

Executive summary

Comparisons of the effective price put on carbon by policies in different sectors and countries provide valuable insights into the cost-effectiveness of alternative policies to reduce greenhouse emissions (GHGs), and their potential impacts on competitiveness. The value of this type of analysis was demonstrated by a report by the Australian Productivity Commission, *Carbon Emission Policies in Key Economies*,* which had a major impact on that country's decision to introduce an explicit carbon pricing system on 1 July 2012.

OECD decided to further develop this study by expanding the sector and country coverage, using the same methodology. The main metric used in both the Australian and present study is the *net cost to society* paid for each unit of abatement induced. This approach gives an estimate of the costs to society of achieving current levels of abatement. Any revenue raised by policies is assumed to be put to other good uses, and are not counted as costs to society.

Many of the policies covered by the case studies were not primarily introduced with the aim of limiting GHG emissions – in several cases this was not at all among the objectives of the policy. The policies were nevertheless deemed to have an impact on such emissions. When assessing their cost-effectiveness it is, however, important to also take the objectives of the other policies into account.

The report provides a snapshot of the post-policy situation compared to a counterfactual snapshot of no policy. It gives an indication of the relative incentives to abate carbon in 2010 within and across the countries examined. In spite of methodological and data limitations, the differences in magnitude of the abatement incentives are sufficiently large to provide a good level of confidence about the lessons drawn about the cost-effectiveness of different policy instruments in abating GHG emissions.

Electricity generation: The estimates available range from less than zero to EUR 800 per tonne of CO₂eq abated. However, carbon prices of at least EUR 25 were found in most of the countries, indicating relatively significant incentives, explicit or implicit, to abate some carbon emissions in this sector in each of the countries.

* See www.pc.gov.au/projects/study/carbon-prices/report.

The total abatement costs were between 0.01% and 0.05% of GDP in Australia, Chile, China, France, Japan, Korea and the United States. Abatement costs were (much) higher in other countries, such as Denmark, Estonia, Germany and the United Kingdom. In Germany they were up to a third of a percentage point of GDP.

The highest costs by far per tonne of CO₂ abated are associated with various capital subsidies and feed-in tariff systems, both in terms of the averages calculated and the maximum values observed. The lowest costs per tonne abated were for trading systems, in line with classical economic theory – a fact which confirms “textbook suggestions” that trading systems (and broad-based carbon taxes) are the most economically efficient policy tools to mitigate climate change. This is especially so when the trading systems address the environmental externality as directly as possible – like with a trading system for GHG emission allowances.

The estimated carbon prices in the *road transport* sector also show considerable variation. The costs per tonne of CO₂eq abated are *very high* in certain cases; exceeding EUR 1 000 per tonne for some policies related to the promotion of biofuels. Significant subsidies are provided for biofuels in all regions of the world. However, the costs of the US and Danish biofuels policies were each estimated to represent of the order of 0.1% of GDP. In contrast, motor fuel taxes resulted in the lowest cost per tonne of CO₂ abated by far.

Almost all the estimated carbon prices related to the *pulp and paper* and the *cement* sectors are very modest, compared to those found for electricity generation, road transport and household energy use. The project has not focused on the motivations behind the policy approaches applied in the different countries, but one factor that may contribute to the modest carbon prices facing these sectors is a fear of loss of international competitiveness.

In many of the countries covered, the *household sector* is facing quite significant GHG abatement incentives, well above EUR 100 per tonne of CO₂eq in a number of cases. The costs are particularly high in relation to some feed-in tariff systems and other subsidy schemes.

To sum up, large differences have been found in effective carbon prices:

1. *within* a given sector, *across* the countries covered;
2. *across* the different sectors, *within* each of the countries;
3. *across* the different instrument types, *across* all the countries covered.

In many respects, the last two findings are perhaps the most interesting and robust. There are a number of caveats that should be kept in mind when analysing the estimates. However, while there may be some uncertainty regarding the “ranking” of carbon prices within a given sector across countries,

it is very unlikely that any caveat could “explain away” the latter two main findings – and they do not seem very sensitive to the exact year of study.

It also seems very likely that the *lower effective carbon prices* found for taxes and emission trading systems compared with other instrument categories in several sectors is related to their greater *cost-effectiveness*. Some of the other instrument types are simply not effective in reducing CO₂ emissions, so costs measured per tonne of CO₂ abated tend to be very high. In some cases (e.g. subsidies for house insulation), abating CO₂ emissions was not the main policy objective, so only “judging” their “performance” in terms of costs per tonne of CO₂ abated can be “unfair”. However, for a number of the other instruments with very high effective carbon prices (e.g. measures promoting biofuels and other renewable energy sources), carbon abatement has indeed been one of the main arguments applied in public debates in favour of their introduction.

The challenge facing the world community in relation to climate change is so enormous that it is unlikely that it can be met unless countries apply policy instruments that are as cost-effective as possible. This report has emphasised that there is a large scope for improvement in this respect.



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