



LE GOUVERNEMENT
DU GRAND-DUCHÉ DE LUXEMBOURG

National plan for smart, sustainable and inclusive growth Luxembourg 2020

National Reform Programme
of the Grand Duchy of Luxembourg under the European semester
2018



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ACRONYMS

AAQE	Annual Allocations of Emissions Quotas
ADEM	Employment Development Agency
AIP	Professional Insertion Activities
ALJ	Local Youth Action
BNL	National Library of Luxembourg
BTS	Vocational Training Certificate
CES	Economic and Social Council
CFE	Financial Contributions by the State
CRP	Public Research Centre
CTIE	Centre for Information Technologies of the State
DSGE	Dynamic Stochastic General Equilibrium
ERA	European Research Area
ETS	Emission Trading Scheme
EU	European Union
FEAD	Fund for European aid to the most deprived
FEDER	European Regional Development Fund
FNR	National Research Fund
ESF	European Social Fund
ETS	Emissions Trading Scheme
GES	GHG – Greenhouse Gases
GDP	Gross Domestic Product
HPC	High performance Computing
IBBL	Integrated Biobank of Luxembourg
ICT	Information and Communications Technologies
IGSS	Inspectorate General for Social Security Administration
ILR	Luxembourg Regulatory Institution
KTOE	Kilo-tonne oil equivalent
LCSB	Luxembourg Centre for Systems Biomedicine
LFS	Labour Force Survey
LIH	Luxembourg Institute of Health
LIS	Luxembourg income study
LISER	Luxembourg Institute of Socio-Economic Research
LIST	Luxembourg Institute of Science and Technology
LLL	Lifelong learning
LTIO	Luxembourg Trade and Investment Offices
MODU	Sustainable Mobility Strategy
NEET	Not in Education, Employment or Training
OAI	Order of Consulting Architects and Engineers
OECD	Organisation of Economic Cooperation and Development
MIP	Macroeconomic Imbalance Procedure
MTO	Medium term objective
NRP	National Reform Programme
PPP	Public-Private Partnership
SGP	Stability and Growth Program
SHP	Sector Housing Plan
SME	Small and Medium-sized Enterprise
R&D	Research and Development
RDI	Research-Development-Innovation
REVIS	Social Inclusion Revenue
SNJ	National Youth Service
SSM	Minimum wage
STATEC	National Institute of statistics and economic studies
SYVICOL	Syndicate of Cities and Towns in Luxembourg
UEL	Union des entreprises luxembourgeoises (Employer's Organisation)

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1. Introduction

The economy of the European Union (EU) is becoming stronger in a changing environment. EU growth rates exceeded expectations in 2017 and the economy has been healthy at the start of 2018 as the economic recovery phase transitions into expansion. Unemployment and public deficits continue to fall and investment is increasing significantly. This dynamic offers a window of opportunity for the EU.

The improved outlook at EU level has favoured Luxembourg, which experienced a fifth consecutive year of recovery in 2017. Many cyclical indicators are relatively satisfactory for 2017 and 2018, as are the medium-term forecasts. Domestic employment is growing at rates above +3% and the unemployment rate fell to nearly 6% in 2017, its lowest level in five years.

For Luxembourg, a small open economy integrated in a large cross-border basin, this type of development is a challenge as such growth generates a certain number of negative externalities. Luxembourg is facing a certain number of challenges, including mobility, access to housing, long-term sustainability of public finances, climate change as well as economic diversification. Moreover, the country is experiencing a low productivity growth rate. Therefore, the government has to continue supporting the economic recovery by taking advantage of favourable economic conditions, while putting forth responsible fiscal policies, increasing investment and implementing structural reforms. The National Reform Programme (NRP) of Luxembourg deals with these factors and challenges from a long and medium-term perspective. This 2018 edition of the NRP both reviews the implementation status of previously announced measures and addresses the 2017-2018 Council recommendations, while taking on Luxembourg's national objectives for 2020, the priorities of the Annual growth survey as well as the country specific recommendations relating to the Euro zone. It also addresses the main issues that have been identified by the European Commission in Luxembourg's 2018 country report¹, published in early March.

On a macroeconomic level, Luxembourg is, once again, one of the Member States not being subject to an in-depth review under the alert mechanism for the macroeconomic imbalance procedure (MIP), although a number of indicators remain above thresholds².

On the microeconomic and employment perspectives, the structural pillars for long-term growth are still education and training, R&D and innovation, efficient use of resources, social cohesion and inclusion and, finally, gender equality as a cross-disciplinary objective. Since late 2016, the government has organised a series of events related to the topic of "qualitative growth". In addressing this issue, the government presented the results of the strategic study commissioned to Jeremy Rifkin and entitled "*The Third Revolution in Luxembourg*", which aims at preparing Luxembourg for a constantly mutating environment via a long-term vision. The government considers this strategic study as a general guideline for the future development of the country. Luxembourg already has a solid foundation so far to meet future challenges as significant efforts have been made in the last decade in the areas of ICT, logistics and energy. The challenge now is to accelerate the existing momentum and to prepare the convergence of ICT, renewable energies and transport within a digital and intelligent network to conceive a sustainable economic development. A strategic monitoring committee was set up to coordinate the implementation of measures, some of which have already been approved by the government. In November 2017, after a year of work, the first results of the committee were unveiled in an interim report highlighting the progress of

¹ For more details see: <https://ec.europa.eu/info/sites/info/files/2018-european-semester-country-report-luxembourg-fr.pdf>

² For more details see: <https://ec.europa.eu/info/sites/info/files/economy-finance/com-2017-771-en.pdf>

work initiated through the various thematic platforms as well as the transposition and concretisation of priority projects³.

On the fiscal level, the NRP goes hand in hand with healthy and viable public finances such as those formulated in the Draft Budgetary Plan (DBP) and the Stability and Growth Programme (SGP).

At the end of 2017, the government has set up a National Economic and Financial Committee in order to, amongst other things, coordinate the work to be carried out as part of Luxembourg's obligations under the EU's economic and financial governance⁴.

In late 2017, the government also presented Luxembourg's new national competitiveness scoreboard, replacing the old version used since 2006, whose structure takes into account economic, social and environmental aspects⁵ in a balanced manner.

With a view to increasing transparency and encouraging ownership at national level, the government involved Parliament and social partners, once again, in the 2018 European semester:

- Parliament was involved in the European semester week, which took place at the end of April, focusing on the government's statement concerning the economic, social and financial situation of the country.
- Social partners were particularly involved in the national social dialogue, which took place under the aegis of the Economic and Social Council (CES). This involves an annual cycle of regular consultations, which started in 2014, and seeks to generate regular social dialogue throughout the year so that social partners can submit their points of view to the government⁶.

In conclusion, the coordinated set of NRP measures accompanied by a responsible fiscal policy set out under the SGP, together with the strengthening of governance on the national level, should provide Luxembourg with the structure for consolidating the foundations of a smart, sustainable and inclusive growth.

³ For more details see: <http://www.troisiemerevolutionindustrielle.lu/2017/11/09/presentation-du-rapport-intermediaire-de-suivi-2017/>

⁴ For more details see: <http://data.legilux.public.lu/file/eli-etat-leg-rgd-2017-10-09-a881-jo-fr-pdf.pdf>

⁵ For more details see: http://gouvernement.lu/fr/actualites/toutes_actualites/communiqués/2017/10-octobre/30-bilan-compétitivité.html

⁶ For more details see: <https://ces.public.lu/fr/actualites/2018/Semestre-euro-2018.html>

2. Macro-economic scenario for 2018-2022

2.1 Macro-economic perspectives for the period covered by the programme

It is essential that NRP measures take into account the constraints of the macroeconomic environment and the medium-term budget strategy that stem from them. Implementing the NRP as a whole thus falls under the same economic hypotheses involving macroeconomic projections as those of the Stability and Growth Programme (SGP).

Macroeconomic forecasts indicate a real GDP growth of +4.6% in 2018 and +4.6% in 2019, as well as medium-term growth of +3.5% on average between 2020-2022.

For the long term, the government has aligned its main economic hypotheses with those in the macroeconomic scenario adopted for Luxembourg as part of the work of the *Working Group on Ageing Populations and Sustainability* of the EU Economic Policy Committee and of its most recent report on ageing⁷.

2.2 Macro-economic impact of structural reforms

Over recent years, major efforts have been made in Luxembourg in the area of evaluating reforms. An econometric DSGE (Dynamic Stochastic General Equilibrium) model, called the *Luxembourg structural model* (LSM), has been developed that will better simulate macro and micro-economic impacts of structural reforms. Some characteristics of the model make it particularly well adapted to analysing economic policies implemented by Luxembourg. It integrates the economic specificities of Luxembourg, especially the particular functioning of the labour market that assimilates residents and cross-border workers, the importance of negotiations between unions and companies, and the fact that Luxembourg is a small, very open economy.

An initial version of the LSM was widely used in reviewing the consequences of structural policies. However, this initial version was not appropriate for studying the consequences of the high level of Luxembourg's specialization in financial services. The development of a new version, known as LSM2, addresses this concern. The LSM2 model including the financial sector for Luxembourg was introduced in June 2012. However, it should not be forgotten that there is no ideal structure for an institutional macro-econometric model⁸.

⁷ For more details see: http://europa.eu/epc/working_groups/ageing_en.htm

⁸ For more details see: http://odc.gouvernement.lu/fr/domaines-activite/Outils-evaluation_competitivite/modele-structurel-luxembourgeois-lsm.html

3. Implementation of country specific recommendations

In July 2017 the Council adopted two recommendations on Luxembourg's SGP and NRP for the period 2017-2018. This chapter describes the measures implemented in Luxembourg to address these recommendations.

3.1 Diversification of the economy and regulatory restrictions in business services

“Strengthen the diversification of the economy, including by removing barriers to investment and innovation. Remove regulatory restrictions in the business services sector.”

3.1.1 Strengthen the diversification, including by removing barriers to investment and innovation

This recommendation aims to reduce the obstacles to private investment and innovation that will free up growth potential. Whilst public investment in Luxembourg as a percentage of GDP exceeds the EU average, private investment is less significant. The government recently took a series of measures, with others under way, in order to spur private investment in Luxembourg.

The government is implementing an active development and diversification policy on the structure of the economy, based on a multi-specialisation strategy, with a view to reducing dependence on the financial sector which is still the preponderant pillar of Luxembourg's economy. Diversification efforts are concentrated on a few specific sectors.

Luxembourg's economic promotion strategy is based on a vision that highlights an innovative and diversified economy. The strategy targets foreign companies and investors bringing added value to the national economy by consolidating the country's qualitative development. This strategy can be modified in accordance with government priorities and is accompanied by contributions from the Chamber of Commerce and Luxinnovation. It focuses on coordinated planning of international economic missions and events as well as all promotional activities. The "external" aspect of this strategy focuses on two major areas: boosting the ecosystem of each sector by developing strategies for the various sectors and by targeting foreign investors that could enhance the consistency of these strategies. It will also strengthen the attractiveness of the country for high performing businesses and optimise the quality of support for these investors, seamlessly integrating them in a sustainable manner into the Luxembourg ecosystem. Dedicated teams from the Ministry of the Economy and Luxinnovation's experts use a structured method of sector prospecting to analyse their sector at the international level, achieve geographical and technological targeting of the players, evaluate the strengths, weaknesses and potential of the sector in Luxembourg and prepare a strategic improvement plan and then a targeted action plan for clearly identified players. These potential investors are then approached directly by the Ministry of Economy and the Luxembourg Trade and Investment Offices (LTIO), as well as by embassy field teams. This new strategy was implemented in 2017 and is overseen and approved by a Trade and Investment Board, which oversees the work of the Trade and Investment Steering Committee to which the development and implementation of the strategy has been entrusted. This entity coordinates the promotion activities and the synchronization of the agendas and programs.

The government adopted the smart specialization strategy for Luxembourg⁹ in December 2017. The smart specialization strategy recommends that specific action plans be implemented for priority sectors, to include the manufacturing industry 4.0, clean technologies including sustainable

⁹ For more details see: https://mec.gouvernement.lu/fr/publications/rapport-etude-analyse/minist-economie/RIS3/Luxembourg_Research_and_Innovation_Smart_Specialisation_Strategy_2017.html

construction, smart mobility and the circular economy, health technologies and ICT. The ICT sector and the circular economy occupy a special position in that they provide the foundation for an innovative economy and a smart society. The smart specialization strategy also identifies the priority instruments for the implementation of the plans and recommends annual monitoring as well as evaluations based on performance indicators.

In this context, the implementation of the space policy reflects the government's desire to diversify its economy by actively supporting the development of a “new space” industry. This relies on the experience gained in Luxembourg by one of the world leaders in the satellite communications sector. Through the *spaceresources.lu* initiative¹⁰, Luxembourg is projecting itself into the future space economy, the development of which will be facilitated thanks to the use of available resources in space. By adopting a law in July 2017, which aims to clarify the question of the appropriation of the resources that can be collected in space and to set up a system of authorization and supervision of these activities¹¹, Luxembourg is the first European country to offer a legal framework in compliance with its international obligations and thus positions itself as a European hub for the investigation and use of space resources. This pioneering approach has already made it possible to reap the economic benefits in the short term following the establishment of new space companies in Luxembourg.

With the entry in effect of the new RDI promotion law¹² in June 2017, the government has access to a series of tools to effectively support businesses in their RDI approach. This law allows action on both companies of all sizes, but also at different levels along the innovation chain. It also makes it possible to shore up SME innovation via a specific regime. In addition, it proposes a strong incentive to the establishment of collaborative research between companies, but also with public actors¹³.

The government has recently made various adjustments to the tax law to strengthen investment and innovation:

- Lowering the corporate income tax rate¹⁴: In an effort to improve business competitiveness, the corporate income tax rate was lowered from 21% to 19% for the 2017 tax year and to 18% as from the 2018 tax year. In particular, to support small and medium enterprises, the gradual reduction of the maximum tax rate goes hand in hand with the lowering of the minimum tax rate, which is reduced from 20% to 15% as of the 2017 tax year. At the same time, the amount beyond which the normal rate applies is increased as of the 2017 tax year, from €15,000 to €30,000.
- Increase in the rates of the investment tax credit¹⁵: To encourage more companies to implement a dynamic investment policy, the rate of the complementary investment tax credit was increased from 12% to 13% and the rate of the global investment tax credit was increased from 7% to 8% for the investment tranche not exceeding €150,000. By approving the State budget law dated 15 December 2017, the scope of the investment tax credit was also widened to include various electric cars, as well as the acquisitions of software.

