The Evolution of European Energy and Climate Policies: The View of a Market Player

Simone Mori and Giuseppe Montesano

Abstract In the late 1990s the EU re-designed its energy system (electricity and gas) to take advantage of the internal market by enhancing competition, transparency and efficiency. As climate change broke into the international agenda, the objective of decarbonization of the energy supply was added to this design resulting in a long-term comprehensive articulation of climate and energy policies, addressing competitiveness, sustainability and security of supply. The 2014 deadline for the completion of the internal energy market is approaching and the debate on the climate and energy policy framework to 2030 is getting into its crucial phase. It is therefore timely to assess what has been achieved so far, also to learn from the past. The European market is still fragmented, the EU ETS is in trouble and industry and consumers complain about high energy prices. Are the objectives of decarbonization and fully integrated European energy markets compatible? Has a good design been undermined by failures of implementing instruments? This paper examines the evolution of energy and climate policies in the Union in the last decades with the eyes of one of the largest electricity players in the Continent. We believe decarbonization and a functional pan-European electricity market are both achievable with a serious rethinking of the current market model toward an 'Energy Plus Capacity' market with a strengthened ETS. This approach can also help in reducing the wedge between the costs of producing electricity (wholesale prices) and end-users prices resulting in electricity bills reflecting more closely the costs of generation and supply.

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1 Introduction

In the EU legislation about energy and climate was initially developed separately.

The internal energy market (IEM) was designed in the late 1990s when climate change mitigation was just appearing in the policy arena. The Kyoto Protocol was agreed in 1997 but it took eight years to come into force in 2005.[1]

1.1 Unity Makes Strength

The idea underlying the achievement of the IEM is simple and unquestionable: a European market would be much more efficient than a patchwork of national jurisdictions. There would be at least three core advantages: competition would drive efficiency; there would be greater diversity and hence greater security of supply; and a fully integrated electricity network would reduce the need for capacity margins, and hence a given level of security of supply would require a significantly reduced installed electricity generation capacity (Helm 2014).

To this end, the EU released three energy packages. The first package was adopted in the late 1990s and mainly consisted of a gas directive (European Parliament 1998) and an electricity directive (European Parliament 1998) in order to privatize and liberalize markets that had been originally designed as national monopolies. Two additional energy packages were adopted in 2003 (European Parliament 2003b, c) and 2009 (European Parliament 2009c, d), while in February 2011 the European Council set the target to integrate European energy markets by 2014.

Consequently, the EU Council gave mandate to the European Commission, the European Agency for the Cooperation of energy regulators (ACER) and the European associations of Transmission System Operators for electricity and gas (ENTSO-E and ENTSO-G) to establish common and harmonized rules (i.e. EU network codes) in order to tackle cross-border issues in a systematic manner thus enabling and facilitating the integration of national energy markets into a single EU-wide energy market.

EU policy makers, through a participative process involving stakeholders, established a target model for both sectors, gas and electricity, which depicts how EU energy market structure and rules should look like in the coming future and defines an end-point of the liberalization process. In December 2009, the **Electricity Target Model** (ETM) was presented at the Florence Forum. The model is mainly based on two broad principles: the energy-only model which implies that the remuneration for the overall system costs should be covered by the short-term price resulting from competitive markets; and the market coupling process that would link zonal spot markets into a virtual market determining volumes and prices in all

[1]The Kyoto Protocol entered into force when Russia, the fifty-fifth Country representing with other fifty-four industrialized Countries 55% of 1990 carbon dioxide emissions, ratified the treaty.

relevant zones and allowing electricity to flow from high- to low-price areas provided that grids are not constrained.

Regarding the gas sector, in December 2011 the Council of European Energy Regulators (CEER) presented the **Gas Target Model** (GTM) which was endorsed by the Madrid Forum in March 2012. The objective of CEER GTM is to foster the emergence of competitive gas markets, reduce the predominant role of long-term contractual arrangements, establish functioning wholesale markets and connect them with one another while ensuring secure supplies and investments. According to the GTM, the creation of wholesale markets and their connection would be ensured mainly through the implementation of the third energy package and the application of the EU network codes on Capacity Allocation Mechanisms (CAM) and Congestion Management Procedures (CMP). Additionally, efficient investments in network interconnection capacity would be favored by a market-based mechanism (e.g. regular "bidding" process) in order to test network users willingness to pay for the additional capacity.

1.2 Climate on the Rise

While the IEM has progressed, the EU has been actively engaged in the UN multilateral negotiations on climate change, participating as a single block on the basis of common positions. Also due to the non-ratification of the Kyoto Protocol by the US, the EU became soon one of the main actors in the negotiations calling for a legally-binding climate agreement with global coverage aimed at limiting the increase of global temperature to 2 °C by the end of the century.

During the course of the negotiations, the EU strongly supported the Kyoto Protocol and after the substantial failure of the Copenhagen Conference[2] was one of the few Parties in favor of its continuation after 2012 in Cancun (COP17) and Doha (COP18).

1.3 A Long-Lasting Marriage?

At the time when the UN Framework on Climate Change Convention (UNFCCC) was signed (1992), the EU had not yet adopted any internal legislation to deal with climate change. Its common position was based on political consensus between the Member States and an aggregation of their emerging national policies.

In the same year of the adoption of the third energy package, the EU made its first attempt to integrate energy and climate policies in its legislation with the

[2]The Copenhagen Conference was aimed at agreeing a successor of the Kyoto Protocol after the expiration of its first commitment period in 2012. However, the Conference did not succeed in reaching consensus among Parties and just "took note" of the "Copenhagen Accord", a non-binding declaration of emission reduction pledges by Developed Countries.

"Climate and Energy Package". The package proposed legislation to implement by 2020 the 20-20-20 targets: 20 % greenhouse gases (GHG) emission reduction on 1990; 20 % EU energy consumption from renewable and 20 % reduction in primary energy use compared to the projected level through energy efficiency improvement. It should be noted that this last target was not set as binding.

The centerpiece of the 20-20-20 package is the EU ETS (European Parliament 2003a), the world's first large scale emission trading system.

Targets were also set for Member States at national level for renewables, to enable the EU as a whole to reach its 20 % renewable target and for emission reduction in non-ETS sectors, such as agriculture, waste and transport (European Parliament 2009a).

The package was also intended to send the message to the outside world that, in the eve of the Copenhagen Conference, the EU was willing to lead the climate change struggle with the example of its domestic policy. Directly linked to this was the EU's offer to step up its emission reduction goal to 30 % provided other developed and developing Countries implemented ambitious emission reduction policies as well.

1.4 Decarbonization, the Mantra of European Energy Policy

After the package adoption, a number of Commission papers and European Council Conclusions reiterated the importance of climate change. Reflecting the fact that on average the burning of fossil fuels accounts for two-thirds of all man-made GHG emissions globally (IPCC 2007), policies were specifically targeted to the energy sector and particularly to de-carbonizing energy supply (e.g. roadmaps for 2050 European Commission 2011a, b).

