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Eloi Laurent, Jacques Le Cacheux

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**POLICY OPTIONS FOR CARBON TAXATION IN THE EU**

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**Éloi Laurent**

*ECONOMIC RESEARCH DEPARTMENT  
OFCE/SCIENCES PO, PARIS*

**Jacques Le Cacheux**

*CATT/UPPA, PAU, AND ECONOMIC RESEARCH DEPARTMENT  
OFCE/SCIENCES PO, PARIS*

# Policy options for carbon taxation in the EU

**Éloi LAURENT,**

Economic Research Department, OFCE/Sciences Po, Paris,

**and**

**Jacques LE CACHEUX,**

CATT/UPPA, Pau, and Economic Research Department, OFCE/Sciences Po, Paris

## *Abstract*

*Even though the EU clearly leads the global fight against climate change and despite the additional reduction in emissions due to the global crisis and European recession, the ambitious objectives flagged in the “20-20-20 by 2020” strategy and ‘climate-energy package’ are probably out of reach if a more resolute and consistent policy of carbon taxation is not rapidly put in place. First, the EU is not as ‘virtuous’ as it may seem, and shows signs of a ‘fatigue’ in mitigating climate change; this is explained by the weak incentive structure of current climate institutions, due to both narrow coverage and insufficient stringency of the European ‘Emission Trading Scheme’ (ETS) – the European ‘carbon market’–, and to excessive reliance on emission standards combined with weak energy taxation. Fears of loosing competitiveness are a major argument against imposing a higher carbon price on industries, feeding tax competition both within the EU and vis-à-vis the rest of the world. Though not fully satisfactory, the Commission’s recent proposal (a revision of the 2003 energy taxation directive introducing floors on national excises based on carbon content) would help solving the intra-EU conundrum. Alternatively, an extension of the EU ETS to households and the transport sector via the ‘upstream’ inclusion of fossil fuel dealers would also be a feasible solution. In order to answer the ‘carbon leakage’ argument and to send appropriate price signals to European consumers on extra-EU imports, a border adjustment mechanism – carbon levy or inclusion of importers into the EU ETS – is also necessary. Ultimately though, in order to make sure that economic agents face a uniform carbon price, a generalized carbon tax, in the form of a European ‘Carbon Added Tax’ (ECAT), would be the most effective instrument in the fight against climate change, as well as the pillar of a thorough tax reform inducing the ‘decarbonisation shift’ of the European economy.*

In the spring of 2009, the EU legally adopted its ‘climate-energy package’, which includes the ambitious objective of reducing greenhouse gas (GHG) emissions by 20% by 2020 compared to their 1990 level. More recently (May 2010), the European Commission has proposed to aim for an even higher 30% target, even while international negotiations are stalled, arguing that the global recession makes cuts less economically painful (European Commission, 2010). By pursuing such explicit quantitative and quite ambitious objectives independently of what is to come out of the next rounds of climate negotiations in Bonn (especially that of Cancun in December 2010), the Commission chooses to ignore the failure of the Copenhagen UN conference of December 2009. It obviously wants the EU to continue leading the way in the fight against climate change<sup>1</sup> in the hope that its example will exert pressure on the US and win over China. But this strategy appears hardly acceptable for all member states. Immediately after the new proposal was made public, a joint German-French press conference voiced resolute opposition, while Poland and Italy are said to remain hostile to further effort in emissions reduction. Even more importantly, the question of the credibility of this renewed ambition must be raised. Is the EU climate strategy a mere replay of the doomed ‘Lisbon strategy’, that failed due to the lack of willingness on the part of the EU decision-makers to endow the Union with adequate instruments to conduct efficient economic collective action? By themselves, targets don’t constitute an efficient policy.

In this paper, we argue that the goal of turning the EU into the leading global low-carbon economy by 2050, and even probably that of reaching the 20% target for GHG emissions by 2020, will be missed unless carbon taxation reform is promptly undertaken. We review various policy options facing the EU and analyze their pros and cons, before concluding in favor of a comprehensive, EU-wide, carbon tax, the European Carbon Added Tax (ECAT). In the first section of the paper, we offer an interim report on the EU performance in emission reduction to date: even though it clearly surpasses the rest of the developed world in reducing emissions, the EU is not as ‘virtuous’ as it may seem at first sight, and shows signs of a ‘fatigue’ in mitigating climate change, partly masked by the recession impact on emissions; the main reason is to be found in the weak incentive structure, due to both too narrow coverage and insufficient stringency of the European ‘Emission Trading Scheme’ (ETS) – alias European ‘carbon market’–, and to excessive reliance on emission standards combined with weak energy taxation. The second section shows that the fear of losing competitiveness, both vis-à-vis third countries and within the European single market, largely explains why any decentralized approach to carbon taxation is doomed to fail, as illustrated recently by the postponement of two projects of direct and indirect carbon

