Energy Union:
New Energy for the EU

This study offers six priorities to feed into the debates around the Energy Union.

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Six priorities to be adopted into Energy Union.
The plans for Energy Union come at an opportune moment. When we are looking to gather momentum to go forward with a more sustainable transition whilst at the same time address effects of the economic and social crises. Fresh and progressive innovation for energy policies in Europe can help solve multiple related problems and bring about a much-needed energy transition.

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FEPS (Foundation for European Progressive Studies) is the European progressive political foundation. The only progressive think tank at European level establishes an intellectual crossroad between social democracy and the European project, putting fresh thinking at the core of its action. As a platform for ideas, FEPS works in close collaboration with social democratic organisations, and in particular national foundations and think tanks across Europe, to tackle the challenges that Europe faces today. Close to the Party of European Socialists (PES) and the S&D Group in the European Parliament but nevertheless independent, FEPS embodies a new way of thinking on the social democratic, socialist and labour scene in Europe.

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The climate and energy decisions that Europe will make over the next 12 months will shape how we use and generate energy for decades to come. They have huge implications for our fuel bills, the security of our energy supplies, our industrial opportunities, and global efforts to manage the risks posed by climate change. European heads of government must now stop delaying these big decisions and offer renewed international leadership through a reinvigorated and progressive climate and energy agenda.

FEPS report **"Energy Union: New Energy for the EU"** offers Progressive recommendations to feed into the debates ahead of the Energy Union Strategy, due to be released on the 25th February 2015, along with a Climate communication 'the road to Paris', December 2015 and a Communication reporting on the electricity interconnection target of 10 percent.

We welcome the initiative which comes at a critical moment when there is opportune impetus to provide it.

Six priorities gather the ideas that FEPS believes should be adopted.

1. **Take international climate objectives seriously**
2. **Diversify from fossil fuels**
3. **Prioritise energy efficiency as the first fuel for Europe**
4. **Give credibility to renewables**
5. **Reform the Emissions Trading Scheme**
6. **Energy Union super-fund**

1. **Take international climate objectives seriously**

A strong Energy Union can provide investors and the international community with clarity over the direction of European climate and energy agendas. The EU should establish clear policies and advocate for an international climate agreement at the UN climate summit this December that establishes emission reduction targets set for every five-year period to 2050.

2. **Diversify away from fossil fuels**

If an Energy Union is to be progressive and forward-thinking, a move away from fossil fuels as soon as possible would be the best solution to reach our long-term goals. Wherever possible investment should be made in efficiency and renewables.

The spectre of the Ukraine conflict, has highlighted the urgent need for more interconnection facilities. Opening up the market so renewables can act on a level-playing field and creating better capacity mechanisms are also important.

3. Prioritise energy efficiency as the first fuel for Europe

Energy efficiency is the fastest, cleanest and safest way to save energy. It's a crucial way to meet our energy needs and has multiple benefits.

It is also the first way to alleviate fuel poverty.

Temporary exemption from state aid rules for instance will lower transaction costs for projects and help investment notably in the building sector and across other areas of the economy.

4. Give credibility to renewables

Robust renewable energy policies can help enhance the market for renewables and reduce our need for fossil fuels.

Discontinuing unfair subsidies to fossil fuels and creating a level-playing field for renewables should be done as soon as possible.

5. Reform the Emissions Trading Scheme

The deep flaws in the ETS, Europe's flagship scheme for cutting greenhouse gas emissions should be reformed before the UN climate summit in Paris this year.

EU member states should create backstop policies to prevent policy failure on decarbonisation, particularly concerning coal, from occurring should these reforms to the ETS fail.

There should be a one-off and permanent removal of 'pollution allowances' in the ETS, to tighten the scheme's carbon budgets so that they are in line with the EU's newly established and strengthened targets for greenhouse gas reduction. The Market Stability Reserve should take effect by 2016, and should not be delayed.

6. Energy Union super-fund

European budgets that exist to support the sustainable transition should be pooled to create a 'clean energy super-fund' that is clearly aligned with Europe's overarching energy objectives for a lasting Energy Union.

There should also be a greater role for the European Investment Bank in helping to leverage more clean energy investment.

INTRODUCTION

Energy Union: New Energy For The EU

We welcome the initiative for Energy Union. It comes at a critical moment when there is the opportune impetus to provide it.

The economic and security reasons are important but should not take precedent over social and environmental considerations. Energy Union must be deeply tied to environmental policy.

Renewed leadership from Europe on climate change could help to leverage greater effort on the part of other major economies, and make a successful outcome at this year's important international talks in Paris more likely. Given the grave security risks posed by global temperatures rising by more than 2°C, this is in our common interest. A key test of the new European strategy will be whether it does what is necessary to manage climate risks, and specifically whether it is consistent with building a carbon-neutral economy within a generation.

Past successes and current strengths of European energy policy illustrate that there are a lot of things that can be done in a concrete and pragmatic way when collective vision, well-identified objectives, leadership and political will, binding rules and the right regulatory infrastructures and financial instruments are aligned. (Andoura and Vinois 2015)

Energy Union should be a comprehensive programme of climate protection and social and economic welfare packages. It needs to be inclusive. It can address the economic crisis and environmental crisis together at the same time. However it needs to be clear, practical and inclusive.

Solidarity should be at the heart of the Energy Union. At the moment it is not and this is exacerbating democratic malaise. Ensuring energy supply at an affordable price for everyone would be the first way to convince the younger generation that working together has far-reaching benefits.

The proposals of the European Commission can show leadership by building on European values and enhancing jobs and welfare for citizens. Energy Union should change the way we look at energy, rather not by supply but by demand. Rather it should serve the people, not the market.

Social dialogue needs to be a large part of Energy Union too. Jobs will be created but many jobs will be lost or changed. We need to learn from history and include re-training and education programmes in the Energy Union programme. Dialogue with the workers is indispensable. We should engage with as many people as possible to build on their knowledge and expertise and this should follow the principle of a 'just transition'.

It should include all stakeholders in order for it to be successful and a convincing project. This would ensure it is accessible and if people feel part of it and involved, they also feel not only participation but ownership and responsibility. Thereby installing a duty and moreover acceptance of the methods and to fulfil the aims and objectives for a shared common, final goal.

Politically, nothing much needs to change, Member States are already linked and the existing treaties allow the space for this to develop fully.

Although to avoid Energy Union being hostage to Member States national interests, the decisions need to be bold and inclusive. Real public alliances need to be built from the initial stages to enhance acceptance of the initiatives and information awareness raising for bridging the gap is very important.

The proposal of the new European Commission for an Energy Union being published at the end of February, means that now is an appropriate time to reconsider what a progressive energy agenda for the Union would look like.

What this opportunity can bring: Welfare and Solidarity

Energy is a fantastic starting point for reforming the presently disenchanted Europe.

Jobs, welfare and security in Europe are three main issues which drastically need to be addressed, if we want to avoid deepening democratic malaise and overcome the economic, social and environmental crises. Energy Union has the potential to involve all three of these.

With decent job creation, ensuring welfare, boosting sustainable growth and at the same time ensuring more security through energy policy, a comprehensive and inclusive Energy Union has the potential to provide the space for addressing these issues. It can bring about better well-being for our citizens and promote a feeling of solidarity instead of isolation.

In this way it holds the key to rebuilding trust and hope in the European project and building solidarity between our neighbours. Solidarity in energy policy has been disappointingly weak in recent years. A strong vision of an integrated energy policy in Europe could serve as a catalyst In rebuilding Europe for its citizens.

The reality is that we can do so much more in energy policy if we act European, together. We have the political tools and a favourable geographical landscape to do so. The European Union, to say that it was originally built on the European Coal and Steel Community (ECSC) and Euratom treaties, has for the last few years been developing divergent paths between Member States. There is a huge potential in more sharing at European level through energy policy yet the lack of finalising the internal energy market for example has made many disappointed. The unclear action and weak leadership has brought about a more uncertain Europe because of this. However a new era of sharing and solidarity and moving towards more sustainability can change this.

The international climate march last September in New York proved there is a global longing to change to a more sustainable future. Over 400,000 people gathered, the biggest climate march in history, calling for 100 percent clean energy worldwide (Avaaz).

Although the European Union is recognised for being a role-model on climate action. The emergence of new clean energy policies in the US and China and the bilateral agreement signed in November now means that an international climate change agreement is more likely to be reached at the UNFCCC summit in Paris in December 2015.

Yet if we want other countries to act in reducing global greenhouse emissions, they will be expecting Europe to be a leading example. Observers have long recognised the pivotal role that a strong, ambitious and united Europe must play in any successful global negotiation. It is Europe that demonstrated to the world that greener growth is possible, and that a heavily polluting energy system is not a prerequisite for prosperity. The European economy has grown by 45 percent since 1990, even as emissions have been cut by 20 percent (EEA 2014). Nevertheless despite having taken a lead at international talks on climate change for decades, European governments have failed to agree a strong climate and energy policy out to 2030. It is now the US and China, rather than Europe, that are making the running in global climate talks.

The political crisis in the Ukraine and the entire continent's significant dependence on imported fossil fuels from Russia caused energy security to rise to the top of the European agenda. This impetus provides a renewed opportunity to develop a cooperative energy policy based on alternatives to fossil fuel imports. Negotiating with one voice on the on the global market, means joint decisions and planning for economic and social benefits. The recent abandoning of the Southstream pipeline has illustrated this. Ridding Europe of the political pull Russia puts on many countries through energy dependency ultimately creates more security for the people. Moreover moving away from fossil fuels is better for our environment, our well-being and health and economic benefits.

By establishing an Energy Union based on welfare and solidarity and shaped for the citizens can be the new momentum needed for a disenchanted Europe.

New focus on energy

The initiative for an Energy Union was proposed back in 2010 by Jacques Delors, together with Jerzy Buzek who published a report on a European Energy Community (Notre Europe 2010) and was taken up more recently, evolving more rapidly since the crisis in Ukraine began last year. Additionally we have been observing for some time now the priority given to energy in discussions at the European Council summits, because of security and economic issues linked to the Ukraine crisis and also through the climate and energy targets.

Energy has been given a clear priority in the new structure of the European Commission, now overarching several Commissioner portfolios. With Energy Union having its own prominent portfolio headed by Maros Sefcovic also one of the Vice-Presidents of the European Commission, and Miguel Arias Cañete holding the merged Climate Action and Energy portfolios.

The climate and energy framework to 2030 was agreed upon at the European Council summit last October. There was a lot of wrangling right up until the last moment before the decision was taken by the Heads of State.

It was agreed to increase the targets by the following amounts until 2030. All three are compared to 1990 levels:

- Reduce greenhouse gas emissions by at least 40 percent.
- Increase the share of renewable energy to at least 27 percent
- Increase efficiency by at least 27 percent (not legally binding)
- Reform of the Emissions Trading Scheme

(European Commission 2014)

The efficiency and renewables targets were watered down in the final agreement by leaders. Many were disappointed that it doesn't send a clear enough message and doesn't develop enough certainty on policy to promote investment.

However we already have some ideas of what this Energy Union might entail through the President of the European Commission's political guidelines (Juncker 2014) and recent interventions of Maris Sefcovic. He has outlined five main pillars of the Energy Union:

1. Security, Solidarity and Trust
2. Internal Energy Market
3. Modulation of Demand
4. Decarbonisation of the energy mix
5. Research and innovation

(Sefcovic 2014)

This appears to focus on the crucial issues, however it remains to be seen in the implementation phase if the social focus of Energy Union will last. Which is why we want to put forward how we see a Progressive Energy Union would be shaped.

Renewables, efficiency and revival of the Emissions Trading Scheme are priorities

A credible European energy strategy would encourage the continued growth of the renewables industry, given the potential for its proven, affordable clean technologies to generate new industrial opportunities and help reduce gas dependency.

Europe must also act in order to protect its first-mover advantage in green industries, and to take full advantage of the economic opportunities available from the transition to a low-carbon economy. The global market in low-carbon and environmental goods and services is worth around €4 trillion a year, and is expected to grow to nearly €5 trillion by 2016 (Platt and Straw 2013). The EU has carved out a 22 percent share of the current market, worth over €900 billion a year, compared with a 19 percent share for the US and 13 percent for China (ibid). Without new policies, the EU risks ceding jobs and industrial opportunities in clean technologies to other economies that are more committed to capturing these new markets. The EU's share of global clean energy investments is already falling rapidly, from 40 percent in 2009 to just 25 percent in 2012 (Green Growth Group 2014a).

Subsidies for fossil fuels are distorting the market. They should be phased out as soon as possible. (Trio 2014) Enormous savings are available by moving away from an energy system based on expensive fossil fuel imports, and towards one that is cleaner, more efficient and home-grown. Avoiding fossil fuel import costs and maximising the positive impact of clean investments within Europe will bring significant economic benefits, and aid economic recovery (EY 2014).

Certainty about the likely economic attractiveness and size of the European clean energy market will be crucial for businesses making decisions about whether to invest in jobs and factories here. Each member state should then set out plans outlining their own pathway to carbon reduction by 2030, including the contribution that renewable energy will make.

Diversifying from Russian imports: Towards more security

Russia has been using gas as a political weapon and is trying to split up EU countries. It will still try and separate Europe into separate entities wherever possible in order to bargain on the best deal. One of the next 'battles with Russia' will be if EU countries face up to oppose different pricing regimes which Russia sets to different EU countries. However in this recent crisis over the south stream pipeline, EU countries have shown solidarity and spoken with one voice. In December 2014 Vladimir Putin abandoned the plans yet we cannot be certain that he will not use this in the debate on Ukraine.

