Levers to Enhance TNC Contributions to Low-Carbon Development – Drivers, Determinants and Policy Implications[1]

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"The single most significant driver of private sector investment in climate change solutions is strong, stable, transparent and credible policy."

Peter Dunscombe, Chairman of the International Investors Group on Climate Change

This contribution focuses on the drivers, determinants and policy implications of low-carbon FDI, with particular attention to developing countries. [1] Parts of this paper served as an input to Chapter IV of the World Investment Report 2010, which examined the issue of TNCs and Climate Change. The authors are however free to use all of the reflections presented below for their own publications.

INTRODUCTION

The role and importance of TNCs and FDI in low-carbon development

Multinational (MNC) or transnational corporations (TNC) are enterprises that manage production or deliver services in more than one country. The International Labour Organization further specifies that an MNC is a corporation which has its management headquarters in one country (the "home country")[2] and operates in several other ("host") countries. UNCTAD distinguishes financial from non-financial TNCs, because of the different economic functions of assets of financial firms and the non-availability of relevant data on sales and employment.

A related concept is that of foreign direct investment (FDI), which UNCTAD defines as "an investment involving a long-term relationship and reflecting a lasting interest and control by a resident entity in one economy in an enterprise resident in an economy other than that of the foreign direct investor". FDI has three components: equity capital, reinvested earnings and intra-company loans or debt transactions. This paper considers not only FDI, but also broader issues related to the contribution of TNCs to low-carbon development pathways.

TNCs and FDI are both critical to the transition to low-carbon pathways, due to the sheer size of the respective material and financial flows they represent, many of the largest dwarfing the impacts of the vast majority of national economies, yet formal climate governance regimes have so far failed to adequately reflect this reality. Under the UN Kyoto Protocol, developed countries have taken on territorial emissions caps corresponding to national boundaries and financial obligations, but these do not directly implicate or engage the private sector, despite the sizable emissions inventories of TNC's and the climate implications of their global value chains and traded goods, financial TNC transactions (including project finance) and FDI, all of which have a global footprint. Some greenhouse gas emissions generated by MNCs remain fully unregulated under the UN Climate Convention, in particular, emissions from bunker fuels used in shipping and aviation.

[1] Parts of this paper served as an input to Chapter IV of the World Investment Report 2010, which examined the issue of TNCs and Climate Change. The authors are however free to use all of the reflections presented below for their own publications

[2] Noting that some TNCs (and increasingly more) consider themselves to have more than one 'home' jurisdiction economically if not legally. Many investors look through the financial statements to assess geographical diversification of their TNC holdings. It is becoming blurred.

Walmart to Eliminate 20 Million Tons of Greenhouse Gas Emissions from Global Supply Chain

On 25 February 2010, Walmart announced a goal to eliminate 20 million metric tons of greenhouse gas (GHG) emissions from its global supply chain by the end of 2015, an amount equivalent to Walmart's direct carbon dioxide equivalent emissions in 2007, the latest year for which data are available.

The announcement is one example of an initiative coming out of one of Walmart's dozen or so Sustainability Value Networks (SVN), which bring together leaders from within Walmart, supplier companies, academia, government, and non-governmental organizations (NGOs.) to explore sustainability challenges, including climate change, and develop solutions that benefit Walmart and the broader community.

Walmart SVN Structure

Walmart collaborated with Environmental Defense Fund (EDF) to develop this global supply chain approach. Other external advisers include PricewaterhouseCoopers, ClearCarbon Inc., the Carbon Disclosure Project and the Applied Sustainability Center (ASC) at the University of Arkansas. This team will identify projects, quantify reductions, engage suppliers and ensure proper procedures were followed for each GHG reduction claim.

"Like everything we do at Walmart, this commitment ends up coming down to our customers," Duke added. "Reducing carbon in the life cycle of our products will often mean reducing energy use. That will mean greater efficiency and, with the rising cost of energy, lower costs, making our business stronger and more competitive. And, as we help our suppliers reduce their energy use, costs and carbon footprint, we'll be helping our customers do the same thing."

Source: www.walmart.com

Conversely, TNCs and FDI can represent important channels for speeding the development and dissemination of climate-friendly technologies for both mitigation and adaptation globally. Yet there are many factors at play, as discussed in a large body of literature[3]. Some of the most powerful tools available to governments to promote the uptake of innovative climate technologies are related to removing international trade and investment barriers, such as: exempting clean energy processes and products from export control regimes (e.g., dual use, end user prohibitions); innovative approaches to protect cleantech intellectual property, without restricting legitimate access[4]; using transparent and non-discriminatory government procurement practices that provide predictable markets for environmental goods and services; and harmonizing international standards and conformity assessment procedures. Effective technology transfer also requires absorptive capacity and attention to the linkages between TNCs and local companies, particularly small- and medium enterprises (SMEs).

[3] See, for example, Onodera (2008) and the body of work that has been undertaken on the development and transfer of technologies under the UN Framework Convention on Climate Change and its Expert Group on Technology Transfer (http://unfccc.int/cooperation_and_support/technology/items/1126.php).

[4] Brazil has called for a Doha Declaration on Climate Change, applying the same logic to the global public good of climate mitigation as was applied in the area of medicines to human health, namely taking full advantage of the flexibility within TRIPS (WTO Agreement on Trade-related Aspects of Intellectual Property Rights) to grant compulsory licenses to critical climate-friendly technologies, and the Group of 77 and China has also called for compulsory licensing under the UNFCCC negotiations. On the other end of the spectrum, universities and public-private partnerships are beginning to voluntarily adopt alternative licensing solutions, such as including humanitarian or open licensing clauses within their licensing agreements. And the list of ideas goes on. The US-CHINA Clean Energy Forum has advanced the idea of establishing a joint intellectual property protection program, with insurance jointly written by US and Chinese entities (for example by the US Overseas Private Investment Corporation and by People's Insurance Company of China), to lend credibility to IPR protection regimes.

Impact of the Clean Development Mechanism on Technology Transfer and Investment

One of the novel features of the UN Kyoto Protocol regime that went into force in February 2005 was the inclusion of three so-called "Kyoto mechanisms", which give countries some flexibility in where, when and how they achieve the necessary greenhouse gas emission reductions. Under the Clean Development Mechanism (CDM), developed countries may acquire fungible credits for greenhouse gas emission reductions that result from the implementation of climate protection projects in developing (host) countries, with a view to assisting (i) developing countries in achieving sustainable development and contributing to the ultimate objective of the Convention and (ii) developed countries in achieving compliance with their emission limitation and reduction commitments under the Protocol.

As of early April 2010, over 2100 project activities and programs had been registered as CDM projects, and nearly 400 million tons of certified carbon dioxide equivalent emissions reductions (CERs) have been issued since the first CDM project was registered in November 2004. Analysis of the experience to date suggests that the CDM has stimulated additional low-carbon investment and technology transfer:

Technology transfer: Although the CDM does not have an explicit technology transfer mandate, it may contribute to technology transfer by financing emission reduction projects using technologies currently not available in the host countries. A study commissioned by the UN Climate Convention secretariat (Seres & Haites, 2008), which analyzed the claims of technology transfer made by project participants in the project design documents, found that:

- Roughly 36% of the projects accounting for 59% of the annual emission reductions claim to involve technology transfer.
- Technology transfer is more common for larger projects and projects with foreign participants. The technology originates mostly from Japan, Germany, the USA, France, and Great Britain. For most project types, project developers appear to have a choice among a number of domestic and/or foreign technology suppliers.
- Technology transfer is very heterogeneous across project types and usually involves both knowledge and equipment.
- The rate of technology transfer is significantly higher than average for some host countries (including Bolivia, Ecuador, Guatemala, Honduras, Indonesia, Kenya, Malaysia, Mexico, Pakistan, South Africa, Sri Lanka, Thailand and Vietnam) and significantly lower than average for Brazil, China, and India.
- As the number of projects increases, technology transfer occurs beyond the individual projects. This is observed for several project types in China and Brazil.

Investment: The most common form of CDM transaction initially was forward contracts to purchase CERs from emission reduction projects, which limits the risk to the buyer (Arquit Niederberger & Saner, 2005). Many of these projects were implemented unilaterally and financed without any foreign investment. As the carbon market has matured, CER trades on the secondary market have come to dwarf the primary market, but these spot, futures and options transactions do not directly give rise to emission reductions (Capoor & Ambrosi, 2009). With respect to primary CER generation, two basic modes have been identified (Arquit Niederberger & Saner, 2005):

- CER trade model: For CER forward purchases, transactions are governed by low-cost greenhouse gas emission reduction and sink potentials, in addition to traditional factors of comparative advantages in production and trade. The relationship between international trade flows and potential CDM flows warrants further study.
- CDM investment model: Direct production of CERs through FDI (or other forms of equity investment) in CDM projects

Some data on the total investment into CDM projects is becoming available (e.g., refer to the investment analysis in the CDM Pipeline http://cdmpipeline.org), but information on the drivers, financial structure and transaction type of private sector CDM deals is generally confidential, but would help CDM host country policymakers and project developers to respond better to CDM demand (via targeted incentives, awareness-raising, capacity building and project identification) and thereby attract CDM investment or enhance their ability to export CERs in support of low-carbon development (Arquit Niederberger & Saner, 2005).