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<sup>1</sup> For an analysis of the EU leadership in the field of climate change, see Laurent and Le Cacheux (2010b).

taxation in France. Section 3 explores the potential of the most practicable policy option, namely relying on a reform of existing instruments, a better management and broadened coverage of the ETS, combined with enhanced tax coordination for higher excises on fossil fuels at the national level. But, as the fourth section argues, this strategy leaves out the concern of ‘carbon leakage’ that, though only partly valid, cannot be easily dismissed; it also shows that in order to have a sizable global effect, the EU taxation policy has to include a border adjustment, carbon levy on imports, or a similar carbon inclusion mechanism on imports, at least as long as other countries do not price carbon nowhere near the European level. In the light of these issues, Section 5 makes the case for a European Carbon Added Tax (ECAT), a straightforward and comprehensive tax mechanism that has the advantage of imposing a uniform price on carbon and of minimizing distortions between domestically produced and imported goods, as well as having the potential of forming the backbone of a new tax structure.

### *1. EU decarbonization shift: unfinished business*

Following the adoption of the Kyoto Protocol, in 1997, the EU has been the only region in the world to embark on a program of carbon emission reduction, by mobilizing two sets of policy instruments: emission standards and norms, on the one hand; the definition and allocation of property rights on emission permits, and the creation of a market for carbon (the European emission trading scheme or ETS) on the other.

#### *1.1. A climate fatigue rescued by the global crisis<sup>2</sup>*

Though pursued since the late 1990s with the help of various policy instruments, both at the national and EU level, the European mitigation policy has yield mixed results to date. Overall, the EU has been doing much better than the rest of the developed world under Kyoto and is now, “thanks” to the global recession<sup>3</sup>, more than halfway through its 2020 goal (the latest data exhibit a 11.3% reduction for the EU 27 and 6.9% reduction for the EU 15 compared to 1990); but precisely because the base year chosen in the Protocol for the different greenhouse gases is generally 1990, a significant fraction of the overall EU performance has been achieved by new members from Central and Eastern Europe (CEE) in the early 1990s when their economies collapsed. In the EU 15, the German reunification and British energy shift away from coal also played a crucial part in the initial strong performance. Both effects are now phasing out: emissions from new member states are increasing and the pace of emissions reduction in the EU 15 has been divided by roughly a

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<sup>2</sup> This section updates Laurent and Le Cacheux (2009b).

<sup>3</sup> Spain, where emissions fell by almost 8% between 2007 and 2008, accounts alone for a third of the overall performance of the EU 27 between 2007 and 2008.

factor 3 since 2000 (table 1). In this context, the targets adopted in the climate-energy package really are ambitious.

Table 1. GHG reduction in %

	1990-2008	1990-2000	2000-2007	2000-2008
EU 27	-11,3	-9,1	-0,4	-2,2
EU 15	-6,5	-3,1	-1,6	-3,4
Germany	-22,2	-16,8	-5,5	-5,4
UK	-18,6	-12,8	-4,2	-5,7
Poland	-12,7	-13,9	2,1	1,2
Czech Republic	-27,5	-24,4	0,0	-3,1

Source: EEA.

The drop induced by the global crisis and European recession is likely to be reflected in 2009 data as well (available by the year end), as estimates for EU ETS emissions make clear (Charts 1 and 2). Yet, when one considers 2000-2007 trends, which are “normal”, it seems very likely that this good news will prove ephemeral and will be fully compensated by an acceleration of emissions as soon as the EU economy recovers.

