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Clean Energy Investment

Project synthesis report

Aaron Cosbey, Jennifer Ellis,
Mahnaz Malik and Howard Mann

July 2008

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The report is supplemented by several pieces of original research, which substantially informed the analysis: case studies on clean energy investment in Ukraine, Kazakhstan and Nigeria. These are available on www.iisd.org/investment.

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Policymakers' Summary

This section provides an overview and summary of the findings from the main report.

Clean energy investment as an environment and development challenge

Energy investment in developing countries is critically important to achieving development goals.

> *"Without access to modern energy services, the poor are deprived of opportunities for economic development and improved living standards. Modern energy services provide lighting, cooking, heating, refrigeration, transportation, motive power and electronic communications that are indispensable to increasing productivity, creating enterprises, employment and incomes, and accessing safe water and sanitation, as well as health and education." (World Bank, 2006:1)*

A key aspect of the development challenge for the coming decades is the immense need for new energy supplies. For many in developing countries the issue is basic needs. 2.4 billion people still use traditional biomass for cooking and heating, and 1.6 million women and children die each year from exposure to the resulting indoor air pollution. (Ibid) 1.6 billion people worldwide have no access to network electricity (mostly in Sub-Saharan Africa and South Asia), and 80 percent of those are the rural poor of developing countries. (IEA, 2006: 157)

Energy needed to feed rapid economic growth in urban centres is also significant. IEA (2007) cites a need for $22 trillion dollars in new energy investment between 2005 and 2030.[1] By 2030 the result would a 55 percent increase in global primary energy use, with developing countries accounting for three quarters of that total. (IEA, 2007) China alone in 2005 added more than 70 GW of new capacity to its grid – equivalent to adding two 650 MW generating stations per week or adding, over the year, the entirety of the U.K.'s installed generating capacity. (Green, 2006)

In some sense, the IEA investment figures are better understood as warning than as a projection: if these torrential flows of new investment do not materialize – and there is no promise that they will – then we will have a crisis of development.

On the other hand, as the IEA also makes clear, if they materialize along the lines of business as usual then we will have a crisis of environment. Energy is a huge part of the climate change equation, accounting for some 80% of global CO_2 emissions (IEA, 2007). IEA's reference case – the scenario that involves $22 trillion dollars of new investment – results in a 57% increase in CO_2 emissions by 2030. Even the IEA's best-case scenario – the Alternative Policy Scenario – results in a 27% increase between 2005 and 2030.

These figures stand in alarming contrast to the needs, as laid out by the IPCC's fourth assessment report and others (IPCC, 2007). The IPCC analysis, which is criticized by many as being too conservative[2] – estimates that to have even a 50% chance of making a stabilization target of 2°C

[1] This is the IEA Reference Case.
[2] See, for example, Hansen, 2007; Spratt and Sutton, 2008.

global temperature increase, global emissions will have to peak by 2015, and be reduced from year 2000 levels by 50 – 85% by 2050.[3] In other words, even the IEA's most optimistic projections take us squarely in the wrong direction.

Missing the 2°C target is seen by many to be courting disaster that extends beyond the environmental, to significantly impact development goals as well. According to the UN Scientific Expert Group on Climate Change (2007:5):

> *"In our judgment and that of a growing number of other analysts and groups, ... increases beyond 2°C to 2.5°C above the 1750 level will entail sharply rising risks of crossing a climate "tipping point" that could lead to intolerable impacts on human well-being, in spite of all feasible attempts at adaptation."*

Meeting the challenge

Daunting though this context may be, it is nonetheless possible for energy to make a substantial contribution to sustainable development. There are four elements to a success scenario:

1. Massive new investments globally in clean energy[4], but most significantly in the developing countries that are the major source of growth in energy demand to 2030.
2. A transformation of existing energy supply infrastructure, primarily focused in developed countries where the majority of the world's stock is located.
3. A long-term collaborative effort by governments to foster revolutionary new clean energy technologies, and to help commercialize promising existing immature technologies, given the hurdles faced by private sector investors to doing so unassisted.
4. A focus on consumption, particularly but not exclusively in OECD countries. In part this can be achieved by a focus on end use energy efficiency and conservation measures. But absolute reductions in consumption will also be necessary, particularly in light of likelihood that successful conservation and efficiency efforts will simply allow for increased consumption (the so-called "rebound effect") (Polimeni *et al.*, 2008).

This paper focuses on the first of these four challenges (without prejudice to the importance of the other three). That is: how do we ensure that investment flows into new clean energy infrastructure in developing countries?

Public investment in clean energy has been on a steady increase. In February 2007 the finance Ministers of the U.S., U.K. and Japan proposed a $10 billion Clean Technology Fund to "help developing countries bridge the gap between dirty and clean technology" (Paulson, Darling and Nukaga, 2008). Part of Japan's Cool Earth Partnership, a fund worth $10 billion over five years, would go into the CTF, as would $2 billion from the U.S. and $1.5 billion from the U.K. over three years. Japan has also contributed to two funds in the Asian Development Bank that may have some impact in this area – the Investment Climate Facilitation Fund and the Asian Clean Energy Fund. As generous and necessary as such expenditures are, however, they are a drop in the bucket relative to the need. Even if 100% of these funds were directed straight to clean energy investment in developing countries (in reality much less than that will be so directed), and was renewed annually

3 IPCC (2007: table TS.2). The 50% odds are implied by the fact that the figures in that table are based on "best estimate" of climate sensitivity of 3oC, meaning there is a roughly 50% chance that it could be higher or lower than 3oC. Obviously the shape of the probability distribution is also important.

4 For the purposes of this paper, clean energy technologies can be defined as those that emit substantially fewer GHGs than their conventional counterparts.

until 2050 at those levels, it would amount to less than 1% of developing country needs for such investment as projected by the IEA, even for its reference case.[5]

Obviously the private sector is going to have to be the main driver for the needed levels of investment. Private sector clean energy investment has, in fact, been growing at a furious pace over the last few years. In 2004 it stood at $30 billion globally, and by 2008 this figure had increased by almost five times to $148 billion. (NEF, 2008) While this is an encouraging trend, the volumes do not yet stack up well against the needs. Of that $148 billion $108 billion was actual asset financing (the remainder being inter alia investment in IPOs, venture capital and private equity). IEA's $22 trillion figure averages out to more than twelve times this much annually.

This leaves us with the question: how can governments, MDBs and IGOs facilitate more of this kind of investment? With the limited funds available relative to the needs, it is inevitable that the best they can do is to act as facilitator and catalyst for larger flows of private sector resources. The project that gave rise to this paper is premised on the assumption that there are several avenues that might be successfully pursued by governments to make such investments more attractive for private sector lenders and investors. It asked: what are the obstacles to clean energy investments, and what are the missing incentives? It found these at both the domestic and international levels.

Obstacles and opportunities: The domestic level

Investors, both foreign and domestic, consider a number of factors when making decisions on clean energy investment, a large number of which can be rolled together under the heading domestic environment for investment. In so doing, they assess how risky or difficult it will be to make an investment in a given country using a given technology, and add this to the expected costs. The sorts of barriers involved are varied. At the level of investment generally, investors look for such things as political and macroeconomic stability, educated workforce, adequate infrastructure (transportation, communications, energy), functioning bureaucracy, rule of law, strong finance sector, as well as ready markets for their products and services.

There are a number of barriers that are specific to clean energy investment. These include a lack of clear guidance on future energy policy (lack of signals), monopoly structures for existing producers with lack of purchase agreements or feed-in tariffs for independent producers, lack of fiscal incentives for clean energy production, weak environmental regulation and enforcement, subsidies for conventional energy sources, a domestic financial sector that has little experience with new technologies, and so on. All of these are found

These types of policy barriers will differ fundamentally from country to country, a function of the many factors that shape national energy policies, including history, politics, geography and chance. But the basic story remains the same: many countries, particularly the least developed among them, are not getting their full share of potential clean energy investment because their existing policies make them unattractive for any but the highest return projects. This basic finding is repeated in study after study. (Amin, 2000; Chandler and Gwin, 2008; Point Carbon, 2007: Dayo, 2008) That

5 Even if we assumed the funding was mandated to cover only the incremental difference between clean and conventional energy infrastructure, rather than covering the total needed investment, we would come up an order of magnitude short.

being the case, any focus on clean energy investment that does not address domestic barriers will be hamstrung from the outset.

What can be done to address this challenge? The first need is for analytical national studies that highlight the obstacles to clean energy investment and the potential for profitable investment of this type. As noted above, the opportunities and obstacles will vary significantly from country to country, and diagnostic studies will help to identify the full range of potential actions that are needed to help make clean energy investment more attractive to both domestic and foreign investors. These types of studies are not unprecedented, and have been carried out by the IEA (various country studies), by the World Bank (under the auspices of its Energy Sector Management Assistance Program) and by the Integrated Framework for Trade-Related Technical Assistance to Least Developed Countries, which focuses more on trade than on investment, but which provides an excellent model on which to draw.

Following on from this type of diagnostic study there would need to be a concerted effort at implementation – an area in which all the above models perform more weakly than in the area of diagnosis. Action in this area would also be possible at levels below the multilateral. In both diagnosis and implementation there may be a role for the types of cooperative mechanisms that are normally established under modern bilateral and regional trade agreements; these agreements typically cover cooperation, technical assistance and capacity building on environment and development matters, among others (OECD, 2007). It is also conceivable that the mandate of the Energy Charter Treaty could be recast to include the type of capacity building conceived of here, given its basic mandate to foster investment in energy, and its association with the objectives of energy efficiency and the environment.

Obstacles and opportunities: The international level

The international regime for investment is in fact less like a regime than it is like a spaghetti bowl of separate agreements. There are a few obligations under the WTO's Agreement on Trade-Related Investment Measures, there are considerably stronger provisions contained in over 2,500 bilateral investment treaties, and there are about 30 investment chapters in bilateral and regional free trade agreements with commitments of a similar, often more ambitious, nature. The overall number of such international investment agreements (IIAs) is growing furiously.[6]

How does that body of law affect investment in clean energy? Its ostensible purpose is to protect investors, and thereby to increase flows of investment.[7] In the event that it did so—and the much-debated question of whether it does is beyond the scope of this paper—investment law might help foster clean energy investment, though it could conceivably also foster investment in traditional high-GHG emitting installations. As well, it might restrict policy flexibility to regulate in favour of clean energy. Or it might also be used to allow for proactive discrimination in favour of clean energy investment. These last two possibilities are briefly examined below.

6 For an overview of that growth, and the drivers that underlie it, see Cosbey et al. (2004).
7 It did just this in the case of Nykomb vs. Republic of Latvia, where the investor took Latvia to binding arbitration after it retroactively changed a regulation that had decreed a higher feed-in tariff for new energy supply.

Investment law varies from agreement to agreement, and the types of measures it applies to are specific to each case, but it is nonetheless possible to say in general terms how the "typical" investment law provisions might affect certain types of measures that favour clean energy investment.

Official promotion of clean as opposed to "dirty" energy investment would be unaffected under most IIAs, since in only a few agreements are there obligations that cover pre-establishment. That is, most investment law covers treatment of investors only after the investment has been made. For those few IIAs (albeit a growing number) that do cover pre-establishment investments, as long as government promotion of clean energy treats foreign and domestic investors alike, there should be no legal concerns.

A policy that created new limitations on GHG emissions from exiting installations, or which outright closed them or demanded significant retrofits from them, would face two types of restrictions, based on commitments in most IIAs related to expropriation and to fair and equitable treatment. If the new policy had significant economic impacts (regardless of whether or not it had the same impacts on domestic facilities), the foreign investor might be able to argue that his or her investment was being indirectly expropriated, and claim damages. The case law on this is contradictory, some saying that a non-discriminatory measure of general application taken in the public interest cannot be expropriation, and others saying that any measure with strong enough economic impacts is expropriation, with damages due.[8] In the final event there is no *ex ante* certainty on this question.

The second type of obligation – fair and equitable treatment – is mostly about just and transparent process. But it has also come to mean, in some awards, no costly regulatory surprises. Most *bona fide* regulation, if undertaken transparently and fairly, would be safe from such challenge, unless there was a stabilization clause in place between the investor and the host government. Such agreements typically guarantee an investor unchanged regulatory treatment for a number of years, and if one exists when new regulations are brought in, it can be the basis for arbitration under the fair and equitable treatment obligations.

A useful role for trade policy in this area would be to clarify the definition of expropriation, though such an undertaking would be difficult because of the scattered nature of the "regime." There is, certainly, precedent on which drafters can draw in elaborating new agreements, including language from the 2004 US model BIT which cautions that "the fact that an action or series of actions by a Party has an adverse effect on the economic value of an investment, standing alone, does not establish that an indirect expropriation has occurred," and goes further to assert that "Except in rare circumstances, nondiscriminatory regulatory actions by a Party that are designed and applied to protect legitimate public welfare objectives, such as public health, safety, and the environment, do not constitute indirect expropriations."[9] It might also be useful for trade policy makers to consider the impacts of host country stabilization agreements on their climate-related obligations, there being a dearth of analytical work in this area.

8 For an example of the former, see Methanex vs. the United States of America. For an example of the latter, see Metalclad vs. the United States of Mexico.
9 US Model BIT, Annex B.

Beyond the sorts of restrictions that IIAs might impose on domestic governments, it is useful to think about how such agreements might proactively foster clean vs. dirty investment. A survey of practice indicates that none of the current agreements do this, though the Energy Charter Treaty—a treaty explicitly aimed at fostering increased energy investment—does have some potentially useful environmental elements. The ECT and a related derivative treaty, the ECOWAS Energy Protocol, are examined as in-depth case studies in this report.

Concluding thoughts

There is a flurry of activity, funding and political capital being directed at the challenge of clean energy technology, aimed at getting it into the hands of investors in developing countries as they make decisions that will have climate change impacts for generations to come. The World Bank has established its Clean Technology Fund, Japan has announced its Cool Earth Partnership, the U.K. and U.S. have followed suit with billions of dollars committed. Other multilateral development banks and individual donor countries are also active in supporting dissemination of technology to address climate change concerns.

The related theme of technology transfer is also attracting an increasing amount of attention. For the first time in UNFCCC negotiating history it is a key issue, having been incorporated in the Bali Action Plan commitments. Negotiators are searching (with varying degrees of success) for ways in which to give effect to the technology transfer obligations to which they have subscribed under the UNFCCC, the Kyoto Protocol and the Bali Action Plan.

In the area of clean energy investment the two agendas come together. The problem of technology transfer is essentially an investment problem; not enough investment is taking place in transformative technologies that will both provide new sources of energy, and do so at a significantly lower cost to the environment. Successfully addressing the barriers to clean energy investment, making host countries more attractive for that investment, is essential for technology transfer. It is, in fact, arguably one of the most effective policy options that governments have available for fostering technology transfer. As noted above, governments cannot muster the scale of resources necessary to make them the primary drivers of technology transfer. Some argue further that they are ill-equipped because ownership of the requisite intellectual property rights vests with the private sector. In any case, improving the domestic investment environment for clean energy technology is an entirely appropriate role for governments, MDBs and aid agencies in the pursuit of both development and environmental benefits. It is therefore surprising that in all the activity related to clean energy investment and technology transfer there has not been more attention paid to this challenge.

More attention also should be paid to the implications of international investment agreements for climate-related investment. The uncertainties of interpretation, particularly with respect to indirect expropriation but also with respect to obligations on fair and equitable treatment, may in the final analysis chill new regulations designed to address climate change. And there may be potential for IIAs to take on an unprecedented proactive role in promoting clean investment, as opposed to any and all investment, but this possibility needs more thoughtful analysis.

1. Introduction

Clean energy is defined in different ways by different analysts. For the purposes of this report, clean energy technology includes renewable energy, non-renewable low-carbon technologies, such as clean coal technology (CCT), cogeneration processes, as well as energy efficiency technologies.

Renewable energy technologies can be grid connected, or stand alone local grid solutions. Renewable energy sources include wind, solar photovoltaic (PV), solar thermal, geothermal, bioenergy which includes biofuels/biomass/ethanol, small hydro, and marine (wave/tidal). Small hydro is usually defined as 10 MW or less, although the definition varies by country, sometimes up to 30 MW (Martinot, 2002). Large hydro is considered by some to be a clean renewable energy due to its zero carbon impact, but is not by others due to its social and environmental impacts (RECIPES, 2007).

Non-renewable low-carbon technologies include clean coal technologies and hydrogen and fuel cells.

Energy efficiency technologies include a wide range of technologies including consumer end-use technologies such as smart-meters and energy efficient appliances, energy efficient machinery for industrial applications, district heating and power generation, as well as energy efficient technologies in non-energy sectors such as agriculture, waste management, and transportation.

1.1 Clean energy investment as an environment and development challenge

Energy investment in developing countries is critically important to achieving development goals.

> *"Without access to modern energy services, the poor are deprived of opportunities for economic development and improved living standards. Modern energy services provide lighting, cooking, heating, refrigeration, transportation, motive power and electronic communications that are indispensable to increasing productivity, creating enterprises, employment and incomes, and accessing safe water and sanitation, as well as health and education." (World Bank, 2006:1)*

A key aspect of the development challenge for the coming decades is the immense need for new energy supplies. For many in developing countries the issue is basic needs. 2.4 billion people still use traditional biomass for cooking and heating, and 1.6 million women and children die each year from exposure to the resulting indoor air pollution. (Ibid) 1.6 billion people worldwide have no access to network electricity (mostly in Sub-Saharan Africa and South Asia), and 80 percent of those are the rural poor of developing countries. (IEA, 2006: 157)

Energy needed to feed rapid economic growth in urban centres is also significant. IEA (2007) cites a need for $22 trillion dollars in new energy investment between 2006 and 2030.[10] By 2030 the result would a 55 percent increase in global primary energy use, with developing countries accounting for three quarters of that total. (IEA, 2007) China alone in 2005 added more than 70 GW of new

10 This is the IEA Reference Case.

capacity to its grid – equivalent to adding two 650 MW generating stations per week or adding, over the year, the entirety of the U.K.'s installed generating capacity. (Green, 2006)

In some sense, the IEA investment figures are better understood as warning than as a projection: if these torrential flows of new investment do not materialize – and there is no promise that they will – then we will have a crisis of development.

On the other hand, as the IEA also makes clear, if they materialize along the lines of business as usual then we will have a crisis of environment. Energy is a huge part of the climate change equation, accounting for some 80% of global CO_2 emissions (IEA, 2007). IEA's reference case – the scenario that involves $22 trillion dollars of new investment – results in a 57% increase in CO_2 emissions by 2030. Even the IEA's best-case scenario – the Alternative Policy Scenario – results in a 27% increase between 2005 and 2030.

These figures stand in alarming contrast to the needs, as laid out by the IPCC's fourth assessment report and others (IPCC, 2007). The IPCC analysis, which is criticized by many as being too conservative[11] – estimates that to have even a 50% chance of making a stabilization target of 2°C global temperature increase, global emissions will have to peak by 2015, and be reduced from year 2000 levels by 50 – 85% by 2050.[12] In other words, even the IEA's most optimistic projections take us squarely in the wrong direction.

Missing the 2°C target is seen by many to be courting disaster that extends beyond the environmental, to significantly impact development goals as well. According to the UN Scientific Expert Group on Climate Change (2007:5):

> *"In our judgment and that of a growing number of other analysts and groups, ... increases beyond 2°C to 2.5°C above the 1750 level will entail sharply rising risks of crossing a climate "tipping point" that could lead to intolerable impacts on human well-being, in spite of all feasible attempts at adaptation."*

Daunting though this context may be, it is nonetheless possible for energy to make a substantial contribution to sustainable development. There are four elements to a success scenario:

1. Massive new investments globally in clean energy[13], but most significantly in the developing countries that are the major source of growth in energy demand to 2030.
2. A transformation of existing energy supply infrastructure, primarily focused in developed countries where the majority of the world's stock is located.
3. A long-term collaborative effort by governments to foster revolutionary new clean energy technologies, and to help commercialize promising existing immature technologies, given the hurdles faced by private sector investors to doing so unassisted.

11 See, for example, Hansen, 2007; Spratt and Sutton, 2008.
12 IPCC (2007: table TS.2). The 50% odds are implied by the fact that the figures in that table are based on "best estimate" of climate sensitivity of 3oC, meaning there is a roughly 50% chance that it could be higher or lower than 3oC. Obviously the shape of the probability distribution is also important.
13 For the purposes of this paper, clean energy technologies can be defined as those that emit substantially fewer GHGs than their conventional counterparts.

4. A focus on consumption, particularly but not exclusively in OECD countries. In part this can be achieved by a focus on end use energy efficiency and conservation measures. But absolute reductions in consumption will also be necessary, particularly in light of likelihood that successful conservation and efficiency efforts will simply allow for increased consumption (the so-called "rebound effect").[14]

1.2 Organization of the report

This paper focuses on the first of these four challenges (without prejudice to the importance of the other three). That is: how do we ensure that investment flows into new clean energy infrastructure in developing countries? The project that gave rise to this paper is premised on the assumption that there are several avenues that might be successfully pursued by governments to make such investments more attractive for private sector lenders and investors. It asked: what are the obstacles to clean energy investments, and what are the missing incentives?

The analysis focuses on two areas of interest. Chapter two begins with an in depth look at the factors affecting investment at the domestic level. That is, what domestic characteristics are likely to make a country more or less attractive as a destination for clean energy investment? It looks at this question first from the broad perspective of investment generally – capturing what is normally conceived of as the domestic climate for investment – and more specifically at those factors specifically important to investment in clean energy provision, infrastructure and technologies. It looks both at potential barriers to investment, and also at potential incentives to further investment. Three country case studies were commissioned as part of this project, looking at the domestic level questions in the Ukraine, Kazakhstan and Nigeria, and these have informed the analysis in Chapter two.