Oil price has plummeted in recent months. It is expected that natural gas prices will also drop. However oil prices are always fluctuating and this doesn't necessarily mean that behaviour will change for the long-term. Although many believe the search for decarbonisation will not be sidetracked by cheap oil (Stilwell 2015). Indeed the recent decision of Shell to urge its shareholders to accept the climate resolution shows how business models are adapting to be more compatible with global climate targets. (Carrington 2015)

Analysis for the European Commission has concluded that investing in an energy system that is more efficient and less dependent upon fossil fuels could achieve annual savings in Europe's fuel bill of over €500 billion. In our view, energy efficiency improvements should therefore be the centrepiece of Europe's strategy for slashing dependence on imports of Russian gas. We supported a target for improving Europe's energy efficiency by at least 35 percent by 2030, since achieving energy savings on this scale would cut the EU's gas dependency by a third – equivalent to the proportion of the EU's gas demand currently met by Russia (EC 2014c). As with renewables, member states should set out what contribution energy efficiency will make to their overarching carbon reduction targets. The European Commission should address any differential between member states' ambition and the EU-wide target – for example, by developing new standards for vehicle efficiency.

The long shadow of the Ukrainian crisis illustrates that a decisive strategy for reducing European reliance on fossil fuels will also help to achieve the urgent strategic objective of cutting the EU's dependence on energy imports, particularly from Russia. Over half of Europe's energy is now

imported, including 90 percent of oil, 66 percent of gas, and 62 percent of coal (EC 2014a). The cost of these imports is expected to increase as global demand for energy rises (EC 2014b).

Energy Union: New Energy for the EU

Therefore a Progressive Energy Union would use energy policy as a means to a transition towards more sustainable growth. It would build real public alliances and social dialogue in this transition should be strong. If used appropriately it gives the opportunity for people, not private companies to make serious decisions on their energy supplies and use. It should be used as a means to addressing vulnerable groups of society who do not have fair and affordable access to energy. It also needs to put environmental protection at the forefront.

An Energy Union built on welfare, solidarity and sustainability for the long-term would be a Progressive approach. We need to provide an alternative to the short-term, isolationist approach. A Progressive Energy Union would serve the people, not the markets. It would build interconnection within its infrastructure on the ground and within the policy decisions too.

This report brings together the research FEPS has been carrying out on a progressive energy agenda and offers recommendations on what a Progressive Energy Union should encompass. Policy recommendations feature at the end of each chapter.

Chapter 1 explains why a strong Energy Union can provide investors and the international community with clarity over the direction of European climate and energy agendas.

Chapter 2 considers the different options for addressing Europe's energy security, and focuses on why energy efficiency and renewables should be the centrepiece of the EU's efforts to reduce its dependence on gas imports from Russia.

Chapter 3 provides further details on the multiple benefits of energy efficiency and how it can be deployed quickly. Clear policy recommendations are given.

Chapter 4 details renewable energy and how robust policies can help enhance the market for renewables and reduce our need for fossil fuels. It also gives clear proposals on the immediate steps necessary and available for achieving this quickly.

Chapter 5 examines the deep flaws in the ETS, Europe's flagship scheme for cutting greenhouse gas emissions. It is our view that a credible plan for urgently-needed reform of the ETS should be in place before next year's UN climate summit, and that EU member states should create backstop policies to prevent policy failure on decarbonisation, particularly concerning coal, from occurring should these reforms to the ETS fail.

Finally, chapter 6 outlines why European budgets that exist to support the sustainable transition should be pooled to create a 'clean energy super-fund' that is clearly aligned with Europe's overarching energy objectives for a lasting Energy Union.

CHAPTER 1.
KEEPING UP WITH THE G2

Clarity and direction towards the COP21

The historical climate deal negotiated between China and the US last November (Gracie 2014) shows they are both willing to use their political leverages towards a better deal at the COP21 summit.

The new goal should see the US reduce its emissions by 26-28percent from 2005 levels. Whilst China agreed to try and peak its emissions by around 2030, with an intention to try and peak earlier and to increase the non-fossil fuel share of all energy to around 20 percent by 2030. (White House 2014)

This is a huge leap towards a climate deal at the next summit this year. Without these two big emitters on board a deal seemed out of reach. Now these two powers have a bilateral agreement in place, it shows that both are taking measures to curb their emissions and act in fighting climate change. The political will is there. Which will in turn now urge other countries to react further. Together, these developments have raised hopes that an international climate agreement is within reach. Now eyes will also be on Europe to set the pace and show how it deals with implementing the climate and energy packages.

Indeed already twelve Chinese provinces have already pledged to cut their coal use. Assuming that these measures are enforced and not neutralised by rises in emissions elsewhere in the country, analysis by Greenpeace (Shuo 2014) suggests that these policies could put China on a pathway consistent with limiting global temperature rises to less than 2°C. The drop in carbon pollution that this would represent would be equivalent to the total emissions of Australia and Canada combined. China is also rapidly expanding its clean energy industry and invested $56 billion in renewable energy last year alone – more than the whole of Europe (BNEF 2014a).

In April 2014, the Intergovernmental Panel on Climate Change published the most comprehensive report to date on the risks that climate change poses to global security, and the ways in which the world could manage those risks (IPCC 2014). The authors warned that levels of the polluting gases that are causing the climate crisis have grown nearly twice as fast in the past decade as in the previous 30 years. Without urgent action to reverse this trend and dramatically cut greenhouse gas emissions, there is a high risk that global temperature rises could put today's levels of prosperity at risk, and decades of progress in international development. A landmark report for the World Bank (Potsdam Institute 2012) warned that a 4°C rise in global temperatures is looking increasingly likely without radical action, and could result in extreme heatwaves, declining global food stocks, loss of ecosystems and biodiversity, and life-threatening sea-level rises.
In 2012 US emissions dropped to the lowest level for 20 years due to widespread switching from coal to natural gas and the more than doubling of renewable energy generation (Reuters 2014a, IEA 2012a). New plans announced by President Obama in June 2014 should lead to a further reduction in carbon pollution, and a redoubling of the amount of renewable energy that the country produces (White House 2013). His administration's introduction of tighter emissions

standards for power stations has sent a clear message that the era of unabated coal-fired power generation in the US is ending. Meanwhile, his economic stimulus package included US$90 billion of support for clean-energy investment (Plumer 2012).

In September 2014 UN secretary general Ban Ki Moon hosted a major summit in New York, at which a number of world leaders – including President Obama – outlined their political commitment to managing risks from climate change (Darby 2014). The same summit witnessed a mass march of over 400,000 people. The biggest climate march in history calling for 100 percent clean energy worldwide. (Avaaz 2014)

Next December, France's President Hollande will host all the world's governments in Paris at the UN's 21st Conference of the Parties ('COP 21') Summit at Île-de-France, where it is hoped that a new, binding UN climate treaty will be agreed. Both the US and the BASIC group of emerging economies[1] have said that they are ready to commit to a new international climate deal in 2015. In Europe, there is clear evidence that cooperation in climate and energy policy still enjoys widespread popular support, despite the recent surge in support for Eurosceptic political parties in some of its members. Eurobarometer polling recently found that 80 percent of Europeans agree that fighting climate change and using energy more efficiently can boost the European economy and create jobs; 70 percent want to reduce fossil fuel imports to Europe; and 90 percent favour new renewable energy targets (EC 2014d). A 2012 YouGov poll, conducted in six European countries, found that tackling climate change was one of only two issues from a list of 16 on which the respondents felt that EU member states should cooperate more closely (Straw 2012).

Managing climate risks

Deep cuts in the annual volume of greenhouse gas pollution from Europe are necessary if Europe is to play its part in global efforts to keep temperature rises below the 2°C threshold to which it is already committed. It must do so if we are to manage the risk that climate change poses to our security and prosperity. The EU has already agreed to cut greenhouse gas pollution by between 80 and 95 percent by 2050. However, the European Commission expects that without new climate and energy policies, Europe will achieve only a 32 percent cut in greenhouse gases by 2030 (EC 2014f), and just a 40 percent cut by 2050 (EY 2014). This would be insufficient to put Europe on a pathway towards avoiding the severe risks associated with a rise in global temperatures of more than 2°C.

The Energy Union should offer long-term clarity on the commitment of Europe as a whole to implementing the climate strategy. This is essential if businesses are to factor climate policies into their decision-making, and if Europe is to avoid becoming 'locked in' to highly polluting infrastructure that makes cutting emissions more expensive in later years. A strong Energy Union guaranteeing to cutting carbon pollution would also give other countries and regions confidence that Europe is not asking something of them that it is not prepared to do itself. This in turn would increase the likelihood that an international climate agreement can be reached at

[1] That is, Brazil, South Africa, India and China.

[2] That is, the Czech Republic, Hungary, Poland and Slovakia.

the UN summit in Paris next year. Observers have long recognised the pivotal role that a strong, ambitious and united Europe can play in any successful global negotiation, and it is expected that leadership from Europe on climate change could help leverage greater effort on the part of other major economies.

Reducing dependence on expensive energy imports

Europe's fuel bill is growing. The International Energy Agency project that by 2035 it could reach US$615 billion (Green Growth Group 2014a). Since European fossil fuel production will halve between 2010 and 2050 (EY 2014), the continent risks becoming increasingly dependent on imports, including gas from Russia and the Middle East. The recent crisis in Ukraine underlines the geopolitical problems of these consequences.

The final decision in December taken by Vladimir Putin not to continue the Southstream pipeline project shows how solidarity between European Member States can significantly change policy. It highlights how more solidarity is needed as the benefits of acting together at European level in energy policy have been rewarding. The pipeline was the cause of a lot of angst between countries and had already highlighted the problems of short-term, isolationist approaches from some Member States. (Rettman 2014)

Meanwhile, most of the rising costs to consumers of electricity results from the rising cost of these fossil fuels, with a significant additional cost arising from the need to replace ageing and polluting energy infrastructure. The European Commission has projected that in a business-as-usual scenario, these factors will be responsible for a 43 percent rise in the cost of power between 2005 and 2030 (ibid). In the same report, the Commission concluded that investing in an energy system that cuts the continent's dependence on fossil fuels could achieve annual savings in Europe's fuel bill of over €500 billion (ibid).

Encouraging investment, jobs and growth

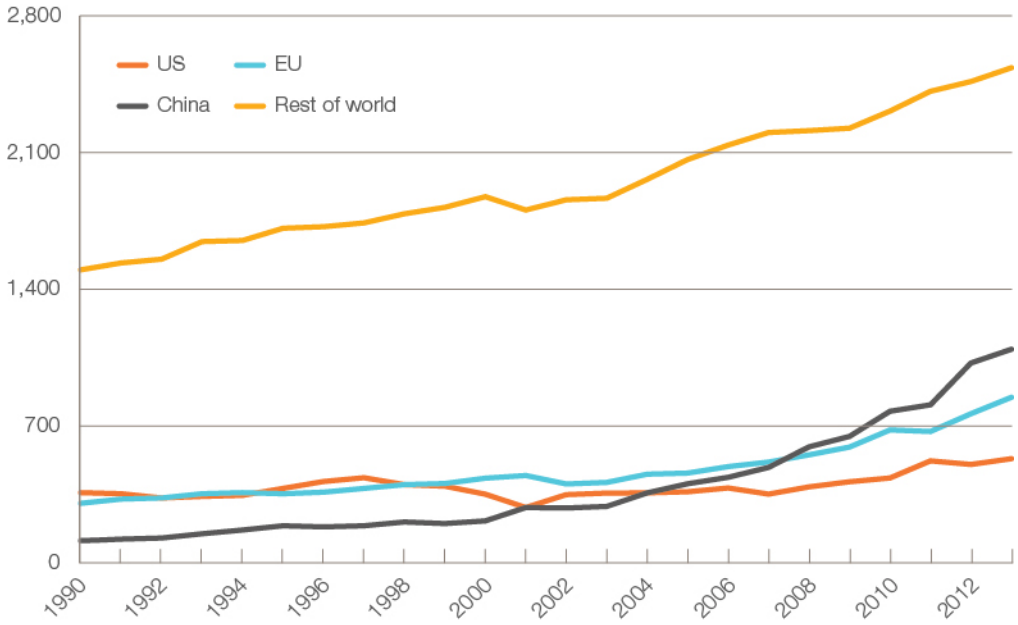
Europe requires vast amounts of new investment in energy infrastructure, irrespective of the carbon-intensity of the pathway it adopts. According to the European Commission, under a scenario in which there is no change to existing EU energy and climate policies, energy infrastructure investments across all sectors would need to increase from around €800 billion per annum between 2010 and 2020 to €1,000 billion per annum between 2040 and 2050 (EY 2014).
Long-term, legally binding targets provide a loud and visible market signal, giving investors the necessary confidence to channel their support to new low-carbon energy infrastructure. Clear targets that establish a shared European strategy can also enable smarter, more efficient infrastructure planning. For example, one study suggested that integrating the European gas market could lead to savings of up to €30 billion (Booz 2013).

Choosing to replace fossil fuel energy imports with domestic investments in clean energy and energy efficiency would boost home-grown job creation (Neuhoff et al 2014). Incentivising research, development, and innovation in low-carbon technologies and their supply chains can also boost jobs and growth in advanced manufacturing and energy service industries. By contrast, mixed policy signals – and the associated perception that there could be sudden changes in the direction of energy policy – prompt investor uncertainty. This is likely to result in

a fall in investment and an increase in the cost of the investment that goes ahead, which will have potentially damaging consequences for Europe's competitiveness.

