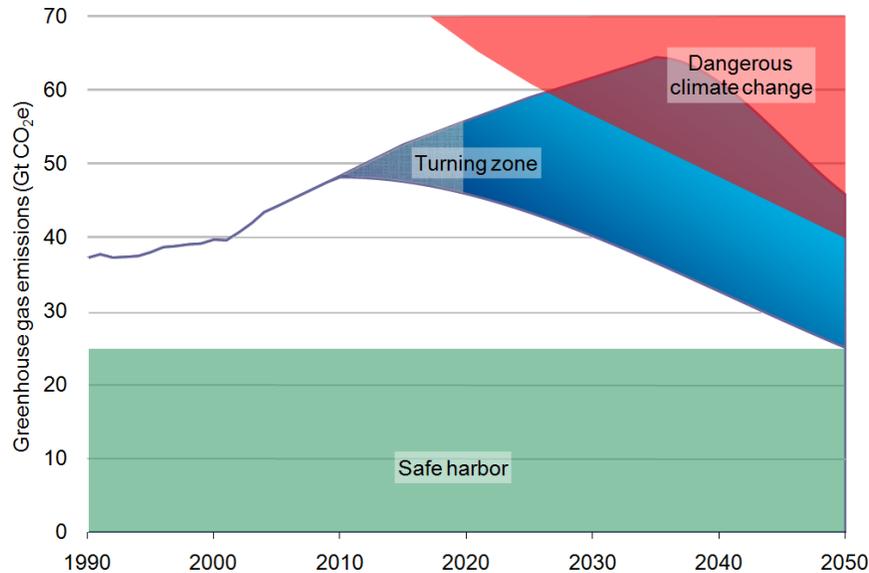


Turn toward climate safety

The science is compelling. We are heading in the wrong direction, and we are running out of time. In the critical period from now until 2020 global emissions must start to decline. The sooner we make the turn, the greater the chance that we can avoid the most dangerous consequences. This paper lays out the steps we can take now to achieve the turn toward safety.



Source: IEA and other emissions data; EDF analysis.¹

Start turning now

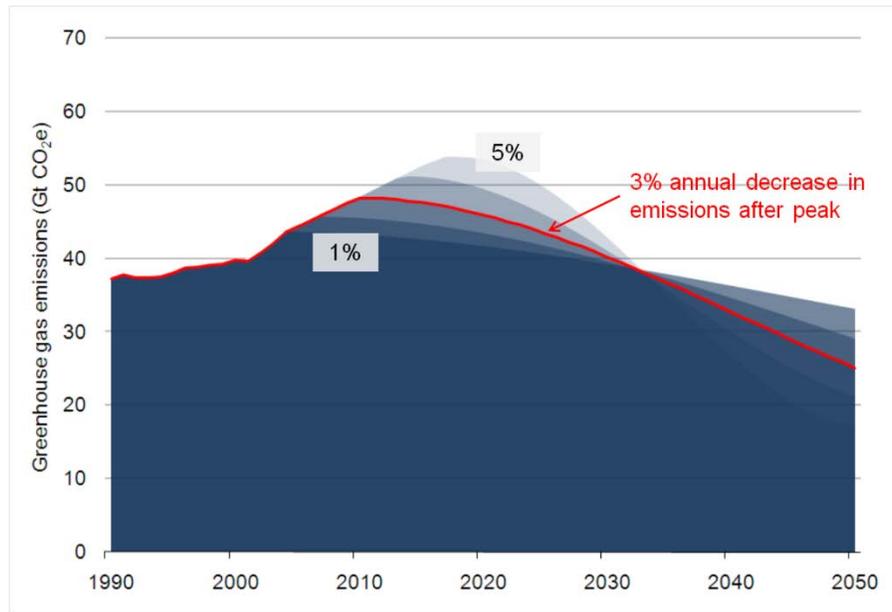
We need to start putting the tools in place now to achieve this “turn toward safety.” The longer we wait the more dangerous, difficult and expensive it will be. The United States and other large-emitting countries must lead this effort. Others, most notably the European Union, have begun to act. The EU needs to strengthen and expand its efforts and increasingly tie in others to increase momentum to achieve this global turn.

Driving private investment: the power of incentives

The fastest, most efficient way to make the turn is to create economic incentives that harness the power of innovation, making investments in clean energy sources more profitable than the dirty alternatives. A well-structured carbon market will reward entrepreneurs for finding cheaper, faster ways of cutting emissions.

The longer we wait, the steeper the turn and the smaller the margin for error

Repeated delays in agreeing on emissions reductions necessitate ever steeper decreases after the peak. The next figure shows five global emissions reductions pathways, each with the same likelihood of avoiding a long-term temperature increase of 2 degrees centigrade above pre-industrial levels but with different peak years and levels. The pathways show the inherent uncertainties in the response of climate systems, but the basic message is clear: the longer we wait, the more difficult the decrease will be.