¹⁰ For more details see: <http://www.spaceresources.public.lu/en.html>

¹¹ For more details see: <http://legilux.public.lu/eli/etat/leg/loi/2017/07/20/a674/jo>

¹² The law intended to 1. Renew the aid schemes for research, development and innovation; 2. Define the tasks of the National Agency for the Promotion of Innovation and Research; and amending the amended law dated 5 June 2009 relating to the promotion of research, development and innovation.

¹³ See Chapter 4.2 The R&D objective and the key measures for achieving it.

¹⁴ The law dated 23 December 2016 on the implementation of the 2017 tax reform.

¹⁵ The law dated 23 December 2016 on the implementation of the 2017 tax reform.

- Tax regime for intellectual property: In August 2017, the government submitted a draft law¹⁶ to introduce a tax regime for intellectual property in accordance with the OECD nexus approach. The draft law is part of the government's overall strategy to build a competitive framework that promotes innovation and respects the new international and European principles in the area of taxes (80% exemption of the adjusted and offset qualifying net income). The law was passed at the end of March 2018.

The law dated 23 July 2016 stipulates the introduction of a simplified limited liability company (Sàrl-s). Based on the observation that raising the minimum required capital is often considered a difficult obstacle, the purpose of this measure is to stimulate entrepreneurship by making it easier to start a company through reduced establishment costs, making the establishment process simpler, more rapid and efficient and above all, by considerably reducing the current requirements of subscribing and paying in capital fully. Therefore, access to this corporate vehicle will provide a legal structure to entrepreneurs who are physical persons by offering them not only protection in terms of liability and protection of their own asset, but also in terms of better visibility. In 2017, for example, there were 50% more registrations of type Sàrl-s companies in the commercial register than physical persons registered as merchants, and type Sàrl-s companies accounted for around 7% of the total number of newly registered companies in Luxembourg¹⁷.

In order to provide additional possibilities to assist and support SMEs so as to encourage the establishment, development, conversion or re-orientation of craft, trading, industrial or service provider entities that influence the economic development of the country, in May 2017 the government submitted draft law no. 7140 on the renewal and reform of aid to SMEs. Over the next 5 years, the government has budgeted a 27% increase in the financial support compared to the 2012-2016 period to support SMEs¹⁸.

Finally, the government has undertaken several initiatives to support entrepreneurship:

- House of entrepreneurship¹⁹: a unique point of contact for current and future entrepreneurs to find all the administrations and information needed to establish a business in Luxembourg in one location.
- Equilibre.lu - harnessing the economic potential of diversity in Luxembourg: launch of a think tank that addresses the issue of the importance and opportunities of the diversity of people in the Luxembourg economy.
- Entrepreneurial schools²⁰: A pilot project involving three high schools to prepare students for entrepreneurship that started in September 2017.
- E-commerce platform "*LetzShop.lu*"²¹: The government launched 'an e-commerce platform' project within the framework of the *Pakt PRO Commerce*, in collaboration with the Chamber of Commerce, the Luxembourg Confederation of Commerce (clc) and the larger municipalities of the country. This online sales site is a digital showcase for all businesses in Luxembourg and aims to allow traders to gain visibility and / or enhance their image through a network of businesses developed to increase their traffic and sales, erase barriers between physical and

¹⁶ Law no. 7163 amending the amended law dated 4 December 1967 concerning income tax, as regards the taxation of intellectual property, and amending the amended law dated 16 October 1934 concerning the valuation of property and securities ("*Bewertungsgesetz*").

¹⁷ Source: Luxembourg Trade and Companies Register

¹⁸ For more details see: https://gouvernement.lu/fr/actualites/toutes_actualites/communiqués/2017/05-mai/04-closener-cdp.html

¹⁹ For more details see: <http://www.houseofentrepreneurship.lu/nos-missions/>

²⁰ For more details see: www.men.public.lu%2Fcatalogue-publications%2Fthemes-transversaux%2Fdossiers-presse%2F2016-2017%2F161107-entrepreneuriat.pdf&usg=AOvVaw3oUVRk1427SMn109XFc1J1

²¹ For more details see: https://gouvernement.lu/fr/actualites/toutes_actualites/communiqués/2017/11-novembre/17-closener-letzshop.html

digital stores, and increase customer service by offering a dynamic, fast and efficient online shopping experience for their customers.

3.1.2 Remove regulatory restrictions in the business services sector

In the most recent edition of the Luxembourg SBA Fact Sheet (November 2017)²², the European Commission noted that the Luxembourg business services sector has recently experienced exceptional growth, with consulting, legal and accounting services acting as the main drivers. Business services in Luxembourg therefore enjoy a favourable business environment for value creation and employment. In addition, as part of its NRP, the government has recently taken or planned a series of additional measures to improve the business environment.

In addition to the elimination of fixed prices in public contracts for architects and engineers (2016), the Law on sales and sidewalk vending and misleading and comparative advertising (2016) and the Law on recognition of professional qualifications (2016), whose objective is to align the requirements of professional qualifications, in particular for architects, with the EU legislation, and to provide the opportunity for third-country nationals to benefit from the procedure for the recognition of professional qualifications and to be offered a professional examination or practice to demonstrate their skills and eliminate potential differences, the government has recently taken a series of measures, while others are underway, to facilitate economic development in the Luxembourg business services sector:

- Work is underway on draft law no. 6795 amending the law dated 13 December 1989 on the organisation of the professions of architect and consulting engineer (submitted in March 2015).
- Work began in the second half of 2017 for a draft law on the modernization of the right of company establishment. Draft law no. 7228 dated 22 December 2017 amending the law on the right of company establishment provides simplifications of the procedure. The aim is to adapt the right of company establishment to socio-economic realities and to technical changes, but maintaining legal requirements in terms of professional qualifications, improving the chances of success to company directors who wish to establish a company. The draft law proposes eliminating the requirement of professional qualification for simple commercial activities and services which would also eliminate other specific procedures (special authorization for fairs and markets, consulting and economic advice). First and foremost, this bill significantly simplifies the establishment of a retail store by repealing the special authorization procedure for large stores.
- In accordance with the government program, the government is undertaking a review of the opening hours regime. In this respect, a study was commissioned by the Luxembourg Institute of Socio-Economic Research (LISER)²³ to carry out a comprehensive review of the issue of opening hours and its implications, including on the social level, for the employees concerned. The study is nearing completion and will soon conclude with an analysis of a questionnaire addressed to all the parties involved. The study and its results will be discussed with social partners and will be followed by discussions that will determine the way forward that will in particular address the ruling of the Constitutional Court of 17 March 2017 on the subject²⁴.

²² EUROPEAN COMMISSION, 2017 SBA Fact Sheet Luxembourg, November 2017, p.3: “Professional activities is another sector which has experienced outstanding growth recently. In 2012-2016, SME employment in professional activities rose by 19.2% and SME value added increased by 42.9%. The main growth drivers were the subsectors management and consulting (for SME value added), and legal and accounting (for SME employment) ».

For more details see: <https://ec.europa.eu/docsroom/documents/26562/attachments/19/translations/en/renditions/native>

²³ For more details see: https://gouvernement.lu/fr/actualites/toutes_actualites/communiqués/2018/02-fevrier/14-eco-heure-ouverture.html
<https://www.liser.lu/>

²⁴ Ruling of the Constitutional Court, n° 128/17 dated 17 March 2017.

- A joint investigation by the Benelux General Secretariat to complete a clear analysis of the issue of territorial supply constraints (TSC) present in the Benelux retail market supply chain was launched at the end of 2016. The purpose of this investigation is to analyse territorial supply constraints and to formulate any necessary solutions for improving the conditions of supply (price, offer, etc.) of companies in the Benelux.

3.2 Long-term sustainability and employment rate of older people

“Ensure the long-term sustainability of the pension system, limit early retirement and increase the employment rate of older people.”

3.2.1 Ensure the long-term sustainability of the pension system

The various social security systems are regularly analysed to ensure that they are well managed strategically and viable in the long term. It is with this aim that the reform of the general retirement pension scheme, which entered into effect on January 1, 2013, stipulates that the Inspectorate General for Social Security Administration (IGSS) performs an analysis of the scheme’s financial situation every five years. The objective of this reform was to adjust the replacement rate of pensions to life expectancy and to plan for regulating mechanisms if financial resources are inadequate, as well as to reduce the gap between legal and effective retirement ages, by means of an active policy to facilitate the conditions for maintaining older employees on the job.

As the overall analysis of the general retirement scheme was to have been done in 2017, the government decided to include an initial evaluation of the impact of the reform in 2016 in its agenda. Accordingly, the government decided to create a Pensions Group, made up of experts from different ministries and professional chambers, whose task is to check the concordance of newly introduced provisions in the middle of the legislative period on the basis of an actuarial opinion drawn up by the IGSS, including the readjustment mechanism. The actuarial report of the IGSS on the financial situation of the general retirement pension scheme was presented to the working group and the press on December 2nd, 2016²⁵.

The report concludes that the general pension insurance scheme is currently in a relatively comfortable financial position. Consecutive surpluses have resulted in the accumulation of a compensation reserve which, at December 31st 2016, corresponded to 4.5 times the amount of annual pay out, well above the minimum required level of 1.5 times the amount of annual pension benefits. The medium-term forecasts and the long-term actuarial projections confirm that the current overall contribution rate of 24% makes it possible to comply with the stipulations of Article 238 of the Social Security Code until the end of the current coverage period extending from 2013 to 2022. The report also highlights the fact that while the impacts of the 2012 pension insurance reform on the financial situation of the scheme are still not fully apparent, actuarial projections confirm that the mechanisms introduced by the pension insurance reform will have a positive effect on the financial situation of the general retirement system over the long term. However, analyses of different scenarios show that it is essential that favourable development of the labour market must be ensured. Obviously, high employment growth implies a steady influx of contributors into the system and is accordingly a necessary adjunct to improving its financial situation. It is important, however, not to depend solely on the current high level of reserves in the compensation fund. On the contrary, the analysis of demographic and financial projections implies that it is a question of using the accumulated reserve as a basis for determining effective mechanisms allowing the next generations to benefit from a general and efficient pension system.

²⁵ For more details see: https://gouvernement.lu/fr/actualites/toutes_actualites/communiqués/2016/12-decembre/02-bilan-assurance-pension.html

The report of the working group is nearing completion. It is expected that this report will contain a summary of the actuarial report of the IGSS, an update of the long-term projections contained therein and the findings and lines of thought that the working group has developed.

3.2.2 Increase the employment rate of older people

The new mechanism to combat long-term unemployment, which has been in effect since July 2017, aims to support the creation of new jobs in the municipality, para-public or social services sector that correspond to real needs. These jobs must be new, not jobs targeting temporary replacement of staff and, above all, not creating situations of unfair competition compared to the private sector. Specific measures are aimed at jobseekers aged 50 and over.

The modifications that took effect on January 1st, 2016 in the reform of the professional reclassification system aim at accelerating procedures, achieving a more thorough preservation of individual rights in external reclassification and creating conditions conducive to internal reclassification. The concept is based on supporting companies in their efforts to improve working conditions by making experts available, by emphasizing internal reclassification, i.e. within a worker's same company, in external reclassification efforts, and above all, improving reinsertion of reclassified persons into a job. On the basis of the first conclusions regarding the implementation of the law, the idea that a certain number of issues be adjusted with the close cooperation of the social partners is under review. According to the latest available figures, the reform had a positive impact on the number of persons reclassified externally without a job who consequently were registered with the Employment Development Agency (ADEM). In this way, the number of jobseekers in outplacement decreased by 15% between January 2016 and January 2018, from 2,564 in January 2016 to 2,174 in January 2018.

The professionalization placement programme²⁶ and the professional reinsertion contract²⁷ are two measures that have become applicable since 2016 that are intended for job seekers at least 45 years old, those in outplacement or those with the status of disabled worker. The first measure is a work placement with a maximum period of six weeks that gives job seekers the opportunity to highlight their professional capabilities within a company. The second measure offers job seekers the possibility of improving their knowledge and professional capacities within a company for a maximum period of 12 months. These measures are intended for companies that can provide a real opportunity for hiring people on permanent contracts.

The reform of the early retirement schemes²⁸, including the solidarity, progressive and early retirement systems of shift and night workers, excluding adjustments, in effect since December 11th, 2017, aims to target more employees with difficult jobs, consequently placing greater emphasis on the working conditions of employees, while favouring the retention of older workers in companies. More precisely, the draft law will abolish the early retirement-solidarity system and the adaptation of other early retirement systems.

In order to support and improve lifelong learning (LLL), a key factor in maintaining employees on the job, especially older ones, the government will progressively implement the measures of the white paper on the national strategy for lifelong learning²⁹. There are eight of these measures,

²⁶ For more details see:

<http://www.adem.public.lu/fr/demandeurs-demploi/beneficier-mesures-aides/mesures-emploi/stage-professionnalisation/index.html>

²⁷ For more details see:

<http://www.adem.public.lu/fr/demandeurs-demploi/beneficier-mesures-aides/mesures-emploi/stage-professionnalisation/index.html>

²⁸ Law dated 30 November 2017: <http://legilux.public.lu/eli/etat/leg/loi/2017/11/30/a1032/jo>

²⁹ For more details see:

<http://www.men.public.lu/catalogue-publications/adultes/informations-generales-offre-cours/livre-blanc-lifelong-learning/131025-s31-livreblanc.pdf>

including the adaptation of the LLL mechanism to the life cycle of the learner and diversity in Luxembourg society, and the development of quality in the area of adult training.

3.2.3 Reform of the nursing care insurance system

Nursing care insurance is one of the fundamental pillars of the social security system in Luxembourg. Nursing care insurance was instituted by the law dated June 19th, 1998 as the 5th pillar of Social Security and its purpose is *"to bear the cost of services in kind of assistance and care for dependent persons provided (...) within the home or in a nursing care establishment as well as technical support and alterations in the home."* Currently, the nursing care insurance scheme supports over 13,500 persons and must now be modernised to meet the challenges of a constantly changing population and to continue to guarantee fair access to high quality services³⁰.

The major reform objectives³¹ begun are based on better individualization of the quality services offer that meets the daily requirements of each person, the improvement of quality by clear standards and criteria with adequate checks and balances, the simplification of procedures and the strengthening of the system with regard to societal change and in compliance with the fundamental principles of the basic 1998 law. Furthermore, the law provides for the implementation of tools to better monitor the entire nursing care insurance system and consequently to better anticipate future changes. Accordingly, the system is better prepared to continue to ensure access to high quality care in the future while maintaining the financial balance of the scheme.