TNCs and FDI will also be critical in financing the transformation to low-carbon development pathways, which is a major challenge, given that a large share of the investment is required to be made in developing countries. Myriad estimates of the investment and financial flows needed to adapt and mitigate climate change have been published[5], and there is a clear recognition that the private sector must foot a large part of the bill. The Copenhagen Accord expressed the political agreement of developed countries on the scale of "new and additional" resources to be provided to address the needs of developing countries:

- USD 30 billion for the period 2010 – 2012 (with balanced allocation between adaptation and mitigation).
- USD 100 billion dollars annually by 2020.

This admittedly modest funding pledge – seen in the context of the additional USD 10.5 trillion that must be invested in energy supply and end-use during the 2010 – 2020 period to limit greenhouse gas emissions relative to the business-as-usual scenario (IEA, 2009) – is to come from "a wide variety of sources, public and private, bilateral and multilateral, including alternative sources of finance." In order to deliver on the Copenhagen pledges, United Nations Secretary-General Ban Ki-moon has convened a High-level Advisory Group on Climate Change Financing that will develop practical proposals to rapidly mobilize the necessary funds, such as carbon taxes, auctioning emissions permits and levies on financial transactions, air travel and shipping. The Group, which will submit its final report before UN climate talks resume in November 2010, is co-chaired by British

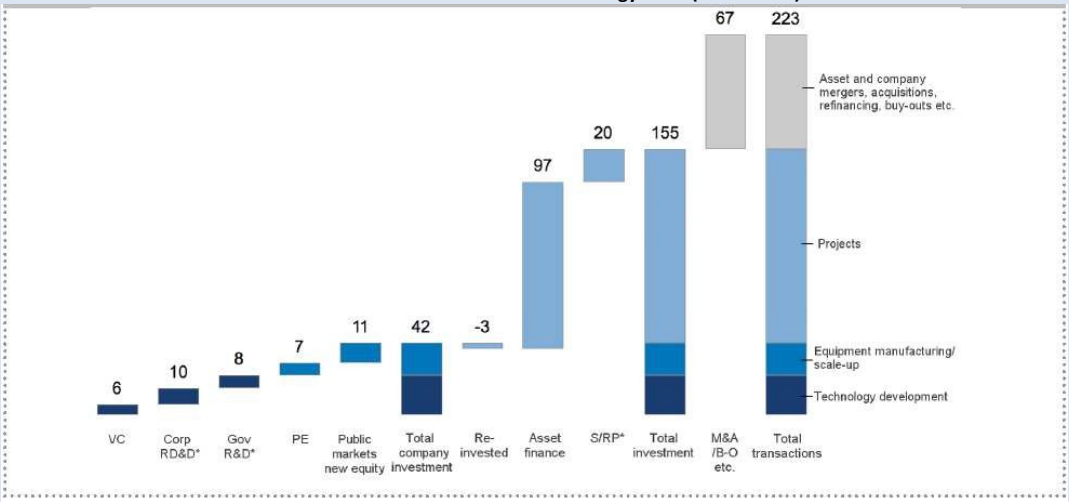
[5] Refer, for example, to the UNFCCC work on investment and financial flows (http://unfccc.int/cooperation_and_support/financial_mechanism/items/4053.php), the Stern Review on the Economics of Climate Change (http://www.hm-treasury.gov.uk/sternreview_index.htm), the IEA's estimate of incremental energy supply and end-use investment requirements (IEA, 2009), and the Project Catalyst brief on overall financing needs (http://www.project-catalyst.info/images/2.%20Climate%20Finance/Publications/2.%20Briefing%20papers%20on%20climate%20finance/20091203%20Finance%20Needs%20Briefing.pdf).

Prime Minister Gordon Brown and Ethiopian Prime Minister Meles Zenawi, but also includes numerous representatives from the financial services sector and government finance ministries.

Global Trends in Sustainable Energy Investment

Investment in sustainable energy was USD 155 billion in 2008. This figure aggregates continued venture and private equity fund investment growth in renewable energy and energy efficiency (an increase of USD 13.5 billion or 37% in new investment compared with 2007); a 51% drop in investment in clean energy firms via stock markets (to USD 11.4 billion); and an increase in debt financing of sustainable energy assets, mainly for new power generation, which was up 12.9% to $117 billion. M&A of clean energy companies dropped in 2008, but is expected to recover, as well capitalized players take advantage of low valuations. The share of financial investment going to developing countries, including China, Brazil and India grew to 31%.

Global Transactions in Sustainable Energy 2008 (USD billion)



S/RP = small/residential projects. Total values include estimates for undisclosed deals. * data based on estimates from various industry sources

Source: New Energy Finance

Source: UNEP SEFI / New Energy Finance (2009)

Effective governance regimes to address climate change as a market failure

Climate change can be considered as a market failure in the sense that market activity is driving global growth in anthropogenic greenhouse gas emissions, increasing their atmospheric concentrations and enhancing the greenhouse effect, with adverse consequences for biological, physical and human systems and net costs into the future (IPCC, 2007; 17). It is a market failure that is inextricably linked with sustainable development and will make it more difficult for countries to achieve the Millennium Development Goals (IPCC, 2007; p. 826-827).

To put economies on low-carbon pathways requires defining the concept of "market failure" in relation to the ability of the market mechanism to achieve specific low-carbon development goals set by the government, rather than in relation to the efficient allocation of resources[6]. Given the ongoing discussion of the financial crisis that began in 2008, the tensions over exchange rate policies, the degree of political influence enjoyed by powerful MNCs, and the failure of the UN Climate Convention process to agree a global climate governance regime, the time is ripe to consider effective governance to achieve low-carbon development pathways.

Governance structures that are currently in place and which can impact the roles that MNCs and FDI play with respect to low-carbon development pathways include:

- International governmental regimes, in particular the WTO regime, economic governance, environmental markets
- Corporate governance, including voluntary industry (or individual corporation) self-regulation, global value chain relationships,
- Multi-stakeholder partnerships
- Domestic governance regimes, from national to local level, particularly investment, taxation, product policies/standards, energy/climate

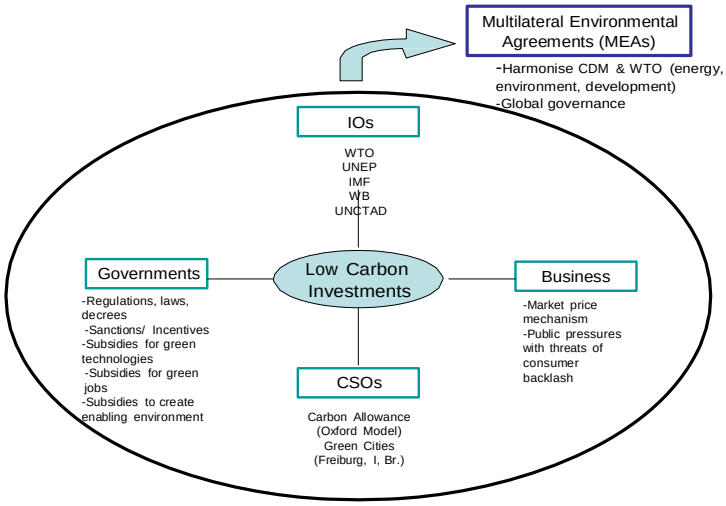
[6] The same argument has been made in the more general context of sustainable development (Panitchpakdi, 2010) and is discussed in detail in Chapter V of this Report.

Civil Society Governance schemes be this at grassroots level or through professional associations and think tanks.

Yet we find ourselves in an existential "race between political tipping points and natural tipping points" (Brown, 2009), and it is not clear that the necessary economic governance reforms will be forthcoming in a timely fashion. Speaking in Copenhagen in December 2009, Heads of State seemed to be converging around the aim of limiting the average global temperature increase to between 1.5 and 2°C above the pre-industrial level[7], which would require global emissions to peak on a timescale of roughly a decade. Yet global emissions are growing at a rate of 1 – 2% annually, putting us on a trajectory that would at least triple the amount of warming. The global recession has created some breathing space, but experts agree that it will be exceedingly challenging, if not impossible, to achieve such a goal, not the least because all of the growth in energy-related carbon dioxide emissions is projected to come from developing countries (IEA, 2009).

Bearing in mind the dangers caused by climate change, aiming at low carbon investment at national and global levels sensible and urgently needed. Low carbon investment could be achieved through incentives and sanctions which can act as drivers and determinants influencing investors and investment flows in the direction towards low carbon investment. As depicted in figure below, low carbon investment could be achieved through at national levels through government policies, civil society pressures and business decisions by commercial actors. At the same time, business investors like TNCs take investment decisions based on market and business strategy criteria which can lead to low or high carbon investment.

