EUROPEAN
COMMISSION

Brussels, 24.10.2023
COM(2023) 684 final

COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE EUROPEAN COUNCIL AND THE COUNCIL

Report on EU policy initiatives for the promotion of investments in clean technologies

(Preliminary assessment of measures taken by the EU to stimulate investment into clean technologies and the impact of the US Inflation Reduction Act on investment)

COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE EUROPEAN COUNCIL AND THE COUNCIL

Report on EU policy initiatives for the promotion of investments in clean technologies

(Preliminary assessment of measures taken by the EU to stimulate investment into clean technologies and the impact of the US Inflation Reduction Act on investment)

1. Context

Clean technologies play a key role in our green transition and tackling climate change and biodiversity loss. Their increased availability is an essential condition for a successful implementation of the Green Deal. According to the International Energy Agency, the global market for clean tech equipment is set to triple by 2030 to around EUR 600 billion annually.[1]

The development and production of advanced clean technologies require a diverse set of inputs, ranging from critical raw materials to microchips, a skilled labour force, research and innovation, considerable public investments as well as a system of incentives to crowd-in private investments and build a business case across key value chains.

Under the overall umbrella of its Green Deal ambition, and through a smart policy mix, the EU has been building a growth-enhancing regulatory framework and business environment that is favourable to the development, production and deployment of clean technology. The EU has shown that economic growth can be achieved while reducing greenhouse gases and resource use – and will continue to do so[2]. The Green Deal Industrial Plan will enhance the competitiveness of Europe's net-zero industry, create quality jobs and support the fast transition to climate neutrality, by ensuring a more predictable and simplified regulatory environment, speeding up access to finance, enhancing skills, and open trade for resilient supply and value chains.

The world is engaged in the search for the best technologies to improve climate and environmental sustainability. Governments throughout the world are adopting policy measures to mitigate their excessive dependencies, to support strategic supply chains vital for the decarbonisation of the economy and to secure significant parts of the clean technologies market. The EU has been spearheading global climate action and has been instrumental in setting ambitious international objectives, such as the recent G20 commitment to triple renewable energy capacity by 2030. The EU therefore welcomes and encourages efforts by international partners to fight climate change and cooperates closely at the international level.

This is happening against a backdrop of successive crises and growing geopolitical tensions that have changed the international context to these endeavours by exacerbating both the fragmentation and fragility of supply chains. In this context, it is important to ensure that state measures designed to facilitate the development of clean tech industry are developed in a spirit of mutual benefit and lead to a positive sum game at global level, without tilting the level playing-field or distorting trade relations amongst countries. More specifically, the EU must make sure that these efforts in different countries do not undermine the competitiveness of the Europe's industry and the resilience of its energy transition and supply.

[1] International Energy Agency (IEA), Energy Technology Perspectives, 2023

[2] European Commission, Long-term competitiveness of the EU looking beyond 2030, https://ec.europa.eu/commission/presscorner/detail/en/ip_23_1668

The EU is therefore diligently monitoring developments around the globe as well as enhancing its own capabilities to keep up its competitiveness in the fast evolving and rapidly growing field of clean technologies. This Communication offers a preliminary assessment of the state of play and sets out what the EU has done to promote and support the development and deployment of clean technologies, reinforcing the Single Market, ensuring a level-playing field, supporting research and innovation, expanding its network of trade agreements and international strategic partnerships, and mitigating the impact of external developments.

This Communication will also look at first results materialising from the U.S. Inflation Reduction Act, as requested by the European Council[3]. However, it is important to underline that other actors, notably China, also have active public support programmes in place that are likely to have a larger impact on the competitiveness of the EU clean tech sector. The Commission has recently launched an anti-subsidies investigation into electric vehicles coming from China and will remain vigilant in other clean tech sectors. The Commission will assess all evidence of alleged unfair practices put forward by the industry or from other independent sources.

2. EU measures to improve the business and investment conditions within the Single Market

The EU has long been investing in the green transition and in industrial decarbonisation. This reflects its climate ambition, but also its aim to reinforce its competitiveness and its open strategic autonomy. According to the International Energy Agency, currently only half of the technologies necessary to achieve full decarbonisation are ready for the market. Therefore, the EU will continue to invest in research and innovation activities..

EU and Member States' funding and regulatory framework focus on creating a long-term stable supply and demand environment. They are in line with WTO rules, non-discriminatory and transparent, address market failures and strive for a careful balance in order to crowd-in private investments while preserving the integrity of the Single Market, bearing in mind differences in Member States' size and fiscal capacity.

The EU acts to create the right conditions for development of clean tech products and solutions and takes the necessary measures to promote cost-efficient industry decarbonisation, in order to remain competitive and respond to the demands created by the green transition. In a similar vein, the Commission has also adopted today a package of comprehensive measures to stimulate the wind industry in Europe, to address the challenges that the sector is facing and ensure a level-playing field with EU trading partners.

