

Let's negotiate a global carbon price signal – quickly!

By Stéphane Dion [\[1\]](#) and [Éloi Laurent](#)

Two decades after the Rio Conference, and just as a new climate conference is opening in Bonn on Monday 14 May 2012, we must admit to collective failure in combating human-induced climate change. We cannot escape serious climate disruption if we continue down this same path. We must change direction, and we must do it quickly.

The International Energy Agency forecasts warming of over 3.5°C by the end of the 21st century if all countries respect their commitments, and by more than 6°C if they content themselves with their present policies. At that level of warming, climate science warns us that our planet will become much less hospitable for humans and all other forms of life.

At the Durban Conference in December 2011, the countries expressed their grave concern about the gap between their commitments and achieving the objective of a 2°C limit on increased global warming (relative to the pre-industrial era). They promised to re-double their efforts to bridge this gap. But they failed to make any commitment to achieve more stringent targets. We are thus facing an increasingly untenable gap between the urgent need for action and the inertia of international negotiations.

The developed countries are refusing to strengthen their climate policies so long as the other major emitters don't do the same. But the emerging economies, particularly China and India, with annual GDP growth rates of 8 to 10%, will not accept in the foreseeable future targets for the reduction of the volume of their greenhouse gas (GHG) emissions. On the

other hand, these countries might be more open to the idea of setting a price per ton of CO₂ that was standardized at the global level, from which they would derive revenue, and which their economic competitors would also be required to levy.

We believe that the best instrument for the international coordination needed to combat climate change is a global carbon price signal. This is why we are proposing that the forthcoming negotiations focus on this crucial goal.

Here is what we are proposing (for more detail, see, in French, <http://www.ofce.sciences-po.fr/pdf/dtravail/WP2012-15.pdf> and, in English): every country would make a commitment to introduce, in their respective jurisdictions, a carbon price aligned with a scientifically validated international standard, in order for the world to achieve or at least come as close as possible to the objective of keeping global warming below 2°C. Each country would decide whether to extract this levy through taxation or through a system of ceilings and trading in emissions permits (a “carbon market”).

Governments would be free to invest, as they see fit, revenues from the carbon emission levy and from the corresponding elimination of fossil fuel subsidies. They could, for example, invest in research and development in clean energy and public transportation, etc. They could also choose to address social inequalities with respect to access to energy.

Developed countries would be required to set aside part of their revenues to help developing countries introduce policies to mitigate emissions, to adapt facilities and to create carbon sinks (by means of reforestation, for example). The contributions of each country would be based on what their respective GHG emissions represent relative to the total emissions of all the developed countries.

Under this international agreement, countries would have the

right to levy border taxes on products from countries that have not established a carbon price in accordance with the international standard. The message would be clear to all large emitters: if you do not levy a carbon tax on your products before you export them, the other countries will do so in your place, and it is they who will collect the revenues. Each country will understand that it is in its own commercial interests to comply with the international agreement, to tax its own emissions and to use the corresponding revenues as it sees fit.

In this way, the world would have available an instrument that is vital to its sustainable development. At last, carbon emitters would be required to pay the environmental price for their actions. Consumers and manufacturers would have an incentive to choose lower-carbon-content goods and services and to invest in new emission-reducing forms of technology.

We need to negotiate a global carbon price signal, and quickly. What better place to do this than at Rio, where the problem of climate change was first recognized by the international community 20 years ago?

[\[1\]](#) Stéphane Dion is a Member of the House of Commons of Canada; as Canada's then Minister of the Environment, he chaired the 11th Conference of the Parties to the United Nations Framework Convention on Climate Change, held in Montréal in 2005 (COP 11).

A carbon tax at Europe's

borders: Fasten your seat belts!

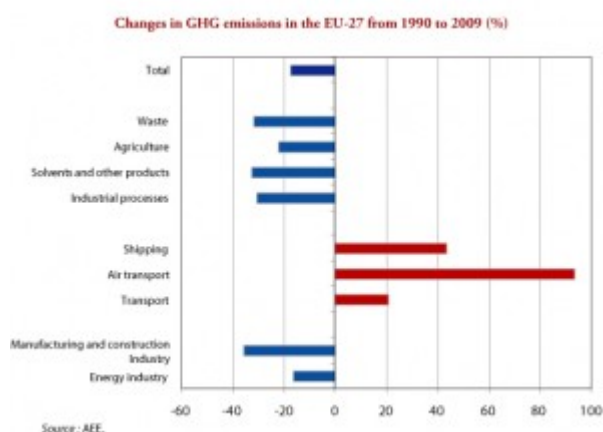
By [Éloi Laurent](#) and [Jacques Le Cacheux](#)

How can the current deadlock in international climate negotiations be resolved? By an optimal mix of incentives and constraints. In the case that currently opposes the European Union and the international air carriers, the EU is legitimately bringing this winning combination to bear by imposing what amounts to a carbon tax on its borders. It is brandishing a constraint, the threat of financial penalties, to encourage an industry-wide agreement that is long overdue among the airlines to reduce their greenhouse gas (GHG) emissions.

