

THE POTENTIAL FOR USING TAX INSTRUMENTS TO ADDRESS NON CO₂ GREENHOUSE GASES: CH₄, N₂O, HFC_s, PFC_s AND SF₆

EXECUTIVE SUMMARY

About 40% of the human contribution to the greenhouse effect come from gases other than CO₂.

While carbon dioxide (CO₂) is responsible for over 60% of the human contribution to the greenhouse effect, methane (CH₄) currently contributes 15–20% and nitrous oxide (N₂O) and other gases contribute the remaining 20% of the human contribution to the greenhouse effect. In OECD countries, the share of CO₂ emissions is about 80%, while CH₄ represents about 10%, N₂O about 7% and other gases about 2% of total emissions.

This paper examines the possibility for taxing these other gases ...

The definition of OECD countries obligations under the Kyoto Protocol as a basket of six gases has raised the profile of non CO₂ greenhouse gases. Emissions of these gases come from many different sources, each of which presents different challenges when considering taxation and other mitigation options. This paper documents the nature and sources of each gas in order to examine the possibilities for taxing them.

... of which the most important sources are:

The most important sources of each of the non CO₂ greenhouse gases in terms of quantities emitted are:

- Methane from landfills, enteric fermentation in ruminants, natural gas and oil systems, and coal mining;
- nitrous oxide from fertilisers and industrial processes;
- hydrofluorocarbons used in place of ozone depleting substances;
- perfluorocarbons from anode effects during aluminium production; and
- sulphur hexafluoride used in electrical insulators and during magnesium production.

The feasibility of taxation depend on measurability of emissions and on the number of taxable events.

The feasibility of taxing non CO₂ gases depends largely on:

- how complicated it is to estimate or measure the emissions;
- the number of taxable events;
- the importance of each emission source in terms of current and expected future emissions; and
- other policies and measures that may be in place to address the emissions.

Among the major sources that could be taxed are ...

Of the major emission sources, the most obvious possible candidates for taxation are methane emissions from natural gas and oil production and from modern landfills, nitrous oxide emissions from use of fertilisers (with the tax placed at point of production or sale), production or sales of hydrofluorocarbons used in place of ozone depleting substances, and sulphur hexafluoride used during magnesium production.

... methane emissions from natural gas and oil

Methane is emitted during natural gas and oil extraction and can either be vented, combusted (flared), or re-injected into the oil/gas well (which can improve productivity).

extraction ...

Flaring the CH₄ emissions converts it to CO₂, which has a much lower global warming potential than CH₄. Flaring activities are an important source of CH₄, and the recent trend is for slight emissions growth. It is technically feasible to gather good quality data on emissions from oil and gas production. There are a small number of very large companies that produce oil and gas, and their emissions are relatively easy to monitor. There is at least one example (Norway) of taxation of emissions from oil and gas production. A tax could be placed on both CO₂ and CH₄ emissions from oil and gas production, with a higher tax on CH₄. Producers would then have a stronger incentive to flare or re-inject the CH₄ emissions.

... and from landfills ...

The amount of CH₄ that is generated from landfills depends on the quantity and composition of the waste but also on the type of landfill. Modern landfills typically include gas collection facilities. It is quite feasible to apply a flow meter to the pipes and measure the amount of gas that is collected. Therefore it would be feasible to tax landfill operators for CH₄ emissions from newer landfills where emissions are typically required to be collected. Tax credits could be issued for gas that is collected and used as an energy source, and a lower tax could be charged for gas that is flared and so emitted to the atmosphere as CO₂. However, care would be needed that taxes do not create disincentives to collection of the gas.

... and nitrous oxide emissions from the use of fertiliser in agriculture, ...

N₂O emissions from the use of fertiliser in agriculture vary depending on a number of factors (farm management practices, weather, and type of crop) so it is not feasible to tax these emissions directly. Emissions from fertiliser use are significant and the recent trend is for slight emissions growth. N₂O emissions from the use of fertiliser in agriculture vary depending on a number of factors (farm management practices, weather, and type of crop) so it is not feasible to tax these emissions directly. However, it would be feasible to place a tax on sales of fertiliser as a proxy for emissions. This would not reflect emissions accurately, but would enable an important source of N₂O emissions to be addressed. Farmers would pay a tax on fertiliser that they buy. A tax could be differentiated so that controlled-release fertilisers (which are used more efficiently by plants) incur a lower tax rate. Data on fertiliser sales are readily available.

... while measurement or estimation difficulties make many sources less suited for taxation.

However, there are many non-CO₂ sources of greenhouse gases that do not appear to be well-suited to taxation from the analysis in this report, largely due to measurement or estimation difficulties.

This report -- which does not cover fiscal and economic implications of possible taxes -- was prepared by Ms. Fiona Mullins and Ms Jessica Troni of Environmental Resources Management in the United Kingdom.

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Nils Axel Braathen or Jean-Philippe Barde, Environment Directorate
Email – nils-axel.braathen@oecd.org or jean-philippe.barde@oecd.org ; Fax : +33 1 45 24 78 76

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