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Addressing industrial competitiveness concerns in the 2030 EU Climate and Energy Package

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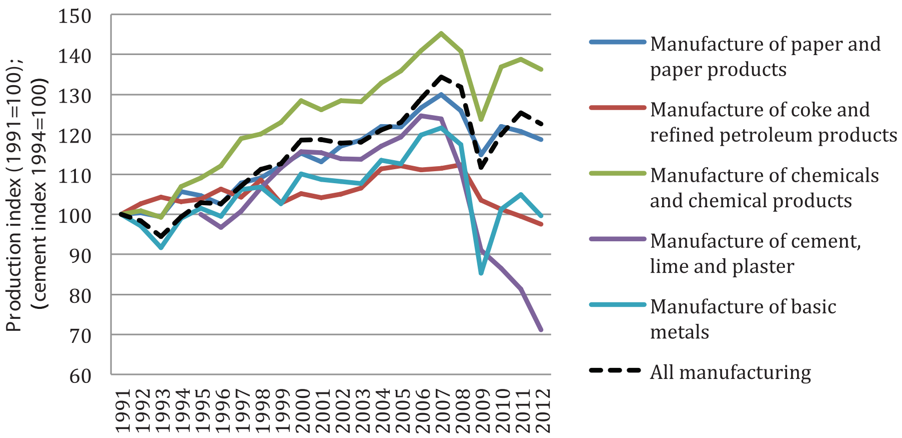
PUTTING THE PROBLEM OF COMPETITIVENESS IN PERSPECTIVE

In the current sombre economic context, the issue of industrial competitiveness has become highly salient. Europe's industrial challenges need to be understood to be addressed. Europe like other major economies has gone through the resource intensive phase of building its capital stock. At Europe's level of development, high incomes tend to be spent on high value added services and manufactures. These factors mean that Europe's industry has been undergoing a long-term transition since the early 70s. In addition, European industry has been hit by a deep cyclical downturn as a result of the crisis. This long-term structural trend and current conjectural situation have nothing to do with energy policy. However, it would be wrong to suggest that energy prices do not play a role for certain industries. For a few highly energy and trade intensive industries, energy prices are a significant factor of comparative advantage.

MEASURES TO ADDRESS COMPETITIVENESS IN 2030 CLIMATE AND ENERGY PACKAGE

These industries will need protection in the 2030 climate and energy package, especially if a meaningful CO_2 price is to emerge. The current mechanisms to address competitiveness involve a number of drawbacks, notably the distortions and windfall profits that they entail due to variations of production levels from the historical reference used for free allocation. They also do not effectively address electricity intensive industries. Finding a solution to these issues is important for negotiating a meaningful future framework. Options that could be considered include moving to output based allocation for energy intensive, trade exposed industries, or considering temporary opt-outs for these industries. Given the potential risks around temporary opt-outs, output based allocation could be a way forward, combined with a much tighter focus on the energy intensive, trade exposed industries and a harmonized system for dealing with electricity intensive industries.

Figure 1. EU28 manufacturing production in energy-intensive sectors



Source: €tat Data.

INTRODUCTION

This paper provides a discussion of competitiveness risks for energy-intensive trade-exposed sectors (EITEs) in the context of the EU 2030 Climate and Energy Package. Section 1 discusses the present economic issues facing EITE manufacturing sectors in the EU28. Section 2 provides data and analysis of the policy costs which could, in the absence of other mitigating measures, be borne by these sectors due to the 2030 Package and could potentially affect their competitiveness. Section 3 briefly looks at developments towards carbon pricing in non-EU countries. Section 4 outlines the broad policy options that are available to EU policy makers for mitigating competitiveness risks for EITEs in the 2030 Package.

1. THE STATE OF ENERGY-INTENSIVE MANUFACTURING IN THE EU

Energy-intensive manufacturing in the EU has faced some significant challenges in the past 5-10 years. However, a brief analysis reveals that climate and energy policy costs have so far only played a relatively minor role in this story. By and large, the current challenges facing EITE sectors are either short term cyclical effects, or they are broader structural evolutions which are likely to continue irrespective of climate and energy policy.

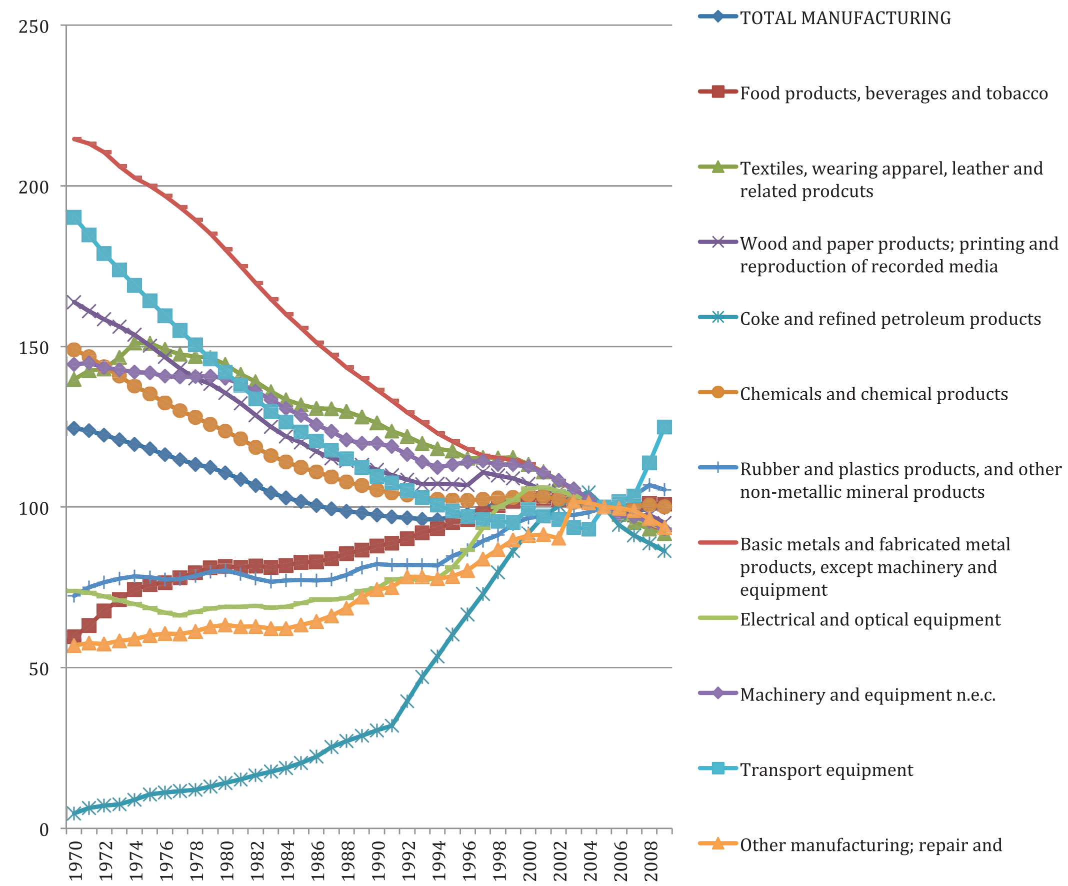
1.1. Weak demand due to the economic crisis