Gradually, decarbonization became the *mantra* of European policies grounded on the conviction that a low-carbon energy system can foster de-carbonization of the overall economy and that innovation and technologies would spread more quickly through the market, creating jobs and welfare for all the EU citizens.

This paper examines the evolution of energy and climate policies in the Union in the last decades with the eyes of one of the largest electricity players in the EU. Our analysis focuses on the impact of policies on the electricity wholesale market and does not address specifically downstream aspects, without intending that these are less relevant.

2 Where We Are

Looking at the results obtained so far, both the IEM and the climate and energy package have had limited success.

2.1 Progress on the Internal Energy Market

With few months left before the deadline of 2014, the IEM is far to be a fully integrated market.

By using the convergence of wholesale electricity prices as an indicator of market integration, it can be noted that a "reverse trend" is under way: in the Central West region (CWE), for instance, prices convergence declines from 68 % in 2011 to 50 % in 2012, following the important increase in 2011 compared to 2010 (Fig. 1). In addition, the number of hours with high price differentials (more than 10 €/MWh) was considerably higher in 2012 (27 %) compared to 2011 (16 %, ACER 2013).

2.2 The Triple-20 Objective

Current distance from 2020 targets in the areas of emission reduction, renewable energies and energy efficiency are shown in Fig. 2. In 2012 GHG emissions were already 19.2 % lower than in 1990 suggesting the EU will meet its objective of 20 % reduction earlier than expected. It should be noted that these results have

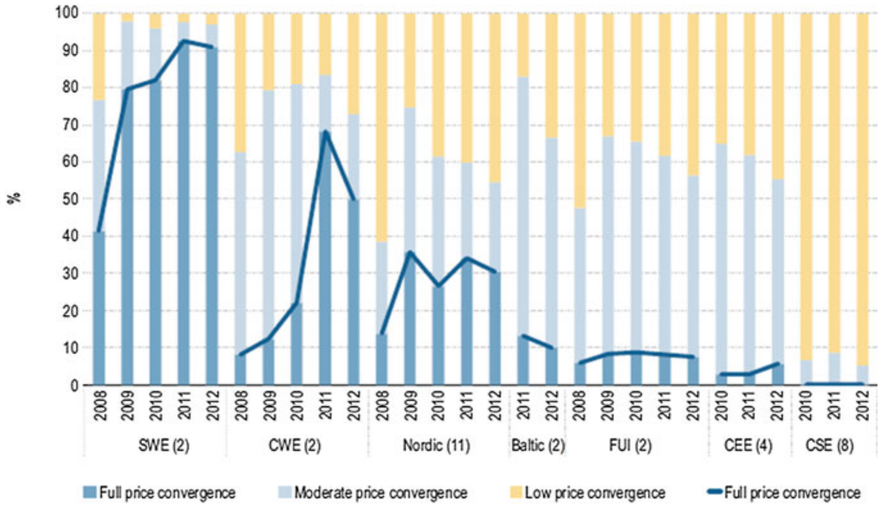
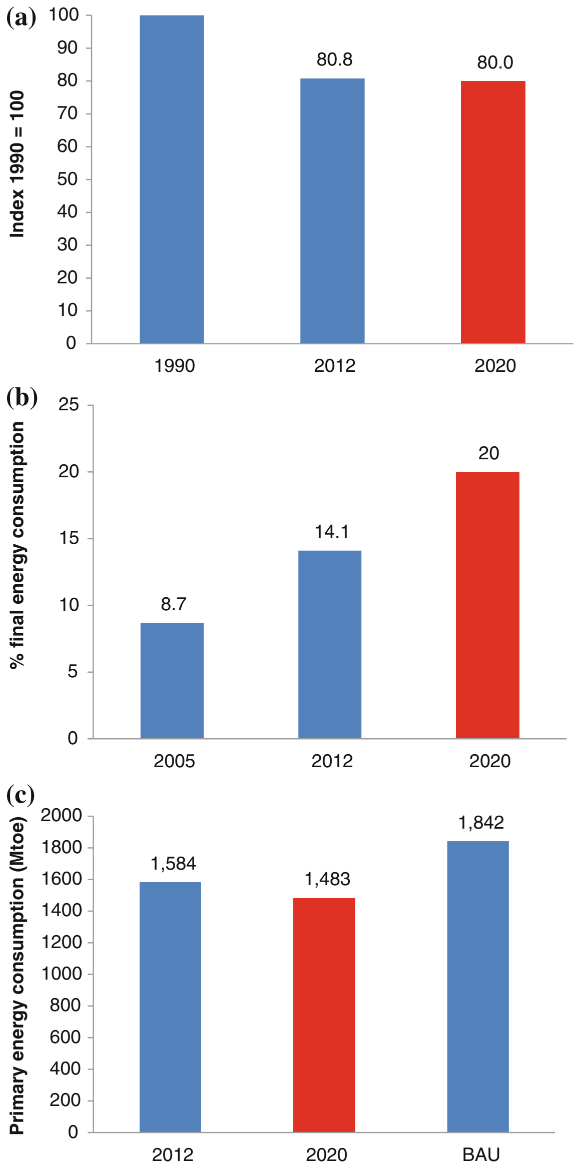


Fig. 1 Price convergence in Europe by region (ranked)—2008 to 2012 (%) Legend: Baltic region (Estonia and Lithuania), CEE region (the Czech Republic, Hungary, Poland and Slovakia), CSE region (Greece, Italy, Slovenia and Switzerland), CWE region (Austria, Belgium, France, Germany, and the Netherlands), FUI region (United Kingdom and the Republic of Ireland), Nordic (Denmark, Finland, Norway and Sweden), SWE region (Portugal and Spain). *Note* The numbers in brackets, e.g. SWE(2), refer to the number of bidding zones per region included in the calculations (from ACER 2013). *Source* Annual Report on the Results of Monitoring the Internal Electricity and Natural Gas Markets in 2012, November 2013, Agency for the Cooperation of Energy Regulators and the Council of European Energy Regulators, 2013

Fig. 2 Current distance from the 20-20-20 targets **a** reduction of greenhouse gas emissions, **b** share of renewable energy in energy consumption; **c** energy efficiency improvement (targets in *red*). *Source* Enel elaboration on Eurostat data



certainly been helped by the economic crisis and the decrease in industrial production in almost all EU Member States. This also resulted in industry using less allowances that those issued in the Emission Trading Scheme (ETS), generating a surplus estimated, without targeted interventions, at more than 2.5 billion allowances by 2020 (Fig. 3). Consequently carbon prices have collapsed (Fig. 4) and have not provided a signal robust enough to promote low carbon technologies.