If the EU targets are not accomplished on track or the Member States choose to go for the least optimal route to reaching them, Europe risks losing some of the economic advantages of its first-mover position in the $250 billion global market in renewable energy technologies (Pew 2014). The EU's share of global clean energy investments is already falling rapidly: in 2009 it accounted for 40 percent, but this had fallen to just 25 percent by 2012 (Green Growth Group 2014a). In 2013, China invested more in renewable sources of energy than Europe for the first time (BNEF 2014a) – indeed, China is on course to overtake Europe as the world leader in these technologies. Seven of the 10 largest solar companies in the world are Chinese, including the company in the top spot – Suntech (Hook and Crooks 2011). In 2012 the US became the world's largest market for wind power, and an American company – GE Wind – overtook a European company – Vestas – to become the world's largest supplier of wind turbines (Navigant Research 2013). Their two closest market rivals are Chinese (Hook and Crooks 2011).

Figure 1.1
Electricity production from renewable sources, 1990–2013 (TWh)



Source: BP *Statistical Review of World Energy 2014*, reproduced in Evans 2014

A foundation for progress

In 2008, European leaders signed up to a set of climate and energy targets for 2020. Specifically, they agreed that by 2020 Europe should generate 20 percent of its energy from renewable sources, and achieve a 20 percent reduction in the output of greenhouse gases against 1990 levels. They also agreed to reduce energy consumption by 20 percent by 2020.

Europe is well on track to meet the first two of these three targets. Unfortunately the third one concerning energy efficiency is not on track to being met. It is the only target not legally binding. The European Commission estimates that levels of greenhouse gas output are likely to be down by at least 24 percent by 2020 (EC 2014b) – indeed, the 20 percent target has been all but met seven years ahead of schedule. Ecofys expects Europe's emissions could be down by as much as 30 percent by 2020 (Ecofys 2013b). This is largely the result of clean energy deployment, efficiency improvements, and the impact of the economic downturn. The European Commission estimates that the share of European energy coming from renewables will rise to 21 percent by 2020 (EC 2014b).

Between 2008 and 2012, when Europe's GDP fell by 1.9 percent, the continent's greenhouse gas emissions fell by 9.2 percent (EEA 2014). Some analysts subsequently attributed between 30 and 50 percent of the total drop in emissions during that period to the economic downturn (ibid). However, an industry analysis suggests that between 40 and 50 percent of the emission reductions made in Europe between 2008 and 2012 can be attributed to the growth in renewables, which means that clean energy deployment has been the primary driver of reduced emissions over the period (CDC 2013).

While Europe is unlikely to meet its 2020 energy efficiency goal, energy consumption is still likely to be at least 18 percent lower than it was projected in 2007 that it would be had no policy action been taken (EC 2014b). Europe is the most energy efficient economy in the world. Since 1990 Europe's economy grew by 45 percent, while its emissions fell by 20 percent (EEA 2014).

The European Commission estimates that achieving the 2020 efficiency target could reduce Europe's oil imports by 2.6 billion barrels a year, saving European consumers up to €200 billion annually (Green Growth Group 2014a). After the growth in renewables and the impact of the economic downturn, energy efficiency already represents the other main explanation for how Europe has reduced its emissions: 10–20 percent of the drop in emissions between 2008 and 2012 has been attributed to efficiency improvements (CDC 2013).

The success of green industries has bolstered economic growth. The global low-carbon and environmental business market is worth around €4 trillion a year, and is expected to grow to nearly €5 trillion by 2016. The EU has carved out a 22 percent share of this market, worth over €900 billion a year, compared with a 19 percent share for the US and a 13 percent for China (Platt and Straw 2013).

Over the last four years, Europe's low-carbon market has grown by over 10 percent, or more than €100 billion (Green Growth Group 2014a), and investment in energy efficiency is expected to create up to 2 million new jobs by 2020 (EC 2012a). A study by DIW Berlin suggests that 180,000 jobs in energy efficiency services will be created in Germany alone by the same date (Neuhoff et al 2014). By 2012, the last year for which data is available, there were around 1.2 million jobs in renewable energy in Europe (IRENA 2014). The data suggests that 60 percent of these renewable energy jobs are in Germany, France, Spain and Italy, the UK is the leader in offshore wind – an industry that employs 56,000 people throughout Europe (IRENA 2014). Some of the most

dynamic low-carbon markets can now be found among member states in the Visegrád Group[2] and the South-East European Cooperation Process,[3] where the market is growing at an average of over 6 percent a year (IRENA 2014). The European Commission estimates that meeting the 2020 renewable energy target will lead to a net growth of nearly 2.5 million jobs (EC no date).

As a consequence of Europe's 2020 commitment to grow the share of renewable energy, Europe's wind energy capacity has already grown to more than 117 gigawatts – enough to power 8 percent of Europe's power consumption – and its solar capacity to more than 70 gigawatts (Dallos G 2014). The share of renewables in final energy consumption increased from 9.7 percent in 2007 to 13 percent in 2011, and in electricity from 15.8 percent to 21.7 percent (Spencer et al 2014a).

Large-scale deployment of renewable energy technologies has brought dramatic cost reductions with it, meaning more clean energy generated for less money invested. This partly explains why, despite increased consumption of energy and electricity from renewables, there was a 44 percent reduction in renewables investment in Europe between 2012 and 2013 (Walsh 2014). Between 2008 and 2012, the cost of solar has fallen by 80 percent, and the cost of onshore wind by 30 percent (Spencer et al 2014a). Earlier this year the first European solar farm able to compete with conventional power stations without any subsidies came online in Spain (Barrero 2013), and solar PV in Germany achieved cost reductions that European Commission models anticipated would only occur in 2035 (EY 2014). Deutsche Bank now project that by 2015 solar power should be able to compete with little or no subsidy in three quarters of the world's solar markets (Evans-Pritchard 2014). The bank says that there are already 19 regional markets, including Germany, where solar can now match or undercut conventional sources of residential power (ibid). Bloomberg New Energy Finance project that onshore wind and solar will be subsidy-free in Europe by the 2020s (Shankleman 2014).

While financial support schemes such as feed-in-tariffs, which governments put in place to enable the growth of clean energy, have raised the cost of energy, they have not been the main cause of rising energy prices across Europe. European Commission data suggests that between 2008 and 2012 renewables policies raised European household energy costs by 7 percent, and industry energy costs by 9 percent (EC 2014b). However, in 2010, European renewables allowed the EU to avoid €30 billion in imported fuel costs – approximately the same sum that Europe spent on renewable energy subsidies in the same year (EWEA et al 2014).

The 2020 climate and energy package is also thought to have brought health benefits to Europe, largely through improved air quality resulting from a cleaner energy system. It has been estimated that these health benefits are worth, in economic terms, between €13 and €52 billion (Holland 2008), representing savings from, for example, the avoidance of premature deaths and working days lost to poor health due to air pollution.

[2] That is, the Czech Republic, Hungary, Poland and Slovakia.

[3] Bulgaria, Greece, Romania and Slovenia.

A new vision for a Progressive Energy Agenda

The prospective economic benefits of deeper emission reductions stem largely from avoided fossil-fuel import costs, which would enable a reallocation of money within the EU economy that could stimulate growth (ibid).

There is broad agreement between member states that rising energy costs is challenging the competitiveness of a small number of energy-intensive industries in Europe. For example, energy accounts for more than a fifth of total production costs for Europe's cement, lime and plaster industries (EC 2014b). The Centre for European Policy Studies found that steel companies in Europe pay double the amount that American steel companies do for electricity, and four times as much for gas (Egenhofer et al 2013). While a report by the London School of Economics has concluded that, for the vast majority of European manufacturing businesses, energy prices are not a primary determinant of economic competitiveness, there are exceptions (Neuhoff et al 2014). Targeted policy solutions will be required to protect these companies, and ensure a just and politically sustainable transition to a lower-carbon economy (TUC 2012).

Our policy recommendations

On these issues we therefore make the following recommendations:

European Heads of State should advocate an international agreement at the Paris summit that establishes emission reduction targets for every five-year period to 2050. By setting the level of global ambition for cutting greenhouse gas pollution on a rolling five-year timetable, targets can best reflect the latest climate science, economic circumstances, and feasibility given the rapidly changing cost and nature of available low-carbon technologies. Setting these binding targets some time in advance would give businesses and investors confidence that there is a clear, long-term and stable framework for agreeing a rolling programme of emission cuts for the long term. It would avoid the need for sudden unplanned changes in targets, or a situation in which insufficient climate ambition is agreed and is then 'locked in' for lengthy periods without any agreed means of changing it. If an international agreement were reached in Paris in 2015 that contains five-year commitment periods like this, Europe should set binding greenhouse-gas emissions targets for both 2025 and 2030.

Once the international agreement in Paris has been decided, the EU should review the 2030 targets in the energy and climate package, as agreed. Renewable energy would need to play a greater role to ensure that member states do not become locked in to a pathway that requires more expensive emission reductions to be made in the 2030–2050 period.

According to analysis from the International Energy Agency (IEA) and the European Commission, most member states need to significantly expand the role of renewable technologies regardless of the decarbonisation scenario. Certainty about the likely economic attractiveness and size of the European renewables market will be crucial to enable renewable energy businesses and their investors to make key decisions, including those concerning the scale of investment that they will make in new jobs and factories in Europe as opposed to other major markets. It will also be instrumental for the deployment of large-scale grid interconnection because the

economic viability of different grid projects will be determined by the size of the renewables market.

For these reasons we recommend that European leaders should do as follows.

Energy Union should re-affirm the EU's and individual Member States' total commitment to the "20-20-20" climate and energy targets for 2020. 27 percent has been agreed by Heads of State as the minimum share that RES should have in final energy consumption by 2030. Member States have not ruled out setting a higher target for the EU during discussions with the European Parliament, which is looking for a renewables target of 30 percent or more (EP 2014).

A renewables share of 27 percent would correspond to the share of renewable energy predicted to be achieved in the EU's energy mix by 2030 if no targets other than a GHG reduction target of 40 percent are set at EU-level for that date (EC 2014n). The legislation implementing the 2030 Framework for Climate and Energy (EC 2014o) must allow for the renewables target and greenhouse gas reduction target to be ratcheted up if the assumptions underlying the predicted RES share change.

There is no target specifically for renewable energy use in transport beyond 2020 and changes in the regulatory regime to promote the most sustainable biofuels and phase out the most damaging ones have failed, after almost two years of consideration in the European Parliament and Council, to materialised. The renewable energy industry has called for "a clear supportive framework for RES-T at European level to be re-established in order to fill the current policy vacuum."(Keep on track 2014)

Ensure that member states have the ability to contribute to the EU's overall goal by creating proposals for shared projects between member states. Such flexibility would mean that, for example, the UK and Ireland could contribute towards the EU goal by cooperating with one another over interconnection and wind-energy projects. It would enable member states to decide which technologies are the most appropriate means for their countries to achieve the necessary reductions in emissions, while giving investors confidence that they can still count on there being a sizeable clean energy market.

All proposals from member states on their contributions towards the EU-wide targets on renewable energy, efficiency and emissions reductions should be submitted to the European Commission, and there should be regular reviews to ensure that member states are following energy strategies that are consistent with the EU's stated goals. Member States' plans must be directly comparable. They should be presented in line with a template.

Energy efficiency should be seen as a major priority: it offers the opportunity to address all of Europe's energy challenges at once. Efficiency improvements create jobs and growth, cut fuel imports, reduce consumers' exposure to fossil fuel price shocks, reduce levels of carbon pollution and improve the competitiveness of the European economy relative to other major economies. It is the ultimate win-win policy.

Member states should have freedom to choose the policies they adopt at a national level in order to contribute towards this collective goal. National plans should be submitted to the Commission so that it can calculate what the combined national contributions will achieve and identify any shortfalls. Member states should have to demonstrate that they have credible delivery plans before they can access European funding for energy projects. The Commission should then put forward legislation that would, subject to the approval of the European Council of Ministers and European Parliament, address any remaining shortfalls that would prevent the EU from meeting its overall goal.

CHAPTER 2.
UKRAINE'S LONG SHADOW: ACHIEVING ENERGY SECURITY BY DIVERSIFYING FOSSIL FUEL IMPORTS

While the precise nature of the risks to our energy security has changed since the crippling Arab oil embargo 40 years ago, Europe is still dangerously reliant upon fossil fuel imports.

During 2011 Europe spent €406 billion (bn) on importing fossil fuels rising to €545 bn in 2012. This is around three times more than the cost of the Greek bailout up to 2013. (EWEA 2014)

Over half of Europe's energy is now imported, including 90 percent of our oil, 66 percent of our gas and 62 percent of our coal (EC 2014a). In 2012 the cost of these imports came to €545 billion (EWEA et al 2014). This trade deficit in energy products amounts to 3.3 percent of Europe's GDP – a four-fold increase since 2004 (EY 2014).

Europe's own production of fossil fuel is expected to halve over the period 2010–2050 (EY 2014). The EU risks being increasingly dependent on fuel imports, including gas from Russia and the Middle East. If it doesn't find alternatives sooner, Europe could be 'locked-into 'fossil fuel infrastructure which would make climate and energy targets even harder to attain. The IEA project that without action more than 80 percent of our gas will come from imports by 2035, and that these will increasingly come from riskier and more unstable parts of the world (Green Growth Group 2014a). The cost of these imports is expected to increase as global demand for energy rises (EC 2014b). Wholesale gas prices in Europe are already more than twice what they are in the US (ibid). Until a few months ago, average oil prices were up by more than 200 percent since 2003, and the European Commission estimates that by 2050 Europe's total fuel bill could double (Green Growth Group 2014a). The IEA project that Europe could be paying more than $615 billion for these fuels annually by 2035 (ibid).

Dependence on Russia

Of the 28 EU member states, 24 import gas from Russia, and half of this gas flows through Ukraine (Oettinger 2014). Six member states are now completely reliant upon Russia for all of their gas, and 18 member states import between 10 percent and 80 percent of their gas from the country (ibid). In total, the EU is sending Russia around €31 billion a year for imported gas (Gazprom 2012).

