Climate Strategies

What is Needed in the EU's 2030 Climate and Energy Framework

Interim Discussion Paper and Results from a Research Project Led by IDDRI and Climate Strategies

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EXECUTIVE SUMMARY

The EU 2030 Climate and Energy Framework presents a number of technical challenges whose solution will be essential to its effectiveness. These include: the question of the role and reform of the ETS, the approach to decarbonisation of non-ETS sectors, and the mechanisms that exist for governing the package of policies at EU and Member State level. This discussion paper presents preliminary results from an analysis of these challenges, as well as proposals that could be included in the package of post-2020 climate policies.

The role and reform of the EU ETS

The stakes for the decarbonisation of ETS sectors in the period to 2030 are high. This will be a critical period in which carbon intensive technologies and infrastructure will either begin to be phased out on a significant scale, and make way for lower carbon alternatives, or not. The post-2020 ETS design and the complementary policies around it are essential to the direction that these choices take.

The EU ETS and carbon pricing are indeed essential to the decarbonisation of the power and heavy industrial sectors. However experience of the ETS to date has also taught us important lessons about what this mechanism can and cannot do. In terms of what the ETS can and should do, there is generally agreement that it should:

1. Provide an economic case for lower carbon operations and investment
2. Provide a longer term scarcity signal for innovation and strategic decisions
3. Control the costs of meeting emissions targets
4. Provide auction revenues for complementary policies.

The question is one of their prioritisation and interpretation. We would suggest that the first objective is arguably the most important. However, it also requires that the carbon price must be relevant to the decision making of participants. The Commission's proposal for a market stability reserve (MSR) recognises this. The MSR provides a useful basis for negotiations going forward as a potential tool to help increase price stability and predictability, as well as a more certain policy environment for market participants. However, much remains to be resolved about how it will work in practice.

Proving a solid investment framework for low-carbon technologies also has important implications for provisions to prevent carbon leakage in the ETS. Particularly for very high carbon cost sectors, such as steel and cement, they must not only protect against leakage; they must also give a stable investment environment in low-carbon technologies and innovation in more efficient end-use of their products. Doing so ultimately requires that anti-leakage measures allow for carbon costs to be passed through the value chain to consumers. A periodically updated or full output-based free allocation system with benchmarks would prevent any economic signal passing through the system. There is therefore a need to evaluate options that would allow for this to begin in the post-2020 period.

The second objective requires that the ETS cap decline at a rate that is relevant to investment, innovation and strategic time horizons for business. This relates to the political signal that is sent by decisions about the ETS cap. The third objective, cost effectiveness, is important, but cost-effectiveness should not have a cut-off date—it should be understood in terms of the contribution of the ETS to the cost-effectiveness of emissions reductions over the entire transition. The fourth objective, auction revenues, is important but is ultimately a co-benefit of the ETS. The need to establishing an effective and efficient market that can decarbonise sectors should therefore take priority over this if there is a clash between this and other aims.

At the same time, it must be recognised that the ETS is not really a 'technology neutral' instrument. Different technologies have different economic characteristics. For example, renewable electricity generation is capital intensive, but with low operating costs. It therefore has an investment risk profile

that is different to fossil fuel generation. Policies outside the ETS for decarbonisation of ETS sectors are therefore essential.

Approaches to decarbonisation of non-ETS sectors

It is important to consider the different challenges within the non-ETS sector, when establishing the overall framework for the non-ETS sectors and considering the need for individual policies within that framework. We propose that there are at least four distinct elements that are required:

- Flexibility (trading) to allow for greater cost-effectiveness in meeting European targets.
- Respect for different circumstances and financial capacities
- National policies and financial resources for long-run transformation
- Appropriate sectoral coverage (split between ETS and non-ETS sectors)

In addition, the post 2020 environment for non-ETS sectors is likely to be different. For instance, achieving the desired level of flexibility from Member State trading may be more difficult when virtually all Member States are short of allowances (before trading). Member States may not necessarily behave like private sector optimisers in comparing their abatement costs with prevailing prices of quotas and then deciding whether to buy or sell. On the contrary, if all they are short and concerned about not meeting their targets, they may be risk averse and simply hang on to their allowance forcing the market to be illiquid. There is also a need to begin to catalyse a range of actions by national governments and the private sector to begin the process of significant long run transformation of non ETS sectors.

We therefore propose three significant complements to the existing framework for non ETS sectors:

1. *The set aside and ex-ante auctioning of a small share of non-ETS allowances to Member States.* A small share of non-ETS allowances could be auctioned ex-ante to Member States (e.g. say 2%). This would force Member States to think strategically about their policy frameworks in the non-ETS sector. It would provide flexibility: Member States concerned about being short can be assured that they buy further allowances at auction if necessary. It would generate further resources for transformation, e.g. auctioning of 2% of non-ETS allowances would raise about 10-12 billion Euro over the period 2021-2030
2. *The creation of a project-based market mechanism to allow for (parts of) non-ETS sectors responsive to price signals to sell emissions reductions to a central fund—capitalized by the auction revenues above—which could then resell them at auction to Member States that wish to buy them.* This would help to provide financial resources and build mitigation capacity and certainty for project investors. More importantly, the mechanism could help to catalyze actions and learning about how to exploit potential reduction opportunities beyond the scope of the project mechanism itself.
3. *Targeting post-2020 structural funds to support Member State policies in non-ETS sectors.* Non-ETS sectors have important market 'failures' and there are potentials for important mitigation cost spill-overs across time, e.g. transport infrastructure, or deep retrofitting programs for the building sector. It is appropriate that such projects be addressed by national policies. The resources to support these national policies could come from EU structural funds in the post-2020 period. They could also be coordinated with the priorities set out by Member States national energy plans under the governance mechanism of the Framework.

Governance of the Framework

Member States' objectives of a sustainable, secure, and affordable energy system cannot be achieved without coordination. It seems unlikely, however, that the 2030 Framework will contain binding national targets for renewables and energy efficiency.

Nonetheless, there are important EU level interactions and spill-overs between national choices on the energy system. For example, decarbonising the power sector entails significant coordination needs on transmission infrastructure, supply reliability, flexibility, market design, etc. Member State spill-overs are also relevant to the decarbonisation of the transport sector, to energy intensive industries, and even in the buildings sector (see energy security paper accompanying this paper).

It is therefore strongly in Member States' own self-interest to have a clear basis for coordination and anticipation of the implications of neighbouring decarbonisation strategies, as well as to ensure that the EU is on track overall.

Member States will need to coordinate two things:

1. *Their overall energy and climate strategy, definition of national objectives, and progress.*
2. *A focus on a few particular sectors where spill-overs are particularly strong (e.g. the electricity sector), or where competence lies most strongly with Member States but where progress is important to the achievement of EU goals (e.g. the buildings sector).*

There are already a number of reporting/planning requirements which need to be streamlined. The new reporting framework should be short (e.g. 30 not 300 pages), transparent, and regularly submitted and updated (ever 2 years). We also propose an overall section which would summarize the Member States' decarbonisation strategy. This would comprise of:

1. A 'dashboard' of the main objectives for decarbonisation organized by sector.
2. A summary of the main barriers to abatement identified and how the chosen policies have been designed to overcome them.

As a second step, the Commission should be tasked with assessing the coherence and adequacy of the national decarbonisation plans. This assessment should be based on two essential criteria:

- *Internal coherence,* i.e. of individual aspects of the strategy with each other, and with the Commission's assessment of the potentials of the various abatement levers.
- *External coherence,* i.e. with collective objectives in particular those in the long term.

