International Journal of scientific research and management (IJSRM)
||Volume|| 1 ||Issue|| 4 ||Pages|| 226-229 ||2013||
Website: www.ijsrm.in ISSN (e): 2321-3418

TNC's Prospects for Low-Carbon Investment by Sector

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Abstract Foreign investment can play a significant role in meeting the challenges of climate change mitigation by contributing the needed financial and technological resources. This requires a better integration of investment policies with the climate change framework and sustainable development strategies. In this article climate change debate is framed in terms of sectors, such as power, transportation, buildings and agriculture, which are deemed significant in achieving Greenhouse Gas (GHG) emission reductions. These sectors offer a concrete framework within which low-carbon investments – domestic and foreign – are defined and required to meet GHG emission challenges; and host countries, including those who themselves are not large emitters of GHGs, can use this as a basis to assess the likely impact and net benefits of foreign investment relative to other options

TNC Perspective and Foreign Investment by Sector

The main sectors which dominate Greenhouse Gas (GHG) emissions – and hence require the attention of policy-makers in order to reduce these emissions – are sectors where TNCs play a strong role as emitters i.e. power and industry, sectors where emissions largely result from consumption and public use i.e. transport, buildings and waste management and sectors where emissions are due to changes in land-use such as deforestation and land degradation (i.e. forestry and agriculture). These sectors – which represent areas of GHG emissions rather than economic areas – are based on the classification used by the Intergovernmental Panel on Climate Change (IPCC) in their Fourth Assessment Report (IPCC, 2007). Emissions vary substantially across these sectors, and their relative weight will continue evolving over time. Estimated annual global emissions by sector in 2030, using the business-as-usual scenario presented in table IV.1. The mitigation potential in each sector is estimated taking into account existing technologies and emitting entities, and the additional investment needed to achieve this potential is then calculated. Some sectors, such as power, are projected to be among the largest emitters of GHGs in 2030, but their impact can potentially be mitigated more cost effectively than in other sectors, such as transport. Much of the potential demand for foreign investment focusing on low-carbon *processes*, for example, lies in sectors where TNCs themselves are major emitters relative to other entities, essentially power and industry (manufacturing and heavy industry). The demand for foreign investment focusing on low-carbon *products and services* – including technology services – is spread more evenly across sectors (as indicated in the right column of table IV.1).

In terms of direct and indirect GHG emissions, as well as mitigation potential using available technology, the ***power*** sector is the cornerstone of any global effort to reduce GHG emissions. TNCs can play a significant role in these efforts, both through process and product/services low-carbon foreign investment. There is plenty of scope for TNCs in the power industry, whose foreign expansion has accelerated since the early 1990s, to improve their processes in host countries (*WIR08*). CEZ Group (Czech Republic), for example, is investing $1.62 billion in a wind park in Romania to offset emissions from dirtier coal-fired power plants it owns in the country. Yet local private and state-owned enterprises (SOEs) still dominate the power sector in most countries and are therefore a significant source of potential demand for foreign investment in low-carbon products services. While

established TNCs are still the main suppliers of goods and services in traditional power technologies, new TNCs – mostly from developed countries, but also from some developing countries are emerging in renewable energy, including manufacturing power generation equipment (see also Kirkegaard, Haneman and Weischer, 2009). An example showing how foreign investment in low-carbon product/services is set to burgeon is the case of SPX (United States) in India. The company has announced a joint venture with Thermax – an Indian company specializing in energy and environmental engineering based in Pune – to make emissions-control equipment for large power plants.

Many companies in the ***industry*** sector are major emitters of GHGs, in particular those involved in oil & gas, cement, iron & steel, and chemicals. TNCs, which are major global industrial players, are in a prime position to diffuse cleaner technologies and processes in their own operations overseas, as well as via their value chains. Cemex (Mexico), for example, is upgrading its cement plant in the city of Sant Feliu de Llobregat (Spain), in particular the electro-filter system, in order to guarantee that GHG emission levels are a fifth of the maximum level set by existing legislation. Beyond these improvements to their own processes, TNCs in industries such as machinery, electronics and energy services can potentially provide the equipment, appliances and know-how for emission mitigation in all sectors worldwide.

