european
council for an
energy efficient
economy

European competitiveness and energy efficiency: Focusing on the real issue

A discussion paper

Prepared by the European Council for an Energy Efficient Economy (eceee) with support from Energifonden.

21 May 2013

eceee SECRETARIAT
SVEAVÄGEN 98 IV
SE-113 50 STOCKHOLM
SWEDEN

www.eceee.org
eceee@eceee.org

May 2013 © European Council for an Energy Efficient Economy

european council for an energy efficient economy

European competitiveness and energy efficiency: Focusing on the real issue

A discussion paper, 21 May 2013

Table of Contents

Summary and key points 2
Introduction 4
What is competitiveness? 4
The concern 5
EU initiatives to support improved competitiveness 7
Competitiveness update 9
Why improved energy efficiency is a winner 13
Competing for customer favour (USP vs. UBR) 13
Industry and jobs 14
Where we are now in improving energy efficiency 15
Final remarks 16

The views expressed in this discussion paper do not necessarily represent the views of the European Council for an Energy Efficient Economy.

May 2013 © European Council for an Energy Efficient Economy

eceee SECRETARIAT
SVEAVÄGEN 98 IV
SE-113 50 STOCKHOLM
SWEDEN

www.eceee.org
eceee@eceee.org

Summary and key points

The debate on the competitiveness of Europe seems to have started on the wrong foot. In a Council paper, "Energy challenges and policy ", that is intended to guide the discussion of the European Council May 22, it is repeatedly mentioned that energy prices in Europe are high and it is even stated that the lower gas prices in the US "erode" the competitiveness of European industry. This is a gross exaggeration, in addition to being quite misleading.

Firstly, it is important to realise that, while energy costs may be a problem, energy prices are not necessarily the cause of high costs – on the contrary. Application of energy efficiency reduces the volume of energy used and since costs are the product of price and volume, energy efficiency mitigates accordingly the disadvantage that higher prices may have.

It is well documented both in European studies and in those of the International Energy Agency that there is a huge potential for cost-efficient reduction of energy use even in the short term and even with existing technologies. So, the first response to high costs (in particular when they are induced by high prices) should be vigorous application of energy efficiency.

Secondly, it should be remembered that when industries in different parts of the world compete, energy price is only one component and production factor. Still, looking only at the energy supply companies in various parts of the world, they also have to face generation and distribution problems with e.g. black-outs and risks for disturbances from external factors, in addition to increasing environmental constraints. A higher price for the input of energy can and almost invariably will be offset by higher security of supply and less exposure to risks.

Thirdly, competitiveness is to a considerable degree an issue of quality rather than of price for the products. European industry should not to any large extent compete with low-priced products. Focusing on price competition rather than innovation and high quality when Europe tries to get out of a long and deep financial crisis might be the worst thing that our governments could do to their industry!

Energy efficiency will work in a number of important ways to boost the competitiveness of Europe. It will (A) in the short term, help solve the cost problems; and (B) in the longer term, it will lay the foundation for innovation and establishment of a new and invigorated industry for both sustainable energy services and for high quality products for rapidly changing domestic and global markets.

In addition to and as a consequence of these investments in energy efficiency, (C) the improved labour productivity, increased competitiveness and larger market shares will lead to higher economic growth, lower public sector payments for unemployment benefits, and higher net VAT and income tax receipts. This will significantly strengthen national budgets and help retire the current often-overwhelming public debt in many EU member States. [1]

It is, however, well known that energy efficiency, in spite of its known and obvious advantages, is still a "hard sell". There are many reasons for this and it is very positive that the EU has begun to address several of them. Financing, business models, certification, labelling, performance requirement design – the European Union has already taken several important initiatives to boost energy efficiency.

[1] This chain of macro-economic events is well illustrated in the building renovation sector, which represents 40% of EU energy consumption, where ambitious energy cost reductions are calculated to lead to public sector budget improvements of 128 billion euro between now and 2017. Multiple benefits of investing in energy efficient renovation of buildings – Impact on Public Finances, p.21. Copenhagen Economics, October 2012.

The biggest remaining problem is probably that energy efficiency can be achieved in so many ways, requiring so many individual decisions, and that it will take some time to make all the changes in a building or an industry. Energy efficiency is not difficult but it is complicated! Energy management (in a general sense) has to be developed in many forms and for many purposes.

The many benefits of energy efficiency need to be made more visible, more understandable and more quantified. All the co-benefits, both macro- and micro-economic, private and well as societal, need to be part of the argument. They are sometimes resulting in what some people call rebound, which is acceptable, as long as there is some additional benefit, and the overall result is still a reduction of energy use compared to what would otherwise have been the case.

There is also a need to better understand the customer/user perspective. The traditional perspective is to assume that the consumer is rational and will eventually make the choice of energy efficiency. Experience is, however, not encouraging for such beliefs. It is therefore important to also make use of regulations and minimum performance requirements, as well as behavioural economics to find out how campaigns and technology should be designed. But also to make better use of behavioural sciences to understand how habits are formed, how cultures are developed, how needs are created and satisfied, and if, how and when these can and should be changed.

A strategic framework for increasing the competitiveness off Europe should be:

1. Map out and harvest the existing cost-effective potential for energy efficiency, based on life-cycle costing analysis. This will reduce the bills and costs for energy for enterprises as well as individual consumers, and take the pressure off the problem of import dependency and uncertainty about future price increases;
2. Develop the methodology for implementation of energy efficiency in programmes that encourage new business models, smarter systems and a more holistic approach in dealing with the market and the customers. Behavioural economics is a key element;
3. In this process to ensure that technologies and applications for appliances, equipment design engineering, and systems development are put in place and made fit for penetrating global markets while meeting domestic market needs, with European industry as leaders, both regarding innovation, and understanding the needs of the users of the services provided by energy and energy-related products;
4. Fine-tune these activities for a roll out of distributed generation with renewables in smart grids, as well as full regard to passive technologies; and
5. Position Europe as a market leader in sustainable energy and resource efficiency for the long haul.