The most important single factor currently facing energy-intensive manufacturing in Europe has been the depth and duration of the economic downturn since 2008. The downturn has hit the EU's manufacturing sector particularly hard, whose production levels were 10% below their precrisis peak in 2012 (and remained at similar levels in the first three quarters of 2013). Weaker manufacturing of consumer durables and construction activity has had a disproportionately large impact on demand for energy-intensive manufactures, such as cement, lime and plaster, and basic metals (see Figure 1). Other energy-intensive manufactures such as pulp and paper, chemicals, coke and refined petroleum products have nevertheless also seen production remain well below full capacity.

1.2. Structural change in EU economies

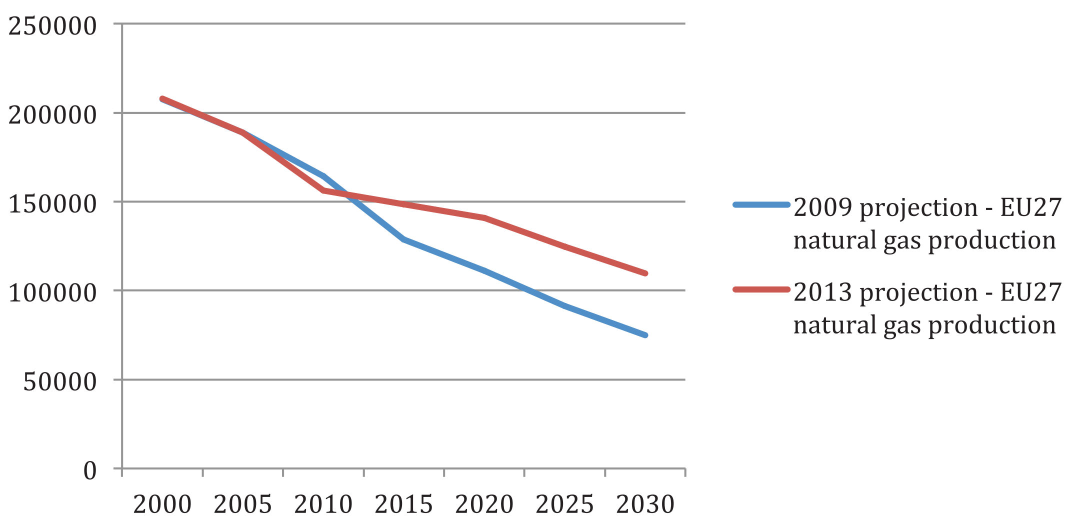
Some energy-intensive sectors in the EU are also facing longer-term or "structural" challenges due to the nature of demand in richer economies which dominate the EU. Such economies tend to have slower growth in construction and building demand due to the fact that capital stock is largely already built. Slower demographic growth can also reduce the demand for infrastructure. Richer economies also tend to see low demand growth for manufactured goods because, beyond a certain point, rising incomes tend to increasingly be spent on services or high-end and R&D intensive manufactures, such as pharmaceuticals, luxury goods, etc. Taken together, this can contribute not only to slower growth for EITE manufacturing sectors, but also to weaker economies of scale and hence lower comparative advantage in EITE products compared to other regions. This is illustrated with the example of the UK in Figure 2, which has seen a decline in the real value of the fixed capital stock in several manufacturing sectors since the 1970s as

Figure 2. Real value of the fixed capital stock by manufacturing sector in UK



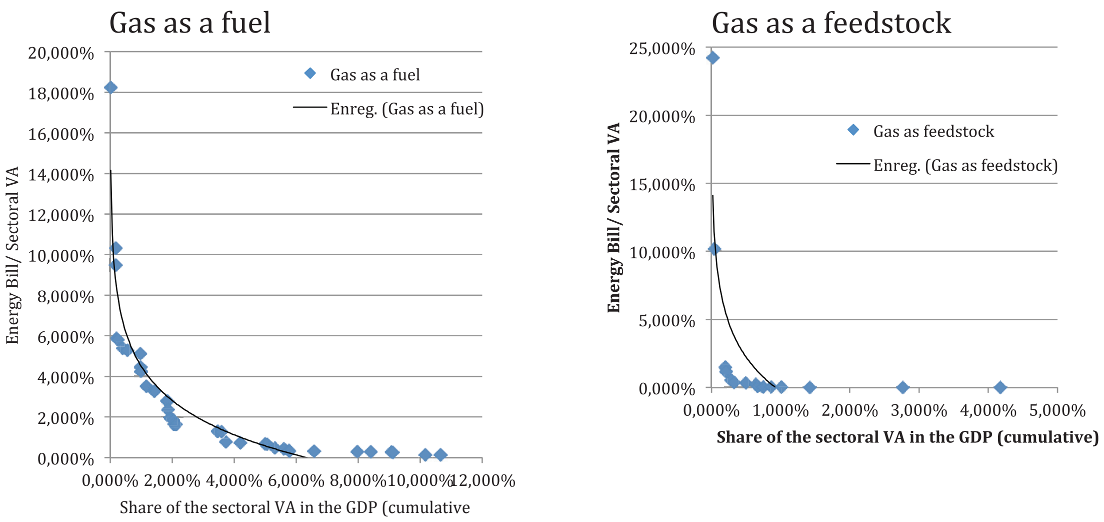
Source: EUKLEMS database.