³⁰ Presentation of the key elements of the reform: http://www.mss.public.lu/actualites/2016/07/art_ass_dep/index.html

³¹ Law dated 12 July 2017.

4. Progress achieved in national objectives for the Europe 2020 strategy

The European Council decided on the new Europe 2020 strategy at its June, 2010 meeting, confirming the five major EU objectives that will make up the common goals steering EU Member State action in the areas of promoting employment, improving conditions for innovation and R&D, achieving objectives in the area of climate change and energy, improving education levels and promoting social inclusion, essentially by reducing poverty. Each Member State had to determine its national objectives reflecting these European objectives. Luxembourg is determining its national objectives for 2020 and a series of measures to implement them as part of its NRP.

Table 1: National objectives determined by Luxembourg (April 2018)

		European Objective 2020	Luxembourg 2020 Objectives
Priority 1 “Smart growth”	<i>Objective 1</i>	<i>“(…) raising combined public and private investment levels in this sector to 3% of GDP”</i>	2.3-2.6%
	<i>Objective 2</i>	<i>“(…) reduce school drop-out rates to less than 10%”</i>	Sustainable under 10% (a)
		<i>“(…) increasing the share of 30-34 years old having completed a university degree or equivalent level of studies to at least 40%”</i>	66% (b)
Priority 2 “Sustainable growth”	<i>Objective 3</i>	<i>“(…) reduce greenhouse gas emissions by 20% (…)”</i>	Reduction of GHG outside of EU ETS -Less than 20% compared to 2005, i.e. emissions of around 8,117 Mt CO2 in 2020 (c)
		<i>“(…) increase the share of renewable in final energy consumption to 20%”</i>	11% (c) (Average 2015/2016 5.45%)
		<i>“(…) move towards a 20 % increase in our energy efficiency”</i>	Use of final energy of 49,292 GWh i.e. 4,292 ktoe
Priority 3 “Inclusive growth”	<i>Objective 4</i>	<i>“(…) raise to 75 % the employment rate for women and men aged 20-64”</i>	73%
	<i>Objective 5</i>	<i>“(…) remove at least 20 million people out of the risk of poverty and exclusion”</i>	Reduce the number of persons under the threat of poverty or social exclusion by 6,000 by 2020. (d)

Notes:

(a) National data will also be used as measurement tools because the indicator calculated by Eurostat out of the Labour Forces Survey is not totally representative of Luxembourg. Statistics must be provided that better distinguish persons having attended Luxembourg schools in order to be able to assess the quality of the national education system for the national resident population and to provide information about the capacity of the Luxembourg school system to educate young people.

(b) Luxembourg intends that this indicator provide data on the capacity of the national education system to educate young people who can earn post-secondary school diplomas rather than it being a reflection of post-secondary qualifications requirements of the labour market. In Luxembourg there is a strong disparity according to birth country; according to Eurostat, the rate for foreign residents is near 60% and that of native citizens is just under 40%, while in neighbouring countries the difference between the two populations is much less marked. Furthermore, the proportion of university degrees is higher among natives than among foreign-born persons.

(c) With regard to greenhouse gases and renewable energies, strict national objectives were already in place prior to the launching of the Europe 2020 strategy. For the post-Kyoto 2013-2020 period, only the sectors outside of EU ETS are targeted by objectives set amongst Member States. This emissions reduction objective excluding ETS is stated for 2020 as compared to the 2005 level.

(d) With regard to methodology, the indicator used under the Europe 2020 strategy does not take the demographic factor sufficiently into account at the national level. In fact, Luxembourg's demographics are very dynamic, even during difficult times, such that the relative nature of the indicator used as a percentage of population inevitably gives rise to an increase in the absolute number of persons concerned. The government is also supporting this goal through measures that increase the employment rate of women and single-parent families in particular, with a view to achieving a 73% employment rate.

4.1 The Employment objective and the key measures for achieving it

European Objective: “aiming to raise to 75% the employment rate for women and men aged 20-64, including through the greater participation of young people, older workers and low-skilled workers and the better integration of legal migrants.”

4.1.1 National Target

Luxembourg's **objective** for 2020 is to achieve an employment rate of **73%**. According to the latest available data, Luxembourg came very close to this objective with an employment rate of 71.5% in 2017. The increase in the employment rate is also due to wider participation of women in the labour market. Accordingly, the percentage of women in domestic employment advanced from 37.9% in 2005 to 40.5% in 2017, an increase of 2.6 percentage points. This increase is more significant for the employment rate of women, which rose from 58.4% in 2005 to 67.7% in 2017.

Table 2: Statistics of the labour market in Luxembourg

	2005	2010	2013	2014	2015	2016	2017
Domestic employment	287,178	337,406	362,361	371,489	381,316	393,036	406,104
Percent of cross-border workers	41.2 %	44.3 %	44.2 %	44.2 %	44.5 %	44.9 %	45.0 %
Percent of women	37.9 %	39.3 %	40.4 %	40.5 %	40.6 %	40.5 %	40.5 %
Total employment rate [20-64]	69.0 %	70.7 %	71.1 %	72.1 %	70.9 %*	70.7 %	71.5 %
Employment rate: Men	79.4 %	79.2 %	78.0 %	78.4 %	76.7 %*	76.1 %	75.3 %
Employment rate: Women	58.4 %	62.0 %	63.9 %	65.5 %	65.0 %*	65.1 %	67.7 %
Employment rate: Youths [20-24]	44.0 %	35.5 %	35.4 %	33.3 %	44.1 %*	40.3 %	41.9 %
Employment rate: Youths [25-29]	81.3 %	81.5 %	76.0 %	81.0 %	80.8 %*	81.8 %	81.4 %
Employment rate: Seniors [55-59]	46.8 %	55.7 %	54.6 %	58.2 %	56.0 %*	57.2 %	56.3 %
Employment rate: Seniors [60-64]	12.7 %	20.1 %	22.9 %	23.1 %	17.0 %*	17.8 %	19.5 %
Unemployment rate	4.6 %	4.6 %	5.9 %	6.0 %	6.5 %*	6.3 %	5.5 %

Source: STATEC; Eurostat-LFS Note: * break in series

The employment rate of persons aged 20 to 64, calculated on the basis of data from the Labour Force Survey (LFS), shows an upward trend over the last years in Luxembourg. Nevertheless, it is important to interpret this trend with caution. STATEC is currently carrying out technical analyses

of this indicator in Luxembourg, including the effects of improved methods of the LFS survey in recent years. A publication of STATEC addressing this aspect is planned in the coming months.

4.1.2 Key measures

Apart from the measures that are part of the implementation of EU Council recommendations in the area of employment³², the government continued its efforts to achieve the national objective. These efforts focus particularly on supporting job seekers who seek professional insertion, targeting vulnerable groups, especially the young, women, seniors, persons with specific needs and the long-term unemployed. To achieve this, national employment policy promotes high quality, sustainable and inclusive jobs, and supports measures and actions designed to eliminate precariousness and poverty, thus seeking to obtain improved living conditions and a sustainable social model. Particular attention has been paid to training courses, which make it possible to acquire skills required on the labour market all throughout a person's working life. The various measures and actions are prepared and implemented in close coordination with the concerned ministries and departments to ensure a concerted horizontal approach that promotes the synergies between the various measures.

In attempting to facilitate the insertion of women into jobs, it is essential to emphasize promoting reconciliation between professional and family life, for example providing child care services, day nurseries, full-time schooling, etc. Under the 2015-2018 Action plan for gender equality, the law dated 15 December 2016 strengthens the principle of equal salaries by gender³³. Awareness campaigns and positive actions in this area will be implemented to eliminate barriers to employment and to ensure equality.

The personalized path for jobseekers was rolled out in its entirety in December 2015. This new way of working allows the Employment Development Agency (ADEM) to improve the quality of support for jobseekers, to manage a constantly increasing number of cases and to personalize follow-up monitoring of job-seekers in order to integrate them into the labour market as quickly as possible in a sustainable manner. In March 2016, ADEM officially launched its new interactive platform JobBoard, which seeks to increase the opportunities for job seekers and employers to meet and to encourage self-reliance among those seeking work³⁴. In addition, the Employer Department of ADEM and the permanent dialogue maintained with the private sector under the "*Companies are Partners for Employment*" programme, are useful in better adapting ADEM offers to company requirements, especially training. With this in mind, UEL and ADEM have renewed their partnership for a further three years (2018-2020). In addition, ADEM continued to invest in the vocational training programmes for jobseekers. In 2017, the number of people who took part in training courses organized by or with ADEM grew by more than +16% compared to 2016.

The Youth Guarantee Youth³⁵, officially launched in June 2014, has been continuously developed and improved, especially regarding the launching mechanism for NEETs, youths who are not in employment, not in education, not in training programmes and not in an academic course. Of the young people who enrolled in the programme, 86% received high quality job offers³⁶. The ADEM youth services have extended their scope to age 30.

³² See Chapter 3.2 Long term viability and employment rate of older persons.

³³ Law dated 15 December 2016 on changes in the Labour Code; amendment of Article 2 of the amended law dated 21 December 2007 on regulation of the financing of political parties : <http://legilux.public.lu/eli/etat/leg/loi/2016/12/15/n2/jo>

³⁴ Presentation of the new Job Board: http://www.adem.public.lu/fr/actualites/adem/2016/03/JobBoard_presentation/index.html

³⁵ For more details see: <http://jugendgarantie.lu/>

³⁶ ADEM figures for the period of January to September 2017.

The draft law on the regulation of internships aims to introduce a high quality and transparent environment³⁷. Internships play an important role in training and career counselling. The new framework will facilitate the transition between the worlds of education and work while ensuring the quality of internships and the legal certainty of the various stakeholders.

Job-seekers from immigrant communities often do not have a good command of at least one of the languages used in Luxembourg. To assist with this, ADEM has developed its internal language training offer and developed partnerships externally to offer job-seekers more courses. In close coordination with the competent public authorities and the private sector, ADEM is also pursuing skills evaluation programmes for refugee job seekers.

Training for job seekers is a priority area of the employment policy. ADEM will continue to work closely with companies to produce multiple specific training programmes that overcome skills deficits on the labour market and give the perspective of a specific job. ADEM has formed partnerships with the major training institutions in Luxembourg to this end³⁸.

The speed of technological transformation poses a challenge in terms of jobs and skills. In the spring of 2018, the government will launch a pilot project to support and encourage businesses to develop the skills of employees to enable them to take up a career changing job or a new job. It is a question of adapting approaches to job retention by focusing on skills enhancement.

Lastly, the implementation of measures and actions that were developed to sustainably promote professional insertion, keeping people employed and social inclusion are supported by the new operational programme for 2014-2020 of the European Social Fund (ESF). The current operational programme puts greater focus on young people under 30, including those from an immigration background, the Youth Guarantee, people who are far removed from the labour market who need better social inclusion and job seekers and employees over 45. Accordingly, the ESF projects particularly focus on new businesses such as ITC and *Green Jobs* and on entrepreneurship.

Finally, to increase the employment rate in general, and in particular that of women, the introduction of the optional individual taxation by the government in its 2017 tax reform can have a potential positive effect on the employment rate.

4.2 The R&D objective and the key measures for achieving it

European Objective: "*improving the conditions for research and development, in particular with the aim of raising combined public and private investment levels in this sector to 3% of GDP (...).*"

4.2.1 National Target

Implementation of an effective RDI policy for both the public and private sectors is a priority for the Luxembourg government. The government has set a range of between **2.3% to 2.6% of GDP** (0.7%-0.9% for the public sector) as a national **objective** for R&D intensity for the year 2020.

The government's R&D budgets have continued to increase, both in the public and private sectors, with allocations evolving from €23.6 million in 2000, representing 0.13% of GDP, to €345.5 million in 2017, 0.67% of GDP.

³⁷ Draft law no. 7265 on: 1. introduction of internships for pupils and students; 2. modification of the Labour Code.

³⁸ House of Training, *Chambre des Métiers*, Luxembourg Lifelong Training Center (*Chambre des Salariés*), *Institut national d'administration publique* (INAP).

Table 3: Changes in budget allocations for RDI from 2000 to 2017

	2000	2006	2008	2010	2012	2014	2016	2017
Mn €	23.6	102.5	167.9	218.1	267.4	317.5	324.2	345.5
% GDP	0.13	0.34	0.49	0.54	0.60	0.63	0.61	0.67

Source: www.statistiques.public.lu

Private R&D spending in Luxembourg has diminished over the last 15 years, while public sector spending has steadily increased. The share of public research increased from 7.5% of total expenditure in 2000 to almost 50% in 2016. Public R&D intensity is now approaching the national target (0.7% to 0.9% of GDP). This change is one consequence of the political actions of governments since 1999, including the setting of objectives for the development of research intensity expressed through expenditures objectives, the establishment of a National Research Fund (NRF) and the University of Luxembourg, and the introduction of multiannual agreements.

Table 4: Changes in gross domestic expenditures and in intensity of research by sector

Year	Public research (Mn €)	Intensity (€/GDP)	Private research (Mn €)	Intensity (€/GDP)	Total (Mn €)	Total (€/GDP)
2000	27.5	0.12	337.0	1.46	364.5	1.58
2005	64.0	0.21	408.0	1.36	472.0	1.57
2006	78.5	0.24	485.0	1.43	563.5	1.67
2007	96.6	0.26	495.0	1.33	591.6	1.59
2008	136.8	0.36	482.0	1.26	618.8	1.62
2009	149.6	0.40	470.7	1.27	620.3	1.67
2010	203.7	0.51	400.0	1.00	603.7	1.51
2011	215.2	0.50	416.2	0.96	631.4	1.46
2012	251.0	0.56	310.4	0.70	561.4	1.26
2013	287.8	0.62	317.9	0.68	605.7	1.30
2014	291.4	0.59	338.4	0.68	629.8	1.27
2015	320.6	0.62	341.8	0.66	662.3	1.28

Source: www.statistiques.public.lu

The structure of the Luxembourg economy partly explains the relatively low R&D intensity in companies. The sectors that represent the bulk of the Luxembourg economy, namely services and in particular the financial sector, traditionally invest less in R&D³⁹. In this context, it must not be forgotten that R&D only constitutes an *input* indicator and that an equally important indicator is *output*, which encompasses innovation, marketing of new products, implementation of new procedures, etc. Luxembourg performs generally better in this area. For example, Luxembourg ranks fourth in the EU in the European Commission's Innovation Output Index⁴⁰.

