

EUROPEAN BUSINESS VIEWS ON A COMPETITIVE ENERGY & CLIMATE STRATEGY

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FOREWORD

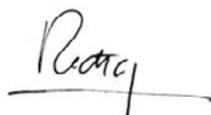
Europe's economy, as many economies across the world, has been in a state of constant transition since the industrial revolution in the mid-1800s. It has lifted millions out of poverty, and allowed us to make technological, socio-economic and political transformations the likes of which the world had never seen before. In recent decades, the growing threat of climate change has increasingly defined how we view this growth, and our scientific understanding of its negative impact has become ever clearer. We applaud the landmark Paris Agreement, as it provides the single most important signal that global efforts are the only option to limit average temperature increases.

The societal debate that now lies before Europe is how to transform our economy to operate in a state of net-zero greenhouse gas emissions ("climate neutrality"), while at the same time improving our competitiveness and securing a supply of critical resources. The implications of this transformation are huge, with far reaching impacts on society at large that will gradually materialise. Today, more than ever, European business is conscious of its responsibility and committed to act.

By means of this energy and climate strategy, we wish to contribute further to this debate. The strategy is the result of a one-year process of work with our membership and stakeholders. Based on these discussions, we are confident that climate neutral economies are achievable, not just in Europe but also elsewhere. The speed with which this is possible will be determined by the extent to which society at large can create and sustain the necessary framework conditions and investments to allow entrepreneurs to thrive with confidence in a low-carbon future. This mutual action is the strength of European societies and how we have always been able to get things done in the past. Having said this, we are determined to make sure that European leadership will continue to drive international action.

The strategy is not the end of the road, but rather the beginning of a new chapter. The next EU political cycle will be fundamental in materialising the framework conditions and related actions that this strategy lays out. We need clear leadership, we need every citizen on board, and we need to make sure that Europe's businesses stay in the lead. Let that be our common goal!

Pierre Gattaz
President



Markus J. Beyrer
Director General



EXECUTIVE SUMMARY



BusinessEurope stands behind the EU ambition of net-zero greenhouse gas emissions (climate neutrality) to reach the objectives of the Paris Agreement. This ambition needs to be closely connected to Europe's agenda on competitiveness and security of supply, in order to reinforce each pillar in this "triangle".

Reaching climate neutrality by around mid-century, as the IPCC Special Report and the European Commission's 2050 climate strategy consider is necessary to limit average global temperature increases to 1.5°C, will fully depend on meeting a set of crucial framework conditions and related actions on both European and global level. These are:

CONDITION 1

RECOGNITION OF DIFFERENT CONDITIONS AND STARTING POINTS FOR EU MEMBER STATES.

ACTION: Boost European coordination for cost-effective policy implementation.

CONDITION 2

DEVELOPMENT AND DEPLOYMENT OF INNOVATIVE TECHNOLOGIES to support the decarbonisation of value chains in Europe in a cost-effective way.

ACTION: Unleash investments through a comprehensive industrial strategy.

CONDITION 3

LARGE-SCALE AVAILABILITY OF AFFORDABLE, LOW-CARBON ENERGY.

ACTION: Design an integrated value chain approach for energy supply.

CONDITION 4

ADAPTATION OF CONSUMER BEHAVIOUR AND PUBLIC ACCEPTANCE for the low-carbon energy transition.

ACTION: Engage actively with citizens to gain societal acceptance.

CONDITION 5

CONVERGENCE OF GLOBAL CLIMATE AMBITIONS, with G20 countries in particular working together on updating their Nationally Determined Contributions (NDCs) and developing common carbon market mechanisms to reach the Paris Agreement goals.

ACTION: Consider additional safeguards depending on international actions to keep industrial production in Europe by preventing carbon and investment leakage.

Achieving collectively all these framework conditions and actions, without cherry picking, is absolutely essential. European businesses are committed to help reach these conditions, but it is clear that the key to success lies with societal-wide actions. Therefore, policymakers during the next EU political cycle should collaborate with business and other stakeholders to discuss the aforementioned framework conditions and related actions. This should be done in the context of the EU's inputs on its long-term GHG emissions reduction strategy to the UNFCCC secretariat by 2020, the UNFCCC global stocktake exercise in 2023, and the EU's energy and climate legislation reviews.

EU BUSINESS: A KEY PARTNER IN ENERGY AND CLIMATE AMBITION



European businesses are fully committed to climate change mitigation and stand behind the EU ambition of net-zero GHG emissions (climate neutrality) as prescribed in the Paris Agreement. This landmark agreement was brokered in 2015, where almost 200 countries agreed on serious efforts to limit the world's average warming to well below 2°C compared with pre-industrial levels, and making efforts to limit this to 1.5°C. As stated under Article 4 of the Paris Agreement, all signatory Parties aim to achieve climate neutrality in their economies by undertaking “rapid reductions in accordance with best available science, so as to achieve a balance between anthropogenic emissions by sources and removals by sinks of greenhouse gases”.¹

Following the adoption of the Paris Agreement, Parties invited the Intergovernmental Panel on Climate Change (IPCC) to conduct a Special Report to assess the ambition needed to keep global warming to 1.5°C. The IPCC's model pathways conclude that limiting the

increase to 1.5°C would significantly reduce the risks and impacts of climate change, such as less exposure to extreme weather events, water shortages and crop yield reductions. **This requires countries around the world to reach net zero CO₂ emissions in their economies by around mid-century.** It is an urgent call to the international community to act accordingly.²

In light of this and the European Commission's 'strategic long-term vision for a prosperous, modern, competitive and climate neutral economy'³, **BusinessEurope stands ready to engage in the debate to contribute to this objective.** To support the transition, more and more companies throughout Europe have either made significant investments in low-emission technologies or have pledged to do so in the coming years.

→ FOR SPECIFIC CORPORATE EXAMPLES, PLEASE VISIT WWW.INDUSTRY4SUSTAINABILITY.EU



¹ [United Nations](#), 2015. Paris Agreement.

² [IPCC](#), 2018. Special report: Global warming of 1.5 °C – Section C.1.

³ [European Commission](#), 2018. 2050 long-term strategy.