***Incentives and predictability*.**

The EU has developed a consistent, coherent and ambitious regulatory framework to make Europe the first climate-neutral continent by 2050. As part of the "Fit for 55" package, the EU is the first economy to have set regulatory targets to achieve the sale of only zero-emissions cars and vans by 2035. It also has a series of other objectives to reduce pollution and make its economy more circular. Through a market-based carbon price signal, the **Emissions Trading System** (ETS) serves as an incentive to invest in clean technologies and

[3] https://data.consilium.europa.eu/doc/document/ST-7-2023-INIT/en/pdf

reduce emissions, whilst the **Carbon Border Adjustment Mechanism** (CBAM) is preventing carbon leakage.

Widespread access to affordable electricity is an essential pre-requisite for the competitiveness of EU industry. The **revised Renewable Energy Directive (RED)** and the **Net Zero Industry Act** will provide a predictable business environment fostering deployment and investments in clean technologies. The reform of the **EU electricity market design** will enhance predictability and stability of energy costs to boost industrial competitiveness. The new **EU regulatory framework for batteries** is also crucial to the EU's transition to a climate neutral economy, by securing competitive, resilient and circular value chains for battery production, reuse and recycling in the EU. The proposed Ecodesign for Sustainable Products Regulation will further mainstream circularity across strategic industry groups.

The Commission is gradually reducing red tape and administrative burden and has acted to simplify and accelerate permitting for projects. In 2022, the Commission adopted policy proposals that are expected to lighten the overall administrative burden for EU businesses by EUR 7.3 billion, in particular through digital and interoperable solutions. Moreover, the Commission has already started the rationalisation of reporting requirements with a view to progressively reduce them by 25%. It has adopted a significant number of relevant proposals following the Commission's Communication on long-term competitiveness of the EU from March 2023 and makes rationalisation of reporting requirements a prominent feature of the 2024 Commission work programme.

EU investment.

Public resources from the EU and Member States alone will not be able to cover to the funding gap for clean technology investments in the EU. But they are the essential catalyst to crowd in needed additional private funding for the decarbonisation of our energy systems, our industries and our economy at large.

The EU budget actively supports green technologies. Over the course of 2021-2027, the EU budget is projected to contribute EUR 578 billion to climate spending, representing 32.6% of the total EU budget. This includes the support under the **Recovery and Resilience Facility** for investments in green projects, as well as for reforms that provide an effective enabling framework for the deployment of green technologies.

Other relevant funds and programmes include **cohesion policy funds, InvestEU,** or the EU research and innovation programme **- Horizon Europe,** including its partnerships, missions and the European Innovation Council. The **REPowerEU** chapters in national recovery and resilience plans support Member States, putting forward additional reforms and investments to foster the manufacturing and roll-out of net-zero technologies and renewables. Financed by revenues of the EU Emissions Trading System, the **Modernisation Fund** co-finances investments to speed up the energy transition in Member States with lower GDP per capita.

In July 2023, the EIB increased by 50% its REPowerEU package approved in October 2022 (from EUR 30 billion to EUR 45 billion). This entails an estimated mobilised investment for the increased package of more than EUR 150 billion. This REPowerEU package will channel loans and equity financing over the years 2022-2027. The additional funds will be directed to renewables, energy efficiency, grids and storage, electric-vehicle charging infrastructure, and breakthrough technologies, such as low-carbon hydrogen.

Also financed by the EU Emissions Trading System, **the Innovation Fund** is one of the world's largest funding programmes targeting specifically industrial decarbonisation and scaling up clean tech manufacturing. Since its inception in 2021, more than EUR 6.5 billion funding has been committed, with total capital investments approximately a factor of 4 higher. The selected projects under the Innovation Fund contribute up to 17% of the production capacity objectives set in the Net Zero Industry Act for solar, batteries and electrolysers, creating quality jobs and growth in Europe. In November 2023, a new call will be launched with a budget of EUR 4 billion, out of which EUR 1.4 billion is reserved for clean tech manufacturing.

The Commission will launch this November the first ever EU- wide auction dedicated to the production of renewable hydrogen, with a budget of EUR 800 million from the Innovation Fund. The Commission has proposed to extend the auction as a platform to Member States (Auction as a service), enabling them to use their own resources for projects on their territory by relying on this EU-wide auction mechanism. The Commission has also announced the **European Hydrogen Bank,** with the objective to scale up the production of domestic renewable hydrogen in the EU.

Moreover, the proposed "**Strategic Technologies for Europe Platform**" (STEP), once adopted, will reinforce and leverage existing EU instruments for a quick deployment of financial support for the development or manufacturing in the Union of critical technologies in several fields, including clean technologies. European industrial policy also requires some common European funding. While the STEP relies on the reprogramming and reinforcement of existing programmes for supporting strategic investments, it is also an important element for testing the feasibility and preparation of new interventions as a step towards a European Sovereignty Fund.

