European Commission

Energy challenges and policy

Commission contribution
to the European Council of
22 May 2013

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Ahead of the 22 May 2013 European Council, this paper reviews some energy challenges confronting Europe, focusing on topical issues linked to the competitiveness of the economy. It does not deal with the broader issue of the climate and environmental dimension of energy use, which is the topic of an on-going public consultation.[1] *Some background facts and figures on Europe's energy mix and challenges, as well as on the main elements of the EU policy and legislative framework, are presented in annex to this paper.*

Member States have very different energy mixes. On average in 2011, the total energy needs of the EU, in terms of gross inland consumption, were covered by the following sources: 35% oil, 24% gas, 17% solid fuels such as coal, 14% nuclear power, 10% renewable sources such as hydropower or wind energy. This mix varies widely across countries (see Annex 5) and evolves over time as a result of their geographical conditions, such as the availability and access to natural resources, national policy choices, such as the decision to make use or not of nuclear power, changing financial incentives, progress in technologies, decarbonisation requirements and the development of the internal market.[2]

They share similar objectives… In spite of their differences, Member States have three common policy objectives: reducing the energy bill for households and businesses ("competitiveness"), ensuring a reliable and uninterrupted supply of energy ("security of supply") and limiting the environmental impact of energy production, transport and use ("sustainability"). In many cases, these objectives are best achieved through a common framework and joint action at EU level. This is why three headline targets to be achieved by 2020 were agreed by Heads of State or Government (often referred to as "20 20 20 by 2020"): to reduce CO2 emissions by 20% compared to 1990 levels, to raise the share of renewable sources as part of the overall EU energy mix to 20% and to increase energy efficiency by 20%. These goals are also at the core of the Europe 2020 strategy for smart, sustainable and inclusive growth.

… and a common framework. A legislative framework is in place to deepen and unify the European energy market, through the development of infrastructure interconnections, safeguards to secure supply of gas and electricity, consumer rights and a level-playing field for competition and supervision among energy actors. EU legislation has been put in place to promote the use of renewable energy sources, to strengthen efforts on energy efficiency and to ensure the safe exploitation of offshore oil and gas. A number of these instruments still have to be implemented (see Annex 3).

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[1] The European Commission presented a consultative Green Paper for a post-2020 energy and climate framework on 27 March 2013 (COM(2013)169). The outcome of the consultation period (end of March until beginning of July) will feed into the Commission's preparation for concrete proposals by the end of 2013.

[2] More detailed information on possible scenarios can be found in the roadmaps produced by the European Commission: "Roadmap for moving to a competitive low carbon economy in 2050" (COM(2011)112) and "Energy roadmap 2050" (COM(2011)885).

1. Key energy challenges for Europe

Europe is increasingly dependent on importing energy from third countries

Today, we are far from producing the energy needed to cover our own demand. Europe's import dependence has increased in the last two decades and is set to grow to more than 80% in the case of oil and gas by 2035. Some Member States rely on one single Russian supplier and often on one single supply route for 80%-100% of their gas consumption. This exposes them to the market power of their sole supplier whose price setting may not always follow a market rationale.

Europe is in a global race for energy sources. According to the International Energy Agency (IEA), global energy demand is expected to grow by more than one-third over the period to 2035 with China, India and the Middle East accounting for 60% of the increase. Increased energy demand in other parts of the world might have direct impacts on Europe. For instance, due to the high prices Japan and Korea pay for Liquefied Natural Gas (LNG) – around 60% higher than the average price of LNG imports to the EU in February 2013 – imports of LNG to the EU fell by 30% in comparison to 2011.

Member States with a diverse portfolio of gas suppliers and supply routes and with well-developed gas markets reap the benefit by paying less for imports. On average the estimated border prices for gas imports to the UK, Germany and Belgium are well below (by about 35%) the estimated border prices for gas imports to countries that rely on a limited number of suppliers like Bulgaria and Lithuania.

While Europe's dependence on fossil fuel imports is increasing, **the US is on its way from being a gas importer to a net exporter**. Differences in electricity prices are significantly determined by the price of fossil fuels and the recent rebound in indigenous production of oil and gas in the US, in particular shale gas, is leading to a widening gap between EU and US industrial energy prices. In 2012, industry gas prices were more than four times lower in the US than in Europe. This erodes the competitiveness of European companies. This development also has an impact in the rest of the world. The IEA's industrial price index for real electricity prices has increased by 37% in European OECD members within only 7 years (between 2005 and 2012), while the corresponding change in the US was minus 4%. The index for households increased less in Europe (+22%), but still significantly more than in the US (+8%).

Another effect of the US shale gas boom is the increasing use of CO2 emitting coal in Europe's power plants. The high consumption of gas in the US frees up US coal for export to Europe. EU consumption and imports of coal (hard coal and lignite) have increased by, respectively, 2% and almost 9% over the first 11 months of 2012, relative to the same period in 2011. In the UK and Spain, coal consumption (hard coal and lignite) increased by 28% in the first 11 months of 2012; France's coal consumption grew by 16% and Germany's by 3%. The largest growth was seen in Ireland (doubling of coal consumption in the first 11 months of 2012) and Portugal (+38%).

A recent study by the European Commission's Joint Research Centre included scenario analysis on the **possible impact of indigenous shale gas production on import dependence**. While it is highly unlikely that Europe will become self-sufficient in natural gas, in an optimistic scenario indigenous

unconventional gas could replace declining conventional production with import dependence maintained at a level of around 60%. Unconventional sources are already exploited in Europe: Estonia covers 90 % of its power needs from shale oil mining.

Some of the EU's price increases come from national policy choices

Energy bills for consumers are rising and account for a growing share of the average expenditure of households, varying between 7% and 17% including personal transport, across Member States. Poorer parts of the population are faced with energy expenditures of 22 % of total expenditure in some Member States. Household expenditure on energy, taxation and levies included, is expected to rise further even if all possible gains from completing the internal energy market are taken into account. This is in part due to the pressure of rising global demand on resources, as well as to the costs linked to an ageing and more difficult to maintain infrastructure.

However, energy prices are also to a large extent the result of Member State's decisions on tariffs, levies (including support scheme fees) and taxes. For the EU15 (data for EU27 not available), they represented 28% of the final price for domestic consumers in 2010, against 22% in 1998. The corresponding figures for industrial users were 19% in 1998 and 27% in 2010. In some Member States, such as Denmark, taxes and levies for some categories of electricity and gas consumers constitute up to 50% of the final energy bill.

Investments in the energy sector at historically low levels

According to the Commission's 2050 low carbon and energy roadmaps the **transition to a secure, competitive low carbon energy** requires sustained increased investment in power equipment, grids, transport technologies, infrastructure and efficient buildings. This increased investment is estimated to be equivalent to 1.5% of GDP on an annual basis over the period until 2050. By 2020, investment in the order of EUR 1 trillion is needed in the EU to ensure security of supply, diversification of sources, cleaner energies and competitive prices within an integrated energy market.

Some Member States still find themselves on an "energy island" as a result of **insufficient infrastructure connections** with the rest of the EU. Single-source gas import dependence still prevails in Northern and Eastern Europe. In certain regions of Europe, increasing amounts of intermittent renewable energy cannot be transported to consumers due to the lack of sufficient infrastructure. To overcome these deficiencies, there is a need for new investment (of about EUR 200 billion) in transmission lines, interconnectors, storage facilities etc. by 2020. This requires an increase in investment by over 50% for electricity and about 30% for gas from the period 2000-2010 to 2010-2020. However, the impact on costs for consumers is expected to remain very limited (about 1% in electricity) and largely offset by the benefits from price convergence, increased security of supply and lower back-up needs as well as higher penetration of renewables.

Up to 2020, almost a fifth of the EU's total coal capacity, comparable to the total installed capacity for electricity in Poland, is due to be retired. 11% of the UK national power generation capacity will go off the grid. In the EU, Switzerland and Norway, known retirements of power plants are 70% greater than those in the previous five years. Due to low energy demand and increasing electricity production from renewable energy sources, roughly 40 GW of gas power plant projects and 25 GW

of coal power plant projects have been postponed or cancelled in the last three years. This roughly corresponds to the combined capacity of the Netherlands, Belgium and Denmark. Investment in renewable energy sources dropped in the first quarter of 2013 by 25% in Europe with an almost complete standstill in countries like Spain (-96%), Italy and France.

2. The right policies are in place but implementation is too slow

At least in the short to medium term, Europe will not be able to compete with its largest trading partner, the US, on energy prices due to a difference of exploitable natural resources. As a net energy importer, Europe's strategy for a secure, competitive and sustainable energy system crucially depends on following a broad approach based on energy efficiency, the creation of competitive markets based on smart infrastructures, diversification of fuels and supply routes, the exploitation of conventional and unconventional energy sources, and innovation.

(1) Energy efficiency: investing in a cheaper and cleaner source of energy

Meeting the EU's 20% energy efficiency target by 2020 means saving the equivalent of 1.000 coal power plants or 500.000 wind turbines. Energy efficiency curbs demand for energy, reduces energy imports and mitigates pollution. It also provides a long-term solution to the challenge of fuel poverty and high energy prices. Despite the vital role that energy efficiency plays in cutting demand only a small part of its economic potential is currently exploited.

Europe still remains the world's most important market for energy efficiency (accounting for 40 % of global investments in energy efficiency in 2011) and the EIB is the world's biggest clean energy lender. China (investing 3-4 % of the energy sector revenues per annum) and the US (more than doubling its energy efficiency spending between 2007-2010) are catching up quickly.

Box 1: Minimum energy efficiency standards on industrial products (Ecodesign Regulations)

The first four Ecodesign Regulations on electric industrial products (motors, circulators, fans and water pumps)[3] are expected to lead to annual energy savings by 2020 equivalent to the current final energy consumption of Hungary (195 TWh) and contribute significantly to the EU 2020 targets. These regulations are the first in the world which take a set of related products together (extended product approach) as well as the needs and changing user-patterns of the consumer (user-pattern sensitive). The innovative nature of the legislation has also already led to significant technology development.

The success of some of these regulations has triggered a European and global standardisation process. China was the first to use the European Regulation on motors as a basis for their national legislation. Saudi-Arabia is now considering setting requirements identical to the European motor Regulation. The US government is in the process of replicating the requirements set of European legislation for pumps and fans and is also using the accompanying measurement standard.

[3] Ecodesign regulations (EC) 640/2009 on electric motors, (EC) 641/2009 on circulators, (EC) 327/2011 on fans driven by motors with an electric input power between 125 W and 500 kW, (EC) 547/2012 on water pumps.

