Public support for the energy and transport system transition

Bruegel publication launch, Bruegel, 2 February, 2012

This event marked the launch of the new Bruegel Blueprint publication, entitled: "The great transformation: decarbonising Europe's energy and transport systems."

The event was chaired by **Guntram Wolff,** Deputy Director of Bruegel. **Georg Zachmann**, Research Fellow at Bruegel, presented a summary of the research in the Blueprint. This was followed by comments from **Pierre Dechamps**, Adviser for Energy, Climate Change and the Environment, Bureau of European Policy Advisors (BEPA), and **Pierre-Etienne Franc**, Chairman of the Governing Board, Fuel Cells and Hydrogen Joint Undertaking.

Georg Zachmann began by outlining the need for an energy transition. Incumbent technologies like internal combustion engines have limited carbon reduction potential. The shift to low-carbon energy and transport will require an energy transition. The motivation for the study was to examine how such a transition could be best supported. High carbon technologies impose negative externalities (GHGs, import dependency, pollution) on society. These externalities are not addressed by markets and there is significant inertia. Path dependencies due to existing institutions, risk aversion, and network effects create inertia for the current energy and transport system. Additionally, externalities related to innovation, coordination costs, business exploration, and infrastructure hinder private investments in low-carbon technologies. To overcome this inertia, new technologies must have significant advantages or require minimal downstream changes in order to succeed. Low-carbon technologies possess neither of these qualities. Without public intervention, the transition will either happen slowly or may not occur at all. Investment in low-carbon technologies not only offer significant side-benefits (such as through reductions in pollution and import dependency), but also may provide an insurance externality – as backstop technologies in case the first-best alternative fails. Green technologies may also provide an opportunity for growth.

Policies in support of low-carbon technologies already exist on regional, national, and European levels. For example, some R&D funding, fuel taxes, and vehicle emissions standards have been implemented. However, they are currently disorganized and insufficient for ensuring a speedy energy transition. Fuel Cell Electric Vehicles (FCEVs) are an example of a low-carbon technology at the demonstration/early market stages which is facing many of the market failures common to low-carbon transport and energy technologies. Using FCEVs as an example, the Blueprint took a modeling approach to study market penetration under different policy-support scenarios. The results indicate that policy intervention is necessary if FCEVs are to be present in the market in the future. The results indicated that a concerted mix of policy instruments, such as increased R&D funding and inclusion of transport into the ETS, resulted in market penetration of around 12% by 2050. The market share gain in the model came largely at the cost of conventional fuels and not so much at the cost of other low-carbon technologies like Battery Electric Vehicles. The optimal policy mix and most cost-effective way to support this were beyond the scope of the study but the results indicate that policy interventions could be effective.

We propose several policy instruments which might be useful for supporting low-carbon technologies in overcoming the market failures which impede their success. In the absence of a credible long-term carbon price, we propose the placement of a carbon price on transport through inclusion of transport in the ETS. Including transport into the ETS may be a way to avoid a rebound effect of increased energy use once

vehicles become more energy-efficient. Additionally, the carbon component of the proposed fuel tax may not be an efficient method since abatement costs are different for different sectors not covered by the ETS. The tightening of average emissions standards may also be a good second-best instrument for incentivizing the provision of low-carbon technologies. Issuing financial option contracts on the carbon price would provide credibility to private investors by shifting the risk imposed by a carbon price vulnerable to shifting politics. In terms of addressing the coordination and infrastructure externalities, we propose the establishment of temporary infrastructure consortia to organize and internally cross-subsidize different parts of the value chain. Of course such consortia should be cleared ex ante by competition authorities. In terms of technology-specific support, some may be needed as horizontal policies cannot address issues of R&D funding or deployment. Therefore, a technology-neutral approach to technology choice for supporting a portfolio of low-carbon technologies is essential. A predictable and transparent technology-neutral mechanism for evaluating new technologies based on clearly defined metrics will promote predictability for stakeholders and investors, and decrease disincentives to the risky long-term investments required for the energy and transport transition. This model should be built, and maintained by an independent public institution.

Paul Dechamps then provided a response to the presentation. The last two years have seen a large penetration of renewables in generation but also an increase in carbon emissions in g/KWh. It appears that renewables may not be the way to meet the 20-20-20 objectives, two of which are legally binding. The ETS is probably working properly in the sense that it gives us the amount of emissions desired, but it does not work properly as an investment signal for clean energy projects. There needs to be a medium- / long-term measure where we fix the quantity of emissions in the intermediate date. We need clear objectives for 2030 to provide a medium- / long-term signal. Another difficulty is risk-aversion. We are in a period which is extremely risk-averse and this does not help transition. Risk-aversion and unclear signals are a problem for infrastructure. When people talk of infrastructure it is unclear what they might have in mind as they could be talking about CCS, electricity grids, or gas transport, etc. which are essentially different. It is difficult to address infrastructure needs with one coherent policy. Additionally, some of the low-carbon infrastructure needs are substitution-only infrastructure needs – they substitute an existing infrastructure to fulfill the same need. Hence, the case of low-carbon technologies is different from the case of the telecommunications industry which required infrastructure to satisfy a new need. It is clear that we need a carbon price and a clear indication of what we want in the long-term. However, having more sectors in the ETS might not be clear as some sectors which were not included in the ETS originally were not included due to the high emissions reduction/substitution cost – this may be the case of the individual transport sector. With only the existing technology, if transport were included in the ETS in competition with the power sector, all of the emission reductions will occur in the power sector and not the transport sector. It may be useful to have a preannounced and predictable carbon floor price – it may be better than an intervention using carbon options. The emissions standards suggestion is also clearly useful. The idea of a consortium looks like a very difficult problem – there are questions to answer: where and how long? Another way to address this may be through infrastructure bonds – similar to Eurobonds, could have infrastructure bonds to address growth. Regarding the predictability of the regulatory environment, this is clearly needed. In 2008 the climate and energy package was supposed to have created clear predictable legal commitments but perhaps we need more. We need some predictability beyond 2020 towards our 2050 position.

Pierre-Etienne Franc then discussed the report. He introduced the Fuel Cell Hydrogen Joint Undertaking which financially supported the study. He stressed that the hydrogen sector is in the middle of many long-term issues related to decarbonization. The sector is entering a phase called the "death-valley" when the technology must be deployed in certain volumes to get to the break-even point. Another specificity of

hydrogen is that there needs to be substitution-economics to guide the development of infrastructure. Huge investments are vulnerable to free-riders. Private companies have no incentives for long-term investments. Neither public nor private actors can achieve the transition alone and so there needs to be partnership. Tech-neutrality is also important, there should not be tech-dogmatism. The help of the public sector is needed for the transition.

Guntram Wolff then led the discussion. During the discussion, there was discussion on why the EU should be a leader – for industrial policy reasons, and for competitiveness/cohesion so as not to have 10 different systems. It is not currently clear the EU is a leader but if we want decarbonization there is no choice but to support these technologies. We should also consider whether we wait or move in terms of trying to be a leader. Georg Zachmann mentioned that a floor price is not a functional long-term device as it is subject to policies, and one might not want to fix a price on which investment in the distant future must be aligned. A floor price would not make any sense if abatement costs would be much lower than the floor in the future. There is no real EU industrial policy and some member states use state-aid to low-carbon technologies as industrial policy to their own advantage only.