Figure 3. Impact of shale gas on EU27 natural gas production projections



Source: DG Energy (2009), "EU Energy Trends to 2030", and DG Energy (2013), "EU Energy, Transport, and GHG Emissions Trends to 2030: Reference Scenario 2013".

Figure 4. Gas as a feedstock and fuel in the US manufacturing sector



Source: Data from on Manufacturing Energy Consumption Survey, US Energy Information Agency, and the Annual Survey of Manufacturers, US Census Bureau. Data from 2010/11.

the nature of domestic demand and comparative advantage has changed.

Some sectors also face structural overcapacity for sector-specific reasons. For example, the refining sector has excess capacity due to diesel versus gasoline taxation policies. The global steel sector is facing overcapacity due to over-investment in China.

The fact the European comparative advantage has generally fallen in EITE markets is not necessarily representative of the direction of EU manufacturing and trade competitiveness as a whole. A recent report by DG Entreprise and Industry entitled, *Towards Knowledge Driven Reindustrialisation,*[1] noted that Europe has a significant comparative advantage in R&D and high-end products, despite relatively weak price competitiveness on low-end products. The future of European manufacturing exports may therefore be driven by growth in the development and commercialization of R&D-intensive products, and in particular in the development of products linked to new enabling technologies, such as in industrial biotechnology or advanced materials.

1.3. Energy cost differences & the impact of shale gas

It is true that some energy-intensive industries in Europe have been affected by rising energy costs in the EU compared to other parts of the world. This is particularly true for electro-intensive sectors, such as primary aluminium smelting. During the past 20 years, no new primary smelting plants have been built in the EU and, in the past 10 years, several have closed.[2] The declining competitiveness of European aluminium producers is largely due to a confluence of rising EU power prices and the inability to replace long-term power contracts following legal developments making such contracting more difficult in the EU[3] European and multinational companies are thus increasingly seeking out new locations for production which can promise large and reliable supplies of electricity at low, guaranteed prices. Countries with large hydro or gas supplies (and sometimes subsidised electricity prices) but with good access to growth markets, such as Iceland (in the EU ETS), Norway (in the EU ETS), Qatar, UAE, Russia and Brazil, have thus become key locations for new investments.[4]

The other main EITE activity which is significantly affected by energy price differences are some subsectors of the chemical sector which use large amounts of natural gas as a feedstock, particularly ethylene. A handful of global chemical

1. DG Enterprise and Industry (2013): EU Competitiveness Report 2013, Towards Knowledge Driven Reindustrialisation, European Commission.

2. Sartor, O. (2012) "Carbon Leakage in the Primary Aluminium Sector: what evidence after 6 ½ years of the EU ETS?" CDC Climat Working Paper, CDC Climat http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2205516
3. *Ibid.*
4. *Ibid.*

Figure 5. EU15 Flat semi-finished steel products

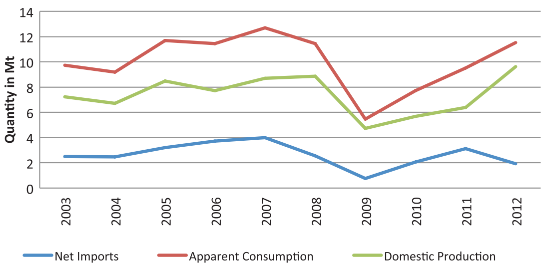
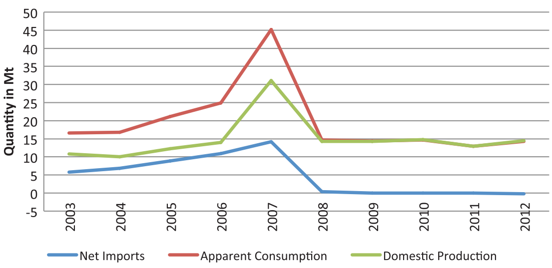


Figure 6. EU15 Cement clinker



Source: €tat Data, Prodcom Data.

companies have announced new investments in the US in order to take advantage of the recent divergence in natural gas prices between the US and both EU and Asian markets, due to the recent shale gas boom in the United States.[5]

The shale gas revolution will have the most significant impact on those sectors that are big direct consumers of natural gas, either as a fuel or a feedstock. The shale revolution's impact on electricity prices will be mediated by other factors affecting electricity prices, and so will likely be less substantial. Wholesale electricity prices diverge much less between the US and the EU than is the case for gas. Even EU shale production would be unlikely to generate sufficient quantities of natural gas at low enough costs to bring domestic EU gas prices down to equivalent levels to those in the USA.[6] This can be seen in Figure 3 (page 4) which compares impact of shale gas on EU natural gas production subsequent to the inclusion of EU unconventional reserves. The difference may be more pronounced at the level of individual Member States.

Figure 4 (page 4) shows the sectors for which natural gas as a feedstock and fuel is important, and their relative importance in US GDP. It can be seen that gas consumption as a feedstock is concentrated in a very small number of sectors, such as nitrogenous fertilizer production and certain organic chemicals such as ethylene.

1.4. Increased international competition and intra-industry trade

This process of offshoring aluminium or ethylene production to locations with a strong comparative advantage in abundant energy reserves has been aided by historically low transport and formal trade barriers in recent years. For example, the average applied tariff rate on EU imports of energy intensive products in 2013 was typically in the order of 3-6% of product value.[7] These tariffs have come down from significantly higher levels in the 1970s. However, it must be stressed that despite low trade barriers and sometimes higher costs in the EU, similar off-shoring effects have not been observed in all EITE sectors. EITE sectors which tend to be produced locally for local markets because of high transport costs (e.g. cement and clinker), or as part of integrated production activities (e.g. integrated steel production processes) have seen less off-shoring take place in recent years (Figure 5 and 6 above).