Chapter three then asks the same sorts of questions, but with a different focus. It considers the myriad strands of the complex web of international investment law – expressed in bilateral, regional and multilateral commitments – and asks how the obligations found therein might affect investment in clean energy. Again, the analysis focuses on potential barriers, and on potential for international investment law might facilitate further investment in clean energy.

1.3 Trends in clean energy investment

Globally, as of 2005, fossil fuels accounted for two thirds of generation capacity, with the remaining third being hydro (16%), nuclear (15%), and non-hydro renewables at 2%.[15] The trends may see these figures changing, however; NEF (2008) claims that fully 23% (3.1GW) of new generation capacity in 2007 was in "sustainable energy."[16]

Almost half of the global *grid-based* renewable capacity in 2000 was in developing countries, mostly in the form of small hydropower and biomass power (Martinot, 2002). By 2005, estimated worldwide grid-based renewable power capacity (excluding large hydro) was 182GW (4.4% of total installed power capacity) (NEF, 2006). India and China were the leaders in the developing world, with 49

[14] See, *inter alia*, Polimeni *et al.*, (2008).
[15] IEA (2007: 93).
[16] They define this as all large-scale renewable installations, including biofuels and biomass. Hydro is a special case, and only installations between 0.5 and 50 MW are counted.

GW of the 79 GW of installed renewable power in the developing world, accounting for 5.6% and 8.2% of their total electricity generation capacity respectively (NEF, 2006). In contrast, Germany and Spain have the largest percentage of their installed capacity (17.8% and 15.8% respectively) while the US sits at 2.2% of its installed capacity (NEF, 2006).

However if one considers Total Primary Energy Supply (TPES), not just grid-based power, Latin America has the largest current renewable energy production of developing country regions with 12 % of TPES.[17] Brazil accounts for 80% of this, mostly in biofuels. Africa in contrast is almost negligible in renewable energy production with less than 0.1% of TPES, if traditional biomass is not considered. In terms of TPES, Brazil is the developing country with the largest renewable energy production, followed by China and then Indonesia. Argentina, Mexico, India, and Thailand are also thought to be potential future leaders in renewable energy development.

In terms of clean coal technology (CCT), India has started to build a few pilot plants that make use of supercritical and Integrated Gasification Combined Cycle (IGCC) technology[18]. China already has coal plants that employ supercritical and ultra supercritical coal technology in operation, but neither country has a full scale coal power plant that makes use of either Fluidized Bed Combustion or IGCC technology, nor do they have a full scale power plant that makes use of carbon capture and sequestration technology.[19] China and India are critical on the CCT front, as 80% of China's electricity comes from coal, while 70% of India's electricity comes from coal.[20]

The importance of energy efficiency technology should not be underestimated. The IEA's two technology scenarios to 2030 (ACT and BLUE) see 36-44% of the reduction in CO_2 emissions coming from end-use energy efficiency (IEA, 2008). Both scenarios are considered to be relatively optimistic across all technology areas. The potential contribution of energy efficiency in developing countries is thought to be even higher.

Investment in renewable energy and low carbon technology has increased dramatically in the last three years. In 2004, $30.1 billion was invested globally in clean energy, and by 2005, it had risen to $48.9 billion, making up around 10% of all investment in the energy industry worldwide.[21] Investment was $83.0 billion in 2006 and exceeded $148 billion in 2007.[22] Of this, some $108 billion went into asset financing, most of it for new power generation projects.

Clean energy investment comes from both the public and private sectors including financial incentives from government, loans and capital investment from banks, private investors, and venture capital funds (CanREA, 2006). Traditionally clean energy has been financed more through direct government financing and subsides (Wolgemuth, nd). Now there is an increasing move to a more market based approach with private investment, and consumer-based financing.

17 RECIPES (2000). This is the source of the rest of the statistics in this paragraph as well.
18 Batoo (2007).
19 Ibid.
20 Ibid.
21 NEF (2006).
22 NEF (2008).

Investment in clean energy technologies is increasing in most countries. However, most investment is still occurring in developed countries and large developing countries like India, China and Brazil, and not in smaller developing countries; investment volumes in most of Latin America, and in Africa in particular, are very low.[23] The United States and European Union accounted for 70% of the global investment in clean energy in 2006.[24] Only 20% of the overall investment in renewables in 2007 was in developing countries – a figure unchanged from 2006.[25] However, this is still an improvement as in 2004, only 15 percent of global sustainable energy investment went to developing countries (UNEP, 2007). There is, however, a significant trend to an increased share of global asset financing in developing countries; the 2006-2007 figures were 20%, or fully twice that of the 2004-2005 figures.[26] In China, installed wind generation capacity increased by 156% from 2006 to 2007.

Almost half the total 2006 investment in renewables in developing countries went to China alone.[27] China was the second largest recipient of venture capital investments globally, behind only the United States.[28] India was behind China in terms of investment but was the largest buyer of foreign clean energy companies in 2006. Investment in Latin America in 2006, primarily in Brazil's bio-ethanol plants, was 5% of the global total.[29]

2. Clean Energy Investment in Developing Countries: The Domestic Side

This chapter will address overall *domestic* barriers to and incentives for investment in clean energy technology in developing countries. Section 2.1 will address barriers to investment in developing countries generally. Section 2.2 will discuss those barriers to investment specific to clean energy technologies. Potential incentives for clean energy investment in developing countries will be outlined in Section 2.3. Finally, Section 2.4 will highlight key needs and areas to address, and describe who is doing what in terms of promoting clean energy investment in developing countries. Much of the material in this chapter is drawn from the case studies commissioned for this project, which looked at the domestic factors affecting clean energy investment in the Ukraine, Kazakhstan and Nigeria, as well as from the rich body of existing literature.

2.1 General barriers to investment

There are a number of factors that inhibit investment generally (over and above specific clean energy investment) in developing countries. Private sector investors are often deterred by a multitude of factors. Developing countries are not uniform, and these factors affect some more than others. In particular, those countries that already lag the most in terms of development, are also often those that that reflect these factors the most and are thus classed as 'non-investment grade' by investors.[30]

23 Ibid. In Latin America the exceptions are Brazil and Mexico.
24 NEF (2007).
25 NEF (2008).
26 Ibid.
27 NEF (2007).
28 Greenwood et al., (2007).
29 NEF (2007).
30 Sethu (2004).

2.1.1 Political factors

Political factors refer to the overall stability of the regime. Sovereign risk and overall governance risks, concerns regarding corruption, weak regulatory systems, and the overall rule of law are often more important deterrents in developing countries than in developed countries.[31] In the worst cases, civil wars and other conflicts lead to significant regime change, constitutional amendments and regulatory shifts. If countries experience significant political instability, investors face risks of property expropriation, breach of contract, political violence and currency devaluation. The OECD has developed a political risk assessment methodology that ranks countries based on their likelihood that a sovereign government will honour its contractual obligations, particularly payment obligations. This ranking is used by agencies to establish insurance premiums for investments. Investments in higher risk countries, such as Afghanistan, Nigeria and Angola, either do not qualify for insurance or face much higher premiums.[32] Another approach to rating countries is the Fitch sovereign ratings. Countries with relatively high perceptions of risk, such as the Ukraine have a much more difficult time attracting external investment.[33]

2.1.2 Overall regulatory factors

Legal restrictions, state monopolies, trade barriers, and restrictions on foreign ownership are all broad overarching factors that serve as barriers to investment in developing countries.[34] In general, investors are interested in countries with liberal trade regimes with open trade and exposure to global trade markets.[35] However, even when trade barriers have been lifted, the legacy of control of the state monopolies or cartels can prevent new entrants, and therefore investment.[36] Complex and unstable regulatory structures are also a deterrent for investment.[37] Non-transparent legal systems, weak legal protection of foreign investors, long arbitration processes and high legal fees in many developing countries have been a barrier to investment.[38] Although dispute resolution processes exist, through for example, UNCITRAL, ICSID and other fora, they are costly and time consuming and most investors regard these as a last resort.[39] Developing countries often lack national policies that support technological development and the concurrent acquisition of skills and knowledge from external sources and training of the local population required, which discourages private investors.[40] Labour regulations also influence investor decisions.

2.1.3 Markets, financial systems and macroeconomic policies

Developing countries may also suffer from dysfunctional financial systems that make lending prohibitively expensive. Markets in many developing countries are small and are perceived to be non-competitive, therefore they do not provide appropriate stimulus to investors.[41] Lower rates of

31 Jallow (2003); Brandzaeg and Hansen (2005); NEF (2006).
32 Brandzaeg and Hansen (2005).
33 Point Carbon (2007).
34 World Bank (2002).
35 Ibid; Amey (2007).
36 World Bank (2002).
37 Brandzaeg and Hansen (2005).
38 Jallow (2003); Brandzaeg and Hansen (2005).
39 Brandzaeg and Hansen (2005).
40 Jallow (2003).
41 Ibid; World Bank (2002).

return on investments in general in developing countries are not uncommon.[42] Investors are wary of markets in which GDP growth is less than 5% and unstable because it is difficult to make projections regarding demand.[43] Markets in the least developed countries in particular do not have the depth or liquidity to promote investment.[44]

Many developing countries have macroeconomic policies that are inadequate for promoting investment. These include fiscal policies, monetary policies, exchange rate policies and debt management.

Fiscal policies. The stability and sustainability of fiscal policies in developing countries are issues of concern to foreign investors. Factors include the level and growth of tax revenues, the dependency of these tax revenues on commodity prices and foreign aid, the long-term stability of corporate income and capital gains, tax allowances for accelerated depreciation and amortization, excise taxes and taxes on imports, tax exemptions of export income, and the size and finance-ability of budget deficits. High taxes and complex tax regimes deter investment (World Bank, 2002; Brandzaeg and Hansen, 2005; Point Carbon, 2007). A weak correlation has been found between the GDP per capita of a country and the overall investment its power sector has attracted (Brandzaeg and Hansen, 2005).

Monetary policies. Foreign investors are concerned with the stability and management of domestic interest rates, the level of domestic inflation, credit policies and access to local credit by foreign firms, regulation of the financial system, extent of government domestic borrowing, and the extent of public borrowing.

Exchange rate policies. For foreign firms, foreign exchange availability and convertibility to repatriate profits ranks as the most important factor in evaluating foreign direct investment. Fluctuations in exchange rates for local currencies still represent a significant financial risk for foreign investment and force the need for significant premiums to be built into project cost estimates.

Debt management. Foreign firms are concerned about the size of public debt burdens and the management of this debt level. Spiralling debt burdens have the potential to increase taxes, cutback public expenditures, decrease foreign exchange available, and increase inflation. External debt management is compounded by internal debt servicing requirements that reduces the amount of funds available for economic development within the country.

2.1.4 *Administrative processes*

In many developing countries, significant efforts have been made liberalize trade and remove constraints to private investment. However, countries with a long history of significant government intervention and administrative control over economic decisions often have a second tier of complex, nontransparent administrative controls and non-tariff barriers to opening, closing and operating businesses that are not easily addressed by policy reforms (Emery and Spence, 1999;

[42] Jallow (2003).
[43] Sethu (2004).
[44] *Ibid.*

World Bank, 2002). These second-tier administrative controls often serve as barriers to investment as minor procedural tasks become major obstacles with long delays and requiring large payments. Some of the key types of administrative processes commonly undertaken by private investors are entry and operational permits and approvals, as well as land and site development permits.

Entry approvals include registration of the company, initial bank account set-up, residence and working permits, tax office registration, investment licensing, business licensing, business, operating and trading permits, health care and pension plan registration, and social security registration. Complicated and time consuming administrative processes have been identified as a barrier to investment by investors in the Ukraine in the appended case study. Other studies have determined that the time taken and costs involved in obtaining the necessary entry approvals varies widely. As an example, for Slovenia it took 30 business days and $2900 US. Nigeria was 18 days and $176 US for an equivalent company set-up (Morisset and Neso, 2004). Another study found that the time required to establish a firm ranged from 2 business days in Canada to 152 in Madagascar (World Bank, 2002). Africa in particular is challenging and studies have found that clearing all the administrative hurdles associated with establishing a company can take over a year in some countries (Emery and Spence, 1999). Operational requirements include import-export permits, foreign exchange controls, health and safety inspections, labour inspections, and social welfare plan payments (Amey, 2007).

Land and site development includes access to the land (in some cases owned by the state), town planning certificate, site inspections, building approvals, electric power connection, telephone connection, water and sewer, and mail service. The time commitments and costs associated with these activities vary widely among developing countries. Even just acquiring the land is often a challenge and a barrier to investors (Emery and Spence, 1999; Brandzaeg and Hansen, 2005). Many developing countries suffer from undeveloped private real estate markets, non-transparent processes for acquiring land for commercial use and lack of tenure rights for informal occupants (Emery and Spence, 1999).

2.1.5 *Lack of in-country information*

Before investing, investors require a significant amount of information regarding a country including general country conditions, investment opportunities, accounting controls, economic data, tax structures, industry profiles, potential joint venture partners, laws, and regulations. Investment promotion agencies (IPAs) have been set up in a number of countries in order to improve access to this type of information.

2.1.6 *Infrastructure deficiencies*

Infrastructure deficiencies can play an important role in determining which developing countries attract foreign investment. Key infrastructure includes: reliability and cost of utilities, the transportation system and quality of roads, the telecommunications system, the availability of land, and air services (Jallow, 2003; Brandzaeg and Hansen, 2005; Amey, 2007). Infrastructure deficiencies affect costs. For example, a poor transportation system can dramatically increase shipping costs, making the prices for goods being exported from that country less competitive. In country shipping costs in India, for example, can be up to 35 percent higher than in China (World

Bank, 2002).

2.1.7 *Human and institutional capital*

Developing countries, particularly smaller ones, often lack human capital in terms of the level of education and training within the general population (Jallow, 2003). Yet the ability to access skilled and educated workers is key to capital investment decisions (Brandzaeg and Hansen, 2005; Amey, 2007). Literacy alone has been found to be a key determinant of levels of foreign investment (World Bank, 2002). In developing countries, even though some skilled workers may exist, there is often a lack of a critical mass necessary for technology intensive projects (Jallow, 2003; Brandzaeg and Hansen, 2005).

Social and institutional capital in terms of corruption, behavioural norms, government agencies and non-governmental civil-society structures can also be problematic in some developing countries (Jallow, 2003; Amey, 2007). There may be a lack of institutional capacity in government agencies responsible for undertaking the administrative processes associated with foreign investment (Emery and Spence, 1999). This can at best make administrative processes slower and more complicated for foreign investors. At worst, government agency officials can distrust investors or view them as a supplemental source of income leading to cases of requirements for unofficial payments or ongoing administrative 'harassment' whereby business operations are interrupted for inspections or clearances (Emery and Spence, 1999; Point Carbon, 2007). In addition, there can be a resistance to change in developing countries that leads to challenges in the development or deployment of new technologies (Jallow, 2003).

2.2 Barriers to clean energy investment

Many of the barriers to clean energy investment that are presented below apply to both developed and developing countries. However developing countries face additional and unique challenges. Where applicable in each section, the additional challenges faced by developing countries will be highlighted. The country case studies completed for this project suggest that developing countries often face even greater barriers associated with more unstable political and financial systems, less developed energy policies, poorly funded utilities, often with grid electrification not extended to all parts of the country, more limited access to information and technology. But at the same time, it should be recognized that developing countries are by no means uniform and some, such as China, India and Brazil, are forging ahead quite dramatically with procuring clean energy investments from both internal and external sources.

In addition, some of the barriers highlighted apply more specifically to certain clean energy technologies, while others apply more to clean energy technologies in general. For example, discriminatory grid policies affect distributed and intermittent technologies such as renewable energy projects more than they affect off-grid renewable projects. Other barriers, such as lack of access to finance apply more uniformly to all clean energy technologies.

Moreover, it should be stressed that many of these barriers are interrelated. The relatively high cost of clean energy technologies makes them difficult for developing countries with less stable financial systems to consider in the absence of aid or foreign investment. But foreign investors are wary, in

some cases, of the relatively unstable financial systems in developing countries.

2.2.1 *Energy policies*

Domestic energy policies have a critical impact on clean energy uptake in both developed and developing countries, as demonstrated in all three of the country case studies completed for this project. If one looks at neighbouring countries with reasonably similar economies (for example France and Germany), energy policy is one of the key drivers in determining the degree of installed clean energy capacity (NEF, 2006). Domestic energy policies affect clean energy investment in multiple ways, some of which are surveyed below.

Clarity of overall energy policy

Historical regulatory structures and policies in both developed and developing countries often favoured, and still favour, existing fossil fuel or nuclear dependent utilities (AusAid, 2000; Brooks *et al.*, 2004). Many developing countries do not have clearly defined clean energy policies with targets or mandates. Energy policies are often in transition, or more ad hoc, particularly with regard to distributed clean energy systems. Many African countries are in the process of defining their domestic energy policies in general (RECIPES, 2007). With respect to renewable energy technologies, many developing countries suffer from a lack of a renewable energy policy, with targets for renewable energy use, or have renewable energy policies in their infancy. Many developing countries also do not have energy efficiency targets and policies, or minimum energy performance standards for appliances (Koizumi, 2007). There is also an absence of targets for increasing the utilization of CCT in most developing countries (Watson *et al.*, 2007).

Unstable or unformed clean energy policies serve as a major deterrent to foreign and domestic investment in clean energy (NEF, 2006; Amey, 2007). Regulatory uncertainties undermine the ability of clean energy proponents and investors to understand the 'playing field,' and develop long term plans (Brooks *et al.*, 2004) and prevent clean energy development from occurring in an integrated incremental manner (Amey, 2007). Similarly, the lack of targets or mandates may suggest to external investors that the government is not supportive of clean energy, will not motivate internal investors, power plant operators or manufacturers to invest in clean energy. Limited energy efficiency requirements on appliances provide little incentive for manufacturers to invest in energy efficiency (Koizumi, 2007).

State monopolies and power purchase agreements

In many countries, particularly developing countries, power utilities still have a monopoly on electrical power production and distribution and the legal framework supports that monopoly (Beck and Martinot, 2004; Amey, 2007). As a result, independent power producers may not be able to sell power to the utility or to third parties through power purchase agreements. (Beck and Martinot, 2004; Amey, 2007). This is a widespread and critical barrier to clean energy investments. Deregulation where it has occurred is sometimes not smooth, producing volatile energy prices and as a result significant negative public reaction to policy reform and independent power producers (Amey, 2007). Moreover, even if there has been deregulation, many former public utilities continue to control a large percentage of the generation, transmission and distribution, allowing them to cross-subsidize these activities, making actual prices unclear, which blurs market opportunities

(Amey, 2007).

In addition, even in many cases where power purchase agreements are permitted, utilities often negotiate them on an *ad hoc* basis, with no set rules and no fixed feed-in tariffs (Beck and Martinot, 2004; RECIPES, 2007). This makes it difficult for projects developers to plan and finance projects on the basis of known and consistent rules. There is also uncertainty in some countries on whether utilities will continue to honour long term power purchase agreements. The uncertainty in government regulation is often enough to make investors wary (Brooks *et al.*, 2004).

Discriminatory grid policies

In countries where power purchase agreements are allowed or required of utilities under the existing regulatory structures, many utilities engage in discriminatory or opaque grid policies which further acts as a barrier to clean energy investment (CEC, 2007). Some of the key discriminatory grid policies are as follows:

- *Utilities may not allow favourable transmission access or may charge high prices for transmission access for clean energy* (Nogee *et al.*, 1999; Beck and Martinot, 2004). For example, intermittent generators like solar or wind may be forced to pay for the maximum potential output, even on pre-existing transmission lines. Most of the time the intermittent generator is producing less than their maximum and therefore they are paying dramatically more (up to three times more per kilowatt hour) for transmission.
- Remotely located facilities may also have to pay heavily in transmission charge schemes based on distance or number of utility territories crossed (Nogee *et al.*, 1999). Building new transmission lines to hook a distant solar or wind generation site to the grid can be more frequently blocked by regulations or right-of-way disputes than transmission lines for conventional power generators, which were often put into place by public utilities. (Beck and Martinot, 2004).
- Intermittent generators may also be charged a penalty if their energy delivery varies even by small amounts from scheduled amounts.
- *Clean energy producers may not receive full credit for the power they are producing*. In a study of power sector investors, the tariff level paid to power generators was one of the key determinants of which countries received investment (Brandzaeg and Hansen, 2005). Utilities often pay wholesale prices for renewable power which do not recognize the fact that renewable projects are often located near the consumer and did not incur transmission and distribution costs. In some cases, utilities negotiate variable power purchase tariffs for renewable energy producers. In Sri Lanka in a World Bank/GEF mini-hydroelectricity project, tariffs were tied to short-run avoided utility costs based on the international price of oil. Mini-hydro development did well when oil prices were high in 1997 and 1998 (tariffs were set at the equivalent of 5 cents/kWh). But when the price of oil declined in 1998/99 tariffs were only the equivalent of 3.5 cents/kWh and most development stopped and hurt the longer-term interest of private mini-hydro developers in Sri Lanka (Miller and Martinot, 2001).
- *Utility interconnection requirements* may be burdensome, inconsistent and unclear increasing

transaction costs (requiring significant legal and technical expertise). Safety and power quality concerns are legitimate, but may lead to interconnection requirements that are beyond what is required (Beck and Martinot, 2004).

