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Recensione del volume:

## **Why Are We Waiting? The Logic, Urgency and Promise of Tackling Climate Change<sup>◇</sup>**

STERN N.

a cura di

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Nicholas' Stern new book, "Why Are We Waiting? The Logic, Urgency and Promise of Tackling Climate Change", was published in June 2015 with a clear and ambitious objective: to influence the negotiation process leading to the Paris agreement on greenhouse gas (GHG) emission control. From this viewpoint, the book has been successful. The agreement has actually been signed in December 2015 at COP 21 and ratified by national governments a year later before COP 22.

This timing, and the short interval between signature and ratification, is quite exceptional in international negotiations and reflects the sense of urgency to start controlling, and possibly limiting, the growth of GHG emissions. Stern's book itself is centered on this sense of urgency and on his dissatisfaction with the state of climate negotiations before Paris: in particular, with the insufficient action implemented in most developed and emerging countries to tackle climate change. Insufficient action that he argues is in strike contradiction with economic rationality.

Stern's argument is simple. Climate change is a serious threat for our economic development. Therefore, the benefits of taking action to reduce GHG emissions are clear. By contrast, costs are relatively small. Stern convincingly shows that economic development, reduced emissions, and creative adaptation can go hand in hand. Consequently, the transition to a low-carbon economy and rapid structural transformations to the world economy provide a story of growth and poverty

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<sup>◇</sup> The MIT Press, Cambridge Mass., 2015, ISBN: 9780262029186, pp. 448.

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reduction that is attractive and sustainable. A committed and strong low-carbon transition could trigger a new wave of economic and technological transformation and investment, fostering sustainable development.

This argument is not new. In the well-known *Stern Review* for example, a book published in 2007, Stern argued that costs of addressing climate change are much lower than the harms that will result. Moreover, even if it costs \$ 2 trillion to fix, that would be less than 3 per cent of total global income. That is not much more than the amount the world economy might grow in an average year. By 2051, we could be as rich as we would have been in 2050 and the climate will have been saved. Even the biggest enthusiast for economic growth can see that that's not a significant sacrifice at all.

Nevertheless, this reasoning has not yet been able to influence private and public decision-makers worldwide. Emissions rose in the past decade more than in the previous three decades, despite the concern for climate change, the ongoing negotiations and the many IPCC reports. In addition, 80% of total emissions come from fossil fuels. More than half of cumulative CO<sub>2</sub> emissions between 1750 and 2100, about 1,100 GtCO<sub>2</sub> out of 2,000 GtCO<sub>2</sub>, have occurred in the last 40 years. About 75% of the 10 GtCO<sub>2</sub>eq growth in annual anthropogenic GHG emissions between 2000 and 2010 comes from the energy supply and industry sectors.

This is certainly bad news for all those who believes that climate change is a serious threat economic development. Particularly because the recent, large, emission increase originated in developing economies. Indeed, whereas most of the emissions growth before 1970 took place in industrialized countries, most of the recent emission increases have been concentrated in the fastest growing regions in the developing world. From 2000 to 2010, about 75% of the 10 GtCO<sub>2</sub>eq increase in total annual GHG emissions took place in upper-middle income countries like China, Russia or Brazil.

Consequently, without additional efforts to reduce GHG emissions, emissions growth is expected to persist driven by population increase and economic growth. Scenarios without additional mitigation result in median temperature increases in 2100 from roughly 3°C to 5°C compared to pre-industrial levels, and higher temperatures cannot be excluded due to climate response uncertainties.

In his book, Nicholas Stern explains why, notwithstanding the great attractions of a new development path, it has been so difficult to tackle climate change effectively. He makes a compelling case for climate action now and sets out the forms that action should take. He emphasizes that the challenge is to envisage a

way in which emerging economies can achieve the kinds of development they seek in a climate-friendly way. These societies are building their infrastructures, industries and cities now; if things are done well, they can build them in low-carbon ways.

However, reality unfortunately remains far from the world desired by Stern. Fossil fuels are the main source of energy in most countries – renewables are increasing but their share remains small – and recent years show a revival of coal, both in developed and developing economies.

At the same time, negotiations on GHG emission control have been in a stalemate for years. The Paris Agreement represents a first important change. Almost all countries signed the agreement and for the first time about 90% of total GHG emissions are under control. This is certainly insufficient – what we need is a reduction of GHG emissions and not only a halt to their growth – nevertheless the Paris agreement is a crucial milestone in the fight against climate change.