Private investment.

A conducive EU regulatory environment helps effectively raise and channel private financing towards economic activities that contribute to decarbonisation. Deep and integrated EU capital markets and an effective sustainable finance framework are essential pre-requisites for fully mobilising the vast-amount of private funding necessary for the green transition. The **EU Taxonomy,** for instance, provides a unifified framework for investors in supporting the development of clean technologies.

A genuine **Capital Markets Union (CMU)** can also provide clean tech companies with opportunities to access larger and deeper pools of funds from a broader range of investors and diversify their sources of funding. The Commission has tabled all the planned legislative proposals under the 2020 CMU Action Plan to tackle barriers that continue to fragment EU capital markets along national lines and hold back the single market for capital. The Commission encourages the swift adoption by the co-legislators of the pending CMU proposals. The CMU is not a 'nice to have' but a 'must have' in order to complement public funding to finance the green transition and ensure the competitiveness of the clean tech industry. The swift adoption by the co-legislators of the pending proposals would help improve access to finance, diversify sources of funding for companies, tackle structural obstacles in cross-border financial services and address risks to the EU's financial stability.

National public investment.

While the private sector will take on the major share, public investment has a crucial role to play to de-risk innovative ventures and correct market failures. The new security challenges, inflationary pressures and the investments needed to deliver on the green and digital transitions have also put extra pressure on national budgets. This highlights the need to swiftly agree on the **reform of the EU's economic governance framework**.

State aid policy provides numerous possibilities to support clean investments at national level. The Guidelines on State aid for Climate, Energy and Environmental Aid (CEEAG), the Temporary Crisis and Transition Framework (TCTF)[4], the Regional aid Guidelines and the General Block Exemption Regulation all provide Member States with a wide range of tools to support clean investments while protecting the level playing field. The latest amendment of the TCTF in March 2023 gave EU Member States even more flexibility to support investments in manufacturing in strategic sectors, i.e. batteries, solar panels, wind turbines, heat-pumps, electrolysers and carbon capture usage and storage, as well as in the production and recycling of their key components and critical raw materials, with support possibilities aligned with Single Market and cohesion objectives.

Since March 2023, the Commission has approved schemes set up by several Member States[5] for a total budget of around EUR 6.9 billion as regards investment in clean technologies and is currently assessing additional ones. In exceptional cases, Member States have the possibility to provide higher support to individual companies, where there is a real risk of investments being diverted away from Europe due to third country subsidies. Furthermore, as part of the TCTF the Commission provided additional possibilities for Member States to support schemes for accelerating the rollout of renewable energy and energy storage, and schemes for the decarbonisation of industrial production processes. On this basis, since March 2023 the Commission has approved eight schemes in several Member States[6] for a total budget of around EUR 17 billion and is currently assessing additional ones.

Separately, under the **Climate, Energy and Environmental Aid Guidelines (CEEAG)**, Member States can support the installation of wind and solar power generation, or of electrolysers to produce renewable hydrogen or to support the decarbonisation of industrial production processes. Thus far, this has resulted in the Commission approving aid schemes with an overall budget of EUR 88.9 billion to deliver new renewable energy production capacity and to unlock other decarbonisation initiatives.

The Commission has also approved State Aid under relevant Important Projects of Common European Interest (IPCEIs) designed by Member States. For instance, two IPCEIs on batteries, have been launched with a total of EUR 20 billion of public and private investment in 68 projects throughout the EU. Likewise, two IPCEIs on hydrogen, have been approved with public and private investments for a total of EUR 26.4 billion for 76 projects across the EU[7], with another two in the pipeline being reviewed as a matter of priority.

[4] The new Framework of 9 March 2023 amends and prolongs in part the Temporary Crisis Framework, adopted on 23 March 2022, to enable Member States to use the flexibility foreseen under State aid rules to support the economy in the context of Russia's war against Ukraine.
[5] Germany, Hungary, Italy, and Spain.
[6] Czechia, France, Lithuania, Hungary, Ireland, Italy, Slovenia.
[7] These IPCEIs involved a collaborative investment effort by 12 Member States in the case of batteries and 16 Member States in the case of hydrogen.

Finally, the EU Emission Trading System generates sizeable revenues that Member States can use to invest in clean technologies including at the manufacturing stage. In 2022 alone, Member States received EUR 29.7 billion in ETS auction revenues. All revenues must be spent on climate-related purposes, including innovation and manufacturing in low-carbon technologies and solutions in a wide range of areas.

Cooperation with stakeholders.

Industrial Alliances[8] like the European Battery Alliance and the Clean Hydrogen Alliance played an important role in gathering a wide range of partners in a given industry or value chain, including public and private actors and civil society, to facilitate stronger cooperation, joint action and common projects.

The EU will seek to enhance consultation of the social partners on such ways to support businesses and workers to drive our transition to climate neutrality.