4.2.2 Key measures

a. Measures for achieving the nation's target in public research

To achieve the European Research Area (ERA) and accelerate its implementation, a roadmap underpinned by six priorities was adopted by the Member States in 2012. In general, the government aims to align its national policy on RDI more with that of the ERA. Regarding this, the government has recently published its national roadmap based on the priorities of the ERA Roadmap.

³⁹ See NRP 2017. For more details see: <https://gouvernement.lu/dam-assets/fr/publications/rapport-etude-analyse/minist-economie/observatoire-de-la-competitivite/programme-national-de-reforme/2017-pnr-luxembourg-2020/2017-pnr-luxembourg-fr.pdf>

⁴⁰ Source : http://ec.europa.eu/research/innovation-union/index_en.cfm?pg=output

- Improve the effectiveness of research systems: Establish the University of Luxembourg development contract for 2018-2021 and the public research centres (CRP) and the FNR multiannual agreements for 2018-2021

As the contract with the University and the agreements with the CRPs and the FNR came to an end on December 31st, 2017, new contracts and agreements were prepared in the second half of 2017. For the first time, the contract for the University of Luxembourg and the multiannual conventions of the Luxembourg Institute of Science and Technology (LIST), the Luxembourg Institute of Health (LIH), the Luxembourg Institute of Socio-Economic Research (LISER) and the NRF have been negotiated in parallel, so as to ensure greater coherence between the contracts of these different actors, with identical definitions of objectives and indicators. This common approach makes it easier to highlight the differences and complementarities between the different institutions.

An institutional performance-based bonus has been introduced. An additional amount is meant to compensate successful teams and research groups in the EU's Research and Development Framework Program, the largest research program in Europe, which is highly competitive. By introducing this objective compensation element for performance, the quality and excellence aspect of research institutions as well as the international dimension are clearly reinforced, which also addresses one of the recommendations of the 2016 OECD report.

Like the previous contracts, the 2018-2021 agreements include a description of the missions and strategic objectives that the institutions intend to implement and the indicators by which the achievement of these objectives may be measured. Indicators may be classified into three categories: financial indicators, outcome indicators and structural indicators.

Although the logic of the multiannual agreement with the NRF is identical to that of the research actors, the objectives and indicators are different in order to better reflect its missions. As the NRF is the research funding agency, the cornerstone of the multiannual agreement is the financial framework. The financial commitments of the NRF for the years 2018-2021 will be capped at €360.80 million. The endowment of the State for the years 2018-2021 will amount to €265.4 million.

Table 5: State allocations included in multiannual agreements and the development contract

€ millions	2018	2019	2020	2021	Total 2018-2021
University	173.54	184.91	198.13	210.26	766.84
LIST	42.90	45.04	47.77	50.36	186.07
LIH	33.02	35.85	38.77	42.26	149.90
LISER	11.01	11.50	11.99	12.57	47.07
FNR	64.80	64.79	66.79	69.03	265.41
Total:	325.27	342.10	363.46	384.45	1415.29

Table 6: Institutional bonus (in € millions) to be distributed among the institutions on the criterion of performance in the EU's Framework Programmes for Research and Technological Development (FP)

	2018	2019	2020	2021	Total 2018-2021
Bonus	/	4.5	7.0	9.0	20.5

Source: Ministry of Higher Education and Research

The development and implementation of a national strategy for higher education, research and innovation is the major objective that Luxembourg has targeted. This strategy is expected to increase the return on investment and the impact of the government's economic diversification, social welfare and sustainability objectives.

Improving the governance of public research is another goal. Several efforts have been envisaged in this area: create an official coordination body between the University of Luxembourg, the CRPs and the NRF; strengthen inter-organizational collaboration between CRPs and the University; continue the development of multi-year performance contracts.

In addition, the NRF invests public funds and private donations in research projects in various scientific areas, with a focus on key strategic areas, such as the CORE programme of 18.4 million / tender in 2018). In the near future, the government, in close coordination with the NRF, will analyse priority areas covered in order to make whatever adjustments may be necessary.

The BRIDGES program (formerly CORE-PPP, starting with the 2018 tender, €1.94 million / five projects for the 2017 CORE-PPP tender) aims to stimulate strong partnerships between public research institutes and businesses, in particular activities that promote innovation and creating sustainable value. The Industrial Fellowships program (formerly AFR-PPP) aims to promote cooperation between Luxembourg companies active in R&D and public research institutions in Luxembourg and / or abroad.

NRF also coordinates activities aimed at strengthening the link between science and society and raising public awareness about research. The aim of the “Promoting Science to the Public” funding program is to bring science closer to the general public, in particular to Luxembourg society.

- Streamline transnational cooperation and concurrent actions

Currently, the NRF has 18 foreign partners to support bilateral projects between researchers based in Luxembourg and abroad (e.g. ANR, BELSPO, BMBF, CNRS, DFG, FCT etc.). The NRF is part of more than eight international research networks offering multilateral research opportunities with more than 35 countries for Luxembourg-based researchers (e.g. AAL, COST, EDCTP, EUROSTARS etc.). In addition to the proposal submitted to the foreign funding agency, Luxembourg applicants must submit documents associated with the INTER program to the NRF. The NRF recently joined ERA PerMed, an ERA-Net personalized medicine programme.

A number of cross-border initiatives promoting R&I links within the Greater Region have been recently developed, including a support programme for trans-regional scientific events, the establishment of a European doctorate label from the University of Greater Region (UniGR) and an effort to determine priority areas of cooperation for UniGR.

Luxembourg is participating in the PRIMA⁴¹ (Euro-Mediterranean Partnership for RDI) initiative, officially launched in early February 2018.

Luxembourg is a founding member of DARIAH (2014), an infrastructure that supports digital research in the arts and humanities. In addition, Luxembourg participates in SHARE via LISER to respond to the socio-economic challenges brought about by the progressive aging of societies. Since 2016, Luxembourg has been a member of ELIXIR, a biological information data infrastructure, and EATRIS, a medical and translational research infrastructure.

In 2017, Luxembourg joined the Partnership for Advanced Computing in Europe (PRACE), which will both strengthen international collaboration and highlight the importance of the digital arena for the development of Luxembourg.

In addition, the “Digital *Lëtzebuerg*” strategy is part of the ERA digital framework and aims at reinforcing the position of the country with regard to ICT. In recent years, Luxembourg has

⁴¹ PRIMA is dedicated to improving RDI cooperation in the Mediterranean countries to allow development of innovative solutions for sustainable food systems and for water resources in the Mediterranean basin.

experienced major development in technological companies working in the sectors of digital content, Cloud Computing, and in Big Data. The objective of the HPC initiative on the European level, for which Luxembourg will be the host entity, is to stimulate new uses of HPC for public and private research entities.

- Opening of the labour market for researchers

The University and the CRPs have developed human resource policies, including open, transparent and merit-based recruitment measures, in line with the guidelines of the European Charter for Researchers and the Code of Conduct for the Recruitment of Researchers. The law requires the publication of scientific positions at the University and CRP and setting up a recruitment committee.

Candidates for the ATTRACT (specially created to attract exceptional young researchers in Luxembourg) and PEARL (senior level) programmes of NRF are examined by selection panels composed of independent international experts. Other senior positions are reviewed by selection boards composed of local and independent international experts. Applications for the NRF's AFR programme for doctoral / postdoctoral fellowships are also reviewed by international experts.

In addition, the University of Luxembourg is implementing the European Framework for Careers in Research to facilitate the recognition of career stages and mobility in Europe under Horizon 2020.

NRF's INTER Mobility programme is designed to support host and visitor geographic mobility as well as cross-sector mobility between the public and private spheres.

Recently, NRF introduced an innovative high-quality doctoral training programme through the PRIDE mechanism, which awards a block of non-nominal doctoral fellowships to a consortium of supervisors within a coherent and competitive research program. This allows institutions to be more competitive, flexible and rapid when recruiting top talent.

- Promoting gender equality and integration of gender in research content

One of the priorities of the Luxembourg Presidency of the EU Council (2015) was to advance gender equality in the ERA. The 2015 SHE figures show that the situation of gender equality in Europe has not yet reached optimal proportions. Although Luxembourg is the European country with the fewest female researchers (24%), it is experiencing a high annual growth rate in the female research community of the public sector, although numbers have decreased in the private sector. It should be noted that Luxembourg had only 16.5% of full professors in 2013, compared to an EU average of 21%.

Several measures have been taken to improve the situation. The law provides that the boards of directors of public research institutes and the NRF (for which the rule also applies to its scientific council) must have a minimum of 40% of members of the under-represented sex. The performance contracts of research institutes call for working toward gender equality at all stages of researchers' careers, and particularly for appointments to internal boards (directors / scientists). The NRF performance contract includes the goal of having 40% and 30% representations of the underrepresented sex at the submitted project level for the ATTRACT and PEARL programmes, respectively. The Performance Contract of the University of Luxembourg explicitly provides for establishing and implementing a Gender Action Plan. In the future, these initiatives will be further strengthened by focusing on two strategic objectives: increasing the percentage of the under-represented gender in leadership and decision-making positions and applying gender mainstreaming in public research programmes. The new multi-year development contract of the University of

Luxembourg for the years 2018-2021 provides for a targeted 30% increase over the situation at December 31st,2017 in the proportion of female regular professors.

- Streamline the dissemination, accessibility and transfer of scientific knowledge

Luxembourg has strengthened the link between higher education, research and innovation at the Belval Science Centre, which hosts the University, the LIST and LISER CRPs, the NRF, Luxinnovation and Technoport's national incubator.

In recent years, a Luxembourg Cluster initiative has been underpinning five thematic clusters aimed at accelerating the application of knowledge and good practices and at increasing the competitiveness and diversification of the Luxembourg economy.

The NRF JUMP Programme (formerly PoC) is a competitive funding program, open to all areas of research, designed to bridge the technical and financial gap between research-based discoveries and their commercialization / use.

The NRF's Knowledge & Innovation Transfer Support (KITS) programme provides competitive funding to research institutions to attract knowledge transfer specialists. The programme will contribute to the strengthening of institutional units that strive to engage in the strategic integration and operational implementation of knowledge transfer activities with the ultimate goal of generating economic and societal value through their research programmes.

Through the “RESCOM: Scientific Events” programme, NRF supports communication between researchers with the aim of exchanging and promoting scientific results.

The University of Luxembourg also offers a Masters in Entrepreneurship and Innovation, which aims to promote entrepreneurship and the creation of innovative companies underpinned by a university curriculum.

The Luxembourg National Composite Centre (NCC-L), operated by LIST with 12 partner companies and launched in early 2016, focuses particularly on industry-oriented research and innovation projects.

The establishment of technology transfer offices for all Luxembourg public research institutions and setting up of a larger number of public-private partnerships through the BRIDGES doctoral and postdoctoral programs and Industrial Fellowships could be envisaged.

As a member of Science Europe, NRF has endorsed a statement of principles advocating that research publications originating with projects funded by NRF programmes be published in an Open Access journal (OA) or be available or submitted as soon as possible into a repository. The University promotes the so-called green publication path through its ORBiLu data repository, which is compatible with OpenAIRE.

- Bolster the international dimension of ERA⁴²

The INTER and INTER Mobility programmes are the NRF's main funding instruments for making bilateral or multilateral arrangements for project tenders in collaboration with other national or international funding agencies. However, other NRF programs cover multiple aspects related to the internationalization of public research, including mobility programmes to recruit foreign junior /

⁴² See “Streamline transnational cooperation and concurrent actions”.

senior researchers such as PEARL and ATTRACT. They aim to give greater visibility to Luxembourg public research in the international context.

In conclusion, the government has also made efforts to increase the supply of electronic publications, to effectively manage the transition to Open Access in Luxembourg and to carry out research projects in the field of digital humanities:

- Digital resources: The Luxembourg Consortium for the Acquisition and Management of Electronic Publications, managed by the National Library of Luxembourg (BnL), will continue in 2018 to increase its range of electronic publications⁴³. The consortium offer is intended for scientific audiences at the University of Luxembourg, LIST and LIH whilst being accessible to the general public of the BnL. The utilization rate of users of the BnL and those of the University is almost identical, showing that the knowledge society is a reality in Luxembourg. The Max Planck Institute Luxembourg joined the Luxembourg Consortium in 2017. The government has delegated the task of setting up a digital government library⁴⁴ to the BnL to equip government departments and administrations with digital resources in law. LISER will join the Consortium in 2018.
- Open access: The BnL and its partners in the Luxembourg Consortium will continue to develop their partnership with NRF to effectively manage the transition to Open Access in Luxembourg, establishing a comprehensive monitoring process in 2018, including costs, for this transition.
- Digital Humanities: The BnL and the National Archives continue to develop their mass digitization projects in cooperation with the University of Luxembourg and scientific institutions abroad in order to provide researchers with the resources needed to carry out their research projects in the field of digital humanities. The Luxembourg Centre for Contemporary and Digital History (C²DH), an interdisciplinary centre of the University of Luxembourg created in 2016, is promoting an interdisciplinary approach with particular emphasis on new methods and tools, especially digital ones, in historical research and teaching.

b. Measures for achieving the nation's target in private research

Conscious of the decrease in private R&D spending that remains below the 2020 national target, the government is pursuing an active policy to stem this decline by strengthening private sector RDI, technological skills and access to public research.

The entry in effect of the new RDI promotion law in June 2017⁴⁵ gives the government access to a series of tools to effectively support businesses in their RDI approach. This law allows action both on companies of all sizes and at different levels along the innovation chain. It also makes it possible to shore up SME innovation via a specific regime. In addition, it proposes a strong incentive to the establishment of collaborative research between companies and also with public actors. Finally, via the research infrastructure scheme, it is possible for companies to pool their efforts to create research synergies through the scientific community. Support for innovative start-ups is once again available, which is an indispensable lever in the support policy of the start-up ecosystem.

In addition to these tools, the implementation of flagship projects, in addition to measures already in place, should reverse the trend and boost spending in private sector RDI:

⁴³ For more details see: www.consortium.lu/about

⁴⁴ For more details see: bibgouv.findit.lu

⁴⁵ Law dated 17 May 2017 to 1. Renew the aid schemes for research, development and innovation; 2. Define the tasks of the National Agency for the Promotion of Innovation and Research; and amending the amended law dated 5 June 2009 relating to the promotion of research, development and innovation.