- *Liability insurance requirements* may be excessive. There are risks from islanding, when self-generators continue to feed power to the grid when the power flow from the central utility has been disrupted causing death or injury to repair crews. Proper equipment standards can prevent this, but liability is still an issue. Some US states have prohibited utilities from requiring additional insurance as part of net metering statutes (Beck and Martinot, 2004).

Administrative barriers

There may also be restrictions on siting and construction for clean energy technologies like wind turbines, solar PV and biomass combustion facilities, due to concerns relating to noise, unsightliness and safety, particularly in urban areas. Planners and permitters are often unfamiliar with clean energy technologies and have no established procedures to deal with the planning, building and operation of clean energy facilities, creating more administrative barriers that must be overcome (Beck and Martinot, 2004; CEC, 2007). This adds to uncertainty with regard to whether a project will be approved, how onerous the process will be and how long it will take, all of which make investors wary.

Subsidies and taxation

Subsidies and taxation favouring nuclear and fossil fuel technologies are also a problem globally and in many developing countries (Nogee *et al.*, 1999; AusAid, 2000; Beck and Martinot, 2004; Amey, 2007). It has been estimated by the World Bank and IEA that global annual subsidies for fossil fuels are in the range of $100-200 billion (Beck and Martinot, 2004). Subsides can take many forms including direct budgetary transfers, tax incentives, R & D spending, liability insurance, leases, land rights-of-way, and guarantees to mitigate project financing or fuel price risks (Beck and Martinot, 2004). These subsidies distort prices, allowing fossil fuel energy providers to lower prices putting clean energy at a disadvantage. (Beck and Martinot, 2004).

Clean energies may also face higher taxes and import duties which add to the cost (Beck and Martinot, 2004). Income and property taxes may be higher, as they require large capital investments but do not have deductable operating and fuel expenses. For example, in the US traditional energy companies can deduct a depletion allowance for the loss of fuels that have been mined or drilled, as well as writing off certain exploration and development costs (Nogee *et al.*, 1999). There may be import taxes on clean energy technology. In the 1990s, for example, there was a 40% import tax on solar PV technology in Zimbabwe (Martinot, 2000).

Lax environmental regulation

Poor environmental standards and lax enforcement of existing standards are a problem in many developing countries. For example, China and India both have a high reliance on coal power, but in India, there are no current regulations on NO_X emissions or SO_2 emissions from power plants (Batoo, 2007). In China many of the coal power plants are not within the jurisdiction of the central government and are seldom required to conform to strong environmental standards (Watson *et al.*,

2007). In the absence of stringent environmental regulations, or enforcement of existing regulations, utilities, power plant operators and manufacturers in developing countries are not motivated to explore ways to make their energy production and consumption cleaner or more efficient(Van der Veen and Wilson, 1997; Batoo, 2007; Watson *et al.*, 2007).

Fragmented and immature industry and market

Markets for clean energy are new and relatively immature and they are generally reasonably new technologies competing with mature energy technologies from conventional fuels sources. As a result, there are information gaps, credibility gaps, lack of technical skills, lack of economies of scale, and high transaction costs which create risks for investors. These knowledge and skill gaps increases uncertainties, make financing more difficult to acquire and prevent clean energy from being considered in the first place by either new producers, consumers or existing utilities. (Nogee *et al.*, 1999; Beck and Martinot, 2004).

Knowledge and credibility gaps

Consumers, lenders, developers, utility companies and planners, both in developed and developing countries, often lack information about clean energy (Beck and Martinot, 2004; CEC, 2007). Problems of lack of information are even larger in developing countries (Jallow, 2003), especially in Africa where local industry has little context for clean energy, and it is often not considered a realistic option (RECIPES, 2007). Potential investors, planners and developers in developing countries often lack the technical information base to effectively identify and select clean energy technologies (Jallow, 2003; RECIPES, 2007). They often have not actively engaged in climate change issues and do not see the connection between climate change and business opportunities (Jallow, 2003). And they may lack information regarding the potential energy savings potentials from energy efficiency (Koizumi, 2007).

In addition, clean energy technologies still face substantial credibility gaps with consumers, utility companies, government agencies and investors (Brooks *et al.*, 2004), although these are narrowing. Often even if there is reasonable commercial experience in other countries, if there is no in-country experience it can be viewed as too risky. Past poor performance feeds this, even though performance has improved (Beck and Martinot, 2004). Negative perceptions increase required rates of return and affect capital availability. Utilities seldom consider starting projects with unfamiliar or just recently commercialized technology and don't put them in their planning frameworks (Beck and Martinot, 2004). For example, Taipower, Taiwan's state owned utility, evaluated the possibility of a pilot power plant based on IGCC clean coal technology, but it was rejected by the Board of Directors due to an insufficient record of commercial operation (Chien, 2007). Likewise, perceptions regarding the need for power and local protectionism regarding power, employment and economic stability mean that, for example in China, smaller more inefficient coal plants are kept open (Watson *et al.*, 2007), though the current policy involves closing many of the more inefficient plants.

Overcoming some of the negative perceptions associated with past projects is also a challenge in some developing countries. Past clean energy initiatives in developing countries have often failed to meet needs and in some cases suffering from poor design, lack of quality implementation and

problems with maintenance (Watson *et al.*, 2007). Money or equipment is donated without any ongoing commitment (AusAid, 2000; Bradsher, 2007). The technology utilized has not always been appropriate, i.e. focusing on solar when microhydro might be more appropriate in Asia and the South Pacific (AusAid, 2000). Sometimes the technology selected has been outdated and achieves lower efficiencies than newer technologies, as in the case of wind power in the Ukraine (Point Carbon, 2007). Energy projects have failed to adapt to meet the needs of the target community. For example, in an electrification project in Indonesia, consumers wanted access to a small, affordable amount of electricity (around 20 watts, enough to power two 10-watt bulbs, giving a great improvement on candles). The utility would only sell the energy in 100 watt increments which was too expensive for most people (AusAid, 2000).

Lack of technical skills

There is also often a lack of technical skills to install, operate and maintain clean energy technologies. Lack of technical skills is often an even larger problem in developing countries (RECIPES, 2007). Smaller developing countries in particular are unable to compete on the technology learning curve. For example, in biofuels, investment is being slowed because there are a limited number of companies with experience in the design and building of refining plants. New companies are being established, but investors wanting to utilize the more experienced companies are finding themselves having to wait (NEF, 2006). In the area of energy efficiency, developing countries often lack experience and skills in energy efficient design, manufacturing and testing (Koizumi, 2007).

Lack of technical skills contributes to the overall transaction costs for clean energy. In addition, projects that have been initiated in developing countries can fail to achieve desired efficiencies due mistakes in selecting technologies, site selections and manufacturing inexperience, a problem experienced with wind power sector in the Ukraine (Point Carbon, 2007).

There can also be a lack of technical skills in the area of marketing and acquiring financing. Managers of clean energy technology projects in the early stages often have technical skills but lack market knowledge and skills, which often deters investors away from emerging technologies (clean or otherwise) (Brooks *et al.*, 2004).

Lack of economies of scale and supply chain bottlenecks

Production of clean energy technology components has still not achieved economies of scale due to limited demand. This is improving – they are still in the cost reduction phase. The cost of renewable energy technologies falls by about 20% every time accumulated production doubles (CanREA, 2006). But prices remain higher than they could be if more were being produced, which in turn limits demand, particularly in developing countries which are more price sensitive.

Because it is an immature industry, there are also bottlenecks in the supply chains of a number of clean energy sectors (NEF, 2006). Silicon is a bottleneck for PV production with prices going from $9 kg in 2000 to $150/kg in 2006 (NEF, 2006). It is expected that this will stabilize in time, but costs like this can be more easily born in countries like Germany, but less so in developing countries such as India (Bradsher, 2007). Wind energy investment is being affected by shortages in turbines,

24 month order on pipelines, and shortages in key subassemblies like gear boxes (NEF, 2006).

2.2.2 *Higher costs of clean energy*

The costs of clean energy technologies are often higher than the (uninternalized) costs of conventional technologies (Beck and Martinot, 2004; CanREA, 2006; Amey, 2007; Batoo, 2007). In developing countries in particular, where funds are limited, and utilities can be in difficult financial shape, these costs can be a major barrier. These higher costs take many forms, including 1) higher capital costs, and 2) higher transaction costs and 3) the higher cost of buying foreign technology.

Capital costs

In the case of clean coal technologies, IGCC technology is considered to be the most effective means for eliminating coal-plant CO_2 emissions (Batoo, 2007). However IGCC plants cost in the range of $400 kW hour, or 25%, more than conventional coal plants to build (Worthington, 2006). In addition, the average cost of generating power from an IGCC plant is 32% higher than from a conventional pulverized coal (PC) plant (Batoo, 2007). Sometimes efficiencies realized through the utilization of CCT can reduce life cycle costs, but the higher initial capital investment still serves as a barrier (Watson *et al.*, 2007). In addition, rising coal costs, falling natural gas prices and the perceived lower impact of natural gas has made CCT projects more challenging from a cost perspective (Sethu, 2004). Thus even though there are many coal fired IPPs in Asia, they are mostly PC plants, largely due to the differential cost. Even in developed countries, the least cost coal option is generally the one selected (Worthington, 2006).

In the case of renewable energy technologies, the initial capital costs are often higher on a cost per unit basis (capital investment per kW) (Beck and Martinot, 2004; CanREA, 2006; Amey, 2007). On a life-cycle basis, lower fuel and operating costs often make renewable energy cost-competitive, but this is often not considered (Beck and Martinot, 2004). The lower transmission and distribution costs of distributed clean energy generation are also rarely considered by utilities who only consider the cost of generating the electricity.

It is also challenging to do a cost comparison between renewables or even clean coal and fossil fuels due to the uncertainty of the future cost of fossil fuels (Beck and Martinot, 2004). Fuel prices until recently have been considered to be stable or moderately increasing, or something that can be passed directly on to the consumer. As a result, they have not traditionally been factored in to cost analyses, or if they have, it has been in a manner that discriminates against clean energies (Beck and Martinot, 2004). The subsidization of fossil fuels also distorts the picture, making clean energy projects appear even more costly. Moreover, the environmental externalities of 'less' clean energy technologies to society in terms of impacts on human health and the environment are rarely factored into the evaluation of costs of conventional versus clean energy projects by investors (Beck and Martinot, 2004; Amey, 2007).

Transaction costs

Transaction costs per kW of capacity (siting, permitting, planning, assembling financing, negotiating power purchase agreements) for renewables are also often higher because of the smaller relative size of the projects, or the nature of the technology requires additional research or time (Beck and

Martinot, 2004; CEC, 2007). For example, it costs more for financial institutions to evaluate the credit worthiness of multiple small projects versus one large one. Smaller relative size also affects the ability of the companies to market and sign up new customers. Independent power producers often have fewer resources and employees than large utilities. As a result, it costs them more to participate in regulatory or legislative proceedings or industry forums defining new electricity rules.

Buying foreign technology

Developing countries generally do not have the funds to support research and development into new technologies themselves (Batoo, 2007). Often licenses must be purchased for foreign technologies, and paid for in foreign currencies (RECIPES, 2007). This can create a major cost barrier for some developing countries.

2.2.3 Lack of access to finance

There are multiple different types of barriers related to finance availability for clean energy projects in both developed and developing countries. These barriers differ from project to project. But some of the key challenges are as follows:

- Those interested in investing in clean energy projects often have difficulty accessing credit, because of the high initial capital investment, the fact that they are new companies without financial track records or creditworthiness, longer payback periods, the regulatory uncertainties (Wohlgemuth and Painuly, 1999; Beck and Martinot, 2004; RECIPES, 2007; Amey, 2007).
- Clean energy technology projects generally face higher interest rates than conventional energy projects when money is borrowed. There are several reasons for this – the higher transaction costs, the unfamiliarity with the technology and greater belief in risk on the part of lenders, the higher initial capital outlay with a longer payback period. This can significantly affect the competitive position of clean energy companies (Nogee *et al.*, 1999; Beck and Martinot, 2004; Brooks *et al.*, 2004; Amey, 2007).
- Available loan terms may be too short relative to the equipment or investment lifetime (Wohlgemuth and Painuly, 1999).
- Returns on investment for renewable energy projects can be lower, can take a longer time or can be subject to higher uncertainty than those for more conventional energy projects making financing more difficult to obtain (RECIPES, 2007).
- Bank regulations and investment policies, often geared for larger conventional energy projects, can be inadequate or unsuitable for smaller, more numerous, distributed clean energy projects (RECIPES, 2007).
- Investors and financial institutions often lack information regarding clean energy technologies and perceive them (correctly or incorrectly) to be riskier than conventional energy projects or other competing investment opportunities (Wohlgemuth and Painuly, 1999; Chien, 2007).
- Clean energy faces a chicken-and-egg situation whereby investors are wary of investing the capital required to reduce manufacturing costs through economies of scale, due to low demand, but demand remains low, due to the higher prices because of low levels of production (Wohlgemuth and Painuly, 1999).

However, in developing countries in particular, the challenges of availability of financing are multiplied by least three factors:

First, in terms of *domestic* funding sources in developing countries, capital markets are often in their infancy (Sierra, 2006) and financing, in Africa in particular, from both private investors and from governments is more limited than in developed countries (RECIPES, 2007). Utilities are often in poor financial condition and have limited abilities to borrow to invest in clean energy or expand their services (Martinot, 2002; Sierra, 2006; Batoo, 2007). Developing country governments often have limited funds to develop and introduce clean energy technologies (Batoo, 2007; Watson *et al.*, 2007). Even if developing country governments offer some funding for clean energy investment, it can be too unreliable and intermittent to encourage firms to commit to capital intensive, high risk technologies (Watson *et al.*, 2007).

Second, with regard to *external* funding sources, developing countries, particularly low income ones, often struggle to acquire foreign direct investment (FDI), particularly for large, fixed capital investments, for a wide variety of reasons already outlined above, and including weak intellectual property rights and perceived regulatory, financial and political risks (Sierra, 2006; Batoo, 2007). There is often a general lack of support mechanisms for investing in the developing world (CanREA, 2006). In addition, smaller less developed developing countries have significant difficulty accessing the international finance mechanisms that the larger emerging countries, such as China and India, have benefited from (RECIPES, 2007).

Moreover, most FDI goes toward larger scale grid-based electricity projects, whereas in smaller developing countries, bioenergy and smaller off-grid projects might be more appropriate. There are multiple complex reasons for this. Rural energy projects can be slower to yield returns. Off-grid projects are often at least partially dependent on end-user financing and rural poor often have very limited spending power for purchasing systems or power (Hankins, 2006). Off-grid electrification is often viewed as a second class technology by developing country governments focused on grid extension (Hankins, 2006). In addition, past off-grid projects have had only mixed success, which likely discourages additional funding. For example it has been found in some African countries that off-grid systems are more costly to end-users and provide less energy (GNESD, 2004). Some off-grid projects were placed hands of a small overburdened government agencies which had difficulties implementing the programs and assisting the end-users in maintaining their equipment (Hankins, 2006). Studies have found that of after several years of operation only 6 to 30% of off-grid systems installed through funding projects are still operational (GNESD, 2004).

Third, in developing countries sometimes the financing problems are related to the consumers who cannot afford the power or technological investment (RECIPES, 2007). Microfinancing for consumers to purchase clean energy technology is only available in a limited number of countries and the funds offered can be too limited and the payback periods too short (Allderdice and Rogers, 2000; Amey, 2007). Likewise, the uncertainty with regard to whether the distribution company will be able to collect from customers and pay the power generation company is a deterrent to foreign investment (Brandzaeg and Hansen, 2005). In the case of India, few IPPs have been established because they have to supply their energy through the Indian State Energy Boards, which are often in

poor financial health, and there is some risk that the IPP will not be paid for the energy provided (Watson *et al*, 2007).

2.2.4 *Patents and intellectual property rights*

Much of the clean energy development in developing countries occurs through some form of technology transfer from developed countries. Technology providers usually preserve their commercial interests during technology transfer using patenting, selective licensing and other forms of intellectual property rights (IPRs) protection. Lax IPRs can prevent technology transfers from occurring if the transferring firm is not confident that the legal regime with regard to IPRs is well enough defined or enforced in some developing countries (Watson *et al*., 2007). Patents and IPRs can also prevent developing country firms from becoming producers (Barton, 2007). This means that the developing countries must buy the licenses and technology from developed countries, often at steeper prices than they could produce a similar technology themselves, creating another barrier to the utilization of clean energy in developing countries (Barton, 2007; RECIPES, 2007). In addition, venture capital firms can prefer to invest in startups who hold the patents themselves (Barton, 2007), which might limit developing country firms who do not hold patents from gaining investment. A few developing countries, such as China and India have effectively established their own clean energy firms, particularly in the renewables sector, which manufacture and install clean energy technologies, but most developing countries are not in this position.

2.3 Incentives for clean energy investment

Despite multiple domestic barriers to clean energy investment in developing countries, such investment has increased dramatically in the last few years.

That trend is being driven by multiple factors that are not domestic in nature. A key driver has been increases in oil prices. In 2005, oil started the year at $41 a barrel and rose to $65 in 2006, and in 2008 stands at close to $150 a barrel. Concerns regarding oil scarcity, geopolitical uncertainty and growing demand in China and India is fostering greater interest in and commitment to clean energy (NEF, 2006; RECIPES, 2007). International agreements such as the Kyoto protocol and its Clean Development Mechanism (CDM) are also promoting increased investment, as well as general global consumer awareness regarding climate change and the need for cleaner energy (NEF, 2006; UNEP, 2007). In some respects, clean energy markets are also just coming of age, growing more mainstream and global, fostering greater private investment and less perceived risk (UNEP, 2007). Clean energy is expected to be a large market growth opportunity over the next few decades, and as a result it is attracting new private investment capital (Brooks *et al*., 2004).

However, developing countries can also create incentives for clean energy investment domestically. This section will highlight some of the key incentives that can be undertaken domestically in developing countries to increase clean energy investment. It is divided into four sub-sections: 1) General government policies, 2) Government energy policies, 3) Access to financing assistance and 4) Fostering market maturity. Many of these incentives are those that must be undertaken by government agencies within the developing country. These types of incentives are discussed in the first two sections. Other incentives could be undertaken by government agencies or other bodies including local or international non-government organizations (NGOs), international agencies, or

private investors. These other types of incentives are grouped into the last three sections. It is important to stress that there is no one approach that fits all clean energy technologies and developing countries (Ockwell, 2006). Incentives that work for certain technologies and countries will not work for others.

2.3.1 General government policies

As argued above, a country's overall governance and government policies play a key role in providing incentives for clean energy investment. In many cases, providing incentives for investment involves simply reversing the main barriers outlined. However, at the risk of repetition, a few of the key incentives identified in the literature will be reviewed here.

In developing countries in particular, political stability, good governance and transparency at the state and corporate level, including the rule of law, legislative stability, respect for property rights and enforcement of contract obligations are critical to attracting foreign and domestic investors (Brandzeag and Hansen; CanREA, 2006; Sierra, 2006). The upholding of government commitments was ranked as one of the key incentives for investment by power sector investors in one study (Brandzaeg and Hansen, 2005). A liberalized trade regime is also thought to be particularly important to attracting FDI. Developing country governments have a critical role to play in establishing an enabling business environment, reducing administrative barriers and ensuring that there is appropriate in-country infrastructure for transportation and telecommunications (Ockwell, 2006).

Less restrictive taxation, bureaucracy and labour laws in general are also thought to facilitate clean energy investment (CanREA, 2006). For example, easing bureaucracy and restrictive labour laws would make it easier for startup companies to hire employees during rapid expansion without creating substantial future liabilities (NEF, 2006). Well defined and enforced domestic intellectual property rights regimes may assist in promoting the transfer of clean energy technologies developed countries to developing countries (NEF, 2006; Ockwell, 2006).

2.3.2 Energy policies

Clean energy investment is particularly dependent on domestic government policy support and public funding (Brooks *et al.*, 2004). The underlying energy policy of a particular country is considered to be one of the key drivers of clean energy investment in that country (RECIPES, 2007; Greenwood *et al.*, 2007). For example, the greater recent private investment in European renewable energy companies, compared to US ones, is thought to be linked to Europe's ratification of the Kyoto Protocol as well as strong European government support for clean energy (UNEP, 2007). The value of clean energy companies in Kyoto ratifying companies was up 68% over non-Kyoto ratifying companies such as the US and Australia (NEF, 2006). Brazil is one of the leading producers of renewable energy in the developing world due at least in part to its energy policy focused on biofuels and energy independence (RECIPES, 2007). Domestic energy policy not only can set targets and provide subsidies for clean energy development, but they are one of the key determinants of many of the other factors that affect the success of clean energy investment including the organizational structure of the energy sector, and prioritized access to the grid (RECIPES, 2007). More private capital could potentially be mobilized if developing countries

pursued aggressive energy sector reforms (Sierra, 2006).

Government energy policies affect clean energy investment through several mechanisms: 1) Establishment of targets or requirements for clean energy supply; 2) Setting the overall regulatory structure of the energy sector including the level of deregulation and the requirement for feed-in tariffs and net-metering; 3) Setting and enforcing more stringent environmental regulations giving power producers an incentive to invest in cleaner technologies; 4) Provision of subsidies for clean energy in the form of tax credits, capital grants and subsides, low interest consumer loans, favourable power purchase tariffs, and tax rebates and exemptions; and 5) Direct public investment in clean energy, and 6) Government financing assistance in the form of credit guarantees or low interest loans. Each of these factors is examined below in turn.

