Climate and Energy Economics

The Climate and energy research group focuses on how national, international and natural external conditions influence the value of national energy resources, the efficiency in the energy markets and development of climate policy instruments. The research covers studies of the behaviour of firms and households and their adaptation to energy and environmental policy, the integrated energy market and general equilibrium models, and the interaction between efficient policy instrument formulation to curb greenhouse gas emissions, reduce environmental consequences and to achieve other policy goals.

Main findings

We explore how the EU could benefit from a broader participation through specific bilateral agreements with developing countries in the post-Kyoto period. The EU may consider cooperation (merger) to act strategically in the permit market. We show how the profitability of a merger depends on whether the merged agents are on the same side of the market as the preexisting dominant agent(s).

Linkage of different countries' domestic permit markets for pollution rights into a single international market alters governments' incentives, and may trigger adjustments of the number of allocated permits. Recent contributions show that climate agreements with broad participation can be implemented as weakly renegotiation-proof equilibria in simple models of greenhouse gas abatement where each country has a binary choice between cooperating (i.e., abate emissions) or defecting (no abatement). We show that this result carries over to a model where countries have a continuum of emission choices. If global emissions are to be cut significantly, it is not sufficient to cut emissions in developed countries. Emissions must be cut also in developing countries. However, we have shown that the Clean Development Mechanism does not have a viable future if global emissions are to be stabilised at a level that prevents substantial global warming.

Documentation: DP 530, N&M 2008, DP568, DP 542, [97], [48], [15], ØA 3/2008

The economic literature prescribes separate tax or cap-and-trade systems to internalize negative environmental externalities and subsidies to internalize positive externalities such as R&D. However, policy is not straightforward because of the influence on cost and competition and concerns for regional employment, economic activity within certain industries, and any distributional effects. Tax discrimination, subsidies and regulations then undermine the efficiency of energy instruments. To balance any environmental concerns, other instruments, including green and white certificates, have been created. We show that these work as simple combinations of taxes and subsidies. Energy-related taxes might vary heavily between countries. A review indicates that taxation varies tremendously across Western countries, which suggests divergence in the theory on efficient means and energy-related policy. Finally, a study of the Norwegian energy and climate policy includes a range of instruments. Still, these instruments are concerned with a few goals. Industrial and employment concerns are important part of the climate and energy policy, and in particular the differentiated carbon taxes imply indirect subsidies of some polluters, while other pay excess taxes through higher rates than the efficient level.

Documentation: [12], Report 28/2008, ØA 5/2008.

In rich economies, emissions of many pollutants show a decoupling from economic growth. One possible mechanism is that emission intensive products are increasingly imported or decreasingly exported. This implies pollution leakages to other countries. We hypothesize that decoupling in a rich and open economy, Norway, is associated with such leakages. We find little evidence in support of this.

Rather, the decoupling of emissions from economic growth observed over the past twenty years was associated with falling pollution leakages, and while forecasts indicate a weaker decoupling than in the past, leakages increase in the future.
Documentation: [14]

Aggregation problems emerge when households react differently to changes in prices and income over time. Thus, the composition of demand on different consumer groups over different time periods is important to determine how total consumption will change when prices and income changes. A method for aggregation over time and consumers has been developed. A micro simulation model developed to analyze household energy consumption solving problems with aggregation in Norwegian household electricity consumption. This model is used to simulate the effect on welfare in various household groups of an increase in the electricity tax. The model is also used to simulate the historical development in household electricity consumption during the period 1975 to 2004.
Documentation: DP *537*, Report 6, Master thesis UiO, Notater 34.

The consumption of storable goods does not necessarily equal purchases during a period because of changes in stock. In many cases, we have information about expenditures only, not consumption. A method is developed to obtain an estimate of consumption and changes in stock when only expenditure data are available. Household energy consumption is used as an illustration, applying data from the Norwegian survey of consumer expenditure.

Documentation: DP 575.

When planning the need for power, both with respect to capacity of transmission and production, one need information about the variation in power demand over time. To increase the information about variation in consumption during the year, a report is written describing the consumption patterns over time in different sectors, using hourly metered data for 8759 household, industry and trade costumers. This data is also used to estimate the effect of changes in prices and temperature on the hourly consumption pattern in different sectors. Finally a report is written discussing the price policy of power suppliers with respect to how changes in the spot and forward prices on the Nordic power exchange, Nord Pool, is carried through to the end-user prices.

Documentation: Report 50, Report 54, ØA 6, Notater 69.

Social and moral norms and the opportunity cost of time will affect household recycling efforts. A model is developed to describe how norms affect the recycling decision through feelings of self-respect, guilty conscience and warm-glow as well as respect in, and sanctions from, the community and applied to describe Norwegian household recycling efforts.
Documentation: [19]

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