In spite of the security concerns that were raised when Russia turned off gas supplies to Ukraine in 2006 and 2009, the proportion of European gas demand for heating and power that was met by Russia has actually risen, from 26 percent of supplies in 2010 to 34 percent in 2013 (Pehlivanova B and Cohen M 2014).

In June 2014, following violence and political tensions in the region, Russia cut off gas supplies to Ukraine for the third time in eight years, prompting another spike in gas prices (Farchy et al 2014). While on this occasion the crisis with Ukraine and ties with Russia is so far not proving that getting through this winter will be so much of a problem as it was back in 2006 and 2009 when Russia cut off gas supplies to Ukraine. (E.L. 2015) This is due to it so far being a mild

winter and gas being held in storage. However if the winter cold is prolonged until later in the year Europe may be at risk.

Lithuania has recently opened a floating platform in the port to receive imported Liquefied Natural Gas (LNG) This directly brought down energy costs for consumers and previously 100 percent dependant on Russia, this diversification means they no longer rely on Russia as much. (Seputyte 2014)

Governments are considering a number of options. In this chapter we shall address of the possible alternatives for fossil fuel imports. Separate chapters are dedicated more fully to energy efficiency and renewables as alternatives.

Diversifying gas supply

Jacques Delors proposed a European energy community in 2010 and several Eastern European Member States have recently taken this up more due to the security threats brought about which the crisis in Ukraine has highlighted.

Both former Prime Minister of Poland and the European Commission have also advocated diversifying Europe's sources of gas (EC 2014a). While most of the imported gas that Europe uses comes from Russia, it also relies on substantial amounts of imports from Libya, Algeria, Norway and Qatar. In March 2014 the European Commission formally asked the US to agree to export gas to Europe to assist in reducing the amount it needs to import from Russia (Traynor 2014).

The evidence suggests that such a strategy of diversifying suppliers would be very costly. One industry analysis suggested that replacing Russian gas imports entirely could double the price of gas for Europeans (Shiryaevskaya and Strzelecki 2014). During the recent crisis in Ukraine, the German government noted that even at the height of the Cold War, Europe continued to rely upon gas imports from the then Soviet Union because of how difficult and expensive it would be to switch to other sources.

There are also practical problems that could at least delay any moves to switch to alternative gas suppliers. First, the US does not yet have terminals for exporting LNG,[4] and some European countries, including Ukraine, do not have LNG import terminals (Rogers 2014). Second, there would be no guarantee that gas exported from the US would come to Europe, given that there is increasing demand from many Asian economies such as Japan that might be prepared to pay more (ibid).

Diversifying gas supplies would, therefore, do little to solve the problem of Europe's exposure to price volatility, and would not significantly help to address Europe's other major energy strategy objectives relating to affordability, carbon pollution, and growth.

[4] This is changing, however. The US is passing legislation that would permit LNG exports to World Trade Organization countries. Two-dozen export permits are pending. (Platts 2014a, Economist 2014)

Coal

Europe is burning huge quantities of coal, and is running most of its coal-powered fleet at high capacity (Economist 2014). In Poland coal-fired generation is responsible for almost 90 percent of electricity production (Cienski 2013). High gas prices, low coal prices, and a very low carbon price in the ETS have meant that coal burning has been very profitable across Europe in recent years (Garman and Kahya 2013). Consequently, there has been a spike in European coal consumption (Economist 2013) – over the last four years coal consumption has risen by 22 percent in the UK, and by 13 percent in Germany (Carr 2014).[5] Analysis by BP and others has found that this is a result of gas-to-coal switching (BP 2014).

The primary problem with using coal unabated (that is, without carbon capture and storage technology fitted) is that it is the most polluting fuel available: it generates from each power plant roughly twice the level of climate-changing carbon pollution that natural gas emits (EPA 2000). The pre-eminent American climate scientist and former NASA director Professor James Hansen has written that, 'coal is the single greatest threat to civilization and all life on our planet' (Romm 2009).

Coal-fired generation also produces a number of noxious air pollutants. Research from the University of Stuttgart concluded that air pollution from the 300 largest coal plants in Europe is causing 22,000 premature deaths a year in the EU (Greenpeace 2013a).
Putting aside the irony that almost a third of Europe's coal also comes from Russia (Eurostat 2012), increasing levels of coal-burning in Europe would be completely inconsistent with any efforts to build a low-carbon economy and cut Europe's output of carbon pollution. A deliberate move to increase coal consumption would be extraordinarily damaging to global efforts to manage climate change as well as bad for public health. It should therefore be ruled out, as it is inconsistent with Europe's existing goals and wider interests.

Energy efficiency

The fastest, cleanest and safest way for Europe to cut gas imports is to become more energy efficient. The European Commission estimates that every 1 percent in energy savings will cut gas imports by 2.6 percent (EC 2014g).

As outlined above, renewed energy security concerns means that at least seven European governments favour a new, binding EU-wide energy efficiency target for 2030 – one focused on delivering energy savings of between 30 and 40 percent against 2007 levels (Garside 2014).
The more energy efficient the European economy becomes, the more our gas dependency will be reduced. A European Commission analysis concluded that a target of making the EU 40 percent more energy efficient by 2030 would reduce gas imports by 40 percent and save more than €550 billion from the EU's fuel bill through to 2030 (EurActiv 2014a). A 25 percent energy-saving target could be expected to reduce EU gas imports by 9 percent, while a 35 percent target would cut gas imports by 33 percent by 2030 (ibid, Oliver 2014).

[5] There is some evidence that this trend is changing. For example, after coal consumption in Europe rose by 9 percent from 2010 to 2012, it then fell by 5 percent in 2013 (Economist Intelligence Unit, 2014).

An analysis by thinktank E3G concluded that action to accelerate building retrofitting, build electricity-demand-reduction markets and incentivise industrial efficiency could, by 2030, reduce gas demand by a volume equivalent to over 170 percent of Russian gas imports in 2011 (Holmes et al 2014).

Greater interconnection within the EU, using interconnector cables that allow power to pass between different countries and markets, could also improve the efficiency of the European energy sector. One study led by the European Climate Foundation found that integrating EU markets would lead to €426 billion of savings overall between 2020 and 2030 (ECF 2011). These were primarily savings made from operating expenditure – largely the cost of fuel, including gas – as well as reduced requirements for power plants, including gas-fired stations.

Renewables

Another means of reducing gas imports is through the greater use of low-carbon alternatives to fossil fuel imports, such as methane captured from landfill sites (biomethane) and sewage networks, and power generated at home from renewable sources.

A UK study by National Grid indicated that by 2020 gas captured from landfill sites and sewage networks could supply 5–18 percent of the UK's gas needs (National Grid 2009). In nine European countries, including Germany, France, the UK and Austria, biomethane is already contributing to gas supplies for consumers (EBA 2013).

The European Commission estimates that existing renewable energy generation in Europe avoids €30 billion a year in fossil fuel import costs (EC 2014). An expansion of electricity generated from low-carbon sources, energy generated from ground source heat pumps, biomass, and renewable gas could all further eat into the share of the market that is currently served by imported gas.

It is expected that in 2020 Europe will be getting 21 percent of its energy from renewable sources. In a scenario produced by Ecofys (aconsultancy) for the environmental group WWF, it is envisaged that this share could double by 2030, in which case Europe would be getting more than 40 percent of its total energy from renewable sources, including 65 percent its electricity (Ecofys 2013a). Another piece of research by the consultancy Energynautics, commissioned by Greenpeace, found that the European grid could handle up to 77 percent of its power coming from renewables by 2030 – including 53 percent from wind and solar power alone – if big changes were made to the way the power network works: a much higher level of interconnection, and smarter grids with more effective demand management, would be required (Teske et al 2014). The 10-year plans published in 2014 by European grid operator ENTSO-E outline plans for Europe to invest in 50,000km of extra-high-voltage power lines, and upgrade existing lines, to allow the EU to accommodate up to 60 percent renewable electricity by 2030 (ENTSO-E 2014).

European Commission figures show that if Europe were to get 30 percent of its energy from renewable energy sources in 2030 instead of 27 percent and meet a 30 percent efficiency target, then in conjunction with the 40 percent greenhouse gas reduction target gas dependency would

be reduced by 27.4 percent. A reduction of only f 13.2 percent would be achieved with the minus 40 percent greenhouse gas target alone (EC 2014c).

Policy recommendations

A huge part of the challenge that reducing fossil fuel imports represents lies in the transport sector, and the Commission should develop new vehicle efficiency standards for the 2020s. These could both help curb emissions from road transport and lessen fuel imports.

The European Commission should make proposals for new, harmonised regulatory standards that could, subject to the approval of the European Council, contribute towards the EU-wide energy efficiency target and make up for any shortfalls in national plans.

The Commission should also assist in sharing best-practice options for delivering large-scale energy efficiency improvements, including on policies for government-backed loans based on the KfW (Kreditanstalt für Wiederaufbau) model.[6]

Member states should have flexibility over what policies they choose to adopt at a national level to contribute towards this goal, but national plans should be submitted to the European Commission. Member states should have to demonstrate that they have a credible delivery plan for efficiency savings before they can access European funding for energy projects.

The Ukraine crisis has highlighted an urgent need to move away from fossil fuel imports due to geopolitical risks. This is especially the case for Russia which has been using tactics to exert political pressure on European Member States. If an Energy Union is to be progressive and forward-thinking, a move away from fossil fuel as soon as possible would be the best solution to reach our long-term goals. Wherever possible investment should be made in efficiency and renewables. This will help secure more investment in the future and otherwise the cost of inaction will be higher in the long-term (Stern 2006). However it is recognised that we will still rely on fossil fuels for the immediate future. The spectre of the Ukraine conflict, mostly recently manifesting as a threat from Moscow to sever supplies to the EU via Ukraine completely (Teffer 2015), has highlighted the urgent need for more interconnection facilities. Opening up the market so renewables can act on a level-playing field and creating better capacity mechanisms are also important.

[6] For a greater understanding of this approach see IPPR's report *Help to heat: A solution to the affordability crisis in energy* (Platt et al 2013).

Chapter 3

ENERGY EFFICIENCY: SAVINGS ALL ROUND

Energy efficiency is the fastest, cleanest and safest way to save energy. It's a crucial way to meet our energy needs and has multiple benefits. Indeed the more energy efficient our societies become, the more our dependency on gas and other non-sustainable fuels will be reduced. Unlike interconnection infrastructure facilities, estimated to take 10 years to fully develop, although a much needed solution in it own right, energy efficiency gives immediate effects.
It was previously considered as the hidden fuel because many gains are hard to measure as it is the amount of energy *saved* and the costs *not* bared. It can mean saving in energy consumption by better use and management or it can be getting the same 'service' for the less energy input. For example more efficient light bulbs provide the same service but use less energy and last for longer. Their price has reduced markedly since they came on the market. For example in the lighting sector, LED (Light-Emitting Diode) bulbs are at least six-times more efficient than their incandescent counterparts – and last up to five times longer than compact fluorescent lamps. Their costs have fallen 98 percent since 2000. (Neslen 2014a)

Dubbed the world's number one fuel by the International energy agency or often described as the low-hanging fruit, easily reachable and ready to deploy. Using less energy is the first way we can cut energy use and save money. It is the most economical solution and moreover addresses a range of side issues.

Firstly as a way to fighting fuel poverty. It is unacceptable that so many people across Europe cannot afford to heat their homes adequately and this affects more than 1 in 10 people across Europe. At least 11 percent of people in Europe cannot afford to adequately heat their homes (Fuel poverty network). Retro-fitting houses can save these vulnerable people money and also improve health and well-being. Homes that aren't heated properly suffer from dampness, condensation, mould. These situations cause respiratory and cardiovascular problems, rheumatism and allergies. Research carried out by Fuel Poverty Network shows that it is worse in Eastern Europe. It affects the most vulnerable in society too, elderly, disabled and people out of work are those most affected as they tend to stay at home more these are often low-income households. This illustrates one of the reasons why Europe needs a comprehensive social energy policy. In this way, efficiency measures encompasses this.

Countries that are most dependent on Russian gas are also the least fuel-efficient, and improvements in energy efficiency could vastly reduce the scale of existing gas imports (Mabey 2014).

Saving energy means less infrastructure is needed in the long-term. I.e. if energy is saved, less power plants are needed, less pipes, less imports of gas and oil, less storage and transport facilities and ultimately less demand means less supply needs to be generated.

It helps people save money. Products and infrastructure also become more efficient therefore it is good for environmental protection.

It can create jobs in many sectors, 'green jobs' leading to more sustainability. Investment and research and development in energy efficiency can help create sustainable growth, services and industrial productivity in Europe.

Towards October last year when the European Council decision on the 2030 targets was due, efficiency became a fundamental part of debates. In the 2020 targets efficiency is not legally binding, and seems to be also the only one out of the three not on target. It seemed therefore almost obvious that there was a need for it to become legally binding in the next set of targets.

Last year the Commission reviewed its initial proposal in July on the 2030 targets concerning energy efficiency. This followed calls from the European Parliament and NGOs and other stakeholders to reduce it by 40 percent compared to 1990. It was also published in a Euractiv article from an EU energy efficiency review in June that a 40 percent energy efficiency target for 2030 would grow Europe's economy at a rate of 4 percent a year, spark an annual 3.15 percent boost in employment and cut fossil fuel imports by €505 billion a year. The 40 percent efficiency gain would also cut gas use by 42.2 percent and gas imports by 40 percent, whereas a 25 percent target would expect to reduce EU gas imports by only 9 percent. (Neslen 2014b)

The Commission proposed a 30 percent target and in the end the European Heads of State at the Council in October 2014, agreed to set the target at 27 percent, not legally binding. Many felt very disappointed. Even business leaders were calling for higher targets. For them it gives them the certainty in a policy and therefore security for investment. Unfortunately politicians failed to send an ambitious message.