(2) Open and competitive energy markets – meeting EU needs

Market opening, increased cross-border trade, market integration and stronger competition, all fostered by EU legislation and the enforcement of competition and State aid rules, are keeping energy prices in check. While prices of primary energy commodities have increased annually by 14% for crude oil, almost 10% for gas and 8% for coal between 2002 and 2012, wholesale electricity prices in the EU have risen much less, namely by 3.4%.[4] Market liberalisation has put downward pressure on prices in wholesale markets where liberalisation was allowed. Competitive markets also provided for the optimisation of the use of electricity infrastructure and for price signals for investment.

There is plenty of room for improvement. On-going work on the cost of not having an integrated European energy market for gas estimates that the market benefits of the full implementation of the third energy package in 2015 compared to 2012 (base case) could reach a maximum of EUR 8 billion per year. These benefits could reach up to EUR 30 billion per year if the EU27 was a fully integrated market. In electricity, the benefit of integration (as opposed to national self-sufficiency) would be an annual costs saving of up to EUR 35billion.

According to estimations from the Agency for the Cooperation of Energy Regulators (ACER) savings equivalent to EUR 15 billion per year (10 % of the gas wholesale prices) are possible if existing market imperfections that allow for uncompetitive price differentials between EU Member States are addressed. In retail, market opening is still held back by end-price regulation. This is detrimental to competition and investment; and in cases where prices are regulated below costs, this leads to deficits which ultimately fall back to taxpayers.

Box 2: Investments in cross-border energy infrastructure

The EU needs to invest in cross-border links as part of building the internal market for energy and ending "energy islands". Thanks to the European Energy Programme for Recovery (EEPR), several reverse flow gas projects are up and running in Central and Eastern Europe. They helped to avoid gas supply problems as seen in the recent February 2012 cold spell. The recently adopted Guidelines for trans-European energy infrastructures introduce a new way to identify infrastructure projects of common interest and to accelerate their implementation through enhanced regional cooperation, streamlined permit granting procedures, adequate regulatory treatment and through European financial assistance under the proposed Connecting Europe Facility.

Regional cooperation between Member States can be very useful in delivering the necessary investment. On 25 March 2013, the Member States cooperating in the Baltic Energy Market Interconnection Plan (BEMIP) agreed on a comprehensive natural gas infrastructure development package and a roadmap for its implementation. The proposed investments in a new LNG terminal which could cover up to 40% of the current gas needs of these countries and pipeline projects (Baltic connector, intra-Baltic connections and Poland-Lithuania interconnector) would cost around EUR 1.3 billion, ending the isolation of the Baltic States and Finland and increasing security of supply.

[4] The difference between whole sale and retail prices is determined by national taxes and levies, the non-energy components of energy costs.

(3) Savings in the costs of renewable energy and other conventional and unconventional indigenous energy resources

To cut CO2 emissions, to reduce dependence on third country energy supplies and to reduce fossil fuel import bills, Member States increased the share of renewable energy sources to 13.0 % of Europe's final energy consumption in 2011 (up by 5 percentage points in 6 years). 20.6% of electricity was renewable in 2011. This development has the potential to keep wholesale electricity prices in check as the key technologies of wind and solar power have near zero marginal costs. Investments in renewable energies have the potential to create three million new jobs by 2020 (today there are already 1.19 million employees in this sector in the EU). The EU is so far on track to achieve the 20% renewables share in final energy consumption target foreseen in the EU Renewables Directive, although the situation varies from one Member State to another.

National support schemes, in line with the EU Renewables Directive, have been instrumental in fostering strong growth in renewables. However, the growth of renewables is still to a large extent based on subsidies and some rigid support schemes have not taken into account the significant price decreases when technologies matured. This resulted in overcompensation at a time of serious economic constraints. At the same time, sudden changes to support schemes, in some cases retroactive, have contributed to investor uncertainty. Cooperation mechanisms available under the Renewables Directive have not been used yet and national support schemes need to converge to exploit the European dimension of an integrated energy market. It is estimated that EU-wide renewable energy trading and achieving the 20% renewable energy target cost efficiently in all Member States would reduce the costs in the overall energy system by up to EUR 8 billion by 2020.

A high share of renewable energy in the electricity mix raises the question of the adequacy of generation capacities and grids. This becomes an issue at times where intermittent renewable energy generation from sun and wind need to be backed up by other sources. Some Member States envisage paying for the availability of generation capacity at national level ("capacity markets"), and this capacity is most often fossil fuel based. This approach risks being economically inefficient, and is likely to perpetuate the fragmentation of the internal energy market and lock in fossil fuel generation capacities. There are other measures to add system flexibility to address possible adequacy problems which are economically more sustainable and preserve or even strengthen the internal energy market. These measures include investing in cross-border infrastructure (the wider the grid, the easier the balancing out of renewable energy sources), demand response measures and storage.

(4) Technology and innovation

The technological shift needed to achieve the EU's energy objectives will only be possible with a substantial modernisation of our existing energy infrastructures. Energy R&D and innovation continue to play an essential role in developing cheaper, more efficient and reliable energy technologies.

Despite the crisis, EU expenditure on R&D is catching up with Japan and US. Public and private investments in technological development in the sectors included in the Strategic Energy Technology

Plan (SET Plan) increased from EUR 3.2 billion in 2007 to EUR 5.4 billion in 2010. Today, industry makes up about 70% of the total research and innovation investment in the SET Plan priorities while Member States account for about 20 % and the European Commission for 10%. R&D efforts remain fragmented among Member States. Better coordination and pooling of resources between Member States has the potential to increase the efficiency of research efforts, avoiding duplications and allowing to reach critical masses for technological breakthroughs.

EU research efforts significantly contributed over the last two decades to price decreases and technological development in various key energy sectors such as wind power and the Photovoltaic (PV) system. For this and other reasons, the cost of PV modules decreased sharply (by 3 times in a couple of years). The SET Plan target of EUR 1/kW by 2030 may be a reality already by 2020. Also in transport, EU efforts have allowed for a positive start on 'second generation' biofuels. Since 2007, the Intelligent Energy in Europe (IEE) programme has promoted the market uptake of technologies and tackled non-technological barriers through more than 300 projects, triggering over EUR 4 billion of related investment. IEE II has also established co-operation with financial institutions to mobilise investments of around EUR 2 billion (with EUR 38 million EU funding) into sustainable energy through its Project Development Assistance Facilities (ELENA and Mobilising Local Energy Investment - MLEI). These investments are expected to generate energy savings of more than 2000 GWh/year.

Annexes:

1. Progress towards the 2020 targets
2. Follow-up to the orientations on energy given by the 4 February 2011 European Council
3. Implementation of key EU energy legislation
4. Overview of EU financial instruments to support energy policies
5. Key facts on energy in Europe

Annex 1: Progress towards the 2020 targets

(1) EU target for GHG emission reductions of 20% relative to emissions in 1990

In 2011 GHG emissions were estimated at 16% below 1990 levels. This target is implemented through the EU Emissions Trading System (EU ETS) and the Effort Sharing Decision.

(2) 20% share for renewable energy sources (RES) in the gross final energy consumption in the EU

In 2011, the RES share in the final energy consumption of the EU was 13.0% compared to 8.5% in 2005. With binding national targets, growth in renewable energy has increased but needs to average 6.3% per year to meet the overall 2020 target. The Commission has thus identified four areas where efforts should be stepped up: energy market, support schemes, cooperation mechanisms and cooperation in the Mediterranean[5] and it is now preparing orientations to address them (i.a. on the internal electricity market opening, better market integration of RES, cooperation and trade, infrastructure and consumers and technology innovation).

(3) 20% savings in EU's primary energy consumption compared to projections made in 2007

This target is not legally binding for Member States. Primary energy consumption peaked in 2005/2006 (around 1825 Mtoe) and is slightly decreasing since 2007 (to reach 1730 Mtoe in 2011). This is due to the economic crisis, the effectiveness of existing policies and reduced energy intensity of EU industry.

[5] Communication "Renewable Energy: a major player in the European energy market" (COM(2012)271).

Annex 2: Follow-up to the orientations on energy given by the 4 February 2011 European Council

On Energy efficiency

The Energy Efficiency Directive was adopted in October 2012 and is expected to allow the EU to approximately reach up to 17% of the 20% energy efficiency for 2020. Also in 2012 the EU-US Energy Star agreement on labeling of energy efficiency office equipment was concluded and the Energy Efficiency Fund was set up with a EUR 265 million budget. The Commission proposal for the Horizon 2020's Energy Challenge, with a proposed allocation of EUR 6.5 billion, is under negotiation and is expected to integrate programmes promoting energy efficiency. Finally, the Smart Cities and Communities European Innovation Partnership was launched in July 2012 to boost innovative energy-transport-and-ICT technologies' solutions enhancing sustainability in cities and communities.

On the Internal Market

'A fully functioning, interconnected and integrated internal energy market by 2014': Progress has been seen in the increased coupling on the electricity market and the convergence of wholesale prices as well as increased gas-to-gas competition due to better interconnections. The Electricity Coordination Group set up in November 2012 is expected to enhance Member States' co-ordination to identify risks and ensure adequate response to security of supply crisis. An Action Plan (COM(2012)663) to address the remaining challenges towards the 2014 deadline was proposed as part of the Commission Communication on the internal energy market.

'End the isolation of certain Member States from the European gas and electricity networks by 2015': Preparatory work concerning the development of infrastructure in Europe continues while waiting for the final Multiannual Financial Framework and the Connecting Europe Facility, in which the Commission proposed EUR 9.1 billion for energy infrastructure. The Guidelines for Trans-European energy infrastructure were adopted in March 2012 setting 12 strategic Trans-European energy corridors and providing a way to identify projects of common interest and accelerate their implementation. ENTSO-E and ENTSO-G also made considerable progress in preparing the Ten-Year Network Development Plans (TYNDP) for gas and electricity.

'Better coordination of EU and Member States' activities to ensure consistency and coherence in the EU's external relations': Work continued on strengthening the external dimension of the EU energy policy in response to the European Council's call for better coordination. Progress was made in the negotiations on a Trans-Caspian pipeline and the Southern Gas Corridor. The EU-Russia 2050 Energy Roadmap was agreed and the negotiations with Russia and Belarus on electricity system operation of the Baltic Member States continued. As regards China, an EU-China Urbanization Partnership and an Energy Security Dialogue were set up. In relation with the European Council's call for information on bilateral energy agreements with third countries, an information exchange mechanism with regards to intergovernmental agreements between Member States and third countries was adopted and entered into force in November 2012.