In the Paris agreement, the sum of all nationally determined emission reduction commitments (NDCs) is very unlikely to be sufficient to keep global average temperature increase below 2°C. The 2°C emission reduction path would be excessively costly for both developed and developing economies, unless new technologies to store large amount of electricity produced by renewables and to remove CO<sub>2</sub> from the atmosphere at a large scale become available in the second half of this century. With the present knowledge and technologies, therefore, the 2°C degree target is unlikely to be achieved.

This was also clear from the latest fifth IPCC Assessment Report. To remain below 2°C temperature increase by the end of the century (with respect to pre-industrial levels) GHG concentrations should stabilize at about 450 ppmv. However, reaching atmospheric concentrations levels of about 450 ppm CO<sub>2</sub>eq by 2100 would require substantial cuts in anthropogenic GHG emissions by mid-century through fundamental changes in energy systems and potentially the land surface. Scenarios reaching these end-of-century concentrations are characterized by global GHG emissions reductions of 40% to 70% by 2050 compared to 2010 and a tripling to nearly a quadrupling of the share of zero- and low- carbon energy supply from renewables, nuclear energy and fossil energy or bioenergy with carbon dioxide capture and storage (BECCS) by the year 2050.

Most importantly, mitigation scenarios reaching about 450 ppm CO<sub>2</sub>eq in 2100 typically involve temporary overshoot of atmospheric concentration levels and rely on the availability and widespread deployment of carbon dioxide removal (CDR) technologies in the second half of the century. In most scenarios, carbon dioxide is

removed from the atmosphere through BECCS and/or large-scale afforestation. The availability and scale of CDR technologies is however uncertain and CDR technologies are associated with a diverse set of mitigation risks. Many studies reviewed by the IPCC could not even achieve atmospheric concentrations levels of about 450 ppm CO<sub>2</sub>eq by 2100 at any cost, if mitigation is sufficiently delayed or under pessimistic assumptions about key technologies – in particular BECCS.

Pessimism over the possibility of achieving the 2°C target progressively changed the focus of international negotiations on GHG emission control that moved from mitigation to adaptation and, more recently, to loss and damages. The recognition that the present effort to reduce emissions, albeit sufficient to avoid business as usual catastrophic emission increases, is not sufficient to offset some important impacts of climate change, led many policy makers to invest resources into adaptation to climate change and to devise financial mechanisms to help countries suffering from natural disasters and economics losses induced by climate change.

The (partial) good news is that financial resources to support mitigation investments and adaptation measures are also steadily growing. The Green Climate Fund is expected to reach 100 billion dollars by 2020 and other financial regional or sectoral mechanisms are likely to emerge soon thanks to the decisions and signals contained in the Paris Agreement. Climate change is therefore seen both as a threat as a business and/or development opportunity.

Substantial reductions in emissions would indeed require large changes in investment patterns. Mitigation scenarios in which policies stabilize atmospheric concentrations (without overshoot) in the range from 430 to 530 ppm CO<sub>2</sub>eq by 2100 lead to substantial shifts in annual investment flows during the period 2010-2029 compared to baseline scenarios. Over the next two decades (2010 to 2029) annual investment in conventional fossil fuel technologies associated with the electricity supply sector would decline by about USD 30 (2-166) billion (median: -20% compared to 2010) while annual investment in low carbon energy supply (*i.e.*, renewables, nuclear and electricity generation with carbon capture and storage) would rise by about USD 147 (31-360) billion (median: +100% compared to 2010).

In addition, annual incremental energy efficiency investments in transport, buildings and industry would increase by about USD 336 (1-641) billion, frequently involving modernization of existing equipment. For comparison, global total annual investment in the energy system is presently about USD 1,200 billion. USD 343 to 385 billion per year are estimated to flow into mitigation and

adaptation projects globally. Estimates of international private climate finance flowing to developing countries range from USD 10 to 72 billion.

What is then the likely future scenario for negotiations on emission control, investments in both mitigation and adaptation, the new finance of climate change? Is Stern's call for immediate action going to be positively and urgently answered by world leaders?

