MALTA

Draft National Energy and Climate Plan 2021-2030

September 2023

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1.1. EXECUTIVE SUMMARY

i. Political, economic, environmental, and social context of the plan.

This update to Malta's National Energy Climate Plan (NECP) is being provided within the context of various actions and initiatives undertaken at a national level in the lead-up to the provision of the final NECP update due in June 2024. Since 2019, the Maltese Government has issued various policies and measures in relation to energy and climate policies, particularly since the Maltese Government is committed to the EU collective target of achieving a climate neutral continent by 2050.

From a national perspective, despite being one of the lowest emitters per capita, the Maltese Government is committed to do its part, carry out efforts, and provide the necessary support to transition to a low-carbon economy. The Maltese Government adopted the Low Carbon Development Strategy (LCDS) which identifies pathways, based on a marginal abatement cost curve, to move towards climate neutrality by 2050.

The global events that have occurred since the adoption of the NECP 2019 and the LCDS have changed the socio-economic context within which these two documents were developed. The COVID period, followed closely by the EU energy crisis, altered the macroeconomic scenario and have also led to the re-organisation of policies and measures.

Malta is expected to experience GDP and population growth, with the latter expected to exceed 600,000[1] by 2030. Given that such parameters impinge on the generation of total greenhouse emissions and energy consumption, updating the baseline with such parameters is paramount for effective energy and climate policies and measures.

At the same time, other key policy areas, such as transport, are in the process of being updated in the form of a Transport Master Plan which is key for feeder within the development of policies and measures relating to emissions reductions as well as energy savings for the relative sector.

There were key developments at EU level in terms of the adoption of the Green Deal and the Fit-for-55 package of legislations, as well as various energy emergency packages that are being taken into consideration in this update.

[1] https://ec.europa.eu/eurostat/databrowser/view/TPS00002/default/table?lang=en

In response to the need to strengthen capacities to monitor the nation-wide global interlinked developments, the Government has committed to create a Climate Action Authority in efforts to fulfil these responsibilities.

Malta, along with other EU Member States, experienced a surge in energy prices reaching record highs in the second half of 2021. The COVID-19 pandemic and its impact on the global supply chain, coupled with the Russian aggression in Ukraine, worsened the situation.

Several EU nations faced disruptions in gas supplies from Russia, leading to a significant drop in the share of Russian gas imports to the EU, from about 40% before the crisis to around 9%. This has created a strong impetus to accelerate the implementation of the European Green Deal and reinforce the resilience of the Energy Union by speeding up the clean energy transition.

Owing to its energy system's characteristics and geographical isolation, Malta faces limitations with regard to fully contributing to the goals of the regulation as well as to extending support to other Member States in emergencies. Malta's usage of natural gas is confined to its essential gas-fired power plants, that rely on Liquefied Natural Gas (LNG) imports delivered via sea vessels and stored in a floating storage unit (FSU) situated adjacent to an existing power plant in Delimara. The LNG is processed at a re-gasification facility nearby. Since there are no gas distribution networks or other end-users of natural gas in Malta, and the country lacks connections to the trans-European Gas network or any third country network, it is unable to contribute significantly to Europe’s gas demand reduction efforts. Recital 15 of Council Regulation (EU) 2022/1369 acknowledges that certain Member States (without direct interconnections to another Member State’s gas interconnected system) cannot release substantial pipeline gas volumes for the benefit of other Member States.

Reducing the critical gas volumes used for electricity production in Malta could heighten the country's reliance on electricity imports through the sub-sea electricity interconnector with Italy - potentially increasing gas demand in Italy. This outcome contradicts the intended effect of the Council Regulation. Nevertheless, Malta remains committed and endeavours to employ existing and new measures to reduce electricity (and by extension natural gas) consumption locally, while ensuring the electricity system's ability to switch to alternative sources like gasoil in the event of an EU alert triggered in accordance with the Gas Demand Reduction Regulation. In a demonstration of solidarity, Malta has made its best efforts in line with Article 3 of the Council Regulation; voluntarily undertaking gas demand reduction measures with a focus on reducing electricity (and consequently natural gas) consumption.

One of the primary concerns for Malta in the current geopolitical landscape, is the impact of high energy prices which is further exacerbated by its geographical isolation, with no domestic energy sources and limited economies of scale.

In recent years, Malta has undergone a significant transformation in its electricity generation methods, shifting away from heavy fuel oil and gasoil towards a cleaner energy mix. The GHG emissions intensity of electricity generation in the existing local power plants has been halved since 2017, compared to previous years. GHG emissions from these plants, in absolute terms, saw a reduction of almost 58% compared to 2012, and a further reduction of almost 47% between 2014 and 2015. Malta has diversified its energy sources for electricity generation, resulting in an energy mix with the following composition: approximately 70% of the annual energy requirement is locally generated, 20% is imported through a 200MW interconnector that connects the Maltese electrical grid to the Italian grid and the remaining 10% is generated by renewables, predominantly photovoltaic systems (PVs).

Recognizing that natural gas serves as a transition fuel, Malta has now turned its attention to further deploying renewable energy sources, including offshore renewable generation, to foster its energy security. Additionally, being an island, Malta seeks to create further pathways for interconnections on both shores of the Mediterranean, with a planned additional electricity interconnector with Sicily, Italy, as well further potential regional cooperation with neighbouring Mediterranean countries.

Strategy relating to the five dimensions of the Energy Union

Malta's strategy under the Decarbonisation dimension strives to promote the transition to a low carbon economy, primarily by upholding national greenhouse gas (GHG) emissions reduction commitments (the Paris Agreement, and the European Green Deal in particular the FF55 package). This transition will primarily take the form of deploying all viable indigenous renewable energy sources and strengthening efforts towards sustainable and active mobility. This includes widespread vehicle electrification through the existing grant scheme, expanding the network of EV charging points, investing in active mobility infrastructure and instances of Government leading by example through electrification of Government fleet and of public transport buses.

In the area of renewable energy, Malta will continue its efforts to increase its renewable energy share through grant schemes and feed-in tariffs for small-scale Photovoltaics (PVs) as well as for larger renewable projects. Further efforts can help ensure further local RES uptake, including accelerated timelines for application processes and permits for renewable energy projects. Legislations that streamline renewable energy permitting procedures on greenhouses and other suitable spaces (such as parking spaces) are also being explored and planned, as are legislations on solar panel installation on buildings that reach maximum allowed heights. Moreover, Malta is currently exploring the possibility of establishing offshore renewable energy farms (wind and/or solar) within the maritime EEZ area.

Temperate climatic conditions and lack of energy-intensive industries mean that Malta has the second lowest final energy consumption per capita across all EU Member States. Nevertheless, the specific characteristics of Malta's energy system and market - due to the small scale, the

existence of a single electricity distributor, the absence of natural gas and district heating and cooling networks, and the small size and number of suppliers and market players - limit the range of measures available to meet energy saving obligations. However, a number of measures - dealing primarily with the increased energy efficiency of buildings - are being implemented. Government grants, subsidies, and guidelines will be established to facilitate Nearly Zero Energy Buildings (NZEB), deep renovations and appliance/equipment replacement for more efficient instrumentation.

Malta's strategy under the Energy Security dimension will continue to emphasize the Government's commitment to achieve greater security of supply through the diversification of energy sources and suppliers, and reduce energy import dependency primarily through the deployment of indigenous RES. This dimension has become ever more prominent in the context of the conflict in Ukraine, as the EU strives to end dependency on Russian fossil fuels (RePowerEU). In addition to the previously mentioned efforts towards RES adoption, there are also plans for local extraction of energy from biogas from waste.

Malta's high-level objectives in the area of energy security as set out in the NECP can be summarized into the following:

- Continued diversification towards cleaner energy sources and suppliers.
- Increasing the flexibility of the national energy system, including the roll-out of cost-effective, innovative solutions such as energy storage.
- Installing utility-scale battery storage systems.
- Periodic contingency planning in the case of supply disruption for the electricity, gas and oil sectors as well as energy system preparedness.
- Ensuring affordable energy prices for consumers.
- Ensuring electricity system adequacy.
- Opting for technologies that reduce dependency on other countries.
- Energy security in the context of the long-term objective of decarbonisation of the energy system as an over-arching principle.

National objectives related to the diversification of energy sources and supply from third countries can be summarized into the following categories:

1) Continue to ensure capability to source LNG from diverse international sources [in the short-to-medium term].
2) Pursue options to enable sourcing and delivery of sustainable fuels.
3) Complete the second electricity interconnector with Italy.
4) Explore the possibility of interconnections with neighbouring third countries.

The ultimate goal of reducing GHG emissions and implementing adaptation measures is to benefit society as a whole. However, it is recognised that different stakeholders will be affected to varying degrees and at different times. Due to Malta's inherent challenges in terms of the size of our domestic market; technology development and adaptability are already limited. This results in financial constraints in terms of implementing the policies and measures required to achieve our climate goals. This is further compounded when one takes into consideration

overall financial constraints within the central Government budgets in a post-COVID era, and the conflict in Ukraine. Certain measures may impact markets for goods and services, the labour market, and how they operate. These measures could result in additional financial and administrative burdens for both the private and public sectors, as well as potential effects on the trade sector. Furthermore, they will also have an impact on individuals and various social aspects of the country. Hence, Malta fully supports the EU's call for a fair and just transition. Steps need to be taken to maximize benefits while minimizing negative impacts. The Government will continue to provide support to areas, groups, and individuals facing socio-economic challenges to ensure a fair transition to a carbon-neutral economy leaving no one behind.

Malta intends to maximise support towards these aims and objectives through the Cohesion Policy funding instruments. In total Malta is benefetting from €817 million in Cohesion Policy funding from 2021 to 2027 as outlined in its Partnership Agreement with the European Commission. Out of this amount, circa €417 million from the European Regional and Development Fund (ERDF) and the Cohesion Fund will be allocated to help small and medium businesses become more innovative, digital, and competitive, fostering a smarter and low-carbon economy. A significant portion of these funds will be invested in improving energy efficiency and energy storage capacity in the country, including the development of a second electricity interconnector with Italy. This will improve electricity supply, security, and contribute to reducing GHG emissions. Moreover, the Common Agricultural Policy Strategic Plan for Malta includes climate change mitigation as one of its priority areas and identifies key initiatives to pursue with the aim of decarbonising the agricultural sector. (These initiatives are co-financed under the EAFRD programme.)

Young people and women will have improved employment opportunities thanks to over €124.4 million from the European Social Fund Plus (ESF+). This funding will also support innovative teaching methods, inclusive education for vulnerable groups such as children with disabilities, and education in the fields of green and digital transitions.

Moreover, Malta is committed to promoting active inclusion, equal opportunities, and non-discrimination for disadvantaged groups, including people with disabilities.

As part of its objective to contribute to a more social and inclusive Europe, Malta has laid out its strategy and investment priorities to enhance the role of culture and sustainable tourism in economic development, social inclusion, and social innovation. The country has published a Tourism Strategy (2021-2030) focusing on recovering, rethinking, and revitalizing its tourism sector. Grants will be provided to preserve cultural assets in the public domain, support regeneration efforts, and promote Malta's cultural heritage. These investments align with the EU's policy objective of promoting culture and sustainable tourism within the context of social inclusion.

To enable regions and individuals to address the social, employment, economic, and environmental impacts of transitioning towards the European Union's 2030 targets for energy and climate, as well as a climate-neutral economy by 2050, (based on the Paris Agreement) the Government is committed to supporting the maritime sector and ensure its transition to more sustainable practices. This will be achieved by providing onshore power supply (OPS) infrastructure powered by electricity at the Grand Harbour and Freeport, the two Core Ten-T ports, thus shifting away from the dependency on heavy fuel oils while vessels are moored in these ports. The investments made by the Just Transition Fund (JTF) in OPS for the Southern region of the Grand Harbour will complement the existing *"Grand Harbour Clean Air Project"* initiated in 2020 under the Connecting Europe Facility (CEF). This transition is particularly important due to the ports' proximity to densely populated residential and business areas. The investment in OPS infrastructure will facilitate sustainable maritime operations, improve environmental conditions, and protect the public health of local residents in the surrounding areas. An allocation of €23.3 million has been approved from the JTF for this purpose.

As outlined in Malta's RePowerEU chapter in its Recovery Resilience Plan; to further increase local energy security, enhancement of Malta's electrical distribution network facilities is ongoing through investments in the extension of the grid, distribution services, and battery storage. Moreover, as envisaged under the ERDF operational programme 2021-2027, tendering procedures are underway to construct and commission a new distributing feeder, linking to a second interconnector with Sicily (Italy).

Policies and measures under the internal energy market and energy security dimensions also focus on ensuring that vulnerable and energy-poor consumers are duly protected. These measures are outlined in sections 2 and 3.

Malta will continue in its efforts to boost research, innovation and competitiveness. A national strategy driven by the smart specialization process has been established through the launch of "*Malta's Smart Specialisation Strategy 2021–2027*[2]*",* wherein the sustainable use of resources for climate change mitigation and adaptation have been prioritized as a niche area of focus. At its centre, the strategy prioritizes the exploitation of indigenous sources of renewable energy to diversify the island's energy mix with green energy. This is done to improve grid reliability, reduce dependence on international energy sources, and increase the local share of green jobs and skills in innovative areas of growth. The salient points are infrastructural investment in laboratories and equipment, training of personnel, and establishment of mechanisms to facilitate joint projects between the private and public sector.

In order to foster research and innovation specifically in the area of energy and low-carbon technologies, a sector-specific strategy for R&I in energy (and water) was also launched under

2 https://mcst.gov.mt/wp-content/uploads/2022/01/RIS3-Strategy-2020-2027.pdf

the *"National Strategy for Research and Innovation in Energy and Water (2021–2030)"*[3]. This targeted investment is expected to impart a number of benefits, namely by encouraging the use of EU, national, and private funds (especially those under the RDP), for the adoption of innovative technologies. Joint endeavours to assist RDI initiatives that focus on climate change adaptation measures will also be facilitated.

Malta recognizes the role its energy systems will play to meet decarbonization goals. The specific characteristics of the local energy system, such as its small scale and its lack of natural gas and district heating networks, significantly limit the range of measures available for exploration. Nevertheless, the country is striving to implement a holistic approach towards achieving a higher rate of coupling between its energy sector and other sectors and industries, including the transport sector.

In addition, sector-coupling and systems integration potential are being explored between the energy and waste sectors as the Government is implementing an upgrade of its waste management infrastructure which includes an organic processing plant (this will also generate renewable electricity and heat), pre-sorting waste facilities, skip management facilities as well as a waste-to-energy facility that will reduce overall emissions as waste is diverted away from landfill and it will also generate energy.

Country Specific Recommendations

The primary country-specific recommendations for 2023 that are relevant to both energy and climate policies are the following:

(a) Reduce reliance on fossil fuels by accelerating the deployment of renewables, including offshore wind and solar energy, and upgrading and expanding the capacity of the electricity grid system. This also includes transmission, distribution, and battery storage.
(b) Reduce energy demand through improved energy efficiency, particularly in residential buildings.
(c) Reduce emissions from road transport by addressing traffic congestion through improved service quality in public transport, intelligent transport systems and investing in 'soft mobility' infrastructure.
(d) Step up policy efforts aimed at the provision and acquisition of the skills needed for the green transition.

The following aspects have been taken into consideration in the draft NECP update to address such recommendation:

- Investment in Malta's energy supply to continue diversifying and decarbonising energy sources.

3 https://www.energywateragency.gov.mt/wp-content/uploads/2020/07/National-Strategy-for-Research-and-Innovation-in-Energy-and-Water-2021-2030-EWA-web.pdf

- Continued support to the take-up of renewable energy sources, with support from Government own investments (RES and battery storage), and co-funding with households and businesses/ commercial investors.
- Sustaining the economy throughout the energy crisis, to ensure continued affordability and household/ business consumption, and hence economic growth. Contraction would reduce the possibility to continue investing in the green transition.
- Supporting businesses and households in building renovations/ retrofitting, as well as Government undertaking similar projects on its own buildings.
- Significant investment in transport; from infrastructure, to public transport, modal shift, EV grants and increased efficiency of the current network, to feasibility studies on hydrogen use in transport.

ii. Overview table with key objectives, policies and measures of the plan

Dimension	**Objectives & Targets**	**Key Policies & Measures**
Decarbonisation - GHG Emissions & Removals	Contributing to the EU's collective climate goal of reducing EU emissions (Fit-for-55 and European Green Deal) of at least 55% by 2030 compared to 1990 levels.	Pursue the commitment of clean energy generation with a focus on offshore Renewable sources. As a result, this enables Malta to further decrease its reliance on Fossil Fuels.
		Works on a new electricity interconnector are underway.
		Pursue policies and measures under the dimensions of renewable energy and energy efficiency.
		Development of a National Transport Master Plan 2030.
	National target of GHG emissions reduction of -19% under the Effort Sharing Regulation (ESR)	The installation of an extended network of EV charging points to match our ambitions and promote a higher uptake of EVs.
		Promote electrification of vehicle fleet, aiming to achieve equivalence savings and emissions reduction of 65,000 electric vehicles by 2030.
		Promote active mobility through incentives and safer transport infrastructure.
	Fulfilling obligations of the Paris Agreement.	Provision of a national free public transport system.
		Electrification of Public Transport Vehicles.
		Government's commitment to lead by example and transition towards greener mobility.
	Zero CO_2 emissions for new passenger cars and light commercial vehicles by 2035.	Preparedness for the ICE cut-off date for the importation of internal combustion engines.
		Implementing waste prevention measures in line with Malta's Waste Management Plan 2021-2030.
		Investment in major waste processing infrastructure including a pre-sorting facility, organic processing plant and waste to energy plant to divert waste away from the landfill.

Decarbonisation - Renewable Energy	Increase ambition beyond the set national renewable energy target of 11.5%	Development of an offshore renewable energy policy that will provide the necessary framework for the deployment of renewable technologies within Malta's EEZ.
		Pursue the ambition of energy generation from offshore Renewable sources.
	Contribute towards the EU 2030 target of 45% renewable share in the union's energy mix.	Intention to invest, reform and adopt legislative proposals to facilitate the deployment of renewables, onshore and offshore in line with the RePower chapter of Malta's RRP.
		Continued uptake of roof based solar PVs installations through sustained financial support incentives including Feed-in-Tariffs & Grants.
		Continued support of solar water heaters (SWHs), Air to Water Heat Pumps and other renewable heating technologies.
	Non-binding agreements to cooperate on goals for offshore renewable generation to be deployed within each sea basin.	Introduction of National Policy for the Deployment of Offshore Renewable Energy.
		Introduce legislative instruments to oblige the installation of Solar Panels on New Buildings reaching maximum height limitations.
		Fuel Supplier Obligation of Biofuel blending.
Energy Efficiency	Contribute to the EU energy efficiency target which translates into a Final Energy consumption of 763Mtoe in 2030	Promote electrification of vehicle fleet, aiming to achieve equivalence savings and emissions reduction of 65,000 electric vehicles by 2030.
		Promote further active mobility measures by 2030.
	Cumulative end-use savings in line with Article 8 of the recast Energy Efficiency directive.	Government's commitment to lead by example and transition towards greener mobility
		Keep on Supporting enterprises to invest in energy efficient investments through various incentives and schemes including the setting up of a Carbon Credit Platform.
	Obligation to renovate buildings owned by public bodies in line with the Energy and Efficiency Directive (EED).	Sustained Energy Efficiency measures and retrofitting to achieve Nearly Zero Energy Building (NZEB) and ZEB levels.
		For new buildings, Government will pursue the implementation of improved Energy Efficiency standards to drive up energy performance in buildings through the adoption of new building codes and guidelines coupled with supporting measures.

Energy Security	Continued diversification towards cleaner energy sources and suppliers	Commissioning of a new (second) interconnector by 2026.
	Ensure security of supply	Significant accelerated investment in the Electricity distribution network to enhance the security and reliability of electricity infrastructure at all voltage levels.
	Ensure affordable energy prices for consumers	Investment in two utility scale battery storage systems at Delimara and Marsa for the storage of energy generated, including from renewable resources.
	Opting for technologies which reduce dependency on other countries	Resume incentives for renewable energy generation and storage on land, while pursuing the ambition of energy generation from the deployment of offshore renewable energy.
	Energy security in the context of the long-term objective of decarbonisation of the energy system as an over-arching principle	Increasing the flexibility of the national energy system, including the roll-out of cost-effective, innovative solutions such as energy storage;
Internal Energy Market	Increase Interconnectivity with EU internal energy market.	Continue to explore additional connections with the EU including the hydrogen ready gas pipeline project.
		Commissioning of a new (second) interconnector by 2026.
		Vulnerability assessments will be carried out to identify where the greatest efforts should be made in terms of adaptation.
		Follow up on the commitment taken between the MED9 countries to enhance regional interconnections with mainland Europe.
Research & Innovation Competitiveness	Initiatives aligned with Malta's smart specialisation 2021-2027.	Joint initiatives to assist RDI initiatives focused on climate change adaptation measures as guided by the Smart Specialisation 2021-2027.
		Update of the national R&I strategy for 2023-2027.
	Adoption of Malta's updated R&I strategy.	Implementation of the national R&I Strategy in Energy and Water.
		Establishment of Platform RINEW (Research and Innovation in Energy and Water) to aid the streamlining and effective allocation of available resources for research and innovation.

1.2. OVERVIEW OF CURRENT POLICY SITUATION

I. National and Union energy system and policy context of the national plan

Since the submission of Malta's first NECP in 2019 there has been an increased urgency to act on climate change mitigation and adaptation to successfully move to a decarbonised economy by mid-century. The EU has raised its collective ambitions for greenhouse gas emission reductions and enhancement of removals, as part of the EU Green Deal for Europe's economy and society, to become climate-neutral by 2050. This objective, as well as the intermediate aim of reducing net GHG emissions by at least 55% by 2030 compared to 1990 levels were written into EU law in 2021.

Furthermore, several crucial energy and climate strategies have been adopted at Union level, related to energy system integration, hydrogen, offshore renewable, solar renewable energy, digitalisation of energy systems or climate adaptation. Based on the geopolitical tensions caused by Russia's aggression against Ukraine, measures to reduce the EU's energy dependence on Russian fossil fuels were brought forward as part of the EU's REPowerEU plan. These aim to accelerate sustainable energy sources such as biomethane, renewable hydrogen, solar PVs or offshore wind and further support the diversification of energy supplies.

On a national level, to aid this important transition to a low-carbon economy, Malta has developed its own pathway towards 2050 looking into climate change mitigation and adaptation aspects as well as sketching out a suite of measures that will help set the country on track to deliver on its ambitions. Malta's Low Carbon Development Strategy (LCDS), which was published in October 2021, looks at various GHG abatement measures across sectors of the economy. These measures take into account inherent limitations such as spatial constraints which massively limit the potential of LULUCF/afforestation or onshore renewables.

Transport energy use in particular has been a major focus area and currently major national strategies are being updated or put into place such as the Transport Master Plan, the National Transport Strategy and the establishment and implementation of Sustainable Urban Mobility and Logistics plans for all regions of Malta. The transport sector is a key contributor towards achieving 2030 climate targets. Indeed, transport measures such as modal shifts to more active modes of transport, electrification of transport and the extension of the free public transport scheme on a national level are high priority measures within Malta's Low Carbon Development Strategy. With regard to transport energy use, the Government has been continuing its efforts to incentivise the shift to electromobility and other forms of low/zero-emission mobility by offering purchase grants or waivers on vehicle licence fees and circulation taxes.

Buildings and constructions in their wider form represent a crucial sector in terms of energy use. As a result, making the building stock more efficient will be a key driver in the transition to net zero by 2050 and to improve energy efficiency. The Malta Long-Term Renovation Strategy (LTRS), adopted in 2021 is a key planning document that sets out how the Maltese Government aims to tackle this challenge

particularly through measures and incentives to increase energy efficiency in new and existing buildings.

For the first time, Malta is also striving to develop a long-term strategy for the environment towards 2050, a first draft was published in September 2022. This strategy naturally has many overlaps and complements the energy and climate objectives of the EU Green Deal, as it takes into account climate mitigation and adaptation measures including nature-based solutions.

Malta's energy policy is being guided by several core principles, which aim to strike a balance between societal needs (e.g. to ensure a just transition by means of energy security and affordability), economic as well as geographic realities (spatial constraints, technology taker, unfavourable margins of scale, import dependency and peripheral location/island state) whilst at the same time trying to build momentum and deliver on Malta's climate ambition.

The underlying objectives guiding Malta's energy policy decisions include:

- Reducing Malta's dependence on the importation of fossil fuels. Whilst recognizing that natural gas is a transitional alternative fuel to other fossil fuels, in the longer-term, Malta envisages further reduction of importation of fossil fuels through the achievement of a diversified energy scenario.
- Increased focus on renewables in the energy mix based on local production on land and offshore as well as potential imports, including stimulating investment in renewable energy sources through the provision of appropriate incentives.
- Reducing the carbon footprint and greenhouse gas emissions of Malta through improved efficiency in generation capacity.
- Enhancing and strengthening the security of supply of the country whilst ensuring the availability of appropriate back-up capacity.
- Achieving a higher degree of connectivity for energy supply from third countries within the Mediterranean to mainland Europe based on potential electricity interconnectors as well as hydrogen-ready natural gas pipelines.
- Reduce the impact of transport energy demand on GHG emissions by incentivising the shift to active and cleaner modes of transport as well as increased intramodality.

Malta has been making progress towards achieving these objectives and is further updating its national policies to streamline its ambitions.

The successful switch of the electricity generation capacity from heavy fuel oil to natural gas based on high efficiency combined cycle gas turbine (CCGT) power plant, and the establishment of an LNG FSU facility with onshore regasification have been crucial steps in Malta's energy transition. To further diversify supply options for the power plant, a potential hydrogen-ready natural gas pipeline, further connecting Malta to the TEN-E/European gas grid via Sicily (Italy) is being planned. The option to either blend hydrogen into natural gas or switch to 100% hydrogen will future-proof the investment, avoid

stranded assets and enable its contribution to the long-term decarbonisation objectives of the country. Furthermore, work is ongoing on a second electricity interconnector to strengthen Malta's capacity as enabler of large-scale development of renewable projects and to address intermittency issues.

The Government is continuing its efforts to support the deployment of renewable energy, especially photovoltaics, solar water heaters and heat pump water heaters (these are particularly well suited to Malta's geographic location).

Despite technical, geographical and spatial barriers limiting renewable energy potential, Malta supports the exploration of viable indigenous sources of renewable energy and is seriously assessing the potential to explore further offshore wind energy and its feasibility by 2030 and beyond. This supports efforts to achieve 400MW of offshore renewable generation capacity by 2050 (pursuant to article 14(1) of the TEN-E Regulation (EU) 2022/869). In May 2022, the Maltese Government issued a Preliminary Market Consultation (PMC) to explore the potential of economic activities related to offshore renewables generation such as solar, wind and production and storage of renewable hydrogen within Malta's Exclusive Economic Zone. The outcome of this consultation and the submission of interested economic operators will feed into Malta's strategic priorities in these areas as they will also help to support the objectives of several Fit for55 initiatives as well as aligning with the RePowerEU.

Malta, as signatory to the Paris Agreement, is committed to the EU's raised ambition to contribute towards the Union's collective target of becoming climate-neutral by 2050. This will be aligned with the collective target to achieve a 55% reduction of the EU's GHG emissions by 2030 compared to 1990 levels. This will also set the country on track to a successful twin transition ensuring no one is left behind.

Within its RePowerEU chapter of the RRP, Malta has included investments aimed at ensuring energy security and the shift towards cleaner energy sources. These include the strengthening of the grid to address internal electricity distribution bottlenecks and to enable further integration of renewable energy by ensuring an adequate grid infrastructure coupled with the installation of a large-scale battery storage system.

II. Current energy and climate policies and measures relating to the five dimensions of the Energy Union

Being a mainstream policy matter, there are various policies that directly or indirectly relate to the five dimensions of the Energy Union as outlined below:

Low Carbon Development Strategy 2050[4]

The Low Carbon Development Strategy 2050 is Malta's Long-Term Strategy as mandated through the Paris Agreement. The strategy identifies pathways for Malta to reduce greenhouse gas emissions from various sectors to move towards climate neutrality by 2050. Based on the compilation of a marginal

[4] https://unfccc.int/documents/311041

abatement cost curve, the most cost-effective measures taking into account Malta's circumstances have been determined in order to achieve the 2030 climate targets and beyond. The strategy is one of the foundations for the update of NECP.

Long-Term Renovation Strategy 2050

The LTRS relates to Malta's obligation to seek the renovation of Malta's building stock with a view of enhancing energy performance, use of renewable energy and reduction of related emissions achieving the decarbonisation of building stock by 2050. This strategy includes actions to strengthen Malta's efforts for Clean Energy in the buildings sector. The design of the LTRS took into consideration the climatic conditions of Malta, the characteristics of our buildings (which are not particularly well insulated), as well as the practices of the local population, which tend to lead to lower energy use when compared to dwellings in other EU countries. The strategy puts forward possible solutions aimed at achieving the long-term goal of reducing GHG emissions by 90-95% by 2050 in buildings.

There are also other overarching strategies that enshrine principles of climate neutrality including the sustainable development strategy and the national strategy for the environment:

Sustainable Development Strategy 2050

The Sustainable Development Strategy converts Malta's 2050 Sustainable Development Vision into a strategic course of action for safeguarding the environment and promoting socio-economic growth within the Maltese Islands. It aligns with the guidelines established by the 2030 Agenda for Sustainable Development and aims to catalyse and integrate initiatives throughout all Governmental processes, guaranteeing the attainment of United Nations objectives and the vision in the most coherent and optimal way achievable. It outlines key strategic objectives that provide a blueprint for successfully realizing the Strategy's goal by the year 2050:

Strategic goal 1 – transitioning towards a climate neutral green and blue economy

Strategic goal 2 – working towards the preservation of sustainable urban development

Strategic goal 3 – ensuring healthy lives and wellbeing for all

Strategic goal 4 – accelerating digital transformation, smart mobility and connectivity

Strategic goal 5 – achieving social fairness and prosperity for all

National Strategy for the Environment 2050

The National Strategy for the Environment (NSE) translates the Wellbeing First Vision for 2050 into a strategic directive concerning our environment. This is achieved by formulating enduring strategic goals and objectives that delineate the approach. The foundational premise of the NSE acknowledges the symbiotic relationship between society and the environment; their interdependence fosters economic activity, making them indispensable to each other's prosperity.
The draft strategy was developed based on eight strategic goals, the NSE encompasses conventional environmental dimensions, augmented by pillars that address critical environmental hurdles confronting our nation. At the same time, it provides a framework for affecting the essential transformations that will underpin an environmental shift spanning a generation. The eight strategic goals pertain to Clean Air, Enhanced Neighbourhoods, Thriving Biodiversity, Zero Waste, Resilient Land Resources, Flourishing Marine Ecosystems, Sustainable Water Resources, and Facilitating Change.

The key policy areas relevant to decarbonisation include transport, waste management and agriculture. The below is a synopsis of relevant thematic policy documents:

The National Transport Strategy and Transport Masterplan

These strategic documents encompass all pertinent modes of transportation (land, public transit, maritime, and aviation) and span across short, medium, and long-term horizons to address Malta's transport needs. The transport masterplan is being updated concurrently with the drafting of the NECP update. The development process involves the compilation of transport modelling to inform policy and provide an integrated transport analysis. Indeed, the updating of this modelling will be further undertaken during the development of the final NECP update.

Waste Management Plan 2021-2030

Malta has adopted a ten-year waste management plan as mandated under the EU's waste framework directive. It aims for Malta's achievement of the waste targets including to divert waste away from landfill. The plan's strategic objectives are to:

- Maximise the resource value in waste through different management options
- Innovate by designing waste prevention initiatives to lower Malta’s per capita generation rate
- Reform the collection system to increase economies of scale, harmonise collection practices and modernise the collection fleet
- Build the necessary waste management facilities to treat recyclable, organic and residual waste to achieve Malta’s targets
- Study the feasibility of an enhanced producer-responsibility framework to complement Malta’s transition to a circular economy and reflect further on the true cost of waste management
- Promote the involvement of the private sector in waste management

Common Agricultural Policy Strategic Plan (2021-2027)

The goal of the Maltese CAP Plan centres on addressing the requirements of the agricultural domain, primarily focused on allocating sufficient resources to fulfill forthcoming needs. These encompass ecological and climate-related goals, equitable income distribution for both farmers and workers, enhancements to rural settings and infrastructure, incorporation of novel technologies and digital advancement, alongside bolstering farm robustness.

This plan will support action in the agricultural sector in favour of climate change. There are opportunities for farms to reduce GHG emissions directly and indirectly from better land management. These include reducing the use of chemical fertilisers, improved housing and management of manure, and improving efficiency of use of organic fertilisers, as well as contributing to climate mitigation through energy efficiency measures.

Moreover, Malta welcomes the continuous support and guidance received from the European Commission in terms of the development and assessment of the NECP, and aims to continuously improve and align it with the increased ambitions as well as economic and social realities of the country.

As outlined in section 3, the final updated NECP will include additional policies and measures in the transport and buildings sector which go over and above those in the NECP 2019 to bridge the gap between Malta's projected emissions profile and its national target of -19% in terms of greenhouse emissions.

Hence Malta will review the NECP and aims to address the potential shortcomings of the NECP and its implementation focusing on improving deliverables across the following areas and sectors:

- Building/Real Estate (monitoring, data availability, energy efficiency measures, EPCs, renovations, increase share of NZEBs)
- Renewables ambition (installed capacity and electricity generation, incentive schemes on solar water & heat pump heaters)
- Mobility/Transport (electrification, modal shift, free public transport, road infrastructure projects, inter-modality, active transport).

Solar Farms Policy

The Solar Farms Policy was published in 2017 to establish a framework supporting the development of solar farms in Malta. This policy sets the definition for solar farms for policy interpretation purposes, while providing guidance for the identification of suitable sites and designs of new solar farms. This policy also lists environmentally relevant specifications and relevant mitigation measures to be integrated in solar farm development.

National Policy for the Deployment of Offshore Renewable Energy

The scope of the Offshore Renewable Energy Policy is to enable the Maltese Government to exploit its offshore renewable energy potential for the country's best interest. This policy develops a framework that promotes investment in research, development and innovation in renewable energy infrastructure, while supporting the implementation of offshore renewable energy projects. This document ultimately seeks to ensure that offshore energy potential contributes to the country's energy security, hence reducing the dependence on imported energy and fossil fuels. The policy is currently undergoing public consultation[5].

R&I Strategy

This strategy seeks to enhance and provide guidance of domestic R&I to address policy priorities and challenges at both EU and national level. This sector-specific policy document aims to enhance research and provide the framework that will centralise R&I support for energy and water research. Investment is driven across multiple sectors and different entities, including research bodies such as universities as well as the private sector, in the fields of energy and water, hence ensuring that the outcomes of these collaborations translate into tangible impacts. Three calls for research projects have already been issued.

[5] https://www.gov.mt/en/publicconsultation/Pages/2023/NL-0030-2023.aspx

III. Key issues of cross-border relevance

Issues of cross-border relevance for Malta have to be viewed within the context of an island with no land borders and with effectively one neighbouring Member State. This has direct implications on Malta's energy system which are reflected in this plan, in particular under the Energy Security and Internal Energy Market dimensions.

Issues of cross-border relevance relate primarily to commercial contracts relevant to importation of electricity via the electricity interconnector(s) and LNG for fuelling of the power station.

The Government is committed to commission a second interconnector with Italy by the end of 2026. Moreover, a possible hydrogen-ready gas pipeline interconnection between Malta and Gela (Sicily, Italy) is still being considered and discussions are underway.

The planned second interconnector is an additional measure to strengthen regional cooperation aiming to support diversification of supply, prevent supply disruptions (enhanced resilience) and increase preparedness.

Cross-border cooperation in areas falling under the other dimensions, such as joint projects in renewables in particular offshore, cooperation and sharing of best-practices on measures targeting energy efficiency and possible joint projects in the area of research & innovation in low-carbon technologies are also being considered.

With regard to more international cooperation, the 5+5 Dialogue serves as a sub-regional forum for the ten Western Mediterranean countries, five from the north of the Mediterranean (Spain, France, Italy, Malta and Portugal) and five from the southern shore (Algeria, Libya, Morocco, Mauritania and Tunisia).

Furthermore, Malta has spearheaded the MED9 EU Ministerial meetings. During this meeting the EU Mediterranean energy ministers including Croatia, Cyprus, France, Greece, Italy, Portugal, Slovenia and Spain and Malta agreed on a very important joint statement. During the first meeting in May 2023, the nine countries signed a joint declaration launching the vision for the Mediterranean Region as a Hub of Green Energy, to accelerate the EU's drive for a decarbonised, energy-independent future. The MED9 countries agreed that the Mediterranean can become a center of renewable energy investments, with a focus on offshore renewables as well as interconnections between EU and non-EU Mediterranean countries, to facilitate European investment in green energy. Ensuring implementation in this regard will be an ongoing commitment.

As an island Member State at the periphery of the EU and beyond the MED9 mindset, Malta is also exploring possibilities with non-EU Med countries for regional cooperation. One specific action is the MoU signed between Malta and Libya to explore the possibility of interconnection between the two countries to supply electricity generated through renewable energy. More similar collaborations are being considered to continue enhancing the collaboration between Mediterranean countries as well as improved interconnections between continents.

IV. Administrative structure of implementing national energy and climate policies

An inter-ministerial committee (IMC) has been set up including high level policy development and implementation officials together with key experts from the main thematic areas relevant to energy and climate, ie, transport, buildings (including planning and construction), finance, economy and EU

funds. This forum is the platform for coordination of policies and measures consolidated within the plan as well as for monitoring their implementation.

1.3. CONSULTATIONS AND INVOLVEMENT OF NATIONAL AND UNION ENTITIES AND THEIR OUTCOME

The involvement of local authorities, social partners, civil society organisation, the business community, industry and other stakeholders as well as the general public are considered key processes under the Regulation on the Governance of the Energy Union. The importance of providing stakeholders with a platform to discuss different options for future national energy and climate policies is rooted in Article 11 of the Governance Regulation. Article 10 of the Regulation also stipulates that Member States ensure that the public is given early and effective opportunity to participate in the preparation of the plans. Malta intends to fulfill this provision through a public consultation launching in the period between the submission of this draft and the final NECP plan. This would allow the Maltese authorities to take into consideration comments from the relevant stakeholders in the final update. A summary of the public's views on the draft NECP will also be submitted to the Commission.

Having said this, it is important to emphasize that this update of the NECP will be based on the integration of other key thematic policy areas and strategies including among others the Low Carbon Development Strategy, the Long-Term Renovation Strategy, the Waste Management Plan, the Transport Master Plan, the Air Quality Plan 2023, and the Common Agricultural Policy Strategic Plan. These national plans and strategies have each undergone or will undergo the process of public consultation with all the major stakeholders outlined in this section.

The public consultation process will take place in line with the established national procedure for online public consultations. Through its platform, the Government will encourage the general public, civil society organisations, trade unions, business organizations, political parties, Government institutions and the general public to participate in the process of online public consultation. Malta's online public consultation process is made up of three main stages:

- Open consultation: The public is requested to submit comments within a stipulated timeframe.
- Closed consultation: Consultation is closed, and comments received are filtered through the moderation process.
- Publication of feedback and Outcome report: Feedback and detailed report of the outcome are made available to the public.

Moreover, as outlined in 1.2, the IMC has ensured that all relevant ministries contribute to the development. Furthermore, the Government plans to consult with all the key stakeholders including those outlined on the basis of the draft NECP update.

Malta is well aware of the requirements stipulated in Article 12, paragraph 2 of the Governance Regulation, whereby Member States are required to identify opportunities for regional cooperation and consult neighbouring Member States. Due to Malta's insular geographical position, consultations with other Member States are largely confined to its neighbouring Member States with maritime

borders. Malta plans to fulfil the obligations stemming from Article 12 as deemed necessary on the basis of this draft NECP update.

To comply with Article 10 of the Governance Regulation, (which requires Member States to set reasonable timeframes allowing sufficient time for the public to be informed, to participate and express their views, and to limit the administrative complexity), the outcome of the public consultation process for Malta's NECP will be included as part of the Final NECP submission, including the consultation process that the Government will undertake.

The process with the European Commission is expected to take place after Malta's submission of the draft NECP. Discussions for the preparation and coordination of Member States' Draft NECPs were held within the framework of the Commission's Technical Working Group on NECPs.

1.4. REGIONAL COOPERATION IN PREPARING THE PLAN

I. Elements subject to joint or coordinated planning with other Member States

As explained in Section 1.2 iii above, Malta's insularity limits the potential and the need for joint and coordinated planning with other Member States within the framework for the development of the NECP. Nevertheless, Malta considers regional cooperation a key element of its NECP. Regional cooperation focuses primarily on the dimensions of Energy Security and Renewable Energy deployment. Cooperation on such areas at Government level, in technical and environmental studies as well as accelerated permitting procedures are explained in more detail throughout the relevant sections of the Energy Security dimension and specifically under Section 3.3.ii. Regional cooperation is also considered within the area of contingency planning under the Energy Security dimension. Currently, Malta is heavily reliant on Italy for a significant portion of its electricity (through the interconnector), and thus effective regional cooperation is crucial to ensure Malta's energy security. Malta is also open to future regional cooperation in the area of RES projects which can provide tangible benefits to all parties involved.

II. Explanation of how regional cooperation is considered in the plan

Aspects related to regional cooperation are considered in more detail within each individual dimension under Section 3.

2. NATIONAL OBJECTIVES AND TARGETS

2.1 DIMENSION DECARBONISATION

2.1.1 GHG Emissions and Removals

I. The elements set out in point (a)(1) of Article 4

The EU Emissions Trading System (EU ETS), as applicable to Malta, presently covers the public electricity generation plants (and international intra-EEA flights departing from and arriving at the sole Maltese international airport). The emission reduction effort of all regulated entities under the EU ETS is determined by an EU-wide cap on emissions, which cap is reduced from year to year by a defined reduction trajectory. The extension of the EU ETS to the shipping sector may be expected to cover a significant share of voyages to and from Maltese ports. Meanwhile, the establishment of the separate emissions trading system for buildings, road transport and additional activities (known as ETS-2) will cover fuels released for consumption in road transport, the commercial and institutional, residential sectors, and in manufacturing industries and construction. As a result, the majority of fossil fuel used in Malta will be subject to a carbon price by 2030.

Binding national target for GHG emissions and annual binding national limits pursuant to Effort Sharing Regulation

Malta is committed to the Paris Agreement to address climate issues to their fullest potential and to contribute towards the European Union's increased collective target of 55% reduction of its GHG emissions by 2030 compared to 1990 levels. This EU objective is intended to be met by a wide range of policy actions, collectively forming the Fit-for-55 (FF55) package of legislation. These actions include, the extension of the EU emissions trading system (EU ETS) to new sectors, and the enhancement of Member States' GHG emission reduction targets under the Effort Sharing Regulation (ESR), together with actions focussed on specific sectors and economic activities (e.g. energy; transport; land-use and forestry).

The Effort Sharing Regulation aims to reduce emissions in non-ETS sectors, such as buildings, agriculture, waste, small industry, and transport, with a contribution to the EU effort, of 40% reduction by 2030 compared to 2005 levels. Malta' share of the overall effort is to reduce GHG emissions falling within the scope of the ESR by 19% by 2030, below 2005 emissions levels. The revision of the ESR, forming part of the Fit-for-55 package, recognized the exceptional mitigation limitations and high abatement costs for Malta, by maintaining its ESR target at the pre-FF55 level.

The 2030 target under the ESR reflecting the 19% reduction in emissions versus 2005 levels translates to a maximum emission level of 826.7 kilotonnes CO_2eq in 2030 and this is no small feat when one considers the evolution of the Maltese economy since 2005; a defined trajectory defines limits for the years up to 2030. Parallel policy actions in the LCDS that address, directly or indirectly, electricity

generation also contribute towards reducing the country's ETS footprint – carbon dioxide emissions from indigenous conventional public electricity generation are practically all covered by the EU ETS. Indicative milestones in Malta's LCDS for 2040 and 2050 reflect 60% and 80% reductions over 1990 levels respectively. These will further be discussed in chapter 3 (Policies and Measures).

Since the publication of Malta's initial NECP in 2019, there have been tangible shifts within the local landscape, affected by a variety of social, economic, and industrial factors. A significant shift in population figures (491,586 in 2019 versus 535,064 in 2023) has increased water and energy demand, outflow of waste, and the number of registered road vehicles. At the same time, a variety of new industries are taking off in Malta, while the tourism sector continues to expand, despite recent lulls from the Covid-19 pandemic and the Russian invasion of Ukraine. The ongoing update of Malta's NECP will reflect the projections in line with the most recent macroeconomic projections.

Despite these challenges, Malta remains committed to work towards mitigation action to meet its obligations and comply its expected contribution towards the overall EU objectives, and in accordance with the legal provisions of EU legislation. At the same time, Malta also acknowledges the societal, economic and geophysical realities including our climatic conditions, which lead us to have fewer options for modal shifts to reduce carbon emissions. Sectoral challenges are various, from diseconomies of scale, high abatement costs and generally low mitigation potential (as in the case of the agricultural or LULUCF sector), to more challenging technology and innovation issues (e.g. refrigeration and cooling), to land use conflicts due to the geophysical reality of our islands (e.g. transport/renewables).

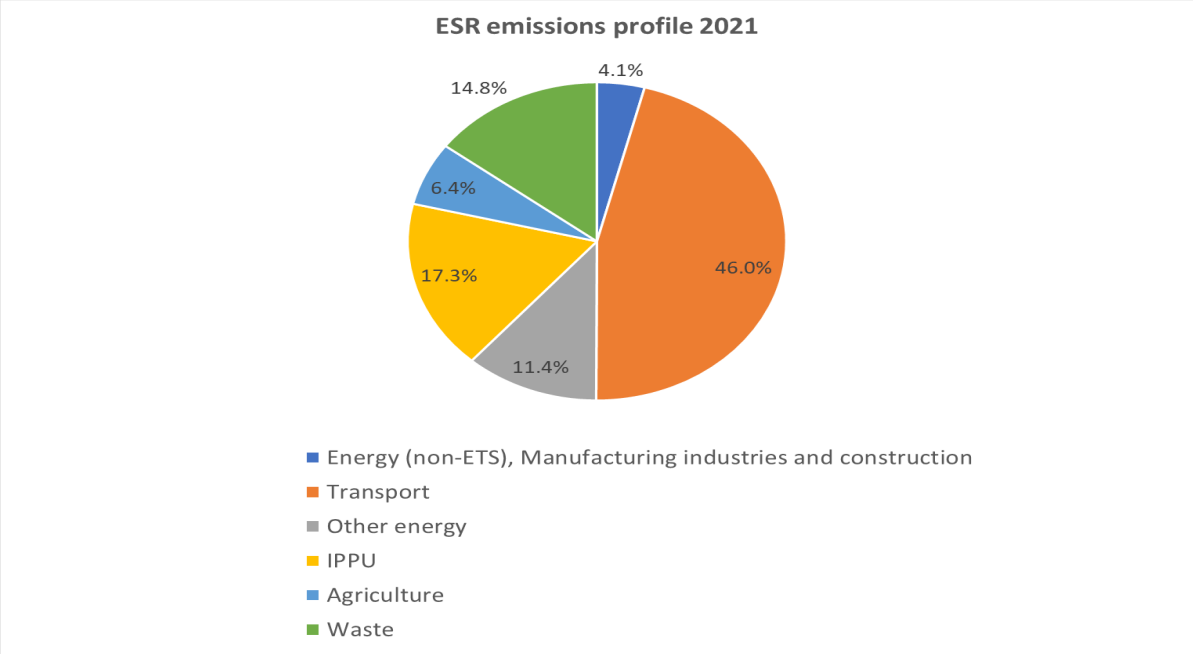

Figure 1 – ESR emissions in 2021 source: Malta's annual GHG emission submission to the UNFCCC; disaggregated based on ESR sectors only

Commitments and national targets for net greenhouse gas removals pursuant to LULUCF regulation 2018/841

The amended Commission Delegated Regulation (EU) 2021/268 of 28th October 2020 and Regulation (EU) 2023/839 of the European Parliament and of the Council of 19th April 2023 (as part of the Ff55) focusing on land use, land use change and forestry requires Malta to ensure that GHG emissions from this sector are offset by at least an equivalent removal of carbon dioxide (CO_2) from the atmosphere, the so-called 'no debit' rule, in the period 2021 to 2025. For the period from 2026–2030, where removals should exceed emissions, Malta needs to comply with the target of 2 kt of CO_2 equivalent reductions by 2030 (Acc. To Art 4(3)). This national effort will contribute to the 2030 Union target for net greenhouse gas removals of 310 million tonnes of CO_2 equivalent. In addition to the 2030 national target, Malta will also comply with a budget/sum of net GHG emissions and removals for the whole period from 2026–2029.

In view of inherent national circumstances including the high population density of the islands and the limited land availability, and to a certain extent the local climatic conditions (such as limited rainfall), the potential for further reduction of CO_2 emissions through carbon sequestration in (new) vegetation is envisaged to remain minimal. The woodland areas of the Maltese Islands total about 200 hectares. These residual woodland areas are now protected by legislation. Data indicates that the potential abatement in this sector is small compared to other sectors. The National Forestry Accounting Plan 2019 reported on Malta's planned levels of afforestation and estimated the likely levels of sequestration achieved by new and existing, still-growing forests. The total sequestration potential of Malta was estimated to be c. 10 ktCO_2 every year, which is a significantly limited contribution in the context of overall national net emissions.

Nevertheless, Malta is channelling significant investment into creating green spaces and ecosystem restoration to bolster and strengthen the islands' ecology as well as improve accessibility to green spaces for Malta's population. In 2023 Malta created a new agency 'Project Green' tasked with the upkeep of national parks and other public spaces. Over a period of 7 years Malta will invest €700 million for the creation, maintenance and invigoration of parks, gardens and other green infrastructure. Although the positive impact on CO_2 sequestration of these afforestation projects, will likely not be counted towards the LULUCF targets due to methodological constraints (such as the applicable definition of forests), it is indisputable that these projects will be contributing to a healthier lifestyle, increasing wellbeing and a more sustainable environment also by means of climate change mitigation and by creating or increasing natural carbon sinks.

II. Where applicable, other national objectives and targets consistent with the Paris Agreement and the existing long-term strategies. Where applicable for the contribution to the overall Union commitment of reducing the GHG emissions, other objectives and targets, including sector targets and adaptation goals, if available

Malta as party to the Paris agreement, and as a contributor to the collective effort of the EU towards the objectives of this Agreement, is committed to the overarching global goal of limiting the increase in the global average temperature to well below 2°C above pre-industrial levels, and pursue efforts to limit the temperature increase of 1.5°C above pre-industrial levels. Furthermore, it strives to achieve a balance between GHG emissions and removals in the second half of this century.

Within its LCDS, which was published in 2021, Malta set out a framework and trajectory as well as policy priorities and mitigation measures that will enable us to achieve a low-carbon economy by 2050.

The LCDS proposes measures related to seven sectors; energy, transport, buildings, industry, waste, water, and agriculture and land -use and land-use change and forestry (LULUCF). Such measures have been analysed, based on the macroeconomic parameters of 2017, using marginal abatement cost curves and social and environmental impact assessments.

Given Malta's size and its geophysical and economical context, the LCDS is quite limited in comparison to other countries, since its characteristics reduce the number of recommended measures that can be used towards the reduction of carbon emissions. Malta's position in the Mediterranean as an island means that it is physically separated from Europe, and thus can only have connections through air or sea transport. Moreover, domestic measures which are linked to other countries emissions from cross border travel are not included within the LCDS.

Malta is also limited in its natural resources and relies heavily on imports where emissions fall with the country of origin. Malta faces a number of diseconomies of scale especially in the technology field, as most technologies require a high-level minimum efficient scale, a scale that is mostly unattainable for Malta. Moreover, limited land availability means that there is a limited amount of woodland being used for natural carbon sequestration and certain mitigation measures such as onshore renewable farms cannot be implemented. Furthermore, Malta's weather means that there is a reduced usage of heating in buildings, and therefore there are lower emission reductions that can be obtained when compared to other countries.

This means that due to its size, location and economic position, Malta remains one of the lowest emitters of GHG per capita and per unit GDP in the EU. Such limitations mean that results of measures suggested for carbon saving will take longer to be seen than other countries. It must be acknowledged that Malta's mitigation effort is just a small contribution to the required global effort. Malta is particularly vulnerable to the impacts of climate change, including by virtue of the same characteristics that limits its mitigation effort. All countries, and even more those in Malta's situation, should adopt adaptive measures to reduce negative climate change impacts, and thus Malta is also presenting adaptation measures aimed at making Malta responsive and resilient to changes brought through CC.

As outlined above, while Malta remains fully committed to its international and national objectives with regard to climate change mitigation, it is apparent that the initial projections, target setting and modelling of the LCDS will be updated in the final NECP update to better reflect the changed economic and societal realities by means of an increased baseline. Potential measures will have to be reviewed and fine-tuned to better capture synergies and thus achieve more targeted and maximised outcomes, thereby enabling higher efficiency of reduction efforts.

Adaptation goals

The Low Carbon Development Strategy includes a section dedicated to climate change adaptation and explores suitable adaptation measures for the Maltese islands.

The frequency and severity of weather extremes is increasing. Since the preparation of the initial NECPs, the importance of climate adaptation has been increasingly recognised globally. In 2021, the Commission published a new EU strategy on adaptation to climate change, which underlined the importance of integrating climate resilience in national fiscal frameworks, and of nature-based solutions. The European Climate Law stresses the importance of sectoral measures being resilient to the potential adverse impacts of climate change.

Two major vulnerability studies on Malta have been completed to date: 'The economic vulnerability and potential for adaptation of the Maltese Islands to climate change' carried out by Briguglio and Cordina in 2003, and the 'Low Carbon Development Strategy internal report based on adaptation carried out in 2019.' These provided qualitative information and contributed to identification of the highest priority sectors for LCDS adaptation measures. These sectors are namely; Water Resources; Infrastructure and Transport; Land Use and Buildings; Natural Ecosystems, Agriculture and Fisheries; Health issues and Civil Protection; Tourism and Cross-sectoral.

Malta is currently undertaking the 'Climate Vulnerability Risk Assessment of the Maltese Economy' (VRA), with the aim of improving the understanding on the degree of vulnerability and risks to which society, the economic sectors, and the natural environment are exposed to, in a more quantitative approach.

In the context of intersection with the NECP's dimensions, the main LCDS measures are as follows:

- Decarbonisation – GHG emissions and removals

The electricity and transport sectors are the primary contributors to greenhouse gas (GHG) emissions in Malta's Inventory Reporting Submissions. The mitigation measures that reduce emissions in these sectors are those which contribute to Active Transport, such as improved walkability, or improvement of aspects of road infrastructure for public transport. Any energy considerations of decarbonisation are also linked to energy security, where non GHG emitting sources of energy (and a diversified energy mix, primarily through offshore floating and onshore renewables, interconnector(s) and hydrogen sources of energy) are safeguarded against the impacts of climate change.

- Energy Efficiency

Energy efficiency can as such be an important tool for climate adaptation because it preserves or extends resources in the face of a more constraining environment and usage patterns. The measures in the adaptation strategy that contribute to it are those below. In general, they look at the main areas of energy consumption (mostly in the form of electricity) and consider aspects of reducing this consumption including through minimising the effects of climate impacts. These are therefore mostly looking at the urban fabric, and its different uses.

- Energy Security

Threats to many different economic sectors overlap with threats to Malta's energy systems and thus energy security. This includes ensuring energy supply (in the form of maritime transport for LNG, and in the form of interconnectors), and the energy network supplying energy within the country. This is related to adapting infrastructure to the impacts of climate change for energy and for maritime transport, primarily in the form of extreme weather events.

- Research, innovation and competitiveness

The most general approach to ensure this is safeguarded in all aspects of adaptation, is through a generic approach of working in partnership with the Malta Council for Science and Technology (MCST), the Government entity tasked with advising Government on science and technology policy which includes administering national funds for R&I. This is also effective because it ensures mainstreaming. Further detail about this dimension is found in section 2.5.

2.1.2 Renewable Energy

Relevant circumstances affecting renewable energy deployment (Article 5(1)(e))

Malta has experienced remarkable growth in population and GDP in recent years. With approximately 542,000 residents in 2022, the country has seen an annual increase of over 10 thousand inhabitants since 2011[6]. Notably, Malta has the highest population density in the EU and ranks fifth globally[7]. It is projected that the population will exceed 600,000 by 2030. The country has also undergone a period of significant economic growth, reaching its peak in 2017. Despite a decrease of 8.3% in 2020, figures for 2021 show that GDP has risen by 9.4%[8]. The economy is expected to continue growing, albeit at a slower pace.

Malta faces various challenges in maximizing its potential for renewable energy. Physical and spatial limitations, technological advancements, and resource potential are the main factors influencing the deployment of renewable energy sources. The availability of resources and the cost of land pose significant barriers to further development in this area. Due to its geology and topology, the production of hydro and geothermal energy is not deemed viable for Malta, as the highest point on the island is only 253 metres above sea level, and there is no significant thermal gradient or any water bodies. Additionally, wave energy production is still in the research stage. The scarcity of fresh water and agricultural land also limits the feasibility of biomass production. Although conventional wind technology is considered largely incompatible with Malta's local context, as already highlighted in the 2019 NECP, recent technological advancements have created new opportunities for offshore renewables, particularly wind.

Solar Photovoltaics (PV)

In Malta's first NECP (2019), solar energy was identified as the predominant and most viable renewable energy resource in Malta to date. Testament to this, are the numerous installations of solar and PV technologies that have significantly contributed to the local uptake of renewables.

By the end of 2022, the cumulative installed PV capacity exceeded 221MW_p[9]. This figure is on a par with both the capacity of the existing interconnector and that of the D4 generating plant at Delimara (however this is operating at a much lower capacity factor). Considering this context, the Maltese Government has pledged to install and commission a second interconnector to assist with grid stability in view of the intermittent nature of PV generation.

