#mission2030

Austrian Climate and Energy Strategy

Federal Ministry
Republic of Austria
Sustainability and Tourism

Federal Ministry
Republic of Austria
Transport, Innovation and Technology

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Stubenring 1, 1010 Vienna – www.bmnt.gv.at
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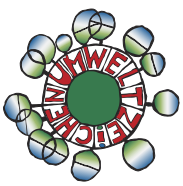


PROTECTING OUR CLIMATE …

THIS FEDERAL GOVERNMENT has a mission. It is determined to safeguard prosperity and the high standard of living in Austria. Global climate change has a major impact … on the economy, on society and on the environment. We need to find answers to these major questions. That means taking an ambitious approach to climate protection while at the same time ensuring sustainable development. Economic growth and environmental protection need to go hand in hand. Clean growth is not an option; it is a necessity.

Our climate and energy targets are ambitious, but feasible. They are also a commitment to the European and international targets by which we feel bound. However, they will only be attained if we manage to get every citizen and every sector of the economy on board and provide them with optimum support. Climate protection will be an Austrian success story if we all pull in the same direction and everyone contributes. In order for the energy transition to succeed, everyone needs to pull together and work towards it, from private homebuilders to heavy industry. Opportunities need to be recognized and seized. Everyone can take a step towards energy self-sufficiency, for example by generating electricity for their own use or for their e-car. Not only will they be helping to save the climate, it will also make them more independent.

We need an energy system that is secure, sustainable, innovative and competitive. We want to reduce our greenhouse gas emissions, increase the use of renewable energy, make energy and resources more efficient, step up clean technologies and make Austria a more competitive place to live and work by creating an improved framework for sustainable investment. We must be a front-runner in research into, and the application of, innovative solutions and provide our internationally successful technology providers with an attractive domestic market.

To achieve this, we need clear prospects and an integrated approach. That is what our Climate and Energy Strategy is designed to achieve. Our #mission2030 is a roadmap from now to 2030 that will enable the Federal Government and regional and local authorities, as well as the economy and society, to plan ahead. We have set ourselves ambitious – but realistic – targets that rely on incentives rather than prohibitions, on relief rather than burden, on a bottom-up rather than a paternalistic approach. We intend to be brave and seize the opportunities of the energy transition!

Welcome to #mission 2030.

Join us!

ELISABETH KÖSTINGER
Federal Minister for Sustainability
and Tourism

… THROUGH BOLD JOINT EFFORTS

OUR MISSION is to develop a sustainable energy and mobility system! We are committed to a proactive climate protection policy with clear targets that will set Austria on a path towards gradual decarbonization. We are taking advantage of the opportunities of the forthcoming transformation for Austria as a business location. Our integrated Climate and Energy Strategy represents the first step on that long and exciting journey!

As Minister for Transport, I am keen to achieve an environmentally- and innovation-friendly mobility transition; reducing emissions represents a major challenge for the transport sector and we shall need to put numerous measures in motion in passenger and freight transport in order to overcome them. Many new trends, such as carpooling, harbour huge potential for improving our mobility system, but also depend on changes to the legislative framework. Aside from strengthening public transport as the backbone of our mobility system, we also need to develop new mobility concepts, especially in rural areas and in freight transport. Aside from purely technical options, I think it is important that we get back to and promote mild forms of mobility such as cycling and walking. We want future mobility to be active, shared, digital and sustainable.

In order to make that dream come true, we need a new social consensus as to how our future mobility and energy system should be organized. We are therefore already working with the Federal Government and regional and local authorities on a Competitive and Clean Mobility 2030 Action Plan to achieve the targets of the Climate and Energy Strategy. However, a great deal of research and development is still needed and, as the Minister responsible for research and innovation, I am delighted that this strategy also focuses on mobility and energy research. Our aim is not just to provide a clear roadmap for achieving our 2030 climate and energy targets; we also intend to use our flagship projects to take the first concrete steps in that direction.

Let's look on the challenges we face as an opportunity to reconcile climate protection with economic growth. Let's tackle this transformation process together and build a clean, fair, secure and competitive mobility and energy system that will help guarantee the future success of Austria.

NORBERT HOFER
Federal Minister for Transport,
Innovation and Technology

1.

AUSTRIA'S PATH TOWARDS A CLIMATE-FRIENDLY SOCIETY

AUSTRIA IS COMMITTED to international climate targets and a proactive climate protection and energy policy. The key objective of the Federal Government's climate policy is to reduce greenhouse gas emissions. Austria intends to reduce its greenhouse gas emissions by 2030 by 36% compared to 2005. That means that a coordinated climate and energy policy is needed that strikes a balance between ecological sustainability, competitiveness/affordability and security of supply both now and in the future. The Federal Government has therefore decided, as one of its first important measures, to take responsibility for consistent decarbonization between now and 2050 by preparing an integrated Climate and Energy Strategy.

Austria is in the process of transforming into as highly-efficient and climate-neutral an energy and mobility system and economy as possible along the entire energy value-added chain (production, transportation, conversion, consumption), including all associated products and services. This should give a clear idea of how the economy and society can make optimal use of the opportunities generated. This Climate and Energy Strategy should be seen as the first chapter in a long-term process, the new approach to future climate, energy and mobility policy that marks the start of consistent future development.

The Strategy provides guidelines for all key areas up to 2050 and for upcoming investments, especially between now and 2030. With its clear framework, the Strategy should help to prevent bad investments and structural gaps. The Climate and Energy Strategy marks a paradigm shift: in future, renewable energy and energy efficiency will be the benchmark for investments. Thus, the Climate and Energy Strategy will ensure that Austria is an attractive location for industry and that our economy remains competitive in an increasingly carbon-free world. This should turn Austria into a driving force for innovation in modern energy and environmental technologies on the global market. In order to strengthen domestic research, Austria will join the global Mission Innovation initiative and promote key technologies as a front runner.

The existing network infrastructure of power plant capacity and domestic energy resources means that Austria has a high level of security of supply. The top priority in the transformation of the energy system is to maintain that high level of security of energy supply. The objective is to strengthen the security of energy supply and become less dependent on imported energy. That means increasing output from our renewable energy sources and making smarter, more efficient use of energy. Our infrastructure must allow for new developments on the energy market, decentralized production, new storage technologies and digitalization. That will be achieved through socially- and environmentally-friendly development and by modernizing the network infrastructure. The planned measures need to be environmentally- and eco-friendly and put an end to soil-sealing and the impact on the man-made environment and natural habitats.

Renewable energy currently accounts for around 33.5% of energy produced. Around 72% of electricity already comes from renewable energy sources. That means that, despite high net imports of electricity in recent years, Austria is already the front runner in Europe in the electricity sector. The Federal Government has therefore set itself the objective of covering 100% of total national electricity consumption (national balance) from renewable energy sources by 2030. This will mean developing all renewable energy vectors, the infrastructure, storage facilities and investments in energy efficiency.

The focus in coming years will need to shift to the transport and space heating sectors, so as to maximize the results from the resources invested. These two sectors have the greatest potential for savings and cuts.

Thanks to investments in the rail infrastructure over recent years and associated operations, Austria is now the front runner in passenger rail transport in the European Union. However, aside from making use of the possibilities provided by digitalization and focusing much more on improving services, the mobility of the future will need to keep developing a more efficient public transport system and improving urban development in liaison with regional and local authorities. In freight transport, the shift from road to rail must be encouraged by improving services and incentives, and combined transport (rail, water, road) must be increased. For the transition to low and zero-emission vehicles, the mix will be tipped in favour of alternative propulsion systems and renewable energy-based fuels (e-mobility, hydrogen fuels, bio-CNG/bio-LNG and biofuels).

The Federal Government will force through measures to cut red tape, so as to encourage energy efficiency measures in business and households. The potential for energy efficiency must be boosted at all levels, especially in buildings, transport, industry and small and medium-sized enterprises (SMEs), while leaving businesses the freedom to innovate and avoiding additional charges. The public sector must set an example here.

It will not be possible to achieve our long-term climate and energy targets with today's technologies alone. Austria therefore needs to make better use of its capacity for innovation and of change processes such as digitalization and decentralization, so that it can use new key technologies to modernize the energy system and capitalize on sector coupling. Between then and now, however, it will have to make use of reasonable bridging technologies. The Federal Government wants to seize the opportunities for industry (e.g. hydrogen fuels), for the construction industry (e.g. more innovative construction and renovation), for the mobility sector (e.g. alternative propulsion systems) and for the countryside (e.g. bio-economy).

The energy transition must be supported by both public and private investment. Public funding should encourage private investment and should focus more on innovation and research. All public incentives and grants should be tested to ensure they will not run counter to climate and energy targets.

Austria's regional, urban and local authorities are vital partners in the transformation of the energy system and climate protection. They have developed their own energy, mobility and/or climate strategies with specific targets. The Austrian Climate and Energy Strategy is designed to provide a framework to support efforts by regional, urban and local authorities, especially when preparing and updating their action plans.

The public should be able to participate actively in the energy system in future, for example by investing in renewable energy sources as consumers and producers ("prosumers"). Increased awareness-raising and information campaigns should boost demand for climate-friendly, energy-efficient products, services and technologies and encourage the necessary investments. With initial and continuing training, highly qualified staff will be able to support the necessary transformation.

This integrated Climate and Energy Strategy is based, first, on the international and national framework (see chapter entitled "Where Does Austria Stand Today?") and, second, on the will to proactively support the steps needed to transform society into a carbon-free society for the good of our economy (see chapters entitled "Targets for an Ecological Economy" and "Our Priorities"). The chapter entitled "Austria's Trajectory" describes the most important measures in individual sectors, and the chapter entitled "Flagship Projects" spotlights the

projects that will be implemented as the first steps along the way and details the most important aspects of climate change adaptation. Finally, the chapter entitled "Ongoing Monitoring and Next Steps" describes the method for regular evaluation of the Climate and Energy Strategy and the transition to action planning.

For the first time since 1954, Federal Government spending will be less than public revenue in 2019. That marks an end to debt policy … with no new taxes. We shall continue along this path towards a sustainable budgetary and fiscal policy in the next decade. Therefore, for the purposes of budgetary sustainability, care must be taken to safeguard structural refinancing. Fiscal measures are handled during the course of structural tax reforms.

The Strategy lays down guidelines for climate and energy policy up to 2030. Once it has been adopted, this Strategy will trigger the implementation processes and form the basis for the new national energy and climate plans within the meaning of the European Governance Regulation. At national level, these ideas will then be implemented in detailed strategies, laws, regulations and numerous other measures, so that we can all shape the future of Austria.

2.

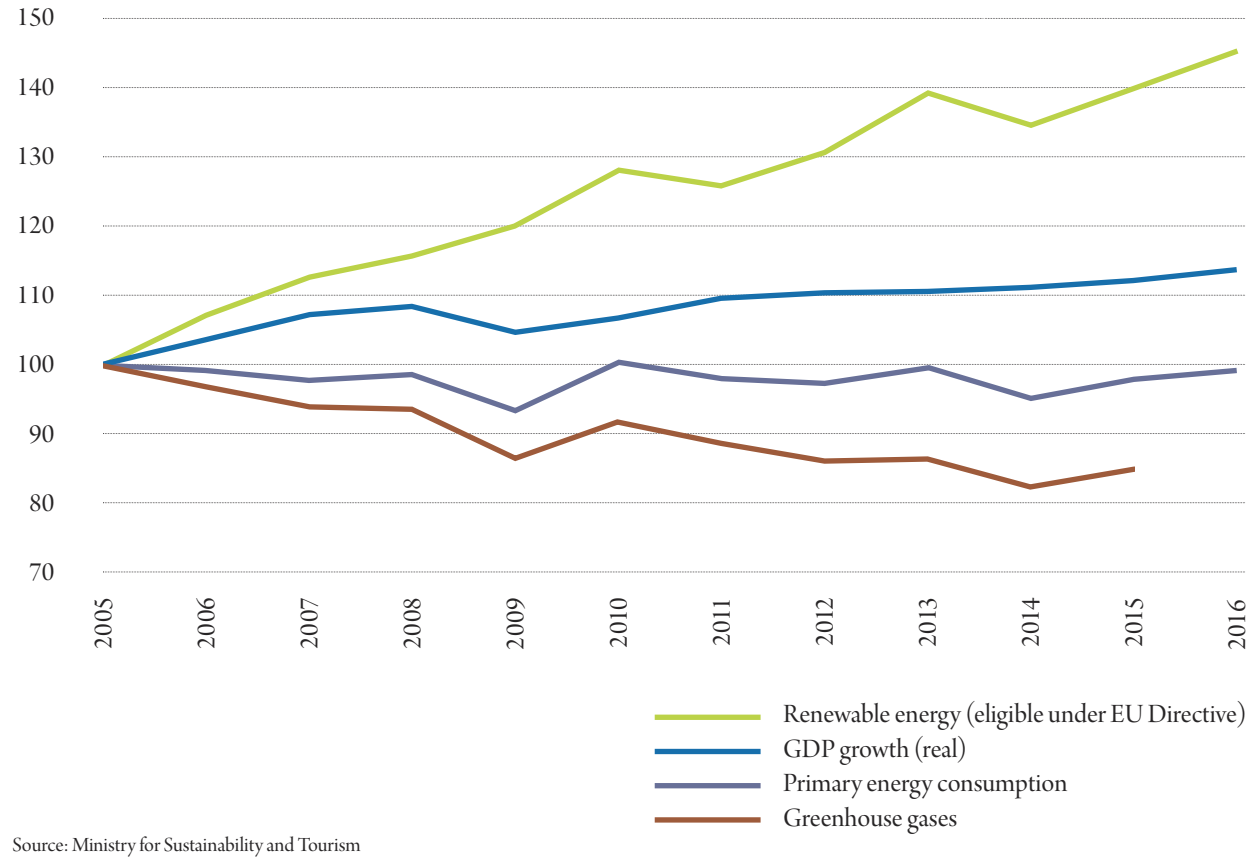
WHERE AUSTRIA STANDS TODAY

AT BOTH EUROPEAN AND INTERNATIONAL LEVEL in recent years, various activities have been initiated or implemented to overcome problems in the climate and energy sectors. The current situation in Austria and European and international frameworks provide important reference points for the development of an Austrian Climate and Energy Strategy.

AUSTRIAN FRAMEWORK

If trends in greenhouse gas emissions, renewable energy and energy efficiency are compared with economic growth since 2005, it is clear that Austria has already made good progress in all three sectors. The biggest success has been in increasing the use of renewable energy, reducing greenhouse gas emissions and stabilizing primary energy consumption. Relative decoupling of the last two indicators from GDP was achieved over the entire period, although greenhouse gas emissions, primary energy consumption and GDP rose again almost in parallel in 2015 and 2016.

FIGURE 1: INDEXED TRENDS IN GREENHOUSE GAS EMISSIONS, RENEWABLE ENERGY AS DEFINED IN THE DIRECTIVE, PRIMARY ENERGY CONSUMPTION AND (REAL) GROSS DOMESTIC PRODUCT 2005-2016 (2005 = 100)



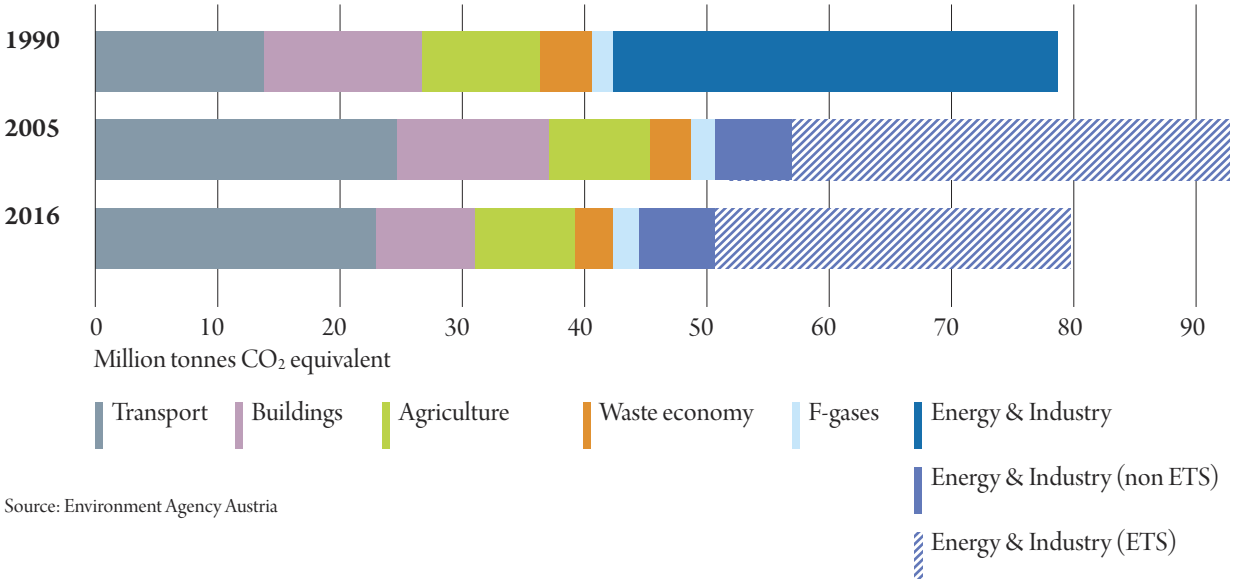
Source: Ministry for Sustainability and Tourism

GREENHOUSE GAS EMISSIONS

Greenhouse gas emissions (GGE) in Austria fell significantly between 2005 and 2016, from 92.7 million tonnes CO_2 equivalent (mt CO_{2eq}) in 2005 to 79.7 mt CO_{2eq} in 2016. Austria therefore wants to take effective action to counter the current, slightly rising, trend reported in the balance in the last two years (2015 and 2016).

- In 2016, 36.5% of emissions were generated by sectors covered by the EU emissions trading system (EU ETS).
- The remaining 63.5% of GGE (non-ETS) are regulated in Austria by the Climate Protection Act (KSG, Federal Law Gazette I No. 106/2011, as amended).
- The preferred method of reducing emissions is to reduce the use of fossil fuels, which are responsible for around 75% of emissions. Marketable alternatives are available in numerous sectors (by increasing energy efficiency and/or using renewable energy).
- Extensive reductions are required in the mobility sector, in which emissions have increased by a massive 66% since 1990. There are serious challenges here due to the predicted increase in both passenger and freight traffic. The sharp increase in urbanization is also putting urban transport systems under huge pressure.

FIGURE 2: GREENHOUSE GAS EMISSIONS IN AUSTRIA IN 1990, 2005, AND 2016



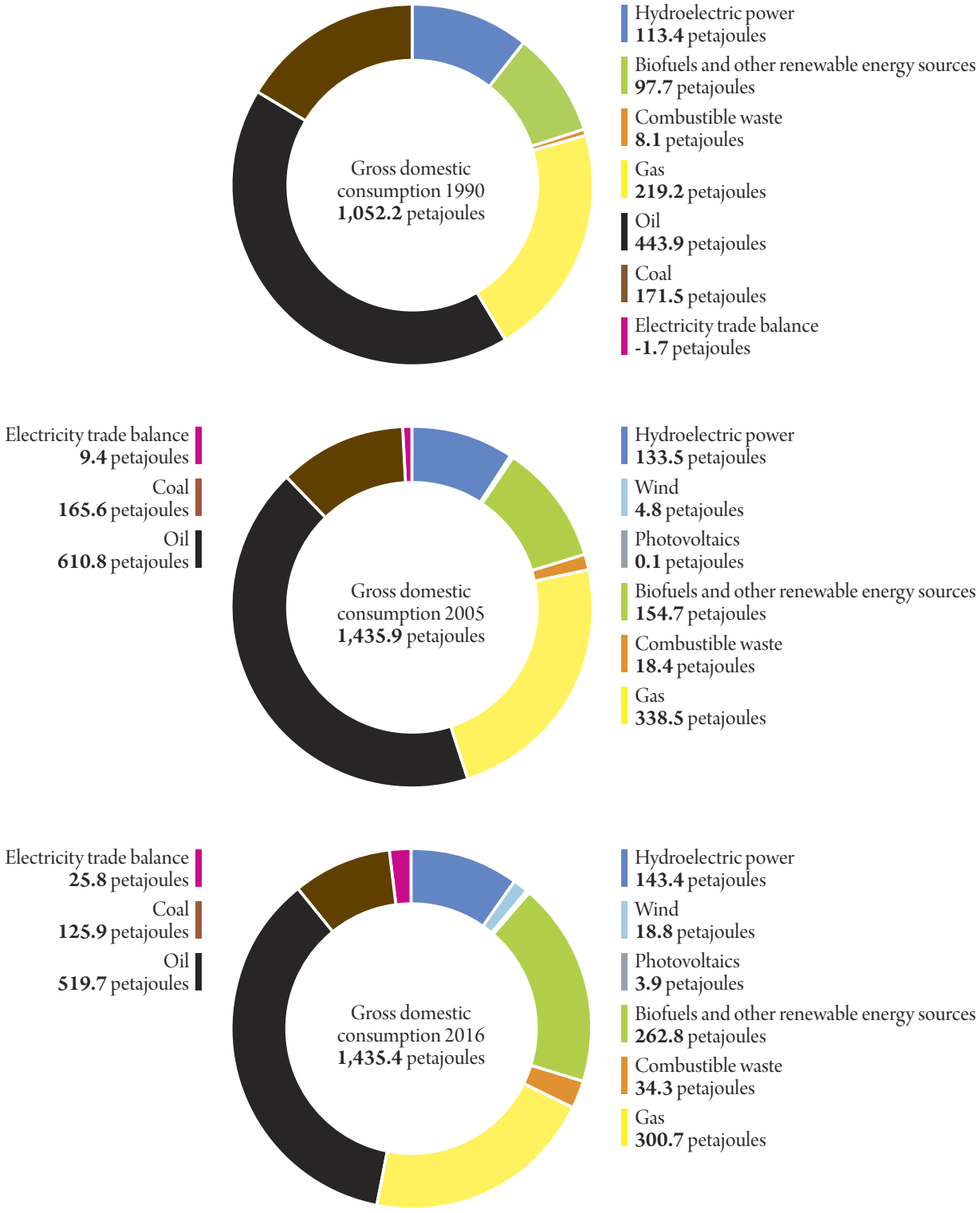
Source: Environment Agency Austria

ENERGY GENERATION AND CONSUMPTION

Gross domestic consumption remained stable at 1,435 petajoules, primary energy consumption fell by 12 petajoules from 1,362 petajoules to 1,350 petajoules and final energy consumption rose by 20 petajoules from 1,101 petajoules to 1,121 petajoules between 2005 and 2016.