SECTOR ACHIEVEMENTS ON ENERGY AND CLIMATE AMBITION

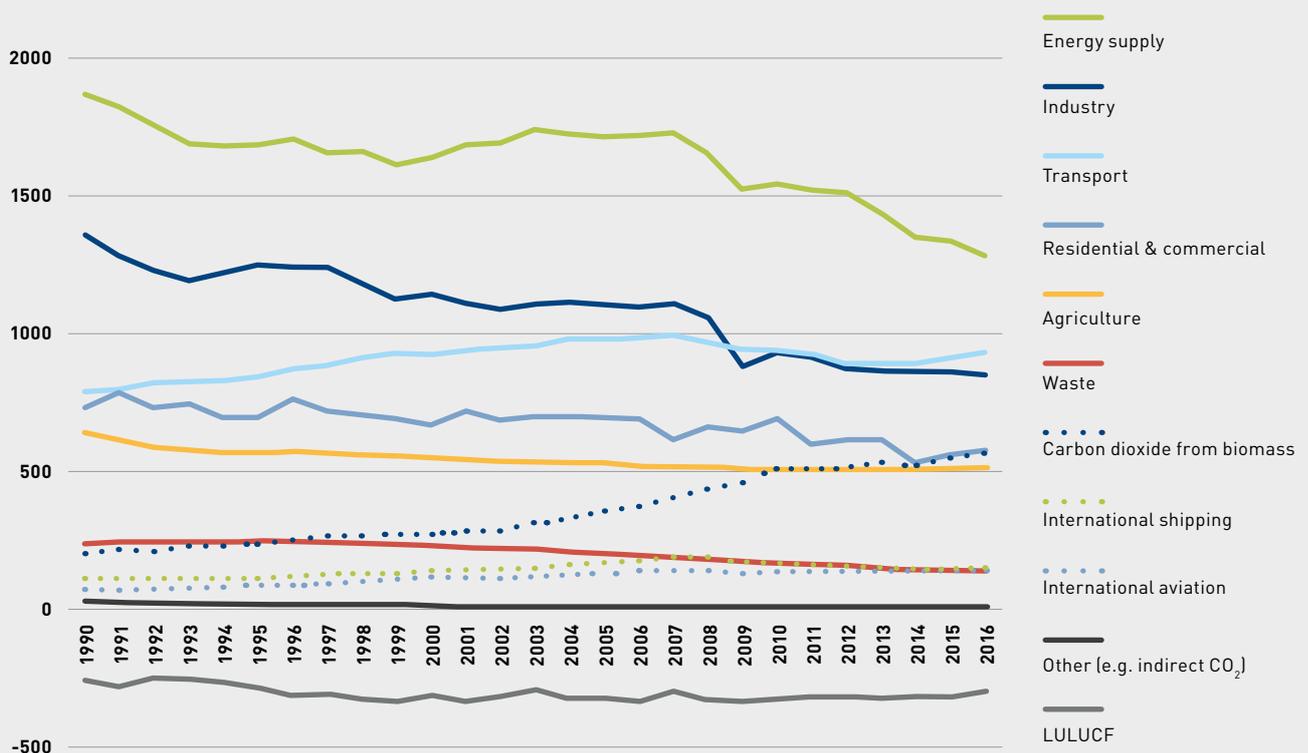
Europe's industry has reduced its CO₂ emissions by 37% between 1990 and 2016, which is more than the emission reduction of the EU as a whole (-24%).

Acknowledging the significant rise in demand for **transport**, the European automotive industry aims to reduce its CO₂ emissions of new cars by 42% in 2021 compared with 2005 levels.⁴ Average aviation fuel consumption fell by 24% per passenger kilometer between 2005 and 2017.⁵ The European railway

sector already consumed 20% renewable electricity in 2015 and strives towards carbon-free train operations by 2050.⁶

Europe's power sector has reduced CO₂ emissions by almost 32% between 1990 and 2016, and committed itself to become fully carbon-neutral "well before" 2050.⁷ Through sector coupling⁸, it can contribute to further CO₂ reductions of Europe's economy, including industries, transport and buildings sectors.

Greenhouse gas emissions by source sector in EU 28 (million tonnes CO₂ eq)



Source: European Environment Agency, 2018

⁴ ACEA, 2018. CO₂ from cars and vans.

⁵ EASA, 2019. European Aviation Environmental Report.

⁶ CER and UIC, 2015. Rail transport and environment – facts and figures.

⁷ Eurelectric, 2018. Decarbonisation pathways.

⁸ Sector coupling involves the increased integration of energy end-use and supply sectors with one another. It is a strategy to provide greater flexibility to the energy system so that decarbonisation can be achieved in a more cost-effective way [European Parliament, 2018. Sector coupling – how it can be enhanced in the EU to foster grid stability and decarbonise].

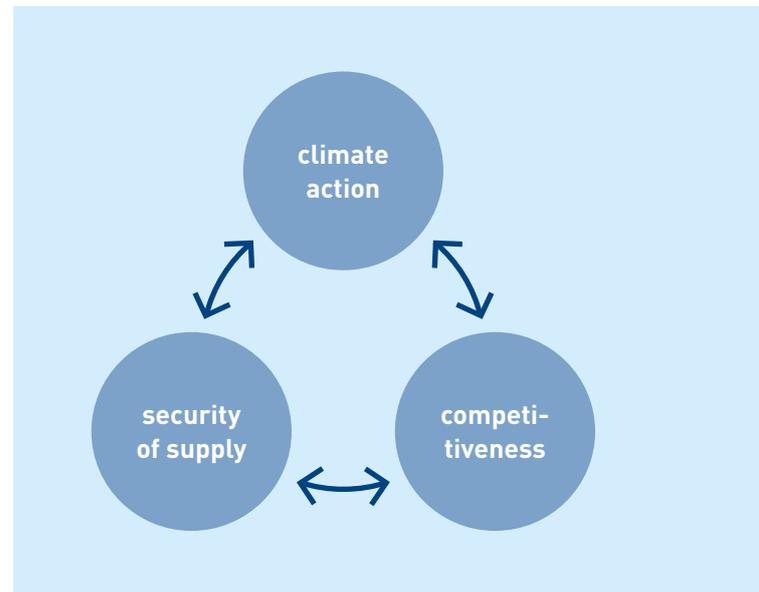
From a business perspective, **competitiveness, security of supply and climate ambition must go hand in hand**. Every sector will need to step up its efforts to deliver necessary climate-friendly solutions and products that boost European competitiveness. And they are already doing so.