1.5. Conclusion

With the exception of some fast-growing new Member States,[8] EITEs are generally suffering in the EU due to a range of factors. The most important (short-term) factor is weak demand due to the poor economy. Other important longer-term factors are structural overcapacity, and the changing nature of global comparative advantage brought about by the changing nature of comparative advantage in richer economies, globalization, and energy price differences for a small number of

5. As reported by Bloomberg Business Week on 25/07/2013 http://www.businessweek.com/articles/2013-07-25/chemical-companies-rush-to-the-u-dot-s-dot-thanks-to-cheap-natural-gas.
6. Joint Research Center of the European Commission (2012): Unconventional Gas: Potential Energy Market Impacts in the European Union, JRC Scientific and Policy Report, European Commission, p. xi.
7. Data from WTO online World Tariff Download Facility, accessed December 2013, via http://tariffdata.wto.org/
8. Cf. Sartor, O. and Spencer, T. (2013) An empirical assessment of the risks of carbon leakage in Poland, IDDRI Working Papers, http://www.iddri.org/Publications/An-Empirical-Assessment-of-the-Risk-of-Carbon-Leakage-in-Poland

energy-intensive and highly-tradable goods. Consequently, some EITE sectors are already confronting difficult decisions about asset rationalization and their industrial structure in the EU, irrespective of climate and energy policy. Delaying climate policy decisions is therefore unlikely to avoid difficult decisions needing to be made in some of these sectors. **In order to plan intelligently for the future and establish a durable, longer-term position in Europe, EITE sectors will require clear policy signals about the longer-term goals of EU climate and energy policy and the role of their sector within those goals.**

2. WHAT WOULD BE THE IMPACT OF EU CLIMATE AND ENERGY POLICIES ON COSTS AND COMPETITIVENESS FOR ENERGY-INTENSIVE SECTORS?

Under the 2020 Climate and Energy Package, the cost impacts for EITEs could largely be divided into two categories:

1. the impact of carbon pricing (after netting out free allocation and state aid compensation) and,
2. the indirect impact of other policies, such as renewables policies on the electricity prices paid by industry.

Overall, these costs were ultimately very small for almost all EITE sectors as the majority of the burden of carbon and renewable costs has fallen onto retail consumers rather than industrial purchasers. Activities included within the EU ETS generally received generous free allocations and carbon prices have been low, varying between 0 and 30€/tCO_2 between the launch of the carbon market in 2005 and 2013. It is therefore not surprising that empirical studies to date have found no evidence of carbon leakage having occurred (e.g. Ellerman *et al.*, 2010; Branger and Quirion, 2013; Reinaud, 2008; Sartor 2012).

2.1. Hypothetical carbon price impacts on EITEs

Figure 7 gives a rough estimate of the impacts of carbon prices on EITE costs, at different levels of carbon prices. Note that these estimates assume no compensation, no abatement potential below these carbon prices, and no ability to pass-through carbon costs in prices. These estimates overstate the true cost at the industry level, since some sectors will have an ability to pass on carbon costs in prices (such as cement), a number of sectors will have substantial abatement options at between 20-50€/tCO_2. Furthermore, even if these industries were forced to shoulder a large share of these costs this would not necessarily translate immediately into carbon leakage as a number of variables and potential barriers are involved in decisions to offshore activities.[9] **Nevertheless, these gross cost estimates still suggest that in the absence of other accompanying measures, the effect of a robust post-2020 carbon price would significantly increase risks of carbon leakage for a number of EITE sectors.**

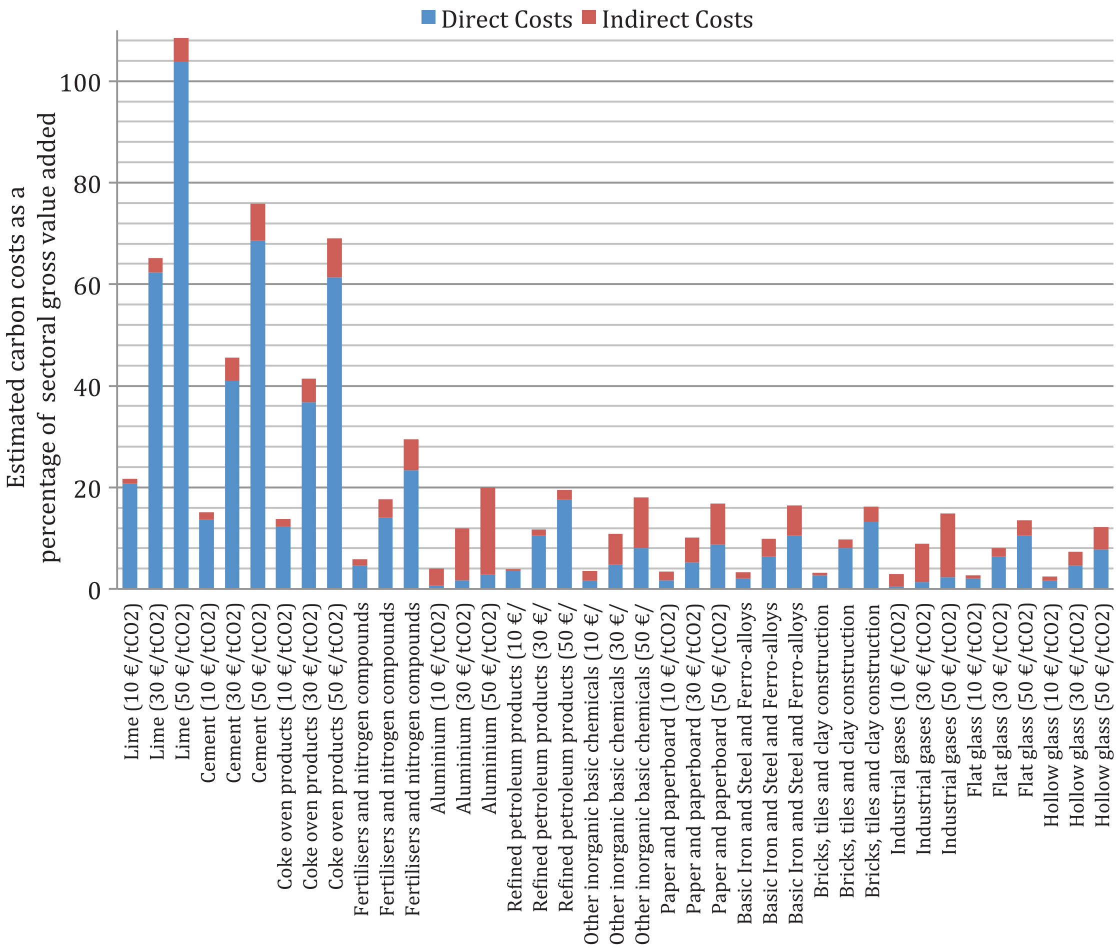
2.2. Indirect carbon costs and electro-intensives