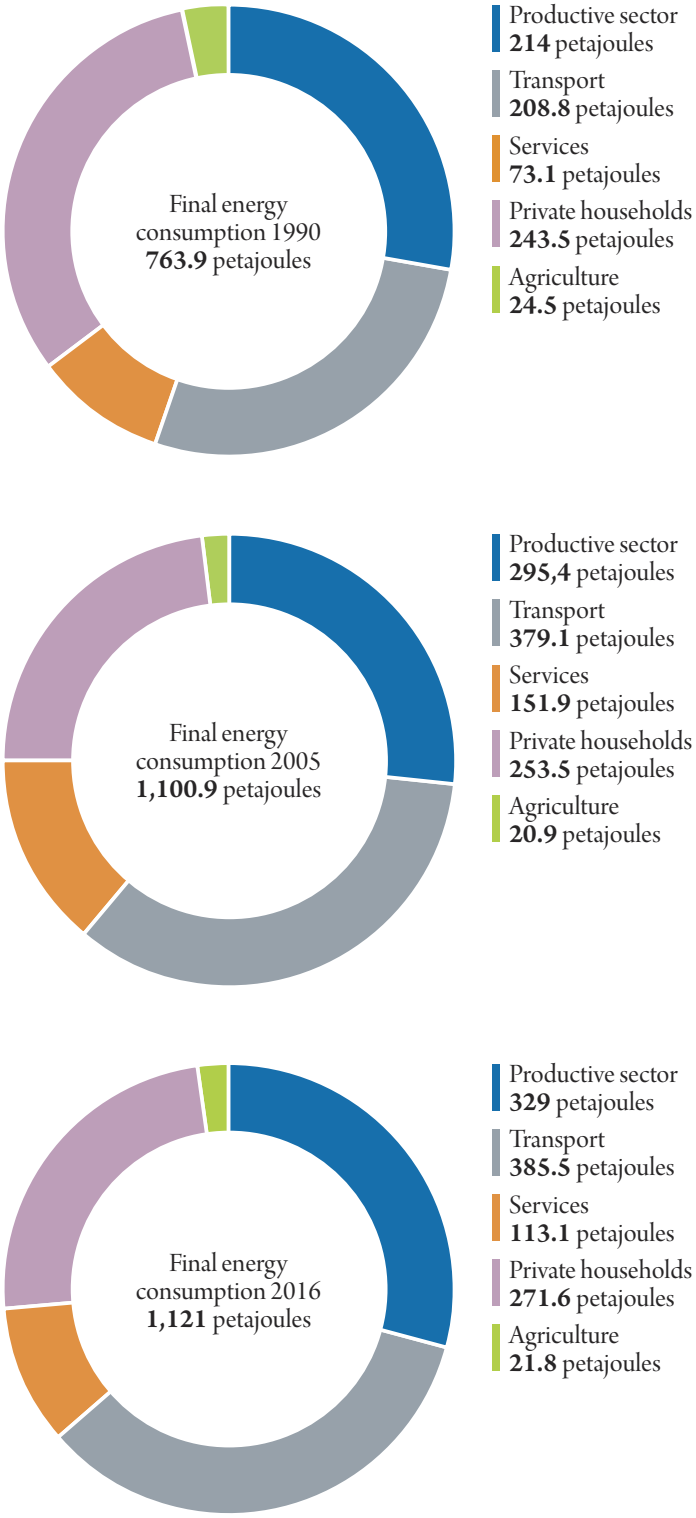
The proportion of energy from renewable sources rose from 23.7% to 33.5%. In absolute terms, that corresponds to an increase of 125 petajoules over that period, of which 38 petajoules was accounted for by power, 66 petajoules by heating and 21 petajoules by biofuels. The proportion of fossil energy sources in final energy consumption is approx. 67%. Imported fossil energy in Austria currently accounts for around 90% and cost around EUR 9 billion in 2016.

FIGURE 3: GROSS DOMESTIC CONSUMPTION IN AUSTRIA IN 1990, 2005, AND 2016 BY ENERGY SOURCE



Source: Statistics Austria

FIGURE 4: ENERGY CONSUMPTION IN AUSTRIA IN 1990, 2005 AND 2016



Source: Statistics Austria

EUROPEAN FRAMEWORK FOR CLIMATE AND ENERGY POLICY UP TO 2030 AND 2050

Back in 2009 and 2011, the European Council, in keeping with other industrialized countries, formulated a conditional long term climate objective for 2050 of an 80-95% reduction in greenhouse gas emissions. Based on that, the European Council set the following targets for 2030 in October 2014:

- A reduction in EU greenhouse gas emissions by at least 40% compared to 1990.
- An increase in the ratio of renewable energy to gross final energy consumption to at least 27%[1] throughout the EU.
- An increase in energy efficiency of at least 27%[2] throughout the EU.
- Cross-border electricity interconnections for at least 15% of domestic generation capacity.
- Greater security of supply and storage capacity in the gas sector.

In order to start moving in the direction of the Paris Climate Agreement, the European Commission tabled proposals in November 2016 and 2017, including in the Clean Energy Package and, from 2017, in Clean Mobility Packages.

In keeping with those proposals, reform of the European legal acts in the internal electricity market, energy union governance, renewable energy, energy efficiency, buildings and mobility sectors is currently being negotiated. Negotiations on the Clean Energy Package and the Clean Mobility Packages at European level were still under way when this Strategy was prepared.

The European greenhouse gas emissions trajectory is essentially mapped by the European Emissions Trading System (EU ETS) for larger emitters in the energy and industry sectors and by the Effort Sharing Decision for sources outside the EU ETS.

The ongoing negotiations on the governance system[3] should ensure that European climate and energy targets are achieved and that every Member State plays its part. In any event, the common European policy provides a solid basis, as well as a framework, for the negotiation of Austrian climate and energy policy. In that sense, this strategy, especially the targets set in Chapter 3, forms the basis for an Integrated National Energy and Climate Plan for Austria in keeping with the Governance Regulation.

[1] The European Parliament is calling for an increase to 35%. A common position will be negotiated between the Parliament and the Council in coming months.
[2] In November 2016, the European Commission tabled a proposed increase in energy efficiency to 30% by 2030. The European Parliament is calling for an increase to 35%. A common position will be negotiated between the Parliament and the Council in coming months.
[3] Proposal for a Regulation on the Governance of the Energy Union (COM(2016) 759final) of 2 December 2016.

GLOBAL FRAMEWORK

The Paris Climate Agreement adopted by 195 countries at the United Nations Climate Conference held in Paris in December 2015, which Austria was one of the first EU Member States to ratify and which entered into force on 4 November 2016, is a globally binding agreement on climate protection. The common targets are:

- To limit the increase in the global average temperature to well below 2°C above pre-industrial levels and to endeavour to limit the increase to 1.5°C above pre-industrial levels
- To achieve a balance between anthropogenic greenhouse gas emissions from the sources and from extraction of such gases by reducing the relevant activities in the second half of the 21st century
- To increase the ability to adapt to the adverse impacts of climate change by fostering resilience and lowering greenhouse gas emissions
- To make finance flows consistent with a pathway towards low greenhouse gas emissions and climate-resilient development

3.

OBJECTIVES FOR A CLIMATE-FRIENDLY ECONOMY

THE TRIPLE TARGETS: ECOLOGICAL SUSTAINABILITY - security of supply - competitiveness/affordability form the cornerstones of the Austrian Climate and Energy Strategy. Equal account must be taken of these different objectives and they must be coordinated in a such a way that each provides optimal support for the others. That is the only way to achieve sustainable and affordable decarbonization that does not compromise growth and employment, that is both cost-effective and resource-efficient and that supports innovation by Austrian firms and makes strategic use of and fosters global development towards renewable energy.

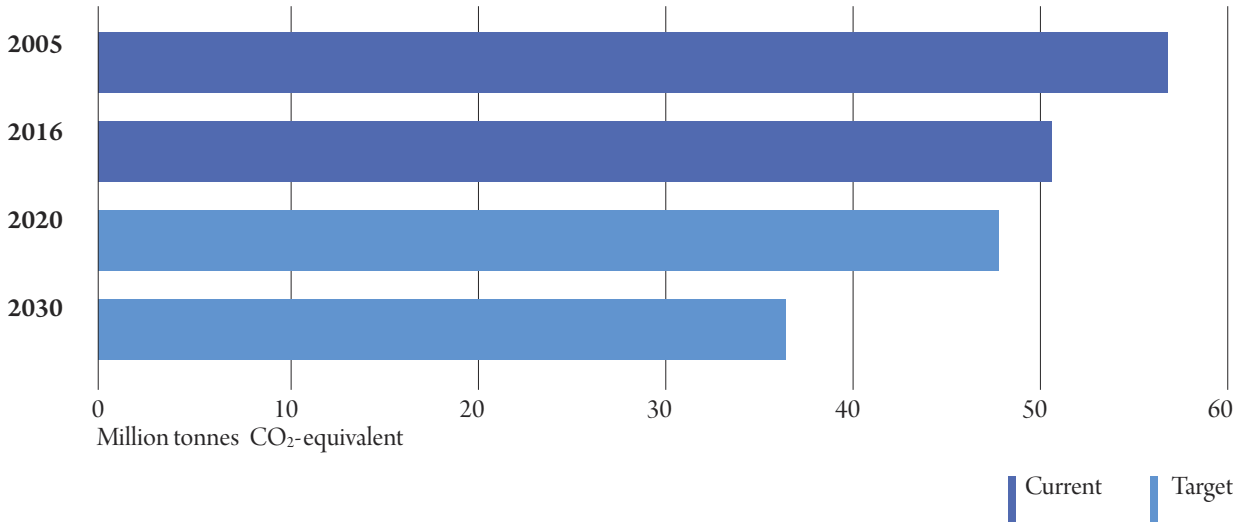
ECOLOGICAL SUSTAINABILITY

The Federal Government wants to set the ball rolling for the Austrian economy and for Austrian society in terms of infrastructure development, security of energy supply, the development of new market models, innovation, research and development, in the aim of turning the energy system into a modern, low-input, carbon-free system by 2050.

GREENHOUSE GAS TARGETS

Austria will reduce its greenhouse gas emissions by 36% in 2030 compared to 2005. In 2016, Austrian greenhouse gas emissions in the non-ETS sector were approx. 50.6 mt CO_{2eq}. The target for 2030 is 36.4 mt CO_{2eq} (a reduction of approx. 28%). The EU Effort Sharing Regulation requires a linear target trajectory to be maintained between 2021 and 2030. All non-ETS sectors will contribute to achieving the target. The focus is on the transport and building sectors, which have the biggest potential for reduction. This reduction is to be achieved by introducing measures in Austria that will set us well on the way towards decarbonization.

FIGURE 5: NON-ETS GREENHOUSE GAS EMISSIONS TRAJECTORY



Source: Environment Agency Austria

Greenhouse gas emissions by firms in the EU ETS must be reduced across the EU by 43% by 2030 compared to 2005, which will also help to achieve the overall European target. This corresponds to an annual trajectory of 2.2%. Austria is hoping to achieve a completely carbon-free energy sector by 2050.

Transport is currently the most polluting sector, accounting for 46% of overall (non-ETS) emissions. It is planned to reduce emissions by approx. 7.2 mt CO_{2eq} to approx. 15.7 mt CO_{2eq} (currently 22.9 mt CO_{2eq}) in order to achieve the overall target by 2030. This will enable Austria to become a front runner in e mobility and alternative propulsion systems and to kickstart further development of public transport at federal and regional level. It will also follow a path that is compatible with the objective adopted in the government programme for fossil-free mobility by 2050.

The building sector also has huge potential for reduction, especially through thermal renovation, which will create important economic momentum for the domestic trade, by shunning fossil fuels in newbuilds and by switching to renewable energy sources and high-efficiency district heating in the existing building stock. This will enable emissions to be reduced in a socially and economically sustainable manner by around 3 mt CO_{2eq} to around 5 mt CO_{2eq} (currently: 8 mt CO_{2eq}) by 2030.

In the energy and industry sector (excluding ETS plants), the energy efficiency measures pushed through, together with as broad a switch to renewable energy sources or power-based processes as possible, should trigger a quantum leap in innovation.

In the agricultural sector, emission reductions are a difficult issue. Full use of arable land to maintain a secure food supply, produce the renewable resources needed and boost organic farming are conflicting objectives. Greenhouse gas reductions can be achieved primarily by using farm machinery with an efficient, renewable fuel-driven propulsion system and by using manure. Cross-sectoral services by the agricultural and forestry sectors to supply more renewable resources must also be taken into account.

In the waste economy and as far as fluorinated gases (F-gases) are concerned, EU law (F-Gas Regulation) and Austrian measures (implementation of the Circular Economy Package) should reduce emissions and ensure international targets are met.

Most greenhouse gas emissions are energy-related and are generated by burning fossil fuels. The best way of driving down greenhouse gas emissions is to increase energy efficiency and switch to renewable energy sources. A mix of measures to reduce greenhouse gases, develop renewable energy and improve energy efficiency is vital in ensuring targets are achieved efficiently.

RENEWABLE ENERGY

Austria's objective is to increase the ratio of renewable energy to gross final energy consumption to 45-50% by 2030. That ratio is currently 33.5%, meaning that the interim target of 34% by 2020 is already in sight.

Another objective is to cover 100% of total electricity consumption (national balance) from national renewable energy sources by 2030. This increase takes account of the anticipated increase in electricity consumption, as electricity from renewable sources in Austria will be used in the mobility, building and production sectors to replace imported fossil fuels. It also relies on future trends in digitalization, decentralization and participation.

Electricity trading on the European internal market will still have an important part to play. Austria's objective is to balance imported and exported electricity and to cover demand from renewable energy at home.

Balancing energy and control energy, the flexibility needed for network operation and assured capacity will continue to be provided, where technically and economically feasible, in order to guarantee security of supply. Balancing energy and control energy to stabilize network operations are disregarded for the purpose of calculating the 100% renewable energy supply.

For reasons of resource efficiency, privately generated electricity in the goods production sector should continue to be generated by low-input, efficient use of by-products on company premises (e.g. in the steel or paper industry), including from non-renewable energy sources. These are generally firms required to participate in emissions trading and to submit certificates for their CO_2 emissions. This means that the above quantities of electricity need not be offset by additional exports.

Although renewable energy is already very important, the heat market still depends heavily on imported fossil fuels. In order to mitigate that dependency, the use of biomass, solar heat and ambient heat will be developed between now and 2030. The details are set out in a National Heat Strategy in liaison with the regions.

A large proportion of natural gas will be replaced in future by renewable methane. Greening the gas, i.e. using biomethane from biogenic waste, hydrogen and synthetic methane from renewable power sources based on a significantly improved system of proof of origin are key components in the development of a sustainable energy system.

A constant absolute quantity of sustainably produced biofuels will account for a relatively higher percentage compared to fossil fuels, at least in the period up to 2030, due to the increasing market penetration of e-mobility. The protein fodder produced as a by-product of biofuels will make an important contribution to the Austrian protein balance.

ENERGY EFFICIENCY

Energy efficiency measures are among the best economic measures for preventing greenhouse gas emissions and take pride of place in Austria, as well as being a recurring theme of the energy union. However, energy efficiency measures may exacerbate what are occasionally long amortization periods in business. Core measures, such as the switch to e-mobility and increased renovation rates, will increase energy efficiency (by a factor of 3 for e-mobility) with no loss of prosperity.

The European Commission's proposal in the Clean Energy Package provides for an energy efficiency target of 30% for 2030 at EU level. However, aside from notifying primary and final energy consumption, the Member States are allowed to define the energy efficiency target as a relative saving based on gross domestic product (at real 2015 prices). Energy efficiency includes a continual reduction in primary energy intensity. As growth will also need to be facilitated in future, especially in the industrial sector, the target for Austria is to improve primary energy intensity by 25-30% compared to 2015. If primary energy demand exceeds 1,200 petajoules (PJ) by 2030, the excess energy will have to be covered by energy from renewable sources. As the ratio of renewable energy to consumption and the greenhouse gas emission targets are fixed, if energy consumption increases, commensurately more renewable energy will have to be used.

SECURITY OF SUPPLY

Security of supply is also a top priority in the transformation of the energy system. Sustainable security of supply means that the short- and long-term physical availability of sufficient energy at any point in time is guaranteed at an affordable price for energy consumers.

INTERNAL DIMENSION OF SECURITY OF SUPPLY

Further development of domestic (especially renewable) energy sources is needed in order to guarantee Austria's security of supply in future and reduce dependency on imports of all energy sources.

The development of renewable energy provides an opportunity to increase the scale of decentral domestic energy supply and strengthen regional supply concepts by creating the necessary framework. The development of renewable energy in the power sector will also be instrumental in achieving the objective of eliminating dependency on imports by 2030.

With a target of a 100% balanced power supply from renewable energy in 2030, sufficient balancing and control energy must be available and the flexibility needed for network operation must be maintained at all times so that this can be achieved economically and ecologically. The high-efficiency combined heat and power plants (CHPP) needed to maintain the power and heat supply, especially in urban areas, are particularly important here.

In addition, greater investment in the storage infrastructure and in the transmission and distribution network will be needed in line with the increase in demand. Economic investments already made (e.g. infrastructure equipment, power lines, storage facilities, power plants) should help to transform the energy system. Existing capacity will need to be used and available network infrastructures will have to take over additional tasks (e.g. power-to-gas, power-to-heat, wind-to-hydrogen, power-to-liquids).

Guaranteed sustainable security of supply, especially in energy-intensive sectors, currently relies largely on natural gas, which can only be substituted in part in the medium term. Sufficient emergency reserves will need to be available in future in order to deal with crisis situations.

EXTERNAL DIMENSION OF SECURITY OF SUPPLY

In light of uncertain geopolitical developments, one major strategic move, aside from developing domestic production capacity, will be to reduce Europe's and Austria's dependency on certain major countries for imports and to diversify energy routes. Reducing dependency on large imports is important for the whole of Europe. Austria is therefore in support of the extensive diversification of energy imports agreed at EU level. International coordination in the event of a crisis is also becoming more important.

Austria's essential role as an important hub for the European gas market, including for storage of gas in long-term storage facilities, should continue to be guaranteed for the sake of security of supply across the entire continent. Austria is working closely with international energy organizations on a multilateral energy policy to achieve secure, transparent, competitive and sustainable energy markets and energy systems.

COMPETITIVENESS AND AFFORDABILITY

The implementation of a decarbonization pathway is a long-term process. A technologically open framework tailored to the pathway need to be put in place that is in keeping with European targets and takes account of competition. This applies to all sectors of the economy that impact on current and future jobs in Austria as a business location. Public resources must be used efficiently, effectively and in a targeted manner along the entire decarbonization pathway.

Successful implementation of climate targets must parallel international targets, in order to ensure a level playing field and maintain the competitiveness of the Austrian economy in general and its energy-intensive industry in particular and thus maintain or expand Austria's share of industry. At the same time, outlets for innovations and environmental and climate technologies from Austria to growing export markets must be increased.

SOCIAL AFFORDABILITY

One policy objective should be that all sections of the population can meet their basic energy and mobility requirements. Consumers should be able to manage this now and in future at a socially affordable cost. High energy costs put low-income households in particular at risk of poverty. It is therefore important to minimize energy poverty in tune with climate and energy targets. Economists, politicians and civil society can work together to find social solutions to help mitigate hardship cases. Maximum transparency in the form of easy and fast access to information and further training should be guaranteed in order to increase social acceptance.

ECONOMIC AFFORDABILITY

The objective is to ensure that Austrian businesses will still be able to obtain energy services at economically affordable prices. Successful transformation of the energy system depends on support for price incentives, energy efficiency and use of renewable energy sources. Competitive pricing mechanisms that take account of tax, duty and incentives should be used to minimize market distortions. Households, commerce and industry should be able to participate actively in the energy market and to react to price signals.