The scenario emerged from COP 21 is only partly consistent with Stern's expectations. Stern believes in economic rationality, whereas real world politics is a different matter, and short-term economic necessities, both in developed and developing countries, are likely to prevail. Just to make an example, to keep GHG concentration below 450 ppmv by the end of the century, about 1/3 of known fossil fuel reserves should remain underground, unexploited, unless carbon capture and storage (CCS) technologies are quickly developed. However, fossil fuel producing countries and companies are quite reluctant to leave huge economic value resources underground, and CCS technologies are unlikely to become operational at a large scale for some decades.

Therefore, GHG emissions will (slowly) be reduced through two main mechanisms: (i) energy efficiency gains, possibly induced by appropriate carbon pricing, even though no such mechanism has been agreed in Paris; and (ii) development and diffusion of renewables, mostly induced by important reductions of their costs, by improvements of their efficiency, by the implementation of smart grids, and by the development of large scale storage devices.

However, these emission reductions will be too slow to prevent climate change to heavily affect our socio economic systems in the next decades, particularly in vulnerable (and poor) regions. Hence, in addition to mitigation investments, it will become necessary to spend on damages to repair, infrastructures to re-build, and measures to protect our societies and ecosystems from the main impacts of climate change.

Most importantly, governments understand that climate change can hinder economic development. Hence, as Stern correctly argues, climate policy is no longer seen as an environmental policy, but rather as a development policy, necessary to eradicate poverty and guarantee prosperity to large fractions of the world population. Consequently, large expenditures in adaptation, in addition to mitigation, are very likely, with the twofold objective to protect, and at the same time stimulate, economic development.

What is needed for a rapid change of action is strong political leadership and credible, consistent, policies. The real issue is re-directing investments and ex-

penditures towards low-carbon and climate-friendly options. This is why long term, stable, policy signals are crucial.

Around USD 90 trillion is likely to be invested in infrastructure in the world's urban, land use and energy systems in the next two decades. Namely, about 5-6 trillion a year. How these investments are managed will shape future patterns of growth, productivity and living standards. Hence, the real objective is to provide incentives to re-direct investments designed to meet increasing demand and foster development.

Putting a price on carbon will provide markets with the policy signals needed to invest in climate solutions. At the UN Summit on climate held in New York in September 2014, seventy-three national Governments, 11 regional governments and more than 1,000 businesses and investors signaled their support for pricing carbon. Together these leaders represent 52 per cent of global GDP, 54 per cent of global greenhouse gas emissions and almost half of the world's population. Some leaders agreed to join a new Carbon Pricing Leadership Coalition to drive action aimed at strengthening carbon pricing policies and redirecting investment. More than 30 leading companies announced their alignment with the Caring for Climate Business Leadership Criteria on Carbon Pricing. There is therefore hope that clear price signals will induce the right flow of investments in the coming decades.

Finally yet importantly, as a global commons problem, effective climate change mitigation requires international cooperation. As a complement to the Paris agreement, and to enhance its effectiveness, policy linkages among existing and future regional, national, and sub-national climate policies offer potential mitigation benefits.

Some first steps into this direction are promising. Leaders from 19 countries and 32 partners from Government, regional organizations, development institutions and private investors committed to creating an 8,000-kilometer-long African Clean Energy Corridor. The Global Alliance for Climate-Smart Agriculture, comprised of 16 countries and 37 organizations, was launched to enable 500 million farmers worldwide to practice climate-smart agriculture by 2030. Leaders of the oil and gas industry, along with national Governments and civil society organizations, made an historic commitment to identify and reduce methane emissions by 2020. A second industry-led initiative was launched by leading producers of petroleum who committed to address methane as well as other key climate challenges, followed by regular reporting on ongoing efforts. A new Compact of Mayors, representing well over 2,000 cities pledged new commitments on climate action supported by new funding from public and private sources – 228 cities

have voluntary targets and strategies for greenhouse gas reductions, that could avoid up to 3 gigatonnes of greenhouse gas emissions per year by 2030.

In addition, international cooperation may have a role in stimulating investment, financial incentives, and regulations to promote technological innovation and diffusion.

Stern's call for action – and the sense of urgency transmitted by his book – clearly needs an effective, international, implementation framework. The Paris agreement is a first step, to be revised and strengthened in the coming years. Action to control climate change will be crucial to achieve poverty eradication, providing universal access to sustainable energy, food, water, transportation and housing services, and improving public health and education. Together with lower pressure on resources, this will slow forced climate migration and limit the number of climate refugees. Sound climate action will not harm the economy but in fact trigger multiple economic, health, security and development benefits by aligning strengthened short-term growth with long-term sustainable development.