For example, **the EU exported EUR 71 billion in clean energy technologies** between 2012 and 2015, creating an EUR 11 billion trade surplus.⁹ Furthermore, the EU's exports between 1995 and 2016 have helped the world save around 200 MtCO₂ compared with if the EU's exports had been produced locally in the importing countries.¹⁰ Recent trade agreements like the one between the EU and Canada (CETA) are also expected to significantly boost trade in certain climate-friendly goods with the elimination of trade tariffs. Such agreements can therefore help decrease global emissions and establish a global level playing field by setting common standards and introducing low-carbon product requirements.

At the same time, **European businesses do not hold all the cards in their hands**. The ambition for climate neutrality will also require a radical shift in mindset by all actors. Not just within Europe: All countries, especially the G20 economies, must act and deliver. Furthermore, to achieve climate neutrality, **all solutions with a climate mitigation potential should be allowed to compete through a technology-neutral approach**.

For example:

- Improved **energy efficiency**, plus a functioning **circular economy** with recycling, waste prevention and new product designs will be important to reduce energy and resource demand in all sectors.
- **Electrification** has the potential to serve up to 50-62% of the decarbonisation effort of Europe's economy.¹¹ A climate-friendly, cost-competitive power sector is therefore a prerequisite for decarbonisation efforts in buildings, transport and industry.
- **Other sources of energy**, including hydrogen, biogas or synthetic fuels, sustainable biomass (heat and feedstock) and biofuels will play an important role in decarbonising parts of the economy that cannot be easily electrified.



- **Sector coupling** will improve system flexibility and reduce total system costs.
- **Smart grids and applications** in homes, industry and transport to increase system flexibility for counterbalancing a growing share of flexible renewable energy sources.
- **Carbon capture utilisation and storage (CCU and CCS)** technologies are indispensable to tackle process emissions in any GHG abatement scenario that envisages GHG reductions of more than 80%.

⁹ [European Commission](#), 2019. Reflection paper – Towards a sustainable Europe by 2030.

¹⁰ [European Commission](#), 2018. 2050 long-term strategy.

¹¹ For an overview of studies: [Eurelectric](#), 2018. Decarbonization pathways European economy (looks until 2045). [WindEurope](#), 2018. Wind Energy and the Electrification of Europe's Energy System (looks until 2050)

WHERE ARE WE TODAY AND WHAT HAVE WE LEARNED?



EUROPE'S ENERGY & CLIMATE POLICIES AT THE FOREFRONT

In the past five years, Europe has adopted a comprehensive set of ambitious energy and climate policies. These include the EU's revised 2030 renewable and energy efficiency targets of 32% and 32.5% respectively, as well as the reformed European Emission Trading System (EU ETS). Although there are many countries around the world that have policies in place for

addressing GHG reduction, the ambition and the extent to which these policies are guiding Europe's economic sectors are quite unique. This framework is increasingly providing long-term investment signals for climate-friendly solutions, though challenges remain with competitiveness impacts for certain industries.

EU EMISSION TRADING SYSTEM

The EU ETS is far wider in scope and ambition than any other system in the world. In recent years several non-EU countries announced intentions to establish carbon pricing systems or have already done so, in the form of either a carbon trading system or carbon taxes. However, the carbon trading systems come in different shapes and sizes: Unlike the EU ETS, which covers installation across Europe, most carbon markets elsewhere only cover a few provinces or states. For example, the USA has states with carbon pricing but nothing nation-wide; neither do Japan,

Russia or Turkey¹². A nation-wide China ETS is not yet in place and will initially only cover its power sector: Industry, which unlike power is subject to international competition, will be excluded when the system starts. Therefore, even though the EU ETS provides some provisions to protect trade-exposed energy-intensive industries to unequal international competition with less ambitious countries, **the risk of investment and carbon leakage remains a real concern.**

CURRENT GLOBAL EFFORTS ARE NOT IN LINE WITH THE PARIS AGREEMENT

Since the ratification of the Paris Agreement in October 2016, 170 national climate pledges or "NDCs" have been submitted. The EU aims to decrease its GHG emissions by at least 40% by 2030 compared with 1990. Still, a large number of signatory countries foresee a net increase in absolute GHG emissions between 2010 and 2030. The GHG emissions per capita in the world and those from the G20 under the current pledges are expected to increase by 1% and 3% respectively by 2030 compared with 2010.¹³ The IPCC special report therefore concludes that current NDCs under the Paris Agreement would not limit global warming to 1.5°C warming.¹⁴



¹² Turkey's integration in the EU process should be an incentive for the country to better align itself with the EU's climate, energy and environment policies.

¹³ [Climate and Energy College](#). Country table on per-capita reduction [% from 2010 to 2030] shown at the bottom of the page.

¹⁴ [IPCC](#), 2018. Special report: Global warming of 1.5°C – Section D.1.