Introduction

Economies have to deal within dynamic contexts. To name but a few, there is the need to confront changing business cycles, national and international policy priorities, evolving trade conditions (including exchange rates and trade barriers), introduction of new technologies, and changing consumer preferences. Energy issues are certainly part of that dynamic context.

The situation is much different in 2013 from what it was ten years ago. The current financial crisis that started in 2007-2008 is taking its toll on most economies as a whole and on business and consumer confidence. Projections on when the cycle will start an upswing provide little comfort.

Understandably, Europe is looking over its proverbial shoulder to see the advantages that other countries and regions are having, seemingly placing Europe in an even more difficult position. Are these advantages real? Will they put Europe at an even greater disadvantage? What needs to be done to the current policy framework to improve sustainability?

In this context the issue of competitiveness comes up. Is Europe competitive? Can it be more competitive? Is competitiveness really an issue at all?

This paper looks at an important element of energy policy – improved energy efficiency – to see if the current policy framework is having a negative impact or, more importantly, whether the policy in fact needs to be bolstered because it has positive macro-economic benefits that have not been fully realised.

This discussion paper also considers the example of the growing energy price differentials between the US and Europe. It first looks at what the real issue concerning competitiveness is, so that there is a common understanding of the problem. It then looks at the on-going efforts and policies of the EU in improving competitiveness. That is followed by a short discussion on sustainability, one of the keystones of the EU policy framework and how competitiveness is integrated into the sustainability concerns. Finally, the paper considers the role improved energy efficiency can play in supporting the improved competitiveness of the European economy.

What is competitiveness?

In 1990, Michael Porter published an article in the Harvard Business Review, stating:

> *Competitiveness is defined by the productivity with which a nation utilizes its human, capital and natural resources. To understand competitiveness, the starting point must be a nation's underlying sources of prosperity. A country's standard of living is determined by the productivity of its economy, which is measured by the value of goods and services produced per unit of its resources. Productivity depends both on the value of a nation's products and services – measured by the prices they can command in open markets – and by the efficiency with which they can be produced. Productivity is also dependent on the ability of an economy to mobilize its available human resources.*
>
> *True competitiveness, then, is measured by productivity. Productivity allows a nation to support high wages, attractive returns to capital, a strong currency – and with them, a high standard of living. What matters most is not exports per se or whether firms are domestic or foreign-owned, but the nature and productivity of the business activities taking place in a particular country. Purely local industries also count for competitiveness, because their productivity not only sets their wages but also has a major influence on the cost of doing business and the cost of living in the country.*
>
> *National prosperity is created, not inherited. It does not grow out of a country's natural endowments, its labour pool, its interest rates, or its currency's value, as classical economics insists.*

> *A nation's competitiveness depends on the capacity of its industry to innovate and upgrade. Companies gain advantage against the world's best competitors because of pressure and challenge. They benefit from having strong domestic rivals, aggressive home-based suppliers, and demanding local customers.*

Since then, his hypothesis, that environmental regulation can trigger innovation, has been thoroughly debated over 20 years and as a result the conditions for its validity have been clarified. The hypothesis is nowadays quoted in two versions. One (weak) says that: "properly designed environmental regulation may spur innovation" and seems to be generally accepted. The other (strong) says that: "environmental regulation often (but not always) leads to an increase in firm competitiveness". [2]

A more sceptical study claims that for the hypothesis to be valid, and actions to produce results, it requires "not only an environmental problem but also some additional market imperfection". With this remark, it is also noted that research on bounded rationality and behavioural economics has shown that in particular decisions that concern energy efficiency represent such situations of imperfect market conditions. The decisions on energy efficiency are complex and the economic agents "employ the use of heuristics to make decisions rather than a strict rigid rule of optimisation". [3]

In the on-going discussion on competitiveness there is much focus on energy prices which risks narrowing down to relevant but not sufficient conditions. The issue for competitiveness of products is the cost of energy and not only the price. Since there are huge opportunities for cost-efficient substitution of energy, the total costs may be reduced by the use of less energy when the prices are higher (as recorded and quoted below). [4]

The present focus also covers the fact that competitiveness has two dimensions. One is price competition between homogenous products and the other is quality competition between products with different characteristics. Europe should take aim at quality competition rather than price competition.

In the debate there is also much discussion about the nominal prices of energy and the perceived risks of outsourcing and leakage. Analysis of the full value of conditions for energy supply in different countries shows that European generation has a high quality with low risks for disturbances in supply and is less vulnerable for problems with supply of primary resources. In the ranking made by the World Economic Forum all European countries rank higher than its competitors. [5]

The concern

While looking at the economy as a whole, there will be increased attention to industry since that is the sector with most of the trade and where the issue of competitiveness is discussed most often.

Table 1 provides a clear indication of the widening gap between the US and selected EU member states in the average natural gas prices paid by industry. Most interesting is to see the change in 2008 and 2009 where prices dropped significantly for US industry. It should be noted that the UK had by far the lowest prices at the turn of the century and remained below US prices until after 2005.

---

[2] The Porter Hypothesis at 20: Can Environmental Regulation Enhance Innovation and Competitiveness? Ambec et.al. http://www.rff.org/documents/RFF-DP-11-01.pdf

[3] Environmental policy without costs? A review of the Porter hypothesis. Brännlund and Lundgren. http://www.irere.net/journal.aspx?product=IRERE&doi=101.00000020

[4] European Competitiveness Report 2012, Reaping the Benefits of Globalization (Staff Working Document SWD(2012)299 final).

