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Climate Change Research



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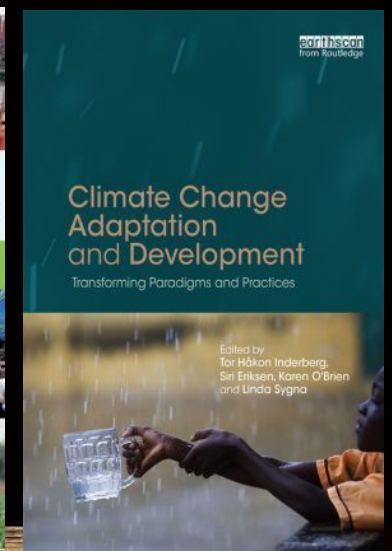
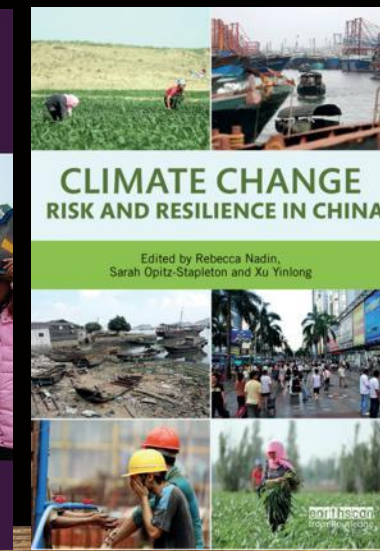
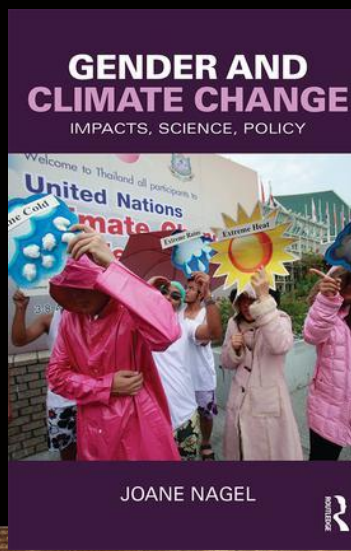
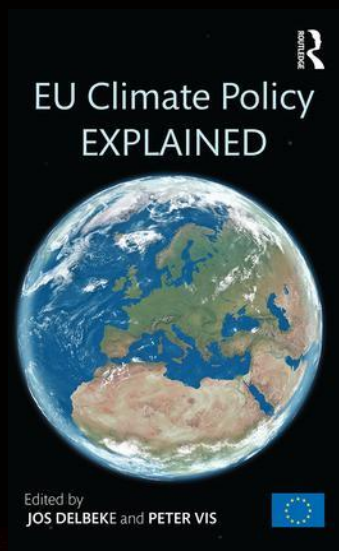
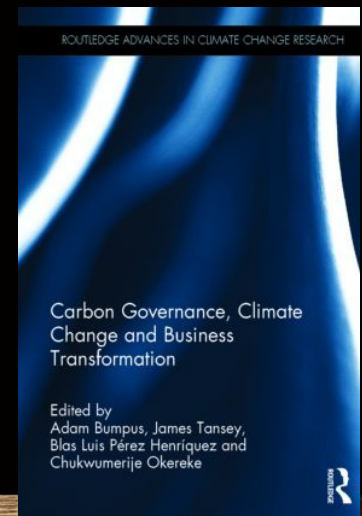
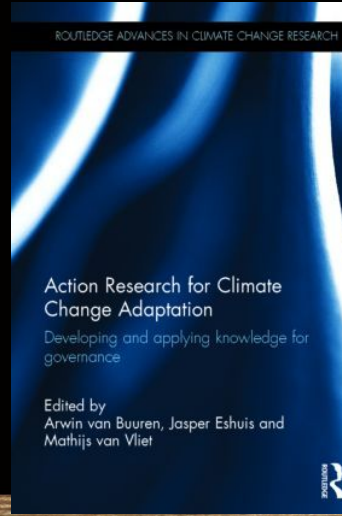
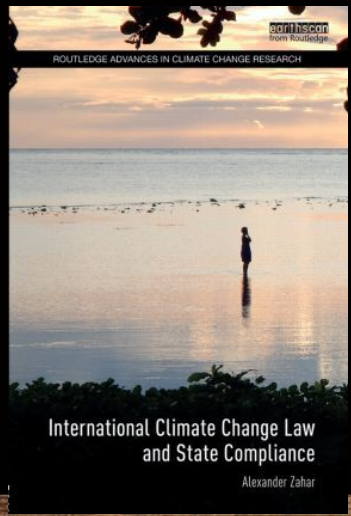
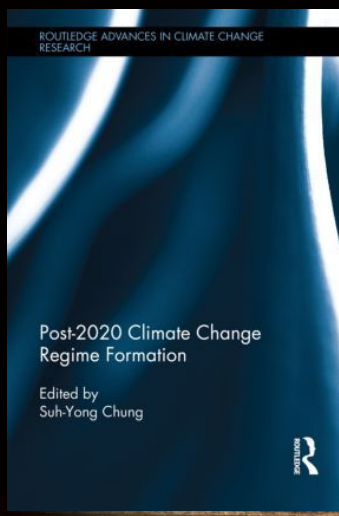
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Introduction

In December 2015, the 2015 Paris Climate Conference (COP21), will, for the first time in over 20 years of UN negotiations, aim to achieve a legally binding and universal agreement on climate, with the aim of keeping global warming below two degrees Celsius. (For further information on the COP21 meeting, [click here](#).)

As the world eagerly anticipates this important meeting, Routledge has assembled a [collection of books in climate change research](#), covering everything from **Climate Security** to **Climate Governance** and **Climate & Society** so that you can be sure to remain up to date on all the latest publishing surrounding climate change in our modern world.

In addition, we have put together this free e-book, which combines a selection of chapters on key themes relating to climate change, in order to share with you some of the important research available on this subject matter. All these chapters have been published within the [Routledge Advances in Climate Change Research Series](#), and include topics such as the Kyoto Protocol's Compliance Committee and the governance of climate change adaptation. Each chapter offers a different glimpse into the wide range of climate change research that Routledge publishes.

Chapter 1: Is an International treaty worth fighting for?

From [Post-2020 Climate Change Regime Formation](#) edited by Suh-Yong Chung

This groundbreaking collection is the first of its kind to explore the key features of the post-2020 climate change regime, featuring meticulously researched pieces from leading experts in the field. Each chapter responds to the questions surrounding the political and structural limitations of the current top-down approach taken in climate negotiations and proposes various alternatives countries can take to overcome such limitations in the process of building the post-2020 climate regime.

Chapter 2: Facilitation and Enforcement of Rules through the Kyoto Protocol's Compliance Committee

From [International Climate Change Law and State Compliance](#) by Alexander Zahar

This is the first book on state compliance that treats the UNFCCC, Kyoto Protocol, and their subordinate institutions as case studies in new international trends regarding state compliance. Drawing on a wide range of sources, from UNFCCC decisions to national-court judgements, this book clarifies the multiple layers of state compliance within the evolving international and transnational climate change regime. It provides a conceptual framework and mode of evaluation of the regulatory elements that have evolved to date. It comments on the current fragmentation (under the Bali Roadmap

process) and possible future unification of accountability and enforcement elements (under the Durban Platform for Enhanced Action).

Chapter 3: The Governance of Adaptation to Climate Change and the Need for Actionable Knowledge

From *Action Research for Climate Change Adaptation* edited by Arwin van Buuren, Jasper Eshuis and Mathijs van Vliet

This book presents a diverse range of case studies in action-research methods used to support the governance of climate adaptation, examining the reasons for using action research in this particular policy domain, its main pitfalls and problems, as well as the advantages and results.

Chapter 4: The Problem of Climate Change: Challenges and Opportunities in Carbon Governance

From *Carbon Governance, Climate Change and Business Transformation*, edited by Adam Bumpus, James Tansey, Blas Luis Pérez Henríquez and Chukwumerije Okereke

The book brings together new analysis from primary research on business responses and innovations to climate legislation, outputs from workshop discussions, and insights from leading low carbon business practitioners. Broadly, the book is based on emerging theories of multi-levelled, multi-actor carbon governance, and applies these ideas to the real world implications for tackling climate change through business transformation.

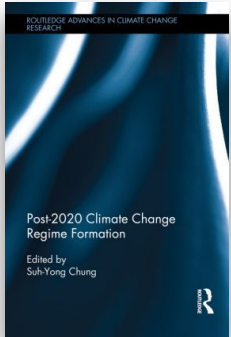
We hope that you find these chapters of interest, whether you are teaching, researching, or just interested in learning more about climate change.

Thank you,

The Routledge Environment & Sustainability Team

Is an international treaty worth fighting for?

Chapter 1. Is an international treaty worth fighting for?



The following is excerpted from *Post 2020-Climate Change Regime Formation* edited by Suh-Yong Chung. © Taylor and Francis Group, 2013. All rights reserved.

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Yvo de Boer

In recent years there has been an increasing sentiment expressed that an international legally binding treaty on climate is unlikely to be agreed and therefore not worth fighting for. Several reasons are behind this pessimism. Most refer to the slow pace of the international negotiations and difficulty of reaching a consensus agreement among 197 countries as the main obstacle. Which is imaginable: we have been negotiating since 1992, and we are still not close to anything that resembles a real solution.

Others point to the current political difficulties around the issue of climate change in the United States and the fact that the conditions laid down by this country for a legally binding treaty (acceptance of a legally binding target by China and other major developing countries) are unlikely to be met. And yes, there is a huge conflict of interest amongst countries indeed.

At the same time, many hold the view that current economic circumstances make it highly unlikely that governments will be willing to take on international obligations that are seen as an expensive constraint on economic growth. It is important to ask the question if the drawn out and complex multilateral negotiations are really worth the effort. Should we not instead focus on national action and regional cooperation as a much more realistic way forward, at least in the short term? What actually is the added value of an international legally binding treaty? Should we give up on multilateralism? Should we focus on smaller groups that can deliver, for example the G20? Or should we rely on bottom-up action for now?

Here, I would like to focus on three essential questions of contemporary climate negotiations.


First: Is an international climate treaty worth fighting for?

Second: Why is the multilateral process so complex?

And third: If an international treaty is worth fighting for, what can be done to come to an agreement?

Is an international treaty worth fighting for?

Is an international treaty worth fighting for? It is, certainly for business. Probably the greatest benefit of an international treaty lies in predictability and stability. Although the costs associated with addressing climate change are seldom welcomed with open




arms, many companies are far more concerned by the cost associated with lack of clarity on potential climate policy, both in terms of level of ambition and time. This is relevant from at least four perspectives.

If the nature of your business involves capital stock investments which may be written off over 30 to even 50 years, the long-term direction of the policy environment is far more relevant than where policy requirements stand today. Take the example of the European Union (EU). The EU commitment to reduce emissions in 2012 by 8 percent against 1990 levels can be achieved at relatively modest cost through energy efficiency and the deployment of existing technology.¹ But European leaders have also committed to reduce emission by at least 80 percent against 1990 levels by the year 2050.² The cost associated with achieving such goals is clearly a different story. Will European leaders stick to this commitment? What interim steps will be introduced? Which mix of policies will be deployed? Making the wrong assumptions in the absence of long-term policy clarity can result in a very expensive need to retire capital stock early.

Second, the flip side of this relates to all those entrepreneurs who hope there will be profits associated with the sale and deployment of technologies necessary to achieve ambitious goals to address climate change (both mitigation and adaptation). The absence of ambitious long-term commitments to reduce emissions almost by definition means a low cost of carbon and therefore greater difficulty for (relatively) expensive low-emission technologies to compete in the market. If technology developers could at least hold out to investors the prospect that this will change, that politicians will meet their long-term goals on time, things would change dramatically. Investments in climate-friendly technologies which appear expensive under the circumstances of today would be seen in a different light in the context of longer-term perspectives, for example, a binding commitment to remain within two degrees Celsius.

A third perspective of particular relevance to the business community is predictability and stability. All too often, elections result in (dramatic) changes in policy. Fiscal policies favoring, for example, renewable energy technology may be introduced by one government and revoked by the next. Similarly, licenses for coal-powered or nuclear electricity generation may be granted by one party only to be withdrawn by the next. Alternatively, natural disasters such as the recent earthquake effecting Japan may have political ramifications in an entirely different part of the world, as was the case when Germany abruptly decided to end its use of nuclear power.

What the three perspectives described above illustrate is that whichever side of the climate debate you may be on, national political preferences are unpredictable beacons by which to plot an investment course. Regional commitments, such as the stated goal of EU leaders to reduce their greenhouse gas emissions by the middle of the century by




at least 80 percent, may seem to provide a greater degree of predictability and stability, but certainly not anything close to certainty. “Even” in the EU, energy policy remains a national prerogative and EU policies in this area must be adopted by consensus. Similarly, the route by which to reach a long-term goal can be the subject of many years of heated debate.

A fourth perspective that is of particular relevance to the business community relates to the so-called “level playing field.” Companies often refer to a maintained level playing field as a prerequisite for (climate) action. They argue that if action is taken in only one country or region, economic activity will simply shift to a part of the world where compliance costs are lower, without there being any net benefit to the environment (also referred to as “carbon leakage”). Of course, there is no such thing as a level playing field. There are no two countries in the world where energy costs, the cost of raw materials, labor costs or taxation rates are the same. What underpins the notion of a level playing field is the concern that climate action only makes sense if it does not alter the economic status quo in such a way that economic activity is simply displaced without any benefit in terms of emission reductions.

An international treaty can help to ensure that the so-called level playing field is maintained. It provides a mechanism whereby the actions of one country or region can be measured against that of another. It can provide politicians with the means to explain to their voters that the burden of responsibility to act is being shared reasonably. Of course what constitutes “reasonable” is actively the subject of interpretation. But at the very least the opportunity to compare effort in an international context provides a greater sense of security than making a leap of faith on one’s own, in the hope others will follow.

Recent history is littered with instances in which elections have led to a reverse in policy with negative consequences for those using fossil-fuel technology, clean(er) (energy) technology, or even both. At the same time, the unexpected will continue to lead to the unexpected: whether it is the German decision on nuclear energy described above, the consequences of the Arab Spring in terms of oil prices, or what the conflict between Russia and Ukraine meant for the European debate on energy security. In all of these areas an international treaty—and certainly an international legally binding treaty—can make a big difference. Although national elections can dramatically change the policy landscape, an international commitment is not lightly set aside. Of course an internationally agreed target does not mean all national policies agreed to achieve it are carved in stone, but having an international legally binding target does provide significantly more predictability and stability than not having one. For all its stated shortcomings, only one country has decided to formally withdraw from the Kyoto Protocol and renege on its related commitment.³




Much of the above relates to merits of international legally binding targets in terms of providing some of the predictability business needs to make climate-friendly investment decisions. Of course international treaties are about a great deal more than setting targets and enshrining them in some kind of legal form. If predictability is what business likes best, then what does it hate most? Inconsistency. Inconsistency can relate to the chopping and changing targets and the policies designed to achieve them. There are many areas in which consistency and clarity can be provided more effectively through an international treaty than without one. To start, think of what generally comes at the end: reporting. One of the greatest frustrations of the business community relates to the myriad of reporting “requirements.” The word “requirements” has been placed between quotation marks because not all requirements are of an equal nature. There are numerous obligations companies must meet in terms of reporting on their products and production processes. These obligations are neither consistent nor uniform. In some cases deploying certain methods to accommodate interests in one part of the world may mean noncompliance with regulations in another.

Even for companies operating in a single market, reporting requirements can be taxing. For those operating in multiple markets the challenge only becomes greater. Then add to this the so-called voluntary reporting standards a company may choose to meet. Reporting may be voluntary, but the choice not to do it may have real financial implications. Being part of the Global Reporting Initiative (GRI), the Carbon Disclosure Project (CDP), and the Dow Jones Sustainability Index or the FTSE4GOOD may seem like a frivolous pastime, but not being part of them can seriously affect reputation, brand, and investor appetite.


An international treaty can help to bring (some) consistency into the complexity of reporting. Of course a climate treaty cannot (and should not) address reporting issues that relate to non-climate issues. But it can at least provide clarity in the climate domain. Twenty years after the Framework Convention on Climate Change was agreed, we are still not able to say that “a tonne is a tonne is a tonne.” Companies are required to report their emissions in different countries in different ways. The number of activities subject to monitoring also varies. Thanks to the efforts of the Intergovernmental Panel on Climate Change (IPCC) the scientific community is striving to provide a consistent and increasingly comprehensive set of reporting guidelines. Without an international treaty this would be lost.

If predictability and consistency are key business interests an international climate treaty can help to provide, a third key benefit worth mentioning relates to flexibility. Although the three aspects (consistency, predictability, and flexibility) may appear to be mutually exclusive, they are not. As no two individuals or countries are the same, there are no two identical companies. While companies may value enormously the



consistency and predictability provided by national and/or international policy frameworks, flexibility in terms of how a target is achieved has great value in terms of (cost) efficiency, without compromising effectiveness. One of the key components of the Kyoto Protocol is the flexibility it offers through a market-based mechanism. Emissions trading has become the key policy instrument of choice within the EU. The Clean Development Mechanism (CDM), which provides industrialized countries the option of achieving targets through offsets in developing countries, has been a cost-effective way to achieve emission reductions at lower cost. Not only are there many relatively cheap emission reduction options available in developing countries (and many economies in transition), emissions trading and the CDM can be attractive alternatives to taking measures in company. Of course market-based mechanisms are not only possible in the context of an international treaty. Trading would happen in the EU with or without an international treaty. India has introduced a tradable energy efficiency certificate scheme, which constitutes trading in a portion of the domestic market and China plans to begin trading experiments in several provinces. But market-based mechanisms in the context of an international treaty do offer the added benefit of a much larger market within which trading can take place or where mechanisms like the CDM can be deployed. The potential significance of this was already pointed out more than a decade and a half ago by the IPCC. The IPCC estimated it would be possible to reduce global emissions by 20 to 30 percent by implementing measures that would pay themselves back through a lower electricity bill in two to three years.⁴ Most of these potential measures are available in developing countries and economies in transition. In other words, an international treaty which provides a global market can significantly reduce the cost (to business) of meeting climate goals. Much of the focus of business has been on the cost of mitigation. Logical, because governments generally pass significant portions of their emission reduction goals on to the companies responsible for the emissions we are trying to reduce. Ignoring the cost to business of the impacts of climate change, as well as the cost of protection against those impacts (adaptation) can be a dangerous mistake. In general, most of the cost related to climate impacts and natural disasters are borne by companies and their insurers.

Is an international treaty worth fighting for? It is, certainly for civil society. Observer organizations far outnumber government representatives at Conferences of the Parties (COPs)—environmentalists, farmers, women’s groups, youth, vegans, religions and organizations, and indigenous peoples—it is important that their voice be heard and their issues addressed. They also incentivize balance in the climate change agenda. For example, in recent years the climate negotiations have increasingly focused on adaptation. Given the international community’s failure to adequately respond to the climate challenge, there will be significant impacts of climate change, especially in developing countries. Their impacts will have far beyond where they occur physically.




Think, for example, of the 250 million people in Africa likely to be subject to additional water stress because of climate change as early as 2020.⁵ These people already live on the brink of subsistence and climate impacts are likely to push them over the edge. Will climate change directly or indirectly be a driver of mass migration? An international treaty allows for an integrated approach to the adaptation challenge. We pool knowledge to better understand challenges and pool resources to better cope with them. The Framework Convention and the Kyoto Protocol have created several financial instruments exclusively or partially intended to deal with the adaptation challenge. This is potentially much more effective than trying to cope with climate impacts or climate-proof future investments purely on a national or regional basis. Civil society also puts the intergovernmental process and nations under a spotlight and ensures that those “playing the game” actually play the game: negotiators actually negotiate to come to an agreement. Finally, adequacy. This is not new to civil society, but the international process offers a critical opportunity to measure the overall level of commitment against necessity (science).

Last, but certainly not least, governments will benefit from fighting for an international treaty. The impacts of climate change may be mainly environmental, but the solutions and interventions are fundamentally economic.

Much of the political debate is about if others are doing their fair share. But purely national or regional approaches can have serious negative economic consequences, and an encompassing approach is vital to adequately answer the questions climate change poses. Modest steps can be taken alone, but ambitious steps must be taken together. Major steps can be taken together, for example to establish common frameworks for greenhouse gases to be included in reduction schemes and to come to common understanding on requirements for monitoring, reporting, and verification. Also, an agreement on means of implementation is key to both industrialized and developing countries. Industrialized countries can benefit from flexibility mechanisms and offsets, whereas developing nations can benefit from finance, technology transfer, and capacity building. A legally binding agreement provides governments more confidence that commitments will be met.

So, although negotiating an international treaty is obviously slow, complex, and frustrating, giving up on the process comes with clear disadvantages and missed opportunities. After the Copenhagen climate change conference, many declared the United Nations (UN) unfit for purpose in terms of the ability to facilitate an international agreement. Even several years before Copenhagen, voices were heard in favor of shifting negotiations to the G20, and the United States established the so-called Major Economies Forum as a platform to debate climate outside the UN. The World Business Council for Sustainable Development (WBCSD) has strongly advocated



abandoning the top-down approach of international negotiations to focus instead on national and regional action.⁶

I have tried to show that although multilateral treaties are extremely difficult to negotiate, and negotiating them successfully can bring very significant advantages to governments, civil society, and, not least, to the business community. If this is correct, we should perhaps devote more time and effort to understanding why treaty negotiations are so difficult and doing something about it.


Why is negotiating an international climate treaty so difficult?

Negotiating an international climate treaty is difficult, and the complexity of the negotiating process itself is often given as the main reason.

One-hundred-and-ninety-seven countries seek to reach agreement by consensus, with every conceivable (and often contradictory) view being represented. Until recently (COP17, Durban) negotiations took place in six main streams, with many smaller working groups operating in the context of each of them. This basically means that only the larger delegations are able to follow every issue under negotiation. Given that everything under negotiation seems to be linked to everything else and a great deal of horse trading takes place, progress can be extremely slow. Having all views represented also means the presence of those who would prefer to see no progress on some of the issues under negotiations. The complexity of the process offers almost countless opportunities to slow things down or block agreement. Also, climate science is work in progress. Yes, understanding of climate change has improved over years, but gaps still remain, hence making it an easy subject to criticize. In addition, climate skeptics are well organized and well financed.

Undeniably, the multilateral negotiating process is extremely frustrating. Equally undeniable is that much can be done to professionalize and streamline it. I would argue that these are investments worth making. For all their shortcomings, the climate negotiations delivered the Framework Convention, the Kyoto Protocol, the Bali Action Plan, the Cancun Agreements, and, most recently, the Durban Package. Every single COP (to the Convention and Kyoto Protocol) has involved small groups (of ministers) negotiating results on behalf of the larger community. Having everyone present does not mean everyone must be at the table and at the end of the day; consensus is not the same thing as unanimity. If there is an overwhelming majority in favor of agreement, agreement will be reached. This was demonstrated in both Kyoto and Durban.

Historic responsibility (greenhouse gases remain in the atmosphere for a long time) for climate change is often used by countries (and sometimes companies) as an argument why they should not be asked to act or to act less. The bulk of greenhouse gas




concentrations in the atmosphere today were caused by countries which contributed very little in the past. Although the emissions of China are greater today than those of the US, the vast majority of developing countries have emissions that are insignificant on a global scale. The fossil fuel-related emissions of the entire African continent are less than 5 percent of global emissions.⁷ If historic responsibility is taken into account, then clearly the root cause of the climate-change problem lies with industrialized countries, not developing nations.

Some developing countries have used this to argue that developed countries should take their (historic) responsibility to act first, before developing countries are called upon to limit their emissions. They have also argued that any action they take should be conditional on financial support from rich nations, a concept which is enshrined in both the Climate Convention and the Kyoto Protocol. Especially in recent years the stark distinction between (rich) countries that have targets and (poor) countries that do not has become a growing source of conflict. Rich nations often use China's status as the world's largest emitter to argue that China (and other major developing countries) should also take on an emissions target. In turn, developing countries see this as moving the goal posts during the negotiations. They rightly point to the fact that the Convention, the Protocol, and the Bali Action Plan all clearly distinguish between those that should take targets and those that need not, as well as to the fact that some must provide financial support while others will receive it.

Of course the world is a very different place than when the Climate Convention was agreed in 1992. Many of the so-called "rich" countries that took targets upon themselves then are significantly poorer today than many of their developing counterparts at that time. Equally, negotiators often seem to forget that a target need not automatically mean a target to reduce. When the EU negotiated its internal burden sharing to meet Kyoto targets, Portugal was given a target of +27 percent, Greece +25 percent, Spain +15 percent, Ireland +13 percent, and Sweden +4 percent.⁸ Nevertheless, there is a strong feeling on the part of many developing countries that rich nations are failing to take their historic responsibility for having caused climate change, while trying to pass on the cost of action to them.

This sense of injustice is probably one of the main obstacles to a more constructive advance in the multilateral negotiations.