RENEWABLE ENERGY ON THE RISE WITH FALLING COSTS

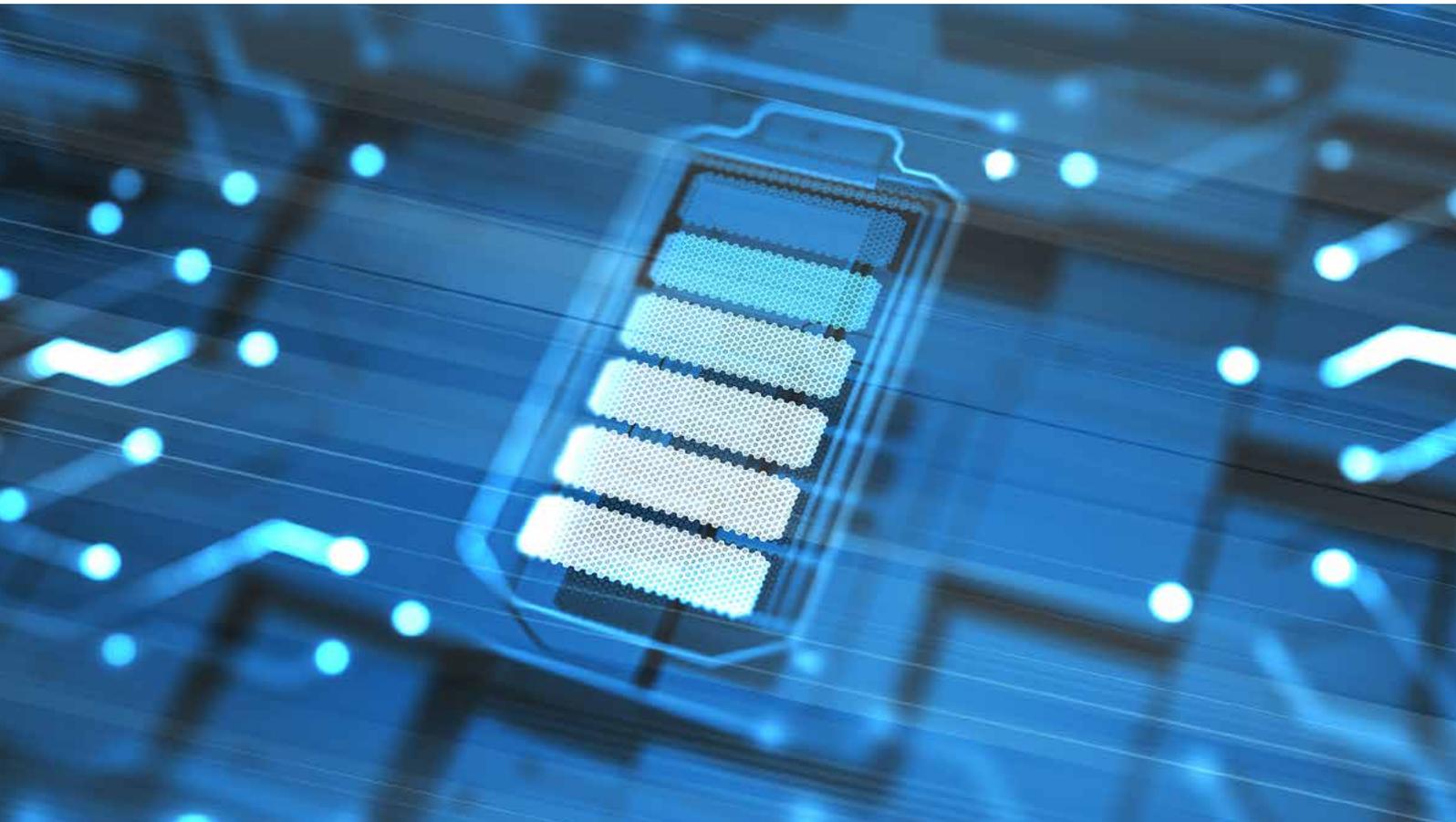
Energy generation costs have on average gradually declined in recent years because of increased competition and significant reductions in the cost of generating electricity from solar photovoltaic (PV) and wind. The

average costs of these forms of renewable energy have fallen significantly due to technology improvements, competitive procurement and a large base of experienced, internationally active project developers.

RENEWABLE ENERGY

The cost of utility-scale solar photovoltaic (PV) has fallen by about 73% between 2010 and 2017. Onshore and offshore wind generation costs have also fallen over the same period by about 25% and 13% respectively, with onshore wind now being one of the most cost-competitive sources of new power generation

capacity.¹⁵ These developments, in combination with country-specific measures and initiatives drove the share of renewable sources in the EU's domestic electricity generation to about 38% in the second quarter of 2018.¹⁶ Electric vehicle battery costs fell by 73% between 2010 and 2016.¹⁷



¹⁵ IRENA, 2018. Renewable power generation costs in 2017.

¹⁶ DG Energy, 2018. Quarterly report on European electricity markets. Volume 11, Q2 2018.