- High performance Computing and big Data enabled applications (HPC): Luxembourg's access to HPC capabilities falls within the framework set by the “Third Industrial Revolution” of Luxembourg, the "Rifkin Process". The signature of the Euro-HPC declaration and the implementation of the European strategy will combine to provide companies with the computing power they need to process their data, in an environment of trust, both in Luxembourg and more extensively within the EU. The proposed infrastructure should be an effective lever for the research activities of the companies. The themes selected by the Euro-HPC mostly correspond to the government’s priority sectors. The work conducted in 2017 clarified key issues related to the use, architecture, technology and computing power of this new machine. At the same time, the national strategy for implementing the HPC and Big-data enabled applications infrastructure was developed with the aim of providing a national structure for data management and processing data for users in the form of a skills centre in a secure environment.
- National Composites Centre Luxembourg: This is a centre whose operational concept is based on close cooperation between public and private players. Following the opening of this centre in 2016, a non-profit organization was created in February 2018 made up of industrial operators and Luxinnovation, which was intended to guide and promote its activities. Furthermore, a mixed group of researchers and entrepreneurs was tasked with setting research orientations and analysing market requirements for composite materials. Half of the financing, totalling 100 million euros, will be provided through private funds. All players in the sector, public and private, are working in close cooperation on this project. Its activities should provide significant leverage in this sector.
- Additive Manufacturing: This initiative was started by the Cluster Materials and Manufacturing group. A survey of manufacturers of available and desired equipment was conducted in 2017, as well as the mapping of potential RED projects.
- Industry 4.0: This project was initiated in 2016 with the support of Cluster Materials & Manufacturing. In 2017, a business awareness campaign was conducted to guide them towards data exploitation and enhancement. A more focused approach should also attract new businesses to round out the Luxembourg digital ecosystem.
- Joint Research Programme: In cooperation with the NRF, the objective of this programme currently being developed is to promote solid public-private partnerships on a long-term basis between *Research and Technology Organisations* and industries in areas deemed priority by the government.

In addition to these flagship projects, new measures were taken and actions pursued to relaunch RDI activities over the long term and to stimulate investment in knowledge capital:

- The tasks of the Luxembourg Intellectual Property Institute Economic Interest Group (GIE) were determined upon its establishment. In addition to its crucial role of coordinating the implementing public policy with regard to intellectual property, IPIL⁴⁶ will be able to support the proper management of research and innovation projects. Accordingly, in addition to support for the proper management of intellectual property in research projects, the patent information search and technological or competitive monitoring services keep it constantly updated with technical information in a particular area and provide strategic and operational support for all purveyors of innovative projects. The use of these specific and highly specialized services makes it possible to avoid duplicating research already carried out elsewhere, determine prior art and to

⁴⁶ Federate involved players, develop and offer support and assistance services to companies, players in research, public institutions and all other interested entities, develop and furnish training programmes and promotion and awareness activities and carry out projects and studies to advise the government.

identify trends and technical developments in a particular field, to monitor new developments in a technology and to monitor competitors' innovation activities.

- The clusters, whose activity should stimulate synergies and emulation amongst members by promoting networking between the public and private sectors, open innovation and exchange of technologies. The Luxembourg Cluster initiative is active in the following themes: Biohealth, Eco-Innovation, ICT, Materials & Manufacturing, Space, Automobility, Wood, Creative Industries.
- Supporting start-ups continued through the establishment of the ICT Digital Tech Fund dedicated to innovative companies, with public and private commitments amounting to 20.3 million. The Fit4Start programme continued with two editions in 2017 and a coaching and start-up financing programme in the ICT sector beginning from the start phase. Plans to intensify and diversify this program by also hosting Biotech start-ups are in place for 2018. Concerning hosting facilities, the Tomorrow Street Joint Innovation Centre was established in 2017. It is intended for start-ups in the growth phase, supporting them in their globalization process.
- Support to SMEs and encouraging innovation are reinforced through the implementation of a series of SME support programmes focusing on the innovation spirit. These programmes are managed with the help of Luxinnovation: the Fit4Digital program, whose objective is to digitally transform companies (a programme reserved for VSB); the Fit4Innovation program, whose objective is helping SMEs improve their level of competitiveness to free up resources for innovation; the launch of the Inno4growth programme, an innovation support programme conceived to help SME transition from the ideas to marketing phase and to grow through innovation via value creation projects; support for companies in participating in the SME instrument of the Horizon 2020 programme; the innovation Club as a forum for exchange of perspectives with regard to key factors for innovation success, as well as the emergence of new ideas. In 2017, RDI projects were implemented by companies that had never had such projects before participating in the Fit4Innovation program.
- With regard to activities promoting and supporting innovation, the following measures were put in place: an innovation portal that centralises all information concerning RDI⁴⁷; a site was developed that includes all innovative solutions originating in Luxembourg that is intended to promote the use of innovative solutions in public contracting; the magazine HAPPEN promotes research and innovation in Luxembourg internationally; domestically, the site www.Horizon2020.lu offers a full panorama of European programmes and provides guidance for players who want to participate in this arena. As a national contact point, Luxinnovation advises and supports researchers and companies, it stimulates them to participate in several training and information workshops such as Horizon 2020 Day as well as the Fit4Horizon2020 measure intended to promote Luxembourg participation in European programmes by covering a part of the costs of preparing a project proposal.
- The finalisation of a "smart specialisation strategy"⁴⁸, in which the focus is on the diversification of the economy while concentrating on a limited number of specific sectors, was adopted during the last half of 2017. Currently limited to FEDER program action, the same approach will be used to define a more general innovation policy.

⁴⁷ For more details see: www.innovation.public.lu

⁴⁸ See Chapter 3.1.1 Strengthen the diversification of the economy, including by removing barriers to investment and innovation. For more details see: <https://meco.gouvernement.lu/dam-assets/publications/rapport-etude-analyse/minist-economie/ris3/luxembourg-research-and-innovation-smart-specialisation-strategy-2017.pdf>

4.3 The climate change and energy objective and the key measures for achieving it
European Objective: “reducing greenhouse gas emissions by 20% compared to 1990 levels; increasing the share of renewables in final energy consumption to 20%; and moving towards a 20% increase in energy efficiency.”

4.3.1 Greenhouse gas emissions objective

4.3.1.1 National target

This climate change and energy objective is based on European Council decisions within the context of the “Climate and Energy Package” of March, 2007, which put greenhouse gas (GHG) reductions for Luxembourg at 20% by 2020 with relation to the year 2005 in the sectors not covered by the EU Emissions Trading System (ETS)⁴⁹.

In accordance with Regulation (EU) No 525/2013, the latest inventory of GHG emissions in Luxembourg covers the period 1990-2016. For 2016, GHG emissions amounted to 10 million tonnes of CO₂ equivalent (Mt CO₂e) (excluding international air transport and forest and land-based emissions and removals - LULUCF), or 246,500 tons of CO₂e less than in 2015. Compared to 2005, a record year since the onset of the 2000s, emissions even decreased by 2.98 Mt CO₂e (-22.9%) which leads to levels reached around the years 2000-2001.

Table 7: Changes in GHG emissions, excluding LULUCF for select years (in million tons of CO₂e)

Source	1990	1995	1998	2000	2005	2010	2013	2014	2015	2016	2016/2005	2016/2015
Production and distribution of electricity and heat	0,04	0,09	0,16	0,12	1,24	1,21	0,69	0,67	0,46	0,25	-79,7%	-44,8%
Industrial production	7,91	4,36	2,09	2,18	2,12	1,94	1,75	1,78	1,72	1,77	-16,4%	3,1%
Road transport: national fleet	0,86	1,05	1,17	1,23	1,44	1,60	1,62	1,69	1,70	1,72	19,5%	1,4%
Road transport: exports of road fuels	1,69	2,24	2,67	3,57	5,68	4,85	4,76	4,38	3,94	3,74	-34,0%	-4,9%
Households, retail and services	1,32	1,40	1,56	1,63	1,63	1,66	1,53	1,36	1,56	1,62	-0,3%	4,2%
Agriculture	0,81	0,79	0,79	0,78	0,71	0,75	0,73	0,74	0,76	0,78	9,2%	2,1%
Other sources	0,16	0,16	0,20	0,18	0,17	0,17	0,15	0,15	0,13	0,13	-26,2%	-3,9%
Total GHG emissions, excluding LULUCF	12,79	10,10	8,63	9,67	13,00	12,16	11,22	10,76	10,27	10,03	-22,9%	-2,4%

Source: Ministry of Sustainable Development and Infrastructures, submission dated 15 January 2018

For the second post-Kyoto 2013-2020 period, only the sectors outside of EU ETS are targeted by objectives set amongst Member States. For Luxembourg, this emissions reduction **objective** excluding ETS amounts to **-20% for 2020**, compared to 2005 levels. This objective is to be met along a linear trajectory for which the starting point, in 2013, is comprised of average emissions excluding ETS for 2008 to 2010. These yearly budgets are represented by annual allocations of emissions allowances (AAQE). Thus, for 2020, emissions outside ETS should be limited⁵⁰ to **8,117 million tons of CO₂**.

According to the latest projections given to the European Commission in April 2017, the government estimates that, for the 2013-2020 period, a possible "emissions reserve" of 1,85 million tons of CO₂e could be released in a central scenario, with current measures. Over this 8-year

⁴⁹ Appendix II of Decision No 406/2009/EC of the European Parliament and of the Council of 23 April 2009 on the effort of Member States to reduce their greenhouse gas emissions to meet the Community's greenhouse gas emission reduction commitments up to 2020. Also see Chapters 4.3.2 and 4.3.3.

⁵⁰ Given the adjustment stipulated in Article 10 of Decision No 406/2009 / EC as published in the Commission Implementing Decision dated 31 October 2013 (2013/634 / EU) and the adjustment recorded by Commission Decision 2017/1471 dated 10 August 2017 amending Decision 2013/162 / EU to revise the annual allocation of emission allowances for Member States for the period 2017-2020. Amount stated as GWP in the Fourth IPCC Report in effect as from the 2015 inventory submissions.

period, 2013-2016 inventories and 2017-2020 forecasts show that it is only beginning in 2019 that the Luxembourg government should record an "emissions deficit" with regard to its AAQE.

Table 8: Indicative trajectory for GHG emissions, excluding LULUCF & ETS under EC decision 406/2009/EC (in million tons of CO₂e)

	2005	2008	2009	2010	2013	2014	2015	2016	2017	2018	2019	2020
Total GHG emissions, excluding LULUCF	13,00	12,13	11,59	12,16	11,22	10,76	10,27	10,03	9,86	9,82	9,79	9,80
Civil aviation emissions (Domestic flights)	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
ETS emissions confirmed in CITL	2,60	2,10	2,18	2,25	1,85	1,93	1,66	1,50	1,48	1,46	1,43	1,41
Total GHG emissions, excluding LULUCF and ETS –ESD version	10,40	10,03	9,41	9,91	9,38	8,83	8,61	8,52	8,38	8,36	8,35	8,38
Annual emissions allowances – Decision 2013/162/EU					9,81	9,61	9,41	9,20	8,99	8,78	8,57	8,36
Contribution to the adaption of ETS processes under Art. 10 of ESD					0,28	0,27	0,27	0,26	0,25	0,25	0,24	0,24
Annual adjusted emissions allowances under Article 10 of Decision 2013/634/EU					9,54	9,34	9,14	8,94	8,74	8,53	8,32	8,12
Deficit (+) or reserves (-) of emissions compared to annual emissions allowances					-0,16	-0,51	-0,53	-0,42	-0,35	-0,17	0,03	0,26
Deficit (+) or reserves (-) of emissions compared to annual emissions allowances - aggregate 2013-2020												-1,85

Source: Ministry of Sustainable Development and Infrastructures (based on the 2018v1 submission - 2005 to 2016 - and revised projections dated 29 March 2017 - 2017 to 2020)

Remarks: The ETS emissions found in the CITL come from the European Environmental Agency's *EU Emissions Trading System (ETS) data viewer* of the European Environmental Agency: <http://www.eea.europa.eu/data-and-maps/data/data-viewers/emissions-trading-viewer>. The "annual emissions allocations" are published in Appendix I of Commission Decision 2013/162/EU dated 26 March 2013 on determining Member States' annual emission allocations for the period from 2013 to 2020 pursuant to Decision No 406/2009/EC of the European Parliament and the Council (ESD). Data adjusted for Article 10 of Decision 406/2009/EC were published in an Implementing Decision 2013/634/EU dated 31 October 2013 and those modified to take account of the methodological changes induced by the use of revised guidelines for calculating inventories were published in Commission Decision 2017/1471 of 10 August 2017.

In this case, the use of external credits should no longer be necessary. However, "reserve" or "deficit" calculations are highly uncertain due to their sensitivity to anticipated changes for a particular source of emissions, namely road transportation that represents almost two thirds of total emission, excluding ETS.

4.3.1.2 Key measures⁵¹

The government has access to a broad range of instruments to achieve the reduction of GHG emissions not pertaining to ETS in accordance with existing rules. In particular, the second action plan to reduce CO₂ emissions contains numerous measures relating to transport, building, energetic efficiency and renewable energies, to industries, to information and awareness campaigns and to consultancy and energy training. However, this second action plan will soon be five years old. Using the new commitments suggested by the Commission to the Member States for 2030, Luxembourg is in the process of drafting a third Climate Plan. This will be one of the reference documents for the drafting of Luxembourg's "National Integrated Energy-Climate Plan 2021-2030" as required by the Council and European Parliament Regulation on the system of governance of the Energy Union currently being negotiated⁵². This plan will also incorporate a longer-term perspective of objectives up until 2050 with a view to full de-carbonisation of the Luxembourg economy.

In the area of transport, the government seeks a genuine change of paradigm through the implementation of actions and projects proposed through its overall sustainable mobility (MoDu) strategy. The ongoing works for the commissioning of a tramway in Luxembourg City are emblematic of this change. MoDu aspires to the development of public transportation, to more intense use of the soft mobility concept and to the establishment of a near real time Public Transport

⁵¹ Also see chapters 4.3.2 and 4.3.3

⁵² This Regulation is under discussion between the Council, the Commission and the European Parliament (trilogue).

Telematics System. This strategy, with the Transportation Sector Plan (PST) that covers it, also recommends a series of other measures such as the installation of a high capacity and high frequency transport system in the capital, the promotion of electric-based mobility or the introduction of an ecological mobility label for companies.