[5] http://www3.weforum.org/docs/WEF_EN_NewEnergyArchitecturePerformanceIndex_Report_2013.pdf

For the US, the price drop was mainly due to the exploitation of domestic natural gas through hydraulic fracturing.

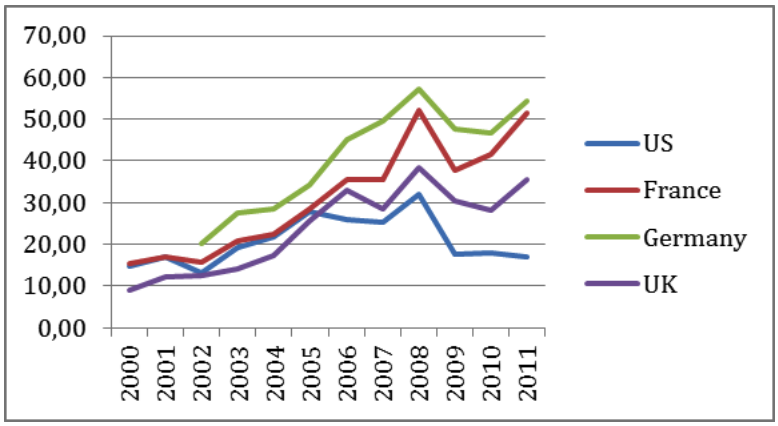
Table 1: **Natural gas prices for industry in US$ (avg. price per MWh on a gross calorific value basis)**

Country	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
US	14.70	17.08	13.28	19.24	21.67	27.97	25.97	25.26	31.93	17.59	17.83	16.96
France	15.31	16.95	15.69	20.79	22.54	28.39	35.44	35.61	52.22	37.75	41.67	51.52
Germany	16.61		20.25	27.54	28.65	34.25	45.10	49.53	57.21	47.76	46.56	54.37
UK	9.00	12.07	12.59	14.15	17.43	25.69	32.98	28.63	38.35	30.36	28.27	35.51

Source: IEA, Natural Gas Information 2012

Figure 1 provides a visual depiction of the evolution of natural gas prices in the selected countries. The trend shows that the gap is increasing.

Figure 1: **Evolution of Natural Gas Prices 2000 – 2011 in Selected Countries (average price per MWh in US$ on a gross calorific value basis)**



Source: IEA, Natural Gas Information 2012

Table 2 shows the use of natural gas in industry in the selected countries. The US has the largest share at 39.8% in 2010 while France had the lowest share at 31.0%. This does not include the natural gas used for power generation.

Table 2: **Natural gas use in industry in 2010 (Mtoe)**

Country	Natural gas in industry TFC	Total Industry TFC	Share of Natural Gas in Industry TFC (%)
US	111.31	279.95	39.8
France	9.09	29.32	31.0
Germany	19.58	55.14	35.5
UK	9.44	26.45	35.7

Source: IEA, Energy Balances of OECD Countries, 2012

Some argue that the differences are in part due to hydraulic fracturing in the US but also due to contractual differences in Europe and the US. The US has essentially stopped linking the price of natural gas to the price of oil, while in Europe that has not occurred. Also, there are many more long-term take-or-pay contracts in Europe that add to the costs.

It is important to note that in the temptation to replicate the US experiences of shale-gas exploitation there is a risk of self-deception. In a report from Harvard Kennedy School it is noted that:

> *"The shale/tight oil boom in the United States is not a temporary bubble, but the most important revolution in the oil sector in decades. It will probably trigger worldwide emulation, although the U.S. boom is difficult to be replicated given the unique features of the U.S. oil (and gas) arena."* [6]

The argument that gas prices are detrimental to competitiveness should not be accepted without questioning. Such differences in price exist for many products and materials and do not automatically result in advantages or disadvantages. Higher prices are on the contrary a driver for development not the least when it comes to resource efficiency. A good example of this can be found in Danish industry, which has had the highest natural gas prices in the EU for the past three years, yet maintained through improved energy efficiency a competitive industry and a sound economy[7].

It is well established that the European economies are operating on a suboptimal level. The waste is estimated to be in the area of double-digit percentages, which means that we should be able to have the same services (light, power, heating and cooling) with 20-30% and even less energy use, in the short term, and at less cost, just by application of today's available technologies.

This has been well documented in EU-studies in preparation of the 2012 Energy Efficiency Directive, in the IEA World Energy Outlook 2012 and in studies made for the German Ministry of Environment. Buildings, for example, in the medium term are estimated to have an 80% improvement potential, and industry over 50%.[8]

A change towards better utilisation of resources will however not happen overnight since it will require changes in infrastructure and in production processes that are already in place and well-functioning today. Such changes will have to be timed to suitable occasions of renovation, retooling and the like. And even if such changes make economic sense they may be prevented for reasons of decision-making in companies that are not always governed by rationality.

The changes are however of paramount importance to Europe where the capital turnover is comparatively slower than in the new fast-growing economies. These countries can pick-up new technologies that make better use of resources much faster. The old economies may rather soon find themselves in a disadvantageous position from a competitiveness point of view.

What does this mean for the current "dilemma" of improving competitiveness in today's business climate? For this, it is important to start by reviewing what the EU is doing to improve competitiveness and what the EC is saying about today's competitive position.