As announced by President von der Leyen in her 2023 State of the Union speech, the Commission committed to holding a series of **Clean Transition Dialogues** with industry on what it will take for them to invest and keep investing in Europe. These dialogues are following a supply chain logic and are putting a special emphasis on small and medium-sized enterprises (SMEs), with the first clean transition dialogue dedicated to hydrogen already held this October 2023.

Skills.

The green transition will also require a **skilled workforce.** Building on previous experience, "**Net-Zero Industry Academies**" complement the objective set out in the **2020 Skills Agenda** to ensure that the EU workforce has the skills it needs to drive the twin transitions. This is also the specific focus of the **European Year of Skills** (9 May 2023 to 8 May 2024).

Resilience and competitiveness.

The Commission's Green Deal Industrial Plan aims at safeguarding the competitiveness of the European clean tech industry and at positioning Europe as a leader of industrial innovation. In particular, the **Net-Zero Industry Act** proposal aims to tackle barriers to the scaling up the European manufacturing capacity of net-zero technologies. For example, it sets a manufacturing capacity benchmark of 40% of the EU's annual deployment needs by 2030 for strategic clean technologies. It also considerably streamlines permitting procedures for strategic projects across different sectors and supply chains to synchronise the scaling of clean tech in Europe. It further facilitates access to markets for clean technology with high quality, resilience, environmental and social standards by ensuring that public procurement procedures, auctions and consumer incentives schemes include resilience and sustainability criteria. It also makes it possible for Member States to set up regulatory sandboxes to test innovative net-zero technologies and stimulate innovation, under flexible regulatory conditions.

The **Critical Raw Materials Act** will bring further certainty for industry in Europe, including through a focus on boosting sustainable domestic mining, processing, refining and recycling

[8] They include, amongst others, the European Battery Alliance, the European Raw Materials Alliance, the European Solar Photovoltaic Industry Alliance, the Clean Hydrogen Alliance, the Alliance for Zero-Emission Aviation, the Circular Plastics Alliance, and the Renewable and Low-carbon Fuels Value Chain Industrial Alliance. See https://single-market-economy.ec.europa.eu/industry/strategy/industrial-alliances_en

capacities of critical raw materials. It foresees that no more than 65% of the EU's annual needs of a strategic raw material at any relevant stage of processing should come from a single third country.

***International engagement and assertive trade policies*.**

The EU will continue strengthening its supply chain resilience and diversification, and thus its economic security through international cooperation and, where necessary, autonomous measures. For instance, by enhancing openness to mutually beneficial exchanges, EU **trade agreements** support the diffusion of clean and more efficient production methods and technologies and create market access opportunities for green goods and services. They help secure access to third country markets for our renewable energy industry and ensure undistorted trade and investment in the raw materials and energy goods that are required to secure the necessary supplies to support the transition to climate neutral economies.

The EU is also partnering with the broadest possible range of countries to ensure it has diversified access to the necessary inputs to develop its clean tech industry whilst supporting partners in their own development and local value addition under Global Gateway. This is done for example, through **sustainable critical raw material partnerships** with resources-rich countries, as already done with Chile, Argentina, Kazakhstan, Namibia, Ukraine and Canada and Just Energy Transition Partnerships with South Africa, Senegal, Indonesia and Vietnam. Moreover, **The Critical Raw Materials Club proposed by President von der Leyen** will facilitate international cooperation and coordination by bringing together consumer and resource rich countries.

The Commission's **Strategic Energy Technology Plan (SET Plan)** aims at fostering collaboration between the SET Plan countries in their efforts to advance research, innovation, and competitiveness in new clean energy solutions.

In addition, **while remaining an open destination for global trade, the EU will also continue to protect itself, when necessary, in a proportionate and targeted way.** This includes responding robustly to unfair and injurious practices in accordance with the EU's international obligations and rules. The anti-subsidy ex-officio investigation into electric vehicles imported from China announced by the President of the European Commission in September is the most recent example for this.

The recently adopted European Economic Security Strategy also sets out, amongst others, a risk assessment of critical technologies, many of which play an important role in the clean transition[9], on the basis of which the EU may decide on further measures to promote such technologies, partner with third countries or protect them through autonomous measures. The EU has already enlarged its autonomous tools and is considering adopting new ones to address possible gaps where appropriate, as laid out in the Strategy.

Despite all the significant work to support clean tech manufacturing and deployment, the Commission is aware that there are still a number of challenges that are actively being worked on , such as high energy costs, administrative complexity in accessing financing, cumulative regulatory burden and skills and labour shortages.

3. Mitigating the impact of the US Inflation Reduction Act

[9] Commission Recommendation (EU) 2023/2113 of 3 October 2023 on critical technology areas for the EU's economic security for further risk assessment with Member States (europa.eu)

With the balanced, broad and cooperative approach illustrated above, the EU is building a solid business case for the development and use of clean technologies and has managed to stay among the front-runners in the field. But EU efforts do not come in isolation, as other global players pursue similar objectives.