Targets or requirements for clean energy

Many countries have targets for renewable energy to make up a certain percentage of total primary energy supply, usually shares of electricity production in the range of 5 to 30 percent, by a certain date in the future. The 46 countries in the world that have such targets include 13 developing countries, such as China, India, Brazil, Thailand and the Philippines (Martinot, 2006). For example India has a target that 10 percent or 10 GW of added electric power capacity between 2003-2012 must be from renewable sources, and China's target is for 15% of primary energy to be produced from renewables by 2020.

More stringent than targets, some states have legislation requiring utilities to get a certain percentage of their power from renewables by a certain date (Martinot, 2006; Barton, 2007; RECIPES, 2007). These often take the form of Renewables Portfolio Standards (RPS), which oblige utilities to ensure that the target is met in the context of their operations. RPS policies have been established in several Indian states, as well as countries such as Australia, Japan and Thailand (Martinot, 2006). Such policies may be critical in the development of clean energy technology and markets by creating sufficient economies of scale such that the industry can develop, competition is promoted and technical knowledge and skills are increased (Wohlgemuth and Painuly, 1999). With regard to energy efficiency and CCT, more effective policy frameworks with express commitments need to be established in most countries (Lallement and Sarkar, 2006). The European Union has set a target of saving 20% of the European Union's total primary energy consumption by 2020 through energy efficiency measures.

There are also a wide variety of other types of mandates or requirements for clean energy in various countries. Some countries require that new building construction must include some form of clean energy. For example, Israel and Spain require that most new buildings include solar hot water collectors , and in Spain new buildings must supply 30 to 70 percent of their hot water from solar (Martinot, 2006). Brazil's policies of mandating that ethanol be blended with all gasoline sold, as well as requirements that all gas stations sell gasohol E25 and pure ethanol (E100) have been instrumental in promoting the investment in the biofuels industry in that country. Similar mandates for blending biofuels into all vehicle fuels sold exist in several other countries including several Indian states, several Chinese provinces and a few US States (Martinot, 2006). Other developed countries, such as The EU, the US and Canada, and developing countries, such as Columbia, the

Dominican Republic and Malaysia, have committed to mandating ethanol (usually 5 to 15 percent) or biodiesel (usually 2 to 7 percent) blends within the next 1 to 5 years.

Supportive regulatory structure

Removing regulatory and legislative barriers to clean energy investments provide a critical incentive to clean energy development (NEF, 206). Supportive regulatory frameworks for clean energy can have a large influence on investment. A key aspect of facilitating private-sector involvement and investment in clean energy is that the framework and rules governing clean energy are agreed upon, fair, transparent and stable (Martinot, 2002; NEF, 2006). Most of these supportive regulatory frameworks relate to the deregulation of the energy sector, the creation of policies relating to allowing independent power producers (IPPs), feed-in tariffs, net-metering, and purchase guarantees of biofuels (Miller and Martinot, 2001, Barton, 2007). But it should be stressed these policies are not always imperative. There are also countries with less liberalized energy markets that are still successfully adopting clean energy technology, due to a combination of public and private investment and government initiative (RECIPES, 2007). In addition, regulatory structures relating to building codes and other standards can play a role in providing incentives for clean energy investment (CanREA, 2006). Some of the key aspects of the overall regulatory structure are discussed below:

Deregulation and independent power producer frameworks

Deregulation of the energy sector, which generally refers to the unbundling of generation, transmission and distribution, is often considered a key first step in the promotion of clean energy in power generation. Power generation is usually the first part of the utility system to be deregulated. Independent power producer (IPP) frameworks require the utility (which usually still holds the monopoly on transmission and distribution) to buy power from independent power producers (often wind, solar, small hydro and cogeneration producers). Independent power producer (IPP) frameworks are often considered key to the success of clean energy as new power generators can enter the market, and power generation choices are not just based on the biases of utilities which tend to favour conventional power generation (Martinot, 2002, Amey, 2007). For example, most wind power capacity worldwide has been installed by IPPs (Martinot, 2002).

In addition, IPP frameworks and other utility buy-back schemes have allowed end-users both industrial and small residential to start generating their own electricity. The complete unbundling of generation, transmission and distribution functions to different commercial entities can provide greater incentives to self-generate using clean energy technologies. If retail tariffs begin to more accurately reflect generation, transmission and distribution costs, customers may have more incentive to self-generate to avoid transmission and distribution charges. But unbundling can create transmission pricing penalties for intermittent renewable energy sources, if they have to pay for capacity even if the capacity is not being used, making them less competitive (Martinot, 2002).

In developing countries, as of 2002, IPP frameworks had been established in 43 developing countries (Martinot, 2002). In some countries, such as India and Sri Lanka, IPP frameworks have assisted in the development of markets for renewable energy (wind power and small hydro) (Martinot, 2002).

Competitive retail power markets are another aspect of power sector restructuring occurring in a few developed countries. Individual consumers are permitted to select their own power generator, allowing them to purchase power from a "green" supplier, usually at a premium. Green power firms could have a competitive marketing advantage promoting investment in clean energy projects. However, significant marketing campaigns are required to explain to consumers that there is a green power provider and that a choice in power supplier exists at all. Green power markets have appeared in a few countries, such as The Netherlands and the United States with mixed success. Interest has mostly been spurred by subsidies or tax exemptions on the power purchases, but even so, the main purveyor of green power in California stopped taking on new residential customers because the cost of educating and signing up new customers outweighed the profits (Martinot, 2002). Some have suggested that clean energy should be mandated in public sector procurement to assist in the creation of green power markets (NEF, 2006).

Feed-in laws, net metering and purchase guarantees

In order for clean energy to work, clean energy producers must receive fair credit for the value they create, in terms of both energy (i.e., kilowatt hours produced) and capacity (i.e., kilowatts available). Feed-in laws, net metering and purchase guarantees can assist in this regard.

Feed-in laws set fixed prices at which power producers can sell electricity into the grid. Some country's policies set a fixed tariff, while others provide fixed premiums added to market or cost-related tariffs. Often, but not always, the fixed tariff is higher than would be paid for conventional power. High feed-in tariffs paid for electricity from solar photovoltaic sources in Germany have been considered to be part of the success of solar energy in Germany (NEF, 2006). High feed-in tariffs were also ranked by power sector investors as the key factor determining which countries were invested in (Brandzaeg and Hansen, 2005). By 2005 several developing countries had feed-in tariffs that were specified so as to act as an incentive for clean energy investment, including India, Sri Lanka, Thailand, Brazil, Indonesia, China, Turkey and Nicaragua (Martinot, 2006).

Net metering allows two-way flow between the electrical grid and self-generating customers. When consumption exceeds generation, power flows from the grid to the customer. When self-generation exceeds consumption, the power flows the other way and the customer pays only for the net electricity utilized. Thirty-five states in the U.S. now have net metering laws, and California allows users with up to 1-megawatt loads to use net metering (Martinot, 2006). A net metering law was recently passed in Thailand, but few other developing countries have yet to consider net metering (Martinot, 2002). NEF (2006) argues that mandating net metering is an important prerequisite to increased investment in clean energy.

Purchase guarantees, whereby the government commits to purchasing a certain portion of production for a certain period of time, were critical in the development of Brazil's development of its ethanol industry (Barton, 2007). Brazil has made similar purchase guarantees with regard to biodiesel for 2005 through 2007 (Agra CEAS, 2006).

Standards and codes, labelling and smart metering

Ensuring that building, electrical and plumbing codes and other standards promote clean energy and energy efficiency is also critical to the success of clean energy investments. Building codes often ignore clean energy (CEC, 2007). Building standards that require, for example, that houses be solar ready, would help promote the use of solar energy (CanREA, 2006). Energy performance standards for buildings are also being put into place in developed countries, such as Canada and the European Union, and are critical to promoting energy efficiency (Rud, 2008; EurActive, 2008). At the very least, building standards and codes should not prevent the use of clean energy.

In addition, energy performance standards for domestic and office appliances, industrial machinery and vehicles are important for promoting energy efficiency. Requirements for appliance labelling and smart metering could also provide incentives for energy efficiency (Point Carbon, 2007). Smart meters inform consumers how much energy they are utilizing, when and how much it costs, allowing utilities to reward customers who utilize energy outside of peak hours (Rud, 2008).

More Stringent environmental regulations

Clearly defined and enforced emissions policies are considered key to encouraging technology transfer to developing countries (Ockwell, 2006). The lack of strong environmental standards, particularly in countries such as India, may serve as a barrier to the development of clean coal technology (Watson *et al.*, 2007). In addition, environmental regulations must be enforced. China has reasonably stringent environmental regulations at a national level, but enforcement is patchy and the control of coal fired plants is within the purview of local governments who do not require the plants to follow environmental standards (Watson *et al.*, 2007). Environmental regulations in developed countries, such as regulations to reduce power plant emissions, have helped foster clean energy development (Beck and Martinot, 2004). Regulations help to internalize the social and environmental costs of greenhouse gas and other emissions, lowering the comparative costs of clean energy. Regulations can promote clean energy development indirectly through offset credits whereby emitters can meet targets by reducing their emissions or through the purchase of credits created through renewable energy generation. Stringent environmental regulations can also promote clean energy development directly as utilities and other power generators begin to favour cleaner energy technologies that do not require emissions reductions or the purchase of offset credits.

Subsidies and tax incentives

Reducing subsidies for fossil fuels and nuclear power are generally considered a key step in creating incentives for clean energy investment (Beck and Martinot, 2004; NEF, 2006). But in practice such policy reform has proved challenging, even in the largest and most financially capable democracies. For example, the US House of Representatives passed a bill on February 27, 2008 (H.R. 5351 – the so-called "Oil for Renewables" bill) to extend $17 billion in tax credits and other incentives to promote renewable energy and energy efficiency, financed by removing tax incentives for oil and gas producers. However, as of August 2008 the bill had failed a key procedural vote in the Senate and would have to be set aside indefinitely. Even were it to pass the Senate, many believe it would be vetoed by the White House, and indeed a similar bill has failed on three occasions, due to pressure from the affected oil and gas producers, and concerns about automobile fuel price increases (Herszenhorn, 2008). In light of these challenges in removing existing incentives, the focus of most

proactive governments has been on creating subsidies for clean energy (Beck and Martinot, 2004). These subsidies come in a wide variety of forms including tax credits, tax exemptions, capital subsidies, and favourable power purchase tariffs (Martinot, 2006; NEF, 2006; Barton, 2007). In many cases these subsidies have been very successful in promoting the development of certain clean energy technologies.

Tax credits and exemptions

Tax incentives are offered for clean energy in a wide variety of countries, including tax credits, tax exemptions, sales tax exemptions, value added tax exemptions. For example, in 2005, the US restored its Federal Production Tax credit which assisted in bringing the wind industry out of hibernation. The Federal Production Tax credit is paid to producers for each kWh of power generated and came into effect in 1995. By 2005 the tax credit was 1.9 cents per kWh. Favourable tax policies played a key role in the development of Brazil's ethanol industry (Barton, 2007).

Tax exemptions have also played a major role in the new green power markets. By early 2002, 2.5% of The Netherlands' 6 million households were green power customers, partly due to an exemption of green power from a tax on fossil-fuel generated electricity, which made green power almost competitive with conventional power. Demand was so high that utilities had to import green power from abroad (Martinot, 2002).

It has been argued that further incentives that need to be put into place include the removal and reduction of all taxes on clean energy technology products and services (i.e. fuel tax, sales tax; import taxes), and an overall reduction in the tax burden for all early-stage companies (CanREA, 2006; NEF, 2006).

Subsidies, rebates, production payments and favourable power purchase tariffs

There are a wide variety of types of subsidies offered for clean energy development, including direct capital investment subsidies, rebates, production payments and favourable power purchase tariffs. In the US, green power markets are emerging in response to state incentives and marketing campaigns by green power suppliers. In California by 2000, there were 170,000 residential customers and 50,000 nonresidential customers of green power. This was partly as a result of a 1 cent/kWh subsidy to green power providers, paid for by a levy on all electricity sales (Martinot, 2002).

Both the US and Japan have offered capital grants or subsidies (ranging from 10 to 50 percent of the cost) for the installation of rooftop grid-connected solar PV panels. In some US states these subsidies have been further enhanced by favourable power purchase tariffs. Capital grants of about 20 to 40 percent of the cost for rooftop solar thermal installations are also common in many developed countries, but not many developing countries (Martinot, 2006). Investment in biofuels in the United States has been driven by government subsides (NEF, 2006).

Direct public investment

In the absence of private sector funds for clean energy development, many governments have chosen to fund clean energy research and development, as well as projects themselves. Governments have a unique role to play in terms of providing funding for clean energy by

addressing the funding gaps and market inefficiencies that prevent private capital from entering the market. Public sector funding can assist in the key early stages of industry development by providing higher risk strategic investments with or without the assistance of private investors. Public-private investment partnerships are critical in pre-commercial and early commercial stages of clean energy development to reduce risks and provide the incentive and risk knowledge required for greater private investment (Brooks *et al.*, 2004).

Many countries, including developing countries have engaged in direct public investment of their clean energy industries. For example, China has subsidized its wind turbine research, and Brazil heavily invested in the development of its ethanol industry (Barton, 2007). In many US states, funds for renewable energy development are raised through a per-kWh levy on electrical power consumption called a System Benefits Charge (SBC). These funds in the US are collecting and spending more than $300 million per year on renewable energy (REN21, 2005). India already has a similar fund and China and Mexico are considering establishing one.

Government finance assistance

Governments can also provide financial assistance in the form of credit guarantees, low interest loans and loans to finance riskier projects. Credit guarantees and low interest loans were critical in the development of Brazil's development of its ethanol industry (Barton, 2007). The India Renewable Energy Development Agency provides loans for clean energy projects (REN21, 2005). Government low interest loans have assisted in the development of the PV industry in South Korea (Globe-net, 2006).

2.3.3 Innovative financing mechanisms

A common theme in the literature is that improving financing availability in developing countries is critical for the success of clean energy investment (Ockwell, 2006; RECIPES, 2007). This financial assistance needs to come in many forms tailored for the particular country and type of clean energy project being targeted. There may also be a role for governments in improving the understanding of financial institutions regarding the unique nature and needs of clean energy investments (SEG, 2006).

These innovative financing mechanisms could come from developing country governments, NGOs or the private sector, and are over and above the various tax exemptions, subsidies and direct investment that should be offered by governments. In particular, public-private partnerships may be critical to advancing clean energy technology. Since this section is focusing on what developing countries can do domestically to improve clean energy investment, it will not examine the various intergovernmental sources of financing. However many of these sources will be highlighted in the final section and clearly still have a critical role to play. However, as some developing countries become increasingly economies in transition, there is a greater potential that they can offer more domestic solutions to financing due to their experience with international investment and greater domestic liquidity (Sethu, 2004).

This section will discuss innovative financing mechanisms in two sections 1) Large and medium scale project financing mechanisms/needs and 2) End-user financing mechanisms/needs.

Large project financing mechanisms/needs

Financing for pilot projects and innovative solutions

Pilot projects normally require debt financing, but still have technology risk. However, financing is difficult to attain if there is any technology risk. If technologies are unproven, more guarantees are required. Smaller companies trying to develop innovative clean energy solutions are often unable to provide these guarantees and have gone out of business as a result. A combination of innovative insurance products to pool risk-taking, perhaps with public sector support could assist greatly in this regard (NEF, 2006).

Domestic development banks

Many of the countries more successful in adopting clean energy technologies have a development bank of some sort which has taken an interest in clean energy. Development banks have funded large to medium scale clean energy projects, as well as providing microfinance programmes. Examples include the Indian Renewable Energy Development Agency or the Grameen Bank in Bangladesh.

Domestic private public partnerships

There are significant opportunities for unique investment partnerships in the area of clean energy. Government partners do not necessarily have to be federal or state level governments. For example, the Decentralized Energy Systems in India is entering into joint ventures with village communities to set up joint partnerships to establish small renewable energy power plants (100-500 kW capacity) (Wohlgemuth, 2000).

Microfinance programmes

Although usually considered to focus on end-users, microfinance programs have also been utilized to finance medium scale energy projects in developing countries (Allderdice and Rogers, 2000). Microfinance programs have been utilized by NGOs to develop community scale clean energy facilities, in which electricity is provided to small businesses for a fee. Microfinance programs have also been utilized to allow individual entrepreneurs to establish energy supply businesses

End-user financing mechanisms/needs

Some clean energy initiatives rely on end-users to make purchasing decisions - for example, the purchase of photovoltaic or geothermal power equipment for rural electrification in grid-remote communities or the purchase of energy efficient appliances. In developing countries this is particularly challenging. Some possible solutions include, microfinance programmes, energy service companies, dealer-credit models and retail finance programmes.

Microfinance programmes

Microfinance initiatives can help provide the initial financing for end-users (NEF, 2006). Microfinance is intended to bring financing to people in developing countries with poor or no credit histories, and no collateral, who would not normally qualify for a loan through traditional banks. Loan are typically small ($50 to $500) and short term (up to one year). With regard to clean energy, microfinance programs have allowed individual end users to purchase small clean energy systems,

such as photovoltaic panels, and could be expanded to include microhydro or wind or micro-biomass gasification equipment (Allderdice and Rogers, 2000). Ensuring that microfinance programs match the requirements for clean energy development is important. For example, larger loan sizes for rural electrification systems, which are typically higher cost, are being established in some countries (Allderdice and Rogers, 2000). Microfinance is provided by a wide range of institutions including NGOs, banks and special microfinance credit institutions.

Energy service companies

Energy Service Companies (ESCOs) provide end-users with clean energy equipment, such as photovoltaic equipment for a fee, or for a percentage of the cost savings that they engender. The ownership of the equipment often remains with the ESCO until the end of the contract period. This approach is often strongly preferred by end-users because it eliminates the risk associated with technical failure of the system (Allderdice and Rogers, 2000).

Dealer-credit financing

Dealer-Credit financing is where the clean energy dealer obtains a loan from a financial institution, often a multinational organization and then extends credit to consumers so that they can purchase the appropriate clean energy technology. This has been effective in Bangladesh whereby Grameen Shakti, a non-profit rural power company, obtained World Bank funding and then extended credit to consumers (Shrestha, 2007).

Retail finance programmes

Clean energy solutions (such as home appliances, heating and air-conditioning, commercial equipment and building insulation) in homes and businesses frequently require higher initial capital costs but ultimately result in lower operating costs. However consumers' purchase decisions are often based on high perceived discount rates, whereby immediate savings are valued higher than long-term benefits. Access to retail financing has helped to overcome this problem in the automobile industry. Similar access to retail financing could dramatically assist in consumer and small business uptake of clean energy solutions (NEF, 2006).

2.3.4 Fostering market maturity and capacity building

Business incubators

Business incubators nurture technologies through their first few years of life. Energy technologies are often challenging for conventional venture capitalists because they often take many years from their initial creation to full scale commercial development. Business incubators for clean energy technology include the UK's Carbon Trust, the US's National Renewable Energy Lab's NACEBI initiative. According to New Energy Finance there are 114 business incubators in the world promoting clean energy technology and service companies. These incubation programmes could be greatly assisted by the creation of an appropriate legislative, information and networking support (NEF, 2006).

Training and capacity building

Training and capacity building in developing countries in the area of clean energy technology would greatly assist clean energy investment. In particular, improving local knowledge and training of local

technicians is required as well as improving local knowledge (AusAid, 2000; RECIPES, 2007). The transfer of clean energy technologies from developed countries to developing countries is unlikely to be successful in the absence of local capacity building and the transfer of knowledge and expertise (Ockwell, 2006). Governments in developing countries have a key role to play in supporting research and development initiatives, fostering networking and engaging in multilateral and bilateral information sharing activities.

Market creation

In some cases, governments may have to assist in market creation for clean energy technologies, through information campaigns informing consumers regarding the benefits of clean energy, purchase guarantees, as well as government procurement policies (Ockwell, 2006). Private businesses could also play a key role in market creation with clean energy procurement policies and demonstration and pilot projects.

2.4 Key needs and existing initiatives

This section has highlighted a number of ways in which various actors might help foster clean energy investment. Some of these initiatives should be carried out by the developing country governments at various levels. Others could be undertaken by NGOs and private companies in developing countries, perhaps in collaboration with various levels of government. Some of the key needs are as follows.

Developing country governments can:

- Ensure an overall political and regulatory structure that is open for investment (though the next section argues that this openness needs to be tempered with a preservation of certain forms of policy flexibility), with a liberalized trade regime, regulatory clarity and stability, minimization of administrative barriers and establishment of clear IPR rules.
- Establish an energy policy with clear targets and requirements for all types of clean energy as a percentage of TPES, as well as targets and requirements for energy efficiency.
- Create an enabling energy regulatory structure that allows for IPPs, sets favourable feed-in tariffs, permits net-metering, and includes standards and codes that promote energy efficiency and do not create barriers to clean energy.
- Establish stringent environmental regulations for emissions that internalize the social and environmental costs of fossil fuel energy.
- Eliminate subsidies and tax credits and exemptions for fossil fuels, or establish equivalent subsidies and tax credits and exemptions for clean energy.
- Engage in direct government investing in clean energy projects, including seeking public-private partnerships.
- Provide government assisted financing of clean energy projects, in the form of loans, low interest loans, and lines of credit.
- Help foster market maturity for clean energy through clean energy government procurement policies and purchase guarantees.