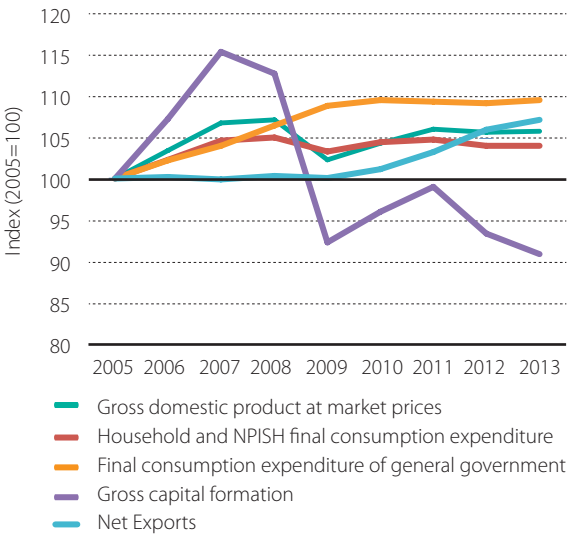
The Commission must also have a foundation for incentivizing compliance when needed. In practice, the best way to do this may be to link it to specific policy frameworks and measures where the EU has a means to incentivise action by Member States. These could be elements such as the revision of the internal energy market package (electricity sector), the energy efficiency directive (buildings sector), and the allocation of structural and cohesion funds to climate related projects.

1. Introduction

The EU has agreed to negotiate a new Climate and Energy Framework to 2030, to put its economy on the path towards a long-term low emissions objective consistent with the recommendations of the IPCC. However, the EU also has important domestic reasons to adopt the 2030 climate and energy framework.

Firstly, the EU is suffering from a massive decline in investment. Gross capital investment has fallen by 21% since 2007.[1] At the same time, the EU has large investment needs, particularly in energy related infrastructure. Regulatory uncertainty is an important barrier to investment, encouraging investors to "wait and see". The EU needs a regulatory framework to stimulate investment demand from sectors with large investment needs, including the energy sector. Agreeing to a well-designed 2030 Climate and Energy Framework (2030 Framework hereafter) in October can provide a powerful signal to the private sector that investment in low-carbon assets is needed, thus helping to contribute to the revival of new investment and economic activity.

Figure 1. Investment as the main drag on recovery: EU GDP and its main components (2005-2013)



Source: Authors based on Eurostat data.

Note: NPISH stands for non-profit institutions serving households

1. Eurostat.

Secondly, the EU also needs to address its situation as an importer of primary resources, in particular fossil fuels. These are in large part responsible for its trade deficit, with current fuel imports accounting for about 3.2% of EU GDP.[2] As the emerging world moves into the middle class, competition for energy and material resources will increase. This will drive price increases, but also a market premium on innovative, resource-efficient products and services. A resource-efficient is attractive to countries such as China and India, which are faced with real resource constraints on growth.[3] The EU's future source of comparative advantage in international trade will be in such knowledge-intensive goods and services, which respond to the long-term trends that will structure global markets.

At the same time, the recent crisis in Ukraine has highlighted continuing energy security concerns for Europe. The transition to a low-emission, resource-efficient economy can help to assure the EU's energy security, i.e. resilience against short-term supply shocks and longer-term pressures on fuel prices and GHG emissions.

The objective of this paper is twofold. Firstly, it aims to set out initial orientations and results of the IDDRI and Climate Strategies research project on the 2030 Framework, as well as describe the research that will be undertaken in the subsequent phase. Firstly, it sets out a brief framework to consider how EU policies should be structured, between the Member State and EU level, and between price-based instruments and other policies. It then addresses the issue of energy security, the role of the ETS, the non-ETS sector, and the governance of the 2030 Framework.

2. A Framework for EU energy and climate policy

The transition to a low-emissions and efficient energy system is long-term and complex, requiring a range of instruments to address different policy challenges (or

2. Eurostat.

3. To take one indicator: the population density of China and India is 145 and 421 people/km2 respectively, compared to 127 people per km/2 in the Eurozone (World Bank data). China and India are projected to become the world's largest and second largest oil importers by 2035. IEA, "World Energy Outlook 2013", Paris: International Energy Agency.

market failures, in economic parlance). The EU faces the additional challenge of navigating this transition, while balancing Member State and EU competence. There is thus the need to consider the 2030 Framework on two dimensions:

1. The balance between Member State and EU competence
2. Instrument choice to address different policy challenges.

We can consider the second dimension first. The energy transition requires addressing three distinct but interrelated challenges. Firstly, greater efficiency of production and consumption requires addressing a distinct set of behavioural and non-market barriers, in particular relating to the decisions of individuals. In this 'first domain', price-based incentives need to be complemented by standards, regulation, information and financing policies to overcome these non-price barriers. Secondly, some economic actors and decisions are more sensitive to price-based incentives: this is particularly the case for large-scale industrial actors in the power and industry sectors. In this 'second domain', price incentives are the crucial policy instrument, such as that flowing from the EU ETS (see section 2 below). Thirdly, the transition requires non-marginal change, driven by technology innovation and changes in long-lived infrastructure. In this 'third domain', research, development and deployment (RD&D), infrastructure policy, and coordinated long-term private and public sector anticipations are crucial.[4]

This may sound like an obscure academic debate. It is not. The current backlash against EU policies and regulation in many parts of the EU risks an overreliance on certain types of instruments (the EU ETS, for example), which can be sold as 'market-based', 'technology neutral', and thus more coherent with more Member State competence in their energy policy. There is a need for a rational, evidence based debate on what can be achieved by certain policies, and what cannot.

This relates to a second point, namely the balance of competence between Member States and the EU. It is not surprising that this is a hot debate in the current context of crisis and social mistrust of the EU (witness the rise of Euro-sceptic parties). However, just as the EU shares an economic and geopolitical destiny, Member States' individual and collective energy goals cannot be achieved in isolation. **Cooperation and coordination are essential.** This has found reflection in the appointment of a Vice President for Energy Union in the new Commission.

This is a key message of this paper: the EU and its Member States must carefully consider the correct role and balance between different policies and between the EU and Member States. This is not an unmitigated plea for 'more Europe' in energy matters. It is, however, a plea for a more open, careful, comprehensive debate on these issues. The energy challenges that Member States face are complex and interconnected. Their response needs to reflect this.

4. For a full discussion, see Michael Grubb (2014), "Planetary Economics: Energy, climate change and the three domains of sustainable development", Routledge.

3. The EU ETS: Its role and reform

The EU ETS must be an essential part of the 2030 Framework. However, there are still divergent views about the role that it can and should play in addressing the EU's energy challenges. Is it an instrument for ensuring the achievement of short-term targets at minimum cost? Is it an instrument for driving long-term investment and innovation in low-carbon technologies into the market? Is it rather an instrument for gradually driving high carbon technologies out of the market? Are other policies needed alongside, and if so, what are the implications for EU coordination?

Given the current 'crisis' in the EU ETS and its prominent role in the proposed 2030 Framework, coherent and precise answers to these questions are essential and has important implications for the proposed carbon market reform. Providing a first framework to address these issues is the objective of this section, as well as of the long-term research in this project.

In terms of the above framework, the EU ETS sectors are ones in which prices are a significant driver of actor behaviour ('second domain'). They are also sectors of high integration in the EU, e.g. Europeanized companies, spill-overs for national policy across borders, etc. This makes the EU ETS particularly suited for these sectors, even if, as we will argue below, prices alone are not sufficient for decarbonising these sectors cost-effectively.