EU initiatives to support improved competitiveness

In 2010, the EC published a Communication on An Integrated Industrial Policy for the Globalisation Era: Putting Competitiveness and Sustainability at Centre Stage [COM(2010) 614]. The Industrial Policy Communication was adopted in order to favour a recovery of industrial investments and to reverse the decline in manufacturing's share of EU GDP. The Communication identified four pillars for a reinforced industrial policy:

1. Innovation and investment in six priority action areas,
2. Access to internal and international markets,
3. Access to finance
4. Human capital and skills.

[6] http://belfercenter.ksg.harvard.edu/files/Oil%20-%20The%20Next%20Revolution.pdf

[7] http://epp.eurostat.ec.europa.eu/statistics_explained/index.php/Electricity_and_natural_gas_price_statistics

[8] http://www.iea.org/publications/freepublications/publication/English.pdf

The Communication proposed a "fresh approach to industrial policy that will put the EU economy on a dynamic growth path strengthening EU competitiveness, providing growth and jobs, and enabling the transition to a low-carbon and resource-efficient economy." Importantly, the Communication further stated:

> *A vibrant and highly competitive EU manufacturing sector can provide the resources and many of the solutions for the societal challenges facing the EU, such as climate change, health and the ageing population, and the development of a healthy, safe and secure society and thriving social market economy.*
>
> *The necessary transition to a more sustainable, inclusive and resource-efficient economy will have to be supported by both horizontal and sectoral policies at all levels and will require strengthened European governance and social dialogue.*

The fresh approach included:

- Bringing together a horizontal basis and sectoral application.
- The whole value and supply chain must be considered, from access to energy and raw materials to after-sale services and the recycling of materials. And some parts of this chain are bound to be outside Europe; hence it is necessary for all industries to have a 'globalisation reflex'.
- The Commission will regularly report on the EU's and Member States' competitiveness and industrial policies and performance.

The framework included:

- Competitiveness-proofing and implementing smart regulation, and
- Improving access to finance for businesses

In 2012, the Commission published the European Competitiveness Report 2012, Reaping the Benefits of Globalization (Staff Working Document SWD(2012)299 final). One of the important topics of the report was "energy efficiency as a determinant of export performance." There is detailed analysis on energy efficiency that deserves more attention. However, the main points are: [9]

- In Europe, the EU-12 economies improved significantly their initial low levels of energy efficiency and the European Union as a whole reinforced its lead in terms of overall energy efficiency.
- The analysis highlighted the role of the substitution of energy for capital —in the sense of a more energy-efficient technology embodied in capital goods — that was observed over time in almost all countries.
- The overall increase in the relative price of energy is one of its many side effects, often seen as partly due to the increasing energy demand from developing countries. The rise in the price of energy and volatility levels have significant and highly differentiated impacts on the competitiveness of countries, sectors, firms or households.
- For EU countries (as a whole) globalisation appears to also represent additional channels for minimising the negative competitiveness effects of the energy-price increases. Overall, EU countries have been able to export more and at the same reduce significantly the energy embodied in their exports, in particular the proportion of energy that is sourced domestically.
- The analysis covered EU-12, EU-15, US and Japan and showed that energy use per unit of exports declined in European (particularly in EU-12) countries over time in the period 1995-2009.
- As expected, the share of energy content in exports sourced from foreign countries (i.e. energy embodied in intermediate imports) has been rising everywhere.

[9] See pp.113-114.

- Along with globalisation of production and increasing vertical specialisation, the European economies have overall reduced in relative terms their vulnerability to potential external-competitiveness losses as a result of an increase in the relative price of energy.
- EU firms that introduce[d] new products with energy-saving features tend to be more successful innovators, particularly in the case of manufacturing firms. Controlling for other determinants of innovation success in the market, these eco-innovators sell more new products (in terms of the firm's total sales) than conventional innovators, which may represent an important competitive advantage.
- EU firms are leading in the growing phenomenon of internationalisation and in cross-border 'eco-investment' in clean and more energy-efficient technologies and products and services, exploiting many business opportunities offered by the global environmental and societal goals and challenges ahead.

This Communication, a staff-working document from DG Enterprise & Industry was very forthright in its support of the benefits of energy efficiency to date.

The March 2011 Energy Efficiency Plan prepared by DG ENER [COM (2011) 109 FINAL] also gave considerable emphasis to energy efficiency's role in improving competitiveness. Some of the important excerpts are:

> *About 20%[10] of the EU's primary energy consumption is accounted for by industry. This is the sector where progress in energy efficiency has been greatest (with a 30% improvement in energy intensity over 20 years). Nevertheless, worthwhile energy saving opportunities remain. The Emissions Trading Scheme and the Energy Taxation Directive (including its planned reform) [11] should encourage take-up of some of these opportunities. In addition, obstacles like the lack of information, lack of access to capital, and short term pressures of the business environment should also be addressed. Overcoming these obstacles would reduce energy bills and improve competitiveness. At a time of increasingly scarce energy resources worldwide, expertise in energy efficient processes, technologies[12] and services can also be turned into a new export business, giving a competitive edge to European industries.*

The plan further discussed financing obstacles for SMEs, the need for audits in industry, research & innovation, use of Ecodesign, and the promotion of voluntary agreements. Many of these are in the 2012 Energy Efficiency Directive.

Competitiveness update

In October 2012, the Commission came out with a Communication entitled A Stronger European Industry for Growth and Economic Recovery, Industrial Policy Communication Update, COM(2012) 582 final, 10.10.2012. It provides some valuable insight as to the state of competitiveness in Europe and putting it in a global context. The following box provides some excerpts:

[10] In 2008. See Eurostat, Energy, transport and environment indicators, 2010 edition.

[11] Directive 2003/96/EC.