Developing country governments, NGOs and private investors and firms can:

- Collaborate to establish innovative financing mechanisms for large projects including funding of pilot projects, support for domestic development banks and public-private partnerships.
- Establish financing mechanisms to support end-users in the form of microfinance programmes, dealer-credit financing, and retail finance programmes.
- Help foster market maturity for clean energy in through business incubators, training and capacity building and market creation.

There is a wide range of organizations, both private and public, international and domestic, involved in addressing the needs outlined above. Some invest directly in clean energy. Others work to remove barriers to investment in clean energy. This section closes with a brief, and necessarily incomplete, overview of the existing initiatives, dividing them into four categories: 1) investment cooperatives and networks, 2) insurance and risk mitigation programmes, 3) research, business incubation, information sharing and capacity building organizations and 4) financing organizations and initiatives. It is striking, in light of the above analysis, how few of these many initiatives actually focuses on what this report has argued to be a key barrier to increased clean energy investment: the domestic climate for investment in such technologies.

Investment cooperatives and networks

Investment cooperatives can be large and small, local or international and directed towards institutional investors or individual investors.

The Clean Energy Investment Working Group (CEIWG) is an institutional investment group that examines opportunities and strategies for investment in clean energy and climate technologies. It is part of a larger investment network on Climate Risk. CEIWG is examining the interests of pension funds, institutional investors and other fiduciaries in establishing investment strategies in the clean energy sector that can deliver competitive returns (CEIWG, 2007).

Cleantech – Cleantech is a coalition of more than forty leading US and European institutional investors, responsible for over $1.75 trillion in assets, have announced a huge commitment to clean technology, with the investors setting a goal of deploying $10bn to the sector collectively over the next two years (Cleantech, 2008a).

Insurance and risk mitigation programmes

World Bank Partial Risk Guarantee (PRG) – The World Bank has established PRG to provide coverage against the regulatory risk infrastructure investors (including power sector investors) face in developing countries. A PRG sets out the terms and conditions of the investment and identifies the way disputes will be resolved. It serves as a guarantee that the government will adhere to its commitments and otherwise compensate the investor for losses incurred. The PRG covers risks such as changes in the regulatory framework for the power sector, expropriation, failure of the government to meet contractual payment obligations, foreign currency convertibility, and failure to issue a licenses and approvals in a timely fashion.

Multilateral Investment Guarantee Agency (MIGA) – The World Bank's MIGA provides political risk insurance to foreign investors and banks against non-commercial risks associated with investments in member countries.

Research, business incubation, information sharing and capacity building

A number of research, business incubation, information sharing and capacity building initiatives have been established in relation to clean energy. Some of these involve government agencies. Others are non-profit alliances of clean energy businesses. They all generally share the same goal of research, information sharing, networking and capacity building. In many cases this work is pre-investment or upstream with the goal of fostering investment or assisting in investment. However although they do not generally invest in clean energies, these organizations undertake important work and can catalyze investments. On March 7, 2008, China and Australia announced plans to build a clean coal carbon capture plant in China as a pilot project, allowing Australian researchers to study the plant (Cleantech, 2008b). The Australian government is donating $12 million to the project, $4 million of which will go to the plant construction and the Asia Pacific Partnership on Clean Development and Climate initiative (discussed below) was a key catalyst in the process. The ones highlighted below are just a sampling of the wide range that exist intended to highlight the range of types of initiatives with regard to the range of clean energy technologies.

UK-India Cooperation on Clean Energy Technology – The UK and India conducted a joint study on how to reinforce cooperation on energy technology between developed and developing countries (Ockwell, 2006). The study was intended to identify policy, regulatory and financing barriers to technology cooperation and how to stimulate innovation and development in both developed and developing countries.

Asia-Pacific Partnership on Clean Development and Climate - The Asia-Pacific Partnership on Clean Development and Climate is a non-binding partnership established in 2002 between the US, Australia, Canada, China, India, Japan and South Korea that focuses on the development and deployment of cleaner and more efficient technology through cooperation and information sharing. It has eight public-private sector task forces. In particular, it has task forces focusing on cleaner use of fossil energy, power generation and transmission and renewable energy and distributed generation. The taskforces are engaging in activities such as promoting best practices in power generation through site visits to partner power generation stations workshops and capacity building among partner country power generator representatives, students and government representatives.

UNFCCC Expert Group on Technology Transfer (EGTT) and Technology Transfer Clearing House (TT:Clear) – The United Nations Framework Convention on Climate Change (UNFCC) Article 4.5 commits Annex I (developed) countries to take practicable steps to promote and finance the transfer of environmentally sound technologies to developing countries. The EGTT was established by the parties to the Convention to enhance the implementation of Article 4.5. TT:Clear was created through the EGTT and is intended to be a clearing house of technology transfer information. The EGTT prepares best practices guides, brochures and guidebooks (on for example innovative financing) conducts workshops, and provides recommendations to international bodies.

World Bank Energy Sector Management Assistance Programme (ESMAP) – ESMAP was established in 1983 as a technical assistance program for developing countries. It provides policy and clean energy advice to developing country governments, conducting country energy assessments and technical studies. It also assists countries with technology transfer and energy sector management. It is a pre-investment organization that works to facilitate the efforts of other development institutions and the private sector.

COOPENER – COOPENER was a programme under the European Commission that ran from 2005 to 2006 to promote policies, technologies and best practices with regard to renewable energy and energy efficiency. It provided support for capacity building in developing countries, so that developing countries are better able to identify their clean energy requirements and establish appropriate legal frameworks and programmes to support clean energy, and set up financing arrangements to attract investment. Projects included training, capacity building, development of planning approaches, research and building national teams in various developing countries (IEE, 2006).

Renewable Energy And Energy Efficiency Partnership (REEEP) – REEEP is an international organization funded by governments, businesses and development banks. It works to eliminate policy, regulatory and financial barriers to renewable energy and energy efficiency technology uptake. Projects focus on creating new policies, draft legislation, business models, training programmes and toolkits (REEEP, 2008).

UNEP's Sustainable Energy Finance Initiative (SEFI) – SEFI works to change attitudes and convince mainstream financiers to consider investments in clean energy. SEFI provides information to financiers, convenes financiers to assist them to undertake joint financing of projects that they have been unwilling to finance individually, catalyzes public-private alliances and develops new economic tools that recognize environmental costs.

World Bank's Clean Coal Initiative – The World Bank's Clean Coal Initiative encourages the implementation of policies that create incentives to improve the efficiency of each sector in the coal energy chain; the adoption of environmental regulations that promote low-cost emission-control strategies; and the installation of locally appropriate pollution-abatement technologies.

US Public Fuel Cell Alliance (PFCA) – The PFCA is part of the Clean Energy States Alliance. The PFCA was created to assist agencies at state, federal and international levels to develop fuel cells and hydrogen infrastructure. Its goal is to help government agencies coordinate their program efforts by sharing information, leveraging government funding and developing strategies for program development.

Other initiatives to foster research, business incubation, information sharing and capacity building with regard to clean energy technology include the UK's Carbon Trust, and the US's National Renewable Energy Lab's NACEBI initiative (NEF, 2006).

Financing organizations and initiatives

The organizations and initiatives listed below are just a few examples of the key financing organizations and initiatives for clean energy in developing countries. In addition there are many international financial institutions that are investing in clean energy companies including: Fortis, Rabobank, Australia and New Zealand Banking Group, and the Asia Triodos Bank (Siegel, 2006). There are also domestic financial institutions (often government owned development banks) in developing countries that are active in investing in and/or providing credit lines for clean energy companies including: Indian Renewable Energy Development Agency, Canara Bank in India, Syndicate Bank in India, China Development Bank, Development Bank of Philippines, Thai TMP Bank; CABEI in Central America, Grameen Bank in Bangladesh. Likewise, there are NGOs and foundations that are active in providing funding for clean energy projects such as the Rockefeller Foundation, Blue Moon Foundation and Enersol Associates (Siegel, 2006; Wohlgemuth, 2000).

Clean Development Mechanism (CDM) – Created by the Kyoto Protocol, the CDM allows industrialized countries to partly meet their own greenhouse gas reduction targets by financing emission reducing projects in developing countries. The CDM allows investors from Annex I countries to generate Certified Emissions Reductions (CERs) by investing in greenhouse gas reduction projects in developing countries. The CDM can facilitate technology transfer to developing countries where emissions reduction projects involve technologies not currently available in host countries. About one third of CDM projects to date intend to include some technology transfer (Watson, *et al.*, 2007). However in many cases there is no technology transfer and local technology or local innovation is utilized, particularly in some countries such as India, where technology transfer is mentioned in only 7.3% of projects (Ockwell, 2006).

EU-China Partnership on Climate Change: Near Zero Emissions Coal – A joint EU-China project on Near Zero Emissions Coal was announced in 2005. The goal of the project is to demonstrate coal fired power generation with carbon capture and storage technology in China by 2020. The UK is supporting the first phase with £3.5M of funding. A 3-year feasibility study will consider the viability of different technology options for the capture of carbon dioxide emissions from power generation and the potential for geological storage in China (G8 Centre, 2005).

Global Environmental Facility (GEF) – The GEF was established in 1991 and funds projects implemented by the UN Development Programme, the UN Environment Programme and the World Bank Group. The GEF is the financial mechanism of the UNFCCC, and dispenses about $250 million dollars per year in projects in energy efficiency, renewable energies (GEF, 2007). Under its climate change programme, the GEF has funded projects to develop markets for renewable energy projects. Projects have supported private firms by providing financing, technical assistance subsidies and marketing support. GEF projects have also focused on capacity building among government agencies and NGOs through studies and development of regulatory frameworks. In addition the GEF has created financing vehicles such as credit lines and business loans.

ACP-EU Energy Facility – The ACP-EU Energy Facility is a European Union initiative that co-funds energy-related projects in African, Caribbean and Pacific (ACP) States. It commenced in 2006 and

all project funding had to be disbursed by the end of 2007. The fund allocated almost 200 million Euros to co-fund energy related projects in ACP countries. Many rural renewable energy electrification programs were funded as well as capacity building and energy planning projects (European Commission 2008).

Asian Development Bank (ADB) – The ADB is a multilateral organization with 67 member countries. It is a major lender for environmental infrastructure in Asia, lending to both governments and the private sector. It has increased its focus on clean energy and in 2005 established its Clean Energy Initiative, committing investments of $1 billion per year over the next five years.

KfW (Germany) – KfW is a German development bank owned by the German federal and state governments. It is one of the most active development banks in financing renewable energy, committing over over 470 million Euros between 2000 and 2004 (Siegel, 2006).

Cool Earth Partnership – The Cool Earth Partnership is an initiative by the Japanese government. Japan has committed $10 billion in funding over the next five years to developing countries to reduce greenhouse gas (GHG) emissions. Japan has called for other donors, including the United Kingdom and US. Of the total funds, $2 billion is earmarked for improved access to clean energy, such as rural electrification programs, while the remaining $8 billion is intended for loans with preferential interest for programs to address GHG emissions, and capital contributions, guarantees and insurance for projects to reduce GHG emissions (FM, 2008). Part of this funding will be funnelled through the World Bank Clean Technology Fund discussed below.

World Bank Clean Technology Fund – The World Bank Clean Technology Fund was announced in February, 2008. The fund is intended to assist publicly and privately financed projects in developing countries that deploy clean energy technologies. The total amount of funding is as yet unclear, but the fund will be comprised of a portion of the $2 billion in climate funding committed by the US, part of the $1.56 billion the UK government pledged last year and a portion of the $10 billion the Japanese government announced with its Cool Earth Partnership (Reuters, 2008).

3. Clean Energy Investment in Developing Countries: International Investment Law

Chapter 1 of this report argued strongly for the importance of investment in pursuing clean energy paths in both developed and developing countries. Simply put, replacing presently unsustainable energy practices with sustainable practices will require a tremendous amount of new investment. Well-planned and high-quality foreign investment in developing and developed countries can contribute to achieving this goal. By contrast, the impacts of decisions to invest in an unclean energy project can stretch over decades. Governments worldwide are now faced with the twin issues of:

- promoting clean energy investments, and
- addressing the ongoing impacts of climate and other environmental impacts of previous "unclean" investments.

This chapter examines the impact of international investment agreements (IIAs) on these two issues. While IIAs are intended to promote foreign direct investment, they may also limit the scope of government policy space to address issues such as these. This chapter explains how such limits may arise, and how they may in turn be addressed to ensure that the promotion of clean energy can be undertaken by governments.

3.1 Scope of the analysis

The primary legal and political instruments for the promotion and protection of foreign direct investment (FDI) are International Investment Agreements (IIAs). There are now over 2500 IIAs[45], most of which are in the form of bilateral investment treaties (BITs) between pairings of countries. Today, in addition to BITs, IIAs also include sector-specific multilateral treaties such as the Energy Charter Treaty (ECT) and investment chapters in trade agreements formed on regional lines such as the North American Free Trade Agreement (NAFTA).

These treaties typically contain specific international legal guarantees from potential host states to foreign investors, which can be asserted against the host state directly by the investor. This powerful dispute-resolution mechanism available directly to an investor against a state before an international arbitration tribunal is often described as giving IIAs "teeth".

Under customary international law, an aggrieved foreign investor had limited recourse to redress (in the absence of a contractual relationship with the state)- it could either seek diplomatic protection from its home state or bring a claim against the host state in its municipal courts if this was possible under the host state's law. In the former option, it could be that the home state would be prepared to submit the claim of the foreign investor against the host state to arbitration under the auspices of a claims commission. However, the recourse to international arbitration for an investor (in the absence of a contractual agreement providing for arbitration) was always indirect, requiring the intervention of the home state.

The provision for direct recourse to arbitration against the host state in the bulk of IIAs removed the need for prior intervention of the home state. Paulsson (1995) describes this as "*arbitration without privity,*" as it does not require the involvement of the home state in a claim, nor does it need a prior contractual relationship between the investor and the state containing an arbitration agreement.

This chapter considers three generic scenarios common to addressing climate and other environmental impacts of energy production facilities:

- The official promotion of investment into clean technologies as opposed to unclean energy sources;
- Creating new limitations on greenhouse gas (GHG) emissions from existing energy facilities; and
- Closing or requiring significant retrofits in energy production facilities.

45 UNCTAD (2006) records 5500 IIAs and 2495 BITs.

The most important provisions of IIAs are then applied to these three scenarios. An additional variation on the theme arises from the existence of a dedicated international investment agreement specific to the energy sector, the Energy Charter Treaty. The role of this instrument, and a similar one covering parts of Western Africa, are also discussed.

Both the types of measures described and the description of the critical IIAs provisions are kept at a generic level. Variations on the themes are potentially broad, and an analysis such as this cannot hope to cover all of them, or those that may be developed in the future. This analysis is also limited by the fact that this field of international law is still developing and there are significant uncertainties and even directly conflicting interpretations in the existing arbitration case law under these agreements. As well, as will be noted, the application of IIAs can change depending on specific provisions found in energy investment contracts. However, despite these features and uncertainties, it is possible to draw sufficiently clear and cogent conclusions from the analysis that follows.

By examining the limits IIAs place on the national sovereignty of governments to regulate foreign investment in order to promote environmental aims, this chapter addresses a currently much debated issue, which has been focus of recent academic writing[46] and judicial reasoning in arbitration awards. This involves "*the determination of the appropriate boundary between two potentially conflicting values: a legitimate sphere for State regulation in the pursuit of public goods on the one hand (even if it may result in a loss of economic benefits to those subject to the regulation); and the protection of private property from State interference on the other*".[47]

IIAs are a response to investors' concern for the predictability and stability of the legal framework governing their investments. In addition to ordinary business risk, which is faced by virtually every business or investor whether investing at home or abroad, investors in developing countries may face political risk that is widely perceived as much greater than that experienced when investing in liberal Western democracies (Comeaux and Kinsella, 1994*)*. IIAs provide an agreed set of rules that aim to attract foreign investment by reducing the space for unprincipled and arbitrary actions. However, the lack of adequate policy space for states can also have a direct impact on the ability of states to regulate in the public interest. Walde and Wouters (1996) argue that IIAs act as "*international law-based controls on national regulatory powers*"[48]. Government regulatory actions, including those designed to protect the environment or public health have been challenged in investor-state arbitrations, in particular under the NAFTA Chapter 11 cases,[49] but in other arbitral fora as well.

The issue acquires further importance, as investors increasingly rely on rights contained in IIAs by bringing claims against states before international arbitral tribunals. There have been over 250 known investor-state arbitrations, the vast majority of which have been brought in the last five years. At least 70 governments- 44 of them in the developing world- have faced investment treaty arbitrations.[50] In 2006, 29% of the known investment treaty arbitrations that year involved the

[46] For example, see Waelde and Kolo (2001).
[47] McLachlan, Shore and Weiniger (2007).
[48] Walde and Wouters (1996).
[49] See, for example the NAFTA Ethyl, Metalclad, S.D. Myers, Pope and Talbot, Methanex and Glamis cases. All documents related to these cases can be found at http://www.naftalaw.org.
[50] UNCTAD (2006b)

primary sector relating to mining and oil and gas exploration services.[51] 42% involved the services sector, including electricity distribution, telecommunications, debt instruments, water services and waste management.[52]

As the analysis below shows, given the sparseness of arbitral awards dealing with these issues, and the divergence in thinking among some of the arbitral tribunals that have ruled, the boundaries of when government measures pursuing the environmental aim for promoting clean energy will breach IIA terms are as yet inchoate.[53]

3.2 Summary of key IIA provisions

IIAs include several key types of provisions. Looking at the two stages of such agreements, one can see that the primary goal of provisions relating to the pre-investment phase concern the right of a foreign investor under the agreement to have equal national treatment compared to a domestic investor in the intended host state. Thus, as will be considered in more detail below, where a government policy on energy investment includes specific measures to promote investment in clean energy or limit investment in unclean energy, this can be applied equally to a foreign investor.

Only a small number of IIAs include provisions on the pre-investment stage. Most do not. In this case, they have no impact on government policy making relating to the making of an investment by a foreign investor.

The objective of the IIA provisions in the post investment stage are to give the investor a greater array of rights than domestic investors.[54] This level of protection is provided through a set of key obligations on states or rights for foreign investors. These include:[55]

- **National treatment and most favoured nation treatment**: these obligations are comparative in nature, and require the host government to treat the foreign investor no less favourably than it treats a domestic investor or the best treated investor form another foreign state. The key issue here, as it is for defining national treatment in relation to the establishment of an investment, is whether a clean investment is in like circumstances to an unclean investment, or can be given more favourable treatment because of its environmental qualities. Conversely, the issue can be stated as whether an unclean energy producer can be subject to tighter controls than a clean energy facility.

- **Fair and equitable treatment** (also often referred to as minimum international standard of treatment): This standard is not comparative; it sets an absolute minimum standard for treating foreign investors from a home state irrespective of how domestic investors are

[51] *Ibid.*
[52] Ibid.
[53] For example, see the cases Lauder v Czech Republic and CMS v. Czech Republic, wherein two different arbitral panels examining virtually the same claim and the same set of facts delivered awards that were quite opposite.
[54] While this is in no cases an explicitly stated aim, it is in all cases the final effect.
[55] In the vast array of existing IIAs there is no common language setting out these rights. As such they will vary slightly from agreement to agreement. Ultimately, however, the list presented here constitutes what can be seen as a template set of the core rights provided in all agreements.

treated. This standard is one of the most difficult to pin down in terms of its full scope and impact, and interpretations have varied in practice from one award to another.

- **Expropriation:** All IIAs include a provision prohibiting the expropriation of property without compensation. They require any expropriation to be accompanied by proper compensation. The critical question in relation to the present paper is what types of measures constitute expropriation. The full taking of a property clearly does. But does the closing of a facility due to its negative environmental impacts amount to an expropriation? Or does the imposition of environmental standards that require significant new investments or full retrofits constitute and expropriation in part of the economic resources of the foreign investor? These questions, the subject of a growing number of investment arbitrations to date, become much more difficult.

- Finally, the great majority of IIAs contain a direct remedy for foreign investors against the host state if the investor believes its rights have been violated. This is an arbitration process known as **investor-state arbitration**. The investor-state process can be initiated independently by the protected foreign investor under a number of different arbitration rules, intended mostly for international commercial arbitration. It is this process that gives IIAs a special place in international law, and gives foreign investors a special opportunity to enforce their rights. These arbitrations, including several now under the Energy Charter Treaty (ECT), often take place in secrecy, with no public access to the arguments being made, the factual documentation being pleaded by the parties, the final decisions, and in many cases even the existence of an arbitration against a host state.[56]

3.3 Analysis of three scenarios

As noted above, the three scenarios to be considered here, each in turn, are:

- The official promotion of investment into clean new technologies as opposed to unclean energy sources;
- Creating new limitations on greenhouse gas (GHG) or other emissions from existing energy facilities; and
- Closing or requiring significant retrofits in energy facilities.

3.3.1 The promotion of clean energy investment

The promotion of clean energy can occur through positive discrimination in favour of clean investments – subsidies, tax incentives, locational advantages, priority in government procurement of energy, etc. It can also come in the form of penalizing or banning would-be investment in unclean energy production.

As summarized above, neither the ECT nor the majority of BITs have any impact on such policies. That is because they do not address decisions or acts relating to the establishment of a foreign

[56] Only the proceedings under ICSID, the World Bank arbitration center, are routinely made known to exist to the public, and most of its decisions are made public. There are a number of other arbitral facilities that do not follow even this standard of practice, although one of the major alternatives to ICSID – the UNCITRAL rules – are now considering amendments to promote greater transparency. Otherwise, access to documents remains haphazard, at best. The Energy Charter Treaty Secretariat does keep a record of publicly disclosed arbitrations, but not other documentation.

investment in a host state. Some IIAs, most notably those with a North American partner (Canada, USA, Mexico) and some more recent ASEAN BITs or regional agreements do, however, include pre-investment (often called pre-establishment) rights for foreign investors.