A separate study by the Fraunhofer Institute found that a 40 percent efficiency target would cut energy imports by 80 percent, while also leading to economy-wide emission reductions of between 50 and 60 percent, by 2030 (Fraunhofer ISI 2013).

In light of the Ukraine crisis, EU member states are right to call for a rethink on Europe's ambitions for energy efficiency. However, it is clear that any binding national targets imposed by Brussels would not be acceptable to a number of countries. There is therefore a strong argument for member states retaining powers over how to make efficiency improvements at a national level, since the policies and powers required to make them include decisions over taxation and spending which member states are best-placed to determine. On the other hand, the Commission should retain its mandate to make proposals for EU-wide efficiency regulations –on vehicle standards and white goods, for example – where cooperation is to Europe's collective benefit.

The market stability reserve in the ETS can prevent any effect this has on the effectiveness of the carbon market, thereby addressing concerns that dramatic improvements in energy efficiency could crash the carbon price (see more on this in chapter 5).

However with the proposal for Energy Union soon due to be announced, a clear message of more solidarity can be given. In addition to Jean-Claude Juncker's jobs, growth and investment package, which we hope will seriously address inequalities across Europe, this gives the opportunity for extending energy efficiency projects too.

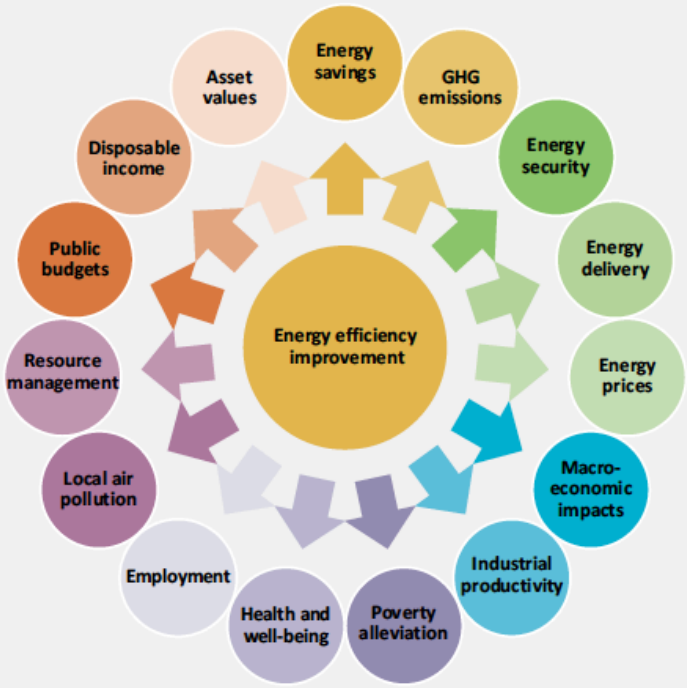
This chapter will remind us of the potential of the gains which can be made through enhancing energy efficiency, will show us where the funding can come from and gives progressive policy recommendations as to what efficiency measures should be carried out through the Energy Union.

WHAT ARE THE BENEFITS WE STAND TO GAIN?

There is a wide range of potential benefits related to energy efficiency. When these are included in efficiency calculations it becomes much more than simply saving energy or using less. Yet taking a different approach shows us the holistic benefits.

This illustrates it very well. Taken from the report (International Energy Agency 2014 'Capturing the Multiple benefits of Energy Efficiency'):

Figure ES.2 The multiple benefits of energy efficiency improvements



Note: This list is not exhaustive, but represents some of the most prominent benefits of energy efficiency identified to date.
Source: Unless otherwise noted, all material in figures and tables in this chapter derives from IEA data and analysis.

Key point A multiple benefits approach to energy efficiency reveals a broad range of potential positive impacts.

Although we have come a long way in improving energy efficiency and many gains have already been made, there remains so much potential in many sectors.

- It can generate financial savings of up to € 1000 per household;
- create up to 2 million jobs;
- and reduce annual greenhouse gas emissions by 740 million tons.
  (EC, Energy efficiency plan, 2011)

- Reduced demand for fossil fuels will lead, in turn, to lower energy prices. According to one estimate, every additional 1 percent in energy savings will lead to gas prices being about 0.4 percent lower and oil prices about 0.1 percent lower in 2030.
- For electricity, more efficient appliances are expected to save consumers €100 billion annually by 2020 on their energy bills, equivalent to €465 per household.
  (EC, Energy Efficiency Communication, 2014)

- 13 to 17 jobs (new or maintained) per €0.1 million public investment in energy efficiency measures
- €1 of public investment in energy efficiency measures can trigger private investment of €13-20 per capita
- Reduction of gas imports by 2.6 percent for 1 percent of energy saved
  (The Coalition for Energy Savings briefing November 2014)

- Net savings for businesses and consumers are projected to amount to an impressive €107 billion annually in 2020 if all cost-effective efficiency measures are taken. (Molenbroek and Blok 2012)

News from the Commission on the 1st January this year says - From 2015 new energy efficiency measures will help Europeans save €45 per household and the amount of energy consumed by 11 million homes per year in electricity. (EC news 01/01/2015)

If we save energy in some areas and make appliances in general use less energy, there is more capacity to use other energy devices when needed, which some people might use less if it is more energy intensive for instance better heating and cooling systems. This can help improve people's health and well-being indoors. The International Energy Agency states in its report on the multiple benefits of energy efficiency that Addressing indoor air quality through energy efficiency measures could, in a high energy efficiency scenario, save the European Union's economy as much EUR 190 billion annually. (IEAa 2014)

Investment can be rolled-out quickly unlike improving transport links or the energy grid. Efficiency can also reduce national budgets as it decreases the amount of infrastructure used. The less energy we consume the less energy would need to be generated and supplied. Thus we would need less transmission lines, the grid could be re-designed for a lower capacity. We would need less import and storage facilities of fossil fuels.

The housing and energy sector in particular have a lot of potential gains. According to Renovate Europe, modern technology is able to reduce up to 80 percent of buildings' energy demands. Buildings account for 40 percent of all energy consumption. They also emit 36 percent of the total CO2 emissions in the EU.

FUTURE PROSPECTS: AN EFFICIENT ENERGY UNION

Energy issues are high on the agenda in houses and communities across Europe. All national governments are struggling to deal with the multi-faceted issues related to securing energy supplies and keeping emissions and prices low. Indeed efficiency is becoming much more widely-recognised as a solution.

Several governments have now produced white papers on what they would like to see in an Energy Union. The German government states that energy efficiency must constitute a key pillar and integral part of the Energy Union project and should be prioritised. (German government white paper for Energy Union @stollmeyerEU 2015.) Unlike the UK and Czech paper which wants to see nuclear and Carbon Capture and storage have the same status as renewable sources and energy efficiency. (Nelsen 2015) If we are to achieve a sustainable future and a safe and decarbonised progressive energy policy any time soon. Efficiency, alongside renewables and interconnection should be given priority status over fossil fuels.

At a time when austerity is affecting many households across Europe, efficiency measures would help people directly and quickly. It would relieve some of the household budget providing then more resources for other activities. Although more needs to be done to encourage initiatives and to inform people about how saving energy can benefit them directly. Also they need to trust the initiatives set up and the economic and social returns need to be laid out before they commit.

Some countries still need to implement the Energy Efficiency Directive from 2012. This is the common EU framework. The deadline for implementation 'transposition period' was June 2014. Some countries still haven't transposed the legislation into national law, this is delaying the process. If we are to reach the 2020 targets these measures need to be implemented as soon as possible.

As mentioned earlier, European member states are not on track to reach a 20 percent reduction. It is estimated that a further €85 billion is needed per year between now and 2020 if we are to reach the 2020 target. Private funding is sought after because the Commission realises this cannot be financed by public money alone. The European Investment Bank and DG Regio (Regional Policy and cohesion policy package in particular) will also help with this. (Hodson, 2014) An Energy Union needs to secure this funding for the first period and demonstrate to investors, policy-makers and citizens the all-round, multiple benefits. A good foundation for these targets in the primary stages will in turn set a good pace for future development, notably in the next decade when looking towards 2030 sustainability goals and beyond.

WHERE CAN THE MONEY COME FROM?

Of course investment has to be carried out in order to reap the benefits. Many funds for energy efficiency exist.

It has been proven that encouraging private financing in initiatives helps the projects be successful. Moreover a revolving fund like the Kredex programme in Estonia is a good recommendation for projects to be successful as they become self-sustaining.

Cohesion Policy funding (European Structural and Investment Funds) 2014-2020:

- Under the **European Regional Development Fund (ERDF)**, obligatory minimum percentages must be invested in sustainable energy (12 percent/15 percent/20 percent depending on development of region).
  Total: minimum **€23 billion**

- Investments from the **Cohesion Fund** and **European Social Fund** (supporting upskilling of labour force) can be spent on energy efficiency.

European Energy Efficiency Fund:

- Established in 2011 with **€265 million** from **European Union, European Investment Bank, Italian and German banks** with 70 percent of funding intended for energy efficiency projects. Aimed to bring proven technologies to the mainstream, boost ESCO market and use of energy performance contracting.

Research funding:

- **€6.5 billion** to be allocated to the "Societal challenge on secure, clean and efficient energy" under **Horizon 2020, less an amount to capitalise the European Fund for Strategic Investment 'still under co-decision)**

International institutions:

- **European Investment Bank** lends **€85 billion** annually to energy efficiency
- **Intelligent Energy Europe** programme funds ELENA – European Local Energy Assistance – Provides up to 90 percent financing of projects to provide technical assistance for structuring and implementing projects
- **European Bank for Reconstruction and Development (EBRD)**

(Presentation Hope 2014)

For more funding initiatives see also the European Commission's energy efficiency communication 2014.

There is also a private finance for energy efficiency (PF4EE) of the Life programme of the European Commission together with the European Investment Bank. It commits up to EUR80million, combined with loan facilities of EUR 480m. (EIB 2014)

These funds are available and are there to be promoted and used so projects can be realised. Some may say it is insufficient but once people see and hear about these projects and the potential gains,

there will likely be higher demand and possibly further funding paths developed. Hopefully through the Energy Union.

It is sometimes unclear to see through the menu of funding options where the possibilities lie. That's why chapter 6 in this report proposes a super fund for Energy Union.

Our proposals towards ensuring more efficiency

Good working method with Member States is indispensable in the implementation of targets

Whether it is legally binding or not, national or European target, the benefits of energy efficiency are clear. As far as possible efficiency measures need to be considered seriously at local, national and European level.

Enhancing Energy Performance Indicators and Modelling

Technologically better and more reliable indicators can assist more in measuring energy use and carbon emissions. Uncertainty is one of the main issues why more energy efficiency measures are not taken. Predicting which policies can help us gain and save more, economically and socially, helps investment decisions to be taken. They can provide information on previous energy use so therefore help forecast future energy demand. They should not be dependent on economical savings alone or related to GDP. Modelling should consider the multiple benefits scenarios.

As the International Energy Agency describes, indicators in isolation from other contextual data have limited value. Effective explanation and reporting of energy efficiency indicators is increasingly important and requires substance and explanation, not just quality data and elegant indicators. (IEAb 2014) Finally in September 2014 just before the decision on 2030 targets the European Commission published calculations which don't include the multiple economic and social benefits. The modelling result taken unfortunately used the most expensive approach rather than the most comprehensive, published in June mentioned at the beginning of this chapter which had been previously known public. This apparently let efficiency become 'sidelined' in the final decision on the 2030 targets. (Friends of the Earth 2014)

Complete the integrated internal market for energy efficiency and the internal energy market

This will increase solidarity amongst Member States. Bringing down trade barriers between Member States and enhancing interconnection facilities have been agreed and need to be carried out. More transparency and fair market access, supporting the integration of renewable energy sources will mean Europe depends on each other, not on third countries. Enable private investors to enter the market and can mobilise further investment.

Efficiency should have equal market access as other fuels, and be able to act on a level playing field. Subsidies for efficiency compared with other fossil fuels should be revised. Furthermore, removal of non-market barriers will help exploit the potential of heating and cooling solutions. This is the largest sector where efficiency improvements can be made, accounting for a third of all energy consumption globally. Space heating and cooling and hot water are estimated to account for half the

energy consumption in buildings. A clear path and steps to achieving with the technology already available should be set out for national and local authorities to be able to roll out.

Do not consider energy efficiency measures as profit-making: Reform State aid rules

Temporary exemption from state aid rules, which many stakeholders are calling for will lower transaction costs for projects and help investment notably in the building sector and across other areas of the economy. This could be done for a temporary period of three years with a longer-term plan to exempt them altogether on the basis that it isn't profit-making. In fact energy efficiency funds should be redefined under State Aid rules as economically-sound entities pursuing a goal of economic viability and cost recovery rather than profit making. (Energy coalition briefing 2014)

Structural reforms

Similarly reforming other structural barriers will allow more investment in energy efficiency to take place which is currently preventing large-scale energy efficiency uptake. It will help achieve macroeconomic goals of reducing energy costs and vulnerabilities. (Holmes et al 2014) For example investment incentives or tax reductions would overcome the barriers to upfront financial costs. Energy prices should encompass social and environmental costs in the production, distribution and consumption. Subsidies to fossil fuels highly distort the market price of energy. These should be stopped and until they are should be factored into calculating energy costs and savings. Policies in general should focus on energy savings rather than energy consumption. Reforms of the market and the economic, financial and institutional framework to bring down structural barriers will help businesses deploy further investment, trade and technology for more efficiency.