Malta's efforts to meet its renewable energy target must also be framed within the context of having to rely on land intensive renewable energy sources such as PV. Figure 2 highlights how the energy consumption per square km is the highest among other EU Member States. This reflects the high population density interlinking with the generation of renewables. It follows that for the same percentage targets, the amount of RES needed to be extracted per unit of area is much higher in the case of Malta's context. This is particularly relevant to land intensive renewables such as PV. Thus, for

[6] National Statistics Office https://nso.gov.mt/world-population-day-11-july-2023/
[7] Eurostat (DEMO_R_D3DENS)
[8] https://nso.gov.mt/gross-domestic-product-2021/
[9] https://nso.gov.mt/renewable-energy-from-photovoltaic-panels-pvs-2022/

example to meet a 10% RES share in Greece, it would require around 0.011 ktoe/km^2/year, whereas the same RES share for Malta would require almost ten times higher; 0.188 ktoe/km^2/year.

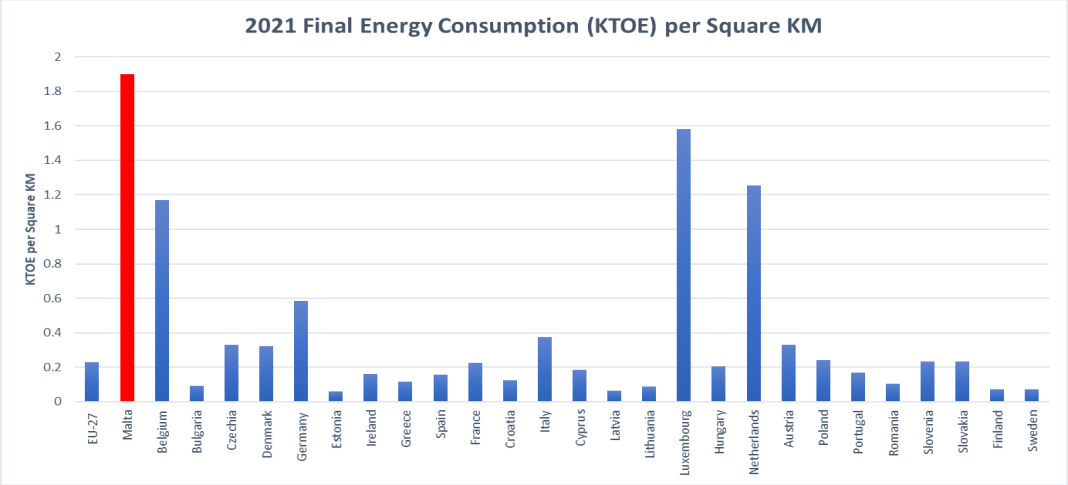

Figure 2 – 2021 Final Energy Consumption per square kilometre (ktoe)

Onshore future PV deployment will largely remain best suited to rooftops within the residential, commercial and industrial sectors, as well as for a limited amount of potential ground-mounted systems. The total area of the Maltese islands (316km^2), coupled with a high population density, largely restricts the availability of green field sites.

The Solar Farms Policy (published in 2017)[8] was designed to take full advantage of brownfield sites such as car parks, disused quarries and landfills. The policy provides guidance for the location of new solar farms and identifies environmentally-relevant specifications that need to be integrated into solar farm development. Furthermore, following the completion of the plan-level Appropriate Assessment and Strategic Environmental Assessment (SEA) procedure in April 2021, proposals for the development of solar farm installations in quarries located within, partly within, or adjacent to Special Areas of Conservation (SACs) and Special Protection Areas (SPAs) will be subject to the requirements of the solar farm policy and they will be assessed in more detail on a case-by case basis[10]. This will be done in accordance with the findings and recommendations of the Appropriate Assessment (AA) and the Strategic Environment Assessment (SEA) that address these locations. Nevertheless, high land costs for such sites, driven by increasing land scarcity, together with significant grid connection costs are impacting the financial viability of solar farms.

In order to address these barriers, Government has identified clusters of potential sites (mainly quarries) that could benefit from a common grid re-enforcement. Funds from the RRP have been set aside for this purpose and through investments in the grid, distribution services and battery storage, the electricity distribution network will be upgraded to facilitate additional integration of renewable energy sources.

The solar farm policy also permits the installation of PV on greenhouses provided that they are not located in sensitive areas and that they are genuinely intended to support agricultural activity. The

[10] https://www.pa.org.mt/file.aspx?f=BF118FF0729BBDC2DEB7A21873465DD7D6C445EFB153498A

Government intends to reform the permitting framework for renewable energy projects, including that for the installation of PVs on greenhouses to shorten the timelines for the application and permit-granting procedures.

In 2018, a high-level assessment of Malta's technical potential for solar PV was conducted by the Energy & Water Agency. In 2021, the Energy and Water Agency initiated a collaborative research project with the University of Malta to more accurately estimate the PV rooftop potential in urban areas. The project proposes a refined methodology and approach for the calculation of the PV potential using refined Geographic Information System (GIS) and Artificial Intelligence (AI) methods and uses the Digital Surface Model captured by the Planning Authority in 2018. Although the project is still ongoing, the results are expected to provide a more accurate update of the rooftop potential as the whole urban landscape is being analysed, and considerations like shadowing effects and the amount of solar irradiance are being considered as part of this research.

Further to the results of this assessment, other aspects, such as the type of dwelling hosting the PV panels are important elements that need to be taken into consideration. Rooftops in Malta accommodate water tanks, TV antennae/aerials, outdoor units of air-conditioning systems, and other building services equipment. Some roof areas are also used for natural drying and airing of clothes and as a place for family leisure. Furthermore, apartments are the most popular choice for new residential developments representing over 85% of the new dwelling approvals issued by the Planning Authority in recent years[11]. This trend is projected to continue over the next decade in view of projected net immigration and population growth. This has a twofold effect: an increase in the depth of shadows cast on neighbouring buildings, and an increase in PV investor uncertainty, wary of possible overshadowing within the useful lifetime of the PV system. In view of these challenges, the Government of Malta has pledged to introduce legislative instruments to enforce the installation of Solar Panels on New Buildings reaching maximum height limitations as per the established local plans.

Wind Energy

With the technological advancements in recent years, wind energy has become globally accepted as one of the most developed, cost effective and well proven renewable energy technologies to meet the ever-increasing demands in a sustainable manner. The EU Commission in fact predicts that wind will amount to half of Europe's electricity by 2050[12].

At the time of the first NECP in 2019, mature conventional technologies, namely onshore turbines and fixed-bottom offshore turbines, were reported to have significant restrictions in the local context, encompassing technical, social and environmental constraints.

For onshore wind, the existing inhibiting factors are still relevant, if not exacerbated due to the limited availability of land for such projects. Onshore installations also present planning constraints such as the potential interference with the safety of airport operations, the significant negative visual impact, proximity to densely inhabited areas, and impacts on protected bird colonies and bats. Similar restrictive statements can be quoted for the possibilities of fixed bottom nearshore wind turbines. The limited coastal and reef locations with depths less than 50m constituting potential areas for the

[11] Planning authority dwelling statistics, available at: https://www.pa.org.mt/file.aspx?f=35409
[12] https://windeurope.org/about-wind/wind-energy-today/

development of fixed bottom wind farms, were, and still are, burdened with significant environmental, social, and economic concerns.

This leaves the option of floating wind generation as the most appropriate technical option for offshore renewable generation in the Maltese Islands. Significant technological advances in offshore wind floating technologies have now opened a possible local alternative for feasible offshore renewable projects located further away from the coast. These floating projects offer several advantages, including reduced environmental impact and potentially minimized interference with various economic activities that rely on the same areas. Larger offshore wind structures capable of improving capacity factors, advance in floating technologies, lower Levelised Cost of Energy (LCOE) for the recent technologies and economies of scale in production, position offshore floating wind as a reasonable option for harnessing renewable energy in Malta.

The Government, as outlined in the Low Carbon Development Strategy (LCDS), is committed to pursuing offshore wind floating opportunities. With this ambition in mind, the Government has published a preliminary market consultation (PMC) process (published in May 2022). The PMC sought proposals of economic activities within Malta's Exclusive Economic Zone (EEZ). The purpose of this PMC was to invite internationally reputable companies to propose economic activities that can be carried out in an EEZ area beyond the territorial waters of Malta so that Government could gauge the interest of investors in Malta's offshore opportunities and learn of the possible activities that companies are willing to invest in. Fifteen of the proposals that were submitted from the private sector target the development of offshore wind farms within Malta's continental shelf[13].

In parallel an ad-hoc offshore renewable energy policy is being developed. The offshore renewable energy policy will provide the necessary framework for the deployment of renewable technologies within Malta's EEZ. This framework will support the implementation and investment in offshore renewable projects, with particular emphasis on floating wind and solar farms.

The Government intends to publish an Expression of Interest for the development of offshore renewable energy within Malta's EEZ. These initiatives show the Government's commitment to harnessing the potential of offshore energy, including wind and solar, and transitioning towards a more sustainable and low-carbon energy future.

Grid Stability Considerations

Malta's renewable energy potential post-2020 faces grid integration challenges due to the intermittency of generation sources like PV and wind as well as the size of the power system. These inherent intermittency issues are particularly relevant in small, peripheral electricity systems like Malta's. These challenges primarily revolve around integrating the intermittent nature of both solar and wind into the electricity system and maintaining a reliable and stable power supply.

In the case of PV systems, these installations will be concentrated within a very limited space (Malta's footprint), and generation is therefore highly susceptible to rapid fluctuations in output due to cloud coverage. Preliminary assessment shows that with 221MW$_p$ of installed capacity (end 2022), cloud cover caused rapid variation in output of up to 65MW in 30 min. These rapid fluctuations already pose a significant risk to grid stability, as at times of high insolation PVs will be covering more than half of Malta's electricity demand (especially on weekends during the shoulder months). Please refer to section 2.4.1 for more information.

[13] Harnessing the wind: clean energy and strategic autonomy (businesstoday.com.mt)

Balancing the variability of large scale solar and wind generation with the demand for electricity requires advanced grid management techniques, energy storage solutions, and a robust transmission infrastructure. Additionally, ensuring grid stability of intermittent RES generation such as from wind turbines and PV may necessitate backup generation or alternative energy sources.

Addressing these issues will be crucial to successfully harnessing the potential of offshore wind and further deployment of solar PV while maintaining a secure and stable energy system. Ensuring system stability will either require significant spinning capacity, utility scale battery storage or flexible balancing services over the electricity interconnector with Sicily. This within the context that with further deployment of solar and wind in both Malta and Sicily, the production profiles of both countries are bound to be similar. This may have implications on the commercial feasibility of future large scale renewable energy projects as well as network congestion.

The Government's commitment to add a second interconnector with Italy, together with investment in utility-scale battery storage, is expected to alleviate, to some extent, the strain on the electricity grid, and thus increase the potential of adding more RES electricity to the Maltese generation mix.

Heating and Cooling

In 2021, 808 GWh of fossil fuels were consumed in Malta for heating and cooling, with the largest contributions coming from LPG and diesel (Figure 3). Half of the LPG share is attributed to households for cooking and spatial heating, with the rest being consumed in the services and industry sectors. Gasoil, fuel oil, and diesel for heating and cooling are almost entirely consumed by the industry and services sectors for process heating. These fuels are typically used as alternatives to LPG in cases where the LPG storage requirements cannot be overcome due to space or safety restrictions.

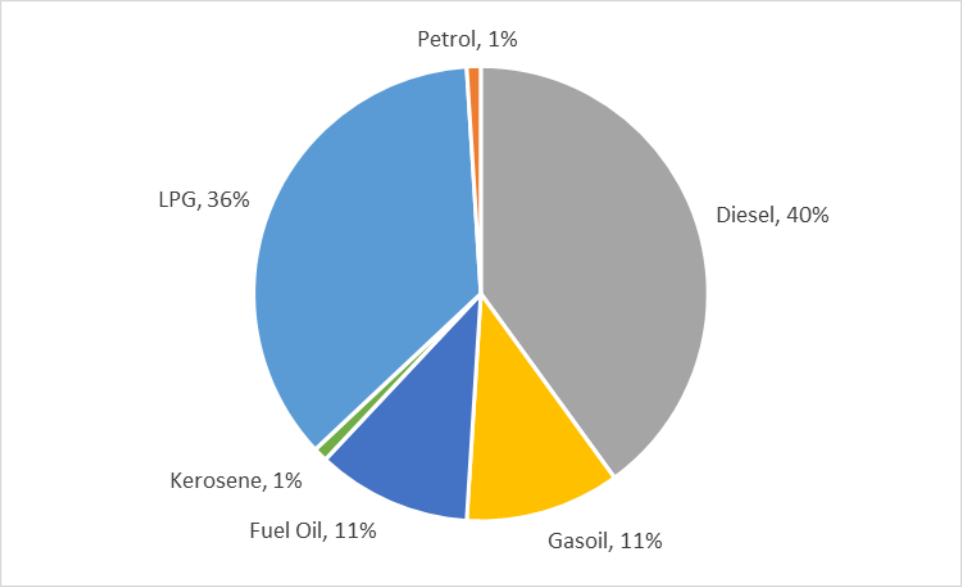

Figure 3 – Fuels consumed for heating and cooling purposes in 2021

In 2015, a comprehensive assessment on the potential for the application of high efficiency cogeneration and efficient district heating and cooling in Malta was delivered to the Commission in accordance with Article 14(1) of Directive 2012/27/EU. This report determined that district heating systems are not cost-effective solutions for Malta because the final energy consumption for heating purposes in Malta is relatively low compared to what is needed to justify the considerable investment required for district heating networks.

In 2020, Member States were required to submit an update of this assessment to the Commission in line with Article 14 of the Directive 2012/27/EU whilst ensuring compliance with Annexes VIII and IX of the same directive as amended by Commission delegate[d] regulation (EU) 2019/826 of 4th March 2019 amending Annexes VIII and IX to Directive 2012/27/EU. This report once again determined that despite the projected increase in final energy consumption for heating and cooling predicted for 2030 and 2050, the final heating demand is likely to remain below the necessary threshold that render such technologies economically feasible. For this reason, the scenarios explored in the report did not consider the possible use of district heating networks. This makes it more challenging to address the heating and cooling sectors through cost-effective solutions.

Furthermore, Malta's lack of potential for local cultivation of biomass due to land availability constraints and manufacturing of biofuels means that any fuel switch to biomass/biofuels would require imports of these products at significant additional transportation costs.

RES - Transport

There is no local production of biofuels in Malta, so all biofuel, namely biodiesel and hydrotreated vegetable oil (HVO), blended in road transport is imported. Bioethanol is currently not available for consumption in Malta. This is due to the hot climate, which creates technical difficulties for the blending of bioethanol with petrol. The addition of bioethanol to petrol in low percentages increases the vapour pressure of the fuel blend and therefore increases the possibility of emissions of benzene and volatile organic compounds, particularly in high ambient temperatures. Therefore, unless petrol with a sufficiently low reid vapour pressure (RVP) is readily available in relatively small volumes and competitive prices, the warm climate in Malta would drive the vapour pressure of bioethanol-petrol blends above the limit determined by EN 228.

I. The elements set out in point (a)(2) of Article 4

The European Union has set binding renewable energy targets to achieve a sustainable energy transition. The initial target for 2020 was 20%, which was later increased to a binding target of at least 32% by 2030. However, with the aim of further raising climate ambitions, the European Commission proposed revising the Renewable Energy Directive to increase the target to at least 40% renewable energy in the EU's overall energy mix by 2030. The onset of the conflict in Ukraine and subsequent energy crisis has placed unprecedented urgency on the deployment of renewable energy to bridge the energy gap resulting from the reduction in gas imports from Russia. To expedite renewable deployment, a temporary emergency regulation was adopted to streamline permit-granting procedures for renewable projects. In March 2023, the European Parliament and the Council reached a provisional agreement to raise the binding renewable energy target to at least 42.5% by 2030.

These actions demonstrate the EU's commitment to increasing the share of renewable energy and advancing towards a more sustainable energy future. Malta is also committed to increase the ambition put forward in the 2019 NECP in view of the updated legislation and EU ambition, where technically and financially feasible, in its final NECP update in June 2024.

Malta is currently in the process of assessing its renewable energy contribution to the EU's higher ambition. Malta is currently developing updated fuel and electricity demand projections that consider new population and macroeconomic projections. These projections take into account the economic situation of the recent years, namely the short- and longer-term effect of the pandemic and the Ukraine conflict. As the population and economy grow, the demand for energy is bound to increase. This could potentially result in a relatively smaller impact on the additional efforts and investments in renewable energy sources compared to the overall energy consumption.

While projections for the increased ambition are being updated to reflect the increased ambition and commitments, in 2021, the Government published its LCDS which identifies pathways to decarbonise the sector by 2050. More information can be found in section 3.1.1.

Within its LCDS, which was published in 2021, Malta sets out a framework and trajectory as well as policy priorities and mitigation measures that will enable it to achieve a low-carbon economy by 2050. The LCDS proposes measures related to seven sectors; energy, transport, buildings, industry, waste, water and agriculture and land-use and land-use change and forestry (LULUCF). These measures have been analysed, based on projections of macroeconomic parameters developed in 2017, using marginal abatement cost curves and social and environmental impact assessments. Although Malta remains fully committed to its international and national objectives for climate change mitigation, as outlined above, it is apparent that the initial projections, target setting and modelling of the LCDS will be updated in the final NECP update to better reflect the changing economic and societal realities by means of an increased baseline. Potential measures will have to be reviewed and fine-tuned to better capture synergies and achieve more targeted and maximised outcomes, thereby enabling higher efficiency of reduction efforts.

The Government of Malta has set the development of offshore renewable energy sources within the context outlined in various sections as a national objective within the presented National Energy and Climate Plan. Studies are being carried out in this regard to assess the technological readiness of appropriate technologies and economic feasibility.

Malta will adopt regulatory measures to maximise the potential RES Generation from the Buildings sector. Further context is being presented within Section 3.

2.2 DIMENSION ENERGY EFFICIENCY

The submission of the updated draft NECP is taking place at a very particular and challenging time marked by significant global events; with the global economy having gone through a two-year long pandemic and a conflict breaking out in the EU’s neighbourhood. These extraordinary circumstances highlight the need for careful consideration and adaptation in the formulation of the NECP to effectively address the evolving energy landscape.

During the COVID-19 pandemic, Malta saw both its total primary energy consumption (PEC) and final energy consumption (FEC) decrease substantially, largely due to the measures put in place to curb the spread of the virus, including a ban on travel both into and out of the country (except for some extraordinary circumstances) together with limited intra-island mobility. Moreover, the reduced use and shutting down of hospitality and entertainment buildings, offices and sports facilities also had a bearing on reduced energy use. In 2022, however, with most of these measures being lifted, the trends observed before the pandemic started to emerge once again with the most noticeable one being in the transport sector, more particularly in aviation.

While the conflict in Ukraine had significant impacts on various Member States, Malta has not been directly affected by the disruptions of Russian gas supplies. Owing largely to its isolated position, Malta is not interconnected to the trans-European gas network. In addition, Malta had a long-term LNG supply agreement which all contribute to the country not being dependent on gas imports from Russia. Nevertheless, the geopolitical context has had a significant impact on wholesale electricity prices since Malta relies on electricity imports to meet a share of its electricity demand and therefore remains exposed to EU market developments, and in particular the impact of high gas prices on electricity price formation. Malta's exposure to EU electricity market prices may increase further with the introduction of a second electricity cable link between Malta and Sicily, Italy by 2026.

Malta continues to experience an increase in its population where, as of the end of 2022, this stood at nearly 542,000 inhabitants, representing a 29% increase from the last census taken in 2011.

GDP in 2022 rose by 6.9% (in chain-linked volume terms) when compared to 2021. Based on national projections, it is expected that the GDP per capita (in 2015 prices) will grow from € 26,225 in 2022 to approximately € 29,703 by 2030.

Figure 4 shows the final energy consumption by end-use sector for Malta as compared to the European Union, for the year 2021. Although 2021 is considered to be an anomaly in terms of consumption patterns as the tourism industry was still recuperating from the COVID-19 pandemic. Indeed, the differences in consumption between the EU and Malta is still evident particularly in the transport sector. Malta's share of final energy consumption in transport is still higher than the EU average despite the overall decrease in consumption for the sector in 2021. This can still be attributed to the following factors:

- No rapid mass transport systems to date and therefore higher reliance on private transport;
- Temperate climate, implying lower heating demands i.e. heating percentage share of the final energy demand; and
- Malta being an island at the periphery of the European Union, leads to a larger than average share of aviation as a necessary means of transport. This is more evident in non-pandemic years.
- Malta is primarily a service-based economy (limited carbon intensive industries)

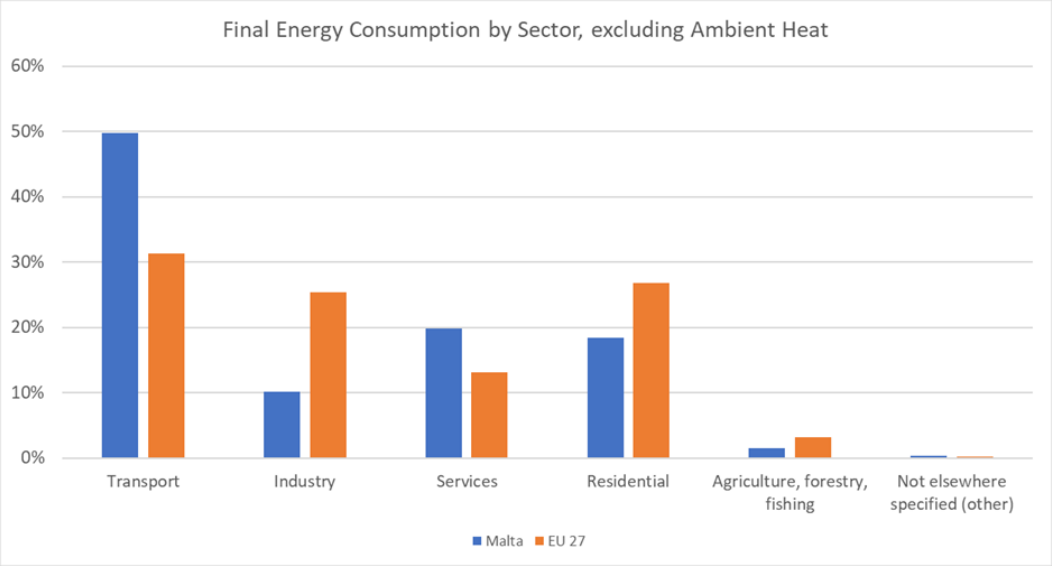

Figure 4 – Final energy consumption by sector in Malta vs EU in 2021. Maritime bunkers are excluded from category Transport (Source: Eurostat)

In 2021, transport accounted for approximately half of Malta's total energy consumption (Figure 4), with aviation contributing 26.1% to this share. However, these figures were significantly impacted by the pandemic, which led to a near standstill in international aviation. A look at 2019 data reveals a different picture, with transport accounting for 58% of total energy consumption, and international aviation representing 40% of that figure. This can be attributed to Malta's heavy reliance on tourism and the limited alternatives for Maltese citizens to travel abroad, as there is no fixed link to mainland Europe.

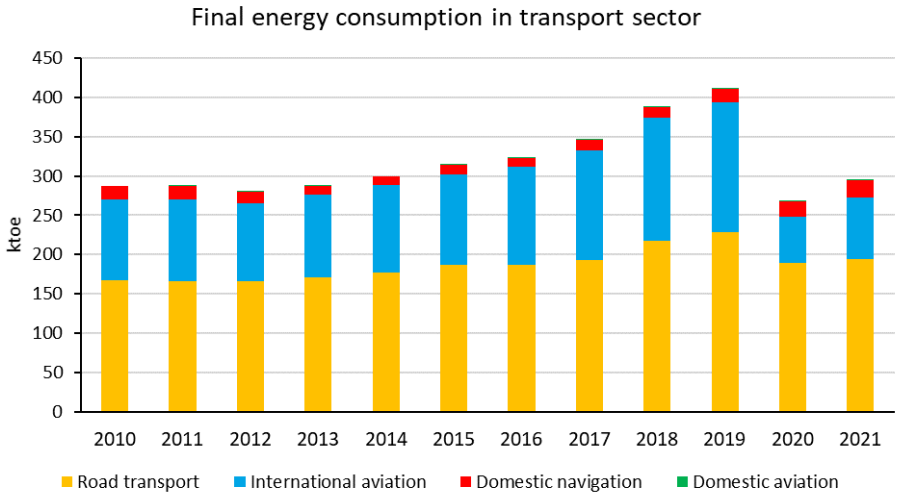

Figure 5 – Final Energy Consumption by transport mode

Road transport in Malta still remains heavily dependent on private vehicle use despite the various initiatives taken to promote alternative means of transport. The Government will continue to monitor demographic changes and developments in transport demand and assess the future viability of mass transport solutions from an environmental and financial sustainability perspective.

In 2021, Malta had the lowest final energy consumption per capita across all EU Member States, almost half the EU average. Even though 2021 is still considered an anomaly in terms of its usual patterns due to the pandemic, Malta's consumption per capita has been following this trend for several years.

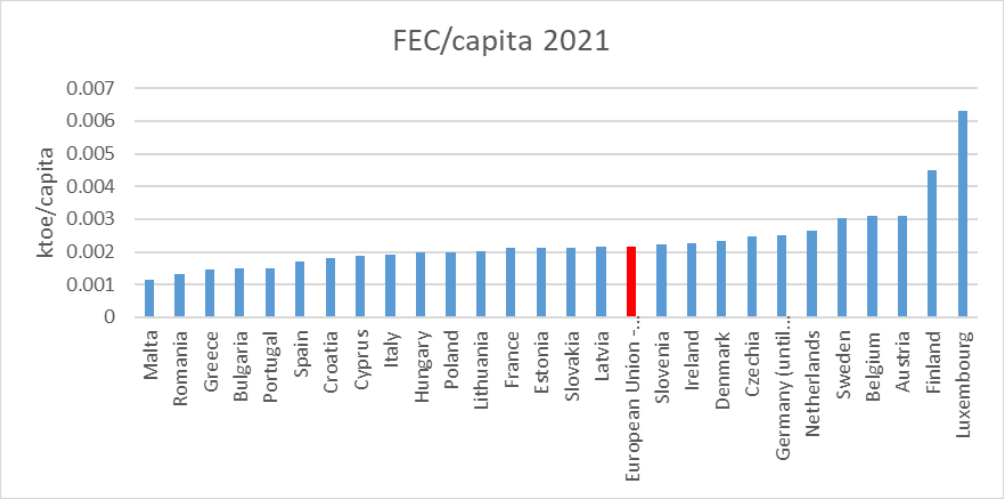

Figure 6 – Final Energy Consumption per Capita in 2021

Heating requirements in Malta continue to be on the lower end of the scale when compared to other Member States, whereas cooling is provided by heat pump technology, which is already deemed one of the most efficient technologies. However, this also means that interventions would need to be performed higher up in the marginal cost curve and are often not viable financially. On the other hand, the changing landscape, whereby a higher share of the population is living in apartments as opposed to single unit buildings, and higher expectations in terms of thermal comfort, means that an increasing number of households are resorting to heat pumps to achieve the desired thermal comfort level rather than relying on natural ventilation. More frequent extreme heat climatic conditions are also having a bearing on the increase in cooling demand. Furthermore, the shift from single unit buildings to apartments also implies that the most effective options to reduce the carbon footprint of households i.e. the installation of photovoltaic panels and solar water heaters, are not always a possible option.

Malta's share of final energy consumption by the services sector in 2021 was higher than the EU average, reflecting the local service-based economy, despite this being a pandemic year. Energy consumption in the services sector increased by 6.3% in the year 2021 (over 2020). There is a trend of relative decoupling between final energy consumption and economic activity because the positive growth rate in final energy use is less than the growth rate of the gross value added (GVA) of the corresponding sector which is 13.4%. Service-based economies, including ICT, arts and entertainment are generally dependent on low energy-intensive activities. Growth in this sector, is in part explained by the growth in the number of tourist arrivals, which in 2021, stood at nearly 1.3 million, accounting for an absolute increase of 47% inbound tourists over the same period in 2020.

i. The elements set out in point (b) of Article 4

Indicative National Energy Efficiency contribution to achieving Union target

As part of the Fit-for-55 package, Member States have agreed to collectively reduce energy consumption by at least 11.7% in 2030 compared to the projections of the 2020 EU Reference Scenario.

The goal is to limit the Union's final energy consumption to 763 Mtoe. Member States agreed to strive to reduce the Union primary energy consumption to no more than 992.5 Mtoe in 2030.

To achieve this, Member States, including Malta, need to set indicative national energy efficiency contributions based on final energy consumption. Malta's indicative targets for primary energy consumption (PEC) and for final energy consumption (FEC) are 835 ktoe and 687 ktoe, respectively, in line with Annex I of the recast Energy efficiency directive, which uses the PRIMES Reference 2020 Scenario as it currently stands. In line with Article 4(5), by no later than 30th November 2023 the Commission will update the Reference Scenario 2020 based on the latest Eurostat data reported by the Member states according to Articles 4(2b) and 14 of Regulation (EU) 2018/1999. In view of this, Malta's indicative targets will be updated accordingly for the final NECP due June 2024.

Although energy demand projections are still a work in progress, Malta plans to submit its PEC and FEC projections for different scenarios in the final NECP update due in June 2024.

Energy savings obligation

I. Malta's specific characteristics compounded by the small size of the energy market continue to substantially limit the range of measures available to the policy maker to meet the energy savings obligations. This has once again been recognized in Article 8 of the provisional agreement (currently Article 7) to the recast Energy Efficiency Directive, where Malta, together with Cyprus, have a derogation which requires both countries to achieve new savings each year from 1st January 2024 to 31st December 2030 equivalent to 0.45% of annual final energy consumption averaged over the most recent three-year period prior to 1st January 2019. This new target will supersede the present target of 0.24% as from 2024.

Figures for final energy consumption for 2016-2018 are shown in Table 1.

Year	Final Energy Consumption[14] (ktoe)
2016	583
2017	622
2018	661

Table 1 – Final Energy Consumption 2016–2018

The average final energy consumption for the period 2016–2018 amounts to 622.7 ktoe. This translates into an average of 1.49 ktoe of new cumulative savings required each year (based on an indicative linear trajectory) from 1st January 2021 to 31st December 2023 and 2.79 ktoe of new cumulative savings required each year (based on an indicative linear trajectory) from 1st January 2024 to 31st December 2030, reaching a total of 118.7 ktoe of cumulative energy savings by end 2030.

Within its LCDS, which was published in 2021, Malta sets out a framework and trajectory as well as policy priorities and mitigation measures that will enable it to achieve a low-carbon economy by 2050 including in the energy generation and buildings sector. Such measures have been analysed, based on the macroeconomic parameters of 2017, using marginal abatement cost curves and social and

[14] Data is from Eurostat (energy balance dataset, NRG_BAL_C)

environmental impact assessments. As already outlined above, it is apparent that the initial projections and modelling of the LCDS will be updated in the final NECP update to better reflect the new baseline due to the changed economic and societal realities. Potential measures will be reviewed and fine-tuned to better capture synergies and thus achieve more targeted and maximised outcomes, thereby enabling higher efficiency reduction efforts.

Energy Poverty sub-target

The Energy Efficiency re-cast directive, and to a certain extent the conflict in Ukraine which coincided with negotiations of this directive, has placed further emphasis/accentuated the problem of energy poverty across the continent. Apart from including a definition for the first time, it is now being expected through Article 8 (3), that Member States achieve an amount of energy savings equivalent to the share assessed in their NECP amongst any of the following cohorts: energy poor/vulnerable customers, low-income households and people living in social housing as per below:

'Member States shall establish and achieve a share of the required amount of cumulative end-use energy savings among people affected by energy poverty, vulnerable customers, low-income households and, where applicable, people living in social housing. This share shall at least equal the proportion of households in energy poverty as assessed in their National Energy and Climate Plan established in accordance with Article 3(3)(d) of the Governance Regulation 2018/1999.'

In view of the upcoming obligation, Malta is currently undergoing internal discussions and analysis to adopt a new indicator that better reflects Malta's specificities. This will be reflected in the final NECP in June 2024.

ii. The indicative milestones for 2030, 2040 and 2050, the domestically established measurable progress indicators, an evidence-based estimate of expected energy savings and wider benefits, and their contributions to the Union's energy efficiency targets as included in the roadmaps set out in the long-term renovation strategies for the national stock of residential and non-residential buildings, both public and private, in accordance with Article 2a of Directive 2010/31/EU

The Long-Term Renovation Strategy (LTRS) for Malta has been developed in accordance with article 2a of the Energy Performance of Buildings Directive coming into force by means of the amendments to the directive in 2018 (844/18/EU). The LTRS was developed on an evidence-based estimates of expected energy savings taking into account energy performance data collected from a large representative sample of the building stock in Malta. Targets are established for 2030, 2040 and 2050. A summary of the indicative milestones is shown in Figure 7 below.

Year	2018	2030			2040			2050		
	Average use	Average use	Change from baseline	Change from 2018	Average use	Change from baseline	Change from 2018	Average use	Change from baseline	Change from 2018
House	23	17	-34%	-26%	17	-46%	-27%	15	-51%	-34%
Flat	29	25	-20%	-13%	25	-29%	-15%	25	-31%	-15%
Total	27	22	-26%	-18%	21	-37%	-20%	20	-42%	-25%

Figure 7 – Average net use (kWh/m²/year - indicative expected progression

The LTRS sets out a plan to renovate public buildings over the period until 2050. The targets to achieve a highly energy efficient and decarbonised national building stock has been set out in the long-term renovation study as described in detail:

For residential buildings, energy efficiency improvements will affect a total of 5% to 6% of the stock per year, including all types of interventions. Of these, the rate of deep renovation will be 0.6% per year from 2025 onwards. The high marginal costs for renovations described earlier will necessitate the use of financial incentives to mobilise investments in the private sector especially to achieve very high levels of performance which typically require deeper and disproportionately costlier renovations.

For non-residential private buildings, the renovation rate from 2021 to 2030 is expected to be 1.1% and it will increase to 3% from 2031 to 2050. This would be achieved by policies to stimulate the uptake of additional energy efficiency measures in existing buildings (information & incentives) but mostly via minimum standards affecting newly built and existing buildings that are rented (regulation & enforcement).

The LTRS sets out a plan to make use of natural trigger points in a building life cycle and implement incentives (including financial and non-financial instruments), where the building is renovated at this point in its lifetime.

The definition of NZEB has been amended following the development of new minimum energy performance requirements which are scheduled to come into force in 2024. These requirements set out stricter requirements than the current NZEB with improvements in the overall energy performance of buildings as well as the energy performance of particular buildings elements and technical building systems.

The strategy also sets out direction towards increasing renovation of building stock by 2050. Part of this aim includes the renovation of public sector building stock. A large proportion of buildings occupied by public bodies have architectural value, historic value or are situated in historical areas and intervention on the building fabric may be limited. In view of this, the LTRS indicates that renovation of public buildings will be done to very high levels of efficiency achievable for that particular building.

iii. Where applicable, other national objectives, including long-term targets or strategies and sectoral targets, and national objectives in areas such as energy efficiency in the transport sector and with regard to heating and cooling.

Please refer to section 3.1.3 iii for measures related to the transport sector.

2.3 DIMENSION ENERGY SECURITY

I. The elements set out in Article 4(c)

The energy security context under which the Union and its Member States are operating in 2023 is vastly different to that in 2018–2019 when Malta's first NECP was adopted. The update of the NECP comes at a time when the EU and Member States are facing unprecedented energy issues, which have been greatly exacerbated by the Russian aggression on Ukraine. Under the current reality, the Union, and to varying degrees respective Member States, have experienced disruptions of supplies of gas from Russia which have led to exceptional action both at EU level as well as by individual Member States to mitigate the situation and ensure sufficient gas imports to cover the Winter peak demand. The gas disruption has also driven energy prices to record highs and contributed to inflation across the whole Union, and although the energy crisis has somewhat abated, it is certainly far from over. This impact was also registered in Malta.

Due to a relatively mild 2022/2023 winter season, supported by an emphasis on preparedness from the EU and its Member States, the level of gas storages remained at historically high levels following the winter period. This was the result of a huge boost in the preparedness for the following winter. Nevertheless, the likelihood of a full disruption of Russian gas flows to Europe remains very high and therefore Member States must continue to implement measures to phase out fossil fuel imports, in particular from Russia. Malta has not been directly affected by disruptions of Russian gas supplies from a security of supply point of view. This is mainly due to the specific characteristics of its energy system, including its isolated position whereby it is not interconnected to the trans-European gas network, the existence of a long-term LNG supply agreement, and the fact that Malta is not dependent on gas imports from Russia.

Moreover, Malta faces the highest energy demand during the summer period. Nevertheless, the geopolitical context has had a significant impact on the affordability of electricity prices. Malta relies on electricity imports from Italy to meet a share of its electricity demand and therefore remains exposed to any EU market developments. In particular, Malta is exposed to the fluctuation in energy prices, which is also linked to the lack of decoupling between electricity and gas prices. The energy crisis and the high energy prices, which have peaked during 2022, have brought about a strong reaction from the Union. This quick reaction came primarily in the form of the REPowerEU Plan, the aim of which is to rapidly reduce dependence on Russian fossil fuels and fast forward the green transition. The REPowerEU Plan was complemented by a series of temporary emergency legislative acts.

On June 29th 2022, Regulation (EU) 2022/1032, dealing with Gas Storage obligations was adopted and on July 26th, 2022, the Council Regulation (EU) 2022/1369 for coordinated demand reduction measures for gas was approved. These Regulations created a coordination framework for national gas storage filling and gas demand reduction measures, introduced a possibility for the European Commission to declare a *Union alert* triggering a mandatory 15% gas demand reduction obligation and mandated Member States to update their gas Emergency Plans in line with these developments. These regulations were further complemented by Council Regulation (EU) 2022/1854 focusing on an emergency intervention to address high energy prices adopted in October 2022 and Council Regulation (EU) 2022/2578 establishing a temporary market correction mechanism to protect Union citizens and the economy against excessively high prices. While these emergency legislative acts have been

adopted for the purpose of tackling a particular crisis and are therefore temporary in nature, they also had a lasting effect and have forced Member States to re-think their objectives and priorities from an energy security point of view.

It's Important to consider Malta's unique position within the context of the energy price crisis and the consequences of the war in Ukraine. In particular, one should note the following elements:

- Malta's lower exposure to security of supply impacts of the conflict in Ukraine and the comparatively lower range of measures and actions available at our disposal;
- Absence of a gas connection to the trans-European gas network;
- Absence of gas storage facilities;

In the updated NECP, the Energy Security dimension continues to be looked at within the unique context of a geographically isolated and peripheral island Member State with a high import dependency due to the lack of domestic conventional energy sources and relatively limited renewable energy resource potential. This updated NECP places an emphasis on any new energy security risks which have emerged over the last few years in the context of the current geopolitical situation, as well as any foreseen risks over the course of the next decade and beyond. The specific characteristics of Malta's energy system and market, such as its small nature, the existence of a single electricity supplier, the absence of a connection to the trans-European gas network, as well as the projected increase in energy demand and necessity for additional generation and/or interconnection capacity, including flexible solutions continue to be factors which affect Malta's security of supply.

Underlying the NECP2019 With Existing Measures (WEM) and With Policy Measures (WPM) scenarios and the updates being developed, is a projected increase in Malta's population, labour force and tourism. This is expected to lead to an increase in the energy demand which has a direct bearing on the investment needs to ensure system adequacy. Over the course of 2020 and 2021 the Government conducted an electricity supply (e.g. resource adequacy) study with the aim of assessing, analysing and presenting cost-optimal solutions to meet the expected growth in electricity demand and tackle any projected shortfalls by 2035. Based on the study, a decision was taken to invest in a second electricity sub-sea link with Italy by 2026. This project will contribute to long-term security of supply as well as allow for the integration of a higher share of renewable energy, thus decreasing Malta's reliance on fossil fuels. This study will be updated to reflect the commitment to construct and commission a second interconnector and utility scale battery storage as well as additional onshore PV and offshore renewable energy installation,

Over the last decade, Malta has transformed its electricity generation mix from one based on heavy fuel oil and gasoil to a more sustainable combination of natural gas, electricity imports via the Malta-Italy subsea connection, and increased use of renewable energy sources. Malta also maintains standby gasoil generation capacity (including dual fired diesel engines) which are available as back-up in the event of an emergency, a feature contributing to Malta's security of supply. Given that natural gas is a transitional fuel, Malta's focus has shifted primarily to the deployment of renewable energy sources, as well as the addition of another electricity interconnector with Italy. The landscape for energy security in Malta will continue to evolve as the share of renewable energy continues to increase, in particular with the possible investments in large-scale offshore renewable energy technologies.

The best way to ensure a reduction of Malta's reliance on fossil fuels and strengthen energy security is through the continued deployment of cost-effective renewable energy sources in conjunction with

flexible resources, such as energy storage. The energy security dimension of the NECP is therefore also to be looked at within the context of the over-arching long-term goal of decarbonising the energy system, which includes the electrification of end-uses and investment in cross-border energy infrastructure.

Malta's high-level objectives in the area of energy security as set out in the NECP can be summarized into the following:

- Continued diversification of energy sources and suppliers.
- Increasing the flexibility of the national energy system, including through the roll-out of cost-effective, innovative solutions such as energy storage.
- Installing large-scale battery systems.
- Periodic contingency planning in the case of supply disruption for the electricity, gas and oil sectors and energy system preparedness.
- Ensuring affordable energy prices for consumers.
- Ensuring electricity system adequacy.
- Energy security in the context of the long-term objective of decarbonisation of the energy system as an over-arching principle.

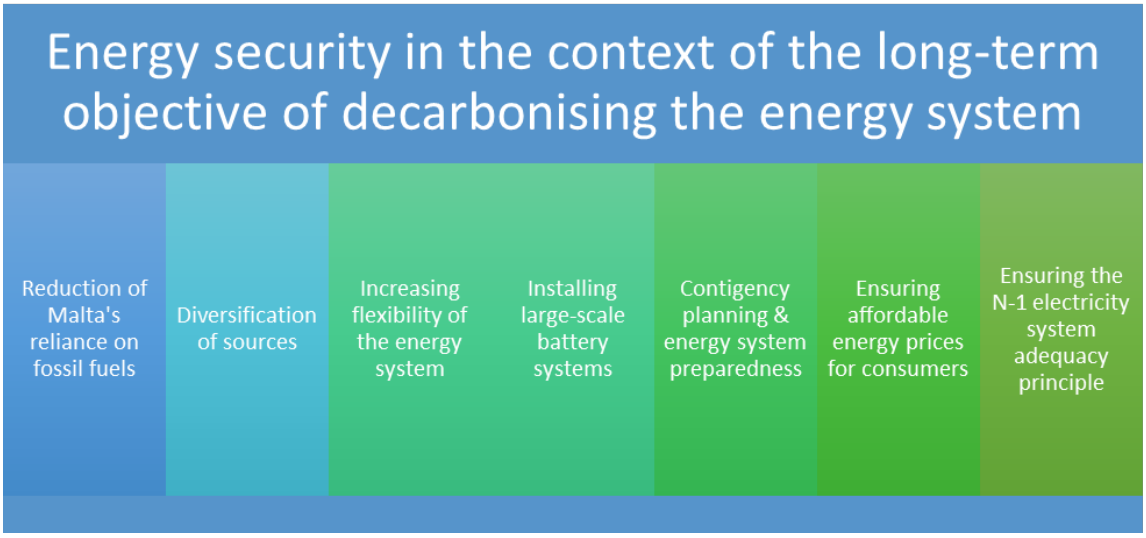

Figure 8 – Energy security in the context of the long-term objective of decarbonisation of the energy system

II. National objectives with regard to increasing the diversification of energy sources and supply from third countries

National objectives related to the diversification of energy sources and supply from third countries can be summarized into the following categories:

1) Continuing to ensure capability to source LNG from diverse international sources (in the short-to-medium term).
2) Pursue options to enable sourcing and delivery of sustainable fuels.
3) Completing the second electricity interconnector with Italy.
4) Exploring the possibility of interconnections with neighbouring third countries.

Natural gas in Malta is used solely for the generation of electricity and currently constitutes the largest share of Malta's electricity generation mix at approximately 70%. The only source of natural gas in Malta is LNG, which is imported via marine carriers and held in a Floating Storage Unit (FSU) supplying LNG to a regasification plant and to Delimara 3[15] and Delimara 4[16] power plants. Malta does not have gas distribution networks or district heating networks and there are no end-use customers of gas apart from two electricity producers at the Delimara Power Station. Currently, Malta does not form part of the EU internal gas market as it is not interconnected via a gas pipeline.

LNG is currently sourced from the international market, which provides flexibility in terms of countries of origin. The LNG that has been delivered to Malta at the Delimara facility between 2017 and end 2021 originated from eight different countries, with the highest share coming from South America. Malta does not import any LNG from Russia. In the short-to-medium term, Malta's main objective would be to ensure the ongoing capability to source LNG from international sources. The planning and management of LNG deliveries is at present handled through existing contractual arrangements.

The electricity Distribution System Operator (DSO) has a long-term gas supply agreement in place ensuring long-term and secure supplies of LNG. In line with its decarbonisation objectives Malta has been considering the option to construct a hydrogen-ready pipeline with Italy. Malta will continue to investigate the hydrogen-ready pipeline project, which has been provisionally listed as EU Project of Common Interest (2023 list). This opens the door for Malta to access new sources of green gases, particularly hydrogen originating from renewable sources. Studies are underway to assess feasible sources for the supply of green hydrogen and determine the necessary infrastructure to deliver it to Malta, coupled with any additional financial considerations relevant to this project. If implemented, the pipeline will end Malta's isolation from the European gas network and would also have the potential to enable the gasification of the island and contribute to a decarbonised energy system by enabling access to renewable gases (hydrogen/biomethane).

Apart from local generation, Malta also relies on imports over the electricity interconnector to meet its electricity demand. Over the course of 2020 and 2021 the Government conducted an electricity supply study with the aim to study and present cost-optimal solutions to meet the expected growth in electricity demand and tackle any projected shortfalls by 2035. Based on the study a decision was taken to invest in a second 200 MW electricity sub-sea link with Italy by 2026. A second cable link with Italy would contribute to long-term security of supply as well as allow for the integration of a higher share of renewable energy sources, thus decreasing Malta's reliance on fossil fuels. These are described in more detail in Section 3.3.i. of the Plan.

Malta also imports all of its fuel requirements, including biofuels which are blended with fossil fuels by fuel importers to fulfil their substitution obligation. The procurement of biofuels is the responsibility of the respective fuel suppliers operating in the local market and there are no Government interventions or policies related to diversification or sources of origin. Nevertheless, the imported biofuels have to fulfil the sustainability criteria stipulated within the Renewable Energy Directive.

[15] Delimara 3 (D3): 8 gas-fired turbines with a maximum rated capacity of 152 MW. 4 of the 8 engines are dual fuel and can also run on gas-oil, supporting security of supply.
[16] Delimara 4 (D4): 205 MW gas-fired high-efficiency combined cycle gas turbine (CCGT) commissioned in 2017.

Malta is also a technology-taker of renewable technologies, such as heat pumps, solar PVs, SWHs, HPWHs, etc. and there are no national objectives for the diversification of sources or critical materials for these technologies.

III. National objectives with regard to reducing energy import dependency from third countries

Malta's unique geographical location tied with the absence of domestic energy sources (with the exception of indigenous renewable sources) and the specificities of Malta's energy system, make it extremely challenging to reduce energy import dependency in general, including from third countries. In view of this, Malta's objectives with regard to reducing import dependency (from third countries) are interlinked with national objectives focusing on the continued deployment of domestic renewable energy sources and the over-arching long-term goal of decarbonizing the energy system.

Notwithstanding the above, in view of the potential for the production of cost-effective renewable energy in neighbouring third countries within the Mediterranean region, it may be counterproductive to discount opportunities to increase imports of renewable energy from these sources. It is therefore deemed opportune to maintain as objective the reduction of import dependency from *specific* third countries while prioritizing indigenous energy production.

Nevertheless, given the limited options for cost-effective indigenous sources due to reasons explained in the decarbonisation dimension, Malta's reliance on energy imports is expected to remain relatively high in the short to medium term.

Apart from assessing the level of energy import dependency, including from third countries, the attainment of this objective will also be assessed by looking at the increase of indigenous renewables in the energy system and the resulting decrease in fossil fuel imports. National objectives related to the deployment of renewable energy are described in detail under the Renewable Energy Dimension of the Plan.

IV. National objectives with regard to increasing the flexibility of the national energy system, in particular by means of deploying domestic energy sources, demand response and storage

One of Malta's high-level objectives is to continue to increase the flexibility of the energy (in particular electricity) system. Increased flexibility of the national energy system will be tackled through multiple actions:

- Increased deployment of domestic renewable energy sources and their safe integration in the energy system.
- The deployment of distributed small-scale storage as well as utility scale storage.
- The Government will continue to assess solutions for ensuring system stability with respect to grid integration constraints inherent in small and peripheral electricity systems.

- The Government will continue to assess the potential and applicability of demand response solutions in the local context.

As further portrayed in section 5.1 of the updated NECP, utility-scale battery energy storage is expected to become an integral part of Malta's electricity system. Malta foresees that in 2026 two large scale battery energy systems will be put in service in two distinct locations. Battery storage is expected to provide flexibility in terms of the ability of the system to accommodate additional renewable energy capacity, including offshore wind, whilst also being able to provide ancillary services to the electricity DSO.

Apart from utility scale storage, incentives are present to support small scale battery storage in households equipped with PV systems. As from 2021 households applying for a grant for a new PV installation are also eligible to benefit from financial support towards a behind-the-meter battery storage system. The scheme aims to increase consumers' flexibility in their ability to store excess renewable electricity generated by PV systems in the peak sunshine periods instead of exporting to the grid. This also supports self-consumption. By the end of 2021, there were 95 behind-the-meter battery storage systems installed in Malta, which amounts to an estimated 0.66 MWh of capacity. As of end 2022, these figures have increased to 489 installations and an estimated 3.55 MWh of capacity. It is Government's intention to continue promoting small-scale battery storage as necessary.

At present, the electricity market structure is not conducive to the development of demand response. While simultaneously recognizing the dual benefits that demand response can bring to both consumers (in the form of reduced consumption and lower electricity bills) as well as system operators (through peak reduction, load shifting and grid balancing), the Government will continue to assess potential solutions and applications of demand response that could be successfully implemented in the local electricity market. This includes assessing the potential of both implicit (price-based) and explicit (incentive-based) demand response mechanisms.

Malta already has a high deployment rate of first-generation smart meters, which are seen as a pre-requisite for the successful implementation of demand response solutions. However, the smart meters and IT system currently in place (one of the first to be deployed in Europe) may need significant upgrades to accommodate the required functionality to deploy effective demand response.

Further studies will have to be dedicated to smart energy management systems, as well as investments into the digitalisation of the electricity network (e.g. development of smart grids). Given the increasing rate of electric vehicles, an increasingly viable option for enhancing flexibility in the system is leveraging the capacity of the battery of electric vehicles as a means of storage. The Government will focus on assessing the potential of vehicle-to-grid (V2G) technologies as flexibility solutions catered for Malta. Enemalta is at present in the process of evaluating the feasibility of this technology to the Maltese Islands.

2.4 DIMENSION INTERNAL ENERGY MARKET

2.4.1 Electricity Interconnectivity

I. The level of electricity interconnectivity aimed for in 2030

The EU has set an interconnection target of at least 15% by 2030. The electricity networks in Malta and Sicily (Italy) are currently linked by a 200MW HVAC interconnector, connecting Malta to the European electricity grid. This came into full operation in 2015 and contributes to the robustness of the electricity system, and hence, the security of supply in Malta. It also enables the trading (predominantly for import and balancing) of electricity on the Italian electricity wholesale market. Malta is considered as a foreign virtual consumption/production zone within the Italian market. The interconnector is operated by Enemalta and considered part of its distribution system.

In 2022, the Government decided to invest in a second electricity sub-sea interconnector with Sicily (Italy) by 2026. This project will double Malta's cross-border electricity transfer capacity from 200 MW to 400 MW and will ensure that Malta continues to meet the 15% interconnectivity target by 2030. The project will contribute to long-term security of electricity supply and allow for the integration of a higher share of renewable energy, thus decreasing Malta's reliance on fossil fuels. Malta's objective for the electricity interconnectivity level is to remain above 15%.

In order to maintain an adequate level of interconnectivity, the EU has set a 15% interconnection target by 2030 and additional complementary urgency indicators with specific thresholds. These are:

(1) Price differential in the wholesale market exceeding an indicative threshold of 2EUR/MWh between Member States, regions or bidding zones;

(2) Nominal transmission capacity of interconnectors below 30% of peak load; and

(3) Nominal transmission capacity of interconnectors below 30% of installed renewable generation.

Details on each of the three indicators are provided below.

Indicators of urgency of action:

I. **Price differential in the wholesale market exceeding an indicative threshold of 2EUR/MWh between Member States, regions or bidding zones**

Malta's electricity system is currently treated as a virtual consumption and production point connected to the Italian electricity network and although there is no liquid wholesale market in the country, in practice, Malta forms part of the bidding zone in Sicily whereby the price of electricity imported over the interconnector reflects the clearing price in the Sicilian market.

Enemalta is obliged to dispatch electricity from local generation plants and/or from the interconnector based on their order of economic merit subject to technical and contractual constraints, with

electricity from renewable energy and CHP plants, irrespective of their size, benefitting from priority dispatch as long as there is no liquid wholesale market in Malta. The onus to meet all demand, including peak demand, is on Enemalta as the DSO and exclusive supplier of electricity to final customers. Any imbalances between the volumes determined on the day-ahead market in Sicily (Italy) and actual electricity flows over the interconnector are settled at the prices calculated using the methodology determined by ARERA through its decision 549/2015/R/EEL[17].

In the absence of a liquid wholesale electricity market in Malta, the Regulator (REWS) publishes a proxy for the wholesale electricity market price on an annual basis by estimating the variable cost of meeting the demand forecast for a given year from local fossil fuel generation and imported electricity, excluding that portion of forecasted demand which is not expected to be met by conventional sources or imported electricity. The reference price is used to determine the amount of operational aid provided to PV installations benefitting from a feed-in-tariff and the rate paid to generators exporting electricity to the grid which are not eligible for any operational support. The proxy is published annually in Schedule 4 of Subsidiary Legislation 545.34 and the methodology was included in the State Aid decision[18] issued in relation to the notified competitive bidding process for the granting of aid to generators producing electricity from RES with capacity of 1MW_p or more. However, given the structure of the electricity system in Malta and the absence of a liquid wholesale electricity market, the proxy for the market price is not deemed to be an appropriate indicator to benchmark against the €2/MWh indicative threshold.

This indicator will become applicable should a liquid wholesale electricity market develop in Malta.

II. Capacity of interconnector in relation to Malta's Peak Electricity Load

Interconnection capacity in relation to the peak load is calculated as a ratio of the nominal interconnection capacity and peak load. The combined nominal transfer capacity of the two interconnectors will be 400 MW, with the second interconnector expected to be commissioned by end of 2026. Although final electricity demand projections are still being developed, it is expected that the interconnection capacity will drop to close to 30% in 2026, but will then remain well above this threshold once the second interconnector comes online in 2027.

III. Capacity of interconnector in relation to installed RES

This indicator is calculated as the ratio between nominal interconnection capacity and installed renewable energy capacity. Once the second interconnector comes online, the total interconnector capacity is not expected to be exceeded by the indicative threshold of 30% of projected installed renewable electricity generation capacity between 2021–2030, even if a large scale offshore renewable installation were to materialize before 2030. However, in the context of Malta's electricity system, the 30% threshold has limited relevance. RES electricity in Malta is almost exclusively generated from photovoltaic systems with limited storage capability, and although dampened by the existing interconnector, significant intermittency is caused by highly variable and localized cloud cover.

[17] Deliberazione 20 Novembre 2015: Disciplina degli sbilanciamenti effettivi applicabile all'interconnessione Italia-Malta
[18] State Aid SA. 43995 (2015/N) – Malta Competitive Bidding Process for Renewables Sources of Energy Installations, Brussels, 26.8.2016, C(2016) 5423 final.

This is expected to be mitigated by the installation of utility-scale and behind-the-meter battery storage and the installation of the second electricity interconnector with Italy by 2026.

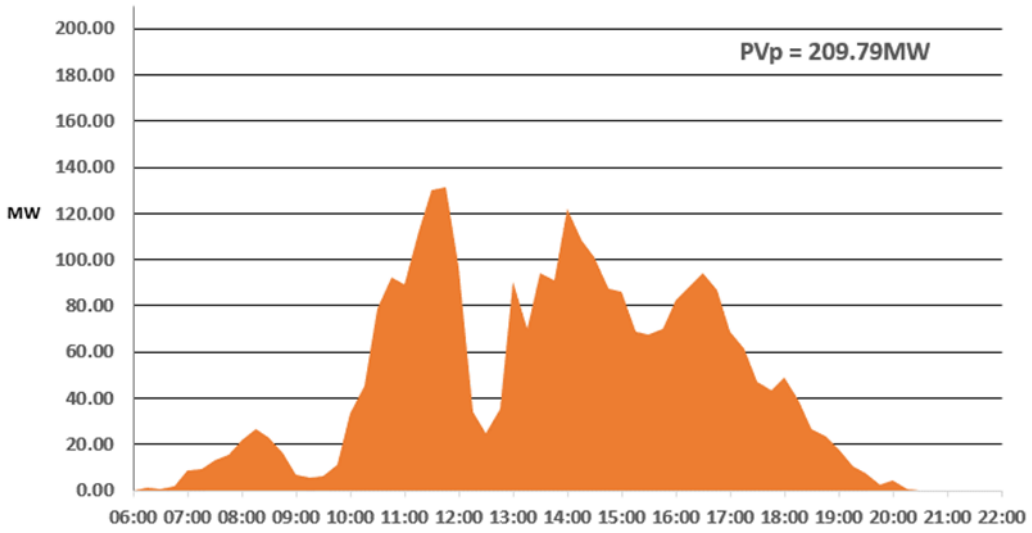

Figure 9 – Solar PV generation during a typical day in April with intermittent cloud cover (MW)

With an installed PV capacity of 221MW$_p$ (as of end 2022), transients of circa 65MW were experienced within 30 minutes. As the installed renewable electricity generation capacity grows, these transients are expected to increase proportionally. Peak PV penetration during Sunday afternoons in April of the current year (when electricity demand is generally lowest) has reached around 57% of demand. In view of the relatively small size of the Maltese grid, such transients are significant and consequential, resulting in interconnector imbalances requiring rapid load shifting, as well as frequent start-up and shutdown of the conventional generating plants. In practice, this means that the interconnector capacity needs to handle the full extent of the imbalances, at least until conventional power plants can be ramped up, if spare capacity is available. This scenario also has significant implications for the DSO which in Malta is responsible for balancing the Maltese electricity system, which could be partially mitigated if the electricity intraday wholesale market would allow bids closer to gate closure time.