The ongoing face-off with the carriers of several major countries, which, with the more or less open support of their governments, are contesting the application of these new regulations on GHG emissions from planes flying into or out of the EU is, from this perspective, a crucial test. It is an issue with considerable symbolic value, as it represents a first: all the airlines serving airports in the EU are subject to the new measure, regardless of their nationality. On March 9th, European officials reaffirmed their determination to maintain this regulation, so long as a satisfactory solution has not been proposed by the International Civil Aviation Organization (ICAO). However, 26 of the 36 member states of the ICAO Board, including China, the United States and Russia, have expressed their opposition to the new European requirement, advising their airlines not to comply. And the Chinese government is now threatening to block or outright cancel orders for 45 Airbus aircraft, including 10 A380 super-jumbos, if the European measure is not repealed.

Air emissions up sharply

GHG emissions attributable to air transport account for only about 3% of global and European emissions (about 12% of total emissions from transport in the EU). But despite the progress made by aircraft manufacturers in energy intensity, these emissions, which are still modest compared to road transport, have been experiencing explosive growth over the last 20 years, and are rising much faster than those in all other sectors, including shipping (see chart). They must be controlled.



In addition, in most countries, in particular in the EU, airline fuel is not subject to the usual taxation applied to oil products, which obviously distorts competition with other modes of transport.

A robust legal framework

The [new European regulations](#), which took effect on 1 January 2012, require all airlines serving any EU airport to acquire emission permits in an amount corresponding to 15% of the CO₂ emissions generated by each trip to or from that airport. The measure is non-discriminatory, since it affects all airlines flying into or out of European air space, whatever their nationality or legal residence. This requirement, which is grounded in environmental protection, is therefore fully consistent with the Charter of the World Trade Organization (WTO).

The measure is also of course in compliance with European

treaties as well as with the various provisions of international law in the field of civil aviation, as is reiterated in the [judgment of 21 December 2011](#) by the Court of Justice of the European Union, in a case brought by several US carriers challenging its legality. The legal framework for this new provision is thus robust.

Towards the death of air transportation?

The airlines and the governments of the countries that are major emitters of greenhouse gases and that are hostile to this measure justify their outright opposition by arguing its poor timing, given the current economic climate of low growth and rising fuel costs, and its excessive cost, *i.e.* that the resulting rise in passenger air fares would be likely to further depress an already fragile industry.

In reality, the measure is largely symbolic and the cost is almost insignificant. Judge for yourself: according to the [Air France calculator approved by the French environmental agency, the ADEME](#), emissions per passenger amount to just over one tonne of CO₂ for a Paris-New York return trip, and approximately 1.4 tonnes for Paris-Beijing. The current price of a tonne of carbon on the European carbon market on which companies must buy emissions permits, the ETS, is just under 8 euros. The additional cost per ticket thus amounts, respectively to 2 euros for Paris-New York and 1.7 euros for Paris-Beijing! (estimates using [the ICAO calculator](#) are even lower).

Towards a trade war?

Given the current state of the legislation, the threats to cancel Airbus orders or similar retaliatory trade measures are obviously out of proportion to the economic impact of the tax on the European skies. To fear that this might trigger a “trade war” is also to forget that such a war has already been declared in industry, particularly in the aviation sector

(with the multiplication of [more or less disguised subsidies, including in Europe](#), and with the use of [exchange rates as a veritable weapon of industrial policy](#)). Furthermore, agreements or cancellations of orders in this sector are in any case very often influenced by the political context, sometimes for dubious reasons (as in the case of diplomatic reconciliation with relatively distasteful regimes). In this case the cause, the defence of the integrity of Europe's climate policy, is legitimate.

The various threats and blackmail attempts being taken up by the pressure groups targeted, in this case air passengers, are intended to sway governments for obtaining short-sighted gains. They are targeting particular countries, foremost among them Germany and Poland, which are currently dragging their feet in accepting the EU Commission's proposal to accelerate the pace of European emissions reduction by raising the goal of emissions reduction for 2020 from 20% to 30% (compared to 1990 levels). As is their right, on the climate issue Germany and Poland have been following an approach that is in accordance, respectively, with a growth strategy based on exports and an energy strategy based on coal. In both cases, these are national decisions that should not take precedence over the European approach. From the perspective of Europe's interests, there is therefore no valid reason to yield to these pressures even if some member states become involved.