LEVEL PLAYING FIELD FOR A STRONG INDUSTRIAL BASIS

Comprehensive carbon leakage protection provides an important short- and medium-term basis for the conversion to zero-emission processes by energy-intensive businesses and plants that are highly efficient compared to their international counterparts. The emissions trading system should effectively support full decarbonization of our energy system by 2050.

However, missing or differing global carbon prices in industry may encourage relocation or put an end to investment in energy-intensive industries ("carbon leakage"). Therefore, in keeping with the Emissions Trading Directive, the full 100% of allowances should be allocated free of charge to the most efficient 10% of industrial plants at risk of carbon leakage between now and 2030.

MEASURES TO SUPPORT RESEARCH, DEVELOPMENT AND INNOVATION

Positioning Austria as an "energy innovation country" in terms of research and development of next-generation technologies is fundamental to the success of Austria as a location for business and employment.

Where Austria is already a front runner in innovative climate protection and energy technologies, that position must be maintained and improved. Technology quantum leaps cannot be planned; however, the probability of their occurring must be increased by creating an innovation-friendly environment. Decarbonization will be facilitated primarily through innovative technologies. Many are at the trial stage and their further development depends on target support in the form of pilot projects. Public and private efforts in this direction need to be increased significantly overall.

FOSTERING COMPETITIVE ENERGY MARKETS

If the electricity supply is to be based on renewable energy sources by 2030, functioning, cross-border, liquid wholesale markets and common price zones (e.g. Germany/Austria) are needed in order to generate the necessary price signals. The required investments will need to be financed primarily via the market. Market-distorting incentives that conflict with the decarbonization pathway must be minimized, and undistorted, competitive pricing mechanisms must be (re-)established.

BUDGETARY AFFORDABILITY

The public purse, businesses and private households are the main financing sources for climate- and energy-related measures. Sustainable public finances create the room for manoeuvre needed to develop strategic options to achieve climate and energy targets. In view of the long-term challenge of decarbonization, the Federal Government is committed to the sustainable consolidation of public budgets and a permanent reduction in overall debt. That depends, among other things, on a careful assessment of the compatibility of the existing spending and revenue structure with climate- and energy-related targets. It is also important to minimize the risk to the public purse of taking no action or taking delayed action (cost of doing nothing), as that will counteract the objective of achieving a permanent reduction in overall debt.

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WHAT IS IMPORTANT TO US

AS PART OF A SUSTAINABLE CLIMATE AND ENERGY POLICY, the Austrian Federal Government applies principles that act as guidelines for the implementation of the Strategy.

ENERGY AS AN INTEGRATED SYSTEM (SECTOR COUPLING)

The energy system needs to evolve. A key aspect of the change is sector coupling. That means that hitherto separate systems (power, heat, mobility, industry) are interlinked. Sector coupling, with the help of renewable energies that primarily supply power, enables all sectors of the economy to decarbonize. In addition, the use of energy-efficient technologies, such as heat pumps (for heating) and e-vehicles, will slash energy consumption. Sector coupling enables the use of large, cheaper energy reservoirs outside the power sector and significantly increases flexibility on the power demand side. This enables fluctuations in variable renewable energies, such as wind and solar energy, to be balanced without relying too heavily on more expensive power storage facilities. As a natural energy reservoir, biomass helps to make the energy supply more flexible and to balance supply and demand. Biomass can be used for demand-driven production of heat and cooling, power and sustainable biofuels.

It is precisely because sector coupling generates synergies from the integration of large proportions of renewable energies that it is seen as a key concept of the energy transition and in building carbon-free energy systems. The following coupling elements are currently being used or tested: power-to-gas, power-to-heat, power-to-chemicals and combined heat and power.

MAINTAINING THE CURRENT STOCK OF EFFICIENT PLANTS

Optimal use should be made of existing efficient plants in tune with climate and energy targets. The economic investments already made in power lines, storage facilities and power plants should make a proactive contribution to the transformation of the energy system. Heat and cooling supplied centrally in urban areas from waste heat from existing high-efficiency CHPP, refuse incineration, industrial waste heat and efficient use of heat from biomass plants are the key to integrated urban development.

Existing wind farms and hydroelectric power plants and high-efficiency biomass plants in agriculture and industry should also help in future to achieve the 100% renewable power target and the supply of heat from renewable sources. Maintaining existing high-efficiency plants will minimize the consumption of space and resources and thus support the eco-friendly transformation of the energy system.

NUCLEAR-FREE DECARBONIZATION

Nuclear power is not the answer to climate change. Austria will consistently defend that position at all levels and will lobby for no more funding for nuclear energy. Austria will therefore continue to fight against the use of nuclear energy at European and international level and to push for continual improvements to nuclear safety.

LOW-EMISSION MOBILITY OF THE FUTURE

Mobility means access to persons and goods. It must be maintained, but it must be organized more sustainably in future. Austria applies a prevent/shift/improve approach:

- Prevent unnecessary journeys (such as empty runs) through traffic-reducing spatial planning and increased telecommuting
- Shift to efficient carriers such as public transport, cycling or walking
- Improve the technologies used in the aim of switching to alternative fuels and power from renewable energy sources

Extensive decarbonization of mobility is possible between now and 2050. Fossil fuels can be replaced to a large extent by switching to zero-emission vehicles and to energy from renewable sources. In addition to electricity, sustainable biofuels or hydrogen produced from renewable energy can be used for applications that do not lend themselves to electrification.

Public transport and active mobility (cycling, walking) are the backbone of sustainable personal mobility. Mobility and urban development are interdependent. Freight transport is being shifted to rail and inland waterways. Aside from the necessary infrastructure, economic framework and behavioural changes, this will depend on far greater mobility management and new mobility services, as well as digitalization for multimodal networking. The mobility transition will trigger major investment and innovation, but will also require new financing and business models for networked and integrated mobility in future. This will make Austria a more attractive business location, have a positive knock-on effect on employment and improve the quality of life in the towns and regions, and will ensure a more cost-effective and socially and economically viable transport system.

TECHNOLOGICAL NEUTRALITY ON THE DECARBONIZATION PATHWAY BETWEEN NOW AND 2050

The energy system needs to be converted, but that cannot be achieved with the help of just one energy vector or technology. A balanced energy mix is required that consistently boosts the expansion of domestic renewable resources along the entire decarbonization pathway and makes targeted use of bridging technologies to achieve security of supply. However, technological neutrality within the meaning of the Climate and Energy Strategy also means switching quickly out of coal, an end to oil-fired heating in the short to medium term and switching to zero- or minimum-emission vehicles. Independence from oil imports will massively increase Austria's independence and its ability to supply the country with domestic energy and switching to efficient technologies will cut the costs of and the risks to the energy supply and mobility.

BUSINESS LOCATION: CREATE AND SECURE GROWTH AND JOBS

The energy and mobility policy makes use of the tax instruments and rules of the social market economy. Pricing and investment decisions therefore require a competitive market environment. Individual technologies and energy vectors need to be able to compete within a stable legal framework in order to expedite innovation.

The necessary conversion to low-input supply systems, renewable energy and efficient mobility systems is seen as an opportunity for the Austrian economy (mottos: Green Growth, Green Jobs, Environmental Technology Growth Market, etc.). Every measure taken must ensure that Austria remains a secure, competitive location for energy-intensive industry; that and increasing the number of green jobs should create and safeguard employment.

RESEARCH AND INNOVATION AS THE DRIVING FORCE BEHIND AUSTRIAN SOLUTIONS ON GLOBAL MARKETS

Research and technological development play a key role in global decarbonization. Austria still has huge potential to build on past innovation success stories to develop and successfully implement innovative technologies and solutions and become an innovation leader. Even today, Austria has pioneers showing how to break into global markets with smart, advanced climate and energy technologies and systems. That path needs to be pursued with redoubled efforts. Mission-oriented research and innovation by the economy and government, in collaboration with research institutes and users, is needed to support the development and trial of bold solutions. Also, the worldwide profile of Austria as a force for innovation needs to be guaranteed through international collaboration in order to establish a permanent presence on global markets. Austria's planned accession to the "Mission Innovation" global initiative will help enormously in achieving that objective.

DIGITALIZATION AS AN OPPORTUNITY TO INCREASE INDEPENDENCE AND OPTIONS

Digitalization of the energy transition can play a key role in meeting the challenges of the decentralization, flexibilization and efficient use of energy and mobility. For example, it can function as an enabler for the progressive expansion of renewable energies. Control and regulation using digital technologies will become increasingly important during the course of the energy transition and will give rise to new, sustainable business models. In the long term, the link between the power, heat and mobility sectors will become the key to ICT-supported optimization of the energy and mobility system. The introduction of smart meters will improve demand-side management across the entire population. Digitalization of the energy transition will be one of the driving forces behind the decarbonization of developed economies.

CUTTING RED TAPE, EFFICIENT STRUCTURES

Innovation and investment need an appropriate environment. Providing planning and legal security and cutting red tape are vital in eliminating investment blockages. That applies in particular to the infrastructure projects needed for the energy transition.

Current procedures are overly complicated and time-consuming. They are slowing down the transformation of the energy system and putting security of supply at risk in the medium term. The objective, therefore, is to cut red tape to speed up and simplify approval procedures in tune with citizens' rights and relevant EU law. For example, obstacles will be eliminated and more investment will be initiated in the energy system.

USING SYNERGIES BETWEEN DIFFERENT LEVELS OF GOVERNMENT FOR COST-EFFECTIVE IMPLEMENTATION

If climate and energy targets are to be achieved cost-effectively, the Federal Government and regional and local authorities will need to collaborate. Strategies and laws will need to be coordinated in future if decarbonization is to be achieved in a cost-effective manner. This means establishing a clear division of responsibilities and powers and avoiding duplications.

EFFICIENT USE OF PUBLIC FUNDS AND MARKET FORCES

Government funding is designed, among other things, to make up for market failure and encourage innovation. Government grants will need to be approved based on objective, transparent, criteria and must provide the best possible benefit at the least possible cost in terms of achieving objectives. Also:

- Double and multiple funding should be avoided and phased out.
- Grant applicants should be able to plan ahead.
- Federal, regional and local funding instruments should be coordinated based on cost-effectiveness. Monitoring mechanisms should be established to achieve this.
- Funding for as yet uncompetitive technologies should primarily target pre-commercial development.
- Incentives and funding that conflict with climate and energy targets may increase the risk of higher costs to the public purse. Review and phasing-out of potentially counterproductive measures are therefore important building blocks in the development of a strategy to meet objectives at minimum cost.

SUSTAINABLE FINANCES

A successful decarbonization pathway depends on public and private finances and the investment environment surrounding them making a cost-effective and sustainable contribution to meeting climate and energy targets. More private investors should be encouraged to invest in energy, transport and climate protection projects. This will involve, among others:

- identifying the green finance PPP instruments that provide the best possible benefit at the least possible cost and with the fewest possible risks in terms of achieving objectives,
- pushing through investment and structural policy reforms to facilitate the transition to a low-coal and energy-efficient economy,
- providing a sustainable, forward-looking and secure investment environment for Austria as a business location,
- avoiding negative lock-in effects, i.e. long-term coal-intensive investments that will have high transition costs at a later date, and thus minimizing the risk of stranded assets.

SUCCESSFUL INTERNATIONALIZATION BASED ON A STRONG DOMESTIC MARKET

Austrian firms are well-placed in the environmental and energy technology sector compared to other countries and are scoring points with quality products and system services. The green tech industry is making an important contribution to our environment, making us a more attractive business location and creating valuable jobs. A strong domestic market which makes an international name for itself by being the first to implement new innovative technologies and services is an important success factor. The Paris Climate Agreement offers Austrian firms additional new export opportunities that can be utilized by markets worldwide. Firms that proactively help to bring about and themselves make use of this major change will be able to recognize these trends and seize the new financial and commercial opportunities. This will make Austria an ecologically and economically sustainable business and job location that sets an example to other countries and economic areas.

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AUSTRIA'S TRAJECTORY: WHAT WE PLAN TO DO

THE EIGHT HORIZONTAL TASKS BELOW describe the key areas for action under climate and energy policy. They form the basis of the Flagship Projects presented in Chapter 6. These are the projects that need to be implemented as a matter of priority.

TASK 1: DEVELOP INFRASTRUCTURE FOR A SUSTAINABLE AUSTRIA

If it is to meet climate and energy targets by 2030 and achieve a carbon-free economy by 2050, Austria will need to make gradual adjustments to its infrastructure that will have a vital impact on supply (e.g. power plants, rail network) and use (e.g. share of public transport). The Federal Government has therefore adopted the following basic principles, which apply equally to mobility infrastructure, buildings, industry, commerce and the energy economy in the narrow sense:

- Investments in infrastructure projects must serve the energy transition and be socially acceptable and existing barriers must be gradually eliminated.
- New infrastructure projects should help to achieve climate and energy targets. Lock-in effects must be avoided.
- A secure investment environment is needed for new projects, in order to mobilize private capital.
- Optimal use should be made of existing infrastructure in line with climate and energy objectives.
- Infrastructure adjustments should be optimized economically and security of supply should be improved.
- The infrastructure of the future will be both physical and digital. Digitalization will allow much more efficient use of existing infrastructure and new services.

HORIZONTAL ISSUES

Eliminating barriers – expediting development

Innovations and investments in a sustainable and secure energy future require an appropriate environment. Planning and legal security and less red tape are vital when it comes to eliminating investment blockages. That applies in particular to the infrastructure projects needed for the energy transition. Structural changes will not only apply to the production side; small-scale production plants will also be a vital factor on the consumer side.

Current procedures are overly complex and time-consuming. They are slowing down the transformation of the energy system and putting security of supply at risk in the medium term. The objective, therefore, is to cut red tape to speed up and simplify approval procedures in tune with citizens' rights and relevant EU law without compromising environmental protection.

Avoiding lock-in effects

New investments in long-term infrastructure projects that depend on fossil fuels must be avoided. They will run counter to the climate and energy targets set and will be economically counterproductive. First, there is a risk that such investments will have to be amortized prematurely and, second, they will make it harder to achieve the country's climate and energy targets and will thus generate additional expenditure.

Renewable electricity production
The Federal Government has set itself the objective of covering 100% of total national electricity consumption (national balance) from renewable energy sources by 2030. This will mean developing all renewable energy sources. Much of this energy will be produced by decentral photovoltaic plants (e.g. "100,000 roofs") and by developing wind power, hydroelectric power and other plants. Decentralization plays as important a role as the transregional structures needed to ensure the secure and cheap supply of power to industry.

Renewable heat production
Conversion of the energy system in the heat sector is one of the main challenges in terms of making a success of the energy transition. This will involve long-term alterations to plants both for the production of space heating and hot water and for commercial and industrial process heat.

MORE FLEXIBLE ENERGY SYSTEMS

The use of flexibility in the energy system must be boosted in order to maximize the use of renewable energies, while at the same time making efficient use of existing and new infrastructures. This will involve various ways of reconciling a less stable energy supply (due to the use of wind and solar energy) with energy demand, while maintaining stability and security of supply in the overall energy system. They include:

- Flexibility in the energy supply sector (sector coupling, targeted chronological use of non-volatile sources such as biomass, etc.).
- Flexibility in consumption (e.g. buffering of thermal energy for heating and cooling in building mass, adapting industrial and commercial processes).
- Flexibility through storage facilities (e.g. power storage, heat storage, gas storage).
- Flexibility through smart network management (e.g. smart electricity networks, flexible heat networks).

The various options differ in terms of their properties, e.g. in terms of quantity of energy, duration of storage or load reduction, speed of use or chronological availability. Both technical feasibility and the economic and organizational environment are decisive factors in terms of the ability to make use of the potential for flexibility, i.e. the right market and regulatory framework and successful business models need to be found. The energy market of the future should therefore provide more support for firms in marketing their flexibility for the benefit of the system and network.

ENERGY INFRASTRUCTURE – NETWORK AND POWER PLANT DEVELOPMENT

- **Extend existing energy infrastructure**
  The existing network infrastructure (distribution and transmission network) will need to be extended and flexible power plant capacity will have to be kept available in order to meet the challenges caused by an increased proportion of renewable energy in the power system (e.g. increasing divide in time and space between production and consumption, volatility and increased transport demand or system stability).
- **Develop a long-term vision for network infrastructure**
  A long-term vision for Austria's network infrastructure needs to be developed based on global technological developments and Austria's innovative skills. Every available technology and innovation for a state-of-the-art network infrastructure will need to be used to ensure sector coupling, i.e. smart integration of the rapidly increasing share of electricity from renewable energy sources that will enable the targets to be met.
- **Develop an Austrian network infrastructure plan**
  Network development and the development of renewable energy sources will need to be dovetailed and better coordinated in order to ensure the energy system is considered holistically. A national plan will be developed with regional and local authorities based on strategic energy planning in the electricity and gas sectors.

- **Promote coordinated network development across Europe**
  Aside from supply- and demand-side measures to control electricity quantities, coordinated development and conversion of transmission networks in particular will need to be stepped up in order to guarantee security of supply and avoid interruptions due to bottlenecks.
- **Synchronize network development with the development of renewable energy**
  The investments made by network operators make them key enablers for investments in renewable energy. Network development and the development of renewable energies must take place s ystemically. Synchronicity and overall planning will bring about security of supply and planning security, as well as saving costs.
- **Safeguard reserve capacity**
  Reserve capacity should be safeguarded through the market, e.g. by putting capacity out to tender by all potential market operators.
- **Facilitate local networks and storage facility operators**
  In order to strengthen the market, regulatory barriers to local initiatives in production, distribution and storage of electricity and heat should be gradually eliminated.
- **Communicate openly and transparently**
  In order to achieve public acceptance, early and effective inclusion of citizens in infrastructure projects will be guaranteed.
- **Use waste heat**
  An efficient district heating system for buildings and factories will be essential in future, especially in urban areas. Aside from supplying district heat from various renewable energy sources (biomass, geothermal energy, solar thermal energy, photovoltaics, etc) and power/heat coupling, storage of waste heat from production processes will also be vital.
- **Legislate district heat cabling rights**
  District heat has the disadvantage of not qualifying for compulsory cabling rights where the property owner refuses consent. This creates a barrier to connections by generating unnecessary additional costs.
- **Facilitate power line regulations**
  Medium-voltage lines (up to 45 kV) should not require planning consent under electricity laws in future.
- **Boost infrastructure for hydrogen and biogas**
  In order to boost non-fossil fuels and create legal security for investors, hydrogen should be brought under the Natural Gas Tax Act and afforded tax relief. The same should apply to biogas.

STORAGE

Energy storage is needed in order to make increased use of energy from renewable sources. Network bottlenecks can be reduced or even prevented altogether by storing power on the production or consumption site, thereby helping enormously to even out supply and demand.

The above-average storage capacity of storage facilities compared to the rest of Europe and their favourable location mean that Austria can build on very specific strengths for the purpose of integrating renewable energy sources. Pumped storage power plants, gas storage facilities, the gas transmission system and future innovative storage technologies offer additional potential in terms of the use, development and optimal integration of renewable energy into the energy market.

Power storage facilities are vital in terms of maintaining network stability and security of supply. Pumped storage

power plants can remove power from the network when supply exceeds demand and deliver it back to the market when demand exceeds supply. It will be possible in future to use other technologies, such as power-to-gas, for seasonal storage that makes use of the existing gas network or for electrochemical storage facilities for short-term electricity storage.

Hydrogen is one of the most promising solutions to energy transportation and storage problems. The following are key areas for action:

- **Maintain gas storage facilities**
  Unlike other energy vectors, gas can be stored in large quantities and therefore used flexibly at any given time. Also, the storage facilities can be used for methane from renewable sources. Over eight billion cubic metres of gas are stored in Austrian gas storage facilities at the start of the winter. That is enough to meet annual gas consumption in Austria.
- **Boost electrochemical energy storage**
  Electrochemical energy storage can be positioned as large- or small-scale storage units at the upper and lowest network levels in the electricity system and are therefore one way of compensating for the supply-based production profile of renewable energy.
- **Reward storage facilities for supporting the system**
  As new storage technologies will make a very important contribution to the transformation of the energy system, their flexibility should be safeguarded during network pricing. Storage facilities should not be subject to end-user charges and should profit from eco-power funding.
- **Support deep geothermal storage potential**
  As a constantly available renewable energy source, geothermal energy can help enormously in achieving security of supply. Unlike shallow geothermal energy, deep geothermal projects allow higher temperature levels to be used. There is the potential to generate synergies by using existing oil and natural gas probes in depleted storage facilities, especially by minimizing the risks of unsuccessful boreholes and high drilling costs.
- **Focus Austria's energy innovation offensive on energy storage**
  The availability of competitive energy storage that can store electricity from renewable energy in large quantities and for longer periods of time will be instrumental in achieving climate and energy policy objectives, especially full decarbonization of the energy system by 2050 and 100% of electricity from renewable energy sources by 2030. The offensive will also focus on stepping up and supporting applied research projects with pilot systems to demonstrate that scalable storage technologies are ready for market.