Chart 1. Emissions in EU ETS for the EU 15

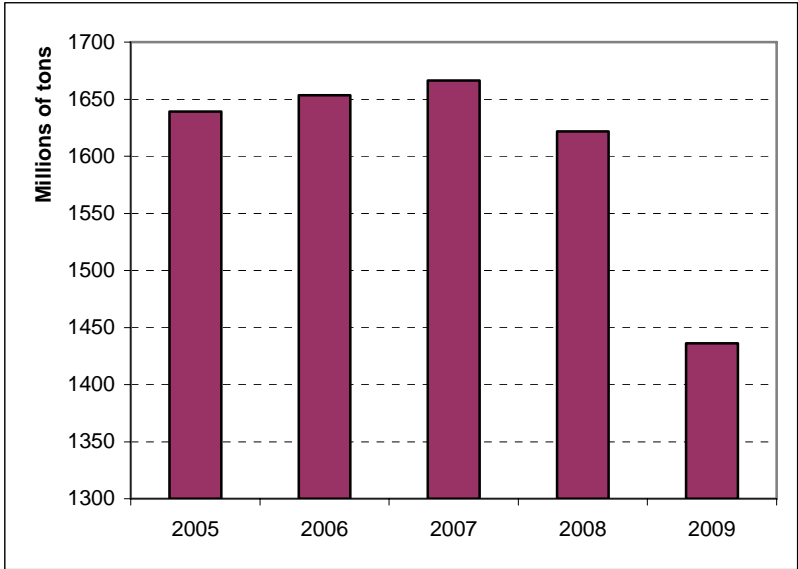
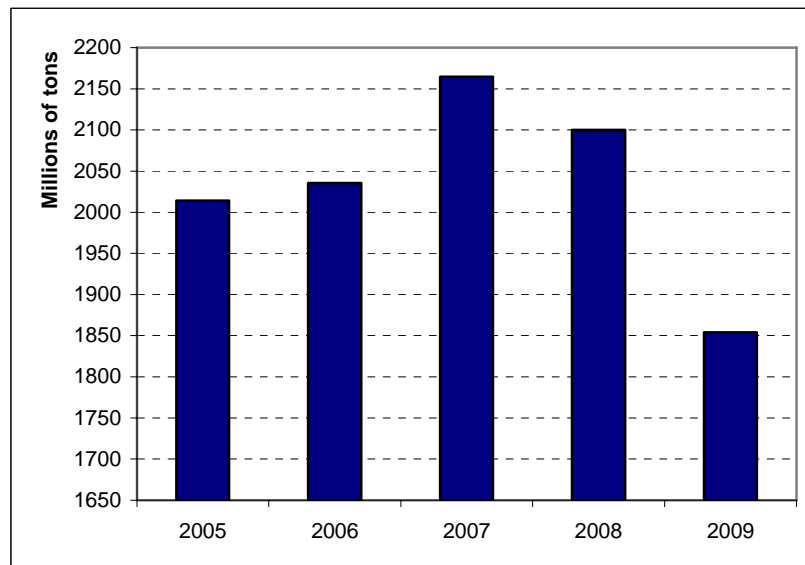


Chart 2. Emissions in EU ETS for the EU 27



Source: EEA.

A closer look at the sectoral composition of GHG emissions and trends reveals the structural weaknesses of the current EU carbon strategy. Submitted to the ETS, heavy industry has reduced GHG emissions, but only moderately and, with the obvious accidental exceptions of 2008 and 2009, ever more slowly. In the negotiations over the ‘climate-energy package’, heavy industries and the countries in which they still represent a large fraction of economic activity and of GHG emissions have actually been seen fighting against tightening existing policies and against introducing new ones, except when it comes to those that can be understood as mitigating ‘carbon leakages’ (see below). Other sectors, such as agriculture, have been improving their performance, due to specific regulations. But the most worrying trend can be observed in the ground transportation activities, especially for light vehicles, which GHG emissions have been growing at accelerated pace over the past decades, in spite of emissions standards relatively tighter than in the rest of the world (Table 2).

Table 2. Change in emissions, 1990-2008

	EU 27	EU 15
Road Transportation	+25.9%	+20.7%
Transport	+23.6%	+19.9%
Energy Industries	-9.3%	-1.3%
Residential	-11.3%	-6.3%
Commercial/Institutional	-13.0%	-6.5%
Industrial Processes	-15.4%	-16.6%
Agriculture	-20.2%	-12.2%
Manufacturing Industries and Construction	-25.0%	-16.8%
Solvent and Other Product Use	-25.7%	-27.7%
Waste	-33.0%	-40.5%

