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Cost of Non-Europe Report

The Cost of Non-Europe in the Single Market for Energy

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On 23 January 2013, the Coordinators of the Committee on Industry, Research and Energy (ITRE) requested a Cost of Non-Europe report with regard to the Single Market for Energy to support the preparation of an own-initiative report entitled 'Making the internal energy market work' (2013/2005(INI) – Rapporteur: Jerzy Buzek).

This paper has been drawn up by the **European Added Value Unit** of the Directorate for Impact Assessment and European Added Value, within the European Parliament's Directorate-General for Internal Policies (DG IPOL). Its aim is to help improve understanding about the subject matter by providing evidence of the specific costs to economic operators and individual citizens of failing to move towards a more efficient and effective internal energy market.

This assessment builds on expert research commissioned specifically for the purpose and provided by:

- Institute for European Environmental Policy (IEEP) - on the quantification of the costs of certain existing gaps and barriers in the internal energy market;
- Mr. D. Buchan from the Oxford Institute for Energy Studies - on the effectiveness of the internal energy market;
- Mr. G. Zachmann from Bruegel Think Tank - on the infrastructure for the internal energy market;
- Dr. Professor J. Haucap, Dr U. Heimeshoff and V. Böckers from Düsseldorf Institute for Competition Economics (DICE) - on the role of competition in the internal energy market.

Abstract

This Cost of Non-Europe report is designed to contribute to a clearer understanding of the potential benefits of building a more open and competitive internal energy market in the European Union. Many gaps and barriers are identified from reviewing the existing literature. Each represents a specific cost for the EU citizens and is a missed opportunity to maximise economic welfare.

Four illustrative cases are explored in detail. A common balancing market, for instance, would create large efficiency gains, estimated to be in the region of EUR 600-900 million per year. The specific case of regulated prices showed that about EUR 720 million could be saved per year in a country of the size of Spain or Poland. Progress in increasing the level of integration and interaction in the single energy market is also far from being satisfactory. Moving from a national, towards a full-integration scenario in the electricity sector alone would mean a decrease in total system cost of EUR 6 billion.

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A clearer understanding of the full costs and benefits of a more open, integrated and competitive internal energy market is needed so as to avoid missing out on the opportunity to establish a more efficient energy market and on the economic and competitive advantages this would bring, with the EU's long-term energy policy objectives also being taken into account.

This report provides an estimation of the associated costs of not having "sufficient Europe" in the energy market in four specific cases and argues that, although not exhaustive, these results certainly give a clear insight in the reasons behind a number of market inefficiencies.

In particular, the report estimates that:

- in a country of the size of Spain or Poland (with 15 million domestic consumers), **about EUR 720 million could be saved per year** by moving from regulated prices towards non regulated prices**;**
- in the case study of hubs and exchange, up to **EUR 1,64 billion could be saved per year** in a situation of trading compared to a situation of no trading between generation portfolios in five countries**;**
- in the case of market coupling, the efficiency loss of **EUR 78 million per year** is estimated to apply **on the border of Italy and France** alone;
- a common balancing market would create large efficiency gains as, at all times, the lowest-cost capacity and balancing energy would be used. This would amount to a gain of **EUR 600-900 million per year**.

These indications show that despite the considerable progress made over the past decade, much remains to be done to create a truly, open and competitive internal energy market so that consumers and businesses can take advantage of lower prices, greater competitiveness, greater energy trade between Member States, a market more conducive to private investment, especially investment in innovation, which reduce dependency on supply from third countries

Although much has already been said about energy policy goals, this report argues that energy should remain on the political agenda because it has enormous potential when it comes to improving competitiveness, creating new jobs, boosting growth and helping overcome the difficult economic crisis that Europe is experiencing. The crisis has put pressure on businesses across Europe, as well as causing huge stress on public finances, and this has made investors cautious about investing in capital-intensive energy markets (in particular the policy-dependent renewable energy sector).

The current level of integration and interaction in the European falls short of what one might expect from a single energy market. It is frequently pointed out that although the process of creating the internal energy market started in 1996 (for electricity) and 1998 (for gas), transferring the advantages of the single energy market to consumers is a major challenge still facing the EU.

Energy prices for private households have risen constantly and people in Europe are being increasingly affected by energy poverty.

Inertia is not an option in the face of these challenges. This Cost of Non-Europe report argues that the cost of inertia will not only be economic but above all political. The risk is that the failure to deliver a common European approach will inevitably lead to a sort of renationalisation, and consequently to the fragmentation of energy policy.

There is a general political debate around the future of the internal energy market. It will face increasing demand, an increasing dependence on external supply (including the possibility of supply disruption), as well as the risk of excessive price volatility. The Monti report[1] stated that although the energy sector is one of the late arrivals in the single market, it is also the sector on which the **highest expectations are placed today**. **Its functioning is therefore of great importance**.

[1] New strategy for the Single Market, at the service of the Europe's economy and society. Report to the President of the European Commission by Mario Monti, May 2010

Methodology

Cost of Non-Europe (CoNE) reports are designed to study the possibilities for gains and/or the realisation of a 'public good' through common action at EU level in specific policy areas and sectors. They attempt to identify areas that are expected to benefit most from deeper EU integration, where the EU added value is potentially significant.

The aim of this Cost of Non-Europe report is to **ascertain and quantify the costs of certain gaps and barriers that currently exist in the internal energy market** by looking at the causes of market inefficiencies and, in doing so, identifying salient points for future consideration. It is **not intended to be exhaustive, but rather to be illustrative and to provide concrete examples** of the problems confronted and of solutions that might be adopted.

It examines briefly some of the benefits that can be expected from further market integration and from enhanced competition and contrasts them with an emerging re-nationalisation of energy policy.

The **report principally deals with the question of 'gaps and barriers'** in the EU internal energy market which need to be filled, and the cost to economic operators and citizens of not addressing them. Wherever possible, it identifies the root cause of the gaps and barriers and classifies them according to their nature and relevance. In order to develop a better understanding of key issues and to understand what happens in a typical case, a number of case studies are presented.

Whenever it was not possible to quantify all the costs and effects, a qualitative complementary approach is used in order to provide insight into how the gaps/barriers identified affect the achievement of the internal energy market objectives.

Finally, this report proposes **two main perspectives to address the cost of non-Europe concept: economic and political**. Both are considered to be of particular importance to help restoring citizens' confidence in the European project.

Introduction

The European Union (EU) is one of the largest regional energy markets in the world. It accounts for one fifth of the world's energy use. Energy is of the utmost importance for the EU, for its economy as a whole and for the daily lives of the people living in Europe, who rely on the availability of electricity, heating, cooling and fuel for transport.

The development of a European energy policy has been at the heart of the European project since its inception with the European Coal and Steel Community in 1951 and the European Atomic Energy Community in 1957. Despite the economic and geopolitical changes that have occurred and the increased regulatory efforts that have been made with a view to establishing a truly integrated internal energy market since then, the scale of the EU's internal energy market is still not optimal.

To bridge the gaps and overcome the barriers that persist in the internal energy market, the EU has to meet crucial requirements that go far beyond liberalisation. Many different factors influence the complex energy market and diverging interests often come into play when defining broad policy objectives. The situation varies significantly from Member State to Member State, but decisions taken at national level affect other countries, thanks to the development of the internal market and of infrastructure.

The scenario is highly complex and the positive effects that the market has achieved so far have not been passed on in full to the all potential beneficiaries. For example, increasing price convergence suggests that progress is being made towards market integration and greater competition, but these benefits are not being passed on in full to final consumers. Indeed, there are still wide variations in household prices among the Member States, and the level of switching has generally remained low.

Between the second half of 2011 and the second half of 2012, household electricity prices in the EU27 rose by 6.6 %. Figures released by Eurostat on 27 May 2013 show that household gas prices in the EU27 increased by 10.3 % over the same period. The average price in the EU27 was EUR 19.70 per 100 kWh.

The EU is committed to a fully functioning, interconnected and integrated energy market. This implies multiple challenges for the Union, such as investing in low-carbon alternatives, building modern, diversified infrastructure, and producing more of its own energy to shore up security of supply. Major investment will also be needed over the next few years to diversify existing resources, create new infrastructure and replace ageing infrastructure, integrate growing amounts of renewables, and so on.

In 2011, the European Council set 2014 as the final date for completion of the internal energy market and 2015 for ending the physical isolation of certain national energy markets.

Will these goals be met?

The EU is racing against time to complete the internal energy market so as to ensure that energy is generated, transported and consumed as efficiently as possible, avoiding losses along the value chain. This has the potential to make European industry and companies more competitive and more resilient.

Against this background, it is generally recognised that more needs to be done **to exploit the full potential of a truly integrated EU internal energy market** (e.g. a number of Member States have either not yet transposed the third energy package several months after the deadline, or have done so incorrectly; in some Member States a huge percentage of energy production remains in the hands of the historic incumbents, etc) and **to buck the current trend involving the fragmentation of energy markets**.

Figure 1: How to exploit the potential of the internal energy market

- Implementing existing legislation
- Empowering consumers
- Enhancing investments in infrastructure
- Harmonising market and network rules
- Enforcing competition and State aid rules

However, at the moment, several regions are still disconnected from the rest of the EU, and a number of key conditions need to be met if there is to be full interconnection, notably establishing certainty about future demand, technological needs and the prospect of commercial returns.