Figure 1



Attempting to achieve low carbon investment at international levels is on the other hand the aim of multilateral agreements and conventions as for instance the Multilateral Environmental Agreements (MEAs) which on the other hand face the governance impact of other multilateral agreements such as the WTO which either hinder or facilitate the goal of achieving low carbon investment.

THE TNC DECISION PROCESS

1.1 Low carbon FDI drivers and determinants

Low carbon FDI can be induced by drivers and their flow directed or influenced by determinants. This section analyses the drivers behind TNC activity in low-carbon FDI, as well as the locational determinants explaining the geographical dispersion of this investment across host countries. This chapter attempts to maintain a distinction between these influences.

[7] One outcome of the meeting was the Copenhagen Accord (http://unfccc.int/files/meetings/cop_15/application/pdf/cop15_cph_auv.pdf), a political agreement that roughly 110 governments have since associated with. This agreement expresses the political will to "hold the increase in global temperature below 2 degrees Celsius".

Generally speaking, drivers will be circumstances in the home country or macro-economic events which 'push' the TNC to make the foreign investment. The drivers of TNC activity are largely contingent on the technological capabilities that were developed by companies in response to domestic policies in the home country. Policies driving FDI are, for instance, evident in the promotion efforts by home country governments to build on their technological capabilities by companies doing business overseas. In addition, drivers also cover international policy mechanisms such as carbon markets.

Influences on low-carbon FDI	Driver	Determinant
Tendency of influence to decide	When	Where
Influence tends to	'Push' FDI	'Pull' FDI
Tends to be a country policy or circumstance of the	Home country	Host country
Tends to be	Macro-economic	Micro-economic

Also generally speaking, determinants will typically be host country policies or micro-economic events with will 'pull' the TNC to invest in a particular country.
Determinants for low-carbon FDI, including full regard to those relevant to particular sectors. A little twist in the determinants (away from the traditional ones) often consists of environmental regulation (mainly as a filter) or industrial and business facilitation policies that favour low-carbon investments/FDI and thus contribute to creating respective markets for such activity. An exception to this tendency is in the power sector, where renewable energy markets are almost solely created by policy. The traditional FDI determinants framework (UNCTAD, 1998: chapter IV - WIR98) will be modified by using the NAMAs' priority sectors as a lens to focus the general FDI policy part.

This distinction can be loose with several policies/ events being a driver and determinant coincidentally. For instance a call for tender issued by a host country for a low-carbon private-public partnership (PPP discussed later) will define both when and where and therefore be both a driver and determinant.

Note that our contribution does not elaborate on the arsenal of policies that home and host country governments choose to implement for various reasons and which themselves may serve as levers to encourage TNC contributions to low-carbon development, as these are described in Subchapter IV.4. Instead, we consider low-carbon investment decision-making from the perspective of the TNC.

1.2 The TNC approach to the investment decision

TNCs – like all companies – are traditionally perceived and modelled as long-term profit maximisers. Opportunities for investment arise frequently in both driver and determinant directions. The local staff of the TNC more aware of local host country policies which may present the TNC an opportunity (in this sense the host country influence again tends to be a driver and determinant simultaneously). Alternatively the head office staff – frequently organised around product or service functions – will note an opportunity based upon their own internal research or because of knowledge on what their competitors are doing and recognising the product or service could be used in foreign jurisdictions; clearly a 'driver'. Once opportunities are defined, the management must assess if the product or service is within their competence and analyse the profitability of the investment. Discussion about competence is left to latter (see TNC Structuring Alternatives). The focus here is whether the opportunity turns into an investment.

The principal technique for the investment decision is the cost-benefit analysis and hence they will be motivated by revenue improvements or cost reductions. In the traditional context, investments would be profitable if the resulting efficiency gains, new products or new projects result in revenue benefits or cost reductions which when discounted at the appropriate cost of capital result in a positive net present value.

Table []; TNC analysis: the cost-benefit analysis

General framework: A firm uses cost-benefit analysis to assess an investment be it project or equipment			
Traditional	**Climate change related**		
	Additional explicit low-carbon benefits typically quantified in cost-benefit	**Additional low-carbon benefits (& requirements) typically not quantified but implied**	**Risks potentially causing a higher discount rate and therefore a lower NPV**
Drivers as determined by the home operations			
Policy, business, firm-level drivers Lack of opportunity in home country for low-carbon product/ project New product/ service that emanates from the TNC head office or TNC network	Carbon credits (CERs) Export credit available for low-carbon equipment	Company global reputation including implications to: o Corporate Social Responsibility (CSR) o ISO14000/FSC certification o fend off CSO criticism and disruptions of operations	Regulatory risks: o CER price o Cross-border regulation Technology risks of not working or 'jumping the gun'
Determinants as identified by the host operations			
Efficiency gains as identified by the host jurisdiction (e.g. energy cost savings) New products (e.g. net revenues from windmill equipment) New projects (e.g. revenues less costs of windmill farm)	Tax benefits (e.g. accelerated depreciation, tax holiday, reduced tariffs) Incentives (e.g. subsidies, grants, concessionary loans)		Regulatory risks: o tax and incentive benefits o Sector specific (e.g. grid access for power projects)

In the low-carbon context, additional savings can arise because energy efficiency (as an example) typically reduces both costs and carbon emissions. Those fewer carbon emissions relative to the 'business-as-usual' scenario can generate Carbon Emission Reduction (CER) certificates or reduce the demand for emissions allowances (or avoid carbon taxes) which can generate further benefits. In a more general context, the Harvard Business Report (HBR) has identified for private companies the drivers in a series of questions directed at management (see box).

Climate Change and Profitability

One way to look at how climate-related forces will affect your company is to consider their impact on both costs and revenue. A company's ability to find opportunities in a carbon-constrained world will depend on its skill at hedging against physical climate risk, mitigating regulatory costs, avoiding expen-sive litigation and other threats to corporate reputation, managing climate risk in the supply chain, investing capital in low-carbon assets and innovating around new technol-ogy and product opportunities.

Harvard Business Review OnPoint Spring 2010 hbr.org pg 74

POTENTIAL REVENUE DRIVERS

How will changes in customer demand patterns affect pricing?

What percentage of climate-related costs will we be able to pass through to customers?

How can we generate streams of revenue from new low-carbon products? What new forms of income (for example, carbon credits) will become available?

What threats do we face from low-carbon substitute products?

What will be the impact of weather patterns on revenue?

POTENTIAL COST DRIVERS

How will regulatory policy affect our costs? Will we need to purchase emissions allowances?

Is there a chance that emissions will also, or alternatively, be taxed? What capital expenditures do we face as a result of emissions-reduction plans?

How much will our raw materials costs escalate? How much will those of our suppliers escalate?

How much will our energy costs rise?

How will our risk profile affect our insurance premiums?

For some questions in the box, investment (FDI or domestic) may be needed to capture revenue opportunities, defend revenue threats or to mitigate cost increases. So the cost-benefit analysis is augmented explicitly by revenues or costs related to low-carbon technologies. Besides the CERs mentioned above, the low-carbon

investments can generate other benefits such as tax benefits such as accelerated tax depreciation on such low-carbon eligible equipment, tax holidays for such low-carbon projects, or reduced tariffs on imported equipment which is designed to reduce carbon emissions.

Sometimes explicit incentives are available in the form of subsidies, grants and concessionary loans to finance such equipment. To the extent such benefits can be quantified, many analysts at firms will include such benefits explicitly in their cost-benefit analysis.

There are additional low-carbon benefits which are less easily quantified. For instance, improved company brand and profile would be assessed as a benefit either explicitly (within the calculation) or implicitly (assessed by the management as 'another item to be considered'). We discuss below two particular important reputation aspects: corporate social responsibilities (CSR) and environmental accreditation (such as ISO14000 and Forest Stewardship Council – FSC) motivations later. Even though these are typically not quantified in the cost-benefit analysis, these are still important influences and will sometimes be quantified. Certified products frequently trade at a higher price (a possible quantifiable benefit) or even may be required for the project or sale of product (hence a quantifiable expense for certification might need to be incorporated into the cost-benefit analysis).

There are obviously benefits from such CSR and environmental accreditation to reliability, innovation, productivity, and competitiveness. To the extent that the TNC financial staff can quantify such benefits, it would be explicitly included in the cost-benefit analysis. Some items would be not quantifiable per se. The TNC's decision makers (Board of Directors for a major investment or TNC management for smaller investments) will make an implied assessment of these values, the analysts can not quantify. In financial theory (and practice noting the way some financial analysts work), the net present value is the first approximation of the increase (or decrease) in the value of the TNC from undertaking (or not) a specific project be it investment in a piece of equipment or project in its entirety.