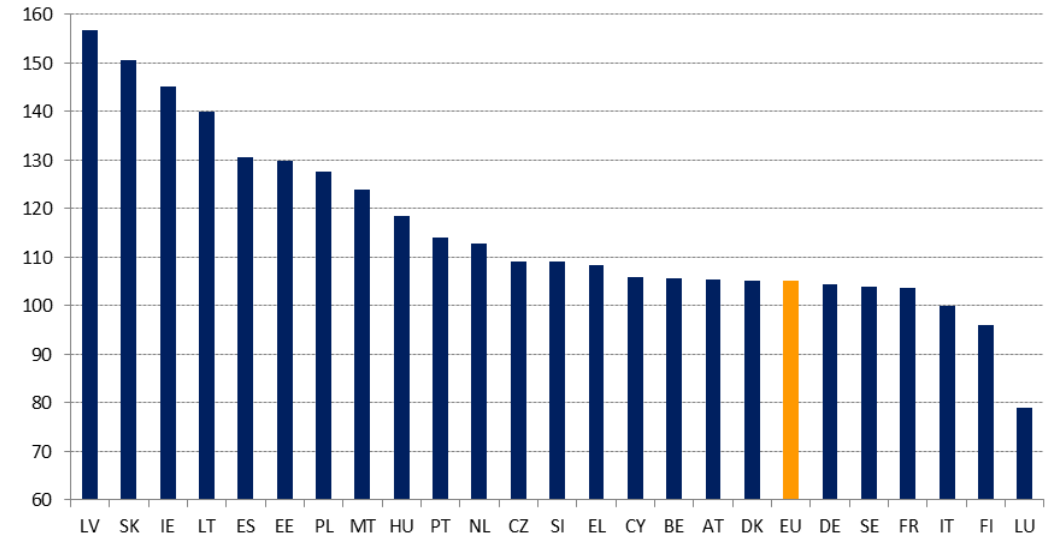
[12] See ELECTRA Communication COM(2009) 594.

> … the continuing economic crisis has put Europe's industry under pressure: production is 10% lower than before the crisis and over 3 million industrial jobs have been lost. Consumer and business confidence are low. Problems in the banking sector make it difficult to access finance. Investments are held back and factories are under pressure to close.
>
> This is happening at a time when the speed of innovation and technological development has put the world on the edge of an industrial break-through.
> …
> **Europe needs to reverse the declining role of industry in Europe for the 21st century.** This is the only way to deliver sustainable growth, create high-value jobs and solve the societal challenges that we face. To achieve this, a comprehensive vision is needed, focusing on investment and on innovation, but also mobilising all the levers available at EU level, notably the single *market*, trade policy, *SME policy, competition policy, environmental and research policy in favour or European companies' competitiveness.*

DG Enterprise provides some illustrative analysis of the state of competitiveness in an update published in October 2012[13]. It is useful to reflect on a few of the highlights. First, the EU's share of world exports has declined between 2006 and 2010 from 17.3% to 16%.

However, for the most part, manufacturing productivity has generally improved, but there is a huge variation across Europe that in a way indicates that it might be dangerous to consider a homogeneous solution to problems with European competitiveness.

Figure 2: **Change in manufacturing productivity (2011, 2006=100)**



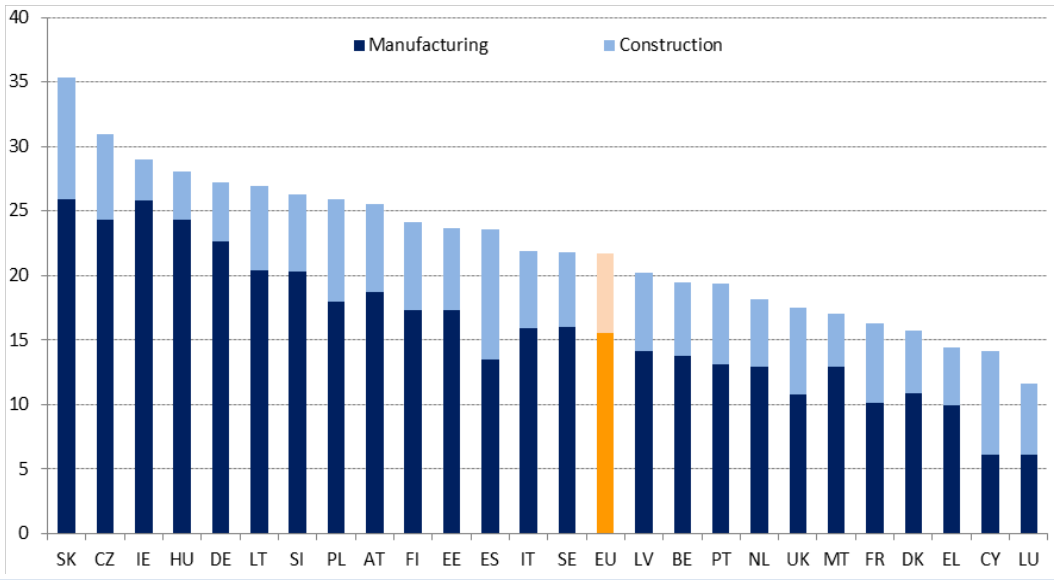
Note: Luxembourg, Ireland and EU average are for 2010; data for Bulgaria, Romania and the UK is not available.
Source: Eurostat (except for LU STATEC); using Nace Rev 1

Source: Commission staff working document entitled, Industrial Performance Scoreboard and Member States' Competitiveness Performance and Policies, 2012 Edition, SWD(2012) 298, p. 9

It is important to reflect on how important manufacturing and construction are to EU economies since this further illustrates that some countries where construction has a low percentage could conceivably benefit more from energy efficiency measures.