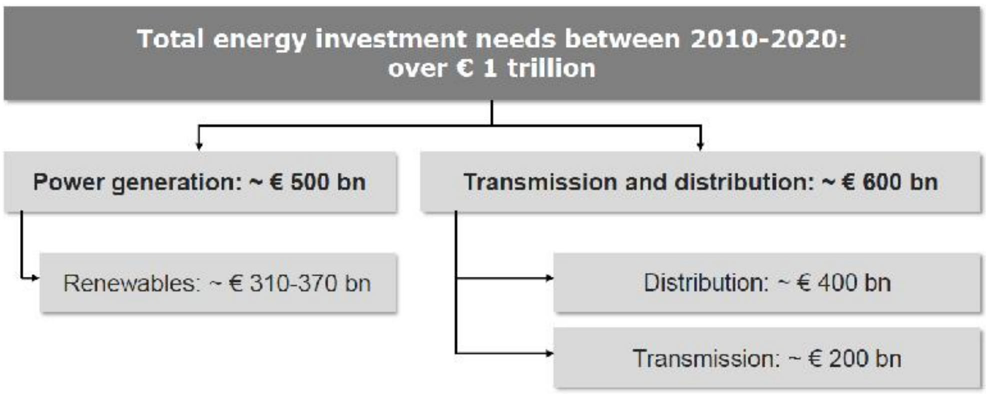
In order for market integration to take place, sufficient connecting infrastructure needs to be in place between markets. The appropriate regulatory and political conditions also need to be established in order to foster trade. Infrastructure is the backbone of the entire energy system, and without sufficient cross-border interconnection capacity it will be simply impossible to establish a truly integrated market. Increased interconnection would increase Member States' ability to draw on their EU neighbours' energy supplies in emergencies, and would also make it easier for Member States to compensate for supply/demand imbalances caused by renewables, for instance. In a truly integrated market, efficiency is increased and prices for goods and services are brought down because resources are better allocated. At the same time, the economic and political weight of the EU increases vis-à-vis countries outside the EU. A well-functioning internal energy market can therefore play a key role in developing solid trade relations, turning dependency into interdependency[2].

If left unaddressed, the energy situation in Europe will be one of increasing need and declining supply. It is estimated that EU dependency on high-price imports of oil and gas from third countries will rise by nearly 80 % by 2035. Given the sheer energy intensity of our economies, the scope for vulnerability and turbulence is immense.

Finally, there is a general consensus that clarity is urgently required about what the situation with regard to energy and climate change will be like beyond 2020. The defining point about energy is that long-term investment is essential for its future and, for this to happen, long-term certainty and predictability are required.

The framework for investment should offer long-term visibility and should also be stable. The rules of the game to which investors sign up cannot be changed half-way through for political reasons. It is not acceptable to take retroactive decisions or to fail to fully implement existing legislation.

Figure 2: Investment needs in energy[3]



If there is a failure to provide clarity and satisfy investment needs, the EU will become uncompetitive and over-dependent on external energy sources. It will

[2] Energy Policy in Europe: Identify the EU Added Value, CEPS Task Force, 2008.
[3] Source: European Commission

also fail to seize an opportunity to make a tangible and lasting contribution to Europe's economic recovery. With the EU's economy stagnating, there is no demand for an increased supply of energy. This is the normal market reaction and slow growth (or no growth at all) has made Europe more 'energy efficient'. However, if there is a return to steady growth in the next few years, demand for energy will increase again. Then, those who have invested in new infrastructure and developed their production, storage and distribution capacities will have a clear advantage.

Whenever a common European approach can help realise a public good to the benefit of all, the European Parliament has constantly been committed to ensuring that the full 'added value' of European action is properly identified in advance and secured in practice. There is no doubt that energy is one of the key questions that will define the future of Europe, and properly addressing that question will help restore citizens' confidence.

Figure 3: Facts and figures on energy policy - why we should care about energy policy[4]

- EU represents 20% of world energy use
- In 2007 the number of employees in the energy sector was 1.6 million, representing 1.3% of the EU economy
- Energy costs represent 1 to 10% of industrial production costs
- EU pays 2.5% of its annual GDP to import energy:
  - EUR 270 billion for oil
  - EUR 40 billion for gas
- Only 3% of EU electricity traded across borders
- World energy consumption will keep growing: owing to global population growth and economic catch-up, world energy demand may grow by 45 % by 2030
- The investment challenge around EUR 1 trillion by 2020 (mostly to be delivered by the market) (COM(2011)676)

[4] Source: European Commission

Renationalisation of energy policies

Although the internal energy market remains at the heart of the European Union's energy policy (which is to move towards a low-carbon economy as cost-effectively and securely as possible), it has to be acknowledged that so far the objectives set have only been partly met.

As a matter of fact, Member States have quite different energy mixes, which evolve over time because of their geographical conditions but above all as a result of their national policies. Member States often have different preferences or conflicting interests. Countries which are low producers might for industrial and social policy purposes want to restrain exports in order to restrict prices, while other countries strive to increase their exports. A transit country knows that if it builds too many transmission lines, the price differentials between the country it imports from and the country to which it exports will decrease. Thus transit countries might want just enough international interconnection to maximise their rents. Overall, on a political level, countries prefer to keep control of their energy policy and as a consequence national energy strategies might be inconsistent.

Nevertheless, despite their differences, Member States have also agreed on a number of common policy objectives, namely: reducing energy prices for private households and businesses; ensuring security of supply; and limiting the environmental impact of energy production, transport and use.

Although no one contests that these objectives are best achieved through joint action at EU level, the current situation is a mixed picture of the effectiveness of energy policies, in which short-term national measures are putting long-term EU plans in jeopardy.

Here are some of the objectives that have been at least partially achieved:

- Price convergence is an indicator of increasing cross-border trade and competition. Wholesale prices have begun to converge among Member States, although renewables are causing some electricity price volatility in certain Member States. A lack of diversity in infrastructure and supply sources creates price-disconnectedness in other Member States. Considerable progress is being made in unifying cross-border trading arrangements.

- In terms of security of supply, much has been done to improve EU resilience to external energy shocks. But the main risks to the continuity of energy supplies are now probably the intermittency of wind and solar power and the difficulty of providing back-up capacity for renewables in ways that are compatible with the EU internal market.

- Emission reduction owes something to the growth in renewable energy and improvements in energy efficiency, but even more to the economic downturn and the consequent decline or at least stagnation in energy demand.

Despite these achievements there is still much to be done at EU level. The Commission's contribution to the European Council of 22 May 2013 highlighted many of the energy challenges that Europe will face in the near future[5].

Figure 4: Key energy challenges for Europe

- **Europe's import dependence is set to grow more than 80%** in the case of oil and gas by 2035.
- Some Member States rely on a single supplier and often on **one single supply route for 80-100%** if their gas consumption.
- **Energy bills for consumers are rising** and account for a growing share of the average expenditure if households, varying between 7 and 17% across Member States.
- Poorer parts of the population are faced with **energy expenditures of 22% of total expenditure** in some Member States.
- Energy prices are also to a large extent the result of Member State's decisions on tariffs, levies and taxes. For the EU15, they represented 28% of the final price for domestic consumers in 2010, against 22% in 1998.
- Transition to secure, competitive low carbon energy requires sustained investment in power equipment, grids, infrastructure etc. This **investment is estimated to be equivalent to 1.5% of GDP** on an annual basis over the period until 2050.
- Some Member States are still in an '**energy island**' as a result of a lack of well functioning infrastructure connections within the rest of the EU. In certain regions of EU, increasing amounts of intermittent renewable energy cannot be transported to consumers due to the lack of sufficient infrastructure. To overcome these gaps, there is a need for **new investment (about EUR 200 billion) in transmission lines, interconnectors, storage facilities** etc.

- Governments are cutting their own spending on energy and other infrastructure.

- The EU is cutting the amount earmarked for energy infrastructure in the Connecting Europe Facility 2014-2020 almost in half, to EUR 5 billion. The crisis in the EU's financial sector has led to most banks and many insurers pulling out of project finance in energy and other infrastructure sectors. This has created a big financing gap that would be very difficult to address with only EUR 5 billion from the EU budget over the next 7 years.

[5] Energy challenges and policy - Commission contribution to the European Council of 22 May 2013, available at: http://ec.europa.eu/europe2020/pdf/energy2_en.pdf

- There is pressure on European utilities in general to reduce debt, sell assets and postpone any new investment unless, like renewables, they are supported by subsidies.

- There is an increasing level of sensitivity among the public – and therefore also among politicians – when it comes to energy price rises. Although it is felt most keenly in certain countries, this energy price neurosis exists throughout the EU, from Bulgaria (where energy price protests recently brought down the government) to Spain (which has retroactively reduced subsidies on existing renewable energy projects).

- The price of carbon allowances in the Emissions Trading System has fallen so much that the system now seems to be having no influence on the behaviour of energy consumers or on the investment decisions of energy companies.

Figure 5: Example of divergent development[6]

Some 'non-integrationist' national policies (i.e. in the areas of renewables and back-up capacity markets) are currently moving ahead faster than 'integrationist' efforts to build cross-border interconnectors, agree pan-EU network codes and couple power and gas markets. The relative lack of progress in cross-border energy networks and trading, for example, gives governments an easy excuse to ignore their neighbours and to follow their own national models and national preferences in designing renewable and capacity schemes.

All capacity schemes in the EU are intuitively more likely to prefer national generators over foreign ones, because most governments would rather not rely on outsiders to keep their country's lights on. This approach may guarantee security of supply in individual Member States, but discourages further interconnection and suggests that countries do not rely on their EU partners in the event of power supply problems.

Against this background, there is a general consensus that the EU internal energy market is not developing in a harmonised way, often because national initiatives proceed faster than efforts to integrate[7].

There is an increasing tendency among Member States to implement policies that differ from those implemented elsewhere in the EU, whether these are renewable energy support schemes, capacity mechanisms or energy taxes and regulations on

[6] See annex II on the Effectiveness of the Internal Energy Market by Mr D. Buchan from the Oxford Institute for Energy Studies.