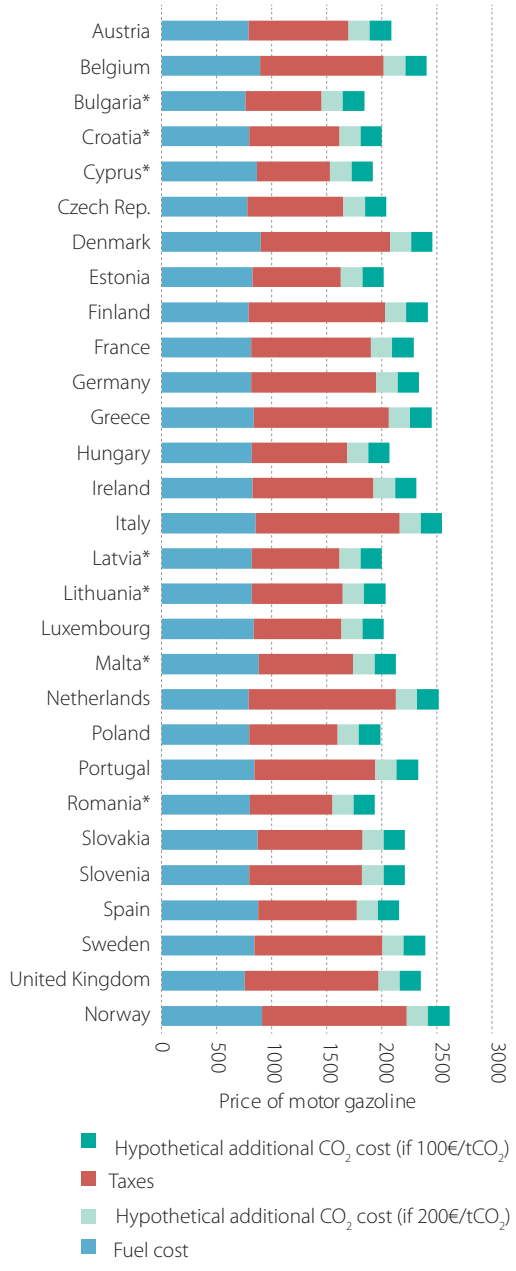
On the other hand, current non-ETS sectors, have been left out of the EU ETS up until now, in part, because a large share of abatement potentials in these sectors is subject to important non-price barriers. For instance, energy use in the transport sector is notoriously price inelastic (unresponsive to price rises) for all but relatively poor households. Deep decarbonisation of the road transport sector, for instance involving large scale fuel switching, or vehicle electrification, also requires public intervention to address market 'failures', such as the need for significant public infrastructure. Finally, these sectors often require policy coordination. As Figure 2 shows, in the motor transport sector, energy taxes currently account for a large share of prices in EU countries. These would need to be coordinated with carbon pricing policy at the political level. Moreover, implausibly high carbon prices in the present political context would be required to have any meaningful impact on consumer behaviour.

3.1. The EU ETS's role

3.1.1. Role number 1: Integrating carbon prices into economic actors' operational and investment decisions

Prices are one of the main vectors that determine the operational and investment choices decisions companies make that determine their emissions intensities. This can be seen perhaps most clearly with the example of fuel switching in the power sector. The power sector currently accounts for approximately one quarter of EU

Figure 2. Price of motor gasoline in the EU divided by taxes and fuel cost and the hypothetical impact of CO_2 prices



Data: Enerdata, author's calculations

energy-related CO_2 emissions[5], with approximately 75% of these emissions stemming from coal or lignite fired plant[6]. A clear alternative is to change the relative prices of the fuels (via carbon prices) to reduce these emissions through switching the fuels and energy sources used by the power sector.

This is not simply a question of short-term emissions management. Short-term incentives, if expected to endure, directly affect incentives about long-term choices, such as what technologies to invest in, thus shaping the future carbon intensities of ETS sectors. Carbon prices therefore an essential to play in generating the economic preconditions conditions for low-carbon investments in ETS sectors.

Figure 3. EU electricity generation share by source 2000-2013

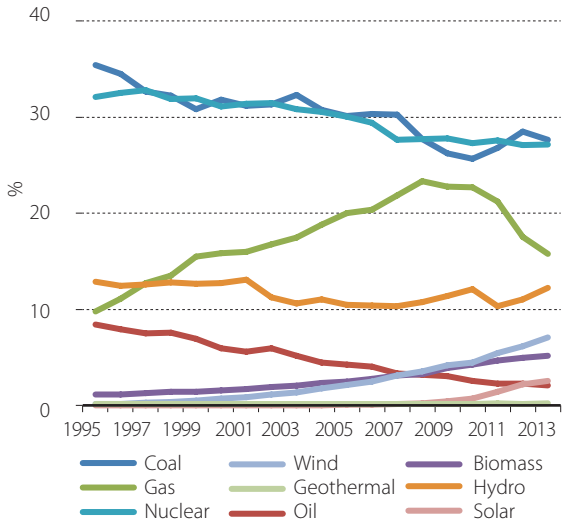
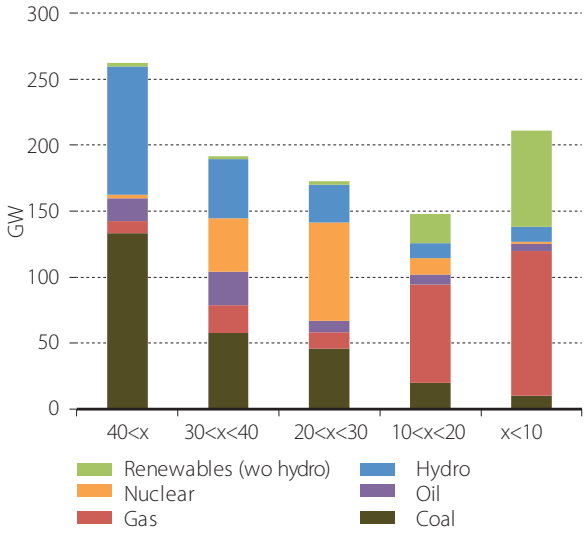


Figure 4. Age structure of the EU power fleet (years).



This is particularly important in the current context in the EU power sector. The EU power sector has been hit by a 'perfect storm'[7] of declining demand, new investments in renewables and thermal capacity, phase outs of a significant share of existing capacity and a change in the relative prices of gas and coal.[8] Figure 3 shows

5. Authors' calculations based on UNFCCC energy industry emissions data by source for 2012.

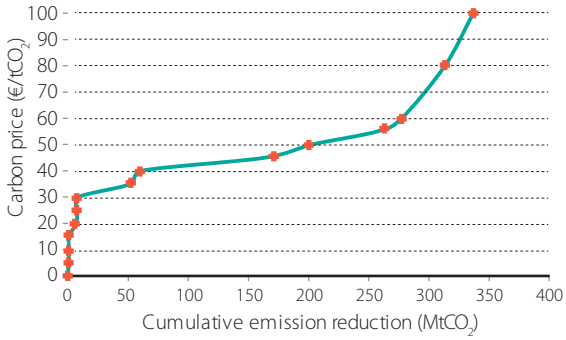
6. Authors' calculations based on Eurostat electricity production data by source for 2012.

7. For a fuller discussion see: Rudinger, A. *et al.* (2014). Getting out of the perfect storm: towards coherence between electricity market policies and EU climate and energy goals, IDDRI, *Working Papers* N°12/14.

8. Due to prices for gas, coal and carbon emissions that are highly favourable to coal.

that gas generation has been the adjustment point resulting from these trends. This is problematic for two reasons. Firstly, the EU has a large share of old coal power plants (Figure 4) which it will need to phase out to decarbonize its power sector. At present, the mix of incentives for doing so is inadequate, despite the possibility of going a long way towards doing so by switching to gas. Secondly, retaining a large share of coal in the grid prevents the greater use of existing and construction of new, flexible thermal plant, which will be necessary to allow for an increasing share of renewables and low-carbon technologies. (Ultimately, providing flexibility services to the power market on investment time horizons will need be addressed by more fundamental power market design issues. However, the carbon market could help to provide a much needed bridge as the future power market design is developed.) A preliminary plant-by-plant analysis for seven of the largest Member States, suggests that carbon pricing can have an essential role to play in responding to these two demands, making for a more transition-coherent mix of incentives in the power sector and directly facilitating the gradual phase out of coal and lignite fired power plants.

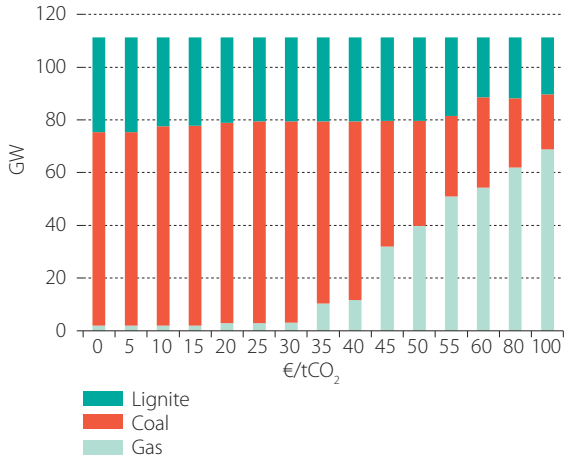
Figure 5. Estimated aggregate emissions reduction potential from fuel switching for 7 Member States in 2012 (UK, DE, ES, IT, PO, CZ, RO)



This analysis takes into account the individual thermal efficiency and fuel source of plants in the UK, Germany, Poland, Spain, Italy, Czech Republic and Romania. In this way, we go beyond the 'average switching' price that is often presented by taking fleet average efficiency levels. This enables us to give a quantitative estimation of the switching potential at different carbon prices.
Figure 5 and Figure 6 present our preliminary estimates of fuel switching potentials for these 7 Member States. A few caveats are in order here. Firstly, these results are based on recent gas and coal prices. These prices, particularly for gas, are highly volatile and vary significantly over time. Therefore, future switching prices could be significantly lower (or higher) than they are here, depending on energy market developments. Secondly, our estimates probably underestimate potentials for switching between lignite and coal or gas at lower carbon prices, because we assume average lignite prices for Member States rather than using a full range. These aspects will be added to the analysis in future work.