All major economies are seeking to improve competitiveness of their industries in this economic field of the future. For example, **the US, China, Canada and Japan** have introduced public financial incentives to ramp up their investment plans in clean technologies.

As noted in the Green Deal Industrial Plan, a number of net-zero technologies sectors[10] are currently dominated by **China**, which has made subsidising clean tech innovation and manufacturing a priority of its Five-Year Plan. China's pipeline of announced investments in clean technologies exceeds USD 280 billion. **Japan**'s green transformation plans aim to raise up to JPY 20 trillion (approximately EUR 140 billion) through 'green transition' bonds[11]. **Canada** has dedicated USD 60 billion in clean energy tax credits and USD 20 billion in sustainable infrastructure investments in its 2023 budget[12].

This Communication focuses on the impact of the US Inflation Reduction Act. Adopted in August 2022, the **IRA relies on direct and indirect subsidies and is a cornerstone of the US's drive to create a domestic ecosystem of low-carbon technologies**. The IRA provides for subsidies and tax incentives worth at least USD 369 billion over ten years to attract investment and production in the US. IRA is expected to facilitate progress toward achieving the US's Nationally Determined Contribution (NDC) to the Paris Agreement of reducing greenhouse gas emissions by 50 to 52 % below 2005 levels by 2030.

As stated in the 10 March 2023 joint statement by President von der Leyen and President Biden, the United States and the European Union are working together to address the climate crisis, accelerate the global clean energy economy, and build resilient, secure, and diversified clean energy supply chains - objectives that are at the heart of the US IRA and the EU Green Deal Industrial Plan. To this extent, the US IRA reflects a welcome, positive turn in US climate policy.

Nonetheless, some elements of the IRA, notably with respect to discriminatory content and assembly requirements, have raised concerns amongst international partners, including the EU, regarding distortion of international trade and investments, adverse impacts of companies not-located in the US and its compatibility with World Trade Organisation (WTO) rules. More generally, the sheer and uncapped amount of IRA incentives has raised questions about its potential to undermine EU efforts to develop an internationally competitive clean tech sector by means other than production subsidies, and to divert future investment decisions.

[10] The 2023 Competitiveness Progress Report 2023 PROGRESS REPORT ON COMPETITIVENESS OF CLEAN ENERGY TECHNOLOGIES provides an overview of EU competitiveness in the main clean technologies.
[11] European Commission, A Green Deal Industrial Plan for the Net-Zero Age, https://ec.europa.eu/commission/presscorner/detail/en/ip_23_510
[12] Government of Canada, A Made-in-Canada Plan: Strong Middle Class, Affordable Economy, Healthy Future, https://www.budget.canada.ca/2023/home-accueil-en.html.

The EU and the US have put in place mechanisms to discuss such EU concerns and to address broader global ramifications. Notably, the **US-EU Task Force on the IRA** set up in October 2022 has led to useful clarifications in the implementation guidance issued by the US Treasury on 30 December 2022. This now confirms that that EU companies can benefit from the Commercial Clean Vehicle Credit scheme (covering leased vehicles) under the IRA, although certain concerns remain with regards to the market for private cars.

Following the March 2023 joint statement, the EU and the US started negotiations on a targeted EU-US Critical Minerals Agreement (CMA) to ensure that the EU is granted the equivalent status of an FTA partner under the provisions of the IRA (setting out the requirements for the origin of critical minerals used in electric vehicle batteries that could benefit from IRA incentives).

We look forward to concluding the CMA negotiations with the US. Such an agreement will strengthen the EU-US political and trade relations in geopolitically challenging times, in which resilient supply chains and secure access to critical raw materials are of increasing importance. The CMA could help by enabling companies mining or processing critical minerals in the EU find new business opportunities in the US. This should help strengthen EU-US supply chains, and help in promoting high levels of sustainability and labour rights along global critical minerals' value chains.

The **EU-US Clean Energy Incentives Dialogue** was also launched in March 2023. Thanks to this dialogue both sides have started a constructive engagement on how to build net-zero industries of the future and how to address challenges such as non-market economy practices. As part of the **EU-US Trade and Technology Council** (TTC), this dialogue will ensure that respective EU and US incentive programs are mutually reinforcing. Other relevant initiatives in the context of the TTC are the agreement on a common international standard on megawatt charging systems for the recharging of electric heavy-duty vehicles and the **Transatlantic Initiative on Sustainable Trade** that will contribute to a more integrated and efficient transatlantic marketplace for green goods, including through working on conformity assessment.

These initiatives will help mitigating some of the most problematic and discriminatory elements of the IRA. Nevertheless some important structural challenges due to the significant amount of US subsidies will likely continue to affect the global landscape in clean technology development.