When using cost-benefit analysis, a key variable is the rate future costs or benefits will be discounted. The HBR questions also suggest the uncertain nature of these revenues or costs. Indeed low-carbon investments will have significant risks probably beyond the standard scope of typical private sector investments. This because some such low-carbon investments may involve: (a) long terms – a typical life of a cogeneration plant is a couple of decades; (b) leading and potentially unproven technology; (c) political and regulatory vulnerabilities; (d) proving a vague additionality concept for some of the benefits; and (e) as mentioned previously, less quantifiable elements such as company brand and reputational risks.

The effect of these additional risks is that there will be higher discount rate applied to anticipated future benefits than the normal cost of capital. The higher the perceived risk, the higher the discount rate that will be applied to any revenue or cost-savings; such will reduce the probability of the low-carbon investment being undertaken. Hence risk and uncertainty will tend to reduce the amount and number of low-carbon investments undertaken. Some of these risks are worthy of more discussion.

Low carbon investment decisions may be fraught with **product and technology risks.** These risks arise either because the technology simply does not work[8] or because better technology shows up tomorrow so the investing company loses out having 'jumped the gun'. As an example of the latter, the current dilemma in the bioenergy field is not unusual. Players are making big bets between various forms of cellulose versus algae biomass ethanol feedstock. It is possible one technology will trump the other.[9] Both the risk of not working and the risk of 'jumping the gun' are more probable with low-carbon technology because the technology is developing. A particular aspect of the risk is if a contrary position is taken relative to the technologies used by the company's competitors, i.e. if the company invests in 'low carbon' and its competitors do not. Such will enforce a herd-behaviour amongst the companies. We note this below as one of the predictions based upon an analysis of the drivers.

Carbon Emission Reduction (CER) certificates such as CDM certificates are time-consuming and costly to create. Some blame may lie in a possibly flawed '**additionality**' concept. In part, additionality was included to avoid 'easy money' for developed country utilities adding technology that they would have done anyway. Because the concept depends upon perceptions of 'business-as-usual' baseline scenario, such determinations are perceived to be constructed artificially to qualify the investment for carbon credits. At the same time, returns on high risk projects such as timber plantations in developing countries for example will be perceived as excessive even before carbon credits. Therefore for such plantations, there is little chance of arguing additionality even

[8] Example Trail BC, Canada Smelter: []
[9] http://www.ecoworld.com/energy-fuels/algae-vs-cellulose.html

though the project probably should justify. Investment bankers must talk two different stories between the investor and the carbon credit accreditation firm: carbon credits are 'icing-on-the-cake' versus carbon credits are 'needed integral revenue' for the project, respectively. Valuation of carbon credits is currently one of the most difficult aspects to the TNC's investment decision (see the carbon price discussion later).

There is a large risk associated with **political and regulatory** regime and application changes. As we discuss later, the demand for CERs depends upon regulatory enforcement. If the regulators do not enforce a binding cap, there will not be a meaningful carbon price. The 'cap' is often perceived as artificial and basing the caps on 1990 levels as in Kyoto, is justifiably ridiculed by developing countries. The caps are further discredited by the degree of 'hot air': excess emission allowances because of a collapse in economic activity (e.g. Russia) and the 'Australia Clause' allowances caused by land clearing in [1991]. Recent speculation is that such an effective cap on all emitters can not be negotiated and that subsidies and a carbon tax might be likely.[10] As noted in the opening the need for a strong, stable, transparent and credible policy.

2010 Investor Statement on Catalyzing Investment in a Low-Carbon Economy

An international coalition of investor groups managing over $13 trillion have urged policymakers to act swiftly to implement the following critical policy measures:

- Short- and long-term GHG emission reduction targets
- Price on carbon, coupled with robust, transparent, well-governed carbon markets
- Sectoral policies (energy supply and end-use) – and government leadership
- Public finance mechanisms to best leverage private-sector investment
- Public-private mechanisms in the areas of risk reduction and risk management to increase developing countries' resilience to extreme events
- Assess the potential impacts climate change may have on infrastructure, water resources, and regions of key economic activity – and climate-proof future investments
- Require companies to disclose to their investors material climate-related risks and the programs in place to manage those risks

Source: Institutional Investors Group on Climate Change (2010)

As far back as 2006, representatives of companies such as General Electric, Duke Energy, and Exelon made the case at a senate hearing that it was "time to move forward with legislation. They would rather know the rules soon, they said, than be surprised by sudden political urgency."[11] With the reassessment of environmental priorities – perhaps caused by the financial crisis, political will and/or public interest – we are far from a strong, stable, transparent and credible policy right now. Traditional coal and oil interests are fighting US cap-and-trade legislation, even as other US-based TNCs are lobbying hard for the Senate to pass climate legislation in 2010.[12]

Without a clear direction in the USA, turning the Copenhagen Accord into a binding, quasi universal UN agreement is unlikely, so continued regulatory uncertainty around the globe is to be expected.

There are also sector specific sources of regulatory risk. In the power sector, one particular aspect of regulation (and competition law policy) is the access to the electricity grid. There is significant risk for power generators that, after making substantial sunk cost investments in infrastructure assuming some stipulated price of electricity sold to a monopsony electricity-grid utility, the price is renegotiated down.

1.3 The TNC motives for foreign involvement

FDI has been traditionally categorized under four motives: (1) Market-seeking; (2) Resource/ asset-seeking; (3) Efficiency-seeking; and (4) Strategic asset-seeking.

[10] Economist 18 March 2010; "Climate-change politics; Cap-and-trade's last hurrah; The decline of a once wildly popular idea"
[11] Harvard Business Review OnPoint Spring 2010, pg 73
[12] As indicated in http://wecanlead.org/race/ , http://www.us-cap.org/

Traditional TNC motive	Market-seeking	Resource/ asset seeking	Efficiency seeking	Strategic asset seeking
TNC traditional objective	Supply the local market with company's product /services Lever into other regional /global markets	Utilise resource	Capture differential comparative advantages Better deployment of company's resources	Offensive or defensive acquisition/ investment to preclude or utilise competition
Traditional economic determinants	Per capita income Market size Market growth Access to regional / global markets	Access to labour Access to raw materials Adequate infrastructure	Differential comparative advantages Better deployment of global resources	Access to new competitive advantages
As applied to low carbon technologies	Products/ services for: Low-carbon products Energy / efficiency / carbon market services Low-carbon energy	Resource might be as typical as LNG but may be wind or wave resource opportunity.	Some operations may be better suited in some environments although this overlaps resource and market seeking motives	TNC may seek foreign acquisitions to fill gaps in their product/ service lines specific to low-carbon technologies
Additional drivers	New products/ services of the above triggered by TNC's current stable of products to be applied to new markets	Leverage existing industrial know-how for low-carbon goods in TNC Access to carbon credits through new investments or upgrading subsidiaries.	Some jurisdictions may have laxer environment standards as some TNC may seek to exploit different regulations between countries	Numerous small firms providing unique IP protected solutions high probability of consolidation
	Home country export credit guarantee programs can target low-carbon technology			
Additional determinants	As above, the new / expanding markets for determined by *host country policy* considerations	Local R&D into low-carbon technologies Access to sun, wind, water, or nuclear fuel Leverage existing industrial know-how for low-carbon goods	Technology upgrades of existing foreign affiliates to gain advantage/or remain in local market.	Industrial policy that creates agglomeration effects and rapid local learning Access to low-carbon know-how/project pipelines Competition policy considerations either for or against acquisitions
TNC relevance	TNCs may have a technical or managerial competitive advantage for supplying these markets Energy services investors Producers of low-carbon goods (carmakers, appliance manufacturers) Providers of energy efficiency or process improvement services	TNCs may have IP, technical or managerial expertise to develop resource effectively. Energy services investors Manufacturers of low-carbon goods to gain access to local knowledge	Typically Industrial TNCs. Some TNCs may shop for low standard jurisdictions for carbon intense operations	TNCs scrutinise ideas and give impetus and credence to some technologies. TNCs seeking to enter new markets beyond their traditional competencies TNCs desiring to "follow" developments in a key market

For the *market-seeking* low-carbon investment, the TNC's more specific objective would be to expand their offering of low-carbon products, energy efficiencies including their services and potentially low-carbon energy itself. Whether the offering of such products and services would be successful depends if the TNC has some technical or managerial competitive advantage for supplying those markets.

Likewise the *Resource/ asset seeking* low-carbon investments, is intuitive in that the TNC has found some resource which it can develop. A windy location or tidal bay may come to mind but because of the definition of low-carbon, even an LNG find may be eligible if the use of LNG replaces coal – the 'business-as-usual' scenario. Once again, the TNC should provide some technical or managerial expertise to be logically investing.