[7] D. Buchan, Europe's misshapen market: Why progress towards a single energy market is proving uneven, Oxford Institute for Energy Studies, 2012.

end-user prices. Here we could cite the example of Germany, which has unilaterally embarked on its *Energiewende* ('Energy transition') policy, or the United Kingdom electricity market reform, which includes measures that effectively disregard any implications for other markets.

The trend to renationalisation is not a surprise politically. Energy issues were on the agenda of a recent European Council meeting. Three main topics were addressed: the fragmentation of the internal energy market (or, rather, the 'renationalisation' of energy policies); the development and financing of interconnections; and energy prices and competitiveness.

At that meeting, with a view to fostering competitiveness and in order to respond to the challenge of high prices and costs, Member States agreed on a series of guidelines on the basis of which a common energy policy can finally be established. With this common energy policy, the internal energy market can be used effectively as a tool to help refocus priorities on competitiveness.

Whilst these good intentions should be acknowledged, it is well known that Member States often act in their own interests, and these interests are often divergent. As a result, there is an ever-present risk that Member States will take decisions completely unilaterally, without consulting their European partners. Recently, Member States at least seem to have considered informing (rather than consulting) their European partners whenever a decision might have an impact on other Member States[8].

One could argue that it is difficult to think of any decision on energy policy at national level that does not have a potential impact on other Member States. However, it is important for the purpose of this report to notice that any uncoordinated approach will certainly have an economic and political cost, especially if we look beyond the EU's borders (we need look no further than the competitive position occupied by the US, which currently pays less than half the European price for electricity, or the forthcoming negotiations on a post-Kyoto agreement scheduled for 2015).

Rather than pushing for an artificial completion of the internal energy market, it might be wiser to aim at a coherent market, for instance by addressing the discrepancy between fast-developing national policies and slower-moving infrastructure construction.

[8] European Council conclusions, 22 May 2013: 'Member States will regularly exchange information on major national energy decisions which have a possible impact on other Member States, while fully respecting national choices of energy mixes'.

Integration and competition

Integration of the EU energy market could provide **scale**, and scale is the EU's main gift to its Member States in every sector of the economy. Scale – i.e. a single market of 28 Member States – can promote wider competition, and competition can lead to convergence with regard to the most efficient price level; scale provides security through diversity of energy sources and supply; and scale can provide a critical mass of low-carbon investment and the level of political influence required at world level to make a difference in international climate negotiations.

It is well known that in a world without transaction costs, more centralisation always increases efficiency. Any 'union' of countries essentially faces a trade-off between two opposing forces: the economies of scale that can be achieved by enlarging the market, and the heterogeneity of preferences among the participants within the integrated area. The larger in number or the more heterogeneous the countries' preferences are, the more likely it is that the transaction costs of mediation will outweigh the benefits achievable through the integrated market[9].

This is also true in the energy sector, where, on the one hand, preferences, resource allocation and traditional dependencies have resulted in very heterogeneous energy systems. On the other hand, the efficiencies resulting from cooperation in energy sectors are substantial. **Efficiencies** result from the cross-border coordination of the use of existing assets (static efficiency) and from the coordinated cross-border development of the asset structure (dynamic efficiency).

One example of static efficiency is the monetary gain derived from replacing, at a given time, electricity produced in an expensive gas turbine on one side of the border by electricity produced by wind turbines on the other side of the same border. Dynamic efficiency would arise from building only one gas turbine to balance both systems instead of two turbines, one on each side of the border.

In other cases, decisions taken at national level do not clash head-on with EU policy, but one might ask whether a more efficient solution, in line with the concept underpinning the internal energy market[10], could not be found. For example, it is well known that the expansion of renewables is being driven by

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[9] Carlo Altomonte and Mario Nava, *Economics and Policies of an Enlarged Europe*, Edward Elgar Publications, 2006.

[10] This being that the lowest-cost sources, whatever their country of origin, should be able to compete on a level playing field across the European market.

national subsidies rather than by a single EU scheme. The outcome is often rather strange, with Germany having more solar power facilities than sunny Spain. In a truly integrated internal market, it would be commercially desirable to harness renewable energy in the most effective locations. If this happens, the transmission infrastructure required will be designed accordingly, and this will help break down the self-sufficient mindset that most Member States still have.

Theoretically, the internal energy market could have numerous benefits. They could broadly be characterised as benefits of using markets for allocation (**'competition'**) and benefits of integrating systems (**'integration'**). Competition and integration can improve the use of existing assets ('static') and/or investment decisions ('dynamic'). Research has largely demonstrated corresponding gains, mainly realised through a better usage of inputs and through strong cost reductions.

Figure 6: Categorisation of benefits[11]

	Static	**Dynamic**
Competition	-Reduced mark-ups -Improved operation	- Less investment withholding - Improved investment decisions
Integration	-Cross-border optimisation of operation	- Cross-border optimisation of investment decisions - Cross-border optimisation of company structures

In this context, the electricity sector is of considerable importance. Its turnover of EUR 420 billion represents more than 3 % of European GDP[12]. Correspondingly, small efficiency gains in the electricity sector represent significant efficiencies in absolute terms.

Extrapolating the efficiencies identified in the literature survey to the EU27 market would correspond to EUR 11 billion in payroll cost savings[13] and to EUR 289 million per year in balancing cost savings (corresponding to a 10 % total

[11] See annex III written by G. Zachmann from Bruegel Think Tank.

[12] The turnover is calculated on the basis of: 3 086 TWh net electricity generation, times an average final sales price of 0.136 EUR/kWh, divided by a GDP of EUR 12 900 billion (all data from Eurostat for 2012).

[13] Eurostat reports data on average personnel cost only. Personnel costs are the total remuneration payable by an employer to an employee for work carried out. This is divided by the number of employees (paid workers), which includes part-time workers, seasonal workers or similar, but excludes people on long-term leave. As we are interested in total payroll costs, we multiplied EUR 43 000 (average personnel cost) by the number of employees in the sector (800 000, source: Eurelectric) and obtained EUR 34 billion (payroll cost in electricity generation in the EU in 2012). 32.3 % of this is EUR 11 billion.

interconnection capacity)[14]. In addition, the literature on full market integration shows promising results if one moves from a national towards a full-integration scenario; a simple extrapolation of these results to the EU27 level would mean a decrease in total system cost of EUR 6 billion[15]. Although all the values given for extrapolation to the EU situation are purely indicative (as the conditions often vary between the individual empirical cases and the EU as a whole), the results do provide an estimate of the potential gains. Furthermore, some of the benefits might overlap, while other potential benefits are not considered.

Notwithstanding this caveat, one might argue that the full integration of the European energy market could bring about major efficiency gains in welfare terms for European households and industry.

One of the research papers[16] annexed to this Cost of Non-Europe report stresses that, while levels of wholesale market concentration have generally decreased across Europe, a major benefit of further market integration would be an increased level of competition on, for instance, the European electricity markets.

Figure 7: Why we should pursue EU market integration

- To allow aggregation of generation
- To allow cross-border use of capacities
- To ensure security of supply
- To allow reasonable infrastructure planning
- To ensure lower energy prices through market and competition

On the basis of simulations published by the European Agency for the Cooperation of Energy Regulators (ACER) in 2012, the Central Western European region alone **could achieve gains from trade worth more than EUR 250 million in comparison with isolated national markets**. The research

[14] Abbasy et al. (2009) estimate EUR 80 million balancing cost savings per year (corresponding to a 10 % total interconnection capacity) for the Netherlands, the Nordic region and Germany. As these countries jointly represent 27.7 % of total gross electricity generation, the corresponding effect on the EU27 would be EUR 289 million in balancing cost savings.

[15] Gerbauleta (2012) estimates a total system cost reduction of EUR 10 million per month, and a re-dispatch cost decrease of EUR 0.2 million monthly. The study focuses on the region including Germany, Austria and Switzerland, which jointly represent 20.6 % of the total gross electricity generation; the corresponding effect on the EU27 would therefore amount respectively to EUR 48 and 0.97 million in total and re-dispatch cost savings.

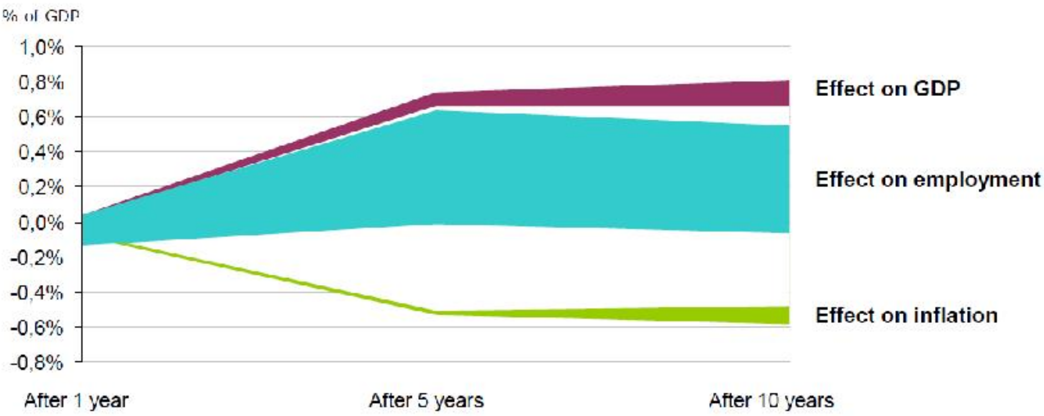
[16] See Annex IV, which analyses the benefits of further market integration of European wholesale electricity markets and argues that major gains from trade are still left unrealised owing to: (1) uncompleted market coupling of national wholesale markets; (2) isolated national regulation of capacity and reserve mechanisms (CRM); and (3) lack of harmonisation of national support schemes for renewable energies.

paper also argues that other major trade gains are still to be realised between several countries in Europe, e.g. Germany and Sweden (about EUR 10.5 million per year), and the Netherlands and Norway (about EUR 12 million per year). Finally, significant gains could also be expected from increasing transmission capacities between Spain and France as well as between Sweden and Poland.