4. Assessment of the situation

Impact of the US Inflation Reduction Act to date

While the US IRA will likely have an impact on certain investment decisions in the specific sectors it addresses, its **macroeconomic effect on Europe has so far been limited**, not least because investments it could bring about have not yet fully materialised. The long-term impact is hard to assess at this stage, with different studies finding contrasting results.[13]

[13] A report by Franco-German Council of Economic Experts (September 2023) found that the macroeconomic impact of the IRA on European countries over a 5- to10-year horizon will be extremely limited, while noting that other studies using the same model (Attinasi, M G, L Boeckelmann and B Meunier (2023b), obtain estimates of the effect of IRA that are significantly larger.

The promise of easily accessible tax credits and the fact that it provides support to cover operating costs for producing clean technologies makes IRA an attractive programme for industry. It is estimated that the IRA contributed materially to reducing energy and manufacturing costs[14][15]. This, combined with structurally cheaper energy prices in the US compared to Europe, is likely to make the US a more attractive place to invest than before. The IRA and its effects on EU investments are thus a factor that the EU needs to constantly monitor.

Analyses so far point towards a rapid acceleration of clean tech investments in the US. However, for the time being it is difficult to assess the IRA real impact on the EU economy, and particularly on the development of the EU's clean technology industrial base in the longer term. This is due to several factors.

First and foremost, investments need time to materialise into tangible projects whose effects cannot yet be seen today. The IRA has been in place for a relatively short period of time, it was signed into law only in August 2022. There is currently no reliable data available on investments realised. In addition, IRA tax credits have not yet been provided, in light of the fact that these credits can only be claimed after the end of fiscal year 2023 (with the 2023 tax returns filed in mid-2024). The actual uptake for a given fiscal year of IRA tax credits will not be known until 18 months after the start of that fiscal year.

Secondly, many IRA tax credits are not capped in overall volume or value terms, therefore the total amount of subsidies will depend on actual take-up. As a consequence, estimates of what could ultimately be its total allocation range widely from USD 390 to 900 billion (approximately from EUR 370 billion to EUR 852 billion) for the period from 2023 to 2031. The uncapped nature of the IRA tax credits therefore adds uncertainty on its future economic effects, both in the US and the EU.

Thirdly, the EU investment climate is affected by several major developments, beyond the IRA. First of all, Russia's war of aggression against Ukraine triggered unprecedented high volatility of energy prices. In addition, the EU economy faces still high but decreasing inflationary pressures and high interest rates . Finally, other major global players have introduced distortive subsidies and engaged in unfair trade practices in pursuit of their climate and clean tech ambitions. All these factors negatively affect investment decisions in Europe, which makes it very difficult to assess IRA's relative impact on the EU economy.

General trends in some technologies sectors

Throughout several relevant industrial sectors, the support from IRA provides some cost competitive advantages for US-based businesses vis-à-vis international competitors. There are indications that US investments are expanding in the areas of battery, solar and wind technology manufacturing. In total, the IRA has so far led to over $110 billion of capital

[14] BCG (2022), "US Inflation Reduction Act: Climate & Energy Features and Potential Implications", p4.
[15] Deloitte (2023), "Sustainability & Climate IRA and the net-zero race – How EU industrial policy should respond", p11.
[16] FACT SHEET: One Year In, President Biden's Inflation Reduction Act is Driving Historic Climate Action and Investing in America to Create Good Paying Jobs and Reduce Costs | The White House

investments announced for clean energy manufacturing projects, including over $70 billion towards electric vehicles and battery supply chains[16].

The cost advantage for the production of **battery packs** as a result of the IRA tax credits amounts to approximately 25 to 30% of the total production costs. The Commission estimates that the IRA is contributing to a significant cost reduction in the production of **green steel**. As a result of the IRA, the production cost of **green hydrogen** is estimated to reach USD 0.3/kg by 2025 and is expected to further decrease by 2030.[17] Such lower input costs due to the IRA have therefore the potential to accelerate the deployment and long-term investment perspectives of clean technologies in the US.

The IRA facilitates the prediction of hydrogen pricing. However, the US has so far not yet published the specific standards to qualify as clean hydrogen, which currently holds back final investment decisions in the US.

The solar industry stressed that investments have been falling in the EU, mostly as a result of the strong pressure from Chinese solar manufacturers. The IRA presents an additional challenge for European solar manufacturers. Nevertheless, according to the European Solar PV Industrial Alliance, progress towards achieving the objectives set out in the Net-Zero Industry Act may lead to future expansion plans in the EU.

The IRA is expected to have some positive effects for the US market of electric vehicles, but it is not expected to adversely affect demand in Europe. However, whether or notEuropean companies will reap the benefits of IRA remains unclear. The IRA has triggered over USD 50 billion investments in the battery sector, but European investments in the US have so far been dwarfed by investments of domestic US and Asian origin. The US demand for batteries and critical minerals might benefit these sectors in Europe[18] but this should not be taken for granted. The long-term impact of the IRA on the battery value chain is still difficult to anticipate as some investment decisions in the EU have been put on hold.