The transport sector is forecast to be responsible for roughly one sixth of global emissions by 2030, over 60 per cent of which will originate from passenger cars and small commercial vehicles. Key mitigation actions, such as the introduction of more fuel-efficient, electric, hybrid or simply lighter vehicles, depend on companies, many of which are TNCs, developing and disseminating these technologies. Nissan Motors (Japan/France), for example, is progressively moving the production of its subcompact car, the Micra, from Japan to Thailand for sale both locally and in export markets; the Government of Thailand is keen for the Micra to be the first in a series of "ecocars" to be manufactured in the country. Beyond technological solutions, there is a need to induce behavioral changes among consumers which might, for example, underpin a shift towards mass transport systems such as urban railways. Providers of such products/services also include TNCs, many of which are already active in rising urban centers. In Nigeria, for instance, the China Civil Engineering Construction Company (CCECC) has started work on the Lagos Rail Mass Transit project; similarly, a joint venture between Odebrecht (Brazil) and Low-carbon process foreign investment can also occur in transport for example foreign owned transport companies can shift to alternative fuels such as biodiesel; or, in a similar vein, car rental companies can alter their vehicle ranges towards more efficient or battery-powered ones.

The ***buildings*** sector is expected to generate the third highest level of projected GHG emissions in 2030, 62 per cent of which originate from households. Along with industry, it is the sector most responsible for indirect emissions from electricity consumption related to heating, cooling and lighting. As well as using less energy in their own buildings – which involves TNCs' investment in low-carbon processes – investment by TNCs in low-carbon product/services, especially from the industry sector, can substantially improve efficiency in buildings, even in relatively poor regions. For instance, Philips (Netherlands) has established a manufacturing facility of energy-efficient compact fluorescent lamps (CFL) in Lesotho, including a CFL recycling plant alongside – the first in Africa. Much of the facility's output will be exported across Southern Africa, where demand for energy-efficient lamps is increasing. This demand is partly driven by the large role played by CFLs in regional power utility Eskom's (South Africa) programme to reduce electricity consumption in South Africa and neighboring countries where it operates.TNCs offering building related services, such as property developers and hotels, can also contribute to emission reduction in the sector. For instance, hotel companies are increasingly integrating a range of products and technologies which allow them to reduce GHG emissions in a traditionally high-emission industry. Examples of such products and technologies include energy-saving technologies, such as air-conditioning and ventilation systems that include heat recovery systems, LED lighting technology, but also rain harvesting techniques and

a wide-spread use of recycled of products, from plastic bottles to beds. Thus changing patterns in one Industry affects demand patterns in many other industries. In comparison to transport and buildings, The ***waste management*** sector – mainly landfills and wastewater treatment – is forecast to account for relatively few emissions in 2030, and almost all of these can be reduced at a relatively low cost (table IV.1).

The abatement potential lies to a very large extent in landfill methane recovery. While this sector is often dominated by the public sector, TNCs can invest in low-carbon technology services such as waste management and consultancy services. Veolia (France) is active in waste management across the globe, including in developing countries (*WIR08*). As a mixed example of foreign investment in low-carbon process and product, Anmol Group (India) has recently invested in a large paper making plant in Ethiopia using waste paper which would normally be incinerated.TNCs are also increasingly involved in establishing waste treatment facilities alongside their other operations, often as services to external users as well as for their own processes. Of the two land-related sectors, ***agriculture*** is projected to have the higher level of GHG emissions in 2030; ***forestry,*** however, has the higher abatement potential – indeed one greater than its emissions – due to potential a forestation and reforestation. Though there are large TNCs involved in agriculture and forestry, overall, TNCs are little involved in these sectors' direct GHG emissions. However, in the context of global value chains, they can potentially help diffuse more climate-friendly (e.g. organic) farming and other sustainable practices across the globe through their suppliers or customers (*WIR09*). Supermarket chain Tesco Plc (United Kingdom), for instance, is working with its global suppliers – along its value chain – to reduce the carbon intensity of the products it sells, or to reduce the number of miles their farm-produce trucks travel every year.

Conclusion

Developing economies are becoming increasingly popular investment destinations in this industry, attracting more projects than developed economies over the past two years. Nearly half of the 806 reported investments over 2000–2011 are in developing countries, over 85 per cent of which involved developed country TNCs. Investments are occurring in a number of developing countries, with Algeria, Argentina, Brazil, China, India, Indonesia, Libyan Arab Jamahiriya, Malaysia, Mexico, Mozambique, Philippines, Singapore, South Africa, United Republic of Tanzania and Viet Nam, among the largest or key recipients.