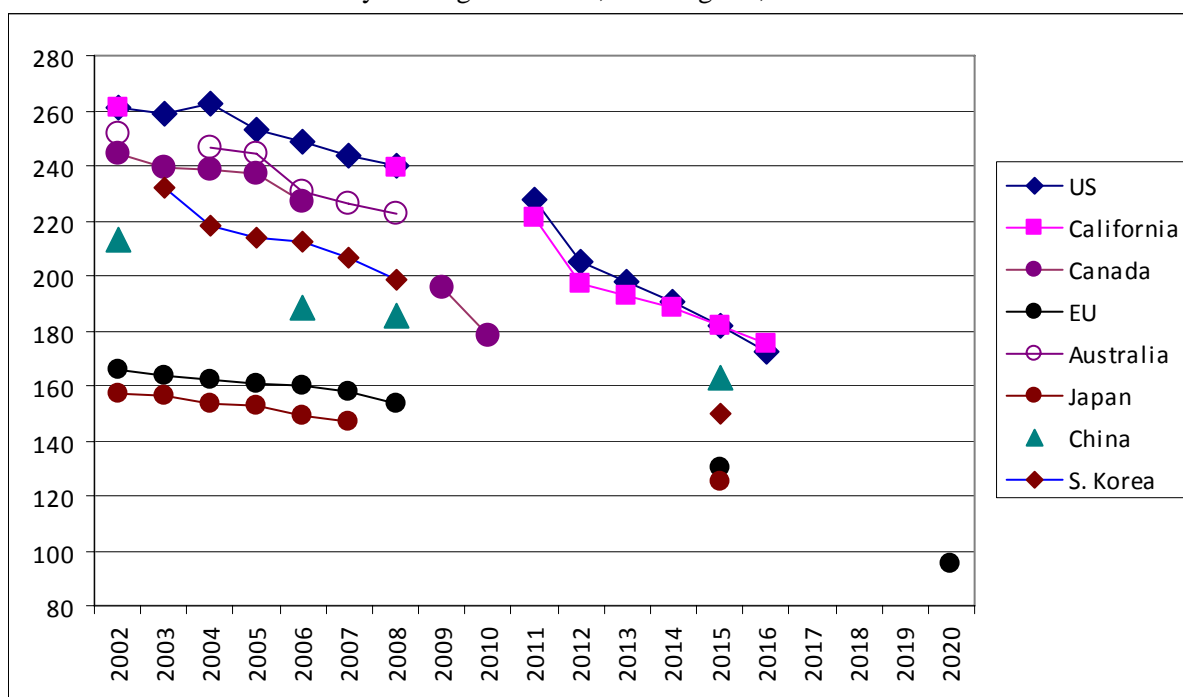
Source: EEA.

### *1.2. Policy instruments flawed by structural weaknesses*

Emission standards, most conspicuously for light vehicles, are indeed very popular amongst policymakers, and usually fiercely opposed by industry. As a matter of fact, they are, for private cars, presently much higher in the EU than in the rest of the world, especially the US. The climate-energy package offers to tighten them progressively further. This policy has already produced significant results: current European average emissions per kilometer by new vehicles are much lower than in the US (Chart 3) and, in compliance with the tighter standards adopted in 2008, they will likely have further decreased by 2015 and 2020.



Chart 3. Emissions by new light vehicles, in CO<sub>2</sub>g/km, 2002-2020



Source: ICCT.

However, this policy tool is clearly insufficient in the absence of a strong price signal, as illustrated by the poor performance of the road transport sector: car makers do eventually comply with tighter emission standards and produce vehicles that consume less fuel per kilometer but consumers faced with a lower user cost tend to drive longer distances (a classic case of “Jevons paradox”), so that total emissions are not reduced but actually pushed up as a result<sup>4</sup>. It thus appears that standards are efficient only to the extent that they are combined with the appropriate price signal.

In this respect, the trends observed in domestic energy taxation in EU countries over the past decade is worrisome: though there exists a degree of heterogeneity in this respect, the average shares of energy taxation in GDP and in total tax receipts have tended to decline since the mid-1990s and even more since 2000 (Table 3), a clear evidence that climate policies are not being pursued consistently at the national level.

<sup>4</sup> See Laurent and Le Cacheux (2009b).

Table 3. Energy taxation, in % of GDP

	1995	2000	2005	2006	2007	1995-2007
Eurozone averages						
weighted	2,1	2,0	1,9	1,8	1,7	-0,4
arithmetic	2,0	1,8	1,9	1,8	1,7	-0,2
EU-25 averages						
weighted	2,1	2,1	1,9	1,9	1,8	-0,4
arithmetic	1,9	1,9	2,0	1,9	1,8	-0,1

Source: Eurostat.

Created in 2005, the European carbon market has induced a reduction in GHG emissions, especially compared to what has been observed in the rest of OECD countries. But because of limited coverage – about 11000 industrial plants, representing about 40% of total EU emissions – and of overly generous carbon allocations in the initial phases, translating into an excessively volatile, and on average relatively low carbon price, the EU ETS is not delivering a strong enough price signal to the sectors covered<sup>5</sup>. So far, the two phases of its functioning have been plagued with too low carbon prices: in the period 2005-2008, there has clearly been an initial over allocation of emissions quotas, leading to a first ‘carbon price crash’; in the second phase, starting in January 2008, in spite of the Commission efforts to reduce quotas, there has been a second ‘carbon price crash’, this time due to a collapse in demand generated by the recession of 2008-2009, with reduced economic activity automatically translating into lower emissions.