Our results should therefore be taken as more of an illustrative example using one plausible future scenario—one in which, if relative gas and coal prices remain close to or below their current levels, there would a be a large potential for the ETS to drive abatement from fuel switching, and thus to begin to force coal and lignite out of the power mix. While these carbon prices may be deemed to be "high" today, this example nevertheless highlights the potential for the ETS to play a key role in decarbonisation of the power sector over time, to do so cost effectively, and potentially at quite reasonable future carbon prices.

Figure 6. Change in the share of gas, coal and lignite used at different CO_2 prices in 2012 (UK, DE, ES, IT, PO, CZ, RO)



Making way for lower carbon alternatives, is not, however, the same thing as driving low-carbon investment. Ultimately, investment in a given technology or piece of capital is driven by a range of factors (demand for the product/service, prices, investment risks, technology risks, etc.), of which prices are but one. As experience with the power sector in Member States who are most advanced in decarbonising demonstrates, low-carbon technologies often have a range of characteristics that can lead to market 'failures' and require complementary policies to address. For instance, the EU ETS cannot provide long-term carbon price signals to low-carbon power producers, due to the fact that European power markets typically do not trade long-term power contracts. Since low-carbon technologies, whether nuclear, renewable or CCS, tend to be highly capital intensive, the carbon market is not sufficient to drive efficient levels of investment in these technologies. While a more robust carbon price can help reduce incremental support costs to these technologies relative to market electricity prices, complementary policies to provide longer term price reliability are essential to the competitiveness of these technologies. Ultimately, the EU ETS is not a technologically neutral instrument, since technologies at different stages of maturity or with different cost characteristics thrive better under different policy and market environments.

In sum: a key role of the ETS must be to provide an economic case for the phase out of high carbon technologies and to create space for the arrival of lower carbon alternatives. The example of the power sector demonstrates this potential convincingly. The EU ETS should be viewed as a key pillar of the economics of decarbonisation, but not as a substitute for other key pillars such as innovation and technology support.

3.1.2. Role number 2: Shaping business and innovation strategies

One can make a distinction between individual investment decisions (for example, to invest in this or that power plant, as discussed above), and the broader investment/corporate strategies of companies and sectors covered by the EU ETS. These decisions—which include in particular RD&D in breakthrough innovations, infrastructure planning, development of new business models, reform of market designs of the power sector, etc.—require a long-term vision and coordination.

As the experience of some Member States in the process of reforming their power markets has shown, the ETS is not sufficient to drive of all these decisions on its own. However, the ETS can help to shape and orient these strategic decisions via the existence of a credible longer term cap on the level of emissions. If the long run ETS cap can credibly signal that there is an important role for low-carbon technologies in the future, this can help in orienting strategic decision making in business and government towards decarbonisation. **A credible and ambitious long-term ETS cap that declines at a fast enough rate to be relevant to investment timeframes is therefore essential.**

3.1.3. Role number 3: Controlling costs of achieving of interim targets

Thirdly, the EU ETS can help ensure that the EU meets its interim emissions targets, and with a reasonable degree of cost-effectiveness. Of course, short run cost-effectiveness is not the only criteria by which to judge the ETS's overall cost effectiveness. However, keeping a control of short-term costs is still important. A regulatory framework which created much higher costs than are perceived as necessary is unlikely to provide regulatory stability for investors. An important role for the ETS is that it can help to control excessive costs in meeting annual and mid-term targets through the flexibility of the trading mechanism and its technological neutrality among mature technologies[9].

3.1.4. Role number 4: Generating resources for other energy and climate policy objectives

Finally, an important co-benefit of the ETS: auction revenues to fill climate and energy financing gaps. Achieving decarbonisation of the European energy and industry sectors will require significant new investment as well as a role for complementary policies. By auctioning allowances to emitters of CO_2, the ETS provides an important co-benefit in the form of funds with significant transformative potential. For example, with a carbon price of 20€/tCO_2 and assuming 75% of allowances were auctioned, the EU ETS would generate approximately 27 billion € in 2021 alone, equivalent to roughly 1 billion € per Member State on an annual basis. In addition to investment in RD&D, these resources are also more than sufficient to compensate the energy price increase for the poorest households.[10]

3.2. The issue of carbon leakage and anti-leakage measures

A small number of energy-intensive, trade-exposed sectors would be at risk of carbon leakage if there is a high carbon price differential between the EU and its economic competitors. There is a significant amount of evidence that such risks are small relative to other sources of competitive advantage, and limited to a few sectors. From a *technical* perspective carbon leakage is not a major issue for all but a few highly exposed sectors. Moreover, the real issue is more the EU's *energy* not carbon competitiveness, which is largely driven by its position as a major importer of expensive fuels. Only a comprehensive strategy of efficiency, domestic low-carbon energy and the appropriate infrastructure can address the issue of the EU's energy competitiveness. This must be a key objective of the 2030 Framework.

Nonetheless, carbon leakage is a major *political* issue. Such exposed sectors are politically powerful, and create an effective lobby against more ambitious energy and climate policy. This issue therefore needs to be addressed with both political and technical aspects in mind. The current discussion on the structural reform of the ETS should therefore encompass a related reflection on anti-carbon leakage protection measures.

There are a number of deficiencies in the current anti-leakage measures. Firstly, the list of sectors exposed to carbon leakage is inappropriate. Simply put, it contains a significant number of sectors which are not at risk or only at risk under significantly higher carbon prices. This means that governments forgo important revenues from auctioning to these sectors. For instance, removing sectors currently on the list which are deemed exposed to leakage purely because they have a high trade intensity with non-EU countries but no significant carbon cost at 30€/tCO_2 would allow for roughly an additional 80 million allowances to be auctioned (800 million € at 10€/tCO_2). Further reductions in free allocation to moderately exposed sectors could also be made in the case of low-carbon prices.

A second problem concerns the appropriate treatment of highly carbon cost intensive sectors. Evidence to date

9. Note that this is nevertheless consistent with ensuring short run scarcity in the market-policy-makers can ensure short-term allowance scarcity, while the market can ensure that ETS actors find the most cost-effective means of achieving the emissions reductions required by that scarcity.

10. Authors' calculation based on data from Enerdata and Eurostat.

suggests that current system, which uses ex-ante production data to determine free allocations is problematic for these sectors. In these sectors ex-ante allocation creates distortions around the production thresholds used to calculate free allocation[11], around new entrant and closure provisions. It also creates concerns among industry that rivals may be advantaged by lower production than in the past. Moreover, the system does not lead an environment that is conducive to investments in low-carbon technologies and processes because it prevents carbon cost pass-through to downstream purchasers of energy intensive products (this is the principle of free allocation). This inhibits the potential for downstream innovation and end-use efficiency in the sectors where it is most important. It also creates an uncertain environment for investments in breakthrough technologies because their costs cannot be paid for by increases in final product prices (without leakage).

3.3. Implications for carbon market reform

The above objectives have a number of implications for ETS reform.

Firstly, a carbon price consistent with shifting operational decisions and a decarbonizing power sector (**ETS Role #1**) requires a scarcity of allowances relative to BAU emissions *in the short run as well as the long run*. The main participants in the carbon market trade on relatively short-term timeframes. Even if the carbon market may have an expected allowance scarcity in the long run, if the market is in surplus in the short run (e.g. during a 5-8 year Phase), then too few of the major participants will purchase allowances and the price can collapse due to excess liquidity. This is consistent with the experience of the EU ETS to date (Figure 8). **A mechanism is therefore required to ensure that the carbon market avoids a large excess of short run supply over demand weighing on carbon prices (Reform #1).**

To date, this problem of an excessively large surplus has been dealt with in two steps. First, in 2014 the so-called 'backloading' measure was introduced as a temporary solution. Backloading reduces the short-term supply of allowances by 900 Mt in total over 2014, 2015, and 2016. However, its effect on prices is significantly weakened by the fact that it a) is relatively small compared to a surplus of around 2 billion allowances and b) the backloaded allowances are scheduled to return to the market very shortly after being removed (in 2018, 2019, 2020).