Annex 3: Implementation of key EU energy legislation

Transposition of the Third Energy Package Directives

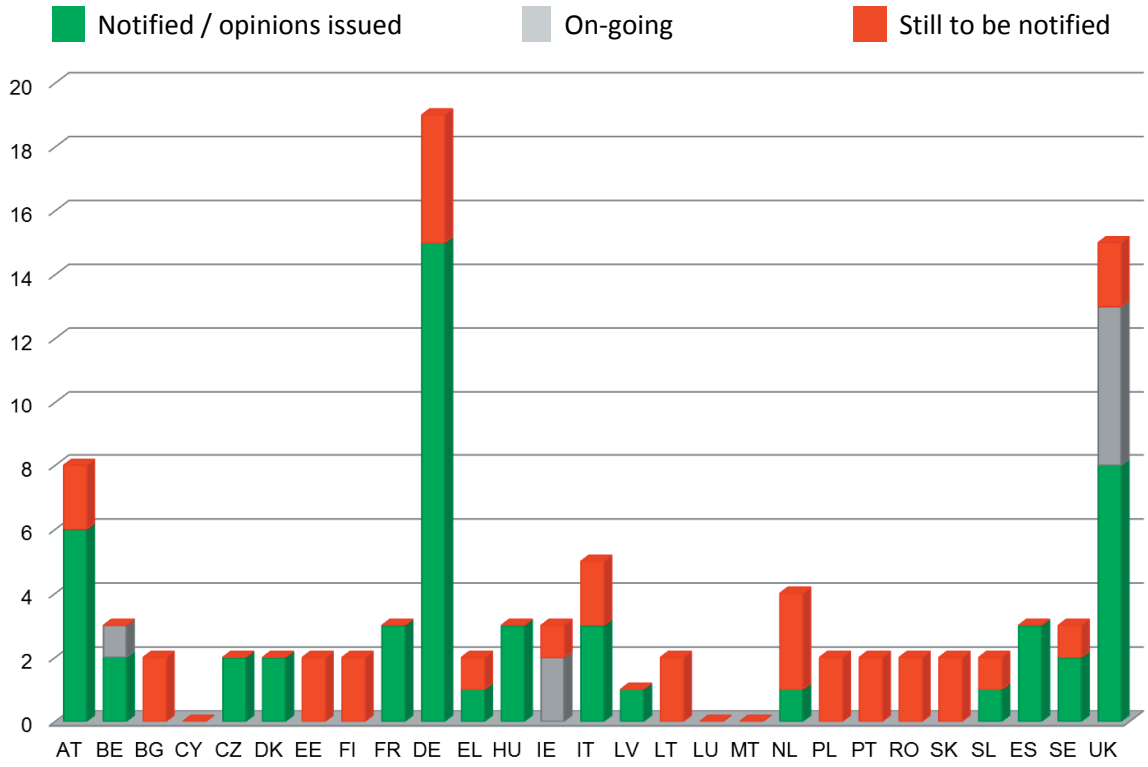
(Situation as of 30 April 2013)

Common rules for the internal market for electricity (Directive 2009/72/EC of 13 July 2009) and Common rules for the internal market for natural gas (Directive 2009/73/EC of 13 July 2009)

Common transposition dates: 3 March 2011

Member State	Transposition status currently declared by MS -Electricity Directive-	Transposition status as currently declared by MS - Gas Directive –
Belgium	Full	Full
Bulgaria	Full	Full
Czech Republic	Full	Full
Denmark	Full	Full
Germany	Full	Full
Estonia	Full	Full
Ireland	Full	Full
Greece	Full	Full
Spain	Full	Full
France	Full	Full
Italy	Full	Full
Cyprus	Full	Full
Latvia	Full	Full
Lithuania	Full	Partial
Luxembourg	Full	Full
Hungary	Full	Full
Malta	Full	Full
Netherlands	Full	Full
Austria	Full	Full
Poland	Full	Full
Portugal	Full	Full
Romania	Full	Full
Slovenia	Partial	Partial
Slovakia	Full	Full
Finland	Partial	Partial
Sweden	Full	Full
United Kingdom	Partial	Partial

The third energy package requires national certification of Transmission System Operators



Implementation of the Renewable Energy Directive

(EU 20% target for renewable energy (RES) share for gross final energy consumption)

Directive 2009/28/EC of 23 April 2009

Transposition date: 5 December 2010

Overview of progress towards the 1st interim target*

(according to progress report of 27 March 2013)

>2% above interim target | <1% from or <2% above interim target | >1% below interim target

Member State	2005 RES share	2010 RES share	1st interim target	2020 RES target
Austria	23.3%	30.1%	25.4%	34%
Belgium	2.2%	5.4%	4.4%	13%
Bulgaria	9.4%	13.8%	10.7%	16%
Cyprus	2.9%	5.7%	4.9%	13%
Czech Republic	6.1%	9.4%	7.5%	13%
Germany	5.8%	11.0%	8.2%	18%
Denmark	17%	22.2%	19.6%	30%
Estonia	18%	24.3%	19.4%	25%
Greece	6.9%	9.7%	9.1%	18%
Spain	8.7%	13.8%	10.9%	20%
Finland	28.5%	33%	30.4%	38%
France	10.3%	13.5%	12.8%	23%
Hungary	4.3%	8.8%	6.0%	13%
Ireland	3.1%	5.8%	5.7%	16%
Italy	5.2%	10.4%	7.6%	17%
Lithuania	15%	19.7%	16.6%	23%
Luxembourg	0.9%	3%	2.9%	11%
Latvia	32.6%	32.6%	34.0%	40%
Malta	0%	0.4%	2.0%	10%
Netherlands	2.4%	3.8%	4.7%	14%
Poland	7.2%	9.5%	8.8%	15%
Portugal	20.5%	24.6%	22.6%	31%
Romania	17.8%	23.6%	19.0%	24%
Sweden	39.8%	49.1%	41.6%	49%
Slovenia	16.0%	19.9%	17.8%	25%
Slovakia	6.7%	9.8%	8.2%	14%
UK	1.3%	3.3%	4.0%	15%
EU	**8.5%**	**12.7%**	**10.7%**	**20%**

* The most objective measure to discuss progress is to assess Member States against their first interim target, calculated as the average of their 2011/2012 shares. Whilst on average such progress to 2010 is good, this does not reflect the policy and economic uncertainties that renewable energy producers appear to face currently.

Energy efficiency: transposition of the energy performance of buildings directive

Directive (2010/31/EU of 19 May 2010)

Transposition date: 9 July 2012

Member State	Energy performance of buildings directive*		
	Transposition	NZEB** report	Cost-optimal calculations
Austria			
Belgium			
Bulgaria			
Cyprus			
Czech Republic			
Denmark			
Estonia			
Finland			
France			
Germany			
Greece			
Hungary			
Ireland			
Italy			
Latvia			
Lithuania			
Luxembourg			
Malta			
Netherlands			
Poland			
Portugal			
Romania			
Slovakia			
Slovenia			
Spain			
Sweden			
United Kingdom			

* Transposition status is based on declared transposition by Member States (Green: Full; Orange: Partial; Red: No). The Commission is undertaking prima facie and conformity checks for those Member States having notified transposition measures. For the NZEB reports and the cost optimal calculations, the status is based on whether or not reports have been received and not on the completeness of the reports. The Commission is undertaking analysis of the reports received.

** Nearly-zero energy buildings.

Annex 4: Overview of EU financial instruments to support energy policies

Overview of EU funds dedicated to energy by programme and financial instruments (existing and possibly new for the period 2014-2020)

Amounts in M€		Funds allocated within financial perspectives 2007-2013			Commission proposal for Funds allocation within financial perspectives 2014-2020		
		Total			Total		
		Electricity & gas infrastructure (1)	Sustainable energy (2)	Nuclear (3)	Electricity & gas infrastructure (1)	Sustainable energy (2)	Nuclear (3)
EU funds	Trans-European Networks Energy (TEN-E)	155					
	Connecting Europe Facility				9 121		
	which includes financial instruments				(1 000)		
	European Energy Programme for Recovery (EEPR)	2 267	1 712		-	-	
	Which includes financial instruments (European Energy Efficiency Fund)		(265)				
	CIP-Intelligent Energy Europe Programme	-	730 (A)		-	(B)	
	which includes ELENA (technical assistance)		(132)				
	Structural Funds	1 607	10 100			17 000	
	RTD Framework Programme		2 350 (C)			6 500	
	Risk Sharing Finance Facility (EC-EIB)		1 400 (D)				
	Enlargement Policy Funding		112				
	Nuclear EURATOM FP7 Fission			1 382			1 080
	Nuclear FP7 Fusion			4 155			3 282
	Decommissioning (LT,SK,BG)			2 848			860
	SUB TOTAL	*4 029*	*16 404*	*8 385*	*9 121*	*23 500*	*5 222*
TOTAL		**28 818**			**37 843**		

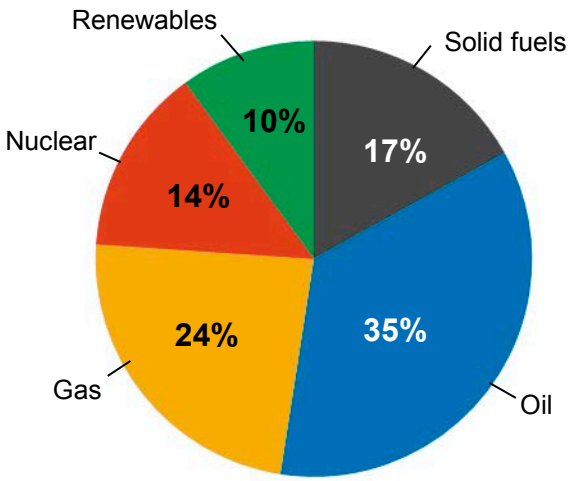
A. includes ELENA in cooperation with EIB, CEB, EBRD and KfW
B. part of the new Research Framework Programme ("Horizon 2020")
C. RTD 2007-2013: funds allocated to non-nuclear energy research in general
D. 14% of total Risk Sharing Finance Facility (RSFF) envelope, which are mainly for solar and wind energy