This situation is compounded by the perception that many obligations and commitments to provide developing countries with finance, technology, and capacity (building) remain largely unmet. Many of the Funds created under the Climate Convention and the Kyoto Protocol remain under-resourced. There is endless haggling over what should or should not be supported financially. Developing countries often complain that the procedures applied by international financial institutions are



complex, bureaucratic, and treat them as though they are inherently untrustworthy. On top of this many developing countries feel that the limited financial support being provided to them comes at the expense of shrinking rich country budgets for overseas development cooperation. In other words, that (aid) funding intended for poverty eradication is being re-labeled to pay for a climate problem poor countries have not caused. For many years, there was also a strong feeling on the part of developing countries that while climate change is an issue that has risen high up the political agenda of industrialized countries, it is not something developing nations can afford to worry about, at least in the short term. For these nations the overriding concern was and is poverty eradication. As a consequence there were frequent situations in the negotiations where some developing countries felt that they could and should hold back on agreements regarding mitigation action and commitments, until other commitments, especially in the area of finance, had been met first by rich nations.

As the impacts of climate change have become more noticeable around the world, this situation has begun to change dramatically. Whether it is the impacts of human-induced climate change, or the consequences of natural disasters, nations now recognize that failure to act on climate change will have impacts that go well beyond the natural environment. Most obviously the small island developing nations, such as Maldives and Vanuatu, have long recognized that a failure to bring greenhouse gas emissions under control threatens their very existence, given related sea-level rise. A broad range of other countries, especially those in South Asia and Africa, are also experiencing the consequences of drought, flooding, extreme weather events, and the like, with increasing frequency. This has begun to have a noticeable impact in the negotiations. The most recent agreements reached in Durban demonstrate that there is now a much broader group of countries that recognize all nations must take action to limit their emissions, while recognizing their (economic) ability to act. How this new realization is nurtured and supported through real international cooperation will determine the pace and success of international negotiations. For the time being, the overwhelming majority of developing countries does not see climate action as being their most immediate priority, and therefore make mitigation action they could take conditional on international financial support.

The sentiment that action to combat climate change runs counter to national economic interests is far from exclusive to developing nations. In many rich countries, developing climate policy has been a slow and painful process. Initially, when the climate science was not as clear as it is today, most industrialized countries were unwilling to go beyond mitigation actions that could also be justified from the perspective of (energy) cost saving. There was little or no willingness to fully price the cost of emissions related with the burning of fossil fuels, especially in light of the competitiveness concerns mentioned above.




This changed to some degree as the climate science became clearer and politicians began to see the potential advantage of mitigation action as a means to address other concerns such as energy prices and energy security. For example, in Europe concerns over dependence on Russian natural gas were a boost for the shift toward energy diversification, more renewable sources of energy, and greater energy efficiency. A number of countries, most notably China and Korea, also used their economic recovery packages at the time of the 2008 economic crisis to promote a cleaner and greener direction for economic growth.⁹

But this tendency has proven to be fragile. Certainly in Europe and the United States, the overriding preoccupation now is with the economic and financial crisis. Climate policy has been pushed onto the back burner as nations focus their limited resources on “bailing out” financial institutions or even whole countries. For all the stated belief in the importance of addressing climate change, the overriding political sentiment seems to be that this will have to wait until more pressing economic issues have been dealt with. The worry here of course is that the nature of economic recovery will be such that subsequently addressing climate change will become more difficult as investments lock in more “old” technology rather than new. The generally held perception that the Copenhagen Climate Conference failed, that the international negotiations are going nowhere, and that major developing countries are unwilling to make commitments, is not helping.

Basically, the core of the issue would seem to be that most nations feel it is currently not in their national interest to act significantly to address climate change. For short-term economic reasons they are unwilling or unable to fully price the cost of fossil fuels, they do not believe that the green growth model can be made to work—at least under current circumstances—and they believe the short-term cost of mitigation action outweighs the cost of postponing climate action while saving the economy first. Unless this changes, it is hard to imagine how we will manage to keep average global temperature increase below two degrees Celsius and avoid severe long-term impacts of climate change. Countries will not negotiate something they believe runs counter to their economic interests today.

At least part of the reason for this situation lies in how the international climate-change negotiations have been conducted and who holds responsibility for climate policy at home. Since their early days, the negotiations have been heavily dominated by representatives of environmental ministries. The ministerial segments which mark the conclusion of every COP are almost exclusively attended by ministers responsible for environmental issues. Finance and economy ministry representatives were in a distinct minority. They often saw climate change as an environmental policy issue and their main preoccupation was to minimize the impact of expensive




climate-policy measures. At home the reality in most countries is that ministers responsible for environmental policy are not very high up the pecking order. The short-term costs associated with action to combat climate change must compete in national budget debates with proposed expenditures to strengthen the economy and create jobs. Under these circumstances few countries have chosen to act boldly on climate change.

Fortunately this situation is slowly beginning to change. In 2007 (in Bali) ministers responsible for the economy, trade, and finance for the first time held a meeting in parallel to the climate-change negotiations, a tradition the World Bank has sought to continue. Representatives of ministries of finance, economy, and transport are increasingly represented on national delegations. In the run-up to the Copenhagen Climate Change Conference, UN Secretary General Ban organized two summits specifically for heads of state and government. This helped to put climate on the highest political agendas and broaden the realization that action to combat climate change is basically in the interest of every nation. Ultimately some 80 of those heads of state and government attended the Copenhagen Climate Change Conference. Beginning in Cancun in 2010 and subsequently in Durban in 2011 the responsibility of chairing the annual COP to the UNFCCC was taken on by ministers of foreign affairs, as opposed to ministers for the environment. This signified a growing realization that the climate negotiations are related to issues of significant national interest.

All of this is positive. Not only has climate-change science come of age, but so have international political efforts to deal with it. That the long-term cost of failing to address the issue is significantly higher than the short-term cost of dealing with it is now also broadly accepted. The fact remains however that there is currently very little appetite to incur cost today for the sake of significant savings tomorrow. I believe that the main reason behind this is that most people, even environmentalists, do not believe the green growth discourse deep in their hearts: the West has grown rich through dirty development, energy-intensive industries have been exported to developing countries, and there are few strong examples of willingness to change—even the EU 30 percent is conditional.

A plausible country-specific case for green growth remains to be made and the international circumstances needed to facilitate this remain elusive. Unless this changes, addressing climate change will probably be a long and arduous uphill struggle leading to too little action, too late.


If an international climate treaty is worth fighting for, what can be done to come to an agreement?



Have the negotiations delivered over the years? Yes, they have. The UNFCCC was set up, the Kyoto Protocol was negotiated in two years, an extensive reporting structure was set up, market-based mechanisms were set up, the Copenhagen Principles were established, the Cancun Accord was agreed and the Durban Package was agreed. So although much criticized for their complexity and slow pace, the negotiations have made real progress in recent years. Although the Copenhagen Climate Change Conference “only” produced a political statement in the form of the Copenhagen Accord, this document was nonetheless essential in addressing some of the key outstanding political issues, including the long-term goal for action and the establishment of the Green Climate Fund. Perhaps even more significantly, at the Copenhagen Conference or in the immediate aftermath of it, all 42 industrialized countries submitted targets to reduce their emissions and some 40 developing countries submitted plans to limit the growth of their emissions.¹⁰ Together these countries account for over 80 percent of global energy related CO₂ emissions; in other words near global coverage. Although these commitments are not enough to avoid a more than 2° Celsius average global temperature increase, they are a multiple of what the Kyoto Protocol achieved by way of avoided emissions.

Many of the important issues addressed in the Copenhagen Accord were formalized at the COP in Cancun in 2010. But Cancun went well beyond formalizing Copenhagen. It also provided a framework for implementation on which the 2011 conference in Durban was in turn able to build. While expectations for Durban were low, it nonetheless became a landmark event that has taken the battle to address climate change to new heights. Countries agreed to a second commitment period under the Kyoto Protocol, made the Green Climate Fund operational, created a mechanism for matching developing country project proposals with finance, established a technology committee, put in place procedures for reporting on emissions and efforts to reduce them, decided to develop a three-year work program for the Adaptation Committee, and took a host of other significant decisions. Perhaps most significantly the Durban conference launched a process to develop a protocol, another legal instrument, or an agreed outcome with legal force under the Convention applicable to all Parties to the Convention. A new group was established to undertake this work and complete it no later than 2015 with a view to the outcome being implemented from 2020 on. The new group prepared a work program at the Conference of Parties in Doha.

The significance of the Durban decisions many people point to lie, first, in the legal nature of the proposed outcome (a protocol, another legal instrument, or an agreed outcome with legal force) and, second, in that the obligations of all countries will be discussed in a single forum. The language on the proposed outcome is clearer than the mandate provided in Bali in 2007 (an agreed outcome), but less precise than that provided in Berlin in 1995. Some would argue, and indeed have argued, that decisions




of the COPs are legally binding and would therefore be in compliance with the Durban mandate. The notion of a protocol, a legal instrument, or an agreed outcome with legal force that is applicable to all Parties is also not new. Both the Convention and the Kyoto Protocol are legal instruments that apply to all who are Party to them and that contain obligations for all Parties. A major source of contention has been that in both cases the obligations are different for different groups of countries. Consequently, there is room for interpretation on the two very issues that have been the greatest cause of contention in recent years: the legal nature of the agreed outcome and the commitments which apply to different (groups of) countries.

Here, what I see as the most important outcome of the Durban Conference will be crucial: the spirit of Durban. Durban was a sea change, opening doors to a global treaty in which all countries have commitments. Although the language of the decisions taken in Durban may be open to interpretation, the mood with which the Conference closed is not. Delegations refused to end the Durban Conference before it resulted in a significant agreement to take climate action to the next level. Countries agreed that the process needs to move to a next level with all countries taking obligations to act and to report on those actions, putting behind us a period in which targets only applied to industrialized countries and economies in transition.

The greatest challenges will be not to focus on sanctions, but on benefits, such as finance, technology transfer, capacity building, and carbon markets; and to keep the spirit of Durban alive, and ensure that the political will expressed in Durban is turned into a fully functioning, legal regime binding all countries to a level of action in line with the challenge the scientific community has made so clear.

If the key to successfully addressing the climate change challenge lies, as I believe, in successfully making the case for green growth, at least three related courses of action merit further exploration.


First and foremost the case for green growth needs to be made convincingly at the national level. Global analysis undertaken by international institutions has enormous value in deepening general understanding but will neither convince a parliament nor the people that have elected it. A convincing strategy must reflect national circumstances and set out a direction rooted in real policy options that are convincingly costed. Developing such a strategy needs to be based on a broad national consultation process involving different political interests, the NGO community, and the private sector. This is important if the strategy is to enjoy true support and survive beyond the next elections. The bulk of investments in the energy sector, in industry, and in economic activity in general are private rather than public. If this is the case at present, there is no reason to assume a green growth strategy would be any different. Therefore, the private sector must play a central role.



Second, many countries will require international assistance both to develop a strategy and to implement it. A wide array of international institutions exist that can help on both fronts. Part of the challenge is to ensure that their actions and interventions are placed in the context of nationally formulated goals and that delivery is coordinated and consistent. In that context I believe it is important that the Secretary-General of the United Nations be explicitly mandated to mobilize the UN system to support national strategy development and implementation and that through him (or her) different UN organizations are held accountable for how they deliver on national needs and priorities. Of course this means that the decisions taken (and resources mobilized) by all parts of the United Nations system (including the World Bank) must be in line with this. As a consequence, the activities undertaken by different UN agencies in the context of helping to develop and implement a particular national strategy would need to be explicitly identified under the overall responsibility of a single UN agency or institution. This can only be made to work if the governing bodies of individual organizations explicitly support such an approach. The greatest battle regarding coherence of the United Nations system needs to be fought in national capitals, not New York.

Third, a review is needed of the purpose the UN climate-change negotiations can best serve. As indicated above, the scope of the negotiations has increased dramatically over the years, making them ever more complex and interrelated. To my mind the focus needs to be twofold. First, a process is needed whereby the adequacy of national and international commitment to action is made real and measured. In Cancun (2010) countries already agreed that the long-term goal of mitigation action needs to be to limit average global temperature increase to 2° Celsius. In Durban, governments furthermore decided that this level of ambition needs to be raised, based on the outcome of the Fifth Assessment Report of the IPCC. This goal must be translated into individual national commitments that are real, measurable, and verifiable. If climate change is a global challenge, all countries must make specific commitments in terms of how they will contribute to addressing it. This obligation is already enshrined in the Framework Convention on Climate Change. To address the issues of stability and predictability referred to above, all countries should make commitments that are legally binding. Of course not all commitments can be the same for all countries, nor can the consequences of non-compliance or the conditions under which such consequences are enacted. Especially for poorer countries, the ability to deliver on a commitment made will be partly dependent on the degree to which financial and technological support is provided. This means that not only the commitment, but also the means of implementation need to be real, measurable, and verifiable. This is where the coherent strategy support referred to above is so important.

Additionally, the UNFCCC negotiations need to provide the rules for effective



implementation. This includes procedures for national reporting, as well as decisions on the use of market-based mechanisms and their supervision. In line with current practice the IPCC needs to be involved in preparing sound decision-making to the extent possible.

So, despite the complexity of the process, an international treaty is certainly worth fighting for. Business, civil society, and governments in all spheres will benefit. The process is nothing more or less than the sum total of its parts. If it works, it works because you made it work. The overriding challenge will be to ensure that multilateral negotiations are not overloaded with issues that can much more appropriately be decided at the national level, or implemented through international organizations with operational mandates. In future, the UNFCCC process needs to (1) set appropriate goals; (2) define modalities for implementation; and (3) monitor and ensure the implementation of agreements reached. At the same time, financial support, capacity building, access to market mechanisms, and technology need to spur greater ambition. In the end, an effective multilateral process and international agreement is vital to help governments, companies, and civil society to remain within our planet's carrying capacity.

Notes

1 European Commission (2010).

2 European Commission (2011).

3 Although Russia and Japan have publicly stated that they would not join a "new" Kyoto agreement, these two countries have not formally withdrawn from the Kyoto Protocol, as Canada has.

4 Intergovernmental Panel on Climate Change (1995).

5 Intergovernmental Panel on Climate Change (2007).

6 World Business Council for Sustainable Development (2012).

7 United Nations Statistics Division, Millennium Development Goals Indicators.

8 European Commission (2002).

9 OECD (2009).

10 United Nations Framework Convention on Climate Change (UNFCCC), Conference of the Parties (COP) (2009).

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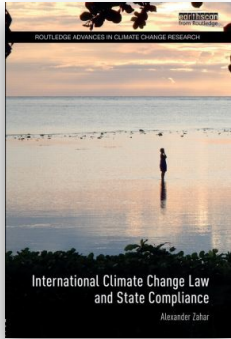
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Facilitation and enforcement of rules through the Kyoto Protocol's Compliance Committee

Chapter 2. Facilitation and enforcement of rules through the Kyoto Protocol's Compliance Committee



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Reporting and review requirements under the FCCC and the Kyoto Protocol (national communications, greenhouse gas inventories, and in-depth, technical, periodic, and annual reviews of the information submitted by states) were discussed in Chapter 2. For Annex I parties which are also parties to the Kyoto Protocol there remains a group of rules at the tail end of the review process that is supervised by a distinct and unique institution: the Compliance Committee. In the climate change regime, the notion of compliance is not exclusive to the Protocol (states must, of course, comply with their FCCC obligations). What the Kyoto Protocol introduced was the notion of compliance through 'enforcement' by a specialized body having the right to impose penalties. These elements raise special questions of compliance, including whether a Protocol-style compliance system is a necessary element of the law on accountable reporting.

1 Rules and process

The sections that follow review the rules that apply to Annex I parties to the Kyoto Protocol in relation to 'questions of implementation' and the functions of the Compliance Committee and its two branches. In the second part of the chapter I assess the legacy of the Protocol's compliance system.

1.1 Questions of implementation

An Expert Review Team is to provide a thorough and comprehensive technical assessment of all aspects of a party's implementation of the Kyoto Protocol 'and identify any problems in, and factors influencing, the fulfillment of commitments'.¹ If the ERT identifies a 'potential problem' during a review, it must question the party about the problem and offer advice on how it could be corrected.² A potential problem is a precursor to a question of implementation, which is a *confirmed* problem.³

The work of Expert Review Teams is guided by an outlook that can only be described as facilitative. The ERTs' facilitative role is emphasized by the compliance system's objectives: ERTs are to 'promote consistency and transparency in the review of information' submitted by Annex I parties to the Protocol; and they are to 'assist' these parties to improve their reporting of required information and, in general, their commitments under the Protocol.⁴ An ERT's official advisory role further affirms the body's facilitative outlook: 'The expert review team should offer advice to Parties included in Annex I on how to correct problems that they identify, taking into account



the national circumstances of the Party’⁵

Expert Review Teams potentially also have a more confrontational side, although in practice it is rarely seen. They can raise a potential problem and escalate it into a question of implementation. From a legal point of view, the latter is a *prima facie* finding that the state is not in compliance with a rule of the Protocol. ERT review reports are forwarded by the FCCC Secretariat to the Compliance Committee, and in this manner any question of implementation is brought to the Committee’s attention.⁶ Once the Committee receives a question of implementation, it initiates its own procedure to engage the allegedly noncompliant state.


A fundamental question arising in this context: What types of non-compliance with the Protocol may ERTs list as questions of implementation? An answer is provided in a 2005 decision of the parties:

*if an unresolved problem pertaining to language of a mandatory nature in these guidelines influencing the fulfilment of commitments still exists after the Party included in Annex I has been provided with opportunities to correct the problem within the time frames established under the relevant review procedures ... that problem [shall] be listed as a question of implementation in the final review reports. An unresolved problem pertaining to language of a non-mandatory nature in these guidelines shall be noted in the final review report, but shall not be listed as a question of implementation.*⁷

It is clear from this passage that an ERT must (‘shall’) list every instance of non-compliance with a mandatory requirement of the Protocol as a question of implementation. Any shortcoming in state practice that does not breach a mandatory rule must *not* be listed it as a question of implementation but must be mentioned as an unresolved problem in the ERT’s review report.

The word ‘mandatory’ occurs only once in the Protocol’s instructions on ERT reviews—at the point quoted above. A separate decision, setting out the procedures and mechanisms relating to compliance,⁸ makes no reference at all to the concept. The italicized segment of the passage I have just quoted is poorly phrased for a key legal provision. What, for example, does ‘pertaining’ mean in the phrase ‘problem pertaining to language’ and how are we to understand ‘language ... influencing the fulfilment of commitments’?

One possibility, considered in Chapter 2, is that ‘language of a mandatory nature’ means any directive prefaced by a prescriptive ‘shall’ and not a discretionary ‘should’ or ‘may’. The connotation of ‘mandatory elements’, where the term is applied to the rules concerning national communications and greenhouse gas inventories, was a puzzle under the FCCC, as well. The issue there never came to a head, mainly because the FCCC



has no compliance system to create a demand for clear and workable definitions. In the Protocol's case, the stakes are much higher.⁹

The Protocol's guidelines for review¹⁰ do not themselves set out how parties must calculate their emissions, organize their national systems, run their registries, or report on these matters and others. The 'language of a mandatory nature in these guidelines' mostly concerns language in *other* guidelines, some developed under the FCCC and others under the Kyoto Protocol. For example, in the Protocol's review guidelines, under the section on the review of annual inventories, 'Problems should be identified as a failure to follow agreed guidelines [on] Transparency, as defined in the UNFCCC reporting guidelines on annual inventories'.¹¹ Under the section on the review of national systems, 'problems' are to be identified on the basis of what is required of parties in the (separate) guidelines on national systems.¹² These guidelines do not offer a straightforward way to distinguish mandatory from non-mandatory elements.¹³ The same holds for the guidelines on national registries.¹⁴ Under the section on the review of national communications, the Protocol's review guidelines say only: 'The problems identified during the assessment relating to individual sections of the national communication ... shall be identified as relating to Transparency; Completeness; Timeliness'.¹⁵ The result is that the meaning of 'mandatory nature' is far from clear.


The FCCC's reporting guidelines referenced by the Protocol's review guidelines take a casual approach to the use of 'should' and 'shall'. As late as 2013, the FCCC parties were approving guidelines whose mandatory and nonmandatory elements could not be told apart on the basis of linguistic or other straightforward indicators.¹⁶

As a consequence of these drafting weaknesses, an Expert Review Team, obliged by the Protocol's rules to list non-compliance with mandatory elements of the Protocol as questions of implementation, must pause to consider what is mandatory and what is not, and the answer cannot always be uncontroversial. ERTs are, therefore, forced to assume a degree of discretion in order to continue to discharge their functions.

1.2 Compliance Committee structure

The Kyoto Protocol's Compliance Committee is to 'facilitate, promote and enforce compliance with the commitments' of states under the Protocol. The Committee is constituted of a Facilitative Branch, an Enforcement Branch, and a Bureau. The Bureau must decide whether to assign a question of implementation raised by an Expert Review Team to the Facilitative Branch or the Enforcement Branch.¹⁷

The Bureau's assignment of a question of implementation to one of the branches must be 'in accordance with the mandates of each branch'.¹⁸ For reasons that will become clear later, it is important to mention the fact that in the Protocol decision setting up



the Compliance Committee there is no procedure for allocating any sort of problem to one of the branches other than a question of implementation. There is not even a mention of any other problem type. Likewise, the Committee's Rules of Procedure¹⁹ do not envisage either branch engaging with any problem other than a question of implementation.

Members of the Compliance Committee and their alternates are to serve on the Committee in their individual capacity. They must have competence relating 'to climate change and in relevant fields such as the scientific, technical, socioeconomic or legal fields'.²⁰ All members of the Enforcement Branch are to have 'legal experience'.²¹ This does not mean that they must be legally qualified. It has been suggested that the Protocol's Compliance Committee is a quasi-judicial construct.²² While it has aspects of a legal procedure, by design it does not specifically require any lawyers to be assigned to the Committee, although in practice several of its members have held legal qualifications.²³


Another common assumption is that the Compliance Committee has low discretion and high 'automaticity'.²⁴ This is true only of certain aspects of its design. Other operational aspects are not strictly defined, and a few of them explicitly bestow a discretion on Committee members. For example, the Committee 'shall take into account any degree of flexibility allowed by the [Conference of the Parties to the Protocol] to the Parties included in Annex I undergoing the process of transition to a market economy'.²⁵ This is a highly discretionary power. Moreover, the Facilitative Branch, which, as we shall see, was poorly conceived and designed in the first place, has in recent years claimed a discretion to redefine its role. I return to this matter below.

The Compliance Committee became operational in 2006.²⁶

1.3 Powers of the Facilitative Branch

The Facilitative Branch is to provide 'advice and facilitation' to the Kyoto Protocol parties in their implementation of the treaty's provisions. This relates to *all* parties. With respect to Annex I parties, which is the only group with 'commitments' under the Protocol, the Facilitative Branch is to 'promote' compliance with their emission-reduction, institutional, and reporting commitments.²⁷


Within its overall mandate, the Facilitative Branch has a responsibility to address questions of implementation, but only insofar as they fall outside the mandate of the Enforcement Branch.²⁸ Phrased positively, a question of implementation for the Facilitative Branch may relate to article 3.14 of the Protocol (on the minimization of adverse social, environmental, and economic impacts of Protocol-related measures on developing parties), including how an Annex I party is 'striving' to implement that provision. A question of implementation may also be raised in relation to evidence that



an Annex I party's use of the Protocol's flexibility mechanisms is not 'supplemental' to domestic action.²⁹

The Facilitative Branch also has advisory/supportive and early-warning functions. It is not clear how these are meant to be engaged, but almost certainly it is not through the device of questions of implementation. The rules say only that the branch may seek to promote compliance and give early warning of potential non-compliance by providing 'advice and facilitation' to Annex I parties in relation to their commitments under article 3.1 of the Protocol (meeting quantified mitigation targets), article 5.1/5.2 (having a national system for the estimation of emissions and using approved methodologies to estimate emissions), and article 7.1/7.4 (reporting supplementary information in national communications and inventories). Matters relating to the last two may be addressed only prior to the beginning of the first commitment period, whereas in the case of the first, promotion of compliance and early warning of potential non-compliance may be pursued both prior to and for the duration of the relevant commitment period.³⁰ At other times, problems arising in connection with these matters will be questions of implementation that go to the Enforcement Branch.

The rules specify a set of permissible responses to states that the Facilitative Branch may choose from when undertaking its functions. The rules call these responses 'consequences'—a case of 'diplomatese' to avoid using the more accurate but guilt-connoting terms 'responses' and 'measures' (and, in the case of what the Enforcement Branch can apply, 'penalties'). Four types of response are open to the Facilitative Branch: (1) 'provision of advice and facilitation of assistance' to a party (i.e. any party) regarding the implementation of the Protocol; (2) 'facilitation of financial and technical assistance' to 'any Party concerned', including technology transfer and capacity-building 'from sources other than those established under the Convention and the Protocol for the developing countries'; (3) facilitation of financial and technical assistance, including technology transfer and capacity-building, 'taking into account' article 4.3/4.5 of the FCCC (relating to finance and technology transfer to non-Annex I parties); and (4) formulation of recommendations to 'the Party concerned' that 'take into account' article 4.7 of the FCCC (to the effect that the implementation of non-Annex I commitments under the Convention will depend on Annex I parties discharging their obligations on finance and technology transfer).³¹ What all this means is far from clear. Two of the four 'consequences' (the second and the fourth) relate to questions of implementation, because 'Party concerned' is defined in the rules as a party in respect of which a question of implementation has been raised.³² The other two response types presumably can be used in any situation that has engaged the Facilitative Branch, whether it concerns a question of implementation or not. The second and third response types permit the Facilitative Branch to engage in facilitation of financial and technical assistance. However, the branch was not given a fund, or access to a fund or to



another mechanism to achieve such an outcome. Therefore, these two response types exist only in theory.