As a more lasting and effective measure, the Commission proposed the Market Stability Reserve (MSR) on January 22, 2014. This measure goes in the right direction and could permanently remove an excessively large surplus from the market. As currently proposed, the MSR would set a target range for the size of the ETS allowance surplus of between 400 and 833 million allowances.[12] Beginning in 2021, allowances would be removed from the auctioned amounts to enter the market and placed into a reserve when the surplus size is above 833M allowances. They would be removed from the reserve and returned to the market when the surplus size fell below 400M allowances. The rate of deposit/withdrawal of allowance from the reserve would be 12% of the accumulated surplus per year.

However, crucial design details make the MSR's current design are fundamentally incoherent with this objective and should be changed. Firstly, the MSR as presently proposed would begin too late (in 2021). As noted above, strong short-term price incentives are required, if only to reestablish the competitiveness of gas versus coal. The MSR design should thus be made more coherent with its stated objective: the backloaded allowances should be placed directly into the reserve rather than returned to the market; or the MSR could be made to begin earlier, say, in 2018, in order to make policy design more consistent with the underlying purpose of the MSR mechanism. It should be noted that the MSR

Secondly, the MSR as presently proposed placed allowances in the reserve at 12% per year. This will almost certainly be too slow to restore the optimal surplus size of 400-833 MtC02 proposed by the Commission within a reasonable time frame. Figure 7 calculates the expected size of the ETS surplus based on the Commission's reference emissions scenario[13]. It uses an assumed linear reduction factor in the cap of 2.2% from 2020. It is evident that, in addition to the back-loaded allowances being returned to the market, the 12% rate of placement into the reserve means the surplus would not reach the targeted level until around 2026. Even if one allows for uncertainty in the optimal surplus size, a steeper reduction in the surplus size could be used when the surplus is a long way from the optimal level, as is presently the case. **A factor for placing allowances into the reserve should vary as a function of the extent to which the surplus is above the optimal size. For instance, if the surplus size is twice the upper band on the optimal surplus size, then the rate of entry into the reserve should be faster, e.g. 40%, if less, then slower, etc.**

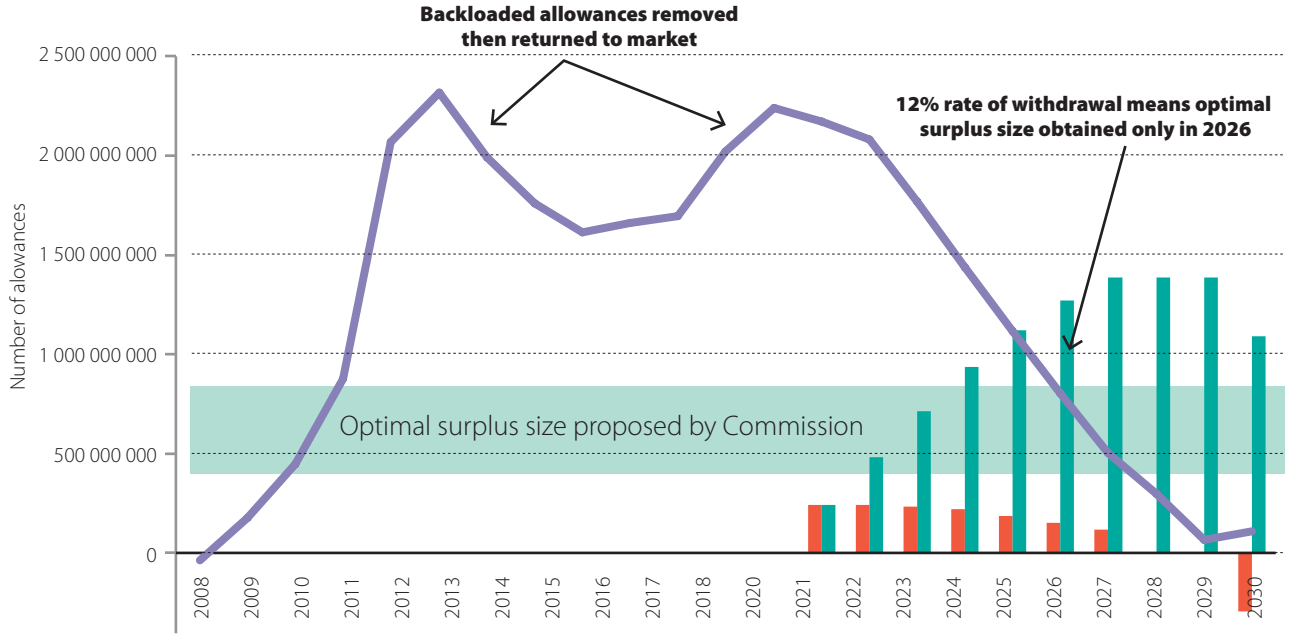
Reform #2: To strengthen the role of decarbonisation in strategic decisions in areas of innovation, investment and business transformation (role #2), the ETS linear reduction factor should be adjusted to 2.2% per annum from the present 1.74%. The Commission's January Communication on the 2030 Climate and Energy Framework proposed the adoption of a 40% GHG reduction target for the EU in 2030 vs. 2005 levels,

11. Cf. Neuhoff *et al.* (2014): Carbon Control and Competitiveness Post 2020: The Cement Report, Climate Strategies, UK.

12. The 400-833Mt surplus range was chosen to (roughly) reflect the annual hedging demand of utilities in the carbon market, which creates additional demand for allowances beyond the pure compliance demand in a given year.

13. European Commission (2013), EU Energy Trends to 2030. http://ec.europa.eu/energy/observatory/trends_2030/index_en.htm

Figure 7. Evolution of the surplus and reserve under the reference emissions scenario



Source: Authors, based on data from EUTL and DG Clima.

Note that this figure assumes a 2.2% linear reduction factor for the ETS cap post-2020, and excludes aviation emissions from the estimate of the ETS cap, emissions and surplus. It includes the impact of back-loading and of spreading the return to market of the back-loaded allowances over 2021 and 2022 due to proposed rules for "end of Phase" auctions in the MSR proposal.

with the EU ETS taking on a target of -43%. A change in the linear reduction factor to reflect this -43% target (from the current 1.74% p.a. to 2.2% p.a.) would help to re-focus management attention on strategic decarbonisation options in two ways. Firstly, it would make the long run ETS cap more relevant to long-lived investment decisions made today. Secondly, adjusting the linear correction factor would credibly signal that policy makers are genuinely committed to the structural decarbonisation of the EU economy by mid-century.

Reform #3: Anti-leakage provisions are particularly important for the decarbonisation of sectors with very high carbon costs. Only with such provisions can a robust EU ETS support investments in efficiency, and low-carbon opportunities in carbon intensive sectors. This also requires that sectors with high carbon costs can pass these on to downstream consumers.

These mechanisms need to be robust to potential long-term deviations in carbon price levels across countries. Two options address these requirements: border-levelling with full auctioning and inclusion of consumption in the ETS combined with output-based free allocation. These options should therefore be explored in detail for the very carbon intensive sectors for implementation in 2020.

To this extent the 2030 Framework should give a mandate to the Commission to explore these options under the anti-leakage provisions of the ETS Directive. For the BTA provisions this has to involve active engagement with international partners in the period post the COP21 in Paris. In light of the international development a decision would then be made on the most appropriate approach by 2018, two years prior to the start date of fourth compliance Phase. Should the implementation be delayed, then leakage protection has to be ensured for the transition period. The current allocation mechanism or output based allocation of allowances available to the sectors can ensure leakage protection for a transition period, during which the disadvantages associated with these mechanisms would be less problematic.

To provide a framework also for other sectors in the economy, we propose the division of carbon leakage exposed sectors into 3 categories: non-carbon cost intensive, moderately carbon cost intensive and highly carbon cost-intensive.