Strengthening standards

Initiatives such as the ecodesign and energy labelling directives are good. Similar standards need to be brought into further sectors. For example the buildings sector has a lot of potential here. EU-wide standards helps products be sold in other countries and helps consumers. Updating and renewing these is necessary and in time they would then begin to rule out less efficient infrastructure.

Allow consumers greater control of their energy consumption

Smart meters providing consumers with detail on their energy use can help them take informed decisions on how to improve energy use. These should be made more widely available across the EU.

Targeted investment and public financing for behavioural patterns

Increase demand by informing consumers of the benefits of saving energy so spending patterns will increase an efficiency focus in products and services. Awareness, education and information regarding the small things we can change in our lifestyle behaviour in how we use our household appliances, heating and lighting for example which offers significant savings on energy bills.

Awareness raising for consumers

The example of the vacuum-cleaner scare stories put out last summer in the British Daily Mail newspaper shows just how far we still have to go on providing information and ensure it is being translated properly for consumers. Consumers need to trust the proposals on products and services being offered. In general it has proven successful to work with household companies that are well-

known to consumers to build trust in more efficient products. Yet also better communication and information platforms wherever possible could help improve this.

Better incentives with innovative finance and delivery mechanisms

Consumers and planning authorities are more likely to invest when the incentives are better and give them better rewards. As there is the finance needed and the bother involved of obtaining planning permission, a decision from the neighbours and authorities when retro-fitting a house for instance. The mechanisms need to be well-organised in order to facilitate these processes as much as possible.

More political will

It is clear that political will determines ambition. Clear and ambitious political leadership gives strong messages to investors and consumers. Momentum is harnessed when political commitments are demonstrated. Public resources should be used in clever ways to stimulate further investment and projects. The returns of these should be re-invested into the public-sector. More political will shown together at European level creates coherent policies, strategies and programmes for economic and social gains.

CHAPTER 4

MORE RENEWABLES: TOWARDS FAIR, SUSTAINABLE ENERGY

The story of renewable energy in Europe is the story of a family of technologies that, with the support of the public and governments, are transforming Europe's energy system from high-carbon and centralised towards low-carbon and decentralised. Their expansion has been rapid, and the reduction in the costs of the two dominant (in the sense of their growth, absolute installed capacity and impact on the energy system) renewable energy technologies, wind and solar photovoltaics (solar-PV), steep. Europe has served as a reference for the rest of the world in the policies needed to support deployment and is pioneering technological and market-design solutions for high penetrations of variable renewable energy sources (wind and solar-PV).

DEPLOYMENT

The share of renewable energy in the EU's consumption grew from 8.1 percent to 14.1 percent in the period 2004 to 2012[7] as the market responded to incentives for installation. While solar-PV, biodiesel wind have grown the fastest (Table 4.1), it is solid biofuels (biomass), followed by hydroelectricity that accounted for the largest share of the EU's renewable energy supply throughout this period, together accounting for over 60 percent of all renewable energy consumed (2013).

Table 4.1

Forms of renewable energy where more than 5Mtoe was consumed in the EU in 2013, ordered by their growth rate over the period 2000-2013.

RES (Renewables) technology	Growth in final energy consumption in the EU (2000-2013 incl) / %
Solar-PV	68070
Liquid biofuels	1900
Wind	960
Biogas	520
Renewable fraction of municipal waste	140
Solid biofuels	70
Geothermal energy	30
Hydroelectricity	4

Generated with reference to Eurostat query 11 February 2015. The growth of solar-PV has been spectacular, consistently exceeding expectations.

Worldwide the picture is similar. The average annual worldwide growth rate in the installed capacity of renewable energy technologies between end-2008 and end-2013 was 55 percent for PV, 48 percent for concentrated solar power and 21 percent for wind (REN21 2014).

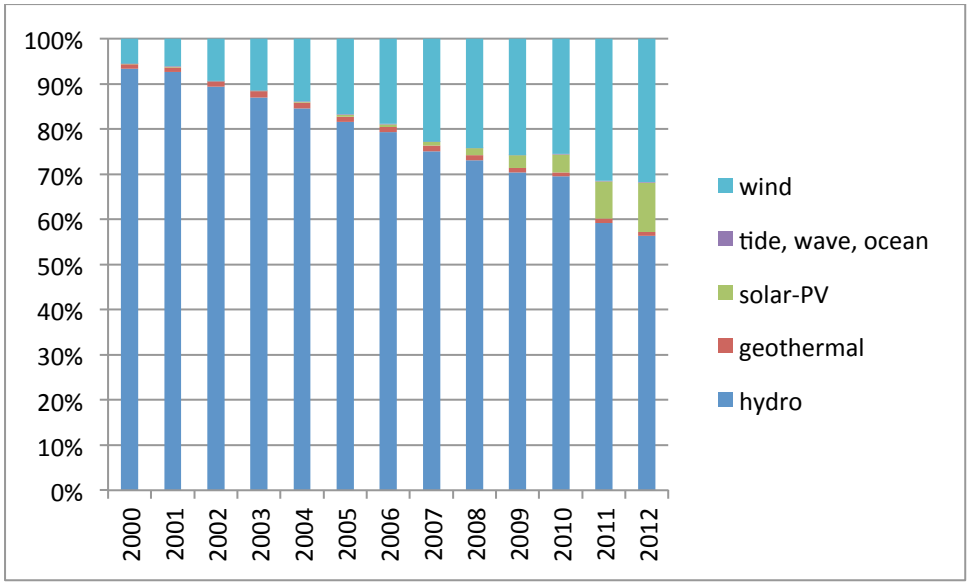
[7] 2012 is the most recent year for which Eurostat data is available.

ELECTRICITY

Considering only electricity supply, the shares obtained in 2012 from different renewable energy sources as percentages of the total are wind at 32 percent, PV on 11 percent and hydro on 56 percent (Figure 4.2). The electricity grid has been able to accommodate the new arrivals (especially wind and solar -PV) in spite of their variability compared to hydro or geothermal.

Figure 4.2

Evolution in the market shares of different forms of renewable electricity (Eurostat 2015).



FUTURE PROSPECTS: 2015-2020

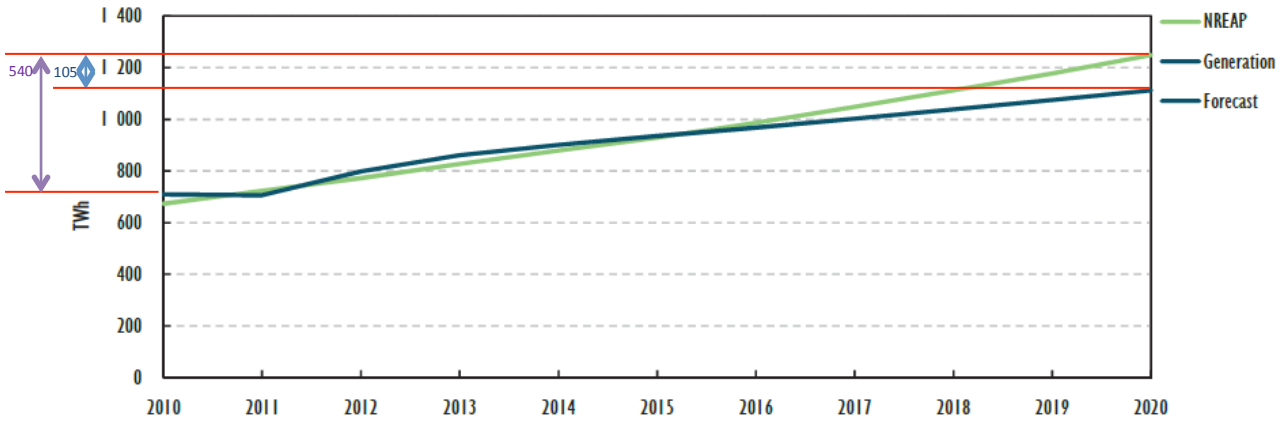
China in 2014 is estimated to have installed 12 GW of solar-PV per year. Installations in this country jumped two and a half times between 2012 and 2013, meaning that now the EU, at 9 GW per year, accounts for around 20 percent of the installation market (Ossenbrink). The perception that the EU sucks in a disproportionate amount of the world's PV products is false. Other regions of the world are also taking to the technology enthusiastically. This is contrary to what the Commission continues to assert (Ristori 2014 and Reilly 2015). The reasons for this may be traced both to massive investment in manufacturing by China at the end of the last decade and support schemes in Europe, particularly Germany, that triggered this investment (Weber 2015).

In Europe, solar-PV's growth has also beaten expectations, but other technologies have not fared so well (EC 2013a). Member States' targets for wind, as laid out in their National Renewable Energy Action Plans (NREAPs), were in 2013 assessed by the Commission to be on track to be missed by 2020 due to "reduced national efforts and infrastructure difficulties."

The International Energy Agency has warned against complacency (IEAc 2014). It forecasts a shortfall of 105 TWh against the National Renewable Energy Action Plans. This is substantial in comparison with the absolute increase in renewable generation foreseen between 2010 and 2020 (Figure 4.3).

Figure 4.3

Shows the IEA forecasts that the increase in the absolute amount of renewable energy consumed in the EU will be lower by about a fifth in 2020 than the sum of the forecasts of the NREAPs (Source : IEA chart Figure 9.4 of [4] + own edits).



To keep Europe on track to reach the binding target of 20 percent by 2020, which requires greater increases in annual renewable consumption, as 2020 gets closer, the policies of Member States may need to change to become more favourable to renewables deployment.

The National Renewable Energy Action Plans were submitted to the European Commission before the economic crisis that began in 2008 had run its course. For this reason, a shortfall in the absolute amount of renewable energy produced in 2020 might not necessarily translate to a failure to meet the 2020 target, as overall energy consumption itself continues to remain lower than foreseen This is due to continued improvements in European industry's energy efficiency and falls in production due to the economic crisis and international competition led to a reduction in electricity consumption of 4 percent over the period 2008 – 2011 (European Commission 2014. The European Commission says the EU is on track for 21 percent renewables by 2020. For their part, the Member States twice in 2014 re-affirmed their commitment to meeting their 2020 overall renewables targets “fully” (European Council 2014).

In 2020, production of renewable energy risks being lower than 1250 TWh for a number of reasons, the proximate one being the withdrawal by governments of production incentives. This has happened with the encouragement of the European Commission, which last year adopted Energy and Environment State Aid Guidelines for the period to 2020 (EC 2014c) to require, as the default option, levels of support to be determined through a competitive bidding process. The Commission had for some time before been concerned that renewable energy producers were too insulated from electricity markets, deriving too great a share of their revenue from levies and not enough from trading on those markets. This has had the consequence that the burden of maintaining system adequacy (i.e. ensuring that the supply of electricity matches demand both on long and short timescales) falls predominantly on the other participants in the electricity market. The Commission had also worried that subsidies when they were offered were too high (“overcompensation”)(EC 2012b).

Though aware of the damage to investor confidence posed by retroactive changes to support schemes (where governments change the terms of support to installations after they have reached financial close) for example in the case of the energy reforms in Spain (Aeeolica 2014), the

Commission stops short of saying these changes are never justified: “Applying retroactive changes […] will seriously undermine investor confidence and should, to the extent possible, be avoided.” The IEA takes the same line.

Annual investment volumes (in monetary terms) in renewables have declined since 2011 (UNEP 2014), but investment costs have also fallen (IRENA 2015). This has allowed the annual deployment of solar-PV to continue to grow. Solar-CSP (concentrated solar power) has boomed since 2011, with an average growth rate of 44 percent (REN21 2013 and IRENA 2015) (the growth has been outside Europe, but Europe-headquartered develop the projects (Diaz 2014). The wind industry expects a return to growth in annual MW installed in 2014 (GWEC 2015).

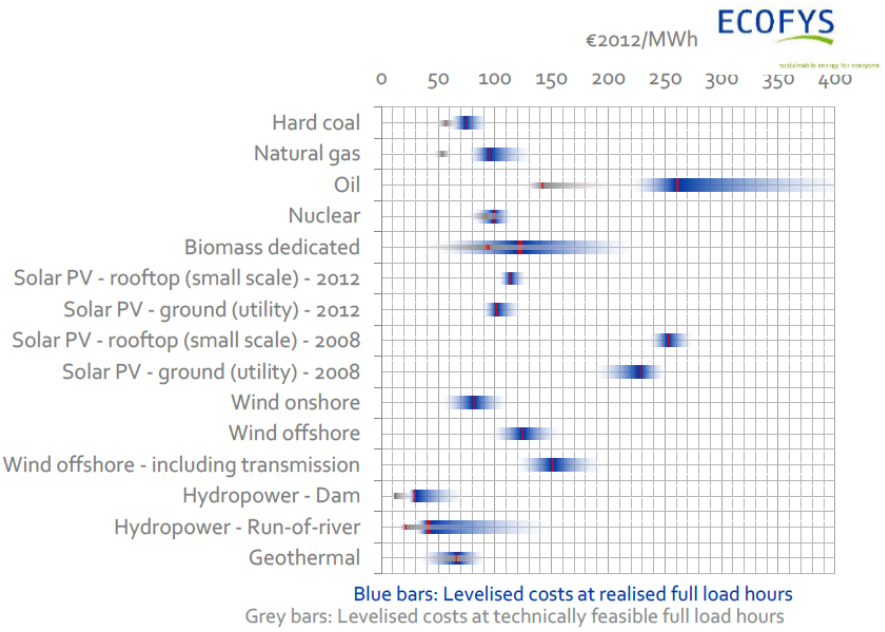
AFFORDABLE

Analysis published by the European Commission last year showed that renewable energy levies accounted for an EU average of 6 percent of household electricity bills, ranging from 1 percent (Ireland, Poland, Sweden) to 15.5 percent in Spain and 16 percent in Germany. In Spain, renewable electricity production appears to have led to a decrease overall in retail prices because renewables have pushed out more expensive forms of generation from the energy mix, leading to a drop in the component of the bill related to the electricity market price (EC 2014d).