Apart from the short-term variability of PV systems' generation arising from variable weather, the projected increase in the installed solar PV capacity will also have a significant effect on the operation of conventional generation plants. The second interconnector with Italy, expected to be commissioned in 2026, is envisaged to alleviate that concern during the afternoon on Sundays in Spring and Autumn, when load is lowest and PV system generation is highest, the generation from solar PV systems could eventually exceed the local demand.

The update of the Electricity Supply Study commissioned by the Ministry responsible for Energy will identify options to optimize system costs while increasing its flexibility to absorb further renewable energy sources, including the possible introduction of offshore renewable technology, while taking into consideration the economic and technical constraints of the market and the grid.

In view of the small size of Malta's electricity grid and highly variable cloud coverage, additional investments in ancillary and flexible solutions, such as battery storage solutions, may be necessary to mitigate significant rapid variations in PV generation. This could have serious implications on interconnector imbalances, as well as load shifting and the required start-up of conventional generating power plants. Ensuring system stability will require significant spinning capacity, utility scale battery storage or flexible balancing services over the interconnector.

Although Malta now has a more diversified generation mix, grid stability will become even more important with the potential deployment of additional variable renewable energy sources such as additional PV installations and floating offshore renewables in the future.

2.4.2 Energy Transmission Infrastructure

I. Key electricity and gas transmission infrastructure projects and modernisation projects

Electricity transmission infrastructure

There is no electricity transmission system in Malta and hence no transmission system operator (TSO). Malta was granted derogations pursuant to Article 66 of Directive EU/2019/944 from the requirements of Article 43 (Unbundling of transmission systems operators), Article 35 (Unbundling of DSO), Article 6 (Third party access), and until 5th July 2027, from Article 4 (Free Choice of Supplier).

There are currently no PCI projects related to electricity in Malta. Details about the planned second electricity interconnector with Sicily are described under point (ii) below.

Electricity network modernisation projects

Enemalta has invested over €106 million between 2018 and 2022 to upgrade and expand the primary and secondary nodes of the national electricity network as well as to improve the quality of service. In the primary network, upgrades and/or replacement of older equipment works were commissioned to increase the capacity of the Tarxien DC, Mrieħel DC and Marsaskala DC. On the medium voltage several reinforcement projects including new cables and switchgear replacements are ongoing, including seven medium voltage reinforcements. On the low voltage system, the DSO is continuously installing:

(i) 25 line voltage regulators,
(ii) OLTC transformers,
(iii) 29 new substations and upgrades in 52 existing substations,
(iv) 45 new low voltage feeders, whilst replacing and upgrading 150 aerial lines.

The DSO will undertake a further major network upgrade to enhance the security and reliability electricity infrastructure at all voltage levels. These will include another five major projects involving new distribution centres and/or upgrading of existing distribution centres and a 132kV reinforcement. Given the issues experienced with the distribution network during the month of July 2023 due to

impacts from prolonged extreme heat weather conditions, the Government has asserted its commitment to address this within the next 6 years with an investment of €160 million.

This investment will be partly funded through the RRF and aims to address internal electricity distribution bottlenecks and enable further integration of renewable energy by ensuring an adequate grid infrastructure.

The investment will consist of the inauguration of the following facilities:

(I) a new 132kV distributing feeder line between Magħtab and Mosta, in preparation for the second interconnector with Sicily (Italy);
(II) a new 33kV/11kV primary sub-station in Naxxar;
(III) a new 33kV/11kV primary substation in Siġġiewi;
(IV) an upgrade of the existing 33kV/11kV Hospital distribution centre in Msida;
(V) an upgrade of the existing St. Andrew's distribution centre in Pembroke;
(VI) 15 new 11kV/415V sub-stations and 15km reinforcement; and
(VII) battery storage equipment.

Natural Gas Transmission Infrastructure Projects

The Melita TransGas hydrogen-ready pipeline project consists of c.a. 159 km of onshore/offshore pipeline between Malta and Italy linking Malta to the trans-European Natural Gas Network and to the emerging Italian/EU hydrogen network. Once implemented, it would contribute to the decarbonisation of the local power generation and future inland market by enabling the access to renewable gases (hydrogen/biomethane). The pipeline will enable Malta to import 100% Green Hydrogen subject to its availability and the maturity of the H_2 market. The project will furthermore contribute to market integration, competitiveness and improved security of energy supply, whilst removing the emissions from the current LNG supply chain and generate environmental landscape benefits.

The Project is a Project of Common Interest under the 5th list of 2021 and has been positively assessed by the EU Commission to retain this status under the 6th PCI list of 2023 pursuant to Article 24 derogation for Malta and Cyprus under the new TEN-E Regulation (EU) 2022/869. In fact, the MTGP is being assessed and expected to be confirmed in the draft 6th PCI list that will be approved by the High-level Decision Making Body in October 2023 for subsequent adoption of the delegated act with the PCI list.

In 2021, the Maltese Government decided to upgrade the Melita TransGas project to a *hydrogen-ready* pipeline and assess the feasibility of importing green hydrogen through the PCI as an option for the decarbonisation of Malta's power generation sector and other inland sectors, while addressing the island's need for security of electricity supply, when taking into consideration the Government's decision to implement a 2nd electricity interconnection with Sicily (Italy).

For this scope, during 2022, the front-end engineering design (FEED) and financial engineering studies for PCI 5.19 were updated to allow the transmission of 100% hydrogen and blends of hydrogen with natural gas. As a result of the upgrade, the CAPEX figure has been revised to EUR 434 million, which includes EUR 3.6 mil. for EU-funded studies conducted up to 2021. The increase in CAPEX is mostly attributed to the rise of inflation, with only EUR 11 mil. attributed to upgrade the design for the transportation of pure hydrogen. In November 2022, the Italian Single Authorisation Permit (development permit) was obtained for the transmission of natural gas for the Italian part, whereas the development permit for the Maltese portion was obtained in October 2021.

The realization of the hydrogen-ready MTGP may also allow the use of renewable gases not solely for energy generation purposes but for future inland use. The PCI is listed in both the 2030 NECP and in the LCDS, and if it materialises, it may contribute towards the decarbonisation goals for Malta in line with the EU's ambition towards carbon neutrality. The pipeline is expected to contribute to security of supply by providing an alternative vehicle for energy supply given the increased dependency of Malta on electrical interconnectivity with Italy which is planned to double by 2026.

The project is expected to result in a more reliable, secure and energy efficient form of transport of fuel. The project will contribute to limiting the actual risks of supply due to the stress from weather conditions and technical capacity failure of the present LNG supply chain and potential increased capacity for future demand.

II. Where applicable, main infrastructure projects envisaged other than Projects of Common Interest (PCIs)

Second electrical cable-link with Italy

Malta's reliance on fossil fuels will continue to diminish with the addition of the second sub-sea electrical cable-link with Italy. This will consist of a subsea and onshore AC cable link with a nominal continuous rating capacity of 200MW (increasing up to 225MW in winter), operating at 220kV between Malta (Magħtab) and Sicily (Ragusa) to be laid in parallel but at a safe distance to the existing AC cable-link. The preliminary identified route is foreseen to have an approximate length of 122km in total: 2km in Malta, 99km offshore, 21km in Ragusa.

The project will help Malta in its roadmap to reach its 2030 climate and energy targets and it will contribute in the transition to a carbon neutral economy by 2050. It is included in the European Ten-Year Network Development Plan (TYNDP) of 2022.[19]

In view of Malta's derogations under the Electricity Market Directive (EU) 2019/944 from third-party access, unbundling rules and free choice of supplier, the project is not considered as an interconnecting transmission system part of the TEN-E network, but an extension of the Maltese electricity distribution system with the sole purpose of importing electricity from Italy.

The project is at an advanced design stage whereby the route and protection, both onshore and offshore, have been determined, and the cable sizing and ampacity designed according to the route length and its physical properties. The design contractor, engaged through an open tender procedure, has also designed the transformers, shunt reactors and new gas-insulated switchgear needed for the project. In line with this design, and as a requirement of the development permit, the EIAs/permitting studies in Malta and Italy, have been compiled by contractors also engaged through an open tendering procedure. The Environmental Impact Assessment studies for Malta were submitted to the Environmental Resources Authority in May 2023 and a public consultation was conducted in June. The application for the Italian Single Authorisation Decree was submitted in August 2023.

Project Benefits:

- The Project will double the electricity interconnectivity capacity of Malta with the European electricity network to meet the predicted increase in the islands' electricity demand from projected economic growth, the electrification of the transport sector and the use of onshore power for vessels.

[19] https://tyndp2022-project-platform.azurewebsites.net/projectsheets/transmission/1085

- It will contribute to Malta's 2030 energy and climate targets and the transition to a carbon neutral economy by allowing the importation of green electricity and the optimisation of the power generation mix.

- The Project will act as an enabler for increased indigenous renewable electricity generation, including offshore RES, by providing a buffer to counterbalance for the RES intermittency and by enhancing the stability and balancing of the Maltese electricity grid.

- It will provide security of electricity supply to the island by serving as a back-up in case of failure in the first cable link and/or domestic power generation.

- The project will contribute to reducing the dependency on domestic fossil-fuel fired (LNG and gasoil) electricity generating plant.

Onshore power supply infrastructure for marine vessels

The Alternative Fuels Infrastructure Directive (AFIR) as well as the FuelEU Maritime Regulation introduce obligations on both the supply and the demand side for marine vessels to connect to onshore power supply when at berth (assuming the infrastructure is available). While these obligations are expected to ensure that marine vessels operating in the EU continue to reduce their fossil fuel consumption, on the other hand this may lead to a significant increase in electricity demand at the national level. This is more pronounced for islands like Malta, where the reliance on the maritime sector and sea-borne tourism is comparatively high. It is therefore important that the increase in electricity demand resulting from shore-to-ship connection is complemented by a corresponding increase in renewable energy capacity.

There are ongoing projects in Malta focusing on the development of onshore power supply infrastructure, one focusing on the Valletta Grand Harbour and another on the Malta Freeport Terminal. In 2020 Infrastructure Malta launched a 33.2million EUR shore side electricity project which aims to cut over 90% of the air pollution that cruise liners produce when visiting the Valletta Grand Harbour. A tender has already been awarded for the provision of onshore power facilities to five cruise liner berths. The project will be completed by the end of 2024. In the third quarter of 2022, 65% of the Onshore Power Supply (OPS) Project was nearing completion. The project covers the northern part of the Grand Harbour and included the preparation of the required infrastructure and installation of equipment that among others included, frequency converters, transformers, and switch gears in line with existing standards.

The second phase will extend the provision of onshore power supply to other quays, which are also used by Ro-Ros. The project aims to significantly improve air quality in several localities in the northern and southern harbour regions while also cutting cruise liners' CO_2 emissions by approximately 40%. The Phase 2 Project which is expected to start in 2024 will cover the southern part of the Grand Harbour and will extend the power network to other areas namely, Ras Ħanzir, Lab and Magazine Wharf, Palumbo Shipyard and Mediterranean Maritime Hub.

Preliminary studies indicate that through this project, Malta will save up to 375 million EUR in costs in the next 20 years. These costs are linked to the measurable consequences of air pollution, including impacts on health, environment, infrastructure and agriculture.

The project is in line with the Government's commitment to decarbonise transport maritime operations within the Grand Harbour as much as possible with the aim to reduce air emissions and reduce the level of noise emissions within the harbour area, thus improving the surrounding environment and quality of life of all persons living and working within the region of the Grand Harbour. The Valletta Grand Harbour is part of the TEN-T Core Network.

In 2022 a tender was issued for a shore-to-ship power system at the Malta Freeport Terminal. The aim of the project is to ensure cleaner air, less noise and vibration and lead to a reduction of CO_2 emissions at the Freeport. The project will ensure that by 2026, cargo ships using the Freeport will switch off their engines as soon as they complete the berthing process and make use of onshore power supply. The project will cost around 13 million EUR and will be co-financed through the Just Transition Fund.

Development of offshore energy

The Government is committed to attract investment in offshore renewable energy. In 2022, in response to the Government's preliminary market consultation process, proposals for a number of renewable energy projects were received. In parallel, the Government is also developing a renewable energy policy to provide the necessary framework for the deployment of renewable technologies within Malta's EEZ. The development of offshore renewable energy will require significant investment, both in terms of the renewable technology infrastructure and interconnections to integrate these installations with the grid.

2.4.3 Market Integration

I. National objectives related to other aspects of internal energy market, such as increasing system flexibility, market integration and coupling, smart grids, aggregation, demand response, storage, distributed generation, mechanisms for dispatching, re-dispatching, curtailment and real-time price signals

Due to its specific electricity network characteristics, Malta does not have an electricity transmission system and although the generation sector has been opened to competition there is currently no liquid wholesale electricity market on the island. Enemalta, as sole supplier of electricity, participates in the Italian wholesale electricity market (in particular the Sicilian bidding zone) for the purpose of purchasing/selling electricity through the interconnector.

Malta's objectives related to the deployment of energy storage, demand response and increasing system flexibility have already been described under the Energy Security section. Increasing the flexibility of the national energy system, including through the roll-out of cost-effective, innovative solutions, such as energy storage is one of the high-level national objectives set out under the Energy Security section.

Malta intends to develop two grid-scale Battery Energy Storage Systems (BESS), one funded under the ERDF and another under the RRF. BESS presents an important potential contribution for Malta to achieve its EU decarbonisation commitments. The main benefits of BESS for Malta's electricity system are the following:

- Provide a source of secure supply in cases of plant outages thereby enhancing the grid's resilience and stability.
- Address grid bottlenecks to accelerate the penetration of RES and offer solutions to alleviate congestion in the distribution network.
- Provide a black start facility capable of re-energising the grid in the event of a total shutdown and supply power to part of the network.
- Store energy generated by renewables during hours of maximum delivery and use it during peaks, thus flattening the variation between day and evening demand. This reduces the need to dispatch peaking plants or for investment in new peaking plants.
- Reduce the effect of the variability and intermittency caused by renewables, in periods of variable cloud cover, and thus permit the operation of conventional plant in a more stable manner, with inherent gains in plant reliability and efficiency, plant emissions reductions and CO_2 emission savings.
- Enable the creation of further RES, including large-scale renewable energy offshore projects, thereby reducing the use of fossil fuels for electricity generation.
- May provide fast frequency and voltage stabilisation to the Maltese grid in case Malta is isolated from the Italian grid because of maintenance or faults.

The size of the Maltese power system and its limited interconnectivity contribute to a significant cost to ensure the desired level of generation adequacy as already recognised by EU Commission's decision SA.45779 which approved availability payments as part of a Power Purchase Agreements and Gas Supply Agreement for the provision of additional generation capacity and gas supply.

Electricity prices in Malta are regulated for all sectors by the national regulator, REWS. Enemalta fulfils multiple roles in the Maltese electricity market: owner and operator of the distribution grid, the sole electricity supplier, the owner and operator of the interconnector with Sicily, as well as the owner and operator of the emergency back-up generation assets, namely Delimara 2 and GT9. Enemalta is also responsible for central dispatch of electricity.

There are currently no real-time price signals in Malta's electricity market. The retail of electricity is not open to competition.[20] Retail supply must be performed under a license issued by REWS in line with the Electricity Market Regulations, and Enemalta remains the only holder of such a licence in Malta. Except in the case of large developments, meter reading, billing and handling of customer relations are carried out by ARMS Ltd which is a subsidiary company owned and controlled by Enemalta and the Water Services Corporation. Electricity customers are on a regulated retail tariff intended to cover the net costs related to the operation of the distribution network, in addition to those related to imported electricity, generation and supply activities.

I. [If applicable] National objectives related to the non-discriminatory participation of renewable energy, demand response and storage, including via aggregation, in all energy markets including a timeframe for when the objectives should be met

As mentioned in previous sections, there is no liquid wholesale electricity market in Malta. Due to the absence of wholesale electricity trading arrangements, Enemalta is responsible for central dispatch and therefore obliged to dispatch electricity from local generation plants and the interconnector based

[20] Malta derogations in EU 2019/944: Articles 4 and 6

on their order of economic merit, with electricity from RES and CHP plants, irrespective of their size, benefitting from priority dispatch as long as there is no liquid wholesale market.

The Electricity Market Regulations (Subsidiary Legislation. 545.13), subject to the fulfilment of requirements related to the maintenance of reliability, safety and stability of the distribution system, oblige the DSO to:

- Guarantee the distribution of electricity produced from RES wherever technically feasible and with regard to system stability;
- Provide for priority access to the distribution system of electricity produced from RES;
- Give priority to generating installations using RES[21];
- Ensure that appropriate distribution systems and market-related operational measures are taken in order to minimise the curtailment of electricity produced from RES.

II. National objectives with regard to ensuring that consumers participate in the energy system and benefit from self-generation and new technologies, including smart meters

Objectives and actions concerning renewable self-generation are discussed in section 3.1.2.vi. An increase in the share of renewable self-consumption by consumers with an installed PV system would provide additional benefits in the form of reduced stress on the electricity grid, in particular during peak hours in the summer months. Grant schemes for residential PV systems and residential electricity tariffs are designed in such a way that consumers are incentivised to self-consume their generated electricity as much as technically possible. Incentives are also available for the installation of behind-the-meter battery energy storage systems, to further promote renewable self-consumption and allow for peak load shaving. Notwithstanding these incentives, most residential households tend to oversize their PV installation (to maximize their rooftop potential). This became more prevalent with higher efficiency panels and decreasing costs and therefore, in terms of percentage share of self-consumption, it is expected to experience a reduction until there is a large-scale deployment of battery storage.

Objectives and targets regarding energy storage and existing schemes are described under the RES and Energy Security dimensions.

In line with its programme to ensure an efficient distribution system, Enemalta has equipped 99.6% of its consumers with first generation smart meters and it has adopted a rising block tariff system that favours the prudent use of energy. In addition, second generation smart meters are being installed which have new functionalities that could allow the consumer to be more aware of their energy consumption. These new meters could be integrated with consumer energy management systems where in-house display systems, smart phones and other devices will provide the consumer with information on their consumption. All new residential electricity services are being installed with a second generation type smart meter. This also applies to situations where first generation meters need to be replaced. Roll-out of second generation smart meters currently stands at around 18.6% of total smart meters installed. Enemalta, in conjunction with the Government, is currently evaluating

[21] This shall be aligned with Article 12 to Regulation (EU) 2019/943.

the available technologies to enable the collection of near real-time data from second generation meters.

III. National objectives with regard to ensuring electricity system adequacy, as well as for the flexibility of energy system with regard to renewable energy production, including a timeframe for when the objectives will be met

National objectives and measures related to the flexibility of the energy system with regard to renewable energy production are set out under the Renewable Energy dimension of the Plan.

Electricity system adequacy:
Enemalta is responsible for ensuring the desired level of electricity system adequacy. Given the small size of Malta's electricity system which includes a gas-fired power plant, a dual-fuel power plant, emergency gasoil-fired back-up plants, an interconnector with Sicily, and several small-scale PV generators, Enemalta has so far adopted an N-1 approach when establishing generation system adequacy. This means that the system needs to be sufficiently resilient to meet maximum electricity demand in case of loss of the largest piece of power generation infrastructure. Enemalta will continue to abide by the national objective to maintain the same level of generation adequacy, based on the present approach until further developments of the power system may require an alternative approach.

At the moment, Malta is almost fully dependent on energy (gas and electricity) imports, with the only significant indigenous source of energy on the island being renewable energy from solar PV with installed capacity of 221MW_p by the end of 2022. Due to the inherent intermittency of RES and geophysical limitations on deployment, storage and costs, RES cannot meet all the non-variable generation capacity Malta needs and therefore sufficient conventional, flexible, and interconnection capacity is required to complement and provide backup. Although Malta now has a more diversified generation mix, grid stability will become even more important with the deployment of additional intermittent renewable energy sources such as additional PV installations and offshore renewable installations in the future.

A new iteration of the Electricity Supply Study, originally conducted in 2021, will be carried out in order to provide an updated assessment of the cost-optimal solutions for Malta's electricity system, including flexibility solutions to cater for grid stability and to mitigate the intermittency of RES.

Enemalta will continue to upgrade its sub-stations with transformers integrated with voltage tap-changers, as well as take onboard new technologies that mitigate current grid integration issues of renewables on the low voltage side and allow further deployment of small scale PV systems on rooftops.

IV. National objectives to protect energy consumers and improve the competitiveness of the retail energy sector

Competition in the supply of fuels is ensured through existing legislation enforced by the Regulator for Energy and Water Services and the Malta Competition and Consumer Affairs Authority. A number of suppliers are active in this sector.

There is only one electricity supplier in Malta. The retail of electricity is not open to competition. Enemalta plc. performs the functions of the DSO and that of the sole supplier of electricity to final customers. Retail supply must be performed under a license issued by REWS in line with the Electricity Market Regulations, and Enemalta remains the only holder of such a licence in Malta. Meter reading, billing and handling of customer relations are carried out by ARMS Ltd., which is a subsidiary company owned and controlled by Enemalta and the Water Services Corporation, Malta's Government-owned water utility company. During the energy price crisis, which peaked in the summer of 2022 when wholesale electricity import prices climbed to approximately 850 EUR/MWh, electricity consumers in Malta were shielded from any increase in the price through regulated retail tariffs supported through a general Government measure.

Details about policies and measures addressing vulnerable and energy poor consumers is provided under Section 3.4.3 iv. and under Section 3.4.4.i. related to Malta's assessment of energy poverty.

2.4.4 Energy Poverty

I. [If applicable] National objectives with regard to energy poverty

In view of the upcoming obligation, Malta is currently undergoing internal discussions and analysis to adopt a new indicator that better reflects Malta's specificities. This will be reflected in the final NECP in June 2024.

In the wider context of vulnerable households, which might not necessarily be limited to energy poor households, Malta is already implementing several measures. In addition, further considerations towards energy poverty will continue, even within the context of the Social Climate Fund Regulation. For details, please refer to section 3.4.4.

2.5 Dimension Research, Innovation and Competitiveness

I. National objectives and funding targets for public and private research and innovation relating to the Energy Union

With the end of the time-period covered by the 2020 National R&I Strategy, the Malta Council for Science and Technology released an updated National Research and Innovation Strategic Plan for 2023–2027[22] for public consultation at the end of 2022. This draft Strategic Plan aims to provide a

[22] https://meae.gov.mt/en/Public_Consultations/MEDE/Pages/Consultations/NationalResearchandInnovationStrategicPlan20232027.aspx

holistic vision for the development of R&I in Malta and aims to ensure a strengthened governance framework. The European Green Deal is recognised as an opportunity provider for more investments towards research and innovation for a greener and more digitized economy. In fact, the draft Strategic Plan recommends a targeted focus on a set of well-defined missions which aim to resolve key economic and societal challenges, including environment and climate change, health, competitiveness and security through research and/or innovation. The same draft Strategic Plan also recognises the role of thematic ad hoc policies and strategies in delivering the key objectives of the national overarching strategy. One of these ad hoc strategies is Malta's National R&I Strategy for Energy and Water 2021–2030.

At the end of 2021, Malta adopted its Smart Specialisation Strategy 2021–2027 which identifies six smart specialisation areas to underpin Malta's Cohesion Policy 2021–2027 in the Research, Technology, Development and Innovation (RTDI) priority. Five out of the six identified areas are directly or indirectly related to the Energy Union and decarbonisation. These are:

- Sustainable Use of Resources for Climate Change Mitigation and Adaptation, with a focus on net-zero carbon buildings, renewable energy generation and energy storage solutions, resource efficiency in industry and turning waste into a resource.
- Smart Manufacturing, with a focus on sustainable manufacturing and flexible automation.
- Marine & Maritime Technology, with a focus on the valorisation of marine resources and maritime technology.
- Aviation and Aerospace, with a focus on avionics, composite materials and development of new technologies for maintenance of new products.
- Future Digital Technologies with a focus on big data and data analytics, open data, smart space applications, human-centric applications, digitizing industries and sustainable use of resources or climate change mitigation and adaptation.

Malta's National R&I Strategy for Energy and Water 2021–2030

Malta's objective for R&I within the context of the Energy Union are identified in the National Strategy for R&I in Energy and Water 2021–2030 published in June 2020. This is the first national sectoral-specific R&I Strategy and covers the period 2021–2030. During this ten-year period Malta will endeavour to continue supporting and bolstering R&I initiatives relating to the dimensions of the Energy Union, specifically those addressing national policy priorities and challenges, and those contributing to national competitiveness and economic growth. In the first NECP three thematic areas, specifically related to dimensions under the Energy Union were identified. These included: Renewable Solutions for Islands, Integration of RE Electricity, and Energy Efficient Solutions. These thematic areas were eventually adopted within Malta's R&I Strategy within the context of an Energy-Water Nexus after consultation with experts and stakeholders as shown in Figure 10 below.

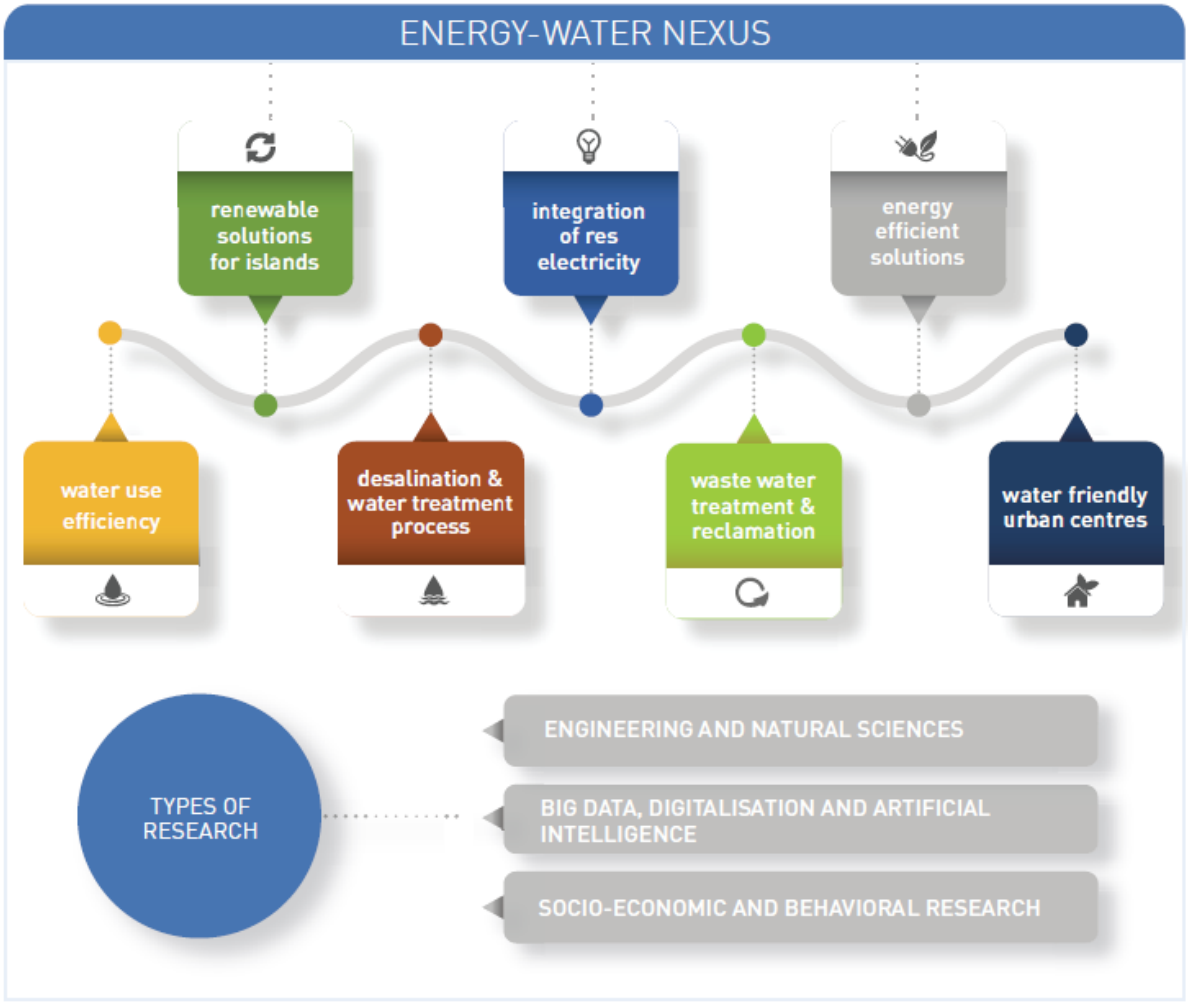

Figure 10 – Priority areas for R&I activities during the ten-year period of the National Strategy for Research and Innovation in Energy and Water (2021–2030)

This Strategy also seeks to strengthen and increase coordination and cooperation on R&I projects between the public sector, research institutions and business enterprises, while ensuring complementarity with national and EU policies, avoiding duplication, and enhancing synergies. To reach the previously outlined objectives, the Strategy envisages the development of a Supporting Framework which includes the creation of a Research and Innovation in Energy and Water (RINEW) Platform, to act as the primary tool for the coordination of its implementation (refer to Section 4.6 (i) for further details). This Supporting Framework also includes the creation of support mechanisms including financial support to incentivise R&I. Calls to provide support were either:

a) calls for bottom-up proposals relating to the Priority Area outlined above, or
b) calls for proposals to address structured research questions relating to the Priority Areas.

II. [Where available] National 2050 objectives related to the promotion of clean energy - technologies and, where appropriate, national objectives, including long-term targets (2050) for deployment of low-carbon technologies, including for decarbonising energy and carbon-

intensive industrial sectors and, where applicable, for related carbon transport and storage infrastructure

Malta does not have 2050 objectives related to the promotion of clean energy technologies. Malta has not set sector-specific decarbonisation target for energy and carbon-intensive industries as these are not present in Malta.

III. Where applicable, national objectives with regard to competitiveness

Malta does not have specific national objectives aimed at competitiveness. However, the National Strategy for Research and Innovation in Energy and Water (2021-2030) prioritises support for research activities contributing to the competitiveness of enterprises developing or adapting ad-hoc solutions for Malta and countries or regions having similar characteristics. Such home-grown products may also have the potential for scaling up and replication, thus multiplying the inherent added value of such research and enhancing its potential contribution to increasing industrial competitiveness.

3. POLICIES AND MEASURES

3.1 DIMENSION DECARBONISATION

3.1.1 GHG Emissions and Removals

Sectors falling within Emission Trading Scheme (ETS)

Within the current ETS in force, only power generation falls within its scope. Policies and measures addressing GHG emissions mitigation potential within this sector mainly target uptake of renewable energy systems together with improvements in energy efficiency. These policies and measures are outlined in sections 3.1.2 and 3.2.

Sectors falling within Effort Sharing Regulation (ESR)

Transport

This sector is a key contributor towards Malta's emissions profile within the ESR as it contributes to practically half of the ESR emissions. Therefore measures within this sector are key to further accelerate the decarbonisation and the achievement on the national target of -19% by 2030. Policies and measures addressing GHG emissions mitigation potential within this sector are outlined in section 3.1.3.

Waste

The waste sector contributed around 15% to total ESR emissions in 2021. The emissions generated are primarily through landfilling of waste. As part of its efforts in this sector, Malta has embarked on the following projects and initiatives that will be reshaping emission abatement potential over the coming period until year end 2030 as they target to divert waste away from landfills:

High Bio-Waste Capture

The investment in the construction of an Organic Processing Plant aimed at diverting waste away from landfills, will be treating organic waste mainly collected from household and commercial entities all over the Maltese Islands. Biowaste plays a key role in sustainable waste management. The project therefore aims at improving waste management in Malta by reducing the amount of biodegradable waste sent to landfill. Through this plant, organic waste will be transformed into compost to be used on agricultural fields and biogas will be generated and transformed into heat and electricity. The projected capacity of the plant is estimated at a maximum of 74,000 tonnes per year and is expected to be commissioned by the end of 2027.

Waste-to-Energy Facility

The development of a Waste-to-energy (WtE) facility in Malta has been included in the NECP 2019. This significant investment in the waste management infrastructure complements the existing and planned initiatives aimed at at supporting Malta's efforts in reducing landfilling of waste in line with the EU targets. Therefore, it will also contribute towards the reduction of emissions from landfilling once it becomes operational. The plant is designed with multiple line facilities, utilising two separate moving grates connected to the same turbine. Each line will accept 12 tonnes (total of 24 tonnes) per

hour of material resulting in a total combined thermal capacity between 16MJ/kg and 28MJ/kg. At 20MJ/kg the heat input to the boiler will be of 66MW. The infrastructural set-up will be located adjacent to existing landfills and other waste management facility within the Magħtab complex.

This additional investment will allow for the extraction of resources from waste prior to delivery to the WtE plant. This is also a priority and will be the *modus operandi* of the national waste operator. Coupled with the recent introduction of important policy tools; mainly mandatory waste separation and the introduction of differentiated gate fees; it is envisaged that organic and dry recyclables stream will be significantly diverted from the mixed waste collection to the selective collection system. Thus, the national waste operator is investing in the necessary infrastructure to presort such streams (black bag and mixed bulky waste) through the necessary investment in the Malta North Plant and the setting up of the Skip Management Facility (SMF).

Waste prevention measures

The Waste Management Plan (2021–2030) has been adopted in a manner that maximises the resource value from waste through holistic waste management solutions, adopting a collaborative approach while fostering behavioural change through the progressive adoption of various economic instruments. Waste prevention is another key priority area for the improved effectiveness of the management of waste. There is an array of measures in the waste prevention programme which is part of the national plan. These include among others, awareness raising campaigns, incentives for waste reduction as well as other policy initiatives that will provide a much-needed shift in consumption behaviour. This in turn will contribute towards reducing emissions from landfill.

Gas extraction from landfill

This will treat the gas extracted from landfill following the closure of the present landfills in operation. The main aim is to increase extractions points and thus biogas generation throughout the landfill once the landfill has been closed with installation of new gas system.

Disbursement will incorporate the drilling and necessary pipework for the construction of biogas wells and the incorporation of a new Combined Heat and Power (CHP) and Regenerative Thermal Oxidizer (RTO). A secondary RTO is required to handle the eventual increase in poor-quality biogas generation and to upgrade the existing RTO capability at the gas plant.

Agriculture

Due to the small size of the agricultural sector in Malta, its contribution towards generation of GHG emissions is around 7% of ESR emissions. Given that food security is essential for Malta as an island member state, this economic sector remains important for the livelihood of the economy as evidenced during recent challenging periods. Having said this, policies and measures aimed at reducing emissions are still planned within this sector in line with those included in NECP 2019 and they are supported in Malta's CAP strategic plan.

Indeed, there are opportunities for farms to reduce GHG emissions directly and indirectly from better land management, such as reducing the use of chemical fertilisers, improving housing and management of manure, and improving efficiency of use of organic fertilisers, as well as contributing to climate mitigation through energy efficiency measures.

Ensure sustainable irrigation for crops

Ensuring sustainable irrigation for crops will be targeted through the on-farm productive investment intervention as support may be directed towards the purchase of smart irrigation systems that are more efficient.

Use animal and agricultural waste and residues as a resource

This need will be addressed through the off-farm infrastructure intervention, which will contribute to the complete disconnection of farm waste from the sewage network through concrete measures aimed at achieving compliance with UWWTD. Support will ensure that farm waste is treated as a resource by transforming it as a fertiliser to be reintroduced as an input in agricultural value chains.

Reduce use of chemical N-fertilizers and other inputs with similarly high carbon footprint

Support for organic farming will target this need since this method of agricultural production leads to a reduced input use. Support will be provided in the form of annual payments for costs incurred and lost income for farmers in the process of converting to organic and also to certified organic farmers. The aim is to encourage more farmers to switch to this method of production in view of its many climate and environment benefits, also in view of the EU Green Deal 2030 target.

Aware of the need to reduce emissions from all contributing sectors beyond 2030, further initiatives within the agricultural sector to those outlined have been devised to ensure the longevity of the sector to continue to be resilient to climatic effects. The planned measures are listed below:

Assess the feasibility of Methane-inhibiting vaccines

From a policy perspective Malta is very much in favour of a methane-inhibiting vaccine. Nevertheless, understanding of the effectiveness and viability of this vaccine is still ongoing. Malta will continue to monitor such developments including from a financial feasibility point of view.

Manure and slurry management

Departing from what was until a while ago common practice, the Maltese Government is determined to implement a plan for the complete disconnection of livestock manure from the sewage network. The plan involves the development of three slurry treatment facilities, two in Malta and one in Gozo. Farm slurry will be collected and delivered to these three facilities and separated into a solid fraction and a liquid fraction. The solid fraction will undergo compaction following any necessary treatment to be used as a soil enhancer or processed into other products, whereas the liquid fraction will be treated in line with Directive 91/27/EEC concerning urban wastewater treatment or Regulation (EU) 2020/741 on minimum requirements for water reuse. The plan will be implemented by end of 2026. This measure will reduce emissions from agriculture as well as from the waste sector.

Aquaponics and vertical farming

The Government will continue assessing the economic feasibility of aquaponics and vertical farming from a cost-effectiveness point of view. From an agronomic and environmental perspective, these technologies have proven to be more productive and more sustainable than conventional systems. However, if these investments are developed on agricultural land they will surely have an impact on the rural landscape assessments including further agricultural land uptake. As such, assessments need to be carried out by the relevant authorities on whether these are to be allowed on agricultural areas or whether they should be set up elsewhere.

Modification of ruminant diets

This proposed measure is applicable to the dairy sector, particularly through improving the digestibility of forage, using high fat-diets, and using nitrate as a feed additive

Malta is totally dependent on import of feeds and this poses an issue in attaining the objectives of changing diets (feeds) on two counts. The availability and Cost Modified feed to achieve reduction in enteric fermentation is most probably attained at a higher cost. High cost of feed is already a challenge for our livestock farmers, increasing such costs would most certainly result in non-viability for the sector.

Industrial Processes and product use

The IPPU projections are based on a stock flow approach of fluorinated greenhouse gases (f-gases). The GHGs identified as being emitted by this sector are CO_2, HFCs and SF_6, as reported in the national inventory under the categories: Soda Ash Production and Use, Carbide Production, Use of N_2O for Anaesthesia and Consumption of Halocarbons and SF_6. Since most of the sectors are relatively minor, projections are solely based on the refrigeration and air-conditioning sector, which covers more than 95% of the whole sector. This ESR sector is particularly relevant to Malta as it includes emissions from f-gases of air conditioning units and contributes to around 18% of ESR emissions. Due to its hot climate, both society and the economy depends on this technology. There is no alternative of a climate neutral technology to air conditioning units for cooling in Malta. It is envisaged that national authorities will continue to improve effectiveness in the enforcement of the requirements under the F-Gases Regulation including to ensure that used up F-Gases are properly disposed of once they reach their end-of-life status.

3.1.2 Renewable Energy

I. Policies and measures to achieve the national contribution to the binding 2030 Union target for renewable energy and trajectories as referred to in point (a)(2) Article 4, and, where applicable or available, the elements referred to in point 2.1.2 of this Annex, including sector- and technology-specific measures

Malta aims to increase its ambition and make a greater contribution to the new Union 2030 renewable energy target. The limitations explained in section 2 mean that achieving this goal requires the extension of existing policies and measures and the development of new initiatives together with the

exploration of innovative technologies and solutions. The Government is determined to fully harness all technically and economically viable indigenous renewable energy sources and provide support to the private sector. Malta recognizes the importance of exploring new initiatives and considering emerging technologies to expand the national renewable energy share. As part of Malta's commitment to increase the share of renewable energy, apart from placing a strong emphasis on established sectors such as solar PV, renewable water heating technologies, biofuels, heat pumps and bio-waste to energy, Malta is also working on emerging renewable energy sources, such as offshore wind and solar.

Share of RES in Electricity

Solar PV

Solar PV continues to be the most viable and robust form of indigenous sources of RES. In 2020, the total number of PV installations was 29,324, while 2021 and 2022 saw a further increase in installations to 31,034 and 32,570 PV systems, respectively. In 2021, the overall energy generated from PVs in Malta accounted for 256 GWh, translating to a share of nearly 9.6%[23] of the overall electricity generated. By end of 2022, the overall PV nominal capacity exceeded 221MW_p. This amounts to an installed cumulative capacity that is 11% higher than the projected capacity indicated for 2022 in the first NECP.

In light of further potential for increasing the energy generated by solar PV, the Government intends to continue providing PV schemes and feed-in tariffs to further promote the installation of PV systems in private households and the commercial sector. Support for solar PV systems smaller than 40kW_p is regulated through Subsidiary Legislation 545.27. The framework supports the installation of new solar PV installations and is currently available in the form of operating aid, and also in the form of a grant on capital investment for households.

In terms of capital grant schemes available for households, the most recent PV grant scheme, launched in 2021, provides the following options for investments:

- 50% of eligible costs up to a maximum of €2,500 per system and €625/kW_p for a PV system with standard solar inverter.
- 50% of eligible costs up to a maximum of €3,000 per system and €750/kW_p for a PV system with hybrid inverter.
- 80% of eligible costs of the Battery Storage up to a maximum of €3,600 per system and €600/kWh plus 80% of eligible costs of the Hybrid inverter up to a maximum of €1,800 per system and €450/kW_p for a Hybrid/Battery inverter and battery.
- 80% of eligible costs of the battery storage up to a maximum of €3,600 per system and €600/kWh for battery storage only.

The second and the fourth options can be applied for in conjunction.

Support for PV systems larger than 40kW_p is given in the form of operational aid. In 2020, the competitive bidding scheme, originally only applicable to systems of at least 1MW_p, was extended to RES technologies with capacities of at least 400kW_p. In 2021, the competitive bidding scheme was further extended to RES technologies with a capacity of at least 40kW_p and a schedule of calls was

[23] Eurostat SHARES 2021

published to provide visibility to potential investors. Various competitive calls for different capacity - between 40kW$_p$ and 200kW$_p$, 200kW$_p$ and 1000kW$_p$ and over 1000kW$_p$ – have been issued since then. These competitive bidding processes are regulated by Subsidiary Legislations 545.32 and 545.39 respectively.

Support for renewable installations having a capacity of at least 1MW$_p$ is provided in the form of a Two-Way Contract for Difference. This will be extended to new installations having a capacity of at least 40kW$_p$ as from 2024.

The total net cumulated capacity as at end of 2022 is shown in Table 2.

	2022
Total capacity (kW$_p$)	222,399
<40kW	120,080
40kW - 200kW	23,733
200kW - 1MW	57,952
>1MW	20,633

Table 2 – PV capacity at the end of 2022

Existing schemes supporting the installation of PV systems cater for the option of self-consumption of renewable electricity in both the residential and non-residential sector. Under existing legislation, the applicant may opt to sell all electricity generated by the PV system to the DSO irrespective of any share consumed on site (full export) or export only the surplus electricity (partial export). Furthermore, in the case where the installation operator does not apply for support, Regulation 4A of SL 545.27 ensures that solar PVs may be installed primarily for self-consumption and that any surplus electricity is supplied to the DSO at the proxy for the market price. The increase in average PV installation size in the residential sector is leading to a higher share of electricity injected in the grid. Meanwhile, the introduction of behind-the-meter battery energy storage systems, is expected to gradually increase the portion of self-consumption in the residential sector.

In 2021, systems on partial export generated 25% of total electricity generated from solar PV (Figure 11). This figure goes up to 35% if third party installations that do not have the option to self-consume being connected to the grid before the consumption meter, are excluded. Additionally, if one were to include renewable electricity consumed on site by those who opt for a *full export* agreement, the share would rise to 44% (Yr 2021). As the support period for several PV systems has come to an end, it is expected that most will switch to a self-consumption billing option (*partial export*).

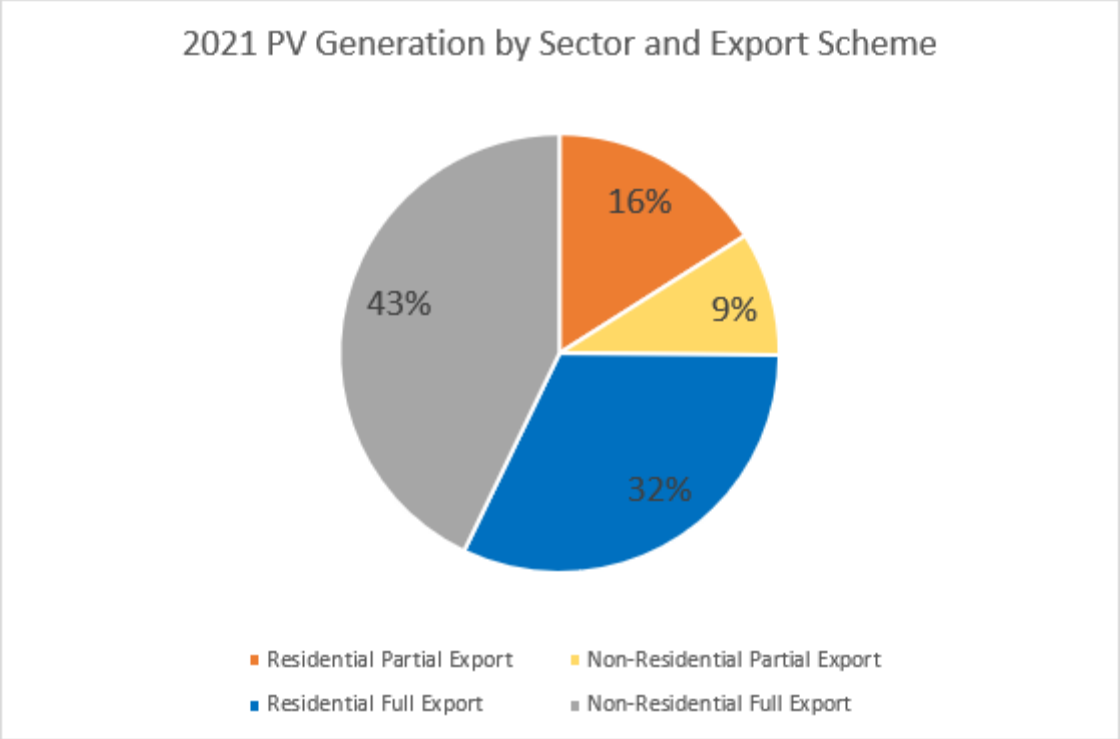

Figure 11 – 2021 Electricity production from PV systems on full vs partial export by sector (residential (RSD) vs non-residential (Non-RSD)),%

Since the introduction of support schemes in the form of feed-in tariffs, Malta's regulatory framework supported self-consumption and ensured that there would be no legal, financial or technical barriers to renewable self-consumption. Systems prioritising self-consumption face no additional charges when selling their excess production of renewable electricity to the grid. Self-consumption is promoted as a way consumers can offset their consumption of electricity from the grid (in real time) and thus, reduce their electricity bills, particularly in cases where such offsetting places the consumer in a lower electricity tariff band.

The Government will continue to promote renewable self-consumption of electricity from solar PV systems and ensure that no discriminatory or disproportionate procedures and charges apply.

Although the structure of the Maltese electricity system, with only one electricity supplier (Enemalta is the exclusive electricity supplier), as well as the limited space available for the deployment of PV installations, can be considered barriers for the setting up of renewable energy communities, the legal framework originally established for co-operatives, also lends itself to renewable energy communities.

A system of fast track permitting, taking the form of a notification process, was adopted by the Regulator (REWS) for PVs less than or equal to 16 amps per phase to facilitate the installation of such systems and their connection to the grid. In line with Article 16 of the recast of Directive 2009/28/EC on the promotion of the use of energy from renewable sources, Malta has adopted a simplified procedure for repowered systems.

PV systems larger than 16 amps per phase require an authorisation and a licence to operate from the REWS prior to construction and connection to the grid. In order to maintain the integrity of the grid, applicants are requested to commission a grid connection study to be carried out by the DSO to ensure that the system is seamlessly integrated into the network. The grid connection study is performed free

of charge for systems below 60 amps per phase or having a capacity not exceeding 40kW$_p$. The DSO has published a manual detailing the process flow for the processing of applications for grid connections of distributed RES to facilitate the process in such cases[24].

Private companies and citizens have an important role in the development of local renewable energy capacities. In parallel, the Government is increasing its efforts to ensure that public rooftop spaces are fully utilised, where possible. The cost-optimality analysis aimed at determining the most economically efficient levels for new buildings have shown that incorporating solar-based renewable sources is financially and economically feasible. The amount of energy generated from these renewable sources depends on factors such as the available roof area and the height of the building. The inclusion of PV panels is listed as one of the requirements in the latest version of technical Document F in line with ongoing discussions on the Energy Performance of Buildings Directive, and implementing such a proposal would promote the adoption of PV panels. The Technical Guide F is a local guide divided into two parts that establish minimum energy performance requirements applicable to new and renovated dwellings as well as new and renovated non-residential buildings intended for human occupancy. The minimum requirements relate to the overall energy performance of such buildings and to the performance of building elements that are retrofitted or replaced. These guidelines have just been updated and issued for public consultation, and are currently being reviewed by the Building and Construction Authority before being adopted.

The Government of Malta, through the established authorities, is developing plans to create the required synergy for the implementation of regulatory measures whereby new buildings reaching the maximum height limitation as per the relevant policies, will reserve the roof tops of the uppermost level for services including renewables. This measure is in fact now a milestone (7.1) of Malta's revised Recovery and Resilience Plan. The permitting framework will be reviewed, and legislation and planning guidelines will come into force requiring the installation of solar panels on new residential and non-residential buildings that reach their maximum allowed height set out in Local Plans and Development Control Design Policy, Guidance and Standards (Annex 2) approved by the Planning Authority (except for buildings in Urban Conservation Areas and scheduled buildings).

INDIS Malta Ltd, as the largest industrial land administrator in Malta, is actively promoting sustainability by encouraging private sector investment in photovoltaic (PV) panels installed on its industrial roofs. To further support private sector involvement in solar energy, INDIS Malta Ltd is exploring the potential collaboration between the Government and stakeholders to advocate for financial incentives such as tax credits, grants, and favourable financing options. Additionally, INDIS Malta Ltd will assess and explore partnership opportunities with renewable energy companies to offer access to its industrial roofs for solar projects, thereby extending the impact beyond its own premises.

In order to further encourage the use of renewable sources of energy, the Government launched 3 schemes for voluntary organisations where eligible applicants were offered a completely free PV system to be used on their premises. This scheme offered a choice between two systems. The first option consisted of the installation of a twelve module PV system having a capacity of 3.6kW$_p$ complete with an inverter including installation, testing and commissioning. The second option offered a twenty-four module PV system having a capacity of 7.2kW$_p$ complete with a three-phase inverter including installation, testing and commissioning. The scheme was made available through 3 calls for

[24] https://www.enemalta.com.mt/wp-content/uploads/2018/08/Enemalta-process-flow-for-processing-applications-for-grid-connection-of-distributed-RES.pdf

applications, and a total of 85 applications were received. From these 85 applications, 34 opted for a 12-module installation, while the other 51 applied for a 24-module PV installation.

To further promote the use of Renewable Energy within Public Buildings, PV panels and batteries were installed within 2 Local Councils. Both Pilot Projects were completed in March 2023. One of the aims of these Pilot Projects is the promotion and provision of information to the general public. For this reason, information screens were installed in both Local Councils to further promote sustainability.

To note that renewable electricity in Malta is prevalently generated from photovoltaic panels. This means that the generation profile does not benefit from complementarity from other renewable sources. Already with the installed capacity Malta's electricity system may be meeting more than half its demand by PV in certain hours, and therefore would need to be able to sustain rapid changes in supply caused by cloud cover. This effect is bound to become more pronounced as PV deployment increases. This was one of the reasons that led to the decision to invest in utility scale battery storage which, together with the interconnector, should assist in stabilizing the grid during high variable insolation intervals.

The Government remains committed to strengthen efforts to maximise potential of RES in electricity. Within its RRP (REPowerEU chapter), the Government committed to introduce legislative instruments to mandate the installation of solar panels on new buildings and shortened timelines for the application and permit granting procedures of renewable energy installations on greenhouses and renewable energy projects.

Battery Storage

As part of the Government's efforts to extend its financial support to further increase the deployment of solar PV technology and promote self-consumption; since 2021, households have also been eligible to benefit from a scheme to install a battery storage system in conjunction with their PV system. The scheme aims to increase consumers' flexibility in their ability to store excess renewable electricity generated by PV systems instead of exporting to the grid. By the end of 2021, there were 95 behind-the-meter battery storage systems installed, which amounts to an estimated 0.66 MWh of capacity. By the end of 2022, the battery systems installed increased to 489 units with a capacity of 3.55 MWh. Apart from residential-sized battery storage, the Government is also investing in two utility scale Battery Energy Storage Systems (BESS). More information on this measure is included in Section 3.3.i.

Biogas

In 2021 alone, the overall energy generated from biogas from waste in Malta was 7.23 GWh, amounting to nearly 0.27% of the overall electricity generated. These figures are expected to increase after the commissioning of the new Organic Processing Plant that is expected to be commissioned by 2027. Within this plant, organic waste from households and commercial entities will be treated and converted into compost and biogas. The organic processing plant will be designed to treat maximum 74,000 tonnes per annum, which at an estimated 120 normal cubic metres per tonne of waste input, will generate 20.98 GWh/y in electricity and 19.75 GWh/y in heat, when working at full capacity. In addition, as outlined in the NECP in 2019, a decision to commission a new waste-to-energy thermal treatment plant within the Magħtab complex was taken. These facilities will incinerate non-otherwise treatable or recyclable waste thereby enabling recovery of energy from the waste as well as a reduction

in the volume of the waste that ends up in the landfill. This is not expected to contribute to Malta's RES share. By 2027, the plant is expected to inject between 14-16 MW of electricity into the grid.

Offshore Renewable Energy Generation

As part of Malta's forward outlook and ambition in increasing the share of renewable energy from indigenous sources, the Maltese Government is focusing on the development of offshore (floating) renewable energy potential. This is being done to establish the necessary administrative and regulatory frameworks, that will enable the deployment of large-scale offshore renewable energy projects.

In parallel, pursuant to article 14(1) of the TEN-E Regulation (EU) 2022/869, in January 2021, with the aim to move towards climate neutrality, Malta expressed its broad goals of developing 400 MW of offshore renewable energy by 2050. As part of the Government's commitment to diversify the sources of energy and exploit all possible sources of renewable energy, the offshore potential is being actively pursued.

In 2021, the Government enacted the Exclusive Economic Zone Act (EEZ) (Cap 625 of the laws of Malta). This legislation allows Government to designate, EEZ areas adjacent to Malta's territorial waters; within the limits of Malta's potential EEZ without prejudice to Malta's final EEZ designation.

In May 2022, the Maltese Government issued a Preliminary Market Consultation (PMC) for The Proposal of Economic Activities within Malta's EEZ. This enabled the Government to gauge the level of interest by potential investors including for offshore renewable energy projects within Malta's potential EEZ.

Government has enacted various legislations to regulate activities in EEZ areas or environment protection areas outside Malta's territorial waters through Parliament. Most of the laws of Malta currently only apply up to the territorial waters, and so, it was necessary to extend the applicability of certain laws to EEZ areas or environmental protection areas, in accordance with the provisions of the 1982 United Nations Convention on the Law of the Sea (UNCLOS). Such amendments to the legislation would give both Government and operators the necessary legislative framework to conduct such operations.

The next step is the development of a national policy framework which caters for the development of offshore renewable energy installations including the identification of suitable sites for such installations. A draft policy for offshore renewables has been published for public consultation.

The relevant conditions and support framework will be defined in an eventual expression of interest for offshore energy installations, that will lead to the selection of successful bidder/s and eventual allocation of sites.

The update of the Electricity Supply Study will consider the introduction of offshore wind technology and assess the impact of various capacities taking into consideration the economic and technical constraints of the market and the grid.

Other initiatives

Malta's first green bonds program issued by the Water Services Corporation (WSC) in 2023 demonstrates the Corporation's commitment to environmental sustainability and responsible finance. Valued at €25 million and spanning ten years with a 4.25% interest rate, these bonds align with the UN's Sustainable Development Goals and the EU's Green Deal. Proceeds will fund eco-friendly projects, including a cutting-edge reverse osmosis plant in Gozo, solar farms for renewable energy, wastewater treatment plants, and network enhancements. This initiative tackles water challenges, promotes job creation, and economic growth. The certified Climate Bonds Initiative ensures that funds benefit environmentally impactful projects.

Renewable Energy Share in Heating & Cooling

It is worth noting that the transition towards a higher share of renewable heating and cooling through heat pump technology is already well-established and is not expected to require specific Government interventions as it is currently the predominant technology for spatial cooling.

The current share of RES-H&C is made up of different technologies, which apart from the heat generated by the bio-digesters referred to above, also includes solar water heaters, heat pump water heaters, air-to-air heat pumps and biomass imports.

Renewable Water Heating Technologies

Given the high solar intensity prevalent in Malta, solar water heaters (SWH) are considered a viable source of RES. In the case of multi-family buildings, which is the most common household type, there is limited roof space for such technology to service most of the tenants; thus heat pump water heaters (HPWP) are considered a viable option.

In 2021, the Solar Water Heater Grant Scheme was renewed, giving applicants the opportunity to claim up to 75% of the total eligible costs, up to a maximum of €1,400. An additional grant of €500 is provided after 5 years to cover the maintenance costs. Apart from the increase in support for these investments, the Government also simplified the application process, such that the beneficiary would receive an immediate clearance to proceed with the purchase of approved SWH/HPWH, removing potential downtime of a household's water heating unit. The maximum support level of the scheme for Heat Pump Water Heaters (HPWH) was also increased from €700 to €1,000. The increase in support for these technologies, along with an educational and awareness raising campaigns to encourage households to invest in such technologies by highlighting the benefits of SWHs/HPWHs, was intended to increase the annual uptake from around 400 units to 800 units over the period 2021–2030 as projected in the first NECP. Despite all these efforts, the actual number of SWHS and HPWHs installed through the grant schemes in 2021 and 2022 was 498 and 633 respectively, falling short of the projected target. There could be several reasons for this shortfall in the target uptake. However, it is clear that retailers prefer to push PV systems rather than SWH and customers see more value in a PV installation (which is practically maintenance free and provides savings which are easily identifiable in the electricity bill). Furthermore, HPWHs in Malta are not typically integrated with a spatial heating system. Buildings are rarely fitted with central heating systems in view of the low heating requirements in Malta. Therefore, HPWHs are installed to replace small (typically 60 to 80 litres) electric boilers, and although more efficient, come at a significantly higher cost.