- Non-carbon cost intensive sectors, such as those currently receiving free allocation based on a high trade intensity but low-carbon cost should no longer receive free allocations.
- Moderately carbon cost sectors should receive free allocation set at a lower level.
- Highly carbon cost intensive sectors would be dealt as described above.

4. Decarbonisation of non-ETS sectors

The non-ETS sectors mix a range of challenges, which cut across the three domains of policy outlined above. They also cut across Member State and EU competence. Some aspects of decarbonisation in these sectors can be dealt with via European policies, such as standards and labels for new energy-consuming goods

in the EU internal market. The tertiary and manufacturing sectors which are not under the EU ETS are also composed of some European actors. These sectors may also be somewhat more responsive to price signals than others (such as the residential or transport sectors). Here, flexible European incentives could be appropriate. The buildings sector is subject to numerous market failures, and is generally more insensitive to prices due to market 'failures'. Here national policies and programs will be needed to incentivize e.g. building retrofits, supported in some cases by EU financing. The transport sector is relatively price-inelastic in the short term, and contains non-price externalities related to the provision of the necessary infrastructure and economies of scale for a low-carbon transport sector (e.g. electric charging, etc.).

The brief discussion above shows the necessity to consider the different challenges within the non-ETS sector, when establishing the overall framework for the non-ETS sectors and considering the need for individual complementary policies within that framework.

4.1. An analytical framework for the non-ETS sectors

In this context, it is important to understand the principles of what we are trying to achieve with this non-ETS framework. There are at least four distinct elements that are required:

- **Flexibility (trading) to allow for short run cost-effectiveness in meeting European targets.**
- **Respect for different circumstances and financial capacities**
- **National policies and resources for long-run transformation**
- **Appropriate sectoral coverage (split between ETS and non-ETS sectors)**

Table 1 summarizes how these objectives can be addressed and how they interact. It is important that these objectives are not confused. For example, some Member States have proposed the inclusion of some non-ETS sectors in the EU ETS (such as the transport sector), or the linking of the EU ETS and non-ETS sector via e.g. domestic offsets. What is the objective of such measures? Is it because it's felt that the EU ETS is an appropriate mechanism to drive the decarbonisation of the non-ETS sector in question, e.g. the transport sector? If so, is this justified Are the sectors likely to be responsive to second domain policies (prices)? We argued above that this is not the case for the transport sector. Is it to give flexibility to Member States on how to achieve their non-ETS targets, via the inclusion of the non-ETS sectors in the EU ETS? If so, could there be other ways to ensure flexibility in the non-ETS sectors, beyond putting them in the ETS if they do not belong there? Is the goal of the inclusion of these sectors is to stabilize the ETS? If so, is this an appropriate way to do so without putting these sectors in the ETS when it is not the right instrument for them? Etc.

Given this discussion, we suggest that the main challenges for the non-ETS sector involve finding appropriate mechanisms for generating resources for transformation and providing flexibility in the achievement of non-ETS targets.

Table 1. Overview of objectives, possible mechanisms and their interactions for decarbonisation of non-ETS sectors

Objective	Mechanism	Interaction
Flexibility	Trading between Member States	Could also provide resources for fairness and transformation Caveat: system must be designed in a way to avoid 'hot air' trading.
Accounting for different circumstances and financial capacity	Non-ETS targets reflect different circumstances and emissions drivers trajectories Resources for transformation	Provision of resources for transformation and flexibility mechanisms can help to 'smooth' imperfections in design of the non-ETS target framework Caveat: system must
Transformation	Member State policies, supported by the Governance Mechanism EU regulations Resources for transformation	A credible framework for transformation is a pre-condition for targets that take into account cost effectiveness to a greater degree
Appropriate sectoral coverage between EU ETS and non–ETS sectors	Decision on sectoral coverage of the EU ETS and non-ETS based on a careful assessment of market barriers and policy challenges in the different sectors	Appropriate mechanisms for flexibility for the achievement of non-ETS sector targets could alleviate pressure to include these sectors in the EU ETS.

4.2. What mechanisms for transformation resources and flexibility?

It is important to note that, while the above elements were all true of the decisions facing the EU in the elaboration of the Effort sharing decision framework governing non-ETS sectors in the 2020 Cliamte and Energy Package, the 2030 Framework must grapple with some important new elements that change the game somewhat. Firstly, a lower emissions cap for the EU as a whole will probably mean that most, if not all, Member States will be required to make significant contributions to reducing emissions in their non-ETS sectors. This has implications for the ability of the mechanism to provide flexibility and deliver finance to where reductions are most cost-effective. This means most, if not all Member States, are likely to be 'short' of non-ETS allowances (before trading takes place) (Oeko Institut, 2014). This will be in contrast to 2013-2020 period, where many Member

States are 'long' (and some are very long) and thus there is ample supply for Member States who may need to purchase allowances to comply with their obligations.

This raises a critical question: if all Member States are all short of allowances, will they trade? Indeed, will the current market mechanism function as intended? There is arguably a risk that Member States will not behave like rational profit-maximizing actors: they may be averse to contracting to selling allowances so long as they expect to be short of allowances, even if they may stand to profit from doing so because reductions on their territory are cheaper than in a buyer Member State. Experience of international trading under the Kyoto Protocol under Joint Implementation and of Member State trading in the EU to meet renewable energy targets suggests that this is a genuine risk. For instance, under the Kyoto Protocol, there was a strong correlation between countries propensity to sell allowances and their expected surplus size, which did not necessarily reflect differences in marginal abatement costs. For this reason, new measures may be needed to ensure that the market for non-ETS allowances can function effectively.

Secondly, by 2030, Member States will need to be well on their way to decarbonisation of non-ETS sectors envisaged by 2050. This has implications for the balance between short and long-term cost-effectiveness of reductions. Member States will need to not only pick the low-hanging fruit of the low-carbon transition. They will also to consider their broader mitigation strategies and interactions between decisions taken today and the cost of reducing emissions in non-ETS sectors tomorrow. Both the transport and heating in buildings sectors are examples of sectors where there are important potential lock-in effects resulting from high carbon infrastructure and where important spill-overs exist across time. Thus, in the 2030 package, there should not be excessive focus on exploiting least-cost measures for meeting a 2030 target. **The policy framework needs to prepare both the private and public sector for significant transformation to 2030 and beyond.**

Thirdly, since the development of the 2020 Climate and Energy Package, there have been major changes in the way in which lower income Member States are to receive and spend EU structural and cohesion funds. A significant share, around 15%, of these funds, which are in the order of 400 billion € for the period 2014-2020, are now required to be spent on climate related investments.

Based on these considerations we propose that the non-ETS Framework be based on the following three elements:

1. ***The set aside and ex-ante auctioning of a small share of non-ETS allowances to Member States.*** A small share of non-ETS allowances could be auctioned ex-ante to Member States (e.g. say 2%). This would have several advantages. Firstly, it would force Member States to think strategically about their policy frameworks in the non-ETS sector, e.g. the trade-off between buying at auction and implementing further policies at home. This can contribute to more robust policy frameworks domestically, and hence a more cost-effective and transformative achievement of the non-ETS target. Secondly, it would provide flexibility: Member States who are concerned about being short can be assured that they buy further allowances at auction if necessary. Thirdly, it would generate further resources for transformation. We estimate that auctioning of 2% of non-ETS allowances would raise about 10-12 billion Euro over the period 2021-2030.[14] These could either be recycled back to Member States, based on e.g. equity considerations. Or a part or all of them could be placed in a central fund to invest in cost-effective projects (see point 2 below)[15] and programs for the transformation of the non-ETS sectors where the potential is greatest and most cost effective.
2. *The creation of a project-based market mechanism to allow for (parts of) non-ETS sectors responsive to price signals to sell emissions reductions in the non-ETS market.* This could help to ensure greater market liquidity in the trade of emissions reductions and thus allow for buyer Member States to achieve a part of their non-ETS compliance obligation via the purchase of these reductions. It would also help to provide resources for Member States with lower financial capacity but where abatement opportunities are among the cheapest. For Member states hosting projects, the projects would have important spill-overs for their decarbonisation in the longer run: for instance, projects often would often reduce CO_2 emissions beyond their crediting period (which could be limited to 2030), thus reducing their long run emissions baselines. They would also help to develop capacity to implement and replicate certain project types. Non-fungibility between the ETS and non-ETS sectors would be preserved in order to ensure that the ETS price signal was not compromised (see above). Furthermore, by linking trading directly to project development, the EU could ensure that trading represented real emissions reductions from additional projects, rather than simply trading of 'hot air'.