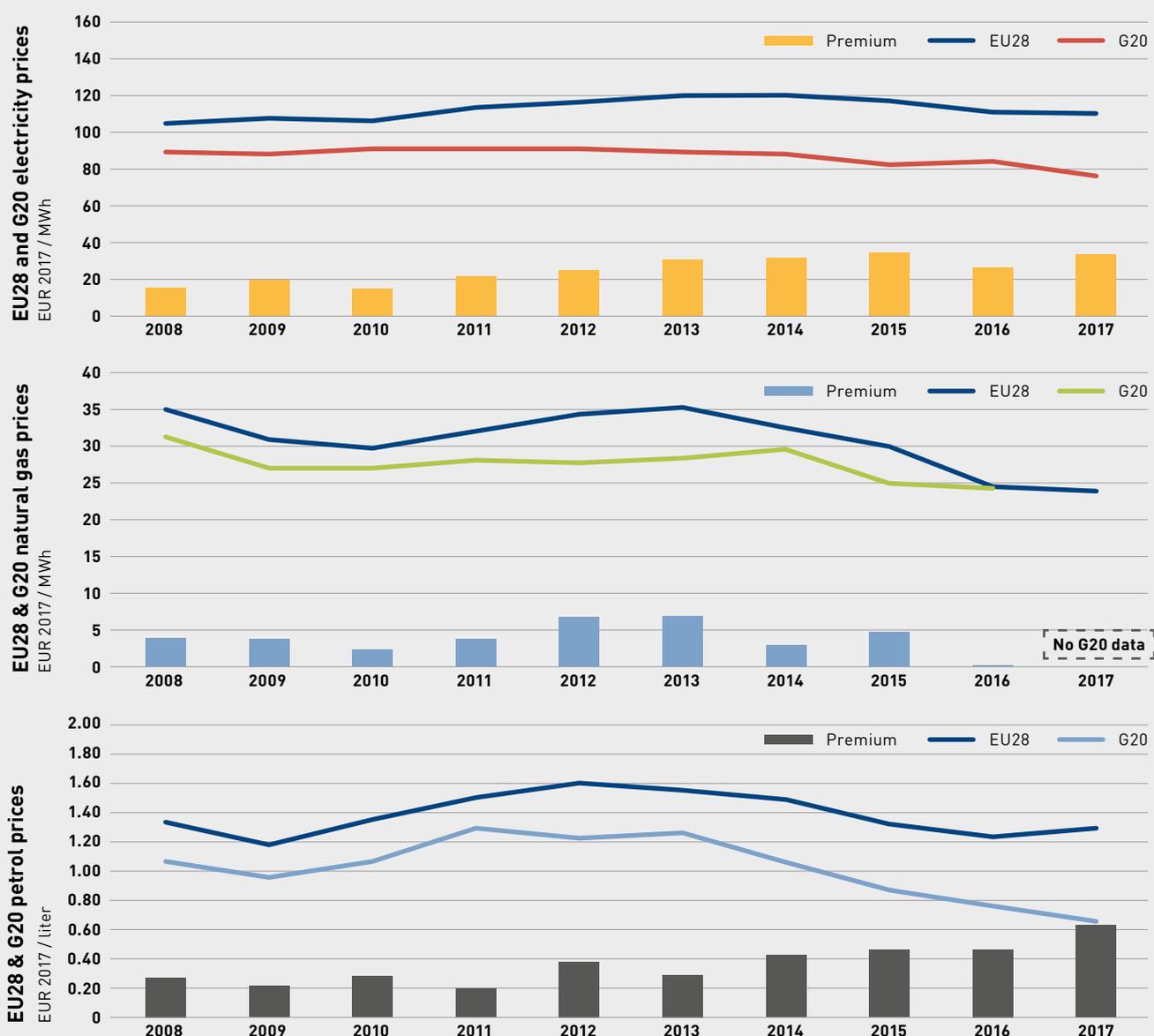
¹⁷ IRENA, 2017. Electricity storage and renewables: Costs and markets to 2030.

ENERGY-PRICE DIFFERENTIAL WITH MAJOR COMPETITORS REMAINS

The price that most industries pay for their energy (made up of the cost of energy generation and supply, energy network costs, and energy taxes and levies) is estimated to be up to 20% of their total production costs, in some cases up to 40% (e.g. for primary aluminium)¹⁸, and therefore has a clear impact on their international competitiveness and profit margins.

When Europe is compared with its major trading partners, the EU's electricity prices remain higher on average than in most other G20 countries. They are comparable with

those in China and lower than Japan's, but higher than in Canada, Russia, Mexico and Turkey, and almost double those in the USA. For gas and petroleum, particularly automotive fuels, EU prices also tend to be higher than in most G20 countries, though EU gas prices are lower than those in East Asian countries, especially those that rely significantly on LNG imports (Japan, Korea). The premium that businesses pay compared with other G20 countries is largely due to taxes and levies: Without these, both electricity and gas prices tend to be more similar, except for the USA and Middle East.¹⁹



Source: Trinomics et al., 2018 (Commissioned by DG Energy, European Commission). Study on Energy Prices, Costs and Subsidies and their Impact on Industry and Households

¹⁸ European Commission, 2018. Energy prices and costs in Europe.

¹⁹ DG Energy, 2019. Energy prices and costs.

EUROPE'S ENERGY SYSTEMS ARE NOT YET FIT FOR FUTURE NEEDS

Energy system costs have increased and will further increase in many EU Member States due to grid development and management costs to integrate a rising share of flexible renewable electricity. This includes the challenge of adapting back-up capacity to ensure a constant electricity supply. All in all, the European Commission's strategic long-term vision expects overall energy costs to increase from about 11.5% of GDP in 2015 to 12.6% of GDP in 2030. Total energy system costs are estimated to rise to € 2.2 – 2.8 trillion a year between 2030 and 2050 (less than EUR 1.6 trillion in 2015), depending on the technology paths.²⁰ They still vary considerably within Europe due to the ongoing dominance of national energy and climate policies.

Several long-term scenarios expect more than 50% of electricity to come from renewable energy by 2030, growing to 81 – 85% by 2050.²¹ This means that interconnections must increase to make energy systems more

adaptable to integrate fast-increasing shares of flexible electricity, and strengthen Europe's internal market competition between Member States. However, despite significant improvements in some Member States such as the Baltics in their interconnections, the overall system has not seen a major change in recent years, with some parts even experiencing decreases in interconnectivity. As of 2017, 17 Member States had achieved the 10% interconnection target that the EU set for 2020, but even in those Member States the existing interconnections are not always used efficiently. Wholesale price differences between Member States remain substantial given the lack of interconnectivity and adequate grid development within Member States, insufficient market coupling and inappropriate use of interconnectors, preventing energy from flowing freely. There is also still a long way to go to provide economically viable solutions for low-carbon heat supply, especially for high-temperature industrial applications.

MORE ENERGY EFFICIENCY AND ENERGY STORAGE FOR RENEWABLE ELECTRICITY, GAS AND HEAT

Energy-intensive industries reduced their final energy use by 20% between 1990 and 2016.²² Member States have also implemented energy efficiency measures in other sectors, which has led the overall EU energy consumption to decrease and provide Europeans with substantial benefits.

Europe's electricity storage capacity currently consists of 97% pumped hydropower storage, which is currently

the only large-scale storage technology able to counterbalance flexible renewable energy. Considering future flexibility needs of a power sector based on almost full renewable electricity, the potential for other types of storage such as batteries (household and industrial), thermo-electric systems and power-to-X, clean hydrogen and e-fuels to contribute to security of supply remains substantial.

IN SUM

Europe has made significant efforts when it comes to climate action. It is also clear that renewable energies are 'riding the wave' of decreasing generation costs, which is making them increasingly cost-competitive compared with traditional sources of energy. Nevertheless, their rising share in the EU's overall energy mix is causing network costs, taxes

and levies to rise. Furthermore, there is still a lot to be gained from improving Europe's interconnection and creating a level playing field with our competitors. It is also evident that, for a swift implementation of the Paris Agreement, urgent action is needed from those countries that committed to less ambitious pledges than Europe did.