Efficiency seeking from the standpoint of environmental efficiency seeking is less well defined. Logically an industrial TNC would seek to capture the comparative advantages between countries to produce a good. In the

environmental sense that is likely to equate to a resource-seeking strategy. For instance the high energy requirement for smelting aluminium typically defines its production location. To the extent that a low-carbon alternative is available (in the past frequently hydro-power), then the differential comparative advantage for energy might be perceived as resource-seeking as efficiency-seeking. Having stated that, we do note that 'capturing differential comparative advantages' from the perspective of the private sector might involve seeking jurisdictions with laxer environmental standards. In this sense some – and we emphasise some – TNCs may shop for doing carbon-intense production in those laxer jurisdictions.

An example for efficiency seeking would be the case of a multinational enterprise regulated in either a home or host market that can reduce emissions more cheaply at one of its own (perhaps less efficient) foreign affiliates, thereby generating both emission offsets / excess allowances for internal use and a less resource-intensive operation. The carbon market in theory allows MNCs to reduce where most cost-effective]

For the *strategic asset seeking* TNC, the low-carbon technologies presents several opportunities for strategic acquisitions either to defensively fend off a competitor in a market and offensively acquire a company for its IP technology or existing market access. The low-carbon technologies are rife with such possibilities particularly because the technology tends to be IP protected frequently by small firms. As an example, during the first 26 days in March 2010, there were 18 entries of M&A activity noted when searching for 'renewable' – most were firm names not recognisable to the authors.[13] With such dynamic developing technology, there will likely be consolidation by such M&A activity as TNCs (and others) position themselves by acquiring key technologies through acquisition. By acquiring such technology, the TNC give impetus and credibility to that technology. The TNCs will be assumed to have done their due diligence to scrutinise the technical and marketing aspects of the technology.

1.4 The TNC focus for drivers and determinants by sector

The following table analyses the specific sectors and the particular focus and most relevant drivers and determinants by sector:

Table []; Emphasised Applicable Drivers and Determinants by Sector

Sector	TNC Particular Focus	Particularly Emphasised Drivers	Particularly Emphasised Determinants
Power	• Availability of needed natural resources (resource-seeking) • Size of market (market-seeking) • Market structure (open, IPPs), (liberalization, privatization) • Political support and general policy framework • Existing investment (re-tooling)	• International energy policy and other market creation policies (for renewables: renewable portfolio standards, feed-in tariffs, blending requirements, etc.)	• Basic economic determinants such as size of market, low-cost labour, existing manufacturing base, etc.) • Market-driven approach: policies to create demand for product locally (pull on respective technologies) • Export-driven approach: incentives (tax, otherwise), access to markets, etc. • Donor linkages (financing)
Transport	(For transport services TNCs) • Regulation of emissions • Existing investment (re-tooling)	• International standards including ISO14000	• Policies that create demand for new low-carbon products (re-tooling FDI?) • Basic economic determinants • Business facilitation (e.g. government initiatives regarding industrial policy)
Buildings	(For real estate TNCs) • Regulation of energy efficiency • Existing investment (re-tooling)	• Lack of opportunity for expansion in home country.	• Policies that create demand for new low-carbon products (e.g. insulation, new materials) • Basic economic determinants (Mfg) • Size of market (Services)

[13] Thomson M&A database using http://www.alacrastore.com/research/thomson-mergers-and-acquisitions as at 29 March 2010.

Sector	TNC Particular Focus	Particularly Emphasised Drivers	Particularly Emphasised Determinants
Industry	• Regulation of emissions/energy efficiency • Existing investment (re-tooling) • Consumer preferences • Availability of low-carbon inputs, changing factor costs	• International standards including ISO14000	• Policies that create demand for new low-carbon products (re-tooling FDI) • Human capital, skills (Mfg) • Size of market (services)
Petroleum & Gas	• Availability of needed natural resources (resource-seeking) • Regulation of emissions • Existing investment (re-tooling)	• Civil Society influence • International standards including ISO14000	• Policies that create demand for new low-carbon products (re-tooling)
Forestry	(For forestry TNCs) • Saleable or useable species for TNC markets (resource-driven) • Familiarity with host jurisdiction • Existing investment (re-tooling)	• Civil Society influence • FSC Environmental accreditation	• Deforestation regulations • Sustainable forestry regulations • Land title ownership (for FDI specifically otherwise
Agriculture	(For agriculture TNCs) • Land-use regulations • Familiarity with host jurisdiction • Existing investment (re-tooling)	• Civil Society influence • International standards including ISO14000	• Land-use regulations
Waste	• Open market structure • Incentives/donor finance	• Civil Society influence • International standards including ISO14000	• Open market structure • Incentives/donor finance

SPECIFIC LOW-CARBON INVESTMENT DRIVERS

1.5 The carbon price

"The point of carbon markets is to put an efficient price on the right to emit carbon dioxide."[14] One aspect of consistency that has arisen is to evaluate the cost and benefits of low-carbon using per tonne of CO2 equivalent. That is, companies are focused on expressing the explicit or implicit benefit of carbon reduction on the basis of a value (dollar or euro) per tonne CO2e.

Expressed in a recent conference of energy commodity traders,[15] the prices of energy commodities are starting to converge and be expressed and evaluated on a per BTU basis. That is, in the power sector companies use whatever logical fuel (coal, oil, gas, hydro, etc) to generate electricity with the 'arbiter' between the various fuels being the carbon emission price. This anecdotal proposition could and should be the subject of further research. It is perceived as evident in the developed countries and could well be progressing to the major electricity companies in the developing countries because of the CDM. As stated, it emphasises part of the role of the carbon price.

That having been said, putting a price on carbon and otherwise maximizing the textbook efficiency of the economic governance system might be theoretically efficient, but it is not a silver bullet for putting national economies, particularly in the developing world, on low-carbon development pathways. For starters, a small carbon tax on top of large, distortionary fossil fuel subsidies is not efficient.

Secondly, we are far from a global carbon price. There are at least nine verification standards and [a dozen] market exchanges that will accept such verified certificates as settlement (sometimes limiting the portion of a certain type of verification). As a result the price of a carbon tonne varies by exchange depending upon which standards it will accept. This variation and lack of fungability will give the private sector apprehension: will the project of interest to a company create certificates that the company can use?

The European experience has created uncertainty for the carbon price. One of the most liquid and frequently quoted markets for the carbon price is in Europe. That price has been highly variable and currently is below €15/tonne.

[14] Economist, 27 March 2010, "Carbon markets: The wrong form of recycling"
[15] UNCTAD Global Commodity Forum; 22 March 2010, Commodity Finance Parallel Session

Source: European Energy Exchange; Spot for both EUA and Carbix; retrieved 2010/03/23

The spot price for a tonne of carbon emission in the European exchanges peaked at about €29/tonne during Phase 1 of the EU Emissions Trading System (ETS) which trades European Union Allowances (EUA; see graph) and proceeded during the debacle during 2006 to fall to nearly zero because of the oversupply of free credits awarded principally to power companies.[16] Some perceive the credits given to developed country utilities as a gift and evidence of a political economy/regulatory capture. The private sector is now more aware of the impact of political and regulatory risk as it can flow through the carbon price.

Phase 2 of the EU's Emission Trading System restarted the trading in late 2008 (coinciding with the first Kyoto commitment period) and the price has been hovering around the €12 to €15/tonne mark despite Copenhagen uncertainties. A €15/tonne price is considered "high enough to induce power companies to switch some generation from coal to gas at the margin, but not high enough to encourage much innovation."[17] Much speculation surrounds the future for the price of carbon. "The credibility of emissions trading as a concept rests on the enforcement of compliance".[18] One significant test of political and regulatory will is out there with the current Phase 2 running to 2012. As recently as 22 March 2010, there were concerns with respect to the EU ETS trading system.[19]

So it is not just the low price which discourages innovation but the price variation and concerns with respect to the system including potential manipulation, that will reduce the net present value attributed to any CER (or any carbon emission reduction revenue) flow.

1.6 Transparency and accountability drivers

The court of public opinion

Reputation gains which could fend off Civil Society Organisations (CSO) criticism and other disruption of operations. Such actions could include strategies to engage non-business partners through practices described as business diplomacy (Saner & Yiu, 2006; Saner & Michalun, 2008).

Low Carbon Investment can also be achieved through "court of public opinion". The following case study describes how a powerful coalition of grassroots organizations has led powerful corporations, investors and local policymakers to rethink their plans for the construction of new coal-fired power plants in the United States.

[16] CEAG; Climate change and Emissions Trading, 3rd edition page 145.
[17] Economist Dec 3rd, 2009: "A special report on climate change and the carbon economy; Good policy, and bad"
[18] CEAG 2009 p 146
[19] Financial Times; March 22nd, 2010; "Carbon traders try to reply to fears" refers to the Hungarian 'recycling' of certificates.

A de facto Moratorium on New Coal-Fired Power Plants?

The past three years have witnessed the emergence of a powerful movement opposing the construction of new coal-fired power plants in the United States, because they are a major contributor to climate change and emit toxic substances including mercury. Initially led by environmental groups, both national and local, it has since been joined by prominent national political leaders and many state governors.