It has been argued that the carbon price fall in the recession is a sign of a well functioning carbon market and of its countercyclical properties that should not be corrected: after all, defenders say, total emissions do fall in times of recession, and it is therefore not necessary, and may even be counterproductive, to add pain to the pain by attempting to maintain high carbon prices. Though appealing at first sight and partly true in the short term, this reasoning misses the big picture: during the period of depressed carbon prices, all those investment projects that had been elaborated on the basis of a higher price are financially endangered, and oftentimes the innovative firms that develop them disappear, so that when the economy recovers, it will bear the ‘scars’ in terms of a reduced stock of ‘low carbon’

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<sup>5</sup> For more detailed analyses of the performance of the EU ETS, see Laurent and Le Cacheux (2009b and c).

equipment, compared to what would have occurred in the absence of a recession; hence, in the longer run, emissions will be higher, not lower.

In all, the current European climate economic instruments do not appear robust enough to revive the EU climate performance. They also don't address the concern of "carbon leakage". The first option to reform them is to strengthen existing instruments.

## ***2. Within: Strengthening existing instruments***

In the short run, the least ambitious but probably most feasible strategy seems to be to consolidate and amend the existing instruments –i.e. the EU ETS – and to make sure that those economic activities that currently do not face a positive carbon price are sent the right price signal. This implies, at a minimum, eliminating fossil fuels subsidies currently in place in many sectors in most EU countries. Further, in order to avoid excessive price volatility and episodes in which the price is too low for investors to make decisions leading to the adoption of low-carbon techniques, the EU ETS should be "taxified" (i.e. brought closer to the properties of a tax), by introducing a floor on the carbon price, or even a corridor<sup>6</sup>. This could be achieved by creating an intervention mechanism, possibly funded by the proceeds of the planned auction selling of quotas<sup>7</sup> that would withdraw excess supply of emission quotas when prices fall below the set floor, and increase supply in times when the price rises above the set ceiling.

For those sectors not currently submitted to the EU ETS, the preferred solution so far seems to be to let national governments take care of imposing their own domestic carbon price via national carbon taxes or similar devices. This has indeed been implemented, but in a very limited number of EU member states –and essentially in Scandinavian countries, who had introduced these domestic taxes before joining the EU, in the early 1990s (see Laurent and Le Cacheux, 2009b; Gras, 2010). More recent developments – such as the indefinitely postponement of the French carbon tax project announced in March 2010 – suggest that this route is not leading anywhere, primarily due to the fear of free riding and intra-EU tax competition.

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<sup>6</sup> See Laurent and Le Cacheux (2009b). Similar proposals have been made by Tirole (2009).

<sup>7</sup> According to the 'climate-energy package' adopted in the spring of 2009, an increasing fraction of emission quotas will be auctioned after 2013. As argued above, this does not alter the price signal, but simply consists in capturing part of the rent created by the distribution of marketable quotas. The Council has decided that the receipts generated by such auctions will be attributed to national budgets. It would make more sense to earmark part of these funds for the regulation of the EU ETS advocated here, and the rest to funding the European budget (see Begg, Enderlein, Le Cacheux and Mrak, 2008; and below).

This dimension should indeed be regarded as the most serious obstacle to domestic solutions. In his recently released report on the functioning of the European Single Market, Mario Monti (2010), former Commissioner for the Internal Market and for Taxation, passes a relatively mild judgment on the overall situation to date, except on one issue, namely tax competition and the near-absence of any major initiative for tax cooperation or harmonization. This is especially damaging in the field of environmental taxation, where the trend observed over the past decade is worrying: as documented above and in Laurent and Le Cacheux, 2009b (see also, OECD, 2009), this category of taxes has indeed shrunk as a share of GDP or of total tax receipts of the member states, and the same is true for the subset of national taxes on fossil fuels. Hence, for all industries not included in the EU ETS, the diversity of domestic conditions with respect to carbon prices is an obstacle to a consistent European climate policy, especially in sectors such as road transport, where emissions have tended to grow fast over the past decades.

In order to submit those sectors not currently included in the EU ETS to a higher and more uniform carbon price, two relatively simple options are available. The first option would consist in an ‘upstream inclusion mechanism’ (De Perthuis and Delbosc, 2010): imposing on fossil fuel distributors the obligation to buy an amount of emission quotas corresponding to the carbon content of the sales would induce them to include the carbon market price into the price of fossil fuels they sell to the ‘diffused emission’ sectors, thus effectively unifying the carbon price in the whole European Single market.