Similarly, markets with effective competition are generally characterised by consumer choice, low prices and quality levels desired by consumers. Effective competition thereby directly benefits: (1) consumers, by increasing consumer surplus through lower prices; and (2) firms, by protecting competitors against the abuse of market power by dominant firms (i.e. incumbents).

This major economic insight is also the underlying principle for the liberalisation of European energy markets. Fostering competition in energy markets is even more important than it is in many other sectors of the economy owing to the outstanding importance of energy prices and to the availability of energy for production processes, economic growth and consumer welfare in modern industrialised economies.

Figure 8: Benefits of liberalising gas and electricity markets (in % of GDP - ranges)[17]



The liberalisation of Europe's wholesale electricity markets started in the 1990s. However, the process did not progress simultaneously across the Member States, and national market designs and national energy policies still differ considerably. The attendant lack of harmonisation and integration has therefore been a long-standing concern for the European Commission. That is why, in 2005, the Commission launched a sector-specific inquiry into the European wholesale

[17] Source: European Commission

electricity and gas markets[18]. Its final report identified serious shortcomings in both markets.

Figure 9: Identified shortcomings

- Too much market concentration in most national markets
- A lack of liquidity, preventing successful new entry
- Too little integration between Member States' markets
- An absence of transparently available market information, leading to distrust in the pricing mechanisms
- An inadequate current level of unbundling between network and supply interests which has negative repercussions on market functioning and investment incentives
- Customers being tied to suppliers through long-term downstream contracts
- Current balancing markets and small balancing zones which favour incumbents

Since 2007 major progress has been made on some crucial points such as information transparency, data availability, and vertical ownership unbundling between network and generation, which has decreased the likelihood of vertical foreclosure. Most Member States have also implemented or at least started to implement the third energy package.

According to the attached research paper on the role of competition in the internal energy market, a comparison of concentration ratios between 2004 and 2011 might lead one to conclude that the situation has improved in many Member States. However, the assessment cannot be totally positive: the market is still concentrated because single energy producers control over 50 % of the markets in as many as eleven Member States, and in six single producers are near-monopolists, holding more than 80 % of market share. This clearly has huge implications for all stakeholders, affecting the quality of the services provided and the flexibility of the markets.

[18] European Commission DG Competition: *DG Competition Report on Energy Sector Inquiry*, Brussels, 2007.

The Cost of Non-Europe

Almost a quarter of a century on from the publication of the Cecchini report in 1988, the issue of the 'cost of non-Europe' has reappeared on the political agenda. Paolo Cecchini famously estimated the economic cost of the absence, in terms of lost intra-Community trade and jobs not created, of a true single European market.
Such empirical evidence of the economic benefits of integration may help people in the EU to see that Europe is not the problem but part of the solution, and that the current economic problems are not related to the excesses of 'Brussels', but to the fact that European integration is not yet complete.

In the specific context of this report, the cost of non-Europe has been considered from two main perspectives: **economic** and **political**.

The **economic perspective** usually refers to the costs incurred for not having attained economy of scale, tackled market failures, appropriately supported public goods, etc. In this context, the following section will look at the existing gaps that need to be bridged and the barriers that need to be removed if the EU is to exploit the full potential of the internal energy market.

In contrast, the **political perspective** also considers the legitimacy of policy choices and the interests of different stakeholders, and may be grounded not in reasons of economic efficiency (e.g. not all interventions that deliver EU public goods are cost-effective) but in political needs, such as solidarity or the need to reinforce EU global leadership.

As regards solidarity, in order to ensure security of supply a common approach to the diversification of energy sources in a spirit of solidarity is needed. This is because certain Member States depend on single, non-EU suppliers and are unable to diversify their energy mixes on their own. For them to diversify, the ability to pool common supply capacities in a well-interconnected market in exceptional circumstances must be developed. This would also reinforce the position of the Member States in negotiations at EU level on the necessary framework agreements with supplier and transit countries.

The EU is already paying a 'political' price when Member States try to achieve national energy self-sufficiency instead of open borders to ensure security of supply, when they intervene in the market to set wholesale and/or retail prices instead of letting the market fix the correct price, or when they cut the funding share of energy infrastructure instead of finding the resources needed to put an end to 'energy islands'.

Against this background, the present 'Cost of Non-Europe' report argues that seeking to reduce costs, optimise expenditure and maximise opportunities is not sufficient: efforts must also be made to seek appropriate responses for meeting current challenges and for finding a positive way out of the crisis that will benefit everyone.

Addressing the multiple challenges facing the internal energy market (e.g. sustainability, competitiveness and securing energy supplies) requires more than just collecting sector-specific policies or ensuring coherence between EU and Member State actions. Ultimately what is needed is a clear and credible EU policy that restores the public's faith in Europe's energy goals and in the measures needed to attain them.

The EU internal energy market is a project that has the merit of being of **practical relevance to citizens and consumers, given the persistence of acute social problems linked to access to affordable energy**. At this stage, however, it is an incomplete project that is costly for the EU in both economic and political terms. Vague formulas and proclamations are therefore no longer enough.

In this light, reflecting on the cost of non-Europe can be seen not only as a means of making an economic assessment but also as an **instrument to promote and where possible help realise goals that are high on the political agenda and to promote further integration**.

Gaps and barriers

This section looks at the barriers that must be removed and the gaps that must be bridged if the EU is to exploit the full potential of the internal energy market. Without such decisive action, the EU is unlikely to become the most competitive economy.

The existing gaps and barriers are summarised in figure 10 below, based on the extensive literature on the subject. The sources have been assessed as to their relevance to this study, i.e. the extent to which they focus on gaps and barriers to market integration, give reasons for such gaps and barriers, and provide quantification of the benefits of market integration.

When studying specific cases in terms of gaps and barriers in the internal energy markets, it becomes clear that every case is connected to other cases. This makes it difficult to delineate a single case, in particular when it comes to quantifying the associated costs. Indeed, the effects of removing a specific barrier, or of bridging a specific gap, also depend on what other related measures are taken. The quantification of cases required to gain insight into the cost of non-Europe is highly dependent on assumptions that need be made. It is therefore important to place the qualitative explanation of the quantifications in the forefront when using the results of this report in further analysis.

Figure 10: Gaps and barriers based on literature review

Document/Source	Identifies: gaps/ barriers?	Overall relevance
ACER 2012: Regional Initiatives Status Review Report 2012	**Barrier:** Diverging views on flow-based methods	Moderate
ACER_CEER 2012: Annual Report on the Results of Monitoring the Internal Electricity and Natural Gas Markets in 2011	**Barriers**: - Differences in retail prices (p. 54) - Differences in retail prices between households and industry (gas) (p.119) - Diverging market liquidities in the EU (p. 61) - Regulated prices (p.48) - Low switching rates (p. 24, p. 119) - Smart meters: entities responsible for data collection and management do not foster active competition - Cross-border transmission infrastructure (p.69) - Reduced cross-border capacities made available due to unplanned flows **Gaps**: - Higher transparency for tariff methodologies necessary	**High**
CEER 2012a: Status Review of Customer and Retail Market Provisions from 3rd Package 2012	**Barrier:** - Gap between legal and practical implementation of 3rd package	Low

Document/Source	Identifies: gaps/ barriers?	Overall relevance
CEER 2012b: Benchmarking Report on Meter Data Management	**Barriers**: - Divergence of policy designs on smart meters	Low
EC 2010: SWD, SEC 1409: Functioning of the retail electricity market	**Barriers**: - High market concentration - Regulated prices	Moderate
EC 2011: SWD, 2009-2010 report on progress in creating the internal gas and electricity market	**Barriers**: - Disharmony of market rules - High market concentration - Differences in retail prices - Disparities in switching rates in MS in energy retail markets - Cross-border transmission infrastructure	Low
EC DG Energy 2012: Quarterly Report on Gas Markets Q3-4 2012	**Barrier**: Differences in retail prices	Moderate
EP DG Int. Pol 2010: EU Energy Markets in Electricity and Gas	**Barriers**: - Differences in wholesale prices - Different trading regimes - Insufficient unbundling of TSOs (p. 12) Cross-border transmission infrastructure (p.12)	Moderate
Gawlikowska-Fyk 2012: Fragmented Energy Market in the EU	**Barriers**: - Diverging funding schemes for construction of new power plants and renewable energies - Conflicts of interests for MS and delays in implementing 3rd Package	Low
Internal Energy Market – Non-Paper 2010	**Barriers**: - Disharmony of market rules - High market concentration - Differences in wholesale (gas) and retail (gas & electricity) prices within Europe (p.2) - Regulated prices - Insufficient powers of national regulators to implement rules - Cross-border transmission infrastructure - Capacity restraints with booked but unused capacity	**High**
Ipek, William 2010: Firms Strategic Preferences, National Institutions and the European Union's Internal Energy Market: A Challenge to European Integration	**Barrier**: - Traditional and national approach to businesses of market participants (p. 26)	Moderate
Jacottet 2012: Cross-border Interconnections for a Well-functioning Internal electricity Market	**Barriers**: - Insufficient power to ACER (p. 15) - No incentives for grid companies to invest in cross-border transmission infrastructure (p.14/15)	**High**

Document/Source	Identifies: gaps/ barriers?	Overall relevance
Van Der Veen et al. 2010: Harmonization and Integration of National Balancing Markets in Europe	**Barrier:** - Balancing regimes not yet sufficiently harmonised and integrated **Gaps**: - Harmonization as a regulatory challenge (p. 5,7)	High
Zachmann 2013: Electricity Infrastructure: More Border Crossings for a Borderless Europe?	**Barriers**: - Diverging funding schemes (p.4) - Non-binding infrastructure planning process (p.8) - Uncertain policy making, conflict of interests among stakeholders and countries → Great uncertainties of investment in transmission assets (p. 3/4) **Gaps:** - Harmonisation of rules (in terms of network congestion discrimination, cross-border trade etc.) - Unbundling of TSOs (p.9) - Add a European system management layer (p.10) - Building a network (p.6) - Establish a stringent planning process (p. 10)	High

As mentioned in previous sections, the overall objectives of pursuing a single energy market are to create security of supply, ensure competitiveness through efficiency and facilitate efforts to attain environmental goals. EU policy should help reach one or more of these goals on the basis of a coherent policy mix. With regard to the overall objectives, a number of **key characteristics** of the EU internal energy market have been identified (see figure 11 below). The figure describes in more concrete terms what constitutes an EU energy market and what is needed to bring these objectives closer.