The Sierra Club, which has kept a tally of proposed coal-fired power plants and their fates since 2000 (www.sierraclub.org/environmentallaw/coal/plantlist.asp), reports that of the 232 plants being tracked, 127 plants have been defeated, whereas only 25 currently have a chance at gaining the permits necessary to begin construction and eventually come online (the second largest group of plants faces opposition in the courts, while 24 others are only at the planning stage).

One illustrative example is the case of the Texas-based utility TXU and it's plans to build 11 new coal-fired power plants. Beginning in March 2007, active litigation and opposition by a coalition of the Environmental Defense Fund (EDF), the Sierra Club and other environmental groups, including a damaging public campaign, led to a drop in the utility's stock price and prompted a $45-billion buyout offer from the private equity firms Kohlberg Kravis Roberts and Company and Texas Pacific Group. Only after negotiating an agreement with EDF and the Natural Resources Defense Council did the firms proceed with purchasing the utility. As part of the TXU buyout agreement, the investors pledged to:

Stop plans for building 8 of 11 new plants proposed for Texas;
Drop plans for new coal plants in Pennsylvania and Virginia;
Back federal legislation that would require reductions in carbon dioxide emissions through a cap-and-trade system; and
Double TXU spending to promote energy efficiency, to $80 million a year, for five years.

Meanwhile, in May 2007, Florida's Public Service Commission refused to license a huge $5.7 billion, 1,960-megawatt coal plant because the utility could not prove that building the plant would be cheaper than investing in conservation, efficiency, and renewable energy sources. Since then, four other coal plant proposals in the state have been withdrawn. A growing chorus of state governors – including those in California, Florida, Michigan, Washington, and Wisconsin – a have voiced strong opposition to building any coal-fired power plants, citing opportunities to invest in technologies to improve energy efficiency and to tap local renewable energy resources, while creating much needed jobs.

Coal's future is also suffering from Wall Street perception of coal industry risk. Coal stocks are being downgraded by major financial institutions and, in February 2008, investment banks Morgan Stanley, Citi, J.P. Morgan Chase, and Bank of America announced that any future lending for coal-fired power would be contingent on the utilities demonstrating that the plants would be economically viable with the higher costs associated with future federal restrictions on carbon emissions.

Source: Brown (2009)

A couple of recent events highlight the active nature of CSOs against carbon-intense operations: British Petroleum's shareholder meeting was disrupted because of the Canada tar sands development,20 and; Greenpeace in issuing a damning report on oil-palm plantations in Indonesia has stirred Nestlé, Unilever and Cargill to reconsider their TNC operations and suppliers.21 These are only representative of an increasing activism.

In a parallel development, investors themselves have begun to call for greater transparency in the disclosure of climate change risks and opportunities facing publicly held companies. The Carbon Disclosure Project collects and distributes climate change information, both quantitative (emissions amounts) and qualitative (risks and opportunities), on behalf of 475 institutional investors. Over 2500 companies globally reported to the Carbon Disclosure Project in 2009. Petitions submitted by large institutional investors and other investor groups led the US Securities and Exchange Commission to issue detailed guidance (SEC, 2010).

[20] Financial Times; March 28th, 2010; "Attack on BP's oil sands assessment" has the following quote: "Dissident BP shareholders have attacked the global oil company's justification for possible investments in Canada's controversial oil sands by arguing it is based on projections that entail catastrophic consequences for the climate."
[21] Financial Times; March 24 2010; "Cargill considers dropping palm oil supplier" has the following quote: "Cargill, the world's largest trader of agricultural commodities, has become the third company to reconsider its relationship with a top Indonesian palm oil supplier over allegations it is tearing down protected forests to make way for plantations... The review was prompted by a Greenpeace report published in December"

Interpretive Guidance on Climate Change Risk Disclosure

On 8 February 2010, the US Securities & Exchange Commission issued interpretative guidance on disclosure of climate change risks by public companies, which highlights the following areas as examples of where climate change may trigger disclosure requirements:

Impact of Legislation and Regulation: When assessing potential disclosure obligations, a company should consider whether the impact of certain existing laws and regulations regarding climate change is material. In certain circumstances, a company should also evaluate the potential impact of pending legislation and regulation related to this topic.

Impact of International Accords: A company should consider, and disclose when material, the risks or effects on its business of international accords and treaties relating to climate change.

Indirect Consequences of Regulation or Business Trends: Legal, technological, political and scientific developments regarding climate change may create new opportunities or risks for companies. For instance, a company may face decreased demand for goods that produce significant greenhouse gas emissions or increased demand for goods that result in lower emissions than competing products. As such, a company should consider, for disclosure purposes, the actual or potential indirect consequences it may face due to climate change related regulatory or business trends.

Physical Impacts of Climate Change: Companies should also evaluate for disclosure purposes the actual and potential material impacts of environmental matters on their business.

This ruling can have wide-ranging implications, as it will lead to increased analysis and disclosure by publicly listed companies, including climate change implications for their up- and downstream operations, and greater market transparency.

And the nearly 70 banks that adopted the Equator Principles – a voluntary financial industry benchmark for determining, assessing and managing social and environmental risk in project financing – are working to integrate greenhouse gas emissions risk considerations into lending and underwriting standards.

Company social responsibilities

[Lead in required; but use 25 March 2010 section 4.7]

Environmental accreditation

The International Organisation for Standardisation (ISO) has created a family of standards (ISO14000) to address various aspects of environmental management. There are also sector specific environmental accreditation standards. One the Forest Stewardship Council (FSC) has been very influential in assessing forest plantations for sustainability. TNCs and their subsidiaries and affiliates frequently consider such accreditation necessary and require it of their suppliers; as of 2006 there were 14,000 companies worldwide that were accredited to some form of ISO14000 (see table). Some consumers and therefore retail distributors require such accreditation and often product prices derived from accredited operations can receive a premium.[22] Either way, TNCs are cognisant of their operations impact on their accreditation or their attempts to attain such accreditation.

ISO14000 accredited firms

According the most recent reports (2006), there are 14,000 companies worldwide certified to ISO14000. Of these, the majority are in:

1. Japan (2,600),
2. Germany (1,600),
3. UK (1, 200),
4. Sweden (650),
5. Taiwan (500),
6. USA (590), the
7. Netherlands (475),
8. Korea (460),
9. Switzerland (400),
10. France (360).

Source: Environment, health and safety http://www.ehso.com/EHSservices/iso14new.htm

SPECIFIC LOW-CARBON INVESTMENT DETERMINANTS

In addition to established policy framework and determinants of business facilitation influencing the flow of Foreign Direct Investment, additional climate change policies and climate change determinants can be envisaged as depicted in figure below.

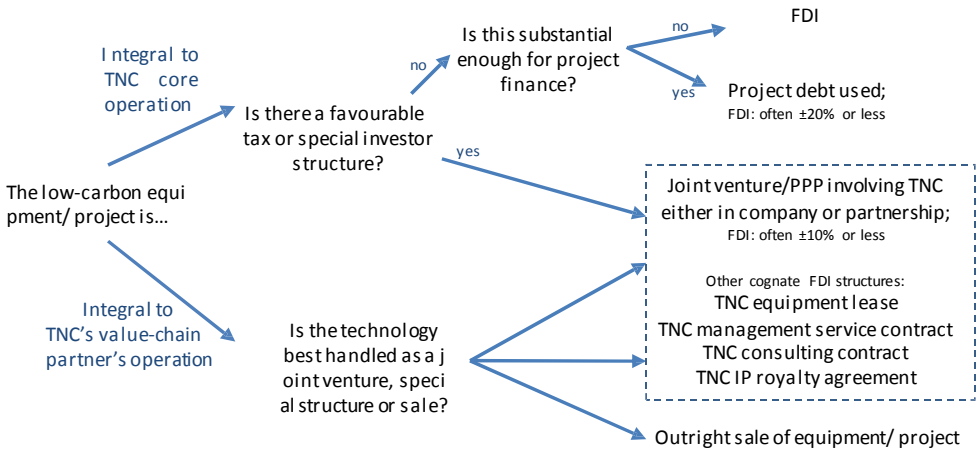
[22] An example is the Home Depot now sells FSC accredited wood products only and therefore require it of their suppliers. There is a perceived premium of about 15% for FSC-accredited wood products at wholesale distribution.