Annex 5: Key facts on energy in Europe

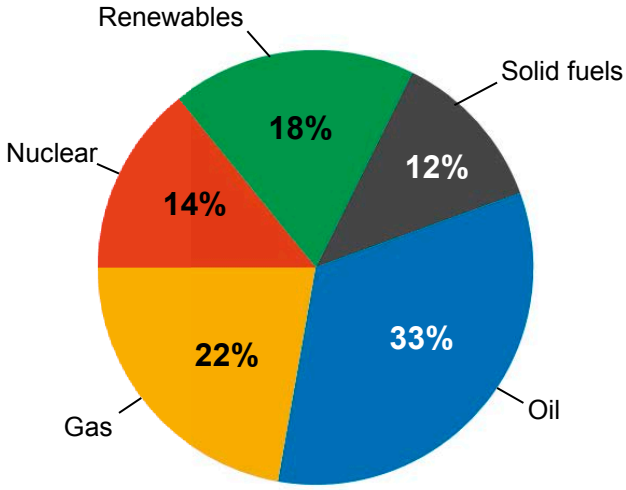
1. Europe's energy mix

Europe's energy mix is changing

EU gross inland consumption 2011



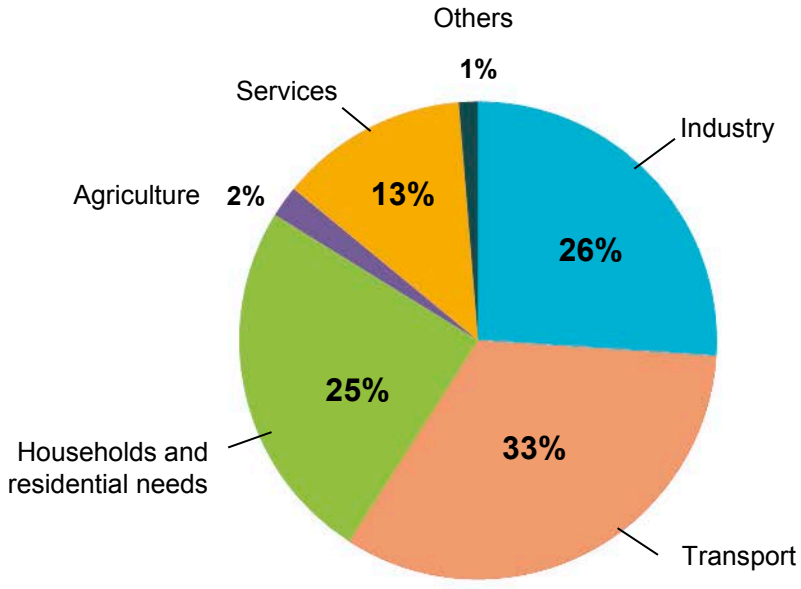
EU gross inland consumption 2030 (scenario)



Source: European Commission

Energy powers our society and economy

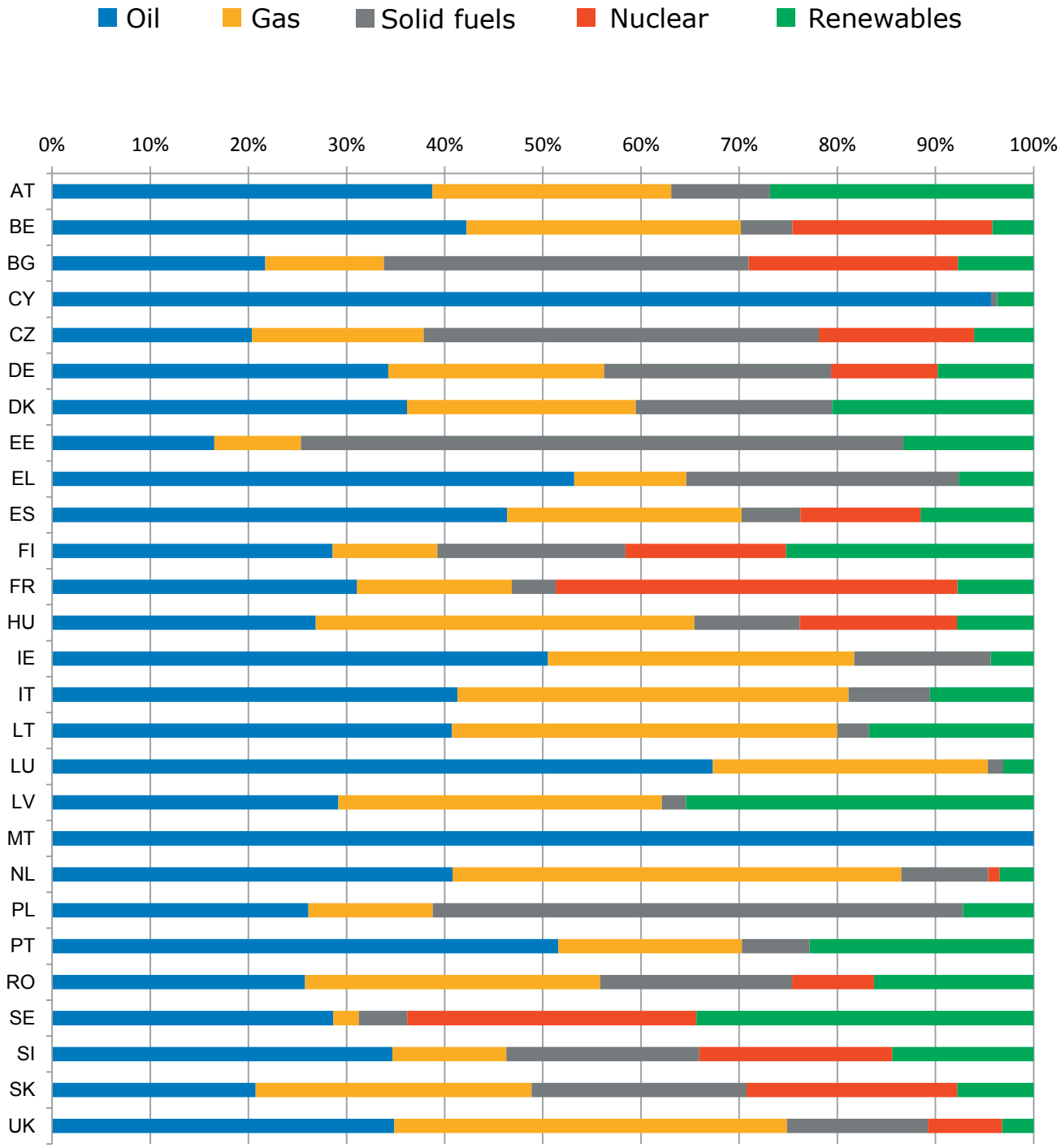
EU final energy consumption by sector in 2011



Source: European Commission

Energy mixes vary significantly across the EU

Gross inland consumption in the EU Member States in 2011

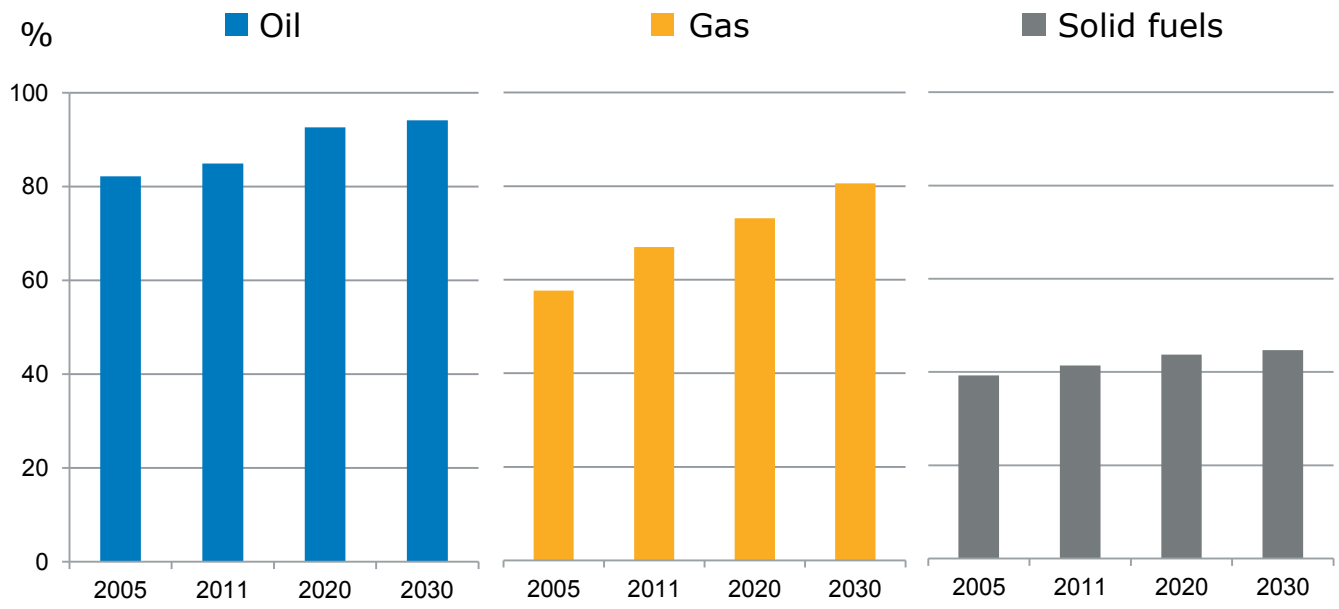


Source: European Commission

2. Europe's dependence on imports

Europe imports the equivalent of EUR 406 billion (3.2% of GDP) of oil, gas and coal every year and its dependence is expected to grow

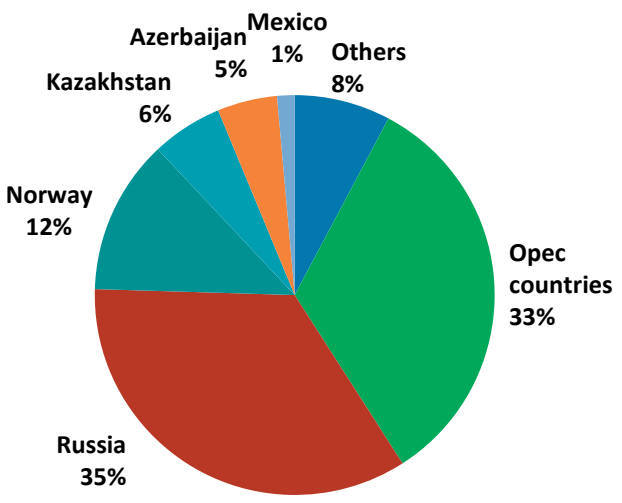
Share of imported fuel in total EU consumption ("business as usual" scenario)