Once a problem of implementation has found its way to one of the branches, certain procedures are common to, and must be followed by, both. The 'Party concerned' is entitled to designate persons to represent it for the duration of the process.³³ Each branch must base its deliberations on information obtainable from a limited number of sources. Sources include information provided by the party concerned, reports of Expert Review Teams, and reports of the Protocol party meetings and the subsidiary bodies of the Convention and the Protocol.³⁴ Relevant factual and technical information from 'competent' IGOs and NGOs may also be considered.³⁵ Each branch may seek expert advice in reaching a decision,³⁶ and the party concerned is to be given an opportunity to comment on any branch decision.³⁷

Scholarly discussion of the Facilitative Branch has been rare, probably because the branch has remained largely inactive. The definition of a big part of its role in negative terms (i.e. that it is to address questions of implementation outside the mandate of the Enforcement Branch) has not been picked up as a fault,³⁸ and the absence of a trigger for the early-warning function has almost gone without comment. Lefeber, who was a member of the Enforcement Branch at the relevant time, writes that in the first two years of the Compliance Committee's operation (2006–2007) there was debate within the Facilitative Branch about whether its mandate allowed it to take action without the submission of a question of implementation.³⁹ However, the branch was not able to resolve the issue about the mechanism by which it should provide advice and facilitation. The internal debate was to continue, but it has still not been resolved.⁴⁰

The performance of the Facilitative Branch is discussed in the second half of this chapter (Section 2.2), while in this section I focus the discussion on its rules. Suffice to say that, by 2011, the branch was facing an existential crisis and had still not clarified its mandate. In a meeting that year, branch members provided a new interpretation of the branch's rules, with the effect of expanding the branch's powers. Plausibility of textual construction appears not to have been the members' primary consideration in reaching this outcome. Their interpretation turns on reading the technical concept of 'question' in a provision on the Facilitative Branch's mandate as connoting *any kind of 'issue'*.⁴¹

the branch considered that the reference to having to 'take into account the circumstances pertaining to the questions before it' should not be interpreted to necessarily refer to questions of implementation. It is rather a reference to the issues before it, which could include questions of implementation.⁴²

The branch members failed to mention that every other time the rules refer to a

‘question’ they clearly mean a question of implementation.⁴³

Having established a new mandate over ‘issues’ in general, the Facilitative Branch proceeded to postulate a corresponding triggering mechanism. It was decided that an intervention by the branch could be triggered by ‘issues’ found in the reports of Expert Review Teams.⁴⁴ The reasoning may seem arbitrary and the result vague, but the branch now had a mechanism for its advisory/supportive and early-warning functions. The branch conceded that it could not proceed with potential issues in ‘the absence of procedures and the need to provide procedural safeguards to Parties.’⁴⁵ It resolved to continue to ‘clarify its practice and/or procedures on how to discharge its responsibilities.’⁴⁶ "


In the following year, 2012, the Facilitative Branch agreed on ‘indicative working arrangements’ for its provision of advice and facilitation. It called the arrangements a ‘work in progress’, to be tested and reviewed in practice ‘as the branch considers its first cases.’⁴⁷ None of these qualifications change the nature of the branch’s intended action, namely to create a way to call before it individual states on the basis of an allegation that they are on a path to non-compliance.

The plenary of the Compliance Committee, which includes the members of the Enforcement Branch, was in two minds about the Facilitative Branch’s indicative working arrangements. By that point in time, the Enforcement Branch had completed several cases against states (see Section 3.2.3, below) on the basis of its own detailed rules of procedure, which had been drawn up by the Conference of the Parties to the Protocol. Its members presumably were not impressed by the creative, in-house process developed by the Facilitative Branch off its own bat.⁴⁸ The plenary meeting of the Committee declared that it was necessary for the Facilitative Branch to further enhance the transparency and due process of its indicative working arrangements, giving due consideration, among other things, to the need to ‘systematically examine all reports of expert review teams, to ensure fair and equal treatment of all Parties’, develop criteria for deciding whether to address an issue of early warning (as well as provide a definition of ‘early warning’), and to further clarify its approach to the range of remedies it would utilize.⁴⁹

As the first commitment period drew to a close, the modalities, if not the very purpose, of the Facilitative Branch were still unsettled. Nevertheless, the branch had received the Compliance Committee’s tacit approval to proceed with developing its mandate. It was even suggested that inconsistencies in state reporting on the LULUCF sector was ‘a possible starting point’ for the advisory work of the Facilitative Branch.⁵⁰

1.4 Powers of the Enforcement Branch

The functions of the Enforcement Branch are defined more carefully than those of the



Facilitative Branch. It is responsible for determining whether an Annex I party has failed to comply with, first, the methodological and reporting requirements under articles 5.1/5.2 and 7.1/7.4 of the Protocol; second, the eligibility requirements under the Protocol's three flexibility mechanisms (articles 6, 12, and 17); and, third, the party's quantified emission-limitation commitment for a commitment period.⁵¹ According to the ERT review rules, 'potential problems' under these headings, if not resolved at the ERT level, must be recast as questions of implementation and forwarded to the Enforcement Branch (via the Compliance Committee's Bureau).

Eligibility for participation in the Protocol's flexibility mechanisms requires compliance with the main methodological and reporting requirements under articles 5.1/5.2 and 7.1/7.4 of the Protocol, including those for national systems, national registries, and annual reporting of greenhouse gas emissions.⁵² Therefore, the second category in the list above is but a special case of the first.

In connection with article 5.2 (first category above), the Enforcement Branch is tasked to decide whether an Annex I party's greenhouse gas emission inventory should be 'adjusted' in a case where an Expert Review Team has called for an upward adjustment of the estimated emissions (downward adjustments are not allowed) and the state concerned does not agree with the ERT. This too is called a question of implementation.⁵³

Where the Enforcement Branch decides to proceed with a question of implementation, the party concerned may make written submissions to the branch and request a hearing to present its views. The branch has the power to call upon expert advice to supplement the information it has received from the ERT and any information it has received from the Annex I party. (The general procedure applying to both branches of the Compliance Committee was summarized in the previous section.)

In the case of a finding of non-compliance, the Enforcement Branch must apply 'consequences' (a euphemism for penalties) corresponding to the three kinds of non-compliance mentioned above.⁵⁴ (Adjustments to inventories are not regarded as consequences, since the party concerned is not required to take any action.)

In particular, where the non-compliance relates to methodological and reporting requirements, the branch must declare the state non-compliant and request it to submit a plan that will bring it into compliance.⁵⁵ The state's 'compliance action plan'⁵⁶ is subject to assessment (and acceptance or rejection) by the branch. The party must submit progress reports to the branch on the implementation of its plan on a regular basis.⁵⁷ This provision is often cited to illustrate the Enforcement Branch's 'automaticity'; however, close attention to the language reveals a discretionary element: 'it shall apply the ... consequences, taking into account the cause, type, degree and

frequency of the non-compliance of that Party.⁵⁸

Where the non-compliance concerns the eligibility requirements for participation in the Protocol's flexibility mechanisms, the Enforcement Branch must suspend the party's eligibility to trade in the Protocol's emission allowances (AAUs, CERs, etc.).⁵⁹ The party may apply to the branch to have its eligibility to participate in the flexibility mechanisms restored.⁶⁰ The branch will normally await confirmation by an Expert Review Team that the non-compliance issue is resolved before reinstating the party's eligibility to trade.


The third 'consequence' available to the Enforcement Branch is relevant only once all reporting for a commitment period has been finalized. Where the branch has determined that the emissions of a party have exceeded its assigned amount for the commitment period, taking into account all emission allowances held by the party, the branch is to deduct from the party's assigned amount for the subsequent commitment period 1.3 times the emissions that were in excess in the earlier period. The party must also submit a compliance action plan and is to be temporarily blocked from selling any of its own AAUs to other parties.⁶¹ At the time of writing (2014), finalization of the reporting for the first commitment period was not expected for another year. It seems safe to predict (see Table 4.5 in Chapter 4 and the discussion following it) that the non-compliance to which this third procedure corresponds will be avoided by all Annex I parties to the Kyoto Protocol. For these reasons there is little that needs to be said about this procedure, except to point out that it is potentially intrusive⁶² and that state emissions during the first commitment period might have been different had the particular penalty not stood as a threat on the horizon throughout 2008–2012.⁶³

2 Compliance system in practice

2.1 A system out of balance

I discussed the limited ability of Expert Review Teams to test the accuracy of greenhouse gas inventories.⁶⁴ In this section, I will examine a different problem involving ERTs, one which arises only in the context of the Kyoto Protocol's compliance system. The problem, in summary, is that whereas the facilitative role of ERTs under the FCCC's accountable reporting system is encouraged through regulation and practice without any resulting systemic difficulty, under the Protocol the same facilitative role undermines the functioning of both the Facilitative Branch and the Enforcement Branch.

When an ERT lists a reporting or institutional issue as a question of implementation in its annual review report on a state, action by the Compliance Committee is




automatically triggered. It is a sign that the ERT and the state under review have failed to see eye-to-eye on a particular point. It elevates a behind-the-scenes factual dispute about a 'potential problem' into an open dispute that requires resolution by a higher authority. The question of implementation will be understood by all involved, as well as by the international community at large, as an allegation of non-compliance by the state with important regime rules. These are unpleasant consequences for a state.⁶⁵

Expert Review Teams are not as independent as some commentators have suggested.⁶⁶ Almost all reviewers have regular jobs in their national government's 'national system' (the state's greenhouse gas reporting authority), which gives them a role in the preparation of their country's national communications and greenhouse gas inventories. They thus serve on two rungs of the reporting-and-review ladder: for the most part, they are engaged in compiling their own country's reports, but once in a while they help to review those of other countries. They have an interest to see that their counterparts in other countries are playing fair, but they also have an interest not to come down too hard on them or expose them during the review of the national communication or inventory, for this could lead to similar treatment of their own country's reports.⁶⁷

These two matters (reputational costs for countries and a small circle of reviewers) are of little consequence for accountable reporting under the FCCC. A negative finding in an FCCC review report lies at the very end of the accountable reporting procedure under that treaty. It does not trigger any follow-up. The same negative finding in a Protocol review report could trigger a whole other, very public, procedure.

The upshot has been that ERTs have interpreted their mandate about whether to list a question of implementation for action by the Compliance Committee as discretionary. In this, they have been assisted by an imprecision in the applicable rules concerning which reporting elements are mandatory for states to follow and which are not.

A question of implementation has never arisen from a 'periodic review' of a national communication, and only eight such questions have resulted from an annual inventory review. It is clear from the way ERTs have been functioning that as long as they regard the Compliance Committee's involvement as unnecessary in the resolution of an infringement against the rules, whether mandatory or not, an ERT will keep the issue under review at its own level without entering a formal finding of a question of implementation. The integrity of ERTs is not in question here. Especially when conducting an annual review, which is about actual emissions and thus goes to the heart of the climate change regime, an ERT will question the states where there is evidence of significant underestimation. But other problems will not be aggressively pursued. The common practice (as with FCCC reviews) is to list the problems as recommendations for improvement for the next time around. If the improvements are




not implemented in the course of the next review cycle, the ERT newly assigned to review the Annex I party (for its membership is required to be different from one review to the next), may relist the desired improvements for yet another cycle⁶⁸ or it may relinquish them as different issues catch its eye. Where a state can demonstrate that its emission accounts are improving from year to year, an ERT will generally be content to conceptualize reported gaps as improvement targets for later reporting years rather than as matters to be immediately corrected.

Because the ERTs, the state parties, and indeed the FCCC Secretariat, are anxious to avoid questions of implementation, functions that by design are assigned to the Compliance Committee are held back in an ad hoc manner at the level of Expert Review Teams.

The problem I have described has not gone unnoticed by the Compliance Committee. In 2011, the Committee's plenary 'recommended' (for it has no mandate to issue orders to Expert Review Teams) that ERT reports clearly state whether or not an identified problem relates to 'language of a mandatory nature', along with the reason for such a determination. The plenary also recommended that if an ERT decides not to list a question of implementation in relation to 'an unresolved problem pertaining to language of a mandatory nature', the ERT should give reasons for its decision.⁶⁹ The latter recommendation implicitly recognizes, of course, that ERTs have prevented questions of implementation from reaching the Compliance Committee. It also suggests that if ERTs are to continue this practice, they should at least provide a rationale for it. Another way of reading this incident is that the Compliance Committee is not condoning the practice but is trying to put an end to it without saying so explicitly. The plenary's report is ambiguous and could support either reading.

Like the Compliance Committee, the Facilitative Branch also attempted at one point to influence ERTs to be more explicit about their decisions. It had every reason to do so, considering that no questions of implementation have come its way since 2006, when a question of implementation assigned to the branch was left undecided (see next section). The Facilitative Branch recognized that ERTs themselves have a strong facilitation function written into their mandate.⁷⁰ The branch members discussed holding a workshop with ERT lead reviewers to focus on 'the issue of consistency of reviews'. What the Facilitative Branch meant by this was that it wanted greater clarity from ERTs on how 'potential problems' were being managed at the ERT level, and in particular it wanted clarity on 'how mandatory language is used in ERT reports ... with respect to identifying questions of implementation and their resolution; and also how the reports might signal the risk of potential non-compliance and the need for early warning'.⁷¹ The workshop went ahead, but it was held in closed session, so we are not privy to what was discussed.⁷²



Compared with the Facilitative Branch, the Enforcement Branch has seen some action but it has not had a taxing workload. Its last question of implementation was received in May 2012.

The Enforcement Branch found an occasion to express its dissatisfaction with the review system, and it did so in relatively strong terms. In the course of its deliberations on the case of Bulgaria, in 2011, the branch


noted with concern the lack of clarity in the 2010 [ERT review report on Bulgaria], which does not clearly explain why unresolved problems did not result in the listing of questions of implementation pursuant to paragraph 8 of the annex to decision 22/CMP.1 [on the guidelines for review under article 8 of the Protocol]. In particular, differing interpretations of this provision may lead to different conclusions as to whether an unresolved problem is required to be listed as a question of implementation. This reveals more systemic issues that concern the review process under Article 8 of the Kyoto Protocol and the compliance system as a whole, which require urgent attention.⁷³

There is a suggestion here that the mandatory/non-mandatory problem could be to blame. However, the Enforcement Branch also leaves open the possibility that the ERT fudged its report on Bulgaria to avoid listing additional questions of implementation against the country.

2.2 Failure of the Facilitative Branch

The Facilitative Branch of the Compliance Committee could in theory provide ‘early warning’ of potential non-compliance with reporting or methodological obligations relating to greenhouse gas inventories, or indeed with emission-reduction obligations. In the early years of the branch’s operation, it was widely expected that it would detect potential compliance problems and defuse them before they became actual problems.⁷⁴ However, the branch’s powers have so far remained largely theoretical.


In May 2006, South Africa, on behalf of the Group of 77 and China, submitted a question of implementation⁷⁵ to the Compliance Committee in respect of 15 Annex I parties that had missed the submission deadlines for their national communications and progress reports on the implementation of various Kyoto Protocol commitments.⁷⁶ The Bureau referred the case to the Facilitative Branch. As Lefeber has summarized the outcome, ‘the Facilitative Branch was neither able to take a decision to proceed nor a decision not to proceed with the question of implementation.’⁷⁷ It was, therefore, left unactioned. According to Lefeber, the impasse was due to flawed reasoning by certain members of the branch. He argues that the branch should have proceeded to decide the question.⁷⁸ It was the first and last question of implementation to go before the Facilitative Branch.



In late 2011, the Facilitative Branch considered that the in-depth review report on Italy's fifth national communication as well as the annual review report on Canada's 2008 inventory (submitted in 2010) 'point to potential problems in the fulfilment of these Parties' commitments', which the branch considered engaged its role on the promotion of compliance and provision of early warning of potential non-compliance.⁷⁹ After further deliberation, however, the branch concluded that the information available to it on Italy was not sufficient for it to engage in an early-warning exercise.⁸⁰ That still left the Canada case. Indeed, this case was calling out for attention since before the start of the first commitment period. For example, on 15 May 2006, Canada's environment minister publicly admitted at a meeting of the Protocol parties that Canada could not meet its emission-reduction target, for it was 'unachievable'.⁸¹ It was a case of non-compliance foretold, and for this reason it should have been a test case for the Facilitative Branch from the very beginning. Instead, the Facilitative Branch took no action on Canada until the last year of the first commitment period. In February 2012, the Facilitative Branch noted the concern expressed by the ERT reviewing Canada's fifth national communication, that the country would not be able to comply with its emission-reduction obligations under the Protocol. By this stage Canada had already submitted to the treaty's depositary a notification of withdrawal from the Protocol, which would make withdrawal effective on 15 December 2012. Despite this, the Facilitative Branch decided that the time had come to act. It reasoned that, 'for the time being, [Canada] remained a Party to the Protocol'.⁸² In Section 3.1.3 above, I described how, by early 2012, the Facilitative Branch had agreed on 'indicative working arrangements' for its provision of advice and facilitation to Annex I parties. The branch decided to proceed with the Canada case on the basis of its draft procedures. As a first step, the chairperson of the branch would send a letter to Canada.⁸³

The letter began with the observation that Canada's projected annual emissions for 2008–2012 were 21 per cent higher than 1990 levels, well above the country's emission limit of –6 per cent. The letter continued in a tone of contrived procedural propriety to note that there had been no indication in the ERT's review report on Canada about whether, or how, Canada planned to stay within its emission limit. The letter referred to the ERT's concern that Canada could become non-compliant. Canada's formal notification of withdrawal from the Protocol was acknowledged in the chairperson's letter, but was set aside with the officious remark that, legally, the party's obligations remained unaltered for the time being. The letter concluded with informing Canada that the Facilitative Branch had decided that it was seized of an early-warning issue with respect to the country, and that before proceeding further with the issue it wished to offer Canada the opportunity 'to engage in a dialogue with the branch' to clarify Canada's position.⁸⁴

The Canadian government replied to the letter by underscoring at the outset that this




was the first time that the Facilitative Branch had taken up an early-warning issue, and that its procedures for doing so were as yet incomplete. It went on to dismiss the branch's approach, with the argument that state compliance with emission-limitation obligations was not due to be assessed until long after Canada's withdrawal from the Protocol in December 2012 had become effective. 'On this basis, we are of the view that there is, therefore, little value in further engagement with the facilitative branch at this time.'⁸⁵ It was an embarrassing finale to an ill-considered initiative. By coming too late and being entirely without a point, the Facilitative Branch's decision to test its new procedure on Canada only managed to underscore the body's ineptness.⁸⁶

Earlier in this chapter I discussed the Facilitative Branch's lengthy meditation on its mandate and its subsequent attempt to interpret its allocated modalities and procedures so as to give it an effective role in international compliance. Certainly, the original design of the branch was poorly thought out and incomplete. This contributed to the branch becoming immediately moribund. However, the system's main flaw lies in its attempt to balance one facilitation body (the Facilitative Branch) on top of another (the Expert Review Teams) in the context of a political aversion to questions of implementation.

The experience with the Facilitative Branch of the Kyoto Protocol's compliance system suggests that a duplication of facilitation through the addition of a body at a level more remote from the underlying facts of each case is no improvement on the original system of accountable reporting under the FCCC.


2.3 Narrow influence of the Enforcement Branch Of the Enforcement Branch's eight cases to date, the majority involved problems of institutional design that were soon repaired. Greece, Bulgaria, Romania, the Ukraine, and Lithuania were criticized for aspects of their national system; whereas in a case involving Canada, the national registry was at fault. The Croatia case arose from a dispute about that state's assigned amount, not from any misapplication of reporting or institutional rules.⁸⁷ Slovakia's case concerned a disagreement with an Expert Review Team about whether to apply an inventory adjustment, as well as a second question of implementation concerning incomplete or methodologically deficient accounting of emissions from two sectors. Both questions were said to spring from the same cause, namely the management of Slovakia's national system.⁸⁸ All eight cases have been resolved.⁸⁹

As I noted earlier, questions of implementation have never arisen from national communications but only from inventory reports. This suggests that ERTs are placing a much greater emphasis on the accuracy of the reporting of greenhouse gases (and the functioning of national systems) than the less data-driven subject of national communications. Once a case is before the Enforcement Branch, the branch begins to engage in facilitation, aimed at returning the country to compliance.⁹⁰ This is another



way in which the facilitation function is shared within the Protocol's compliance system. The states that appear to have benefitted most from the experience are the five economy-in-transition cases (Bulgaria, Romania, Ukraine, Lithuania, and Slovakia), not counting Croatia (which was a case of legal interpretation of a rule). For them, the process worked in the manner of an external consultancy to fix systemic problems. The Enforcement Branch normally sought expert advice, both to find a solution and to confirm that it had been implemented. All experts were chosen from the FCCC Roster of Experts and had experience as ERT members.⁹¹ Thus, even when a question was in the hands of the Enforcement Branch, most of the advice was coming from the ERT level. The branch provided little more than a forum to focus the attention of states on that advice. States have responded with seriousness to the Enforcement Branch's proceedings against them. This is evident from the profiles of those assigned to represent the states at the branch's hearings. Lithuania sent a team comprising ten government ministers and senior public servants, plus a lawyer from a top legal firm.⁹² At its second hearing it sent a team of six.⁹³ In Ukraine's case, eleven senior government officials plus an interpreter went to the first hearing,⁹⁴ and the same group was dispatched again to the second.⁹⁵ Slovakia was represented by seven officials; they included greenhouse gas experts and academics.⁹⁶ Romania sent nine high-level officials, including a lawyer and a greenhouse gas expert.⁹⁷ The response pattern is consistent with what we know about states being highly sensitive about being found in violation of agreed rules.

Where a system provides conditional benefits, such as optional emission trading under the Protocol, participants will be cut off from the benefits if they do not comply with the conditions of the special scheme. In the Protocol's case, the Enforcement Branch has the authority, outlined earlier in this chapter, to suspend and reinstate eligibility to participate in the flexibility mechanisms. States that appear before the branch and are temporarily excluded from the flexibility mechanisms seem very keen to be reinstated as soon as possible. It might be thought that all that they really want is to regain the benefit of trade and potentially lessen the costs of compliance with the Protocol by buying or (for EIT countries, especially) selling emission allowances. The presence of multiple motives has always made explanation and prediction difficult in the social sciences. Considerable weight inevitably is given to how states account for their own conduct, and international law traditionally has relied heavily on this source. The evidence strongly suggests that states wish to comply with their accountable reporting obligations under the Kyoto Protocol because they reflect what international law requires and not solely for their own economic benefit. In conclusion, it is difficult to assess the overall influence of the Enforcement Branch on state compliance with accountable reporting rules and the quality of state reports. It is possible that, in the absence of the branch, some states would have produced less complete or transparent




accounts of their actions and emissions.⁹⁸ Such shortcomings would have been detected by Expert Review Teams under the regular FCCC review process and publicly highlighted as areas needing improvement. The difference is that they would not have been listed as questions of implementation.

3 Viability of the Protocol's compliance system

This chapter has surveyed the broad discretion available at the Expert Review Team level to report questions of implementation to the Compliance Committee. The existence of the discretion explains why the Protocol's compliance system has generated only eight cases for the Enforcement Branch and (in terms of cases originating in ERT reviews) none for the Facilitative Branch. The answer is that the ERTs have been pursuing facilitation efforts themselves.⁹⁹ There is a marked desire by all involved in the Protocol's process to avoid questions of implementation. At the negotiation stage, the major green NGOs favoured a hard-hitting compliance system,¹⁰⁰ afflicted though this position was by the oxymoron that states would be willing to deliver and suffer heavy blows to themselves. The European Union did favour a strong compliance system, but not all Annex I parties agreed with it.¹⁰¹ In its implementation, if not in its design, the Protocol compliance system has not been hard-hitting. ERT de facto facilitation has ensured that states only rarely will get into trouble with the Compliance Committee. By the second half of the Protocol's first commitment period, the Facilitative Branch was searching for ways to make a contribution to the compliance process. Its desire to elaborate its mandate led it to a tendentious reading of the applicable rules.

Over its eight years of operation, the Compliance Committee has averaged one case per year. No-one foresaw that the facilitative spirit and discretionary approach of Expert Review Teams to questions of implementation would undermine the Facilitative Branch and keep the Enforcement Branch barely active. The compliance system has evidently had no political appetite for being hard-hitting. The only alternative to this, of course, is facilitation. Yet facilitation can be handled well enough at the basic review (ERT) level, with the result that there is no significant role left for the specialized Protocol bodies at a higher level in the system.