General policy framework	
Traditional general policy framework	**Additional climate change policies**
Economic, political and social stability Good governance Policies on functioning and structure of markets (esp. Competition and M&A) Private property protection (incl. IPR) Industrial and regional policies; development of competitive clusters Trade policy (tariffs and non-tariff barriers) and stable exchange rates Bilateral international investment agreements (IIAs)	Nationally Appropriate Mitigation Actions (NAMA) National Adaptation Programmes of Action (NAPA) Environmental policy (low-carbon house gas reductions) Industrial policy (energy efficiency, low-carbon energy) Energy policy (goals for low-carbon energy) Technology policy (related to transfer) International/domestic financial mechanisms (carbon markets, public finance mechanisms) Trade policy and IIA adjustments for low-carbon activities
Business facilitation	
Traditional determinants	**Additional climate change determinants**
Investment promotion Investment incentives Hassle costs Social amenities After-investment services	One-stop shops (organized and transparent display of all environmental policies and related investment policies, e.g. for low-carbon energy development) Incentives for manufacturers of low-carbon goods Incentives for providers of energy efficiency or process improvement services Transparent and simple reporting standards Good CDM, or other carbon market, institutions

TNC STRUCTURING ALTERNATIVES FOR FOREIGN INVOLVEMENT

The indicative schematic in Figure [] portrays the decision process that a TNC goes through when considering how to structure their foreign involvement. Much will depend upon the TNC's anticipation of whether the project or equipment is integral to the TNC's subsidiary or affiliate core operation. Such may require more control over the asset. If the project or equipment is more integral to other value-chain partners, then their approach will be focused on how to best capture the value of the technology. Either way, there may be some particular favourable tax or special investor which influences the ownership and financing structure of the asset.

Figure []: Indicative TNC structuring decision for foreign involvement



Tax-driven structures

Several jurisdictions treat the tax of some low-carbon assets specially. These can include: defining a special class of asset for allowing accelerated depreciation; providing tax holidays for projects which use low-carbon technologies; and possibly reduced tariffs for importing qualified low-carbon technology equipment.[23] Tax and

[23] For example, India allows an 80% tax depreciation in the first year for some low-carbon assets. They also have provisions for tax holidays and reduced tariffs. (http://business.outlookindia.com/article.aspx?263915) In Canada, some low-carbon

withholding tax differentials between dividends, interest payments, royalties could influence the nature of the TNC's involvement.

Specifically with respect to accelerated depreciation, there are ownership and finance structures including leases, project partnerships, and even management service contract arrangements which are designed to maximise the benefits of such tax concessions. As per portrayed in the schematic, the question of "Is there is a favourable tax or special investor structure?" will be asked early in the corporate finance department in the TNC. To the extent that low-carbon projects and equipment are given such tax benefits, the TNC's expected involvement may well not involve ownership and hence not FDI per se.

This above discussion is not to promote or hinder governments from using tax (or any other incentive mechanism) to promote low-carbon investments. The benefits of inducing low-carbon investments this way must be weighed against the reduced tax revenues to the governments.

Investor-driven structures

Another typical aspect of some low-carbon investments is that frequently they can be portrayed as low-risk bond-like in nature. A cogeneration facility which has long-term take-or-pay contracts with a utility can be packaged as a bond-equivalent to certain types of institutional investors. Securitised debt offerings might in future once again be possible.[24] But even outside the securitised market, various partnerships with the TNC as general partner and financial institutions as limited partners can make sense. Of a similar ilk, some trust structures with the TNC (or its designate) as trustee may make sense. Such partnership or trust structures frequently combine tax benefits with a targeted investor institution or group. Some of these trust structures leave ownership in hands of pension funds because of the cash profile of the underlying asset. For instance, "institutional investment in timberland accounts for more than $40 billion… pension funds and other institutions with vast amounts of capital, and a legal mandate to diversify their investments, became logical buyers of … timberland." [25] Some of this timberland investment is international including plantations in for example South Africa and Chile often orchestrated by a new form of TNC, the timber investment management organisation (TIMO). TIMOs frequently use management services contracts to execute their international plans and use the capital of institutions seeking asset diversification for investment.[26]

Even an 'outright sale of equipment/ project' can have an element of TNC finance associated with it. Conditional sales agreements with phased payments stretched over years would be another variation whereby a TNC can influence a value-chain partner to make a low-carbon investment. And the sale need not be for a strictly tangible asset. The TNC may have some intellectual property (IP), be it patent, industrial design or copyright, for which royalty payments could be returned to the TNC or its subsidiary or affiliate. Once again, this would be a TNC involvement that might well induce investment but is not FDI.

Foreign direct investment

As somewhat implied by the schematic, after decisions about using tax and incentive benefits – frequently offered to local industries only – combined with targeted special structures for certain types of investors, the actual amount of FDI might well be a fraction of the TNC's influence for inducing investment. Even in the case where the piece of low-carbon equipment is integral to the TNC's subsidiary and no tax or special investor structure fits, if the value of the piece of equipment is more than say $20 million, it is probable that the TNC's corporate finance division will investigate using non-recourse project financing to perhaps as much as say 80% of the value of the equipment.

Public-Private Partnerships

Some significant low-carbon technologies such as power, waste and industrial cogeneration projects are well suited for public private partnerships (PPPs). These complex project financing structures involve creating a special purpose vehicle (SPV typically company or partnership), funding using principally private financing, acquiring the assets to generate a cash flow stream and then entering into contracts to secure the cash flow stream for the payment of product or service. The contract can either be a concession or explicit commitment by a public entity such as the electricity grid provider.

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equipment (defined as Class 43.1) to a 50% capital cost allowance. In Australia, there are similar accelerated tax depreciation advantages.

[24] Noting there is a current difficulty in raising securitised offerings because of the US mortgage-backed collapse.

[25] According to John Hancock:

[26] http://www.pwc.com/gx/en/asset-management/assets/pdf/AMN0609_13.pdf

There is no doubt PPPs have significant potential. The World Bank projects $300 billion/year in infrastructure projects in Asia and $93 billion/year in sub-Saharan Africa generally (not just low-carbon) could be funded this way.[27] There are current significant issues with respect to PPP structures because of the 2008/10 financial crisis: e.g. securitisation spreads have widened dramatically (if doable at all for low-grade deals) and monoline insurers have disappeared – both are typical techniques for PPPs.

For a developing country hoping to host a PPP, there are a couple of keys. There must be good domestic policies particularly with respect to the rule of law and property title so that security can be found to underpin the PPP. Secondly these PPPs are inherently complex involving security, contract and financial issues which require expertise. Developing countries will need to build capacity to negotiate a PPP from the standpoint of the state.

MULTISTAKEHOLDER PARTNERSHIPS AND QUASI GOVERNANCE

Multistakeholder partnerships and the resulting *quasi* governance structures are an integral and growing phenomenon in the context of TNC operations. The variations are endless; some generic examples include:

Infrastructure financing and financing of large clean energy programs as discussed above as a project finance alternative (PPP) above.

Participation of TNCs in the work of standardization bodies, such as the ISO committee that is currently finalizing a new Energy Management System Standard, which would require companies that adopt the standard to establish energy policy goals and demonstrate continual improvement, based on appropriate indicators. Standards have also been developed for corporate greenhouse gas emissions inventories, life-cycle analysis and for quantifying the carbon footprint of products. Corporations are also cooperating under the Asia CFL Quality Charter (http://www.cleanenergyasia.net) to create an industry-driven standard to improve the quality of compact fluorescent lamps (CFLs), as well as under the IEA Implementing Agreement on Efficient Electrical End-Use Equipment.

Implementation partnerships to reduce greenhouse gas emissions. TNCs develop their own multistakeholder initiatives (see Box on Walmart global supply chain initiative), participate in voluntary agreements with governments or support the efforts of others (see Box on Ghana efficient home appliance program). In some cases, governments have taken the lead in establishing such cooperation frameworks (e.g., Asia-Pacific Partnership on Clean Development and Climate).

Stimulating Demand for High-Efficiency Home Appliances in Ghana
Recognizing that the low efficiency of major home appliances, such as air conditioners and refrigerators, imported into Ghana represents a huge cost to the national economy (Van Buskirk et al., 2007), as well as to the global commons (emissions of greenhouse gases and ozone-depleting substances), the Ghanaian government recently adopted two regulations to stop the dumping of obsolete technologies. One regulation bans the importation and sale of used refrigerators (and other products), whereas the other establishes minimum energy performance standards and a mandatory energy labeling scheme.
In order to implement the transformation of the refrigerator market, the government of Ghana plans to enter into a public-private partnership with the Bosch and Siemens Home Appliances Group, a leading global manufacturer of high-efficiency appliances. The company will support the project in a number of ways, including assisting in the design, implementation and adaption of rebate program schemes for the needs of the Ghanaian market; establishing, in coordination with local entities, the infrastructure for implementation (including stakeholder dialogue, sales forces and consumer education, marketing, logistics and reverse logistics, recycling); assisting in the establishment of appropriate metrics for the assessment of effectiveness; and developing CO_2 offset possibilities by sharing knowledge and expertise of refrigerator programs under the CDM. This cooperation will be in the context of a market transformation program supported by the Global Environment Facility.
This example illustrates the need to address regulatory frameworks, innovative financing models, human and institutional development, risk mitigation, and other success factors in parallel, a challenge that can be mitigated through public-private partnerships.

