

The Stern Report on the Economics of Climate Change

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The economics of climate change are sophisticated and the message stark. The arithmetic of climate change is relatively simple and equally stark.

According to the World Business Council for Sustainable Development (WBCSD), demographic and economic growth can combine to produce a global economy by the middle of the century that is 3 1/2 to 4 times the size of today's.

An energy system simply that replicates today's but is three and half times to four times the size of today's may not be tenable. The Stern report says the scientific evidence is indicating that climate change could impede economic growth and damage prosperity. And climate change is not the only threat. Scarcity of water and the undermining of biodiversity also need to be tackled.

However, although the dangers are stark and the truth inconvenient, we do not have to be presented with an awkward choice. We do not have to tell the 1.6 billion people in the world who do not yet have the same kind of access to energy that we all take for granted, that they can't have it because we got there first and the planet cannot support them coming later.

In response there are two levers to pull on. The first is energy efficiency and the second is the decarbonisation of energy. If we can double the energy efficiency of economies and halve the carbon intensity of energy, then a global economy 3 1/2 to 4 times the size of today's can be supportable (per WBCSD).

This prompts a set of five questions. Do we have the technology? Do we have the money? Do we have the time? Do we have the people? And do we have the leadership?

Taking the first question, a set of technologies is available to deliver the required energy within the necessary carbon limits. Fossil fuels will remain a substantial portion of the primary energy mix into the middle of the century. So carbon capture and storage is going to be an important set of technologies particularly as it relates to coal. Renewables could grow from about 2% of the primary energy mix today to about 20% by mid-century (per WBCSD). This would be very substantial growth. To give an example, there are about 30,000 2 MW wind turbines in the world today. By mid-century there might need to be something of the order of a million wind turbines of 5 MW capacity. Solar might grow by 160 times.

The transport sector will also have to change. There are about a billion vehicles in the world today. By the middle of the century there could be 2 billion vehicles. They are likely to have to be twice as energy-efficient as today. In addition the fuel mix will have to contain a substantial amount of biofuels and those will need to be second-generation biofuels that are truly low carbon. In addition, if hydrogen can be successfully developed as a carbon free energy carrier, then about a quarter of the vehicles could be powered by hydrogen (per WBCSD).

These are examples to demonstrate that there is available a set of technologies, at various stages of development, that can be deployed to support a much larger global economy by mid-century, while giving a reasonable prospect of tackling climate change.

The next question is whether we have the money. Nick Stern's report has shown that the cost to the global economy could be around 1% of GDP. That ought to be manageable. However it is not a trivial number. 1% of GDP is about \$350 billion. So the effective management of that expenditure is extremely important. The sooner the technologies can be deployed the sooner the costs of their application can be reduced.

When it comes to time we probably have enough time but only just.

On the question of people we must recognise that the energy industry needs skilled people for its operation and development. The demographics of Europe and North America are not in our favour. We need to excite a global generation of young people to step up to the energy challenge by deploying their energy, skill and ideals within the energy industry.

The final question is about whether we have the leadership. We need to examine what that means. Leadership needs to come from three groups – from individuals, from corporations and from governments.

As individuals we need to support the political consensus for change. We also need to change our behaviour in support of energy efficiency. However, given our propensities, it is quite likely that changes to our behaviour need to be helped through standards and regulation in such areas as appliances, buildings and transportation.

Business has a role to play in two areas. Firstly, business should get into the right frame of mind and recognise the opportunity generated by the necessity for tackling climate change. New markets and new competitive opportunities are opened up not just in the energy industry but in a whole range of industries. We should pay particular attention to the opportunities created in the small and medium-sized sector of economies.

Secondly, business needs to advocate for change and earn the right to consultation on the important policy instruments that need to be put in place. These policy instruments encompass the establishment of effective markets for carbon, including giving appropriate credit for carbon capture and storage.

Political leadership is important both nationally and internationally. International agreement should be based on the UNFCCC as a strong foundation. In the next few years, there needs to be international agreement on a carbon pathway for the world through to the middle of the century. Such an agreement needs to be supported by the establishment of international markets for carbon. Based on that, a mosaic of solutions to tackle climate change can be

established on both national and international bases for different elements of the energy system.

The world is reasonably good at identifying impending crises but less good at avoiding them. With climate change we need to in act in advance of the worst of the problems. This is something we need to get right first time.