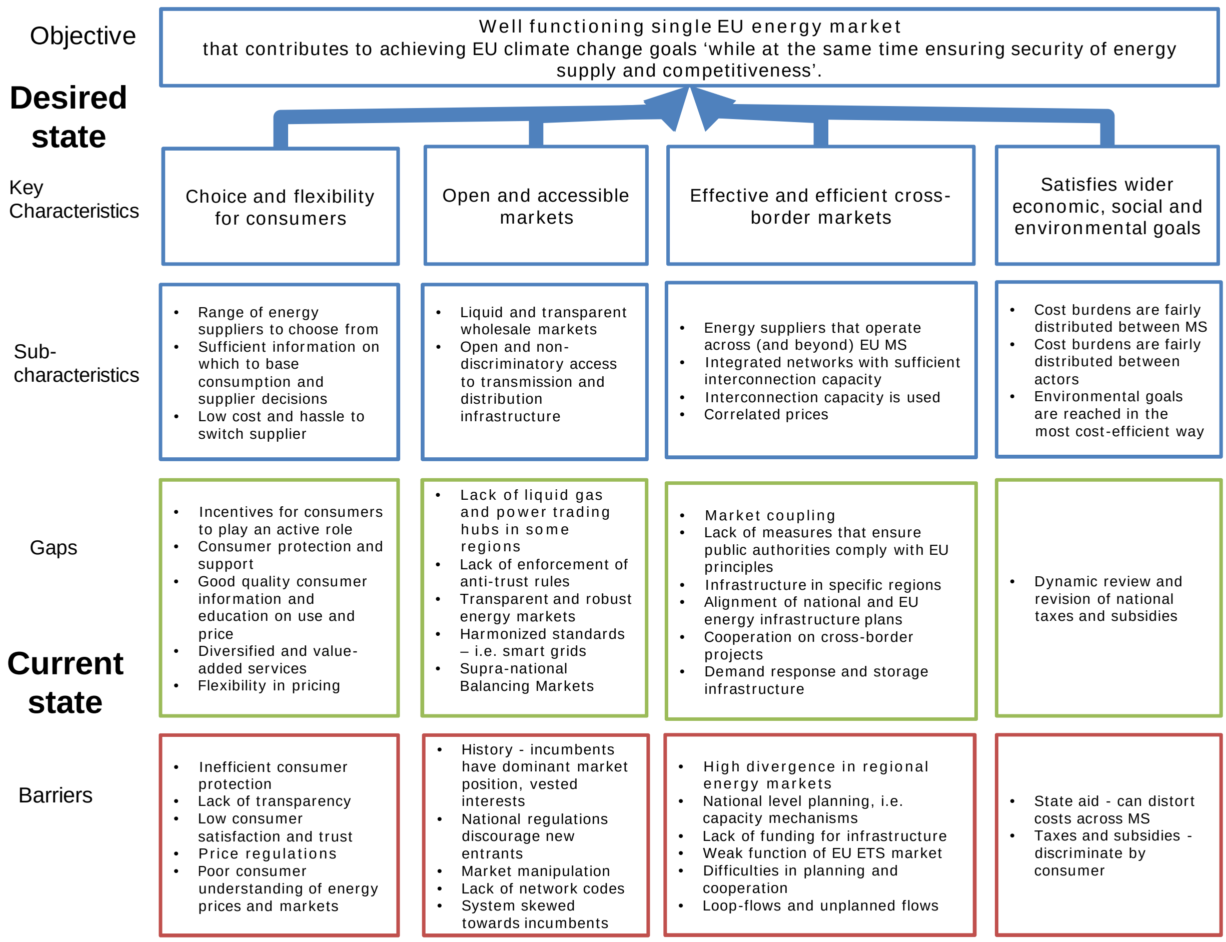
In the figure, gaps and barriers are identified and categorised in juxtaposition to the associated key characteristics of a well-functioning single EU energy market. The 'desired state' of the EU energy market (top part) and its 'current state' (lower part) are presented in such a way to visualise the current situation.

Gaps indicate those characteristics that, by their absence in the current situation, make it differ from the single EU energy market described under the 'desired state' heading. These gaps have been derived from the reviewed literature.

Barriers, in contrast, indicate those characteristics that can currently be observed that prevent the development of an EU energy market as described under the 'Key Characteristics' heading. Again, these barriers have been derived from the reviewed literature.

Among the identified gaps and barriers, some have been singled out for further investigation and have been worked up into case studies, whereby the cost of not addressing them is quantified and added to the 'cost of non-Europe'.

Figure 11: Synoptic view of gaps and barriers



Cases studies[19]

The case studies that follow were chosen on the basis of their assessed relevance, as presented in Figure 12 below. To this end, the gaps and barriers identified were assigned to one of the market or policy segments listed below. The relevant segments are listed in Figure 12, together with the market effect of overcoming a gap or barrier within the according segment.

- **Efficiency of market performance:** Does the gap/barrier impede the demand with the largest value creation from being met with the most cost-effective supply?
- **Efficiency of system operation:** Does the gap/barrier impede power-plant dispatch and energy flows from being economically optimised, thereby decreasing operational costs?
- **Protection of consumers:** Does the gap/barrier impede market prices from being set at a level that allows competitive pressure to minimise prices to consumers?
- **Competition performance:** Does the gap/barrier impede newcomers from entering the market?
- **Security of investment:** Does the gap/barrier impede market actors from investing and, if so, can this be resolved by means of a more static policy approach to increase trust?

Figure 12 also outlines whether improvements in this segment have a direct or indirect impact on social welfare. For example, increasing the efficiency of market performance leads directly to lower supply costs, and this is followed by lower prices and a higher surplus for consumers. In addition, more efficient operation reduces system costs, which in turn reduces the costs of energy delivery for end-consumers.

Figure 12: Relevance of the identified gaps and barriers for the EU

Gap/Barrier		Market/ policy segment mostly affected	Direct/ indirect impact on welfare	Derived relevance for EU
1	Gas and power trading hubs in some regions	Efficiency of market performance and system operation	Direct	Very high
2	Price regulations	Protection of consumers and competitors	Direct	Very high

[19] For more detailed analysis of the four case studies see Annex I on the quantification of the costs of the existing gaps and barriers in the internal energy market by the Institute for European Environmental Policy.

Gap/Barrier		Market/ policy segment mostly affected	Direct/ indirect impact on welfare	Derived relevance for EU
3	Market coupling	Efficiency of market performance and system operation	Direct	Very high
4	Supra-National Balancing Markets	Efficiency of market performance and system operation	Direct	Very high
5	High divergence in regional energy markets	Competition performance	Indirect	High
6	History – incumbents have dominant market position, vested interests	Competition performance and protection of consumers	Indirect	High
7	Loop flows and unplanned flows	Efficiency of system operation	Direct	Very high
8	Dynamic review and revision of national taxes and subsidies	Securities of investment	Indirect	High

The remaining gaps and barriers should not be considered unimportant – they also have very considerable effects on the effort to achieve an integrated market. In certain cases, however, more time is needed, after the gap/barrier is removed, for end-customers to benefit.

This notwithstanding, the cases chosen for analysis in the study convey a broad picture of the existing challenges to the European energy market and help quantify the current cost of non-Europe.

Four illustrative case studies were selected to provide concrete examples of costs and benefits. They were used to verify the relevance of different barriers to the costs faced by different stakeholders and utilities, where feasible.

In each case, a number of questions were raised, notably: What is the rationale for the case study? What is the definition of the relevant gap/barrier? What are the root causes of the gap/barrier? How can the gap/barrier be overcome? What is the cost of the gap/barrier?

Regulated prices

This case addresses the barrier of regulated end-user prices in Member States. A regulated price can be defined as a price that is subject to regulation by a public authority, as opposed to a price that is set exclusively by supply and demand, and hence has an impact on competition in the market.

The main reasons for the regulated prices found in many Member States are: to protect consumers (the primary aim in most Member States, including by limiting the profits of low-cost incumbent suppliers); to encourage competition in markets characterised by strong market concentration; and to support energy-intensive industries by providing electricity at prices regulated below what the market can offer.

Regulated end-user prices can have important negative impacts on the energy market. For instance, where prices do not reflect actual costs economic incentives for investment in new and existing generation capacities and in demand reduction measures, are insufficient[20]. **Such prices do not provide an economic incentive for new players to enter the market and invest in new generation capacity**. This impacts negatively on the overall level of competition and may also affect energy security.

If no other supporting policy and regulatory measures are in place to generate income for the generation and supply of energy, the price generated on the retail market is the only income for the operator. As a consequence, the retail price needs to cover the full retail costs, which are the sum of generation costs, network fees, taxes and any other levies.