²⁰ [European Commission](#), 2018. 2050 long-term strategy, In-depth analysis, p. 208-209.

²¹ [European Commission](#), 2018, p. 76, and [Eurelectric](#), 2018. Decarbonisation Pathways, full study results, p. 59.

²² [IES](#), 2018. Industrial value chain: A bridge towards a carbon neutral Europe

CLIMATE NEUTRALITY: FRAMEWORK CONDITIONS AND ACTIONS



CONDITION 1

RECOGNITION OF DIFFERENT CONDITIONS AND STARTING POINTS FOR EU MEMBER STATES

The challenges facing Europe and its major trading partners are significant and therefore have to be managed well. While the potential to decarbonise is significant, **there is a large variation between EU Member States in terms of starting points** that make the shift towards climate neutrality more challenging for some than others. For example, Nordic countries have already achieved an electrification rate of 32% in their industries, buildings and transport sectors, whereas the figure is much lower in Eastern European

countries.²³ The economic structure also matters, with countries like the Czech Republic, Germany, Poland and Romania generating more than 20% of their GDP from the manufacturing sector. The difference in economic situation, share of industrial activities and energy mix means that each EU Member State will require a different pathway to undertake a successful energy transition. Europe therefore needs to become more cohesive and inclusive to implement energy and climate policies as cost-effectively as possible.

→ ACTION: Boost European coordination for cost-effective policy implementation

Given the many economic benefits that more integration can bring to countries, the relative lack of progress so far implies that the decision to not do so is often more politically motivated than it is market-based. **Member States must show a much greater willingness to coordinate and to further integrate Europe's energy markets.** We need to move to a full Energy Union with integrated short-term energy markets and better interconnections, where clean energy can easily and safely flow from one Member State to another.

Furthermore, **cooperation between economic sectors** must be improved through sector coupling and industrial symbiosis to benefit from synergies and spill-over effects, but also to reuse or repurpose existing energy infrastructure (e.g. gas) for clean energy sources so as to prevent the costly premature write-off of assets. This also means that the right decisions must be taken at the right time in order to prevent excessive subsidies and unnecessary inter-connection delays.

Lastly, different approaches need to be followed per sector. For **buildings**, Member States must increase efforts on renovation and develop incentives to increase their energy efficiency. It should also make sure that buildings become energy-intelligent and are able to communicate with the grid. In addition, more should be done to provide affordable, low-carbon heat for household and industrial applications. In the **transport** sector, expected increased demand needs to be met with more affordable zero- and low-emission vehicles (ZLEVs), which would prevent the need to take measures not acceptable to the wider public. In **agriculture**, we need more incentives for climate-friendly agricultural services, more efficient (re-)use of agricultural waste, fertilisers, soil and water management, and to reduce or mitigate methane emissions from animals.

²³ Eurelectric, 2018. Decarbonisation pathways.

CONDITION 2

DEVELOPMENT AND DEPLOYMENT OF INNOVATIVE TECHNOLOGIES

Innovative technologies are necessary for many sectors, in particular those for which linear GHG emission reduction trajectories in GHG reductions will be more challenging. **How are we in Europe going to make sure that they are developed and deployed here on an industrial scale?** Companies in China, Japan, South Korea and the USA are fast-developing through public-private

partnerships. For mature technologies, Europe is right to trust in free market forces as the most efficient way to allocate capital. However, the same rules do not apply to emerging technologies with scope for many breakthrough solutions, which typically emerge when cooperation between governments and businesses is strongest.

→ ACTION: Unleash investments through a comprehensive industrial strategy for Europe

To keep industrial production in Europe, companies will have to invest and innovate significantly. Therefore, **Europe needs a comprehensive industrial strategy** enabling companies to do so. This includes greater flexibility for public-private partnerships, state aid and other political decisions that reduce costs and determine the magnitude of private investments that will flow into Europe. In particular:

→ **Financially support the business case for breakthrough technologies** to help companies make them competitive. The EU's finance gap for reaching its 2030 energy and climate targets is estimated to be around EUR 180 billion a year.²⁴ The potential to attract more funding from financial markets is huge.²⁵ Therefore, we need the right enabling framework that includes the possibility to underwrite risks that are unique to new business models for breakthrough technologies. Secondly, extra government support should be focused on those sectors that must make the transition without current commercially available technologies. The EU ETS Innovation Fund (estimated total size: EUR 10 billion between 2021-2030) and the 35% share for climate-friendly technologies in the HorizonEurope budget for the period 2021-2027 are significant steps in the right direction. European businesses expect that other initiatives will follow, including more green public procurement to create a critical mass for new ideas.

→ **Rethink the public finance approach to fund energy infrastructure.** Currently the energy transition is often financed through energy bills. However, Member

States could consider other financing sources, such as the general government budget. Integration in the wider budget allows for a comprehensive industrial strategy that foresees the emergence of new value chains, and uses the entire toolbox of government support to implement them in Europe. In particular, in addition to breakthrough technologies, a large-scale restructuring of the energy system is required, including vehicle-to-grid solutions, smart charging and digitalisation, but also next-generation waste management systems. There is also a significant shortage in charging and fuelling infrastructure for low-carbon transport.

→ **Invest in education and reskilling the labour force** so companies have better access to high-skilled labour that can deliver high-value and modern production processes. This also means that new entrants are encouraged into the labour market through apprenticeships and graduate schemes. Europe can pride itself on its ability to bring together cross-sectoral collaborations between SMEs, large companies, universities and public authorities. Such complex structures when leveraged well can deliver the necessary know-how that industry needs to invent new breakthrough technologies and to make them competitive, efficient and commercially attractive. This includes **a just transition plan** for Europe's workforce with decent work and quality jobs in accordance with nationally defined development priorities, so that no region in Europe is left behind. Structural investments should increasingly target the energy transition, regional integration and identify synergies to make use of shared public financial resources.²⁶

²⁴ [European Commission](#), 2018. Financing a sustainable European economy.