[13] Commission staff working document, Industrial Performance Scoreboard and Member States' Competitiveness Performance and Policies, 2012 Edition, SWD(2012) 298.

Figure 3: **Manufacturing and construction in Member State economies (as % of GDP at factor cost: 2011)**



Note: LU (2010)
Source: Eurostat; LU (STATEC)

Source: Commission staff working document entitled, Industrial Performance Scoreboard and Member States' Competitiveness Performance and Policies, 2012 Edition SWD(2012) 298, p. 8

DG Enterprise also provides a monthly update on the state of competitiveness. It is useful to consider some of the latest results from the March report[14]:

- The latest figures for the last quarter of 2012 confirm a second dip for manufacturing during this crisis;
- The contribution of manufacturing to EU GDP at the end of 2012 was 15.2%, 0.4 percentage points below the 15.6% reached at the end of 2011;
- The seasonally adjusted manufacturing output in January 2013 was some 2.8% lower than a year ago;
- Over November 2012 and January 2013, manufacturing production is 12.4% lower than it was in the first quarter of 2008;
- The contribution of manufacturing to the EU GDP is slightly farther away from the 20% of GDP; and
- In the last quarter of 2012, the EU27 share of manufacturing in total value added fell to 15.2%, 0.1 pp. less than in the previous quarter.

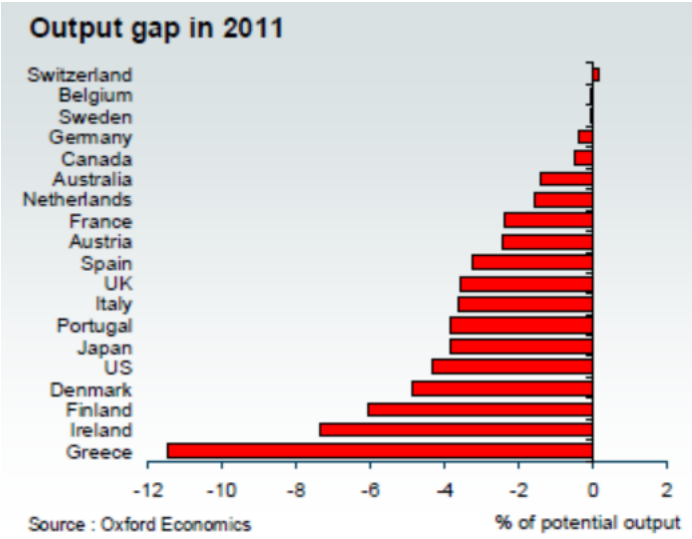
The important issue, however, is whether Europe as a whole is different and worse off than competitors throughout the world. Internally, within the European Union, there are large differences amongst countries and there is not one single measurement that could explain if one country or region lags behind.

Comparison of the output gap (the difference between potential and actual economic output), however, indicates that on average Europe is not very different from the US[15]. The gap rather shows that many of these countries could catch up quickly by engaging idle resources and spare capacity when recovering.

[14] EC, Industrial policy indicators and analysis, March 2013.

[15] Have the advanced economies suffered a permanent loss of output? Oxford Economics

Figure 4: **Output gap in 2011**



Source: Oxford Economics, Economic Outlook

The overall results are not encouraging but the excerpt from the Commission Communication gives encouragement for the need for a comprehensive vision. Improved energy efficiency with its innovative technologies and techniques should certainly be part of that comprehensive vision.

A study from McKinsey gives evidence to that energy efficiency could be the horse to put before the wagon on the road to recovery of economies and employment. [16]

Figure 5: **Increasing energy efficiency promises up to €37 billion of annual investment between 2010 and 2030**

Levers		Potential energy savings, 2030 QBTU[1]	Carbon, 2030 $MtCO_2e$[2]	Annual investment, 2010–30 Constant 2010 € billion
Commercial	Lighting, appliances, electronics	0.5	44	3.2
	Building efficiency, new build	0.3	23	4.0
	Building efficiency, retrofit	1.0	87	1.8
Residential	Lighting, appliances, electronics	0.3	24	0.6
	Building efficiency, new build	0.6	41	5.0
	Building efficiency, retrofit	2.7	189	22.0
Total		5.4	408	36.5

1 Quadrillion British thermal unit.
2 Metric tonne of carbon dioxide equivalent.
NOTE: Assumes $/€ exchange rate of 1.25. Numbers may not sum due to rounding.
SOURCE: Global Greenhouse Gas Abatement Cost Curve v3.0; McKinsey Global Institute analysis

Source: McKinsey Global Institute, Investing in growth: Europe's next challenge, December 2012, p. 36

[16] McKinsey Global Institute, Investing in growth: Europe's next challenge, December 2012

Why improved energy efficiency is a winner

One of the reasons energy efficiency is so complex is that it does not only provide the lower (life-cycle-) cost, but also several other, more or less intangible, benefits that have a value, even if it is not always easy to calculate and put into a rigid rule of optimisation.

It might however be useful to consider these multiple benefits in some detail when considering how the competitive edge should be "honed". The IEA has provided a typology based upon levels where the benefits could be noticed and accounted for. [17] A qualifier for these could be to map also the nature of the benefit for the actors/agents concerned. This for two reasons:

1. It would be possible to connect the promotion of energy efficiency to other policy-areas and form "alliances" in pushing for changes
2. It would be useful in order to find the target groups that have a "consumer" interest of the change and that may pull new products/solutions into the market place.