In addition to being energy-intensive, a small number of EITE sectors are also *electro*-intensive. These sectors can therefore be impacted both by the effect of higher carbon prices on electricity prices and by other policies, such as renewables charges and related infrastructure costs, which affect power prices. This is a relatively small number of around 16 very specific EITE sectors at the NACE 4-digit level of sectoral disaggregation. It includes primary aluminium smelting, copper production, manufacture of paper and paperboard, and certain subsectors of the chemicals sector.[10]

Estimating the precise impacts of different policies on these sectors is difficult due to data non-availability and the complexity of the transmission of different policies on final

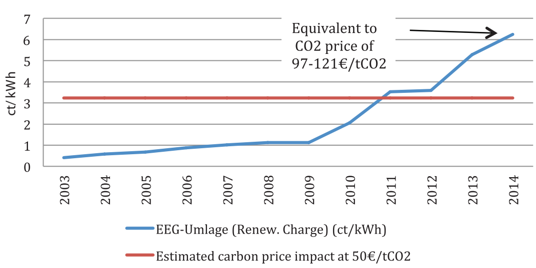
9. In practice a large number of factors will affect and potentially mitigate carbon leakage rates, including: transport costs, logistical barriers, tariffs, taxation and other policies in competing countries, exchange rates, the availability of excess production capacity in third countries to satistisfy European demand in the short run, sunk costs in European countries, the importance of client relationships or integrated production processes in the sector, the ability to pass on carbon costs to consumers in final product prices, the cost of abatement alternatives, etc.
10. Sectors deemed to be eligible for state aid as electro-intensives (and their 4-digit NACE codes) are: Aluminium production 2742, Mining of chemical and fertiliser minerals 1430, Manufacture of other inorganic chemicals 2413, Lead, zinc and tin production 2743, Manufacture of leather cloths 1810, Manufacture of basic iron and steel and of ferro-alloys, including seamless steel pipes 2710, Manufacture of paper and paperboard 2112, Manufacture of fertilisers and nitrogen compounds 2415, Copper production 2744, Manufacture of other organic basic chemicals 2414 ,Spinning of cotton-type fibers 1711, Manufacture of man-made fibres 2470, Mining of iron ores 1310, The following subsectors within the Manufacture of plastics in primary forms (sector 2416): Low-density polyethylene (LDPE) 24161039, Linear low-density polyethylene (LLDPE) 24161035, High-density polyethylene (HDPE) 24161050, Polypropylene (PP) 24165130, Polyvinyl chloride (PVC) 24163010 Polycarbonate (PC) 24164040, The following subsector within the Manufacture of pulp (sector 2111): 21111400 Mechanical pulp.

Figure 7. Estimated cost of EU ETS as a share of sector gross value added for the 12 most strongly affected EITE sectors at 10, 30 and 50E/tCO_2 (at NACE 4-digit level)



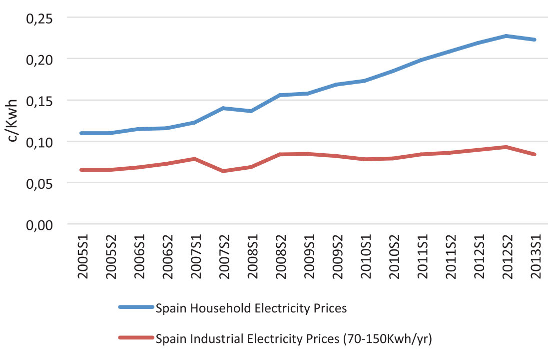
Source: Authors' calculation based on data from DG Clima's Dec. 2009 *Impact Assessment of Commission Decision determining a list of sectors and subsectors which are deemed to be exposed to a significant risk of carbon leakage pursuant to Article 10a (13) of Directive 2003/87/EC.*

Figure 8. Growth in renewable energy charges to household consumers in Germany



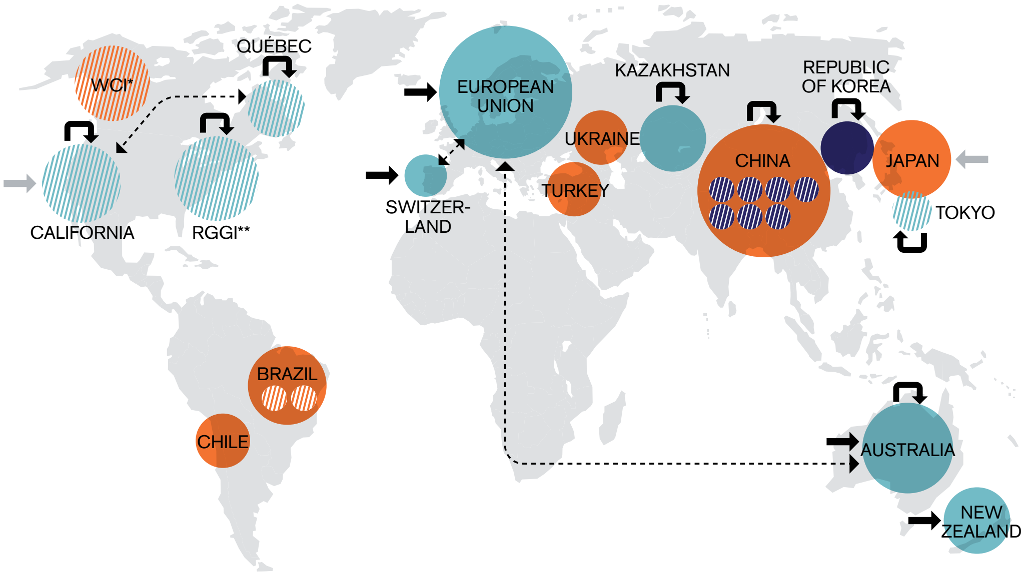
Source: BMU, EEG/KWK-G, BWE, Sijm et al. 2006, Authors' calculation based on assumed average 76% CO2 cost pass-through rate, as per DG Competition 2012.

Figure 9. Household vs. industrial electricity prices in Spain



Source: €tat, Energy Indicators, Domestic and industrial electricity prices.