CLEAN MOBILITY INFRASTRUCTURE

Mobility is a fundamental need of society and is crucial to an open economy. However, mobility must be climate-friendly, i.e. the balance must consistently tip away from fossil energy vectors. This also means converting the necessary physical and digital infrastructure. Improved public transport services, optimized traffic flows to make more eco-efficient use of the infrastructure, mobility management for business, communities and tourism and the use of digitalization for new mobility services such as carpooling or ride-sharing are important here, as are improvements to the pedestrian and cycle path infrastructure.

E-mobility and alternative propulsion methods

Investment in the strategically planned and demand-driven development of infrastructure is essential in promoting e-mobility and alternative propulsion methods. The most important step here is to develop the charging infrastructure for e-vehicles in collaboration with private-sector suppliers. The basic framework needs to be improved, in order to facilitate charging points, especially in apartment blocks.

Public transport: Investments in transport infrastructure and services

Public transport will be extremely important in the transport system of the future. Public transport is much more energy-efficient and space-saving than travel by car. Therefore, publicly available mobility services in a carbon-free transport system will form the backbone of mobility to which the entire population has barrier-free access. This will involve establishing a dense, optimally coordinated scheduled public transport system (rail and bus), in combination with other demand-driven public transport services and mobility services throughout the country. Multimodal mobility, i.e. enabling combined use of different means of transport, is particularly important here. Again, new infrastructure will have to be created, such as multimodal nodes.

Maintaining and developing public transport and thus mobility in both towns and the countryside will be a fundamental task. In urban areas in particular, the existing public transport system does not have sufficient capacity throughout for extensive switching. More capacity means greater switching potential. Additional night-time rail services can also reduce air traffic.

Therefore, the following measures are vital:

- Completion of the Target Network 2025+, to create the basis for efficient rail freight traffic and an integrated scheduled timetable in Austria. Together with true-cost pricing between the modes of transport and consistent review of existing standards in road freight traffic, this will ensure that infrastructural capacity in public transport and on the railways is used to the maximum by 2030.
- Full implementation of the target rail network for 2050 in Austria needs to be fully under way in 2030 and planning work has been completed. Creation of the bases for investment decisions between 2017 and 2022. Continual evaluation of progress in achieving the target network by 2050 and ensuring any necessary measures are taken. Prioritize measures with a view to maximizing CO_2 reductions.
- In passenger transport, development of intermodal traffic nodes to improve continuity between transport by car and public transport and implementation of a mobility-as-service approach. Developing park & ride, bike & ride and carpooling schemes at railway stations across the country will be key in attracting commuters to public transport.
- In urban areas, combination of public transport with private transport, so that joining the environmental alliance becomes an attractive option for more people. This means creating multimodal mobility nodes, for example to link e-mobility (e.g. e-taxis or e-carpooling) with other mobility services (e.g. public transport, cycle hire).
- Efficient, broadly electrified public transport systems form the basis of a CO_2-neutral transport system in urban areas. Comprehensive cooperation and coordination between the local authorities concerned will create efficient transport systems between towns and the surrounding area and across administrative borders. In remote areas, the targeted development of demand-driven systems will plug the gap down to the "last mile". Ensure recommended minimum standards for passenger rail traffic are implemented.
- In rural areas also, easily accessible public transport can help to reduce CO_2. E-mobility and the development of multimodality (bike & ride, park & ride) or new mobility services are especially important here. Develop scheduled public transport services (rail and bus) and supplement them nationwide with demand-driven public transport and mobility services, such as sharing, pooling or micro-public transport systems as scheduled public transport feeders so as to provide a free choice of means of transport for locals, visitors and the regional economy. Develop efficient, effective and innovative regional railway services and automated systems that help to provide economical demand-driven systems.

Combined transport & freight transport logistics

- Austria as a logistics location should be improved by developing logistics hubs and ensuring that the necessary railway infrastructure is available. The "New Silk Road" project should increase ecological processing by rail of the rising volume of goods from Eastern Europe and Asia.

--- Analysis of efficient and effective strategies to internalize external effects on the road is key in encouraging traffic to switch to rail. This includes hubs or terminals between rail, road and water in combined transport in Austria to encourage more freight to switch to the more energy-efficient modes of transport (rail and ship) based on the "Target Network 2025+" and "Austrian Railways Master Plan" projects. Potential innovative freight traffic solutions for medium and long journeys need to focus on loading techniques, light wagons and specially developed unit loads.

Cycle/pedestrian traffic

52% of journeys made in Austria are under five kilometres long. Cycle and pedestrian traffic is a climate-friendly and energy-efficient alternative for these journeys, especially in towns and surrounding areas. However, their use depends directly on the standard of the traffic infrastructure for these forms of transport. Transport services must be brought up to the standards needed for active mobility. The aim, therefore, is to implement and improve the Cycling Master Plan and the cycle infrastructure development programme in collaboration with local authorities, in order to increase cycling in Austria from 7% to 13% by 2025. This figure may be much higher in towns in the future. The Walking Master Plan to encourage pedestrian traffic will also need to be implemented and improved by local authorities and intermodal interfaces with public transport will need to be improved.

Sustainable Austrian (transport) infrastructure & mobility services

Carbon-free transport will be achieved by using e-mobility on the roads and railways, setting up an appropriate energy supply infrastructure and improving coordinating with available network capacities. Therefore, developments and interactions with other sectors, especially the energy supply and energy networks (motto: "sector coupling") must be analysed. Furthermore, the increasing importance of mobility services and new implementation models must be taken into account.

A process to develop and implement a sustainable mobility infrastructure for e-mobility, alternative fuels and the environmental alliance is needed and should be developed in a strategic infrastructure and spatial planning concept in collaboration with regional and local authorities as the basis for the infrastructural development of Austria. This includes demand-driven, forward-looking and coordinated development and further optimization of efficient infrastructures for road, rail, air traffic and waterways. The gradual implementation of measures to achieve a sustainable reduction in traffic emissions, including in particular use of the supporting potential of digitalization, is key here.

BUILDINGS

Space heating, air-conditioning and hot water account for around 27% of energy consumption in Austria. The energy service involved can be provided at a fraction of the current energy input, provided that the building has good thermal insulation. For the current building stock, that means striving towards a high renovation rate and standard of renovation and ensuring newbuilds are built to the highest thermal standards and have a non-fossil fuel energy supply. A mix of instruments (including energy certificates and recommended long-term renovation concepts) should be used to support the switch from fossil fuel-fired central heating to renewable energy systems (biogenic resources, solar energy or high-efficiency heat pumps, local and district heating), often in combination with the thermal renovation of buildings.

Flexible load management of buildings enables buildings to be used as thermal accumulators and for electricity load-shifting. This involves coupling electrical and thermal systems, for example by using the building mass as a thermal accumulator for space heating and cooling. In order to avoid unnecessary increases in the costs of infrastructure and the demand for motorized private transport, urban sprawl should be stopped. This means erecting buildings in existing urban developments, mixing the functions of urban areas and providing them with public transport services.

PRODUCTION AND SERVICES IN TRADE AND INDUSTRY

Trade and industry are important energy consumers, but they are often also energy producers. For example, using industrial waste heat is often an economically and ecologically sound way of supplying buildings with heat. The switch from fossil fuel-based industrial processes to climate-friendly production methods goes hand in glove with infrastructure conversion. Switching to electricity and/or hydrogen (produced by electrolysis powered from renewable sources) is especially important and will require the corresponding infrastructure. A hydrogen strategy is therefore being developed within an international framework that will also address the technical, regulatory and economic aspects of infrastructure to produce hydrogen using power from renewable sources (e.g. electrolysis system based on proton exchange membrane technology) and store it.

As the use of renewable energy sources increases, flexibility becomes more and more important. Flexibility is what guarantees a stable balance between electricity supply and demand and thus security of supply. One promising flexibility option is demand-side management (DSM), i.e. targeted switching on and off of loads based on market signals. The energy market design of the future should enable firms to market their flexibility, including as control energy.

TASK 2: CREATE THE NECESSARY ECONOMIC FRAMEWORK AND MOBILIZE INVESTMENT

INTRODUCE A MINIMUM CO_2 PRICE AT EUROPEAN LEVEL

Emissions trading in Europe has failed so far to squeeze coal-fired electricity production out of the market; in fact, there has been a revival of coal-fired power plants in some countries. As it has not been possible to achieve the anticipated market effects in the electricity sector, additional instruments are needed to increase renewable energy on the market.

Energy efficiency and the use of renewable energy need to be driven by carbon prices at European and international level and other price incentives. The Federal Government is therefore supporting efforts to introduce a minimum CO_2 price for CO_2 certificates traded in the EU emissions trading scheme (ETS) which is predicated on the electricity sector. The introduction of a minimum CO_2 price would be a sensible addendum to the EU ETS. The price must be chosen so as to drive an adequate fuel shift, i.e. the switch out of CO_2-intensive coal. Any minimum European CO_2 price would have to be accompanied by the development of mechanisms to maintain the standard of Austria as a business location compared to other Member States.

FUND CLIMATE AND ENERGY PROJECTS FROM THE PROCEEDS FROM ETS AUCTIONS

Auctioning certificates in the EU ETS generates revenue for the Member States that can provide an important source of funding for climate protection measures. In Austria, the proceeds from ETS auctions should be appropriated primarily to achieve climate and energy targets. Revenue is expected to rise from 2020 onwards.

MOBILIZE PRIVATE CAPITAL

Explicit involvement of the private sector is needed in order to meet the targets laid down in Art. 2 of the Paris Agreement. The initiatives included in the 2017-2022 Government Programme to "mobilize private capital to

resolve social challenges" (including green bonds and impact investment) need to be analysed against that background for their anticipated effects on the public purse, policies and financial markets by March 2019 by a focal group of representatives of the Federal Ministry of Finance, the Federal Ministry for Sustainability and Tourism, experts and private-sector stakeholders. Proposals for their implementation need to be prepared with due regard for initiatives at EU level.

ELECTRICITY MARKET DESIGN

One objective of the market model of the future is to enable and guarantee access to new market operators (such as aggregators and energy service providers) on a level playing field. Firms and energy suppliers can turn into energy service providers, supply new products and services and include consumers as prosumers. The objective of supplying 100% of all electricity consumed from renewable energy sources in Austria by 2030 is based on a marked growth spurt in domestic power production from renewable energy sources. The market design for all sectors of the electricity system must be predicated on that objective to ensure that the anticipated increase in consumption is covered.

Action is needed in the following key areas to redesign the electricity market:

- **Adjust the network tariff structure: push smart meters and prosumer network tariffs for households and businesses**
  In order to exploit the potential from network stabilization and load balancing, households and firms with interruptible equipment, such as heat pumps, photovoltaic systems, electricity accumulators and e-vehicles, and innovative business models should profit from favourable "prosumer network tariffs". The facility to participate in electricity and heat production plants should be developed on a voluntary basis. Every prosumer will be entitled to a smart meter and thus to participate in these innovative models.
- **Provide a stable framework and cut red tape for aggregators**
  Aggregators should be supported by providing a stable framework and cutting red tape for market participation. This requires a clear legal framework both for aggregators and for third parties.
- **Raise awareness and strengthen consumer rights**
  Consumer rights must be adjusted and strengthened in line with the new developments. Better communication, awareness-raising and information are needed.
- **Divide infrastructure costs fairly**
  The cost of maintaining and developing the network infrastructure needed to transform the energy system must be divided fairly between all network users, even in cases of increasing private generation. It is necessary to guarantee here that metering points will not be offset.
- **Test blockchains**
  A blockchain in the energy economy allows direct transactions in small quantities of energy from numerous small-scale systems between the producer and consumer in order to slash transaction costs. This technology can be used to integrate small-scale market operators or aggregators into the market. Pilot projects should therefore be initiated to find answers to urgent regulatory issues.
- **Abolish tax on private electricity generation**
  There is already tax relief on the first 25,000 kWh of electricity from private generation. Thus, small-scale producers (private individuals and smaller firms) in particular already enjoy a tax break. More firms and households should install photovoltaic modules on their roofs to generate energy. The abolition of the private generation tax should be addressed during structural tax reforms.
- **Develop alternative funding instruments and civil participation**
  For example, in the form of an "energy transition bond" for renewable energy and efficiency projects.

DEVELOP THE BALANCING AND CONTROL ENERGY MARKET AND IMPROVE SYSTEM STABILITY

System stability depends on supply and demand being balanced unconditionally at all times. Derogations from that balance, for example as a result of a power plant outage or unforeseen changes in consumption, must be compensated for by permanent delivery or removal of power. These control power-capable power plants must meet special requirements if they are to be able to offer a high level of flexibility. A larger market for control power-capable power plants would be helpful in terms of increasing system stability.

A stable legal framework at European and national, or even regional, level enables a large number of new operators to join the balance and control power market. This compensates in large measure for the volatility caused by the significant expansion in wind and photovoltaic systems, meaning that fewer conventional power plants are required to maintain network and system stability. As Austria's energy supply companies are planning to switch out of coal-to-electricity conversion in the next few years, we need to speed up the process for switching out of coal-powered generation in Austria.

Key actions include:

- **Sending market operators the right price signals**
  In order to trigger investment and increase flexibility, the market should send out the right price signals. That means permitting price peaks ("scarcity prices") and limiting intervention in pricing mechanisms. Negative wholesale prices should be avoided in keeping with the rest of Europe.
- **Making the control and balancing power market more attractive**
  Official requirements need to be amended, interval shortening needs to be facilitated and the number of new market entries needs to be boosted, while avoiding incentives that are counterproductive in terms of climate and energy targets.
- **Improving the internal energy market and increasing flexibility**
  Much more intensive coordination and collaboration is needed between European transmission network operators and the EU Member States. An integrated European electricity market depends on fully functional markets with quick response times and more cross-border collaboration on next-day, intraday and balancing markets.
- **Introducing annual flexibility reports**
  To ensure better mapping of control and balancing power, potential flexibility, the number of flexibility suppliers on the control power markets and the number of industrial customers which supply flexibility need to be reported annually.
- **Adjusting and balancing the tariff structure**
  Flexible network tariffs to support the system can have a balancing effect on the energy system and thus reduce overall system costs. Network tariff structures need to be simplified and made transparent to customers, so that future dynamic price changes can also be taken into account.
- **Ensuring network stability**
  Cost-effective, forward-looking, supply-secure network stabilization concepts should also help in future to secure the overall system.

MOBILITY

An economic framework, especially public investment and services, funding and tax schemes, have a significant impact on mobility behaviour and traffic development. Social and business systems are predicated on the economic framework. This applies both to the choice of location for home and work and to the choice, quality and energy consumption intensity of the means of transport used. Analyses illustrate that the current transport sys-

tem includes financial measures that are counterproductive in terms of the objectives. The right price signals must also be sent to market operators.

Creating the right economic environment and tailoring services and measures to target groups in freight and passenger traffic are key to a sustainable, carbon-free transport system.

Tax incentives to promote the purchase and use of more efficient, low-emission vehicles need to be optimized. Experimentation clauses should enable sustainable, cross-sectoral service concepts (sector coupling, housing and mobility, tourism services), as well as new technologies such as blockchain applications.

A modern public platform for planning mobility from starting location to destination independently of the form of mobility needs to be further developed as the basis for personalized, energy-efficient services. A new nation-wide fare and sales system for public transport and transparent financing and charging flows should form the basis for integrated and simple fare structures.

The economic framework also needs to be adjusted to take account of traffic-prevention behaviour. Options such as telecommuting or ecological delivery systems need to be increased, especially in densely populated urban areas. The often very low occupancy rate of private motorized traffic needs to be significantly increased.

The configuration of freight traffic logistics is a key factor in achieving climate and energy targets. More freight can be encouraged to switch to rail by ensuring true-cost pricing compared to the roads and providing much better services. Efforts will be made in urban areas to implement CO_2-neutral city logistics systems by 2030, in the aim of having CO_2-neutral urban logistics systems by 2050. This will be achieved through a suitable, adaptive mix of regulatory, logistic, cooperative and technological measures.

RENOVATION OFFENSIVE AND RENEWABLE HEAT FOR BUILDINGS

The building sector will be key in achieving climate and energy policy objectives. Space heating, hot water and cooling in buildings account for around 27% of final energy consumption in Austria. The aim is to reduce greenhouse gas emissions by 3 million tonnes CO_2 equivalent by 2030 (from around 8 today to below 5 mt CO_{2eq}). Several interlocking measures will need to be implemented in order to slash the demand for fossil energy for space heating and hot water. The current building stock has huge potential for savings that can be achieved using current technology. Thermal standards must be further improved in newbuilds and renovations. The rate of renovation needs to be increased from around 1% today to an average of 2% between 2020 and 2030. Fossil fuel-fired heating systems are still widespread, even though the proportion of renewable energy fuels has increased in recent years. Austria still has approx. 700,000 oil-fired heating systems in use which are on average over 20 years old (see Flagship Projects 4 and 5).

TECHNOLOGICAL TRANSFORMATION TO CO_2-FREE INDUSTRY

The most important energy vectors for Austrian industry in 2030 should be electricity and hydrogen (both from renewable sources), synthetic renewable methane (power-to-gas) and biogenic materials. This transformation should receive targeted support that includes an increase in production capacities (e.g. electricity). Research and development should be stepped up in sectors in which there is still no technological option for low-emission, energy-efficient production.

Until the objective of CO_2-free energy-intensive industry can be achieved technologically, emissions trading should be configured to provide incentives for investment in innovative, low-greenhouse gas technologies for

below-benchmark plants and ensure that energy-intensive industry in Austria remains competitive. That means that the 100% of ETS allowances should be allocated free of charge to the most efficient 10% of industrial plants at risk of carbon leakage between now and 2030. In industrial sectors outside the ETS, measures, incentives and targeted investment funding should be used to encourage the technological transformation to CO_2-free industry.

USING THE BIO-ECONOMY TO ACHIEVE A BIO-BASED CIRCULAR ECONOMY

The Austrian countryside is also a space of the future in terms of the transformation of the energy system. Forestry and agriculture and associated industrial and commercial sectors in Austria are important operators in a bio-economy in which fossil fuels are being increasingly replaced by biogenic raw materials. Efforts to achieve the following objectives will focus on existing Austrian know-how and regional potential:

- Improve the capacity for innovation in and outside universities and collaboration between researchers and with private-sector R&D.
- Reduce imports of raw materials by supplying locally and regionally available raw materials and increase Austrian added value in industry and the economy.
- Improve resilience to fluctuations in the price of raw materials and prevent any supply bottlenecks.

The government programme includes the adoption and implementation of a national action plan for a bio-economy. Key elements of the action plan are bio-economy research and establishing and supporting an Austrian bio-economy cluster to bundle and increase the impact of existing activities (see Flagship Project 12).

TASK 3: TARGETED ADJUSTMENT OF THE FUNDING AND TAX SYSTEM TO ACHIEVE CLIMATE AND ENERGY TARGETS

The economic framework and potential for investment are vital in terms of achieving the objectives of this Strategy. The Paris Climate Agreement includes making "finance flows consistent with a pathway towards low greenhouse gas emissions and climate-resilient development".

INTERACTIONS WITH THE PUBLIC SPENDING AND TAX SYSTEM

Ensuring that climate and energy measures can be implemented/financed is vitally important. They will have direct effects on the public spending and tax system that can be clearly allocated to a particular measure, as well as indirect effects causing public spending to rise/fall in interaction with other instruments. Climate and energy policy measures should be set within the framework of structural tax reform. These direct and indirect effects must be taken into account when choosing options that reduce the strain on the public purse.

The Federal Government has committed to the following steps with due regard for the necessary reforms:

- **Changes to the overall spending structure to reduce expenditure**
  All climate and energy measures must help to ensure that the overall government spending structure is cost-effective. If a new measure will put additional strain on the public purse, cuts must be made elsewhere, preferably to expenditure that runs counter to climate and energy objectives. The cost of taking no action must also be considered here. Climate change is costing the Austrian economy as much as EUR 8.8 billion per annum.[4]

[4] Project COIN; Steiniger K. et al (eds.), Economic Evaluation of Climate Change Impacts: Development of a Cross-Sectoral Framework and Results for Austria, Springer 2015.

- **Cooperation between Federal Government and regional and local authorities**
  The Federal Ministry for Sustainability and Tourism will be responsible for coordinated implementation of the processes laid down in Section 3 of the Climate Protection Act and Section 28 of the Fiscal Transfer Act, in liaison with the Federal Ministry of Finance. In addition, the "Environment and Energy" pilot project started under the current Fiscal Transfer Package for the transparency database will need to be extended in order to improve the consistency and compatibility of the overall grant system for climate matters.
- **Compliance with budget limits**
  Federal Government measures must be paid for within the limits imposed under the current and future Federal Finance Act and federal fiscal framework. All departments should ensure in future spending negotiations that no measures are included that run counter to climate and energy targets.
- **Analysis of the cost-effectiveness of climate and energy instruments**
  In order to ensure that resources are spent efficiently, climate and energy funding instruments should be reviewed regularly to ensure that they are still cost-effective and are achieving the desired effects. Central budgetary instruments for climate and energy grants will gradually be analysed by the responsible departments and the Federal Ministry of Finance in spending reviews from September 2018 onwards.
- **Abolition of counterproductive incentives and funding**
  A list of subsidies that run counter to climate and energy targets, including their implications in terms of Austria as a business location, will be prepared by the Federal Ministry of Finance, in liaison with the Federal Ministry for Sustainability and Tourism and the Federal Ministry for Transport, Innovation and Technology. This list will be used as the starting point for abolishing counterproductive incentives and funding.
- **Verify how measures are to be financed**
  Climate and energy measures with implications in terms of spending laws or fiscal policy must be tabled in agreement with the Federal Ministry of Finance.
- **Miscellaneous challenges faced by public authorities**
  The objectives of the Paris Climate Agreement represent both opportunities for and challenges to the exchequer. The Federal Ministry of Finance and the Federal Ministry for Sustainability and Tourism will prepare a joint report within the next two years, so that an informed assessment can be made of the other implications for the federal budget. This joint report should include an assessment of the current and future risk of stranded investments from the point of view of the federal budget (see also Flagship Project 8).