The second option corresponds to the Commission’s recent proposal to foster tax harmonization and act via the ‘energy taxation directive’: in addition to simply setting minimum excises on fossil fuels, as in the current (2003) version of the (1993) directive, the Commission proposes to base minimum excise duties on the carbon emissions of the various categories of fuels, corresponding to 20 euros per ton of carbon<sup>8</sup>. Both solutions would result in a more effective European climate policy, insofar as the sectors that are currently the most problematic in terms carbon emission trends would be facing a positive and more uniform carbon price, though the current diversity of domestic energy taxation (Table 4) suggests that, unless minimum rates are set sufficient high and are really made mandatory for all, this might not be enough to solve the problem of intra-EU tax competition.

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<sup>8</sup> See the European Commission’s proposal (2010).

Table 4. Statutory Rates of Taxation on households' energy, in euros per ton of CO2

	Unleaded fuel	Diesel	Domestic fuel	Natural gas
Austria	179	120	36	30
Belgium	251	127	7	5
Bulgaria	133	101	9	0
Cyprus	125	92	72	48
Czech Rep.	173	130	130	0
Germany	277	179	23	28
Denmark	223	134	103	139
Estonia	119	91	16	0
Spain	177	111	31	0
Finland	243	128	26	10
France	265	158	21	0
Greece	144	102	102	0
Hungary	168	121	114	0
Ireland	183	136	17	0
Italy	233	154	149	36
Lithuania	119	91	8	0
Luxembourg	192	108	0	5
Latvia	124	94	8	0
Malta	196	123	36	15
Netherlands	281	141	17	70
Poland	172	119	22	0
Portugal	241	134	34	0
Romania	135	96	96	3
Sweden	226	170	135	109
Slovenia	166	119	20	14
Slovakia	172	143	67	0
UK	315	298	42	0
EU 27 (weighted avg)	244	160	39	18
EU legal minimum	148	110	8	5,3
Standard deviation	55,3	41,1	45,5	35,2

Source: ADEME and authors' calculation.

### ***3. Between: 'Carbon leakages' and the 'carbon linkage' solution***

Ever since the launching of mitigation policies, be they at the national or EU level, the issue of external competitiveness has been flagged by industry to oppose tighter regulation. Not only has lobbying by heavy industry been quite persuasive so far, but other sectors, such as road transport, have successfully pleaded their case at the national level in terms of lost competitiveness in the internal market. This issue, usually referred to as the problem of 'carbon leakages', cannot be dismissed lightly: imposing a carbon price on domestic producers can only be an effective device for fighting climate change if it induces technical change in the direction of low-carbon intensity, or if the higher production cost induced by carbon pricing can be passed on to the final consumers, the ultimate recipients of the price signal.

In the presence of foreign competitors not submitted to a similar carbon price, or in case the targeted domestic industry has the possibility to relocate in another country where similar policies are not being pursued, the fight against climate change will result in a double failure: it will induce a decrease in domestic economic activity and employment, and it will not produce any reduction in global emissions, insofar as domestic consumers will be induced to switch to foreign suppliers, not to decrease their demand for carbon-intensive goods. Indeed, it may well be that global emissions will, in this occurrence, increase, not decrease: first, because domestically consumed goods will have to be shipped from farther away, meaning more transportation; second because the technologies used in the foreign countries are likely to be more carbon-intensive than those used by domestic producers.

#### *3.1. How serious is the 'carbon leakage' problem?*

The argument of 'carbon leakages' has been used by industry everywhere to escape carbon taxation, to mitigate its tax burden, or to be granted free permits in the EU ETS. In the latter instance, lobbying has been quite successful to date: national governments of many member states – in the forefront are Poland, Italy and Germany, but other governments, less vocal in EU negotiations, have also succumbed – have imposed a postponement of the auctioning of emission quotas after 2013, and a free distribution of quotas for those sectors that can demonstrate that they are facing foreign competition. The Commission has, on December 31, 2009, published a list of these sectors: a very long list, indeed, which according to some estimates cover close to 80% of firms engaged in the EU ETS.

Although precisely measuring the effects of imposing a carbon price on firms on their competitiveness and on their decision to relocate their production facilities in countries that do not price carbon is not easy, there is indirect evidence that the problem is indeed serious, at least for some industries. In particular, it appears that heavy emission sectors – such as cement, aluminum, etc – have almost completely deserted the EU, and relocated in lower cost countries. And some studies show that a significant fraction of the spectacular increase in emissions in emerging economies, most notably China, are to be imputed to the production of goods for exports to OECD countries, among which the EU is a leading importer. This evidence supports the argument of a perverse effect of European climate policies<sup>9</sup>.