²⁵ The Asset Owners Disclosure Project (AODP) finds that most of world's 80 largest institutional investors still view climate-related issues as a risk to underwriting and investment portfolios rather than a business opportunity. Only 1% of their assets under management are currently directed to low-carbon investments. Source: [AODP](#), 2018. AODP Global Climate Index 2018.

²⁶ [Eurelectric](#), 2018. Decarbonisation pathways.

CONDITION 3

LARGE-SCALE AVAILABILITY OF AFFORDABLE, LOW-CARBON ENERGY

The amount of installed capacity from electricity sources needed to meet the demand for energy-intensive industries is estimated to increase to 2,980-4,430 TWh by 2050 (up from about 1,000 TWh in 2016)²⁷, which is more than even the most extreme scenario considered in the European Commission's long-term climate strategy.²⁸ For some industries, this is as much as **four to nine times higher than in a scenario where no efforts are made to reduce emissions**.²⁹ Therefore, it is crucial that operational expenditures (OPEX) of low-carbon energy sources are cost-competitive internationally. Otherwise, the capital expenditure (CAPEX) investments will not happen. The power sector will have to provide cost-competitive clean electricity as soon as possible. For parts of the economy that cannot be easily electrified, sustainable biomass (fuel and feedstocks) needs to be readily available and affordable, as well as abundant clean hydrogen (fuel and feedstock) and gas (bio or synthetic) by upgrading the existing gas infrastructure.



→ ACTION: Design an integrated value chain approach for energy supply

→ **Initiate a strategic mapping process** linking future industry low-carbon energy needs to infrastructure development through a bottom-up approach. This can include local and regional roadmaps identifying the preconditions for GHG reductions in industry. It should also consider where governments can co-invest with industry in carbon storage solutions such as CCS, bioenergy with CCS (BECCS), CCU and natural sinks, which will be needed to abate unavoidable emissions (such as process emissions).

→ Ensure security of supply by providing, where necessary, **adequate low-carbon back-up power capacity**. In various industrial production processes, high-quality energy and uninterrupted supply is crucial for product quality, to prevent damage to

highly sensitive machinery and equipment and to ensure safe working conditions.

→ Analyse where **existing energy infrastructure can be upgraded**, interconnectivity and storage increased, and demand-side management improved to make efficient use of rapidly increasing renewable electricity across Europe.

→ Analyse in cases of risk of energy insufficiency the **import needs for low-carbon energy** (guaranteed by certificates of origin) in Europe to cover the estimated domestic demand.

→ **Incentivise further improvements in energy efficiency**, as this will remain crucial to balance the significant increase in overall energy demand.³⁰

²⁷ For a deeper discussion on the CAPEX-OPEX challenge, see IES, 2018.

²⁸ Figure 73 in the Commission's long-term climate strategy considers the lower bound of 2,980 TWh from the EIS study to be their most extreme electricity demand scenario for industry. Most other scenarios assume lower demand levels of 1,000-2,800 TWh.

²⁹ McKinsey, 2018, How industry can move toward a low-carbon future.

³⁰ IEA, 2018, World Energy Outlook 2018.

CONDITION 4

ADAPTATION OF CITIZEN BEHAVIOUR AND PUBLIC ACCEPTANCE

The public attention given to the energy transition is growing fast. Businesses are an important player in the debates by providing products and services that reduce emissions, make more efficient use of resources and simultaneously boost well-being. Nevertheless, public support for a political move towards climate neutrality will be tested if certain policy decisions touch upon restricting or limiting consumers in their current lifestyles or lead to an unjust transformation that leaves the most vulnerable groups of society behind. Therefore, **Europe needs to engage effectively with its citizens to actively involve them in the transition** and pave the way for technology acceptance and changes in consumption patterns.



→ ACTION: Engage actively with citizens to gain societal acceptance

Cost-effective policies need to be combined with educational and awareness-raising campaigns, improved product information and community approaches that accelerate the understanding amongst citizens that their own actions significantly influence their carbon footprint, and that they should act upon this. This can spur new demand, which in turn allows businesses to adapt their product and service portfolios accordingly. The objective must be that Europe's societies, in light of the circular economy, move towards a fully functioning market for secondary raw materials where waste is minimised both at the source and at the point on consumption. Furthermore, governments need to explore all avenues to **actively involve citizens in the energy transition**.

This means:

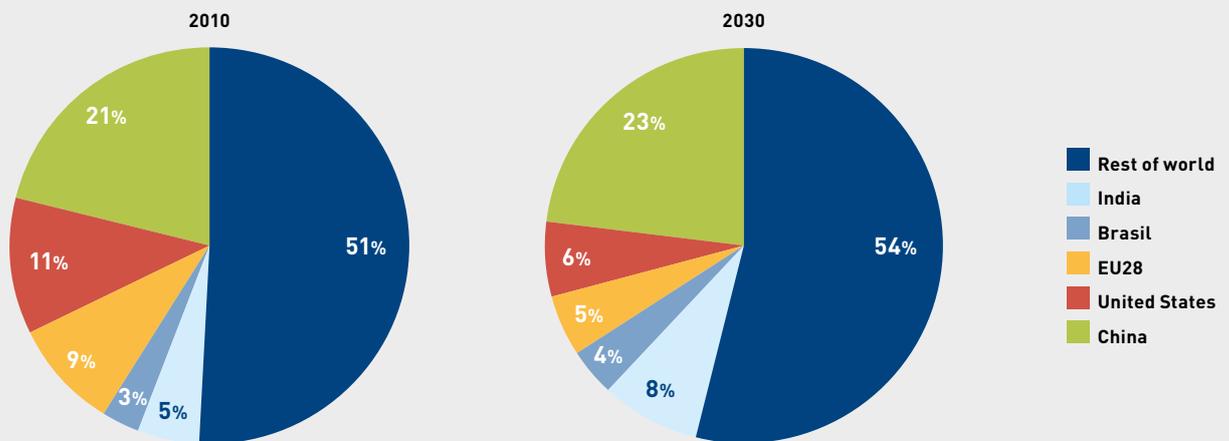
- **Informing citizens** about how to reduce their energy use through energy efficiency measures, and how to use energy in a way that shifts load away from peak hours towards hours where demand is lower (demand response).
- **Increasing consumer empowerment** to self-generate clean energy.
- **Increasing social acceptance and interest** for large renewable energy projects, zero- and low-emission vehicles (ZLEVs), and other technologies such as carbon capture, utilisation and storage (CCU and CCS).