Considering that the evidence on the workings of the Protocol's compliance system does not suggest that accountable reporting is definitely advantaged by the additional features introduced by that system, what have the state parties been saying about the model's long-term viability? In the ADP negotiations on the post-2020 agreement there is a consensus on the need for 'transparency for mutual trust, comparability and accountability' and for 'the need to take into account, and build on, the existing



arrangements for measurement, reporting and verification [many of which] are just coming into effect and need to evolve'.¹⁰² The latter is a reference to the IAR and ICA processes under the FCCC. Beyond this, positions diverge. At the COP in Warsaw in 2013, the LDCs and China argued for the features of the Protocol's compliance system to be transposed to the post-2020 agreement.¹⁰³ Presumably, they see it as continuing to apply only to Annex I parties. The United States, by contrast, said that existing reporting and review procedures under the FCCC are sufficient, as long as they are extended to all parties according to capacity.¹⁰⁴ The US position appears to be informed by a deeper theory (or maybe assumption) that accountable reporting is itself an adequate compliance system. 'Managerialist' compliance theory could be read as suggesting that effective compliance management requires the establishment not only of transparent reporting but also a 'response system', such as the Protocol's compliance system: 'The information system must produce adequate and accurate information about actors' behaviours under the treaty. The managerial response system must then produce discriminating responses to different types of non-compliance.'¹⁰⁵ The production of 'discriminating responses' could, of course, take many forms, from recommendations in the review reports of Expert Review Teams, to question-and-answer sessions in the SBI forum under the IAR/ICA procedures.¹⁰⁶ It does not follow from managerialist principles that these responses are necessarily less effective than the approach represented by the Protocol's compliance system, which is itself, as I have explained, more facilitative than enforcement-oriented, and thus in practice no different from the other responses.¹⁰⁷

There has been full cooperation of states with the Compliance Committee.¹⁰⁸ In this sense there has been compliance with the rules of the Kyoto Protocol's compliance system.¹⁰⁹ This further confirms the high level of state support for accountable reporting, which in turn supports the view that climate law is solidifying with respect to the report-and-review duty. The states that went before the Enforcement Branch did not evince any reluctance to report on emissions or have their reports reviewed; for the most part the problems were caused by reporting institutions that had not been set up in strict accordance with the rules.

Nevertheless, even if all states have complied with the compliance system's rules, it is still not clear that this system has added much value to the FCCC's version of accountable reporting.¹¹⁰

As for a legal duty to comply with core-outcome obligations (the substantive rule that states must reduce emissions), one looks in vain to the Protocol's compliance system for evidence of a normative development in this area. The Compliance Committee has not dealt with substantive obligations, and probably never will.¹¹¹ A more accurate term for the Committee, in retrospect, would have been the Uniform Reporting Committee.

Brunnée and Toope have noted 'the presence of strong shared understandings and the strong adherence to legality in the case of the regime's procedural aspects, and fragility of its substantive aspects'.¹¹² This difference can be explained from a legal perspective through the fact that the FCCC's rules on accountable reporting are, and always have been, directed at states individually; by contrast, the FCCC's general mitigation rule has always subsisted in its communal form, creating only implied, incidental obligations at the state level.

Notes

1 Kyoto Protocol (2005), *Decision 22/CMP.1, Guidelines for Review under Article 8 of the Kyoto Protocol*, FCCC/KP/CMP/2005/8/Add.3, Annex, para. 4.

2 *Ibid.*, para. 7.

3 Questions of implementation can also be raised by states themselves. An example of this will be given in Section 3.2.2, below.

4 Kyoto Protocol (2005), *Decision 22/CMP.1*, paras 2.b and 2.c.

5 *Ibid.*, para. 5; and see, *ibid.*, paras 106 and 117.

6 Kyoto Protocol (2005), *Decision 27/CMP.1, Procedures and Mechanisms Relating to Compliance under the Kyoto Protocol*, FCCC/KP/CMP/2005/8/Add.3, Annex, para. VI.1.

7 Kyoto Protocol (2005), *Decision 22/CMP.1*, Annex, para. 8.

8 Kyoto Protocol (2005), *Decision 27/CMP.1*.

9 Mitchell writes that where 'negative responses such as sanctioning of noncompliant states [are used] the regime's rules will need to distinguish clearly between desirable and undesirable behavior, that is, between compliance or noncompliance': Ronald B. Mitchell (1998), 'Sources of Transparency: Information Systems in International Regimes', 42 *International Studies Quarterly* 109, p. 114. In the ramping up of the FCCC's accountable reporting system to the enhanced level of the Protocol's compliance system, the need for greater definitional clarity was overlooked.

10 The Annex to Decision 22/CMP.1 is entitled 'Guidelines for Review Under Article 8 of the Kyoto Protocol'.

11 Kyoto Protocol (2005), *Decision 22/CMP.1*, Annex, para. 69.

12 *Ibid.*, Annex, paras 102–105.

13 E.g. 'National systems should be designed and operated to ensure the quality of the inventory' (Kyoto Protocol (2005), *Decision 19/CMP.1, Guidelines for National Systems under Article 5, Paragraph 1, of the Kyoto Protocol*, FCCC/KP/CMP/2005/8/Add.3, Annex, para. 7), although clearly this is a mandatory requirement.

14 Kyoto Protocol (2005), *Decision 22/CMP.1*, Annex, paras 115–116.

15 Ibid., Annex, para. 137.

16 For example: 'Each Annex I Party should implement and maintain national inventory arrangements for the estimation of anthropogenic GHG emissions by sources and removals by sinks ... each Annex I Party should ... Designate a single national entity with overall responsibility for the national inventory ... each Annex I Party should ... Prepare national annual GHG inventories in a timely manner in accordance with these reporting guidelines and relevant decisions of the COP ... GHG emissions and removals should be presented on a gas-by-gas basis'; but: 'Annex I Parties shall report actual emissions of HFCs, PFCs, SF6 and NF3, providing disaggregated data by chemical ... Annex I Parties shall estimate and report the individual and cumulative percentage contributions from key categories to their national total', etc.: FCCC (2013), *Decision 24/CP.19, Revision of the UNFCCC Reporting Guidelines on Annual Inventories for Parties Included in Annex I to the Convention*, FCCC/CP/2013/10/Add.3, Annex.

17 Kyoto Protocol (2005), *Decision 27/CMP.1*, Annex, para. VI.1. The annex is entitled 'Procedures and Mechanisms Relating to Compliance Under the Kyoto Protocol'. Andresen and Gulbrandsen write that the idea of a dual approach to compliance was jointly introduced to the Kyoto Protocol negotiations by two NGOs, namely WWF and the Center for International Environmental Law: Steinar Andresen and Lars H. Gulbrandsen (2005), 'The Role of Green NGOs in Promoting Climate Compliance', in *Implementing the Climate Change Regime: International Compliance*, ed. Jon Hovi, p. 175.

18 Kyoto Protocol (2005), *Decision 27/CMP.1*, Annex, para. VII.1. 19 *Rules of Procedure of the Compliance Committee of the Kyoto Protocol*, contained in the annex to *Decision 4/CMP.2*, as amended by *Decision 4/CMP.4* and further amended by *Decision 8/CMP.9*.

20 Kyoto Protocol (2005), *Decision 27/CMP.1*, Annex, para. II.6.

21 Ibid., Annex, para. V.3.

22 See, e.g., Sebastian Oberthür and René Lefeber (2010), 'Holding Countries to Account: The Kyoto Protocol's Compliance System Revisited after Four Years of Experience', 1 (1) *Climate Law* 133, p. 140.

23 On this topic, see Geir Ulfstein and Jacob Werksman (2005), 'The Kyoto Compliance System: Towards Hard Enforcement', in *Implementing the Climate Regime: International Compliance*, ed. Jon Hovi, Olav Stokke, and Geir Ulfstein, pp. 45, 47.

24 E.g. Sebastian Oberthür and René Lefeber (2010), 'Compliance System Revisited', p. 141; Jutta Brunnée (2012), 'Climate Change and Compliance and Enforcement Processes', in *International Law in the Era of Climate Change*, ed. Rosemary Rayfuse and Shirley V. Scott, p. 306.

25 Kyoto Protocol (2005), *Decision 27/CMP.1*, Annex, para. II.11. Another example: 'The facilitative branch shall [take] into account the principle of common but differentiated responsibilities and respective capabilities': *ibid.*, Annex, para. IV.4.

26 Compliance Committee Plenary (29 May 2006), *Report on the First Meeting*, CC/1/2006/4.

27 Kyoto Protocol (2005), *Decision 27/CMP.1*, Annex, para. IV.4.

28 Ibid., Annex, para. IV.5.

29 Ibid., Annex, para. IV.5. The latter is a reference to a decision to the effect ‘that the use of the mechanisms shall be supplemental to domestic action and that domestic action shall thus constitute a significant element of the effort made by each Party included in Annex I to meet its quantified emission limitation and reduction commitments’: Kyoto Protocol (2005), *Decision 2/CMP.1, Principles, Nature and Scope of the Mechanisms Pursuant to Articles 6, 12 and 17 of the Kyoto Protocol*, FCCC/KP/CMP/2005/8/Add.1, para. 1.

30 Kyoto Protocol (2005), *Decision 27/CMP.1*, Annex, para. IV.6. 31 Ibid., Annex, section XIV.

32 Ibid., Annex, para. VI.2.

33 Ibid., Annex, para. VIII.2.

34 Ibid., Annex, para. VIII.3.

35 Ibid., Annex, para. VIII.4.

36 Ibid., Annex, para. VIII.5.

37 Ibid., Annex, para. VIII.8.

38 E.g. Geir Ulfstein and Jacob Werksman (2005), ‘Towards Hard Enforcement’, p. 45; Jutta Brunnée (2012), ‘Promoting Compliance with Multilateral Environmental Agreements’, in *Promoting Compliance in an Evolving Climate Regime*, ed. Jutta Brunnée, Meinhard Doelle, and Lavanya Rajamani, p. 51.

39 René Lefeber (2009), ‘The Practice of the Compliance Committee under the Kyoto Protocol to the United Nations Framework Convention on Climate Change (2006–2007)’, in *Non-Compliance Procedures and Mechanisms and the Effectiveness of International Environmental Agreements*, ed. Tullio Treves et al., p. 311.

40 See Compliance Committee (2012), *Annual Report*, FCCC/KP/CMP/2012/6, p. 14.

41 Last sentence of para. IV.4 in Kyoto Protocol (2005), *Decision 27/CMP.1*, Annex.

42 Compliance Committee (2011), *Annual Report*, FCCC/KP/CMP/2011/5, paras 48–49, emphasis added.

43 This is also true of the phrase *question before it*—as in ‘The relevant branch shall undertake a preliminary examination of questions of implementation to ensure that, except in the case of a question raised by a Party with respect to itself, the *question before it*...’: Kyoto Protocol (2005), *Decision 27/CMP.1*, Annex, para. VII.2, emphasis added.

44 Compliance Committee (2011), *Annual Report*, paras 50–51. This argument relied on section VII of the rules on procedures and mechanisms (*Decision 27/CMP.1*, Annex), however, the relevant text does not refer to any questions other than questions of implementation.

45 Ibid., pp. 12–13.

46 Ibid., para. 53.

47 Compliance Committee Facilitative Branch (6–8 February 2012), *Report on the Eleventh*

Meeting, CC/FB/11/2012/2, p. 2. The indicative working arrangements appear as an annex to this report. Early-warning intervention by the Facilitative Branch would be on the basis of 'sufficient information in [ERT reports] indicating potential non-compliance with commitments'. Concerning commitments under art. 3.1 of the Protocol (quantified mitigation limits), the branch would focus on emission projections and measures being taken by the party to address the potential non-compliance: *ibid.*, p. 2. In the absence of formally established procedures for the early-warning function, the Facilitative Branch would apply, *mutatis mutandis*, procedures developed for dealing with questions of implementation: *ibid.*, pp. 5–6.

48 The Enforcement Branch has its own procedures set out in section IX of the procedures and mechanisms (Decision 27/CMP.1, Annex), whereas the Facilitative Branch has only the general procedures of section VIII.

49 Compliance Committee Plenary (9 February 2012), Report on the Tenth Meeting, CC/10/2012/2, pp. 2–3. See also Compliance Committee (2012), Annual Report, p. 16.

50 Compliance Committee Enforcement Branch (7–8 and 10 February 2012), *Report on the Eighteenth Meeting*, CC/EB/18/2012/3, pp. 5–6.

51 Kyoto Protocol (2005), *Decision 27/CMP.1*, para. V.4.

52 Kyoto Protocol (2005), *Decision 2/CMP.1*, para. 5; and Kyoto Protocol (2005), *Decision 3/CMP.1, Modalities and Procedures for a Clean Development Mechanism as Defined in Article 12 of the Kyoto Protocol*, FCCC/KP/CMP/2005/8/Add.1, Annex, para. 31. These eligibility requirements for the CDM are repeated verbatim in the decisions setting up trading mechanisms under articles 6 and 17 of the Protocol. A party may also be excluded from the flexibility mechanisms if major errors in its reporting are uncovered, notwithstanding the fact that adjustments are effected to correct these errors: Kyoto Protocol (2005), *Decision 15/CMP.1, Guidelines for the Preparation of the Information Required under Article 7 of the Kyoto Protocol*, FCCC/KP/CMP/2005/8/Add.2, para. 3.

53 Kyoto Protocol (2005), *Decision 27/CMP.1*, Annex, para. V.5; Kyoto Protocol (2005), *Decision 22/CMP.1*, Annex, para. 80; and Compliance Committee (2012), *Annual Report*, pp. 13–14 ('With regard to the question of implementation relating to the disagreement about whether to apply adjustments...'). For the adjustment procedure, see Compliance Committee Enforcement Branch (3–4 July 2013), *Report on the Twenty-Third Meeting*, CC/EB/23/2013/3, Annex, pp. 5–6. The procedure was approved in Kyoto Protocol (2013), *Decision 8/CMP.9, Compliance Committee*, FCCC/KP/CMP/2013/9/Add.1. The Enforcement Branch has a similar mandate where an ERT recommends a correction to the compilation and accounting database for the accounting of assigned amounts under art. 7.4 of the Protocol and the party concerned disagrees with the ERT: Kyoto Protocol (2005), *Decision 27/CMP.1*, Annex, para. V.5.

54 Kyoto Protocol (2005), *Decision 27/CMP.1*, Annex, para. V.6.

55 *Ibid.*, Annex, para. XV.1.

56 For a description of which, see *ibid.*, Annex, para. XV.2.

57 *Ibid.*, Annex, para. XV.3.

58 *Ibid.*, Annex, para. XV.1.

59 An exception applies to ERUs generated from a JI project hosted by the country, as well as to CERs forwarded by a developing country hosting a CDM project for the Annex I party in question.

60 Kyoto Protocol (2005), *Decision 27/CMP.1*, Annex, para. XV.4.

61 *Ibid.*, Annex, para. XV.5.

62 See especially *ibid.*, Annex, para. XV.6.

63 Thus the compliance system's theoretically 'most controversial aspect' (Jacob Werksman (2005), 'The Negotiation of a Kyoto Compliance System', in *Implementing the Climate Change Regime: International Compliance*, ed. Jon Hovi) will be remembered as its least controversial aspect in practice. As there will be no *third* commitment period in which to punish states with excess emissions in the second period, the system's one chance to generate controversy has passed.

64 See Section 2.3.2, above.

65 Greece and Canada were the first countries to have questions of implementation raised against them. They reacted with indignation. Canada, which at the relevant time had already declared that it did not intend to meet its emission-reduction target under the Protocol (Sebastian Oberthür and René Lefebvre (2010), 'Compliance System Revisited', pp. 155–156), sought to have the record of the proceedings before the Enforcement Branch reflect that there had been 'no need' to engage the non-compliance procedure, since very early on the process it had put right the identified problem. See Compliance Committee (2008), *Annual Report*, FCCC/KP/CMP/2008/5, para. 30 and Annex V. Greece's responses were also irate; see the documentation at the Kyoto Protocol's website, 'Question of Implementation – Greece', <http://unfccc.int/kyoto_protocol/compliance/enforcement_branch/items/5455.php>, especially the document listed as 'Further Written Submission of Greece' and dated 9 April 2008. See also Malgosia Fitzmaurice and Catherine Redgwell (2000), 'Environmental Non-Compliance Procedures and International Law', 31 *Netherlands Yearbook of International Law* 35, p. 64 ('It remains the case that the finding that a state has committed an internationally wrongful act as a matter of international law has significant psychological impact').

66 Geir Ulfstein and Jacob Werksman (2005), 'Towards Hard Enforcement', p. 43 ('The credibility of the ERTs lies first of all in their composition as a team of independent experts'). Oberthür and Lefebvre have suggested that the Kyoto Protocol's compliance system has been designed to minimize political interference: Sebastian Oberthür and René Lefebvre (2010), 'Compliance System Revisited', p. 140.

67 Taryn Fransen (2009), *Enhancing Today's MRV Framework to Meet Tomorrow's Needs: The Role of National Communications and Inventories*, p. 8.

68 Kyoto Protocol (2005), *Decision 22/CMP.1*, Annex, para. 48 ('All final review reports prepared by the expert review team, except for status reports, shall include the following elements: ... (b) ... (iii) An assessment of any efforts by the Party included in Annex I to address any potential problems identified by the expert review team during the current review or during previous reviews that have not been corrected').

69 Compliance Committee (2011), *Annual Report*, pp. 7–8.

70 Compliance Committee Facilitative Branch (23 March 2013), *Report on the Thirteenth Meeting*, CC/FB/13/2013/2, p. 2 ('Given the expert review teams' role in assisting Parties in improving their reporting of information, the branch was interested in further exploring how it could exercise its [own] facilitative function').

71 Compliance Committee Facilitative Branch (22–23 October 2012), *Report on the Twelfth Meeting*, CC/FB/12/2012/3, pp. 4–5.

72 Compliance Committee Plenary (22–23 March 2013), *Report on the Twelfth Meeting*, CC/12/2013/3, p. 2.

73 Compliance Committee Enforcement Branch (4 February 2011), *Decision on Bulgaria Case*, CC-2010-1-17/Bulgaria/EB, para. 14.

74 See, e.g., René Lefeber (2001), 'From The Hague to Bonn to Marrakesh and Beyond: A Negotiating History of the Compliance Regime under the Kyoto Protocol', 14 *Hague Yearbook of International Law* 25, p. 47; and Jan Klabbers (2007), 'Compliance Procedures', in *The Oxford Handbook of International Environmental Law*, ed. Daniel Bodansky, Jutta Brunnée, and Ellen Hey, p. 999.

75 This is an alternative triggering mechanism for questions of implementation; see Kyoto Protocol (2005), *Decision 27/CMP.1*, para. VI.1.b. 76 Compliance Committee (2006), *Annual Report*, FCCC/KP/CMP/2006/6, paras 19–22.

77 René Lefeber (2009), 'The Practice of the Compliance Committee', p. 314.

78 *Ibid.*, pp. 314–315.

79 Compliance Committee Facilitative Branch (11–12 October 2011), *Report on the Tenth Meeting*, CC/FB/10/2011/3, p. 3.

80 Compliance Committee Facilitative Branch (6–8 February 2012), *11th Meeting*, pp. 2–3.

81 Jane Matthews Glenn and José Otero (2013), 'Canada and the Kyoto Protocol: An Aesop Fable', in *Climate Change and the Law*, ed. Erkki J. Hollo, Kati Kulovesi, and Michael Mehling, pp. 497–498.

82 Compliance Committee Facilitative Branch (6–8 February 2012), *11th Meeting*, p. 3.

83 *Ibid.*, p. 3.

84 Compliance Committee Facilitative Branch (22–23 October 2012), *12th Meeting*, Annex.

85 *Ibid.*, Annex.

86 Canada's imminent withdrawal from the Protocol was only half the story. In relation to emission targets, the Facilitative Branch conceivably could have played a useful role in Canada's case early in the first commitment period. As time passed, however, Canada built up an emission profile that was increasingly difficult to change. By the time the branch began to reflect on its utility in late 2011, state policies, such as Canada's, had been fixed for the

commitment period, and nothing could be done, realistically, in the final year of the period to significantly reduce the annual average of a country's emissions for 2008–2012. The Facilitative Branch's action on Canada was not only officious but illogical.

87 See Compliance Committee (2012), *Annual Report*, pp. 9–10.

88 *Ibid.*, pp. 13–14.

89 The earlier Enforcement Branch cases are discussed in detail in Meinhard Doelle (2010), 'Early Experience with the Kyoto Compliance System: Possible Lessons for MEA Compliance System Design', 1 (2) *Climate Law* 237. 90 For example, see the extent of facilitation invested by the Enforcement Branch in the Lithuania case (Compliance Committee Enforcement Branch (14–18 November 2011), *Report on the Sixteenth Meeting*, CC/EB/16/2011/2, pp. 4–6, and *idem* (9–14 July 2012), *Report on the Twentieth Meeting*, CC/EB/20/2012/2, pp. 7–8) as well as the Ukraine case (Compliance Committee Enforcement Branch (20–21 December 2011), *Report on the Seventeenth Meeting*, CC/EB/17/2011/2, pp. 3–4).

91 See, e.g., Compliance Committee Enforcement Branch (14–18 November 2011), *16th Meeting*, pp. 3–6; Compliance Committee Enforcement Branch (8–9 March 2012), *Report on the Nineteenth Meeting*, CC/EB/19/2012/2, p. 3; Compliance Committee Enforcement Branch (9–14 July 2012), *20th Meeting*, pp. 5–8; and Compliance Committee Enforcement Branch (3–4 July 2013), *23rd Meeting*, pp. 2–3.

92 Compliance Committee Enforcement Branch (14–18 November 2011), *16th Meeting*, pp. 3–4.

93 Compliance Committee Enforcement Branch (9–14 July 2012), *20th Meeting*, p. 6.

94 Compliance Committee Enforcement Branch (7–8 and 10 February 2012), *18th Meeting*, pp. 3–4.

95 Compliance Committee Enforcement Branch (8–9 March 2012), *19th Meeting*, pp. 2–3.

96 Compliance Committee Enforcement Branch (9–14 July 2012), *20th Meeting*, p. 3.

97 *Ibid.*, p. 5.

98 Lefeber assumes that the Compliance Committee's light workload is a good sign: René Lefeber (2009), 'The Practice of the Compliance Committee', p. 317 ('The Committee does not have much work and that must mean that the Kyoto Protocol, including the procedures and mechanisms relating to compliance, has made a good start'); see also George W. Downs (1998), 'Enforcement and the Evolution of Cooperation', 19 *Michigan Journal of International Law* 319, p. 331 ('The fact that punishments are rare can just as easily be interpreted as evidence that enforcement is operating effectively as that it is irrelevant').

99 This has been noted by Meinhard Doelle (2010), 'Kyoto Compliance System', p. 259 ('The ERT process [is] not consistently bringing issues of implementation before the compliance committee. ... Whether the review by ERTs, in particular through in-country reviews, is sufficiently detailed and frequent for the credibility and integrity of the reporting system is unclear based on the experience to date').

100 Steinar Andresen and Lars H. Gulbrandsen (2005), 'NGOs in Climate Compliance', p. 175.

101 See René Lefeber (2001), 'Negotiating History of the Compliance Regime', pp. 34–35. Lefeber's article shows that there was nothing inevitable about the Protocol's compliance system coming into being. The Sixth Conference of the Parties to the FCCC was not able to agree on it, and had to be suspended and resumed. In the resumed session, the parties again almost did not agree. With so little common ground on compliance, it would be implausible now to say that all states favoured a strong interpretation of the system they finally did agree on.

102 Ad Hoc Working Group on the Durban Platform for Enhanced Action (ADP) (13 August 2013), *Note by the Co-Chairs: Note on Progress*, ADP.2013.14.InformalNote, p. 2.

103 International Institute for Sustainable Development (2013), 'Warsaw Highlights: Friday, 15 November 2013', 12 (588) *Earth Negotiations Bulletin* 1, p. 2.

104 International Institute for Sustainable Development (2013), 'Summary of the Bonn Climate Change Conference: 29 April – 3 May 2013', 12 (568) *Earth Negotiations Bulletin* 1, p. 13.

105 Abram Chayes, Antonia Handler Chayes, and Ronald B. Mitchell (1998), 'Managing Compliance: A Comparative Perspective', in *Engaging Countries: Strengthening Compliance with International Environmental Accords*, ed. Edith Brown Weiss and Harold K. Jacobson, p. 42.


106 See Michael Mehling (2012), 'Enforcing Compliance in an Evolving Climate Regime', in *Promoting Compliance in an Evolving Climate Regime*, ed. Jutta Brunnée, Meinhard Doelle, and Lavanya Rajamani, p. 197 (enforcement 'is today seen as also comprising all the actions undertaken by states [to] compel states ... this definition can include a range of flanking and alternative measures').

107 Bodansky makes this point more generally about MEAs: Daniel Bodansky (2010), *The Art and Craft of International Environmental Law*, p. 227 ('the procedures established by many recent agreements to identify and respond to cases of noncompliance have a primarily facilitative rather than an enforcement function [as] they seek to determine the cause of non-compliance and work with the state concerned to rectify the problem').