But is exempting some industries from carbon taxation or from the EU ETS, or distributing emission quotas for free to those industries, the solution to the ‘carbon leakage’ problem? Clearly not. In the first case, the exempt sectors are not submitted to the proper incentives to switch to low-carbon techniques. This implies that they will go on using carbon-intensive technologies until they will eventually be hit by the unavoidable rise in the fossil fuel prices. And the free distribution of emission quotas is nothing but a lump-sum subsidy that does not remove the incentive induced by the carbon price signal: it may postpone the firms’ decision to relocate in a country with zero, or low, carbon price, but it does not alter the economic calculus in terms of production costs.

### *3.2. A carbon levy: border tax adjustment or emission quotas for importers*

In addition, the free distribution of emission quotas to sectors exposed to ‘carbon leakage’ problems does not address the ‘carbon linkage’ problem, i.e. the incentive to relocate production in countries not imposing tight carbon policies and the consequent lack of incentives for European consumers not to opt for carbon-intensive, imported goods, and hence the increase in carbon emissions in these countries. Such a policy thus results in a ‘triple pain’, with European public finances willingly reducing their receipts from selling the emission quotas, the EU economy losing production facilities and jobs, not only in the most carbon-intensive sectors, but in many others in which imports from countries with no or low carbon price will become artificially more competitive, and no effect on the global reduction of carbon emission.

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<sup>9</sup> Facing EU home producers with a high carbon may however be less of a competitive handicap than often argued: to the extent that this policy brings about faster adoption of low-carbon technologies, and fosters innovation, it would even help domestic producers in the longer run. On this point, see Gras (2010) and Laurent and Le Cacheux (2009b).

The ‘border adjustment mechanism’ advocated by a number of national governments in the EU is the most straightforward, and indeed the only answer to this problem. Contrary to what opponents argue, such a mechanism is not protectionist, and WTO has, in a report issued in 2009, set the conditions under which it could be used (WTO, 2009).

Here again, two options are available. In the first instance, imports from countries not putting a price on carbon would be submitted to a ‘carbon levy’, calculated on the total carbon content of the goods, including transportation to destination. In the second option, similar to the ‘upstream inclusion mechanism’ described above for fuel distributors, importers would be required to buy emission quotas corresponding to the same total carbon content of imports.

In practice, of course, a difficulty arises with respect to the determination of carbon contents, implying a reasonable traceability of the goods as well as a minimum international agreement on carbon accounting. As a practical first step, two simpler devices have recently been proposed: the first one would consist in limiting the carbon levy to those imports that correspond to very high carbon contents (McLure, 2010), such as fossil fuels, cement, aluminum and the like; the other one, put forward in a recently publicized Franco-Italian proposal, would limit the inclusion of importers of these ‘high-carbon’ goods into the EU ETS. The Franco-Italian proposal also recommends to base the calculation of carbon content on the best available technology used by EU producers of the imported goods, an appealing, but clearly inadequate solution: first, it implies that similar goods are still being produced in the EU, which is not always the case; and second, it would generally lead to under-pricing the carbon content of imported goods, because non-EU producers often use more carbon-intensive technologies, and because the carbon emissions corresponding to transportation would then be ignored. And all these practical options have the common feature of exempting most imports from the levy or inclusion device, meaning that the problem of incentives facing EU consumers is effectively not addressed.

### ***5. A European carbon added tax (ECAT)?***

In a longer term perspective, it seems desirable to launch a major rebalancing of taxation with a much greater reliance on the taxation of natural resources and carbon, away from labor incomes. This implies the creation a broad-based tax instruments. In addition, if it is to be efficient, carbon taxation should be extended to all sectors not covered by the ETS in all EU countries on a reasonably comparable basis, in order to send European consumers the correct price signal on all goods and services and to limit the dangers of intra-European tax competition and other “beggar-thy-neighbor” policies that would be detrimental to internal



cohesion and to the achievement of the overall, common goals. From this point of view, the first best solution would be to adopt an EU-wide carbon tax, which could be ‘European carbon added tax’ (ECAT) on all goods and services marketed in the single market, whether they are produced in the EU or imported from the rest of the world.

The proposed carbon tax would be a universal tax on transactions, modeled on the same principles as the well-known Value Added Tax (VAT), except that added carbon content would be the tax base. It would be levied on all transactions intervening in the production, transportation, and retailing of all goods and services, either on a national basis or, preferably, at the EU level. If the former solution were to prevail – which is likely under the current decision-making rules for tax policy in the EU –, it would be necessary to coordinate national carbon taxation by having, at the very least, some minimum standards, in the spirit of what currently exists in the EU for VAT.