Figure 10. Carbon trading initiatives implemented or under consideration as of 2013



Status of implementation
- Implemented (in force with established rules)
- Implementation scheduled (mandate agreed, start date communicated, rules in preparation)
- Under consideration*** (government gave public signal towards the development of an ETS)

- National
- Sub-national or regional

Offsetting
- CDM and JI credits
- Bilateral offsets
- Domestic offsets

Linking
- Planned link

* WCI – Western Climate Initiative. Participating jurisdictions are British Columbia, California, Manitoba, Ontario and Québec
** RGGI – Regional Greenhouse Gas Initiative
*** Schemes under consideration are at different stages in the process. See Section 3 for more details.

Note 1: The size of the circles is not representative of the size of the schemes.
Note 2: Mexico's Congress passed a General Law on Climate Change, which provides the federal government with the authority to create programs, policies, and actions to mitigate emissions, including an ETS.
Note 3: Costa Rica is working on the design of a domestic carbon market that would contribute to meeting the country's carbon neutrality goal

Source: World Bank, Mapping Carbon Pricing Initiatives (May 2013).

industrial power prices. However, since all of these sectors are estimated by DG Competition to have carbon costs of at least 5% of GVA if carbon prices are at 30€/tCO_2, it follows that these sectors are all sensitive to rising electricity costs.

Renewable energy support schemes have begun to have a bigger impact on electricity prices than even reasonably high carbon prices would have had (Figure 8). Electro-intensive industries have so far not had to bear these costs in many countries, as most (but not all) Member States have placed the burden of paying for renewables onto retail consumers, whereas electro-intensive activities tend to pay wholesale power prices (Figure 9). On 18 December 2013 the European Commission opened an investigation into whether industrial exemptions from renewables supports and other policy costs are consistent with the internal market. **If these exemptions were to be disallowed or abandoned in the future, it is possible that the current mechanisms for preventing carbon leakage in electro-sectors may not be sufficient to address the risks. There is thus a strong argument for keeping these compensation frameworks, which may necessitate a consideration of limiting them to the few truly electro-intensive sectors.**

3. THE STATE OF CLIMATE AND ENERGY POLICIES IN NON-EU COUNTRIES

Assessing the risks of carbon leakage and competitiveness losses associated with European climate and energy policy post-2020 also requires taking into account policy developments of non-European countries. A 2013 study by GLOBE International found that, as of 2012, 32 out of 33 of the world's major economies "have progressed or are progressing significant climate and/or energy legislation".[11] The 2013 Climate Conference in Warsaw, which saw parties agree to detail their domestic policies to reduce emissions post-2020, was another important, albeit incomplete, development in this respect.

Nevertheless, it must be recognized that, even in the context of a global agreement at COP21 in 2015, and with emerging global action on climate change, the costs of climate policies are very unlikely to be equivalent between all countries, even in the 2020-2030 decade. At the same time, however, the EU faces relatively urgent choices about its energy technology mix and related infrastructure in the coming decade. The EU must therefore find ways to effectively pursue its energy and climate goals, while also striving to mitigate policy-related competitiveness distortions between itself and non-EU countries and in the internal market.

4. OPTIONS FOR ADDRESSING COMPETITIVENESS CONCERNS FOR EITE ACTIVITIES IN THE 2030 PACKAGE

4.1. Option 1: continuing the status quo?

The first option to address the competitiveness concerns raised by the 2030 Climate and Energy Package would be to maintain the same mechanisms from the 2020 Package. The latter consisted of ex-ante free allocation for direct industry emissions, based on historical production data and EU-wide emissions performance benchmarks. It also included an option for Member States to provide cash payments for electro-intensives to compensate for indirect CO_2 costs in the electricity price. Member States generally managed the cost of renewable support policies by placing the charges onto retail rather than wholesale prices. In the years to 2020, this would be guided by state aid guidelines as recently proposed by the Commission, which contain quantitative measures to determine sectors eligible for state aid in the form of exemptions to renewables or carbon charges.

There are both technical and more fundamental reasons why the status quo may be undesirable from 2020 to 2030. From a purely technical point of view, if the current system were maintained, a number of issues would need to be addressed:

1. Inappropriate criteria for judging which sectors are at risk of carbon leakage. The current criteria for determining the list of sectors to receive the maximum level of free allocation includes a criterion which allows a large number of sectors to be added to the list only because they have a high level of trade with non-EU ETS countries, despite the fact that their carbon costs are ultimately very low (below 5% of value added). This has led to a large number of allowances being given to sectors not really at risk and potentially too few allowances being given to sectors genuinely at risk.

2. Minimum activity thresholds distort product markets. Under the Phase 3 free allocation rules, installations whose production falls below 50% of the level used to calculate its free allocations (known as the HAL for "Historical Activity Level") see their allocations in the following year fall by 50%. Similarly, if production falls by 75%, free allocation in the following year falls by 75%. These rules were designed to avoid large windfall profits accruing to installations which were temporarily producing below full capacity. However, there is evidence that these rules are distorting at least some product markets within the EU by encouraging companies to optimize plant utilization rates to ensure that all installations are producing above 50% (Figure 11). There is evidence in the cement sector that this is in turn reducing the energy and emissions efficiency of these installations, preventing asset rationalization, and distorting trade.[12]

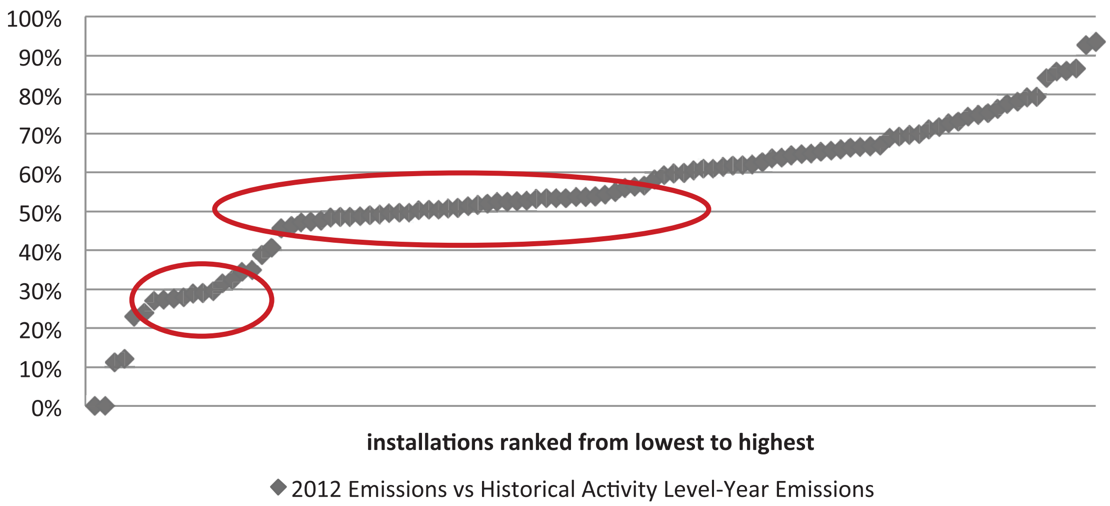
3. Compensating electro-intensives for indirect CO_2 costs. The current approach relies on individual Member States to allocate state aid to their industry, unlike under harmonized free allocation for direct emissions. This has already led to different Member States allocating different percentages of the maximum allowable aid amounts to their respective industries, due to differing budgetary constraints and priorities across Member States. This raises concerns of distortions to the internal market.