Greenfield investments in the ***manufacturing of environmental- technology products*** (806 in total during 2000– 2011) – such as wind turbines, solar panels and biodiesel plants, as well as associated parts – has expanded rapidly since 2003. When moving towards a low-carbon economy, developing countries are facing two major challenges (a) financing and implementing investment in appropriate activities; and (b) the generation and dissemination of relevant technology. TNCs are both major carbon emitters and low-carbon investment and technology providers. They are therefore, inevitably part of both the problem and the solution to climate change. Channeling investment and technology, including from TNCs, to meet the challenge of climate change is crucial. In doing so, developing countries can look to the opportunities arising from the transition to a low-carbon economy, as well as the challenges, and take advantage of them in line with overall developmental objectives. The global partnership outlined is aimed to support these effort

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Table IV.1. Mitigation potential and TNC involvement in sectors of emission

Sectors of emission	Sector definition[b] and relevant emitting entities	Key mitigation technologies and practices currently commercially available[c]	Demand for low-carbon foreign investment	
Projected annual emissions in 2030 ($GtCO_2e$)[d] Mitigation potential in 2030 ($GtCO_2e$)[d] Additional annual investment needs (over existing levels of investment in these areas, in Euro billions)[a]			Low-carbon *process* foreign investment (i.e. impacts on TNCs' own operations or their value chain) (examples)	Low-carbon *product/services* foreign investment (i.e. TNCs supplying products and services to entities in sector) (examples)
Buildings 12.6 $GtCO_2$ 3.5 $GtCO_2$ 198 €	Direct emissions from the combustion of fossil fuels and indirect emissions attributable to public heat and electricity consumption in residential, commercial, and public buildings. Emitting entities: households (62 per cent of emissions), companies, governments	Efficient lighting and daylighting; more efficient electrical appliances and heating and cooling devices; improved cook stoves; improved insulation; passive and active solar design for heating and cooling; alternative refrigeration fluids, recovery and recycle of fluorinated gases	Input switching • Source low-carbon energy Input reducing • Make use of more energy efficient appliances, lighting etc. • Improve insulation of facilities to reduce emissions due to heating/cooling	• Appliance manufacturers • Building materials manufacturers • Heating/cooling manufacturers • Lighting manufacturers • Architecture services • ESCOs
Waste management 1.7 $GtCO_2$ 1.5 $GtCO_2$ 8 €	Direct emissions from landfills, wastewater treatment, human sewage, and others. Emitting entities: landfill operators (private & public), wastewater treatment facilities (private & public)	Landfill methane recovery; waste incineration with energy recovery; composting of organic waste; controlled wastewater treatment; recycling and waste minimization	Enhanced recycling • Capture and use methane emissions	• Waste management services firms • Engineering / environmental consulting firms
Sectors largely with emissions from changes in land use				
Forestry 7.2 $GtCO_2$ 7.8 $GtCO_2$ 43 €	Direct emissions due to deforestation, decay and peat. Emitting entities: forestry companies, private forest owners, governments	Afforestation; reforestation; forest management; reduced deforestation; harvested wood product management; use of forestry products for bioenergy to replace fossil fuel use	Enhanced recycling • Use bio waste Value chain – upstream • Wood and wood product manufacturers supporting and influencing their suppliers in the sector	• Technology services companies • Environmental services companies
Agriculture 7.9 $GtCO_2$ 4.6 $GtCO_2$ 0 €	Direct emissions from livestock, manure, cultivation of crops, soil management, and others. Emitting entities: households (farmers), governments, plantation companies and other agribusiness	Sustainable agricultural practices, such as improved crop and grazing land management to increase soil carbon storage; restoration of cultivated peaty soils and degraded lands; improved rice cultivation techniques and livestock and manure management to reduce CH_4 emissions; improved nitrogen fertilizer application techniques to reduce N_2O emissions; dedicated energy crops to replace fossil fuel use; improved energy efficiency	Input switching • Less use or improved types of fertilizer Enhanced recycling • Use bio waste Value chain – upstream • Food & beverage manufacturers, food retailers (supermarkets) supporting and influencing their suppliers (farmers, plantations) in the sector	• Seed companies • Fertilizer producers • Technology services

Source: UNCTAD, partly based on IPCC, 2007; McKinsey & Company, 2009.

[a] Projected emissions in 2030, mitigation potential in 2030 and additional investment needs are taken from McKinsey & Company, 2009.
[b] Sector definitions are based on IPCC, 2007; and Baumert, Herzog and Pershing, 2005, but differ slightly, thus the mitigation potential and investment needs are also slightly different from IPCC's.
[c] Key mitigation technologies are taken from IPCC, 2007.
[d] $GtCO_2$ stands for gigatons of CO2 equivalents.