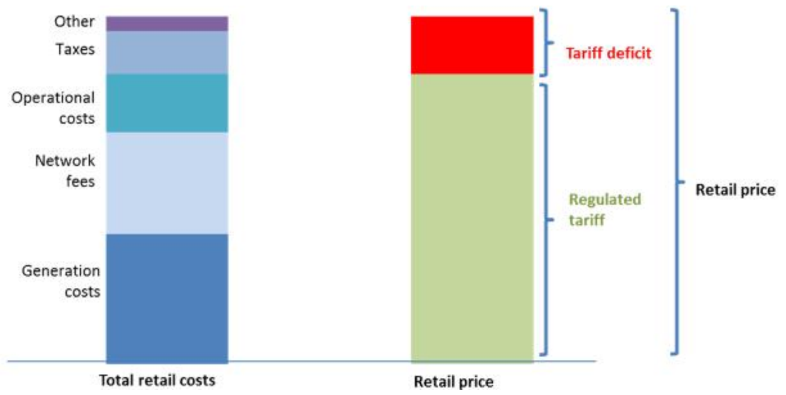
Most importantly, **costs not fully reflected in energy prices need to be covered somehow**. If regulated end-user prices are fixed below the total retail cost, a tariff deficit occurs. This deficit may be borne either by an economic operator in the generation/supply chain, at the cost of incurring losses, or by the electricity 'system', which ultimately means by the taxpayer or the final consumer (both domestic and non domestic).

It should be noted that the legitimate concern of protecting specific groups of vulnerable consumers should not be confused with a need for end-price regulation for all consumers, and that regulated prices, therefore, may be justified under specific conditions and for a limited time only.

In the case of electricity, for example, a 'tariff deficit' (i.e. the difference between the regulated end-user price and the actual retail cost) is accumulated for each kWh of electricity supplied at the regulated tariff.

[20] Unless the deficit is compensated by subsidies.

Figure 13: Illustrative example: tariff deficit[21]



In a country where the retail market price for electricity is EUR 0.20 per kWh for domestic consumers and the regulated tariff is set at EUR 0.18 per kWh, the tariff deficit would be EUR 0.02 per kWh. If there are **15 million domestic consumers** with an average annual electricity consumption of 3 000 kWh, of whom 80 % are supplied at the regulated tariff, **the result is a total tariff deficit of EUR 720 million per year**. One may compare the size of the country in this hypothetical illustrative case (15 million domestic customers) with a country of the size of Spain or Poland.

Against this background, one may ask whether alternative measures should be implemented to ensure adequate protection of vulnerable consumers in liberalised markets in terms of affordable energy. Complementary measures to help end-consumers cope with energy prices could, for instance, include support for the implementation of energy-saving measures. Such measures may reduce final energy consumption and thus keep energy costs under control.

Figure 14: French gas retail market

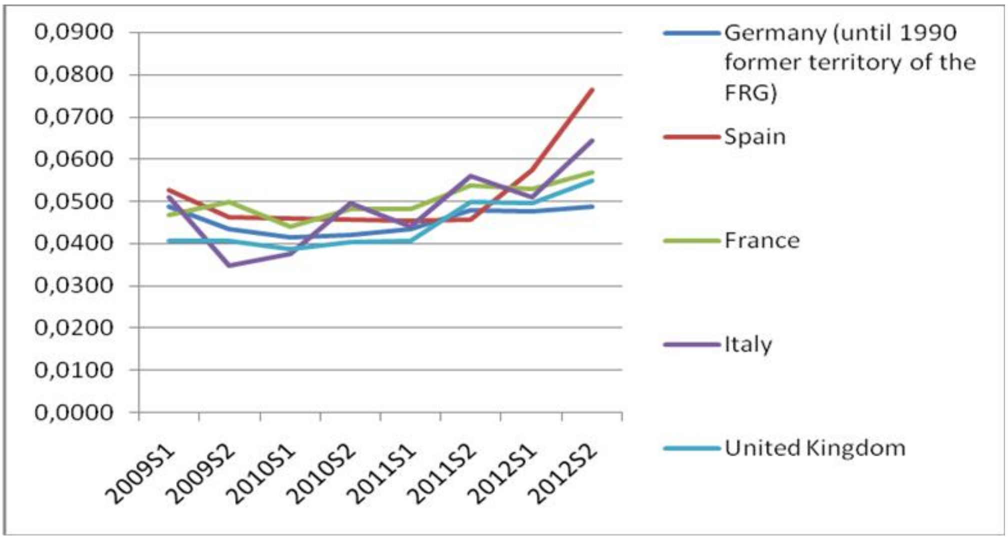
A comparative price study carried out by the French competition authority in March 2013 shows that **a given household could have saved up to EUR 450 per year on its natural gas bill** if it had switched to the best price offer[22]. In its market survey for the fourth quarter of 2012, the CRE (Commission de régulation de l'énergie) notes that a **household could save up to EUR 117 if it switched from the regulated tariff to the best market offer**[23].

21 Data source: Annex I on the quantification of the costs of the existing gaps and barriers in the internal energy market by the Institute for European Environmental Policy.
22 Based on the annual consumption for a household with a natural gas-based heating system for a surface of more than 200 m^2.
23 CRE (2013): Electricity and gas market survey for the fourth quarter of 2012.

In France, around 40 % of the 27 million households use gas for central heating,[24] and around 9 million of those households use the regulated gas tariff[25]. If only half of these 9 million households were to switch to the best market offer, **a total annual saving of EUR 0.5-2 billion could be realised**, on the basis of a possible saving of EUR 117-450 per household.

To give another example, the French competition authority has looked at the dynamics of France's retail market in gas and compared it with other major markets in Europe (the UK, Germany, Italy and Spain). This analysis showed that in countries with no regulated tariffs (the UK and Germany), prices for natural gas have been constantly lower than in those countries with regulated tariffs (France, Italy and Spain).

Figure 15: Gas prices - domestic consumers: biannual prices (EUR/kWh)[26]



Liquid hubs and exchanges

Generally, the availability of liquid hubs and exchanges[27] in an area has a number of advantages. It brings together supply and demand in a certain region, allowing the most cost-efficient source to be used to meet the demand that creates the largest value. It creates a price signal that allows consumers and

[24] Commissariat Général au développement durable (2010) : Le budget 'énergie du logement': les déterminants des écarts entre les ménages, bulletin n°56, June 2010; INSEE (no date): Ménages selon la structure familiale, http://www.insee.fr/fr/themes/tableau.asp?reg_id=0&ref_id=AMFd2
[25] CRE (2013): Electricity and gas market survey for the fourth quarter of 2012.
[26] Data source: Annex I
[27] A liquid wholesale market 'facilitates the buying or selling of a desired commodity or financial instrument quickly, without causing a significant change in its price and without incurring significant transaction costs' (ACER/CEER 2012).

producers to make decisions about their optimal level of production and consumption and about investments in, for example, generation capacity or efficiency measures. As the liquidity of a market increases, it reduces the possibilities for market players to manipulate prices, increasing the soundness of the market results and thereby setting a reference price.

In addition to these and other general advantages, liquid hubs and exchanges also play an important role in the creation of an internal energy market. Firstly, they allow new entrants to buy or sell electricity at any time, reducing volume and sales risk, and providing a source of flexibility for unexpected fluctuations in demand. Secondly, the price signal mentioned above allows potential new entrants to assess the business case for entering a certain market. Thirdly, the element of liquidity is important, as it reduces the risk of price manipulation by incumbent parties, which can be used to harm the interests of new competitors.

Looking at liquid hubs and exchanges is a way to bring together the separate markets of individual Member States[28]. Increased cooperation in trading between countries can have significant economic impacts.

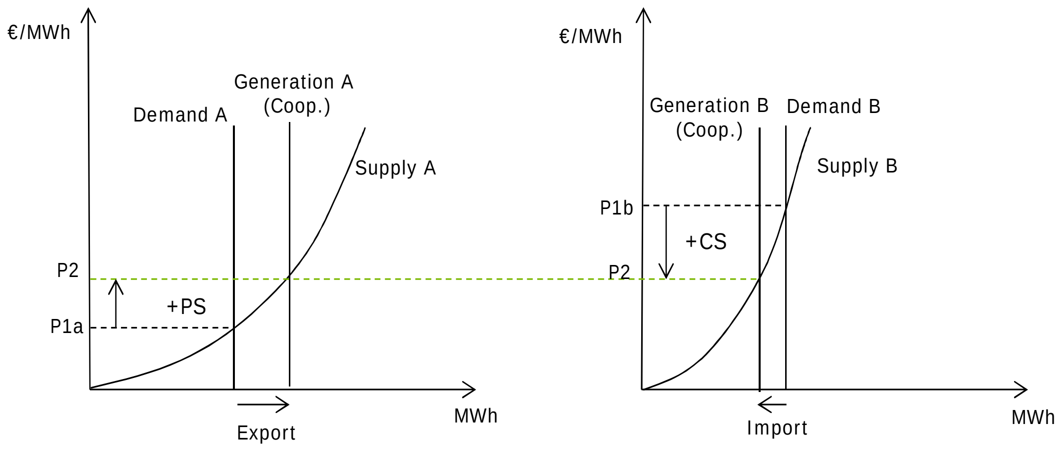
The cost of non-Europe in this specific case could be defined as the loss of social welfare owing to the continued separation of supply and demand curves, which continues owing to a lack of liquid exchanges on facing sides of EU internal borders.

As illustrated in figure 16 below, before cooperation countries show a typical market clearing with equal demand and supply. With increased trading (cooperation), generation in low-price country A increases since there is more cheap generation available. The excess power produced will be exported to high-price country B. Here, generation decreases, resulting in significant cost savings. The missing amount for satisfying the demand can be imported from country A.