R&D Collaboration. Many multinationals have established research centers in foreign countries, particularly in emerging markets. The approach to R&D varies by sector and company, with some

27 http://web.worldbank.org/WBSITE/EXTERNAL/NEWS/0,,contentMDK:22511594~menuPK:34463~pagePK:34370~piPK:34424~theSitePK:4607,00.html

multinationals taking a much more open and collaborative approach to the development of intellectual property than others.

Membership in traditional trade associations or new associations that specifically address climate issues (e.g., World Business Council for Sustainable Development, Institutional Investors Group on Climate Change, International Emissions Trading Association), and participation in related multistakeholder programs, ranging from data-sharing and analysis, policy research, to advocacy and joint implementation programs.

In recent years, there has been a lot of discussion and analysis to better understand the role of government in stimulating low-carbon investment by the private sector, and the response to the 2008-10 financial crisis has led to active experimentation.

China's Fiscal Policy on Climate Change

Fiscal Policy Framework

- Government spending for climate mitigation, sink enhancement and cleantech R&D
- Tax reforms to create rational incentive/disincentive mechanism to promote energy conservation and emission reduction
- Government leadership and procurement of energy-conserving and environment-friendly products
- Reform of compensation for resource use and pollution

Examples of fiscal policies in response to climate change

- Subsidies for industrial retrofits and elimination of backward production capacity
- Promotion of energy-saving buildings
- Subsidizing purchase of energy-efficient products (e.g., refrigerators, CFLs, air conditioners)
- Pilot programs for public vehicles powered by clean energy
- Investment in infrastructure for pollution prevention and treatment by local governments
- Promoting development of renewable energy, including wind power (integrated approach, including wind resource assessment, equipment industrialization, on-grid power price, tax incentives)

Source: MOF (2009)

The UN Environment Program has created a conceptual framework to discuss public finance mechanisms (PFMs), including a wide range of debt-focused (including credit lines, guarantees and soft loan programs), equity-focused (including private equity and venture capital funds), carbon-focused, and grant-focused PFMs (including funds to assist with project preparation, "soften" loan programs, provide technical assistance, or reward innovation). The UNEP Finance Initiative recently summarized the case for governments to use "green" spending programs (renewable energy, energy efficiency, environmental initiatives, etc.) as economic stimulus and job creation programs (UNEP SEF Alliance, 2009):

- Government investments in green programs are good for the economy – they stimulate economic growth and create jobs;
- Green stimulus spending creates more jobs, for a given investment, than most other programs (and 3 to 4 times as many jobs than tax cuts);
- Conventional energy subsidies are the most serious barrier to the growth of green energy;
- The portfolio of clean energy incentives must be coordinated, complimentary, consistent, and predictable;
- Policymakers must realize that the future is now – Business-as-Usual is not a viable option and time is running out;
- Even with large incentives, it will take many years for clean energy to make significant inroads, and an accelerated policy shift to green energy must be initiated immediately.

It has been estimated that if a concerted programme of public finance mechanisms were put in place, USD 10 billion in public monies could leverage USD 50-150 billion in total investment in the climate mitigation sectors (UNEP, 2008).

7. POSSIBLE ADDITIONAL SOLUTIONS WITHIN AND OUTSIDE WTO CONTEXT

SOLUTIONS WITHIN WTO RULES AND AGREEMENT

Article XX

The WTO has provisions for general exceptions which allow for trade restrictions that would otherwise be inconsistent with mainstream obligations with WTO context. Such public policy provisions for instance permit restrictions of trade in order to protect human, animal and plant life or health (Article XX (b) and another to conserve exhaustible natural resources. Such measures would have to be used in a non-discriminatory way in both MFN and national treatment sense which in practice would be difficult and most likely seen as opportunistic or illegitimate thereby leading again to prolonged trade dispute settlement processes

TRIMS+

Another option could be to renegotiate and re-energize the Trade Related Investment Measures agreement (TRIMS) which came into force in 1995 as part of the Uruguay Round negotiations (UNCTAD, 2007). TRIMS did not define prohibited FDIs but precluded use of a list of local content requirements, trade balancing requirements and export restrictions. WTO member countries were given 90 days to notify WTO of any existing non-conforming measures at the time the agreement came into effect. There were a 43 notifications by 24 developing countries. After some requests for extension of the transition period, most developing countries abolished their notified TRIMS. . However, since TRIMS was experienced as a useful mechanism allowing developing countries to temporarily protect their own industries in select sectors until they were ready to drop these measures, it could be envisaged that a second generation TRIMS agreement could be negotiated which would allow developing countries time to protect infant industries in the sector of carbon reduction technology and hence make could make it easier for them to commit to CO2 reduction targets. Assessing such a re-use and negotiations of TRIMS+ could be guided by UNCTAD whose research on FDI and developing country mandate would make it the appropriate International Organisation to lead such an effort.

TRIPS++

Another possibility could be to revisit the TRIPS agreement and to explore ways how to apply similar exceptions as are available for LDCs in the field of health. Faced with the full brunt climate change like inundations, dryness and deforestation exceptions can be considered to allow LDCs to get access to technology from developed countries in regard to carbon reducing machines through “compulsory licensing” which is permitted under TRIPS. Such use of the “compulsory licensing” could leverage LDCs in their UNFCCC’s adaptation negotiations.

3-SECTOR PLURILATERAL

Another solution could be to bundle three sectors which have so far been treated as separate negotiations into a plurilateral agreement similar to the GPA consisting of three sectors namely: a) energy (goods and services); b) environment (goods and services); and, c) trade and development (Aid-for-Trade, Enhanced Integrated Framework, TRTAs). Developing and especially Least Developed countries have to face multiple challenges ranging from poverty, political instability, lack of supply of exportable products and services to climate change which are all in various degrees related to energy, environment and trade development. LDCs in particular lack continuous access to energy, water, and food and development aid. WTO members have not been able to make much progress within each of the three sectors and, lamentably, have not been able to explore cross-sector concessions which would be beneficial for all parties concerned whether developed or developing.

SOLUTIONS OUTSIDE THE WTO CONTEXT

Trade agreements and negotiations are also conducted outside the WTO context. For instance, rules pertaining to maritime shipping are negotiated within the context of the International Maritime Organization (IMO). Fuel use in shipping is a major source of GHG. Members of the IMO are currently discussing how they could reduce CO2 emissions. Some members want stringent rules which would apply to all ships whether they are owned or registered by a shipping country located in a developing country or developed country. Members are also discussing solutions entailing emissions trading, use of a bunker levy or trading energy efficient credits based on efficiency performance of ships which could be an interesting example for other sectors to follow who are outside the WTO context.

Free Trade Agreements (FTAs) and Regional Trade Agreements (RTAs) are supposed to be complementary to WTO rules. However, the proliferation of FTAs has made it difficult to ensure that they do not contradict the respective members' WTO obligations. Several of the FTAs involving the US and the EU include provisions regarding the environment and climate change. In other words, they go beyond what has been so far agreed within the WTO. The same is true for Bilateral Investment Agreements (BITs) which are most of the time confidential and do not reveal the extent to which FDI is invested into low carbon technologies and for instance into carbon reducing technology IPs. There is a need for closer scrutiny of all these various agreements (FTAs, RTAs, BITs).

CONCLUSIONS

1. There will be a herd mentality… if several power companies for instance move to low carbon technology, it will be easier for the next power company. This is because: (a) the company that solely bets on a technology could find the company uncompetitive (and potentially bankrupt) if the technology fails or if the CO2e savings is not valued enough relative to 'carbon intense' competitors; (b) there is less chance for public criticism of the management. Company directors do not like to be perceived as experimenters; and (c) many of the technologies arise because of a clustering of technologies and companies. Success in one aspect of the technology can breed extra efforts and investments in that and value-chain related technologies.

2. Many low-carbon technologies can be small scale. They have the potential for leap-frog traditional carbon-intense technologies based around the electricity grid. Hence, like mobile phones, there is a potential that such technologies can be accepted in developing countries more effectively than in developed countries.

3. Because the low-carbon technologies frequently involve new specialised equipment often with tax incentives. Will it be FDI? As argued in the decision schematic, FDI is less likely and we are seeing evolving types of TNCs like TIMOs who do not own (hence not even necessarily a TNC) but use institutional funds and effectively control by management services contract. The investment landscape has changed.

4. Existing international and national climate governance regimes have failed to leverage the power of TNCs to contribute to low-carbon development. Effective levers are those that affect TNC decision-making to encourage low-carbon technology innovation and investment.

5. Mandatory disclosure of greenhouse gas emissions, carbon risks and opportunities can increase transparency and accountability

6. A global carbon price is politically unrealistic at present and in any case would not be a silver bullet. The goal should not be to create an economically efficient market as an end in itself, but to correct the market failure that is driving increasing greenhouse gas emissions. Finance, technology and capacity building will be needed for developing countries to embark on low-carbon development pathways.

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