108 The only notable problem with the running of the Compliance Committee has been a frequent lack of quorum at meetings: Compliance Committee Enforcement Branch (22–23 March 2013), *Report on the Twenty-Second Meeting*, CC/EB/22/2013/3, p. 1; Compliance Committee Enforcement Branch (3–4 July 2013), *23rd Meeting*, p. 1; Compliance Committee Plenary (17–18 September 2013), *Report on the Thirteenth Meeting*, CC/13/2013/7, p. 2; and Compliance Committee (2013), *Annual Report*, FCCC/KP/CMP/2013/3, p. 10 ('the overall participation of members ... has declined over the last several years').

109 On whether states are legally obliged to comply with the decisions of the Compliance Committee, see René Lefeber (2001), 'Negotiating History of the Compliance Regime', pp. 50–53.

110 Thus the jury is still out on Oberthür's claim that 'Compliance mechanisms ... constitute a key factor strengthening the bindingness and effective implementation of international agreements' (Sebastian Oberthür (2014), 'Options for a Compliance Mechanism in a 2015 Climate Agreement', 4 (1–2) *Climate Law* 30, p. 31), at least as far as it applies to the climate change regime.



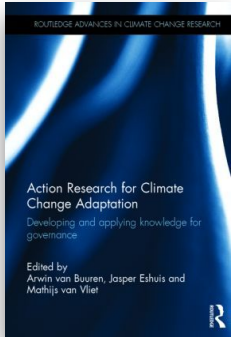
111 The IPCC's comment, that 'Despite the Kyoto Protocol's compliance system ... it is difficult in practice to enforce the Kyoto Protocol's targets because of the lack of a legal authority with enforcement powers, and the weakness of possible sanctions relative to the costs of compliance,' therefore seems misconceived: IPCC (2014), *Climate Change 2014: Mitigation of Climate Change: Working Group III Contribution to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change (Final Draft)*, ch. 13, p. 62. See also Jutta Brunnée and Stephen J. Toope (2010), *Legitimacy and Legality in International Law: An Interactional Account*, p. 195 ('the compliance mechanism of the Kyoto Protocol ... through its practice, can reinforce the protocol's substantive requirements').

112 Jutta Brunnée and Stephen J. Toope (2010), *Legitimacy and Legality*, p. 203.

The Governance of Adaptation to Climate Change and the Need for Actionable Knowledge:

The challenges of climate change adaptation and the promise of action research

Chapter 3. The Governance of Adaptation to Climate Change and the Need for Actionable Knowledge



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The challenges of climate change adaptation and the promise of action research


Arwin van Buuren, Mathijs van Vliet and Catrien Termeer

Introduction

All over the world, governments are considering how to deal with the issue of climate change and its possible consequences. Most energy is devoted to the question of how to mitigate climate change by reducing CO₂ emissions. However, there is growing evidence that climate change will be irreversible and will have serious threatening consequences. Therefore, the issue of how we can and have to adapt to changing climate conditions is coming more and more onto the political and administrative agenda (IPCC, 2012). The taboo that for a long time rested on adaptation is slowly being lifted (Pielke *et al.*, 2007).

The policy domain of climate change adaptation is thus relatively new; this means that policy ambitions are still under construction, and the same holds for policy instruments and arrangements. In many countries, governments are still busy with exploring the possible impact of climate change, whereas in other countries authorities are drafting ambitious programmes to make society climate-proof. Many authors urge for more decisive action and are anxious about the indecisiveness that they are witnessing (Giddens, 2009; Hulme, 2009).

The fact that climate change adaptation is still in its infancy also implies that there is a strong perceived need for policy-relevant information. Much time, money, and effort is invested in conducting technical analyses about what climate change can and does imply, which policy options are available, and how effective they are (Bruin *et al.*, 2009). There is, however, also a growing need for information on how to govern climate change adaptation and deal with the specific challenges it poses; in other words, how to govern adaptation to climate change (Termeer *et al.*, 2011). In particular, questions like how to mainstream adaptation into other policy arenas, how to mobilize private actors to finance adaptation measures, and how to connect short-term and long-term policy ambitions are important for many policymakers at multiple governance levels. Other questions relate to how to design institutional arrangements that fit the adaptation ambition (Hallegatte, 2009).




For social scientists, it is interesting to see how the climate change adaptation domain is evolving, the frames used to put climate change on the agenda, the barriers met, and the mix of instruments chosen (Biesbroek *et al.*, 2010; Hulme, 2009; Pralle, 2009). However, because of a serious lack of systematic, comparative, and evaluative research, it is difficult to translate this emerging body of knowledge into policy-relevant insights. Part of the problem relates to a lack of knowledge of suitable research methods that fit into the emerging policy adaptation domain – which is characterized by much complexity and uncertainties – and that result in both scientifically sound and application-oriented knowledge.

We explore the potential for action research. We define action research rather broadly as a research methodology in which researchers enter real-world situations and aim both to improve it and to acquire knowledge (Checkland and Holwell, 1998). Action research approaches share the aim of building ‘theories within the practice context itself and test them through intervention experiments’ (Argyris and Schön, 1991: 86). Doing scientific research *in situ* seems to be highly relevant in a context in which much has to be invented. Researchers are involved in a much more active way compared to the traditional observant role, on the one hand giving them the opportunity to get detailed empirical insight information that they might not obtain with traditional research methods, and on the other urging them to design interventions that improve the practices that they are analysing.

We present and analysis a variety of action research practices in the field of *governance of climate change adaptation* and reflects on the current action research literature. Case studies from diverse countries show how action research works in this complex and relatively new field. Special attention is paid to the potentials and pitfalls of action-oriented research approaches. At the same time, the case studies unveil new insights and different practices of governance of adaptation to climate change. The book has both a methodological and a prescriptive aim. First, the book explores the different methods of action research in the field of governance of adaptation to climate change and analyses how action research methods are being applied in this complex and relatively new context, and the potentials and pitfalls faced by researchers. Second, the book has a prescriptive ambition because it contributes to the development and effective application of action-oriented research approaches in the domain of climate change adaptation, through learning across cases, places, and methods.

In this chapter, we substantiate our argument that the status of climate change adaptation and the characteristics of this emerging domain are fertile ground for action-oriented research approaches. In the next section, we show that climate change adaptation is as much a governance challenge as a technical issue. In the third section, we argue that, because it is an immature policy domain and because policymakers are




faced with huge uncertainties and controversies, a more collaborative interaction between social scientists and policymakers or planners could be helpful in realizing more effective governance strategies. Then we describe in more depth the expected benefits of action research in the context of climate change adaptation.

Climate change adaptation as a governance challenge

There is increasing recognition of the need for society to adapt to the impacts of climate change (IPCC, 2012). Climate change adaptation involves technical adjustments, like raising dykes or creating water storage, but also calls for broader processes of societal change and transitions, and for increasing the adaptive capacity of society to deal with unexpected future changes (Jordan *et al.*, 2010). The governance of adaptation will face all the usual difficulties, hindrances, and opportunities of dealing with complex problems. On top of that, adaptation to climate change poses some specific, particularly demanding, governance challenges and dilemmas (see e.g. Haug *et al.*, 2010; Termeer *et al.*, 2011).

The governance of adaptation: challenges

A number of governance challenges characterize the field of climate change adaptation. First, a multi-actor, multi-sector, and multi-level governance world forms the inescapable context for climate change adaptation, because the ramifications of climate change stretch across different policy domains and institutional levels. Adaptation is highly interconnected, stretching over policy fields as varied as water management, spatial planning, infrastructure, agriculture, energy supply, industry, nature, and health. Climate change potentially impacts upon all these fields, and the interactions between them. Within each field, there are also increasingly complex governance systems that involve not only governmental actors, but also businesses and other civil society actors, at local, regional, and national level. Successful adaptation is highly dependent upon the ability to mainstream adaptation with other – existing – policy domains (Uittenbroek *et al.*, 2013) and also upon the involvement and collaboration of many actors from these fields, with their own ambitions and preferences, responsibilities, problem definitions, and resources (see Boezeman *et al.*). Governance strategies need to deal with this fragmentation (Verkerk *et al.*, forthcoming). Taking adaptation measures thus also leads to complex coordination issues and institutional flurry. These characteristics make it far from easy to formulate legitimate adaptation strategies (van Buuren *et al.*, 2014) and implement them (see Ellen *et al.*). In spite of these inherent uncertainties and ambiguities, decisions about adaptation strategies need to be taken or prepared now. The fragmented context of adaptation leads to many ambiguities when it comes to the question of who is



responsible for what (Brouwer *et al.*, 2013).

Second, climate change adaptation is still in its infancy and lacks a wellstructured policy domain and practice. This further increases the ambiguity about rules, roles, and responsibilities in the adaptation domain. Climate impacts will not affect all sectors and actors in the same way. It is therefore necessary to deal with the distribution of risks, costs, and benefits. Moreover, because of the multisectoral nature of climate change adaptation, redistribution of responsibilities is also needed. Land-use planners will have to deal with water-management issues, and water managers have to take into account the threats of new insects with new diseases, for example.

Third, decision making in relation to climate change is knowledge intensive, and important uncertainties about the nature and scale of risks and about the effectiveness of solutions will persist (Termeer *et al.*, 2011). There are still important uncertainties about the impacts of climate change and the effectiveness of adaptation measures (Arvai *et al.*, 2006). In addition, because climate change is controversial, climate change adaptation is controversial too (see Vink *et al.*). Organizing enough support for adaptation to uncertain climate changes is thus far from easy. Controversy is inevitable when the many actors involved bring with them a variety of frames to make sense of a highstake issue like climate change (Dewulf, 2013; Hulme, 2009). Differences in frames and perspectives affect not only the interpretation of knowledge, but also the desirability of adaptation options and connected governance arrangements (see van Buuren *et al.*, Chapter 10, this book). The redefinition of rights and obligations further contributes to the controversy.


Finally, the consequences of climate change manifest themselves in the future; this gives decision makers the time to implement adaptation measures, but they have to be drafted without absolute certainty about the consequences (see Huntjens *et al.*). This often leads to a delay in decision making (Fankhauser *et al.*, 1999; Hulme, 2009). We need to find ways to link long-term problems to present-day solutions and develop them in a robust way so as to deal with part of the long-term uncertainty (van Leeuwen and van Buuren, 2013).

The governance of adaptation: international examples

Notwithstanding this complex character of adaptation to climate change, policymakers all over the world have started to develop more or less ambitious adaptation programmes. However, both the scope and intensity of national programmes varies significantly (Table 1.1). In this section, we give a variety of examples which give a first impression of how various countries deal with adaptation to climate change.¹

Table 1.1 Policy sectors addressed in European adaptation strategies (EEA, 2013: 75)

Sectors	Number of countries	AT	BE	BG	CH	CY	CZ	DE	DK	ES	FI	FR	GR	HU	IE	IT	NL	NO	IT	LV	PL	PT	RO	SK	SI	UK
Water management and water resources	23	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Forests and forestry	23	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Agriculture	22	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Biodiversity, ecosystem services	19	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Human health and wellbeing	18	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Infrastructure and built environment	14	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Spatial planning, urban planning, and development	14	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Energy, energy consumption	14	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Coastal areas, coastal management	13	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Tourism	13	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Civil protection, safety, preparedness, and rescue services	10	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Transport, transport infrastructure	10	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Fishery and aquaculture	9	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Industry	8	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Natural disasters/ hazards	5	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Soils and desertification	5	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Business and services	5	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Green infrastructure, urban green spaces	2	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Economy	2	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Regional development	2	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Communities	2	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Heat-related issues	1	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Mountain areas	1	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x




There are significant differences regarding the scope of national adaptation strategies. It is quite surprising that there is a strong bias towards domains that are traditionally seen as vulnerable to natural disasters, whereas much less attention is paid to things like heat stress, green infrastructure, industry, and natural disasters.

With regard to the governance of climate change adaptation, there is a strong focus on flood management and other water-related issues. Furthermore, there is a growing awareness of the importance of mainstreaming adaptation into other policy domains (Uittenbroek *et al.*, 2013).

In a flood-prone country like the Netherlands, climate change adaptation is highly focused upon flood risk safety. In 2009, the Dutch Delta Programme started with the aim of taking long-term decisions to keep the Dutch Delta safe from floods, provide it with enough fresh water, and anticipate climate change. It is based on the recommendations of the 2008 Delta Committee, which recommended a Delta Act that should constitute the basis of a Delta Programme, a Delta Fund, and a Delta Commissioner to institutionally bridge the usual four-year policy cycles and guarantee the long-term character of the climate change adaptation measures when national budgets become tight. The Delta Act came into force in 2012 (Boezeman *et al.*, 2013; Vink *et al.*, 2013).

The Delta Programme consists of three thematic sub-divisions (water safety, fresh water, and urban and spatial planning) and six geographical sub-divisions. The programme is led by a Delta Commissioner, who serves as a liaison between the government (local authorities, water boards, provincial authorities, and ministries), civil society organizations, and other stakeholders. Many meetings have been held and studies have been done. The Commissioner is responsible for combining the insights from the different sub-programmes and will present the Delta Decisions in September 2014 (Termeer *et al.*, forthcoming). Despite the Delta Programme's efforts, the Dutch Audit Council assessed the Dutch adaptation strategy as too narrow and too fragmented. With the Climate Agenda (Ministerie van Infrastructuur en Milieu, 2013), Dutch politics responded by announcing climate risk assessments for vulnerable sectors such as energy, public health, infrastructure, and nature, in order to draft a more comprehensive national adaptation programme before 2017.

At European level, the governance of climate change adaptation is approached from a more integrated perspective. In April 2013, the European Commission (EC) presented its strategy on adaptation to climate change (EC, 2013). The strategy is accompanied by documents on adaptation in specific sectors and policy areas, such as migration, marine and coastal areas, health, infrastructure, agriculture, cohesion policy, and insurance. It further includes guidelines for the member states (MSs) on preparing national adaptation strategies (EC, 2013). The strategy's overall aim to contribute to a more



climate-resilient Europe (EC, 2013) splits up into three goals supported by eight actions:

1 promote and support MSs to develop national adaptation strategies and take concrete actions via the provision of guidelines and funding to support capacity building;

2 ensure better-informed decision making by filling knowledge gaps on adaptation costs and benefits, risk assessments, decision support models, tools and frameworks, monitoring and evaluation methods, as well as further developing the CLIMATE-ADAPT web portal (<http://climate-adapt.eea.europa.eu/>); and

3 climate-proofing EU action via mainstreaming adaptation into EU policies and programmes. This has already been done for the sectors mentioned above; in the near future, other policies like the Common Agricultural Policy, Common Fisheries Policy, and Cohesion Policy will follow.

The EU cannot force member states to take action and develop national adaptation strategies, as it has no mandate in this field. This is a major reason for emphasizing mainstreaming climate change adaptation into EU initiatives, such as Europe's growth plans and sectors in which it does have the power to force member states to act (EEA, 2013). In the 2014–2020 budget, 20 per cent of disbursements should be climate related (EC, 2013). Multiple adaptation projects have already received funding from, for instance, the European Regional Development Fund (EEA, 2013).

The EC realizes that most of the actual adaptation should be done at local and regional level and that climate change will have different effects in the different MSs. Yet, it sees a role for itself, as a lack of adaptation in one MS might negatively affect neighbouring countries (EC, 2013). Moreover, MSs can learn from one another, and the EU can assist in bridging knowledge gaps and capacity building (Termeer et al., forthcoming).

On the global scale, the UN Framework Convention on Climate Change (UNFCCC) aims to prevent 'dangerous' human interference with the climate system. From its inception in 1992, the focus lay mainly on mitigation, but in 2001 three funds were set up to support adaptation, among which is the Adaptation Fund funded via the Clean Development Mechanism of the Kyoto Protocol. Also, the Green Climate Fund should provide developing countries with funding for adaptation. However, little progress has been made, and available funding is inadequate to meet even the most urgent needs of developing countries (Verschuuren, 2013). In 2010, the Cancun Adaption Framework was adopted, requiring countries to plan, prioritize, and implement adaptation actions and strengthen institutional capacities (Termeer *et al.*, forthcoming).

Knowledge for adaptation: the need for reflexive and application-oriented research

In this complex context and with such a complex issue at stake, policymakers can benefit from insights from social sciences like economics, sociology, law, public administration, and political science when drafting adaptation strategies. There are many examples of large-scale research programmes aiming to deliver policy-relevant knowledge, to make adaptation policies more evidence based, and to deliver usable insights about governance arrangements, procedures, and strategies. Again, a short overview can give an impression of what is happening in this field.

In Germany, the Federal Ministry of Education and Research (BMBF) is funding KLIMZUG – Managing Climate Change in the Regions for the Future – to stimulate the development of innovative approaches to climate change adaptation. It contains a number of projects spread over Germany, with a strong focus on network development and interaction, capacity building, and institutional development (<http://www.klimzug.de/en/160.php>).

Adaptation in France is rather diverse, even though the focus is predominately on energy mitigation. Under the Sarkozy administration, France started to organize adaptation in a rather hierarchical way, for instance with a law that forces communities to make a climate plan (Grenelle II Act: http://www.developpement-durable.gouv.fr/IMG/pdf/Grenelle_Loi-2.pdf). In general, the boundaries between science and policy in France are rather strict. In 2008, club ViTeCC (an expert network organization) was founded to assist cities and local administrations with their adaptation efforts. This boundary organization is a collaboration of different knowledge institutes, develops local impact studies, and functions as a platform to bundle expertise. Several other experiments have also been undertaken, for instance the setting up of a regional IPCC for the Bordeaux region.

Go-Adapt is an Austrian political science research project that studies the governance of climate change adaptation (<http://www.wiso.boku.ac.at/goadapt.html>). It studies three governance challenges perceived as important in the context of climate change adaptation: improving horizontal and vertical policy integration, coping with uncertainties, and stakeholder involvement. It aims, among other things, to provide guidance on the establishment of climate change adaptation policy frameworks and thus has a strong focus on delivering application-oriented knowledge.

In the Netherlands, the Knowledge for Climate (KfC) programme, a largescale scientific programme, ran from 2011 to 2014. It was preceded by the Climate Changes Spatial Planning research programme. Within the KfC, the consortium on the governance of adaptation to climate change tried to apply action research on a large scale. Three

examples of this work are given in this book, dealing with flood risk management and fresh water availability.

At European level, numerous climate change projects have been taking place. JPI Climate is a collaboration between 13 European countries to coordinate jointly their climate research and fund new transnational research initiatives (<http://www.jpi-climate.eu/home>). CIRCLE-2 is a European network of 34 institutions from 23 countries committed to funding research and sharing knowledge on climate change adaptation and the promotion of long-term cooperation among national and regional climate change programmes (<http://www.circle-era.eu/np4/home.html>).


On the global scale, the World Bank is financing research projects on climate change (<http://www.worldbank.org/en/topic/climatechange/projects>), for instance in Kenya, Chile, and Laos. The 2007 IPCC report also includes information on adaptation to climate change, including an assessment of adaptation practices, options, constraints, and capacity (Adger *et al.*, 2007).

These examples of application-oriented research bring us to the question of how scientific knowledge can contribute to the governance of adaptation to climate change. After all, there are many problems when it comes to bridging the gap between knowledge and policy. Often, traditional research programmes fall short of becoming relevant and making the step from pure science towards utilization and application. Here, we come to our argument that other research approaches are necessary to prevent misfits between policymaking and research. Especially in the emerging domain of adaptation to climate change, organizing this connection in an effective and legitimate way seems to be of vital importance (Pielke, 2010).

The need for applicable knowledge in the governance of adaptation

Action research as co-production of science and policy

Current action research approaches have many different roots, and many sources have inspired the development and application of its methods (Reason and Bradbury, 2001). Action research starts from the idea that scientific knowledge has to be produced by creating, revisiting, and intervening in concrete social practices. In action research, the researcher generally enters a real-world situation and aims to both improve it and acquire knowledge (Checkland and Holwell, 1998). The aim is to build theories within the context of practice, and test them through some form of intervention (cf. Argyris and Schön, 1991). Action research aims both to contribute to the practical concerns of people in the field and to further the goals of social science simultaneously (cf. Gilmore *et al.*, 1986).



For now, it is enough to stress that action research essentially is a matter of coproduction between practitioners and scientists: scientific knowledge is developed by designing, implementing, evaluating, and refining concrete interventions in concrete practices in close collaboration with these practices.

The ambitions of action research therefore fit nicely with the plea of many authors to enhance collaboration between scientists and policymakers in order to address the specific challenges of adaptation to climate change (e.g. Pielke, 2010; Pahl-Wostl, 2009; Hoppe, 2010). Pielke (2010) even claims that society's ultimate success in responding to, and preparing for, climate change in the face of ongoing uncertainty depends on a renewed relation between climate scientists and policymakers, based on the principles of co-production. Many others have pleaded for innovative knowledge arrangements that enable joint fact-finding or joint knowledge production (Ehrmann and Stinson, 1999; Edelenbos *et al.*, 2011).

The scientific promise of action-oriented research


The promise of action-oriented research is that the involvement of practitioners will enhance the development of actionable knowledge, and that researchers will provide the scientific underpinning of actionable knowledge and guard the development of scientifically sound theoretical knowledge. By engaging in complex governance systems, researchers are better able to understand their dynamics, increasing the research quality in terms of its sensitivity to contextual factors, the incorporation of local knowledge, and relevance. As Reason and Bradbury (2001: 9) stated, action research:

lead[s] to 'better' research because the practical and theoretical outcomes of the research process are grounded in the perspective and interests of those immediately concerned, and not filtered through an outside researcher's preconceptions and interests.

By proposing alternative actions or strategies, researchers are able to ascertain the factors that explain behaviour, the barriers that people experience, and the belief systems that they hold. Therefore, action research is, from a scientific point of view, a promising approach because it results in a deeper understanding of practice. In this book, we critically reflect upon this scientific promise: does action research really result in a more profound understanding of what is happening in governance processes around climate change adaptation?

The normative starting point of action-oriented research

In general, action research cannot be neutral. By doing action research, the researcher tries to influence his or her object of research, not only to enhance insights, but also to



improve the functioning of this object. In governance processes, action research can, for example, be aimed at improving the quality of stakeholder participation, the progress of planning processes, the extent to which policymakers are able to reflect upon their choices and their consequences, or at the smooth implementation of drafted adaptation strategies. In this book, we take it as a defining characteristic of good action research that the normative aspects are made explicit. The reader has to be able ascertain the researcher's normative position. In general, three normative ambitions regarding action research can be witnessed in this book:

- action research has to enhance policymakers' reflexivity: it has to enable them to reflect upon their own choices and behaviour by providing critical reflection on, or insight into, alternative possibilities;
- action research has to enhance the governance capacity necessary to formulate and implement adaptation strategies; this capacity exists partly in the competencies of involved people, but also partly in the institutional capacity of the arrangements at hand; and
- action research has to contribute to the legitimacy of climate change adaptation by improving provisions for public participation, science–policy interfaces, and collaboration between different stakeholders.

The various case studies reflect different normative starting points, and throughout the book we critically reflect upon these normative ideals and how they end up in practice.

Dilemmas of action research

In a context in which policy formulation is just starting and much is unknown about what constitutes effective and legitimate approaches, arrangements, and strategies, doing scientific research that is also policy relevant requires methods other than traditional (evaluative) case studies (in which practitioners are not actively involved and there is no aim to alter the situation). Action-oriented research is relevant not only for assisting policymakers by exploring what works, but also for analysing emerging policy processes that are meaningful to policymakers. In Chapter 2, the potencies of applying action research in the domain of climate change adaptation are described in more detail.

Although action research seems a very promising research methodology in the context of governance of adaptation to climate change, like with all research methods, several problems and pitfalls can be encountered in its application. Many of these pitfalls are also applicable when action research is applied in other policy domains, but some of them seem to be specific to the climate change adaptation domain.

First of all, there are fundamental differences between the research and policy


institutions that have to be bridged in action research projects. Table 1.2 compares the logic of research and policymaking institutions on five aspects:

- 1 What constitutes progress in processes of conducting science and governance?
- 2 How is the scope for conducting science and governance defined and maintained?
- 3 Which influences contribute to adjustment and evolution within processes of science and governance?
- 4 What defines the type of interventions made to influence the course of events?
- 5 What outcomes are seen as valuable and effective?

These differences in institutional logic might cause problems in action research projects, and thus have to be dealt with. Also, the specific characteristics of, and assumptions underlying, action research might cause friction with the general

Table 1.2 Differences between the logics of research and the logics of policymaking (Termeer et al., 2012)

	<i>Research institutions</i>	<i>Policymaking institutions</i>
Logic of progress	Empirical cycle: from research questions and hypotheses, to data collection, analysis, intervention, to evaluation	Disjointed incrementalism: non-linearity, hiccups, setbacks characterize decision process
Logic of structure	Research is organized around a single researcher and by establishing a structured set of involved participants	Decision-making processes are multi-actor, multi-level and multi-arena: elements of the process are located in different arenas
Logic of change	New data and insights are used to refine hypotheses and to adjust interventions	Changing circumstances or power balances can necessitate changing course
Logic of intervention	Interventions have to contribute to getting more insight into the way in which processes unfold and are aimed at testing theoretical hypotheses	Interventions have to contribute to realizing effective and legitimate collective action
Logic of outcomes	Results have to be scientifically valid and worth publishing	Results have to be politically feasible and have to attract enough resources to be implemented



assumptions of both institutions. In the various chapters, we further analyse the frictions and tensions between these logics. We expect to find at least three main tensions.