With regard to residential buildings, apart from the implementation of sector-based housing, an ambitious schedule has been prepared for progressively strengthening requirements in terms of energy performance in new buildings and residences. Accordingly, beginning from January 1st, 2017 all new residential construction must now in general meet the AA energy class standard, which is the nearly-zero energy use building standard, making Luxembourg one of the precursors in the EU to require this type of criterion. As energy retrofitting is often quite expensive, the government set up a "climate bank" in 2017. This initiative is part of a "climate bank and sustainable housing bonus" published at the end of 2016, through which the government has implemented new mechanisms to simultaneously promote sustainable construction, energy-efficient renovation of residential buildings and renewable energies in the housing sector. In particular, this involves the following measures:

- "climate bank": a climate loan at a reduced interest rate and a zero-interest climate loan for the most disadvantaged households that seeks to promote sustainable energy-efficient renovation even more and prepare for energy insecurity.
- reform of the PRIME *House* financial aid scheme: new, more attractive bonuses to promote the construction of sustainable housing and sustainable energy renovation.
- a certification system for sustainability of new housing (LENOZ): this certificate reflects the level of sustainability ultimately achieved by housing units.

With regard to administrative buildings, the government intends to progressively reinforce energy performance requirements for new administrative buildings. In this context, the government has carried out an inventory of the central state buildings concerned by the European directive on energy efficiency.

Numerous measures seeking to promote energy efficiency, as well as the use and production of renewable energies, are being implemented actively. A study on the potential of renewable energies in Luxembourg by 2040 was presented in early 2018. In the framework of the future governance system of the European Energy Union, by the end of the year, Luxembourg plans to have an initial draft of its "National Integrated Energy-Climate Plan 2021-2030" which will cover these two aspects in particular.

Industrial entities that are susceptible to emitting substantial GHG quantities are involved in the Community Emissions Trading Scheme. Furthermore, the government has set up a system of energy audits in large corporations and is encouraging ecotechnologies.

Through the Climate Pact, the government is offering technical and financial support to municipalities in an effort to reinforce their role as models in climate policy, to reduce greenhouse gas emissions and their energy bills and to stimulate investment on a local and regional level and, since 2016, to ensure improved air quality. The Climate Pact has been highly successful, as illustrated by the participation of nearly all municipalities. The circular economy concept was incorporated into this on January 1st, 2018.

4.3.2 Renewable energies objective

4.3.2.1 National target

Directive 2009/28/EC dated 23 April 2009 for promoting the use of energy produced from renewable resources calls for Luxembourg achieving an **11%** share of energy from renewable sources in its gross final consumption for 2020 as well as an objective of 10% share of fuel energy from renewable resources in the transport sector for 2020.

Luxembourg is on track to reach its 2020 targets. In 2016, the share of renewable energy in final consumption reached 5.44%, compared to 5.04% in 2015 and 4.51% in 2014. In recent years, Luxembourg has steadily increased its share of renewable energies and in 2016 was already on its indicative trajectory. The contributions to this objective by the various sectors were 6.68% for electrical energy and 7.33% for heat and cooling production. The portion of renewable energy used in transportation came to 5.92%. Thus, the overall increase in final consumption of renewable energies in Luxembourg is slightly higher than the expectations of the national action plan for renewable energies (excluding statistical transfers). With regard to keeping to the trajectory, Luxembourg must achieve an average rate of 7.47% for 2017 and 2018.

4.3.2.2 Key measures

The national action plan in the area of renewable energies sets out three areas for achieving the national objective in this domain:

- Developing renewable energy within the country by means of producing electricity and heat/cooling from renewable sources.
- Adding biofuels into fuels for use domestically as well as developing public and private electric mobility.
- Use of the cooperation mechanisms, primarily through statistical transfers and joint projects with other Member States and third countries.

The measures, as well as the planned schedule, are described in this action plan. The principal recent actions taken as part of these measures that have an impact on the development of renewable energies are outlined below:

- Spread in the use of renewable energies on national territory

In the domain of energy performance of residential buildings⁵³, as of 1 January 2017, new residential buildings must generally meet the highest energy performance class of AA, which corresponds to the nearly zero energy use building standard. The new requirement levels also contain an implicit incentive to implement renewable energies.

New financial instruments have been put in place as part of the development of renewable energies in the country. A new regulation went into effect in 2017⁵⁴. The regulation provides for the possibility of domestic and European competitive bidding procedures (call for tenders) for the development of new installations for the production of electricity from photovoltaic solar energy. Throughout 2017, Luxembourg worked on the terms of a first call for tenders that was launched in February 2018. The amended Grand-ducal Regulation dated 1 August 2014 was further amended to

⁵³ See Chapter 4.3.3 National energy efficiency objective

⁵⁴ The Grand-ducal Regulation dated 24 April 2017 amending the amended Grand-ducal Regulation dated 1 August 2016 regarding electrical production based on renewable energy sources.

widen the circle of operators of photovoltaic plants that can produce peak electric power of more than 30 kW and less than 200 kW to include cooperative or non-government companies.

- Mix of biofuels in fuel available for consumption nationally

Through a modification to existing legislation⁵⁵, the rate of biofuels mixed with gasoline and diesel has been set at 5.5% for 2017. Directive 2009/28 / EC stipulates that in 2020, it will be mandatory to include a minimum share of 10% of biofuels in the total consumption of gasoline and diesel for transportation, so that the share of biofuel will have to be continuously increased. The contribution of biofuels produced from waste, residue, non-food cellulosic material or from lignocellulosic material is considered equivalent to double that of other biofuels. In 2017, the minimum rate of these "double counted" biofuels to be added in gasoline and diesel was 15%.

- Electric mobility

In Luxembourg, the government and network managers monitored the installation of 800 public charging stations for electric cars as well as for chargeable hybrid electric cars (plug-in hybrid cars). The first of these 800 public charging stations, called "Chargy"⁵⁶, were installed by the distribution system operators at the beginning of 2017. At the end of 2017, 102 of these terminals were operational. In addition to these 800 terminals, the government is evaluating possible strategies for implementing fast charging infrastructure, and super-fast charging in motorway service areas, and for developing a clear and consistent framework for charging stations not accessible to the public, for example in private homes or at the workplace.

- Use of cooperation mechanisms in the field of renewable energies

Directive 2009/28/EC provides for cooperation mechanisms to enable Member States to achieve their objectives through cooperation mechanisms. Apart from its national efforts and in order to reach its 11% renewable energy target, Luxembourg concluded in 2017, as the first EU Member State, two statistical transfers with Lithuania and Estonia. Both agreements provide for the mandatory transfer of minimum quantities and the possibility of transferring maximum quantities for the period 2018 to 2020. It should be stressed that Luxembourg is the first country to use the cooperation mechanisms to ensure the achievement of its national objectives, which is a clear signal for increased European cooperation in the field of renewable energies.

4.3.3 Energy efficiency objective

4.3.3.1 National target

Luxembourg has set the **objective** for energy efficiency of annual final energy use not to exceed **49,292 GWh** by 2020, i.e. **4,239.2 ktoe**, or 52,111 GWh and 4,481.6 ktoe of primary energy⁵⁷. In addition to the energy efficiency objective, Luxembourg has also set an energy savings target of 5,993 GWh to be achieved by December 31st, 2020 through a mechanism of energy efficiency obligations set up in 2015. During 2017, Luxembourg held discussions with the obligated parties with a view to adapting the regulation to requirements actually encountered, and to recent technological developments in the field of energy efficiency energy field. An amendment was introduced in the regulatory procedure in early 2018.

⁵⁵ Amended law dated 17 December 2010 setting the excise and other taxes on energy products, electricity, manufactured tobacco products, alcohol and alcoholic beverages.

⁵⁶ For more details see: <https://chargy.lu/>

⁵⁷ In application of Article 3 of EU directive 2012/27/EU relating to energy efficiency. The energy efficiency objective for 2020 is therefore no longer expressed in percentages but rather in absolute values of final energy used.

As part of the transposition of Directive 2012/27/EU of the European Parliament and of the Council of 25 October 2012 on energy efficiency, amending Directives 2009/125/EC and 2010/30/EU and repealing the 2004 Directives / 8 / EC and 2006/32 / EC (hereinafter referred to as "Directive 2012/27/EU"), in 2017 Luxembourg achieved its fourth National Energy Efficiency Action Plan (EEAP). This plan is the latest EEAP in this form, based on the EU's goal of saving 20% of annual primary energy consumption until 2020, and on the planned target for Luxembourg for the same deadline. The successor of the EEAP should be, according to the current status of negotiations on the amendment to Directive 2012/27/EU, a National Integrated Energy-Climate Plan.

Through Directive 2012/27/EU, the EU has put in place a common framework of measures to promote energy efficiency in order to achieve the EU's 2020 target. Measures in the areas of energy efficiency in the sectors of households, services, industry and transportation appear in the directive. The EEAP focuses on the administration and implementation of Directive 2012/27/EU and covers significant measures to improve energy efficiency and forecasted/achieved energy savings in supply, transportation, distribution and final use of energy up to 2020. The two main elements of the EEAP are a forecast of overall consumption by the final and primary energy sectors in 2020 and quantified measures whose objective is to improve energy efficiency and generate energy savings in upcoming years, for the purpose of achieving the national energy efficiency goal.

In short, the baseline forecasts, i.e. estimates of final and primary energy consumption up to 2020, show a change in energy consumption in line with the mandatory objectives for Luxembourg in 2020.

4.3.3.2 Key measures

- Increase energy performance in buildings.

Directive 2010/31/EU of the European Parliament and of the Council dated 19 May 2010 on the energy performance of buildings reformulates the existing Directive (2002/91/EC) and provides a new "nearly zero energy use" standard for all new buildings for 2021 (2019 public buildings). The "Nearly Zero Energy Building" (NZEB) legislation came into force on January 1st, 2017 through the Grand-ducal Regulation dated July 23rd, 2016 amending the amended Grand-ducal Regulation dated November 30th, 2007 concerning energy performance in residential buildings, which is the energy performance standard required for new residential buildings. NZEB energy efficiency standards generally correspond to buildings of the AA energy classes (thermal insulation and energy performance classes). With regard to administrative buildings, the transposition of this aspect of the directive continued in 2017 and has made considerable progress.

- Voluntary agreement with Luxembourg industrial companies

As part of its policy of rational use of energy, in early 2017 the government signed a new voluntary agreement with the industrial sector which covers the period 2017-2020 (inclusive). The aim of this agreement is to increase the commitment of member companies to improve energy efficiency and to get them to implement new or renewable energy sources. Companies signing the agreement further commit to implementing an energy management system that identifies potential improvements in energy efficiency and establishes an action program to produce a package of measures to achieve this potential. The economic interest grouping myenergy is taking over the coordination and follow up roles of data provided by companies, as well as information dissemination, consulting and awareness responsibilities.

- Intelligent electric and gas meters

Luxembourg has continued monitoring the widespread installation of smart joint metering by gas and electricity network operators. Since July 1st, 2016, grid operators have been installing a smart meter for each new connection to their grids, and progressively replacing existing meters of each of their customers. As of March 1st, 2018, approximately 87,000 smart electricity meters and 17,700 smart natural gas meters have been installed nationwide. The replacement of at least 95% of the old electricity meters will continue through until December 31st, 2019. With regard to natural gas, the replacement of at least 90% of the old meters will extend through December 31st, 2020.

- The government has also pursued its long-term strategy to mobilize investment in the renovation of the national supply of public and private residential and commercial buildings under Directive 2012/27/EC. This strategy emphasizes the following points: priority for complete, energy-efficient renovations; affordability of energy renovation measures; improved coordination between energy policy and protection of heritage; promoting sustainable construction and the circular economy.

- Strategic Study entitled "The Third Industrial Revolution Strategy"

In September 2015, the government, the Chamber of Commerce and IMS Luxembourg jointly launched the strategic study "The Third Industrial Revolution Strategy", in close collaboration with economist Jeremy Rifkin and his team of experts. This process, in line with the so-called "open societal innovation" approaches and aimed at making the existing economic model more sustainable and interconnected for future generations, produced a study that was presented in November 2016. The Government took the view that the executive summary of this strategic study provides a general direction for the future development of the country and decided to transpose a number of specific projects using existing or new platforms. Consequently, with regard more specifically to the energy component, it was decided to create the thematic platform "*Energiezukunft Lëtzebuerg*" aiming to thematise all the strategic aspects of energy transition in the medium and long term, as well as the implementation of the "Internet of Energy" in Luxembourg. The ambition sought for this platform is not simply a transition to a fully sustainable energy system but the use of this transition to achieve energy savings whilst combining technical and commercial innovations in an intelligent manner. The platform will also take into consideration the results of the "Building", "Mobility" and "Smart Economy" pillars of the strategic study. The main tasks of the platform are split into two parallel working processes, one of which consists in developing and finalising a proposal for a national energy strategy and the other in achieving the implementation of measures identified by the strategic study, particularly in the field of smart energy infrastructure and the implementation of the national energy Internet, which is leading Luxembourg towards a digital and intelligent energy network. In 2017, Luxembourg started a process of evaluation and preparation with a view to incorporating market concepts that are compatible with the results of the strategic study into Luxembourg law, and that take into account the results obtained from the work of the "*Energiezukunft Lëtzebuerg*" thematic platform. Preparatory work has begun to amend the amended Law of August 1st, 2007 on the organisation of the electricity market with a view to incorporating new concepts such as individual and collective self-consumption within an energy community or a national computer platform for energy data. This work led to a draft law introduced in the legislative procedure in early 2018.

4.4 The Education objective and the main measures to achieve it

European Objective: "*improving education levels, in particular by aiming to reduce school drop-out rates to less than 10% and by increasing the share of 30-34 years old having completed tertiary or equivalent education to at least 40%.*"

4.4.1 Early school leavers objective

4.4.1.1 National target

The government continues to pursue its **objective** of sustainably keeping the school dropout rate **below 10%**. LFS figures show a positive trend⁵⁸, the rate having decreased from 9.3% in 2015 to 5.5% in 2016. For ten years the government has been conducting a national study as a complement to the LFS. This data does not allow comparison at European level, but they make it possible to identify dropouts at the level of the national system. According to this analysis, it is at the lower cycle of secondary education (general and preparatory) as well as at the beginning of vocational training that students run the greatest risk of dropping out.