TASK 4: LEGAL FRAMEWORK FOR A CLIMATE-FRIENDLY AUSTRIA

NEW ENERGY ACT FROM 2020

A new framework is needed for the development of renewable electricity production. A comprehensive new Energy Act will ensure that objectives are achieved in terms of the development of renewable energy in Austria. One objective is to produce enough electricity in 2030 to cover 100% of total national electricity consumption (national balance) from renewable energy sources. Hydroelectric power, wind power and photovoltaics will be the driving force behind that development. Biomass-fired electricity production is expected to make a limited contribution. The main potential of these energy vectors is in decentralized systems with heat-led CHPP and in the heating sector.

Successful transformation of the energy system will depend on price incentives that reward energy efficiency and the use of renewable energy sources. Greater attention needs to be paid to interface issues so as to enable sector coupling and, thus, a holistic approach to electricity, heat and mobility systems as the cornerstones of that transformation. Funding policy will need to be adjusted and developed in keeping with EU aid law. Adapting the

funding structure will guarantee a positive investment climate and eliminate administrative barriers. This will facilitate the market integration of renewable energy.

It should be possible to make use of all innovations to achieve climate and energy targets. All paths should be open to encourage research and innovation by businesses. This can be achieved through technology incentive schemes and market-oriented, technologically-neutral funding schemes. The act should be passed by no later than 2020 and should integrate the tasks identified under the previous Eco-Electricity Act.

- **Strengthening marketing responsibility**
  Action must be taken to ensure that every supplier is able to participate in the market on economically viable terms and the target of cost-effectiveness is achieved by having a large number of suppliers. With these conditions in place, market operators can take responsibility for their product (price, quantity and control energy risk, balancing energy costs, network services).
- **Focusing on market premiums and investment funding**
  The current funding model needs to be revised on the basis of current EU subsidy law in order to attract producers of renewable energy to the market in the medium term. The transition from the current tariff subsidies to a market-driven and competitive subsidy system which focuses on market premiums and investment funding and, where appropriate, tendering models, should be implemented quickly to keep overall subsidies close to current levels despite the increase in renewable energy.
- **Paying closer attention to cost-efficiency**
  Further development of renewable energy should be cost-effective and market-driven. This means that aspects such as system costs can be included by using control and balancing energy. In terms of future subsidies, there must be room for manoeuvre where technologies are expected to cease to be cost-effective.
- **Facilitating the development of existing and the construction of new energy production plants and power plants for renewable energy**
  The objective of developing renewable energy can only be achieved in a favourable legal environment. The intention is to implement or use the necessary renewable energy technologies quickly and consistently. The increase in energy from renewable sources and the gradual reduction in fossil fuels must also be taken into account in the energy efficiency sector.
- **Coupling eco-electricity funding with storage capacity**
  Where appropriate, the development of reservoirs should be stepped up in line with increasing volatility on the electricity market by coupling eco-electricity funding with the provision of storage capacity.

FEDERAL LEGISLATIVE POWERS FOR ENERGY LAW

The division of tasks between the Federal Government and regional and local authorities is complex and, in part, out of date. Responsibilities therefore need to be reallocated in order to shed outdated responsibilities and create clear structures for regulation and responsibility. Innovation and investment in a clean and energy-secure future require an appropriate environment. At the same time, structures in the energy sector need to be streamlined. Targeted and efficient use of resources depends on simplified structures and transparency.

ENERGY EFFICIENCY POST 2020

Austria's energy consumption targets and energy savings targets are based on the requirements of the Energy Efficiency Directive (EED). The Austrian Federal Energy Efficiency Act (EEffG) complies with the need under EU law to boost energy efficiency between now and 2020. Aside from the obligation schemes, a series of mea-

sures (e.g. regional residential building grants, energy and environmental grants and federal funding instruments) are helping to improve energy efficiency. The national framework needs to be reconfigured for the period between now and 2030 in order to take account of developments within the European Union in the energy efficiency sector. In order to amend the Energy Efficiency Act in line with EU rules, a process to evaluate current regulations will be started in September 2018. Options will be worked out in consultation with the relevant stakeholders, in the aim of achieving increased energy efficiency targets more efficiently and without any unnecessary red tape.

The following issues will need to be taken into account:
- The need to increase annual plant renewal rates for pumps, motors and ventilation and lighting systems
- In public procurement: the total cost of ownership (best bidder criterion), by including energy consumption across the entire life cycle
- The preparation/implementation of "energy-efficient town" and "energy-efficient village" pilot projects
- Energy savings through increased energy efficiency and conversion to renewable energy sources
- Energy management, which also offers SMEs the opportunity to record energy consumption in their firm and, where possible, achieve a lasting reduction. This will give them a competitive edge and is key to making Austria a strong location for business and employment. Funding schemes will be needed to support the implementation of energy management systems in small and medium-sized enterprises.
- The need for people, especially commuters, to switch to public transport
- Investments in thermal building renovation, high-efficiency building services and energy management systems in buildings
- The possibility of shorter amortization periods for investments in certain energy efficiency measures
- Use of commercial and industrial waste heat

If efficiency is increased, the resources consumed in the production of goods and services can be reduced. This may cut costs which, in turn, will impact on purchasing habits and the use of products. This rebound effect needs to be taken into account.

ENVIRONMENTAL IMPACT ASSESSMENT ACT

If climate and energy targets are to be achieved and the necessary infrastructure developed, red tape needs to be cut and procedures simplified. A bill amending the Environmental Impact Assessment Act is being prepared which provides for responsible fast-tracking and simplification of approval procedures without compromising ecological standards. Measures to improve procedural economy should include:
- shorter preliminary proceedings;
- vesting jurisdiction to rule on complaints in proceedings seeking declaratory judgment in judges sitting alone;
- adopting clear jurisdictional rules for transregional proceedings.

MOBILITY

Cycles or developments in the transport system are influenced both by the economic environment and, more importantly, by the legal environment. This applies to the environmental impact of individual means of transport (e.g. in the form of current limits on greenhouse gas emissions) and to laws governing traffic organisation and sequencing (e.g. through speed limits or rules governing idling vehicles, such as those in regional parking regulations). Due to its federal structure, the jurisdiction of Austria's local authorities differs. Alongside federal

jurisdiction, the regional authorities are responsible for key areas in which action is needed to achieve zero-emission mobility and decarbonization, such as land use planning, parking regulations, public transport and traffic organization. This applies in particular in terms of the responsibilities of towns and councils for zoning, building regulations, traffic organization, public transport and cycle and pedestrian traffic. Proper coordination and collaboration with local authorities is therefore essential to zero-emission mobility and carbon-free traffic.

If targets are to be achieved, strategies and key areas need to be coordinated and agreed between the Federal Government and the regional, urban and local authorities, rules and regulations that are counterproductive in terms of decarbonization need to be identified and abolished, and the legal framework adopted by the Federal Government and the regional, urban and local authorities to support a carbon-free traffic system needs to be coordinated.

An open mind is needed, especially towards innovation, and an optimal legal framework needs to be created for (e)carpooling, e-taxis, automated driving and other forms of mobility such as ride-sharing and attractive mobility services. Another objective is to cut red tape and to evaluate the 60 kph night-time speed limit for lorries, exemptions from driving bans for e-vehicles, new and revised weight limit rules and measurements, ways of stepping up non-monetary incentives for cleaner mobility or the necessary logistic adjustments to buildings and infrastructure, especially the establishment of e charging points. This can be specifically included in laws governing residential construction materials. Clear rules are also needed to ensure that e-charging points do not require an industrial installation permit.

NEW BUILDINGS

Buildings erected after 2020, i.e. which will not require comprehensive renovation between then and 2050, should meet the highest efficiency standards. These buildings should not require fossil fuels for space heating, hot water or cooling.

The necessary building regulations, which will include climate change adaptation measures (e.g. shades for passive cooling), should be adopted by no later than 2020 and should guarantee that investors can plan ahead. The building standard developed by klimaaktiv already highlights the requirements that will be relevant post-2020. In any event, the requirements of the EU Buildings Directive (that, from 1 January 2021, all newbuilds must be designed as nearly zero-energy buildings) will be met.

A holistic approach must be taken to the building concepts of the future. Decisions on location impact on mobility and buildings also play a key role in energy storage. In future, numerous sustainable solutions will be implemented, depending on location and type of use. Very different concepts are required in densely built-up areas with commercial housing developments compared to smaller building units (such as terraced/semi-detached houses and single-family houses). Residential buildings also have a very different energy consumption profile compared to office buildings or schools, for example. However, all types of buildings should have as efficient a building envelope as possible in common in terms of heating and cooling requirements, so that they consume relatively little additional energy. In addition to the construction methods used for nearly zero-energy buildings, passive and plus-energy building standards will become more and more commonplace.[5]

[5] Demonstration building from "House of the Future" and "Town of the Future" research programme, Federal Ministry for Transport, Innovation and Technology 2017 (www.nachhaltigwirtschaften.at/resources/hdz_pdf_SdZ_TechnicalGuide2017.pdf.

WASTE MANAGEMENT

Austria has a very highly developed and differentiated waste management compared to other countries. Waste incineration and energy extraction (to prevent CO_2 emissions in other sectors, especially space heating) and methane emissions from landfills are important in terms of the emissions generated.

The objective is to achieve a highly efficient recycling economy. A recycling economy is important when it comes to dealing with valuable resources and climate protection and also minimizes dependency on imported fossil and other mineral raw materials (e.g. metals, phosphorus). Waste prevention, reuse and increased recycling will be boosted, in part by smart product regulations (product design, material selection, repairability, longer lifetime, etc.), which are not waste management measures in the narrow sense.

Key areas for action/contribution of waste management to 2030 targets:
- In the lead-up to 2030, methane emissions from landfills will need to be reduced, in part by watering and, at the same time, improved landfill gas capture and aerobic in-situ stabilization.
- In sewage management, optimizing nitrogen removal creates the potential to reduce nitrous oxide emissions.

FLUORINATED GASES

Reducing emissions of greenhouse gases from fluorinated greenhouse gases (F-gases) is a declared EU objective. Quotas for F-gases placed on the EU market should reduce quantities (measured in CO_{2eq}) by 79% by 2030. F-gases will be replaced by natural coolants or coolants with low greenhouse gas potential. Measures adopted by the EU in legal acts should enable emissions to be eliminated in large part by the middle of the century through innovation and technical advances.

Key areas for action/contribution of the sector to 2030 targets:
- Monitor compliance (harmonized in large part under EU law) with the provisions of Regulation (EU) No 517/2014, especially restrictions and bans
- Monitor progress under the quota system and the conversions needed as a result of the shortage of F-gases
- Gradually replace F-gases in all stationary cooling and air-conditioning systems and heat pumps by natural coolants or coolants with low greenhouse gas potential in the economic sectors affected. F-gases as a propellant for foamed materials (e.g. insulation slabs for buildings) will also have to be replaced in coming years.
- Endeavour to limit the use of sulphur hexafluoride in circuit breakers in the medium term
- Limit the use of F-gases in medicinal aerosols, where possible by switching to powder inhalers and similar HFC-free systems

TASK 5: RESEARCH AND INNOVATION AS KEYS TO A SUCCESSFUL BUSINESS LOCATION

Research, technological progress and innovation will be key in developing new solutions, proactively helping to shape change processes and positioning Austrian operators on international markets. The task of making the decarbonization agenda technically feasible, economically viable and socially acceptable depends on a long-term research, technology and innovation (RTI) policy.

New energy solutions and energy technologies are likely to develop into the biggest growth market of the 21st century. For export-driven technology providers in the energy sector, it is important to take account of application-driven implementation and transposition both on the European home market and on global markets. Aside

from a structured interplay of technology providers and users, the reference market needs more innovation-oriented public procurement. This will enable the often difficult phase up to market entry to be mastered. In terms of innovative energy solutions, Austria has already scored points internationally as an exporting country and positioned itself successfully on the world market with clever energy solutions for the future.

MISSION INNOVATION

The aim of the Climate and Energy Strategy is to put Austria at the forefront of energy innovation. This will involve a significant increase in public-sector research and innovation ("Mission Innovation"). In order to boost research at home, Austria will accede to the global Mission Innovation initiative and promote key technologies as a front runner. The leverage effect of direct research grants to attract private investment in energy innovation must be taken into account, especially with regard to forward-looking investments in Austria. Other incentives are planned to significantly improve the research and innovation quota by mobilizing private investment in research, development and applications.

Mission-based research and innovation will support joining forces to implement specific joint projects, as well as focused and efficient innovation management. The interplay of research, economy and policy needed for acceptable restructuring must be predicated on people and their basic needs (housing, mobility, work, etc.). Fundamentally, these are solutions for an economically successful, climate-friendly business location (see also Flagship Project 9).

AUSTRIAN ENERGY RESEARCH AND INNOVATION SYSTEM

Thematic focal points for Austrian research and development were identified during preparation of the Austrian Energy Research and Innovation Strategy[6] using a function-oriented approach. The primary aim is to achieve demand-driven target systems and to integrate production, conversion and storage technologies optimally into the target system. This systemic approach will need to be developed to include the interplay between the individual action levels in order to create the necessary long-term latitude for decisions and action to achieve climate and energy targets.

DEVELOPMENT OF KEY TECHNOLOGIES

The Federal Government work programme includes the objective of modernizing our energy systems by developing key technologies under an open technology energy research initiative. Domestic resources and know-how should drive mission research and development to overcome specific challenges in the energy system. Technological leadership will be achieved and a quantum leap in development and application will be initiated through large-scale trials of technologies/solutions under real conditions. The driving forces of innovation in the country – from green tech start-ups through small and medium-sized enterprises to international industrial plants and research institutes – should all be proactively involved in shaping current change processes, such as digitalization and decentralization of our energy systems or diversification of mobility systems to make them climate-friendly.

--- **Sector coupling**
  Design integrated system solutions for coupling infrastructure, technologies and services for power, heat and mobility
--- **Digital and smart energy**
  Ensure system integration of new energy storage and energy supply system flexibility technologies as basic enablers for a high proportion of renewable energy, coupled with security and resilience

[6] Federal Ministry for Transport, Innovation and Technology (2017): https://nachhaltigwirtschaften.at/de/e2050/publikationen/energie-forschungs-innovationsstrategie.php.

--- **Marketable comprehensive solutions and technology-based services**
Develop new business models in connection with digitalization by taking account of new social trends (see also Flagship Projects 10 and 11)

Current research programmes should focus on alternative propulsion technologies (such as hydrogen/fuel cells) for public transport buses, shunting locomotives, etc. Future research into vehicle technologies should focus on zero- and low-emission vehicles. That includes research into innovative fuels (e-fuels).

INTEGRATED FUNDING PORTFOLIO FROM BASIC RESEARCH THROUGH TO TRANSITION TO MARKET

Breakthrough technologies are used both to save energy and, increasingly, when using energy. In order to boost these advances, a new environment needs to be created for oriented basic research, alongside ways of increasing integration of the innovative capacity of entrepreneurs and start-ups in RTI initiatives. Climate and Energy Fund programmes currently cover the entire innovation process from basic research through to demonstration (see also Flagship Project 10).

TASK 6: EACH AND EVERYONE'S RESPONSIBILITY – EDUCATION AND AWARENESS-RAISING FOR A SUSTAINABLE FUTURE

This Strategy will enable the public to participate actively in the energy system in future. More intensive awareness-raising and information campaigns should boost the demand for climate-friendly and energy-efficient goods, services and technologies and attract the necessary investment. Efforts must be made to introduce a common approach at federal, regional and local level.

EFFECTIVE INCLUSION OF ALL MARKET OPERATORS AND CONSUMER EMPOWERMENT

Transformation of the energy systems depends on households being active operators and beneficiaries of the energy transition. One target, therefore, is to empower consumers and, where possible, to prevent or remedy potential systemic cost/benefit imbalances. A fair and sustainable energy transition must be everyone's business.

Digitalization of energy system infrastructure (as in the current rollout of smart meters) enables previously passive consumers to make proactive and flexible use of new products and services.

Ways of enabling consumers to produce, store and use their own energy are being supported and improved. In future, the focus will go beyond single-family owner-occupied houses to owner-occupied apartments and, most importantly, to mixed-use and rented buildings. What we need to do now is to lay the groundwork, as better load distribution through greater use of control and balancing energy will benefit the entire system. In addition, future prosumers will be able to benefit from flexible price mechanisms and incentives and new, complex tariff structures will need to be transparent and comprehensible. Consumer rights will need to be adapted and strengthened in line with the new advances. Improved communication, awareness-raising and information are also needed.

Existing mobility platforms need to be developed to network transparent, publicly accessible mobility services (mobility as service) and to establish integrated door-to-door services. Digitalization allows new services such

as ride-sharing, public transport on demand and personalized services that both facilitate new business models and support energy-efficient mobility behaviour.

AWARENESS-RAISING

One overarching issue is awareness-raising to ensure efficient energy use by the public. One example was the introduction of waste separation in the 1980s, when Austria played a pioneering role in modern waste management and environmental technology. This issue ranges from information campaigns to the inclusion of energy efficiency and climate protection in curricula and technical training courses. The klimaaktiv initiative has already kickstarted awareness-raising, information and further training among relevant tradespeople.

A broad approach to awareness-raising should make everyone aware of the importance of climate protection and energy efficiency and the need to use energy resources sparingly. Successful implementation of numerous Climate and Energy Strategy measures will depend on how well people identify with them. It is therefore vital to ensure that consumers are informed of this broad-based sea change and are included from the outset or motivated to make a personal contribution.

- Awareness-raising for the purpose of image-building, identification and integration (networking of stake holders involved)
- Image-building to establish positive associations with the Energy Strategy and thus increase the public's identification with the issue ("Count me in!")
- More social dialogue on energy issues and innovative solutions
- Improved consumer understanding (e.g. comfort can have a different quality) and raised awareness as to the importance of the right technologies and products (resource savings, etc.)
- Advice on the right way to use appliances and technologies and enhanced personal responsibility. Correct user conduct generates savings.

EDUCATION

Proper integration of the subjects of energy use, energy efficiency, resources and climate protection along the entire education chain will help trigger effective behavioural changes in the short term and a sea change in the long term.

- Boost interest in the subjects of energy, sustainable mobility, climate protection and the need to strike a balance between energy consumption and resource-intensive behaviour
- Include these key subjects in compulsory and higher education curricula
- Put more emphasis on these subjects in teacher training and further training at teacher training colleges
- Prepare teaching material for different types of schools
- Campaign to generate highly-qualified technicians and step up further training activities
- Improve skilled trades
- Transfer know-how between industries and trades (see also Flagship Project 11)

RESEARCH-FRIENDLY ENVIRONMENT

Transformation of the mobility and energy systems depends on firms and (research) institutes having sufficient qualified staff. The aim, therefore, is to significantly increase the number of energy researchers in universities, polytechnics and non-university research institutions. Developing and expanding targeted measures to attract young researchers to the energy sector and creating or developing education services along the research/innovation/market value added chain should help to achieve this. Even though the majority of questions are technical/scientific questions, care must be taken to ensure that social science questions (acceptance of techniques,

system transition and change in the economic system) are also answered.

Networking between the people involved in theoretical research and practical application is important in terms of increasing the relevance of research results. Improving the transfer of knowledge and technology, especially from universities to industry, should help to generate socially relevant applications or added market value from the research results obtained. Creating or developing joint research infrastructure in the energy system and an integrative approach between research and transition to market (e.g. in terms of economic and legal requirements) will help Austrian energy researchers and firms to position themselves better on the European and global market.

ENERGY CONSULTING

Energy advice is a very good way of guaranteeing more efficient use of energy by the public. Information on energy efficiency helps households to save energy and thus cut costs. It must be assumed that energy efficiency skills need to be improved across the entire population if sustainable results are to be achieved. Therefore, energy advice and information on how to make savings must be available to all households and economic operators. Communication will need to differentiate between target groups. Existing advice structures and programmes should be developed, extended and harmonized. Comprehensive energy advice when granting housing subsidies or planning permits should be prescribed in collaboration with the regional authorities.

MOBILITY MANAGEMENT AND AWARENESS-RAISING

Mobility management is a key element when it comes to improving traffic organization in the private and business sector and in towns and regions and makes an important contribution in terms of the change to sustainable mobility and carbon-free traffic. Mobility management supports the introduction and use of new, eco-friendly technologies, so that full use can be made of their potential and counterproductive developments can be avoided.