The processes of research and decision making are fuelled by different incentives which can be conflictive and mutually exclusive. Scientists are often confronted with internal pressure to publish in high-impact journals, because universities are increasingly working with performance indicators in which the number of publications in high-impact journals is a crucial element. This implies that scholars need to devote much of their time to writing and rewriting scientific articles. This is difficult to reconcile with collaborating with actors in the field. Also, high-impact journals tend to put strict demands on the rigour of the research, including a rigorous research design. Several journals are hesitant in accepting articles based on action research.


Related to this tension between incentives is the issue of conflicting values. These may be ethical values, but also professional considerations. For a policymaker, it is important to enable political compromises, whereas scientists are often focused upon delivering the most effective solution. Policymakers are often confronted with time or budget constraints, whereas scientists would like to test hypotheses that require the mobilization of additional resources. These value differences make it difficult to define a common interest and goal.

Finally, research is essentially a goal-searching, exploratory activity, whereas policymaking is frequently organized in terms of narrowly defined projects in which existing insights are exploited, refined, and re-used. Also, the processes are structured differently, and this adds further to the difficulty of synchronizing processes of knowledge production and policy formulation.

Notwithstanding these problems, there have been numerous cases in which action research has been used with good results. Given the very positive reasons for using action research (more detailed insight into complex governance processes, increased social importance of research, and so forth), there is a lot to gain.

Aim and outlook (of the featured book)

This book thus centres on action research for the governance of climate change adaptation and presents a variety of action research practices in this field. Chapter 2 (by Patrick Huntjens, Jasper Eshuis, Catrien Termeer, and Arwin van Buuren) introduces action research in more detail, explaining the various ‘degrees’ of action research. It forms the theoretical foundation for the other chapters. The main part of the book is composed of eight chapters that describe different studies in the field of governance of



adaptation to climate change in which action research has played an important role. They describe the methodology of action research adopted, the problems encountered during the research process, the results of the methods (in terms of research results, knowledge utilization, and satisfaction of both practitioners and scientists), and a more general reflection upon the pros and cons of action research in the domain of governance of adaptation to climate change. To get a good overview of different projects, two case studies are derived from the governance of adaptation to climate change consortium (GACC), three from other Dutch research projects, and five from projects in other countries, such as Denmark, Australia, and Vietnam. The topics studied in the case studies differ too, from flood management, land-use planning, and water management to the process of developing and implementing strategies.

Chapter 3 (by Martinus Vink, Daan Boezeman, Art Dewulf, and Catrien Termeer) couples Wittgenstein's ideas (Gasking and Jackson, 1967) on learning through the authentic view of a 'bad city guide' with the role that action research can play in puzzling over ideas and powering for support in the governance of climate adaptation. The authors describe an action research project in which they collaborated with a civil servant acting as guide in the policy network of the Dutch Delta Programme. Teaming up with Wittgenstein's 'bad' guide gave them insight into the array of actors' frames at the informal fringes of the network, yielding a complete picture of the wicked character of climate adaptation as a policy issue. They conclude that, for effective action research in policy networks, partnering with a guide is crucial not only for effective puzzling over the various practitioners' frames creating the problem, but even more so in terms of effective powering with practitioners' frames to gain a powerful say in the collective puzzle.

To develop a climate adaptation strategy for the Lower Vam Co River Basin in Long An Province, Vietnam, the VamcoPart Partners for Water project chose a participatory approach, based on the action research methodology. Given the Vietnamese culture and context, this could not be done in the same way as in Western cultures. The pilot project shows that action research methods – such as group model building (GMB) and highly interactive forms of learning – are possible in the Vietnamese context if properly embedded, initiated, and facilitated. Eventually, the project was able to find a way to connect with the Vietnamese participation tradition; and, in six meetings, more than 200 representatives of organizations at province, district, and commune level contributed to a series of GMB sessions focusing on a common understanding of problems, causes, solutions, and the development of strategy components. This participative planning approach, together with advanced decision support tools, resulted in a Preferred Climate Change Adaptation Strategy. Chapter 4 (by Patrick Huntjens, Bouke Ottow, and Ralph Lasage) addresses the question of the extent to which action research methods can be applied in a non-Western culture like Vietnam,




taking into account cultural differences and possible ways to bridge these.

In Chapter 5, Daan Boezeman, Martinus Vink, and Pieter Leroy elaborate how action research can be a particularly helpful way to make institutionalized ways of knowing, problem-solving, and decision making perceivable for a researcher. Institutional perspectives challenge purely rationalist approaches in stressing that actors interpret events in structures with which they are socialized. A strongly institutionalized context, where role expectations are stubborn, the science–policy interface strongly codified, and (potentially conflicting) competencies formalized, yields an interesting avenue to explore the potential for action research to deliver better grounded insights and societal changes. Their case study concerns the Dry Feet 2050 project, dealing with the future of the regional water system in the northeastern part of the Netherlands. Dry Feet 2050 aimed to organize knowledge production for climate adaptation in a more participatory way and engaged researchers to develop a joint action research project to enable learning thereon. Boezeman *et al.* used a number of action research methods: observing project meetings, organizing workshops on participatory governance and knowledge production, and reflection sessions with project members.

Chapter 6 (Rob Roggema, John Martin, and Lisa Vos) explains how design charrettes were used as a creative tool in participatory action research. The State of Victoria, Australia, wanted to develop knowledge on how to involve communities in decision making for climate adaptive futures and supported the research project entitled: Design-Led Decision Support for Regional Climate Adaptation. The design charrette methodology entailed an intensive multi-day and multi-participant design workshop aimed at creating innovative, creative, and integrated visions. The charrettes functioned as participatory action research in the complex arena of local/regional governance and climate adaptation. The researcher(s) interacted with a wide range of experts, local stakeholders, citizens, and policymakers. The chapter elaborates on the methodological advantages of this specific participatory action research, the results in terms both of climate adaptation visions and of participants' commitment and involvement, and evaluates and reflects upon the advantages and the disadvantages of the approach undertaken.

In Chapter 7, Gerald Jan Ellen, Corniel van Leeuwen, Wiebren Kuindersma, Bas Breman, and Frank van Lamoen study the difficulties that arise when adaptation strategies need to be implemented. The aim of the Adaptive Implementation Arrangements project was to develop – in interaction with stakeholders, universities, and knowledge institutes – a methodology to organize combinations of reflexive monitoring and flexible (legal, financial, and organizational) arrangements. The action research applied consisted of interviews and three types of meetings with stakeholders. The synchronization of science and practice was therefore sometimes difficult. However, the action research



process led to a significant increase in reflection and learning between practice and science, also resulting in a higher degree of knowledge utilization and increasing the approachability of scientists for practitioners, and vice versa.

Patrick Driscoll and Martin Lehmann describe in Chapter 8 how the city of Copenhagen (Denmark) investigates new ways to develop, test, evaluate, and refine new forms of local governance tools, such as serious gaming. The city of Copenhagen uses these new tools for the implementation of their adaptation strategy. Driscoll uses a variety of action research tools to study this project, among which are interviews, recordings, focus groups, on-site observations, and discussions with project members.

In Chapter 9 Todd Schenk and Lawrence Susskind introduce role-play simulation exercises (RPS) as a powerful tool for supporting action research efforts. Their experiences with this type of serious game suggest that they can be invaluable when various stakeholders are engaged to collaboratively learn about climate change risks, explore options, and seek agreement on how to proceed with adaptive measures. Exercises constitute action research when officials and other stakeholders are actively engaged at all stages, from design to the interpretation of results, and the focus is on meeting community needs. Researchers working with communities can concurrently devise and test wider theoretical insights based on what happens during exercises and how participants reflect on their experiences. RPS exercises can be used to engage stakeholders in fictional yet realistic decision making that mimics challenges they are facing, or may soon face, allowing them to experience various dynamics and explore options in a low-cost, low-risk setting. Participants get a sense not just of the technical challenges posed by climate change, but also of the governance dynamics that make decision making difficult. This chapter draws on the authors' experiences of using RPSs around the world, and in particular with coastal communities in New England (United States) and infrastructure planners and decision makers in Singapore and Rotterdam.

In Chapter 10 Arwin van Buuren, Mike Duijn, Ellen Tromp, and Peter van Veelen describe a co-creation process that aimed to refine adaptive flood measures in such a way that they could be implemented. They describe how the process was executed by an interdisciplinary team of researchers and a policymaker from the City of Rotterdam. The chapter shows why action research in this case was a very useful approach and how the process was managed in order to deliver both policy-relevant knowledge and scientifically valid insights.

Chapter 11 by Mathijs van Vliet, Arwin van Buuren, and Jasper Eshuis includes an overall reflection on the use of action research in studying governance of climate change adaptation. It compares the difficulties hypothesized in this introductory chapter on the basis of the research presented in the eight cases presented in Chapters 3 to 10.

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Note

1 A larger overview of adaptation projects in Europe can be found at <http://climateadapt.eea.europa.eu/>. WeAdapt provides an overview of projects around the world, as well as downscaled climate data (<http://weadapt.org/>).

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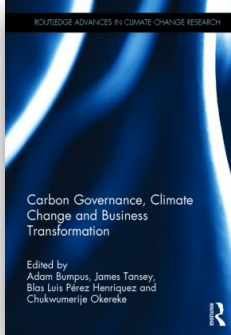
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The problem of climate change: Challenges and Opportunities in Carbon Governance

Chapter 4. The problem of climate change



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Challenges and opportunities in carbon governance


Blas L. Pérez Henríquez

Climate problem solving and the promise of a prosperous clean economy

This chapter discusses the challenges of climate policymaking and the role of policy drivers and governance in supporting low carbon business transformation. It focuses on the need for a critical mass of credible, well-designed and compatible new climate policies for key regions of the world. Addressing climate change in a timely and cost-effective manner remains a huge challenge for the global community. It demands enhanced understanding of the issues at stake, policy ingenuity and pragmatism, as well as long-term commitment by politicians and policymakers to low carbon economic development. Smart carbon policy drivers should foster much more entry of business into sectors that can support clean and highly energy-efficient economic growth. The kind of changes that are needed and may be feasible, particularly in our energy, transport and urban systems, are presented as a first step towards a more comprehensive global carbon regime.

With historical accumulation of greenhouse gas (GHG) emissions in the atmosphere from fossil-fueled industrialization at the centre of the problem of climate change, the scientific community is stressing the increasing urgency of implementing timely and effective governmental interventions to mitigate these emissions. Expected climatic effects are advancing at a faster rate than previously thought (IPCC 2013; Melillo, Richmond and Yohe 2014). Moreover, once certain so-called tipping points are reached – for instance, the melting of grounded ice sheets – implications to human livelihood could be catastrophic (Mora et al. 2013).

To sustain safe levels of GHG emissions in the atmosphere, a transition to a highly efficient, low carbon economy is necessary. The emergence of a clean, prosperous economy will have distributional implications; therefore broad economic, social and equity considerations should be included in national and multilateral policy formulation processes for a global carbon compliance regime. Governmental green growth strategies, based on supporting low carbon business transformation, have great promise for enhancing human development. However, faster uptake of clean technology than the market will induce is needed, through more innovative financial, marketing and legal instruments.




Path-dependent institutional, political, social and technological inertia is significant. Fossil fuel has been central to economic progress and wealth creation since at least the mid-1800s in the industrialized world. Toward the end of the twentieth century, large fast growing emerging economies such as the BRICs groupings, and in general the G20 nations, have relied on carbon-intensive energy to fuel their economies.¹ In 2012, coal, natural gas and oil accounted for 87 percent of the world's primary energy. Moreover, coal, the most GHG-intensive fuel, is expected to soon become the most consumed primary energy source in the world. China alone accounts for more than 50 percent of global coal consumption, mostly to generate electricity (Gonzalez and Lucky 2013; Cusick 2013). Such global energy-mix patterns are unsustainable absent reliable carbon sequestration. The transformation and revitalization of the tech-intensive US\$5 trillion global energy industry presents enormous economic growth opportunities to be realized (American Energy Innovation Council 2011).

The international scientific consensus about the need to address climate change calls for the stabilization of the total concentration of atmospheric carbon at 450 parts per million by the year 2020 in order to mitigate the greatest risks and dangers of climate change (IPCC 2007). Scientists believe that accumulation beyond this threshold, given how long carbon dioxide (CO₂) remains in the atmosphere causing warming, will lead to a more than 2 degree Celsius rise in global temperature over the next 100 years (Meehl et al. 2007). In this scenario, temperatures will lead to an increasingly unstable global environment for life, including humans.

In most nations around the world, this evidence has stimulated some degree of climate policy action to contribute to achieving the recommended carbon emission stabilization goals, while at the same time adequately meet adaptation challenges. In the developed world, most notably, the European Union (EU) has taken the lead in multinational climate commitments by implementing a regional market-based mechanism to price carbon and supplementary measures as part of the region's 2020 strategy for supporting 'smart, sustainable and inclusive growth'. Leaders in the region's policy framework argue that 'the climate and energy challenge contributes to the creation of jobs, the generation of "green" growth and a strengthening of Europe's competitiveness' (European Commission 2013).

In the developing world, and despite recently passing the United States (US) to become the world's largest emitter, China has taken the lead to seek profit from the race towards a clean economy by taking a pragmatic approach to climate action. From their perspective it makes financial sense to invest heavily in energy efficiency and renewable energy sources as a matter of industrial policy. On one hand, China has emerged as a top exporter in the global market for renewable technology products, while on the other hand, by deploying renewables domestically it is also saving on




energy costs to help sustain its fast-paced growth rates. The central government in its *12th 5-Year Plan 2011–2015* (PRC 2012) will support, with a budget of RMB 5 trillion, pertinent investments to achieve an energy mix target of 15 percent from renewables by 2020 (WEF 2010). China's policy goals are based on the concept of carbon intensity, which regulates emission reductions per dollar of economic output and is currently set at around 40 to 45 percent in 2020 from 2005 levels. Such policy, given China's growth patterns, most likely will still allow increased emissions. A universal cap under a national carbon market system would be a more certain target (Morales 2013). China has already implemented several pilot carbon markets at the city level, and is considering implementing a national emissions trading system (ETS) between 2016 and 2020.

However, the elusive *sine qua non* condition of international collective action for a cost-effective, equitable and multi-sectoral solution to address climate change at the global level has been absent throughout the multilateral process launched in 1992 at the United Nations (UN) Rio Earth Summit. This event jumpstarted a process of international environmental policymaking to address global commons and sustainability issues, from biodiversity decline to the then emerging issue of climate change. While climate change is a long-term problem, the process of garnering political support for action through multilateral negotiations in support of emission mitigation programs has been convoluted and lacks the incentive structure to succeed because of a lack of credible policy ambition among a critical mass of states and regions in their emission reduction goals. There is a huge gap between what needs to be achieved in terms of GHG emission reductions at the global level and actual, stated or legally binding, national commitments.

No single jurisdiction has developed and implemented a fully comprehensive system to address climate change, and no single policy approach will ensure success. A combination of national legally binding commitments and local organic solutions, in parallel with the top-down framework being developed under the *United Nations Framework Convention on Climate Change* (UNFCCC), may be the most pragmatic path toward real progress in reducing GHG emissions. Except for a few responsible global actors, a wait-and-see attitude has been the international norm. Reservations over independent or early climate action by some jurisdictions (i.e., local, regional, national and multinational) is rooted in the perception that such efforts will put a damper on growth and will become a burden on the competitiveness of their economies.

In addition, climate stabilization is a tragic, pernicious prisoners' dilemma. Because the atmosphere is well mixed, a jurisdiction only gets $\frac{p_i}{P}$ total benefits obtained from an investment in it, where p_i is country i 's population and P is the world population. This means, for example, that the benefits of, say, California climate policy are diluted 1:200




for Californians. Under this perspective, if a government thinks the world will step up and stabilize, then a political jurisdiction's best bet is to free ride. Moreover, if a government thinks the rest of the world will take no action, the best bet then is to do nothing and, for instance, avoid becoming uncompetitive by raising costs to local industrial sectors.

Advancing climate policy solutions will undoubtedly require a time-intensive (but not extensive) process of trial and error. In policymaking, mistakes or unintended consequences are common. Governmental interventions can be costly, and may affect economic development. Despite this, first movers are betting on competitively positioning their economies by developing carbon pricing policy drivers to incentivize their businesses and industry to start the energy systems transition within a carbon constrained world. Major corporations are already expecting binding climate regulation at some point in the future. For instance, in the US 'more than two dozen of the nation's biggest corporations, including the five major oil companies, are planning their future growth on the expectation that the government will force them to pay a price for carbon pollution as a way to control global warming' (Davenport 2013).

In some cases, governmental support for the development of a renewables industry has led to inefficient investments. For instance, while Spanish companies compete in the global market for wind and solar power generation, domestically these projects have been criticized for their high costs per unit of clean energy generated compared to fossil fuels. Therefore, some suggest that not enough is being spent on bringing costs down in green-energy innovations. Aiming at high efficiency in power generation should be the focus of clean technology investment (Lomborg 2013). The private sector, and in some cases public-private partnerships, could also capitalize on some of the 'positive effects of climate change' (IPCC 2007).

However, significant political, economic and social hurdles remain to properly account for the social cost of carbon – both negative and positive externalities – to manage in a cost-effective and equitable manner the transition to a climate resilient, clean, prosperous economy. More collaborative frameworks leading to 'win-win' scenarios between government and the private sector may be the key to overcoming these hurdles. Focusing on the business case for climate action is paramount. Pricing carbon is essential to stimulating such transformational efforts (Perez Henríquez 2013: 233). However, as many of the complementary measures towards energy efficiency are market failures, government interventions along with public-private partnerships will be needed, for instance, to develop sustainable transport mobility solutions as well as well-integrated, clean and highly efficient energy systems. Smart, well-designed national and international carbon policy will bring an array of new business opportunities to the private sector (Leone 1986).




The following section will address the role of climate science, the media and public perception in the development of climate policy. This chapter will then discuss the challenges to projecting outcomes and policy solutions in addressing climate change. Also, it will discuss the relationships between policy drivers and low carbon business opportunities. The problems of a lack of policy ambition and the consequent emissions reduction gap to achieve GHG stabilization goals will be discussed in the context of the tension between sustaining growth patterns with fossil fuel energy and the need to develop cleaner energy sources and implement sectoral industrial programs to mitigate carbon emissions. Finally, I outline some of the key issues surrounding responsible business practices and the role of private investment in enabling this century's energy transition.

Communicating climate science, incomplete information and policymaking

Scientific uncertainty, combined with the absence of a cohesive and effective public communication strategy for climate science, has for the last two decades contributed to inappropriate risk management regarding this global environmental issue by some countries and industries. Efforts to improve this situation are now in place in the aftermath of a highly publicized scandal regarding questions over modeling assumptions and the inclusion of some generic sources in studies, by some scientists contributing to the UN Intergovernmental Panel on Climate Change (IPCC).² Ultimately, these perceived methodological mistakes do not change the overall projections of this scientific risk assessment body formed by more than 2,000 world scientists and policy experts.

In scientific research, which searches for cause and effect relationships in nature through experimentation in order to identify predictable patterns with explanatory power, mistakes are made in the process. Through peer review systems, the scientific and research community identifies faults and areas for improvement. The cautious and gradual approach to reaching scientific conclusions opens the door to misinformation and misinterpretation of knowledge gaps at some point in the process, that in turn can instill confusion or doubt in the public. These gaps can be used by those who lobby against climate policy to garner public support.


Some have compared the strong and well financed lobby involving the coal, gas and oil industries against a carbon constrained world to the tobacco industry's lobbying and legal battles in US courts during the 1980s surrounding its reluctance to acknowledge definitive scientific evidence about the addictive effects of nicotine in humans and the need for government intervention (Oreskes and Conway 2010). While the tobacco industry maintained strong unanimous opposition for more than a decade, by the



mid-1990s public opinion turned against them and eventually some of these corporations acknowledged the health risks of their products and declared to have changed their views (Kessler 2001; Yach and Aguinaga 2001). However, this was facilitated by proactive state attorneys general who filed a class action lawsuit against the largest tobacco companies to recover their tobacco-related health care costs, as well as fund a large anti-smoking campaign (National Association of Attorneys General 1998). Ultimately, these actions resulted in the banning of cigarette advertising on TV, then print media, and eventually a continuously expanding set of national regulations beyond the US eliminating smoking, for instance in airplanes, restaurants and public places around the world. A similar pattern of shifting public opinion and industry resistance seems to be occurring in the climate science debate and the fossil fuel industry lobby. Gradual acknowledgment of the carbon emissions problem, emphasis on the cost of this energy transition, and a slow embrace of clean energy solutions are part of their business portfolio. For instance, many oil companies invest a relatively small amount of their profits in renewable energy research while funneling most of their cash into continuing to develop fossil fuel discovery and extraction.

Moreover, the media business, which plays a critical role in communicating relevant science and educating the public, in its constant search for headlines, has also played a role in popularizing incomplete conclusions. For instance, the popular press in the 1970s raised awareness about what seemed at the time an emerging environmental threat: the issue of global cooling (*Time* 1974). The scientific plea at the time was to consider warming up our oceans with geoengineering solutions in order to save our civilization from a new ice age. Such call for action based on faulty evidence from a few scientists is now being publicized by climate skeptics as an example of incomplete science leading to misguided and potentially very costly policy recommendations that would alter social behavior in its entirety. These ideas are reemerging in the climate debate in both traditional and new media outlets (e.g., blogosphere). Financial resources available to lobby against climate action dwarf those available to official research and scientific communication campaigns. Opinion leaders' statements in the media in tandem with the perceptions of the public over the issue of climate change play a key role in informing the attitude, readiness and capacity of politicians and policymakers to advance pertinent, responsible policy action in this area.

Unfortunately, environmental policymaking around the world shows that frequently institutional action to implement diligent and effective governmental interventions occurs only after scandals and catastrophes impact relatively more affluent societies and enter the public consciousness there (Verchick 2012). In such cases, civil society groups demand protection and governmental action to address and prevent future risks to citizens. With time, the better organized, technically capable and politically savvy environmental groups lobby for action to minimize risks to society and habitat. These



incidents are known as focusing events, 'a crisis or disaster that comes along to call attention to the problem, a powerful symbol that catches on, or the personal experience of a policy maker' (Kingdon 1984: 100). In such cases, people and their livelihood are directly impacted and actions are implemented in tandem with significant institutional strengthening and regulatory reform.


As the quality of policy-relevant scientific evidence on climate change, and the degree of certainty about impacts to the global economy and on the habitat continues to improve, arguments in favor of policy action are strengthened. Furthermore, in many regions of the world extreme climate events are now more visible in all media and may increase social pressure for governments to act swiftly. For instance, more frequent super storms in both the developing and developed world, as well as the impacts of fast changing sea levels in island nations and coastline communities, have made climate change a part of everyday considerations for many people (Revelle 1983; 441–442, Levermann et al. 2013; IPCC 2013). However, effects on baseline conditions from non-environmental factors, such as economic growth and development of new technologies that could reduce vulnerability, remain less well analyzed (IPCC 2001).

In modeling climate cycles, there are still unavoidable limits to our capacity to understand and project climatic scenarios into the future. Integrated analysis of the relatively recent human-made carbon emissions in the atmosphere vis-à-vis the natural carbon cycle of our planet makes these projections complicated. For instance, timescale estimates of atmospheric carbon containment and eventual absorption capacity in the atmosphere go from decades to thousands of years (Wunsch et al. 2013: 4435–4436).

The long view, precautionary climate action and global governance

Climate change is a long-term intergenerational global environmental commons problem. Prospective policy analysis, and planning beyond a decade, is by the nature of the process a difficult task. Policymakers are forced to project outcomes into the future based on uncertain scenarios and incomplete understanding of the problem at hand (Bardach 2012: 47). A common argument against early or preemptive action on climate is that future generations will be better informed, wealthier and, thanks to technological advances, more capable of confronting this issue in a cost-effective manner. Moreover, most global leaders and trade and finance ministers' agenda reliance on growth and attracting productive investment tends to trump formal efforts to capture the risks of climate-related shocks in conventional economic models.

In climate action, patterns of implementation tend to be initially cautious and limited in scope. Experience so far shows that adaptive management and clear and transparent institutional adjustment policy paths to minimize regulatory uncertainty are needed to




enhance the cost-effectiveness of government interventions to achieve their desired outcomes. This is especially important in climate policymaking given the evolving knowledge of scientific, economic and implementation considerations in the process of addressing climate issues.

Our atmosphere, a common good, may be stressed in its capacity to sustain life from excessive accumulation of carbon because no one person or group has sole responsibility or ownership over this resource. Some responsible actors have taken unilateral measures to address GHG accumulation in our atmosphere. But without the appropriate institutional arrangements for all, some actors may opportunistically free ride on others' efforts to reduce emissions and undermine common goals. Devising appropriate mechanisms and incentive structures for cooperation and collective action is a major policy design challenge to global governance; a bottomup or 'polycentric' approach may be more realistic and pragmatic in the short-term (Ostrom 2009).