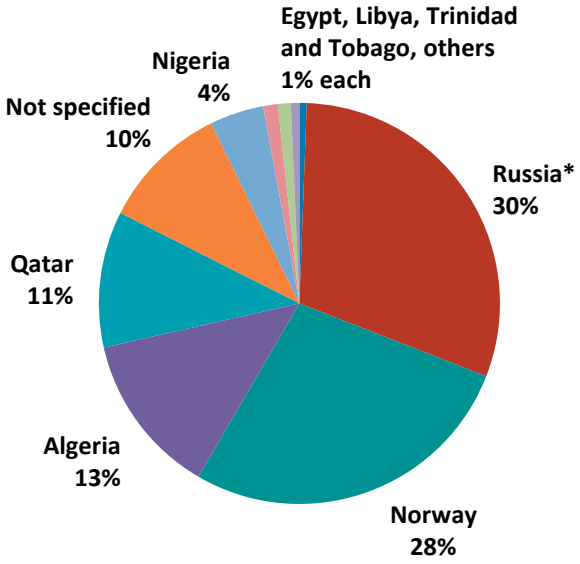
Source: European Commission

Europe depends on a few suppliers

EU imports of crude oil in 2011



EU imports of natural gas in 2011



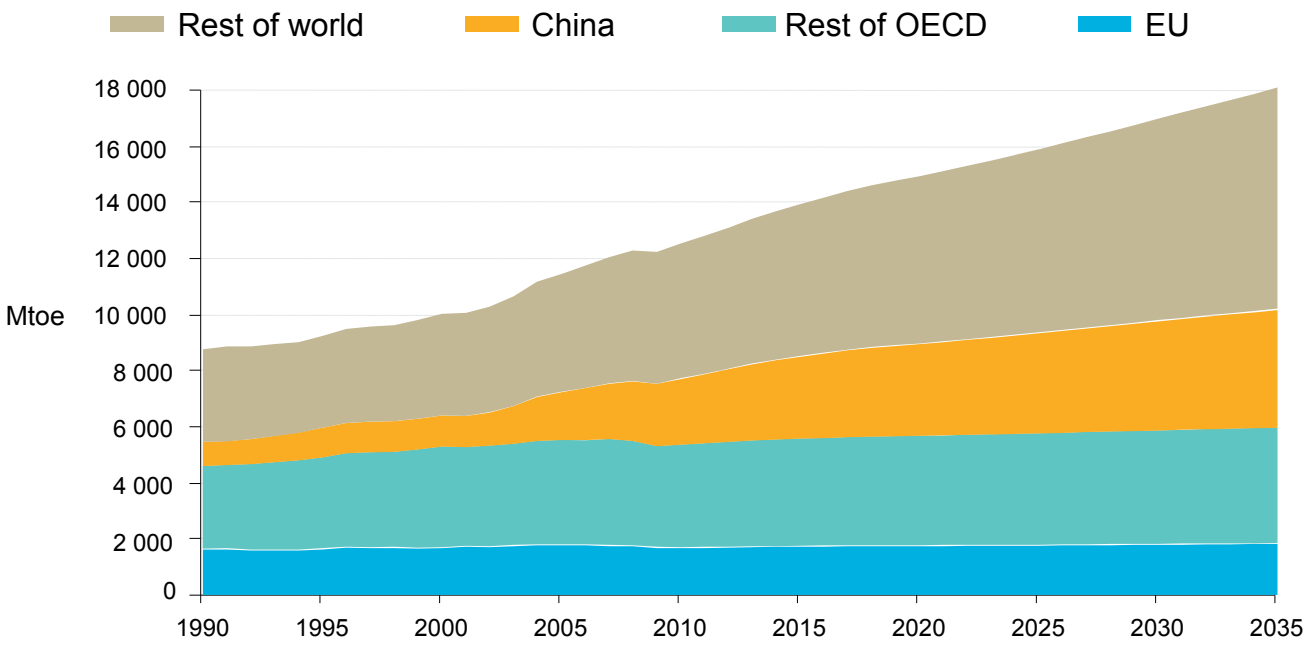
* This figure includes gas from other countries than Russia exported through Russia to the EU

Source: European Commission

3. World trends affect Europe

World energy demand is on the rise

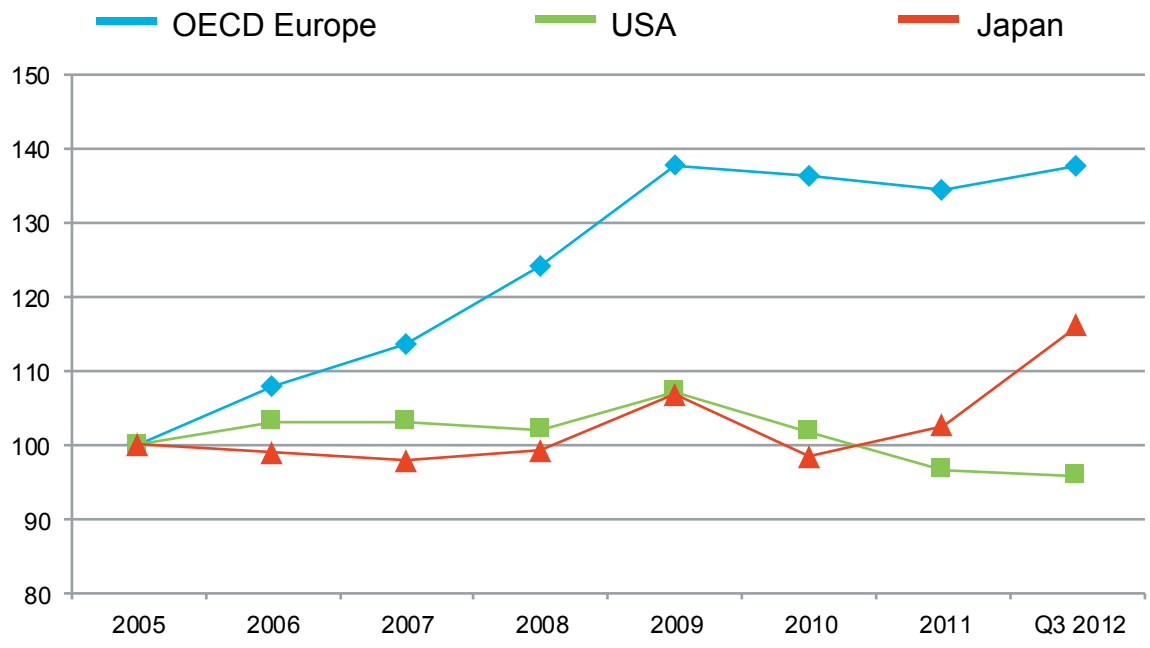
Evolution of the world energy demand in million tons of oil equivalent (Mtoe)



Source: International Energy Agency

Electricity prices: the US is increasing its advantage, largely thanks to shale gas

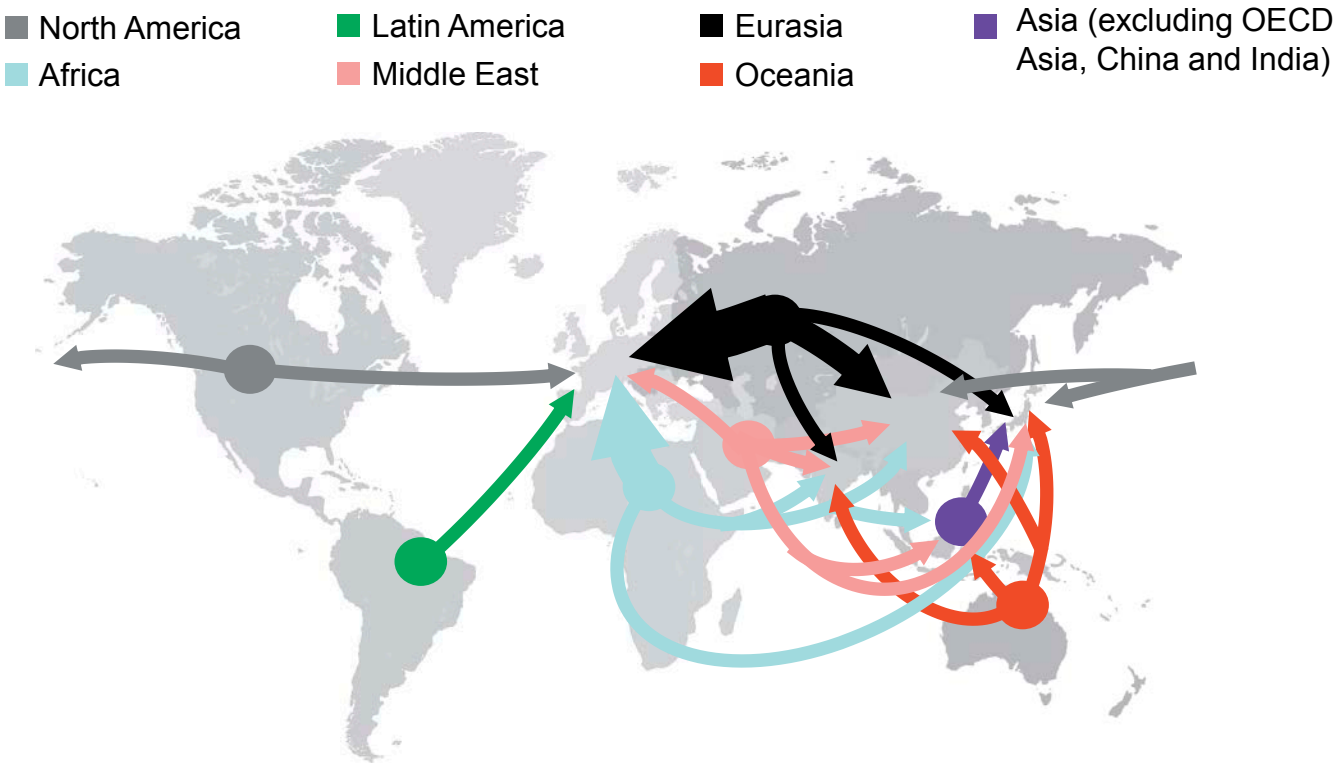
Evolution of end-user electricity prices for industry, taxes excluded (2005 = index 100)