By confirming its determination, the EU can provide proof that leadership by example on the climate can go beyond simply setting a moral example and lead to actual changes in economic behaviour. The EU can ensure that everyone sees that, despite the impasse at the global level, a regional climate strategy can still be effective. If its approach is confirmed, the success of the European strategy, which consists of encouraging cooperative strategies under the threat of credible sanctions, would point towards a way to break the deadlock on climate negotiations.

The European Union will, in the coming weeks, be passing through a zone of turbulence (yet another) on the issue of its border carbon tax. It would be legally absurd and politically very costly to make a U-turn now: instead, let's fasten our seat belts and wait calmly for the stop light to change.

Post-Durban: For a Sino-European axis

By [Eloi Laurent](#)

The European Union absolutely must stay the course at the Durban conference and afterwards, not only by reaffirming its climate goals but even more by consolidating these through the improved control of its carbon linkages (see the OFCE note in French: [The European Union in Durban: Hold the course](#)), that is to say, the overall impact of its economic growth. This requires moving – on its own if necessary – from a target for 2020 of a 20% reduction in its greenhouse gas emissions to a target of 30% of its emissions, which is more in synch with the goal that it has endorsed of limiting global warming to 2°C compared to the pre-industrial era.

The possibility of transitioning the global economy towards a low-carbon economy depends on Europe's determination. As the largest market in the world, the EU possesses great power over the environmental policies of the world's other countries: the more ambitious it is in terms of the climate, the more its influence and leadership will spur the ambitions of other

countries too.

But the pursuit of the de-carbonization of the European economy requires the reform and coherent articulation of EU and national economic policy tools.

For France, this means achieving its climate targets (the division of its emissions by four by 2050, called the “factor 4” approach) by introducing a price signal to contain emissions from diffuse greenhouse gas emissions (*i.e.* from housing and transport) that are not included in the European carbon market. To be clear, it will be necessary to introduce a carbon tax that spells out how it will be integrated into the French tax system. [A recent study by the OFCE](#) shows that this may well generate a dual dividend, both social and environmental. The [Perthuis report](#) is quite clear on this point: with the support of a price signal, the French climate transition will generate jobs. This transition should not, however, neglect issues of social justice, starting with the urgent problem of fuel poverty.

The European Union must also speed up the reform of its carbon markets, whose price signal is now almost inoperative (a tonne of CO₂ has fallen to 7 euros). These markets could be significantly affected by the outcome of the Durban conference, as was the case after the summit in Copenhagen. Various options exist, such as to establish a Europe-wide central carbon bank.

Finally, the introduction of a carbon tariff at the borders of the European Union could restore coherence to the region’s climate policy by addressing the problem of carbon leakage and imported emissions and by providing a source of funding for the Green Fund, whose architecture might be the only genuine accomplishment of Durban.

There are, ultimately, three fundamental reasons why the EU needs to confirm and reinforce its climate goals at Durban and

especially “post-Durban”:

1. The first concerns the human security of Europeans: the EU needs to reduce its emissions of greenhouse gases because, as is shown by a recent report by the IPCC, these are at the origin of the proliferation of extreme weather events on our planet, and this will be even more the case in the future. The European Union has experienced nearly 350 of these events during the Noughties alone, almost four times more than in the 1980s. The heat wave of summer 2003, alone, cost the lives of 70,000 Europeans.
2. The second reason relates to the economic prosperity of Europeans. The EU needs to strengthen its comparative environmental advantage and free itself as soon as possible from the fossil fuel trap. Europe's dependence on carbon has only increased over the past two decades. The rate of energy dependence of the EU member countries rose by an average of about 10 percentage points over the last fifteen years, to 53% in 2007, including 82% for oil and 60% for natural gas, which between them account for 60% of all energy consumed in the EU. Conversely, the short-term economic cost (not including the longer-term benefits) of switching from a 20% target for the reduction of emissions to a 30% reduction by 2020 is minimal, on the order of about 0.6% of the EU's GDP per year (estimated by the European Commission).
3. The third reason, and perhaps the most fundamental, concerns the need today for the political cohesion of the European Union. What is necessary now is nothing less than rebuilding the European Union, which has been devastated economically and politically by the global crisis. The prospect of the coordinated economic depression currently being proposed to European citizens by their governments will signal the breakup of the euro

zone but also in turn, it can be feared, a halt to the construction of Europe and even its unraveling. The ecological transition may indeed “save the climate”, but it can also save Europe by giving it a future once again.