Air-to-Air Heat Pumps

Reversible air-to-air heat pump technology is well-established in Malta and considered essential for thermal comfort by many. As a result, the number of air-to-air heat-pumps is projected to increase without the need for policy intervention. The Commission Delegated Regulation (EU) 2022/759 of 14th December 2021 amending Annex VII to Directive (EU) 2018/2001 of the European Parliament and of the Council as regards a methodology for calculating the amount of renewable energy used for cooling and district cooling gives Member States details on how to calculate RES-cooling from heat pump technology. More details on the methodology and assumptions used in the RES contribution of heat pumps can be found in section 4.2.2.

Renewable Energy Share in Transport

Biofuels

As indicated in Malta's first NECP, importers of EN228 petrol and EN590 diesel fuels are subject to a substitution obligation which requires them to blend an increasing share of biofuels in the volumes of fuel placed on the market, with the aim of meeting the targets set in SL 545.17. These reflect the obligation set out in Article 25 of Directive (EU) 2018/2001.

The Government transposed the fuel supplier obligation in S.L. 545.17 by gradually increasing the obligation of biofuel blending on importers of petrol and diesel from 10% in 2020 to 14% in 2030, by energy content, as a share of renewable energy supplied for final consumption in the road transport sector. The obligation additionally requires importers of petrol and diesel to increase the share of advanced biofuels from 0.1% in 2020 to 3.5% in 2030, with the share in 2022 and 2025 being 0.2% and 1.0% respectively.

Malta is still in the process of assessing the new fuel supplier obligation included in the provisional agreement of the recast proposal of the Renewable Energy Directive. The new target obliges Member States to choose one of the following options:

- A binding target of 14.5% reduction of greenhouse gas (GHG) intensity in transport from the use of renewable energy by 2030; or
- A binding target of at least 29% share of renewables within the final consumption of energy in the transport sector by 2030.

The provisional agreement also sets a binding combined sub-target of 5.5% for advanced biofuels and renewable fuels of non-biological origin in the share of renewable energies supplied to the transport sector. Within this target, there is a minimum requirement of 1.0% of renewable fuels of non-biological origin (RFNBOs) in the share of renewable energies supplied to the transport sector in 2030.

Electric Vehicles

Policies and measures addressing the electrification of vehicles are outlined in detail in Section 3.1.3.iii.

i. Where relevant, specific measures for regional cooperation, as well as, as an option, the estimated excess production of energy from renewable sources which could be transferred

to other Member States in order to achieve the national contribution and trajectories referred to in point 2.1.2

In 2018, Malta predicted a small shortfall in its renewable energy generation in 2020 due to a higher-than-expected increase in consumption as well as a lower-than projected yield from PV panels. In order to ensure full compliance with the Renewable Energy Directive, Malta made use of statistical transfers and acquired 80 GWh from Estonia with the option to transfer part of this amount to 2021.

However, the disruption caused by the COVID pandemic led to a drop in consumption and Malta reached its 10% renewable energy target in 2020 without the need for statistical transfer. It was therefore agreed with Estonia to transfer 60 GWh to 2021, leaving only 20 GWh to be attributed to 2020. While recognising the importance of these transfers, the Government does not foresee the purchase of RES credits for the periods leading to 2030.

Development of indigenous renewable capacities will continue to be prioritised, alongside seeking opportunities for regional cooperation.

In this context, Malta has embarked on projects and initiatives that are fostering intra-regional collaboration and that will enable the further deployment of more renewables. One such project includes the construction of another 200 MW interconnector between Malta and Sicily. This project is expected to be fully commissioned by the end of 2026. This project will double the electricity interconnectivity of Malta with the European grid to meet the forecasted increase in the islands' electricity demand expected from the projected economic and population growth, the electrification of the transport sector and the use of onshore power for vessels. The linkage with the mainland's network will provide security of electricity supply to the island and contribute towards reducing the dependency on domestic fossil-fuel fired (LNG and gasoil) electricity generating plant and thereby also reducing generation of local GHG emissions.

In the spirit of promoting regional cooperation, in May 2023, Malta together with eight other Mediterranean countries participated at the Med9 Energy Ministerial meeting in Malta and signed a joint statement that seeks to turn the region into a hub of green energy. The Med9 countries agreed that the Mediterranean can become a centre of renewable energy investments, with a focus on offshore renewables and new energy interconnections between the EU and non-EU Mediterranean countries, in efforts to facilitate European investment in green energy. More details about regional cooperation can be found within section 3.4.2 (ii).

ii. Specific measures on financial support, where applicable, including Union support and the use of Union funds, for the promotion of the production and use of energy from renewable sources in electricity, heating and cooling, and transport

The Government plans to extend existing support schemes and is also considering new opportunities for support to RES generation. Malta's planned deployment of RES until 2030 will be presented in the final NECP, and thus funding needs for the support of the respective measures are still not final.

iii. Where applicable, the assessment of the support for electricity from renewable sources that Member States are to carry out pursuant to Article 6(4) of Directive (EU) 2018/2001

According to article 6.4 of the Renewable Energy Directive, 'Member States shall, at least every five years, assess the effectiveness of their support schemes for electricity from renewable sources and their major distributive effects on different consumer groups, and on investments.' Member States are required to provide an update of this assessment in the NECPs and progress reports. Malta is currently developing this assessment and preliminary results are to be provided in the final NECP to be submitted in June 2024.

iv. Specific measures to introduce one or more contact points, streamline administrative procedures, provide information and training, and facilitate the uptake of power purchase agreements

RES generators and Combined Heat and Power plants rated up to 16 amps on any phase require just notification to the Regulator for Energy and Water Services. Therefore the aforementioned systems are exempted from requesting and obtaining any authorisation prior to installation and from getting a licence to generate electricity both of which are issued by the Regulator for Energy and Water Services. They are also exempted from the requirement to request a grid study from the DSO.

The Regulator for Energy and Water Services will coordinate with the relevant authorities the setting up of one or more contact points related to the permit-granting process. To this end, the Regulator is implementing an electronic platform that integrates the permitting process of the Regulator and the distribution system operator. The applicant will be able to submit an application to install a RES generator or CHP electronically through the electronic platform and the whole process up to the submission of the formal application for the connection to the grid will take place through this platform.

v. Assessment of the necessity to build new infrastructure for district heating and cooling produced from renewable sources

Malta does not have any district heating and cooling networks. The second comprehensive assessment, in line with Article 14 of the Energy Efficiency Directive 2012/27/EU dealing with the potential for efficient heating and cooling, was submitted to the Commission in 2020. Information regarding the outcome of the assessment is elaborated in Section 4.3. ii on the current potential for the application of high-efficiency cogeneration and efficient district heating and cooling.

vi. Where applicable, specific measures on the promotion of the use of energy from biomass, especially for new biomass mobilisation taking into account:

- *Biomass availability, including sustainable biomass: both domestic potential and imports from third countries*
- *Other biomass uses by other sectors (agriculture and forest-based sectors); as well as measures for the sustainability of biomass production and use*

Biomass is imported to Malta in small volumes and mostly used for heating purposes by households, and to a lesser extent by the non-residential sectors. Biomass imports are expected to remain stable and no specific measures are foreseen to promote the use of energy from biomass.

3.1.3 Other Elements of the Dimension

i. Where applicable, national policies and measures affecting the EU ETS sector and assessment of the complementarity and impacts on the EU ETS

As of 2022, Malta had a combined nominal electricity generation capacity from fossil fuel of 588.6 MW[25], using mainly natural gas (effective available capacity depends on season and maintenance schedule). Malta has no other large-scale industrial installations falling under the scope of the Emissions Trading Scheme Directive.

Insofar as aviation is concerned, Malta is the administering Member State of the EU ETS in respect of aircraft operators with a valid operating licence granted by the Civil Aviation Directorate (Transport Malta), and those operators that are licenced by non-EU Member States, or that do not require an operating licence, and for whom Malta has been identified as being the Member State with the greatest attributed emissions from flights performed by that operator. For the period 2017 to 2023, aircraft operators administered by Malta and eligible for free allocation amounted to only three. The updated rules on emissions trading in the aviation sector will bring the phasing out of free allowances for this sector by 2026. This agreement increases the stringency of the existing system, which has covered aviation since 2012.

The scope of the EU ETS has been extended to include CO_2 emissions from large ships (above 5000 gross tonnage), regardless of the flag they fly. The extension covers all emissions from ships calling at an EU port for voyages within the EU (intra-EU) as well as 50% of the emissions from voyages starting or ending outside of the EU (extra-EU voyages), and all emissions that occur when ships are at berth in EU ports. This EU-wide policy initiative is expected to impact Malta particularly given that as a small island member state, it relies heavily on transhipment for goods and services including food items. It is envisaged that this policy initiative will lead to socio-economic implications and possibly inflationary pressures as the higher costs are likely to be passed on to the end consumers. Having said this, the Maltese authorities are gearing up their administrative set-ups to be able to implement this initiative together with the other EU member states' authorities.

The ETS2 (Buildings and Road Transport) is a new separate emissions trading system for fuel combustion in buildings, road transport and additional sectors (mainly small industry not covered by the existing ETS). It complements policies covering these sectors by ensuring cost-efficient emissions reductions and a more level playing field for decarbonisation in these sectors. This upstream system regulates fuel suppliers rather than households and car drivers. Malta acknowledges that, in the framework of the EU's collective transition towards climate neutrality together with meeting the 2030 climate objectives (as enshrined in EU law), the ETS-BRT is designed to direct EU citizens towards making greener and cleaner choices.

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Moreover, provided that Malta has a lack of viable rapid mass transport alternatives despite the level of urbanisation, it is not expecting this to lead to significant emission reductions. This is the ultimate objective of the ETS-BRT. It is evident that the reality Malta faces in terms of infiltration of electric vehicles onto its highly particular market requires further significant support and policy measures. This is the only way to effect change in terms of emission reductions from the road transport sector by 2030.

ii. Policies and measures to achieve other national targets, where applicable.

No other national targets are specified, hence this category is not applicable at this stage.

iii. Policies and measures to achieve low emission mobility (including electrification of transport)

In 2016, the Maltese Government adopted a Transport Master Plan leading up to 2025. This plan is currently being updated and extended to 2030 in line with the 2050 National Transport Strategy. The 2030 Transport Master Plan comes at a time when Malta is experiencing robust post-pandemic recovery, continued economic growth, population growth, and record employment levels, with demand for transportation and energy steadily increasing.

The Master Plan is a catalyst to ensure that Malta takes the necessary, coordinated steps in proper transportation planning, identifying the right policy mix of measures while ensuring that economic progress and infrastructure development move steadily while managing the effect of transport on the environment, public health, and climate change.

The revision will take a comprehensive look at all modes of transport, including inter-modality for both freight and passenger transport. For these purposes, the National Transport Model (NTM) will be updated to reflect the current and forecasted economic and social scenarios and to inform policy and provide an integrated transport analysis. The model will be an update of the 2025 National Transport Model and will be used for the testing and appraisal of transport scenarios and provision of transport forecasts to refine the National Transport Strategy and develop the updated Transport Master Plan for Malta. The model will assist the Government's work by producing outputs for more detailed local or project models as input into the engineering design process, economic and financial analysis, environmental assessment, and for monitoring current and future projects.

The use of the national transport model, updated as part of the TMP, enables the Government to look at future trends and scenarios concerning options relating to transport policy and investment that would support the transport needs of the islands in the short, medium and long-term. The updated National Transport Master Plan will go through a public consultation phase concerning objectives and measures followed by an Environmental Report and Appropriate Assessment (Art. 6.4 Directive 92/43/EEC).

The measures being considered in the process come from two main sources: the 2019 NECP and the 2021 Low Carbon Development Strategy with revisions that will need to take into account the effects of the pandemic, of the shortage in raw materials, the change in global energy markets due to Russia's invasion of Ukraine and also commensurate with Malta's Recovery and Resilience Plan. The complete set of measures, will be designed to ensure consistency with Malta's long-term decarbonisation goals and will effectively be included in the final NECP2024.

Malta's strategies and initiatives with respect to air quality, recognize the transportation sector as a primary contributor to air pollution. The actions outlined in these initiatives are aimed at enhancing sustainable transportation, thereby also addressing the issue of reducing greenhouse gas emissions from the transportation sector. Malta is currently in the process of updating its Air Quality Plan, which will be made available for public consultation at the same time as the drafting of the National Energy and Climate Plan (NECP) update. This plan encompasses a range of measures designed to comprehensively address mobility challenges through sectoral initiatives that differentiate between household mobility needs and business operations mobility needs. The measures to be issued for public consultation revolve around encouraging a change in behaviour and they include; encouraged reduced use of private vehicles in conjunction with increased use of environmentally friendly public transportation services such as free public transport, as well as transitioning to cleaner fuels for the vehicle fleet. Therefore, the implementation of such plans and programmes will be included in the final NECP update as complimentary to the other policies and measures outlined in chapter 3.

As set out in Malta's first NECP, some measures have been implemented to achieve low emission mobility and incentivise the uptake of EVs in the local fleet. These measures are expected to be extended, strengthened where possible and complemented with new measures in the period leading up to 2030 and beyond, in line with other national policies.

Electrification of Transport

The Government's commitment to the reduction of GHG emissions from the transport sector includes an array of measures particularly related to the electrification of transport aimed at easing the transition to zero emission vehicles. These measures are being planned in line with various external and internal factors, particularly the ban on sale of Internal Combustion Engine Vehicles in line with regulation of the European Parliament and of the Council amending Regulation (EU) 2019/631 as regards strengthening the CO_2 emission performance standards for new passenger cars and new light commercial vehicles in line with the Union's increased climate ambition, supply considerations and the price convergence element.

This commitment, from a policy perspective, is in line with the national objective of climate neutrality by 2050. The below list outlines the policies and measures related to the transition towards electrification of vehicles:

- Electrification of vehicles equivalence of 65,000 electric vehicles in its fleet by 2030.
- Roll-out of EV Publicly accessible charging points
- Legislative obligations and incentives for private charging pillars
- Electrification of Public Sector Vehicle Fleet
- Electrification of Public Transport Fleet
- Work Plan of Cleaner Vehicles Commission
- Assessment of the Vehicle to Grid systems

Electrification of vehicles

Electrification of vehicles is one of the identified priority areas at EU level to achieve the increased overall EU ambition to reduce climate emissions by 55% by 2030. Malta has also identified the electrification of vehicles as a key measure to reduce emissions from the transport sector. Within this context, the Maltese government is intensifying its ambition from the set levels as outlined in the NECP 2019. It is indicated that the equivalent savings of 65,000 electric vehicles are being considered as part of the array of measures as part of the required 2030 emissions reduction objective in the road transport sector.

Electrification of land transport remains an important tool to reduce emissions in road transport. In order to incentivise the take up of electric vehicles, €50.3 million from Malta's Recovery and Resilience Fund (RRF) have been allocated over the span of 3 years to instigate a wider shift towards electric mobility and reduce emissions emanating from the road transport sector. These funds will assist in promoting the uptake of new electric vehicles in the private sector, including the commercial sector, through grant schemes. The schemes support the purchase of new passenger and goods carrying vehicles, minibuses/coaches, quadricycles/motorcycles and pedelecs. The scheme was launched in January 2022 and will continue to run through a rolling call up to 2025.

Malta currently offers the most advantageous scheme in terms of incentivising the modal shift to EVs and measures have been taken to achieve this throughout the years. Following the grant package that was launched in 2018, the Government relaunched the scheme in 2022 and is now offering €11,000 grants to the purchase of EVs with an additional scrapping scheme of €1,000 offered to those opting to deregister a vehicle of any category which is older than 10 years from its year of manufacture. This scheme was welcomed by the public, and in 2022 alone, over €28 million worth of applications have been received with 1,139 applications for new EVs, 893 applications for used EVs or plugin hybrids, 110 applications for LPG conversions and 2,264 applications for low and medium performance vehicles (new L category).

As a result of an investment of around €28 million in incentive grants in 2022, 1,381 electric/plug-in hybrid vehicles and 1,378 pedelecs/motorcycles were registered by the end of December 2022. In 2023 Government increased the investment to €29 million, €15 million available from the RRF and €14 million from national funds. This resulted in the registration of new electric vehicles and plug-in hybrid vehicles surpassing that recorded in 2022 in the same period. By the end of March 2023 there were a total of 6,221 registered electric vehicles, and 3,304 plug-in hybrid vehicles on our roads. A total of 9 financial initiatives in the form of grants were launched in the beginning of 2023.

Roll-out of EV Publicly accessible charging points

To support the electrification of transport systems, around 6,500 charging points are estimated to be required to be installed by 2030. This transition towards electrification of ICE vehicles across the nation will impact all stakeholders, from Government to industry and the private sector, civil society, and citizens. Such infrastructure will be adequately supporting the uptake of EVs on a national scale.

Around 360 charging points are already installed around the Maltese islands. A further 1,200 charging points will be funded through the Cohesion Fund, achieving a total of 1,500 points by 2025.

Legislative obligations and incentives for private charging

By virtue of Legal Notice 134/2020 new non-residential buildings and those undergoing significant renovation and having more than ten parking spaces must include at least one recharging point as defined in Directive 2014/94/EU of the European Parliament and the Council. Additionally, ducting infrastructure, such as conduits for electric cables, must be installed for at least one in every five parking spaces to allow for future installation of recharging points for electric vehicles. This requirement applies when the car park is located inside the building and renovation measures involve the car park or the electrical infrastructure, or when the car park is physically adjacent to the building and renovation measures include the car park or its electrical infrastructure.

Moreover, according to the Maltese Subsidiary Legislation 623.01, by 1st January 2025, requirements for the installation of a minimum number of recharging points in all non-residential buildings with more than twenty parking spaces will be established.

In the case of new residential buildings and those undergoing significant renovation with more than ten parking spaces, ducting infrastructure for electric cables must be installed for each parking space to enable the future installation of recharging points for electric vehicles.

Furthermore in 2021, the Electricity Supply Regulations (S.L. 545.01) were amended to reflect preferential electricity tariffs for EV charging in residential and non-residential premises. Off-peak consumption tariffs for EV charging apply from Mondays to Saturdays between midnight and 6am and between noon and 4pm. The off-peak tariff applies all day on Sundays.

Electrification of Public Transport Fleet

Following the successful introduction of six fully electric buses as a pilot project which started by offering a park and ride service from central Gozo to the Mġarr (Gozo) Harbour in November 2021, the Government of Malta has decided to roll-out the electrification of Public Transport Fleet through the replacement and integration of 141 electric buses by 2026 out of which 102 will be financed through Malta's allocated RRP Funds, with an investment of €34 million. The necessary upgrades to the electricity distribution grid will be carried out in time for the introduction of the 102 buses in 2025.

Electrification of Public Sector Vehicle Fleet

As part of the Government's commitment to lead by example and transition towards greener mobility, 250 EVs will be introduced as part of the public sector vehicle fleet and improve the efficiency of current operations through the concept of ridesharing between the various ministries and Government departments. The aim is to see a change in mobility management in the Maltese Public Service through the procurement of a cleaner fleet of Government general-use vehicles. This is also in terms of Reform C2-R6 of the RRP which is namely: Enhanced mobility management in the public service. The reform will be implemented by 30th June 2025. In addition, Government, through the

adoption of the Second Green Public Procurement National Action Plan, made the criteria for the product group 'Transport' mandatory, for all procurement in scope. These criteria are applicable to all vehicles for ordinary use, emergency vehicles and special vehicles. This Policy initiative is supporting the public sector to transition towards a lower GHG intensity within its fleet mainly through electrification of its vehicle fleet.

Electrification of Vehicles in the services and industry sectors

The Government also recognizes the importance of reducing emissions from specific sectors including the services and industry sectors in line with the objective of moving towards climate neutrality. Malta already provides assistance and supporting measures within the RRF framework as outlined in previous sections, and it will continue exploring innovative measures assessing the challenges that are currently hindering significant progress in this regard; both from a demand and supply perspective.

Assessment of the Vehicle to Grid systems

The Government is also supporting the shift to EVs by assessing the technical feasibility of a vehicle-to-grid system, where EV owners can contribute directly to the national electricity grid. This technology would allow for transfers of excess electricity in the battery storage with applicable feed-in tariffs.

Modal Shift towards alternative means of Transportation

National Free Public Transport Service

Over the span of five years, Malta has introduced progressive schemes to promote use of public transport. The Government launched free use of public transport for youths and students between 16–20 year olds, persons with disability and individuals over the pensionable age in October 2018. From the end of 2022, nation-wide free public transport service was provided to all 'Tal-Linja' card holders (data as of 2023 shows 479,667 card holders). The below table reflects the total number of Passengers using Public Transport across a 10-year period showing a significant increase year-on-year.

Total Number of Passengers using Public Transport 2012–2022	
2012	34,030,681
2013	39,438,822
2014	43,687,135
2015	42,160,228
2016	43,253,238
2017	48,053,045
2018	53,467,404
2019	57,409,385
2020	33,776,664

2021	35,207,174
2022	49,222,424

Table 3 – Total Number of Passengers using Public Transport 2021–2022

Complementing this measure, free school transport is being offered to all state and non-state school students, with over 29,900 students registering for this service for the scholastic year 2021–2022.

Ferry Landing Infrastructure

The Government remains focused on upgrading and enhancing its ferry infrastructure to meet the needs of commuters and tourists alike. Ferry transportation is being prioritised to reduce the circulation of private road vehicles through the provision of accessible maritime routes between coastal towns, thus reducing land-based transport emissions.

Works on the quay structure at the ferry landing site in Bormla have been concluded, with ferry trials expected to take place soon. Meanwhile, works at the ferry landing in Sliema are well underway, and completion is expected in Q3 of 2023. In addition to these works, a pedestrian lift at San Salvatore bastions, connecting Valletta's Peacock Garden to the Marsamxett ferry landing is currently being constructed. These projects, which are financed through both national and European funds, are intended to improve the quality of the ferry service by providing better accessibility, sheltered waiting areas, a safer and easier embarkation process, and make the service more reliable throughout the year.

Improved maritime transport connectivity

As part of the Government's vision to promote collective maritime transport and providing connections between different modes of public transport, a new ferry landing site in Buġibba is also planned. The investment will consist of the demolition of the existing dilapidated infrastructure, the construction of a ferry landing place featuring the addition of a breakwater for the safe harbouring of maritime activities, a slipway, jetty, sheltered waiting facilities for commuters, gangways and fenders.

These interventions will render the ferry service more reliable and therefore more attractive to users as an alternative mode of transport and a viable commuting option.

Fast passenger ferry link between Malta and Gozo

A fast ferry link between Malta and Gozo has been introduced to complement the conventional ferry services operated by the Gozo Channel. This service has been welcomed by both locals and tourists as it has facilitated commuting between the two islands. In fact, during its first year of operation the service has catered for 627,493 passengers (between June 2021 and July 2022) and additional trips covering more hours are offered on a seasonal basis to suit the demands of its users.

Active Transport

Incentivise Active Transportation modalities

In order to further encourage active modes of transport, the existing schemes to incentivise the electrification of vehicles, introduced in 2022 using RRP funds, was also applicable for pedelecs and all Category L vehicles including e-bikes. In 2022, total grants for Category L vehicles amounted to €2,929,091 for a quantity of 1046 vehicles and a total grant value of €360,592.94 for 343 pedelecs.

The National Cycling Strategy

The National Cycling Strategy including a National Cycling Action Plan which is being finalised and is intended to further support the uptake of cycling in Malta as a sustainable mode of transport. In this respect, it is intended to encourage cycling by ensuring measures that make our road infrastructure safer for cyclists. These measures also promote the good employment and better integration of bicycles and pedelecs on our roads. This strategy addresses cyclists' needs and concerns within the Maltese context while bearing in mind the spatial constraints of our Islands. It recognises that a coordinated approach needs to be adopted and that all stakeholders need to cooperate to promote cycling. The strategy also highlights the importance of discussions with other entities and authorities to ensure that major new developments cater for cycle parking, cycling infrastructure and pedelec charging facilities.

To promote and support cycling as a sustainable mode of transport, this Strategy aims to achieve the following strategic goals:

1. Increase awareness and improve cycling skills throughout the Maltese population.
2. Ensure a connected, cycle-friendly urban environment where cycling infrastructure forms an integral component with an investment of €35 million in new cycling routes.
3. Improve safety conditions.
4. Develop a cycling culture.
5. Establish strong cooperation networks between all respective stakeholders.

The scope and objectives of the National Cycling Strategy also fall within the current Government's policy to promote healthier lifestyles, with the Government's ambition of being a walking and cycling nation by 2025.

Investment in Active Mobility Infrastructure

Complementing the already integrated cycle lanes in major road infrastructure projects on the TEN-T Network and beyond, in October of 2022 the Government announced its to invest a further €35 million by 2029 to create a network of clean urban transport infrastructure (covering 50–60km) connecting various areas of the country to further promote a multimodal shift in mobility.

Through this investment, the Government will ensure the appropriate infrastructure and safe links for more direct and continuous active mobility routes for those who opt to walk or cycle as their mode of travel. The aim is to connect many different localities and landmarks by integrating them with public transport nodes and new proposed mobility hubs. These active mobility connections will enhance and facilitate the use of various alternative modes of transport.

The proposed routes aim to connect green spaces and busy nodes, offering an enhanced experience and efficient way to travel by walking and cycling. This project is also an opportunity to ameliorate existing urban spaces and transform them into non-motorised users' areas.

In previous years, extensive studies and work to provide the necessary infrastructure and connect several kilometres of cycling infrastructure with new pedestrian connections was undertaken. This project is a continuation of those studies, and it seeks to look at active mobility systematically while simultaneously connecting existing routes introduced in past projects and providing new continuous connections. It will increase travelling efficiency for those who forgo their private vehicle opting instead to walk or cycle.

Identified routes will have different aims. Transit routes provide direct connections between towns and regions. Others will allow effortless access to the heart of urban areas and villages. The projected investment will also be integrating the Slow Streets Project by the Local Council Association as parts of these routes can be interlinked and integrated into the general plan. The general map includes active mobility routes across all regions of Malta and will soon be discussed with various stakeholders. The current plan focuses on the Sustainability Urban Mobility Plan (SUMP) area. The SUMP area includes the northern and southern areas of the Grand Harbour. It connects busy districts in Sliema and St. Julian's on the northern side with central localities such as Birkirkara and Qormi. Ultimately, these routes will connect to several principal nodes, such as Valletta and Malta International Airport. On the southern end, the SUMP will connect SmartCity in Kalkara, with various towns across Marsa and Żabbar.

Other projects are in progress within the Grand Harbour area to facilitate active mobility. The Project on the coast of Msida which includes a larger promenade, a separate bicycle lane, new lighting System, planting of trees as well as facilities for fishermen/women and boat owners was completed. A similar Project along the coast in Pietà is currently underway and expected to be completed in the second quarter 2024. Technical studies are underway with respect to the Ta' Xbiex coast, ahead of planned Works in the second half of 2024. All these Projects will lead to a continuous promenade starting from Sa Maison all the way to Ta' Xbiex/Gżira. Other regeneration projects addressed the area known as 'tal-Magħluq' in Marsaxlokk while other Works currently underway with end of year completion will be addressing two areas in Cottonera, Senglea and Kalkara. In Senglea, the Project will result in making the area known as the Belvedere accessible to persons with restricted mobility, while in Kalkara, the Project will be going beyond structural works to also include a change in traffic design and the creation of a pedestrianised zone. With an investment of €5 million, Malta is nearing the final stages of the regeneration of the dilapidated Sally Port quays, turning a neglected seafront area in Cottonera into a new promenade. This new outdoor recreational space connects to the Vittoriosa (Birgu) Waterfront, creating an uninterrupted pedestrian route from the Villa Bighi area of Kalkara to the Birgu marina, the Dock 1 area of Cospicua, the Senglea waterfront and all the way to Boiler Wharf, beneath the Gardjola Gardens.

Alternative fuels

Assessment of the potential deployment and usability of hydrogen for transport

Malta aims to study solutions to decarbonise the transport sector. While existing policy focuses on electromobility, in order to maximise opportunities for different technological solutions for decarbonisation in transport, the Government is carrying out a study to assess the potential deployment and usability of hydrogen for transport in Malta covering all modes of transport including road, aviation and maritime.

The study will take into consideration demand and supply, availability of technology, cost of infrastructure required, as well as environmental, regulatory, planning and safety issues amongst other issues. Assessing the feasibility of hydrogen in transport is required to test out different case scenarios applicable to the local context and to assess the best integrated solutions for the Maltese Islands.

Roads Infrastructure Network Improvements

The continuous upgrades of various projects on the TEN-T network aim to reduce congestion at traffic bottlenecks that lead to an increased overall average speed (and consequent reduction in fuel consumption and GHG emissions). One example of such projects is the Marsa Addolorata Project – completed in 2021. This project involved the construction of a multi-level intersection with seven flyover structures, 12 kilometres of new lanes, 3.5 kilometres of footpaths and cycle lanes, two footbridges, bus lanes, a 380-space car park, 15 kilometres of underground networks and extensive landscaped areas with thousands of new trees.

Kappara Junction; the regional road section in Kappara formed part of the original strategic TEN-T road network and had been previously identified as a major traffic bottleneck. Works on the Kappara junction were completed in 2017.

A number of traffic bottlenecks have been addressed through various developments such as the Kirkop Tunnels and Airport Intersection Project, improving access to Malta International Airport and the Malta Freeport, two strategic locations for several sectors of the Maltese economy. This project has provided safer facilities for alternative modes of travel and now includes new footpaths and improved public transport amenities as well as new cycle lanes and safe cycle routes that complement the cycle lanes and the cycling and pedestrian bridge at L-Avjazzjoni Avenue and the designated cycling and walking track at San Tumas Road and Ħal Qormi Road, which were developed during the last three years. The roundabout's new design also includes safer pedestrian and cycling crossings.

The €11 million investment in the Luqa Junction Project, now nearing its completion, will replace this locality's principal roundabout with a multi-level junction facilitating quicker and safer connections between Qormi, Luqa, Santa Luċija, Marsa, Gudja the Airport, and the Kirkop Tunnels. The project incorporates pathways, pedestrian crossings and a new segregated cycling and pedestrian path along

Il-Kunsill Tal-Ewropa Road. Furthermore, it will create a new recreational open space with easy pedestrian access from the centre of Luqa.

In October 2022, the opening of the Mrieħel Underpass created an uninterrupted link between L-Imdina Road, Balzan and Mrieħel Bypass. This two-lane 60-metre underpass is located beneath the new roundabout, eliminating the traffic lights at this important junction between Balzan, Birkirkara and Mrieħel. Through an investiment of €7.4 million on this new tunnel, the main eastbound traffic flows from L-Imdina Road, Balzan, towards the Mrieħel Bypass (Royal Malta Artillery Avenue) and is grade-separated from the other flows converging at the newly built roundabout. Furthermore, it is covered with the new roundabout and its approaching lanes, pedestrian and cycling crossings. This augments the positive impacts of the Central Link Project in Attard, Balzan, Birkirkara and Mrieħel by reducing traffic volumes, the Mrieħel Underpass Project enabled the introduction of safer pedestrian and cycling crossing to link Birkirkara, Mrieħel and Balzan with Il-Ħofor Road, a rural road leading to Żebbuġ and Qormi. These roundabout crossings will further improve the connections of the four-kilometre cycling and walking infrastructure developed through the Central Link Project in Ta' Qali, Attard and Balzan.

As part of the Central Link Project, two new lanes have been built to create an uninterrupted route in the opposite direction, westbound from the Bypass towards Balzan and Attard. By eliminating the principal eastbound (through the new tunnel) and westbound flows from the new roundabout, it has become quicker and safer for road users travelling to other nearby destinations, including Mrieħel, Birkirkara and Żebbuġ (from Attard, Balzan and Lija).

A project upgrade in the southbound carriageway of the Mrieħel Bypass and upgrading the existing junction leading to the Mrieħel Industrial Estate will upgrade 1.5 kilometres of crash barriers and motorcycle strips, upgrade the existing stormwater system and build 800 metres of new footpaths as well as the complete rebuilding of L-Intornjatur Road, replacing the existing stormwater tunnel, upgrading its underground networks and resurfacing the road. A safety upgrade of €5 million along both carriageways of the Mrieħel Bypass and upgrading the existing junction leading to the Mrieħel Industrial Estate will introduce a total of 4.5 kilometre vehicle restraint systems on both sides of the road. Previously open culverts along the southbound carriageway were roofed and made way to introduce 800 metres of new footpaths. Most of the works, which are being done at nightime to minimise the impact on traffic flows, comprise of the replacement and upgrading of 940 metres of stormwater pipes to alleviate flooding problems, as well as the complete resurfacing of both carriageways at the Mrieħel Bypass comprising of over 26,000 square metres of geogrid sheets with self-adhesive, reinforcing all layers beneath the newly asphalted surfaces.

A major investment of €5.4 million will address the traffic bottleneck in St Andrews Road, Swieqi, by transforming a restricted dual carriageway with two traffic light junctions into a safer connection by introducing two hairpin turns to allow vehicles to cross over without stopping the opposing flow, drastically improving vehicle flow in this junction. Furthermore, a stretch of road in front of the Park and Ride Area up to the Red Cross premises (before the junction at Triq Profs Ganado) will accommodate an additional lane and introduce a new shared pedestrian/cycle lane in the form of a raised footpath to make room for a new multi-mobility link in the area. A new physical central reserve system to increase road safety and avoid head-on collisions will be incorporated. The redesigned junction in Triq Profs Ganado and Triq Sant'Andrija will transform the existing entry into a safer and

more organised intersection, which through a traffic model study will address the projected vehicle increase for the coming years.

The road corridor extending from the Sa Maison area of Msida to the Tal-Qroqq Skatepark roundabout is one of the country's principle network nodes, connecting Valletta and the Grand Harbour region with the northern and southern regions of the island. Over 4,500 vehicles go through the Msida Creek traffic lights junction every hour to travel to and from Valletta and other nearby localities.

This investment of approximately €18 million, includes the redesign and reconstruction of the traffic lights junction connecting, the upgrade of nearby junctions with other roads leading to and from Gżira, Sliema and Ta' Xbiex. The proposed road design will eliminate traffic light waiting times and reduce travel times and accident risks along this arterial route, improving air quality in this part of Msida and other nearby residential and recreational areas.

Aside from the construction of a new flyover to replace the Msida Creek traffic lights junction and safer facilities for alternative modes of travel, including a new cycling and walking track, the project will also provide a major upgrade and embellishment of the surrounding areas with new recreational zones.

The new open spaces and recreational zones being created by this project, will include a new 2,200 metres squared piazza in front of the Parish Church and a seawater channel, the latter also forming part of a plan to prevent flooding. This 220-metre channel will be surrounded by pathways in a landscaped area designated for relaxation in a serene environment.

The new 200-metre-long bidirectional flyover proposed in this project will directly link Triq il-Marina with Triq Mikiel Anton Vassalli, to reduce the impact of this through traffic on the nearby recreational and residential areas and promenades of Msida. By replacing the traffic lights with a grade-separated intersection, this project will increase the efficiency and capacity of this node, while reducing the existing high levels of air and noise pollution caused by long waiting times.

The upgrade of this important network node forms part of Malta's ongoing commitment to improve the quality, efficiency, safety and sustainability of Malta's land transport infrastructure, and to provide the necessary capacity to overcome existing challenges and meet future requirements. A Road Scheme Upgrade Assessment and a Road Safety Audit demonstrated that this upgrade will sufficiently cater for the requirements of current and future road transport demands.

Public transport connections along this route where the bus service is widely used will improve. Wider pavements, along with a part of the new separate cycling and walking track by the seafront, that eventually will connect Tal-Pietà with Ta' Xbiex and Triq il-Wied tal-Imsida as well as Pelican pedestrian crossings will contribute to safe active mobility.

A new solar-covered parking lot with 100 spaces will also be developed, and the area surrounding the Workers' Memorial will be transformed into a landscaped green area, adjoining the existing public garden which will be extended. The landscaped zone and public garden will cover a total area of 4,500 m^2. The new project plans include a comprehensive underground stormwater system to alleviate the area's flooding problem that has been dragging on for decades.

In addition to works on Malta's arterial and distributor roads network, by January 2023, 1,057 residential roads/projects have been completed, approximately 75% of its total 1,400 planned residential roads projects. These works involve widening, construction and re-organisation of road infrastructure that provide better and safer access for cyclists and pedestrians to further encourage active mobility in our local communities. Another 104 projects are ongoing and Infrastructure Malta plans to maintain its current rate of 200 road projects per year until all planned road works are completed.

Other Policies & Measures

Sustainable Urban Mobility Plans (SUMP)

The first SUMP in Malta was developed for the city of Valletta and covered the years 2006–2012. Building over the achievements of this first SUMP, the northern and southern Harbour Regions SUMP has been published in December 2022 and extends over 27 localities surrounding Valletta.

The SUMP process includes a thorough dialogue with stakeholders as well as expert consultation and results in a compilation of existing actions, measures and future measures, that together contribute to the overall vision of an improved quality of life and mobility for residents and commuters to the area, and in making the region safer and more attractive to tourists. The measures in the 2022 SUMPS have been categorized under four core pillars:

1. Incentivise alternatives to car use
2. Transition to cleaner transport
3. Optimise the (current) transport ecosystem
4. Optimise provision of goods and joint services.

Following the publication of this SUMP, the next steps will focus on implementation (expected to take place within 5–10 years) and monitoring. Ultimately, the intention is to extend this exercise to all the remaining regions of the Maltese Islands.

Over the period 2019–2020, a pilot project where the delivery of goods from entities to Valletta was organised through the use of a shared electric vehicle was conducted. In total, 7 small businesses delivered goods from their premises in Ta' Qali Crafts Village to various souvenir shops in Valletta by sharing an electric van. This short-term pilot project was successful, and its outcome was used to inform the SUMP for the Northern and Southern region.

Low Emission Zone Study

As announced in the 2019 NECP, the Government has continued to study the possible introduction of Low Emission Zones in Malta with a view of improving air quality and lower emissions, particularly in the Grand Harbour area. A project to study potential LEZ designated areas is being carried out with its outcome potentially enabling the possible introduction of LEZ in the Grand Harbour area, especially in areas with high traffic and poor air quality.

Development of a real-time journey planner

Public transport in Malta has made significant progress in innovating its user interface and experience. The Malta Public Transport has implemented a real-time journey planner through the 'Tal-Linja' Mobile app providing travellers with the possibility of planning all their bus routes and real-time tracking of buses. The current journey planner, although not intermodal, has undergone extensive development. The intention is to further develop this to provide a more enhanced experience.

Smart Parking System for Valletta

One other measure that was implemented with the aim of reducing congestion was that of the smart parking system in the Hastings parking area in Valletta. In 2021, a monitoring system that informs commuters getting into Valletta whether there is parking available within the Hastings car park has been implemented. This enables commuters to either head straight towards the parking, or to avoid the area and look at alternative sites when the parking is full. Therefore, CO_2 emissions have been decreased by reducing needless circulation of vehicles in search for a parking place within the car park when there is no availability.

Urban transport and urban logistics

Malta is the most densely populated country in the EU with about 1,265 inhabitants per square kilometre. There are over 18,000 vehicles for each square kilometre of road in Malta and 70,000 cars are driving in either direction during peak hours. Malta has a total of 435,000 vehicles registered to date, of which 376,000 are cars, vans, buses, and trucks.

The Government is engaging with stakeholders so that services on Maltese roads are not provided in the morning and afternoon peak hours. In the interest of traffic safety, the reduction of emissions and rationalising traffic flow during peak traffic hours, a proposal has been made to ban commercial and heavy vehicles from travelling during the peak hours.

The expected result of this new approach is the decongestion of streets and roads during peak hours. Average vehicle speed – including that of public transport – will increase especially in the northern and southern Harbour Area with an improvement of air quality and lower emissions GHG emissions overall. The implementation of the measure will be monitored and periodically assessed.

Sustainable Multimodal Intelligent Transport Hubs Project

Ongoing implementation of the 2025 Master Plan relates to a number of measures falling under the **Sustainable Multimodal Intelligent Transport Hubs Project** known as SMITHs Project. The concept revolves around the identification and the setting up of local transport hubs to provide multi-modal transport services for transport users as an alternative to the use of the private personal car. In this respect, the work so far has been preparatory in nature in terms of project design, engagement of third-party consultancy services and preparation/publication of procurement processes.

The main objective of the SMITHs is to provide different inter-modal services in conjunction with public transport to essentially complete the last mile of one's journey. Thus, in effect, apart from public bus transport stops in a given local transport hub, one would also find electric car sharing services, pedelec sharing, bicycle sharing, electric motorcycle sharing and scooter sharing. In some localities, especially in maritime towns and villages, maritime public transport is being provided and the service will be extended to other localities due to increased popularity.

Integrated Transport Management System (ITMS) Platform

Under the SMITHS Project, an Integrated Transport Management System (ITMS) Platform will be bringing together various already-existing operational systems with the aim of providing improved availability and quality of information that can ultimately be used to decrease the level of congestion on the roads and lead to reductions in GHG emissions. By facilitating information on for example, the public transport system, the efficiency of this mode of transport can be improved and this will contribute towards an increased modal shift where motorists will be more encouraged to opt for public modes of transport instead of using their own privately owned cars. The platform will also be supporting the implementation of delegated regulations under Directive 2010/40/EU, whereby accurate data on infrastructure, safety, traffic and travel data should be made available to users such as transport authorities or service providers. The aim is for this platform to be complete by 2023, after which it would be populated with data.

Permanent Link between Malta and Gozo

Enhanced connectivity between Malta and Gozo holds significant importance within the economic, social, and environmental context of the islands. The Government continues evaluating the feasibility and viability of establishing a permanent link between Malta and Gozo through various studies related to the proposed initiative. These studies will also analyse and consider a range of external elements and circumstances that can influence the realization of this permanent connection between the islands.

i. Where applicable, national policies, timelines and measures planned to phase out energy subsidies, in particular for fossil fuels

Malta, as part of the EU, has committed within the international fora 'to accelerate efforts towards the phasedown of unabated coal power and phase-out of inefficient fossil fuel subsidies'. Bearing in mind

Malta's specificities, there are no plans to phase out any energy subsidies at this particular juncture, while remaining committed to, inter alia, encourage the adoption of technologies that can help reduce greenhouse gas emissions.

Domestic Voluntary Carbon Offsetting Market

Malta is currently assessing the potential to set up a voluntary carbon offsetting fund whereby companies can participate by obtaining carbon credits to achieve climate neutrality. This measure will bolster CSR in Maltese companies while at the same time raising capital mass to invest in climate action.

3.2 DIMENSION ENERGY EFFICIENCY

i. Energy efficiency obligation schemes and alternative policy measures under Articles 7a and 7b and Article 20(6) of Directive 2012/27/EU and to be prepared in accordance with Annex III to this Regulation

As mentioned in Section 2.2, Malta has the lowest final energy consumption per capita across all Member States, almost half the EU average. However, Malta is still committed to reduce its energy consumption across the different sectors where possible.

Transport

Malta is committed to move away from ICE vehicles and electrify its fleet. A number of measures which have been identified in the LCDS are also expected to contribute to the energy savings obligation target.

A generous grant scheme to incentivise the purchase of electric vehicles by private individuals, voluntary organisation and undertakings is already in place. The grant scheme was relaunched in 2022 and offers grants of €11,000 for the purchase of EVs, which can be bolstered by an additional grant of €1,000 if the purchase is combined with the scrappage of a vehicle older than 10 years (from its year of manufacture). Funds under Malta's Recovery and Resilience Plan have been allocated to support the scheme with the aim of introducing 5,600 electric vehicles within the private sector by the end of 2025.

Apart from the EV grant scheme, grants were also available for the purchase of plug-in hybrids. This package of schemes, which underlines Malta's commitment to decarbonise its fleet, was welcomed by the public, and in 2022 alone, over €18 million worth of applications were received for both used and new EVs and Plug-in Hybrid vehicles (PHEVs).

Furthermore, as part of the Government's commitment to lead by example and transition towards greener mobility, 250 EVs will be introduced as part of the public sector vehicle fleet and improve the efficiency of current operations through the concept of ridesharing between the various ministries and Government departments. The aim is to see a change in mobility management in the Maltese Public Service through the procurement of a cleaner fleet of Government general-use vehicles (GUVs). This is also in terms of Reform C2-R6 of the RRP which is namely: Enhanced mobility management in the public service. The reform will be implemented by 30th June 2025. In addition, Government adopted the Second green public procurement (GPP) action plan (2021–2027) which includes the transport sector as one of its mandatory product groups. This policy initiative will support the public sector to transition towards electrification of its vehicle fleet.

The Government's ambition to accelerate the shift to cleaner vehicles is further exemplified in the LCDS's commitments towards the local EV charging infrastructure and electrification of transport. A sufficient number of charging points to meet the objectives of electrification of transport is expected to be installed by 2030. The aim is to have adequate infrastructure in place to intensify the uptake of EVs on a national scale. Around 360 charging points are already installed around the Maltese islands.

A further 1,200 charging points will be funded through the Cohesion Fund, achieving a total of 1,500 points by 2025.

The Government is also committed to electrify 102 buses by 2025 using funds available under the Recovery and Resilience Plan for Malta. This follows the success of a pilot carried out in the island of Gozo to demonstrate and test electric buses and electric mini cabs. This project, implemented in November 2021, introduced 6 fully electric buses offering a park and ride service from Central Gozo to the Mġarr Harbour.

The Government is also supporting the decrease of private vehicle use through a number of transport measures and investments. These include measures to further encourage the use of smaller vehicles for urban mobility such as pedelecs and L category vehicles (such as mopeds, motorcycles, tricycles and quadricycles). Investments in transport infrastructure include footpaths, pedestrianised areas, widened sidewalks, cycling lanes, bicycle parking facilities, bike charging points as well as traffic management systems and associated signage.

Following a two-year pilot project which started in 2019 within the public sector, the Remote Working Policy was introduced in October 2021 aiming to achieve new work-life balance while also introducing the concept of remote workspaces. This policy had a transition period of 18 months. Following this transition period, certain policy changes were made to better reflect today's realities. The main changes which started from April 2023 are the retention of already present measures such as the reduced hours, the improvement of remote working and the introduction of new measures such as the flexi-hours and the flexi-week.

While the primary objective of these proposals is to improve work-life balance, the introduction of these modern work practices is also intended to promote sustainability, flexibility, and efficiency. The measures related to remote working, flexi-hours and flexi-week will enable the reduction in the number of vehicles on the roads, particularly during peak hours, and this will eventually contribute to fewer journeys and alleviate traffic congestion.

Moreover, over the span of five years, Malta has introduced incentives to promote the use of public and collective transport. In October 2018, the Government launched free use of public transport for youths and students between 16 and 20 years old, persons with disability and individuals over the pensionable age. In 2022, the Government has extended this initiative drastically, to offer free public transport to all 400,000 public transport card holders. Complementing this measure, free school transport was offered to all state and non-state school students, with over 29,900 students registering for this service for the scholastic year 2021–2022.

Industry and Services

Promotion of Energy Efficiency in industry and the services sectors is addressed through a number of schemes and initiatives.

The Investment Aid Scheme

Through this initiative, Malta Enterprise together with the Energy and Water Agency aims to support businesses in carrying out investments leading to improved energy efficiency. This aid aims to facilitate investments in technological solutions providing higher energy efficiency and which contribute directly towards a reduction in energy requirements of its beneficiaries. This support comes in the form of a cash grant or a tax credit (which can be utilised against tax payable by the beneficiary) or a combination of both.

The Investment Aid Scheme[26], first launched in 2018, encourages enterprises to undertake energy efficiency projects and provides aid to the maximum allowed by State Aid rules. The scheme is now under review to improve its uptake.

Smart and Sustainable Investment Grant

Through this grant Malta Enterprise will be supporting business in their investments to incentivise the adoption of more digital and environmentally sustainable business practices. The Smart and Sustainable Investment Grant provides business funding to support the undertaking of investments that lead to more sustainable processes leading to the enhancement of competitiveness of the enterprise through the optimisation of the use of resources in their activities. Aid is awarded in the form of a cash grant of up to €100,000 capped at 50% of eligible costs in machinery and equipment resulting in the beneficiaries becoming more sustainable. A further tax credit of up to €40,000 may be awarded if criteria established in the guidelines are met.

Households

Malta's average consumption per dwelling is well below the EU average and is the lowest amongst all EU Member States. Furthermore, as shown in Figure 12, Malta has a considerably different consumption profile. While the European Union as a whole has the highest share of energy attributed to space heating, Malta has the highest share of energy used for lighting and appliances followed by water heating and space cooling.

[26] https://www.maltaenterprise.com/support/energy-efficiency-projects

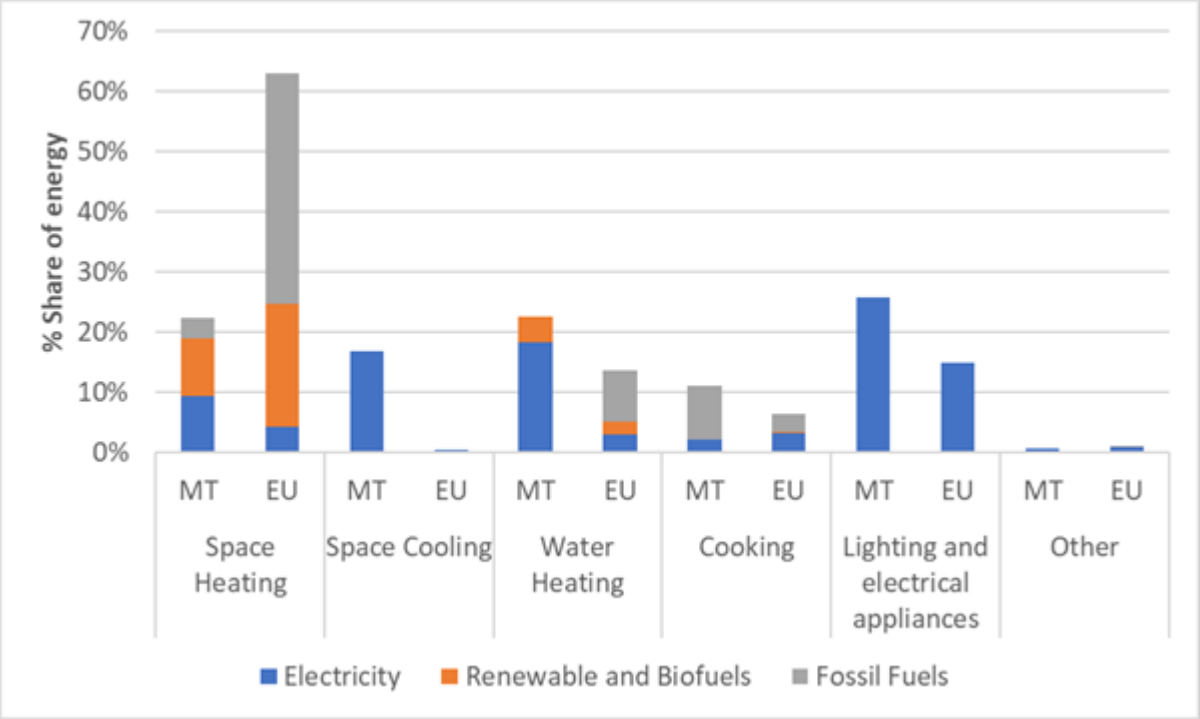

Figure 12 – Typical Household Energy Consumption by end-use in 2021

In view of the widespread use of efficient heat-pump technology for cooling, and to a lesser extent, heating, no Government intervention is necessary to promote their deployment. Therefore, savings resulting from such actions cannot be accounted towards the Article 7 target of the EED. Furthermore, in reflection of the temperate climate and the general preference for natural ventilation when possible, households have typically low energy bills and so there are limited cost-effective interventions for savings in households, and such interventions are therefore typically limited to light renovations and the installation of renewable energy technologies.

To support these renovations, the roof insulation and double-glazing scheme for households was relaunched in 2022. This scheme, funded through national funds, was open to private individuals for use on their residential properties, and for organisations that are not carrying out an economic activity. Beneficiaries were eligible for grants up to 50% of the eligible cost, capped at €1,000.

In order to increase the uptake of small-scale renewable energy technologies in households, such as solar water heaters and heat pump water heaters, grant schemes were redesigned in 2021. Despite the more generous grant provided, however, data for 2021 and 2022 shows that the increase in uptake still falls short of the target figures. The schemes and public propensity to adopt these technologies is being re-assessed. As these schemes are cross-sectoral and contribute to Malta's renewable energy target, they are described in more detail under Section 3.1.2 of the Plan.

In order to address vulnerable households, a tailor-made scheme managed by the Energy and Water Agency in collaboration with the Financial Services for Social Welfare was designed to conduct home visits. Through this scheme, advice is provided to these households on how to lower energy and water consumption, where possible. Furthermore, if merited, the scheme provides for the replacement of old and inefficient appliances with new energy-efficient models at no cost.

Government leading by example

The Government of Malta is committed to lead by example and as such, it will be implementing a number of projects/measures in order to promote energy efficiency and achieve energy savings. Apart from the transport measures detailed further above, such as the electrification of public buses, electrification of the Government fleet, shared mobility and remote working, amongst others, Malta will continue its efforts to roll-out energy efficient street lighting. Malta is committed to replace 34,000 lamps from the present lighting luminaries to LEDs by 2027. Furthermore, electricity tariffs continue to incorporate a built-in mechanism which promotes end-use savings. This includes a *rising block tariff* and an eco-reduction mechanism. These mechanisms incentivize end-users to reduce consumption below an established threshold and deter high consumption by applying higher tariffs as consumption increases.

Government acknowledges its important role in promoting energy efficiency and its obligation to gradually improve the energy performance standards to inherently achieve relative energy savings. The Building and Construction Authority (BCA) has devised a structured approach to systematically acquire and assess the relevant energy performance related data of the national public building stock. The Government is also embarking on various projects and initiatives to attain such objectives which will be outlined below.

The structured approach being adopted by BCA, shall serve to update and maintain a repository in order to further evaluate and assess the energy performance standing of the national public building stock. This systematic process will enable the central Government to guide the strategy towards decarbonisation of the building stock and will enable the authority to monitor energy improvements being carried out across the public sector.

Various projects of investment in the renovation and greening of public sector buildings, including deep retrofitting through energy and resource efficiency measures are underway within the context of the reforms and investments under the RRP and in line with the long-term renovation strategy commitments to renovate and improve the energy efficiency of 9,232m² of public buildings. These investments will contribute towards a substantial reduction in primary energy use of these buildings. The objective of this investment is to improve energy efficiency, reduce energy demand, lower carbon emissions and limit energy waste through the retrofitting of public sector buildings. The renovation will achieve a reduction of primary energy demand (PED) of at least 30%, which amounts to an estimated reduction of 316,519 kg of CO_2/year.

The Government has recently completed the first renovations of public office buildings occupied by the central Government as envisaged by the long-term renovation strategy. These include the deep renovation of an office block including the insulation of building fabric; building integrated photovoltaics on facades and roof and buildings automation and control (BACS). The project gave new insights as to the best methods to achieve nearly zero-energy levels and reduced primary energy demand by 50,400 kWh annually.

Investments in improving energy efficiency, reducing energy demand, lower carbon emissions and limiting energy waste is being made in two public schools. Through this investment the schools shall achieve near carbon neutral state with increase in the use of renewable energy whilst improving the learning environment within these schools through the optimisation of indoor health, air quality and comfort. The investment consists of the renovation, including retrofitting, of two public schools (St

Benedict College Għaxaq Primary School and Gozo College Nadur Primary School), covering a total area of at least 9,710m^2. The renovation aims to achieve a reduction of primary energy demand (PED) of at least 30%.

The Government is also building one new near carbon neutral school, St. Theresa College Msida Primary School, complying with standard requirements of high-energy efficiency, taking into account resource efficiency, climate adaptation measures, the adoption of digital technologies and affordability. This is meant to serve as a pilot project for future investments and to showcase the optimisation of indoor health, air quality, high energy efficiency, low carbon emissions and extensive use of renewable energy systems. Equal access for persons with disabilities will also be ensured. The investment will consist of the construction of a near carbon neutral pilot school amounting to a total area of approximately 14,499m^2, with a capacity of 500 students, 40 classes, a childcare centre able to take approximately 120 children, a library (capacity of 300 people), and a hall that will also be made available to the community. The construction will ensure that a PED of at least 20% lower than the Nearly-Zero Energy Building requirement is met.

A retrofitting investment is underway within a public hospital in efforts to improve the energy efficiency while reducing energy demand in a public building. This provides a model for other similar buildings. In addition, the investment is aimed at improving the wellbeing of the patients and increase the service quality level. The investment consists of the renovation and retrofitting of at least 5,600m^2 of the Mount Carmel public hospital. The renovation seeks to achieve a reduction of primary energy demand (PED) of at least 30%.

Energy and Water Nexus

The biggest challenge in the Maltese water sector is the scarcity of natural freshwater. Malta has the lowest freshwater availability per capita in the EU. Even if these natural water resources are used sustainably, they are still not enough to meet national demand and therefore the production of alternative (non-conventional) water resources is a necessity. In view of this, Malta has developed a water management framework based on the conjunctive use of water demand management and water supply augmentation measures.

At present, the provision of water services accounts for approximately 6% of the total national electricity demand. This is mainly used for water production, particularly due to the use of sea-water desalination plants which account for around 60% of the total production of potable water. Malta is well aware of the interdependency between energy and water and that the provision of the two has to be considered in a holistic and economic manner if sustainability is to be achieved. In this regard, the Water Services Corporation, the Government owned water utility company, is carrying out projects in the primary water network and the wastewater treatment plant to improve system efficiency and reduce the electricity consumed per unit of water delivered. These measures are estimated to result in an investment of circa €38.6 million.

Water Demand Management (water efficiency) also leads to energy savings as it results in lower volumes of water moving in the urban water cycle. At national/regional level, distribution network leakage identification and control is the most effective measure to optimise the effective use of water. Leakage management in Malta resulted in a reduction of around 40% of municipal water demand over a 15-year period.

