

## High priority for low carbon

In December 2015, the world's nations concluded the Paris Agreement, a new framework in which all countries contribute to tackling climate change. To achieve the objective of the agreement of keeping global temperature rises well below 2 degrees Celsius, global net emissions of carbon dioxide (CO<sub>2</sub>) and other greenhouse gases (GHG) must be stopped in the second half of this century. This decarbonisation of the global economy is a huge task, requiring unprecedented levels of innovation and trillions of euros in investments. The EU, a frontrunner in climate policies, has taken action to progressively reduce its GHG emissions and promote a low-carbon economy.

### The Paris Agreement – a new framework for global climate action

The [Paris Agreement](#) was adopted on 12 December 2015 by the 21st Conference of the Parties (COP 21) to the United Nations Framework Convention on Climate Change (UNFCCC). It provides a framework for global action to address climate change in the period after 2020. The agreement overcomes long-standing divisions between developed and developing countries.

The objective of the agreement is to maintain the increase in global temperatures well below 2 degrees Celsius above pre-industrial levels, whilst making efforts to limit the increase to 1.5 degrees. This target is considered as one at which the risks of climate change may still be manageable. The agreement aims to ensure global greenhouse gas emissions peak as soon as possible, and to achieve a balance between emissions and removals of GHGs in the second half of this century. Furthermore, the agreement addresses adaptation to climate change, financial and other support for developing countries, technology transfer and capacity-building as well as loss and damage.

The agreement requires all countries to set out their objectives and plans in nationally determined contributions (NDCs), take measures to achieve their objectives, and report on progress. In order to raise the level of ambition over time, Parties must submit updated NDCs every five years.

### Decarbonisation – a race against the clock

If aiming for a two-thirds chance of keeping global warming below 2 degrees, global GHG emissions must be cut by 40-70% from 2010 levels by 2050, and become zero or negative by 2100, according to the Intergovernmental Panel on Climate Change (IPCC). Even greater efforts would be required to limit global temperature rises to 1.5 degrees. The IPCC has been requested to analyse the issue and report in 2018.

Since CO<sub>2</sub> stays in the atmosphere for hundreds of years, any delay in reducing emissions means that greater emission reductions will be needed later on. If too much CO<sub>2</sub> is emitted, it may even become necessary to [remove carbon](#) from the atmosphere with costly, unproven and risky technologies.

The phasing out of GHG emissions requires changes on many levels, first and foremost reducing the consumption of fossil fuels as much as possible, and capturing the remaining CO<sub>2</sub> emissions for storage or re-use. In the energy system, this means a shift from fossil fuels to low-carbon energy sources such as renewables and possibly nuclear power. Gas-fired power plants, which emit less CO<sub>2</sub> than coal plants, can play a role in compensating for the variability of renewable energy sources such as wind and solar, as long as large-scale affordable electricity storage is not available. In the residential sector, zero energy houses can help reduce emissions. Emissions in the transport sector can be addressed through electrification in combination with low-carbon electricity, or through sustainable biofuels. The steel industry and cement production are sectors in which emissions are hard to reduce with current technologies.

*This note has been prepared for the [European Youth Event](#), taking place in Strasbourg in May 2016.*



Forests and agriculture play an important role in the global carbon cycle. Forestry, agriculture and other land use account for almost a quarter of global GHG emissions. On the other hand, the growth of new forests can help remove carbon from the atmosphere. As carbon is also stored in soils, agricultural and forestry practices can improve or reduce the capacity of soils to store carbon.

Finally, food production contributes to climate change. Increased meat and dairy consumption leads to deforestation, as forests are cleared to grow feed for animals. Cattle also emit methane, a powerful greenhouse gas. [Chatham House](#), a think-tank, therefore advocates a reduction of global meat consumption.

Global emissions from all sources would have to be reduced while a growing and increasingly prosperous world population needs more food and energy. Analysis by [PricewaterhouseCoopers](#) indicates that global economies would have to reduce their carbon intensity (GHG emissions relative to economic output) by 6.2% every year from now until 2100 – more than five times the rate currently achieved. The [International Energy Agency](#) estimates that US\$44 trillion in additional investment is needed to decarbonise the energy system by 2050, although this investment would be offset by over US\$115 trillion in fuel savings.

Experts disagree over whether existing technologies are sufficient, or whether technological breakthroughs are needed. Some investors, including [Bill Gates](#), argue that rapid innovation is needed to achieve emissions reductions. Together with other investors, he launched the [Breakthrough Energy Coalition](#) to invest billions of dollars in clean energy technology research and development, working with the [Mission Innovation](#) initiative of 20 countries that intend to double their investments in this field over the next five years.

The rapid growth and wide adoption of the internet and mobile technologies shows that disruptive innovation and transformational lifestyle changes are indeed possible. If this dynamic can be replicated in the energy sector, while avoiding the associated [systemic risks](#), there are good prospects for decarbonisation and sustainable growth. However, energy infrastructure has a long lifetime, so that changes may be much slower. To give some examples, power plants last many decades, and efforts to introduce carbon capture and storage have been held up by economic difficulties as well as public opposition. Access to finance, skills shortages, and limited supplies of critical raw materials (such as lithium for batteries) may also limit the speed of decarbonisation. Strong economic growth generally makes it easier to finance low-carbon innovation, but at the same time tends to be associated with higher emissions than a low-growth scenario.

## European climate policies

The EU, a front-runner in climate policies, is on track to achieve its binding target of a 20% reduction in GHG emissions below 1990 levels by 2020. It aims for a 40% reduction by 2030, as an intermediate step to an 80-95% reduction by 2050. The main instrument for achieving emission reductions is the EU emissions trading system (ETS), a cap and trade system in which a limited supply of tradable emission allowances is made available to electricity generators, industry and the domestic aviation sector. The ETS was reformed in 2015 with the new [Market Stability Reserve](#) aimed at better aligning supply and demand of emission allowances.

Currently, the European Parliament and Council are considering a [legislative proposal](#) for post-2020 ETS reform that would reduce the number of emission allowances by 2.2% per year in line with the targets for 2030. For sectors not covered by the ETS, national targets for the EU Member States are set out in an [Effort Sharing Decision](#). The EU's greenhouse gas emission targets are complemented by targets for renewable energy sources and energy efficiency. Climate legislation in the EU includes ecodesign and energy labelling, the Renewable Energy Directive, the Energy Efficiency Directive, the Fuel Quality Directive, CO<sub>2</sub> limits for cars and vans, and legislation on fluorinated gases. Much of this legislation is currently being reviewed, in order to bring it into line with the medium and long-term targets.

On the international scene, the EU's climate diplomacy contributed to the successful conclusion of the Paris Agreement. In June 2015, the EU and China [agreed](#) to cooperate on developing a low-carbon economy while maintaining robust economic growth, enhance cooperation on carbon markets and launch a low-carbon cities partnership. In March 2016, the EU and India [agreed](#) to cooperate on clean energy, energy efficiency and climate action. The EU and its Member States contributed €14.5 billion in climate finance in 2014.

The European Parliament favours an ambitious EU climate policy. Its [resolution of 14 October 2015](#) on a new international climate agreement urges a phasing-out of global carbon emissions by 2050 or shortly thereafter. It calls for a reinvigoration of EU climate policy and asks the EU and Member States to agree a roadmap for scaling up EU climate finance, and to earmark revenues from the EU ETS, and from possible future taxes on aviation and shipping emissions, for that purpose.