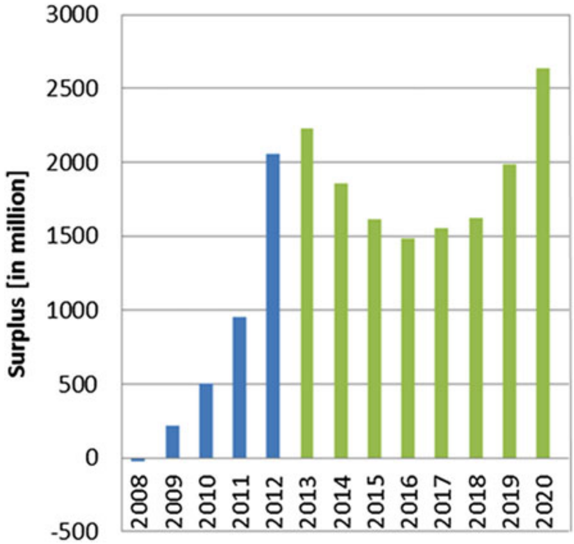


Fig. 3 Current and projected surplus of EU allowances. Actual figures 2008–2012, estimated ones 2013–2020. *Source* http://europa.eu/rapid/press-release_MEMO-14-39_en.htm

Fig. 4 EUAs prices, 2008–2014 (Spot OTC + ICE). *Source* Enel elaboration on Reuteurs data

With respect to the renewables target, the EU reached the share of 14.1 % of renewable energy in final energy consumption in 2012. Many analysts think the 20 % target will thus be met while others argue that the spread of RES in the Union will be constrained in years to come due to difficult access to finance. In fact, in the course of the economic crisis, many Member States have curtailed their support schemes and in some cases even retroactively, thus not only reducing funds for future projects but

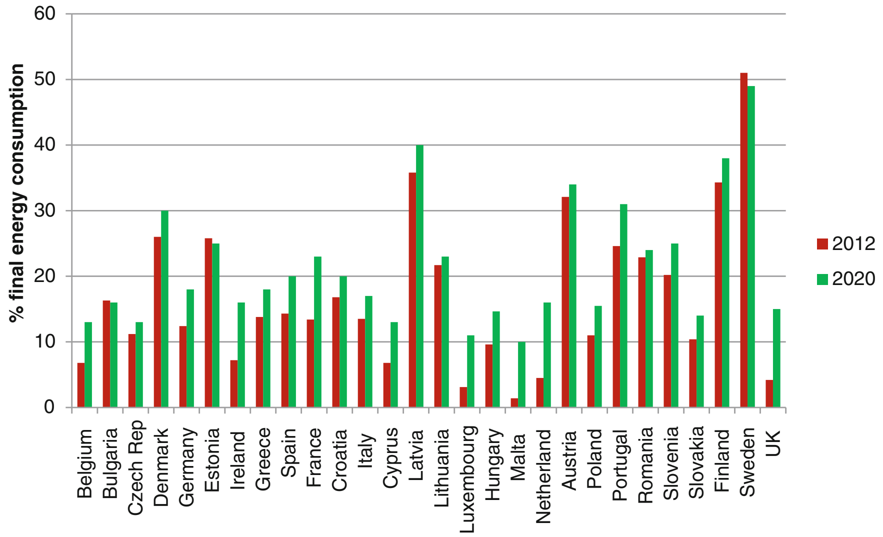


Fig. 5 Distance from the RES target in Member States. *Source* Enel elaboration on Eurostat data

also cutting promised support for facilities that had been already installed (e.g. Bulgaria, Greece, the Czech Republic. These measures severely affected investor's confidence and led to a more cautious outlook for the development of renewables. Due to the change in circumstances, even some of the former pioneering States in the area of renewable energy, such as Spain, are now unlikely to achieve their national renewable targets (Fischer and Geder 2013; Fig. 5).

As for the 20 % improvement in energy efficiency, it is very likely that this non-binding target will not be met. Projections before the adoption of the Energy Efficiency (EE) Directive in 2012 (European Parliament 2012), indicated only a 10 % energy saving achievable while, according to the European Commission, the implementation of the EE Directive would probably reach a 17 % saving in 2020. While there is still a significant untapped potential to be harnessed, energy efficiency policies in the EU remain a fragmented set of individual and incoherent measures. It is also uncertain if the transposition of the EE Directive in national legislation due by early June 2014, will lead to effective energy efficiency regulation in Member States.

3 Impact on the Power Sector

The EU 2020 energy and climate legislation along with other market factors interacted with the current crisis of the EU electricity sector, which can be clearly seen on the stock markets. Since their peak in 2008, the stock values of the top twenty utilities in the EU has declined by 50 % (Spencer et al. 2013).

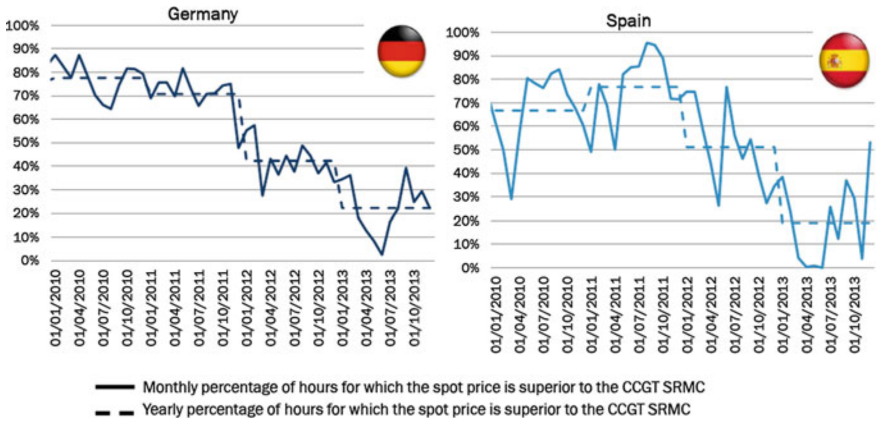


Fig. 6 Comparison between spot prices and CCGTs short run marginal costs. *Note* Theoretical utilization rate of a 56 % efficiency CCGT; For Germany NCG gas price, for Spain, PEG Sud + transit costs estimated from CNE, starting Jan 2013, gas tax included. *Source* Roques F (2014)

In particular, conventional generation, especially gas-fired, is becoming unprofitable to operate. Over the course of 2012–13 ten major EU utilities implemented or announced mothballing and closure of over 20 GW of CCGT capacity in response to persistently low or negative clean spark spreads.

This has been caused by several factors. The economic crisis resulted in significant reductions in electricity demand compared to the levels projected in 2008–09 depressing wholesale electricity prices in many countries. The impact on CCGTs has been amplified by the shift in the merit order due to increasing renewable energy capacity, which has further curtailed operating hours and depressed wholesale prices (Fig. 6). In other words, the 2020 package prompted new renewables capacity in the electricity sector at an unexpectedly high rate in several Countries. This has de facto resulted in "stranded" generation assets.