4. Cross-sectoral adjustment factor may need to be revised. Another issue would be how to continue to apply a declining uniform cross-sectoral adjustment factor to free allocations. Continuing the current decline rate would result in free allocation rate of 66% of the best available technology benchmark level by 2030. For sectors really at risk of carbon leakage and assuming high carbon prices,

11. Cf. GLOBE International & Grantham Research Institute on Climate Change and Environment (2013): The GLOBE Climate Legislation Study, 3rd Edition, A review of Climate Legislation in 33 countries, http://www.globeinternational.org/index.php/legislation-studies/publications/climate-legislation-study-3rd-edition

12. Cf. Climate Strategies (December 2013) Energy Intensive Industries: Carbon Control and Competitiveness Post 2020, Climate Strategies.

Figure 11. Cement installation production levels in 2012 vs historical activity level (HAL) in 5 "low-demand" Member States.



Source: Climate Strategies 2013.

this low compensation rate may raise competitiveness concerns. The cross sectoral adjustment factor is inversely related to the number of sectors receiving free allowances.

4.2. Option 2: status quo "plus"?

The preceding discussion of the technical weaknesses of the status quo raises the question of whether the status quo might be maintained with only minor changes to these elements. This could include:

1. Adjustment of the carbon leakage list: the carbon leakage list could be adjusted to make it focus more closely on sectors truly at risk of carbon leakage. The current criteria for the carbon leakage list are i) carbon costs are greater than 5% of sectoral GVA and trade intensity is above 10%; or) either measure is above 30%. Removing or adjusting the second option would exclude a number of sectors which are trade but not emissions intensive. This would increase auction revenues and the quantity of free allowances available for allocation to EITEs. In turn, the cross sectoral adjustment factor discussed above would be reduced.

2. A harmonized method of dealing with electro-intensive industries: in order to mitigate the concerns around a decentralized fiscal mechanism to compensate electro-intensive industries, an alternative could be developed, involving downstream free allocation of free allowances to electro-intensive sectors in order to cover their indirect carbon costs. This was the approach taken by Australia in designing its ETS.

3. Removing the activity thresholds: this would prevent arbitrage around activity thresholds in order to preserve maximum free allocations. But it would mean accepting (counter-cyclical) discrepancies in the level of free allowances between installations, and the potential dis-incentive to exit this might create. It would also mean accepting potential windfall profits.

However, the reality is that even a "status quo plus" approach would fail to address more fundamental concerns with the current system.

1. Carbon leakage is still a significant risk despite ex-ante free allocation. Ex-ante free allocation only discourages installations to completely shut down operations in the EU in order to reinvest in plant abroad ("investment leakage"). However, it does not discourage firms from reducing production volumes at existing plants in order to sell surplus allowances, if the value thereof exceeds the marginal value of production ("operational leakage"). In practice, a range of factors are likely to mitigate operational leakage e.g. capacity availability overseas, inefficiencies involved in running domestic plants below capacity, transport and logistics costs. However, their importance as barriers would likely be a function of the carbon price. The absence of such leakage so far should not therefore be taken as evidence that ex-ante free allocation would provide the same protection at higher carbon prices.

2. The ex-ante nature of the free allocation rules risks creating distortions to the internal market and stakeholder concerns about the fairness of the ETS. In Phase 3, free allocation is determined using a reference historical production level multiplied by

an emissions benchmark. Since the current historical reference period allows installations to use production level data from before the onset of the 2009 and 2011/12 crises on output, this has led to:

a. Significant surplus allocations to many installations;

b. Large differences in the sizes of these surpluses.

This creates concerns among companies about the fact that their competitors may gain a competitive advantage from having a larger number of banked free allowances than they do. It also creates concerns among stakeholders and policy makers about the distributional implications of providing large numbers of unnecessary allowances for free.

3. The present system has failed to effectively eliminate competitiveness fears related to ambitious climate and energy policy. Irrespective of whether the present combination of state aid and free allowances is effective at addressing actual competitiveness risks, the reality is that despite relatively generous (and in many cases surplus allocations of allowances to ETS installations[13]), competitiveness fears remain a major political barrier to the EU agreeing to a level of ETS ambition that is consistent with its long term climate and energy goals. The strong opposition to the recent proposal to delay the auctioning of a given amount of allowances in the EU ETS (known as "backloading") on the basis of competitiveness risks underscores this point.

One of the reasons for strong opposition to moves to strengthen the ETS is that many industry stakeholders perceive that because the present system allocates allowances based on an historical reference activity level, it may impede their growth and profitability over time if their production levels outgrow the historical reference period. The existing package has attempted to account for this eventuality by allowing for the historical reference period to be augmented by the amount of "significant capacity expansions" in certain cases. In practice, however, defining effective and flexible rules for such situations are difficult and also prone to create distortions. For example, the present benchmarking rules define a significant capacity expansion to be an investment of 15% or more of existing capacity accompanied by a "significant increase in activity". It is likely that such provisions encourage the gaming of the rules, e.g. by ensuring that new capacity expansions smaller than 15% do not occur. Also, in some cases, an installation may experience significant growth in production from a base well below existing physical capacity, but not need to physically expand capacity. But aside from the potential for actual market distortions, these rules lead to strong negative perceptions of the existing rules by EITE industries and hence to strong opposition to more ambitious carbon pricing policies. This perception is further strengthened by the fact that the cross-sectoral adjustment factor—referred to in Option 1 above—has further reduced allocations across the board to levels below the best technology benchmarks in Phase 3.