Where these rights exist they generally require national treatment for foreign investors. The key issue then is whether the host state discriminates between *domestic* producers of clean and unclean energy when it comes to establishing new investments. Only to the extent it does so will it also be allowed to also discriminate against foreign investors that desire to establish an unclean facility, and in favour of those that plan to bring cleaner technology. The discrimination in question can go beyond straight bans, to also include the increased costs face by the investor due to subsidies for the clean investment, or the extra costs associated with unclean investments.

Whether a foreign investor would have a chance of being successful in such a claim for discrimination against an unclean investment would furthermore depend primarily on whether an investment in a clean energy producing facility and an unclean facility are considered as being in like circumstances.[57] Although this test has similarities to the "like product" test in trade law, recent arbitration decisions conclude it is a broader concept that requires a range of factors to be considered.[58] In our view, it is likely that the environmental impacts of an energy production facility can be legally considered in setting standards that promote investments in clean energy.

While this view is considered as likely across the range of IIAs, subject to any particular variation that requires a narrower test than this, it is even more likely in the case of the ECT. It was noted above that the ECT does not apply to the pre-investment stage of an investment. However, it does include a provision that allows the states parties to list areas of investment that would be covered at the pre-establishment stage. To date, we are unaware of any state that has done so. However, should they do so, the environmental provisions in the ECT discussed in the next section would certainly support the argument that under its terms clean energy facilities and unclean facilities, including as new investments, are not in like circumstances due to their environmental impacts. Thus, distinctions on this basis leading to more favourable treatment of clean investments would be acceptable. Here, the deference to other investment agreements is not likely to be factor, as most other agreements do not include investor rights to make an investment.

Where problems may arise is in any effort to discriminate between clean technologies, for example solar, small hydro and wind power. Here, local factors may provide a basis for a wider range of discriminatory measures to be taken, for example local impacts of hydro projects or wind projects. But absent such particular local factors the scope for different treatment between clean energy types will be much less than between clean and unclean energy sources.

3.3.2 *Creating new limitations on GHG emissions*

This second type of regulatory measure is extremely common and applies to almost all environmental issues in almost all sectors. It includes the vast array of regulations that limit the

[57] This is the type of terminology usually used to require an appropriate comparison between domestic and foreign investors for purposes of establishing discriminatory treatment.
[58] The Methanex v. United States arbitration decision, for example, highlights the need to understand the environmental impacts of a product produced by an investment in assessing the likeness of one investment to another.

emissions of gases and effluents into the environment, be it air, water or land. In the energy sector, it can be seen as including new limits on GHG and other air emissions form energy production and transportation facilities. As the call to address global warming becomes ever stronger, the call for increased stringency of such regulations will also continue to grow. The energy sector, as a major point source of GHGs will be increasingly called on to reduce these emissions.

When governments act on this call, do IIAs have anything to say about it? The answer is likely not, but we do not know for sure. Assuming that the measure is non-discriminatory—that is, that it applies in similar terms to domestic and foreign energy producers—two obligations under international investment law may be relevant. One is expropriation, the other is fair and equitable treatment.

Expropriation

Under classic international law rules, normal regulatory measures to protect the public welfare, such as for environmental and human health protection, have fallen under the so-called "police powers" rule, and were excluded from consideration as an expropriatory measure. Some arbitral decisions, however, have argued that the expropriation test for regulatory measures is the same as for any other type of government measure affecting property rights. Under these decisions, the so-called "sole effects" test is applied, whereby the economic impact of the measure on an investment is the only consideration. If it is significant in any way (but not requiring it to be shut down) then an expropriation is established. Under this approach, the reason for the measure is not relevant, only its impacts on the foreign investor.[59]

This line of reasoning was completely rejected in *Methanex v. United States*, where a bright line restating the police powers exemption[60] was drawn, thereby precluding any claim against normal regulatory measures being an expropriation.

These two conflicting cases cannot be reconciled in legal principle. They are simply inconsistent. Thus, it is not possible to say with certainty that normal regulations will not be captured by the expropriation provisions of investment agreements. Nonetheless, we believe that such measures, which have never required compensation under any legal system to our knowledge,[61] should not be captured on a proper understanding of the expropriation rules.

The ECT and a growing number of IIAs have provisions clarifying the expectation for future environmental regulations, and/or the applicability of the police powers rule. The ECT is particularly notable in this regard. These provisions significantly reduce the likelihood that these agreements can be used to attack normal regulatory measures by foreign investors. However, as noted previously, the ECT contains a provision allowing an investor to choose the most investor-

[59] The test was initiated in Metalclad v. Mexico and TECMED v. Mexico.
[60] This is not an exception as per Article XX of the GATT, which has an array of legal implications associated with it, but rather what trade lawyers would term a carve out and thus a complete *ab initio* exemption from the concept of being an expropriation.
[61] This issue is often compared to the regulatory takings doctrine in the United States. However, this doctrine has never been extended to these types of regulations. No compensation has ever been paid for regulations enacted at the state or federal level pursuant to the US Air Quality Act.

friendly rules available to it under other investment agreements, thus potentially reducing the importance of its environmental provisions.[62]

Fair and equitable treatment

The second option under which investors might claim is the *fair and equitable treatment* provision. Originally construed to mean government actions that would be so unfair and inequitable as to shock the conscience of the objective observer, this standard has expanded greatly over the years and includes both procedural transparency requirements and a notion of not breaching the legitimate expectations for the investors. Measures adopted and imposed in complete secrecy, for example, risk breaching this provision. In addition, measures in breach of a commitment to an investor not to alter conditions of regulatory control can be seen as a breach of this protection. Thus, while all investors must normally expect to be subject to regulations, and that these regulations will change over time, if a commitment to maintain regulations unchanged has been given, it can be upheld under this obligation regardless of the impact of not changing the measure on other stakeholders.[63]

Generally known as stabilization clauses, such commitments can therefore be a major factor in determining the interpretation of IIAs in the energy sector. An active enforcement of stabilization clauses through IIA protections can effectively guarantee the investor in an energy facility the right to pollute for the full period of the investment agreement, irrespective of its impacts on the public welfare, or the application of such measures equally to domestic investors. Compensation may well be required in such cases. This situation is not inevitable however, and a growing recognition of the fact that changed circumstances can have an impact on the applicability of such commitments is emerging in some cases. Still, one must recognize that such provisions will have a significant impact on the application of investment agreements in any given dispute.

3.3.3 Closing facilities or requiring significant retrofits

The closing of ageing or other environmentally unclean facilities, or requiring major refits in order for them to continue running, constitutes a level or impact on an investment that is significantly greater than what is envisaged under scenario 2. Clearly, closing a facility by a government measure, or requiring a major new capital investment for it to continue running, will have a major impact on the ownership rights of an investment. In many contexts, this could constitute an expropriation, or a breach of the expectations of the investors to be able to operate until the normal end of the lifespan of the facility form a purely operational perspective.

The matter can, however, be phrased differently from an environmental perspective. Essentially, the inability to take action against older facilities because smaller adjustments or retrofits cannot achieve applicable standards allows them to escape all environmental regulations no matter how harmful to others. From an environmental perspective, this is clearly not an acceptable result.

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[62] The scope of the ECT provision is not perfectly clear, but it can be analogized to a most favoured nation clause that allows an investor to choose provisions of another IIA not normally applicable to it if it is more favourable to the investor to do so.

[63] Some arbitrations, including *Methanex*, have held that the breach of such a commitment can also amount to an expropriation.

In essence, then there is a possible clash between investment regimes and environmental goals in this regard. The clarity of the environmental goal will be critical here, and ensuring the measure is not discriminatory. As well, the existence or non-existence of a stabilization clause will be important. Our view is that a measure clearly designed to address the environmental impacts of outdated facilities will be covered by the police powers rule, and can escape coverage of the fair and equitable treatment obligation, if it is transparent and non-discriminatory. But the matter is certainly not free of doubt, and the greater the degree of interference with the right to operate an investment, the greater the doubt that will arise.

3.4 A tale of two energy sector-specific treaties: The Energy Charter Treaty & the ECOWAS Energy Protocol

The analysis above provides us with a general understanding of how IIAs might relate to government measures designed to foster increased clean energy investment. It is important to note, however, the limitations of that analysis. First, it generalizes about the rights and obligations that might be found in any given IIA. While these are broadly similar from agreement to agreement, they are not identical, and the analysis therefore lacks specific validity to any particular agreement. Second, it generalizes about the nature of the legislation being hypothesized. That nature will matter a great deal in any given case, and it is difficult to accurately predict arbitral results at that level of generality.

To address the first problem to some extent, and to give greater depth to the analysis found in the previous section, this section looks in some depth at two energy-specific treaties: the Energy Charter Treaty (ECT) and the ECOWAS Energy Protocol. Note, however, that the ECT like most BITs will not affect conditions placed on entry of investment (scenario 1 from above), since it does not have obligations related to pre-establishment.

Although, the ECT and the ECOWAS Energy Protocol emerged from two separate processes involving different member state participants and concerns, the latter uses the former as a template with almost identical provisions. The ECT's 51 plus membership comprises mainly of European and former Soviet states, whereas the 14 state signatories to the ECOWAS Energy Protocol are from West Africa. It is therefore somewhat surprising to see that the ECT has been transplanted into a West African context with little adaptation.

The failure of two high profile attempts at a multilateral international investment treaty- first at the OECD and then at the WTO- further enhances the importance of the ECT. The successful conclusion of the ECT could lie in its limited mandate of being restricted to energy rather than investment generally, and the fact that the states involved are primarily those from Europe and former Soviet Union republics. Its adoption by the ECOWAS states as a template further emphasizes its importance. In the words of the arbitral tribunal in *Plama Consortium Limited vs. Republic of Bulgaria*, the ECT is the "*first multi-lateral treaty to provide as a general rule the settlement of investor-state disputes by international arbitration*" and provides "*a covered investor an almost unprecedented remedy for its claims against a host state.*" The ECT is a described a modern multilateral investment treaty, whose provisions are inspired by BITs, the network of which was already vast and growing at the time of its signing, and NAFTA in particular. Materials commenting on the ECOWAS Energy Protocol are

scarce.

The member states of both the ECT and the ECOWAS Energy Protocol have signed a vast number of BITs. ECOWAS member states have signed a total of 164 BITs, of which 13 are with other ECOWAS states. ECT member states have signed over 1876 BITs, of which at least 627 are with other ECT member states.

3.4.1 Introduction to the ECT

The ECT was signed in December 1994 and entered into legal force in April 1998. To date the ECT has been signed or acceded to by fifty-one states[64] plus the European Communities (the total number of its Signatories is therefore fifty-two). Its roots lie in the European Energy Charter, conceived to integrate the former non-market economies of Eastern Europe and Central Asia in a framework of energy cooperation with Western Europe[65]. Today, the ECT's membership spans beyond those nations, as Japan, Australia and Mongolia are also members[66]. At the same time, its coverage has major gaps, with the United States and Canada not signing, but remaining observers to the ECT.

The primary purpose behind the ECT- a multilateral framework for energy cooperation- is to build "*a legal foundation for global energy security, based on the principles of open, competitive markets and sustainable development*"[67]. The ECT's provisions extend beyond investment protection and contain those related to competition, trade and transit, including (a) investment protections intended to create a '*level playing field*' and reduce to a minimum the non-commercial risks associated with energy sector investments; (b) trade provisions consistent with WTO rules and practice; (c) obligations to facilitate transit of energy on a non-discriminatory basis consistent with the principle of free transit; (d) energy efficiency and environmental provisions which require states to formulate a clear policy for improving energy efficiency and reducing the energy cycle's negative impacts on the environment; and (e) dispute resolution mechanisms for investment related disputes between an investor and a Contracting Party or between one state and another as to the application or interpretation of the ECT.

As the ECT is a young treaty, there have been few known cases decided to date, but claims under the treaty are on the rise. There have been 18 known investor-state arbitrations within 9 years of the

64 The members of the ECT are: Albania, Armenia, Austria, Australia*, Azerbaijan, Belarus*, Belgium, Bosnia and Herzegovina, Bulgaria, Croatia, Czech Republic, Cyprus, Denmark, Estonia, European Communities, Finland, France, Georgia, Germany, Greece, Hungary, Iceland*, Ireland, Italy, Japan, Kazakhstan, Kyrgyzstan, Latvia, Liechtenstein, Lithuania, Luxembourg, Malta, Moldova, Mongolia, Netherlands, Norway*, Poland, Portugal, Romania, Russian Federation*, Slovakia, Slovenia, Spain, Sweden, Switzerland, Tajikistan, The former Yugoslav Republic of Macedonia, Turkey, Turkmenistan, Ukraine, Uzbekistan and United Kingdom. * denotes state in which ratification of the Energy Charter Treaty is still pending

65 This was the result of a political initiative launched in Europe in the early 1990s at the end of the cold war. Russia and many of its neighbours were rich in energy resources but needed major investments to ensure their development, whereas the states of Western Europe had a strategic interest in diversifying their sources of energy supplies.

66 Further, the following list of observers provides a broader scope: Afghanistan**, Algeria, Bahrain, People's Republic of China, Canada**, Islamic Republic of Iran, Republic of Korea, Kuwait, Morocco, Nigeria, Oman, Pakistan**, Qatar, Saudi Arabia, Serbia**, Tunisia, United Arab Emirates, United States of America** and Venezuela. ** - denotes observer state which has signed the 1991 Energy Charter Declaration

67 www.encharter.org

ECT's entering into force.[68] Of these 18 cases, 13 are still pending, 2 were settled by the parties, (*Alstrom v Mongolia* and *AES v Hungary*) and in 3 cases the arbitral tribunal has made an award (*Nykomb v Latvia, Petrobart v Kyrgyz Republic* and *Atmo v Ukraine*). The frequency with which disputes are brought by investors under the ECT is due in part to an increased awareness among energy investors and the legal community about the redress the ECT offers- 13 of the 18 known cases were registered in 2005 or after.[69]

It is important to note that at the time of signing the ECT, parties to it also signed the Energy Charter Protocol on Energy Efficiency and Related Environment Aspects (PEERA), both of which were concluded in December 1994 and entered into legal force in April 1998[70]. The ECT and PEERA are different types of international instruments. The former includes an investment promotion and protection chapter with IIA style provisions which allow both states and investors of a state party to bring a claim against the state party hosting the investment, whereas the latter does not have any such investor-state or state-state dispute resolution system in place. PEERA is designed to reinforce energy efficiency policies and programmes that are environmentally sound and consistent with sustainable development by providing member states with a menu of good practices and a forum in which to share experiences and policy advice on energy efficiency issues. The idea behind PEERA is to improve energy efficiency and thereby reducing the environmental impacts of the energy cycle in a manner appropriate to each state's own specific energy conditions.[71] The provisions of PEERA are "soft law" - they do not impose obligations on the states that can be enforced, but rather provide guidance and models. All 51 states who have signed the ECT have also signed PEERA. To sign PEERA, a state has to sign the ECT, however, there is no obligation on states to sign PEERA in order to be a party to the ECT. The impact of PEERA on the interpretation of ECT's provisions is considered in the discussion below.

3.4.2 *Introduction to the ECOWAS Energy Protocol*

The ECOWAS Energy Protocol is perhaps unique in the developing world. No energy-specific IIA equivalent of this type is found within the regional integration organizations of Asia and Africa. In pursuit of a regional solution to providing access to energy and thus fuelling the development of this poor region, the ECOWAS Energy Protocol was signed in December, 2003. Addressing both the lack of access to modern energy services and the need to improve uses of traditional biomass is one of the challenges in the region. Unsustainable use of traditional energy resources for cooking and heating are still predominant. This factor has, to some extent, a direct link to the high levels of poverty in ECOWAS countries, as up to a third of household budget is set aside for fuel costs. As the main cause of dependency on biomass is people's inability to access modern, reliable and affordable energy services, increasing that access is likely to engender significant benefits in terms of living conditions, protection of the environment and economic growth.

The ECOWAS Energy Protocol, a new Annex to the 1993 Revised ECOWAS Treaty, calls for the swift elimination of cross-border barriers to trade in energy, and aims to encourage investment in the energy sector by providing for investor friendly terms as international arbitration for dispute

[68] As per http://www.encharter.org/index.php?id=213&L=0#Eromu, accessed July 2008.
[69] *Ibid.*
[70] *Ibid.*
[71] Article 5: Strategies and Policy Aims, PEERA

resolution, repatriation of profits, protection against expropriation of assets, and other terms popularly perceived attractive by energy sector firms and investment bankers.[72] Like the ECT, it covers not just investment, but also trade, transit and competition with respect to the energy sector.

As the discussion below shows, the ECOWAS Energy Protocol uses the ECT as a template of '*international best practice'* in this sector. Although, it largely replicates the text of the ECT, there are a few differences as well which are raised in the discussion below. In particular, the ECOWAS Energy Protocol does not contain annexes found in the ECT where certain member states have placed reservations on the dispute resolution provisions such as the omission of the umbrella clause and introducing a fork in the road provision.[73]

3.4.3 ECT, the ECOWAS Energy Protocol and the environment

The ECT's recent vintage means that contemporary issues such as energy efficiency and environmental protection feature in it, even though these are not dealt with the majority of BITs. As the ECOWAS Energy Protocol follows the ECT template, it also contains such provisions. Coop (2005) explains the ECT's relationship with environmental as follows:

> "*The importance of energy efficiency and its relationship to better protection of the environment comes within the much wider context of energy policy in general and in relation to security of supply in particular. The growing international concern not just for cost- efficiency but also for the protection of the environment in relation to energy had became clear even before the Charter process began. For this reason, energy efficiency and environmental protection issues were already emphasized in the 1991 European Energy Charter, The Treaty provided that each Contracting Party should strive to minimize, in an economically efficient manner, harmful environmental impacts coming from all operations within the energy cycle in the area. Thus the basic principles of energy-efficient behaviour within a given economic context are already anchored within the Article 19 of the Treaty. However, the concept of setting up mechanisms for international cooperation, through exchanges of experience and information, in particular via country reviews, was implemented by means of an additional Protocol on Energy Efficiency and Related Environmental Aspects (PEERA)"*[74].

Chalker (2006) points out that "*Support for and deference to sustainable development is found at many places in the Treaty… One can find three types of treaty provisions signaling the ECT's support for sustainable development and related principles: those protecting the environment that contribute to, or at least allow for, economic and social development; those that refer specifically to sustainable development, and those references to other international agreements that support sustainable development*". He argues that based on Article 2 of the ECT, including a careful reading of the Charter, the protection of environment and the promotion of sustainable development are legitimate objectives of the ECT and should not be undermined by pursuing any other objective (such as, for example, creating favorable investment flows). Waelde and Kolo (2001) agree that the ECT breaks new ground on the environment.

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[72] For further reading, see Plunkett (2004)

[73] For example, The ECOWAS Protocol does not have annexes similar to ECT's Annex 1D (list of parties not allowing an investor to resubmit the same dispute to international arbitration at a later stage under 26; Annex 1A (list of parties not allowing an investor or contracting party to submit a dispute concerning the last sentence of article 10 (1) to international arbitration; Annex P (Special sub-national dispute procedure); and Annex PA (list of signatories which do not accept the provisional application obligation of article 45(3) (b)).

[74] Coop (2006).

3.4.4 *Examining the provisions of the ECT and the ECOWAS Energy Protocol*

This section analyses the various provisions in the ECT and ECOWAS agreements, asking what effects they might have on government provisions designed to foster increased clean energy investment.

Dispute settlement

Article 26 of the ECT, like that of the ECOWAS Protocol, enables an investor to make claims against a Contracting Party in case of a breach of an obligation relating to investment protection in Part 3. Discussed below, Part 3 contains the basic obligations on non-discrimination, fair and equitable treatment and expropriation, among other things.

Article 26 mandates conciliation as a first step, but if that fails the investor can choose the forum for dispute resolution: either a domestic court or international arbitration. Arbitration under the ECT is to be submitted to the International Centre for Settlement of Investment Disputes (ICSID) if one or both parties are party to the ICSID Convention; to a sole or *ad hoc* arbitration tribunal established under the Arbitration Rules of the United Nations Commission on International Trade Law (UNCITRAL); or to an arbitral proceeding under the Arbitration Institute of the Stockholm Chamber of Commerce. It should be noted it is an asymmetric right: treaty investors can invoke the arbitration facility, but states cannot use the facility against investors.

The investor-state dispute resolution provision gives investors a powerful tool to assert the protections under the treaty. Investors have frequently used the provisions on expropriation, fair and equitable treatment, national treatment and most-favoured nation treatment to challenge government regulatory measures under IIAs, including those regulations that were apparently made for the protection of the environment, such as the banning of a polluting petrol additive (*Methanex v. US*) and refusing to permit a hazardous waste facility (*Metalclad v. Mexico*).

Preambular and objectives provisions

The preamble to an international treaty plays an important role in setting negotiating goals. However, recent investment treaty jurisprudence has shown that it can also be crucial in guiding the interpretation of the treaty by the arbitral tribunal. Several international arbitrations have focused on preambular or objectives provisions that highlight the goal of protecting investors and investments. Applying this "*object and purpose*" principle, it has been argued in such cases that the treaties should be construed in a way that promotes investment protection, to the exclusion if necessary of other public policy objectives. Therefore, existence of environment protection goals in the preambles of the ECT and ECOWAS, albeit to different degrees, is novel and welcome.