Demand management measures are also important at the level of the user. Domestic water consumption in Malta stands at around 17 million m^3 p.a. which amounts to an average daily consumption per person of around 110 litres. Well aware of this, the Energy and Water Agency embarked on a nation-wide campaign to help raise awareness on the optimised and efficient use of water resources to facilitate a cultural shift in people's behaviour towards water conservation. Various communication methods were used in order to reach the wider population, including developing a campaign, branding identity; advertising on conventional media; education through non-conventional media sources; and organising public awareness raising events amongst others.

The Energy and Water Agency also carries out household visits (particularly in vulnerable households) where technical personnel are tasked with helping residents understand energy and water usage and provide tailored energy conservation tips. Such households are also provided with water saving kits which provide all the necessary information on water conservation (also as part of the aforementioned campaign). To date, almost 68,000 water saving kits have been distributed.

ii. Long-term renovation strategy to support the renovation of the national stock of residential and non-residential buildings, both public and private, including policies, measures and actions to stimulate cost-effective deep renovation and policies and actions to target the worst performing segments of the national building stock, in accordance with Article 2a of Directive 2010/31/EU

The below are a list of policies and measures that specifically relate to the objectives and targets of the long-term renovation strategy. All policies and measures in relation to energy efficiency outlined in this draft update also provide benefits in relation to the long-term renovation strategy objectives.

Regulatory measures to increase energy-efficiency in buildings

Analysis of the building stock and projections was carried out as part of the LTRS study. This indicates that the path to decarbonisation of the building stock in the private sector is dependent on mobilising national and private funding coupled with regulatory policies.

Following the coming into force of minimum energy performance requirements in 2016 and the coming into force of NZEB requirements for private buildings in 2020, cost-optimality studies were carried out to determine if further improvements were cost-optimal. The cost-optimality studies were carried out on a wide range of building typologies and building geometries to identify the opportunities for economically viable increased energy performance. These cost-optimality studies carried over 2018–2021 indicated a gap between the cost-optimal energy performance and the current minimum energy performance requirements. New minimum energy performance requirements have been developed and issued for public consultation.

The buildings simulated during cost optimality studies include:

- Dwellings,
- Offices,
- Hotels,
- Schools,
- Shops,

- Restaurants,
- Sports Complexes
- Homes for the elderly.

New cost-optimality studies have resulted in possible policy measures that are able to increase the energy performance level of both new buildings and existing buildings undergoing major renovation. Where the buildings are constructed in sites with geometries that give the building the potential to have solar renewable energy sources installed, substantial improvements are possible. These proposed recommendations will be considered following the public consultation of the new Technical guidance Document F.

The public consultation on the new Technical Document F was concluded in July 2023 and a thorough evaluation process is underway. The aim is to have an updated technical document to increase the uptake of energy efficient measures such as using more energy efficient building materials.

Training programmes aimed at ensuring the adequate skilled resources in the sustainability of buildings

One of the commitments of the Government of Malta's Recovery and Resilience Plan was an open call for applications for training and certification programme for professionals and tradesmen of various levels in the buildings and construction industry.

This was targeted towards an array of professionals and tradesmen at various levels within the local construction eco-system. The course attracted a range of professionals and tradesmen, including architects, civil engineers, consultants, electrical engineers, building energy performance assessors, interior designers/building technicians, lecturers in mechanical engineering, project managers, building service engineers, quantity surveyors, mechanical engineers, and even individuals from the IT sector.

The course focused primarily on climate change and sustainability as its main objective. Subsequently, moving to more technical aspects such as sustainable design and building energy systems. The course also covered topics on technological advancements and innovation within the industry, along with insights on construction assessment tools that future certified assessors may employ. The students were taught about the legal framework, standards, policies, and government funding opportunities that must be adhered to in the field. Once technical Document F is finalised and published, the BCA is planning to initiate another training programme focusing solely on the policies and compliance to minimum energy performance requirements.

Incentives for increased energy efficiency in Buildings

The Government of Malta introduced a pilot scheme in 2022 entitled "*Irrinova Darek*" designed by the Building and Construction Authority (BCA) to renovate properties and improve energy efficiency. The pilot scheme was available for the renovation of properties in the Grand Harbour Area where buildings are particularly challenging to renovate. The scheme stipulates that that buildings are renovated to levels 20% more efficient than NZEB levels and the renovated buildings should be comparable to passive house buildings.

The scheme allows for the renovations to be carried out according to the particular site constraints as long as the technical eligibility is satisfied. The scheme has a co-funding rate of 90% Government funds to 10% own funds with a maximum allowable outlay of €15,000 per project. The scheme registered a total of 100 beneficiaries that received financial assistance to renovate their private dwellings around the Harbour region.

As part of Malta's commitment to the decarbonisation of building stock by 2050, the Government will continue exploring the possibility to support investments in improving the energy performance of buildings possibly to also address the challenges due to potential longer payback periods of the capital investment. Nevertheless, Government already supports improvements in energy efficiency through several schemes and incentives, particularly those related to roof insulation, higher efficiency glazing, air-to-water heat pump water heaters and solar water heaters.

Renovation of Private Sector Buildings Grant Scheme

Another grant scheme for the renovation of private sector buildings, including commercial and non-residential buildings was introduced in 2022. The assistance provided under this scheme is intended to facilitate building renovation investments within the private sector. The objective of this investment is to improve energy efficiency, reduce energy demand, and lower carbon emissions through the retrofitting of buildings. The scheme is targeting the renovation of 40,605m^2 in private sector buildings and to achieve a reduction in primary energy demand (PED) of at least 30% by 31st December 2025.

iii. Description of policy and measures to promote energy services in the public sector and measures to remove regulatory and non-regulatory barriers that impede the uptake of energy performance contracting and other energy efficiency service models

In 2017, a public consultation on Energy Performance Contracting was launched, bringing together academics in the engineering sector, the energy regulator, the buildings industry regulator, companies providing energy services, the DSO, an Energy NGO and the Malta Business Bureau. The conclusion was that while the Energy Performance Contracting model can, in theory, be suitable for Malta, the take-up is limited due to limited savings and very long payback periods.

iv. Other planned policies, measures and programmes to achieve the indicative national energy efficiency contributions for 2030 as well as other objectives referred to in point 2.2 (for example measures to promote the exemplary role of public buildings and energy-efficient public procurement, measures to promote energy audits and energy management systems, consumer information and training measures, and other measures to promote energy efficiency

Together with the measures listed in the previous section, there are several additional measures which are expected to contribute to the indicative national energy efficiency contributions by 2030. The below section provides details of such.

Transport

The Government's ambition to accelerate the shift to cleaner vehicles is further exemplified in the LCDS's commitments towards the local EV charging infrastructure and electrification of transport. A sufficient quantity of charging points is expected to be installed by 2030 to meet the objectives of electrification of transport. The aim is to have adequate infrastructure in place to intensify the uptake of EVs on a national scale. Around 360 charging points are already installed around the Maltese islands. A further 1,200 charging points will be funded through the Cohesion Fund, achieving a total of 1,500 points by 2025.

The Government is also supporting the decrease of private vehicle use through transport measures and investments. These include measures to further encourage the use of smaller vehicles for urban mobility such as pedelecs and L category vehicles (e.g. mopeds, motorcycles, tricycles and quadricycles). Additionally, there is ongoing investment in transport infrastructure including footpaths, pedestrianised areas, widened sidewalks, cycling lanes, bicycle parking facilities, bike charging points as well as traffic management systems and associated signage.

Industry and Services Sectors

Malta's enterprises are very diverse, and thus a tailored approach is normally taken when designing initiatives for enterprises so that the measures taken yield the greatest energy savings. Apart from the schemes and initiatives referred to in 3.2 (i), a number of initiatives targeting specific enterprise groups include the following:

- **Smart and Sustainability Scheme**: A cash grant of up to €100,000 capped at 50% of eligible costs and a further tax credit of up to €40,000 is given to enterprises according to established criteria.
- **Support for Reducing the Environmental Impact of Construction Activities**: This tax credit is allocated to enterprises up to €100,000 capped at 50% of eligible costs.
- **Investment Aid for Energy Efficiency Projects**: This is provided as a cash grant or tax credit capped at 70% (Small), 60% (Medium) and 50% (Large) of eligible costs, up to a maximum of €15 million per investment project.
- **Business Re-Engineering and Transformation Scheme**: This scheme has been set up to support small and medium-sized enterprises (SMEs) to realign their business activity, restructure their employees, optimise the use of technology, and embrace green technology and practices. Aid is given in the form of a cash grant covering 50% of the costs incurred up to a maximum grant of €5,000 per advisory service per undertaking.
- **MERCA** (Managing Essential Resources in Retail through Consumption Analysis) which focuses on small- and medium-sized retail establishments that sell food and beverages and aims to support them in carrying out improvements that will lead to more sustainable operations.
- **GUEST** (Guesthouse owners and Users embarking on a Sustainable Transition) which provides guesthouses and boutique hotels with a more tailored approach to address energy and water management given that their setup and management might differ from other types of collective accommodations such as hotels.

- **WE MAKE** project (Water and Energy Management and Knowledge Transfer in Manufacturing Enterprises) focuses on improving engagement in the business community through constructive conversations on energy and water that encourage more manufacturing companies to implement energy and water efficiency-related projects. A series of workshops were organised to highlight technical, financial and R&I opportunities. Best practices were also showcased and SMEs were encouraged to replicate the best practices implemented by large companies through the setting up of mentoring sessions. The project is also exploring the possibility of integrating local companies in project proposals submitted for EU funding.
- **The Energy and Water Awareness Initiative for Micro-SMEs.** The Energy and Water Agency extended its free house visits to Micro SMEs to advise them on efficient energy and water use in their businesses. The service is free of charge.
- **The Promotion of Energy Audits Scheme for SMEs.** The Energy Audit is the first step for an enterprise to take stock of its energy consumption. The Promotion of Energy Audits in SMEs is divided into a Scheme A and B to cater for enterprises that would be eligible for support under the De Minimis Regulation and enterprises that would resort to support under the General Block Exemption Regulation. Enterprises can receive a grant of up to €5000, depending on their size and operating NACE Code.
- **Feed-in Tariffs Scheme (Electricity Generated from Solar Photovoltaic Installations) Regulations.** Feed-in Tariff applicable to all consumers including businesses for capacities between $1kW_p$ and less than $40kW_p$. The electricity generated by a solar photovoltaic installation and exported to the distribution system is eligible to be paid at the established feed-in tariff rate determined by the regulations (current rate at 15c per kWh).
- **Invitation to Bid (ITB) for Financial Support for Electricity from Installations producing from renewable energy sources with Capacity of 40 kW or more.** Feed-in tariff applicable to all consumers including businesses for capacities greater than 40kWp. The electricity generated by a solar photovoltaic installation and exported to the distribution system is eligible to be paid at the established feed-in tariff rate determined by a competitive bidding process.

Malta's Energy and Water Agency also participates in the LEAP4SME project which aims to support Member States in establishing and improving policies to encourage SMEs to undergo energy audits and implement the recommended cost-effective measures. The project involved the engagement with businesses and key stakeholders including chamber of commerce, to gain a better understanding of the challenges encountered by SMEs when undertaking energy audits and energy efficiency projects. The project also intended to build links and connections between SMEs, policy makers and energy agencies for the proposition of more effective policy measures.

The Energy and Water Agency together with other European energy agencies, most of which are LEAP4SME project partners, were successful in their bid to receive funding for the LEAPto11 project through the LIFE funding programme. Following the findings of the LEAP4SME project, the LEAPto11 project will strive to contribute to a comprehensive improvement of the current framework for energy audits, energy management systems as well as national programmes. The transposition of the new Article 11 of the recast EED will also be supported through the project.

Support for Reducing the Environmental Impact of Construction Activities

Given the various impacts of construction activities on the environment, this initiative aims to support investments that reduce the negative impact of construction activities by facilitating the reduction in volume of construction waste, control of dust emission and replacement of equipment. The maximum support shall cover 50% of the eligible expenditure up to a maximum €100,000 per project.

Environmental Social and Governance (ESG) platform

As part of Malta's commitments towards the country's green transition, the Government launched an ESG portal in December 2021 as a voluntary initiative, designed to instil education and awareness on enterprises' environmental, social and governance credentials.

The initiative was very well received, with all of Malta's listed companies participating in this voluntary initiative as well as other medium-sized enterprises. Since 2021, this initiative has yielded successful results with the number of enterprises increasing from 20 in 2021 to 28 in 2022. These included a large number of entities that fall out of scope of the CSRD due to their size.

Moreover, it was found that on average, companies that reported on their criteria through the Government portal registered an 8% decrease in carbon emissions, 9% decrease in waste generation and a 7% increase in women in management roles.

In order to further instil a supported transition towards the principles adopted by ESG, the Government has collaborated with Malta Enterprise to provide an ESG scheme – that will give a cash grant of €3000 (capped to 75% of the cost) for engaging specialised advisory services to assist in the reporting of the ESG report. In addition to this, the scheme will also provide further support of €1000, in grant form, in the two subsequent years to enterprises deciding to continue to report on the ESG portal. This is designed to act as a further incentive for enterprises to improve on their year-on-year performance by making significant investments that will improve their ESG score.

The eligible service providers originate from the private sector and include some of Malta's largest audit firms. The idea is that with increased collaboration through this scheme with these financial practitioners, more companies will be aware of the ESG portal and, by default, the scheme. The intended result of this is that a wider spectrum and depth of companies, both large and small, will invest in their sustainability efforts to further upgrade their ESG position.

Besides this commitment spearheaded by the Government, the Malta ESG Alliance was set up in July 2022 independently by the private sector which acts as a platform for Maltese businesses to collaborate and work together to lead and drive national ESG goals. This initiative is wholly welcomed and supported by the Maltese Government through regular collaborations and stakeholder meetings to enable and accelerate the transition.

In addition to these steps, Malta also implements soft measures aimed at promoting a behavioural shift through knowledge transfer and best practices. These measures are designed to encourage energy savings and contribute to overall energy efficiency goals and are mentioned in section iv of this chapter.

Industrial facilities

Since Malta has spatial limitations for industrial purposes, INDIS Malta[27] is seeking to overcome this challenge by adopting a going vertical approach. This is being done by building, wherever possible new facilities on multiple levels to create more industrial space on land that is already earmarked for industrial purposes and without increasing the footprint of these developments. Furthermore, in cases where companies currently have multiple facilities spread across the island, these facilities are being returned to INDIS in exchange for a newly built facility that streamlines and consolidates their operations into one multistorey facility. Such projects will have the possibility of carrying a Gold LEED certification (Leadership in Energy and Environmental Design), which is the world's most widely used green building rating system. An example of this is a warehouse project currently underway (in Ħal-Far) which, once completed, will achieve this standard.

Furthermore, a company operating within the INDIS-administered property has launched a new project aimed at setting up a smart factory based on Industry 4.0 principles. The smart factory will incorporate the production of the company's products, starting from sheet metal through the various process stages, until the final output, greatly increasing efficiency and output rates. It will consist of an interconnected network of machines and communication mechanisms using the Internet of Things (IoT). INDIS Malta Ltd intends to promote similar projects to move towards achieving carbon neutrality.

Energy Efficiency and Renewable Energy Financial Instrument (EERE)[28]

Two local banks are partnering with the European Investment Fund (EIF), mandated by the Maltese Managing Authority, to deliver interest free loans under the EERE in Malta. EERE aims to improve financing conditions for enterprises and natural persons, through a guarantee and an interest rate subsidy. The interest rate subsidy applies for ten years and helps to push the loan interest rates for project promoters near 0%. The combination of EERE with other grant schemes is also possible, as long as EERE loans are not used to pre-finance the grant.

Energy Audits

Non-SMEs

Regulation 10 of SL 545.33 of 2021 makes it mandatory for non-SMEs registered and doing business in Malta[29] to carry out energy audits to the established quality level and frequency as outlined in the regulation. Guidance notes are available to enterprises which qualify or may qualify for the statutory energy audit to assist in the discharge of this responsibility. The main objective of the Government is to build on lessons learnt from previous cycles so as to ensure that future Energy Audits performed by

[27] INDIS Malta Ltd is responsible for the administration of the government-owned industrial parks and related facilities around Malta and Gozo, as well as supporting and promoting their further development.

[28] https://eere.mt/

[29] Large companies and subsidiaries of large companies in Malta and Maltese subsidiaries of large foreign companies.

non-SMEs attain a higher quality. The next round of energy audit reports by non-SMEs is due at the end of 2023.

SMEs

A scheme was setup in 2018 whereby Small and Medium sized enterprises can benefit from grants to help them carry out Energy Audits of their premises/processes/plants/transport fleet. The annual budget for this scheme is €50,000. The scheme was updated in 2022 to include:

- increased assistance depending on enterprise category,
- an additional grant of €500 for the auditors to assist the enterprise to apply for funding to implement the measures recommended in the energy audit,
- an added requirement to include water in the analysis when the operation of the enterprise includes a large consumption of water.

Accommodation and food service Activities Sector

With a contribution of around 4% to total gross value added, the accommodation and food service activities sector is considered one of the key economic pillars. In fact, the Malta National Tourism Strategy 2021–2030 acknowledges the crucial goal of achieving climate neutrality within the context of its tourism industry. This involves an emphasis on reducing the carbon footprint of tourism activities and operations. The strategy outlines a commitment to adopting sustainable practices and technologies to minimize greenhouse gas emissions generated by the sector. It highlights the importance of enhancing energy efficiency, promoting renewable energy sources, and integrating environmentally responsible practices throughout the tourism value chain. The strategy also highlights the need to raise awareness and engage stakeholders in efforts to achieve climate neutrality, recognizing that a sustainable tourism industry can contribute to both environmental protection and long-term economic growth.

One of the main objectives of the strategy is to prioritise positioning Malta as a Climate-Friendly Travel Destination. This objective entails a two-pronged approach: comprehending and addressing the effects of Climate Change on the local landscape and tourism infrastructure, while simultaneously assuming a leading global role in advocating for Climate-Friendly Travel in collaboration with the travel industry, academia, and other stakeholders as a response to the imminent threat of global warming. The primary goals include:

- Understanding Climate Change impacts on Travel and Tourism. Applying the science to Malta's realities. Quantifying the scale and nature of the threat.
- Investigating potential Climate Change impacts on Malta's coastal amenities, infrastructure, beaches, harbour facilities, residential and accommodation plant, historic towns, water and power production/generation, yachting and boating facilities, aquifers, natural hazard incidence and other factors. Creating a Climate Change Tourism Risk Index.
- Apply the findings emerging from Goals 1 and 2, to form the basis of actions to be undertaken to minimise risks, enact protective/preventative measures, plan alternative strategies and draft plans to create future market repositioning accompanied by the relevant product development initiatives to adjust the tourist offer to the new emerging realities.

- Categorising, quantifying, and locating which aspects of the Maltese tourism industry are most likely to be influenced by climate change.
- Sourcing and investigating international best practice in the different fields in terms of mitigation measures.
- Following and contributing to international fora discussing Climate Change and Travel and ensuring that the small island state perspective is given adequate recognition in discussions and decision-making.
- Work towards establishing Malta as a credible and effective Climate Friendly Travel Destination through an ambitious portfolio of local and international actions.

Aligned with this perspective, the Government is committed to the ongoing expansion of the eco-certification scheme. Simultaneously, endeavours persist in the quest for a suitable green label that can be effectively employed for various economic activities within the tourism sector. The unveiling of an enhanced scheme aimed at fostering sustainability within the tourism industry, with its anticipated launch is expected in 2024.

Households

As previously mentioned, Malta has one of the lowest energy intensity figures for households within the EU. Even so, the Government has, over the last decade, invested heavily in promoting and fostering energy efficiency. In the case of households and other small consumers, the Government will continue incentivising the uptake of new technologies, as well as fostering behavioural change where necessary. Information campaigns are run by the Government and these are coupled by the free service offered by the Energy and Water Agency whereby technical personnel visit households, hold discussions to understand energy usage and, provide tailored energy conservation tips. As of 2022, this professional advice was also extended to micro-SMEs to advise them on efficient energy and water use in their businesses.

Other Actions

The Energy and Water Agency also offers a set of free online sustainability sessions aimed at the corporate sector which cover a spectrum of sustainability opportunities including waste management, renewable energy, water and energy efficiency, sustainable buildings, green roofs, and much more. In August 2022 the Government issued guidelines on efficient energy use to be followed by all public buildings and public open spaces in line with Council Regulation (EU) 2022/1369 on coordinated demand reduction measures for gas. These guidelines focus on heating, cooling, lighting, and efficient use of appliances with the aim of achieving energy savings. By following these guidelines, the public sector is leading by example.

A scheme is also available for voluntary organisations. The assistance provided under this scheme is intended to facilitate investment in solutions that support a reduction in overall energy and water consumption through an increase in energy efficiency, and/or reduction in water use, and/or augmentation of water supply. This scheme has proved very successful and allocated budget has been fully exhausted.

In January 2023, the Ministry for the Environment, Energy and Enterprise, together with Malta's business partners, launched an information campaign promoting energy efficiency for businesses in Malta and Gozo. The campaign, 'Be Efficient. Save Energy!' will provide guidance on how different economic sectors can reduce energy consumption in their operations.

With the participation of nine associations representing the island's principal economic sectors, this campaign was planned in response to these organisations' proposal to participate in the Government's efforts to promote responsible energy use.

The campaign was set up to see business and professional organisations sharing suggestions with their members, on how they can consume less energy and explain how small changes and environmental investments can lead to drastic reductions in energy costs and carbon footprint. Follow up work is ongoing to assess the effectiveness of such a campaign within businesses and the nine associations involved.

Energy Efficiency First Principle

The Energy Efficiency-first principle has already been considered in Malta's energy planning, policy and investment decisions. Energy efficiency was treated as a priority element in recent investment decisions in Malta's power generation sector and energy infrastructure which transformed Malta's energy mix from one based on heavy fuel oil to a more sustainable energy mix based on gas, electricity imports through the Malta-Italy interconnector and renewable energy sources (gasoil is used as a backup fuel).

Malta plans to continue taking the Energy efficiency First principle into account as and when necessary, in line with the new provisions included in the new recast directive. There are, however, other factors that need to be equally considered when applying the *Energy Efficiency First* principle in energy planning, policy and investment decisions which need to give due importance to security of supply and cost-efficiency. In cases related to national security or national heritage projects, the energy principle will continue to be implemented within constrained parameters.

iv. Where applicable, a description of policies and measures to promote the role of local renewable energy communities in contributing to the implementation of policies and measures in points I, ii, iii and iv

Although the structure of the Maltese electricity system, with only one electricity supplier (Enemalta is designated as the exclusive electricity supplier in Malta), as well as the limited space available for the deployment of PV installations, can be considered barriers for the setting up of renewable energy communities, the legal framework originally established for cooperatives, also lends itself for renewable energy communities.

v. Description of measures to develop measures to utilise energy efficiency potentials of gas and electricity infrastructure

Electricity Generation

By 2017, Malta had closed its inefficient power generation units and was exclusively using natural gas for electricity generation[30], which is delivered as LNG. Also in 2017, one of the existing electricity generation plants was partially converted from heavy fuel oil and gasoil fuel to natural gas/gasoil. During the design process of the conversion, the plant was equipped with a heat recovery system which makes use of heat generated by the internal combustion engines to produce fresh water. The plant has two evaporators and produces 30 m^3/hr per evaporator.

Electricity Distribution

Enemalta plc is the only electricity Distribution System Operator in Malta. In the recent years, Enemalta has embarked on an extensive program to ensure an efficient distribution system that minimises losses, operating the system in an efficient manner in accordance with European and local legislation. It must be noted that Enemalta has equipped 99.6% of its consumers with smart meters and it has adopted a tariff system that favours prudent energy use and energy efficiency, with the aim of fostering such behaviour in its final consumers. Rollout of second-generation smart meters currently stands at around 18.6% of total smart meters installed.

The network operator has been adopting measures to improve the energy efficiency of its infrastructure. These include the use of low-losses distribution transformers, natural ventilation in transformer rooms to reduce the need for forced ventilation, energy efficient cooling fans, light colour finishes to reduce heat gain in summer, LED lighting and high efficiency air conditioning systems.

vi. Regional cooperation in this area, where applicable

Malta's national authorities responsible for implementing the Energy Efficiency Directive have been actively participating within the Concerted Action of the Energy Efficiency Directive (CA-EED) project since its inception, in 2008. Malta considers the CA-EED a useful regional cooperation forum for the sharing of best practices and dissemination of knowledge on the implementation of the Energy Efficiency Directive. Malta has been fostering a working relationship with all CA-EED members, especially with other EU Member States with similar geographical realities, which tackle comparable challenges in implementing energy efficiency measures. In this sense, the CA-EED continues to be a useful structure for knowledge-sharing between Member States' experts. The CA-EED is currently in its third grant agreement and financed under the EU's Horizon 2020 Programme. The Energy and Water Agency will continue to participate within this forum.

As a member of the European Energy Network (EnR) network, a voluntary network for European energy agencies, the Energy and Water Agency also participates actively in the EnR Energy Efficiency working group. This working group aims to provide a communication and cooperation platform for energy agencies to discuss issues of common interest relating to energy efficiency. The working group focuses mainly on practical and operational matters in relation to programmes and measures in the field of energy efficiency, but it also strives to identify potential solutions, new project initiatives and

[30] A diesel-powered plant is kept on standby to achieve the desired level of security of supply.

propose good practices on common issues relating to energy efficiency, also in collaboration with other working groups in the EnR network.

vii. Financing measures, including Union support and the use of Union funds, in the area at national level

The predominant source of funding for Malta's energy efficiency measures are national funds. Nevertheless, EU funds are, and will continue to be used in conjunction with national funds for energy efficiency measures.

Malta's Recovery and Resilience Plan which is financed by €316.4 million in grants was given a positive assessment by the European Commission and as part of the key measures to secure a green transition, the following are amongst some of the actions will be taken:

- the large-scale electrification of road transport to promote the purchase of zero-emission electric vehicles for the public and private sector. This investment will cost a total of €60 million. Together with this, a further 102 electric buses for public transport are planned and will cost a total of €34 million as well as a reform granting free public transport to more than 100,000 Maltese citizens which will boost the use of public transport and help address congestion. The electrification of road transport will be supported by the installation of charging pillars, funds for which are allocated under the Cohesion Fund. The aim is to have some 1,200 charging points by 2025 through this measure.
- A large-scale energy-efficiency programme for public and private buildings worth €60 million leading to a sizable reduction of greenhouse gas emissions. These include a near carbon neutral school covering an area of 14,499 m^2, and several Government buildings covering a total area of 28,188 m^2.

3.3 DIMENSION ENERGY SECURITY

i. Policies and measures related to elements set out in 2.3

Section 2.3 provides a summary of the high-level objectives and targets related to energy security, as well as a breakdown of the changing energy security landscape since the development of the first NECP and its impact on the evolving energy security dimension, including the specific impacts on Malta.

The below section builds on the objectives and targets section, by providing an overview of the main policies and measures which are implemented and planned under the energy security dimension in the coming decade and beyond. As mentioned in section 2.3 the objectives and targets related to energy security are contemplated within the context of the overarching objective of decarbonising the energy system, concretely through the deployment of renewable energy sources (RES) and implementation of energy efficiency (EE) measures. Policies and measures promoting RES and EE have already been described under the relevant sections of the Plan (Section 3.1.2 – RES; Section 3.2 – EE).

This section focuses primarily on the policies and measures related to energy system preparedness, periodic contingency planning, and measures strengthening the flexibility of the energy system, which are expected to contribute to Malta's energy security in the coming decade and beyond. In line with the guidance provided by the European Commission, this section also covers actions and measures taken following the 'Save Gas for a Safe Winter' Communication and the Council Regulation on coordinated demand reduction measures for gas.

Complementing the already established interconnectivity link between Malta and Italy, Malta is also in the process of implementing a second interconnector with Italy, with a rated capacity of 200MW (winter rated power 225MW) planned to be completed by 2026.

Malta is also actively assessing the feasibility of importing green hydrogen through the PCI as an option for the decarbonisation of Malta's power generation sector and other inland sectors, while addressing the island's need for security of electricity supply. Moreover, Malta has been a catalyst in spearheading such discussions amongst Mediterranean Member States and is committed to continue promoting this dialogue while also seeking engagement amongst all Mediterranean countries that aspire to build a platform for green energy hubs in the Mediterranean.

Within the context of the Mediterranean, Malta is continuously seeking enhanced cooperation for mutual opportunities in the energy sector with other Mediterranean countries, including with third countries.

These measures can potentially contribute significantly to a number of targets and objectives under the energy security dimension, including reducing reliance on fossil fuels, and diversifying energy sources). Given that they are cross-sectoral in nature and that they contribute to objectives set out under the Internal Energy Market dimension, these projects are described in detail under Section 3.4.2 (Energy transmission infrastructure).

N-1 System Adequacy principle:

The Government, through Enemalta, implements a security of supply principle described as the N-1 system/generation adequacy standard. This explains that even when losing the largest piece of power generation infrastructure (e.g. electricity interconnector or gas facilities) the system needs to be sufficiently resilient to meet the maximum electricity demand. This is an overarching principle and is expected to be maintained until such time the power system configuration would require a probabilistic approach (as adopted in larger power system) to establish a system adequacy standard. As already mentioned, to ensure the ability to meet the N-1 system adequacy principle, the Government has announced its intention to invest in a second electricity interconnector with Italy by 2026.

An update of the Electricity Supply Study, first carried out in 2021, is currently being carried out to account for recent developments in the energy sector and incorporate new elements and technologies, such as the second electricity interconnector and utility-scale battery storage. The updated study will set out the necessary cost-optimal solutions for Malta's energy sector in order to ensure resource adequacy by 2040.

Contingency planning:

The policy framework for energy security in Malta can be split into various policy documents aligning with requirements under the respective EU legislative acts, in particular the Gas Security of Supply Regulation (EU) 2017/1938, the Electricity Risk Preparedness Regulation (EU) 2019/941 and the Oil Stocks Directive 2009/119/EC[31].

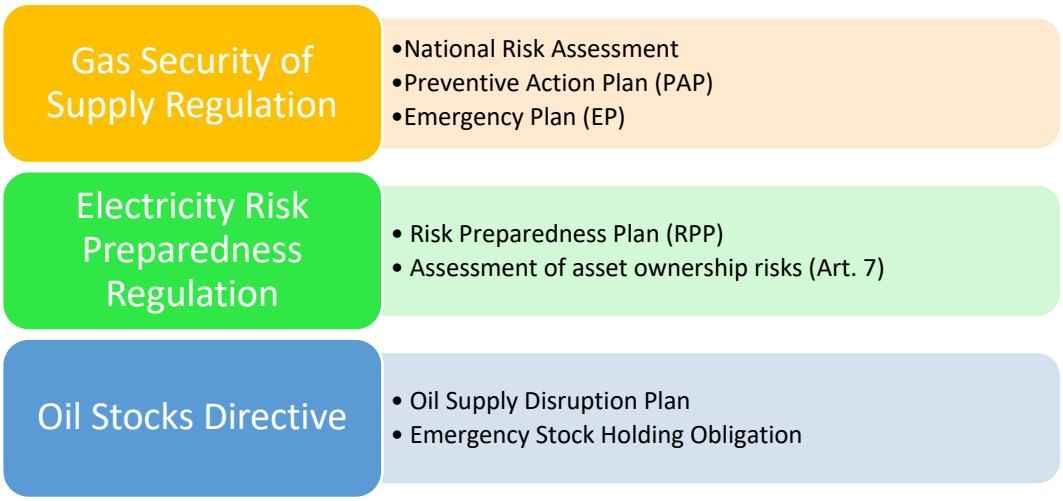

Figure 13 – Energy contingency planning in Malta

[31] Council Directive of 14th September 2009 imposing an obligation on Member States to maintain minimum stocks of crude oil and/or petroleum products

The Gas Security of Supply Regulation and Electricity Risk Preparedness Regulation set out timeframes for periodic updates of national electricity and gas contingency plans. Gas Security of Supply Plans and the electricity Risk Preparedness Plan have an updating cycle every four years. There are no timeframes for the update of the Oil Supply Disruption Emergency Plan. However, as per Regulation 18(2) of S.L. 545.09, the Regulator will consistently hold contingency plans to be implemented in the event of a major oil/petroleum supply disruption and shall provide for organisational measures to be taken to allow those plans to be implemented.

Malta's Gas Emergency Plan was updated in the second half of 2022 to take into account gas demand reduction measures as a result of the adoption of Council Regulation (EU) 2022/1369. Malta's National Risk Assessment (NRA), including the N-1 calculation, was also updated over the course of 2022/2023. In line with the Gas Security of Supply Regulation, Malta's Preventive Action Plan was updated and submitted to the European Commission in July 2023. Malta's first Electricity Risk Preparedness Plan (RPP) was developed and submitted to the European Commission in 2022.

Natural gas is used exclusively for the generation of electricity and currently constitutes the largest share of Malta's electricity generation mix (approx. 70% in 2021). Natural gas is imported in the form of LNG. Given the interlinkages between gas and electricity production in Malta, the contingency plans developed for the purpose of the Gas Security of Supply Regulation and for the Electricity Risk Preparedness Regulation take a unified approach – they are based on similar risk scenarios and incorporate the same framework of roles, procedures, and preventive and emergency measures before, during and after a crisis impacting gas and electricity supply in Malta.

Gas Security of Supply

The Security of Gas Supply Regulation (EU) 2017/1938 of the European Parliament and of the Council of 25th October 2017 requests the competent authority of each Member State to carry out multiple tasks, which include the development of a gas security of supply National Risk Assessment, a Preventive Action Plan, and an Emergency Plan. The Ministry responsible for energy is the designated Competent Authority for Malta. In line with Annex I of the same regulation, Malta forms part of four Regional risk groups, which are also required to prepare a Common (regional) Risk Assessment and develop joint regional chapters for inclusion in the preventive action and emergency plans:

- North African gas supply risk groups:
  - Algeria: Greece, Spain, France, Croatia, Italy, Malta, Austria, Portugal and Slovenia
  - Libya: Croatia, Italy, Malta, Austria and Slovenia
- South-East gas supply risk groups:
  - Southern Gas Corridor – Caspian: Bulgaria, Greece, Croatia, Italy, Hungary, Malta, Austria, Romania, Slovenia and Slovakia
  - Eastern Mediterranean: Greece, Italy, Cyprus and Malta

Malta's **National Risk Assessment** was updated in line with Article 7(3) of the Gas Security of Supply Regulation in 2023. The updated Risk Assessment considered the loss of the gas facility at Delimara on a day of peak demand with a likelihood of occurring once in twenty years. As the only use of natural gas in Malta is for electricity generation, the Risk Assessment considered how the loss of the LNG

facility would impact the supply of electricity. Malta's Risk Assessment also took into account the effect of seasonality, therefore comparing the summer period (peak demand) with the rest of year. Since meeting electricity demand is more sensitive to within-day peaks as compared to gas, Malta's Risk Assessment also considered within-day peak periods. It highlights the importance of a second interconnector and utility scale battery storage to provide Malta with the additional headroom necessary to mitigate any loss of gas supply.

The Risk Assessment also highlighted the strategic national importance and criticality of gas-fired power generation in Malta. It underlined the need for ensuring continued imports of LNG in line with the long-term gas supply contract and ensuring the operational capability of gas facilities, and the need to ensure the security and resilience of the Delimara Power Station against natural hazards and man-made threats. Multiple risk scenarios were identified and adapted to gas security of supply. Compared to Malta's first NRA, the 2023 update included two additional risk scenarios, one which stems from the geopolitical situation and security of supply consequences of the conflict in Ukraine, and another one related to the prolonged loss of or damage to the electricity interconnector with Italy.

Article 8(2) of the Regulation requires that Member States develop a **Preventive Action Plan** containing the measures needed to remove and mitigate the risks identified in the Risk Assessment and an **Emergency Plan** outlining the measures to be taken to remove or mitigate the impact of a disruption of gas supply.

The Preventive Action Plan established a list of preventive measures in place, or to be adopted, to address the risks in case of a disruption of gas supply, as well as roles and responsibilities of relevant stakeholders that contribute to the prevention of a disruption of gas supply. The list of preventive measures includes physical security arrangements, periodic technical and engineering inspections and monitoring, national security measures, legal, statutory, and operational obligations, as well as measures promoting the use of RES, energy efficiency measures, measures promoting the diversification of sources of energy supply, as well as measures available at regional level identified within the relevant Risk Groups. Malta does not have household gas customers, SMEs or essential services that are connected to a gas distribution network or gas district heating network. Nevertheless, customers are vulnerable if the supply of gas is restricted or stopped through the reduced availability of electricity. To minimise the impact from a gas supply disruption, Malta will maintain a formalized procedure for prioritising electricity supply to these groups of vulnerable customers.

Preventive measures in Malta can be broadly split into the following categories: diversification of sources, reduction of reliance on fossil fuels, energy system preparedness and other measures, such as those focusing on reporting and monitoring, protection of critical sites, cyber-security and statutory obligations under EU and national law. Under diversification of sources, preventive measures focus primarily on planned or ongoing transmission infrastructure projects such as the hydrogen-ready gas pipeline and the second electricity interconnector with Italy. Malta's goal to reduce reliance on fossil fuel imports is driven by accelerating the deployment of renewable energy sources, implementation of energy efficiency and demand reduction measures, as well as increasing the flexibility of the energy system. Energy system preparedness is achieved through ensuring the capability of alternative electricity generation sources, through the long-term LNG supply contract, routine emergency testing as well as general physical security arrangements and national security measures. These measures are

expected to be in place in the short-to-medium term as Malta moves closer to a decarbonised energy system.

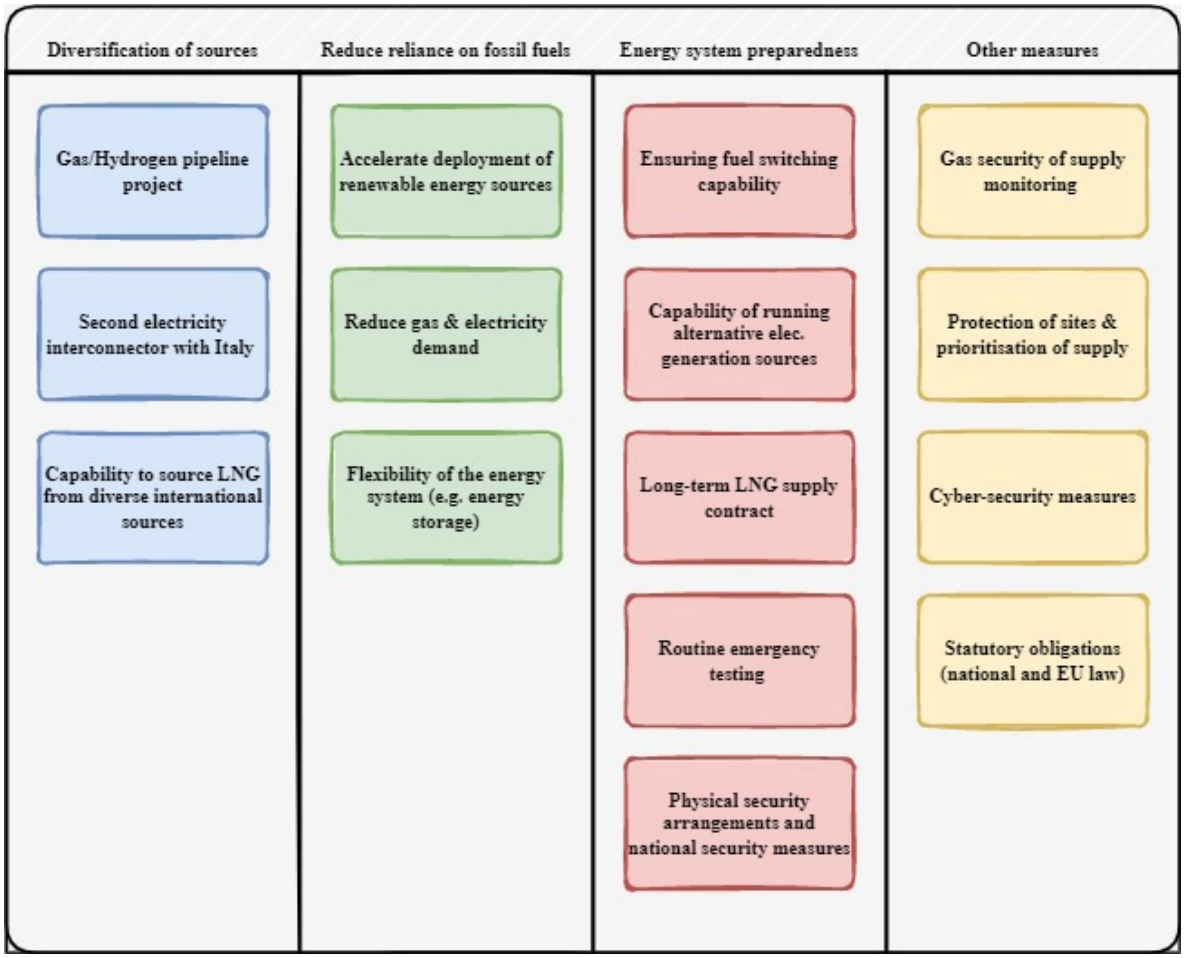

Figure 14 – Schematic of high-level preventive measures (as per Gas Preventive Action Plan)

The **Emergency Plan** defines three main crisis levels related to a disruption of gas supply: early warning, alert, and emergency. It also outlines the roles and responsibilities of specific actors, such as the competent authority (MEEE), natural gas undertakings, the electricity distribution system operator, the national regulatory authority, civil protection bodies, Critical Infrastructure Protection Directorate (CIPD) and other stakeholders per each crisis level. The Plan also identified the measures and actions to be taken to mitigate the impact of a disruption of gas supply on the electricity sector and the mechanisms and provisions in place to ensure the appropriate coordination and exchange of information between the main actors in the gas and electricity sectors. Apart from the escalation process, going from one crisis level all the way to an emergency, the plan also outlines the measures and responsibilities for the process of de-escalating an emergency situation back to business-as-usual.

Emergency measures

The measures set out in Malta's Emergency Plan (EP) which are to be deployed at each relevant crisis level during a gas security of supply crisis are described below. From the perspective of ensuring the availability of gas, measures which are introduced at the alert and emergency level primarily take advantage of the pre-existing contractual arrangements for the procurement of LNG.

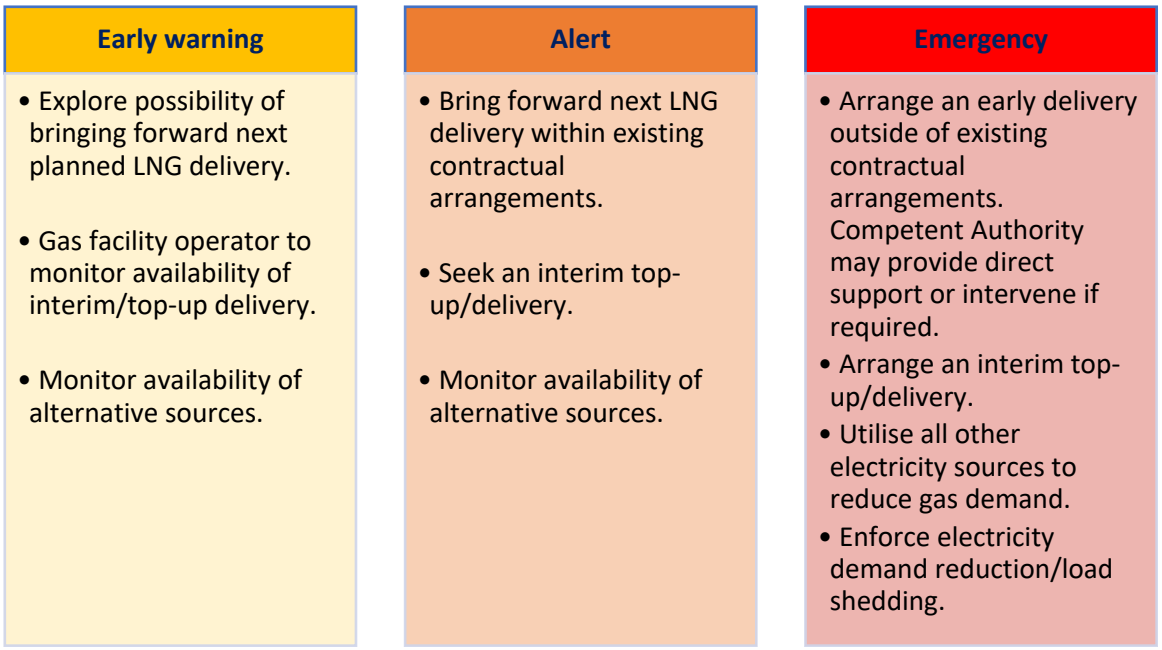

Figure 15 – Measures to be deployed during a gas security of supply crisis

At a high-level the measures to be implemented during a gas security of supply crisis can be split into the following categories:

1. **Measures regarding the management of LNG deliveries** (e.g. seeking a top-up delivery, bringing forward a delivery, ensuring approval of LNG facility by international suppliers, designation in line with international standards to ensure as many vessels as possible are suitable to berth and supply LNG to Malta).
2. **Using alternative electricity sources** (e.g. maximising the use of the electricity interconnector with Italy, maximising other forms on-island generation such as emergency back-up power plants, reducing demand for gas/electricity).
3. **Enforced electricity demand reduction and load-shedding** (e.g. in case of a prolonged gas supply shortage impacting Malta, electricity rationing may be necessary, restricting the consumption of certain electricity customers. This measure includes the protection of sites dependent on continuous electricity supply and which provide essential services.)

Gas and Electricity demand reduction measures

Council Regulation (EU) 2022/1369 on coordinated demand reduction measures for gas entered into force on 5th August 2022. Article 7(2) of the Council Regulation obliged Member States to update their gas Emergency Plans to reflect the voluntary gas demand reductions measures for the winter period from 1st August 2022 until 31st March 2023 and provide a description of measures to be implemented to achieve this reduction. These measures were to reflect each Member State's best efforts to achieve a 15% reduction in gas consumption ('voluntary demand reduction') compared to the same period during the preceding 5 years.

Due to the nature of its energy system and its isolated position, Malta cannot fully contribute to the goals of the Regulation and provide solidarity to other Member States during an emergency by supplying other Member States with natural gas. Malta only uses natural gas for its critical gas-fired power plants. Natural gas is imported as LNG via sea vessels and stored in a floating storage unit (FSU) which is permanently moored next to the power plants and processed at an adjacent re-gasification facility. There is no gas market in Malta as there are no gas distribution networks and no end-users of natural gas. Since Malta is not connected to the trans-European Gas network or any other third network, with just-in-time deliveries of LNG shipments for exclusive use by power plants, Malta does not have any means to provide any significant contribution to the reduction of gas demand in Europe. In fact, recital 15 of Council Regulation (EU) 2022/1369 notes that certain Member States, due to their lack of direct interconnection to the gas interconnected system of another Member State are not able to free up significant volumes of pipeline gas to the benefit of other Member States.

Moreover, a reduction of the critical gas volumes used for electricity production in Malta would increase Malta's reliance on electricity imports via the sub-sea electricity link with Italy and could ultimately lead to an increase of gas demand in Italy. This would have the opposite effect to what is intended by the Council Regulation. Malta is nevertheless committed and doing its utmost to utilise existing and implement new measures focusing on the reduction of electricity (and therefore natural gas) consumption in Malta and ensure the capability of the electricity system to switch to alternative sources, such as gasoil in case an EU alert is triggered in line with the gas demand reduction Regulation. In the spirit of solidarity, Malta has also made its best efforts in line with Article 3 of the Council Regulation on voluntary gas demand reduction by introducing additional measures focusing on the reduction of electricity (and therefore natural gas) consumption. The following measures, outlined in the '*Save Gas for a Safe Winter*' communication are considered of relevance to Malta:

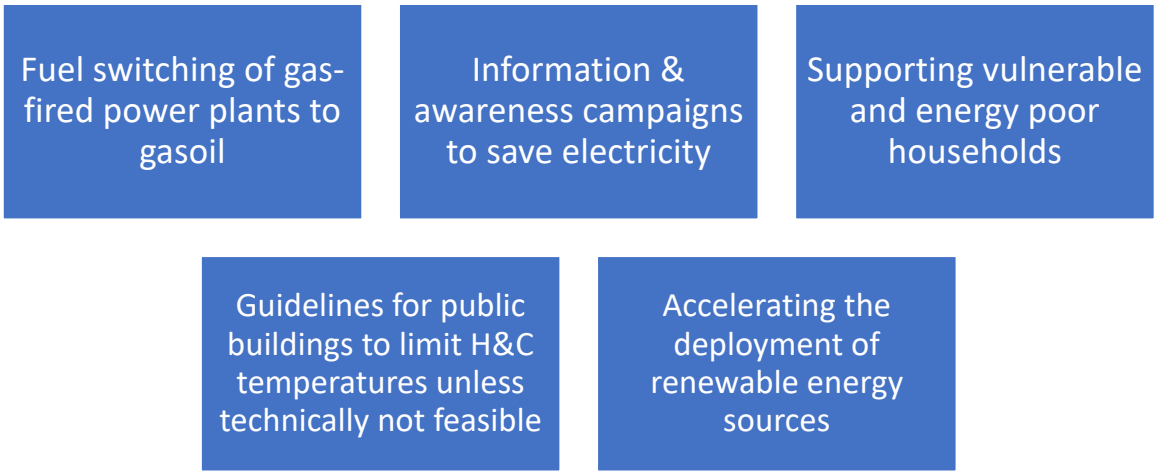

Figure 16 – Measures of relevance for reducing gas volumes in Malta

- **Fuel Switching**: all gas-fired power plants in Malta are considered critical. Gas supply is covered by a take-or-pay long-term gas supply contract and therefore reducing gas for electricity production is, in practice, unfeasible in the short-to-medium term. During emergencies, Malta has the capability to run gasoil-fired power plants for a limited period of time. It is to be noted that gasoil-fired emergency plants can only be used in case of an emergency and due to technical constraints and limited capacity, cannot fully replace gas-fired power plants in the event of a long-term gas disruption.
- **Measures focusing on the reduction of electricity consumption**: existing and planned measures focusing on the reduction of consumption of electricity among its citizens and businesses in the various sectors are described under the Energy Efficiency dimension, whereas measures focusing on the installation of renewable energy sources are described under the Renewable Energy dimension.
- **New measures and actions on voluntary gas demand reduction**: In August 2022 the Government issued guidelines on efficient energy use to be followed by all public buildings and public open spaces. These guidelines focused on heating, cooling, lighting, and efficient use of appliances with the aim of achieving energy savings. Furthermore, in October 2022, Malta launched a public awareness campaign focusing on inducing energy saving behaviour in the residential sector. This consisted of a three-month campaign aimed at raising awareness among the public to conserve energy through small and easy changes in everyday life. The campaign used tools such as an interactive website, printed and online booklets, advertising via social media and digital platforms focusing on different energy savings tips. The Government will continue to promote and develop policies and measures to support the efficient use of energy in the public sector, households, and businesses. Further information with reference to the joint action with business associations in section 3.2 SMEs.

Risk Preparedness in the Electricity Sector

The electricity system operator, Enemalta plc, was assigned responsibility of preparing the Risk Preparedness Plan (RPP) on behalf of the National Competent Authority. Enemalta plc, as the designated Distribution System Operator in Malta is responsible for ensuring the security of electricity supply within the Maltese Islands. Regulation (EU) 2019/941 sets out a common framework of rules on how to prevent, prepare for and manage electricity crises whilst ensuring that measures are taken in a coordinated and effective manner, including solidarity measures between Member States. As per the Regulation, Member States are required to ensure that all relevant risks relating to the security of electricity supply are assessed, identify electricity crisis scenarios, and subsequently establish Risk-Preparedness Plans, which consist of national and regional measures to prevent, prepare for and mitigate electricity crisis.

Malta's first electricity Risk Preparedness Plan (RPP) was prepared and submitted to the European Commission in 2022. Malta's RPP included a description of national electricity crisis scenarios. These were broadly aligned to the regional electricity crisis scenarios developed by ENTSO-E but adapted to

the specific circumstances of Malta. The most relevant national electricity crisis scenarios were grouped into the following main categories:

- Cyber-attack
- Extreme weather
- Physical attack
- Human-induced threat scenarios
- Fuel shortages
- Technical failure
- Market rules
- Natural disasters.

The Plan also considers scenarios which are specific to Malta, such as the prolonged loss of the electricity interconnector with Italy. Furthermore, the RPP set out the roles and responsibilities of national actors in terms of crisis management, established the role of the designated competent authority, outlined the responsibilities delegated to other relevant stakeholders, and identified the role of the Crisis Coordinator. The RPP also sets out the procedures and measures implemented during an electricity crisis, including the information flow between relevant parties before and during a crisis, the preventive and preparatory measures established in Malta as well as measures which are to be implemented to mitigate any electricity crisis. Furthermore, the RPP establishes a framework for emergency testing and includes a summary of previous and planned emergency tests which are to be carried out at the Delimara Power Station.

The measures which are described in the RPP consist of the following main elements:

- National legislation governing the procedures to be implemented in an electricity crisis.
- Alignment with the EU legislative and regulatory framework for crisis management and contingency planning.
- National rules for the declaration of a crisis level (falling under the responsibility of the Crisis Coordinator).
- Routine monitoring carried out by the Regulator for Energy and Water Services (REWS).
- National procedures for emergency response and coordination with civil protection bodies.
- Strategic preparatory measures (e.g. black start capability, implementation of business continuity plans).
- Operational preparatory measures (e.g. ensuring effective physical security arrangements, regular cyber-security testing, checking availability of critical spares, testing capability to move FSU onto storm moorings, etc.).
- Measures to mitigate electricity crises.
- Principles for load shedding and prioritisation of designated sites.
- Mechanisms to inform the public about an electricity crisis.
- Bilateral procedures and measures;.

Malta is in the process of updating the national RPP in line with the Commission Opinion.

Oil Supply Disruption Emergency Plan

EU Directive 2009/119/EC amended by Commission Implementing Directive (EU) 2018/1581, which requires Member States to maintain minimum stocks of crude oil and petroleum products, was transposed into national law through Legal Notice 109 of 2013 and amended by Legal Notice 156 of 2019. Regulation 18(2) of this legal notice requires the REWS to develop contingency plans that would be implemented in the event of a major supply disruption. In this regard, an Oil Supply Disruption Emergency plan, to be activated in the event of difficulties arising in the supply of crude oil and petroleum products has been prepared.

The document outlines the strategic approach to be taken in the management of an oil supply disruption emergency in Malta. The Plan ensures that, as far as possible, the institutions, information, hardware, and infrastructure are available, ready, and coordinated to perform efficiently and expeditiously in any emergency involving oil supply, while allowing a certain freedom and flexibility to respond effectively to any circumstances as they arise. It also highlights the arrangements to be established between the oil industry, the REWS and the European Commission for the safe and effective management of oil supply emergencies. The scope of the original plan does not cover natural gas.

Under the Contingency Plan, an Oil Supply Disruption Task Force may be appointed on an ad hoc basis, depending on the disruption/interruption event that arises. The Task Force would be made up of high officials representing the Ministries responsible for energy and for finance, the Regulator for Energy and Water Services, and oil suppliers and importers, under the Chairmanship of the Minister responsible for Energy. The Task Force would be able to collaborate with high fuel consumers potentially affected by an oil supply disruption. If the emergency is the consequence of a natural disaster, the Oil Supply Disruption Task Force would work closely with the Civil Protection Department, which has the overall responsibility for emergency response to such events. The Task Force would also advise the Minister on what measures, proportionate to the situation, to take, monitor, analyse and report to the Minister on the situation and events, during activation of the contingency plan. Finally, when the shortage is declared over, the Task Force is required to take stock of lessons that could be learnt and update the Plan where required.

Emergency stock holding obligations

In Malta, the national emergency stock holding obligation is delegated to fuel importers and calculated on the gross inland consumption attributed to each importer. The national emergency stock holding obligation on aviation kerosene (Jet A1), bitumen and lubricants constitutes an exception whereby the emergency stock is held by the Regulator on behalf of the Government.

The emergency stock holding obligation must be met through emergency stock holding tickets in Malta or any other EU country, except in those cases where the importer has a legal title to storage (ownership or lease) and may claim emergency stocks held as physical stocks. The composition and location of the security stock holdings may vary. For instance, in 2022, on average, throughout the first and second quarters of the year 2022, 79% of the stocks were held as tickets abroad while 13% were held as tickets locally whereas the remaining 9% were held as physical stock by the operators. As for the third and fourth quarters of the year, on average, 84% of the stocks were located as tickets held abroad and 12% were held as tickets in Malta whereas the remaining 4% were held as physical stocks by the operators.

The Regulator monitors the compliance of the entities delegated with an emergency stock-holding obligation. Operators are required to report monthly data related to commercial and emergency stocks held on their behalf and on behalf of third parties being local or foreign entities who are holding stocks on behalf of Malta or other EU Member States. In addition, normally verification inspections of oil stocks including those stocks declared as emergency stocks are carried out at the end of June, September, and December of each year.

Critical Infrastructure Protection

Critical Infrastructure Protection Unit

In accordance with Article 3 of Legal Notice 434/2011 transposing Directive 2008/114/EC, the Government established the Malta Critical Infrastructure Protection (CIP) Unit within the Ministry for Home Affairs, Security, Reforms and Equality. Its aim is to identify, designate and oversee critical infrastructure, assets and facilities in Malta. The principal role of the CIP Unit is to ensure owners and operators of critical infrastructure perform risk assessments and draw up and maintain contingency plans. The CIP Unit also acts as the European critical infrastructure protection contact point in Malta and coordinates the Malta position on critical infrastructure protection issues at the European level.

Designated entities are required to identify Security Liaison Officers (SLOs) acting as the points of contact for security related issues between the owner or operator of essential services and the CIP Unit. Every owner or operator of a designated critical infrastructure is required to draw up and maintain an Operator Security Plan (OSP).

Under LN 434/2011 energy has been identified as a key critical infrastructure (CI). This is further divided into the electricity, oil and gas subsectors. Enemalta has developed an OSP for the generation sector and for the distribution sector, with the overall goal of ensuring a reliable supply of energy, identifying measures to ensure the protection of critical assets/systems and ensuring safety measures are in place, and drawing up contingency plans for restoration and recovery times in the case of loss of assets/systems.