The risk of maintaining the current system is therefore that, while providing significant transfers of free allowances to industry, it nevertheless fails to allow for the EU to implement the kinds of incentives required to transform its energy sector. As has been well documented, there are significant costs and risks associated with delaying important low-carbon investments in the energy sector. This casts significant doubt on whether the status quo is desirable post-2020 from a political economy perspective.

4.3. Option 3: border carbon adjustments?

If even a reformed version of the status quo is deemed undesirable as a means of mitigating leakage concerns in the post-2020 package, then more radical reform approaches may be worth considering. One such approach is the adoption of border carbon adjustments (BCAs). One way this might function would be to require EU importers to purchase allowances equivalent to the quantity of the product imported multiplied by the benchmark CO_2 intensity value of the products. Imports from countries with carbon pricing already or firms with production intensities of CO_2 better than the benchmark would be allowed to have exemptions from the full cost of carbon. To ensure technical feasibility, BCAs would probably need to be applied only to the most energy or carbon-intensive products for which leakage risk is also particularly high, e.g. cement and cement clinker, basic iron and steel, nitrogenous fertilisers.

In theory, BCAs are more environmentally effective and economically efficient than free allocation since they allow for carbon price pass-through on both domestically produced and imported carbon intensive goods. Nevertheless, in practice, for the EU to implement BCAs unilaterally is likely to be politically difficult. The recent example of the EU's unsuccessful attempt to unilaterally include international flights

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to and from its territory into the EU ETS—a move which provoked a strong backlash from developing and developed countries alike—has provided an important test case in this regard. For the moment therefore, it seems reasonable to assume that this option is off the table.

4.4. Option 4: opting EITEs out of the EU ETS?

Given the significant political economy challenges that are posed by having EITE sectors in the ETS in the context of unequal global climate action, it is worth considering whether some form of temporary derogation from carbon pricing for EITE sectors may be desirable post-2020. Indeed, it could be argued that by removing competitiveness concerns for EITEs from the political debate might help to forge political agreement on a greater level of ambition and visibility for investors in the electricity sectors via a reinforced and better functioning ETS. Currently, the paradoxical price of maintaining EITE sectors inside the market based, harmonized price of the ETS is that the carbon price is kept low and prevented from being as effective as it could be. Other complementary policies are relied on to take an inefficient share of the abatement load. Therefore, it may be worth removing EITEs from the system for a period.

If EITEs were to be given a temporary derogation from the ETS, this raises the question of how these sectors would contribute to the EU's climate goals. Some possible options for an opt-out mechanism for EITEs might include:

- Regulation of certain aspects of EITE production where significant abatement potentials are identified (e.g. clinker content in cement, building and construction codes).
- Exemption from the ETS upon condition of sectoral agreements based on existing ETS benchmarks.
- A moderate EU carbon levy applied to EITE sectors.
- Creating a two track ETS (not dissimilar to that which is currently applied to aviation), whereby caps and/offset credit use are set at different levels for EITE and non-EITE sectors within the carbon market framework.
- Targeted R&D policies and other supply side policies.

However, if an opt-out approach were pursued, a number of potential drawbacks would need to be addressed:

- An advantage of having these sectors inside the framework EU ETS is that it allows more easily for compatibility with the EU's common internal market (existing free allocation distortions notwithstanding). Moving sectors outside the EU ETS could potentially create problems in this respect.
- The issue of equality of treatment between sectors. There has been some EU jurisprudence on the non-equality of treatment between sectors when certain sectors such as some emissions from aluminium were excluded from the EU ETS during the first phases.
- In practice, defining feasible sector-specific targets on a sector-by-sector basis that would be met in a non-trading system, such as regulation, could be difficult. Sectoral agreements or direct regulation are options, but likely involving a higher administrative and economic cost than economic instruments.
- Fiscal instruments, such as a carbon levy would encounter the issue of agreeing to common fiscal policy.

There is a logic to opt-outs for EITEs: structural mitigation options are still some way off in these sectors, although there is potential; and it would improve the political economy of ETS reform and the 2030 package. However, there are also difficulties to finding a feasible alternative coherent with the internal market.

4.5. Option 5: output-based free allocation?

One option for providing an effective derogation from the ETS to EITE sectors while also minimizing risks to the internal market would be to technically keep EITEs inside the perimeter of the ETS but to provide output-based free allocation. As the name suggests, output-based free allocation means that free allocations are calculated based on actual rather than historical production data (although both could be multiplied by an emissions benchmark to determine the free allocation level). Allocations are then given after the year's production and emissions have occurred instead of before.

The main advantage of an output-based free allocation approach over *ex ante* allocation is that any change in production would automatically result in a proportional change in free allowances. This implies that:

- Unlike in the case of ex-ante free allocation, *both* "operational" and "investment" carbon leakage are no longer economically attractive to undertake;
- Surplus free allocations do not occur due to fluctuations in output. Hence internal market distortions due to free allocation differences

are not possible;
- Minimum activity thresholds are not necessary;

Some of the carbon price signal is still maintained. For example, installations still have incentives to improve their emissions intensity per unit of output in order to reduce their allowance shortfall or even sell excess allowances if they can perform better than the emissions benchmark.

The main drawback of output-based free allocation is that it prevents carbon price pass-through into final product prices. This is indeed part of the objective of free allocation as an anti-leakage policy, whether ex-ante or ex-post. However, it is likely to limit some abatement possibilities through product substitution. This issue could theoretically be addressed in several ways:

- Regulation in order to facilitate the uptake of low-carbon industrial products from the EITEs in consumption sectors (e.g. in construction via building codes or cement and concrete standards) or downstream manufacturing. The potential for this has not yet been explored in the relevant research.
- Carbon-based consumption levies at the relevant point of consumption of EITE industrial products. In order to preserve the mitigation of leakage risks, these would need to be applied equally to imported products at the point of consumption (not import). The technical, legal and political feasibility of this option has not really been explored in the relevant research.
- Ultimately, the judgment thus far has been that the loss of abatement from substitution and the associated efficiency loss are worth the (political economy) benefit of preventing perceived leakage risks. If this judgment were to continue to hold, output-based allocation could be a viable option addressing some of the weakness of *ex ante* free allocation.