Despite most GHG emissions coming from wealthy nations and emerging economies (e.g., G20), it seems increasingly likely, based on scientific risk assessments, that impacts from inaction will be most severe in countries with smaller gross domestic product (GDP). As infrastructure expenditures for adaptation grow, countries with less technical and financial capacity will suffer the most. Additionally, impacts on food supply from droughts may threaten progress achieved in human development indices in many nations. While in some cases, climate change will bring some economic gains to developed countries such as Canada and the US, for instance from agriculture, others like Russia, Turkey, Mexico and China will see losses in crop yields (Lobell et al. 2011). Moreover, peace in some regions of the globe may be at risk because of the social and economic impacts of climatic variations, particularly in less developed countries where conflict may arise over accessibility to natural resources such as water (Hsiang et al. 2013; Hornig and Daley 2013).

Undoubtedly, equity is a major concern for environmental and climate policymaking. Industrialized nations have already used most of the atmosphere's absorption capacity, and safe levels of GHG accumulation require establishing and meeting a certain universal cap to global emissions. Policymakers are therefore required to put forward innovative, pragmatic, non-adversarial policy mechanisms to address the global climate change challenge in a manner that pushes business collaboration and investment towards the development of new low carbon technologies, processes and industries. The expected scale of transformation in our economic and energy systems to limit carbon emissions from burning fossil fuels, both in the developed and developing world, requires the highest degree of international cooperation. Carbon policy drivers will certainly impact incumbent industries such as coal, oil and gas, as discussed earlier. Like any other transformative process, good climate policy will produce dislocation and



transition costs akin to the process of expanding free trade and other global policies. Such policymaking challenges demand unprecedented levels of ingenuity to balance broad social considerations while devising cost-effective programs and equitable economic opportunity paths in support of this century's energy transition.

Government and low carbon business opportunities in a green economy

The policy and technological paths needed to transform our global economic system by bridging the current transition from a fossil fuel-based economy to a cleaner one remain uncertain. However, consumer demand for more sustainable business practices and products is driving innovation and investments in cleantech and green industries, while legislatures around the world introduce policies such as renewable portfolio standards for the electric power industry, and low carbon fuel standards for vehicles. Pressure from consumers and regulators helps to integrate renewable sources into the electric power grid and develop lower carbon paths for transportation and urban systems. Inclusive and transparent consultation processes can enhance program development by reflecting these preferences. In cities, for instance, consideration of individual property rights and personal preferences by planners and government as they set community or regional goals for smarter, more resilient urban environments is important.

The next generation of technological solutions, including smart information technology systems, that will reduce carbon emissions and increase the efficiency of energy systems differ in their stages of development. Some are sitting on laboratory shelves and others are just in the discovery stage. Commercialization remains challenging. Policymakers in the US have discovered that bridging cleantech innovation from discovery to finance to deployment, through the so-called valley of death, is essential but remains riddled with pitfalls and is vulnerable to political cycles and polarization. For instance, the bankruptcy of California-based Solyndra, a US solar panel manufacturer unable to compete with global competitors who have industrial policy supporting this sector, created a public relations nightmare for the Department of Energy's loan guarantees to the cleantech sector. This case has been portrayed by some as the epitome of the failed strategy of the US Government to invest in clean energy businesses (Anon 2011).

In contrast, electric car company Tesla repaid its government guaranteed loan nine years early, and is widely regarded as a major economic success. Government interventions helped Tesla move from being a small manufacturer to one of the fastest growing car companies in the world (Eavis 2013). While picking winners and losers in technology remains controversial and cleantech business development comes after a good number of failures, experience has shown that it can lead to success. This is the nature of doing business in innovative, potentially disruptive technological sectors.

Increasing the deployment of clean sources of power and heat needs to be propelled through a globally mandated energy systems transition in the context of long-term credible climate policy drivers.

In general, levels of the governmental support to foster the renewable energy industry remain modest compared to previous energy transitions. Current calculations of global subsidies for fossil fuels range from US\$500 billion to US\$1 trillion annually (Bast et al. 2012; IEA 2013). Historically, in the US energy transitions have always been financially supported by government. First timber and coal, then oil and gas, and more recently hydro and nuclear, benefited from government subsidies and infrastructure development support. For instance, a leading venture capital investment firm in the cleantech sector in California reported that, 'in inflation-adjusted dollars, nuclear spending averaged \$3.3 billion annually over the first 15 years of subsidy life, and oil and gas subsidies averaged \$1.8 billion, while in the case of renewables, subsidies have averaged less than \$0.4 billion per year' (Pfund and Healy 2011). Figure 3.1 shows the historical average of annual energy subsidies in the US.

As mentioned above, the Chinese government is investing more than any other nation in its transition to a low carbon economy, including major sustainable mobility infrastructure projects such as high-speed rail, and actively supports the expansion of its renewable energy industry (PRC 2011). China now supplies affordable renewable generation inputs for deployment around the world. The central government's industrial policy in support of this sector has in effect brought down costs of solar energy provision to levels that are now competitive with natural gas power generation.

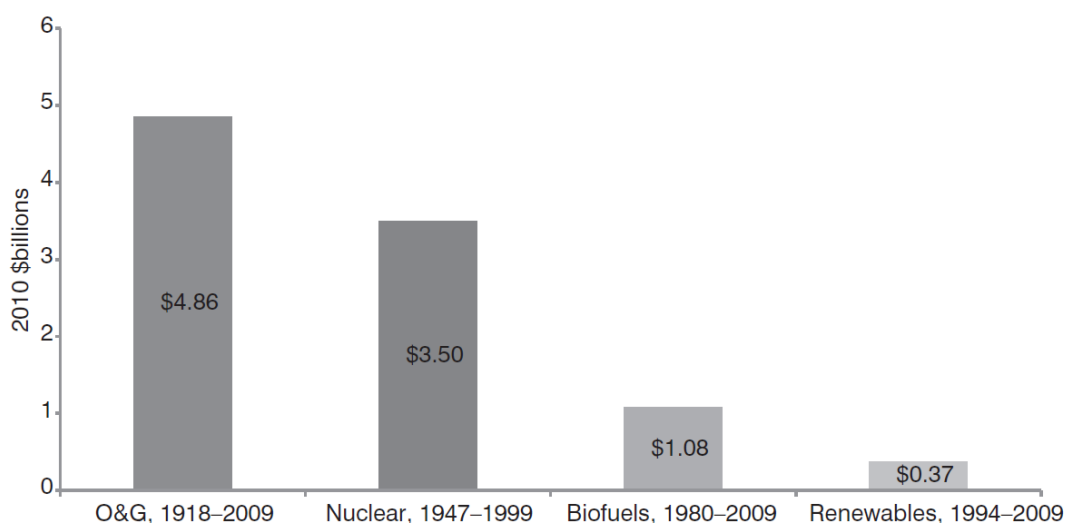



Figure 3.1 Historical average energy subsidies. Source: Pfund and Healy (2011)




In the US, the spillover effect is that green jobs instead are being created by installing these more cost-competitive solar systems, particularly for clean power generation in the south-west region of the country.

The role of public funding in cleantech has been a highly politically contentious issue in the US. In principle, markets and competition are more efficient than government in determining winners and losers, in other words the role of renewables in energy markets. However, in order to effectively mitigate GHG and other copollutants, cleaner sources of energy need to be deployed urgently. This does not mean clean technologies have to be produced domestically. Innovation research instead is the comparative advantage of the US and other advanced economies. Modeled after the Defense Advanced Research Projects Agency (DARPA), an agency created to maintain the technological superiority of the US military since the mid-1950s, the Advance Research Projects Agency – Energy (ARPA-E), was created to back high-risk innovations in energy. In 2007, Congress passed and President George W. Bush signed into law The America COMPETES Act, which officially authorized ARPA-E's creation. In 2009, Congress appropriated and President Barack Obama allocated US\$400 million to fund ARPA-E's first projects. Since 2009, ARPA-E has funded over 285 potentially transformational energy technology projects. These grants are meant to help move research ideas to the prototype or demonstration stage.

During the presidential election debates of 2012, Republican criticism of federal government loan guarantees in support of new energy technologies, focusing on the Solyndra bankruptcy, spilled over to ARPA-E. Political polarization in Washington and difficult budgetary negotiations in Congress resulted in diminishing funds. Funding levels and a narrow mission impedes ARPA-E in supporting the commercialization of technology. Some experts argue that new energy technologies will require large-scale demonstrations that could cost hundreds of millions of dollars before private investors will be willing to take over. Therefore, the multiplier effect of federal government financial support for transformative cleantech in the US remains very modest.

Private investment in cleantech is evolving as well. As discussed in Chapter 11, in California, data shows that after the initial bump from the new tech investment hype period, traditional venture capital remains a key source of financial resources for startups in this sector. By supporting further research, technological and business plan refinements, product commercialization and operations scale up, these individuals and companies provide the foundations to make viable the emerging business opportunities in innovative clean energy, green consumer goods and related products (e.g., sensors, smart meters, smart phone applications, etc.).

However, as reported by the San Francisco Bay Area-based group Next 10, other types of investors are now involved in the development, growth and acceleration of these



businesses. From private loans from banks to corporate investments, cleantech is now expanding its finance options. An important development beyond initial support phases is that 'a greater proportion of this investment is being directed towards deploying cleantech products and services'. Moreover, 'public policies, innovative new finance mechanisms and tax incentives are also helping to drive cleantech deployment investment' (Next 10 2013: 1).

Sustainability as a business strategy is gradually taking hold in the management and culture of companies at the national and multinational level. As corporate strategy theory suggests in addressing environmental concerns in general, carbon policy drivers might enhance profits and the competitiveness of the most environmentally concerned companies by incentivizing energy cost savings and a low carbon footprint in cleaner products and services (Porter 1991; Porter and van der Linde 1995).

Financial and investment instruments to bridge the transition to a low carbon future are important both in the developed and developing world. Governments and the private sector, independently or jointly in public-private partnerships, can invest in and finance adaptation projects that, ideally, maximize returns. Moreover, an abundance of business opportunities will emerge from energy, transport and urban systems transformation processes as societies engage in enabling low emission, high efficiency economies.

New-clean versus old-dirty energy economy business tensions

Industrial activities and their related logistics are an important source of wealth creation and the main engine of growth in the global economy. Responsible climate action to limit the burning of fossil fuels at the local, national and regional level is important to sustain momentum towards a climate-safe planet. There is no silver bullet to address climate change. Limiting GHG emissions is not a simple act like quitting smoking, but a portfolio of things, none of which can solve the problem alone. In a few cases, the promise of a green solution may have unintended consequences and will turn out to make it worse, as we have learned from crop-based biofuels which are mugged by indirect land use change impacts and about natural gas possibly vitiating by leaking high levels of methane (Searchinger et al. 2008; Karion et al. 2013).

However, supporting the transformation of a few key industrial sectors could also lead to great progress towards the goal of reducing carbon emissions globally. Those jurisdictions acting as responsible members of the international community have demonstrated that multifaceted strategies have the biggest impact on carbon emissions mitigation. The right mix of policies and incentives to foster low carbon business transformation remains elusive at the international level. Policymakers and business leaders need to thoroughly explore more collaborative approaches and

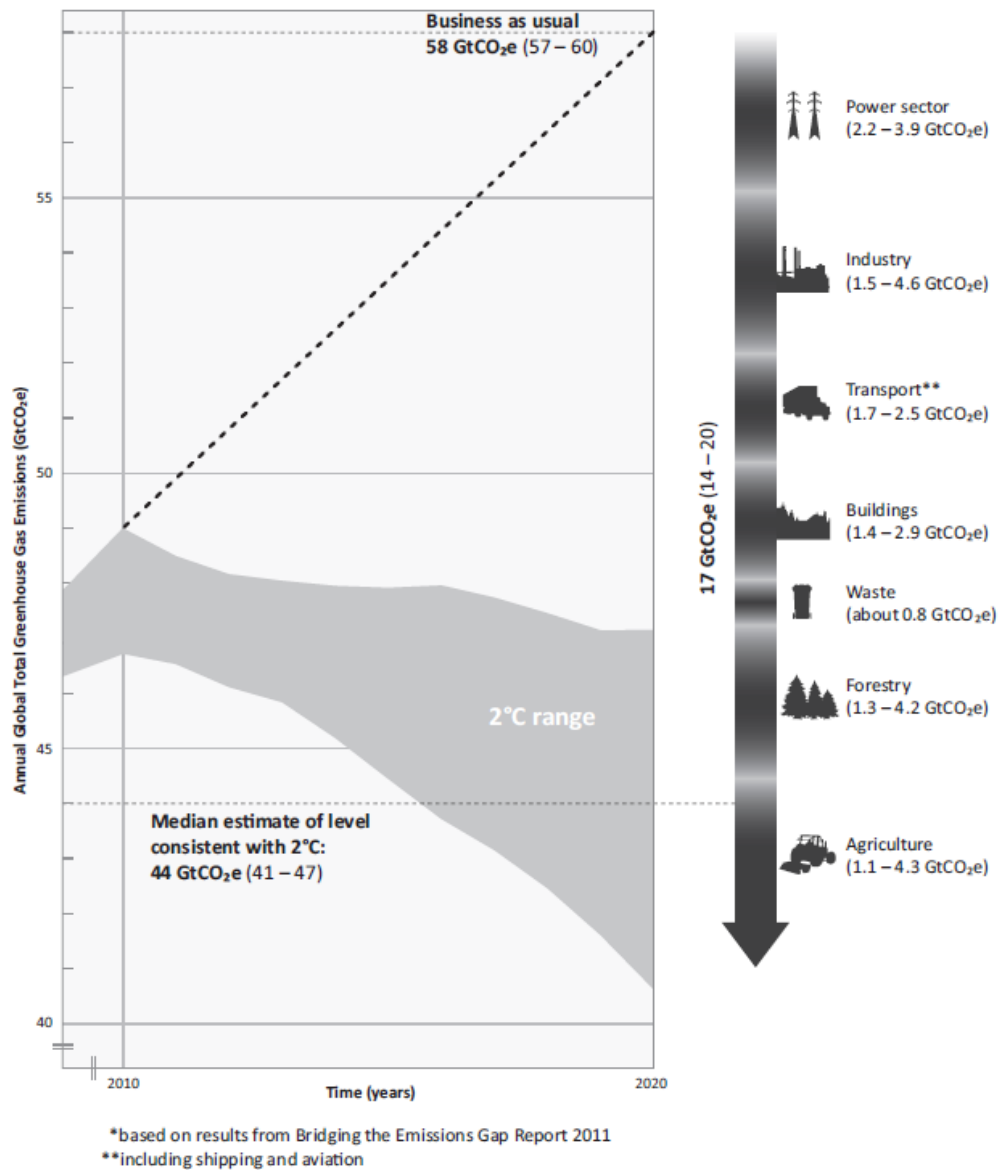



Figure 3.2 Bridging the gap through sectoral programs. Source: UNEP (2012)

targeted (i.e., sectoral) actions (Figure 3.2).

Moreover, the developed world alone will not be able to achieve global GHG emissions stabilization goals. Mitigation ambition and cooperation needs to increase across the globe. The costs of embarking on a full-scale energy systems transformation remain a key concern for politicians, business leaders and citizens around the world, while the social cost of carbon pollution is not yet adequately captured by multilateral regulatory frameworks.

Societies and governments are still struggling with how best to internalize the costs of burning fossil fuel while sustaining economic growth. While some industries may




transition successfully to a carbon constrained world, other industries, such as cement and steel manufacturing and fossil fuel extraction, processing and distribution, have higher costs to bear in this process, and their products and services remain in high demand and are expected to generate major financial returns. For instance, the US is currently betting on non-conventional oil and gas production to boost its economy and enhance energy independence. A recent report by the McKinsey Global Institute projects that shale gas and oil development could contribute between US\$380 billion and US\$690 billion to US GDP while adding 1.7 million permanent jobs. The International Energy Agency (IEA) expects that by the year 2020, the US will become the world's top oil producer and possibly by 2030 a net oil exporter (IEA 2012; Lund et al. 2013: 22–23).

In the developing world, the rise of China as an economic powerhouse and manufactured goods exporter has been fueled in great part by cheap, but dirty, coal-fueled energy. Demand for coal from China accounts for almost half of global demand and, because of its own internal human development needs, China is expected to continue using coal as its main fuel to meet its energy demand for the foreseeable future. In Australia, extractive industries, particularly coal mines, are highly dependent on such demand. After an election that made carbon pricing a central theme of the political debate, in September 2013 Tony Abbott, the new Prime Minister, announced that his government would not extend the carbon tax that Australia had recently implemented beyond 2013–14, even if the parliament does not pass the carbon tax repeal bills until after July 1, 2014. If successful, Australia will go from a leading climate jurisdiction to becoming the first nation in the world to dismantle a carbon market. Political cycles and the economic interests of fossil fuel industries do make climate policy vulnerable. This hesitation to commit to climate policy goals sends mixed signals to the developing world as well.

California, to some the beacon of hope for climate action in North America, now has in place one of the world's most complete climate plans featuring an economy-wide approach to carbon reductions. California so far seems to be fully committed to decarbonizing its economy. However, the state sits on reserves of recoverable shale oil from hydraulic fracturing and acidification that are estimated to reach 400 billion barrels and could add up to US\$24 billion to the state's tax coffers.³ Although regulatory and recovery feasibility questions have yet to be answered, this situation underscores the dilemma that many policymakers face.⁴ California is widely regarded as a leader in environmental policy, but will it be able to turn down the opportunity to create high-paying jobs and grow its economy from fossil fuel extraction? These potential reserves are nearly half the conventional oil in all of Saudi Arabia.

The case studies included as part of the Carbon Governance Project – the origins of this




book – reflect not only the leadership assumed by these governments (i.e., the United Kingdom (UK), British Columbia, Canada, and California, USA), but also the actions of their citizens at the national and local level to minimize their carbon footprint for the benefit of the global common good. For instance, results from an annual survey conducted by the Public Policy Institute of California on attitudes towards environmental and climate policy in the state show that 65 percent of the population says the government should act right away to cut emissions, up 9 points since 2012 (Baldassar et al. 2013). At the top of Californians' concerns are more severe wildfires and more severe droughts. However, an interesting perspective also reflected in the survey is that Californians would consider oil exploration in the Pacific if gasoline prices go up significantly. Shale oil and gas now offers an alternative source of fuel and income to the state.

Alternatively, regional climate programs to develop transport-oriented communities, and large infrastructure-sustainable mobility projects such as highspeed rail, may begin to alter the car-dependent culture in the state through more developed and integrated public transport networks and smart growth policies. While policy action remains vulnerable to political cycles, attitudes and support among voters in California for policy drivers that help internalize the social cost of burning fossil fuels and wasteful production and consumption patterns remain strong.

The UK, another leading climate jurisdiction, piloted the ETS later implemented at the EU level, as well as other carbon pricing policies beginning in 2002. In 2008, the UK became the first country in the world to pass a national Climate Act, establishing a national carbon budget, with the long-term goal that the net UK carbon account for the year 2050 is at least 80 percent lower than the 1990 baseline. However, more recently a combination of low investment in updating aging electric power infrastructure and expected increases in energy costs from climate policy are starting to put pressure on the conservative government of Prime Minister David Cameron that aims to be 'the greenest government ever' to reconsider the UK's green growth strategy and its impact on the economy (*Financial Times* 2013).

Political cycles will inevitably impact policy implementation in democracies whenever tensions between economic development and the environment remain. In the face of these realities, IEA has warned policymakers, regarding the expansion of fossil fuel investments in energy systems, that the planet is at risk of 'locking itself into an unsustainable energy future which would have far-reaching consequences' (IEA 2011). More recently, the emerging debate over the amount of 'unburnable carbon' needed to reach UNFCCC GHG stabilization targets highlights the risks ahead to our global financial system as well. If these assessments are correct, oil, gas and coal mining may be overvalued because of stranded assets through the implementation of effective




carbon policy around the world. In the US, such a major risk to the financial health of businesses would have to be reported as part of the financial disclosure rules under the Sarbanes-Oxley Act of 2002. Major changes in institutional investment and finance behavior are to be expected in the near future over fossil fuel stocks similar to what happened a decade ago to tobacco companies.

In environmental policymaking in general, debate and contention during the public process of program design traditionally focuses on the challenge of balancing the policy goals of environmental protection and economic development and job creation. This perceived policy tradeoff is particularly salient given the current economic environment in which global financial indicators are slowly improving from a major downturn that began in 2008. In the context of unreliable data on depletion of global oil and uranium reserves and perceived risks of nuclear power, abundant coal reserves and the emergence of unconventional high energy intensive sources of oil and gas such as shale and tar sands may become the main source of heat and power in the near future, exacerbating climate change problems. While gas can play its role as the so-called transition fuel, given that it has a lower emissions intensity than oil or coal, a more concerted effort to support investment in technology and infrastructure to effectively transition to a clean energy future is needed. Hopefully, more political and business leaders will see such transition as an engine for economic vitality for decades to come based on clean technology activity and green growth initiatives. For instance, the government of South Korea, through its 2009 Green New Deal Plan, allocated 95 percent of its fiscal stimulus, or 3 percent of GDP, to environmental sectors including low emission vehicles (Barbier 2010).

Effective global carbon policy and alternative approaches

Regulation is not enough to push the transition to a low carbon global economy. A systems approach that integrates and supports government, business and civil society climate action is needed (Pérez Henríquez 2013). Even if all UN member states agreed to pursue this goal, and the treaties and accords developed to take action and bind them under legal obligations are ratified by their corresponding legislatures and parliaments, international law can be rendered moot by weak enforcement mechanisms. Nations rarely sacrifice their interests for the global common good unless the governance regime in place can impose effective penalties for non-compliance (Shelling 2002: 6–8). Trade sanctions are seen as a possible solution, because current World Trade Organization rules in general are effective, ‘they prevent free riders from obtaining unfair competitive advantages’ but may also limit climate cooperation (Cirone and Urpelainen 2013).



While under the UNFCCC process, climate action has slowly gained legitimacy in some jurisdictions at the local, national and even multinational level, these successes are tempered by a failure to deliver results in terms of absolute GHG emission reductions that are needed to avoid dangerous global warming. Time is of the essence. What is known at UN climate summits as ‘the emissions gap’ (see Figure 3.3) shows the difference between actual emissions predictions and the levels that would be consistent with a 2 degree Celsius increase in global temperature. This means that humanity is currently not on track to achieve the emission reductions necessary to avoid catastrophic climatic disruptions to human livelihood. The UN process calls for state actors to ‘bridge the gap’ through both legally binding compliance and voluntary mechanisms from different sectors of the economy as mentioned above. Businesses and industrial sectors are slowly understanding that maximizing their own value in a responsible way it also results in value maximization to their shareholders.