Table 3: **Excerpt from IEA "Spreading the Net: the Multiple Benefits of Energy Efficiency Improvements" (table 2)**

BENEFITS		Level at which outcome takes effect		
		Individual	**National**	**International**
Social	Health	X	X	
	Energy affordability	X		
	Energy access	X	X	
	Development		X	X
	Job creation	X	X	
Economic	Asset values	X	X	
	Disposable income	X	X	
	Industrial productivity	X	X	
	Energy provider benefits and infrastructure	X	X	
	Energy prices		X	X
	Public budgets		X	X
	Energy security		X	
	Macro-economic effects		X	
Environ-ment	Greenhouse gas emissions		X X	X X

Source: Spreading the Net: the Multiple Benefits of Energy Efficiency Improvements

Competing for customer favour (USP vs. UBR)

The traditional model for marketing and selling has been to define the Unique Selling Proposition, or USP, of a product. Designing of policies for industrial development and competitiveness naturally has the same perspective. The issue is to find innovative products that can open up new markets – "to innovate and upgrade" – as Michael Porter said. [18]

Implementing such policies should, however, focus first to use of the leverage from "niche markets" that can mobilise forces to articulate the features and need for new

[17] Spreading the Net: the Multiple Benefits of Energy Efficiency Improvements. http://www.iea.org/publications/insights/name,26319,en.html

[18] Michael Porter, The Competitive Advantage of Nations, Harvard Business Review, March-April 1990.

products and amplify the demand. Lately this has shifted focus for relations on the market to put more emphasis on UBR, the Unique Buying Reason, i.e. the customer's perspective. [19]

Technology Procurement is a tool that is built on the concept of using the force of the buyers/users/consumers to both define the performance of new technologies and disseminate these products to the essential forerunners on the markets, sometimes known as early adopters. The EC has made recommendations on how the technology procurement can be staged and used. [20] Actually the first A+ refrigerator was a result of joint European procurement!

There are also other experiences, with distinct European involvement and leadership, in joint technology procurement of, for example, the markets first heat pump equipped tumble dryers, energy efficient copying machines, super-efficient electric motors and LED for traffic control. [21]

The method has been used also in, for example, the USA and in private initiatives such as the X-prize. In several of them the consumer perspective has however been suppressed and the project have more the character of technology competitions with little respect for developing a market for the results.

Industry and jobs

Parts of industry sometimes want to refute the Porter hypothesis and claim that either the market is already well functioning and rational decisions are made, or that government cannot know what the future market needs.

It is well understood that many decisions both for the use of energy and for the innovation of products are not based on rational calculations. Research in behavioural economics has shown that decisions are much more complex than any calculation can capture, but more often not rational. [22] Applied research has also shown that many companies do not even have the necessary internal organisation to be rational. [23] The recent Energy Efficiency Directive, EED, will form a base to improve this as well as it could serve as a start for industry to be customers in procurement as described above.

And it is correct that the government cannot know the future markets, but it can certainly stage procurements by gathering sufficient and relevant user interest and act as a catalyst for them when they describe what they want. There are important companies having fruitful dialogue with government about their strategies to stay in the forefront of the market. [24]

Energy efficiency improvements are the only proven method to secure existing jobs today by keeping energy costs under control, but will also create new jobs both for achieving energy efficiency and for developing new (greener) industries with new (greener) products.

---

[19] Zaidi (2011-2012). Green Marketing. From usp to ubr. Thesis (http://ebookbrowse.com/gdoc.php?id=375768497&url=777ea0f9faba19ce6cb250d4b4220ff4)

[20] Developing procurement practices favourable to R&D and innovation. http://ec.europa.eu/invest-in-research/pdf/download_en/edited_report_18112005_on_public_procurement_for_research_and_innovation.pdf

[21] See about methods and examples in: Success Stories from the IEA DSM Technology Procurement Program" http://archive.iea-shc.org/publications/downloads/success2.pdf

[22] Maps for Bounded Rationality: Psycholgy for Behavioral Economics. Daniel Kahneman. http://www.econ.tuwien.ac.at/lotto/papers/Kahneman2.pdf

[23] See e.g. "Exploring energy management in the Swedish pulp and paper industry." Patrik Thollander. Eceee proceedings 2009 and "Investment in energy efficiency: Do the characteristics of investments matter?" Catherine Cooremans. Eceee proceedings 2011.

[24] Some of them apostrophed or presenting at the eceee workshop on Eco-design and innovation http://www.eceee.org/eceee_events/seminar-ecodesign-and-innovation

The above refer only to competitiveness in business. There is a growing body of literature that shows that improved energy efficiency also brings significant benefits to the buildings and transport sectors. With those benefits, Europe as a whole becomes more resilient, sustainable and, yes, competitive.

Where we are now in improving energy efficiency

Traditionally, the European Union has not implemented many policies to directly promote energy efficiency in industry. The Emissions Trading System is to have an impact but it has been minimal to date. Essentially, there was a belief that price signals for emission allowances would give industry enough motivation to improve energy efficiency and to a certain extent, it has worked. Member States have been more active through voluntary agreements, carbon levies, carbon taxes, promotion of energy audits and energy management systems.

It must also be remembered that the ETS is not really designed to reduce GHG through the price signals, but only to allocate the undertaking of measures to those who can do it most cost-effectively. The reductions are the result of the capping made by the annual 1.74% allowance reduction factor.

Following the March 2011 Energy Efficiency Plan, the 2012 EED includes some elements that will promote energy efficiency in industry. First, there are mandatory audits for large industry. These are to be done on a regular basis. There is no requirement to actually invest in the recommendations, but it is an important awareness tool that should lead to benefits. There is promotion of energy management systems for SMEs. It will be important how this is implemented by member states. This could also be supported by the European Investment Bank, in particular, which knows it must do more to support SMEs. The EED also supports the expanded role of energy service companies, which would be an important first step in development of more relevant business models where focus would be on the services that energy provides rather than on energy itself. The EED also gives considerable attention to targets and the importance of meeting the 2020 energy savings objectives.