The only requirement for implementing the Carbon Added Tax (CAT) is the evaluation of the quantity of carbon emissions to be imputed to each economic agent in the production and distribution chain. Arguably, this is not entirely straightforward, and necessitates the elaboration of a full-fledged and standardized carbon accounting system. This is probably not as far out of reach as may appear at first sight, as an increasing number of firms have been establishing carbon balance sheets for their various activities over the past few years. In addition, it has historically always been the case that the introduction of a new tax has inevitably entailed the necessity of developing and progressively generalizing new accounting practices – the introduction of VAT is a good example, showing that transitory lump-sum levies for some categories of taxpayers not yet acquainted with the full carbon-accounting rules are perfectly feasible.

Each taxpayer would be paying a ‘carbon price’ for the amount of carbon it has emitted. Ideally, this ‘carbon price’, the tax rate, should be uniform. But, it is also conceivable to allow for some differentiation in rates, if one wanted to favor some types of consumption goods<sup>10</sup>.

The proposed CAT would be perfectly compatible with the existing EU ETS, provided the share of carbon emissions already accounted for by the permits is properly discounted, and therefore not submitted to the tax. Of course, the ‘carbon prices’ that are set in these two, largely independent, mechanisms cannot be made to perfectly coincide at all times; but it

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<sup>10</sup> This ‘carbon price’ should probably apply not only to CO<sub>2</sub> emissions, but also to the full range of greenhouse gases, including methane –a difficult issue for farmers–, and possibly other pollutants, if one wants to use this tax instrument more broadly than to fight climate change. ‘Conversion rates’ for the various emissions would then have to be decided, an additional complication.

would probably be wise to make sure that they evolve in close correlation, an additional argument in favor of a EU-wide or highly harmonized CAT.

Imports would be submitted to the same CAT as the domestically produced goods and services, which provides a simple solution to at least part of the problem of ‘carbon leakages’. Of course, imputing carbon emissions to imported goods might prove technically more difficult than for domestically produced goods; but at the very least, the amount of carbon emitted in transporting the goods can be ascertained, and the traceability of an ever larger number of goods will make it easier to evaluate carbon contents. Thus CAT would dispense of the introduction of a ‘border carbon levy’, as well as of the currently in place system of free distribution of emission quotas for those firms that can prove they are suffering from foreign competition.

A tricky issue arises with respect to exports: should they be tax exempt, as in the case of VAT? This solution would be favored by exporters, and would completely solve the ‘carbon leakage’ problem. But from the point of view of the ultimate goal of the carbon tax, which is the fight against global climate change, hence the reduction in total, worldwide emissions, submitting exports to the CAT would prove more efficient, though costly from a short-run competitiveness point of view, if other countries do not impose similar carbon pricing devices.

## ***6. Concluding remarks***

The economic and political context in the EU is such that the more modest options are most likely to prevail. Pragmatic or realistic solutions may be appealing as a first step in the direction of a better EU carbon policy; but they should be carefully scrutinized because of the very strong path dependency of policies: once a certain type of instrument has been introduced, it is often very hard to switch to more efficient ones, due to lock-in effects. Special attention should therefore be dedicated, at this early stage of implementing the EU carbon strategy, to the next steps, and not only to what currently appears simplest and most feasible.

As an additional, but highly relevant dimension, the issue of receipts generated by each policy option should be carefully considered. EU domestic carbon instruments will yield receipts for the public sector, either national or at the EU level. In this respect, the decision taken by the Council in 2008 to allocate the revenue generated by auctioning emission quotas to national budgets is not appropriate and should be reversed: because it results from the common carbon policy instrument, this receipt ought to be regarded as an 'own resource' of the EU budget, which would help finance the carbon conversion policies that need to be carried out at this level. Other options would yield additional revenue, and would then raise the issue of the allocation of such resources, both their sharing between national and EU budgets, and their use: double dividend or financing the investments in R&D and in the adoption of techniques to reduce carbon emissions, especially for households. In the specific case of the carbon levy, the best way to make such a tool acceptable for third countries would consist in earmarking receipts to financing the transfers targeted to help less developed countries to invest in climate change mitigation and adaptation. Indeed, even the decision has formally been made by the Council to offer such a financial assistance, the EU lacks the resources to finance them at this stage and the proceeds of the proposed carbon levy would be a natural candidate for funding this policy.

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