Policy instruments available to bridging this gap and some of the new emerging solutions are:

- *Direct regulation*: Described as a command-and-control policy instrument, this approach distributes emissions control responsibility by setting specific emission standards across polluters. Direct regulation is an effective means to achieve environmental gains, but implementation can come at a high cost to industry – a cost that most likely will be passed on to consumers (Hanley et al. 1997:154). However, based on the now vast previous experience with environmental regulatory initiatives, the cost is usually lower than expected and almost always substantially lower than the affected industry predicts. Commonly, there are three key approaches: technology-based/design standards, performance-based standards and market-based instruments.
- *Technology-based (or design) standards*: These regulations prescribe the use of specific mandatory technologies (e.g., smokestack scrubbers) to reach allowable emissions rates. These standards can also regulate the level of production of a particular product or pollutant (e.g., no lead in gasoline, low-carbon fuels, etc.).
- *Performance-based standards*: This relatively more flexible regulatory approach specifies an acceptable pollution level and gives polluters latitude in meeting this target (e.g., energy efficiency standards).
- *Market-based instruments*: Markets help in organizing economic activity to reach a certain regulatory standard. However, in the case of environmental assets and risks this capacity is limited. This in turn limits the ability of the regulator to establish the ideal levels of control on pollution. Therefore, assuming cost minimizing behavior by economic agents, a comparison of the benefits of decreased pollution with the cost of

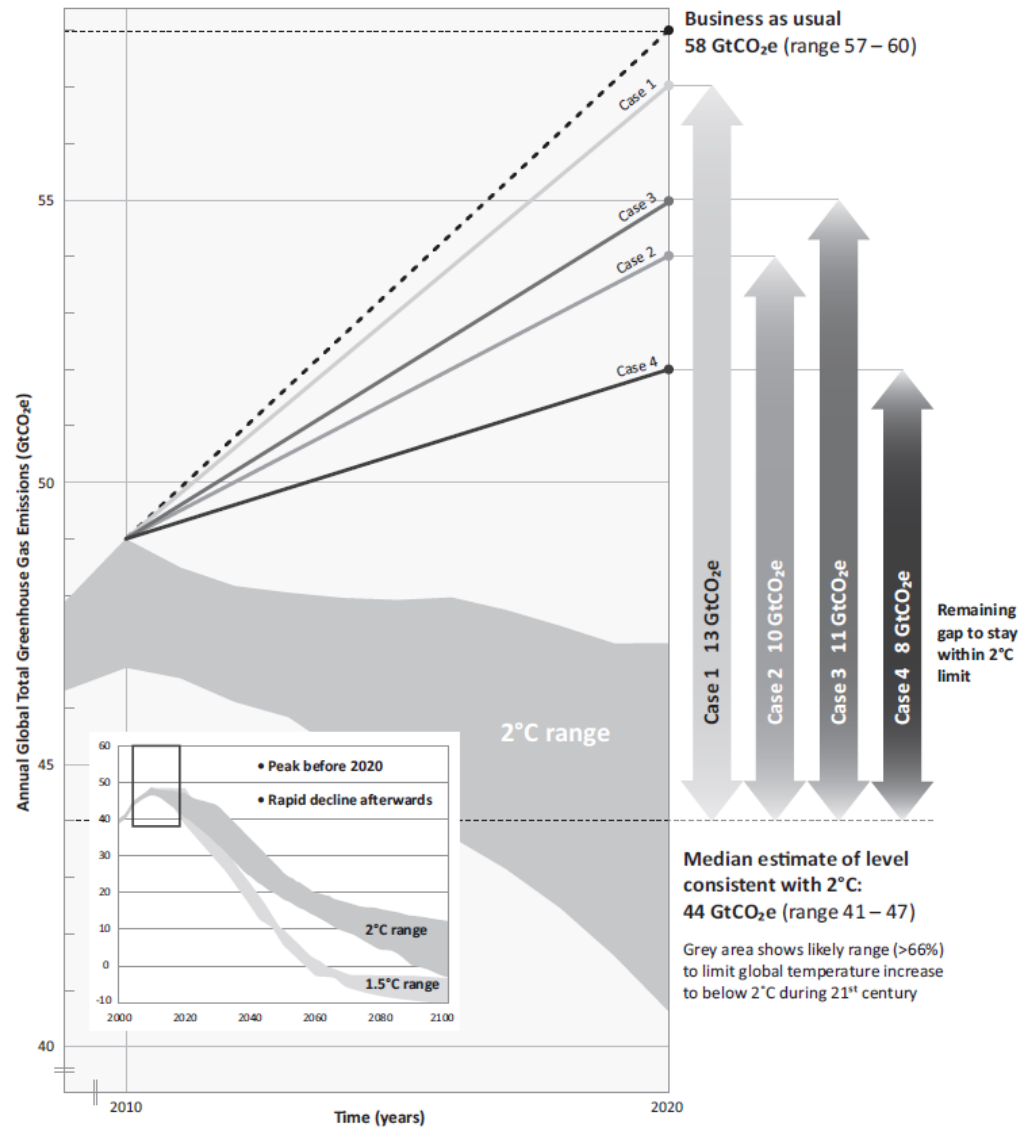



Figure 3.3 The emissions gap. Source: UNEP (2012)

pollution control at the level where the marginal cost of polluting equals the marginal benefit of abatement can provide guidance. This requires clear valuation of the benefits of pollution abatement.

Market-based approaches to carbon regulation typically come in one of two forms: an ETS, such as cap-and-trade, or a carbon tax. Carbon taxes put a uniform price on the GHG emissions that an industry or business emits, thereby incentivizing reduction. The tax allows regulators to achieve desired levels of GHG reductions without stipulating how those reductions need to come about. This means that businesses are free to seek out the most cost-effective means of reducing their emissions, and thus their tax liabilities.




A cap-and-trade system is similar, except that rather than setting a price, regulators set a limit on the total amount of GHGs that may be emitted, allocate rights to this amount by some administrative process such as an auction to everyone who emits now (or might want to emit) and the price of emissions is set by the market through trading. This captures many of the benefits of the carbon tax, but ensures that emissions levels will be at the desired level. However, ETSs are much more complex to implement than carbon taxes because they necessitate creating an economy-wide marketplace from scratch. On the other hand, in many cases it is more politically feasible to propose an ETS, where some industries may be able to profit from selling allowances, than a carbon tax, which carries all the negative connotations that come with any other tax.

In both of these cases, international cooperation is key to global success. If a region imposes a carbon tax or ETS and a neighboring region does not, there are few barriers preventing polluting industries from moving to the regions with less stringent regulations, although a tariff can control some of this. Given the global commons nature of climate change, this so-called 'leakage' could potentially negate some or all reductions in GHG emissions.

In contrast to regulatory strategies, economic incentives in the energy sector are misaligned because of legacy subsidy structures that do not promote low carbon growth. For instance, the IEA's latest estimates indicate that fossil fuel consumption subsidies worldwide amounted to US\$523 billion in 2011, up from US\$412 billion in 2010, with subsidies on oil products representing over half of the total (IEA 2013). As petroleum companies benefit from these subsidies, only a few jurisdictions around the world have actually implemented policies and programs to internalize the social cost of their GHG emissions. In the US, given the lack of legislative action on climate policy, an effort in this direction is now in place to support GHG controls. The 2013 Economic Report of the President defined the 'social cost of carbon' as a monetized estimate of the damages caused by emitting an additional ton of CO₂ in one year. The report placed a value of US\$37 per tonne⁵ based on estimates of the damages caused by each incremental unit of emissions; these damages cover 'health, property damage, agricultural impacts, the value of ecosystem services, and other welfare costs of climate change'. The US government justified its recently announced climate plan based on the best available science to calculate the benefits of reducing GHG emissions. By imposing strict direct regulations on coal-fired plants and the lack of competitiveness of coal compared to gas prices, electric utilities are closing these units, resulting in real gains for the environment.

At the multilateral level, the flexible mechanisms under the UNFCCC were introduced to minimize the compliance cost to industrialized countries (i.e., Annex I) of meeting their emissions targets through market-based mechanisms with estimated savings of



US\$3.6 billion vis-à-vis more costly domestic projects, and to promote sustainability in the developing world with economic transfers in the amount of US\$215 billion through the clean development mechanism (CDM). The CDM system is now in crisis. The economic recession, which resulted in a surplus of allowances in the EU ETS, drove down carbon prices. Moreover, macro economic policy goals have trumped climate action in many national policy agendas. These conditions killed European demand within the CDM, leading to the cancellation of many projects in developing countries. New market mechanisms are being explored to support joint efforts between the developed and the developing world. If successful, supporting legally binding efforts in developing nations to achieve GHG emission mitigation, while supporting energy systems transformation and pertinent adaptation, may raise the ambitions of countries and regions. For instance, Mexico became the second country after the UK to pass a national climate bill in 2012. The developed world, through these new mechanisms, should reward nations and industrial sectors if they are willing to commit to legally binding climate action. Innovative climate investment and collaborative policy efforts towards achieving real GHG reductions is of particular importance in large developing countries. These nations need support to avoid the temptation to follow dirty development paths of the past industrialization processes.

Crafting the right policies for global climate governance is a complex process, to put it lightly. If cost-effectiveness and timeliness are important policy design criteria to assess the performance of a multilateral climate program, we also need to be aware of the distributional consequences of policy action, such as carbon pricing, as well as the social costs of inaction. Moreover, the impact of low probability, high impact climatic events need to also be captured in our still very incomplete understanding of how capital stock, productivity and growth will be affected in the future as national economies confront the new reality of a warmer planet (Stern 2013; Pindyck 2013). Economic growth models project that environmental action is feasible only after a nation reaches certain income per capita levels (Kuznets 1955; Grossman and Krueger 1991). However, this conclusion may not be pertinent in the case of this particular global environmental problem.

If the science is correct, global GHG emission stabilization cannot wait until income and human development indices improve in every corner of the planet. Sooner, rather than later, nations should adopt sustainable, green growth patterns for economic development. Indeed, smart climate policy should drive economic growth, and those countries that can profitably maximize GHG reductions will also reap economic rewards. If nations are to solve the climate problem, they cannot afford to follow past patterns of reactive policymaking of wealthy societies described above, known in the political science literature as the affluence-scandal cycle (Landy 1995).

Responsible business, investment, growth and climate action

The role of the private sector in generating economic opportunity, innovative technical solutions and products for a cleaner economy is central to addressing climate change. As nations transition to more advanced stages in their development (i.e., post-industrialization), towards an information and service-based economy, demand for environmental quality increases, as well as the capacity to deliver it through innovative clean technologies (Munasinghe 1999; Yandle et al. 2002).

Carbon governance aims for economic agents, both individuals and firms, to internalize the social cost of their carbon footprint from their consumption and production activities.⁶ Ideally, emerging climate-related regulatory mechanisms, policies and supplementary programs will provide a sense of permanence and flexibility for compliance supported by market incentives to enhance their cost-effectiveness. Also, policy frameworks should foster investment and the development of new business opportunities to supply green markets, as well as the technological innovation required to conduct the needed energy and infrastructure reconversion processes.

Moreover, growing consumer awareness about the issue of climate demands that businesses' products, services and logistics be as green as possible, as well as transparent, including indicators and measures to assess their climate and environmental impacts. Civil society groups seek to increase transparency in reporting environmental performance. For instance, independent and accredited third party verification organizations have emerged to more accurately track carbon management practices from businesses and to certify carbon emission reduction in voluntary projects around the world.

No doubt corporations will above all focus on profit maximization; virtue has historically been a marginal business strategy (Vogel 2005). However, firms themselves are starting to realize that a long-term commitment to shared social and environmental values with the communities they serve can positively impact their bottom lines, while those who only react to regulation lag behind (Eccles et al. 2012). A recent survey of business executives managing sustainable products and services shows that consumer demand is the primary driver for implementing longterm sustainable initiatives within their companies. These strategies have resulted in the short-run in the ability to charge premium prices for green products and services, helping them increase their revenues (Accenture 2012). Other companies have taken a longer-term perspective and invested in future growth areas. This is most readily visible in the rapidly growing number of patents for low GHG energy production cleantech ventures (Figure 3.4). Although still representing a relatively small portion of

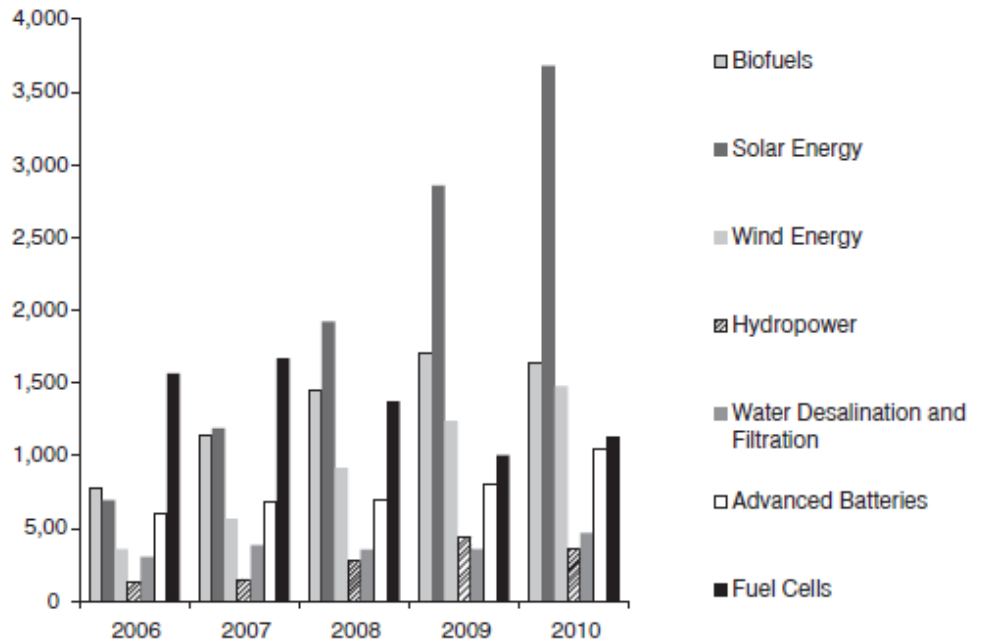


Figure 3.4 Global cleantech patent filings. Source: Makower et al. (2013), GreenBiz Group research from World Intellectual Property Organization and other national patent office databases

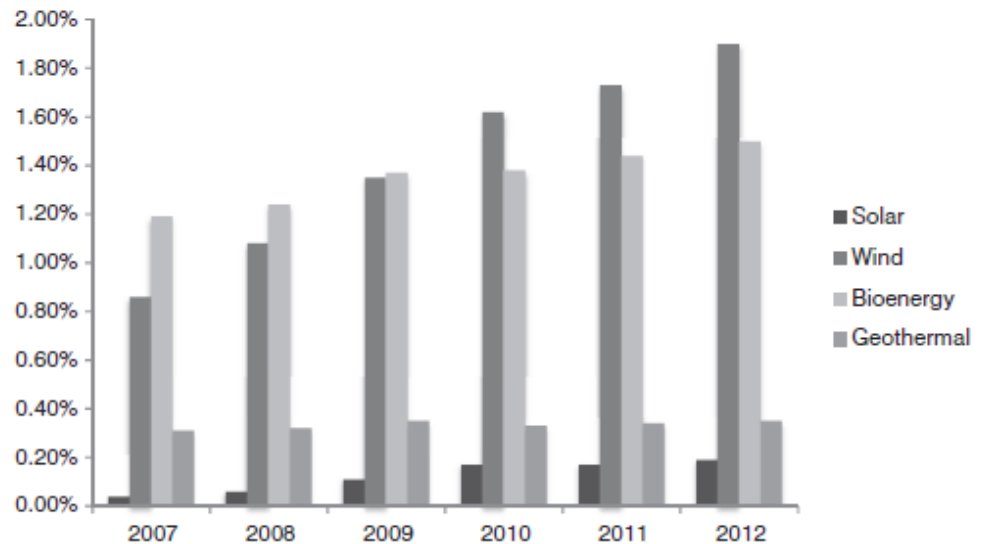



Figure 3.5 Global green power production as a percent of total. Source: World Economic Forum (2013)

energy production, cleantech has grown steadily in recent years (Figure 3.5).

As some business leaders are keen to emphasize during policy debates, overzealous

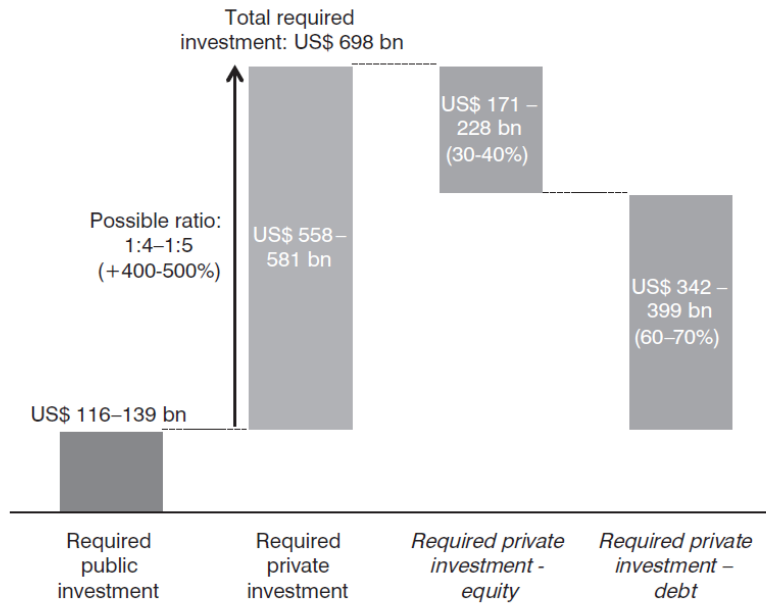


regulation could be too costly given our high dependence on fossil fuel-based infrastructure to support economic growth in most national economies. Transitioning from fossil fuels to a clean energy economy will be difficult in many industries and could jeopardize the existence of many large companies, especially those that procure and provide fossil fuels.

In climate policymaking, decision makers need to balance scientific evidence about the risks and dangers of climate change with pressures from stakeholders that on one side demand swift action to reduce GHG emissions regardless of costs (as some environmental groups demand), while others, such as global energy industrial leaders, prefer a more cautious approach because they deal with longterm large capital investments, such as in electricity generation. There are also researchers and entrepreneurs who believe that they can disrupt the market with innovative approaches that could transform entire energy systems as we know them; but this too might take time and needs to be proven effective at large scale. Even these innovative ideas will require a regulatory framework to deliver their promise in the marketplace in a safe and secure manner to consumers. However, as Pacala and Socolow (2004) suggest, there is good evidence that by dramatically scaling up currently available technologies humanity can solve the carbon and climate problem. Moreover, new power-system modeling programs such as SWITCH, as discussed in Chapter 10, can help government plan better for the different mixes of power, whether natural gas, nuclear, solar, wind, biomass or geothermal needed in a particular context of implementation to reduce carbon emissions in an effective and timely manner (Nelson et al. 2012).

While the historical responsibility of industrialized nations for the past accumulation of GHGs in the atmosphere is a reality, the idea of wealth transfers to the developing world to mitigate the impact of global warming on future generations is a tough sell in many political contexts. The expectation from those who bet on the technological discovery process is that future technology-based solutions to these problems make it irrational to invest today's limited financial resources to endow the next generation with the same amount of natural resources as current generations enjoy. However, this idea goes against the essence of the concept of sustainability; it is an ideological debate, not only an economic one. In the economic sense, it has been estimated that an initial US\$700 billion investment is 'required to put the world on a climate-resilient path towards green growth' (WEF 2013). Whether and how to make that investment, potentially through public-private partnerships, is the crux of the debate (see Figure 3.6).

Economists have recognized that wealth transfers might be needed to address global environmental issues (Oates and Portney 2003). For instance, clean energy




Note: The debt-to-equity ratio is assumed at 70:30 based on the current average debt to equity ratio of clean energy projects

Figure 3.6 Potential public-private finance mobilization to close the cost gap for climate-specific investment. Source: WEF (2013)

infrastructure finance needs for developing countries are expected to be around US\$100–200 billion per year by 2020 (IEA 2008). However, potential wealth transfers, including sharing technological know-how from developed to developing countries to assist in the transition to a low carbon future, has become a major hurdle to progress. While technology transfer was promised in the first rounds of negotiations of the UNFCCC, soon governments from developed economies and their business interests involved in developing cleaner products and industrial processes realized this was not practical, nor feasible. Current economic theory prescribes that research and development (R&D) and innovation requires full protection of intellectual property (IP) rights to maintain the incentives for individuals and teams to generate new technology paths towards a low carbon future. However, new IP management strategies and business models, such as collaborative research networks, are needed to revitalize the partnership between government and industry in fostering and materializing economic growth, while at the same time meeting the shared global commons problem of climate change for the benefit of all humanity.

On climate finance, new international mechanisms have been developed and agreed upon in more recent UN climate summits in order to support the transition of the developing world to a carbon constrained world. A leading example is the UN Green Climate Fund. However, resources available to this institution from signatory countries




are scarce given the global economic recession. In addition, it is also politically difficult to garner support for such transfers from domestic constituencies in developed countries, particularly during difficult economic times. Moreover, the failure to extend the commitment period for a global climate agreement beyond 2015 has tempered the interest of investors in a global carbon market in the presence of such regulatory uncertainty.

Regulatory uncertainty at all levels of governance inhibits private sector longterm planning and deters investment in general. Clear and transparent carbon policy paths can drive investors and entrepreneurs to catalyze the energy, transport and urban systems transformation needed to make the vision of a clean, green economy a reality. While investors can promote the expansion of markets for green products, clean energy and lean infrastructure, carbon policy drivers can sustain their momentum and further incentivize the development of these business sectors. Businesses require regulatory certainty and credible commitments on carbon policy from governments in order to invest in clean energy infrastructure. Moreover, in a recent survey of UK private sector attitudes to some elements of British climate policy, it was reported that 'businesses may not agree with the policy but they want consistency. If the government keeps reviewing policies just after businesses have put in the necessary systems and investment it will be impossible for them to create any sort of long-term strategy in the future' (GAP 2012; Donald 2012).

Government regulation in the form of conventional direct regulatory commands, more flexible performance standards, market-based mechanisms (such as taxes or allowance trading), as well as government managed programs such as financial incentives for decarbonization of the economy (i.e., subsidies, procurement programs and organizational change) can provide this certainty. Climate change is a complex and long-term issue that will require a mix of policy approaches to prevent, adapt to and mitigate its effects.

Bottom-up initiatives have so far provided the only progress at the international level. While the UN may ultimately legitimate the process, its current lack of effectiveness should compel policymakers and climate advocates to rely on other contexts for cooperation and sources of authority. Ideally, the unilateral policies and programs implemented by so-called leading climate jurisdictions will eventually be linked, harmonized and recognized under the international governance mechanisms outlined by the UNFCCC. After more than two decades of negotiating at the multilateral level on how to propel global climate action under an international policy framework, it is clear now that this process will take more time and resolution by political and business leaders to be achieved. Complex social, economic, technological and mainly political barriers remain to be resolved. By putting a price on carbon, attitudes towards energy



consumption change, fostering energy efficiency and the development of alternative industrial processes and clean technologies that enable low-carbon economic growth (Pérez Henríquez 2013: 182).


Concluding remarks

The window for effective climate action is closing; we are falling behind schedule to meet the scientific recommended stabilization goal of atmospheric CO₂ concentrations at 450 parts per million. Moreover, a quarter of the world population lacks access to electricity. Providing reliable, clean energy to the least developed communities in our planet, while accelerating the uptake of clean energy technologies in industrialized and emerging economies are urgent policy tasks. Huge implementation challenges remain, but business engagement in the low carbon transformation challenge is essential. Smart carbon policy drivers are needed to support such processes.

While there is concern that regulating GHGs is costly to the business sector, the lack of certainty about climate institutions at the national and international level also has a price. In order for climate policy to work, it has to be rethought as an attractive and profitable business proposition (Pérez Henríquez 2013: 2). Fine-tuning existing government interventions through policy innovation and harmonization to equitably and cost-effectively foster the emergence of a clean economy is the carbon governance challenge. In the private sector, once clear regulatory carbon policy drivers are in place, economic agents, in particular businesses, will begin to develop strategies to profit from the transition to a low carbon future, including both mitigation and adaptation efforts, especially in the areas of energy, transport and urban system transformation.

Effective, efficient and equitable climate action offers an opportunity for social and economic transitions towards a prosperous clean economy. New engines of prosperity from economy-wide transformations, based on low carbon growth development strategies, will emerge, conserving for future generations the planet's natural assets. This is the essence of sustainability. Policy drivers are important in achieving energy systems transformation and climate goals. Energy efficiency should be, for instance, a no regrets climate action because it makes business sense to save on energy costs. Governments will need to encourage and enable deeper and even disruptive transformation if societies are to meet the challenge of GHG emissions stabilization with time to avoid enhanced risks and dangers of climate change.

Therefore, next generation energy and climate policy drivers, that is to say greener and smarter regulatory frameworks that cost-effectively coordinate clean energy systems development and environmental controls using markets, information technologies and collaborative approaches, should also facilitate the finance and deployment of



technological advances to underpin cleaner economic development paths (i.e., green growth). Business opportunities are enormous. Bloomberg New Energy Finance projects a cumulative US\$7.2 trillion in asset financing between 2013 and 2030 in renewable energy (Forrister 2013). However, in many countries around the world, reforming or eliminating inefficient support for the consumption or production of fossil fuels is necessary for enabling green growth while tackling the issue of climate change (IEA 2012; OECD 2013).

Advanced policy frameworks for inducing technological innovation need to be crafted in order to meet the challenge of transforming the global energy system while creating sustainable opportunities for economic growth for all nations. International collaborative efforts on innovation and policy experimentation can produce shared gains within a system of robust and productive economic competition that respects intellectual property rights.

A credible commitment by a group of key governments that includes large developing economies (e.g., G20) to climate policy action would be an important step to enabling a compelling business case for low carbon business transformation. Governments need to provide stable and cost-effective regulatory frameworks for the private sector's long-term planning to realize profitable business opportunities in a carbon constrained future. While progress on creating a comprehensive and stable global carbon policy regime has faltered so far, leadership by some can help build, through the power of demonstration, a set of new climate policies of the right kind to foster much more entry of business into the sectors of clean and efficient energy.

Paraphrasing the top climate regulator in California who spoke at our Carbon Governance Project workshop in Berkeley: Let's pause and ask ourselves why do this? California is a responsible actor in the national and global context on this issue, we want to grant future generations the same opportunities we had to enjoy our planet, but once the democratic system has articulated public demand for action, 'in California we act because it is the law'.

Notes

1 For instance, BRICs are Brazil, Russia, India and China; MIST are Mexico, Indonesia, South Korea and Turkey; and, G20 includes these two groups plus the following developed and developing nations: Canada, France, Germany, Italy, Japan, the United Kingdom and the United States (i.e. G7), the European Union and Australia, Argentina and South Africa.

2 See for instance: Harvey (2010).

3 <http://www.bloomberg.com/news/2013-03-17/california-fracking-fight-has-25-billion-taxes-at-stake.html>

4 <http://sntr.senate.ca.gov/sites/sntr.senate.ca.gov/files/Hydraulic%20fracturing%20background.pdf>

5 <http://www.whitehouse.gov/blog/2013/11/01/refining-estimates-social-cost-carbon>

6 Defined as the amount of CO₂ or other equivalent carbon compounds (CO₂e) emitted into the atmosphere by the activities of an individual, company, country, etc. that cause the greenhouse effect on earth.

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