Cyber-security in the energy sector

Directive (EU) 2016/1148 of the European Parliament and of the Council concerning measures for a high common level of security of network and information systems across the Union is transposed into national legislation through the **Measures for High Common Level of Security of Network and Information Systems Order**[2] (Legal Notice 216 of 2018). The order establishes the Critical Information Infrastructure Protection Unit (CIIP unit) within the Critical Infrastructure Protection Directorate, responsible for monitoring the application of the Order, which includes the establishment of criteria for the identification and designation of essential services within Malta as well as identifying the designated operators of essential services in Malta. The CIIP unit is also tasked with encouraging the use of European or internationally accepted standards and specifications relevant to the security of network and information systems. Electricity, oil and gas undertakings are included as operators of essential services in the energy sector.

The requirements and tasks of Computer Security Incident Response Teams (CSIRTs) within designated operators are also spelled out in the legislation. CSIRTMalta, the national CSIRT Unit within the CIIP Unit, supports critical infrastructures (CIs), Critical Information Infrastructures (CIIs) and other sensitive infrastructures in Malta on how to protect their information infrastructure assets and systems from cyber threats and incidents. CSIRTMalta also promotes the sharing of unclassified information which is useful against cyber-attacks and provides alerts and warnings to its constituents and internal autonomous CSIRTs. CSIRTMalta is composed of two units, Security Operations Centre (SOC) and Intelligence and Forensics Unit (IFU).

The following measures were taken by the Critical Infrastructure Protection Directorate to enhance the cyber security across multiple sectors, including energy. This includes the following:

1. Identified Operators of Essential Services are requested to establish their own Computer Security Incident Response Team (CSIRT) as part of the local transposition of the NIS Directive (L.N. 216 of 2018). Further to this, MaltaCIP directorate is updating the list of Security Liaison Officers (SLOs) and keeping them informed about their duties.

2. MaltaCIP Directorate issued a letter to all OESs requesting information about the status of implementation related to their Operator Security Plans. On the 9th August 2023, MaltaCIP directorate requested information from the Operators of Essential Services (OESs) and Digital Service Providers (DSPs) on their preparedness, processes, and solution plans. The status of their conduct a risk assessment and the implement of their operator security plans. Documents had to be provided as evidence in the OESs' survey reply. From the energy sector, Electro Gas provided the documentation and this is currently under review. In the interim, MaltaCIP directorate intends to request the other entities to provide a reply to this survey.

3. CSIRTMalta managed to successfully apply to an EU funds program entitled "*Increasing the Resilience and Capability of the National CSIRT heightening Malta's Cyber Security Infrastructure"* and acquired €1.2 million in funds to assist OES's CSIRTs in purchasing equipment and necessary training such as MISP training, TAP devices and other CSIRT services. CSIRTMalta issued a circular to the Operators of Essential Services (OESs) and Digital Service Providers (DSPs) dated 20th April 2023 informing them as being eligible to utilise new services. These new CSIRT services are:

    i. Hosting MISP instances within CSIRTMalta.
    ii. Connecting with a central CSIRTMalta MISP instance.
    iii. The usage of Nine (9) high-speed sensor Network Detection and Response (NDR) devices with aim to detect IOCs collected from the MISP Servers network.

    On 10th April 2023, MaltaCIP Directorate issued a circular to the Operators of Essential Services (OESs) and Digital Service Providers (DSPs) entitled "*Provision of services under the Cybersecurity Support Action*" as part of the F-OCU-22-T31 programme 100% funded by the European Commission. The project coordinator is the European Union Agency for

Cybersecurity ENISA and the contractor for Malta is Deloitte. As part of this project OESs and DSPs operating within Malta are eligible for Ex-ante and Ex-post services related to cyber security incidents.

Ex-ante services refer to different types of penetration testing services as follows:

- Application Testing
- Infrastructure testing
- Red Teaming
- Hardware/IOT penetration testing
- Industrial Control penetration testing
- Wireless penetration testing
- Purple Team Testing
- Breach Attack Simulation

Ex-post Services includes:

- Incident Response
- System Forensics Cloud
- Forensic Analysis
- Digital Footprint Assessment
- Malware analysis
- Pure Sandbox (PS) analysis Mixed Light (ML) analysis Mixed Deep (MD) analysis
- Takedown Services
- Blacklisting of fraudulent sites
- Removal of fraudulent content
- Closure of fraudulent web pages that impersonate the Client's identity.

The project budget is of €500,000 and services are expected to be available until the end of November 2023. Within the energy sector, Enemalta requested to undertake penetration testing services, the scope for the exercise was agreed and is planned for quarter three of this year. The overall cost of the penetration testing exercise is €70,000.

4. MaltaCIP Directorate conduct regular training exercises with OESs and DSPs. The last one was organized on 14th and 15th November 2022. The exercise was conducted not only by MaltaCIP directorate but as part of the inter-ministerial committee on Countering Hybrid threats. The committee has representation from the Office of the Prime Minister, Ministry for Home Affairs, Security, Reforms and Equality, Ministry for Foreign and European Affairs and Trade, and Malta Permanent Representation to the EU. The exercise was entitled EU Integrated Resolve 2022 also known as Parallel and Coordinated Exercise known as PACE. The simulation exercise involved entities from public and private sectors from the transport and energy sectors. In fact, the Maritime Security Committee was called for a meeting. Finally, a report was provided to the participating members and to the inter-ministerial committee on Countering Hybrid threats after the exercise.

Furthermore, Cyber-security risks were also considered within the existing contingency planning, such as the Risk Assessment and Preventive Action Plan and Emergency Plan under the Gas Security of

Supply Regulation. The Critical Infrastructure Protection Directorate (CIPD) was consulted during the development of these plans to ensure that gas facilities are classified with respect to designated essential services, that the appropriate cyber-security measures are in place which enable the manual override of electricity and gas facilities in the event of a cyber-attack.

Offshore renewable energy technologies

The Government is committed to increase its share of renewable energy from indigenous resources to contribute towards increased energy security. Unlike fossil fuels, intermittent renewable energy sources such as solar and wind are not subject to price fluctuations as their levelized cost of electricity is heavily dependent on their CAPEX. Relying on indigenous resources also reduces the country's dependence on foreign energy imports, further strengthening energy security and insulating the nation from external energy market volatility. Moreover, investing in renewable energy projects fosters the development of a more diversified energy mix. This diversification reduces reliance on a single energy source, minimizing the impact of potential disruptions and enhancing overall energy resilience. Details on renewable energy policies and measures are found in section 3.1.2.

Energy Storage solutions

The Government will also invest in **utility-scale battery storage**. Energy storage solutions are considered essential for boosting flexibility of the electricity system, further deployment of renewables and for optimization of the power system by providing for demand management and peak demand shaving. Investments in utility-scale battery storage may also postpone the requirement for new capacity. Battery storage technologies are also included in Malta's Low Carbon Development Strategy (LCDS) as a potential technology ensuring back-up supply given the intermittency of large-scale solar and offshore wind technologies.

Two utility scale Battery Energy Storage Systems (BESS) are under development, both of which have a planned commissioning date of Q2 2026.

(1) The first BESS Project to be located inside the 'A' Station in Marsa, will be funded from the Recovery and Resilience Fund (RRF) with a budget allocation of circa €12 million to address investment for the scope of "Strengthening and widening the electricity distribution network, through investments in the extension of the grid, distribution services and battery storage."

(2) The second BESS Project will have a larger capacity than the first and will be located within the Delimara power station site. It will be funded under the Multi-Annual Financial Framework (MFF) programme 2021-2027 with a max. eligible cost of €35 million allotted for this project under the Specific Objective *RSO2.3. '*Developing smart energy systems, grids and storage outside the TEN-E.'

Furthermore, it is expected that the Government will continue to provide financial support to further increase the deployment of solar PV technologies in conjunction with **behind-the-meter battery storage systems**. Malta implemented a scheme in 2021 which aimed to increase consumers' flexibility in their ability to store excess renewable electricity generated by PV systems instead of exporting to the grid. This scheme also supports self-consumption. Incentives promoting battery storage will

continue to be implemented by the Government. Further details on this initiative is found in sections 2.3 IV and 3.1.2.

Demand-side Response

The lack of a liquid wholesale electricity market limits possibilities for explicit demand response, such as the participation of demand aggregators in the national market.

Nevertheless, some demand-side price-oriented solutions have already been implemented in Malta. For example, to incentivise off-peak charging of electric vehicles, reduced electricity tariffs apply for off-peak consumption by electric vehicles (00.00 hrs – 06.00 hrs; 12.00 – 16.00 hrs daily and all day on Sundays).[32] Additionally, a night and day tariff is available for non-residential consumers of electricity with an annual consumption over 5 GWh.

It is also important to note that smart appliances, smart metering systems and smart grids are an essential pre-requisite for unlocking the full potential of demand side response. Currently, a second generation of smart metering systems are being installed in the residential sector in Malta. These new meters have new functionalities which could be deployed to allow consumers to be more aware of their energy consumption. This will be done through a consumer energy management system where in-house display systems, smart phones and other devices will provide consumers with information on their consumption. Consumers will therefore better understand their consumption patterns, resulting in increased energy conservation.

As mentioned under Section 2, as the number of electric vehicles increase, new flexibility options become possible. The potential of vehicle-to-grid (V2G) technologies as flexibility solutions shall be assessed.

v. Regional cooperation

The role of the CIP Unit, in charge of coordinating and supporting general emergency preparedness plans under Legal Notice 434/2011 on the identification and protection of critical infrastructures, includes collaboration with other European Member States and the European Commission.

Malta also cooperates with other European Member States on national emergency stock holdings. In 2022, emergency stocks for Malta held in the form of tickets abroad were located in the Netherlands, Italy and Belgium. For the first and second quarters of 2022, Malta held emergency stocks as tickets for Greece. These arrangements are approved by the competent authorities of the Member States, in the case of Malta by REWS.

Regional cooperation is an important element under the Security of Gas Supply Regulation. The importance of regional cooperation has been further exacerbated by the energy price crisis and the consequences of the conflict in Ukraine, which demanded a coordinated EU response. As mentioned above, Malta forms part of the active Libyan and Algerian Risk Groups. The updated 2022/2023 Common Risk Assessments for the Algerian and Libyan Risk Groups, respectively, together with the

[32] *Electric Vehicle Charging Electricity Tariffs - Enemalta*

simulations done by ENTSO-G for the European Commission and presented during the Gas Coordination Group (GCG) confirmed that Malta is not at significant risk from a disruption to the gas supply. The only source of natural gas in Malta is imported Liquified Natural Gas (LNG). This enables flexibility in the country of origin. Regional Risk Groups have worked on updating the common risk assessments to consider recent developments, and in particular assessing the impact of a full Russian gas disruption.

The Regional chapters of the Preventive Plan and the Emergency Plan also identify various mechanisms developed for cooperation between Member States, such as the exchange of relevant information between Competent Authorities, risk groups, and the Gas Coordination Group organized by the European Commission. Nevertheless, until Malta is connected to the trans-European gas network, regional measures implemented by gas TSOs are not particularly relevant in the national context.

As regards the provision of solidarity, as explained in the previous section, due to the nature of Malta's energy system, its isolated position, and the fact that Malta only uses natural gas (in the form of LNG) for its critical gas-fired power plants, it cannot fully provide solidarity to other Member States.

Whilst entering into mandatory solidarity arrangements with neighbouring countries is currently not relevant for Malta, should it become necessary for Malta to arrange an LNG delivery outside the existing contractual arrangements (e.g. long-term gas supply agreement), the Competent Authority would be in a position to provide support as deemed fit, including by liaising with other Member States in the spirit of solidarity.

Moreover, Malta does not have any gas storages and therefore the gas storage obligations do not apply. As a result, Malta did not carry out any bilateral or regional cooperation for this purpose. Furthermore, given the existence of a long-term gas supply contract, Malta does not currently participate in the EU Energy Platform focusing on joint gas purchasing. This does not prejudice to Malta's potential future participation in the platform following the expiry of the current gas supply contract in 2026.

Under the Risk-Preparedness Regulation in the electricity sector, Member States are required to act and cooperate in a spirit of solidarity to prevent or manage electricity crises. Regional and bilateral measures must be agreed upon by Member States for the purpose of protecting public safety and personal security and outlined in their Risk-Preparedness Plans.

Arrangements are currently in place between TERNA (Italian TSO) and Enemalta regarding the operation of the existing sub-sea interconnector between Malta and Sicily. These arrangements are prescribed by the Regolamento di Esercizio signed in February 2015. Discussions regarding a solidarity agreement for electricity with the Italian authorities are ongoing in line with Article 15 of the Risk Preparedness Regulation. Until now, discussions have mainly been carried out at the technical level. The bilateral agreement seeks to establish the mechanisms for bilateral cooperation and ensure appropriate coordination before and during electricity crises, including the decision-making procedures for an appropriate reaction between Malta and Italy.

Regional cooperation is most prevalent in Malta with regards to interconnections. Malta is hence working on enhancing such cooperation through the planned second cable interconnector between Malta and Italy.

At the same time, preparatory work continues with respect to the Melita TransGas Pipeline Project of Common Interest. By way of an update, in November 2022, the Italian Single Authorisation Permit was

obtained for the transmission of natural gas. The entire pre-application and statutory procedure for obtaining this permit was conducted in close consultation with the Italian TSO, PCI one-stop shop (MASE), the Sicilian Regional Authorities including the Gela Council, as well as the concerned Sicilian stakeholders.

vi. [If applicable] Financing measures in this area at national level, including EU support and use of EU funds

Financing is required for the deployment of large-scale infrastructure projects. Moreover, EU funding has been allocated under the ERDF 2021-2027 for the 2nd interconnector between Malta and Italy and for utility scale battery storage systems. Additional funds are also available for utility scale battery storage systems under the Recovery and Resilience Fund (REPowerEU chapter). These projects are described in more detail under the Internal Energy Market dimension, under sections related to energy transmission infrastructure.

3.4 DIMENSION INTERNAL ENERGY MARKET

3.4.1 Electricity Infrastructure

i. Policies and measures to achieve the targeted level of interconnectivity

As indicated in section 2.4.1. on the national objectives and targets in electricity interconnectivity, the level of interconnectivity is expected to remain well above the EU-wide target of 15%, as required under the Governance Regulation. A second electricity interconnector with Italy is expected to be in operation by the end of 2026. This will ensure that Malta continues to remain above the EU level target.

ii. Regional cooperation in this area

Cooperation between the Maltese and Italian authorities on issues of electricity interconnection, has always been very strong. Since 2015, continued coordination between Enemalta and the TSO in Italy has ensured the optimal functioning of the existing electricity interconnector. On a technical level, high-level inter-ministerial discussions between Malta and Italy are underway to ensure an efficient and streamlined permitting process for the new second cable interconnector between Malta and Sicily.

iii. Financing measures in this area at national level, including EU support and use of EU fundsThere are no electricity transmission systems and electricity transmission system operators in Malta. Enemalta continues to perform the functions of the DSO and that of the sole supplier of electricity to final consumers. Strengthening and development of the electricity infrastructure including the cable link with Sicily (existing interconnector) was mainly financed by Enemalta.

As regards the 2nd electricity cable link between Malta and Italy, the total preliminary investment costs of the project (including preparatory studies) is €285.5 million[33]. The Project has been included as a specific intervention under Malta's MFF programme 2021–2027 addressing the specific objective: RSO2.3. 'Developing smart energy systems, grids and storage at outside TEN-E (ERDF)'. An application for funding under this programme for the Project is planned to be submitted in 2023.

The two Projects for the Utility Scale Battery Energy Storage System will be financed from EU funds. The first Project will be funded entirely from the Recovery & Resilience Fund and the second project will be part-financed through ERDF funds.

[33] *Cost reflects a preliminary estimation – a more accurate estimate will be known once EPC tenders are awarded.*

3.4.2 Energy Transmission Infrastructure

i. Policies and measures related to elements set out in 2.4.2

As already outlined in section 2.4.2, Government committed to roll out investments to address internal electricity distribution bottlenecks and to enable further integration of renewable energy by ensuring an adequate grid infrastructure.

Further considerations in this area are still being assessed. More updated information will be provided in the final NECP 2024.

ii. Regional cooperation in this area

During the Med 9 Energy Ministers' meeting held in Valletta on 18th May 2023, a commitment was made by all participants to make the Mediterranean region a green energy hub that can support the EU's drive towards a decarbonised Europe. The nine countries signed the Malta Statement, a joint declaration launching the vision for the Mediterranean Region as a Hub of Green Energy. This has been affected to accelerate the EU's drive for a decarbonised, energy-independent future. The Med9 countries agreed that the Mediterranean can become a centre of renewable energy investments, with a focus on offshore renewables and new energy interconnections between the EU and non-EU Mediterranean countries, in efforts to facilitate European investment in green energy.

The joint statement sets out several important actions. The Med9 countries will be launching a steering committee to work together and plan the way forward for the establishment of the Mediterranean Green Energy Hub. This commitment will lead to new growth and employment opportunities in the region.

The Energy Ministers also invited the EU Commission to conduct a comprehensive report to study the potential of green energy corridors that can link Europe with the renewable energy potential in neighbouring North African countries and to prioritise funding for the development of these critical Mediterranean interconnections. They also agreed to prioritise investments in renewable energy solutions, such as offshore renewables, solar PV power generation systems, renewable hydrogen, and storage solutions.

Finally, the Malta Statement affirms that the nine countries will work to make sure that every member state can benefit from the Mediterranean region's green energy potential.

Malta has been catalyst in spearheading such discussions amongst Mediterranean Member States and is committed to continue promoting this dialogue while also seeking engagement amongst all Mediterranean countries while aspiring to build a platform for green energy hubs in the Mediterranean.

Within the context of the Mediterranean, Malta is generally seeking enhanced cooperation with other Med countries. In fact, Memoranda of Understanding (MoUs) to enhance cooperation in the energy sector are being explored.

iii. [If applicable] Financing measures in this area at national level, including EU support and use of EU funds

Given that considerations in this area are still being assessed, more updated information will be provided in the final NECP 2024.

3.4.3 Market Integration

i. Policies and measures related to elements set out in 2.4.3

Policies and measures related to market integration have largely already been described under section 2.4.3. For the sake of clarity, the high-level measures which fall under section 2.4.3 are summarised below:

- Roll-out of cost-effective and innovative flexibility solutions, such as energy storage (existing and planned schemes to support energy storage are mentioned under the energy security dimension).
- Promotion of renewable self-consumption through schemes which combine the installation of solar PV technology and battery energy storage.
- Further deployment of second-generation smart metering systems which allow monitoring of near real-time consumption.
- Ensuring power system adequacy in the long-term (through investments in second interconnector, utility-scale battery storage, offshore renewables and additional solar PV technology).
- Electricity Supply Study update: new iteration of the electricity supply study will provide an updated assessment of cost-optimal solutions to ensure resource adequacy for Malta's electricity system.
- Evaluation, through the engagement of a consultancy company, of the feasibility of Vehicle to Grid (V2G) technology as applied to the Maltese Islands.

There are no liquid wholesale markets in Malta. The electricity generation sector was liberalised in 2005, however significant Independent Power Producers (IPPs) entered the sector in 2017. Other than that, independent power production was limited to small producers generating electricity from renewable sources. The fossil fuel IPPs, namely D3 Power Generation Ltd and ElectroGas Malta Ltd, account for 71.98% of the electricity sent out to the grid from all sources during the year 2021. The involvement of Enemalta plc in the electricity generation sector is mainly limited to the provision of backup generation service.This is evident from the fact that while Enemalta plc owns 23.36% of the production capacity, only 0.35% of the electricity sent out to the grid during 2021 was produced by its own plants.

The electricity distribution system covering Malta remains under the responsibility of one distribution system operator which forms part of a vertically integrated company, Enemalta plc. Enemalta is the only undertaking which is licensed to carry out all the three activities of generation, distribution and

supply and remains the exclusive supplier of electricity in Malta. The demand for electricity is met from the IPPs generating mainly from natural gas, RES generators (mainlysolar photovoltaic systems) and from imports through the interconnector Italy (Sicily)- Malta.

Enemalta plc is obliged to dispatch the available sources on economic merit order basis with electricity from renewable energy benefitting from priority of dispatch. Electricity imported through the interconnector is mainly traded in the Italian day-ahead market. Since the retail market is not open to competition, all independent power producers may either consume on site the electricity generation and/or sell to Enemalta plc. The trading arrangement between Enemalta plc and the independent power producers for thesupply of electricity is based on long-term bilateral contracts.

In the absence of a liquid wholesale market, the REWS determines the proxy of the wholesale market price on an annual basis. This price is the reference used to determine the amount of operational aid paid to PV installation benefitting from a feed-in tariff and is also the ratepaid to renewable generators exporting electricity to the grid and not eligible for any operational support. The REWS determines the proxy of the market price by estimating the variable cost of meeting the demand forecast for a given year from local fossil fuel generation and imported electricity; and then uses the average of this estimate as a proxy for the market price. The demand assumption excludes that portion of the forecasted demand which is not expected to be met by conventional and/or imported electricity. The methodology was included in the State Aid decision of CION issued in relation to the notified competitive bidding process for the granting of operational aid to generators producing electricity from renewable energy sources with capacity of 1MW_p or more. The proxy of the market determined by the REWS, normally every year, is published in the Electricity Regulations SL 545.34.

i. *Measures to increase the flexibility of the energy system with regard to renewable energy production*

Thus far, the intermittent nature of renewable electricity sources has been mitigated by relying on the interconnector to provide balancing services and, to a lesser extent, on local conventional facilities. Although the Government is planning to install a second electricity interconnector, increased flexibility of the energy system will be tackled through multiple other actions:

- Increase sector integration through the electrification of road transport.
- Further deployment of energy storage (both small scale; distributed, and utility scale).
- Assessment of the potential and applicability of demand response solutions in the local context.

Distribution system secondary node reinforcements are being implemented to address issues related to system current carrying capacity and voltage regulation. However, further installation of renewable energy capacity, particularly large-scale installations such as offshore wind/solar technology, will necessitate the implementation of different mitigating strategies, namely utility scale storage, dispatching, and major grid upgrades to minimize curtailment.

Mechanisms for dispatching, re-dispatching, and curtailment

Enemalta's Network Code approved by the Regulator in 2013 does not discriminate between renewable and conventional generators. Generators less than 5MW are not subject to dispatch (self-dispatched). However, there are only a handful of renewable energy installations larger than 5MW in Malta. Enemalta is required to dispatch different generation sources on an economic basis and aim to minimize the overall system costs. Enemalta has set up an energy trading section to optimise the various parameters influencing its dispatch scheduling.

No planned measures are envisaged for the establishment of real-time price signals and dynamic prices, largely in view of there being no liquid wholesale market. Enemalta is presently finalising its Network Code.

ii. *[If applicable] Measures to ensure the non-discriminatory participation of RES, demand response and storage, including via aggregation in all energy markets*

As mentioned in Section 2.4.3(ii), there is no liquid wholesale electricity market in Malta. In view of the absence of wholesale electricity trading arrangements, Enemalta is responsible for central dispatch and therefore obliged to dispatch electricity from local generation plants and the interconnector based on their order of economic merit, with electricity from RES and CHP plants, irrespective of their size, benefitting from priority dispatch for as long as there is no liquid wholesale market.

Hydrogen market

There is currently no production of renewable or low-carbon hydrogen in Malta, no consumption of hydrogen for energy purposes and negligible consumption of hydrogen for non-energy purposes. For Malta, the main constraints remain the physical isolation from the trans-European gas network and the lack of a gas distribution network. There is no natural gas production in Malta, natural gas is imported as LNG and used solely for electricity generation. There are also no district heating and cooling networks. This greatly limits the potential use of hydrogen in end-use sectors in Malta. Malta also does not have any gas infrastructure which could be repurposed or retrofitted for hydrogen use.

In 2022, renewable electricity made up approximately 10% of the electricity mix and this is fully absorbed in the present demand. The lack of a necessary storage infrastructure coupled with the absence of any hydrogen-based industries (such as steel manufacturers) diminish the likelihood of having economically feasible indigenous hydrogen production in the short to medium term in Malta.

An analysis conducted in 2020 as part of a "*Pre-Feasibility Study for Alternative Solutions to cater for the Energy Demand in Malta*", concluded that it is not feasible to produce green hydrogen indigenously from onshore RES due to economies of scale, spatial requirements, and water scarcity. The country's water resource is already limited, and the water required for electrolysis would need to be produced from energy intensive desalination plants. This makes a hydrogen ready pipeline the most realistic solution for importation of green hydrogen, but this only in a context where hydrogen demand picks up locally either for power generation and/or maritime transport.

Malta believes that hydrogen is just one of many tools and solutions to help the Union achieve decarbonisation by 2050. Hydrogen can be the primary solution in decarbonising hard-to-abate sectors, but at the same time should not diminish or replace Member States' present efforts in the electrification of end-use sectors where this is the more cost-effective solution. The Government

recognizes that hydrogen has vast potential as an energy carrier and can act as a link between the electricity and gas sectors, but also sees the need for technology neutrality to allow all sustainable and renewable technologies and energy carriers to compete on a level playing field in the market.

In line with the EU Hydrogen Strategy, Malta will develop a national hydrogen plan based on expected developments in technology and demand, such that relevant industry will have access to a clean alternative fuel. The plan will identify the potential for H_2 demand by industry and services and the necessary infrastructure and associated regulatory framework necessary to meet the projected demand.

iii. *Policies and measures to protect consumers, especially vulnerable and where applicable energy poor consumers, and to improve the competitiveness and contestability of the retail energy market*

Vulnerable electricity consumers are catered for within the social policy framework. The Department of Social Policy has established criteria whereby certain categories may be eligible to receive energy benefits, which are deducted directly from the consumer's electricity bill. Consumers that are eligible include low income families, households on social assistance, persons receiving unemployment benefits, pensioners, or the disabled.[34] In 2021, 16,273 individuals received the energy benefit. Malta's assessment of the number of energy poor households is further described in section 4.5.4.

As regards the retail electricity market, it is currently not open to competition. Enemalta plc. is the exclusive electricity supplier on the Maltese islands. Regulated retail electricity tariffs shielded electricity consumers from any price increase during the energy price crisis of 2022. As a result, rather than adopted individual financial compensation measures targeting final electricity customers, Government implemented general measures that freeze electricity retail prices at pre-crises levels.

iv. *Description of measures to enable and develop demand response including those addressing tariffs to support dynamic pricing*

The electricity supply market is currently closed, with Enemalta plc. (electricity DSO) being the exclusive electricity supplier on the island. There are currently fixed retail electricity tariffs in Malta.

While recognizing the dual benefits that demand response can bring to both consumers (in the form of reduced consumption and lower electricity bills) as well as system operators (through peak reduction, load shifting and grid balancing), the lack of a liquid wholesale market prevented the development of aggregation activities.

Nevertheless, as explained under sub-heading *Demand-Side response* in Section 3.3 (i) time-of-use tariffs are available for EV charging and large non-residential consumers.

[34] https://socialsecurity.gov.mt/en/Short-Term-Benefits/Pages/Energy-Benefit.aspx

3.4.3 Energy Poverty

i. Policies and measures to achieve the objectives set out in 2.4.4

A number of measures are in place to address vulnerable households. These include:

- The Energy Benefit scheme administered by the Department of Social Security within the Ministry for the Family, Children's Rights and Social Solidarity, under which vulnerable households receive a direct reduction in their utility bills.

- The Eco-reduction scheme under which households that consume either: (i) less than 2,000 electricity units per year in a single household; or (ii) less than 1,750 electricity units per person in a two or more-person household, receive a direct rebate on 15-25% of their electricity bills. This policy incentivises efficiency and lower consumption, while also having a positive effect on the bills of low-income households who fall within the consumption limit.

- The provision of professional advice, free-of-charge, by the Energy and Water Agency to vulnerable and low-income households on energy efficient appliances, water efficiency and behavioural change.

- Financial schemes aimed at reducing energy and water consumption in low-income/vulnerable households through the replacement of old and inefficient appliances, the result of collaboration between the Energy and Water Agency and the Foundation for Social Welfare Services.

Moreover, the development of the Social Climate Fund (SCF) Plan referred to in section 2.4.4, is foreseen to commence in 2024, starting off with the engagement of key stakeholders. This will enable the identification of the key actions and ambitions that will make up the SCF Plan and lead to a first draft of the plan that can be shared with the Commission services and serve as a basis for wider consultations on the draft SCF Plan, in early 2025. This timeline will enable the necessary dovetailing with the final NECP foreseen for mid-2024 and will enable the submission of the SCF Plan by June 2025 in line with the regulatory parameters.

3.5 Dimension Research, Innovation and Competitiveness

i. Policies and measures related to the elements set out in point 2.5

Malta's National R&I Strategy for Energy and Water 2021–2030

Malta's National Strategy for R&I in Energy and Water 2021–2030 provides for the establishment of the Platform-RINEW (Research and Innovation in Energy and Water) to act as the primary tool for the coordination of its implementation. Platform-RINEW brings together Government, academia, industry, and the commercial/private sectors (the Quadruple Helix) within a structure that enables multi-level coordination and cooperation, as well as streamline and effectively allocate resources for R&I in energy and water. The platform also enables the development of appropriate supply- and demand-side policies which strengthen the interrelationship between the energy and water sectors and R&I. The platform achieves these goals through the constituted Technical Committee which is supported by a Secretariat.

ii. Where applicable, cooperation with other Member States in this area, including, where appropriate, information on how the SET Plan objectives and policies are being translated to a national context

Since the development of the National Strategy for R&I in Energy and Water 2021–2030, EWA has entered a joint project with partners from Malta, Cyprus and the Netherlands called the Mediterranean Island Cleantech Innovation Ecosystem (MICIE). The project, which started in mid-2022, aims to create two Action Plans, one for Malta and another for Cyprus to enhance R&I in both countries, under the theme of Energy and Climate. The Action Plans will include actions resulting from stakeholder interaction workshops carried out in Malta and Cyprus respectively. Further information on this joint project is available in Section 4.6 (i).

iii. Where applicable, financing measures in this area at national level, including Union support and the use of Union funds

As mentioned in Section 2.5 (i), the financial support measures being provided through the National Strategy for R&I in Energy and Water 2021-2030, functions through two distinct mechanisms (like the set-up of Horizon 2020):

1. Calls for bottom-up proposals relating to the Priority Areas outlined in this Strategy; and
2. Calls for proposals to structured research questions which relate to Priority Areas.

The financial support under this Strategy as of the 2022 Call of the EWA Research & Innovation Scheme prioritises projects at experimental design stage to system prototypes which means that any project that is applying for this scheme, needs to ultimately reach Technology Readiness Level (TRL) 7 by the end of the Project Period. Support through this fund may also act as an essential springboard for research teams to apply for the larger volumes of support required at higher TRL levels as projects evolve. Further details on the funding scheme being employed through the Strategy can be found in Section 4.6 (i).

Since the 2019 NECP, MCST's National Strategy for R&I for the post 2020 period has been published, and incudes under Smart Specialisation the section for the *Sustainable use of resources for climate change mitigation and adaptation*. The section contains several focus areas namely:

- Towards net zero carbon buildings
- Renewable energy generation and energy storage solutions
- Resource efficiency in industry
- Turning waste into resource

Through this strategy and in particular the above section, it is being envisaged that EU funds will become a significant resource for the R&I undertaken in Malta.

4. CURRENT SITUATION AND PROJECTIONS WITH EXISTING POLICIES AND MEASURES

4.1 PROJECTED EVOLUTION OF MAIN EXOGENOUS FACTORS INFLUENCING ENERGY SYSTEM AND GHG EMISSION DEVELOPMENTS

i. Macroeconomic forecasts (GDP and population growth)

Malta has adopted its own methodology and set of assumptions to forecast the macroeconomic indicators as part of the analytical basis of the NECP. The set of national indicators was developed by the Economic Policy Department (Ministry of Finance) using the Structural Annualised Econometric Model for Malta (SAMM). The model's main purpose is to perform policy simulations at a detailed sectorial level. The output indicators include Gross Domestic Product, Gross Value Added by NACE, disposable income, and employment rates. These figures provide the basis for governmental economic policy formation, analysis and decision-making processes and are therefore used by various ministries in all modelling exercises, including those relating to the development of the NECP.

Economic growth and a consequent increase in demand for labour have led to a high net inward migration, resulting in a rapid increase in population up to 2019. Figure 17 shows the increase in population together with the corresponding yearly percentage increase, as per data published by the National Statistics Office (NSO)[35] and projections by the Ministry for Finance. Demographic and employment trends, shown in Figure 18, were projected based on trends in age groups established by Eurostat projections and recent trends in employment by economic activity type. From 2017 to 2019, population increased by 8%, reaching 514,467 in 2019, growing at an average rate of 4.0% each year. Demographics have been characterised by an ageing process due to falling fertility rates and increased life expectancy. This has been offset by an increase in net migration, with most people not being in the working population age bracket[36]. The COVID-19 pandemic during 2020 and 2021 resulted in a population growth which was much less marked, with an average growth rate of 0.5%.

Population growth is projected to continue with an average rate of 1.5% between 2023 and 2030, reaching 610,244 and 670,787 by 2030 and 2040 respectively. Projections for Population under a policy change scenario that assumes a slower growth than accustomed, same level of historical productivity, an increase in labour productivity in line with the Ageing Working Group (AWG projections), an average unemployment rate of 3%, and a less labour-intensive economy. This naturally translates to an increased number of households over the projected period (Table 4). The source of historical data for number of households is the EU-SILC Survey (Survey for Income and Living Conditions) while the projected data considers historical trends as well as projected population growth. A mean unemployment rate of 3% was applied consistently over the projection horizon.

[35] Census of Population and Housing 2021: Final Report: Population, migration and other social characteristics (Volume 1). Published 16th February 2023

[36] State of the Maltese Economy – Submission to the National Post-Covid Strategy Steering Committee, Economic Policy Department, Ministry for Finance and Employment. Published June 2021.

	2020[37]	2025	2030	2035	2040
Population	515,984	564,212	610,244	643,551	670,787
Number of households	208,584	236,110	261,667	280,159	295,281

Table 4 – Total population and number of households at five-year intervals. Source: Historical data up to 2020 from the NSO 'World Population Day' and 'EU-SILC: Main Dwellings' news releases; projected population as per Ministry for Finances and Employment projections; projected number of households based on historical trends.

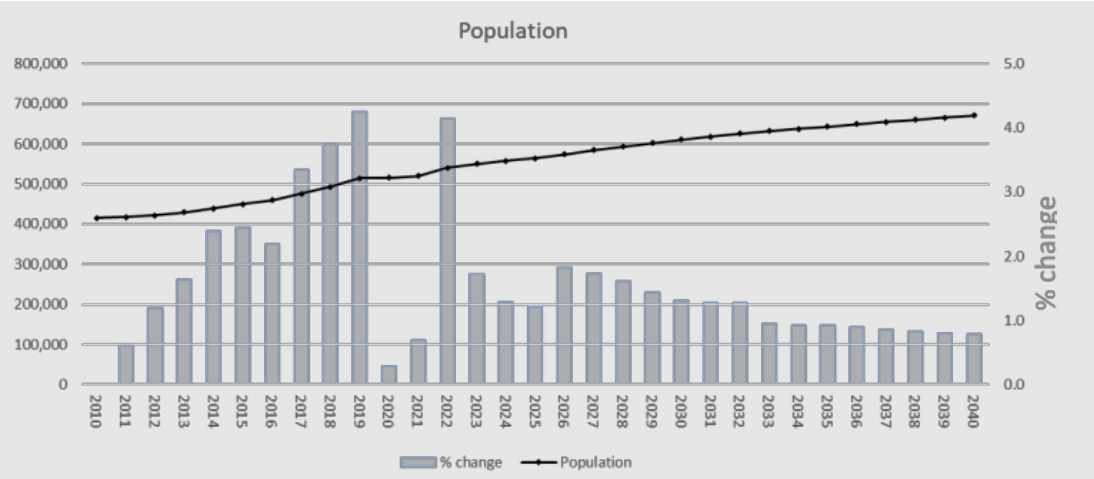

Figure 17 – Population trends and growth rate in Malta. Source: Historical data up to 2021 from the NSO 'World Population Day' news release; projected data as per Ministry for Finance and Employment projections.

[37] Historic data point. Source: NSO

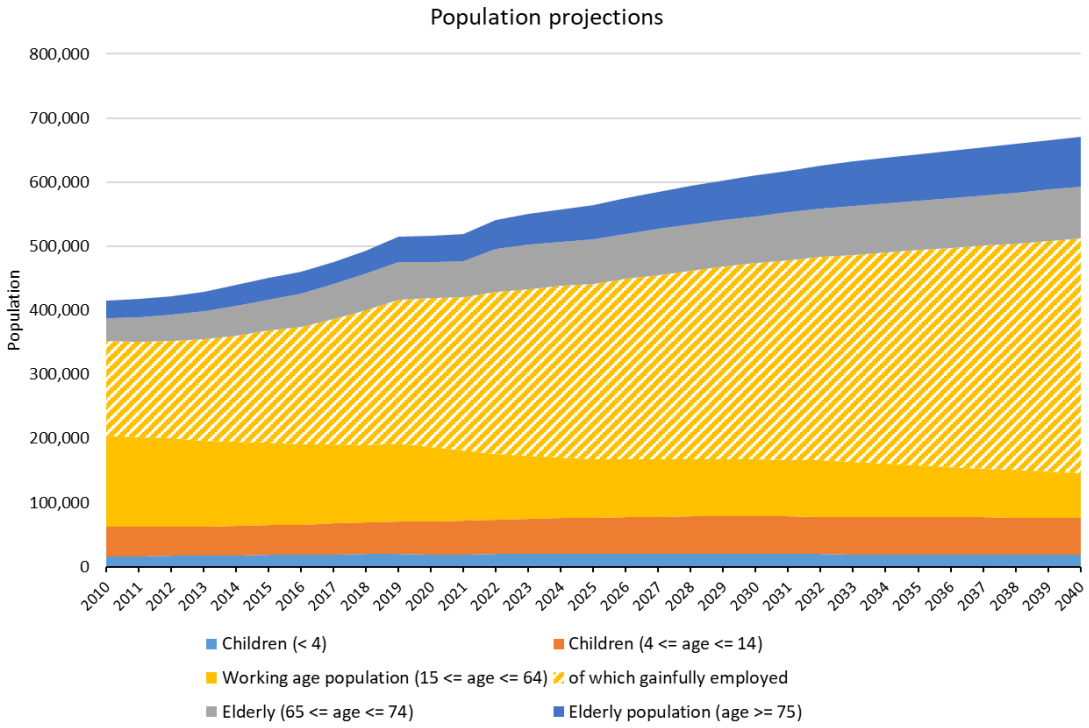

Figure 18 – Projected demographic trends. Source: Historical data up to 2021 from the NSO 'World Population Day' news release; projected demographics as per Ministry for Finance and Employment projections.

Table 5 shows the projected average GDP growth rate and the average GDP per capita up to 2040. The largest contributor to a decline in GDP in 2020 was net exports, primarily due to a decrease in foreign demand, restriction on travel-related activities and disruptions to the global supply chains[38]. Looking ahead, GDP growth is projected to stabilise at around 3%. The GDP per capita is projected to maintain a steadily increasing trend reaching 30,000 EUR 2016/p.c. by 2030.

5-year period	2016 –2020	2021 –2025	2026 –2030	2031 –2035	2036 –2040
Average GDP growth (%)	3.6	5.7	3.1	3.0	3.0
Average GDP per capita (€2016)	24,290	26,902	29,342	31,906	35,409

Table 5 – Projected average GDP growth in five-year periods, %. Source: Ministry for Finance and Employment projections.

[38] State of the Maltese Economy – Submission to the National Post-Covid Strategy Steering Committee, Economic Policy Department, Ministry for Finance. Published June 2021.

ii. Sectoral changes expected to impact the energy system and GHG emissions

Residential Sector

Traditionally, the main driver of consumption in the residential sector is the growing population, particularly the number of households. The average energy consumption per household is estimated to increase by 3.7% between 2020 and 2030, while the number of households is estimated to increase by 25%. The average total energy consumed by a household is the result of electricity and other non-electric fuels (such as LPG) that are used by households. In a WEM scenario, it is expected that the natural process of electrification of households will continue, leading to a projected increase of 12% of electricity consumption per household by 2030 with respect to 2020. Other contributors to this higher estimated electricity consumption are the increase in disposable income per household, as this tends to lead to a higher use of certain electric devices such as white appliances and air-to-air heat pumps. On the other hand, non-electric energy consumption per household (mainly LPG that is used for cooking and space heating) is expected to decrease by 25% between 2020 and 2030.

Non-Residential Sector

The gross value added (GVA) generated in Malta in 2017 stood at €10.4 billion (EUR 2016), while that in 2021 it increased to €12 billion, representing an overall growth of 15%. The COVID-19 pandemic, along with its economic implications, had an impact on all the sectors of the economy, albeit with different intensities. The hardest-hit sector was the services sector which includes tourism and contact-intensive personal services. Activity in this sector was restricted due to containment measures imposed in Malta and abroad. The contraction of the industrial sector due to COVID-19 was less pronounced than that observed in the services sector and depended heavily on the nature of manufacturing operations.

The changes in GVA sectoral distribution between 2017 and 2021 were only marginal. As shown in Figure 19, the largest sector remained by far the services sector. Based on macroeconomic projections, this sector is expected to remain the most significant in terms of GVA, maintaining a share of around 87% of the total GVA up to 2040.

The GVA of all sectors is forecasted to reach around €23 billion (€2016) by 2040, corresponding to an increase of 72% over 2022. Therefore, a significant increase in economic activity is expected. This growth in activity will likely require an expansion in floor area utilised by such economic activities to support new and enlarged businesses. It is also assumed that additional floor space will also be required to accommodate:

i. an increase in the number of employees,
ii. additional bed spaces in the healthcare sector, whch is required to cater for an increasing population,
iii. additional bed spaces in elderly care facilities, owing to growth in the 75+ demographic.

Given the assumption that the projected economic growth results in a corresponding expansion in physical terms, in a do-nothing scenario, the energy consumption required to sustain economic activities is reasonably expected to increase.

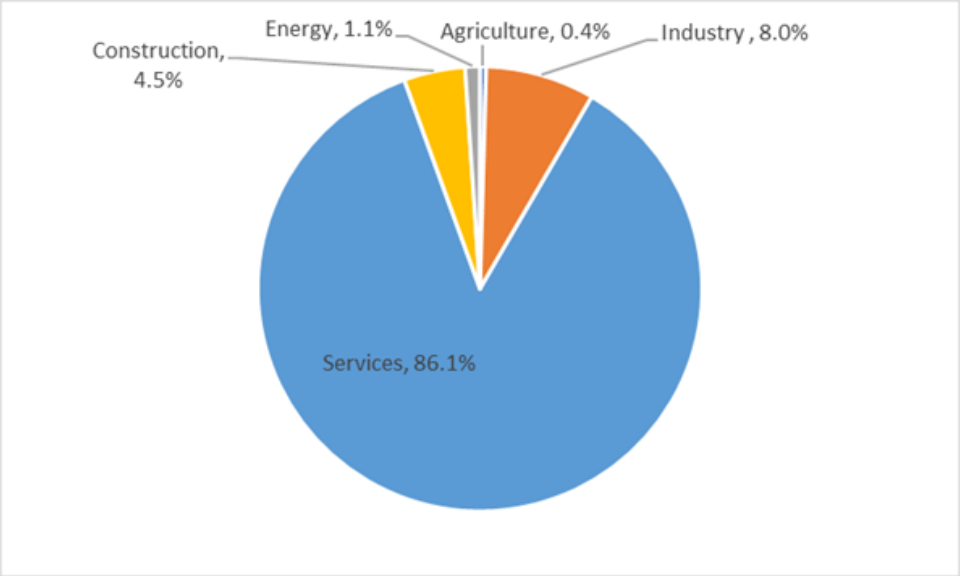

Figure 19 – GVA distribution in 2021. Source: Ministry for Finance and Employment.

In 2021, approximately 59% of the gainfully employed in the services sectors worked in office-based jobs or educational institutions; this is projected to remain the same for 2030 and 2040. Given the energy consumption profile of such activities, predominantly electricity for space heating and cooling and ICT equipment, electricity demand for such end-uses is expected to create additional load on the electricity grid.

The contribution of the hospitality sector to the services sectoral GVA decreased from 6% in 2017 to 3% in 2021 due to the COVID-19 pandemic. However, electricity and fuel consumption in this sector is generally high, accounting for 27% (average over years 2017 to 2019) of the energy consumption in the entire services sector. Tourism is expected to continue to be one of the main drivers of economic growth for Malta. The healthcare sector, incorporating hospitals, medical institutions, and elderly care facilities, is another important contributor to electricity and fuel consumption, with the healthcare sector contributing circa 10% of energy consumption within the services sector.

The industrial sector maintained a contribution of around 8% of the total GVA in between 2017 and 2021. While it is projected that the GVA will continue to increase, its sectoral contribution is expected to decrease moderately, declining to around 7% by 2040. The physical output from the manufacturing sector is projected to increase in line with results from pan-European models and national projections and the new opportunities expected to arise within this sector.

Water supply, sewage and wastewater management in Malta is closely linked with the energy system due to the country's dependency on reverse osmosis for desalinisation. Energy is also required for wastewater treatment, pumping and distribution. The overall demand for potable water is expected to increase, along with the volume of wastewater requiring treatment; however, the trend of increase in electricity demand for these end-uses shows decoupling from both population and economic growth. It is projected that energy consumption per capita required to produce and distribute water and treat wastewater will decrease from 284 kWh/capita in 2021 to 271 kWh/capita (-4.6%) in 2030. This is largely a result of investments in the sector and policies/campaigns to increase resource management efficiency.

Transport Sector

The number of road vehicles is projected to continue to increase because of population growth and sustained economic development. That being said, the average fuel consumption and emissions per vehicle is projected to decrease slowly, as manufacturers respond to EU Regulations setting CO_2 emission reduction targets for new vehicles. Meeting such targets requires manufacturers to include an increasing share of electric cars in their fleet, a trend that is expected to be reflected in the stock of newly imported vehicles in Malta. The effect of this development may be somewhat delayed as a significant portion of newly licensed vehicles tend to be imported second-hand vehicles (48% of the total stock excluding e-kick scooters and 59% of passenger cars in 2021).

Malta's Low Carbon Development Strategy sets an ambitious set of measures to electrify the transport sector including amongst others the need to intensify the penetration of electric vehicles within the fleet (LCDS estimates this need equivalent to 65,000 vehicles by 2030). Incentives in the form of financial grants have been renewed from year-to-year to help achieve this aim. The increased share of electric vehicles in the vehicle fleet is expected to impinge on the average consumption of electricity although the impact on peaks may be mitigated through effective demand management. In this context, an advantageous night-time electricity tariff, applicable to EV charging, has been in effect since 2021.

iii. Global energy trends, international fossil fuel prices, EU ETS carbon price

The harmonised prices for international oil, gas and carbon as proposed by the European Commission in 'Recommended parameters for reporting of GHG projections in 2023' were used for projections.

The past two years were characterised by global instability linked to the war in Ukraine and an on-going economic recovery from the pandemic and its impact on supply chains. Wholesale natural gas prices in Europe peaked in August 2022, reaching levels above €300/MWh, which is well above pre-pandemic levels where prices stood at around €10-€20/MWh [39]. These very high prices reflected a surge in demand where Member States rushed to fill depleted gas storages in preparation for the winter season. Following a mild winter, prices started to drop, and continued to slide in 2023, even though they are still higher than pre-pandemic levels. Supply diversification and high storage levels have led to a decreased risk of stress in European gas markets. Whilst the threat of immediate gas shortages has abated, the evolution of natural gas prices is still uncertain. In the short-term, it is projected that gas market prices in 2024 will decrease to around 50 Euro/MWh (€ 2020 prices). However, increased demand triggered by various factors such as cold winters or hot summers, and reduced incentives to save gas can reignite pressures on market prices. In the long-term, gas market prices are projected to hover at around 40 Euro/MWh.

From its inception the EU ETS market was the main source of EU carbon pricing for industries including the energy sector, which were the first to be subject to a 'cap and trade' system which transformed carbon from an externality into a market commodity. In this regard, the early days of the carbon market

[39] European Commission (2023), European Economic Forecast – Spring 2023

saw EU ETS allowances trade at prices below €10 per tonne from 2013 to the early 2018. The prices were maintained at this level as supply somewhat exceeded demand and conditions for price movements for carbon allowances weren't that strong. Early signs of price movements started in 2020 when the EU ETS price started to trade at an average rate of €24 per tonne, which was more than double the standard price the market had ever witnessed. This surge in price was further pronounced in 2021 as ETS allowances were traded on the market at an average price of €54 per tonne and which was underpinned by several factors that led to further market dynamism. ETS price record highs were registered in 2022 and further solidified in 2023 to the point that ETS allowances hit for the first time the €100 per tonne price mark as a result of various factors, including, among others, market reaction to decreased fuel supplies from Russia, having long been a leading reliable energy supplier to the EU, market formation changes, the falling back on more polluting industries for energy such as coal, the impact of episodes of extreme weather conditions and other international events. A high degree of uncertainty remains on the future evolution of international fuel prices in the coming years, and these would be reflected in future projections.

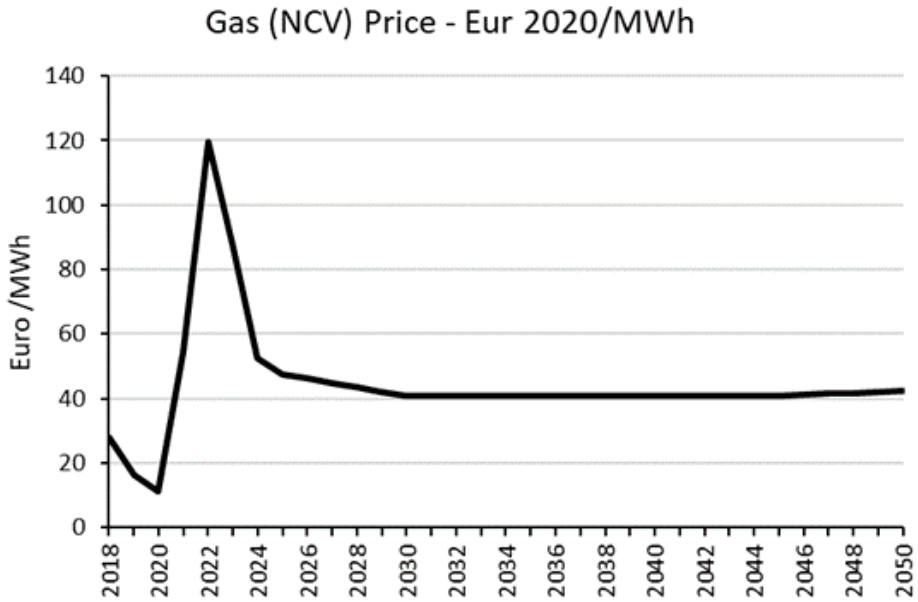

Figure 20 – Natural gas price developments and future prices. Source: European Commission (2022), 'Recommended parameters for reporting on GHG projections in 2023'.

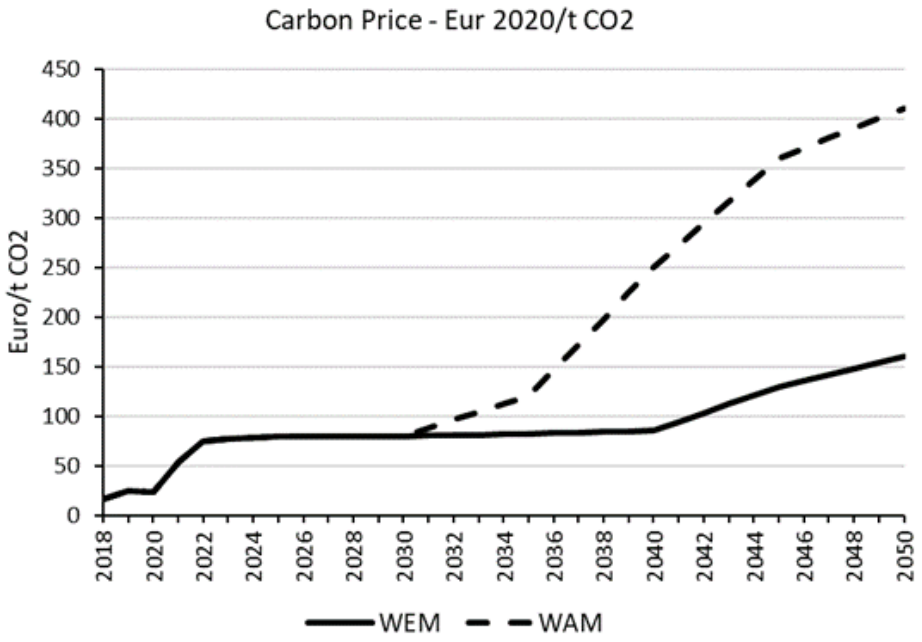

Figure 21 – Development of carbon price. WEM trajectory is based on Reference Scenario 2022, WAM trajectory is a modelling driver to reach EU 2050 climate neutrality in the FF55 package analysis. Source: European Commission (2023), 'Recommended parameters for reporting on GHG projections in 2023'.

iv. Technology cost developments

The primary technology cost assumptions used in the development of Malta's With Existing Measures (WEM) and With Policy Measures (WPM) scenarios for the NECP are presented in this section. As a technology taker, Malta faces various challenges and limitations. First, relying on off-the-shelf technologies may not always align perfectly with Malta's specific needs, leading to potentially suboptimal solutions. Secondly, the country's dependence on external technologies exposes it to vulnerabilities when sudden technological changes occur due to shifts in international policies or market conditions in technology-exporting countries. Additionally, Malta has limited control over the development and direction of adopted technologies, potentially hindering its ability to address specific national priorities effectively.

Solar PV

Projected cost reductions for small-scale residential solar photovoltaics [40] are based on the costs for small-scale rooftop solar PV set out in the PRIMES 2020 technology assumptions (Table 6) which provide overnight investment costs and annual fixed operation and maintenance costs (EUR/kW) for the projected years (Table 7). However, given the discrepancy between actual local costs (as of 2020, based on data compiled by REWS) and those assumed by PRIMES, an adjustment had to be made. In addition to these costs, a one-time €50 connection fee was included in the overnight capital costs. The technical lifetime of solar PV technology was assumed to be 20 years. Moreover, it is assumed that the inverter will require changing half-way through the installation's lifetime. The cost for a replacement

[40] The present average size of residential PV systems is 3.2kW$_p$. This is an increase from 2.8kW$_p$ in 2017.

inverter was calculated based on historical data of inverter costs and projected according to trends in overnight costs.

	Investment Costs €/kW (2015=100)				Fixed annual O&M €/kW (2015=100)			
PV Solar Residential	**2020**	**2030**	**2040**	**2050**	**2020**	**2030**	**2040**	**2050**
Solar PV – residential rooftop	890	803	597	483	19.0	14.9	11.1	9.0

Table 6 – Solar PV technology cost assumptions, € 2015/kW excluding taxes. Source: Primes 2020 technology assumptions.

	Cost reduction scenario (€(2014=100)/kW$_p$)		
	2014	2050 (before efficiency effect)	2050 (incl. efficiency effect)
Installation	50	30-45	13-28
Mounting Structure	75	38-60	16-38
DC Cabling	50	30-45	20-32
Grid Connection	60	24-36	24-36
Infrastructure	40	28-36	16-26
Other BoS costs	60	39-56	29-46

Table 7 – Cost reduction scenario, € 2014/kW excluding taxes. Source: Fraunhofer ISE, 2015.

For non-residential PV systems, the overnight investment costs and fixed annual operation and maintenance costs for solar PV with a high potential were selected from the Primes 2020 technology assumptions. However, given the variance between local capital expenditure (circa €1200 /kW in 2021 excluding VAT) and EU capital costs (€730 /kW in 2020), it was concluded that the Primes 2020 study costs had to be complemented by other sources to accurately project the CAPEX of non-residential PV systems in Malta. Furthermore, capital costs in the Primes 2020 assumptions appear to exclude grid connection costs. In Malta, these costs are borne by the PV developer and were thus factored into national estimates of the CAPEX of commercial PV systems. However, grid connection costs for PV connections greater than 16 amps per phase are not fixed but are dependent on the particularities of the installation site and are derived following site specific network studies. These costs can be relatively high, running into the hundreds of thousands depending on the site and the size of the installation.

The ASSET study projected costs based on average prices of solar PV in Europe which have, in recent years, been driven down significantly following the introduction of auctions to support utility-scale PV systems and other renewable technologies around Europe. Given that the median size of non-residential PV system in Malta is 12kW$_p$, ASSET prices are not reflective of local costs. Therefore, for non-residential PV systems, it was assumed that the ASSET costs did not adequately account for the Balance of Systems components. These were factored into the total PV system costs based on

projections published by Fraunhofer ISE (2015) on behalf of Agora Energierwende[41]. As the report uses 2014 as its base year, it is likely that the recent price evolution of PV systems, as a result of the increase in utility-scale PV, was not captured and therefore the costs are more reflective of small-scale PV systems prevalent in Malta.

Battery Systems

The electricity generated from Renewable Energy Sources (RES) in Malta, which is almost exclusively solar PV, is highly volatile. The nominal power of solar PV installed in Malta is relatively high when compared to the installed power capacity. Given that size of Malta's power system variations in output by solar PV is significant and creates problems for the energy provider, mainly in the spinning reserve and voltage regulation. Battery Energy Storage (BES) is one solution to smooth out the supply of variable forms of renewable energy. The current average cost of installing a household-size battery in Malta is around € 760 /kWh[42]. However, through the new Government schemes that were launched in 2021, beneficiaries may be able to recuperate up to 80% of the battery cost.

A BES system also enables consumers greater control to fully utilise the power they are generating reducing their energy bill. Considering this, the Energy and Water Agency will be cooperating with the University of Malta to conduct a study on how best to enable the active participation of electricity consumers.

Floating Offshore Wind

Due to the geospatial characteristics of Malta's territorial waters and environmental constraints, the installation of onshore or fixed-foundation offshore wind turbines is not considered a feasible option. Figure 22 depicts, total land area for Member States, with Malta having the smallest total land area, amounting to a total of 316 km^2.