Source: IEA and other emissions data; EDF analysis.²

Economic and climate models indicate that the fastest the global economy can cheaply reduce emissions is approximately 3 percent per year, using current and anticipated technologies. The red line shows the 3 percent pathway, which peaks in 2010, a year when actual global emissions were still on the rise.

Funding the turn

Financing currently available for climate mitigation amounts to roughly \$80 billion annually.³ About \$5 to \$10 billion come from international government funds, both bilaterally and via multilateral channels. The rest comes from private investments. Early estimates of the cost of reducing global emissions in developing countries range widely, from \$100 to \$600 billion per year by 2020.⁴ Government funding may increase but cannot realistically make up the difference. The private sector can.

First in Copenhagen and again in Cancun, the developed countries committed to mobilize \$100 billion for climate change mitigation and adaptation per year by 2020. The UN high-level Advisory Group on climate change Financing (AGF) found that generating these new funds is possible, but only by channeling market forces with significant a global price on carbon.⁵

Total global investment averaged around \$20 trillion per year before the 2008 financial crisis and ensuing recession. Foreign direct investment in developing countries alone is around \$500 billion.⁶ Much of the financing for the turn toward safety can come from funds nations are currently preparing to spend on polluting fossil fuels. We now spend \$5 trillion annually on them, nearly \$600 billion per year on fossil fuel subsidies in developing countries alone.⁷ The kind of policies required to implement the necessary steep downward trajectory in emissions will be extremely effective in redirecting large amounts of private investment toward clean technologies.

It is crucial as well to recognize the limits of current carbon markets. Currently climate-related capital flows to developing countries primarily via the Clean Development Mechanism (CDM). But the CDM does not provide a platform for achieving global reductions, and cannot mobilize the amounts required to fund the transition to a low-carbon, high-efficiency economy.

The power of innovation and clear economic signals

Reducing emissions steeply and soon is a tall order, but it can be done. It has already been done. In the 1990s, the United States put a cap on the sulfur dioxide emissions that cause acid rain. The program has cut emissions 50% below 1980 levels, essentially solving the U.S. acid rain problem — and has done so at a fraction of the expected costs. Similarly, the European Union's emissions trading system has begun to decrease emissions, and others from California to New Zealand to China are following suit.

The history of markets and technological innovation demonstrates powerfully that the introduction of new technologies is often explosive rather than linear. Growth in technologies usually follows an S-shaped curve: slow start, rapid acceleration, and then tailing off at the end once the new technologies are ubiquitous. When innovations catch hold and are propelled by market forces, they spread more widely, quickly and cheaply than anyone beforehand was able to predict.

The transition to a clean energy economy and low-carbon development will follow the same pattern. To send the unmistakable signal needed to drive investment and innovation requires hard caps on absolute emissions, structured in ways that channel market forces to reward innovation and ratchet down cost.

Two externalities, two policy solutions

Businesses, entrepreneurs and innovators will lead the way toward lower emissions once the economic signals are clear. One of these signals is a cap on emissions and ensuing price on pollution. A second will be a concerted push for public investment in green technology.

Pollution is one externality currently underpriced. Another—positive—externality not currently considered in daily investment decisions is that of innovation. R&D generates positive knowledge spillovers that call for initial public funding and support to jumpstart private investments.

Fast forward to the future

We know the turn toward safety must come soon. The clock is ticking.

We know that with clear economic signals we can redirect capital away from wasteful, carbon-intensive infrastructure and use it to finance the turn toward safety.

And we know that within the next decade all major emitting countries must get on a downward trajectory in carbon emissions.

The task before us now is to establish and expand the markets and incentives that will make this happen — without delay.

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Version 9/28/2011

¹ Graph based on IEA and other emissions data; EDF analysis of avoiding warming in excess of 2°C above pre-industrial temperatures for a range of probabilities — 50 percent for the upper line of the blue zone, 83 percent for the lower line.

² Graph based on IEA and other emissions data; EDF analysis of an 83 percent probability of avoiding warming in excess of 2°C above pre-industrial temperatures for a range of annual decreases after the peak—1 percent for the earliest peak, 5 percent for the latest peak.

³ Figures from New Energy Finance (2011), UNFCCC (2008) and World Bank's *State and Trend of the Carbon Market* (2011), corroborated by Climate Policy Initiative (2011).

⁴ The lower bound of \$100 billion comes from Project Catalyst (2009) and European Commission's *Stepping up international climate finance* (2009); the upper bound comes from IEA's *Energy Technology Perspectives* (2009).

⁵ The AGF (2010) identified financing streams totaling between \$100 and 400 billion per year by 2020 from public and private sources, assuming a global carbon price of \$25 per tCO₂e.

⁶ UNCTAD estimates Foreign Direct Investment to developing economies in 2008 to be \$620 billion, dropping to \$478 billion in 2009.

⁷ Fossil fuel subsidy figure from IEA (2010).