There are some concerns about the relationship between ETS and improved energy efficiency. At the end of March, the Commission published a Green Paper on a 2030 framework for climate and energy policies and the following excerpt (from page 7) reflects some of the friction within the policy community.

> *There are obvious synergies but there are also potential trade-offs. For example, more than anticipated energy savings and greater than expected renewable energy production can lower the carbon price by weakening the demand for emission allowances in the ETS. This in turn can weaken the price signal of the ETS for innovation and investments in efficiency and the deployment of low-carbon technologies whilst not affecting attainment of the overall GHG reduction target.*

Fortunately, the Commission currently has a consultation on the Green Paper, allowing all interested parties to provide their views on how Europe should move forward on this issue.

It is also important to realise that industry is coming together more than before to try to find common solutions. In 2011, eceee began an industrial energy efficiency summer study[25] and the reaction by industry and analysts was overwhelming. In recent years there have been new organisations such as the Institute of Industrial Productivity[26] and

[25] http://www.eceee.org/industry/

[26] http://iipnetwork.org/

Energy Efficiency in Industrial Processes[27] that have built large constituencies to find common ground. While impossible to quantify, their impact is growing.

Final remarks

There is still much that is not known. While US natural gas prices have diverged from European prices, there has often been a big gap in consumer prices because of taxes and related government policies. Is European industry being held back? DG Enterprise in its monitoring reports gives no indication that it is a serious concern. This must be explored more.

Consumer energy prices have an impact and not only in the industrial sector and more needs to be known. Oil prices have climbed significantly in the past decade and that rise is considered to have been one factor in the start of the financial crisis. The IMF, however, also believes that prices must also be considered in relation to subsidies that many countries are providing to either improve competitiveness or protect the vulnerable. More needs to be done in this area and it is welcome that there is the Global Subsidies Initiative[28] and activity by the IEA and OECD[29].

The analysis by DG Enterprise in its 2012 report provides considerable evidence of the important role that energy efficiency is playing in ensuring European business is more competitive.

While there are not many EU-wide initiatives to promote energy efficiency in industry, it is essential that those efforts do not lose any momentum. Mandatory audits have to be considered a first step. There has to be more analysis on whether industry is struggling to finance those recommendations. There is nothing conclusive to date. Private investment funds, pension funds and industry efforts such as Siemens Financial Services show that there is adequate funding. There could be problems on due diligence, confidence in the technologies and managing risk.

The current financial crisis has created a lot of confusion and anxiety. As shown, business confidence is still dropping. There is a reluctance to take chances. Is investing in energy efficiency "taking a chance?"

Separately, there are many initiatives in other sectors – buildings and transport – that are improving the overall energy performance of those sectors and bringing significant macro-economic benefits.

It should be noted why hydraulic fracturing means so much to the United States. It is more than lower consumer prices that lower the costs of production for business. From an energy policy perspective, the increased domestic production has significantly reduced imports, giving the US a major energy security boost. This was highlighted in the IEA's WEO 2012. This also allows the US to consider energy exports. It has already agreed to sell natural gas to the UK in coming years. This was unheard of in recent decades.

From a climate change perspective, the switch from coal to natural gas in power generation has significantly lowered GHG emissions. While the US has few international obligations to reduce GHG emissions, the reduction has been noted internationally.

Moving forward there are several issues that need further discussion and/or analysis

- There is the need to do a much more in-depth analysis of US, Asian and European industry, looking at specific factors of production, to see if there are major differences that are putting Europe at a disadvantage.

[27] http://www.ee-ip.org/

[28] http://www.iisd.org/gsi/

[29] http://www.oecd.org/site/tadffss/

- There should be a more educated analysis on carbon footprints, carbon leakage and whether companies are leaving Europe to avoid the progressive environmental policy framework.
- The analysis to date has to be re-assuring that Europe is on the right track. In fact, if anything, more needs to be done to support industry.
- Energy efficiency is an important component of economic and industrial policy. Proof of that is in how many EU governments have energy efficiency integrated within their economic or industry ministries. Whether the integration is complete is debatable, but what has happened to date is a realisation of the role energy efficiency can play. As James Carville, campaign strategist to former President Bill Clinton said, "It's the economy, stupid." Energy efficiency has to remember this because it is not a "stand alone" policy area. If anything, energy efficiency is probably the most integrated into a larger range of government policies.
- The energy efficiency community needs to take a more active role in industrial policy in Europe. For example, plant siting could be much more effectively undertaken to take advantage of waste heat recovery. This is an element of the Energy Efficiency Directive that could be developed better.
- The eceee[30] has taken a first step in organising in 2012 an industrial summer study. Now the results of the peer-reviewed papers that were presented at the Summer Study need to be better disseminated and there needs to be a better sharing of the lessons learned.
- Energy efficiency is not a panacea for all economic and industrial concerns but it can play a vital role. But, without an energy-efficient approach and commitment at a high level, the inefficiencies within a plant, an industrial sector or an end-use sector, place too high a burden on an economy. Energy efficiency is recognised to be the most cost-effective way to address energy demand and environmental issues. There is a wealth of examples to confirm that. Now it is a matter of increasing that awareness, providing best practice examples and being more pro-active in economic and industrial policy making.
- The role of energy efficiency in a comprehensive strategy towards sustainable societies should be discussed. Such a strategy should consider the interrelation between energy efficiency, renewables and creation of jobs and industry that makes use of the new technologies.

[30] It should not be forgotten that eceee stands for the *European Council for an Energy Efficient Economy*.