[41] Fraunhofer ISE (2015): Current and Future Cost of Photovoltaics. Long-term Scenarios for Market Development, System Prices and LCOE of Utility-Scale PV Systems. Study on behalf of Agora Energiewende.
[42] Median value is €665 /kWh, while the 25th and 75th percentiles are 633 and 900 €/kWh – all prices are nominal, excluding inverter but including VAT. (Source: Regulator for Energy and Water Services)

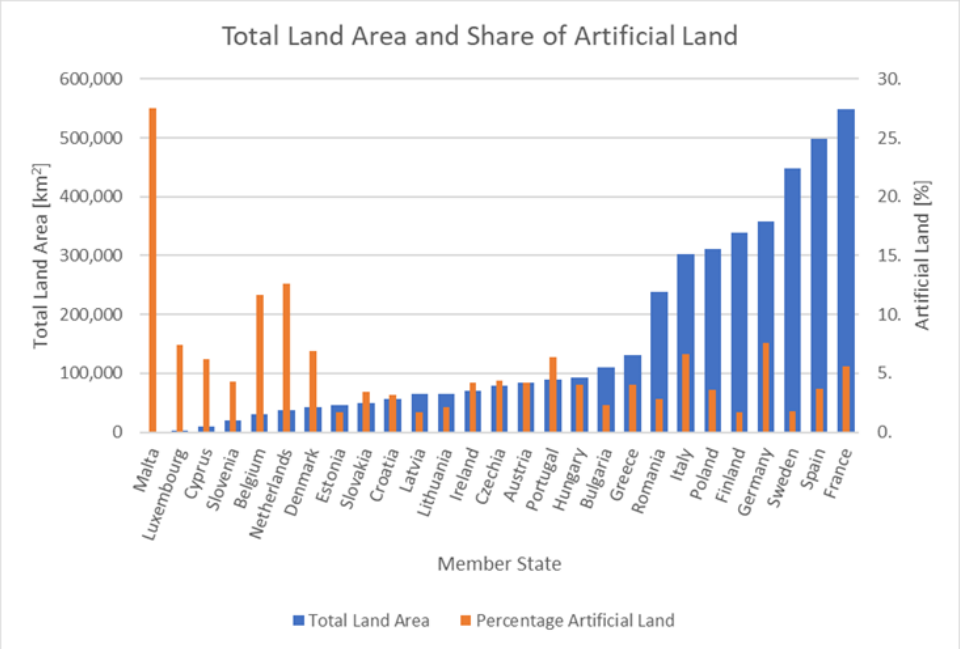

Figure 22 – Share of Artificial Land and Total Land Cover. Source: Eurostat (lan_lcv_ovw)

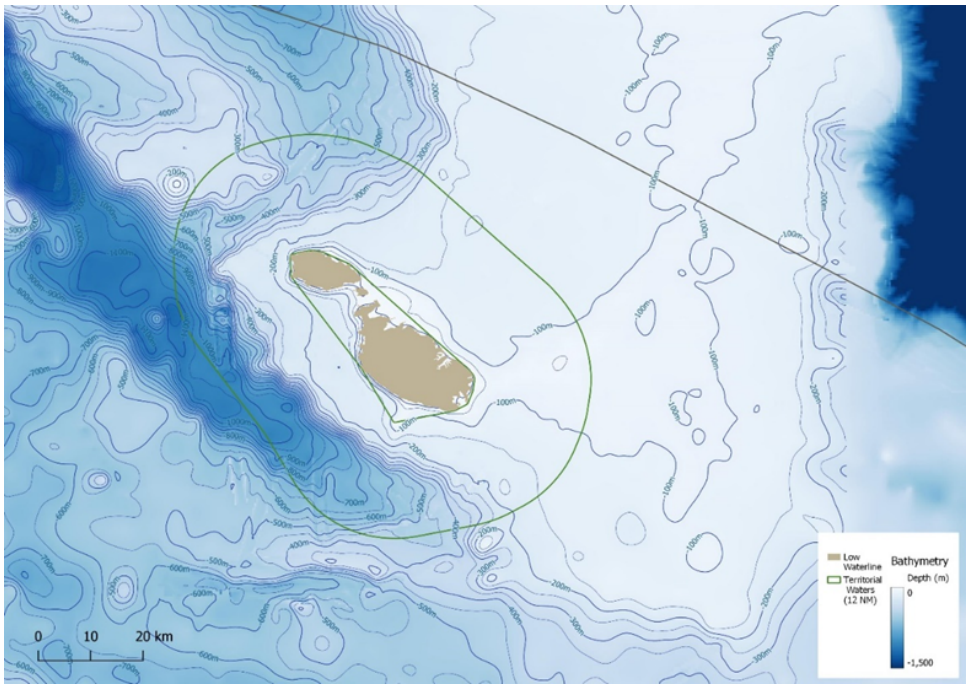

Figure 23 – Bathymetry. Source: GEBCO (2021), Gridded bathymetry data.

In addition, Figure 22 also portrays the share of Artificial Land from total Land Area, which includes all human developed land surfaces which have replaced or significantly altered the natural landscape, such as urban areas, industrial zones, roads etc. Malta ranks with the highest share of Artificial Land from all Member States, amounting to 27.5% in 2018. As illustrated in Figure 23, the bathymetric characteristics of Malta's territorial waters, highly restricts areas suitable for offshore bottom-fixed wind turbines, due to the relative shallower water depth requirements of such technology. However,

floating offshore wind technology presents a potentially viable solution for harnessing wind energy in this context.

The potential of floating offshore wind technology was assessed for the period 2021–2030, as sources of reliable costings in the Mediterranean region beyond this period are less than reliable. Floating offshore is a very recent and innovative technology and thus available data is limited since few such projects have been implemented globally to date and more so when considering the Mediterranean region. Charts displayed in Figure 24 show the main drivers of change for the global levelized cost of wind between 2020 and 2050, as presented in the Energy Transition Outlook 2022 report. Costs for offshore floating wind are expected to decline at a higher rate till 2050 relative to fixed-bottom wind, given that floating technology is still in the initial development stages, while fixed-bottom is at a more advance stage along the cost learning curve. The levelized cost of floating wind technology presented in Figure 24, as sourced by DNV, shows a decline in the cost for floating wind from 249 USD/MWh in 2020 to 41 USD/MWh by 2050.

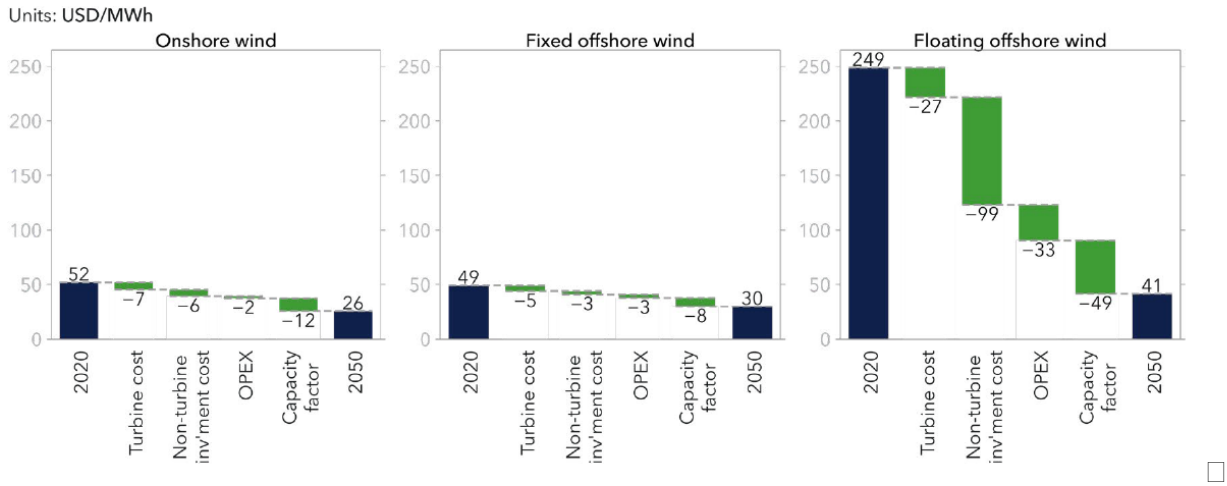

Figure 24 – Levelized cost of wind technology. Source: DNV, Energy Transition Outlook 2022.

A study[43] conducted on levelized cost of energy (LCOE) of floating wind in the Mediterranean Sea has been analysed. Best- and worst-case scenarios for LCOE mapping presented for the central Mediterranean region close to Malta suggest LCOE ranging from 100-140 €/MWh in the best-case scenario and goes up to 200-300 €/MWh in the worst-case scenario. Case studies presented estimate a total capital expenditure (CAPEX) for a 1GW floating wind farm in the Mediterranean to range from €4.1 bn and €5.0 bn.

It is important to note that due to the novelty of floating offshore wind technology and the lack of large-scale projects, there is inherent uncertainty associated with these cost estimates. Further research, development, and the implementation of actual floating wind projects will provide more accurate data and reduce uncertainties in the cost projections.

[43] A. Martinez et al. (2021)

4.2 DIMENSION DECARBONISATION

4.2.1 GHG Emissions and Removals

i. Trends in current GHG emissions and removals in the EU ETS, Effort Sharing Regulation and LULUCF sectors and different energy sectors

Table 8 below illustrates historical GHG emissions trends for Malta from 1990 to 2021.

Historical GHG Emissions 1990–2021 by sector (Gg CO_2 eq.)							
Year	Energy	Industrial Processes and Product Use	Agriculture	LULUCF	Waste Management/Waste	**Total with LULUCF**	**Total without LULUCF**
1990	2435	8	109	-8	75	2618	2626
2005	2667	43	91	0	197	2997	1998
2010	2612	142	85	11	124	2974	2962
2015	1664	230	85	-4	150	2125	2129
2019	1652	227	86	6	184	2156	2150
2020	1600	232	89	8	191	2120	2112
2021	1609	236	88	1	201	2135	2134

Table 8 – Historical GHG emissions 1990–2021 by sector (Gg CO2 eq.). Source: sourced from Malta's 8th National Communication Under the United Nations Framework Convention on Climate Change

The profile of Malta's total national GHG emissions is a story of two contrasting trends. For the period between 1990 and 2012, the general trend is one of increasing emissions, reflecting the general trend in the Energy sector (inclusive of electricity generation, transport and other fossil fuel used in various economic sectors). After 2012, a rapid decrease in emissions occurred, reaching the lowest ever level of GHG emissions in 2016, followed by a period of relatively minimal growth and general plateauing of emissions. This second period is again characterized by the strong correlation of total emissions with those of the Energy sector, with the rapid decrease observed over the short 2012–26 period being largely due to the developments in the local electricity supply sector. In more recent years, the relative contribution of sectors other than energy, including trends of emissions related to the use of F-gases (Industrial Processes and Product Use sector) and emissions from Waste management, together with continued growth in emissions from road transport, have had a counteractive effect.

It could be observed that overall emissions have decreased since 1990. The major sector remains the energy sector which apart from power generation also includes fuel use in the transport sector. An evident drop in emissions registered in 2015, with total emissions dropping by around 38% from 2005. This came because of the investment carried out in the energy sector, and which led to gradual decreases in overall emissions reaching 2014 and 2015. The decrease registered meant that the emissions in 2015 were even less than what had been registered in 1990, thus indicating the magnitude of this drop. In the context of other more relevant sectors, though at a lower level, there is Industrial Processes and Other Product Use sector which saw a surge in emissions related to the switch from CFCs to HFCs (with the latter being more pronounced in GHG intensity than the former). The

trend in agriculture has been on the downside in emissions between 1990 and 2021, though several fluctuations where visible across the time horizon. Emissions induced by waste related activities were on the rise between the base year 1990 and 2021, with some years being characterised by fluctuations.

The relationship between national total emissions and GDP per capita can be observed in the following indicator, thus it is a metric to showcase the important decoupling of economic growth and GHG emissions. The following table show the 'emissions intensity'[44] of Malta's economy which has seen a consistent downward trend over the years.

Trends in emissions (tCO_2 eq.) per capita compared to population growth		
	Emissions/GDP (with LULUCF)	Emissions/GDP (without LULUCF)
1990	942	945
1995	875	877
2000	670	672
2005	578	578
2010	434	432
2015	212	212
2020	162	162

Table 9 – Trends in emissions (tCO_2 eq.) per capita compared to population growth. Source: Malta's 8th National Communication Under the United Nations Framework Convention on Climate Change

With regards to emissions per capita, Malta registered a drop in total emissions per inhabitant over the 2012–2021 time horizon from 7.4 tonnes of CO_2 equivalent per person to 4.1 tonnes of CO_2 equivalent per person[45]. This decrease was calculated at –44% from 2012 levels. On average, over the years under observation, Malta registered an emission per capita of 5 tonnes of CO_2 equivalent. This contrasts well when comparing this average with that of the EU 27 block which measures at 8.4 tonnes of CO_2 equivalent per person[46]. In this vein, Malta managed to secure a stronger decrease in emissions per capita over the mentioned period when compared to the EU's emissions per capita which dropped only by –14% over the same period. Currently, Malta has the lowest rate of emissions per capita, when taking into account national emissions (and excluding emissions from international bunkers, which, by international convention, are reported as memo items and not include in national totals) amongst the EU 27 Member States as is demonstrated in Figure 25.

[44] Malta's National Communication to the UNFCCC (8th Edition)

[45] Raw data extracted from Eurostat database; own calculation

[46] Raw data extracted from Eurostat database; own calculation

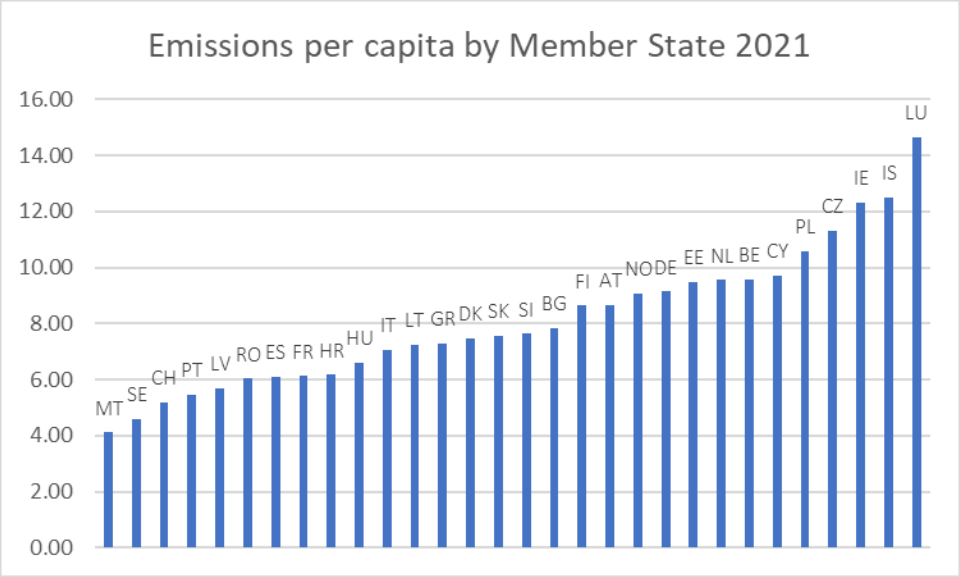

Figure 25 – Emissions per capita by Member State, 2021. Source: EEA GHG Emissions viewers

GHG emissions trends in ETS and Effort Sharing Regulation

Malta's contribution towards the EU's 2020 and 2030 emission reduction objectives is determined by local compliance by a number of large local installations, together with a series of aircraft operators which are subject to the EU Emission Trading System (ETS, as well as compliance with the obligations of the Effort-Sharing Decision (ESD: covering the period 2013–2020), and similarly the now applicable Effort-Sharing Regulation (ESR: which runs through the period 2021–2030).

ETS

As explained in section 2 and 3 respectively, in Malta, only the plants for the conventional generation of electricity fall within the scope of the EU ETS.

Notably, there has been a decline in CO_2 emissions over the last few years, particularly due the upgrades in the electricity generation sector, and the significant investment in renewable energy.

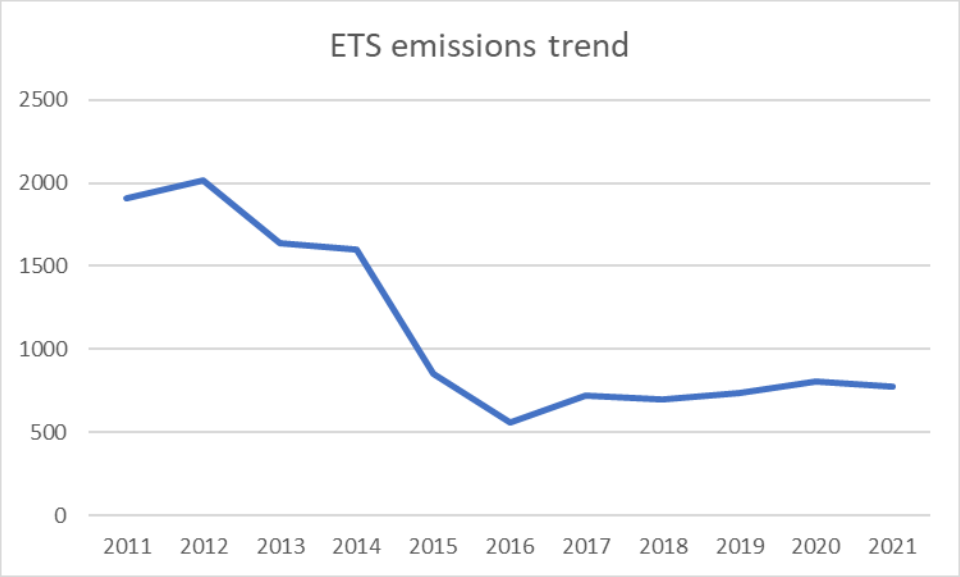

Figure 26 – ETS Emissions Trend. Source: Malta's GHG emission profile as submitted to the UNFCCC; disaggregated based on activities falling under the ETS

Effort Sharing Regulation

The Effort Sharing regulation applies national emission targets across sectors which do not fall within the existing ETS including transport, IPPU, waste, manufacturing industries and construction, the commercial, institutional and residential sectors, and agriculture. The emissions profile of ESR sectors is provided in section 2. The overall emissions have been increasing throughout the period under review. Key contributing activities include indigenous transport, the growing emissions related to the use of F-gases in cooling and refrigeration systems and waste management. As can be expected, decreases were evidenced during the COVID period (2020 and 2021) owing to the impact that the pandemic had on the transport sector.

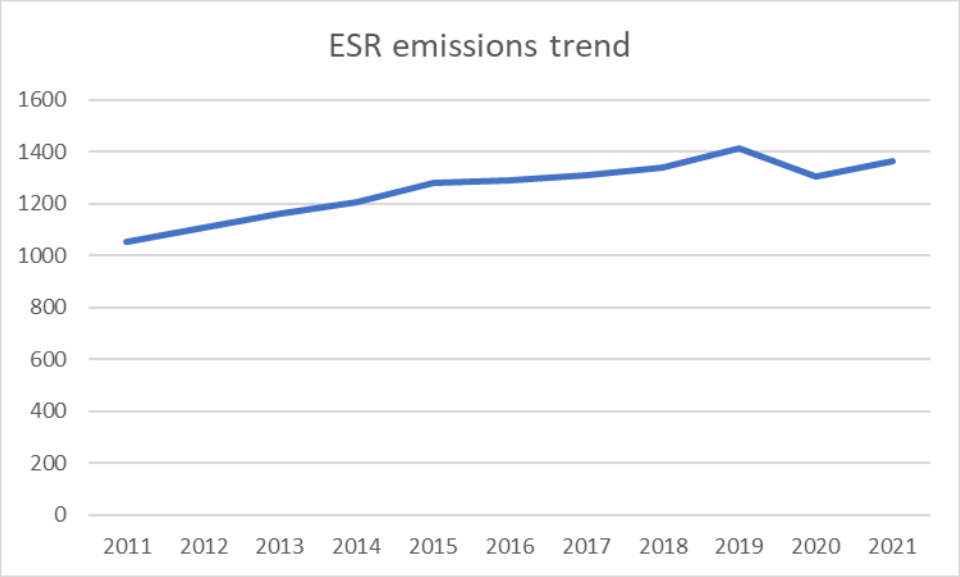

Figure 27 – ESR emissions trend. Source: Malta's GHG emission profile as submitted to the UNFCCC; disaggregated based on activities falling under the ESR

ii. Projections of sectorial developments with existing national and EU policies and measures at least until 2040

The projected emissions profile shown below is aligned with the ambition at EU and national level. Updates will be provided in the final NECP which will align with the most recently available macroeconomic projections and taking into consideration the COVID pandemic and the impacts of the conflict in Ukraine which had a major impact on the general economic context.

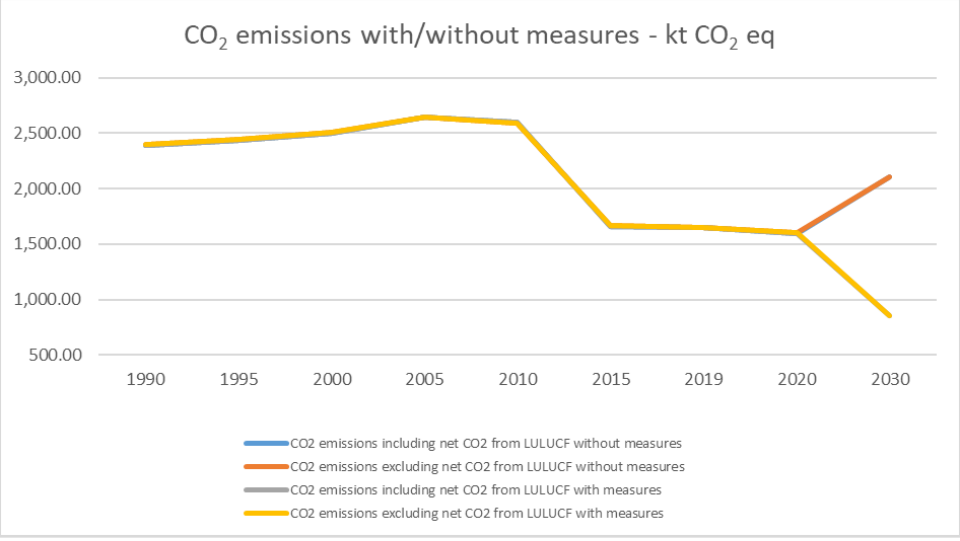

Figure 28 – CO_2 emissions with and without measures (kt CO_2 eq)

4.2.2 Renewable Energy

i. Current share of renewable energy in gross final energy consumption and in different sectors (H&C, electricity, transport) as well as per technology in sectors

Table 10 shows the share of renewable energy in total gross final energy consumption, as well as in the sectors of heating and cooling, electricity and transport. The overall RES-share as at end of 2021 stood at 12.2%. This amounts to an increase of 5% over 2017. Malta's target of 10% overall RES in 2020 was surpassed by 0.7%. The highest relative share of renewable energy was achieved in the heating and cooling sector.

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Heating & Cooling[47] (%)	7.3	12.0	13.4	15.4	15.0	14.6	16.9	19.3	22.8	23.6	23.0	31.4
Electricity (%)	0.0	0.5	1.1	1.6	3.3	4.3	5.7	6.8	7.7	7.5	9.5	9.7
Transport (%)	0.0	2.0	3.2	3.5	4.7	4.7	5.3	6.8	8.0	8.9	10.6	10.6
Overall RES share (%)	1.0	1.8	2.9	3.8	4.7	5.1	6.2	7.2	7.9	8.2	10.7	12.2

Table 10 – Share of renewable energy in gross final energy consumption, total and per sector 2010 – 2017. Source: Eurostat, SHARES Tool.

From 2017 to 2021, total final energy consumption of RES increased by 68%, reaching 758 GWh in 2021, growing at an average rate of 15.5% per year. This growth is attributed to the continuous deployment of PV installations and increased use of biofuels on the Maltese market. This is to be compared to a mere 6 GWh of RES consumption in 2005, when only a handful of solar water heating systems were practically the only RES technology in Malta.

The Government's current policy around RES remains is to fully exploit the potential of effective indigenous renewable energy sources. PV technology has proved to be the most robust and fastest-growing technology, owing much to the successful history of public and Government initiatives to promote this technology. Malta also enjoys high incoming solar radiation with the yield of PV systems among the highest in Europe. The total cumulative installed capacity at the end of 2021 stood at 206MW_p, rising to 221MW_p by the end of 2022. Over 93% of the installations (amounting to circa 46% of the capacity) are installed in the residential sector. New initiatives promoting PV investments have

[47] Excludes ambient heat from heat pumps in 2010–2011.

been launched in 2021. These initiatives now include financial support for battery storage system installations.

Figure 29 presents the distribution of renewable energy sources in final energy consumption of renewable energy in 2021. Solar PV technology accounted for the largest share, contributing to 33.7% of renewable energy consumption. Additionally, there has been a steady increase in the use of heat pumps for heating and cooling purposes (37.3%) and the use of biofuels in transport (16.6%). On the other hand, installation of new solar water heaters has experienced a slowdown in recent years, with a share of renewable energy consumption amounting to just under 8% in 2021. Other sources of RES include electricity and heat produced from biogas plants and biomass imports.

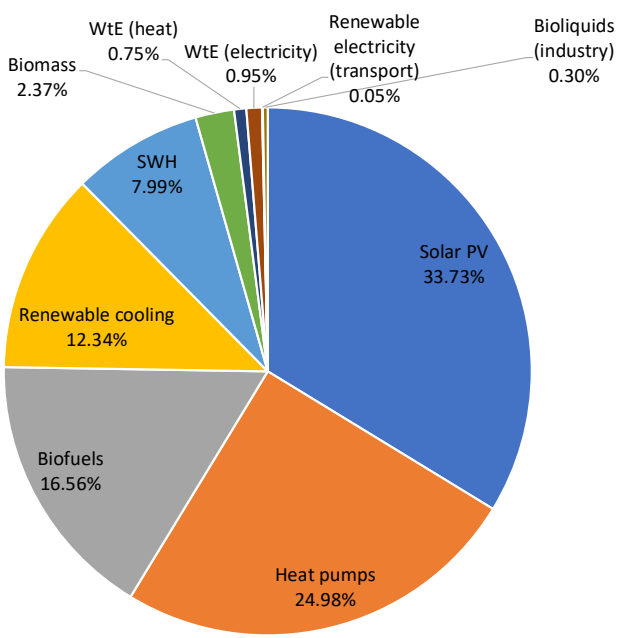

Figure 29 – Share of RES technologies in consumption in 2021. Source: Eurostat, SHARES Tool.

Share of RES in the heating and cooling (H&C) sector

The share of renewable energy within the heating and cooling (H&C) sector amounted to almost 370 GWh in 2021, increasing from 193 GWh[48] in 2017. This steady increase in renewable energy share in H&C is attributable to the use of air-to-air heat pumps for heating and cooling, as shown in Figure 30. Other smaller contributions by order of significance are solar water heaters, biomass imports, heat produced from Waste-to-Energy plants and bioliquids. The latter are used for spatial heating and industrial processes in the industrial sector. The contribution of renewable cooling to RES consumption in H&C stood at around 25% in 2021. This was calculated in-line with the methodology found in Annex

[48] Ambient heat from air-to-air heat pumps for 2010 is estimated to have provided 40 GWh, making the total figure for RES_H&C 90 GWh as opposed to 50 GWh. However, in the published energy balances and energy statistics, ambient heat from heat-pumps is not calculated before 2012, that is, prior to the publication of Commission Decision 2013/114/EU which established the guidelines for Member States on calculating renewable energy from heat pumps.

VII of Directive (EU) 2018/2001. It is worth noting that this figure represents a conservative estimate accounting only for split-unit heat pumps imported in 2021. Contribution from the relevant stock of installed heat pumps has not been included so far as data is being collated. There is no district heating network in Malta and there are no plans for the development of any such services either, since, as shown by past studies, such an option would not be cost-effective.

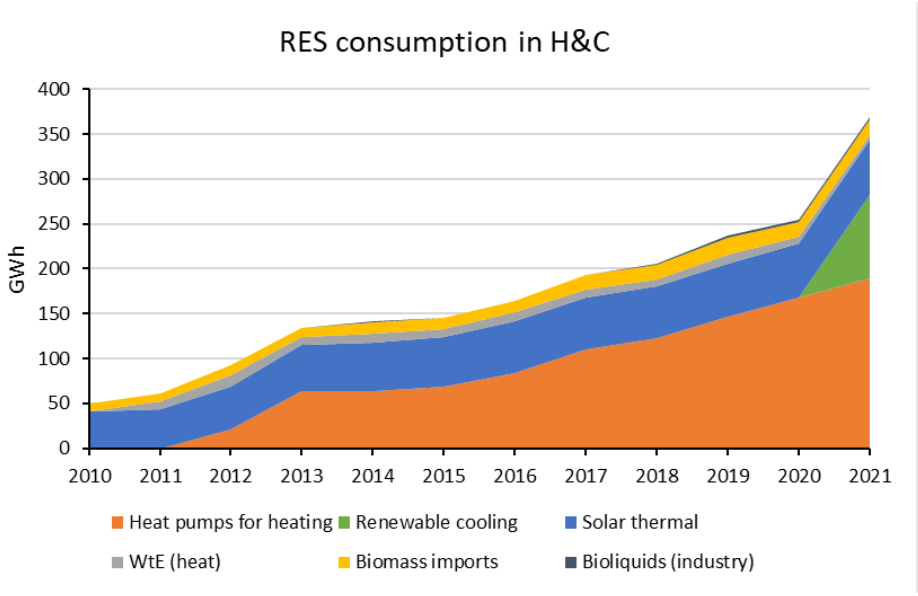

Figure 30 – Renewable energy consumption in the heating and cooling sector between 2010 and 2021. Source: Eurostat, SHARES Tool.

Due to its typical warm Mediterranean climate, the major application for heat pumps in Malta has traditionally been for ambient cooling. This has resulted in buildings being fitted with reversible air-to-air split-units. In response to lower electricity tariffs, the utilisation of heat pump technology for heating purposes increased, supplementing or, in some cases, replacing the use of either LPG heaters or electric filament heaters. In 2021, the estimated number of heat pumps (split-units) installed in Malta stood at 519,000, with around 70% in the residential sector. Their utilisation in SMEs and large enterprises for both heating and cooling has also been on the rise.

Solar Water Heaters (SWH), predominantly installed in the residential sector, offset a good percentage of energy consumption that would otherwise be used for water heating. However, their use is limited in summer when ambient temperatures are high and hot water demand is low even though their yield is at its maximum. Since 2005, a few grant schemes promoted the use of solar water heaters for households, which led to an increase in RES-H generation by an average of 4.3 GWh/year until 2017. After a peak in 2010, the uptake of this scheme has been decreasing steadily with increase in RES-H generation falling below 1 GWh/year in recent years. This downward trend can be attributed mainly to consumer shift towards PV systems, developments in the construction and renovation of buildings linked with limited roof accessibility and reliability concerns accentuated by the prevalence of hard water in Malta.

Biomass imports comprised primarily of wood charcoal, fuel wood and wood pellets. These were used for heating purposes by approximately 10,000 households[49] (2021) that have a wood or pellet burning stove or fireplace. The number of establishments in the services and industry sectors using biomass for heating is negligible.

Renewable energy generated from waste treatment in the form of heat contributed to just 5.64 GWh in 2021. This contribution is attributed to the combined heat and power (CHP) plant and Regenerative Thermal Oxidiser (RTO) facilities at Malta North Mechanical and Biological Treatment Plant and Ta' Barkat Sewage Treatment Plant. During 2021, Sant' Antnin Mechanical Biological Treatment Plant was non-operational, and no renewable energy in the form of heat was produced at the Marsa Thermal Treatment Facility and the Magħtab Environmental Complex. Waste management in Malta is driven by Malta's Long-Term Waste Management Plan 2021–2030 with strategic objectives including maximising the resource value of waste, implementing waste prevention initiatives, reforming the collection system, and building the necessary waste management facilities to treat recyclable, organic and residual waste to achieve Malta's Waste Package targets.

Share of RES in the electricity sector

Renewable electricity generation capacity in 2021 comprised of 206MW_p from PV generation and 5 MW from Waste-to-Energy plants. This contributed to 263 GWh and represents a renewable energy share of 9.7% of the total electricity consumption. This share increased by 2.8% since 2017. A further 15MW_p of PV were installed during 2022 (for a total of 221MW_p). Whilst electricity generation from PV systems is the main contributor towards renewable electricity, other sources include CHP plants treating waste and sewage, managed by Wasteserv and Water Services Corporation respectively. Waste-to-energy plant capacity remained stable at 5MW since 2016. The total energy generated in 2021 amounted to 7.23 GWh of electricity, compared with 9.74 GWh in 2017. The share of micro wind in renewable electricity is negligible.

[49] Number of households owning a wood/pellet burning stove or fireplace decreased from 12,000 in 2017 to 10,000 (-17%) in 2021.

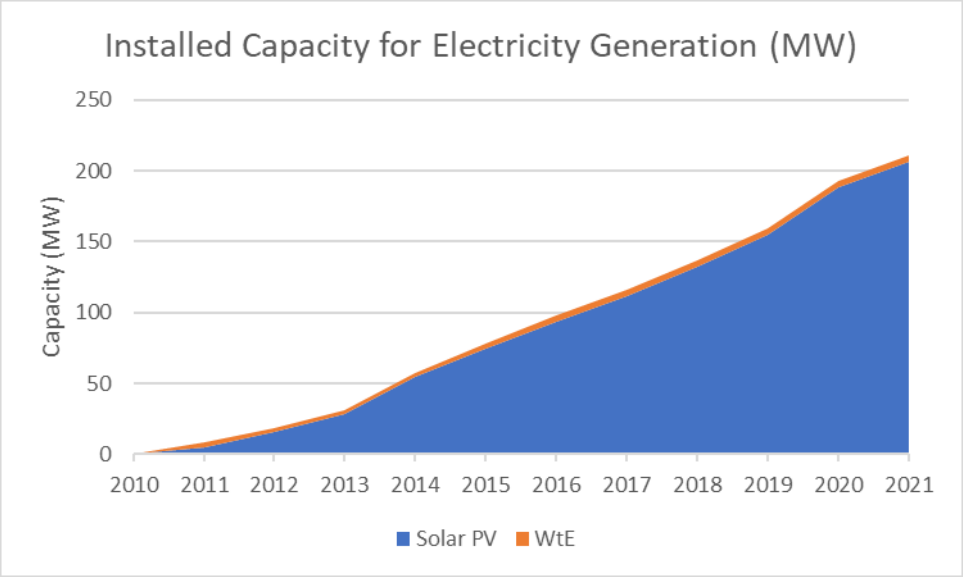

Figure 31 – Renewable electricity generation in the electricity sector between 2010 and 2021. Source: Eurostat, SHARES Tool.

Share of RES in the transport sector

The share of RES in the transport sector's total energy consumption (including international aviation) was 3.7% in 2021. This is an increase from 2.1% in 2017 and is a result of Malta's push to decrease the sector's dependency on fossil fuels. The share of RES-T in 2020 was 10.59%, exceeding the separate target of 10%. The lack of a mass transport system or rail largely limits the electrification options to replace ICE vehicles with EVs. RES consumption in the transport sector in 2021 reached 126 GWh, which translates into a 50% increase over the 84 GWh registered in 2017.

RES in the transport sector is almost exclusively the result of imported biofuels (Figure 32), with renewable electricity in transport having a minimal role. The dominant biofuels used in Malta are Hydro-treated Vegetable Oil (HVO) and FAME biodiesel. Malta requires that biofuels placed on the market fulfil the necessary sustainability criteria and comply with EU directives and local legislation. To achieve an increasing penetration of biofuels in the transport sector, Legal Notice 68/2011 was published in 2011. This introduced a 'substitution obligation' for biofuels, by which importers and wholesalers of automotive fuels are obliged to place on the market a minimum biofuel content as a percentage of the total energy content of fossil diesel and petrol. This was amended by Legal Notice 336 of 2021, which sets a minimum biofuel content of 14% in 2030 and includes a sub-target for advanced biofuels.

In 2020, fuel suppliers were obliged to blend conventional automotive fuels to reach a target of 10% share whilst taking into account the possibility of double counting biofuels listed in Annex IX of Directive (EU) 2018/2001, thus enabling Malta to reach its RES target in transport. To supplement diesel blending, the use of HVO has been introduced by importers since 2015. In 2021, 109 GWh of HVO was consumed in the road transport sector, which accounts for more than 84% of the biofuels consumed in transport. Suppliers are allowed to use their discretion in determining the blend of biofuels, provided that the minimum biofuel content stipulated in local legislation is met. This decision is informed by various factors including the source of biofuel, prices and multiplicator mechanism set in Directive (EU) 2018/2001.

As shown in Figure 32, the contribution of renewable electricity in the transport sector is only marginal. As at end of 2022, there were 11,626 electric vehicles, including plug-in hybrids, across all vehicle type categories. This is deemed a considerable increase in two years, as the total EVs in 2020 stood at 3,318. The share of BEVs and PHEVs stood at 2.7% of the stock of licensed motor vehicles (424,904 end of 2022).

The main benefit of electric vehicles lies in having zero tailpipe emissions, assuming an effective GHG reduction from an energy mix that includes renewables and an efficient generation infrastructure used to charge vehicles. Malta has set an ambitious target to reduce emissions from the transport sector including electrification of equivalence of 65,000 vehicles by 2030. In order to support this transition, the existing EV grant scheme was revised in 2022 with additional funds.

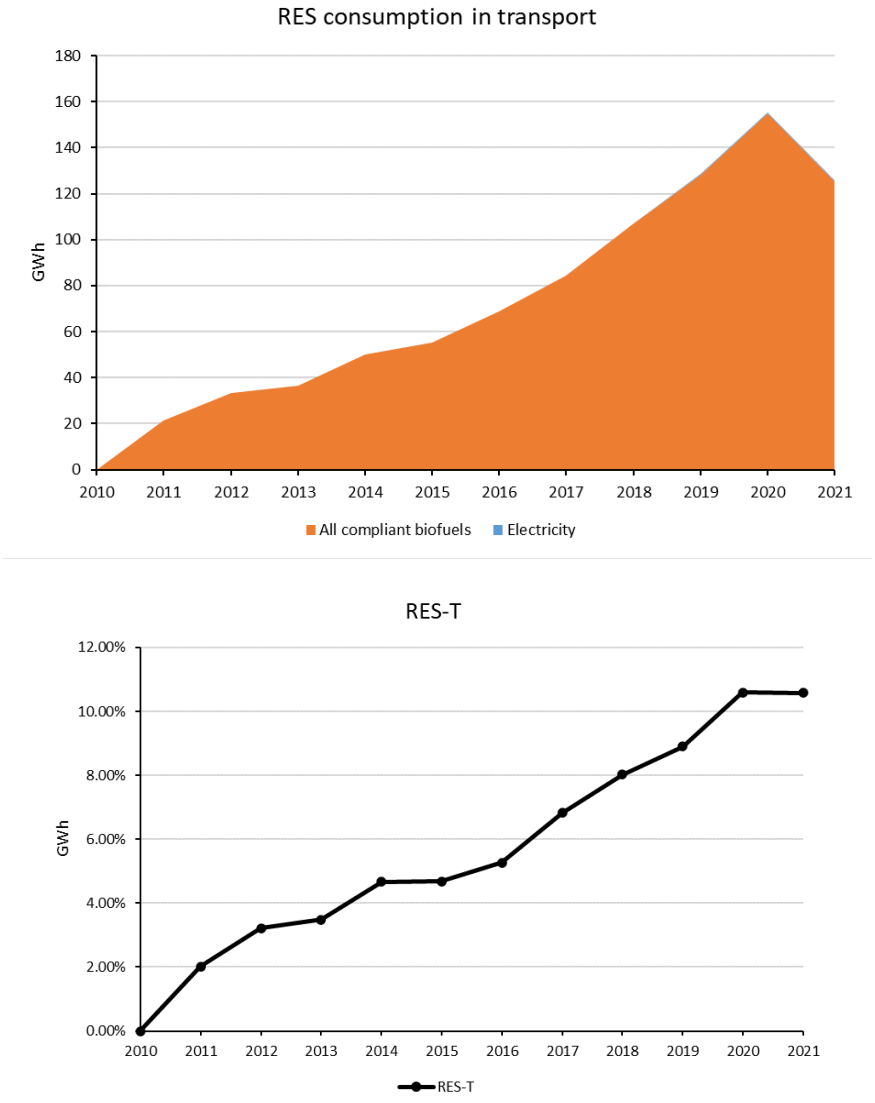

Figure 32 – Renewable energy consumption in transport and RES-T development between 2010 and 2021. Source: Eurostat, SHARES Tool.

ii. Indicative projections of development with existing policies for the year 2030 with an outlook to the year 2040

Within its LCDS, which was published in 2021, Malta sets out a framework and trajectory as well as policy priorities and mitigation measures that will enable it to achieve a low-carbon economy by 2050. The LCDS proposes measures related to seven sectors; energy, transport, buildings, industry, waste, water and agriculture and land-use and land-use change and forestry (LULUCF). Such measures have been analysed, based on projections of macroeconomic parameters developed in 2017, using marginal abatement cost curves and social and environmental impact assessments. While Malta remains fully committed to its international and national objectives with regard to climate change mitigation, as outlined above, it is apparent that the initial projections, target setting and modelling of the LCDS will have to be updated in the final NECP, to be submitted in June 2024. They will need to reflect the new baseline due to the changed economic and societal realities. Potential measures will have to be reviewed and fine-tuned to better capture synergies and thus achieve more targeted and maximised outcomes, enabling higher efficiency of reduction efforts.

4.3 DIMENSION ENERGY EFFICIENCY

i. Current primary and final energy consumption in the economy and per sector

Malta's primary and final energy consumption by sector from 2010 until 2021 is shown in Table 11. Figures provided in this table include ambient heat.

	2013	2014	2015	2016	2017	2018	2019	2020	2021
Total primary energy consumption (GWh)	**875**	**887**	**752**	**710**	**805**	**824**	**873**	**741**	**769**
Total final energy consumption (GWh)	**531**	**553**	**585**	**591**	**632**	**671**	**710**	**560**	**610**
Transport (GWh)	288	300	316	324	347	388	411	268	296
Industry (GWh)	52	55	55	55	57	56	56	56	60
Services (GWh)	105	113	123	121	128	122	128	117	125
Residential (GWh)	77	77	84	82	91	96	104	107	119
Agriculture, forestry and fishing (GWh)	5	5	4	5	6	8	9	9	9
Not elsewhere specified (other) (GWh)	3	2	2	3	2	2	2	2	2
Final energy consumption per capita (MWh/capita)	1.237	1.258	1.299	1.284	1.329	1.360	1.380	1.085	1.174

Table 11 – Total primary energy consumption and final energy consumption (including heat pumps) from 2013 to 2021. Source: Eurostat, Energy Balances (NRG_BAL_C, April 2023).

The distribution of final energy consumption by sector (including heat pumps) is shown in Figure 33. Prior to 2020, the transport sector (including international aviation) accounted for more than half of the final energy consumption. Restrictions imposed to contain the COVID-19 pandemic resulted in reduced mobility and tourism-related activities. Thus, the share of energy in the transport sector declined to 47.9% and 48.4% in 2020 and 2021 respectively. The most significant drop was in the international aviation sector with a decrease in energy consumption of 64% compared with 2019 levels. On average, the services and residential sectors account for 20% and 14% of the final energy consumption.

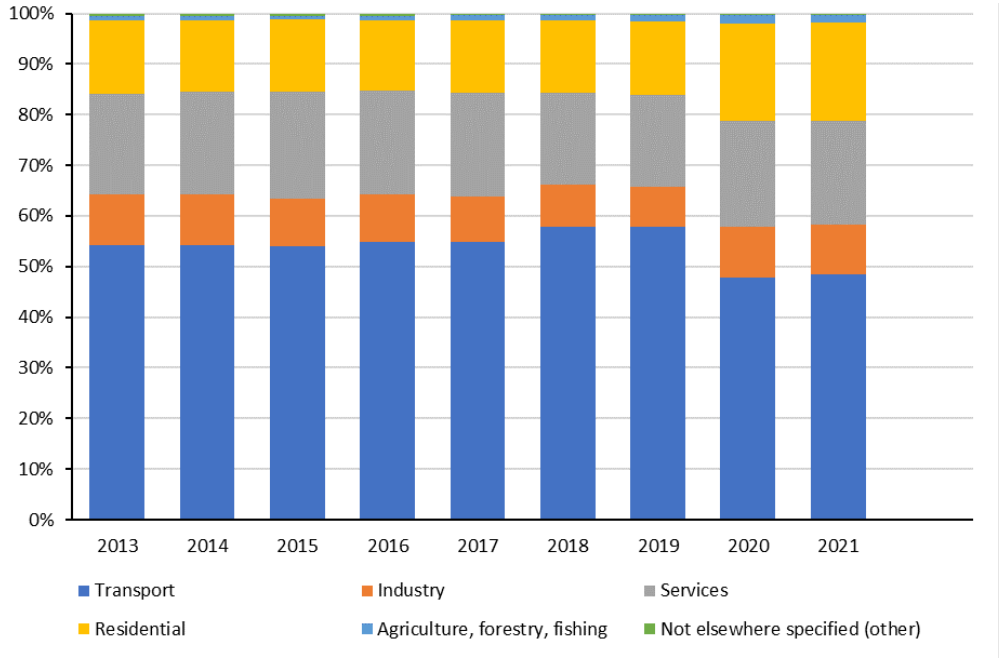

Figure 33 – Final energy consumption by sector in 2021. Source: Eurostat, Energy Balances (NRG_BAL_C, April 2023).

ii. Current potential for the application of high-efficiency cogeneration and efficient district heating and cooling

The residential and services sectors contribute to most of the total estimated heating and cooling demand[50]. Local climatic conditions impose a much higher summer cooling demand than the winter heating requirements. Malta has no public district heating and cooling networks, and this cooling demand is currently being met through efficient air-to-air heat pumps, which are widely used in both households and commercial buildings. These heat pumps are also being used in reverse mode for spatial heating purposes. In recent years, with the increase of high-rise buildings, centralized solutions have become more widespread leading to more cost-effective heating and cooling.

Based on the fuel survey carried out in 2016, the main consumer of fuel for space heating is the hotel sector. As an effort to incentivise the uptake of highly efficient CHP units, in 2016 the government

[50] Figures estimated based on 2013 data. Source: An Energy Roadmap – Towards Achieving Decarbonization for the Maltese Islands – Analysis for a Cost-Effective and Efficient Heating and Cooling

launched a scheme whereby enterprises were eligible for aid through tax credits.

The second Comprehensive Assessment on efficiency in heating and cooling (previously referenced in Section 2.1.2) concluded once again that cogeneration and district heating and cooling are not feasible in Malta. This is mainly due to the small size of the country, the lack of heavy industry, low thermal loads and low heat/power ratios required as well as the fact that residences and industrial sites are not connected to a natural gas grid, which is non-existent in Malta.

In view of the current installed stock of heat pumps, which is already inherently very efficient, and the low share of heating demand, it is envisaged that the role of heating and cooling networks and CHP technology in the next decade is only marginal[51]. This is further accentuated by the fact that Malta has practically no available indigenous resources of biomass or biogas, and currently there is no natural gas distribution network to render a fuel supply cheaper than the present options.

iii. Projections considering existing energy efficiency policies, measures and programmes for primary and final energy consumption for each sector at least until 2040

This section will be updated for the final NECP update in 2024.

iv. Cost-optimal levels of minimum energy performance requirements resulting from national calculations according to Article 5 of EPBD (Directive 2010/31/EU)

Apart from Grants the Minimum Energy Performance Requirements which came into force in 2016 that mandate minimum overall energy performance levels, cost-optimality studies were carried out in line with EPBD requirements. The Cost-optimality studies were carried out on a wide range of Building typologies and building geometries to be able to identify the opportunities for economically viable increased energy performance. These cost-optimality studies carried over the period 2018 –2021 have indicated a gap between the cost-optimal energy performance and the current minimum energy performance requirements. New energy minimum energy performance requirements have been developed and issued for public consultation.

The buildings simulated during cost optimality studies include:

- Dwellings
- Offices
- Hotels
- Schools
- Shops
- Restaurants
- Sports Complexes
- Homes for the elderly.

[51] This will once again be assessed in the upcoming CA which is due together with the final NECP

New cost-optimality studies have resulted in a number of possible policy measures that are able to increase the energy performance level of both new and building undergoing major renovation. Where the buildings are constructed in sites and constructed with geometries that give the building the potential to have Solar renewable energy sources installed, substantial improvements are possible over the existing energy performance levels in force. These new recommendations will come into force with the entry into force of the new Technical Guidance Document F.

4.4 DIMENSION ENERGY SECURITY

i. Current energy mix, domestic energy resources, import dependency, including relevant risks

Energy mix:

The energy mix of primary products as a share in the gross inland consumption in 2021 shows that while significant efforts have been made in recent years to increase the share of renewable energy, in particular through the deployment of solar PVs, solar water heaters, heat pumps and biofuels, Malta's reliance on oil and petroleum products (mainly in the transport sector) and natural gas (for electricity generation) continues to be significant. The share of renewable energy in the energy mix is increasing on an annual basis. The share of electricity imported over the interconnector with Italy in the energy mix amounted to 5.5% in 2021. The potential for imported electricity will increase in 2026 when the second interconnector comes into operation. Malta currently maintains a high dependency on oil and petroleum products which amounted to 47.4%[52], out of which natural gas amounted to 39.9% of total gross inland consumption.

Net import dependency:
In 2021, energy dependency[53] in Malta reached 97.1% as all energy sources, apart from indigenous renewables, are imported. Energy dependency is also calculated by product categories:

- Oil and petroleum products: 97.9%
- Natural gas: 103%
- Renewable energy sources: 27%.

In terms of renewable energy, all biofuels which are used for the biofuel substitution obligation in road transport as well as solid biomass used primarily for cooking purposes in the residential sector are imported.

[52] This value includes fuels supplied for international aviation, but excludes fuels supplied to international marine bunkering.
[53] This indicator (as defined in Eurostat) measures the level of total net energy imports as a proportion of total gross inland consumption and the fuel supplied to international maritime bunkers. Energy dependency, as defined in Eurostat, may reach values of above 100% in cases of increasing stock levels. Negative dependency rates indicate that a country is a net exporter of energy.

Electricity generation mix:

The diversification of energy and supply sources and restructuring of the power generation sector achieved in recent years was an important milestone for Malta. Over the last decade, Malta has transformed its energy mix used for electricity generation from one based on heavy fuel oil and gasoil to a more sustainable energy mix based on natural gas, electricity imports through the Malta-Italy electricity subsea connection and increased deployment of renewable energy sources. Cognisant that natural gas, however clean, is a transition fuel, focus has now shifted towards strengthening interconnection with the EU grid and support for renewable energy sources.

Following significant investments in a new generation plant and the conversion of an existing plant in 2017, natural gas replaced heavy fuel oil as the main fuel for electricity generation. In 2021, natural gas in the form of LNG constituted almost 69% of the electricity generation mix, with electricity imported over the interconnector covering 20%, renewable energy sources (solar PVs) amounting to 9% and gasoil covering the remaining portion at 2%. It's important to note that gasoil-fired back-up generation is only used in case of emergencies, such as during unavailability of gas-fired generation infrastructure or during outages of the electricity interconnector.

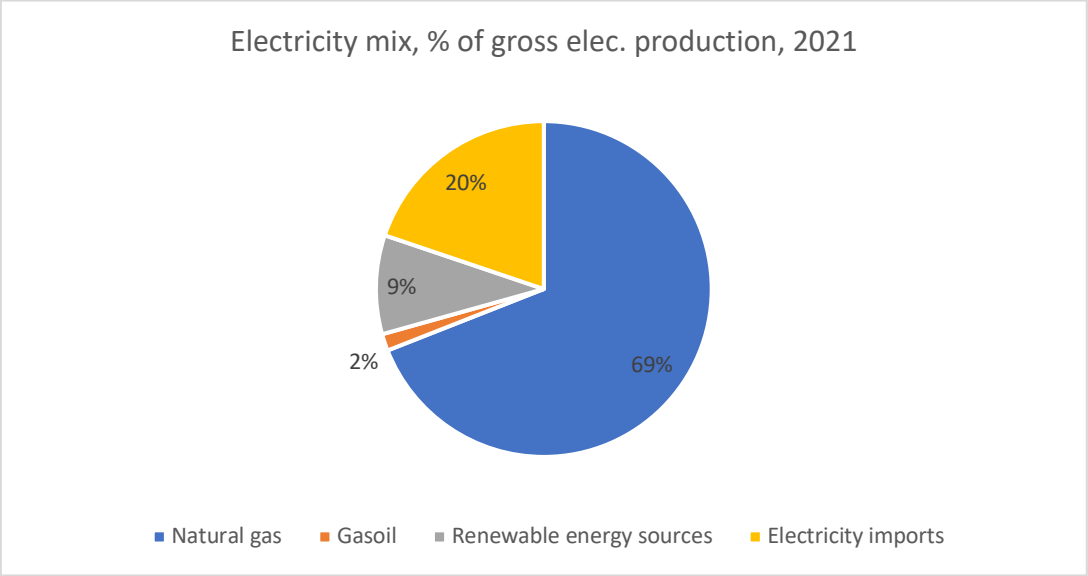

Figure 34 – Energy mix as share in gross electricity production in 2021, %. Source: Eurostat, Energy Balances.

LNG is currently imported via marine carriers and held in a floating storage unit which supplies gas to two gas-fired power plants, Delimara 3 and Delimara 4. There are no onshore LNG or gas storage facilities in Malta and no gas distribution networks. Natural gas is used solely for electricity generation. The establishment of the LNG facility further diversified the sources of supply, as it provides access to an unlimited number of sources of LNG on the international market. Gas deliveries to the power generation sector in Malta between 2017 –2021 in bcm, and converted to energy, are provided below:

Gas deliveries	*bcm*[54]	*TJ*[55]	*GWh*
2017	0.27	10,776	2,993
2018	0.35	13,614	3,782
2019	0.37	14,230	3,952
2020	0.38	14,802	4,112
2021	0.38	14,811	4,114

Table 12 – Gas deliveries to the power generation sector in Malta, 2017 –2021. Source: Regulator for Energy and Water Services.

The LNG that has been delivered to Malta at the Delimara facility between 2017 and 2021 originated from eight different countries.

m^3 of LNG	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**
South America	325,226	324,759	505,146	488,822	430,704	429,800
Africa	119,008	189,823	91,174	0	0	0
Europe	13,525	10,047	14,356	0	0	0
USA	39,982	100,060	14,907	111,634	216,066	204,059
TOTAL	**497,741**	**624,689**	**625,583**	**600,455**	**646,769**	**633,859**

Table 13 – LNG deliveries by sources of origin, 2017–2022 (Source: Eurostat NRG_TI_GASM)

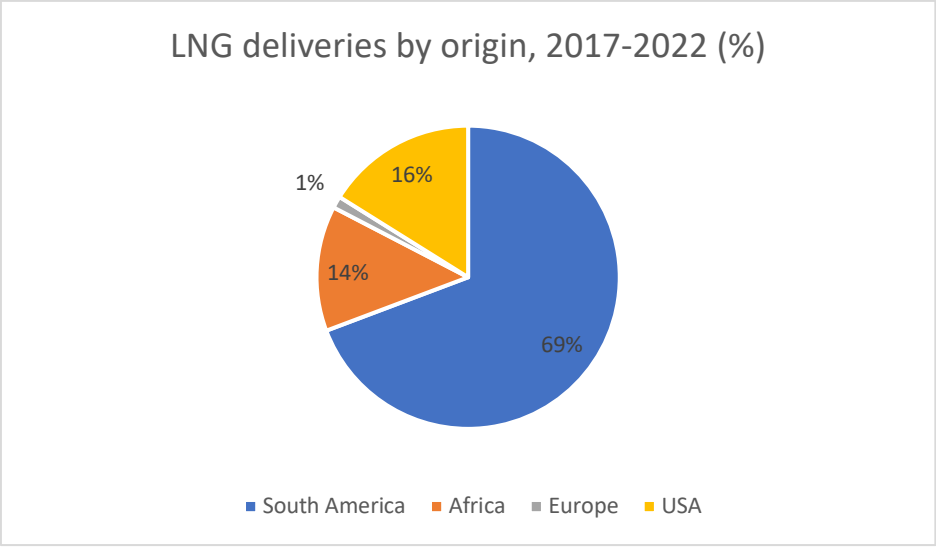

Figure 35 – LNG deliveries by sources of origin, 2017–2022, %. Source: Eurostat, Imports of natural gas by partner country (NRG_TI_GASM).

ii. Projections of development with existing PAMs at least until 2040

[54] Standard Temperature and Pressure (15°C, 760mm Hg)
[55] Based on average higher heating value

This section will be updated for the final NECP update in 2024.

4.5 DIMENSION INTERNAL ENERGY MARKET

4.5.1 Electricity Interconnectivity

i. Current interconnection level and main interconnectors

At the end of 2022, Malta had an interconnection level of 25%, well above the 2030 interconnection target of 15%. Malta currently has one electricity interconnection with Italy with a transfer capacity amounting to 200MW, while Malta's net nominal generation capacity in 2022 was 766MW, including solar PV installations. The interconnection level is calculated as a ratio between import interconnection capacity and net installed generation capacity. The details of 200MW HVAC interconnector are outlined in Table 14.

Characteristics	Details
Starting point	Substation in Sicily – Ragusa
Landing point in Sicily	Marina di Ragusa
On-shore route (Sicily Marina di Ragusa to Ragusa)	18.992km
Off-shore route	98.735
Landing point Malta	Qalet Marku
End point Malta	Maghtab substation
On-shore route Malta	Included in the offshore route length
Average depth	110m
Voltage rating	220 kV AC
Nominal capacity	200MW
Total length of interconnector	117.727 km

Table 14 – Malta-Sicily Electricity interconnector details.

ii. Projections of interconnector expansion requirements (including for the year 2030)

As indicated in the section above, Malta's electricity interconnection level is well above the 15% EU interconnection target for 2030 required by the Governance regulation. Details on the planned second electricity interconnector with Italy by 2026 are described in detail under section 2.4.2, point (ii).

4.5.2 Energy Transmission Infrastructure

i. Key characteristics of the existing transmission infrastructure for electricity and gas

As described in Section 2.4.2 related to national objectives and targets in energy transmission infrastructure, there is no electricity transmission system locally. Malta has an electricity distribution network and Enemalta plc. fulfils the role of the DSO. The electricity supply sources connected to the Maltese electricity grid and dispatched by Enemalta include conventional power generation plants and the Malta-Sicily interconnector connecting the Maltese electricity grid to the European grid. Renewable energy sources are self-dispatched. Enemalta is also responsible for procuring the energy it uses to cover energy losses and reserve capacity in its system according to transparent, non-discriminatory, and market-based procedures.