Standard objectives in the preambles of BITs usually limit themselves to the desire to "*promote greater economic cooperation*" and "*stimulate the flow of private capital*". The primary objective is to increase the flow of private capital and investment through the treaty.[75] There is also usually no recognition of the objective to attract the right quality and quantity of investment that supports sustainable development, as opposed to merely a quantitative context. The lack of reference to the protection of the environment or sustainable development may lead to an unbalanced interpretation in favour of

[75] See for example, the UK, German and Dutch BITs.

investment protection rather than one that strikes a balance between legitimate investor protection and the responsibility of states to regulate economic activity in order to ensure public interest, including the environment, is protected.[76]

The ECT's preamble starts with having "*regard to the European Energy Charter adopted in the Concluding Document of the Hague Conference on the European Energy Charter signed at the Hague on 17 December 1991*" and "*wishing to implement the basic concept of the European Energy Charter initiative which is to catalyze economic growth by means of measures to liberalize investment and trade in energy*".[77] Article 2 describes the purpose of the ECT as "*establish[ing] a legal framework in order to promote long term cooperation in the energy field, based on complementarities and mutual benefits in accordance with the objectives and principles of the Charter.*"

The above clearly establishes that the ECT's purpose is established in the objectives and principles of The Concluding Document of the Hague Conference on the European Energy Charter ("the Charter"). The objectives of the Charter are much broader than investment liberalization and growth, and include environmental protection. The Charter states:

> "*The signatories are desirous of improving security of energy supply and of maximizing the efficiency of production, conversion, transport, distribution and use of energy, to enhance safety* **and to minimize environmental problems***, on an acceptable economic basis*" (emphasis added).

However, the Charter carries on with stronger language in favour of the protection of the environment: "*Within the framework of State sovereignty and sovereign rights over energy resources and in a spirit of political and economic co-operation, they undertake to promote the development of an efficient energy market throughout Europe and a better functioning global market, in both cases based on the principle of non-discrimination and on market-oriented price formation,* ***taking due account of environmental concerns***." (emphasis added). This clearly recognizes that an efficient energy market based on the principles of non-discrimination should take due account of environmental concerns.

There are more obvious references to the environment in the ECT's preamble as well. It provides: "*Recalling the United Nations Framework Convention on Climate Change, the Convention on the Long-Range Trans-boundary Air Pollution and its protocols, and other international environmental agreements with energy-related aspects";* and *"Recognizing the increasingly urgent need for measures to protect the environment, including the decommissioning of energy installations and waste disposal, and for internationally-agreed objectives and criteria for these purposes."*

The Preamble of the ECOWAS Energy Protocol starts by relating the connection with the ECOWAS Treaty and the decision of the member states with respect to the protocol. "*Mindful of the fact that the responsibility of the economic development of the West African region rests with the Members States themselves*"; and "*Wanting to secure regionally efficient and reliable supplies of electricity and other forms of energy*".

[76] See the award in *Saluka v. Czech Republic*, para 300, for an argument of the importance of the preamble in allowing a broader reading of the public policy objectives of a BIT.

[77] It also recalls "that all signatories to the Concluding Document of the Hague Conference undertook to pursue the objectives and principles of the European Energy Charter and implement and broaden their cooperation as soon as possible by negotiating in good faith an Energy Charter Treaty and Protocols, and desiring to place the commitments contained in that Charter on a secure and binding international legal framework."

There is no emphasis on clean energy, but simply the need for efficient and reliable energy in the region.

It then goes on to refer to the ECT in terms that do not explicitly deal with the commitments to environmental protection that the ECT makes in its preamble. They merely pick on the more obvious objective of catalyzing economic growth by liberalizing energy investment. It could be argued that the environmental commitments are to be indirectly incorporated into the ECOWAS Energy Protocol by reference to the ECT, but this is perhaps a generous interpretation. Having said that, there is also an explicit reference in the ECOWAS Energy Protocol to sustaining the environment: "*UNDERSTANDING that sustaining the environment is an essential component of all phases of development and trade in the energy sector …*"

Article 2 of the ECOWAS Protocol also sets out the purpose of the agreement, stating that it is to "*establish a legal framework in order to promote long term cooperation in the energy field, based on complementariness and mutual benefits, with a view to achieving increased investment in the energy sector, and increased energy trade in the West Africa region*". However, the ECOWAS Protocol is different from Article 2 of the ECT, which provides that the legal framework for promoting long term cooperation is to be in accordance with the objectives and principles of the Charter, which also includes environmental goals. On the other hand, the ECOWAS Protocol's purposes are restricted to increasing investment in the energy sector under Article 2. This is likely to strengthen an investor's argument that the primary purpose of the protocol is to protect and promote investment, with environment objectives taking a lesser significance.

Overall, the preambles of both the ECT and, to a much lesser extent, the ECOWAS Energy Protocol do refer to the need to sustain or protect the environment, which go beyond what is found usually in BITs. A tribunal when faced with these preambles would find considerable scope in interpreting their provisions in a way to that supports a need to balance the interests of investor protection with that of environmental protection.

Part 3 of the ECT and Chapter 3 of the ECOWAS Protocol: Investment Promotion and Protection

Part 3 of the ECT and Chapter 3 of the ECOWAS Energy Protocol aim to protect foreign investors against the most important political risks, such as discrimination, expropriation and nationalization, breach of individual investment contracts, damages due to war and similar events, and restrictions on the transfer of funds, in a bid to attract investment in the energy sector. It contains the basic obligations described above in Section 3.2, which are enforceable through the dispute settlement provisions described above. While examining its provisions, it should be remembered that the ambiguous drafting of the ECT together with the sparse decisions on its provisions make its interpretation a challenge.

The ECT's investment provisions build on the content of BITs as they have developed during the last half-century. The ECOWAS Energy Protocol inherits these as well, as it largely replicates the ECT. However, the marked difference from the usual BITs is that the investment provisions of both treaties explicitly respect the sovereignty of member countries in conducting their domestic

investment-related policies, including in the area of energy (Article 18) and do refer to environmental goals (Article 19). Further, there is a limited exception in Article 24 allowing states to take measures to protect animal, human and plant health or life in certain circumstances. These special features, each of which is examined below in turn, may temper the basic obligations set out in Article 10 of the ECT and the ECOWAS Protocol, including non-discrimination (national treatment, MFN) and fair and equitable treatment.

Article 18: National sovereignty

Article 18(1) of the ECT confirms the principle of national sovereignty over energy resources, but makes its exercise in accordance with and subject to the rules of international law. Apart from this obligation, host states remain free to conduct their national policies, including in the area of energy. Pursuant to Article 18 (2), contracting parties also retain their sovereign right to determine the system of property ownership of energy resources. Article 18 (3) contains an illustrative list of sovereign rights that are not affected by the ECT. Each state continues to have these rights, including the right to regulate the environmental and safety aspects of such exploration, development and reclamation.[78] Article 18 of the ECOWAS Energy Protocol contains an identical provision.

The explicit right to regulate—including in environmental and safety aspects of exploration, development and reclamation in the energy cycle—is important and, subject to the rules of international law, could provide the host state regulatory space to justify environmental measures. However, the state's sovereign rights are clearly limited by its obligations under international law, which would entail respecting any obligations it has under customary international law and most importantly any BITs it has signed. This is in line with the importance the ECT attaches to the principle of a state honouring its international legal obligations as emphasised by Article 16 (discussed below). Therefore, the confirmation of the principle of national sovereignty in the ECT may give way to any to the obligations it takes on in the BITs a state has signed. Assuming that there is no relevant BIT, then it remains open to debate whether these rights of national sovereignty are subject to the obligations owed to the investor under Part 3 of the ECT and ECOWAS Energy Protocol or not. If they were not, and a state had unfettered rights, then this clause would render Part/Chapter 3 meaningless. As such, in keeping with the rules of interpretation, a tribunal is likely to read this clause in line with Part/Chapter 3 obligations. Further, in any event, this sovereignty is likely to be limited by the rules of customary international law standard of treatment.

Article 19: Environmental aspects

Article 19 (1) of the ECT is titled "*Environmental Aspects*" and commits states to "*strive to"* minimize in an economically efficient manner harmful environment impacts inside or outside their area from all domestic operations within the energy cycle, taking into account obligations existing under other international agreements and in pursuit of sustainable development. In doing so, contracting states are to act in a cost-effective manner; to strive to take precautionary measures, and agree that, in

[78] Other rights are (a) To decide the geographical areas to be made available for exploration and development of its energy resources; (b) To decide on the optimalization of their recovery and the rate at which they may be depleted or otherwise exploited; (c) To specify and enjoy any taxes, royalties or other financial payments payable by virtue of such exploration and exploitation; (d) and to participate in such exploration and exploitation, *inter alia*, through direct participation by the government or through state enterprises.

principle, the "*polluter pays*" principle should apply. Article 19 of the ECOWAS Protocol has identical provisions.

Article 19 (1) also requires contracting parties to take various concrete actions. They relate to, *inter alia*, the promotion of market-oriented price reform and a fuller reflection of environmental costs and benefits; the encouragement of international co-operation; the improvement of energy efficiency; information sharing on environmentally sound and economically efficient energy policies; promotion of environmental impact assessment activities and monitoring; promotion of public awareness on relevant environmental programmes; and R & D of energy efficient and environmentally sound technologies, including the transfer of technology.

Article 19 does not directly impose environmental obligations on foreign investors operating in the territory of state parties. This approach reflects the principle that environmental protection is primarily a matter of national policy. It is the host country's domestic legal order that sets environmental standards for national and foreign companies operating in its territory. It is a *"soft law*" provision, and accordingly is excluded from the state-state dispute resolution clause in Article 27 of the ECT.

As discussed above, the environmental obligations of the state under the treaty may be relied upon by an international tribunal interpreting other provisions of the treaty (e.g. the expropriation or sanctity-of-contract provisions). The environmental standards recognized in the ECT could serve as factors to be taken into account when assessing the legitimate expectations of an investor when deciding this issue and could provide legitimacy to the national regulation.

Further, while PEERA and ECT are connected as part of the same Energy Charter process, there is no express reference in the ECT on what impact PEERA obligations can have on a state's investment obligations in Part 3 of the ECT (Investment Promotion and Protection). In any event, PEERA's text clearly states in Article 13 that:

> "*In the event of inconsistency between the provisions of this Protocol and the provisions of the Energy Charter Treaty, the provisions of the Energy Charter Treaty shall, to the extent of the inconsistency, prevail.*"

The fact that member states that have all signed PEERA and ECT means that a tribunal will take these into account when interpreting the obligations under ECT, in particular that a state's PEERA commitments could be interpreted to create a marker regarding state conduct and an investor's reasonable expectations. However, in the case of a conflict Article 13 makes it clear that ECT will override. The ECOWAS Energy Protocol has no PEERA-like agreement attached to it.

Article 24: Exceptions

Article 24 of the ECT and Article 24 of the ECOWAS Energy Protocol contain the exceptions to the obligations in the treaties, applicable in certain circumstances:

"(2) The provisions of this Treaty other than

(a) those referred to in paragraph 1; and
(b) with respect to subparagraph (i) Part 3 of the Treaty

shall not preclude any Contracting Party from adopting or enforcing any measure

(i) necessary to protect human, animal or plant life or health,
(ii) in emergency energy shortage situations, and
(iii) to benefit investors who are indigenous or socially or economically disadvantaged persons."

However, these exception clauses are of limited effect because Article 24(1) of both the ECT and the ECOWAS Energy Protocol state that they do not apply to Articles 12 (compensation for losses), 13 (expropriation) and 29 (interim provisions on trade related measures). Thus, a state is not allowed to rely on the environment-related exception with respect to claims for expropriation. The importance of ensuring adequate policy space is discussed below under the expropriation section.

As well, any excepted measures must not constitute a disguised restriction on economic activity in the energy sector or an "*arbitrary or unjustifiable discrimination*". The measures shall be duly motivated and not impair benefits reasonably expected under the Treaty to an extent greater than is strictly necessary to the stated end. This raises the question with respect to the situations in which a state can take measures to protect human, animal and plant life or health, or in emergency situations or to benefit disadvantaged investors, without being held in breach of Part 3 obligations. Traditionally BITs do not contain such exceptions from such obligations.

Some modern IIAs like the US Model BIT and the Canadian Model BIT, do contain such an exception provision, however they do not exclude expropriation from its scope as the ECT and the ECOWAS Energy Protocol do. The omission of expropriation from the application of the exceptions clause in the ECT and the ECOWAS Protocol may lead an investor to argue that the specific limitation of the exceptions clause curtails the state's police powers to regulate in these interests.

Pre-establishment and post-establishment protection

This report has argued that new stocks of investment are needed in the energy sector, in particular in developing countries facing the growing energy demands of their citizens and industry. Under customary international law, a state is free to determine for itself the conditions under which it chooses to admit foreign investment, and the nature of the rights acquired upon establishment.

However, IIAs can limit a state's sovereign powers to regulate foreign investment by subjecting them to the terms of the treaty. Therefore, it is important to ask whether the ECT or the ECOWAS Energy Protocol limit a state's right to take measures relating to the establishment of investments in the energy sector. The bulk of BITs do not impose obligations on states with respect to the admission of investments, but their provisions only apply once the investment has been established in the state in accordance with domestic laws and regulations.

Therefore, a state is not obliged to treat foreign investors as favourably as its nationals, or for that matter as the nationals of another state, during the making of the investment under typical BITs.

However, once the investment is established, assuming there are National Treatment (NT) and MFN provisions in the BIT, as there are in the ECT and ECOWAS Protocol (see below), a state would be constrained by these provisions. This unfettered right to exercise its discretion means that there is no obstruction to any government measures promoting new investment into clean energy technologies. A state can provide certain incentives or for that matter impose penalties with respect to new investments in those technologies that are unclean without being challenged by an investor for compensation under the ECT and ECOWAS Protocol, as under most BITs.

However, where a treaty does provide rights in the pre-establishment phase, i.e. during the making of an investment, as in the case of the US BITs, a state's discretion to treat prospective foreign investors will be restrained by the terms of the BIT. The obligation on the host state then is usually to treat investors no less favourably than it treats its own nationals or nationals of a third state in "*like circumstance*s". As some arbitral panels have ruled that only very general tests must be met to compare foreign and domestic investments (such as whether they are both exporters or whether they are in the same production sector), this could lead to inappropriate results if no distinction is made between clean and dirty energy investments. However, recently, tribunals have rejected the trade law, 'like products' test, instead focussing on the relevant circumstances and comparability of the products.[79]

The ECT falls somewhere in between traditional BITs, which contain no pre-establishment obligations, and some modern BITs, which do. Article 10 (2) of the ECT states that each host state shall "*endeavour*" to accord investments national treatment or Most Favoured Nation (MFN), whichever is more favourable during the making of investments. The ECOWAS Protocol adopts a similar approach to the treatment of the making of investments (Article 10 (2). The effect of this unique best efforts provision is debatable. In view of the language used in its drafting, in practice, it would be a difficult to show that the standard has been breached. In other words, neither treaty seems to contain effective pre-establishment rights for investors.[80]

Standards of treatment

Once the investment has been established, the ECT and the ECOWAS Energy Protocol aim to ensure a basic standard of treatment for foreign investors, similar to that commonly found in most BITs. According to Article 10 (1) of the ECT, each member state shall, in accordance with the provisions of the treaty, encourage and create stable, equitable, favourable and transparent conditions for investors to make investments. The commitments on the host state include those to provide "*fair and equitable treatment*" and the "*most constant protection and security*".

The frequently used fair and equitable standard has been termed "*elusive"* by international law commentators. The standard is primarily directed at the process of decision making, rather than at the effect on the investment (which is at the core of the expropriation provision).[81] In assessing the

[79] See, for example, the reasoning in *Methanex v. United States of America.* Note that, as discussed below, the ECT and ECOWAS Protocol do not contain any text limiting non-discriminatory treatment to "like circumstances" or to "like products."

[80] Although, the ECT includes a "*best-efforts*" clause concerning non-discrimination in the pre-establishment phase (i.e. the making of an investment), it provides for negotiations to transform it into a legally binding obligation. At the time of writing this report, negotiations on pre-establishment issues appear to be on hold.

[81] McLachlan, Shore and Weiniger (2007).

adequacy of administrative action, tribunals have focused on legitimate expectations of the investors or the application of a fair and transparent decision making process. The enquiry into legitimate expectations focuses on the predictability and consistency of treatment. It starts with the premise that the investor must accept the host state law, and that there should be a legitimate scope for regulatory flexibility. However, bad faith or discriminatory treatment is likely to veer the tribunal towards a finding that the standard has been breached.

Articles 10 of the ECT and the ECOWAS Energy Protocol also enact the principle of non-discrimination, although as noted above these only apply effectively to investments once they have been made. At that point, Article 10 (7) of the ECT obliges host states to accord to investments of investors of other contracting states treatment at least as favourable as that they accord to the investments of their own investors or of investors of other countries, i.e., the better of national treatment or most-favoured nation (MFN).

Therefore, if there is discrimination in favour of a national competitor then the investor can allege a breach of the national treatment clause. Similarly, if nationals of another country are treated more favourably, the investor can claim a breach of the MFN provision. Discriminatory environmental measures – for example, discriminating in favour of investors with low-GHG emission profiles – might therefore lead to independent claims under these headings, depending upon the circumstances of the case.

Of course, neither the ECT nor the ECOWAS Protocol prohibits *all* types of discrimination. Clearly it is within a state's normal sovereign rights to regulate different industries and sectors differently, depending on their characteristics (which, among other things, include the degree to which they contribute to climate change). The key question is how to interpret the obligation to render treatment no less favourable than that accorded to domestic investors. As noted above, most IIAs qualify this obligation by adding "in like circumstances" or some similar text to explain that treatment of completely unrelated types investors need not necessarily be alike, but no such language appears in the ECT or ECOWAS.[82] This leaves us quite unclear as to whether discrimination against high-GHG emitting enterprises or sectors would be considered a breach of obligations, or whether it would be considered part of the normal and legitimate exercise of sovereign regulatory powers.

There are a few limited exceptions to the obligations for non-discrimination, including one of interest from the perspective of clean energy investment. Article 10(8) notes that a Supplementary Treaty is to deal with the modalities of the application of the principle of non-discrimination concerning grants and other financial assistance for technology R&D (Article 10(8)). This incorporates some flexibility by creating potential policy space for a state to encourage incentive-oriented for promoting R &D with respect to clean energy national programmes which may involve discrimination.

[82] Where such language *does* exist the key question becomes whether a high-GHG emitting investor in sector X is in like circumstances with a low-GHG emitting investor in the same sector. On this there is no legal certainty under IIAs, there being little in the way of case law to go on.

Expropriation

Article 13 of the ECT and the ECOWAS Protocol states that investments shall not be expropriated except where such expropriation is in the public interest, non-discriminatory, carried out under due process of law and accompanied by payment of prompt, adequate and effective compensation.

Expropriation can include both direct and indirect takings. That is, expropriation may result from either (a) a *direct* and overt formal act of taking, such as an nationalization, which substantially deprives the investor of the use or enjoyment of its investment or (b) from an *indirect* taking in which government measures – including environmental regulatory measures – have the equivalent effect of a direct taking (even if the legal and beneficial title of the asset remains with the investors). The latter is variously described as '*de facto expropriation*', '*measures equivalent to expropriation'* or '*acts tantamount to expropriation'*, which are well established in judicial practice.[83] The Tribunal in CMEv the Czech Republic argued that, "De facto *expropriations or indirect expropriation measures that do not involve an overt taking but that effectively neutralize the benefit of the property of the foreign owner are subject to expropriation claims*".[84] An expropriation may also be '*creeping*' or '*constructive*': it need not be immediate, but may take place through a series of acts the cumulative effect of which is the substantial deprivation of the use or value of an investment.[85]

Most governments have responded to the challenge of climate change by introducing measures to reduce carbon emissions, along the lines of the three basic scenarios described in Section 3.3: promoting investment into clean technologies; creating limits on GHG emissions from existing sectors, and; closing or requiring significant retrofits in existing energy facilities. Such measures in turn can impact upon the value of investments, both local and foreign. However, IIA disputes have seen foreign investors challenge government measures introduced to protect the environment claiming that these breach the expropriation provisions in IIAs and create a right to claim damages for the loss of value in their investment. When government measures amount to expropriation, they are often called *regulatory takings*.

The concern from an environmental perspective is that regulators who are held liable for their impacts on investors will not regulate to the extent that they should (the *"regulatory chill"* argument).[86] The issue is obvious: most people would agree that taxpayers should not be paying investors to alter behaviour that is contrary to the public interest (in contravention of the widely accepted polluter pays principle).

There are two key questions to answer where there seems to be an indirect expropriation through regulatory practice. First, is the measure in question simply a legitimate exercise of government's sovereign right to regulate (often referred to as a state's rights of *police powers*)? If so, then it cannot be considered an expropriation. Second, if the measure is not of that nature, is it a significant enough interference to be deemed expropriation (and thus subject to compensation)? Both of these questions are examined below.

[83] Schreuer (2006:115).
[84] CME Czech Republic BV v Czech Republic UNCITRAL 2001
[85] Reed, Paulson and Blackaby (2004).
[86] Cosbey (2003).