These two mechanisms would replace the current flexibility mechanisms of state-to-state trading of non-ETS allowances and access to CDM credits for the achievement of some of the non-ETS targets. In practice, there may be an interest in operating them together—for instance, project developers may be fearful of developing projects if they are unsure of the price they will receive, or the quantity they will sell, due an illiquid or intransparent market. One way around this may be to combine the auctioning of

14. 2020 non-ETS emissions are estimated at 2367.5 Mt (EU energy trends 2013). These are projected to decline linearly to reach -30% below 2005 levels by 2030. The non-ETS carbon value is estimated to be 17.5 Euro/ton in 2021, rising linearly to 40 Euro/ton in 2030 (EC, 2014). The second scenario assumes a lower cost for non-ETS abatement, rising from17.5 Euro/ton in 2021 to 30 Euro/ton in 2030.

15. This would provide investor certainty for project developers via the use of centralised purchaser of emissions reductions at a pre-agreed price and quantity.

allowances with an auctioning of projects by the central fund, which would thus come to operate as a kind of clearing house for non-ETS emissions reductions. This could provide greater investor certainty together with greater market transparency for buyers and sellers alike. However, bilateral arrangements between Member States and project developers need not be precluded. Another

3. *Leveraging of structural funds to support first and third domain Member State policies in non-ETS sectors with market 'failures' or important mitigation spill-overs across time (e.g. for building refurbishment, transport infrastructure, etc.).* Much of the abatement challenge in the non-ETS sectors relates to the barriers of 'domain one' and 'domain three'. This relates in particular to policies in the buildings sector (domain one), but also infrastructure (domain three). These policies will have spill-overs between Member States and across time for the achievement of EU energy and climate goals. For this reason, a pure focus on developing only cost-effective projects in the short run is dangerous and may not lead to the desired decarbonisation outcome, nor cost-effectiveness over the longer run. As such projects often relate to large scale investment efforts in strategic sectors, e.g. transport infrastructure, or deep retrofitting programs for the building sector, it is appropriate that such projects be addressed by national policies. The resources to support these national policies could come from EU structural funds in the post-2020 period. The use of these funds could be coordinated with Member States via the strategic direction for key sectors outlined in their national energy plans under the newly proposed energy Governance Mechanism. In many instances, Member States will therefore need to put into place the national financial infrastructure and distribution channels to ensure that Structural Funds—typically deployed for large and medium scale projects—to their most effective uses.

The approach proposed here therefore has similarities to, but also goes beyond the recently proposed option of a "modernisation fund" covering electricity and buildings sectors based on ETS auction revenues. It does so for several reasons. Firstly, the existence of a central fund for projects may not by itself be sufficient to generate trading between member states, and thus to exploit cost-efficiencies and provide the necessary flexibility that the mechanism requires. As flexibility is an important component of the mechanism, we therefore propose an addition involving auctioning of ESD allowances and the development of a project-based mechanism with the explicit goal of facilitating international transfers of allowances. Secondly, non-ETS sectors go beyond buildings. While an ambitious program focusing on the buildings sector is very important, a mechanism capable of delivering financing to a full range of emissions reduction options, including smaller scale projects (for which large funds often are not geared) is also needed. Finally, under the market stability reserve mechanism proposed for the ETS it is possible that in some years there may be no or relatively few allowances auctioned to the market. This may inhibit the predictable capitalisation of such a fund and potentially complicate the ETS reform debate.

5. The Governance Mechanism

5.1. Justification

Member States' objectives of a sustainable, secure, and affordable energy system cannot be achieved without coordination. It seems unlikely, however, that the 2030 Framework will contain binding national targets for renewables and energy efficiency, due in part to different potentials and preferences for different decarbonisation options. It is right to reflect these different potentials and preferences in the 2030 Framework. Nor can the governance challenge be limited to the decision to set, or not, Member State targets for e.g. renewables or energy efficiency.

Nonetheless, there are important EU level interactions and spill-overs between national choices on the energy system. For example, decarbonising the power sector entails significant coordination needs on transmission infrastructure, supply reliability, flexibility, market design, etc. Member State spill-overs are also relevant to the decarbonisation of the transport sector, to energy intensive industries, and even in the buildings sector (see energy security paper accompanying this paper[16]). **It is therefore strongly in Member States' own self-interest to have a clear basis for coordination and anticipation of the implications of neighbouring decarbonisation strategies, as well as to ensure that the EU is on track overall.**

5.2. What needs to be coordinated?

A key question is 'what needs to be coordinated'? The mechanism should not be additional useless paperwork. It needs to be an effective, targeted, light-touch way of coordinating the key spillovers of Member Stare policies. In this sense, it could have two different levels of focus:

1. *Overall energy and climate strategy, definition of national objectives, and progress to the achievement of these objectives.* For this, a transparent and simply process should be developed for the formulation of 'national deep decarbonisation plans'. These should be short (i.e. 30 not 300 pages), transparent, and regularly submitted and updated (ever 2 years). They should be followed with a regular assessment of progress towards targets, using a series of indicators.

16. Climate Strategies-IDDRI, 2014, "The Climate and Energy Framework 2030: What Energy Security Strategy for Europe?" Climate Strategies, UK, IDDRI, France.

2. *A focus on a few particular sectors where spill-overs are particularly strong (e.g. the electricity sector), or where competence lies most strongly with Member States but where progress is important to the achievement of EU goals (e.g. the buildings sector).*

The sectors identified in point 2 are likely to require further specific regulatory action to give the necessary legal basis for coordination. These could be the revision of the internal energy market package (electricity sector), or the energy efficiency directive (buildings sector). This would complement, but not replace, the need for a framework which identified Member States central policy orientations.

5.3. The process for the Governance Mechanism

The procedure for the Governance Mechanism can be thought of in three steps:

1) the formulation of national plans for decarbonisation;
2) the assessment of the coherence and adequacy of these plans;
3) a process of assessment and incentivization of their implementation.

The formulation of national plans for decarbonisation

Plans should serve two main purposes. Firstly, plans should help national policy implementation, e.g. provide time frames and reference numbers to facilitate implementation and management of individual policy packages. Secondly, they should facilitate consistency and coordination between Member States approaches at the European level and the collective achievement of EU objectives.

To be effective domestically, plans will require a precise characterisation of the main decarbonisation drivers for different key sectors. (See example strategy matrix below). For verification of consistency with European objective and to serve as a basis for coordination, plans will have to outline envisaged developments in harmonized time steps. Plans will therefore need to focus on the essential areas where European spillovers are most apparent, while allowing for an overall vision of the given Member State's decarbonisation strategy.

There are already a number of reporting/planning requirements which need to be streamlined. The formulation of national plans should be short, simple and regular (i.e. every 2 years), rather than complex and irregular (e.g. every 5 years). These would be formulated by Member States to reflect the key competences of Member States in developing national energy policy.

We propose an overall section which would summarize the Member States' decarbonisation strategy. This would comprise of:

1. A 'dashboard' of the main objectives for decarbonisation organized by sector.
2. This would be complemented with a summary of the main barriers to abatement identified and how the chosen policies have been designed to overcome them.