EU investment environment

The Commission is closely monitoring global investment flows in clean tech sectors. While a number of European companies have announced their intention to reconsider their investment plans, **there is so far insufficient evidence to assess the extent of the IRA's impact on investments in the EU or the extent to which it has led to EU firms deciding to relocate to the US.**

Despite the many headwinds mentioned above, the EU continues to play an active role in expanding the global clean technology market with important business opportunities for investors and industry. One reason for this is the proximity principle: while many clean technologies, or key inputs for them, are internationally traded, production of goods tends to congregate close to demand and the EU has a long track record in creating predictable demand for clean technologies through the tools and measured summarised above. The EU can also build on a strong science base and talent pool to further promote innovation, identify and develop breakthrough technologies and support their commercialisation. Therefore, a sharp

[16] FACT SHEET: One Year In, President Biden's Inflation Reduction Act is Driving Historic Climate Action and Investing in America to Create Good Paying Jobs and Reduce Costs | The White House
[17] BCG (2022), "US Inflation Reduction Act: Climate & Energy Features and Potential Implications", p15

build-up in US manufacturing investments to serve newly created demand there does not necessarily entail a diversion of investments that would serve European demand from within the EU – and may represent a new growth opportunity for EU firms with relevant technology and experience.[19]

Companies in the EU also benefit from the funding possibilities permitted under State aid rules, as evidenced by the amount of authorised aid mentioned above. In addition, in order to tackle the risk that specific investments could be diverted away from the EU due to greater support received elsewhere, the Commission has provided (via the Temporary Crisis and Transition Framework) a specific tool for Member States to take such diversion risks into account, by allowing support up the level of the foreign subsidy but not exceeding a proven funding gap (so called 'matching aid'). This tool has been carefully calibrated in order to preserve the level playing field within the single market.

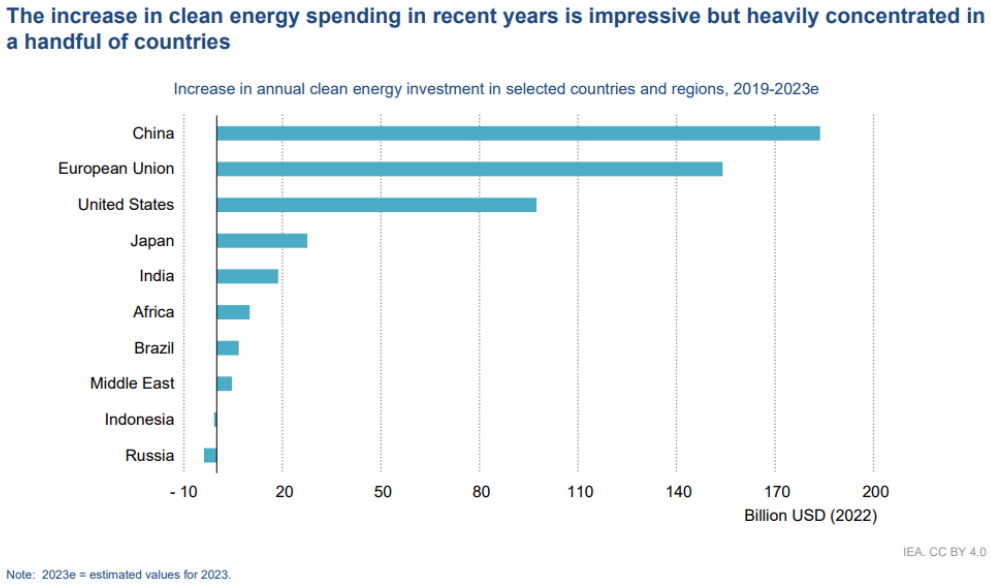
Important expansion plans and investments are occurring in the EU to roll out key clean technologies. Indeed, the Commission awarded on 13 July 2023 over EUR 3.6 billion to 41 large-scale clean tech projects to be financed through the EU Innovation Fund. Additionally, under InvestEU, around EUR 4.5 billion of loans in clean energy transition have been approved. Through clean tech partnerships[20] with industry and the European Innovation Council, Horizon Europe is currently investing more than EUR 11 bn into net zero world-leading clean technologies. These investments will help to crowd in additional private funding that is needed to roll out clean technologies at sufficient scale.

Looking more specifically into sectors, the Commission is co-investing EUR 2 billion with industry in the **Clean Hydrogen Partnership** and has approved two IPCEIs with public and private investments for a total of EUR 26.4 billion across the EU. During 2022 and 2023, 17 electrolysers companies have announced major manufacturing projects in Europe. Looking at the heat pump value chain, the total investment announced over the last 5 months to build new production capacity in Europe to be executed over the next 3 years sums up to nearly EUR 5 billion.