The Maltese electricity grid has a consumer base consisting of:

a. Domestic and residential consumers, accounting for approximately 40% of total load; and

b. Industrial and commercial consumers, accounting for approximately 60% of total load.

A schematic of Malta's current electricity sector is shown below.

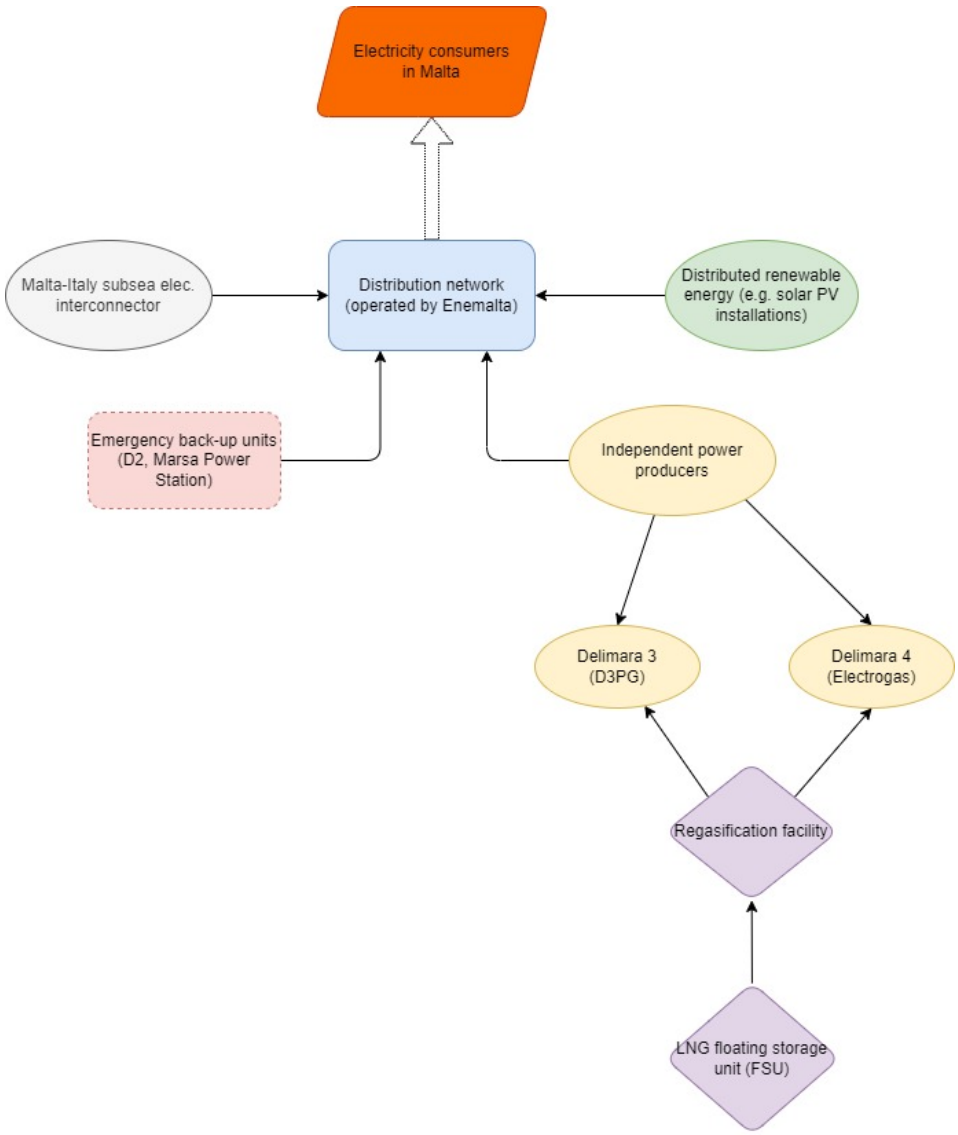

Figure 36 – Simple schematic of Malta's current electricity sector

Details on the planned hydrogen-ready gas pipeline project are described in detail under section 2.4.2, point (i).

ii. Projections of network expansion requirements at least until 2040

The local distribution grid network has three voltage levels, i.e. 132kV, 33kV, and 11kV. Reinforcement of the 11kV network is a continuous process following increase in demand. The seasonal peak load on the 33kV Distribution Centres (DC's) is monitored and measured against respective DC installed transformer capacity, so that the necessary expansions (installation of additional transformers, or erection of new DC's) are affected before the N-1 reliability standard is breached. Reinforcement of the 33kV network is affected to sustain these DC expansions. With regards to the 132kV network, while this network presently caters for N-1 requirements, Enemalta is planning for reinforcement of

the 132kV network in view of projected increase in demand. Enemalta is also studying the reinforcement of the 132kV network required for Malta's grid to be self-sufficient in the eventuality of long-term unavailability of the Malta-Sicily Interconnector.

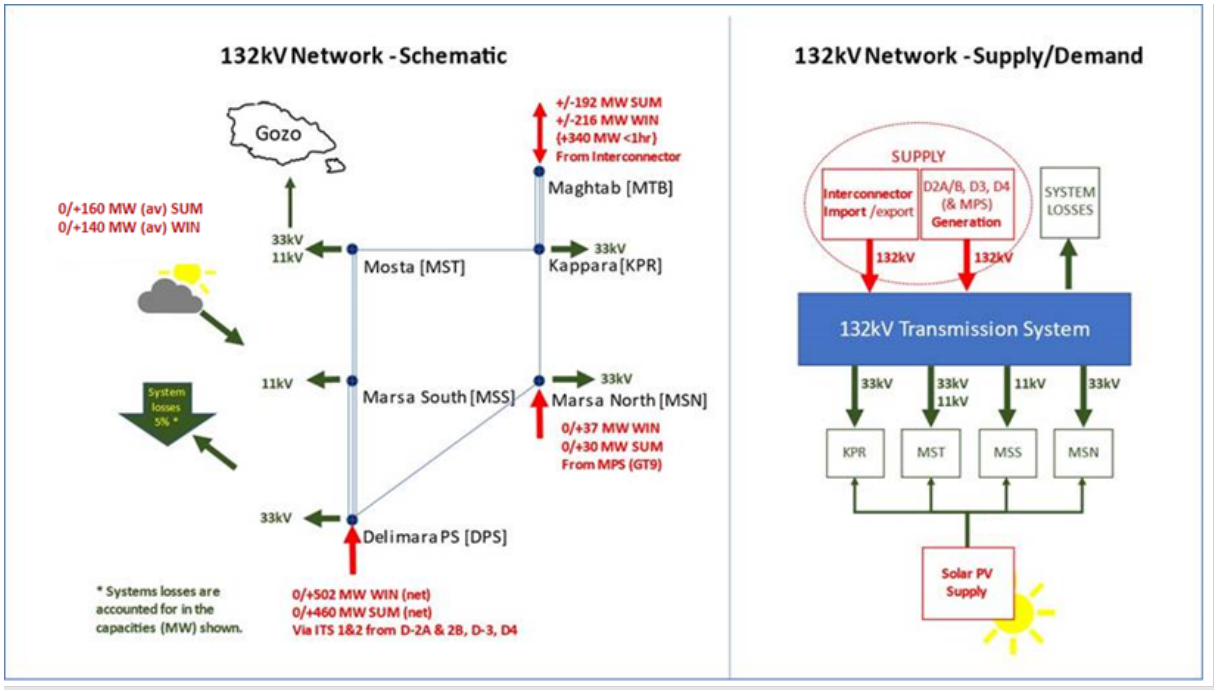

Figure 37 – Schematic of Malta's 132 kV electricity network. Source: 'National Electricity Crisis Scenarios Report' sent to the European Commission pursuant to Article 7(1) and (3) of the Risk Preparedness Regulation.

4.5.3 Electricity and Gas Markets, Energy Prices

i. Current situation of electricity and gas markets, including energy prices

As noted in previous sections, there are no liquid wholesale electricity or gas markets in Malta. Enemalta performs the functions of a DSO and is the only electricity supplier to final consumers. A proxy for the wholesale market price of electricity is established by Enemalta and endorsed by REWS[56]. This is calculated as the average cost of meeting the demand forecast through local generation and, as of 2015, electricity imported over the interconnector excluding generation from RES. As shown by Figure 38, following significant investments in the energy infrastructure, the proxy for the market price (in EUR 2016 prices) declined steadily from €0.12,5/kWh in 2011 to €0.071/kWh in 2017, after which it stabilized.

[56] As there is no liquid wholesale market in Malta, the proxy for the market price is used to establish a reference price for electricity generation. This is published on an annual basis under Subsidiary Legislation 545.27 entitled *"Feed-in Tariffs Scheme (Electricity Generated from Solar Photovoltaic Installations) Regulations".*

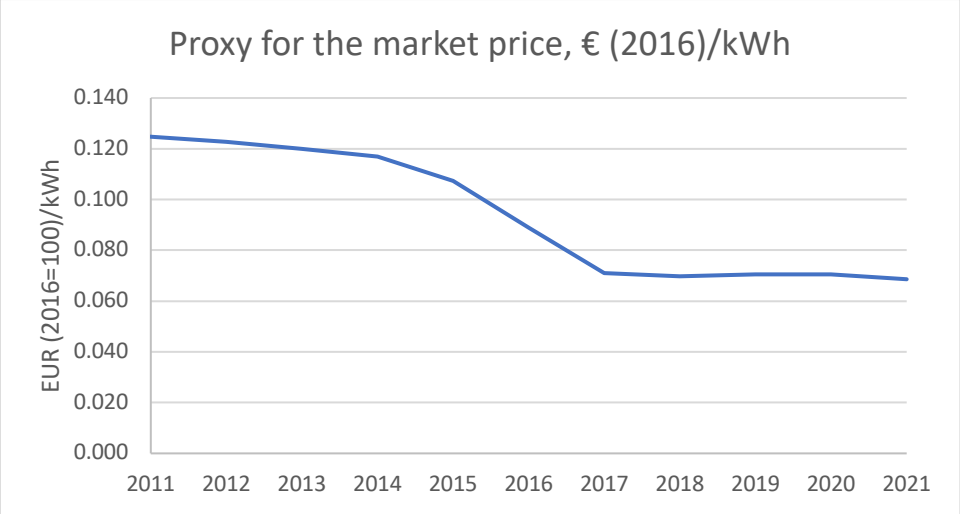

Figure 38 – Trends in the proxy for the market price in € (2016)/ kWh. Source: Prices compiled from Legal Notices 71 of 2013, 171 of 2015, 369 of 2016, 120 of 2017, 159 of 2018, 171 of 2019, 36 of 2021 and 88 of 2022.

Electricity customers remain on a regulated retail tariff. The retail tariff paid by consumers for electricity covers the costs and revenues related to the operation of the distribution network, apart from those related to imported electricity, generation and supply activities. The method used for tariff regulation is based on the full cost recovery method.

Retail tariffs are composed of a fixed annual service charge and a unit (kWh) consumption tariff structure. The fixed service charge differs between a single-phase service and three-phase service and between residential/domestic and non-residential premises. Consumers with a service connection capacity rating over 60 Amps/phase are required to also pay the maximum demand tariff.

The electricity tariff uses a rising block structure whereby higher tariffs are applicable for higher annual consumption tiers. The tariff structure differs between residential (e.g. primary residence), domestic[57] and non-residential premises. As per the eco-reduction scheme, households that consume less than a pre-defined threshold receive a direct rebate on 15-25% of their electricity bills. This policy is meant to incentivise energy efficiency and lower consumption. Additionally, a night and day tariff is available for non-residential consumers with annual consumption over 5 GWh. A 5% VAT is applied to the household tariffs.

Electricity tariffs are published in the Government Gazette, and online on the Regulator's website[58] and the websites of Enemalta plc and ARMS Ltd, the latter being the billing company. The approved electric vehicle charging tariffs are also published online, with tariffs for off-peak hours (between 12am-6am, 12pm-4pm and Sundays all day) being relatively more attractive.

[57] Domestic premises are intended for domestic use but are not registered as a primary residence.
[58] Available online: https://www.rews.org.mt/#/en/a/13-regulated-electricity-tariffs

Following significant investments in energy infrastructure over the past decade, Malta's consumers benefitted from a reduction in electricity bills. The average electricity price for household customers in Malta in the consumption band 2,500 – 5,000 kWh over the time period 2010–2022 (Figure 39) amounted to 0.1416 €/kWh, which is lower than the EU average of 0.2072 €/kWh.

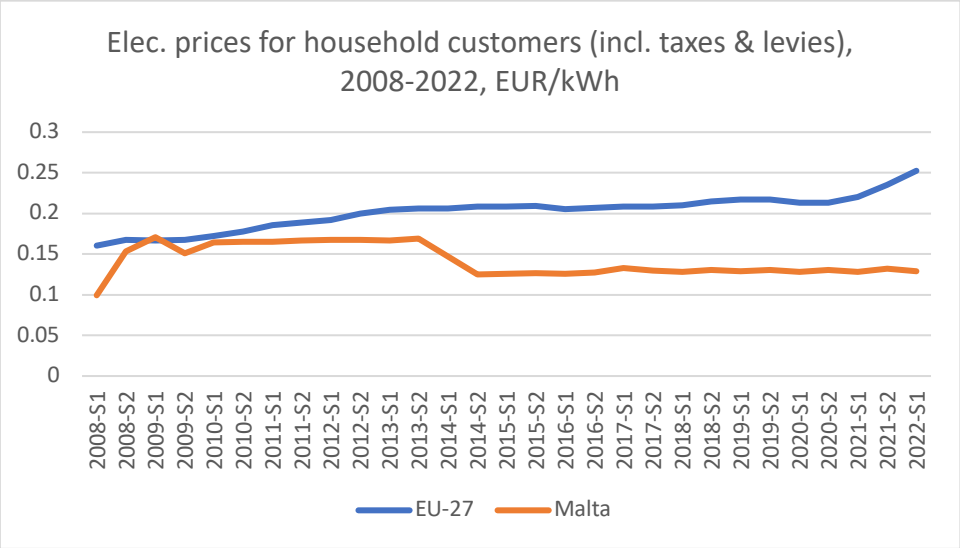

Figure 39 – Household electricity prices in Malta 2008–2022, €/kWh. Source: Eurostat, Electricity prices for household consumers (NRG_PC_204).

Until 2015-S1, electricity prices for non-residential customers in Malta were above the EU average (Figure 40). This was followed by a period of convergence. Malta's prices were kept stable even during the pandemic and energy crisis, well below the EU average.

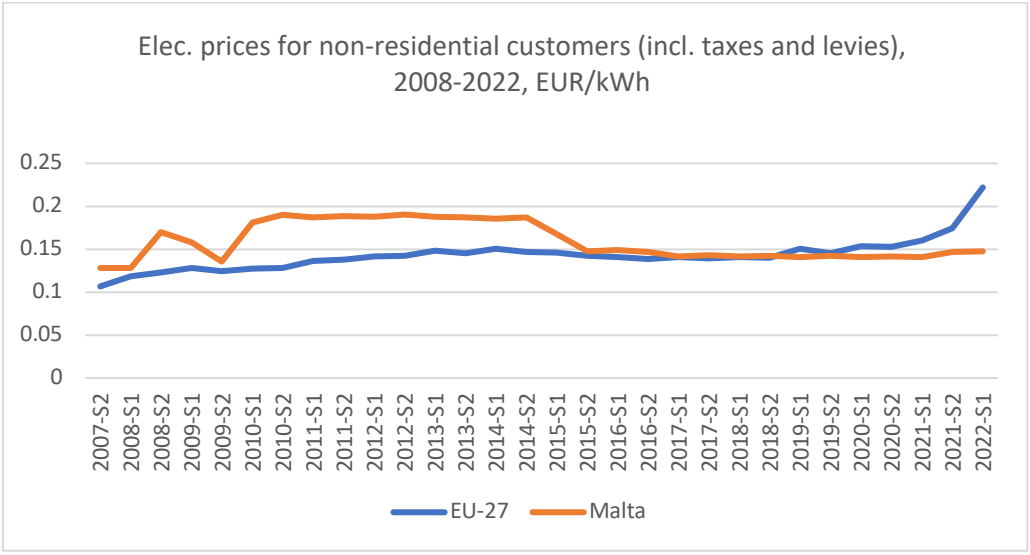

Figure 40 – Electricity prices for non-residential customers (including taxes and levies) for years 2008–2022, in €/kWh, for consumption band 500-1999 MWh. Source: Eurostat, Electricity prices for non-household consumers (NRG_PC_205).

Given the existence of regulated retail tariffs, electricity consumers in Malta were shielded from the recent electricity price spikes resulting from the conflict in Ukraine.

Nevertheless, as from 2021, Malta experienced high prices of electricity imports from the wholesale electricity market in Italy, which in summer 2022 peaked at approximately 850 €/MWh. End-use electricity consumers were shielded through regulated retail tariffs and a general measure adopted by Government intended to maintain the retail prices at pre-energy crises levels. Electricity imports over the interconnector are required to meet approximately 20% of Malta's electricity demand. The remainder is met by conventional gas-fired power generation sources and indigenous renewable energy sources. Gas volumes in Malta are subject to a long-term gas supply contract, under which the price of imported LNG is indexed to the international price of oil as of April 2022.

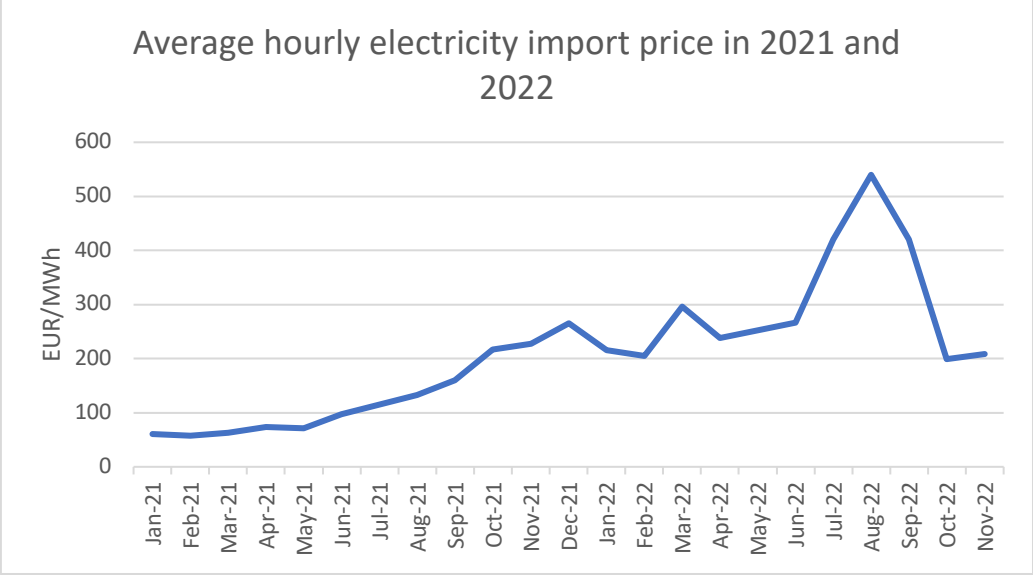

Figure 41 – Average hourly price of electricity imported over the interconnector in 2021 and 2022, €/MWh. Source: Gestore Mercati Energetici, Historical data – day ahead market.

ii. Projections of development with existing policies and measures until at least 2040

The projected evolution of energy prices under both the 'With Existing Measures' and 'With Planned Measures' scenario, including the price projections used in the Malta's NECP modelling framework, shall be included under the internal energy market part of Section 5.1.i of the final NECP.

4.6 DIMENSION RESEARCH, INNOVATION AND COMPETITIVENESS

I. Current situation of the low-carbon-technologies sector and its position on the global market

Clean Energy Transition (CET) Partnership

The CET Partnership's general aim is to empower the clean energy transition and contribute to the EU's goal of becoming the first climate-neutral continent by 2050, by pooling national and regional RDTI funding for a broad variety of technologies and system solutions required to make the transition. It gathers more than 51 partners/ funding organisations from 30 EU Member States and Horizon Europe Associated Countries. The countries will pool annually national funds of around €100 - €130 million (2022–2027) to launch joint transnational calls for R&I projects that will be co-funded by the EU. The Malta Council for Science and Technology (MCST) within the Ministry for Education, Sport, Youth, Research and Innovation (MEYR) has an allocated budget of €3.5M over the span of the Partnership duration. MEYR (MCST) has signed the grant agreement to join this partnership in 2022 and the consortium agreement in 2023.

The CET Partnership's Strategic Research and Innovation Agenda (SRIA) has identified eight main challenges within the clean energy transition. Transition Initiatives (TRIs) are thematic configurations working together on a specific thematic challenge. Malta is a participant (at different levels) in a number of TRIs focused on the heating and cooling transition, integrated net-zero emissions energy system, enhanced zero emission power technologies and integration in the built environment.

The first CET Partnership call was launched in September 2022 and is co-funded by the European Commission under the Horizon Europe Partnership scheme. The CET Partnership aims to fund projects that develop applicative solutions and provide results for the clean energy transition. In this call, Malta received two applications for one proposal which unfortunately did not make it to the second stage. Currently, the CET Partnership is preparing for the launch of the second call in September 2023. Malta has also started the dissemination process of this call to ensure that all stakeholders will be aware of this funding opportunity in this thematic area.

In addition, hereunder is also a list of relevant projects funded under FUSION:

Project Title	**Beneficiary**
Investigating the Thermal Performance of Subsea Energy Storage Accumulators with a 2-Phase Fluid transition	University of Malta
Green Algae to Solve Emerging problems in food security	University of Malta
Exploring the Potential of achieving Subsea Air Isothermal Compression using Offshore Pipelines in Long Duration Energy Storage Applications	University of Malta

Robust Optimisation Framework for PVs and EVs Integration at Low Voltage Network	Foundation for Innovation and Research
Sustainable Utilisation of Seaweed for Transparent and Innovative Packaging	Natural Edge Ltd
Floating Liquid-piston Accumulator using Seawater under Compression - Development of a Hydro-Energy Storage System for Offshore Multi-Purpose Floating Platforms	University of Malta
A Smart Micro Combined Heat and Power System (microCHP)	University of Malta
Novel Evaporative Cooled Battery Technology (NEVAC)	University of Malta
DOUBLE C-BLOCK - Thermal and Acoustic insulation of buildings	University of Malta
AIRSAVE - Improving the sustainability of compressed air systems through continuous monitoring Development and Analysis of an Industry 4.0 System to Autonomously Improve the Sustainability of Pneumatics	University of Malta
Commercialisation of the microCHP: A compact, hybrid DC Combined Heat and Power Unit	Abertax Kemtronics Ltd
Irrigoptimal - A new integrated operational management system based on Artificial Intelligence to tackle water scarcity	Westrade Ltd.
REcycled Stone & Concrete Insulated Unit	University of Malta
Waste Management Solution	IOT Solutions Ltd

Table 15 – Projects funded under FUSION

R&I Strategy in Energy and Water

Given the importance that Research, and Innovation plays in the NECP objectives, the Energy and Water Agency developed a ten-year strategy to strengthen and support R&I that addresses national policy priorities and challenges, and that bolsters national competitiveness and growth in a variety of sectors. Such action was deemed necessary as there was no specific support tools in such fields, as well as no organised structure of reporting or keeping track of what projects entailed and have achieved, what funding opportunities were utilised etc. The National Strategy for Research and Innovation in Energy and Water envisions that during its implementation, it will increase coordination amongst a wide array of stakeholders in the fields of energy and water. This would then lead to a better understanding of how policy priorities can be implemented, what challenges arise, and ultimately boost growth and interaction when coordinating research and innovation activities. The strategy gave way to many R&I activities such as an annual Research and Innovation grant scheme and a baseline study A key part of the strategy was the establishment of Platform RINEW (Research and Innovation in Energy and Water) which acts as a national observatory on R&I activities within the fields of energy and water, creating the environment for all stakeholders and participating sectors to communicate changes and progress, and ultimately position itself as a one-stop shop for anything related to R&I in energy and water in Malta.

Platform RINEW is a key contributor in the running of the Energy & Water Agency's running of the R&I scheme, as meetings with the technical and steering committees (composed of stakeholders within the impacted sectors) are frequently held to discuss progress, participation, and changes to the upcoming scheme to improve such initiatives. A baseline study in line with the goals of the strategy was conducted to do so effectively. The main objectives of this baseline study were to tabulate and take account of what research projects were developed in both water and energy fields, the amount of funding, any overlaps/gaps (over exhausted themes are identified), and to gather any information on the current Maltese R&I landscape. The baseline study also guides further development of the existing support scheme by identifying and organising the eligible themes that offered most potential to be further researched. These categories were: industrial heat recovery and/or spatial cooling system (waste energy), and PV And Battery storage Integration (Solar and Batteries). This was a necessary step in fine tuning the scheme and optimising funding opportunities while mitigating overlaps and repetition – therefore boosting Malta's potential in other fields.

Energy Efficiency and Solar Energy have been the most explored areas as denoted by the baseline study, whilst all other renewable energy areas are yet to researched further.

Funding for R&I projects in the Maltese Islands comes from EU funding & Local funding opportunities and schemes, as well as from private funds. The 7 key performance indicators (KPIs) that the Baseline Study accounted for are denoted below. These KPIs, in the fields of R&I, are indicators that provide information on how effective these projects are and are also a progressive approach to compare and keep tabulating such data in the future. These KPIs are:

- KPI 1: Publications - The number of publications per project acts as a measure of the quality that the project and researchers on the project bestow.
- KPI 2: Implementation - The implementation aspect is a measure of how applicable the project is to Malta's different targets, frameworks, and directives.
- KPI 3 & 4: National & EU-Level Funds - The number of projects making use of available funding opportunities.
- KPI 5 & 6: Number of non-Innovative Projects and Innovative Projects working on different themes and sectors - Categorizing the projects working on different sectors and fields within the remits of Energy.
- KPI 7: Number of Researchers - The number of researchers per project and field.

The Energy and Water Research and Innovation scheme

In line with the R&I strategy, EWA introduced a scheme seeking to boost R&I efforts in the fields of Energy and Water by providing financial support for selected projects within the respective sector. The scheme can support projects within the seven thematic areas established in the National R&I strategy in the fields of Water and Energy and has so far awarded circa €1.25 million following the first two calls, supporting 11 projects in total. A new call is launched every year.

Supported projects need to be completed typically within 2 years and could benefit from a maximum grant of €120,000 (2020 & 2021 call) but this has now been increased to €200,000 (future calls). The increase in funding is a result of a change in the structure of the scheme itself, as the first two calls, eligible projects were required to be within TRL (technology readiness level) 2-6, and the scheme now requires projects to reach TRL-7. In an effort to create more collaboration between the three targeted sectors; the Academic, Private Enterprises, and Public Entities, a consortium complied of at least two different partners has become mandatory for a project to be eligible for funding. This structure will also be adopted for the 2023 call.

Five projects were awarded support following the first call which was launched in September 2020. Three focused on water whereas another two projects dealt with solar panel optimization using cooling systems and the deployment of power to X technologies in Malta, respectively.

Project Acronym	Theme
Sigma	Track temporal and spatial changes in water content found in groundwater.
Wetsoil	Monitor hydrological water balance
Purilma	Better Quality Potable Water
IPCoSy	Solar panel incorporating the cooling system
Estelle	Deployment of BESS and P2X technologies

Table 16 – Malta's R&I Scheme 2020 call beneficiaries

Six projects were selected following the second call which was published in March 2021. This time round, the majority of beneficiaries were working on energy related projects. Two projects complement each other, working on offshore breakwaters and the installation of floating renewable energy systems (res), and the potential of coupling offshore wind generation with a co-located hydrogen production plant. Another two projects focused on solar technologies. Of these; one project studies the effectiveness of different and perhaps cheaper alternatives to solar cells, while the other project assesses the effect on efficiencies of PV panels resulting from the dusty environmental conditions of the island. Finally, the water thematic focused project tackles water scarcity issues of the Maltese Islands as it plans to develop a controlled-source electromagnetic system to map submarine groundwater discharge and offshore groundwater resources. These projects are required to present their results and publish findings.

Project Acronym	Theme
SWAN	Track temporal and spatial changes in water content found in groundwater.
Siforce	Improving the efficiency of silicon-based solar cells
DustPV	A cost-effective dust-related power loss sensor to monitor daily and cumulative energy losses.
Revolt	Focuses on reducing the intermittency of energy generated from renewable sources through voltage regulation for the domestic/residential sectors.

Hydrogeneration	Seeking to investigate various technical aspects to enable the coupling of offshore wind generation and a co-located Hydrogen production plant.
Fortress	Floating breakwaters behavioural analysis in deep seas and Integration of Energy Storage.

Table 17 – Malta's R&I Scheme 2021 call beneficiaries

For the calls of 2022, the scheme follows a similar structure, but projects are obliged to present an operational prototype in an ideal working environment. Projects as mentioned above can request up to €200,000 and must also form part of a consortium.

The third call, launched in June 2022, has two beneficiaries, with both beneficiaries working on energy-related research topics. One of the projects will be studying and developing accessories for secondary use for electric battery packs found in electric vehicles once they are no longer deemed suitable for vehicles, whereas, the other project will be working on enhancing and improving water-heating on a domestic scale.

Project Acronym	Theme
PVpro	Integrated PV-Powered Water heating and battery systems
ReUse	Second life of EV Batteries

Table 18 – Malta's R&I Scheme 2022 call beneficiaries

Mediterranean Island Cleantech Innovation Ecosystem (MICIE)

In the second half of 2022, EWA partnered with other entities from Malta, Cyprus and the Netherlands in a joint project funded under Horizon Europe with partners called the Mediterranean Island Cleantech Innovation Ecosystem (MICIE). The project, which started in mid-2022, aims to create an Action Plan to improve research and innovation (R&I) in energy and climate in Malta and Cyprus. The Action Plan is based on several high-level actions resulting from stakeholder interaction workshops carried out in both Malta and Cyprus. In total, eight workshops, evenly split between the two islands, were conducted with relevant stakeholders.

The first workshop brought together relevant stakeholders for a generic workshop to gather R&I ideas in the field of energy and climate. Post-workshop information analysis was conducted by the project partners, who identified three high-level thematic areas for the second set of workshops. The second set of workshops, consisted of three parallel sessions, addressing each theme. Each stakeholder group was tasked to identify three high-level sub-priorities under their respective themes, and identify the resources needed for each specific sub-priority. Actions for the Action Plan were extracted from this process.

The action plan template was developed based on a non-exhaustive list covering the following areas: baseline, stakeholder interaction, actions, resource mobilization, budgets, progress monitoring, and

multiannual work programs. Within each section, background information is provided along with guiding principles on how to execute each step, and templates are provided based on these principles.

II. Current level of public and, if available, private research and innovation spending on low-carbon-technologies, current number of patents, and current number of researchers

The public expenditure in R&I for 2021 amounted to €35.3m, of which € 943,001 were directed towards research and development in clean energy and low carbon technologies.

	2020	2021
Total Yearly R&I public expenditure in clean energy and low carbon technologies	€ 793,055	€ 943,001
Total yearly R&I public expenditure in clean energy and low-carbon technologies, as a percentage share of overall public R&I expenditure	2.34%	2.67%

Table 19 – Public expenditure in R&I focused on clean energy and low carbon technologies. Source: Reported data for Annex 7 under Regulation (EU) 2018/1999 on Governance of the Energy Union and Climate Action Implementing Regulation 2022/2299.

III. Breakdown of current price elements that make up three main price components (energy, network, taxes/levies)

In Malta, there are four components making up the price of electricity for household and non-households: energy and supply, network costs, excise tax and VAT. These figures are published by the Eurostat on a yearly basis and can be found in Table 20 and Table 21.

Malta has one electricity supplier, Enemalta plc, which also performs the functions of a DSO and some of the functions of a TSO, albeit not being considered a TSO. Enemalta is also responsible to dispatch electricity sources on economic merit within the technical limits. All consumers are on a regulated tariff and electricity prices reflect the overall costs incurred by Enemalta to perform the above functions. The tariffs adopt a rising block structure to incentivise energy efficiency while taking due account of the need to secure the competitiveness of local industry.

For both household and non-household prices, the yearly network-associated price component was €0.027 per kWh in 2021. A 5% VAT and an excise tax that is fixed at €0.0015/kWh are also applicable to both. The energy and supply component varies according to the regulated tariff bands as approved by the REWS. Costs associated with security of supply are internalized whereas support for renewable energy is financed through central Government budget.

YEAR 2021	ALL BANDS	BAND 1A	BAND 1B	BAND 1C	BAND 1D	BAND 1E	BAND 1F
	(1A-1F)	<20MWh	20 MWh - 499 MWh	500 MWh - 1,999 MWh	2,000 MWh - 19,999 MWh	20,000 MWh - 69,999 MWh	70,000 MWh - 149,999 MWH
Energy and Supply, €/kWh	0.1101	0.1870	0.1258	0.1090	0.0924	0.0800	0.0697
Network Costs, €/kWh	0.0270	0.0270	0.0270	0.0270	0.0270	0.0270	0.0270
Excise Tax, €/kWh	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015
VAT (taxes/levies), €/kWh	0.0069	0.0108	0.0077	0.0069	0.0060	0.0054	0.0049
Total, €/kWh	0.1455	0.2263	0.1620	0.1444	0.1269	0.1139	0.1031

Table 20 – Main price components by tariff bands in the non-household sector in 2021, € nominal. Source: Eurostat, Electricity prices for non-household consumers (NRG_PC_205).

YEAR 2021	ALL BANDS	Band DA	Band DB	Band DC	Band DD	Band DE
	(DA-DE)	< 1000 kWh	1000 kWh - 2499 kWh	2500 kWh - 4999 kWh	5000 kWh - 14999 kWh	>= 15000 kWh
Energy and Supply, €/kWh	0.1203	0.3285	0.1142	0.0954	0.1147	0.2693
Network Costs, €/kWh	0.0270	0.0270	0.0270	0.0270	0.0270	0.0270
Excise Tax, €/kWh	0.0015	0.0015	0.0015	0.0015	0.0015	0.0015
VAT (taxes/levies), €/kWh	0.0075	0.0179	0.0071	0.0062	0.0072	0.0149
Total, €/kWh	0.1563	0.3749	0.1498	0.1301	0.1504	0.3127

Table 21 – Main price components for the household sector in 2021, € nominal. Source: Eurostat, Electricity prices for household consumers (NRG_PC_204).

IV. Description of energy subsidies, including for fossil fuels

The Government's ambition is to provide its citizens with secure, affordable, and clean energy solutions. Malta's recent investment in the energy sector is aimed to build sufficient capacity to match the forecasted growth in electricity demand in the foreseeable future. The strategy hinges on an electricity mix consisting of renewables, interconnection capacity and high efficiency generators. Moreover, the plans for the development of a pipeline between Malta and Sicily remain in place, after having been updated to enable the transport of hydrogen and hydrogen blends. The relevant permits from Maltese and Italian authorities have now been secured and the pipeline may be commissioned by 2028 at the earliest, subject to EU funding.

Electricity generation from PV continues to be a principal contributor that enables Malta to meet its renewable targets. Support schemes are still issued periodically in line with State Aid Guidelines, with the most recent one being launched in 2023 to support renewable installations having a capacity of at least 1MW. Such schemes are usually in the form of feed-in premium or grants, the latter being reserved for small residential systems. They are funded from the central Government budget. Standards and Guidelines for PV installations, tailor-made for Malta's specific conditions, have been developed. The standards clearly lay out best practices for improved quality, safety, and aesthetics in PV installations.

Whilst the deployment of photovoltaic installation remains the major contributor of renewable energy generation in Malta, it is clear that space restrictions are bound to act as a constraint. It was therefore necessary to consider new opportunities brought about by developments in floating offshore

technologies. In this context, a regulatory framework as well as an ad-hoc policy are being developed to support such deployment.

Subsidies are not limited to renewable energy sources. To reduce transport-related emissions as well as promote electrification, financial support is provided for the purchase of electric vehicles, conversion of ICE vehicles to use LPG, retrofitting of solar photovoltaic panels on passenger transport vehicles, retrofitting of DPFs and SCR systems on heavy duty vehicles, and retrofitting of battery electric powertrains on motor vehicles.

Malta's realities as a very small Member State at the periphery of the EU, pose certain challenges that if not addressed properly will result in social and economic implications on the population and the island's competitiveness. Given this reality and the current international price volatility, impacting a number of different sectors, there are no immediate plans to phase out energy subsidies. However, Malta remains firm and determined to encourage the adoption of technologies that can help reduce greenhouse gas emissions.

5. IMPACT ASSESSMENT OF PLANNED POLICIES AND MEASURES

5.1. IMPACTS OF PLANNED POLICIES AND MEASURES DESCRIBED IN SECTION 3 ON ENERGY SYSTEM AND GHG EMISSIONS AND REMOVALS, INCLUDING COMPARISON TO PROJECTIONS WITH EXISTING POLICIES AND MEASURES (AS DESCRIBED IN SECTION 4).

Malta remains committed to contribute to the EU collective target of Climate neutrality by 2050. The policies and measures outlined in section 3 are in principle based on the packages of measures outlined in the Low Carbon Development Strategy, complemented by other additional policies and measures which have been introduced, adopted or planned following the publication of the LCDS.

This section will be further provided in detail in the final National Energy and Climate Plan (NECP) as it inherently relies on various initiatives and decisions being undertaken in relation to critical sectors which will have a direct impact on the eventual projections to be reported.

The main contributing sectors identified in the LCDS in terms of GHG emissions in Malta are those related to energy systems, transport and, to a lesser extent, waste. The impact of these policies and measures has been estimated through the compilation of a Marginal Abatement Cost Curve (MACC) within the context of the low carbon development strategy.

A Marginal Abatement Cost Curve (MACC) serves as a valuable tool to strategically determine pathways for decarbonization by considering cost-effectiveness. In this manner, a balanced approach between GHG emissions abatement and economic costs is ensured. Based on the outcome of the MACC compilation, sectoral measures were identified for the interim (2030) and long-term goals (2040, 2050).

The long-term strategy puts forward measures and initiatives spanning over seven key sectors: energy, transport, buildings, industry, waste, water, and agriculture and land-use, land-use change, and forestry (LULUCF).

Energy systems

The thrust of this sector within Malta's long-term strategy is to increase interconnectivity for electricity and at the same time increase efforts towards increasing renewables, particularly through offshore renewable generation. As outlined in the LCDS, it is estimated that the abatement potential in 2030 is 825,033 tonnes CO_2 eq and abatement potential continues to increase to reach 1,262, 117 tonnes CO_2 eq by the year 2050.

In the meantime, policies and measures aimed to reduce energy consumption in buildings will persist. Such measures include uptake of energy efficiency measures in buildings and renovation of buildings. As outlined in the LCDS, the abatement potential of these measures is estimated to reach 82,025 tonnes CO_2 eq in 2030. As building stock becomes more energy efficient, the abatement potential drops to 2,215tonnes of CO_2 eq by 2050.

Moreover, abatement potential through energy efficient measures in industry is estimated to reach 74,848 tonnes of CO_2 eq in 2030. As industries become more efficient, the abatement potential drops to reach 2,706 tonnes of CO_2 eq in 2050.

Transport

Given the inherent challenges explained in other sections of this update, an array of policies and measures are required in this sector in order to effectively reduce GHG emissions. In line with the transport measures identified in the LCDS, the policies and measures being put forward in section 3 of this update evolve around addressing; a reduced use of private vehicles, electrification of vehicle fleet, active mobility (e.g. pedelecs, e-bikes, remote working) and upgrading transport infrastructure to align with these policies and measures. As outlined in the LCDS, it is estimated the abatement potential by 2030 is 270,241 tonnes CO_2 eq and continues to increase to reach 1,016,788 by 2050.

Waste

The Maltese Government is investing substantially in this sector in order to improve its waste management facilities and to enable more diversion of waste away from landfills. As explained in section 3, this includes a total investment of €500 million to construct an organic processing plant, a pre-sorting facility, a waste to energy plant and a skip management facility. At the same time, measures to reduce and separate waste more effectively are being rolled-out in line with the Waste Management Plan 2030. As outlined in the LCDS, it is estimated that by 2030, the waste sector abatement potential reaches 31,832 tonnes CO_2 eq and continues to increase to reach 68,083 tonnes CO_2 eq in 2050.

Country specific challenges and considerations

Malta faces inherent challenges that pose obstacles to successfully reducing emissions. These challenges, previously discussed in other sections, revolve around Malta's specific circumstances as a small island member state with limited access to raw materials, thereby heavily dependent on imports and trade for economic activity.

The difficulties Malta encounters in achieving emission reduction, as outlined in its NECP 2019, persist and remain relevant. These challenges include:

- Unique characteristics of Malta's energy system and market, such as its small scale, absence of natural gas and district heating and cooling networks, and limited number of suppliers and market players. These factors collectively restrict the range of measures available to meet energy-saving obligations.
- Geographic, environmental, and spatial constraints, such as limited land area and high population density, coupled with a rich but delicate natural environment and climate conditions. These constraints limit the options for modal shifts to reduce carbon emissions, and the economies of scale hinder the adoption of alternative technologies.

Limited mitigation potential due to Malta's service-based economy. With Malta already being one of the lowest emitters per capita, there is limited mitigation potential. This means that there are high mitigation costs and significant socio-economic considerations.

Addressing these challenges requires careful consideration and strategic planning to find suitable and effective solutions for Malta's unique circumstances in the pursuit of emission reduction goals.

Air quality

Air quality and decarbonization are closely interconnected since they share common sources of pollution. In fact, the policies and measures outlined in section 3 of the draft NECP update are in line with the policies and measures specified in the air quality plan issued by the Maltese Government for public consultation as per regulations 32 of the Ambient Air Quality Regulations (SL 549.59). This

alignment signifies a coordinated approach to address both decarbonization and air quality concerns, ensuring a comprehensive strategy to tackle shared sources of pollution and promote sustainable development.

Water Management

The Maltese islands, with their semi-arid Mediterranean climate, face challenges related to water scarcity. During the summer, there is a general lack of rainfall and limited exploitable surface waters. The primary source of natural freshwater available throughout the year is groundwater, which has been experiencing degradation in quality and quantity due to nitrate pollution and seawater intrusion.

One of the effects on the water quality and quantity status is an increase in extreme storm events and more frequent flash floods. As these extreme events become more common, as a result of climate change, and with the increased urbanisation which occurred over the years, the ground becomes less capable of absorbing water runoff and subsequently the percolation of water runoff into the water table. This diminished absorption will eventually lead to greater run-off, which in turn may cause floods, resulting in damage to infrastructure and property if not properly managed. Proper water resource management becomes crucial to mitigating the impacts of climate change on water availability and addressing potential flooding risks effectively.

Since the 1980s, Malta has relied on desalination of seawater to supplement its potable water supply. Water scarcity combined with the effects of climate change on water resources poses significant pressures on the country. Climate change can impact the hydrological cycle, leading to several consequences. In view of this, the final NECP will align with the measures planned to be committed as part of the development and implementation process of the third River Basin Management Plan and Second Flood Risk Management Plan. More information on these plans will be provided in the final NECP, once the plans undergo the statutory public consultation and are adopted by Government.

Finally, given Malta's heavy reliance on desalination, which together with the other water services being offered by the national water utility, consumes around 6% of the country's total electricity consumption, efficiency in the water sector becomes an important aspect. The primary motivation for water sector efficiency is the limitation in the supply of natural fresh water on the island, leading to the necessity of using desalination plants to meet a significant portion of the national water demands. The operator in water services in Malta aims to achieve a net zero utility with improved efficiency in the distribution network. This focus on efficiency is also driven by tariff mechanisms that encourage users to stay within the lower 'efficient water use' tariff band.

Efficiency measures in the water sector are essential due to the challenges in addressing the ever-increasing demand for fresh water supply and the limited natural available freshwater resources. Any improvements in the efficiency of water supply would not only benefit the sector but also lead to reduced energy requirements, consequently contributing to the reduction of greenhouse gas (GHG) emissions. By adopting water-efficient practices, Malta can further optimize the current cycle for the production, conveyance and disposal of its water resources, reduce energy consumption from the desalination processes, and make significant strides towards mitigating its carbon footprint and supporting overall GHG emission reduction goals.

With respect to the Projections of the development of the energy system and GHG emissions and removals and a full assessment of policy interactions (between existing policies and measures and planned policies and measures within a policy dimension and between existing policies and measures

and planned policies and measures of different dimensions) will be provided in detail in the final NECP subission in 2024.

5.2. MACROECONOMIC AND, TO THE EXTENT FEASIBLE, THE HEALTH, ENVIRONMENTAL, EMPLOYMENT AND EDUCATION, SKILLS AND SOCIAL IMPACTS, INCLUDING JUST TRANSITION ASPECTS (IN TERMS OF COSTS AND BENEFITS AS WELL AS COST-EFFECTIVENESS) OF THE PLANNED POLICIES AND MEASURES DESCRIBED IN SECTION 3 AT LEAST UNTIL THE LAST YEAR OF THE PERIOD COVERED BY THE PLAN, INCLUDING COMPARISON TO PROJECTIONS WITH EXISTING POLICIES AND MEASURES]

A socio-economic impact assessment will be conducted based on the draft NECP update, and the results of this assessment will be incorporated into the final NECP update.

Similarly, to Malta's long-term strategy (LCDS), this assessment will be carried out in line with the EU Commission guidelines. For the LCDS, a qualitative impact assessment was performed. This assessment revealed that the implementation of the identified measures is likely to have mostly positive social and economic consequences. However, it was acknowledged that some challenges need to be addressed, particularly in view of diseconomies of scale (small domestic market).

The positive impacts of climate and environmental measures include the creation of new entrepreneurship and employment opportunities. These opportunities are fostered by the potential growth of specialized economic sectors through innovation and the development of a wider range of products in these fields. For industries, the measures are expected to enhance efficiency, reduce energy costs, and improve business competitiveness, ultimately leading to economic gains through decoupling of energy consumption from gross value added.

Conversely, some proposed measures may impose increased financial burdens, making them less accessible to society, particularly for vulnerable individuals who cannot afford the higher capital investment. These measures might also disrupt business operations, particularly for micro enterprises and SMEs, and could have implications on family life during installation.

Moreover, the implementation of these measures might lead to an increased administrative burden for both applicants and administrators of grant/subsidy schemes.

Nonetheless, all the proposed measures are in line with various Sustainable Development Goals (SDGs) and are expected to bring overall benefits to society. Steps will be taken to maximize the positive impacts while minimizing any negative consequences that may arise. This includes providing Government support, especially to vulnerable groups, to ensure a fair and just transition towards a sustainable and climate-neutral future. The ultimate goal is to achieve the desired climate objectives while fostering economic growth and social wellbeing for Malta.

As mentioned in section 5.1, the Government has devised pathways towards achieving climate neutrality based on a cost-effectiveness approach. It is being reiterated that Malta is already one of the lowest emitters of greenhouse gases (GHGs) per capita, therefore, the easy and readily available options, which are accessible to larger and more carbon-intensive countries, are not suitable for Malta. This means that the benefits and carbon savings from the proposed measures may take longer to realize compared to other measures implemented in larger countries or may involve marginally higher costs.

Furthermore, Malta's small size limits its capacity to be a technology enabler, and in fact is essentially an adopter of existing technologies. As a result, the adoption of carbon-saving technologies might take more time locally compared to larger countries with greater resources and capacities.

Despite this, Malta is determined to create opportunities from the challenges and believes that its small size makes Malta a potential test bed for cleaner technologies.

Malta is aware that its individual efforts will contribute only a very small portion in absolute terms to the global effort required to combat climate change. It acknowledges that all countries need to undertake reductions according to their *common but differentiated responsibilities and respective capabilities*. This approach is recognized by the European Commission in its impact assessment for the Effort Sharing Regulation[59] which states the following:

'This Member State has a gap of around 69 pp between its GDP based emission reduction target and its cost-efficient emission reductions in modelling based on the most recent reference scenario. This is because of particular developments related for instance to population development, build-up of housing stock and F-gas emissions from air conditioning systems. The projections are also in-line with Malta's own 'with additional measures scenario' that still sees emissions increase by 41% compared to 2005 emissions by 2030.'

5.3. OVERVIEW OF INVESTMENT NEEDS

i. Existing investment flows and forward investment assumptions about the planned policies and measures

As explained during the draft NECP, the implementation of the measures identified within existing policies and strategies in relation to decarbonisation will require a great amount of capital investments, that will need to become available through public and private funding mechanisms. Although it has not been updated yet, the below provides estimated investment needs to achieve climate neutrality based on the compilation of the MAC within Malta's Long-Term Strategy. This exercise estimates the net present values (NPV) for the period of 2020–2050, which provides an overview of the total marginal investment needed from both the private and public sectors. The total amount of net marginal investment for this reference period has been estimated at around €15.3 billion.

This section and figures will be updated in the final NECP update as investment needs will be updated in line with the new projections as explained in section 4 of this draft plan.

ii. Sector or market risk factors or barriers in the national or regional context

As described earlier, planned policies and measures need to consider the unique geophysical and economic context of the Maltese islands and cannot be implemented independently. This distinguishes it from other plans as certain characteristics of the islands impose limitations on the

[59] SWD (2021) 611 final

recommended measures to reduce carbon emissions. Malta's physical separation from mainland Europe means that it can only be connected to Europe through air or sea connections.

Malta's small size and limited natural resources leads to dependence on imports. This poses challenges due to economies of scale and cost considerations, as certain technologies require a larger scale of operation that Malta may not achieve. Despite this, Malta can serve as a testing ground for new technologies in collaboration with larger countries or private partners, and emerging carbon technologies offer opportunities in this regard.

Land limitation also restricts Malta’s potential for large-scale deployment of large scale onshore solar or wind farms, and while floating offshore technology is expected to provide new opportunities, this technology has yet to reach full commercialization. As already stated in previous sections, in an attempt to overcome this challenge, the Maltese Government launched a specific policy to promote investment towards offshore renewable generation.

It is also important to mention that Malta's climate is characterised by extremely hot summers and mild winters, which result in relatively short periods of heating, and cooling in buildings. This typically increases the demand for efficient air-to-air heat-pump technology. It also leads to lower potential emission reductions compared to colder countries. The key economic sectors in Malta are primarily service-oriented or involve low carbon-intensive manufacturing, further limiting the potential for carbon reductions in those areas. While Malta’s energy consumption per household is already one of the lowest in the EU, higher expectations with regard to thermal comfort and more people living in multi-dwelling buildings, means that an increasing number of households are resorting to heat pumps to achieve the desired thermal comfort level rather than relying on natural ventilation, thus any improvements in efficiency are expected to require pronounced measures and efforts.

Due to these constraints, the proposed measures may result in delayed benefits and carbon savings compared to similar measures implemented in other countries. Additionally, Malta is more of a technology importer than it is a producer, due to its small size, which means that the adoption of carbon-saving technologies may take longer to occur locally, particularly if they require changes to work properly in the local environment.

A short description of main sectoral barriers already outlined within the NECP 2019 are further provided in the table below.

Sector	**Market Barriers**
Power Generation	Limited indigenous renewable energy sources
	Limited capacity for onshore PVs
	Little or no potential for onshore wind RES
	Floating offshore RES technology still expensive
	High relative cost to ensure power system adequacy.

Transport	Cleaner fuels for all transport modes are still not adequately accessible resulting in higher prices than conventional fuels
	Issues with the global supply of electric vehicles, primarily right-hand drive vehicles supply in the EU
	Lack of rapid mass transport system
Buildings	High upfront capital cost and long payback periods
	Limited climate neutral alternatives for air conditioning units

Table 22 – Main sectoral barriers

iii. Analysis of additional public finance support or resources to fill identified gaps identified under point ii

As previously mentioned, the implementation of climate and environmental measures is expected to require front loading of investment (capital intensity), particularly on low-to-middle-income families. In response, the Government is actively considering several mitigation approaches to alleviate this burden.

Incessantly in the last couple of years, the Government has been supporting the transition towards cleaner technologies for both industries and businesses as well as households. This support is provided through incentives aimed at encouraging the adoption of cleaner and more sustainable technologies. These incentives are designed to mitigate barriers on a local level and make cleaner options more accessible and affordable for various sectors of society.

The Government's commitment to supporting this transition is evident through the various projects and initiatives that are committed to be implemented co-financed through different EU programs. As a Member State of the EU, Malta is committed to maximise these funds to facilitate increased investment in green jobs and sustainable economic growth. This involves directing financial resources towards clean technologies and renewable energy, enhancing energy efficiency, and promoting the adoption of sustainable green transportation and infrastructure.

By offering incentives and facilitating financial support, the Government aims to promote the uptake of cleaner technologies, mitigate the financial burden on citizens and businesses, and facilitate the transition towards a more sustainable and eco-friendly future for Malta.

In view of inherent barriers explained, the Maltese Government will likely need to continue to shoulder the costs of mitigating the financial burdens resulting from the implementation of climate and environmental measures. Hence, National public funding and EU Funding will continue to play a crucial role to support projects and initiatives aimed at reducing carbon emissions and promoting sustainable practices.

To support this investment in the green transition, the Government is implementing various regulations, policies, and incentives designed to encourage sustainable practices and reduce carbon emissions. These measures create an enabling environment for businesses and industries to adopt

cleaner technologies and practices, further driving the transition towards a more sustainable and climate-resilient economy.

These endeavours manifest the direct investments of the Government in decarbonization infrastructure to facilitate the transition towards a low-carbon economy. In turn, these investments serve as a guiding force for private sector investment to follow suit, in line with the overall objective of achieving climate-neutrality.

In 2021, Malta Stock Exchange (MSE) launched a Green Market and is increasing efforts to promote sustainable investments that meet ESG standards, through the listing of Green Bonds within the Exchange, which would also support economic development. Qualifications for listing will entail issuers to invest in projects contributing to environmental objectives such as Climate Change Mitigation, Climate Change Adaptation, Pollution Prevention, and Sustainable Use of Water and Marine Resources amongst others.

Malta's first green bonds program issued by the Water Services Corporation (WSC) in 2023 demonstrates the Corporation’s commitment to environmental sustainability and responsible finance. Valued at €25 million and spanning ten years with a 4.25% interest rate, these bonds align with the UN's Sustainable Development Goals and the EU's Green Deal.

Proceeds will fund eco-friendly projects, including a cutting-edge reverse osmosis plant in Gozo, solar farms for renewable energy, wastewater treatment plants, and network enhancements. This initiative tackles water challenges, promotes job creation, and economic growth. The certified Climate Bonds Initiative ensures that funds will go towards environmentally impactful projects.

The commitment to decarbonization infrastructure, alongside strategic policies and incentives, fosters an environment that is conducive to private investment in green initiatives, accelerating progress towards climate-neutrality and creating a more sustainable and prosperous future for all.

As part of Malta’s commitments towards the country’s green transition, the Government launched an ESG portal in December 2021 as a voluntary initiative, designed to instil education and awareness on enterprises’ environmental, social and Governance credentials.

The initiative was very well received, with all of Malta’s listed companies participating in this voluntary initiative as well as other medium-sized enterprises. Since 2021, this initiative has yielded successful results with the number of enterprises increasing from 20 in 2021 to 28 in 2022 (particularly including entities that fall out of scope of the CSRD due to their size).

Moreover, it was found that on average, companies that reported on their criteria through the Government portal registered an 8% decrease in carbon emissions, 9% decrease in waste generation and a 7% increase in women in management roles.

To further instil a supported transition towards the principles adopted by ESG, the Government has collaborated with Malta Enterprise to provide an ESG scheme – that will give a cash grant of €3,000 (capped to 75% of the cost) for engaging specialised advisory services to assist in the reporting of the ESG report. In addition to this, the scheme will also provide further support of €1,000, in grant form, in the two subsequent years to enterprises deciding to continue to report on the ESG portal. This is designed to act as a further incentive for enterprises to improve on their year-on-year performance by making significant investments that will improve their ESG score.

The eligible service providers originate from the private sector and include some of Malta's largest audit firms. The idea is that with increased collaboration through this scheme with these financial practitioners, more companies will be aware of the ESG portal and, by default, the scheme. The intended result of this is that a wider spectrum and depth of companies, both large and small, will invest in their sustainability efforts to further upgrade their ESG position.

Besides this commitment spearheaded by the Government of Malta, the Malta ESG Alliance was set up in July 2022 independently by the private sector which sets out to act as a platform for Maltese businesses to collaborate and work together to lead and drive national ESG goals. This initiative is wholly welcomed and supported by the Maltese Government through regular collaborations and stakeholder meetings in order to enable and accelerate the transition.

By utilizing a combination of public and private funding, the Government can secure the resources needed to implement the proposed measures effectively and advance the transition towards a more sustainable and climate-friendly economy.

5.4. IMPACTS OF PLANNED POLICIES AND MEASURES DESCRIBED IN SECTION 3 ON OTHER MEMBER STATES AND REGIONAL COOPERATION AT LEAST UNTIL THE LAST YEAR OF THE PERIOD COVERED BY THE PLAN, INCLUDING COMPARISON TO PROJECTIONS WITH EXISTING POLICIES AND MEASURES

Malta's small economy, energy system, and geographical isolation on the periphery of the EU, means that the impact of its national planned policies and measures, as described in Section 3, on other EU Member States is minimal.

However, certain measures included in the draft update hold regional significance. These measures include the second interconnector with Italy, a potential hydrogen-ready pipeline, and other potential connections with neighbouring third countries to access renewable and clean energy sources. The impacts of these measures are discussed in greater detail under the Energy Security and Internal Energy Market dimensions of the Plan.

Of particular relevance to Malta, are price developments in the Italian (Sicily) wholesale electricity market. Malta's single electricity supplier procures a share of its power requirements (circa 20%) from the Italian spot market. Therefore, price convergence within Italy and at the EU level would have a direct impact on Malta's cost of electricity. Malta is also closely following the proposed changes to the EMD, as it is important that the cost of electricity acquired from the European grid fully reflects the increasing share of renewable energy sources and slowly decouples from the price of natural gas.

Apart from price considerations, interconnection with mainland Europe is also essential to increase the grid's stability in view of a higher share of intermittent renewables in Malta's energy mix.

Having said this, Malta deems it crucial to diversify sources of electricity supply, including onshore backup facilities, to mitigate risks associated with potential failure to its electricity interconnection with Sicily, also in view of the fact that damages to subsea cables often require several months to be repaired.

These considerations highlight the need for interconnections between Malta and neighbouring regions in the context of energy supply. As Malta seeks to expand its renewable energy capacity and improve its energy security, cooperation with neighbouring countries becomes increasingly important in the pursuit of common climate and energy goals.