This situation has been even further exacerbated by increased coal-gas spreads (Fig. 7). Prices of imported coal in the EU dropped also as a consequence of reduced domestic demand for US thermal coal driven by the boom in US shale gas extraction (Figs. 8 and 9).

All these developments have increased the share of generation from coal plants at the expense of CCGTs. As an example: between 2009 and 2011 electricity generation from coal grew by 3 % while it fell by 3 % for gas in the same period (Spencer et al. 2013). Consequently, power generation in the EU has evolved towards an odd mix of coal and renewables.

Governments across the EU are undertaking different measures to remunerate thermal generation in order to ensure capacity for adequacy and security of the

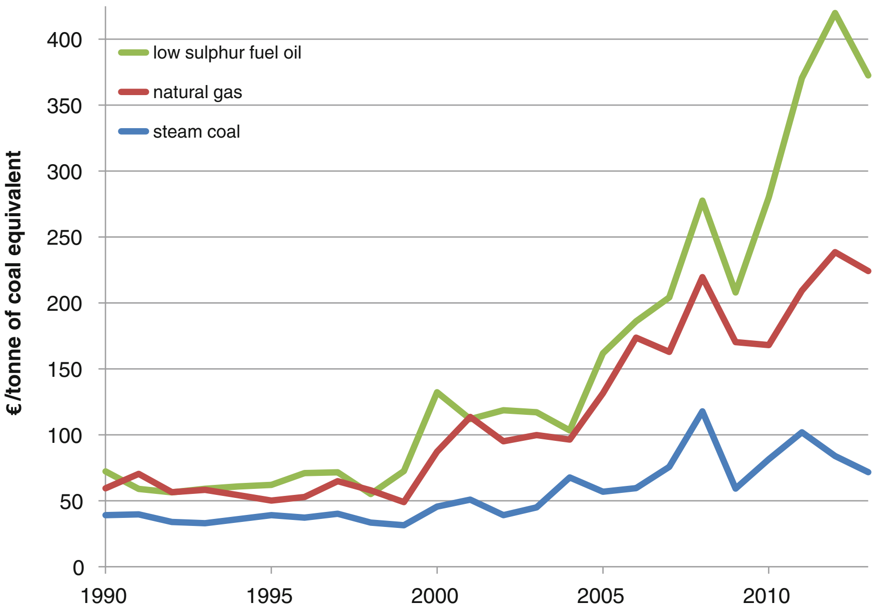


Fig. 7 Import prices for oil, gas and coal in the EU, 1990–2013. *Source* (EURACOAL 2013) from IEA oil product spot prices database for Northwest Europe—Rotterdam; average price of gas imports at German border as reported by BAFA—German Federal Office of Economics and Export Control; and IHS McCloskey Northwest Europe coal import prices)

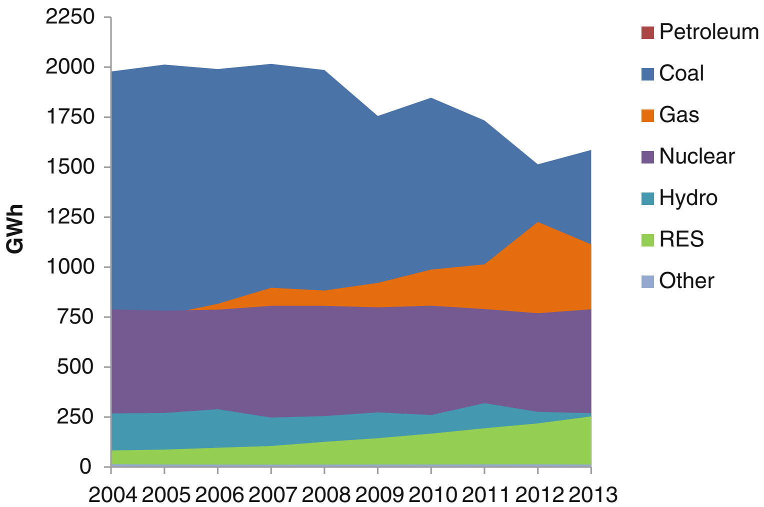


Fig. 8 US net generation by energy source. *Source* Enel elaboration on U.S. Energy Information Administration, EIA data

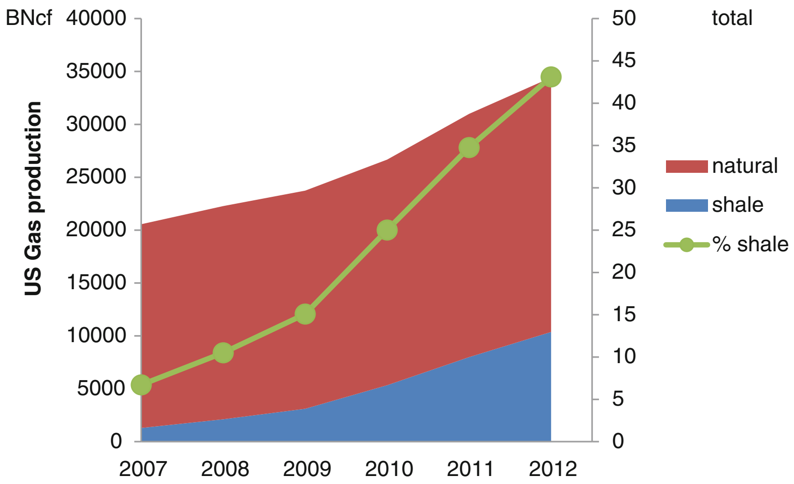


Fig. 9 US shale vs total gas production. *Source* Enel elaboration on U.S. Energy Information Administration, EIA data

electricity system including France, the UK and Germany. Italy is planning to implement similar measures.[3]

However, these initiatives, if not properly coordinated, may lead to a fragmentation of the IEM. In any case, they highlight the need for a well-thought reconsideration of the EU's vision of a single electricity market based on an energy-only model.

4 Lessons Learnt

In January 2014, the Commission, in line with the need to have long-term perspectives to plan investments in sectors such as the energy one, presented its proposal for the framework for energy and climate policies to 2030 (European Commission 2014c). It consists of two targets to be achieved by 2030: (i) reduction of GHG emissions by 40 % below the 1990 level and (ii) increase of the share of renewable energy to at least 27 % of EU's energy consumption. There are no provisions for energy efficiency in the proposal as the role of energy efficiency in the 2030 framework will be further considered in a review of the EE Directive due to be concluded in September 2014, also taking into account the ongoing debate on

[3]Decree n. 379/03 established the main criteria for a capacity payment model, whose rules have been defined by Italian TSO Terna, discussed among stakeholders in public consultations and then endorsed by the Italian Regulatory Authority in 2013 (Deliberation 375/2013/R/eel). Afterward the model has been submitted to the Italian Ministry of Economic Development for the final approval (not yet issued).

energy security, which is further highlighting the benefits of both renewables and energy efficiency in this respect.