4.4.1.2 Key measures

In 2017, the government continued its efforts to promote the educational success of an increasingly heterogeneous population where the linguistic and socio-economic background is critical to student success (see OECD PISA results). Reform projects in early childhood education and in secondary education have been underway since the start of the 2017-2018 school year.

At the level of education and childcare, the multilingual education program⁵⁹ (familiarization with French and Luxembourg languages as well as promoting languages spoken with the family), which is aimed at children aged 1 to 4 years of age in early childhood education, aims to support the language development of children at an early age. The government has improved access to education and reception facilities by offering 20 hours of free service per week from the age of 1, effective October 1st, 2017. The programme, which is based on a solid scientific foundation, aims to better prepare children for Luxembourg society and school. Beyond the free 20 hours, the State contributes to the childcare costs through the system of hospitality checks.

Regarding secondary education, a series of laws have been approved in 2017 to establish the contours of a modern high school⁶⁰. This is a high school that takes every student to their fullest level of capability, gives everyone a chance to earn a diploma and prepares its students to face the challenges of modern society. The key points of these reforms take into account the fact that students do not perform at the same level in all the languages taught in secondary school, German, English and French. By introducing specialised coursework, the chances of success for all students increase, especially for students who come into the country in the middle of their academic experience. The European and international school offer⁶¹ in public education is well developed in order to take into account the needs of students from migrant backgrounds and families who settle in Luxembourg for a fixed period.

Based on the principle that it is in primary schools and high schools that students will learn to succeed, the government introduced the obligation to conceptualize how to prevent dropping out as part of academic development plans. It is at this level that the individual needs of students can best be taken into account. The government is convinced that the reform of specialised education and the creation of eight skills centres, as well as more specific supervision of children with special needs in education, will reduce dropout rates.

⁵⁸ For more details see: http://ec.europa.eu/eurostat/tgm/table.do?tab=table&init=1&language=en&pcode=t2020_40&plugin=1

⁵⁹ For more details see: <http://www.men.public.lu/catalogue-publications/enfance-jeunesse/infos-generales-offre/170926-brochure-info-z/info.pdf>

⁶⁰ For more details see: <http://www.men.public.lu/catalogue-publications/secondaire/informations-generales-offre-scolaire/modernisation-lycee/lycee.pdf>

⁶¹ For more details see: <http://www.men.public.lu/fr/actualites/grands-dossiers/systeme-educatif/offre-internationale/fr/index.html>

In addition to structural reforms in the school system, the government has implemented a number of measures to prevent dropping out, such as vocational induction courses for various trades (IPDM), a programme addressed to students who are not accepted into vocational training structures or who do not have the necessary skills to access the labour market. Specific projects aimed at preventing school dropouts have been set up in several high schools, such as Belval High School and Bonnevoie Technical High School.

Relay classes or "mosaic" classes are designed for students at risk of leaving school because of their behaviour. With support based on a temporary individualized plan of 6 to 12 weeks, the "mosaic" class is intended to reintegrate and re-socialize students in their initial class or in a class adapted to their level of development.

The Second Chance School is for young people aged 16 to 30 who have dropped out of school without recognized certification or who do not find an apprenticeship. It offers them a different programme from that of other high schools: the priority is on supervision and monitoring is personalized. The Second Chance School offers pathways to qualification in standard and general secondary education as well as in vocational training.

Additional efforts have been made to better supervise dropouts. The service in charge of supporting school dropouts, the Local Action for Youth, offers activation programs. There are 12 local Youth centres across the country whose mission is to support young people in their transitions from school to work.

Reforms at the secondary school level, which feature greater flexibility and permeability, are an appropriate basis for implementing upskilling pathways in adult education. The academic programme offer of the second qualification track will be developed and adapted to the new system of initial education. Emphasis is placed on the development of distance learning and on-the-job training as well as on the reorganization of fifth grade classes with offers for young dropouts as well as offers for newcomers and applicants/participants of adult international protection (IPA/BPI). These fifth-grade classes are linked to the supported integration programme (PIA), which the government has set up to accelerate the sociolinguistic integration of applicants for international protection. This program, which begins with a person's arrival in Luxembourg, includes compulsory courses in the knowledge of the country and 120 hours of language or basic training. A portfolio has been developed to document IPA/achievements as well as their training and integration pathways in Luxembourg.

4.4.2 Tertiary education objective

4.4.2.1 National target

The national **objective** consists of ensuring that **66%** of the working population between the ages of 30 and 34 receive higher education and earn higher education degrees between now and 2020. This objective was set at the time when two out of three jobs in Luxembourg require higher education training.

4.4.2.2 Key measures

The government is continuing its efforts to create a fertile environment for expanding the range of public and private higher education programmes, as well as developing a mentality of quality in the sector. Several higher education institutions have been established in the country since 2012. During the 2017-2018 academic year, 24 courses were accredited by private higher education institutions. The number of accredited professionally oriented short-cycle higher education

programmes “*Brevet de technicien supérieur*” (BTS) was 23 for the 2017-2018 academic year, with a total of 763 students. In addition to this, since 2013-2014 a short-cycle higher education programme has been in place as preparatory classes to competitive examinations for entry into the major French business schools, “*Grandes Ecoles Françaises*”. The programme, which began in 2013-2014 as a pilot project, was attributed a legal framework in 2016 by the government through an amendment to the law on the organization of higher education. In 2017-2018, the aforementioned study program (economic and commercial sector) offered at the *Lycée classique d'Echternach* will be reviewed in an accreditation procedure. Should the programme be approved, it will thereafter provide a preparatory structure at the same time for the “*Diplôme d’études supérieures générales*” awarded to candidates who successfully complete the modules forming an integral part of that course of study. The law of July 23rd, 2016 also aimed at revising quality assurance procedures. All higher education institutions, as well as any programme offered by them, are subjected to an accreditation procedure carried out by a foreign and independent agency registered in the European Quality Assurance Register for higher education (EQAR).

For several years, the requirement and opportunity to develop a medical training course at the University of Luxembourg has been under discussion. Since its establishment in 2003, the university has offered a programme of studies in medicine limited to the first cycle. Luxembourg has concluded bilateral agreements with certain universities in order to reserve a fixed contingent of slots for students who have successfully completed the first year at the University of Luxembourg in view of pursuing medical studies at partner universities. However, these agreements have been called into question because numerous universities in other countries are trying to limit the number of foreign students. Following these recent developments, the University of Luxembourg will develop Bachelor degree programmes in medical studies beginning in 2020 and will thus contribute to sustaining the number of doctors in Luxembourg. In addition, the government intends to sign an additional protocol relating to scientific and academic cooperation with the government of France, which provides for inter-university cooperation in Master's programmes in medicine and hospital-university within the framework of basic medical training and specializations.

The government continues to implement a strong policy regarding higher education and research in terms of financial resources. Financial contributions for the operational side of the University of Luxembourg have increased considerably. The State allocation for the functioning of the University has increased from 72 million (2009) to 101.6 million (2012), reaching 173.5 million (2018). With the start of the 2015-2016 academic year, a total of 2,000 students and some 1,600 researchers and research staff from the University of Luxembourg and the CRPs settled at the Belval site. The Bachelor’s program of the faculty of law, economics and finance has taken place for the first time with the 2016-17 academic year at the Belval site, with some 1,000 additional students who joined the 2,000 already there. Investments for finalising construction and fitting out work of these new higher education and research infrastructures at the Belval site continued with a total investment of some 800 million between 2010-2019. The number of students also increased by + 25% between 2009-2010 and 2017-2018.

Table 9: Total number of students at the University of Luxembourg by academic year

Year	Number of students
2012/2013	6,308
2013/2014	6,231
2014/2015	6,309
2015/2016	6,189
2016/2017	6,153
2017/2018	6,366

Source: Ministry of Higher Education and Research

4.5 The social inclusion objective and key measures for achieving it

European Objective: "*promoting social inclusion, in particular through the reduction of poverty, by aiming to lift at least 20 million people out of the risk of poverty and exclusion. The population is defined as the number of persons who are at risk-of-poverty and exclusion according to three indicators (at-risk-of-poverty; material deprivation; jobless household), leaving Member States free to set their national targets on the basis of the most appropriate indicators, taking into account their national circumstances and priorities.*"

4.5.1 National Target

The government supports the conclusions of the European Council in this objective⁶² through measures that contribute to increasing women's' and single-parent families' rate of employment in order to arrive at a 73% employment rate figure in 2020. Access to employment creates the type of conditions that promote social inclusion and constitute a rampart from which to react against poverty and social exclusion, both for individuals and society in general. In the area of horizontal and transversal approaches, all the efforts detailed under the national employment and education objective headings are, together with the measures outlined below, also measures for contributing to promoting social inclusion, particularly by reducing poverty. The national objective is in line with the priorities of the 2018 Annual Growth Survey and the principles and rights enshrined in the European Pillar of Social Rights⁶³.

4.5.2 Key measures

The government continued to take steps intended to modernise family policy by promoting employment, especially for women, and keeping people in jobs so that parents can have financial independence.

The parental leave reform was approved in October 2016. The new parental leave system entered into effect on December 1st, 2016. This reform aims at the following objectives: promoting reconciliation between family and professional life, creating a strong relationship between parents and children, better addressing requirements of parents and increasing the percentage of fathers who benefit from it in order to promote equal opportunities. It also aims to increase the number of persons in general who benefit from the reform. The reform of parental leave is mainly favourable to men. While the number of parental leaves taken by women has also increased, the number of men has almost tripled. The total number of women who took parental leave increased from 3,557 in 2016 to 4,577 in 2017 (+28.68%). In contrast, the total number of men taking parental leave increased from 1,163 in 2016 to 3,674 in 2017 (+215.91%).

To further ensure the reconciliation between professional and private life and to guarantee in this way that women stay in employment, as from January 1st, 2018 the government implemented adaptations to a series of extraordinary leave benefits. Accordingly, fathers will have paternity leave

⁶² The government set the objective of reducing the number of persons threatened by poverty or social exclusion in Luxembourg at 6,000 people in 2020. Yet, with regard to methodology, the AROPE indicator does not include the demographic factor and Luxembourg's population continues to increase significantly, even during crisis periods, such that the relative nature of the indicator, as a percentage of population, inevitably leads to an increase in the absolute number of persons concerned. In addition, social benefits in kind (e.g. service vouchers) are not reflected in the risk of poverty rate, although the impact of these benefits on the standard of living of households is significant.

⁶³ The Annual Growth Survey 2018 aims to relaunch sustainable economic and social convergence. It is based on the principles and rights enshrined in the European Code of Social Rights, which aims to restore the path of convergence towards better living and working conditions in Europe. The 2018 Annual Growth Survey focuses on reform to stimulate investment, particularly in human capital, and to improve the functioning of services and labor to increase inclusion. The European Pillar of Social Rights is based on 20 key principles, which are based on three themes: equal opportunities and access to the labour market, fair working conditions and social protection and insertion.

of 10 working days, 8 of which will be covered by the government budget. Up until now, this leave related to the birth of a child was limited to 2 days.

In addition, leave for family reasons, intended to enable parents to stay with a sick child, has been entirely modified: instead of 2 working days per year, parents will be able to request this leave by age group of the child. 12 days of leave allowed for children between 0 and 4 years, 18 days between 4 and 13 years and 5 days for a child hospitalized between 13 and 18 years.

In the area of social exclusion, the Social Inclusion Income Bill (REVIS)⁶⁴ was tabled in January 2017. With this project, the government wants to reorganize the guaranteed minimum wage system (RMG). The four objectives of this reform are to specify a social inclusion approach, to establish a coherent system of stabilization, social activation and professional reinsertion policies, to act against child and single parent family poverty and to simplify administrative procedures. Amendments to the draft law have been submitted in October 2017. These amendments include an increase in the amount for common household expenses for families with children, a longer transition phase to the new law for people with a pension and the possibility for the self-employed to receive from social inclusion income under certain conditions.

- Continue the policy of providing socio-educational welcoming structures to children: The number of authorized places in socio-educational welcoming structures for children 0-12 years old was 56,363 at December 31st, 2017. Luxembourg therefore has widely exceeded its national objective of 35,000 places in 2015. In Luxembourg, all reception centres apply a quality assurance system.

Table 1 : Change in the number of places in socio-educational welcoming structures for children (2009-2017)

Situation as of December 31th, 2017	2009	2013	2014	2015	2016	2017	Difference 2016-2017	Increase between 2016-2017
Education and hosting services authorised by social security*	20,308	34,053	35,579	37,440	38,287	40,489	2,202	+ 5.75 %
Commercial education and hosting services**	2,734	9,194	10,371	10,406	11,576	12,874	1,298	+ 11.21 %
Nanny services	1,606	3,130	3,258	3,278	3,247	3,000	- 247	- 7.61 %
Total	24,648	46,377	49,208	51,124	53,110	56,363	3,253	+ 6.13 %

Remarks: * including reception centres, day care centres and nurseries ** including day care centres and nurseries

Source: Ministry of Education, Childhood and Youth / Education and Hosting Service (31/12)

⁶⁴ Draft Law No. 7113 on Social Inclusion Income and amending 1. the Social Security Code 2. the Labour Code 3. the amended law dated 12 September 2003 on persons with disabilities; 4. the amended law dated 26 July 1980 concerning the advance and recovery of maintenance payments by the National Solidarity Fund; 5. the amended law dated April 30, 2004 authorizing the National Solidarity Fund to pay part of costs for services relating to the admission of persons to an integrated center for the elderly, a nursing home or another medical institution providing 24 hour service; 6. the law dated 18 December 2009 organising social assistance and repealing the amended law dated 29 April 1999 establishing the right to a guaranteed minimum income.

- Making beneficiary parents aware of the Guaranteed Minimum Income (GMI) mechanism for using welcome centre cheques. Luxembourg achieved its national objective, since the awareness campaign with the target population was successful.

- Increasing activation rates as part of the GMI mechanism: The number of professional integration activities (AIP) provided by the National Social Action Service (SNAS) has steadily increased⁶⁵ since 2007 and in parallel administrative statistics indicate a decrease in the number of people referred to the AIP⁶⁶, in particular due to the continuous extension of a sharing of competence between SNAS and ADEM, allowing a large number of beneficiaries to get exclusive guidance to the labour market. The activation rate for 2017 is thus at 64.8% (2016: 61.8%), exceeding the target rate for 2020 (64.3%). Given the expected increase in beneficiaries following the introduction of REVIS, which will replace the GMI scheme and which is still intended to improve activation of beneficiaries, the support of the objective by all possible means remains necessary. The draft law stipulates a budget of 15.8 million to finance staff running the programme at assigned agencies who will implement activation measures under REVIS.