- The aim is to improve the level of information and awareness among the public concerning sustainable mobility. Every Austrian firm and urban, local or regional authority and other relevant operators in the mobility system should be motivated to introduce zero-emission sustainable mobility solutions under mobility management schemes and should be supported in that endeavour.
- Traffic and mobility also have serious health implications, e.g. in terms of road traffic safety and the health benefits of active mobility. Health aspects should be linked to environmental and traffic aspects by adopting a Transport/Environment/Health Plan along the lines of the WHO UNECE Transport, Health and Environment Pan-European Programme.
- Aside from using alternative technologies, it is also especially important to provide advice on the use of new intermodal transport services.

PUBLIC-SECTOR ROLE MODEL

- The best bidder criterion, alongside climate and energy criteria, should be applied as standard in public procurement.
- Demand-side stimulus for innovation is becoming increasingly important as a corollary to supply-side approaches. The introduction and establishment of energy innovations should be stepped up through innovation-oriented public procurement.
- The right environment should be created for switching the heat supply to renewable energy sources, including district heat for public buildings used by federal, regional and local authorities.
- The public sector should set an example with public procurement or public transport fleets by switching to

zero- or nearly zero-emission vehicles during routine replacements on the part of public agencies with no particular application requirements. Vehicles should be purchased based on the total cost of ownership (TCO).

TASK 7: USE TECHNOLOGY FOR DECARBONIZATION

Numerous innovative inventions originated in Austria. Innovative Austrian firms – from green tech start-ups to internationally successful industrial plants – are both in demand on the home market and figure among the world leaders. As a small open economy, trade is vital to Austria and it needs to make use in particular of comparative advantages in production and energy technologies and market development within the framework of the Paris Climate Agreement.

Austria is a technologically advanced country and needs to use its stable home market as a springboard to build consistently on that advantage. The eco-industry is innovative and competitive and its growth is a win for the climate, the location and employment. The Austrian eco-industry (productive sector) generated national revenue of around EUR 18 billion in 2015, thereby safeguarding over 90,000 jobs in the Austrian economy. Each and every new recruitment to the eco-tech industry generates close to two additional jobs in other sectors of the Austrian economy.

The Austrian energy and eco-tech industry is a robust industry of the future on every count with massive export potential. Promoting Austrian energy and eco-technologies generates enormous opportunities for added value and employment in Austria. The increase in the already high export quota also makes an important contribution to global climate protection.

BUILDING ON STRENGTHS

The demand for energy and environmental technologies will increase in the wake of the Paris Climate Agreement throughout the world in future. That means that it will be even more important in future for Austrian energy and environmental engineering to be able to demonstrate its capacity for innovation and technological leadership. Austrian firms are particularly innovative in the e-mobility, low-emission mobility, bio-energy engineering and energy efficiency sectors. These sectors are areas of strength in the Austrian economy that we must build on. Support for exports of domestic environmental and energy technologies is therefore being developed. Austria ranks first and second in the EU in terms of the number of new patents registered in the transport/mobility and energy efficiency sectors[7], respectively.
Key areas for action to help Austrian energy, transport and environmental technologies to maintain their current momentum are as follows:

- Increase investment in environmental and climate protection
- Increase energy know-how in SMEs through energy management systems
- Improve the framework for establishing and operating demonstration and pilot systems using energy, mobility and environmental technologies
- Put public procurement in the energy, mobility and environmental technology sectors on a sustainable and innovation-promoting basis
- Boost digitalization in energy, mobility and environmental technologies
- Develop initiatives to stimulate and support start-ups in environmental and climate protection

[7] Economica (2016), on behalf of the Federal Ministry of Agriculture, Forestry, Environment and Water Management. EU28+EFTA, data base: EP/PCT publications 2006-2015

- Step up training and further training in energy, transport and environmental technologies, especially by creating green jobs under training and grant schemes
- Improve quality standards and advice initiatives in the climate and energy sector
- Boost support for the internationalization and export of domestic energy, environmental and transport technologies
- Exploit export opportunities through international climate funding
- Boost exports of Austrian know-how in sustainable forest management, forest development and harvesting techniques and reforestation systems

BROAD-BASED TRIAL PHASES UNDER REAL CONDITIONS

The implementation of broad-based solutions and development and test phases will be particularly important. This will involve integrating individual technologies into holistic systems, optimizing their interactions and obtaining relevant findings or empirical knowledge on broader implementation under real conditions or with user involvement. Various funding instruments will need to be combined and coordinated within the framework of a long-term development and test phase for these broad-based trial phases. Investment funding and private investment will need to be dovetailed or merged with research grants for these test phases.

One example of this is the Climate and Energy Fund RTI initiative "Energy Showcase Region". The Energy Showcase Region is designed to illustrate that an energy supply based on up to 100% renewable energies is feasible using Austrian innovations. Innovative energy technologies are tested in the showcase region and then rolled out in Austria under the Climate and Energy Fund marketing programme. The Fund will support three selected showcase regions over the next three years (for implementation in 2018-2025): WIVA P&G (hydrogen/methane), NEFI (100% renewable energy power supply for domestic industry) and GreenEnergy-Lab (smart grids/demand-side management/demand response). Over 200 project partners are involved (of which 60% are firms).

These RTI initiatives can provide a basis for supporting an experimentation clause based on the German example set in the SINTEG Ordinance, by giving participating firms an opportunity to test new business models in a protected regulatory environment (see Flagship Project 10).

TECHNOLOGY TRANSFER AND INTERNATIONAL POSITIONING

As innovative firms cannot afford not to internationalize, not least due to globalization and the relatively confined home market, they are supported in this challenging growth phase. The successful positioning of Austrian energy technology suppliers depends, first, on active networking of and collaboration between Austrian operators in international RTI initiatives (e.g. under the EU Strategic Energy Technology (SET) Plan or International Energy Agency collaboration programmes) and, second, on strategic bundling of individual strengths to give comprehensive solutions.

One example is the transnational Smart Energy Systems Joint Programming Platform based on an Austrian initiative. The Federal Ministry for Transport, Innovation and Technology is coordinating a network of 25 national and regional RTI grant schemes in 23 European/associated countries on the topics of smart & digital energy systems and integrated regional energy systems. The objective is to initiate and promote transnational RTI projects in co-creation with regional operators and users in the participating countries. This will give Austrian operators access to international innovation partners and EU funds. It will also open the door to the EU framework programme and to international markets. Cooperation under transition-to-market programmes in the participating countries and private investors is also planned.

MOBILITY

A technological sea change is needed in order to create a framework for low-CO2 mobility predicated on e-mobility, especially in the vehicle sector. In order to achieve a carbon-free transport sector, e mobility from renewable energy is the technological alternative to the combustion engine. Electrification of transport includes both private transport in passenger and goods vehicles and public road and rail transport, carpooling and taxis. Much more efficient propulsion and electricity production from renewable energy sources are both important advantages of the system. In addition to energy and CO2 savings, traffic pollution and noise are massively reduced. Aside from creating an appropriate charging and fuelling infrastructure or developing a direct energy supply to means of transport (e.g. electrification of the railways and buses), e-mobility must be integrated in the long term into the electricity-based energy system of the future by resolving the energy storage problem.

Sustainably produced biofuels, biogas (bio-CNG/bio-LNG) and hydrogen from renewable energy can also help to replace fossil fuels. Research in this sector needs to be stepped up in order to develop innovative bio-refinery concepts, second-generation biofuels and cheap hydrogen production and storage, and power production in fuel cells. However, no further significant developments are expected in the phase up to 2030. Increased use of alternative renewable energy-based technologies is needed where electrification is currently a limited alternative (e.g. heavy goods vehicles, agriculture, aviation).

- In order to increase e-mobility (including fuel cells) and alternative fuels and their infrastructure at federal, regional, urban and local level, the national strategy framework for clean energy in transport needs to be developed as an Austrian platform for entities implementing the measures.
- Efforts will be made between now and 2030 to shift the focus in new registrations to zero-emission cars and light commercial vehicles. This will depend on incentives and regulatory policy improvements and having the Federal Government lobby at EU level for a follow-up regulation on CO_2 limits for new cars and light commercial vehicles so that greenhouse gas reduction targets can be achieved.
- The technological options for lorries and buses need to be increased between now and 2030, for example by subsidizing and designing alternative freight transport technologies and zero-emission logistics on the roads and railways and in combined transport and by having the Federal Government lobby at EU level for strict regulation of CO_2 limits for lorries and buses so as to achieve greenhouse gas reduction targets. Specific incentives are planned to help significantly increase the number of zero-emission lorries and buses by 2040.

Smart transport systems have the potential to provide mobility via end user services and to influence their acceptance. Vehicles of the future will be cooperative, networked and, at a later stage, automated. Automated driving also has the potential to reduce the number of vehicles on the road and the use of energy in transport. Controlled driving can guarantee a more even traffic flow and close links with public transport systems can achieve sensible meshing between transport operations and efficient transport systems (sharing/e-mobility/automation). The necessary legal, economic and transport framework needs to be created for this. Vehicles should act as feeders to and collectors from the public transport system for medium and long journeys. The necessary flanking ICT systems need to be developed for this. Pilot applications should focus on sustainable use, so as to improve safety and achieve more eco-efficient use of infrastructure by optimizing traffic flows.

TASK 8: MAKE URBAN AND RURAL AREAS MORE CLIMATE-FRIENDLY

The settlement pattern, i.e. the distribution of various land uses (housing, work, leisure, education, shopping and services), has a massive impact on the transport effort needed to link these different uses. Decision-making processes in the past have paid insufficient attention to these interactions. Land use planning in the past decades has

been responsible in large measure for the increase in road traffic and energy consumption in buildings and thus the increase in CO_2 emissions. Requiring climate and energy targets to be included in spatial planning concepts and the land use plans and programmes of local authorities is a necessary regulatory policy move.

SETTLEMENT DEVELOPMENT IN RURAL AREAS – MAKING SPARE USE OF THE LAND

Land use is an important long-term factor in terms of achieving climate objectives and using energy resources economically. In Austria, 14.7 ha of land are developed daily (2014-2016 average). Rezoning for buildings, business and traffic by numerous local authorities in Austria is squeezing out agriculture and "eating up" land at a rate that is still well above the sustainable development strategy reduction target of 2.5 ha per day.

Land use regulations must therefore be moved towards limiting land utilization, preventing soil sealing and only allowing compact urban and commercial developments. Reviving town centres also has positive social aspects. Land development must be coordinated with public transport catchment areas and promote a proper mix of functions such as housing, work and leisure. Land use planning will help to reverse the increasing trend towards road transport services and the resultant increase in CO_2 emissions in the mobility sector over recent years.

One major concern in Austria is to stop urban sprawl. This will be achieved by erecting buildings in existing urban developments, mixing the functions of urban areas and providing them with public transport services. Building regulations and parking regulations are vital to climate-friendly mobility.

Greater use should be made of housing grants and other investment instruments for urban developments and energy spatial planning. This needs to be seen within the context of future negotiations between regional and local authorities.

Issues that need to be discussed with the regions include the impact of spatial planning on greenhouse gas emissions, use of public transport quality classes (mobility labels) and development land zoning or land use grants. The objective is cost-effective and efficient spatial planning in keeping with climate and energy targets.

- Spatial planning and zoning should promote settlement patterns that help to compact and mix functions and guarantee short journeys.
- A comprehensive infrastructure and spatial planning concept needs to be prepared, adopted and implemented in collaboration with regional and local authorities.
- Land use should be controlled responsibly and land loss/sealing reduced.
- Measures should be taken to activate unused factory premises and residential buildings (incentives to use).
- A master plan to prevent soil sealing is needed.
- Land use planning should focus on reducing the need for mobility.

PROMOTE SMART CITIES

Cities play a vital role in successful climate protection and energy system transformation. The objective must be to configure the urban regions of the future to be more functional, climate-conscious, energy-efficient and low-input. Smart cities pursue more sustainable urban development and always take a holistic approach. Energy-efficient urban development depends on energy standards for districts and neighbourhoods developed in conjunction with climate-friendly energy supply systems and a common approach to urban development, buildings, energy and energy systems. Urban planning, infrastructure planning, network planning, land use planning and energy planning processes must therefore be developed at all levels of local/regional government.

ENERGY SPATIAL PLANNING

Coordinated, transregional, forward-looking energy spatial planning, especially in connection with major infrastructure projects, reduces the potential for conflict and fosters greater acceptance among the public.

Energy spatial planning allows innovative energy concepts to be implemented that focus on cheap, locally available renewable energy, the use of waste heat and integrated mobility systems. Analysing and pinpointing energy consumption and the potential for energy savings and energy production provides important information on their planning dimension to enable climate-friendly planning. Modern, integrated energy concepts can be used in spatial planning for zoning, infrastructure investment and housing grant decisions.

Providing buildings and businesses with efficiently produced district heating will continue to play an important role in future, especially in urban areas. Alongside production from various renewable energy sources (biomass, geothermal energy, solar thermal energy, photovoltaics, etc.) and combined heat and power, delivery of waste heat from factories will play a very important role. There is a great deal of untapped potential here in Austria. Instruments such as energy spatial planning should be used in future to incentivize the use of waste heat.

These new systems and technologies are being successfully demonstrated under real conditions in the Climate and Energy Model Regions supported by the Climate and Energy Fund and in the Smart Cities to expedite their market launch and transformation of the energy and mobility systems.

The Austrian Spatial Planning Partnership "Energy Spatial Planning 2" was introduced in 2014 to improve coordination between spatial planning, energy sector and regional development operators. Work on implementing priority recommended actions and on the application and development of existing instruments is being carried out under the aegis of the Federal Ministry for Sustainability and Tourism.

MOBILITY

Traffic prevention takes first place when it comes to reducing energy consumption and greenhouse gas emissions in the mobility sector. Differences in settlement patterns in urban and rural areas must be taken into account. Public transport links should be an important criterion for new developments. The regulatory and legal framework and infrastructure and spatial planning should also take better account of active mobility requirements. Mobility is influenced by the quality of the built-up environment, such as the attractiveness of pedestrian and cycle routes. Spatial planning and land use planning are therefore highly relevant to mobility and extremely relevant to climate.

Spatial planning must include the degree of mobility induced by a particular residential or commercial development as a planning criterion in future and take measures to implement it. Stationary traffic management should favour the environment/transport alliance, improve the environment in public spaces and strengthen the quality of the location for trade and commerce, focusing on reform of parking regulations, new bicycle racks built to defined minimum standards in terms of access and weather protection, e-mobility infrastructure and measures to favour alternative forms of mobility (walking, cycling, carpooling).

USE OF NATURAL RESOURCES

The Federal Government is committed to competitive, large-scale, multifunctional agriculture and forestry based on agricultural holdings. Agriculture and forestry face the challenge of finding strategies and solutions to climate protection and adjustment to climate change, while at the same time having to meet social needs in the

form of food and raw materials and animal welfare. Due to the emissions (predominantly methane and nitrous oxide) associated with cattle farming, the use of manure and land cultivation, agriculture and forestry differ from other sectors which primarily generate CO_2 from the use of energy.

Agriculture and forestry in Austria are an important source of renewable raw materials (and their waste products) for the domestic energy supply. Forests in particular are vital to the global climate system. Now that land use has been included in the EU climate targets for 2030 (LULUCF Regulation), emission and carbon storage from agriculture and forestry are now firmly embedded in the national climate balance. Measures to protect and develop biogenic carbon storage, such as forests, pastureland and arable land, are therefore classed as climate protection measures. Measures that affect the land use sector should help to achieve the national target for Austria by 2030 in keeping with Article 4 of the LULUCF Regulation. In future, EU agricultural policy and its instruments should be predicated more closely on environmental and climate policy.

Measures under the common agricultural policy and the master plan for the countryside should enable the variety of high-output rural areas to make key contributions to the transformation of the energy system by:

- Maintaining agricultural land, especially pastureland
- Controlling land use responsibly and reducing land loss/sealing[8]
- Continuously increasing tree growth and timber harvesting in Austrian forests in keeping with the basic precepts of sustainable forest management, in the aim of increasing carbon storage in forests and durable timber products in the context of the EU Land Use, Change in Land Use and Forestry (LULUCF) Regulation in the long term
- Increasing the use of domestic timber in construction, for example in public spaces, and making use of the various opportunities of the bio-economy
- Cultivating and using agricultural land in keeping with local and environmental conditions and protecting natural resources (maintaining soil fertility, reducing environmental impacts, using resources more efficiently, fostering a recycling economy, protecting inland waters)
- Promoting regional and seasonal produce (short journeys, shorter time in storage, less food waste)
- Reducing CH_4 and N_2O emissions by improving livestock breeding without compromising animal welfare, using fodder adapted to nutritional requirements and optimizing the entire manure chain, especially by preventing losses during dunging, storage, spreading and working in
- Allowing targeted humus formation on Austrian land and extending organic farming, where regionally sensible, productive and feasible, including through ground cover and erosion protection measures

[8] Requirement of spatial planning and zoning to reduce loss of agricultural land and prevent soil sealing.

6.

FLAGSHIP PROJECTS

IN ORDER TO LAUNCH the integrated Climate and Energy Strategy, the Federal Government has adopted the following measures as the first key steps. Core elements of the flagship projects, which include both short- and long-term measures, should be implemented during the current legislative period.

FLAGSHIP PROJECT 1: EFFICIENT FREIGHT TRANSPORT LOGISTICS

CURRENT SITUATION

Freight transport and mobility are vital to economic progress and social prosperity. However, transport is one of the main causes of environmental impacts, and a significant proportion of those impacts is ascribed to freight traffic. The "Transport Plan for Austria" adopted for the freight transport and logistics sector was prepared by the Federal Ministry for Transport, Innovation and Technology with broad involvement of representatives of industrial, commercial, transport and logistics service providers, the social partners and scientists.

A comprehensive list of measures was prepared based on the results of analysis and discussion in the working parties. The priority objectives are to:

- Increase the competitiveness of the Austrian freight transport and logistics sector,
- Increase the attractiveness of Austria as a business location,
- Safeguard social and ecological sustainability.

That concluded preparations to define the transport policy strategy of the Transport Plan in the freight transport and logistics sector and paved the way for the implementation of a specific package of measures.

MISSION

The public sector and the logistics and transport industry want to process current and future transport demand more efficiently, reduce the negative impact of freight traffic and guarantee a high standard of transport services. The efficiency of the overall transport system must be ensured, despite the rise in freight traffic, taking account of the special requirements of freight mobility.

MEASURES

Measure 1: Efficient Freight Transport Logistics
Instrument: Special Logistics Funding Directive, approved by the Federal Ministry of Finance under ref. BMF-112702/0019-II/10/2017
Logistics funding aims to support integrated solutions that take account of the special requirements of freight transport and logistics, such as the requirements of urban business and freight traffic (e.g. to overcome special challenges such as scarcity of thoroughfares, delivery time/place restrictions, interface problems, pressure of costs, emission reductions, etc.) and the implementation of integrated concepts in rural areas.
Responsibility: Federal Ministry for Transport, Innovation and Technology
Timeframe: Directive applies from 2018 to 2022

Measure 2: Research and Technological Development and Major Energy-Efficient Freight Logistics Automation and Organization Pilot/Demonstration Projects
Instrument: RTI Directive
Responsibility: Federal Ministry for Transport, Innovation and Technology
Timeframe: 2019 onwards

FLAGSHIP PROJECT 2: INCREASE RAIL-BOUND PUBLIC TRANSPORT

CURRENT SITUATION

As a rule, there is massive potential in urban areas to shift vehicle traffic to public transport. A dense network is economically justified and makes public transport an attractive option. Although the service could be improved through additional public transport options based on the existing infrastructure, they are not being offered at present due to financial constraints on regional local authorities.

However, it is precisely in conurbations that the public transport infrastructure does not always provide sufficient capacity for extensive switching. Ideas for projects and proposals with a high switching potential exist, but funding for them has not yet been secured. They include, for example:

- Increased capacity on Austrian Railways routes in and around the Vienna junction, including to improve l ocal traffic. These include the Airport junction, four-track Meidling-Mödling extension, Laaerberg Tunnel, Simmering-Praterkai extension and inner Aspangbahn projects.
- Other urban rail projects (streetcar, light railway, metro) in and around Vienna, Graz, Salzburg, Linz and Innsbruck.

Night train connections also qualify as public transport with high switching potential that could reduce air traffic. New connections could be developed with relatively little (initial) support.

MISSION

To cut greenhouse gases by tipping the modal split in favour of public transport (varying impact on the public purse depending on the savings made)

MEASURE

Develop infrastructural and operational (operator-side) measures to promote rail-bound public transport in urban areas.

Instruments:

- Infrastructure: Austrian Railways Master Plan, Medium-Term Investment Programme for private railways and metro
- Operation: Transport service contracts

Responsibility:

- Infrastructure: Federal Ministry for Transport, Innovation and Technology, regional authorities, local authorities, infrastructure companies
- Operation: Regional authorities (incl. alliance organization companies), Austrian Railways/PV AG, other passenger rail transport companies (e.g. private railways).