A new governance framework has been envisaged by the Commission, based on national plans to be prepared by Member States under a common approach to ensure coherence at the EU level. An iterative process between the Commission and Member States will ensure the plans are sufficiently ambitious, as well as their consistency and compliance over time.

The Commission also proposed to establish a “market stability reserve” at the beginning of next ETS trading period in 2021 to make the EU ETS more robust and effective. The reserve would both address the surplus of emission allowances that has built up in recent years and improve the system’s resilience to major shocks by automatically adjusting the supply of allowances to be auctioned (European Commission 2014a).

While objectives and instruments are still being negotiated among European Institutions, it is timely to draw on the lessons from the 2020 experience and frankly recognize that a fully integrated climate and energy policy, relying on the internal market requires a serious re-thinking of the current approach in terms of both IEM target models and instruments for climate policies.

4.1 Unexpected Circumstances or Policy Failures?

Both the IEM and the 2020 Climate and Energy package have not delivered as expected for a number of reasons. One can argue that the recession that hit Europe in 2008, the most severe during the past fifty years, was a significant factor in undermining the assumptions on which the European Commission had based the impact assessment of current energy policies made by before their adoption. In other words much of what materialized was not at all envisaged by EU policy-makers.

The economic and financial crisis produced two remarkable effects on the implementation of energy and climate policies. On one side it made investments in new conventional power generation capacity much less profitable; on the other side it made climate change slip down the political agenda. Moreover it made industry and consumers more sensitive about the level of energy prices which are unanimously blamed to be too high and ultimately to be one of the counter-forces hampering EU competitiveness and recovery from the crisis.

This is especially evident when the EU compares with the US, where the so-called “shale revolution” drove gas prices to widen even further a structural gap, bringing them to levels four times lower than in the Union (Fig. 10).

Without omitting to note that the crisis quite substantially contributed to reduce GHG emissions, its effects should however not be used to hide root causes of policy inefficiencies.

The first and the foremost was the underestimation of the conflicts between the multiple 2020 package objectives and both the European wholesale electricity market and the IEM.

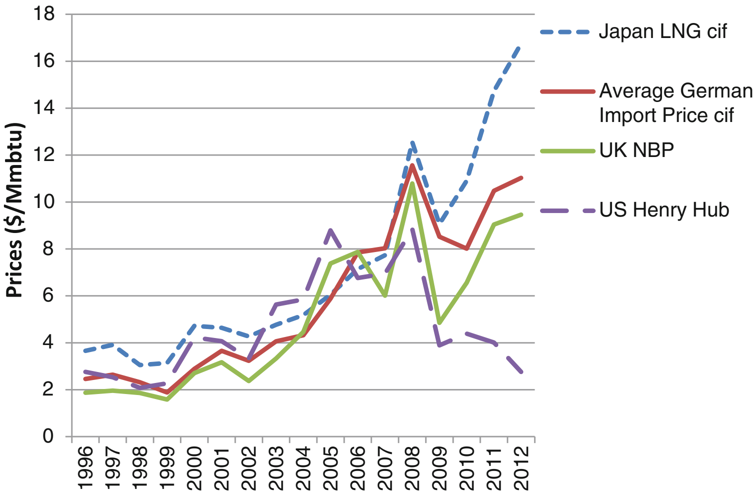


Fig. 10 Annual gas prices are given for benchmark natural gas hubs together with contracted pipeline and LNG imports. The benchmark hub prices incorporate US (Henry Hub) and the UK (NBP). Contract prices are represented by LNG imports into Japan and Average German Import Prices. The prices for LNG at European border are calculated as cif prices, where cif = cost + insurance + freight (average freight prices) in US dollars per million British thermal units (*Btu*). *Source* Enel elaboration on BP energy statistics (2013)

4.2 The RES Revolution

According to the RES Directive, RES targets in the Union were declined at national level so that individual Member States had their own target determined on the basis of the respective stage of development of their renewable energy sector in 2005 and their economic performances at the time (Dir. 2009/28/EC). Consequently Member States established support scheme for RES, especially in the electricity sector (RES-E, Table 1). At the same time, the cost of RES technologies, especially solar, dropped significantly and with an unexpected rate (Fig. 11).

Both factors pushed a significant penetration of RES-E in the generation mix (Fig. 12), mainly in Countries such as Germany, Spain and Italy where incentive schemes were particularly generous especially for solar technologies. Latest available data on net renewable support payments (2013) show figures in the order of 15 €bn/year for Germany (50 % solar PV), 9 €bn/year for Italy (53 % solar PV) and 7 €bn/year for Spain (50 % solar PV), as opposed to just over 2 €bn for France and UK.

The development of RES has contributed to reduce GHG emissions. However, abatements were often obtained at very high cost especially if compared to those that would have been achieved by the EU ETS (Fig. 13).

This has resulted in increasing the electricity bill for European industry and consumers, who are assisting at an “electricity price paradox”: prices on wholesale

Table 1 Renewable electricity support instruments in Member States

		AT	BE	BG	CY	CZ	DE	DK	EE	ES	FI	FR	GR	HU	IE	IT	LT	LU	LV	MT	NL	PL	PT	RO	SE	SI	SK	UK
Electricity	FIT	x	x	x	x	x	x		x	x		x	x	x	x	x	x	x	x	x			x			x	x	x
	Premium					x		x	x	x											x					x		
	Quota obligation		x													x						x		x	x			x
	Investment grants		x		x	x					x		x	x			x	x	x	x								
	Tax exemption		x							x	x		x						x		x	x			x		x	x
	Fiscal incentives			x			x		x											x	x	x				x		

Source European Commission (2012)

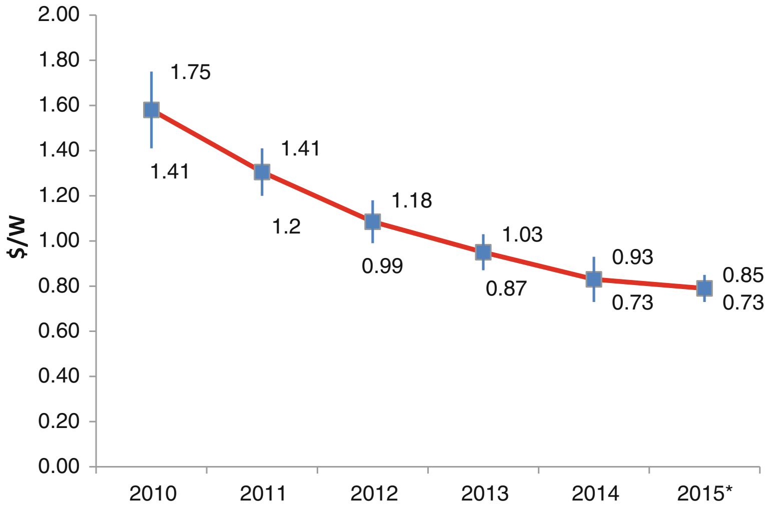


Fig. 11 Price of crystalline silicon PV modules. Higher costs refer to European, North American and Japanese manufactures, lower costs to low-cost manufactures (e.g. China). *price projection. *Source* Enel elaboration on IRENA data

markets are decreasing for power producers while those to end users are increasing as subsidies for renewables, as well as other levies, are charged on the retail electricity price (Figs. 14 and 15).