Announcements of new investment decisions in the EU are promising and if implemented will enable Europe to meet its clean production targets by 2030 to a large extent. According to the IEA's latest report "World Energy Investment 2023", the EU remains the second largest global investor in clean tech in the period 2019-2023 behind China and ahead of the US.[21] (see Figure 1).

[19] As an illustration, the European Innovation Council has supported a hydrogen company which has achieved 'Unicorn' valuation, and more recently another one which is now valued at over €200m completing a €40m fundraising round earlier this year.
[20] Including initiatives and projects run by the Knowledge Innovation Communities (EITInnoEnergy, Climate KIC, EIT Raw materials) funded by the European Institute of Innovation and Technology.
[21] International Environmental Agency (2023), "World Energy Investment 2023", p14

Figure 1: Increase in annual clean energy investment in selected countries and regions, 2019-2023e (source IEA)



Finally, the overall impact of the IRA on the EU clean technology investments will also depend on the effectiveness of the EU response and on the EU policies to improve its long-term competitiveness and technological edge. It is crucial that the EU maintains its efforts to stay competitive and keeps on supporting Member States and market players in their effort to decarbonise their economy. The potential risk of global competition can be mitigated by stepping up the EU's own attractiveness in the European and global context, including by tackling remaining challenges such as energy costs, the attractiveness of the business environment, the availability of sufficient skilled labour and private capital, reducing legislative complexity and the administrative burden and accelerating permitting procedures. Moreover, a swift adoption of relevant EU legislation, such as the Net-Zero Industry Act and STEP, reinforced by the MFF mid-term revision, would help further improve the EU regulatory framework and address the heightened need for EU public investments in critical technologies.

5. Conclusions

The EU has been leading the green transition both domestically and globally. The European Green Deal is an ambitious plan to transform the EU into a modern, resource-efficient, and competitive economy. The EU's growth model is based on a smart policy mix building on a growth enhancing, predictable and simplified regulatory and business environment, faster access to funding, enhancing skills and open trade. The European Single Market based on open, competitive markets, and a supportive social model, diversity and creativity ensures predictability for investors.

The Net-Zero Industry Act, the Critical Raw Materials Act and the Strategic Technologies for Europe Platform (STEP) will support our growth model in clean tech. Horizontal measures such as the economic governance review are also necessary to underpin investment and competitiveness. The Commission calls on the co-legislators to swiftly finalize negotiations on these proposals, as well as for the conclusion by the end of 2023 of the mid-term review of the MFF.

Others are also adopting ambitious measures to support the transition to climate neutrality, including through industrial policy measures**.** China, for instance, currently dominates a number of net-zero technologies sectors and some of its public support policies poses the most direct risk to the competitiveness of European clean tech companies.

This Communication focuses on the case of the US, who with **the Inflation Reduction Act have changed their approach to climate change.** The IRA supports the reduction of greenhouse gas emissions and the transition to cleaner energy sources and contributes to global efforts to implement the Paris Agreement. It is, to this extent, **a welcome development**.

However, with IRA being based on direct and indirect subsidies in a drive to create a domestic manufacturing ecosystem of low-carbon technologies, it is also clear that the US's approach to support the green transition is different to that of the EU, with its pragmatic mix of market, funding and regulatory tools on both the demand and the supply side.

Apart from specific problems with certain discriminatory provisions which the EU is currently addressing through dialogue, an approach based so predominantly on uncapped manufacturing subsidies must be continuously monitored by the Commission to detect any distortionary effects between our continental investment markets. At the same time, some lessons can be drawn in relation to the simplicity and swiftness of the IRA approach.

Despite these differences, **both models offer the opportunity to boost clean tech markets and create demand** for green products and services, making our paths towards a sustainable net zero economy and society by 2050 a reality. The European Green Deal and the US IRA will accelerate the deployment of clean tech in the EU and the US respectively, contributing to the needed global investments in clean tech. Demand for clean tech products worldwide is rising.

However, **there would be no EU green transformation without a strong, competitive, sustainable EU industry and fair and open trade**.

While IRA may lead EU companies to consider relocation to the US, **preliminary and available data are so far not conclusive.** It is therefore too early to be able to assess the extent of the impact of the IRA on investments in the EU and on such possible relocation decisions. The concrete effects of the IRA on EU investment can only be assessed in the longer term due to the long-term investment cycles and long-lasting capital assets of the clean technology industry.

In this light, the Commission will remain highly vigilant. We will continue monitoring global and domestic investment flows and public support policies from other countries, while at the same time constructively engaging with the US to mitigate potential effects of the IRA and make sure that our respective policies are mutually reinforcing in accelerating the green transition.

Beyond IRA, other elements will shape the future competitiveness of the EU clean tech industry. This in particular concerns the stable supply of affordable energy, the availability of a highly skilled work force and adequate private and public funding, the sufficient availability of raw materials, continued trade openness, as well as a supportive business environment. Sustained, determined and consistent policy action on all of these fronts will therefore be essential.