The best hope for what is already being called “post-Durban” may well lie in the establishment of a Sino-European axis on the climate: China is becoming aware that its impact on climate change is matched only by the impact of climate change on it (the world’s largest emitter, it will in turn be the first victim of its emissions). As a result of the desertion by the US, Europe can confirm its role as global leader on the climate.

Europe’s leaders sometimes seem annoyed to be alone among the developed countries to assume this responsibility, and they are tired of suffering the criticisms reserved for the one who wields the baton, even though the EU is the only region in the world to have met its Kyoto commitment, the only one to have set itself interim targets on the reduction of greenhouse gas (GHG) emissions, and the only one capable of meeting these goals. This European annoyance is misplaced: given the disasters that science is warning us of, the fight against climate change could be Europe’s greatest contribution to the future of humanity. Holding the course on the climate is a compelling duty. It also just happens to be in Europe’s interest.

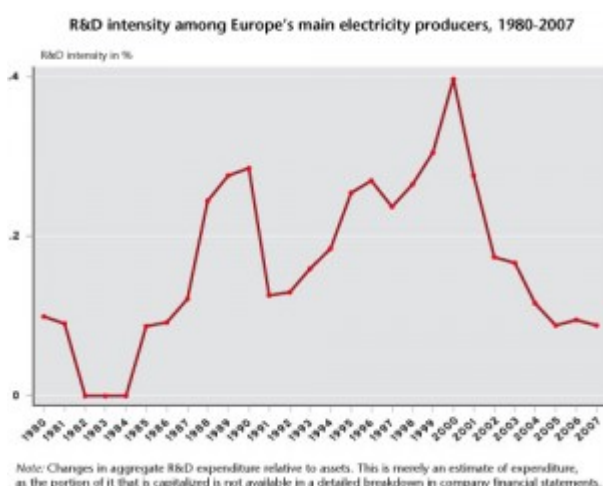
R&D all at sea: Have

electricity producers lost the plot?

By [Evens Salies](#)

Is there an inherent conflict between the technological efforts needed to meet the requirements of environmental policies and the liberalization of electricity markets? In effect, the way R&D spending by European electricity producers has changed over the last three decades can give rise to doubts about the ability of the European Union to meet its goal of reducing greenhouse gas emissions by 80% to 93% by 2050 ([European Commission, COM/2010/0639](#)).

This is shown by the graph below, where we have isolated the expenditure of the 15 main producers. The figure shows a surprising reversal of the trend concomitant with the wave of liberalization in the sector sought by the EU. As concurrence doesn't necessarily mean causation, we took a look at whether the liberalization could be the source of this turnaround.



The R&D spending of Europe's electricity producers has shrunk by 70% between 2000 and 2007, from 1.9 billion euros to 570 million euros (figures adjusted for inflation). The giants EDF and E.ON, which represent the two biggest R&D budgets in the sector, are largely responsible for this decline. R&D spending by the French electricity firm fell 33% from 2000 to 2007, from 568 million euros to 375 million. As readers are probably aware that R&D costs mainly go on personnel, it will come as no surprise that, in the case of EDF, the number of employees engaged in R&D (researchers plus technical support and administration) has fallen by about one-quarter since 2007, but we were not able to break this reduction down by type of activity.

How can producers meet the technical challenge posed by alternative energy while spending so little on R&D? Some people might believe that the situation is not as dramatic as implied by the graph above. Indeed, the R&D expenditures of the large electrical groups constitute only the bare minimum (around 10%) of the total, which is mainly spent by equipment manufacturers and public research laboratories. Looking at the figures for total private spending, it can be seen that there has been a relative increase since 2000 in the shares intended not only to increase energy efficiency, but also to produce electricity from renewable energy sources. This is the result of numerous support measures for innovation (measures to purchase "green" electricity, financing for public / private partnership projects, etc.), without omitting the research tax credit also enjoyed by EDF.

It is nevertheless best to hold off before celebrating the above-mentioned shift in environmental innovation from the producers to the manufacturers, as the competition might well wind up by undermining the ability of the former to acquire these innovations. The question of why R&D spending has been falling thus remains relevant. Were levels abnormally high in the past, when producers enjoyed the status of public

monopolies? It is in any case possible to find objective reasons for the decline, beginning with the liberalization of the markets in the European Union which, as several studies have shown, was the event triggering this radical change in the innovation policy of the electricity producers [1].