Source: International Energy Agency

Rising supplies of unconventional gas & LNG help to diversify trade flows

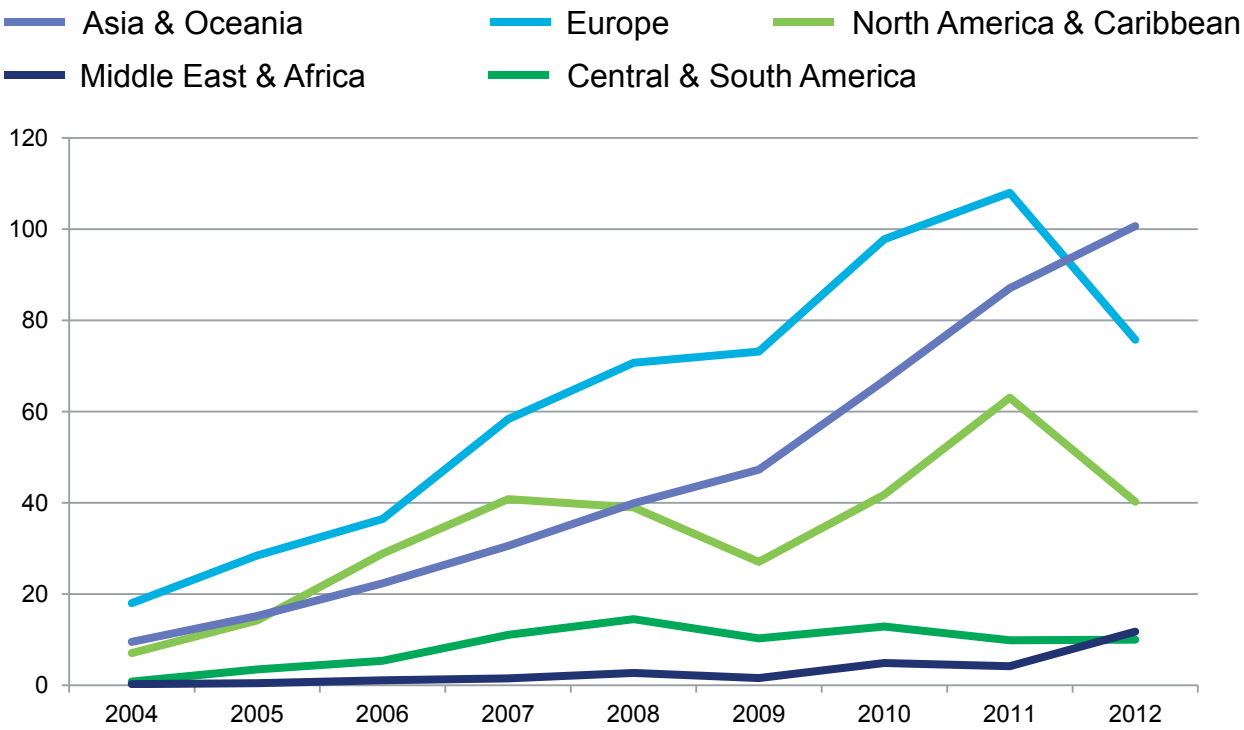
Major global gas trade flows in 2035



Source: International Energy Agency

Increasing global investments in renewable sources

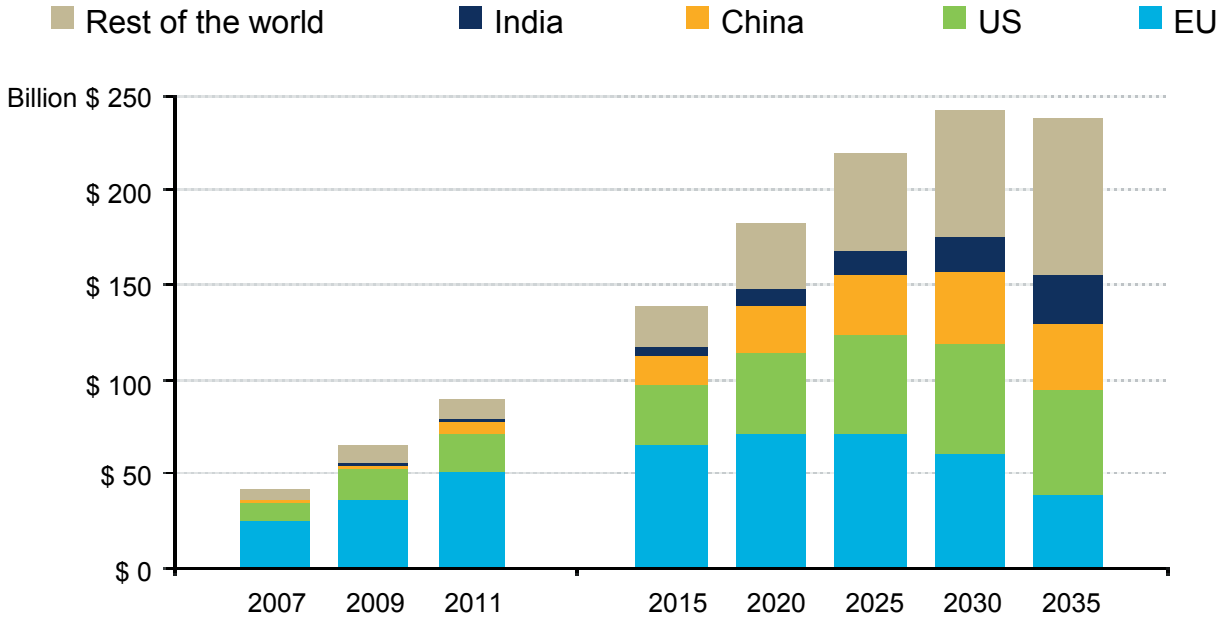
New investment in clean energy by region 2004-12 ($ billion)



Source: Bloomberg

Support for renewable energy is increasing across the world, with the EU still leading in 2011. Total subsidies amount to USD 88 billion, 1/6th of fossil fuels subsidies.

Global renewable subsidies by region

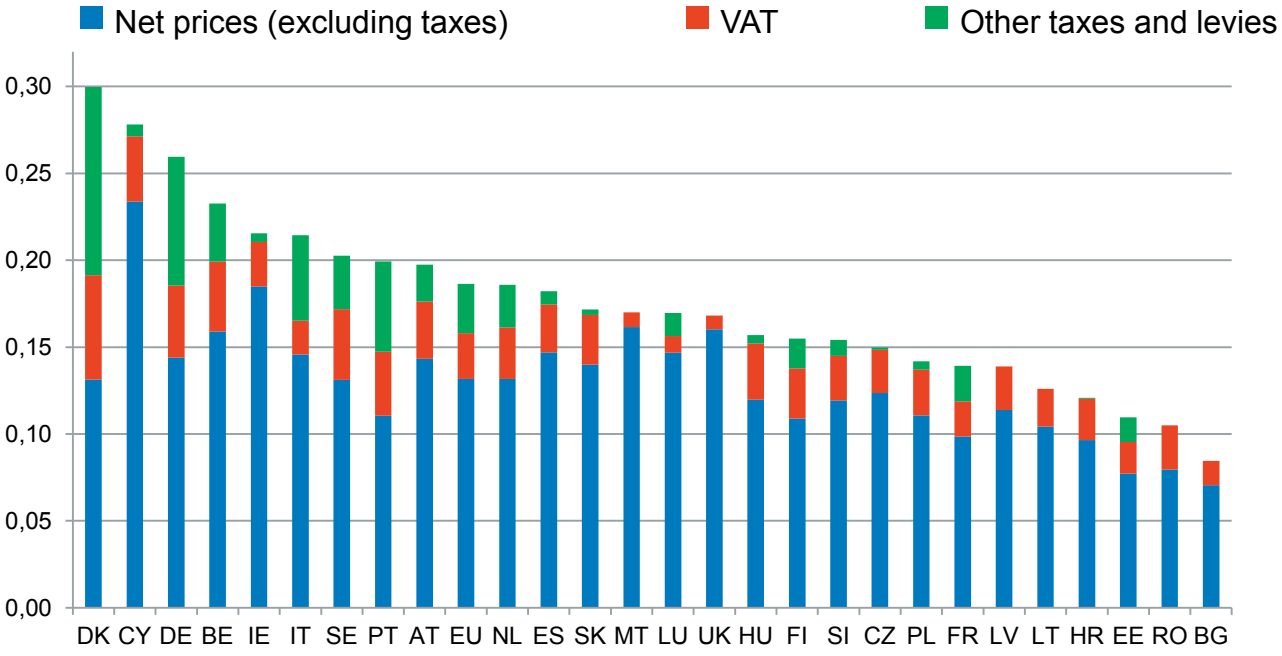


Source: International Energy Agency

4. Europe's internal energy market is not yet completed

Importance of taxes and levies in household electricity prices

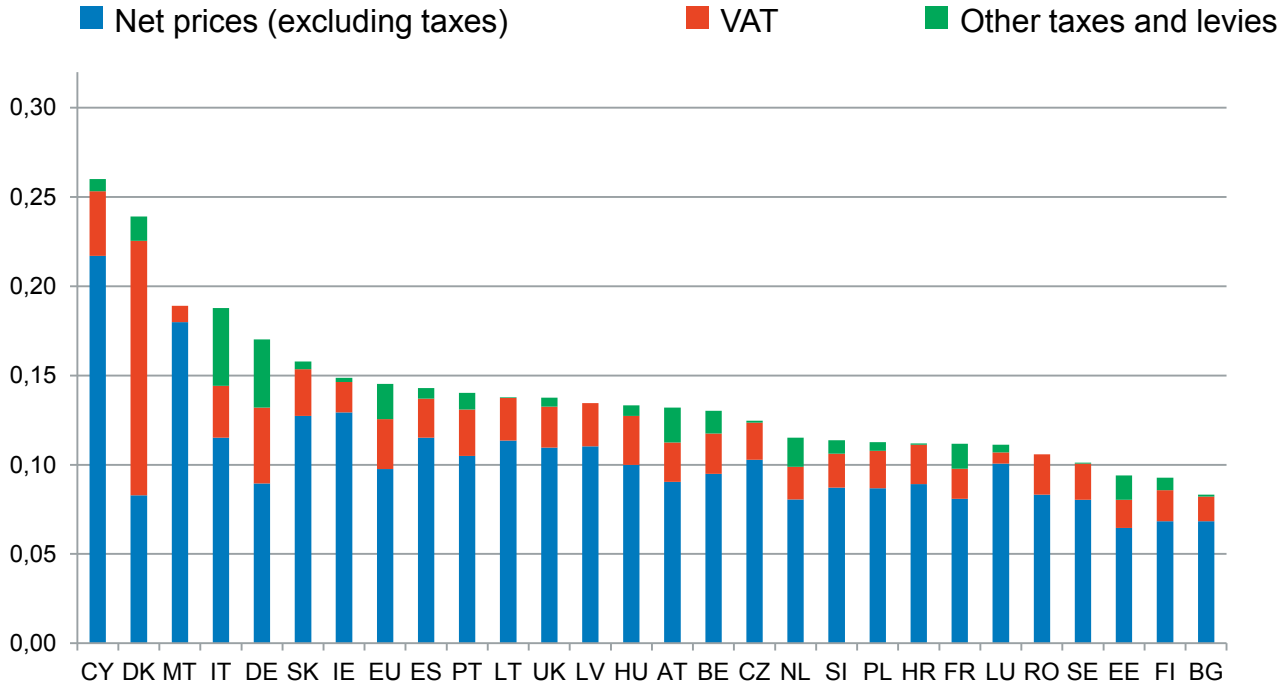
Electricity price for households, first half of 2012 (EUR/kWh)



Source: European Commission

Less differences for industry electricity prices across Europe

Electricity price for industry, first half of 2012 (EUR/kWh)

