Climate change also brings opportunities

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There are two ways to look at the expenditures that will be required if the world is to make a serious attempt to curb global warming.

Pessimists see a huge cost: one that some think means it is not even worth trying to take on the challenge.

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Optimists see perhaps the greatest business opportunity of the century.

As always in the analysis of climate change, there are enormous uncertainties, both about the science and the economics. But calculations set out in a report from Shell Springboard, Royal Dutch Shell's environmental awards scheme for small and medium businesses, give some rough idea of the scale of both the challenge and the opportunity.

Sir Nicholas Stern, head of the government's review of climate change, has argued that a concentration of carbon dioxide and other greenhouse gases in the atmosphere of 550 parts per million by the middle of the century would be "potentially dangerous territory". On unchanged policies, it seems likely that greenhouse gas levels will rise well beyond that level.

The Shell Springboard report suggests that to stabilise atmospheric greenhouse gases somewhere below 550ppm by the middle of the century, emissions between now and 2050 will have to be about 3,000bn tonnes of carbon dioxide lower than they would have been based on "business as usual". The price of preventing carbon dioxide emissions varies a great deal. In less developed countries it can be as low as $5 per tonne of CO_2; in rich countries it can be as much as $30 a tonne. Take an average of $20 per tonne of emissions prevented, and you get a total expenditure needed over the next 50 years or so of about $60,000bn (£31,745bn): roughly equivalent to the world's total annual gross domestic product today.

It could be more, it could be less. To give an idea of the uncertainties involved, two academics from Princeton suggested in a recent edition of Scientific American that the reduction in carbon emissions might need to be less than a quarter of that suggested in the Shell Springboard report.

The cost estimates are uncertain, too. As new technologies emerge, cutting CO_2 emissions may get cheaper. Or once the obvious problems are fixed, tackling the remaining emissions may get tougher. But even at the lower end of the range of possibilities, action against climate change still creates a very big market.

Assuming that the spending builds up steadily over the decades, global expenditure could be worth about $1,000bn over the first five years from a decision being taken to make a serious attempt to stabilise carbon dioxide in the atmosphere.

That would be spent across a range of industries including power generation, oil and other fuels, construction and the motor industry.

The opportunity for businesses could be even greater than the expenditure numbers suggest, because companies that can help reduce emissions will have an opportunity to displace their more polluting competitors.

Cameron Hepburn, an energy economist at Oxford University who worked on the Shell Springboard report, says: "Technological change tends to be disruptive to business models, and climate change will be a disruptive influence, creating danger for incumbents and opportunities for new entrants."

Many of the new opportunities will go to big established companies.

But there are still likely to be some gaps for smaller businesses to exploit. Royal Dutch Shell, for example, has invested $1bn over the past five years in renewable energy, compared with its total capital spending this year of almost $20bn.

British and other European companies have been given a head start in this emerging market by their government's adoption of the Kyoto treaty. The UK market for climate change mitigation has been estimated at £3.5bn by 2010, up from £2.1bn this year, driven by policies already in place to promote energy efficiency and renewable electricity. The US is catching on to the potential very fast, however, with California's greenhouse gas reduction law, passed last month, signalling the change in attitudes.

What should encourage companies looking at opportunities in this area is that Sir Nicholas seems to be convinced technologies for cutting greenhouse gas emissions will depend on government action to sustain them.

He argued earlier this year: "In the absence of policies to correct the externalities and market imperfections associated with the emission of GHGs and with innovation, markets cannot be expected to deliver efficient or desirable outcomes."

In other words, if politicians are serious about wanting to head off the threat of global warming, they have to put the policies in place to make it happen.