- Cost of living allowance: The government aims to renew the cost of living allowance to low-income households for 2018. For the calculation of the total income of the household, family allowances, the back to school allowance and the birth allowance are no longer taken into consideration; this measure will enable some 1,500 additional households to receive a cost of living allowance and some 700 additional households to receive a full allocation, all for an additional total cost of 3.5 million. The amounts of the cost of living allowance remain unchanged from those in effect in 2017.

- Promote measures favouring the transition of young people from academic to professional life and those motivating them to return to school: The National Youth Service (SNJ) is implicated in the problem of disadvantaged young people, especially young people qualified as "NEET", as well as school dropouts. Since July 2017, the SNJ has been incorporated into the Local Action for Youth (ALJ), a service that was attached to the Professional Training Department and offers not only activation offers to NEET youth, but also programs to fight the school dropout phenomenon. In this context, nearly 5,000 young people were contacted by agents to take advantage of SNJ's offers, namely information sessions, practical workshops, voluntary service programs and individual support in 2017. The European short-term voluntary service project, funded by Erasmus +, is a project that enables young people with fewer opportunities to have the experience of living abroad. The SNJ pursued its research on the NEET phenomenon. The study was finalized in 2017 and the resulting recommendations were discussed with policy makers and professionals working with these young people. The annual budget allocated to SNJ transition measures is estimated at 3 million.

- The Social Aid law: During 2017, the 30 Social Offices gave out a total of 3.4 million in non-repayable financial aid. The measure will be allocated an annual budget of approximately 18 million, 50% of which is furnished by the State and 50% by the municipalities.

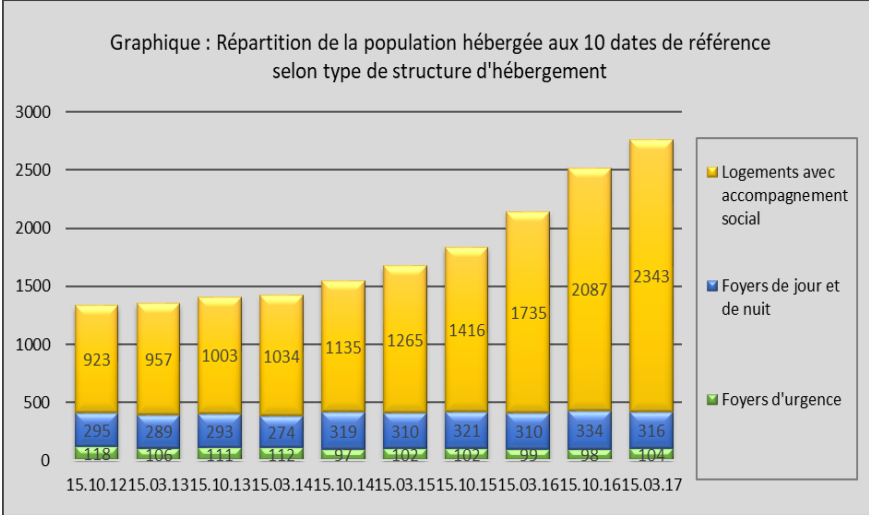
- National strategy to counter homelessness and exclusion linked to housing. The government continued to coordinate the implementation of the national strategy against homelessness and exclusion due to lack of housing (2013-2020). In 2017, inter-ministerial collaboration to combat homelessness among young people and support innovative projects for long-term homeless people

⁶⁵ 2007: 835; 2015: 1,520; 2016: 1,564; 2017: 1,579.

⁶⁶ 2007: 1,288; 2015: 2,573; 2016: 2,529; 2017: 2,438.

(e.g. an integrated centre for elderly homeless people, a housing project for young adults and a housing structure for ex-prisoners) were continued. The government conducts a bi-monthly census of the number of people housed with nineteen managers of adult-shelter facilities since October 2012. A final census was conducted in March 2017. The total number of persons accommodated has increased strongly and consistently over a period of 5 years (+ 107%)⁶⁷.

Figure 1: Distribution of populations hosted by type of accommodation structure



Source: Ministry of the Family and Integration and the Greater Region

The participatory consolidation study of the "housing first" concept revealed the strengths and momentum present within the national institutions, while giving advice for developing the concept in the future. The mid-term evaluation on the implementation of the national strategy was finalized by the government during the first half of 2017. In all, 16 actions have been carried out since the beginning of the strategy (e.g. two overnight stops, a hotline, a social bistro, the “Para-chute” social structure and several “housing first” projects).

- Housing subsidy: The law reforming rent subsidies came into effect in January 2018. This caused the number of households that can potentially benefit from this subsidy to be substantially increased. In order to increase the number of potential beneficiaries, eligibility criteria for the aid were reviewed: reduction of the minimum required contribution rate to 25% of household income; not counting social transfers when calculating the income of the applicant household; reduction of the requirement to have a regular income after 3 months; modification of the income threshold used to determine eligibility for the subsidy. The overhaul of the rent subsidy simultaneously acts on these four parameters and makes it possible to homogeneously expand the target population, which affects all types of households (single persons, single-parent families, households with children, etc.). With these modifications, the new target population is estimated at 28,620 households that do not receive the GMI, rising to 35,020 households if the beneficiaries of the GMI are included. It is estimated that the portion of the target population among all private market renters will increase from 34.8% to 64.9%.

- Fund for European aid to the most deprived (FEAD): In Luxembourg, FEAD is used to respond to food and basic needs-related distress situations. 11,728 persons, 54% of whom were women and 46% men, divided into 4,607 households, received food and basic needs-related items.

⁶⁷ The number increased from 1,336 people on 15 October 2012 to 2,763 people as at 15 March 2017 (+1,427 people).

- Reception of refugees and applicants for international protection in Luxembourg: In order to guarantee a dignified and high-quality reception of refugees, the staff of the Luxembourg Office for Reception and Integration (OLAI) were increased by 64 between September 2015 and September 2017, including 17 socio-educational jobs intended for the guidance of applicants for international protection. At the same time, the Luxembourg Centre for Integration and Social Cohesion *Lëtzebuurger Integratiouns- a Sozialkohäsiounszenter* (LISKO), managed by the Luxembourg Red Cross on behalf of the State, received additional appropriations. LISKO was conceived as a "mobile social office" that supports municipalities and local and regional social offices in their task of assisting people with political refugee status on their path to independence and integration.

In addition, in March 2017, the government approved the implementation of a supported integration programme (PIA) for applicants and beneficiaries of international protection in Luxembourg. The PIA concept works off the principle that properly prepared integration is based on two elements: learning the national and administrative languages and understanding how daily life functions in Luxembourg. It comprises three successive phases, each phase being reserved for a specific target audience, with specific content and characteristics adapted to the needs. The course is divided into three parts: PIA 1 (launched in September 2017), PIA 2 (launched in January 2018) and PIA 3 (launched in March 2018). Since the launch of the PIA 1, 129 IPAs, 35 women and 94 men, attended the 16-hour training course within the first 6 to 8 weeks of their arrival in Luxembourg.

5. Use of Structural Funds

5.1 Coordination with structural funds

Coordination between the NRP and the Structural Fund is required because the Europe 2020 strategy also has a Community action program. Projects developed and supported by Community financing under structural funds heading are asked to contribute to meeting the objectives of the Europe 2020 strategy.

With regard to the FEDER 2007-2013 Regional Competitiveness and Employment program (RCE), efforts to support European objectives and national objectives determined by Luxembourg have been made, particularly from the Priority 1-Objective 1 and Priority 2-Objective 3 standpoints. The RCE FEDER program represents total public eligible commitments and investments of 85,000,000, of which 21.8 million in Community funds amassed during the programming period of 2007-2013 concerning the above priorities of the Luxembourg NRP and the Europe 2020 Strategy. These investments, in line with NRP objectives, correspond to 83.2% of the FEDER RCE envelope for Luxembourg for the programming period of 2007-2013. In this way, 50 projects were co-financed in the area of research and innovation by FEDER in the amount of 15.3 million and 13 projects in the area of renewable energy in the amount of 6.4 million. The program was officially closed out by the European Commission's closing recommendation of 27 October 2017 and the acceptance of the recommendation by the Managing Authority on 6 November 2017.

The themes and programmes for European Territorial Cooperation (ETC) were hammered out on the basis of the Europe 2020 strategy. With regard to the trans-national and inter-regional projects slated for Luxembourg participation that were approved by the INTERREG A, B and C programmes, the main areas of intervention with relation to the NRP are in R&D innovation with thirteen projects under FEDER in the amount of 2.6 million, and Climate Change and Energy areas of climate, environment and transportation, with twenty-two projects garnering total grants of 5.0 million, an amount approved in favour of the Luxembourg partner.

5.2 Financing priorities for the period 2014-2020

Under the common strategic framework for 2014-2020 and in accordance with European Commission recommendations, the FEDER Management Authority decided to concentrate its interventions on two priority areas focusing on thematic objectives No. 1 "Strengthening research, technological development and innovation" and No. 4 "Supporting the shift towards a low-carbon economy in all sectors".

The FEDER Operational Programme, which has a budgetary allocation of 19.5 million and an estimated total cost of 48.2 million, focuses equally on two thematic objectives: strengthening research, technological development and innovation, as well as the transition to a low-carbon economy in all sectors, in line with the objectives set out in Regulation (EU) 1303/2013 and closely linked to the objectives of the Europe 2020 strategy. In addition, with the approval of the Dudelange municipality, it has been decided to use an Integrated Territorial Investment (ITI) based on themes in the two areas in compliance with regulations and sustainable urban development concepts in the amount of 1.2 million. The areas of intervention proposed by Luxembourg are consistent with the recommendations of the European Commission and will ensure continuity with the 2007-2013 programming period, already in line with the Europe 2020 strategy. The "Investment for growth and employment" operational programme for the

period 2014-2020 was adopted by the European Commission on December 15th, 2014. As of December 31st, 2017, 18 projects were selected and authorised.

Table 11: Financial contracts by area

Area	Total cost (in € mn)	FEDER (in € mn)
Area 1 “Improve research, technological development and innovation”	19.5	7.8
Area 2 “Support the transition to a low carbon emissions economy in all sectors”	20.2	8.1
Area 3 “Technical Assistance”	2.3	1.2
Total	42.0	17.1

Source: Ministry of the Economy

European Territorial Cooperation programmes for 2014-2020 are already in development. The themes relevant to the Europe 2020 strategy selected for the INTERREG *North-West Europe* trans-national programme with a FEDER budget of 396 million are the following: Innovation, Low carbon emissions and Effective use of materials and resources. The themes relevant to the Europe 2020 strategy selected for the INTERREG Europe inter-regional programme with a FEDER budget of 359 million are the following: Strengthening research, technological development and innovation, improving competitiveness of SMEs, supporting the shift towards a low-carbon economy in all sectors, protecting the environment and promoting the rational use of resources.

Lastly, the implementation of measures and actions that were developed to sustainably promote professional insertion, keeping people employed and social inclusion are supported by the new operational programme for 2014-2020 of the European Social Fund (ESF). The current operational programme puts greater focus on young people under 30, including those from an immigration background, the Youth Guarantee, people who are far removed from the labour market who need better social inclusion and job seekers and employees over 45. Accordingly, ESF projects particularly focus on new businesses such as ICT and Green Jobs and on entrepreneurship.

6. Institutional issues and the role of stakeholders

6.1 National ownership

With a view to increasing transparency and encouraging national ownership, the government closely involved Parliament and social partners:

- Parliament was involved in the European semester week focusing on the government's statement concerning the economic, social and financial situation of the country at the end of April and the government presented the NRP and SGP documents to Parliament prior to submitting them to the European Commission.
- Social partners were again involved as part of the national social dialogue that took place under the aegis of the Economic and Social Council (CES). In March, a meeting inaugurated the new annual round of consultation and discussions focused on the main messages to be drawn from the latest 2018 Luxembourg country report published by the European Commission and the main government priorities for the 2018 European semester, including aspects related to housing policy⁶⁸.

6.2 Communication

Diverse studies have shown that the resistance that forms to structural reforms is linked to the fact that uncertainty regarding expected future benefits of reforms is often greater than the uncertainty regarding costs incurred. The government attaches particular interest to this challenge and intends to pursue its efforts.

Progress achieved as part of the implementation of the Luxembourg 2020 strategy should have effective follow-up, reporting and evaluation processes. Diverse structural indicators used prepare a quantitative follow-up of the Lisbon strategy had a tendency of not taking adequate account of the national specificities surrounding Luxembourg. The Tripartite Coordination Committee considered that it would be opportune to publish a "Competitiveness scoreboard" on an annual basis. The Observatory of competitiveness of the Ministry of the Economy has since updated this national scoreboard up until 2016. After more than ten years of use, a revision has proven necessary. Over the years, several indicators have lost their relevance, others have been replaced by new indicators of better statistical quality or could not be updated. A revision was therefore undertaken in recent years within the Economic and Social Council (CES)⁶⁹, which in July 2016 unanimously adopted its opinion on the national system of indicators that will constitute the new modernised dashboard and structure. The results of this new national indicator system have been presented⁷⁰ for the first time as part of the latest Competitiveness report⁷¹ in autumn 2017, which provides a detailed overview of Luxembourg's position compared to other EU Member States. This new dashboard is based on 67 indicators, including 41 entirely new ones, which are grouped into the three categories of the economy, social action and the environment. Luxembourg ranks fourth overall in the EU. It ranks seventh in the economy, first in social action and ninth in the environment.

⁶⁸ For more details see: <https://ces.public.lu/fr/actualites/2018/Semestre-euro-2018.html>

⁶⁹ CES, *Le système d'indicateurs national*, Avis, 8 July 2016

For more details see: <http://www.ces.public.lu/content/dam/ces/fr/actualites/2016/07/2016-indicateurs.pdf>

⁷⁰ For more details see: http://gouvernement.lu/fr/actualites/toutes_actualites/communiqués/2017/10-octobre/30-bilan-compétitivité.html

⁷¹ MINISTRY OF THE ECONOMY, *Le système d'indicateurs national*, in the 2017 Competitiveness Report, Perspectives de politique économique n°33, Luxembourg, October 2017. For more details see: <http://gouvernement.lu/dam-assets/fr/publications/rapport-etude-analyse/minist-economie/observatoire-de-la-compétitivité/perspectives-politique-economique/perspectives-politique-economique-33/ppe-033-fr.pdf>



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