4.3 RES Impact on Wholesale Markets

Notwithstanding benefits in terms of emission reduction and energy independence, RES pose challenges to the electricity system from different perspectives. First of all, high penetration of intermittent RES, especially in certain hours (Fig. 16) modifies quite substantially the patterns to keep the balance between supply and demand on the networks and guarantee reliability of supply. From the perspective of the market, high penetration of RES modifies the way it works and provides price signals.

Since RES typically have zero or low marginal generation costs, they generally displace conventional generation, since the latter typically takes place by burning fossil fuels at marginal costs well above zero. In marginal pricing systems this generally contributes to reduce prices and margins. This trend is enhanced if RES enjoy grid priority access and are subsidized, in particular if subsidies are addressed to technologies having marginal costs above zero, such as biomass. In this case, in fact, RES generators may be willing to accept even negative prices up to concurrence with the level of the granted incentive, leading to market distortions.

Prices below zero have in fact started to appear in wholesale markets (Fig. 17).

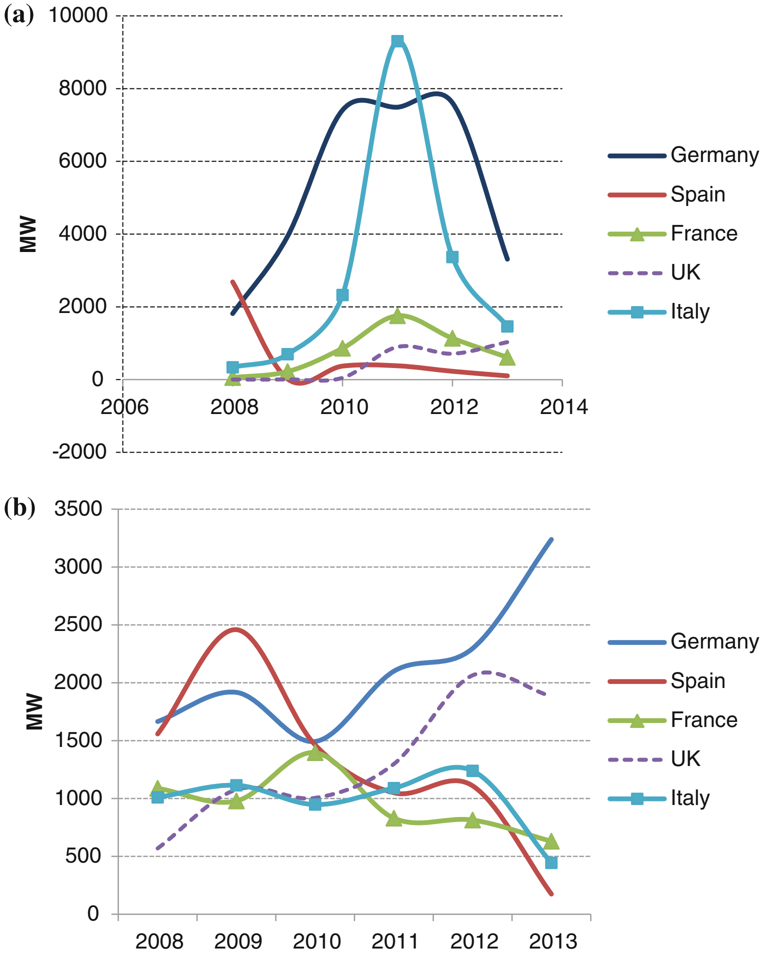


Fig. 12 Penetration of solar and wind renewable energy in the electricity mix of selected Member States: **a** capacity additions of installed photovoltaic power (*Source* Enel elaboration on EurObserv'er data); **b** capacity addition of installed wind power (*Source* Enel elaboration on European Wind Energy Association, EWEA data)

In such context an energy-only market allows conventional generators to remunerate their investments, which are necessary to guarantee the security of the system, only if prices are free to reflect scarcity situations when these occur, i.e. to reach high levels in a limited number of hours.

However high price levels are rarely politically accepted. The experience teaches that regulators are very often tempted to impose caps. Caps exist in day-ahead markets in Europe (including Belgium, Germany, Denmark, Spain, Portugal, France, The Netherlands, Switzerland, and Italy), Australia (AER 2012) and in the

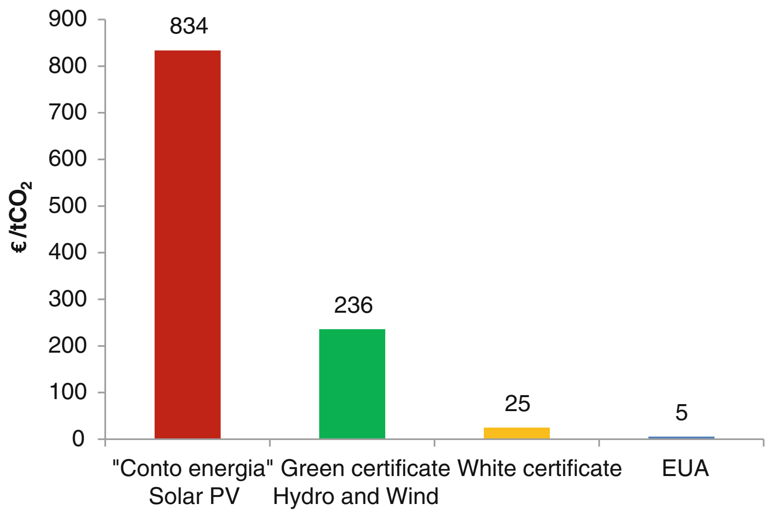


Fig. 13 Examples of abatement costs for different options in Italy. *Note* Conversion of carbon intensity based on CCGT equal to 0.36 tCO_2/MWh,"Conto energia" average value of the scheme; Green certificates (average value of 2013); EUA (average value 2013). *Source* Enel elaborations on Terna, Gestore Mercati Elettrici GME data