The Spanish experience could become more common as the capital cost of renewable electricity technologies falls. Renewable energy technology installed today is in many cases much cheaper than the technology installed at the time that Spain set up the support schemes giving rise to its present levies (see for example, the evolution in the price of PV modules) (IRENA 2012). Some forms of renewable energy technology, when deployed in the EU, have also become cheaper than fossil-fuel technologies (Figure 4.4). Fossil-fuel technologies and nuclear continue to receive substantial government subsidies in spite of their far higher total costs once their external costs are taken into account (Ecofys 2014b). In 2012, the total value of subsidies given to coal, gas and nuclear energy in the EU was approximately the same as those provided for solar-PV and onshore wind (Figure 4.5).

Figure 4.4

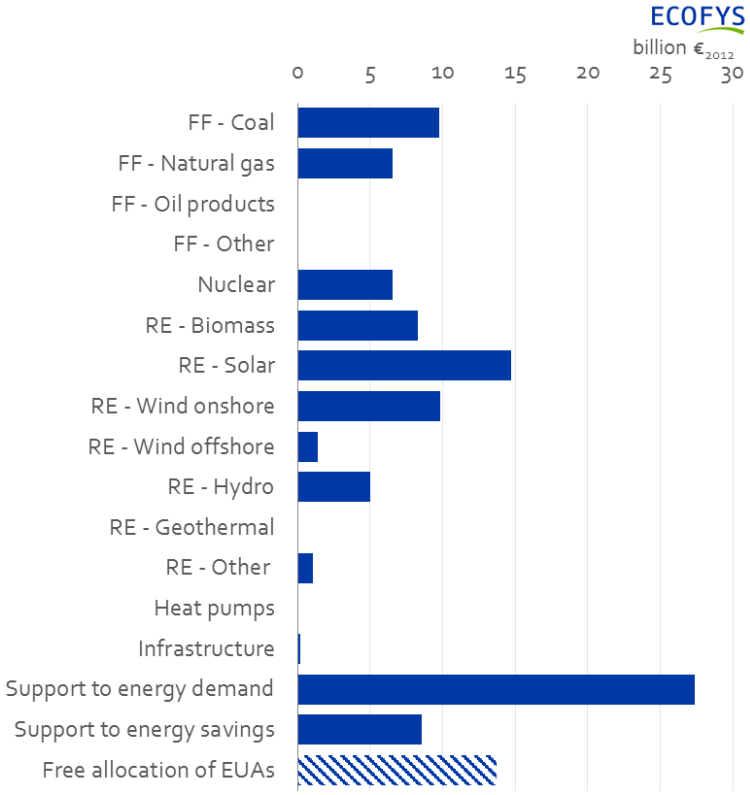
Demonstrates levelised cost of electricity in the EU28 for various technologies in the EU28.



The blue bars indicate the levelised cost at full load hours estimated from energy production and capacity statistics and the grey bars indicate levelised cost at technically feasible full load hours. The red vertical lines represent the median of the range [EC 2014c]. Renewable energy technologies are competitive with fossil fuels and nuclear energy.

Figure 4.5

Illustrates total public interventions (subsidies) provided in the 28 Member States (in billion €2012), including EU level support, in the year 2012. Historic support is not included [EC 2014c].



The subsidies to coal, gas and nuclear are comparable to those flowing to certain categories of renewable energy technology. Subsidies, if they will remain a feature of energy markets, are better directed towards those technologies whose expansion is most needed to achieve an energy system of lowest overall cost in the long term.

RESEARCH & DEVELOPMENT

The importance of Research & Development in delivering cost reduction is recognised both by the European Commission and Heads of State (European Council 2014b). The capacity factors of technologies have improved, which is an indicator of improved siting and reliability (PV, wind) as well as the integration of storage (CSP) (IRENA 2015). The efficiencies of PV technologies have improved also.

The EU's budget for Research and Development in low carbon technology (including renewable energy), has increased in the seven-year period 2014-2020 compared to the period previous period, 2007-2013. However, no para-budgetary measures like NER300, which also provide funding at European level for innovation in renewable energy, have been announced for this period so overall it remains to be seen whether the total of EU-controlled funding for renewables will be greater in the coming period than in the last (Ibid fig 5.5).

NUMBER ONE IN RENEWABLES

President of the European Commission, Jean-Claude Juncker, (Juncker 2014) in the statement of his priorities if appointed to head the European Commission, said he wanted 'Europe's Energy Union to become the world number one in renewable energies.' This sentence has been interpreted as a call to "pool resources, make use of synergies, connect networks and unite our efforts," as the basis of an industrial policy for (in the particular context of the quote) solar-PV (Reilly 2015). The speaker, representing Commissioner Navracsics, also acknowledged that the industry policy should help economic actors to make investments that are of a sufficient scale build manufacturing plants big enough to achieve, with their economies of scale, the most competitive production costs.

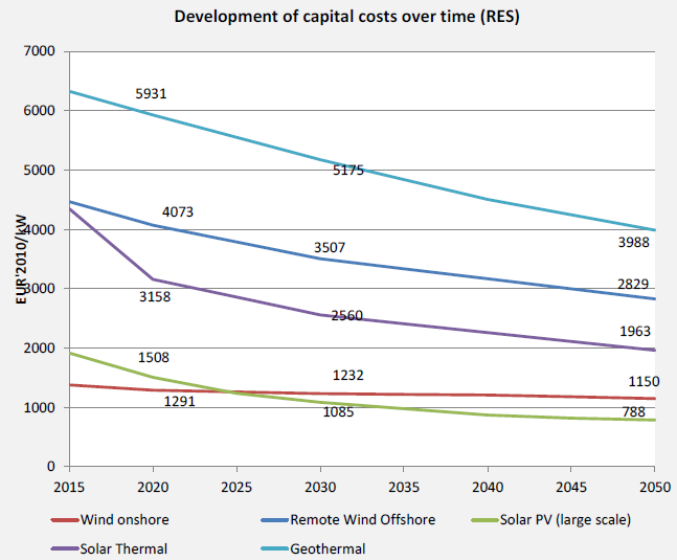
The European Commission's proposal for the European Fund for Strategic Investments would be one of the tools for financing manufacturing capacity expansion. To recognise the importance of energy (not to mention the contribution that a budget that had been earmarked for energy research and development, namely from within Horizon 2020, will make to the capital put up by the European Commission to underwrite European Fund for Strategic Investments - EFSI loans), a minimum volume of EFSI underwritings should be in the energy area.

Future prospects: 2020-2030

- The capital costs of renewable energy will continue to fall (Figure 4.6).

Figure 4.6

EU energy, transport and GHG emissions "Trends to 2050" (European Commission 2013) Dec 2013



- Today's forecasts of the size of some renewable energy technologies may prove to be too low. This has been a feature of solar-PV forecasts made in recent years (Weber 2014).
- The European Commission expects "that in the period between 2020 and 2030 established renewable energy sources will become grid-competitive, implying that **subsidies and exemptions from balancing responsibilities should be phased out in a degressive way**." (European Commission 2014c)
- If renewable technologies (particularly, in Europe, wind and solar-PV) do become grid-competitive under the same market rules as fossil fuels, **the business case for fossil fuels in the generation mix will disappear.**
- Any **subsidies for renewables will increasingly be directed towards less-deployed renewable supply technologies.**
- With the governance around the EU's 2030 ambitions for renewables weak (low 'EU target' of 'at least 27 percent' and no binding national targets commensurate with it; resistance from Member States to be held to trajectories as they were with National Renewable Energy Action Plans) the deployment of renewable energy in Europe may slow and will have to be driven by the value of energy delivered from renewable energy systems compared with alternatives. **It is vital that the European Council stands by its assertion that the 2020 targets "need to be fully met"** (European Council 2014). This will keep momentum high to the end of this decade and help to make the flaccidity of the 2030 commitments less relevant.
- **The market must be designed to guarantee system adequacy at minimal cost, but hopefully not by taxing 'own-consumption'** (the consumption of energy by the same entity that produces it, typically a household, small community, or light industry).

CHAPTER 5.
WAKING THE SLEEPING BEAR: A CREDIBLE PLAN FOR EMISSIONS TRADING SCHEME REFORM

The Emissions Trading Scheme (ETS) is supposed to be the centrepiece of Europe's strategy for achieving its targets for cutting greenhouse gas pollution.

The world's first carbon trading scheme for reducing emissions, it was designed to be the most cost-effective means of cutting greenhouse gases through an efficient, market-based, and harmonised pan-European approach. Similar carbon trading schemes are now proliferating across many other parts of the world, including the US and China, where policymakers have drawn on Europe's leadership and experience.

The European scheme covers 31 countries (the 28 member states plus Iceland, Norway and Liechtenstein) and approximately 45 percent of total EU greenhouse gas emissions, including emissions from 12,000 power plants and manufacturing installations (Platt and Straw 2013). The scheme is supposed to drive emissions reductions across the sectors it covers by making polluters pay for every tonne of carbon dioxide they emit. The intention is that this will incentivise them to change their practises and investment decisions to emit less pollution and so avoid incurring higher costs. High carbon prices were, in turn, meant to incentivise research and development into new, clean technologies.

Despite being Europe's flagship policy for cutting carbon output, the majority of emissions cuts delivered in Europe have not in fact stemmed from the ETS. Instead they have come from the deployment of clean energy, improvements in energy efficiency, and the economic downturn (EEA 2014).

The primary problem has been that for long periods the price of carbon in the European market has been stuck at a level far below that which is required to trigger fuel-switching away from the dirtiest fuels, and to incentivise low-carbon investment.

Since mid-2011 the carbon price has fallen by 70 percent, and today remains so low as to be virtually irrelevant to the decision-making of heavily polluting companies (Clark 2013b). A number of energy companies suggest a carbon price in excess of €30 per tonne would be required to trigger switching away from coal (the dirtiest fuel), yet carbon is currently trading at around €5 per tonne (Garman and Kahya 2013).

The reason for this 'bottoming out' of the carbon market is that it has been oversupplied with pollution 'allowances'. This oversupply is the result of multiple factors, including an overgenerous distribution of pollution permits (partly as a result of successful industry lobbying), the creation of new offset mechanisms that have flooded the market with even more allowances, and a weakening in demand due to the global financial crisis (Morris 2012, Murray 2013).

Figure 5.1

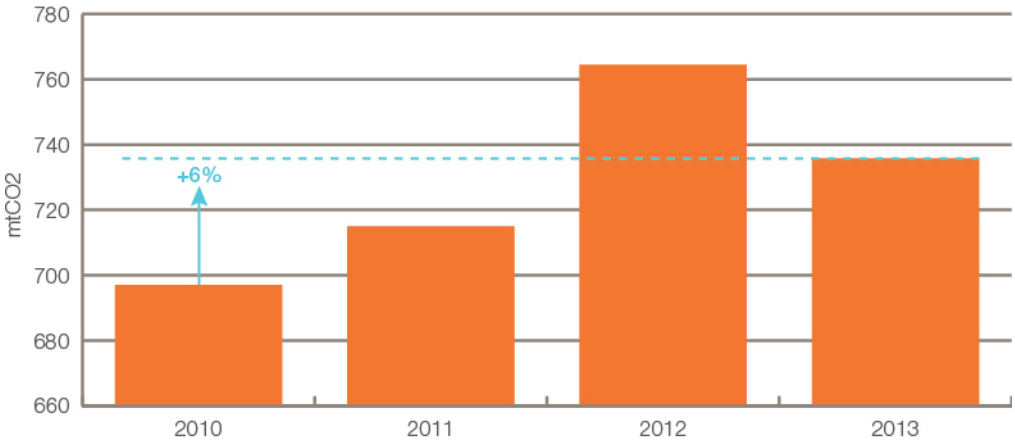
Spot price of EUA carbon allowances, 2005–14 (€)

Sources: The Intercontinental Exchange with calculations from Sandbag Climate Campaign; IEA 2013

The consequence has been that ETS carbon budgets are not in line with Europe's stated emissions reductions target for 2020. The European Commission concedes there are at least 2 billion surplus allowances (EC 2014). Just one country, Poland, has pollution allowances through to 2020 equivalent to almost double their existing national emissions (Morris and Elsworth 2014). In fact, Sandbag's analysis suggests that the ETS is so seriously oversupplied with allowances that without reform it would allow domestic greenhouse gas pollution levels in the EU to grow back to near-1990 levels by 2020, reversing decades of progress (Sandbag 2013, 2014b). They estimate that this excess of allowances is now effectively cancelling out the 700 million tonnes of emissions reductions that have resulted from other, more successful European climate policies (Morris et al 2012).

The failure of the ETS to drive fuel-switching away from coal-fired power plants has meant that there has been no policy barrier to prevent European coal consumption from rising, sending greenhouse gas emissions in the wrong direction. Overall levels of coal consumption in Europe are not significantly lower now than they were when the EU adopted its climate change policies in 2008 (Economist Intelligence Unit 2014). The failure of the ETS has created a perverse situation wherein the dirtiest fossil fuel – lignite coal – is more profitable to burn than gas in many EU countries (Allan 2013). This has resulted in a 13 percent growth in coal consumption in Germany over the past four years, and a 22 percent rise in the UK, with a corresponding rise in emissions (Carr 2014). Between 2010 and 2013, emissions from coal burning across Europe rose by 6 percent, and emissions from coal-fired power generation now amount to 18 percent of the total EU greenhouse gas output (Jones and Worthington 2014).