CONDITION 5

CONVERGENCE OF GLOBAL CLIMATE AMBITIONS

If all major economies in the world meet their current 2030 goals under the Paris Agreement, Europe will likely account for only 5% of global emissions by 2030 (down from 9% in 2010), China for 23%, India 8% and the USA for 6%. The rest of the world will account for more than 50% of emissions by 2030.³¹

Total GHG Emissions Including Land-Use Change and Forestry (GtCO₂e)



Source: Boyd et al., 2015. China's 2030 share based on its emissions peaking by 2030. If China peaks by 2025, its 2030 share drops to 13.8 Gt CO₂e, or 22% of the global share.

All Paris Agreement signatories have agreed to collectively review and increase their climate ambitions in an open process called the Talanoa Dialogue. It is crucial that this dialogue starts to deliver real results: Whereas Europe's energy-related CO₂ emissions continued to fall by 1.3% in 2018, they rose globally by 1.7% to hit a new record due to sharp increases in China (2.5%), the United States (3.1%) and India (4.8%).³² Even with current climate pledges by major economies, which are less ambitious than Europe's, there are many uncertainties as to how they aim to achieve these targets. For example, whereas the EU's NDC provided comprehensive economy-wide emission targets based on absolute reductions, the NDCs by China and India are based on carbon intensity (emissions per unit of GDP). This means China's absolute GHG emissions are still on

the rise as more new coal-fired capacity is added to the grid, and it is unclear when its absolute emissions will peak.³³ Furthermore, with the current US administration's intention to withdraw from the Paris Agreement and abolish its national Clean Energy Plan, it looks unlikely that the US will reach its targets, though there are some impressive ambitions led by more than 3,000 states, cities and companies representing 35% of nationwide GHG emissions to stay committed to the Paris Agreement.³⁴

It is crucial that major trading partners also commit themselves to ambitions comparable with Europe's as soon as possible. As long as they do not do so, European leaders must consider additional safeguards.

³¹ [Boyd, Stern and Ward](#), 2015. What will global annual emissions of greenhouse gases be in 2030, and will they be consistent with avoiding global warming of more than 2°C?

³² [International Energy Agency](#), 2019. Global Energy & CO₂ Status Report.

³³ China also provided US\$ 36 billion of financing in 2018 for coal plants outside the country. Source: [IEEFA](#), 2019. China at a Crossroads.

³⁴ [America's Pledge](#), 2018. Fulfilling America's Pledge.

→ **ACTION: Consider additional safeguards depending on international actions**

Ideally, all major economies converge their climate ambitions and aim for climate neutrality by around mid-century in order to comply with the Paris Agreement. This includes the introduction of carbon-pricing mechanisms worldwide (an agreement on Article 6 under the Paris Agreement's Rulebook on carbon markets should therefore be concluded no later than 2019-2020). Preferably, each carbon-pricing mechanism should be harmonised over time to create a global carbon price. This would create a global level playing field, and make discussions about investment and carbon leakage less relevant³⁵. One important step on the way is to link existing carbon markets and establish common, international accounting rules that reflect the fact that economies are highly interlinked and strengthen the awareness that climate mitigation is a global effort.

If, on the other hand, a significant number of key G20 countries and other signatories of the Paris Agreement provide no indications that they are willing to raise their ambitions towards climate neutrality, the chances of limiting average global temperature increases well below 2 degrees Celsius, let alone 1.5 degrees, disappear. International competition for Europe's industries will remain distorted. Thus, the threat of investment and carbon leakage increases, especially as the carbon costs create an increasingly bigger premium compared with other economies.

In such a scenario, the EU should consider additional safeguards to the existing ones to prevent investment and carbon leakage in order to attain the climate-neutral ambition without significantly jeopardising competitiveness. Sectors will be affected differently by the energy and climate transition and they are often interlinked by complex value chains. Therefore, a toolbox of targeted instruments is needed to safeguard the competitiveness of European industry as a whole. **These additional safeguards should be considered in close dialogue with business and other stakeholders from now until 2023**, when many of the EU's key energy and climate legislation will be reviewed and during which time the 2023 global stocktake exercise under the Paris Agreement will take place. The following options could be carefully assessed:

→ **Better protection under the EU ETS** for sectors facing international competition, including but not limited to more free allocation and indirect cost compensation, if other major economies do not face similar costs and regulatory burdens.

→ **Climate provisions in free trade agreements** in the context of the sustainability chapter, which should allow for an adequate response by the EU to trading partners, for example when a trading partner considers withdrawing from the Paris Agreement or the UNFCCC, but also if the trading partner were to significantly deviate from the CO₂ emission reduction pathway in its NDC under the Paris Agreement. The first reaction should of course include a collaborative approach by finding ways to help the trading partner to improve its situation, such as ways to implement carbon pricing and promote trade in climate-friendly goods and services. For example, the EU could try to form "carbon clubs" with other large, similarly ambitious economies and grant each other trade preferences based on equivalent climate policies and costs to industries, while respecting the EU's international commitments.

→ **Carbon border adjustments** (CBAs) for imported products of certain sectors, preferably together with other economies through "carbon clubs". The World Trade Organisation (WTO) could allow members under certain conditions to compensate for carbon costs that are levied on domestic products by means of an adjustment charge on similar imported products, thereby levelling the playing field. Before considering this option, the EU together with the UNFCCC should try to receive climate pledges from major cities, states and companies outside Europe that they are committed to climate neutrality even if their national governments are not yet willing to do so. Moreover, before taking concrete action, a detailed analysis should be made of the practical feasibility, legal aspects, impacts on the sectors involved as well downstream sectors, and risks of retaliation.

³⁵ Even if businesses do not move their manufacturing sites outside of the EU overnight ('carbon leakage'), they may still decide to gradually shift more investments out of the EU depending on carbon price ('investment leakage')

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