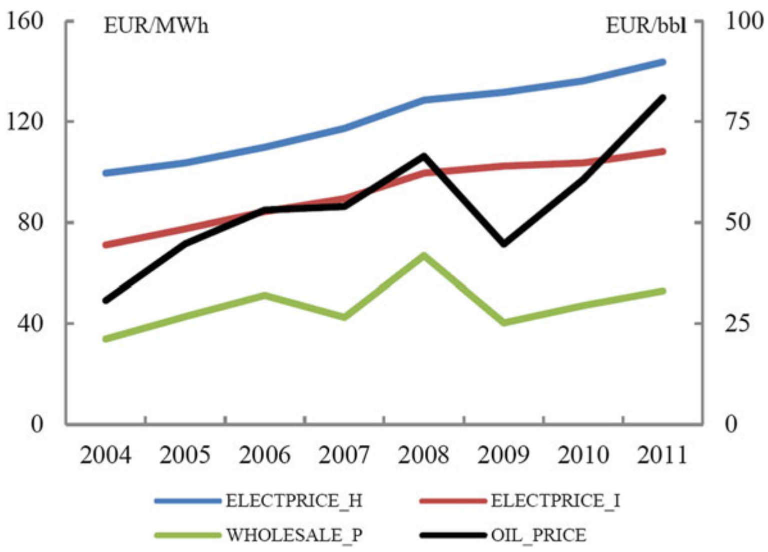


Fig. 14 The "price paradox". *Note* The consumption bands used were DC for Households (2500 kWh < Consumption < 5000 kWh) and IC for Industry (500 MWh < Consumption < 2000 MWh), wholesale prices are average spot prices from different European power exchanges and pools. *Source* European Commission (2014b)

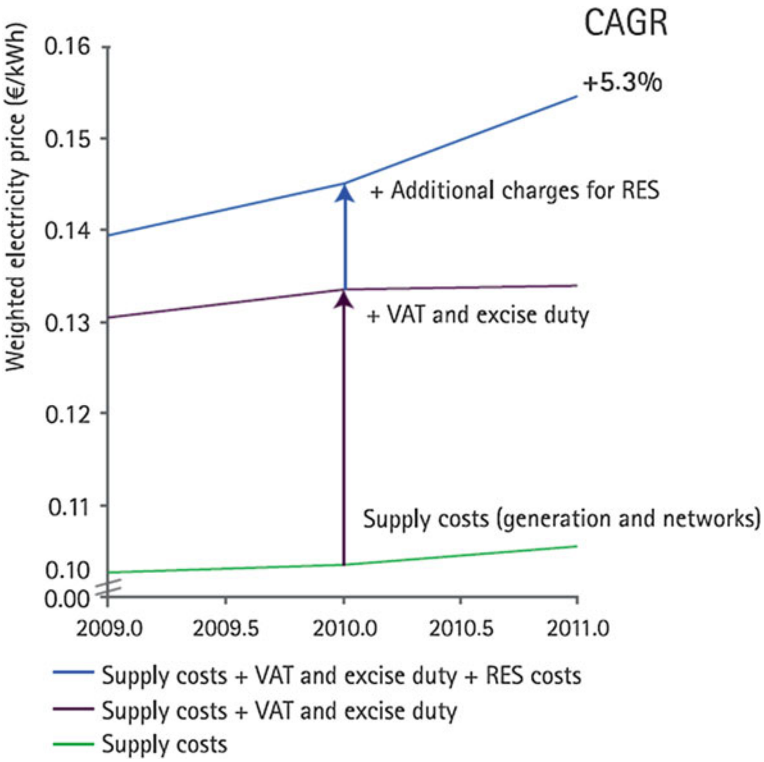


Fig. 15 Weighted average electricity prices by component (2009–2011)*. *The weighted price represents the average costs over different user categories, weighted by their relative consumption. The renewable energy costs represent the total costs for supporting renewables in the country distributed evenly over total consumption. *Source* EURELECTRIC (2014)

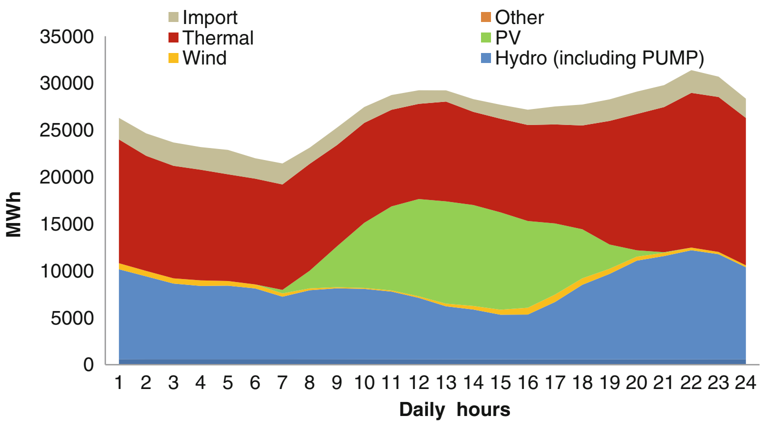


Fig. 16 Load coverage, Italy—16 June 2013. *Source* Enel elaboration on European Energy Exchange EEX, Terna

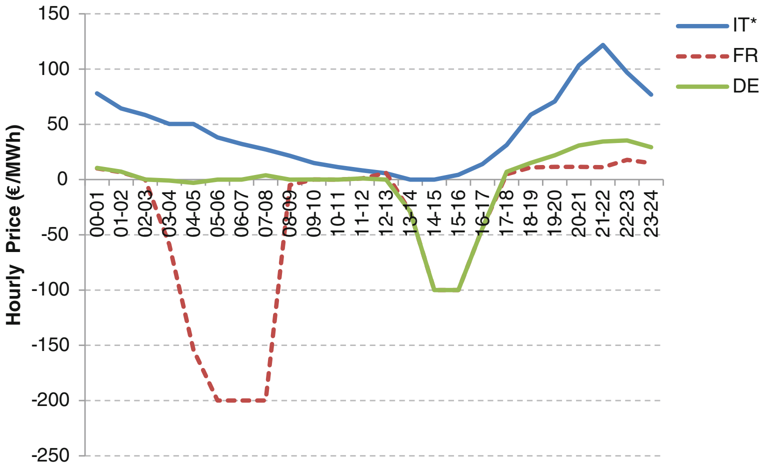


Fig. 17 Hourly pricing on day-ahead wholesale markets (16 June 2013). *PUN = *Prezzo unico nazionale*. *Source* Enel elaboration on European Energy Exchange EEX, Terna

US, where it is worth to mention the case of Texas. The Electricity Reliability Council of Texas (ERCOT), indeed, recognizing the need for generators to be compensated, is in the process of raising the existing cap of 1,000 $/MWh to 9,000 $/MWh (Keith and Michaels 2013).

If price ceilings are in place, the only way to ensure that necessary back up capacity is not mothballed or withdrawn because of unprofitability is to guarantee additional revenue streams, e.g. through capacity remuneration mechanisms.

Last but not least, renewables and their subsidies significantly interact with the IEM achievement. 28 RES national policies and related attempts of Member States to respond to the above-mentioned missing-money problem for thermal generation are undermining the fundamentals of the EU project of a single energy market.

Finally, coming back to the question whether circumstances prevail on policy failures as causes of the current situation, our conclusion is that the change of circumstances made inherent policy failures more evident.