Overall, prices converge to p2, country A shows added producers' surplus (+PS) and country B shows added consumers' surplus (+CS).

[28] This assumes that interconnection capacity is available between markets.

Figure 16: Benefits of cross-border trade



In addition, grouping demand together generally lowers the overall capacity that is required to meet peak demand; individual peak uses do not occur simultaneously and therefore show a 'flatter' profile if joined together. This means that a lower-generation capacity is required to provide the same volume of energy. This lowers the cost per unit of energy.

To quantify the particular costs of having non-integrated generation portfolios, and therefore high overall peak loads, the research paper looked at the case of bringing together the demand portfolios of Germany, France, Luxembourg, the Netherlands, Belgium and Austria.

This allows a comparison between a 'non-Europe' situation and a situation in which the aforementioned countries are well integrated through physical intermission capacity, the use of which is optimised by liquid market places in the countries included in the area (see case study: 'Combining demand and thereby lowering the peak demand')[29].

The study showed that in the integrated situation over the whole area, 14 GW less generation capacity was required, or roughly 7 % less than what would be required in the aggregated separate portfolios.

To determine the yearly associated costs, the research paper looked at the **avoided capital costs** and the **avoided fixed operational costs**. These add up to an annual cost of **around EUR 1.64 billion**, providing an indication of the cost of non-Europe in this specific case.

[29] This case is used as an illustration of the value of the integrated energy market. As it happens, the region chosen for study is already well connected, which means that a good share of the calculated benefits have already been captured in the effort to integrate the EU energy markets.

Market coupling[30]

Market coupling refers to efforts to integrate further two markets that are already connected, physically as well as commercially. It also refers to a different way of allocating the capacity between these markets.

Market coupling has the advantage of lowering the transaction costs for energy traders. While it is also possible for traders to bid in different markets without market coupling, this requires reservation of cross-border transmission capacity for each individual party, and extensive market analysis for parties to construct bidding and offering curves for separate markets. Market coupling simplifies this process by allowing parties to define their bidding strategy by looking at a single exchange. Also, price convergence of coupled markets reduces the arbitrage opportunities for traders.

In summary, market coupling ensures that

- the highest bids and lowest offers are matched automatically, which reduces transaction costs and market imperfections;
- profits from arbitrage are left with primary market players on either side of the interconnection;
- reserved capacity cannot be used for gaming.

Market coupling can help price convergence and improve the allocation of cross-border transmission capacity, thereby increasing welfare. It is still far from complete, however, and it poses further challenges to policy. Market coupling means that the allocation of cross-border transmission capacity is based on bids and offers submitted in energy markets, and that market participants do not receive cross-border capacity allocations directly but bid for their energy in one of the coupled exchanges (‘markets’). A subsequent process within the **implicit auction** managed by the ‘coupled’ exchanges ensures that the available cross-border transmission capacity is allocated in a way that minimises the price difference between two or more areas. Thus, social welfare can be increased and any artificial splitting of markets is avoided.

It should be emphasised that markets are not necessarily disconnected if market coupling does not exist. With two exchanges being connected via **explicit auctions**, a trading party can purchase capacity on a cross-border connection,

[30] Market coupling allows players to trade directly between markets by benefiting automatically from cross-border capacities, without having explicitly acquired the required transmission capacity in individual markets. The lack of market coupling prevents prices from acting as effective signals for the direction of power flows between markets. It should therefore be regarded as an effective, market-based tool contributing to the achievement of a single European wholesale electricity market.

and subsequently buy electricity on one exchange, transport it, and sell it on another. This is called **arbitrage.** While providing a business model for the trading party, it brings down the differences between markets (by increasing demand in low-price areas while increasing supply in high-price areas). In theory, the price difference between the countries is equal to the price traders have to pay for transmission capacity. It reflects the congestion rent of cross-border lines and is the result of explicit cross-border capacity auctions.

According to ACER, implicit auctions are to be established extensively by 2014, when the integrated energy market is to be completed. In this particular case, to show the **current cost of non-Europe, a comparison is made of the market results of explicit auctions and those of implicit auctions**. The difference reveals the costs and benefits of a perfect market coupling.

While market coupling is well under way, especially in north-western Europe, there are still many opportunities to pursue it further. A number of barriers stand in the way, however, namely:

- **Insufficient trans-border capacity**: Market coupling is not possible if the physical and contractual capacity is not available. Also, in certain cases, even where there is sufficient physical capacity a further advancement of market coupling can be hindered by differences in the methods used by TSOs (transmission system operators) to calculate transmission capacity. When this happens, the available capacity is set at the lowest common level, which leads to inefficient allocation of cross-border transmission capacities. Also, TSOs are reluctant to allow further market coupling because increased cross-border flows imply increased unplanned cross-border flows. Unplanned flows can affect system security and stability, obliging TSOs to take preventive measures such as reducing the available cross-border capacities. On the other hand, a coupled market can increase the use of cross-border capacity by managing unplanned flows efficiently and preventing TSOs from making less capacity available.

- **Lack of liquid exchanges**: A prerequisite for market coupling is that there are liquid markets – i.e. day-ahead exchanges – to couple. This is not always the case; they are often absent in hubs further away from north-western Europe, such as the PSV in Italy.

- **Administrative barriers**: Market coupling requires close cooperation between market operators and TSOs. In a situation where TSOs on either side of a border have little history of working together – and in some cases still hold separate explicit auctions, and continue to harvest their revenues separately – they may not have enough reason to give up their independence and work together. Market coupling also requires that clearing procedures are sufficiently aligned between exchanges.

- **Distributional effects**: Not all stakeholders benefit from market coupling. Distributional effects mean that traders might lose business opportunities and capacity owners might lose revenues from capacity auctions that reap a large part of the congestion rent and, with prices converging, on one side of the border prices will in fact increase.

Figure 17: Benefits of market integration by ACER/CEER 2012

A quantification of the benefits of market integration was carried out by ACER/CEER in 2012. Here, welfare is measured as the difference between the bid prices and the obtained matched prices. Calculations always refer to two countries and gross welfare benefits include consumers' and producers' surplus as well as congestion rent. Three scenarios were simulated:

1) Historical scenario: the calculation is based on detailed historical information such as network constraints, the exchange participants' order books and available cross-border capacity.
2) Zero scenario: the difference to the historical scenario is the reduction of available cross-border capacity to zero (no cross-border trade)
3) Incremental scenario: cross-border trade is increased by 100 MW compared to the historical scenario.

One example of a potential resulting welfare gain per border (the difference between the historical and the zero scenario) has been quantified. The highest potential welfare gain is on the SE-FI border and is estimated at **EUR 250 million** per year. The incremental gain (difference between the historical and incremental scenario) per border can be as high as **EUR 19 million** (on the IT-FR border) per year and per additional 100 MW interconnector capacity.

In explicit auctions, two different prices are determined on two different markets. One can assume that at least one of the players holds sufficient capacity to allow for arbitrage. Market participants pay for transmission capacities, although the final market clearing levels out physical flows in opposite directions. This means that they pay for capacity that in the end is not used. In a perfect market coupling with implicit auctions, traders would only pay for the net flows. This would result in welfare gains.

For the calculations, the results of the explicit auctions over one year of two decoupled markets – France and Italy – were analysed.

In a situation in which two marketplaces are already connected, physically as well as commercially, market coupling increases the efficiency of capacity allocation. It does this by making sure that capacity is allocated on the basis of supply and demand in the two 'coupled' markets. This has the advantage that market players need not book capacity they may not use, which increases efficiency.

In the specific case study, the research paper looks at the border between France and Italy, comparing the cost of capacity bookings to the value of the capacity and noting the difference as indicative of the efficiency loss.

The results show that implicit auctions between France and Italy would lead to an efficiency gain to the market of **EUR 78.4 million**. This amounts to a reduction in costs of 92 %. When looking at net flows the interconnector is apparently not congested very often, but market participants pay too much for separate purchases of transmission capacity and energy.

Figure 18: Benefit of market coupling[31]

	Cost for explicit auctions (euro)	Cost for implicit auctions (euro)	Benefit of Market coupling (euro)
2012	85.154113,28	6.748.052,26	78.406.061,02

Another way of highlighting existing inefficiencies in the market is to compare the hourly spot-price differential with the actual price of the explicit day-ahead auction. In a perfect market, these prices should be equal since arbitrage is an incentive for participants to enter and trade until the point is reached where no further arbitrage can be gained. This is the point where the auction price and the price differential are equal.

In times of congestion the price differential will be smaller than the corresponding auction price. Looking at the French and Italian markets, those values are not equal, nor is the price differential smaller than the auction price in times of congestion. This is indicative of existing market imperfections that could be explained by the small size of the trading market along the French-Italian border. Also, the risk of trading there could be considerable, given that the volatility of the spot prices, in particular in Italy, is rather high and the price differential is striking, with the French spot price ranging between EUR 40 and EUR 50 per MWh and the Italian price ranging between EUR 60 and EUR 70 per MWh.

[31] Data source: Annex I on the quantification of the costs of the existing gaps and barriers in the internal energy market by the Institute for European Environmental Policy.

The imperfections shown here are derived by subtracting the spot price differential from the corresponding auction price during hours of congestion. The value outlined is a negative euro value showing the imperfections on both sides of the border. It also becomes obvious that most of the time France is exporting power to Italy, resulting in clearly larger imperfections on the French side of the border. The values derived point to the urgency of establishing market coupling on the French and Italian border.

Figure 19: Imperfections in the cross-border trade between France and Italy

	Market imperfections IT (euro)	Market imperfections FR (euro)
2012	-58.052,23	-256.413,71

As it was assumed that in a situation where market coupling is in place this market imperfection is removed, the quantified market imperfection could represent the cost of non-Europe.