Time frame:

- Infrastructure: 2018 to 2022 create framework to pursue projects
- Operation: additional contracts from 2020

FLAGSHIP PROJECT 3: E-MOBILITY OFFENSIVE

CURRENT SITUATION

E-mobility offers a great deal of potential for growth in the vehicle production, charging infrastructure and production technologies sectors, as well as for new service providers and mobility services. The Austrian automotive industry could generate up to 34,000 jobs and EUR 3.1 billion in added value by 2030 by developing e-mobility. The share of e-vehicles among new registrations is 2.25% and the share of e-vehicles among all passenger vehicles is currently 0.39%.

The Austrian Railways infrastructure is currently 73% electrified. That figure will rise to approx. 79% on completion of measures already decided. However, there is still untapped potential for measures to remedy the lack of integrated systemic mobility solutions and there are numerous outstanding research issues in terms of range, costs or battery technology. The Federal Government has therefore undertaken to create a framework for low-CO_2 mobility focusing on e-mobility and to define development objectives for e-mobility in order to increase e-mobility.

MISSION

Austria wants to achieve an essentially CO_2-neutral transport sector by 2050. In road transport, the switch to mainly zero-emission vehicles based on renewable energy and nearly zero-emission vehicles should happen over the medium to long term. For that, a framework will need to be created to facilitate the shift to new registrations of zero-emission vehicles by 2030.

Electrification of the Austrian Railways network should increase to 85% by 2030. For that, an average of 50 km of existing routes will need to be electrified each year. On private railways, 20 km will need to be electrified. By 2030, the share of e-buses and e-utility vehicles should have increased significantly. The mobility concepts of town councils and local and regional authorities will be brought into line with e-mobility concepts and redesigned.

MEASURES

The following bundle of measures under this flagship project should be implemented in the form of a broad, concerted e-mobility offensive. At federal level, the Federal Ministry for Transport, Innovation and Technology and the Federal Ministry for Sustainability and Tourism should implement the measures in collaboration with regional and local authorities, the automobile industry and mobility and logistics companies, using existing funding directives, funding instruments and processing departments.

Bundle of measures 1: E-Mobility for Road Vehicles and Infrastructure
This bundle of measures includes new priorities in the vehicle sector such as e-utility vehicles and an important infrastructure component (e.g. charging infrastructure for e-buses). For e-vehicle funding, the co-financing model should be further developed with the automobile industry. In the RTI sector, one focus will be on zero emissions research. Other important components of this package are improvements to increase everyday utility, eliminate barriers and boost private investment. That includes, in particular, reforming housing law to make it easier to install charging points in apartment blocks. In fact, the installation of charging points can be included in the list of privileged modifications in Section 16(2) No. 2 of the Condominium Act (WEG). Classification as a

normal fixture under Section 4(2) No. 2 of the Tenancy Act (MRG) can be achieved by adding "charging points for electric vehicles" and under Section 2 No. 2 of the Limited Profit Housing Act (WGG) by adding "electric vehicles" in the list of adequate connection facilities. The fact that the charging points do not require an industrial installation permit also needs to be clearly regulated. Additional simplifications are planned in road transport, such as the exception from IG-L air pollution restrictions ("Luft100er" 100 kph speed limit to cut air pollution) and driving bans.

Instruments: klimaaktiv mobil Directive, incl. EAFRD, Environmental Funding Act (UFG), Climate and Energy Fund Act (KLI.EN FondG), RTI Directive, housing law (WEG, WGG, MRG), IG-L, road traffic regulations (StVO), innovation-oriented public procurement, innovation partnerships
Responsibility: Federal Ministry for Transport, Innovation and Technology, Federal Ministry for Sustainability and Tourism, Federal Ministry of Constitutional Affairs, Reforms, Deregulation and Justice, Federal Ministry of Digital and Economic Affairs, regional and local authorities
Timeframe: 2019 to 2022 (vehicles & infrastructure); 2018 to 2022 (zero emissions research; legal and organizational matters)

Bundle of measures 2: E-Mobility by Rail
Electrification of the railways should be increased in collaboration with regional authorities. Research into decarbonization of the railways (batteries or fuel cells for traction purposes) is also being planned.

Instruments: Austrian Railways Master Plan, Medium-Term Investment Plan for Private Railways, RTI Directive, innovation-oriented public procurement, innovation partnerships
Responsibility: Federal Ministry for Transport, Innovation and Technology, co-financing by regional authorities
Timeframe: Research from 2019, rail electrification by 2030

Bundle of measures 3: E-Mobility Management, E-Fleets and E-Logistics
The successful introduction of e-mobility will depend on smart mobility management to integrate e mobility into existing mobility concepts in regions, towns and municipalities and in corporate logistics, alongside automotive technology and infrastructure measures. E-mobility management will help to achieve numerous CO_2-neutral or even zero-emission mobility solutions and mobility services, such as e-carpooling, e-taxi systems, demand-driven e-mobility services, electric bus-on-demand services, e-bike hire systems, e-delivery services and logistics. This bundle of measures should help new e-mobility services to penetrate the market. In particular, all operators in the transport sector (urban, local and regional authorities, tourism operators, firms, fleet operators, mobility service providers, logistics service providers, associations) should be motivated through incentives and mobility management to introduce e-mobility and supported in the transformation to and implementation of e-mobility. This can trigger positive sustainable systemic effects in the transport and mobility system and in the structure of space and the economy and boost the economy and employment.

Instruments: klimaaktiv mobil Directive, incl. EAFRD, KLI.EN FondG, innovation-oriented public procurement, innovation partnerships
Responsibility: Federal Ministry for Sustainability and Tourism, Federal Ministry for Transport, Innovation and Technology, regional and local authorities, companies
Timeframe: 2019 to 2022

FLAGSHIP PROJECT 4: THERMAL BUILDING RENOVATION

CURRENT SITUATION

Heating and hot water in residential and commercial buildings currently account for around 16% of Austrian greenhouse gas emissions in non-ETS sectors. They have declined significantly since 2005 (-35%), mainly as a result of thermal renovation and conversion to renewable energy sources. In addition, heating, hot water and cooling in buildings account for around 27% of total final energy consumption in Austria. There is enormous potential for renovation, especially in the building stock dating back to the 1950s to 1980s. These properties are becoming harder and harder to reach for funding purposes, due in part to ownership structures and conflicts of interests between owners and tenants.

MISSION

There is therefore still considerable potential for CO_2 savings in the building sector in the longer term. The objective is to achieve a reduction of at least 3 million tonnes CO_2 equivalent by 2030 (from around 8 million tonnes today to below 5 million tonnes). The objective for 2050 is to have as many zero-CO_2 and energy efficient buildings as possible. The renovation rate (in the sense of comprehensive renovation in relation to the total stock of residential units) should be increased from less than 1% today to an average of 2% between 2020 and 2030. Comprehensive renovation can also be carried out in stages under multi-annual renovation plans. Conversion of heating systems to renewable energy sources in combination with comprehensive renovation always makes sense and should be credited (see also Flagship Project 5). There is the potential to save more than one million tonnes CO_2 through thermal renovation (with no change of heating system). This requires coordinated funding, building regulation reform and changes to civil law.

MEASURES

- Consistent implementation of the requirements of the EU Buildings Directive in connection with building renovation (long-term national renovation strategy, socially tenable renovation conditions, especially in the case of measures with a short amortization period)
- Funding for thermal renovation of residential buildings from housing grant funds based on joint minimum requirements (Art. 15a Agreement on climate protection in the buildings sector)
- Add-on funding following federal renovation check for best renovation practices (klimaaktiv gold standard, ecologically sustainable building materials, energy reservoirs, conversion of heating system to renewable energy sources)
- Simplified application procedure for funding and incentive schemes. Clearly formulated requirements should cut red tape and make processing more efficient. Accompanying energy advice makes sense here.
- Bespoke renovation funding for commercial buildings through federal funding schemes
- Amendments to housing law to simplify renovation measures (Condominium Act, Tenancy Act)
- Funding for sector coupling in buildings, for example using smart e-charging infrastructure in/on building (over and above requirements of EU Buildings Directive)

Instruments:

- Funding instruments
  - Environmental Funding and Renovation Check (UFG): Federal Government (Federal Ministry for Sustainability and Tourism)
- Changes to legal framework
  - Building regulations (in keeping with EU Buildings Directive): regional authorities
  - Residential building funding: Federal Government and regional authorities (Fiscal Transfer Act, Art. 15a Agreement, regional implementing acts)

Responsibility: Federal Ministry for Sustainability and Tourism, Federal Ministry of Finance, Federal Ministry of Constitutional Affairs, Reforms, Deregulation and Justice, regional authorities

Timeframe: 2019 to 2023

FLAGSHIP PROJECT 5: RENEWABLE HEAT

CURRENT SITUATION

Heating and hot water in residential and commercial buildings currently account for around 16% of Austrian greenhouse gas emissions in non-ETS sectors. They have declined significantly since 2005 (35%), mainly as a result of thermal renovation and conversion to renewable energy sources. In addition, heating, hot water and cooling in buildings account for around 27% of total final energy consumption in Austria. Heating systems fired by fossil fuels (fuel oil, natural gas) still play an important part, despite the increase in the share of renewable energy sources over recent years. Austria still has approx. 700,000 oil-fired heating systems in use which are on average over 20 years old. Gas-fired heating in Austria plays an even more important role, especially as natural gas is still used in newbuilds in many places.

MISSION

The building sector will need to slash energy demand (heating and cooling) over coming decades. At the same time, fossils fuels must gradually be replaced by renewable energy. Over the next 20 to 30 years, fossil oil-fired heating will need to be squeezed out of the heating market altogether, for which the necessary steps must be taken as quickly as possible. By 2030, conversion of fossil oil-fired heating to heating systems based on renewable energy should save a good 2 million tonnes of CO_2 compared to today's levels and a further 1.5 million tonnes by approx. 2045.

Conversion from natural gas to renewable energy sources (including renewable gas) on the heating market will take a long time, as only limited alternative systems are available in some urban areas.

MEASURES

- The Federal Government and regional authorities are preparing a joint heat strategy that focuses on reducing the thermal energy demand of buildings and replacing fossil fuels with renewable energy sources and high-efficiency district heating. This will mean continually adapting building standards for newbuilds and renovation to the best state of the art.
- A long-term, socially tenable and complete switch from oil-fired heating to renewable energy sources is a key component of this heat strategy.
- The switch out of oil-fired heating in newbuilds should be completed in all regions by no later than 2020 (building regulations).
- "Renewable by default": renewable energy sources should be used when existing oil-fired boilers are replaced.
- Socially tenable switch out of fossil oil-fired heating from 2025 at the latest, starting with boilers over 25 years old.
- Consistent and harmonized implementation of the requirements of the EU Buildings Directive for the "alternative check" for newbuilds and renovations, so that gas-fired heating is gradually replaced by renewable energy, where that is a sensible and reasonable alternative.
- Depending on the heating requirements of the building, appropriate options in terms of heating systems based on renewable energies should be included in building regulations.
- Heating boilers should be checked by independent experts who make bespoke recommendations and point customers to funding schemes. Accompanying public information campaign.

--- Attractive funding schemes should be created to provide an incentive for early conversion from fossil fuels and prevent social hardship. Integrated, coordinated renovation (building envelope and heating system) in particular should benefit.
--- The conversion from fossil fuels to renewable energy sources in public buildings should be stepped up (public sector as role model).
--- Storage of energy (heat and power) should be boosted through building regulations and funding schemes.

Instruments:
--- Funding instruments:
Environmental funding at home (businesses, in particular) and renovation check: Federal Government (Federal Ministry for Sustainability and Tourism)
Residential housing funding: Federal Government and regional authorities (Fiscal Transfer Act, Art. 15a Agreement, regional implementing acts)
--- Changes to legal framework
Building regulations (in keeping with EU Buildings Directive): OIB Directive 6 and regional authorities

Responsibility: Federal Ministry for Sustainability and Tourism, Federal Ministry of Finance, regional authorities

Timeframe: Immediate; continuous effort with the implementation milestones defined in the Heat Strategy

FLAGSHIP PROJECT 6: 100,000 ROOF-MOUNTED PHOTOVOLTAICS AND SMALL-SCALE STORAGE PROGRAMME

CURRENT SITUATION

Photovoltaic systems make an important contribution to sustainable electricity production. Roofs of residential and commercial buildings currently offer untapped potential for electricity production from solar energy. By 2016, Austria had installed photovoltaic capacity of 1,096 MW. Thus, in that year, 1,096 GWh of electricity was produced. However, production only accounted for 1% of final domestic renewable energy consumption. In keeping with the objective of switching to domestic renewable energy sources, the way forward will be to pursue what was started, for example, with communal production plants.

There are currently around 125,000 photovoltaic systems in Austria generating 1,096 GWh of electricity. The installation and operation of photovoltaic systems creates/maintains approximately 3,400 jobs a year and generates turnover of EUR 500 million. These systems are already saving over 400,000 tonnes of CO_2 emissions a year. Also public acceptance of photovoltaics is very high (83% of Austrians want electricity from Austria and 95% want green electricity).

MISSION

In future, buildings will both meet high energy standards and make an active contribution to the supply and storage of energy for their own use. Optimum use should be made of all available building surfaces (especially in newbuilds and renovations) for integrated photovoltaics. An increase in photovoltaics will increase private generation and thus also help to relieve the pressure on the distribution and transmission network. In addition to investment funding for the 100,000 Roof-Mounted Photovoltaics and Small-Scale Storage Programme, the abolition of tax on the consumption of privately generated electricity and the elimination of investment barriers in housing and industrial installation law should support buildings as energy producers. This incentive will accelerate the cost-effective development of photovoltaics for both consumers and firms.

MEASURES

- The 100,000 Roof-Mounted Photovoltaics and Small-Scale Storage Programme is meant to provide investment funding to encourage greater use of roof surfaces for photovoltaic modules by private individuals and businesses (New Energy Act).
- Private generation tax should be abolished. There is already tax relief on the first 25,000 kWh of electricity from private generation. Thus, small-scale producers (private individuals and smaller firms) in particular already enjoy a tax break. More firms and households should install photovoltaic modules on their roofs to generate energy. The abolition of the private generation tax should be addressed during structural tax reforms.
- Investment barriers should be eliminated in housing and industrial installation law. This applies to permits for communal systems and photovoltaic systems on commercial roofs (MRG, WEG, WGG) and clear regulations that photovoltaic systems on commercial roofs do not require an industrial installation permit.
- A framework needs to be established for micro-networks. This should enable tenants and owner-occupiers to distribute electricity generated privately in the building more easily.

Instruments: Investment funding, tax relief, changes to legal framework
Responsibility: Federal Ministry for Sustainability and Tourism, Federal Ministry of Finance, Federal Ministry of Constitutional Affairs, Reforms, Deregulation and Justice
Timeframe: 2019 to 2023

FLAGSHIP PROJECT 7: RENEWABLE HYDROGEN AND BIOMETHANE

CURRENT SITUATION

Using hydrogen produced on the basis of renewable electricity will pave the way for decarbonization of energy-intensive industries and can provide an excellent long-term energy reservoir (summer/winter) to mitigate fluctuations in electricity generated from wind and photovoltaics. As a central energy storage region (favourable geological conditions), an energy transport hub, an economy with a strong industrial base and an important location for renewable energy vectors, Austria fits the bill for this energy vector. At present, natural gas, with its densely developed natural gas distribution network, is an important energy vector in Austria. It should gradually be replaced by renewable gas, such as hydrogen and biogas.

MISSION

As an energy vector, hydrogen supports the integration of renewable energies, which is vital to the successful transformation of the energy system. Hydrogen should improve network stability via decentral electrolysers and long-term storage of renewable energy. At the same time, cost-effective production of hydrogen should expedite the switch out of fossil fuels in energy-intensive industry.

Raw materials for the production of biogas should be supplied primarily from agriculture and from waste/compost and sewage management. Another important benefit is the potential to reduce methane emissions from agriculture (slurry recovery) and to extract manure from digestate. Increasing the feed-in of biogas, renewable hydrogen or synthetic methane from power-to-gas plants to the existing natural gas network will enable cost-effective sector coupling of electricity, heat and mobility with renewable energy vectors.

MEASURES

- Long-term storage of electricity through hydrogen should be enabled and supported. This will involve establishing whether future investments by the hydrocarbon industry in this sector (e.g. power-to-gas) can be offset when calculating royalties (Mineral Raw Materials Act).
- Excess production of electricity from renewable sources should be absorbed by producing hydrogen in electrolyser systems. Linking funding for renewable energy with the provision of storage capacity should speed up the development of reservoirs as volatility in the electricity market increases (New Energy Act).
- Delivery of hydrogen/biogas to the natural gas network should be prioritized. Appropriate instruments should be developed for this (New Energy Act).
- In order to boost non-fossil fuels and create legal security for investors, hydrogen should be brought under the Natural Gas Tax Act and afforded tax relief. The same should apply to biogas.

Instruments: Mineral Raw Materials Act, New Energy Act, Natural Gas Tax Act, Gas Industry Act
Responsibility: Federal Ministry for Sustainability and Tourism, Federal Ministry of Finance
Timeframe: 2019 to 2021

FLAGSHIP PROJECT 8: GREEN FINANCE

CURRENT SITUATION

Aside from limiting the increase in the global average temperature to well below 2°C and fostering climate-resilient development, the Paris Climate Agreement ratified by Austria makes provision (Article 2.1.c) for "making finance flows consistent with a pathway towards low greenhouse gas emissions and climate-resilient development". We now need to analyse, from the point of view of green finance, what potential Austria as a business location has to offer the private sector and what green finance instruments (such as green bonds) can help, and to what extent, to achieve EU climate and energy targets. Important potential target areas include the energy and buildings sector or general infrastructure. It is also vital to ensure that private capital is mobilized cost-effectively, without distorting the market or compromising the stability of the financial market.

MISSION

An Austrian Green Finance Agenda, in line with the European Commission action plan on financing sustainable growth of 8 March 2018, is being developed based on a comprehensive market analysis and with the direct involvement of the private sector. Aside from identifying relevant financial instruments, it incorporates well-founded sustainability criteria in keeping with the objectives of the Paris Climate Agreement (i.e. it is more impact-oriented). The ultimate objective is to minimize stranded investments and create incentive structures for investment in climate-friendly infrastructure in liaison with the Federal Ministry of Finance.

MEASURES

- Analyse the Austrian market and establish the practicality of green finance instruments.
- Establish a dialogue between stakeholders and the public sector on the development of the green finance agenda (in the Green Finance Focal Group). This will involve establishing criteria for "green" or "climate-friendly" (financing and investment) products in line with similar activities at EU level.
- Test a pilot project (Austrian Green Bonds) for developing renewable energy vectors and increasing energy efficiency to consider both the introduction of a sovereign green bond and measures to encourage the private market and the interfaces with projects at regional and local level.
- Review relevant laws in the matter (Federal Staff and Self-Employed Welfare Act, Pension Funds Act, etc.) in the aim of eliminating existing barriers that prevent private investors from investing more in sustainable projects.
- Prepare an Energy Transition Investment Plan (Federal Ministry for Sustainability and Tourism and Federal Ministry for Transport, Innovation and Technology) to send a clear message to the private sector.

Instruments: Dialogue between stakeholders and the public sector to test and develop the above measures.
Responsibility: Federal Ministry of Finance, Federal Ministry for Sustainability and Tourism
Timeframe: 2019 onwards

FLAGSHIP PROJECT 9: ENERGY RESEARCH INITIATIVE 1 – BUILDING BLOCKS OF THE ENERGY SYSTEMS OF THE FUTURE

CURRENT SITUATION

The energy systems of the future will comprise networked subsystems that will need to integrate multiple technologies and operators. Technologically neutral, mission-oriented research and development projects should enable successful technologies and solutions to be developed that will allow Austria to position as an innovation leader on the global technology markets. Aside from integration across energy vectors and infrastructures, the interactions between various industries and sectors (mobility, trade and industry, agriculture) will be as important as the interlocking of different innovation systems (e.g. regional operators and global start-ups). Economic and organizational issues thrown up by technological issues will have to be resolved. Acceptance processes and user behaviour need to be better understood and taken into account. Early involvement of future users in co-creation processes and similar formats will be crucial to sustainable success.

MISSION

Plus Energie Areale, that are able, thanks to optimization of the structural infrastructure (maximum efficiency in all sectors of final energy consumption and development of appropriate business models), to cover their entire energy requirement from renewable sources. These are an important precursor to CO_2-neutral towns and urban areas. Locally produced energy is mainly used locally by making final consumption more flexible and using reservoirs and the synergy effects of infrastructure.

Integrated regional energy systems, that will ensure 100% of energy from renewable sources in the local and regional energy supply in the foreseeable future and support the participation of businesses and the public in regional value added chains and transregional markets. These systems and networks are an important precursor to a more flexible energy system that enables integration across sectors, energy vectors and infrastructure and the supply and use of a much higher share of renewable energy. They enable local and regional authorities to achieve ambitious energy targets, to develop regional value added chains and to participate in transregional energy exchange.