The thesis put forward in these studies is that the expected increase in competition following the opening up of these markets makes the value of the producers' future income more uncertain. The argument in support of this thesis is that some research projects directed towards public policy objectives (those reducing emissions) do not any yield short-term cost savings that would benefit the producers. The producers have thus refocused on their core business and abandoned research programs that are not procuring them any tangible benefits, particularly in terms of patents. In Europe, however, these sacrificed environmental innovation projects are now being developed by the manufacturers (for example, Vestas in the field of wind power). Research in nuclear power is being taken over by research providers such as Areva and Siemens. The producers are tending to replace these by programs with shorter research time frames that focus on energy demand management or improvements in energy efficiency. Note that the nature of innovation as a public good makes producers cautious, as they are supposed to bear the costs of the research projects but will not be the only ones to reap their benefits. This encourages some players to engage in "free riding", and therefore leads to underinvestment in R&D at the aggregate level in the sector.

Interestingly, we find that this switchover gives rise to an acceleration of R&D spending in the period just prior to liberalization. First observed in the United States, this phenomenon can be seen clearly in Europe when looking at R&D levels. When the Directive containing the common rules for the internal electricity market was passed in 1996, the decline in spending that ensued was actually preceded by an increase that

was even greater than that observed on average between 1980 and 1995.

However, the establishment of market rules does not explain everything. The restructuring / fragmentation taking place as the sector has opened up is not without consequences for innovation. In a way that is similar to what has been observed in other sectors like ICT, the major electricity groups began to take on debt – which necessarily came at the expense of spending on research and other investments – as they engaged in new acquisitions. Companies reorganized their research by outsourcing. The example in France is that of EDF Energies Nouvelles, since August 2011 a wholly-owned subsidiary of EDF. The industrial organization that exists today in the electrical power sector is an oligopoly with a competitive fringe. Although the activities of the main traditional producers are subject to separate accounting, they still form vertically integrated groups, from production to marketing.

This restructuring and fragmentation evokes a hypothesis that is well-known to economists concerning the advantage of large companies in terms of innovation: the *Schumpeterian hypothesis* [2]. Formally, the question is whether the intensity of R&D – that is to say, the ratio of R&D expenditure to a size variable (the balance sheet, for example) – is positively correlated with size. We were able to demonstrate this link in a sample of 15 major European electricity producers for the period 1980-2007 [3]. However, this result is largely contingent on the period under study, during which most producers were protected from new market entrants and competitive pressure on the territory where they were doing business as public enterprises, then called “natural monopolies”.

This position gave them at least three advantages that have now disappeared. First is a kind of “right of first refusal” on the use of innovations provided by equipment manufacturers, while they were also less fearful of being imitated on their

own innovations. The potential for replication was limited to a very specific area of π -activity for each country, usually the country, which made it possible to spread the costs of innovation over all domestic consumers. Moreover, as they were certain not to lose their customers, the traditional producers could take risks in launching basic research projects. Finally, the regulation of tariffs ensured a predictable level of revenue.

This suggests that the Schumpeterian impact of rent appropriation dominated the negative effect on the incentive to innovate due to the lack of actual or potential competition. Once the sector was opened to competition, some of the advantages listed above disappeared. The vast majority of customers remained loyal due to the significant cost of switching, but an increasing share of the electricity produced was sold on weakly regulated wholesale markets at volatile prices. The Schumpeterian hypothesis could therefore disappear, and competition would lead to stifling the innovation fostered by spending on R&D.

An oligopoly of producers with a competitive fringe

Europe's electric power sector is characterized by a small number of large producers (oligopoly) that hold a large share of the market, while a large number of small firms (the competitive fringe) each have a small part of the residual market. Contrary to the received wisdom about competition, the fringe can have an impact on wholesale prices. In practice, since electricity cannot be stored, a producer asked by a carrier that is responsible for balancing production and consumption can offer the output of a power plant with low marginal costs at a price above the cost. An example is a producer at a marginal plant which, in times when demand is running up against production capacity (the peak), is requested to ensure the overall balance as a last resort.

[1] The study by Kammen, D.M. and R. M. Margolis ("Underinvestment: the energy technology and R&D policy challenge", *Science, Energy-Viewpoint*, no. 285, 1999, pp. 690-692) had anticipated this situation for the United States. A study by P. Sanyal ("The effect of deregulation on environmental research by electric utilities", *Journal of Regulatory Economics*, Vol. 31, no. 3, 2007, pp. 335-353) was the first to use econometrics to show how the liberalization of the electricity market was related to the fall in R&D spending.

[2] Please see http://en.wikipedia.org/wiki/Creative_destruction .

[3] "A test of the Schumpeterian hypothesis in a panel of European electric utilities", *Document de Travail de l'OFCE*, no. 2009-19, <http://www.ofce.sciences-po.fr/pdf/dtravail/WP2009-19.pdf>.