Balancing markets

After the closing of the day-ahead market, usually 16-40 hours ahead of delivery, and the subsequent intra-day markets, the markets close one or two hours before delivery. This moment is called 'gate-closure'. After this moment, generally the TSO starts managing supply and demand in a single-buyer system. This is usually called the 'balancing market'.

ENTSO-E describes balancing as 'the process through which TSOs manage the physical equilibrium between injections (generation) and withdrawals (consumption) on the grid'. It entails two key activities:

- **Ensuring sufficient reserves:** Ahead of real time (i.e. before the gate closure time of the last market in which participants can trade energy), TSOs secure access to power capacity for control purposes in their control area.
- **Managing balancing energy:** Close to and in real time, the TSOs activate these reserves or other available resources to maintain the balance within their control area. This may happen automatically or be done manually by the TSOs.

The development of effective cross-border balancing schemes can increase social welfare and can help support the cost-effective integration of renewable energy into the European electricity system, in line with energy and climate policy goals. It can also enhance competition in markets for reserves and balancing energy.

Compared to day-ahead markets, the intra-day and balancing markets lag behind at the level of integration. For this reason this particular case is used to highlight the specific gaps and barriers related to the intra-day and balancing markets.

Balancing markets are mostly organised in national or even sub-national systems that are largely operated separately of each other. This means that each balancing region provides the capacity and balancing power available within that region. Generally, there are a number of barriers that can explain this lack of interchange between balancing zones, notably:

- **Mandatory offerings of reserve capacity and regulated prices**: Some TSOs apply mandatory reservations of capacity for all generation that is online in their balancing area. Also, some balancing regimes pay regulated prices to providers of balancing power. Both arrangements distort the market and impede the formation of commercial and market-based pricing, with an effect similar to that of regulated prices described in the previous case study.
- **Differences between balancing regimes**: Differences between balancing regimes impede the materialisation of a transparent market for balancing services. For example, gate closure times are different between regimes. Removing the differences will allow providers to compare different markets, and to make their bids and offers in the markets where they have the most value.
- **Disagreement about level of optimal reservation of transfer capacity:** If reserve capacity for one country is located in another country, it must be possible for the balancing energy to be transported across the border when needed. This means there must be 'firm'[32] cross-border capacity available to connect the generation to the load. There is currently no agreement on the appropriate levels of capacity reservation.

There is much to be gained by the further integration of balancing markets. Some examples:

- **Lower reserve costs**: Capacity reserves for balancing purposes are unused a significant part of the time. When these are shared between TSOs, the overall requirement for reserve capacity can be lowered, as there is an overlap insofar as it is statistically not to be expected that both TSOs will require the reserve capacity at the same time. In addition, in some cases the imbalance in one system can be offset by an opposite imbalance in the

[32] Firm means capacity that is guaranteed to be available and uninterruptable. This is a contractual rather than a physical term, but it does strongly interact with the level to which physical capacity can be guaranteed.

other. This will lower the costs to be paid for reserve capacity per end-user. This effect will be increased by the fact that the most expensive capacity reserve will be avoided.

- **Lower energy balancing costs**: Not all balancing power is provided by contracted reserve capacity. Generation capacity and other sources of flexibility are also tapped into through online pricing signals. This allows market players to provide balancing power without a contractual relation with a TSO. Enlarging the pool of potential providers here will allow the lowest-cost providers over the whole region to respond first.

- There could also be associated benefits such as the **facilitation of renewable energy**: keeping balancing costs as low as possible will limit the costs of the transition towards a sustainable energy supply. Larger amounts of intermittent sources will increase the demand for balancing services, potentially driving up the costs of ancillary services. A joint, EU-wide system would allow the provision of these services at the lowest possible cost while increasing security of supply[33].

The research paper commissioned for the purpose of this Cost of Non-Europe report developed a number of scenarios, each corresponding to a different level of integration, with associated requirements and benefits:

- **Netting**: Two balancing regions 'net' their imbalances. This means that in case of a counter-imbalance (one region has a surplus while another has a shortage) this is netted by sending the surplus over the border to compensate for the shortage. In many cases this obviates the need of either TSO to make use of its balancing powers. However, it does not diminish the need for reserve capacity – if action is needed, both systems still rely on their respective reserve capacities.

  Netting is being applied in the International Grid Control Cooperation (IGCC), which has Germany at its centre. According to figures presented on the TenneT website, **each year** the IGCC is making savings of around **EUR 300 million**. This value is created by netting the imbalances of six cooperating TSOs. This is the first of the steps described above towards integrating balancing regimes, as each balancing zone still has its separate balancing reserves, and still dispatches these independently. This means that additional benefits can be expected when further steps are taken towards balancing market integration. The value of netting is not necessary distributed equally between balancing zones.

[33] Assuming sufficient interconnection capacity is available.

- **Intraregional trading in balancing services**: This refers to the possibility for balancing services providers to sell balancing energy not only to the TSO in their own area, but also to TSOs in other areas[34].

  The advantage of having cross-border provision of balancing services is that providers in low-cost balancing zones can benefit from higher prices in other zones, which will bring down the overall level of balancing costs.

  It is not possible to provide a quantification of these costs, given the wide array of possible implementation modalities and the difficulty of creating a complete overview of bids and offers in the separate and combined markets. Nonetheless, a qualitative assessment has suggested that the additional price efficiency would be limited, given the potentially sub-optimal allocation of cross-border capacity, the lack of transparency – owing to the multitude of markets that balance service providers can bid into – and the possibilities for gaming[35].

- **Common merit order list**: This entails the creation of a single balancing market in which providers from the whole region can offer bids for balancing energy and capacity, the introduction of downward regulation and the creation of a centrally balanced, common control area.

  This results in a 'common merit order', which means that dispatch of reserve capacity will take place in order of marginal cost, disregarding the location of the specific asset and allowing of course for the availability of cross-border capacity.

  A common balancing market would create large efficiency gains as, at all times, the lowest-cost capacity and balancing energy would be used. This is estimated to be two to three times the value of netting. This would amount to a gain of **EUR 600-900 million per annum**.

[34] See for example ACER, France-UK-Ireland Electricity Regional Initiative Work Plan 2011-2014.
[35] If balancing markets are badly harmonised, it is possible that balance service providers will sell balancing energy in a higher priced balancing zone and subsequently not deliver the energy, which will merely incur the costs of their own, lower priced, balancing zone.

Conclusion: Why should the EU play a more proactive role in setting the scene?

If properly shaped and managed in a pragmatic way, the energy policy has the prospect of being a thoroughly European project, reducing costs for all Europeans, and one which further integrates the peripheral Member States that can benefit from this ambitious project. As shown in this report, a fully functioning and competitive internal energy market could overcome the gaps and barriers assessed and deliver further economic gains.

This report demonstrates that a range of gaps and barriers still remain to be overcome in the internal energy market and that each may entail a specific cost for EU consumers, whether households or businesses.

In particular, the report looked at four case studies and concluded that:

- regulated prices in a country with 15 million final consumers (a country of the size of Spain or Poland) could generate an annual tariff deficit (i.e. the difference between the regulated end-user price and the actual retail cost) **of about EUR 720 million**;
- there is a great divergence within the EU of level of liquidity of gas hubs and electricity exchanges. To illustrate this, a situation of trading was compared to a situation of no trading between generation portfolios in five countries. The difference was estimated to reduce the requirement for capacity by 7%. Taking into account capital and operational costs of generation, **this could represent a cost of EUR 1,64 billion per year**;
- market coupling could produce a saving of around **EUR 78 million per year on the border of Italy and France alone**;
- a common balancing market would create large efficiency gains as, at all times, the lowest-cost capacity and balancing energy would be used. This would amount to a gain of **EUR 600-900 million per year.**

Inertia is not a solution when facing these challenges, on the contrary fully grasping and enabling the growth opportunities of tomorrow requires fostering action from EU policies, industry and society. Sustainable potential benefits in economic, social and environmental terms can be achieved through continuous and stable commitments and policy frameworks, especially in economically challenging times.

Achieving a truly integrated internal energy market will also influence the role of the EU on the international scene. If no action is taken, the EU's energy dependency is predicted to climb from 55 % in 2008 to 70 % in 2030[36]. Since the Union is one of the world's largest energy markets, with over 500 million consumers, this persistent external dependency could harm its geopolitical position.

The EU knows what measures are needed to achieve the internal energy market and to bridge the persisting gaps. These measures need to be implemented. In order to do so, we need the political will to carry them out, as well as engagement and committed action at all levels, both EU and national.

The report of the rapporteur Jerzy Buzek lists a number of actions that are urgently needed to enable further integration of the market. Three of these actions are particularly important if the EU is to tackle the new energy landscape and lead the way in overcoming the well-known gaps and barriers:

Firstly, Member States must correctly and rapidly implement existing EU energy market legislation. This may sound obvious, but many infringement cases are still being pursued against Member States for non-transposition or non-compliance regarding the internal energy market legislative packages. The four case studies examined in this study confirm that the need for additional regulation is limited. In most cases, legislation is in place, but more effective implementation is urgently needed.

Secondly, the market should be consumer-friendly. As the real core of the market, consumers should benefit from affordable prices, clear information and choice. Energy should be affordable, because the price of energy affects not only households but the price of all goods and services.

Finally, infrastructure must be expanded and upgraded, particularly where cross-border interconnections are concerned, so to enable full integration of national markets. Facilitating cross-border trade by building interconnectors, modernising existing infrastructure and building new-generation transmission, distribution and storage infrastructure are essential for energy security and supply. Very significant investments are required, and obviously a part of these investments may not be commercially viable and will require funding from national and EU sources.

[36] European Commission: 'A European Strategy for Sustainable, Competitive and Secure Energy' (COM(2006)0105).

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