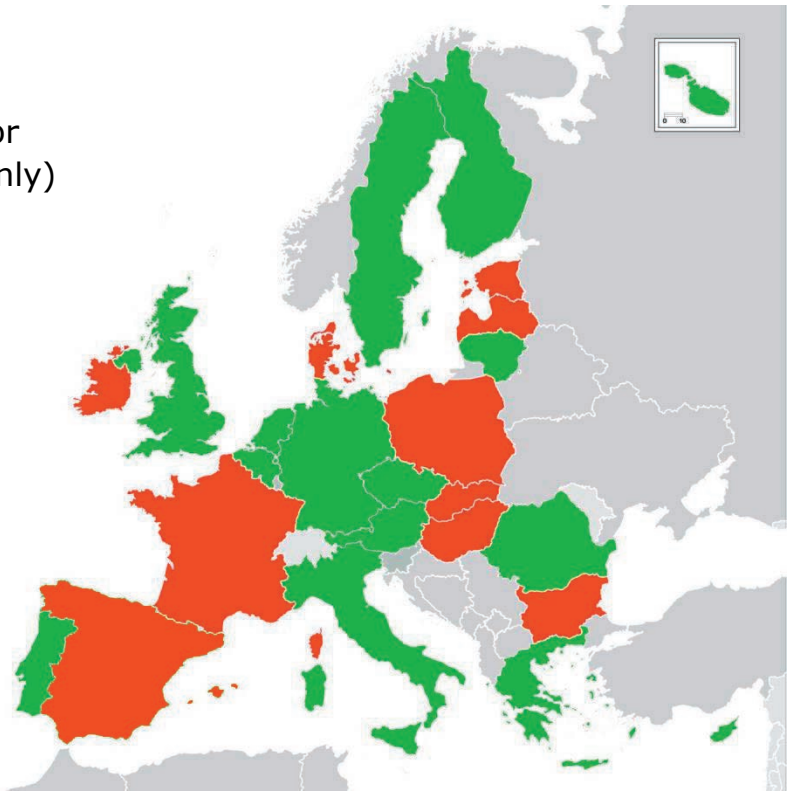


Source: European Commission

Price-setting mechanisms vary across the EU

Retail price regulation for electricity and/or gas (LV for electricity only; IE for gas only)

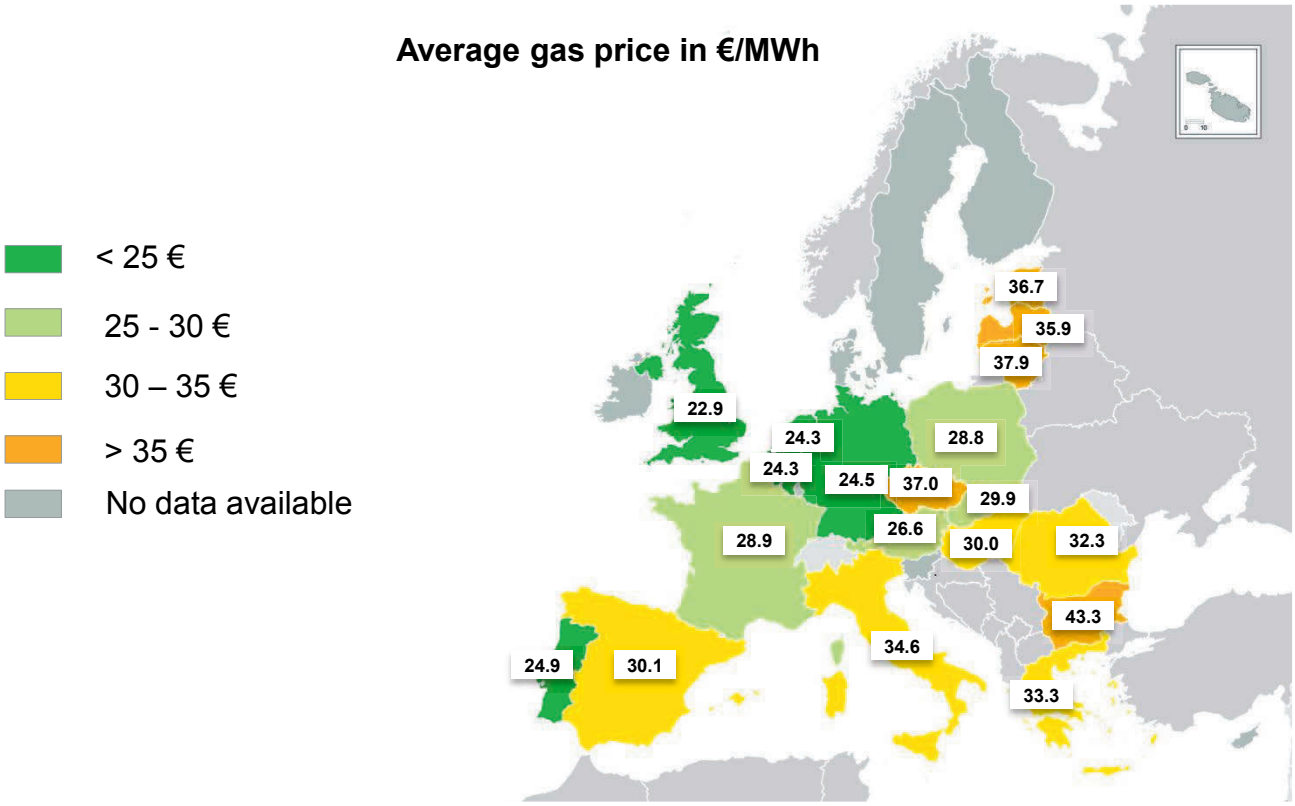
No retail price regulation / Phase-out of regulation foreseen / Non-distortive or possibly less distortive regulation (for example due to isolated markets)



Source: European Commission

Gas prices vary significantly across the EU depending on level of competition

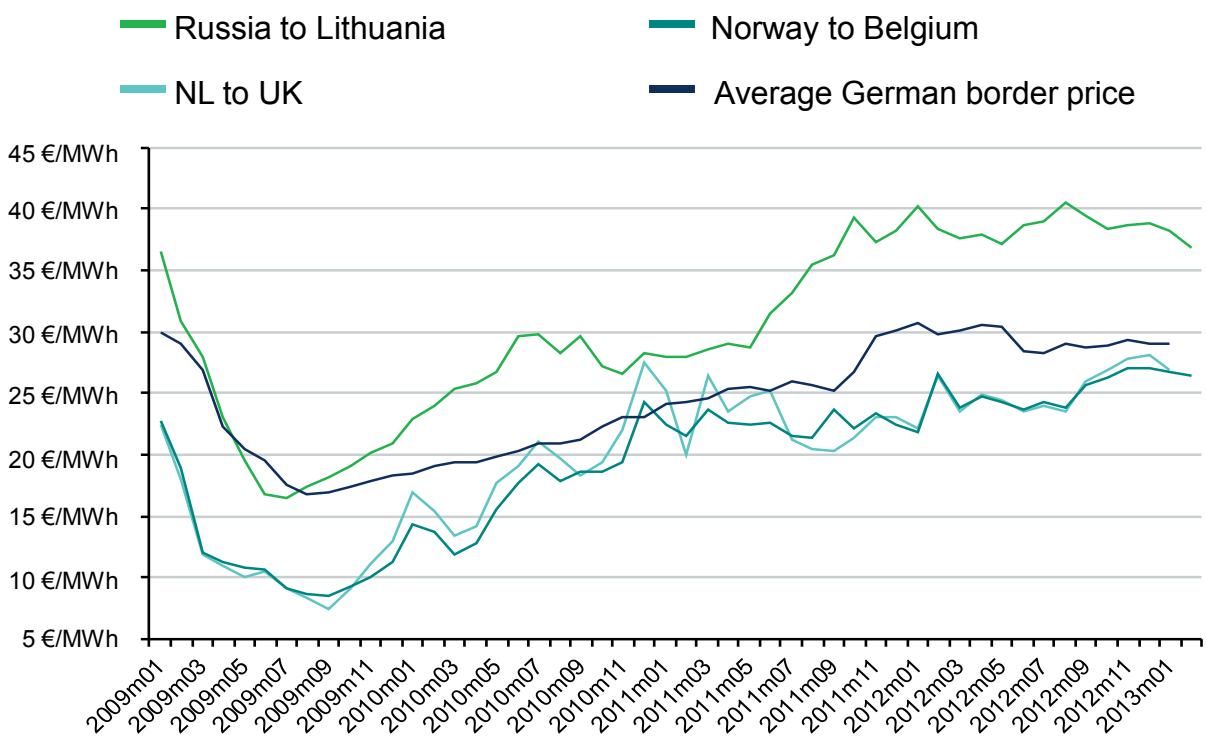
Average gas price in €/MWh



Source: European Commission

Gas prices become more competitive with more suppliers/sources

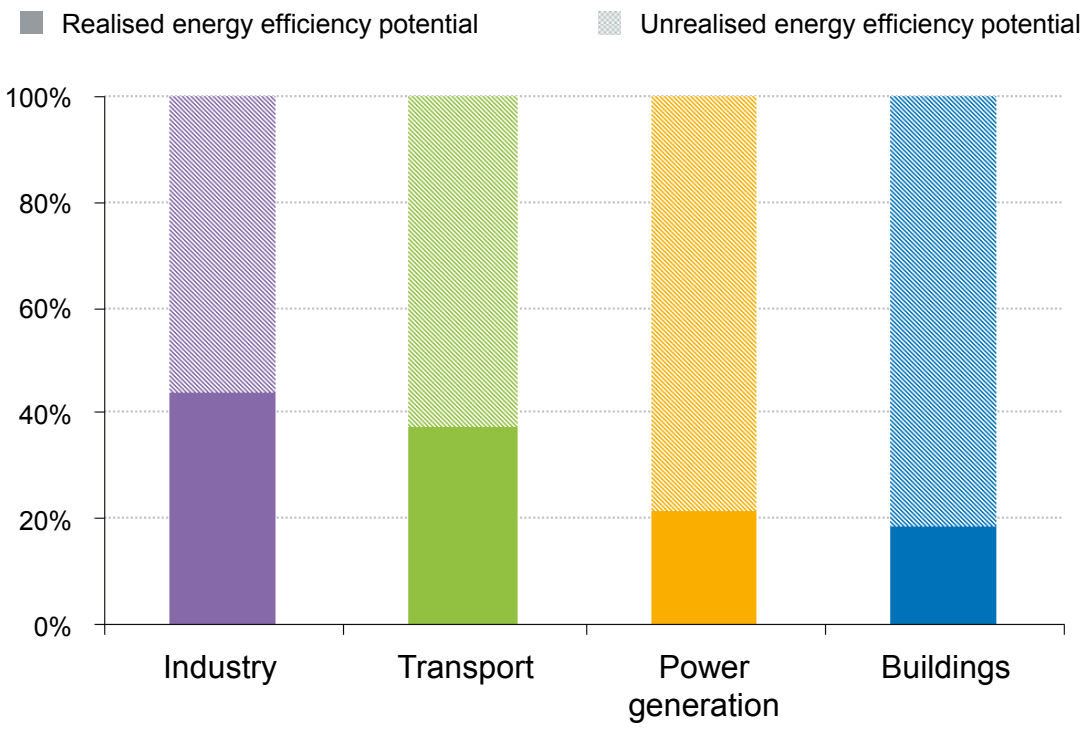
Comparison of EU wholesale gas prices (€/ MWh)