Although jurisprudence under the ECT is scarce, in *Nycomb Synergetics Techonology Holding AB ("Nycomb") v. Republic of Latvia,* the first known award delivered under the ECT, the tribunal dealt with the claimant's challenge of government regulatory acts by presenting claims that included those of breaching non-discrimination, fair and equitable treatment and expropriation provisions. The case involved the investments of a Swedish company – Nycomb – in the electricity market in Latvia. Nycomb was the sole shareholder of a joint stock company SIA Windau ("Windau") established under Latvian law, which operated a power plant in Latvia. With the aim of increasing foreign investment into its electricity sector, Latvia introduced a regulatory framework which entitled investors to double the normal tariff for electricity sold to Latvergo, a state-owned entity. Windau and Latvergo entered into agreements for the construction of power plants, under which the former undertook to pay Windau the higher tariff. Latvergo subsequently refused to purchase the surplus electricity from the plants at the double tariff, but did so later at 75% of the average tariff. The Latvian Cabinet of Ministers issued regulations to amend the earlier regulation which essentially had the effect of repealing the offer to pay the double tariff.

The tribunal in *Nycomb v. Latvia* in deciding the expropriation claim under the ECT agreed that government regulation may under certain circumstances amount to expropriation or the equivalent of expropriation. The tribunal commented that the "*decisive factor for drawing the border line towards expropriation must primarily be the degree of possession taking or control over the enterprise the disputed measures entail.*" It held that the payment of 75% rather than 200% of the tariff did not suffice as an expropriation, or the equivalent of an expropriation, though it did find a breach of the obligation for fair and equitable treatment.

This raises a central issue in finding expropriation – is it determined only by the degree of impact, or can even a clear significant impact be sheltered from claims of expropriation if it is non-discriminatory and taken in good faith for clear public purposes? This issue has generated a growing number of arbitral awards and academic writing. The existing arbitral decisions go in two separate and irreconcilable directions. Some say the key element is the economic impact of the measure, irrespective of any other condierations (*Metalclad v. United States*[87], *TECMED v. Mexico*[88]).[89] This is known as the "sole effects doctrine." Others say that *bona fide* regulatory measures fall within the customary international law concept of "police powers" and do not constitute expropriatory measures.

The key question boils down to this: In what circumstances will a government measure undertaken for a clear public welfare purpose (such as health and safety, environment, public morals or order, etc.), that is *bona fide* and non-discriminatory, but has the effect of harming a foreign investor be an indirect expropriation, for which the government must pay compensation?

Academic writing, like the available case law, is free from consensus on this issue. Yannaca-Small (2006) focuses on the right of governments to regulate and in particular, on the criteria for distinguishing, between indirect expropriation requiring compensation and governmental measures

[87] Metalclad Corporation v. The United Mexican States (ICSID Case No. ARB(AB)/97/1)
[88] *Técnicas Medioambientales Tecmed, S.A. v. United Mexican States*, ICSID Case No. ARB (AF)/00/2. (Spain/Mexico BIT)
[89] See also Schreuer (2006) and Waelde and Kolo (2001).

impacting an investment but not requiring compensation. She argues against the sole effects test as a critical criterion:

> "*There are some cases focusing on the affect on the owner as the main factor in distinguishing a non-compensable regulation from a taking. However, there is also authority to support the view that the character, meaning the purpose and the context of the governmental measure also enters into the analysis- i.e., whether the measure is normal regulation taken to promote a recognized 'social purpose' or the 'the general welfare; when non-discriminatory and in good faith… This right to regulate is sometimes addressed in terms of the 'police powers' of the State. Under the broad view of the term, 'police power' encompasses the government's right to regulate for the general welfare, e.g., in the area of health, safety and the environment, in addition to traditional measures such as taxation, criminal seizure and confiscation. Under a more narrow view, however, 'police power' covers only the latter, traditional elements. It should be noted that, the traditional police powers are not seen as one criterion among others to be balanced in distinguishing between non-compensable regulation and compensable indirect expropriation, but as* per se *exemption from any duty to compensate.*"

The Tribunal in the *Methanex* case in effect confirms the state police power to regulate in the public interest under international law. It focuses on the state's power under customary international law rather than an exception under the treaty:

> "*As a matter of general international law, a non-discriminatory regulation for a public purpose, which is enacted in accordance with due process and, which affects,* inter alios*, a foreign investor or investment is not deemed expropriatory and compensable unless specific commitments had been given by the regulating government to the then putative foreign investor contemplating investment that the government would refrain from such regulation.*"[90]

If this reasoning were followed by all subsequent Tribunals, there would be relatively little concern about the types of measures taken under the scenarios described above, as long s they were legitimately taken for the purpose of environmental protection, and did not involve any degree of deliberate protection of domestic investors. The problem is, however, that under IIAs there is no principle of jurisprudence, and nothing prevents future Tribunals, for example, from using the sole effects doctrine in interpreting a State's obligations under the treaty.[91] As such, there is fundamental uncertainty about the challengeability of measures taken under the three scenarios if they indeed act to substantially deprive a foreign investor of the value of his investment.

Measures that do *not* fall under the police powers carve out, whether because they fail to meet the standards of customary international law on police powers, or because the relevant Tribunal uses the sole effects test, must be assessed to determine whether they in fact cross the threshold of impact that would constitute expropriation. That is, the certainty of an action qualifying as an expropriation is bedeviled in circumstances where the interference does not sterilize *all* economic value of the

[90] Final Award, Part IV, para. 7.

[91] A small number of BITs now incorporate language intended to guide Tribunals on this question. For example the current US Model BIT establishes that: "Except in rare circumstances, nondiscriminatory regulatory actions by a Party that are designed and applied to protect legitimate public welfare objectives, such as public health, safety, and the environment, do not constitute indirect expropriations." (Annex B, para. 4(b))

investment, but interferes to a significant degree with the enjoyment of its use or its benefit. The tribunals in *Metalclad v Mexico* and *Marvin Feldman v Mexico* appear to hold that the depriving the owner in whole or in significant part would be sufficient.

In cases where there is substantial deprivation, for example where the limitations imposed by the government measure strip away all economic value from the investment, or in a more straightforward scenario such as a ban on the investment's production of a product, the investor can argue that there this is a *de facto* expropriation and therefore compensation is due. In cases of indirect expropriation, tribunals usually consider the measures are covered only if they achieve the same result as a direct expropriation. "*While it may sometimes be uncertain whether a particular interference with business activities amounts to an expropriation, the test is whether that interference is sufficiently restrictive to support the conclusion that the property has been 'taken' from the owner.*"[92]

Assuming that *Methanex* reflects the customary international law position (an assumption with which it should be stated that many would disagree), the concern that arises under the ECT and the ECOWAS Energy Protocol is whether by excluding expropriation from the Exceptions clause (article 24) which entails the articulation of state's authority to take measures necessary to protect public health or life, a state's rights under customary international law are modified. It should be noted that most BITs do not contain such exceptions, and therefore it can be argued that they impliedly retain the police powers exception. However, under Article 16 (2), the terms most favourable to the investor will apply. Article 16(2) provides "*nothing in such terms of the other agreement shall be construed to derogate from any provision of Part III or V of the this Treaty or from any right to dispute resolution with respect thereto under this Treaty, where any such provision is more favourable to the investment of the investor.*"

In the end, it is difficult to state with certainty when a claim for expropriation may succeed against a state notwithstanding it has exercised its powers for a legitimate environmental purpose, particular where the effect destroys the economic value of the property. Absent further clarity in the actual text of the treaty, therefore, one is left very much to the skills of the lawyers arguing any given case and the aptitudes of the arbitrators involved. This lack of clarity presents a number of risks for host governments in adopting new measures affecting economics of an investment substantially, such as those described in the three scenarios above.

3.4.5 Article 16: Relation to other agreements

As noted above, the recent vintage of the ECT and the ECOWAS Energy Protocol provide welcome references to environmental and objectives and national sovereignty (Art 18, 19 and 24, and the preambular text), which appear to support the case that these treaties provide comfort to states taking *bona fide* regulatory measures to promote clean energy investments that such measures will not breach the legal guarantees to investors made under the treaties. This is also an improvement to standard BITs which do not contain such references, either in the body or the preamble.

The provisions of Article 16, however may wholly undermine these elements via reference to existing and subsequent BITs in a manner which is most favourable to the investor. Articles 16 of

[92] Pope & Talbot Inc v Government of Canada, Interim Award on Merits, phase one, para. 102.

the ECT and the ECOWAS Energy Protocol provide that if two or more Contracting Parties enter into a prior or subsequent international agreement, the provision more favorable to the investor shall govern where there are disparities. Article 16 refers to treaties concerning "the subject matter of Part III or IV" of the ECT, which is likely to include BITs. In view of the large number of intra-ECT and intra-ECOWAS BITs, investors would probably have recourse to those agreements, none of which would likely contain the exceptions clause found in the ECT and ECOWAS Protocol, or the references to environmental objectives.

3.4.6 Conclusions

In view of the uncertainty surrounding the key terms such as the definition of fair and equitable treatment, and of indirect expropriation, it would be difficult to see how states can be confident that regulatory measures taken to protect the environment post-establishment will not attract compensation claims for breach of the ECT or ECOWAS Energy Protocol, particularly if the impact of the value of the investment is severe. Adding to the uncertainty is the fact that expropriation has been carved out of the scope of coverage of the Treaties' exceptions clauses, leading to the possible argument that the Treaties intentionally sought to limit the exercise of the police powers of the Contracting Parties in this context.

As well, it is not clear whether the obligations to render treatment no less favourable than that granted to domestic investors does or does not preclude discrimination against high-GHG emitting investors, or in favour of low-GHG emitting investors.

Finally, while the praiseworthy references to environmental objectives and national sovereignty in the ECT and to a lesser degree in the ECOWAS Protocol give some hope that Tribunals would grant states the necessary policy space for environmental protection, the gaping loophole is Article 16, which would seem to allow investors to by-pass these treaties and resort to other existing agreements (i.e., BITs) where those would afford investors greater protections.

While these concerns are important for states that might seek to take action on climate change, it is also important to recall that neither treaty accords pre-establishment rights to investors. This means that neither would prevent states from taking actions described under the first scenario in Section 3.3: favouring inward investment by firms that are low-GHG emitters. The other two scenarios, however, would potentially leave states open to arbitration under the dispute settlement provisions of the treaties, with outcomes that are worryingly uncertain.

4. Conclusions

This report has started from the assumption that one of the key ingredients in successfully addressing climate change at the global level is a massive amount of new investment in clean energy infrastructure and technologies, particularly n developing countries where the bulk of new investment will take place over the next few decades. And it has looked for potential obstacles and opportunities to promoting that outcome in two areas to which not enough attention has been paid by policy makers: domestic-level policies, and international investment law.

As a backdrop to the discussion, the report noted that public investment in clean energy has been on a steady increase. In February 2007 the finance Ministers of the U.S., U.K. and Japan proposed a $10 billion Clean Technology Fund to "help developing countries bridge the gap between dirty and clean technology" (Paulson, Darling and Nukaga, 2008). Part of Japan's Cool Earth Partnership, a fund worth $10 billion over five years, would go into the CTF, as would $2 billion from the U.S. and $1.5 billion from the U.K. over three years. Japan has also contributed to two funds in the Asian Development Bank that may have some impact in this area – the Investment Climate Facilitation Fund and the Asian Clean Energy Fund. As generous and necessary as such expenditures are, however, they are a drop in the bucket relative to the need. Even if 100% of these funds were directed straight to clean energy investment in developing countries (in reality much less than that will be so directed), and was renewed annually until 2050 at those levels, it would amount to less than 1% of developing country needs for such investment as projected by the IEA, even for its reference case.[93]

Obviously the private sector is going to have to be the main driver for the needed levels of investment. Private sector clean energy investment has, in fact, been growing at a furious pace over the last few years. In 2004 it stood at $30 billion globally, and by 2007 this figure had almost quadrupled to $117 billion. (NEF, 2007) While this is an encouraging trend, the volumes do not yet stack up well against the needs. Of that $117 billion only $55 billion was actual asset financing (the remainder being inter alia investment in IPOs, venture capital and private equity). IEA's $22 trillion figure averages out to sixteen times this much annually.

This leaves us with the question: how can governments, MDBs and IGOs facilitate more of this kind of investment? With the limited funds available relative to the needs, it is inevitable that the best they can do is to act as facilitator and catalyst for larger flows of private sector resources. The project that gave rise to this paper is premised on the assumption that there are several avenues that might be successfully pursued by governments to make such investments more attractive for private sector lenders and investors. It asked: what are the obstacles to clean energy investments, and what are the missing incentives? It found these at both the domestic and international levels.

Obstacles and opportunities: The domestic level

Investors, both foreign and domestic, consider a number of factors when making decisions on clean energy investment, a large number of which can be rolled together under the heading domestic environment for investment. In so doing, they assess how risky or difficult it will be to make an investment in a given country using a given technology, and add this to the expected costs. This report found a varied assortment of this type of barriers. At the level of investment generally, investors look for such things as political and macroeconomic stability, educated workforce, adequate infrastructure (transportation, communications, energy), functioning bureaucracy, rule of law, strong finance sector, as well as ready markets for their products and services.

The report also found a number of barriers specific to clean energy investment. These include a lack of clear guidance on future energy policy (lack of signals), monopoly structures for existing

[93] Even if we assumed the funding was mandated to cover only the incremental difference between clean and conventional energy infrastructure, rather than covering the total needed investment, we would come up an order of magnitude short.

producers with lack of purchase agreements or feed-in tariffs for independent producers, lack of fiscal incentives for clean energy production, weak environmental regulation and enforcement, subsidies for conventional energy sources, a domestic financial sector that has little experience with new technologies, and so on. All of these are found

These types of policy barriers differ fundamentally from country to country, a function of the many factors that shape national energy policies, including history, politics, geography and chance. But the basic story remains the same: many countries, particularly the least developed among them, are not getting their full share of potential clean energy investment because their existing policies make them unattractive for any but the highest return projects. This basic finding is repeated in study after study. (Amin, 2000; Chandler and Gwin, 2008; Point Carbon, 2007: Dayo, 2008) That being the case, any focus on clean energy investment that does not address domestic barriers will be hamstrung from the outset.

What might be done to address this challenge? The first need is for analytical national studies that highlight the obstacles to clean energy investment and the potential for profitable investment of this type. As noted above, the opportunities and obstacles will vary significantly from country to country, and diagnostic studies will help to identify the full range of potential actions that are needed to help make clean energy investment more attractive to both domestic and foreign investors. These types of studies are not unprecedented, and have been carried out by the IEA (various country studies), by the World Bank (under the auspices of its Energy Sector Management Assistance Program) and by the Integrated Framework for Trade-Related Technical Assistance to Least Developed Countries, which focuses more on trade than on investment, but which provides an excellent model on which to draw.

Following on from this type of diagnostic study there would need to be a concerted effort at implementation – an area in which all the above models perform more weakly than in the area of diagnosis. Action in this area would also be possible at levels below the multilateral. In both diagnosis and implementation there may be a role for the types of cooperative mechanisms that are normally established under modern bilateral and regional trade agreements; these agreements typically cover cooperation, technical assistance and capacity building on environment and development matters, among others (OECD, 2007). It is also conceivable that the mandate of the Energy Charter Treaty could be recast to include the type of capacity building conceived of here, given its basic mandate to foster investment in energy, and its association with the objectives of energy efficiency and the environment through the PEERA treaty.

Obstacles and opportunities: The international level

The international regime for investment is in fact less like a regime than it is like a spaghetti bowl of separate agreements. There are a few obligations under the WTO's Agreement on Trade-Related Investment Measures, there are considerably stronger provisions contained in over 2,500 bilateral investment treaties, and there are about 30 investment chapters in bilateral and regional free trade agreements with commitments of a similar, often more ambitious, nature. The overall number of such international investment agreements (IIAs) is growing furiously.[94]

[94] For an overview of that growth, and the drivers that underlie it, see Cosbey *et al.* (2004).

How does that body of law affect investment in clean energy? Its ostensible purpose is to protect investors, and thereby to increase flows of investment.[95] In the event that it did so—and the much-debated question of whether it does is beyond the scope of this paper—investment law might help foster clean energy investment, though it could conceivably also foster investment in traditional high-GHG emitting installations. As well, it might restrict policy flexibility to regulate in favour of clean energy. Or it might also be used to allow for proactive discrimination in favour of clean energy investment. These last two possibilities are briefly examined below.

Investment law varies from agreement to agreement, and the types of measures it applies to are specific to each case, but it is nonetheless possible to say in general terms how the "typical" investment law provisions might affect certain types of measures that favour clean energy investment. This report considered three scenarios for policy action and asked how IIAs might relate to each of them.

Official promotion of clean as opposed to "dirty" energy investment (scenario one) would be unaffected under most IIAs, since in only a few agreements are there obligations that cover pre-establishment. That is, most investment law covers treatment of investors only after the investment has been made. For those few IIAs (albeit a growing number) that do cover pre-establishment investments, as long as government promotion of clean energy treats foreign and domestic investors alike, there should be no legal concerns.

A policy that created new limitations on GHG emissions from exiting installations (scenario two), or which outright closed them or demanded significant retrofits from them (scenario three), would face two types of restrictions, based on commitments in most IIAs related to expropriation and to fair and equitable treatment. If the new policy had significant economic impacts (regardless of whether or not it had the same impacts on domestic facilities), the foreign investor might be able to argue that his or her investment was being indirectly expropriated, and claim damages. The case law on this is contradictory, some saying that a non-discriminatory measure of general application taken in the public interest cannot be expropriation, and others saying that any measure with strong enough economic impacts is expropriation, with damages due.[96] In the final event there is no *ex ante* certainty on this question.

The second type of obligation – fair and equitable treatment – is mostly about just and transparent process. But it has also come to mean, in some awards, no costly regulatory surprises. Most *bona fide* regulation, if undertaken transparently and fairly, would be safe from such challenge, unless there was a stabilization clause in place between the investor and the host government. Such agreements typically guarantee an investor unchanged regulatory treatment for a number of years, and if one exists when new regulations are brought in, it can be the basis for arbitration under the fair and equitable treatment obligations.

[95] It did just this in the case of *Nykomb* vs. *Republic of Latvia*, where the investor took Latvia to binding arbitration after it retroactively changed a regulation that had decreed a higher feed-in tariff for new energy supply.
[96] For an example of the former, see *Methanex vs. the United States of America*. For an example of the latter, see *Metalclad vs. the United States of Mexico*.

A useful role for trade policy in this area would be to clarify the definition of expropriation, though such an undertaking would be difficult because of the scattered nature of the "regime." There is, certainly, precedent on which drafters can draw in elaborating new agreements, including language from the 2004 US model BIT which cautions that "the fact that an action or series of actions by a Party has an adverse effect on the economic value of an investment, standing alone, does not establish that an indirect expropriation has occurred," and goes further to assert that "Except in rare circumstances, nondiscriminatory regulatory actions by a Party that are designed and applied to protect legitimate public welfare objectives, such as public health, safety, and the environment, do not constitute indirect expropriations."[97] It might also be useful for trade policy makers to consider the impacts of host country stabilization agreements on their climate-related obligations, there being a dearth of analytical work in this area.

Beyond the sorts of restrictions that IIAs might impose on domestic governments, it is useful to think about how such agreements might proactively foster clean vs. dirty investment. A survey of practice indicates that none of the current agreements do this, though the Energy Charter Treaty—and to a lesser extent the ECOWAS Energy Protocol—does have some potentially useful environmental elements that might be replicated in other IIAs. In practice though, these seem to be rendered useless by other aspects of the text, including explicit provisions for investors to resort to other IIAs that might be more investor-friendly.

Concluding thoughts

There is a flurry of activity, funding and political capital being directed at the challenge of clean energy technology, aimed at getting it into the hands of investors in developing countries as they make decisions that will have climate change impacts for generations to come. The World Bank has established its Clean Technology Fund, Japan has announced its Cool Earth Partnership, the U.K. and U.S. have followed suit with billions of dollars committed. Other multilateral development banks and individual donor countries are also active in supporting dissemination of technology to address climate change concerns.

The related theme of technology transfer is also attracting an increasing amount of attention. For the first time in UNFCCC negotiating history it is a key issue, having been incorporated in the Bali Action Plan commitments. Negotiators are searching (with varying degrees of success) for ways in which to give effect to the technology transfer obligations to which they have subscribed under the UNFCCC, the Kyoto Protocol and the Bali Action Plan.

In the area of clean energy investment the two agendas come together. The problem of technology transfer is essentially an investment problem; not enough investment is taking place in transformative technologies that will both provide new sources of energy, and do so at a significantly lower cost to the environment. Successfully addressing the barriers to clean energy investment, making host countries more attractive for that investment, is essential for technology transfer. It is, in fact, arguably one of the most effective policy options that governments have available for fostering technology transfer. As noted above, governments cannot muster the scale of resources necessary to make them the primary drivers of technology transfer. Some argue further that they are ill-equipped because ownership of the requisite intellectual property rights vests with the private

[97] US Model BIT, Annex B.

sector. In any case, improving the domestic investment environment for clean energy technology is an entirely appropriate role for governments, MDBs and aid agencies in the pursuit of both development and environmental benefits. It is therefore surprising that in all the activity related to clean energy investment and technology transfer there has not been more attention paid to this challenge.

More attention also should be paid to the implications of international investment agreements for climate-related investment. The uncertainties of interpretation, particularly with respect to indirect expropriation and with obligations on fair and equitable treatment, may in the final analysis chill new regulations designed to address climate change. And there may be potential for IIAs to take on an unprecedented proactive role in promoting clean investment, as opposed to any and all investment, but this possibility needs more thoughtful analysis.

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