

An Assessment of the Economic Costs of reducing CO2 Emissions

Beginning in 1996, Statoil, a Norwegian oil firm, has been experimenting with a technique known as Carbon Sequestration, at the disused Sleipner oilfield located a few hundred miles from the British coast. Carbon Sequestration involves the injection of large quantities of liquefied CO2 into underground storage facilities. Predominantly, the most suitable sites are depleted oil and gas reservoirs, which are capable of trapping underground gas and are in plentiful and growing supply. This project demonstrates in a highly visible manner how the oil and gas industry is investing in new technologies to reduce CO2 emissions emanating from their core business activities. As developed world economies begin to place legal limits on their emissions of green house gases, many within the wider business community are assessing the costs of such action.



It is the purpose of this article to give a broad economic evaluation of the costs of reducing CO2 emissions within the developed world. The 1997 Kyoto Protocol saw the fifteen countries that constituted the European Union (EU) plus other industrialised nations agree to reduce their greenhouse gas emissions to the equivalent of 92 per cent of 1990 levels by 2012. This is likely to mean a number of significant legislative and cultural changes as developed countries balance this objective against sustained economic growth. However, recent trends display a dramatic restructuring of the traditional western economy, away from resource intensive manufacturing and construction, towards clean, knowledge based industries. It is possible that our development path will move us towards a low carbon economy, with or without sustained effort to reduce emissions.

It is important to understand that, from an economic perspective, reducing CO2 emissions is likely to lead to some significant benefits as well as costs. Although open for discussion by ecologists and others in the scientific community, there is a large body of evidence suggesting that limiting the growth of global emissions will help to avert a number of serious problems. Climate change is already apparent and could cause increased occurrence of natural disasters, species loss and human morbidity and mortality. Quantitative estimates of the benefit from a one tonne reduction in CO2 emissions range from \$10 to \$160. It is notoriously difficult to attach a monetary value to environmental resources, such as clean air and a predictable climate, which explains the wide variation in these estimates. However, it is clear that some benefit is to be gained from limiting our emissions of CO2 and other greenhouse gases. Hence, the case for dedicating some economic resources to such an effort is created.

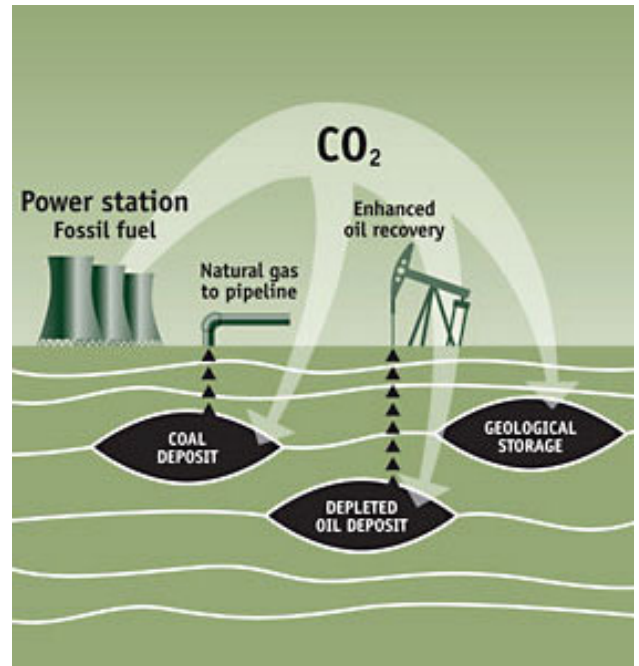
The Kyoto Protocol

The economic costs of reducing CO2 emissions in

line with the Kyoto Protocol will be heavily determined by the policies and actions put in place to achieve such goals. Free market based policies, such as a tradable permit scheme or pollution tax, will allow markets to compare the benefit of an additional reduction in emissions against the abatement cost. Measures such as these will lead to emission targets being achieved at the lowest possible cost. Polluters will not embark on a project to cut emissions if the cost per unit of pollution abated is greater than the pollution tax or the cost of a pollution permit. Only the lowest cost projects will be undertaken. Many estimates have been made of the likely total cost of meeting Kyoto targets through free market measures. Consensus points towards a small overall benefit for the global economy, as some of the more damaging impacts of climate change are prevented or delayed.

The development of new technologies is often touted as our most likely solution to reducing industrial emissions. Our limitless ingenuity has led to enormous reductions in the global output of many other pollutants, such as Sulphur Dioxide and CFCs. It is likely that new technological development could achieve a restructuring of the global economy away from fossil fuels. There is a cacophony of innovation and technologies, many at the embryonic stage but others looking like increasingly viable alternatives to fossil fuels. It is essential that governments allow free markets to decide on which will become the future energy sources of choice for the global economy. Pockets of market distorting subsidies and tax exemptions exist around the world, benefiting industries chosen by politicians rather than rational economic actors. Germany's burgeoning solar power industry is a case in point. Central government has ploughed enormous resources into research and development projects but it is looking increasingly likely that wind power and bio fuels will be the first to achieve parity with fossil fuels and nuclear power on a cost per kilowatt basis.

The costs borne by developed world economies will rise significantly if legislatures implement rigid pollution abatement policies. There are already a number of instances where this is taking place. The problem with prosaic policies is that governments lack the information to determine which new technology is best to implement or which polluters



Source: Nottingham University

can most easily reduce their emissions. Estimates from the International Council for Capital Formation suggests that meeting emissions reduction targets through non-market policies will lead to the UK economy in 2010 being 1.1% smaller than in the business as usual case. They also predict the loss of roughly 200,000 jobs and electricity bills increasing by 26 per cent. These are relatively modest figures and suggest that even in a worst-case scenario, compliance with the Kyoto Protocol targets will not lead to severe economic difficulties.

It seems likely that meeting the targets of the Kyoto Protocol will only have a limited impact on developed world economies. The bottom line is that the targets themselves are not strenuous enough to cause any serious economic upheaval. It is apparent that the Kyoto signatories have not made intensive efforts to reduce emissions. The EU's Emissions Trading Scheme is a prime example, with extremely lax conditions imposed after lobbying from business groups. Restructuring towards low polluting service industries and inflationary pressures on traditional energy sources, means that some emissions reductions are inevitable. In this respect, the Statoil project may become an odd peculiarity if the next generation of global pollution targets fail to drive significant change.