Source: European Commission

Large untapped potential for energy efficiency across the world

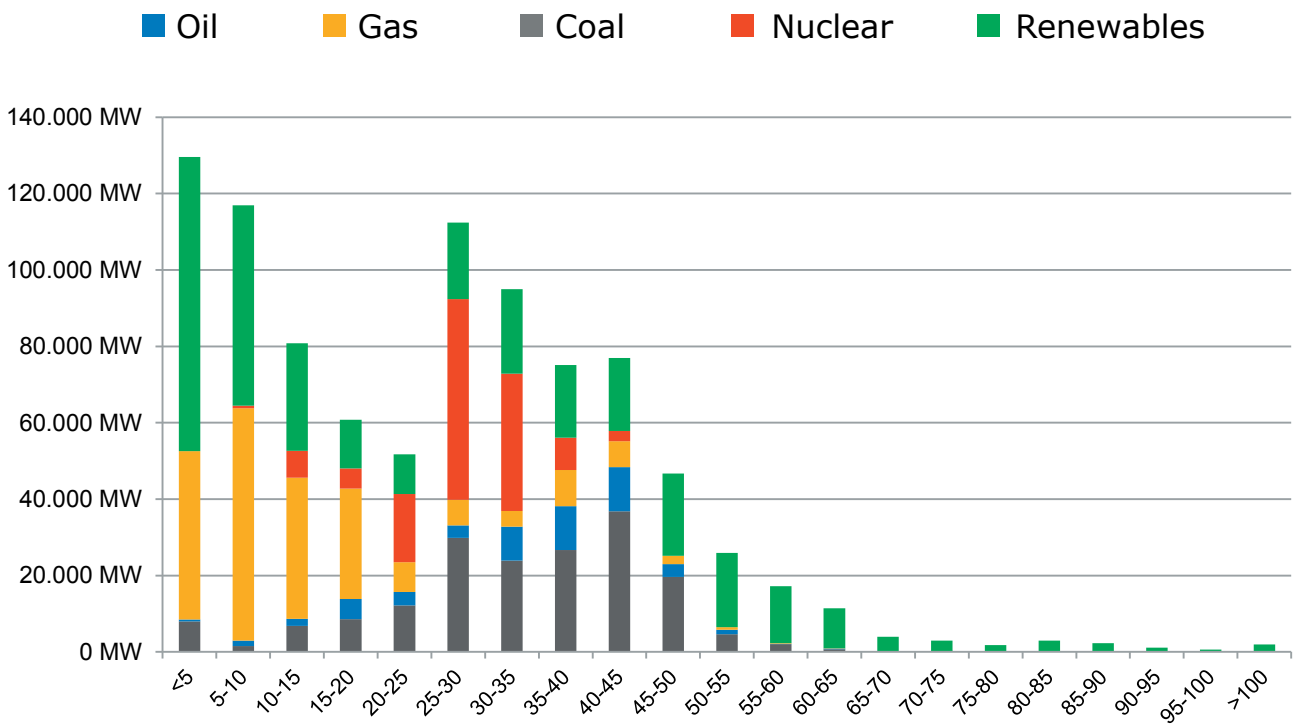
Projected energy efficiency potential which will be (un)realised by 2035



Source: International Energy Agency

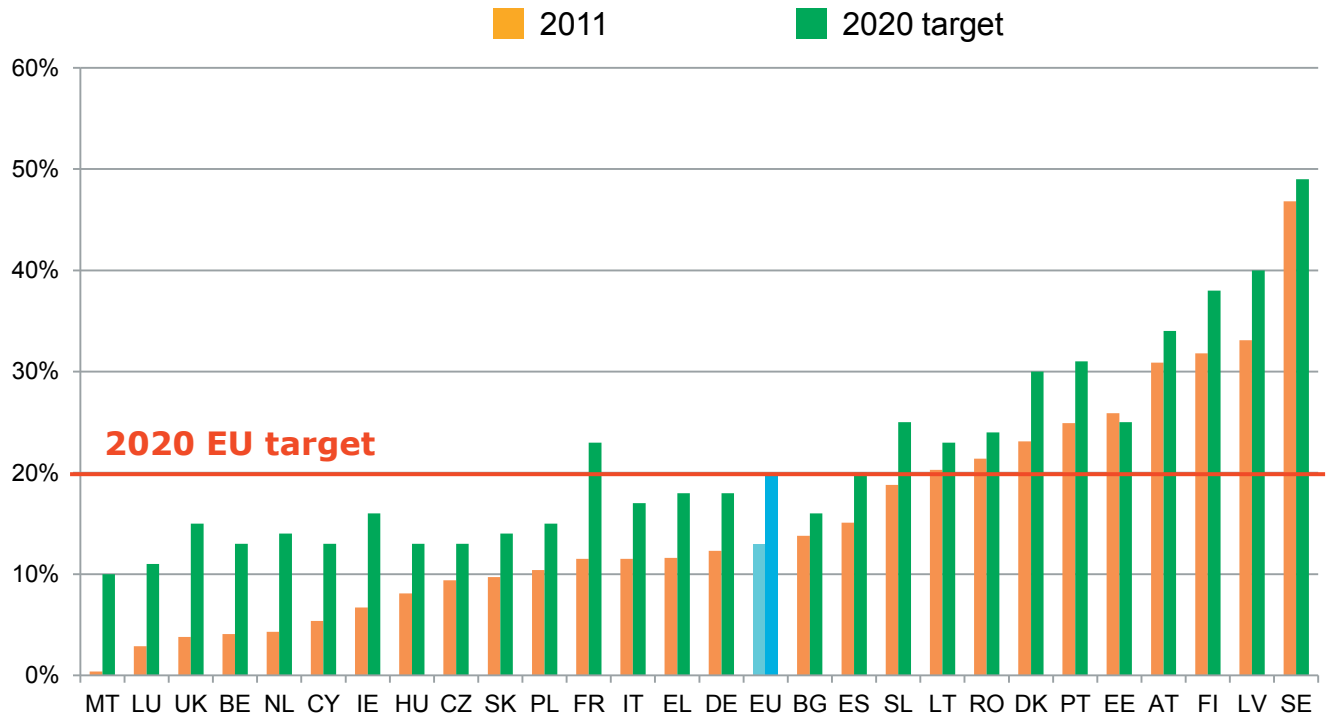
Significant investments will be required to renew or refurbish our energy system

Age of power generating capacities in the EU in 2013 (in years)



Source: European Commission

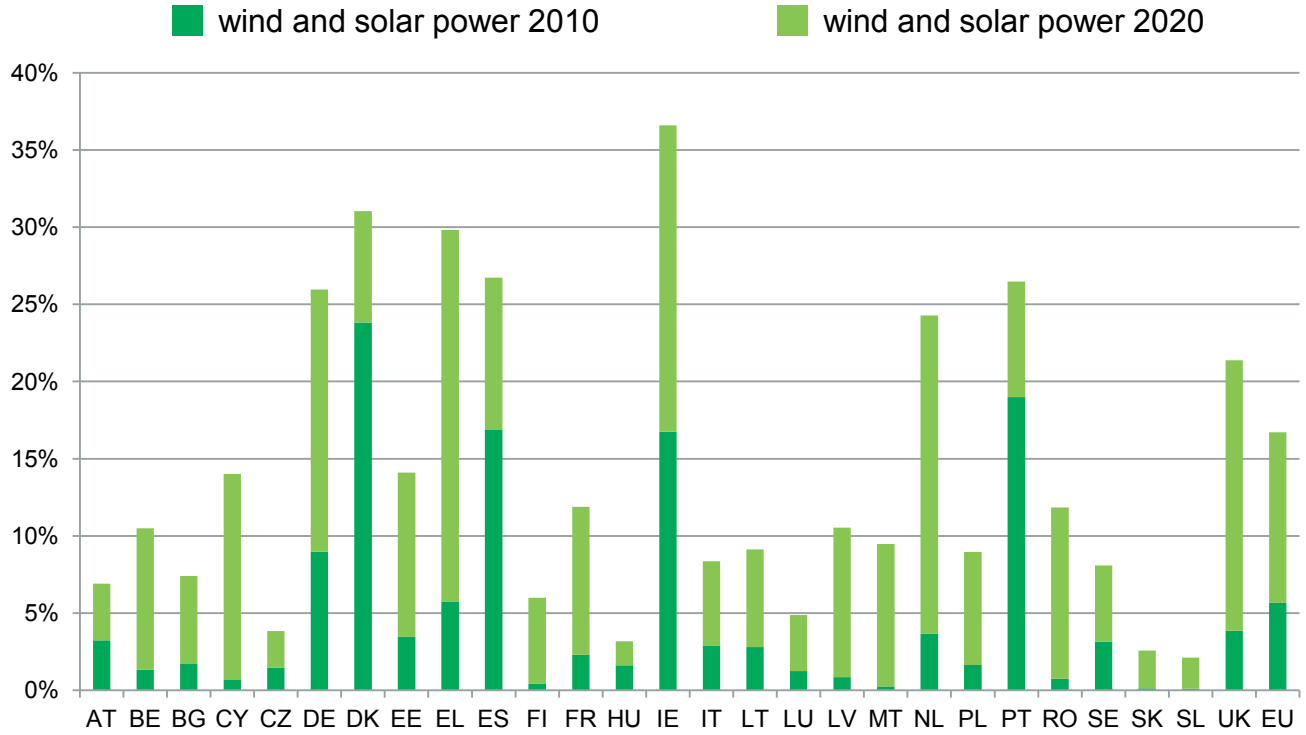
Renewable sources accounted for 13% of the EU final energy consumption in 2011



Source: European Commission

The rise of intermittent sources also calls for complementary measures to ensure generation adequacy

Share of intermittent renewable energy sources (wind and solar) per Member State in 2010 and 2020



Source: European Commission