5 Thinking Ahead

EU electricity markets are experiencing fundamental changes whose impacts are arising faster and in larger proportions than expected. With a growing share of RES, conventional generation is facing varying degrees of overcapacity, low load factors and margins insufficient to recover costs, including investments needed to cope with RES intermittency.

Is the current difficulty in electricity markets an inevitable consequence of pursuing the EU decarbonization objective?

We think it's not. Decarbonization and a functional electricity market are compatible goals but they require policies that do not create tensions among each other, especially when they are turned from principles into implementation measures.

5.1 Competitiveness Is Back on the EU's Agenda

While the 2020 package has only been a first attempt to integrate climate and energy policies, the 2030 framework includes some openings to ensure that competitiveness, security of supply and climate objectives are better balanced than in the past. It is worth to mention that the package was accompanied by a report on energy prices and costs which assessed the key drivers and compared the EU prices with those of its main trading partners, indicating a renovated intention by the EU policy makers to ensure that the energy system contributes to the competiveness of the EU economy.

The new 2014–2020 Guidelines on State aid for environmental protection and energy are also a positive step since they address specifically the issue of making RES support schemes sustainable, well-targeted to less mature technologies and harmonized among Member States, while promoting better integration of RES in electricity markets through participation in balancing.

5.2 Toward a Low-Carbon Future

The GHG emission reduction target of 40 % proposed by the 2030 framework goes in the right direction and should consistently be followed by further objectives for years to come in line with the 2050 Low Carbon Roadmap. They are essential to give a clear, long-term signal to investors on the direction of the EU energy and climate policy.

Concerning RES, they are an essential option for decarbonization. Benefits in terms of diversification of the electricity mix, emissions reduction of GHG and traditional air pollutants, promotion of innovation are all out of discussion. However, badly designed support or incentive levels have proven to have undermined market dynamics and reduced the benefits of market liberalization and integration. Moreover in a general climate of austerity and budget constraints, several Member States have decided to intervene abruptly in RES markets reducing or removing retroactively support to RES. Such move obviously undermined existing investments and investors confidence.

6 Remedies

Remedies should focus primarily on two objectives.

Firstly, for future investments, RES subsidies should be differentiated on the basis of the technological development stage along the path to full competitiveness and integration into the market, and phased-out for mature technologies.

The provisions of the 2014–2020. Guidelines on State aid for environmental protection and energy (European Commission 2014d) are in line with this aim, as they foresee the gradual introduction of competitive bidding processes for allocating public support and the gradual replacement of feed-in tariffs by feed-in premiums.

6.1 A Dynamic Approach to RES

More concretely, we believe that up to 2020 deployed technologies should receive investment aid through bidding processes in order to limit distortions and to promote more competitiveness in the market. Beyond 2020, we believe that RES incentives should be progressively phased out when renewable technologies become competitive. Their development should be substantially supported by a strong CO_2 price in a framework of markets evolving towards conditions which enable a level playing field among all participants.

Technologies in the demonstration phase should be able to benefit from low-risk incentives, such as feed-in tariffs, as long as cost or volume control mechanisms are in place to avoid excessive burdens or market distortions. Technologies in the deployment phase instead can be gradually exposed to market risks (e.g. using a feed-in premium or tradable green certificates systems). Mature renewables should be developed only through tendering on capacity in order not to distort short-term market signals and to capture the learning curve of technologies.

6.2 An 'Energy Plus Capacity' Market

Secondly, the European electricity target model should be reviewed and consider market-based capacity remuneration mechanisms (CRMs) as a pillar of future market design.

The way forward is to re-think the European market design by allowing the implementation of sound and coordinated market-based CRMs across the EU and its borders.

Properly designed CRMs are a market design option that can complement energy markets in a stable and long term manner as well as an important tool to bridge a secure transition to decarbonisation. The key arguments rely upon the potential role of imperfections, failures and real conditions of European electricity markets which are far from ideal. Market based mechanisms appear frequently to be the most desirable solution and better able to address the most significant challenges posed by the context. Moreover, CRMs should be technology neutral, ensure equal treatment of different market players, take into account interconnectors and be established as a stable framework.

6.3 *Strengthening the EU ETS*

Decarbonization needs also devoted policies for reduction of carbon emissions at source level.

We maintain that the EU should set a post-2020 CO_2 target of reasonable ambition and negotiate it for the purposes of the Paris Climate Conference (COP-21) in December 2015, where the Parties of the UNFCCC will meet to agree a global agreement against climate change to be adopted in 2020.

The ETS should remain the cornerstone of EU climate policies and its price signal should be used to drive policy and measures in non-ETS sectors. A reform is being undertaken by the European Commission to restore the effectiveness of the system after the creation of huge oversupply since 2009. It consists in (i) the so-called “back-loading”, i.e. the postponement of the sale of 900 mln allowances from 2013–2015 to 2019–2020 aimed at redressing the oversupply of allowances in the short term, and (ii) the establishment of a “market stability reserve (MSR)”, i.e. an automatic adjustment of auction volumes triggered by level of surplus outside a predefined range (Fig. 18).

While the back-loading is entered into force in March 2014, the MSR is under discussion like all other measures encompassed in the 2030 framework.

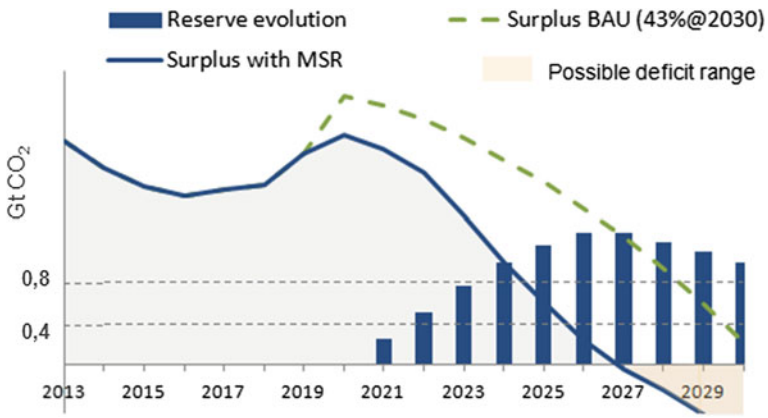


Fig. 18 The market stability reserve. *Source* Enel elaboration based on the EC proposal

We have analyzed these measures and concluded that they are valuable interventions, although they do not tackle the surplus issue quickly enough and they should be accompanied by a longer term view to align the ETS cap reduction path with the ambition of climate policy embedded in the 2050 EU Roadmap.

All these measures will help to address the energy and climate policies in one coherent structure ensuring benefits for conventional and renewables producers but also for industry and consumers. Improved policies will also contribute to reduce the wedge between the costs of producing electricity (wholesale prices) and the end-user price so that energy bills will better reflect the cost of electricity. All other costs should be left out, including those generated by ineffective policies.

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