Figure 5.2
Coal consumption in Europe, 2010–13 (mtCO2)



Source: Jones and Worthington 2014

Recent research by Merrill Lynch projects that coal will consolidate its position as a more profitable fuel than gas in Europe this year, and the situation could be worsened by capacity market payments being made available to existing coal plant operators, thereby improving the profitability of coal-burning further still and increasing carbon pollution (ibid, Wynn 2014). This underlines the need for governments to urgently intervene to avoid the risk of policy failure on cutting greenhouse gas output.

In spite of these problems, all European governments say that they are still relying on the ETS as their primary tool for making emission reductions, believing it can still be made the most cost-effective and efficient means of curbing greenhouse gas output. The failure of politicians to address the scheme's inbuilt structural problems has prompted investors and parts of the international community to question their political commitment to their stated goals on climate change. A proposal known as 'back loading' was brought forward in order to offer a temporary solution to the problems with the ETS, by withdrawing 900 million surplus allowances from the scheme on the basis that they could be reintroduced at a later date when the EU's economy improved. The proposal was initially rejected by the European parliament, which later approved a watered-down version of the plan (McGrath 2013). After these plans were passed, the carbon price continued to languish at around €5 per tonne (EurActiv 2013c). These developments only heightened concern about Europe's commitment to cutting emissions.

A new proposal for fixing the ETS was set out by the European Commission in January 2014, with the aim of rectifying this lack of confidence in Europe's climate strategy by empowering the ETS to respond to demand shocks. This is being called upon more frequently by European Member States who are requesting for it to be implemented as soon as possible in order for a carbon price to become credible again.
It would see a market stability reserve (MSR) established, with the remit of addressing any oversupply of allowances by withholding them in reserve if major drops in emissions were to

lead to a major fall in the price of carbon. It is intended that the MSR will be free from political interference, and will make the carbon price more predictable. Under these proposals, the supply of allowances would be cut if there was a surplus of 833 million metric tons, but if this figure fell below 400 million they would be returned from the reserve to the market (EC 2014h).

Modelling suggests that the MSR could enable carbon prices to reach €50 per tonne (in today's prices) by 2030 (EC 2014i). However, these reforms are not expected to have a significant impact on the carbon price in the short term, as even if they are approved they are not scheduled to take effect until 2021. Bloomberg New Energy Finance has suggested that this delay in introducing the MSR means that the ETS would contribute very little towards meeting a new 2030 greenhouse gas target. This would create a strong risk of 'lock in' to high carbon infrastructure in the short term (BNEF 2014b). Similarly, Reuters Point Carbon suggest that, unless the MSR was able to take effect earlier, the proposal would not cause the carbon price to rise above €30 per tonne until after 2026 (EC 2014i).

Our policy recommendations

To maximise the chances of achieving an international climate treaty at the UN summit in Paris in December 2015, Europe needs a credible plan in place to build a cleaner economy and deliver on its 2030 decarbonisation targets before it attends the conference.

A temporary removal of pollution allowances from the ETS could help raise the carbon price, but ultimately this would only defer action to genuinely address the problem of excess allowances. Ecofys has concluded that if the surplus allowances are not removed from the ETS market altogether, but instead simply carried forward and allowed into the next phase, a 40 percent greenhouse gas reduction target for 2030 would effectively become only a 33 percent target (Ecofys 2013).

For the scheme to be fit for purpose, a one-off and permanent removal of allowances is required to tighten ETS carbon budgets so that they are in line with the EU's targets for greenhouse gas reduction. We recommend that if an international agreement is achieved in Paris next year, the ETS budgets should be aligned with a target for a 50 percent cut in European greenhouse gas pollution (on 1990 levels) by 2030.

To restore the scheme's credibility, the ETS requires wider structural reform to ensure that the issues that are currently undermining it can never recur.

IPPR has previously recommend the creation of a new 'carbon market policy committee', based on the 'goal-dependence, instrument-independence' model of the Bank of England's monetary policy committee (Platt and Straw 2013). This committee should have the clearly defined goal of reducing emissions at the lowest cost, but also have flexibility to intervene in the supply of allowances in the ETS in pursuit of this goal. The European Commission has opted to have the MSR fulfil this function. In light of this we make the following recommendation.

The MSR should not be delayed, and should take effect by 2016. It should be accompanied by a tightening of the ETS budget in line with newly established and strengthened greenhouse gas targets.

If the current political obstacles that are preventing reforms like these can be overcome, the ETS could yet become a central pillar of Europe's emissions reductions plan.

Poland's opposition to new efforts on clean energy and emissions reduction has been the primary obstacle to progress for climate change policy in Europe. The advancement of climate reforms will, in our view, require member states to end their concessionary approach to the Polish government. Poland receives more funding from European budgets than any other member state (Morris and Elsworth 2014). Other member states should leverage pressure by making access to these funding streams, including ETS auction revenues, conditional on support for the necessary reforms. A concessionary approach to Poland that enabled the coal industry in Europe to expand – for example, through allowing state aid for coal, or increased coal burn through so-called 'ETS holidays' – could send a hugely damaging signal to emerging economies ahead of the international talks in Paris (Aldridge 2014).

Given that so much uncertainty exists around the political feasibility of passing effective reforms to the ETS, member states should introduce backstop measures for unabated fossil fuel power plants, such as emissions performance standards. These should prevent the construction of any new coal-fired plant that is not equipped with CCS, and ensure the closure of any existing unabated fossil fuel plant on a timeframe that is consistent with Europe achieving its 2030 greenhouse gas target.

Emissions performance standards (EPS) would guarantee that greenhouse gas output could not get so high as to throw Europe off a pathway towards becoming an almost carbon-neutral economy by 2050. They would also send an important signal to investors and the international community that the era of unabated coal-fired generation in Europe is ending.

If the ETS is reformed so that it functions effectively, these EPS measures should be effectively redundant, and the MSR would ensure they didn't interfere with the functioning of the carbon market. However, if ETS reforms were to fail then they would provide a crucial backstop to prevent policy failure on decarbonisation objectives. One advantage of using an EPS in Europe is that monitoring and enforcement arrangements that have been established for the ETS could be used, and there would be no requirement for duplication.

The UK has already acted to put an EPS in place to work alongside the ETS, so there is a precedent that could be replicated in other member states (DECC 2012). Equally, the Obama administration is now promoting an EPS policy alongside support for regional carbon trading schemes and renewable energy policies across America (EPA 2014).

Any capacity payments made available by member states should assist in reducing the carbon intensity of the energy sector, and be consistent with the EU's 2030 climate and energy targets. There is a risk that member states that are introducing capacity payment schemes in order to ensure that there is flexible back-up capacity to accommodate for the growth of renewables in European energy systems are inadvertently helping to improve the economics of unabated coal generation. In the absence of an EPS, capacity payments – together with a low carbon price and favourable market conditions – could grow the share of coal (the dirtiest fuel) at the expense of

cleaner generating capacity (Jones and Worthington 2014). It is therefore necessary that European rules on state aid policy towards capacity payments be aligned with climate policies.

CHAPTER 6.
RAISING AMBITION: A SUPER-FUND AT THE HEART OF ENERGY UNION FOR CLEAN ENERGY INFRASTRUCTURE

Over the coming decades, ageing energy infrastructure must be replaced, and this will require large amounts of investment irrespective of the technology.

The Energy Union needs a 'super-fund' to carry out ambitions in transparent, practical and inclusive way.

According to the European Commission, under a scenario in which there is no change to existing EU energy and climate policies, energy infrastructure investments across the European heat, power and transport sectors would increase from around €800 billion per annum between 2010 and 2020 to €1,000 billion per annum between 2040 and 2050 (EY 2014).

A recent estimate found that €628 billion would need to be mobilized from 2010 to 2020 (ECF 2011). Most of this investment is required for new low-carbon generation capacity, but €15 billion is needed for back-up capacity and €46 billion for the expansion and modernisation of transmission networks.

The report projects that in the period 2020–2030, the figure will almost double to €1,153 billion of capital expenditure, and estimates that during this period €1,028 billion will be needed for generation, €57 billion for back-up capacity and €68 billion for transmission (ibid). ENTSO-E, the organisation that represents European grid operators, put the figure needed for grid networks much higher, at €150 billion by 2030 (Platts 2014b).

Transmission networks must be modernised to accommodate an increasingly dominant role for clean technologies, and because greater interconnection can deliver large cost savings by enabling smarter use of the energy system and reducing the need for so much new generation capacity and imported fuel.

The current approach

EU member states currently make key energy infrastructure decisions from an almost entirely national perspective. This is causing opportunities to be missed: cost savings and technology breakthroughs could be achieved if member states were to agree and adopt a more integrated European strategy. This could involve pooling resources, cooperating on projects, and factoring in this wider approach when making choices about energy at a national level.

There are numerous areas of energy investment where a shared approach could work to the common interests of many member states. For example, projects aimed at achieving higher levels of interconnection, large-scale energy efficiency improvements in housing stock, and projects aimed at researching, demonstrating and developing new low-carbon technologies. Proposed examples include the North Sea grid proposal to enable an expansion of offshore wind; a regional grid designed to accommodate large-scale solar deployment across the Mediterranean; and a major energy-efficiency push across buildings in the Visegrád Group countries.

The commercialisation of carbon capture and storage (CCS) technology is another important shared project. The Intergovernmental Panel on Climate Change has concluded that it could be very difficult to keep global levels of greenhouse gases within safe levels without commercial deployment of CCS technology, and they estimate that the cost of keeping global temperature rises to less than two degrees of global warming could rise by up to 138 percent without the commercial deployment of CCS (IPCC 2014).

Despite these examples, pooled funding for clean energy projects is currently disbursed as relatively small grants from a range of different budget headings. These tend to be on an ad hoc basis according to the national preferences of individual member states, and funding is not focussed but instead spread thinly across different types of project.

There is a 'Horizon 2020' fund that allocates €5.9 billion for innovation and research into energy efficiency and competitive low-carbon (but non-nuclear) energy sources (EC 2014j). Separately, revenues raised from selling 300 million pollution allowances in the new entrants reserve of the ETS have been channelled into the European 'NER 300' fund, which is worth €2.2 billion (EC 2014k). This funding, now largely spent, has been used to support dozens of different small-scale low-carbon energy demonstration projects across the EU, rather than being pooled into a smaller number of strategically important projects. The first round of NER 300 funding saw €1.2 billion spent on 23 different projects around Europe; the second saw €1 billion spent on a further 19 projects (ibid). This disjointed and un-strategic approach has seen small levels of financial assistance given to, for examples, a floating wind power project in Spain, a biomass project in Latvia, a relatively small CCS project in the UK, a bio-ethanol project in Poland, a smart-grid project in Cyprus and a solar project in Italy (ibid).

The European Regional Development Fund has earmarked €23 billion from the EU cohesion budgets for the period 2014–2020 to support renewable energy, energy efficiency and sustainable urban transport projects across Europe (EC 2014l). Again, it is expected that these funds will be awarded to projects on the basis of national, rather the EU-wide or regional, energy strategies. The European Court of Auditors recently concluded that spending from cohesion funds on renewable projects has not delivered value for money (EurActiv 2014b). They believe that some projects would have taken place without EU support, and some did not contribute to overarching EU energy objectives.

Another scheme called the 'Connecting Europe Facility' allows regional groupings to agree energy 'projects of common interest,' which can access European finance worth €5.85 billion between 2014 and 2020 (EC 2014m). The first decisions on spending allocation from this facility are expected this autumn. Unfortunately, this funding stream does not appear to be aligned with Europe's headline strategic targets either. For example, the list of potential projects that were initially earmarked as contenders for support included a number of gas network infrastructure projects that are predicated on European gas consumption reaching levels that are inconsistent with the European Commission's own proposed targets on decarbonisation (Gaventa 2013).

See more on financing of energy efficiency and renewables in chapters 3 and 4.

Our policy recommendations

A 'super-fund' for clean energy infrastructure should be at the heart of the Energy Union.

While relatively small-scale grants and individual national projects may have strong merit in themselves, we believe that a better approach would be to pool the remaining European funds available until 2020 for clean energy deployment, low-carbon infrastructure and energy efficiency. These pooled funds should create a 'European clean energy super-fund' to support a smaller number of much larger, shared projects. This approach would utilise European cooperation to enable large-scale projects that would not have proceeded if they were dependent upon a single member state.

This would not prevent smaller projects from going ahead, with the support of individual member states. However, the focus for the European 'super-fund' should be to act as a driver of European energy cooperation – assisting where member states want to work together on a big transformational energy project in their common interests, or where an energy project is literally crossing borders.

The projects that benefit from support should all be verifiably aligned with either shared innovation priorities or the regional delivery plans proposed by clusters of member states in pursuit of the overarching EU-wide climate and energy objectives for 2030. This would complement this report's proposal (in chapter 1) for member states to have the flexibility to make joined-up, bottom-up contributions towards the shared clean energy and greenhouse gas targets.

Access to any European funding for energy should be conditional on member states showing that the projects they are seeking assistance for are consistent with credible and deliverable regional plans, and are proven to be the most cost-effective means of achieving 2030 targets. This would enable best-value investment across different infrastructure types – meaning, for example, that where a big efficiency investment is more beneficial to security than a new gas pipeline, it would receive priority.

In the EU budget for 2014–2020, a minimum of €38 billion in the EU's Structural and Investment Funds is set aside for the low-carbon economy (EurActiv 2014d). After 2020, there is scope to also direct further revenues from the sale of ETS allowances into clean energy schemes. Indeed, the European Commission is already rumoured to be examining new NER 300-type arrangements for using ETS revenues for increasing clean energy support.

The European Investment Bank and the European Bank of Reconstruction and Development should leverage greater sums for clean energy investment that could assist the low-carbon transition (Cozzi and Griffith-Jones 2014).

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