Breakthrough technologies for industry that enable raw materials and energy consumption to be slashed, significantly reduce emissions and increase independence in terms of raw materials and energy with no loss of output. They are an important precursor to the decarbonization of industrial processes and products, especially in energy-intensive industries. The new products and processes need to focus on highly efficient use of the energy and resources used, where possible on a cascading basis, and to enable the energy demand of industrial plants to be matched with the energy supply from fluctuating renewable energies. Issues in connection with CO_2-neutral steel production play as important a role here as processes and products that use bio-based raw materials.

Energy-efficient mobility systems of the future
Intensive mobility research is needed in order to meet obligatory EU targets and avoid fines. At the same time, the Austrian automotive and aeronautical industries need to remain competitive during the technological switch towards e-mobility, lightweight construction and automated transport by funding R&D. Organizational and social innovations must be used. EU initiatives, such as the initiative for battery cell production in Europe, must be

flanked by complementary national funding schemes to help e-mobility gain a foothold. Furthermore, domestic industry must be integrated into international value added chains in the overall battery/vehicle/energy supply system from production through to recycling.

MEASURES

--- RTI funding programmes (technology maturity stage – TMS 1 to 8)
--- Activation of European funding resources (e.g. SET Plan, EU framework programme)
--- Participation in European and international cooperation, such as EU Strategy Plan for Energy Technologies (SET Plan) or International Energy Agency

Instruments: RTI Directive, KLI.EN FondG, Environmental Funding at Home (UFI) Directive
Responsibility: Federal Ministry for Transport, Innovation and Technology (City of the Future, Mobility of the Future) and Climate and Energy Fund (Energy Research Programme)
Timeframe: 2018 to 2023

FLAGSHIP PROJECT 10: ENERGY RESEARCH INITIATIVE 2 – MISSION INNOVATION AUSTRIA PROGRAMME

CURRENT SITUATION

In order to stimulate implementation on European home markets and raise the international profile of Austrian solutions on global markets, large-scale trials of technologies and solutions under real conditions are needed. This living-lab approach is important to the necessary transformation of energy and mobility systems, as the application of research results often fails under real conditions or during scaling-up.

MISSION

Best practices for smart, secure, affordable energy and transport systems of the future are being developed and demonstrated in large test regions using innovative energy technologies from Austria. Starting from the three thematically different "Energy Showcase Regions" and the transport simulation laboratories (urban mobility laboratories and test environments for automated driving), projects need to be developed with a broad range of innovations from the economy, the sciences, regional operators and users. The objectives are to:

- Develop and apply examples of domestic energy technologies and energy-related transport technologies for large-scale trials of smart systems under real conditions
- Strengthen and develop Austria as a leading market for innovative energy technologies and energy-related transport technologies and technology-based services
- Test interactions between subsystems and technologies in a real environment
- Design and test solutions based on specific regional or local needs, taking account of the specifics of individ ual innovative eco-systems
- Compile and supply systemic knowledge, with the help of the laboratories, by supporting a joint learning process and enabling adjustments to the necessary frameworks
- Establish temporary regulatory innovation zones to allow operators in innovation regions to test new technologies, processes and business models in an innovative (and possibly different) legal and regulatory environment at no economic cost
- Provide follow-on financing funded under market transition and implementation funding schemes for the development of projects in innovation regions through to TMS 9
- Provide open experimentation rooms to enable both local innovators and the public to transform current problems into solutions and to help research and innovation unlock their potential by involving future tech- nology customers and users in the development process as test users

Instruments for all innovation phases (if possible) up to market launch and private investment are needed here.

MEASURES

- Process an innovation programme based on Energy Showcase Regions through the Climate and Energy Fund and research funding companies
- Set up an "Energy.Free.Room" in preparation for the experimentation clause as an experimentation room for firms to test systemic implementation of new integration and market models to integrate renewable energy technologies and storage and energy efficiency technologies into the system
- Establish the legal framework needed for regulatory innovation zones (German-type "experimentation clause")

--- Participate in European and international cooperation initiatives such as "Mission Innovation", SET Plan
--- Use green finance instruments for research and innovation (see Flagship Project 8)
--- Apply for funds under European funding and financing schemes (e.g. EU Structural and Innovation Fund (ESIF), EU Innovation Fund) by including projects in corresponding EU programmes for the next programming period

Instruments:
--- RTI Directive, UFI Directive, KLI.EN FondG, innovation-oriented public procurement, innovation partnerships
--- Financing from special E-Control fund
--- Legal framework ("experimentation clause")

Responsibility: Federal Ministry for Transport, Innovation and Technology, Federal Ministry for Sustainability and Tourism
Timeframe: 2018 to 2025

FLAGSHIP PROJECT 11: COMMUNICATION – EDUCATION AND AWARENESS-RAISING FOR A SUSTAINABLE FUTURE

CURRENT SITUATION

The successful implementation of climate protection measures depends on a targeted and adapted communications strategy. We need to create a positive climate in the country that highlights the many opportunities for a better quality of life, improved competitiveness and a forward-looking society. Everyone involved should be encouraged to join in, as the Climate and Energy Strategy targets will only be achieved if everyone pulls in the same direction. That follows merely from the fact that different operators are responsible for numerous measures. In order to ensure they are implemented in a motivated and effective manner, the various operators will be given guidance on the action open to them in the form of practical information and attractive incentive systems (such as voluntary corporate networks, etc.).

MISSION

This form of communication guideline needs to be prepared by the Federal Government, together with regional and local authorities and representatives of the economy, sciences and civil society. It should also be made easier for the public to become actively involved in climate protection. Disseminators and decision-makers should see climate protection measures as an opportunity and be given support during their implementation with relevant tools and arguments.

Demand for climate-friendly and energy-efficient products, services and technologies should be increased and the necessary investment incentivized through enhanced awareness-raising and information campaigns tailored to target groups such as consumers, firms and communities.

Energy advice as an tool for direct communication with consumers and businesses should be stepped up and improved. This should create an awareness of the sense that it makes to invest in thermal building renovation, a new heating system or process optimization in businesses.

Transformation of the energy system and climate protection should be anchored more firmly in school curricula and developed into separate modules.

Technologies to improve energy efficiency and the use of renewable energy can only be rolled out on a large scale with the help of well-trained experts with special knowledge. The education and training needed should therefore be stepped up in liaison with interest groupings and firms, taking account of existing initiatives.

MEASURES

A target group-based communications strategy needs to be prepared as quickly as possible that effectively reaches all market participants and, most importantly, empowers consumers. It should include a broad-based awareness-raising initiative (especially in the energy and mobility sectors), education and training and energy advice and should extend to role-model action by the public sector (see Task 6). Existing instruments, such as klimaaktiv and the Climate and Energy Fund should also be used.

- Prepare a communications strategy in liaison with representatives of all stakeholder associations concerned, that includes the following steps at the very least:
  - Situation analysis: covers all communication measures and content for awareness-raising at federal, regional and local level
  - Target group definition
  - Development of communication objectives and content
  - List of measures
- Improve direct communication with operators via energy advice and disseminators
- Anchor issues in school curricula
- Improve technical education and training

Responsibility: Federal Ministry for Sustainability and Tourism, Federal Ministry for Transport, Innovation and Technology, Federal Ministry of Education, Science and Research, regional and local authorities
Timeframe: 2018 to 2023, milestones by 2019

FLAGSHIP PROJECT 12: BIO-ECONOMY STRATEGY

CURRENT SITUATION

The Austrian Bio-Economy Strategy will be a cornerstone of the Climate and Energy Strategy. The trendsetting economic form of the bio-economy will give us the tools needed to meet the challenges of the future. Inspired by the metabolic cycle in nature, leading-edge techno-fixes can be used to develop new products that manage without oil and often have better product properties. The concept of the bio-economy encompasses almost all industrial and economic sectors and their services that process or use biological resources (such as plants, animals and microorganisms). The objective is to achieve a bio-based economic cycle that aligns technology and ecology within the context of the European Research Area and European Economic Area. The draft Bio-Economy Research Technology and Innovation Strategy provides the economic basis for the bio-economy, but the focus needs to be expanded to include options for a sustainable, export-oriented economy and society.

MISSION

The objective is to seize the opportunities of a knowledge-based bio-economy and turn them into permanent economic growth. The development and implementation of the Strategy may trigger a growth spurt in bio-based products, energies, processes and services and improve the global competitiveness of the economy.

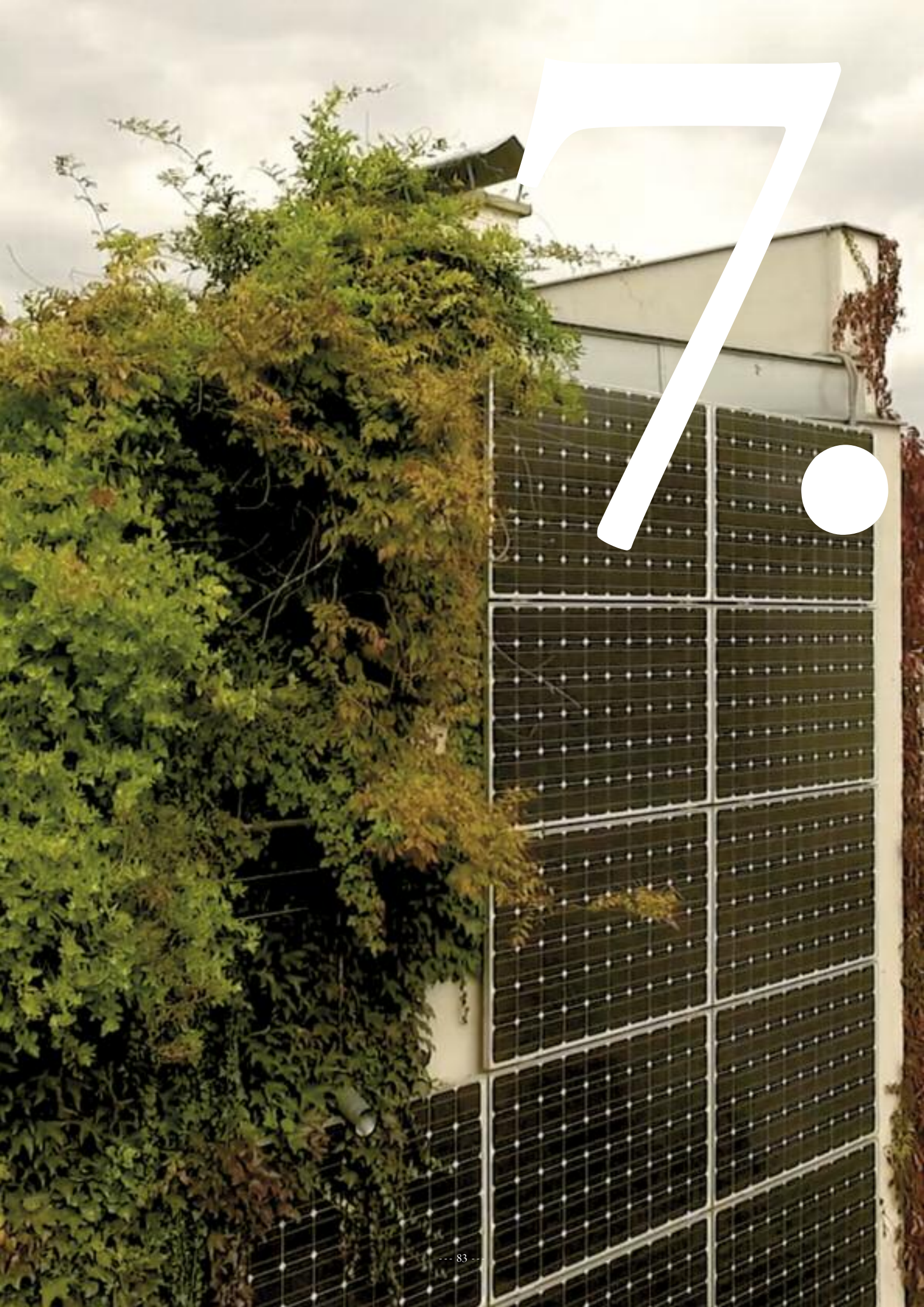
This will require integrated research that takes equal account of economic, ecological and social interests and a holistic approach to value added chains. Research and innovation provide the basis for a structural shift from an oil-based to a bio-based economy.

MEASURES

- Have a national master strategy prepared jointly by the Federal Ministry for Sustainability and Tourism and the Federal Ministry of Education, Science and Research as the basis for an Austrian action plan. All sectors concerned must be included in the action plan in order to guarantee that implementation will be as broad as possible.
- Establish and fund an Austrian bio-economy platform to optimize regional collaboration so that existing or new research facilities, firms and other innovators can process individual bio-economic issues along the entire value added chain, with the help of upstream and downstream sectors
- Use regional strengths (available resources): e.g. timber processing, pulp industry, construction industry (insulation products), food industry (e.g. starch, sugar, bioethanol)
- Use technological strengths
- Use infrastructural strengths
- Use available RTI skills
- Network with existing national strategies and action plans (e.g. recycling economy, Forest Strategy, Renewable Raw Materials Action Plan, Resource Action Plan, Biodiversity Strategy, etc.)
- Network with international advances and foster connections outside the economy (e.g. under Horizon 2020), especially during preparation and development of the European Bio-Economy Strategy
- Enable international firms to use regional bio-economy platforms (many start-ups etc. have an international background)
- Strengthen research, technology and innovation: Austria's profile as a bio-economy location and cross-disciplinary research centre of excellence should be established through increased international cooperation
- Boost funding for bio-economy start-ups

Instruments:
--- Set up a bio-economy platform
--- Prepare the Bio-Economy Strategy
--- Prepare a Federal Government Action Plan
--- Consider forming an Austrian bio-economy cluster with the help of leading Austrian bio-economy firms based on the Bio-Economy RTI Strategy
--- Monitor the bio-economy as a follow-on measure once the Strategy has been adopted.

Responsibility: Federal Ministry for Sustainability and Tourism, Federal Ministry for Transport, Innovation and Technology, Federal Ministry of Education, Science and Research
Timeframe: Bio-Economy Strategy 2019, Federal Government Action Plan 2020



ADAPTATION TO CLIMATE CHANGE

AUSTRIA (according to the Austrian Climate Change Status Report 2014) has recorded an increase in average annual temperature of around 2°C since 1880. That increase is well above the global temperature rise of 0.9°C (IPCC 2013). The impact of climate change is already having clear consequences (rising number of hot days, fewer frosty days, faster-melting glaciers, thawing permafrost ground, longer vegetation periods, more frequent precipitation events, new pathogens, etc.).

Even achieving the target set out in the international Climate Agreement of limiting the increase in the global average temperature to well below 2°C above pre-industrial levels will only go part way to preventing the consequences of progressive climate change. Due to the slow response of the climate system and the long life of greenhouse gases, a further rise in temperature is inevitable. Extreme weather events in Austria are already having a huge economic impact, which has increased over recent years. The potential for climate change-induced losses will continue to grow in Austria in future (COIN, 2015[9]).

The Paris Climate Agreement has now put adaptation to climate change on an equal footing with climate protection. Austria has been applying this two-pronged attack in climate policy for several years and was one of the first EU Member States to link a strategic concept for adaptation to climate change with an action plan to implement specific recommended action (Austrian Strategy for Adapting to Climate Change, 2012).

The overlaps between adaptation to climate change and climate protection are most marked in the energy, construction, housing and economic sectors and their effects are closely interlinked. There is a raft of measures here that both reduce emissions and have positive effects in terms of adapting to climate change. For example, thermal renovation of buildings both reduces the energy required for space heating in winter (climate protection) and helps to prevent overheating in summer (adaptation). As a rule, care must be taken to ensure that, rather than contradicting each other, measures to adapt to climate change and climate protection measures have reciprocal benefits and generate synergies.

Adaptation to climate change must be based on the latest scientific knowledge and current policy framework. A "baby steps policy" is needed which integrates climate change in all relevant planning. It is important in future to take account of the potential impact of climate change in all relevant planning and decision processes at national through to local level.

AUSTRIAN STRATEGY FOR ADAPTING TO CLIMATE CHANGE

The Austrian Strategy for Adapting to Climate Change was adopted by the Council of Ministers in October 2012 and endorsed by the Conference of Heads of Regional Governments in May 2013, since when implementation of the catalogue of measures has been ongoing (132 specific recommendations for adaptation in 14 sectors of activity). The first progress report was published in 2015, as required under the Government Programme. That progress report was also noted by the Federal Government and regional authorities.

The "KLAR!" funding scheme specifically illustrates how to deal with the impact of climate change in the regions and use regional measures to reduce its economic cost. The Climate and Energy Fund started a climate

[9] Project COIN; Steiniger, K. et al (eds.), Economic Evaluation of Climate Change Impacts: Development of a Cross-Sectoral Framework and Results for Austria, Springer 2015.

change adaptation programme in 2016, the first of its kind in Europe, which is based on scientific knowledge and now enables the regional authorities to apply the latest knowledge to minimize the negative effects of climate change and make use of any opportunities. The programme dovetails with federal and regional strategies and is the only national programme to address the regional level. As this issue will become increasingly relevant, this programme needs to be maintained.

INTERACTION WITH NATIONAL BUDGET

The objective of budgetary sustainability ties in closely with cost-effective measures to adapt to climate change and international funding. Initiatives under (i) the Austrian Strategy for Adapting to Climate Change (National Adaptation Strategy, NAS 2017) and (ii) the Austrian Strategy on International Climate Funding (KFS 2013 or KFS-Rev. 2017) are expressly required to take account of "budgetary sustainability". For the National Adaptation Strategy, this also applies in terms of heading off the risk of ineffective, incorrect or harmful adaptation.

8.

ONGOING MONITORING AND NEXT STEPS

THE CLIMATE AND ENERGY STRATEGY sshould ensure that both the relevant requirements of the 2017-2022 Government Programme in the energy and environment sectors and EU requirements are fulfilled. This applies to requirements, targets and guide values laid down in EU directives on renewable energy, energy efficiency and the performance of buildings and in regulations on effort sharing, land use and governance of the Energy Union. These requirements must be taken into account in specific measures and during preparation of the Integrated National Energy and Climate Plan (see below). In order to resolve urgent challenges in the transport sector, the Federal Ministry for Transport, Innovation and Technology has already started a process, in collaboration with the Federal Ministry for Sustainability and Tourism and regional and local authorities, to prepare a Competitive and Clean Mobility 2030 Action Plan.

A STRATEGY LEARNING CURVE

The Integrated Climate and Energy Strategy marks a change in attitude towards longer-term energy policy. The innovative approach of a multi-stakeholder dialogue on energy policy will remain in place. Numerous measures are instructions to act and need to be broken down and configured in greater detail. New data and new knowledge will need to be incorporated during implementation. Various instruments will be needed to achieve the targets, i.e. funding will need to be flanked by both regulatory and fiscal measures. A balanced mix is the only way of ensuring that the strain on the public purse is kept within limits and that the innovation needed to achieve the targets is funded. Ongoing monitoring of progress in the measures and of their efficacy will therefore need to be set up.

This Strategy should be evaluated by the Federal Government every five years, starting in 2023, in keeping with EU requirements governing national energy and climate plans. Given the possible financial implications, particular attention should be paid during evaluation to whether the greenhouse gas and renewable energy trajectory is still on track.

Changes to the following external factors must be taken into account during regular evaluation:

- Reaction to changed environment (economic situation, prices, technologies, international and EU requirements) and compliance with EU reporting requirements (potential synergies)
- Monitoring progress in terms of achieving targets
- Cost-effectiveness of the measures
- Effects achieved and possibility of readjusting instruments
- Overarching effects: are the measures helping to achieve overarching objectives (employment, competitiveness, environmental improvement, etc.)?
- Sustainability: will positive effects be lasting?

Where ongoing progress monitoring of measures and projections suggest that Austria's trajectory cannot be maintained, the Federal Government will immediately identify further possibilities and take appropriate action to get back on track by, first, increasing the share of renewable energy and, second, limiting CO_2 emissions in non-ETS sectors.

Regular exchange of information, continual coordination of implementation phases and ongoing monitoring should ensure optimal coordination of activities by everyone involved.

INTEGRATED NATIONAL ENERGY AND CLIMATE PLAN

IThe EU is developing a governance system for the Energy Union[10]. It should ensure that climate and energy targets can be achieved at European level and that every Member State helps to achieve those targets. It should also guarantee that strategies and measures at the various levels to transform the energy system are consistent, complementary and sufficiently ambitious. The governance system will need to be transparent and to leave the Member States the flexibility and freedom to decide their energy mix.

This Strategy in general and the targets in particular form the basis for an Integrated National Energy and Climate Plan for Austria and for setting strategic targets in the five dimensions of the Energy Union (security of supply, internal market in energy, energy efficiency, decarbonization, competitiveness and energy research). Individual Integrated National Energy and Climate Plans should be prepared for a period of ten years and should provide an overview of the current status of the national energy system and of the strategies and measures put in place to achieve national targets (as detailed and specified based on this Strategy). Specific provisions governing National Energy and Climate Plans are currently being negotiated at European level. Therefore, Austrian targets will be set in due course.

[10] Proposal for a Regulation on the Governance System of the Energy Union (COM(2016) 759 final).

Federal Ministry
Republic of Austria
Sustainability and Tourism

Federal Ministry
Republic of Austria
Transport, Innovation
and Technology