Table 2. Sample national 'dashboard' for the residential sector

		2000 2010	2010 2020	2020 2030	2030 2040	2040 2050	
CO_2 intensity of residential FEC							
Floor area, residential units	Msqm	2,539	2,665	2,859	3,037	3,199	26%
Residential FEC	Mtoe	46	43	37	30	22	-52%
Residential electricity consumption	TWh	163	211	179	157	117	-28%
Residential CO_2 emissions	$MtCO_2$	67	40	27	14	6	-92%
Residential sector indicators							
Per capita residential floor area	sqm/cap	39.019	40.403	41.719w	42.933	44.258	13%
Residential energy intensity	kWh/ sqm	211	188	152	115	80	-62%
CO_2 intensity of residential FEC	tCO_2/toe	1.45	0.92	0.72	0.45	0.26	-82%
Share of electricity in residential FEC	%	30%	42%	41%	45%	46%	50%

Table 3. Sample national strategy matrix for the residential sector

	Structural change	Technical energy efficiency	Fuel switching	Decarbonization of energy transformation
Residential buildings	Unitary surface per capita From 40.2 to 43.8 sqm/cap (+9%) between 2010 and 2050 Increase in the share of tenement buildings compared to individual houses	Retrofitting obligation of existing buildings: 650.000 retrofitted per year on average 65% energy efficiency improvement on average Standards for new buildings building codes impose very efficient buildings for new construction energy-neutral buildings in 2050 Ambitious regulation for electric equipment (-40% specific electricity consumption per household)	Switch from gas to electricity and renewables as heating fuel Switch away from liquid fuels less than 10% in 2050	penetration of biogas (50% of gas)

The assessment of the coherence and adequacy of these plans

As a second step, the Commission should be tasked with assessing the coherence and adequacy of the national decarbonisation plans. This assessment should be based on two essential criteria:

- **Internal coherence,** i.e. of individual aspects of the strategy with each other, and with the Commission's assessment of the potentials of the various abatement levers within the country.
- **External coherence,** i.e. with collective objectives in particular those in the long term.

The process of assessment and incentivization of their implementation

The governance mechanism needs to operate at two levels. Firstly, it must provide an overview that facilitates open coordination. However, it must also have a more robust foundation for assessing and incentivizing compliance is when needed. In practice, the best way to do this may be to link it to specific policy frameworks and measures where the EU has a means to incentivise

action by Member States. These could be elements such as the revision of the internal energy market package (electricity sector), the energy efficiency directive (buildings sector), and the allocation of structural and cohesion funds to climate related projects (see Section 4). Another option could be to link flexibility for Member States in their debt/GDP assessments under the EU Semester if debt is increased due to public sector supported investments that seek to secure e.g. EU targets on renewable energy, energy efficiency or reduce energy dependence etc. These are simply suggestions. However, the point should be clear that such options may be required to reinforce and concretise the link between the overall framework which identified Member States central policy orientations and the incentivisation of compliance with specific policy measures.

The Commission should be charged with the regular assessment of the implementation of these decarbonisation plans. To do so, a small number of indicators should be developed and followed by Eurostat: carbon intensity of electricity, new investments in low-carbon capacities, refurbishment rate of the building stock, residential energy intensity, etc. The Commission should be given a legal basis and tools to express its opinion on and incentivize the implementation of these plans.

Another important issue will be the link between financing for Member state's energy sector investments and the effective implementation of the national energy plans. As noted above in discussion of financing decarbonisation in non-ETS sectors, the effective use and targeting of European structural funds will be critical to developing appropriate infrastructure, policies and programs to overcome barriers and drive structural decarbonisation in key sectors (such as transport, buildings, electricity). The existing rules governing the use of EU structural and cohesion funds require significant shares of these funds to be dedicated to climate and energy efficiency-related investments. However, post-2020, the national energy plans will provide the background and planning framework against which priority energy projects should be identified and implemented. It will thus be necessary for these plans to serve as a key input into the process of allocating and spending EU structural funds post-2020, as well as the climate specific funding mechanisms that are likely to be developed in the 2030 Climate and Energy Framework.

Conclusions

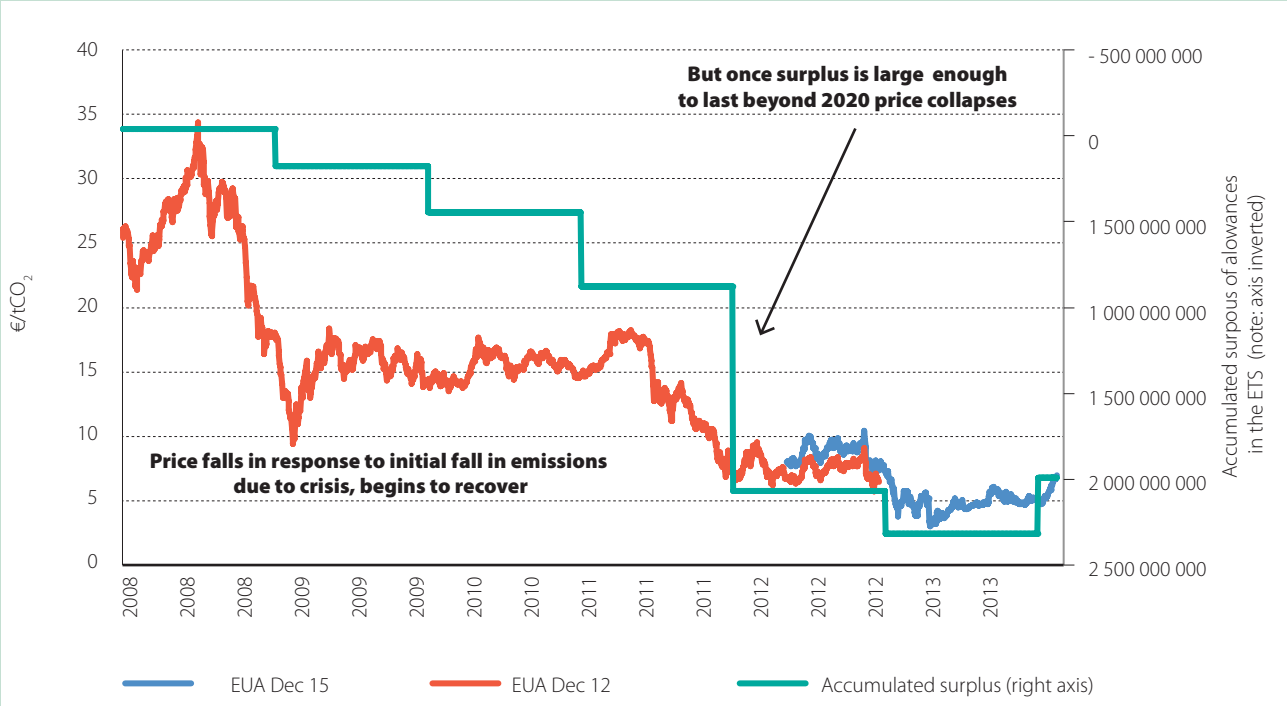
At a time when the EU economy is struggling for ways to reignite growth and reduce unemployment, and when key interest rates are at record lows, the 2030 Climate and Energy Framework presents a timely opportunity for investing in the security and low-carbon transformation of the European energy sector. To stimulate this investment, the Framework must deliver a clear vision of where the EU wants to go, as well as a credible set of incentives it intends to use to get there. Constructing a credible set of incentives requires an intelligent combination of instruments that directly address the three different types of barriers to change: behavioural barriers, price barriers, and structural barriers to non-marginal change. This approach suggests that the post-2020 Framework will require a number of new elements. The ETS must set more realistic expectations that relate to the specific decarbonisation needs of the sectors it covers. E.g. the ETS has a strong potential to drive the phase out of coal in the power sector if its reform is adequately ambitious and made more internally coherent. Mechanisms that protect against carbon leakage but which also facilitate the pass-through of carbon costs downstream in energy—intensive sectors must also be explored.

A new approach to non-ETS sectors is needed which balances the need for short run flexibility and cost-effectiveness and the need for resources to be targeted to longer strategic mitigation objectives. A combination of initial auctioning and project based approaches with structural funds dedicated to national policies is therefore proposed.

Finally, the EU requires an energy governance framework that provides for internal and external consistency in the planning and achievement of Member States energy sector goals and that builds on concrete policies and measures to incentivise action. Given the strong spill-overs between Member State action in the energy sectors, all Member States have an interest in a role for a robust European governance mechanism. The proposals outlined in this paper are therefore offered as a contribution to thinking about how these goals should be achieved.

Annex

Figure 8. Relationship between carbon prices and the total accumulated surplus in the EU ETS



Sources: ICE, EUTL, DG Clima, Authors Calculations. EUA DEC 15 refers to the December 2015 EUA futures contract price as traded on the ICE exchange. EUA DEC 12 is the same contract but for Dec 2012.

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