UNITED NATIONS CONFERENCE ON TRADE AND DEVELOPMENT

UNCTAD

Investment Advisory Series
Series A, number 7

PROMOTING LOW-CARBON INVESTMENT

UNITED NATIONS

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United Nations
New York and Geneva, 2013

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Publications are available on the website at http://www.unctad.org.

This publication has not been formally edited.

UNCTAD/DIAE/PCB/2013/2
ISSN 1995-6088
United Nations Publication

Preface

The *Investment Advisory Series* provides practical advice and case studies of best policy practice for attracting and benefiting from foreign direct investment (FDI), in line with national development strategies. The Series draws on the experiences gained in, and lessons learned through, UNCTAD's capacity- and institution-building work in developing countries and countries with economies in transition.

Series A deals with issues related to investment promotion and facilitation and to the work of investment promotion agencies (IPAs) and other institutions that promote FDI and provide information and services to investors. The publications are intended to be pragmatic, with a how-to focus, and include toolkits and handbooks. The prime target audience for Series A is practitioners in the field of investment promotion and facilitation, mainly in IPAs.

Series B focuses on case studies of best practices in policy and strategic matters related to FDI and development arising from existing and emerging challenges. The primary target audience for Series B is policymakers in the field of investment. Other target audiences include civil society, the private sector and international organizations.

The *Investment Advisory Series* is prepared by a group of UNCTAD staff and consultants under the guidance of James Zhan.

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The publication was made possible by donor contributions to UNCTAD's technical cooperation programme on investment promotion.

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Abbreviations

CCC	Copenhagen Cleantech Cluster
CCS	Complex Cleantech Solutions
CopCap	Copenhagen Capacity
FDI	foreign direct investment
GHG	greenhouse gas
ICN	International Cleantech Network
IEA	International Energy Agency
IPA	investment promotion agency
IPCC	Intergovernmental Panel on Climate Change
SEZ	special economic zone
SMEs	small and medium-sized enterprises
TNC	transnational corporation
ZDA	Zambia Development Agency

Executive Summary

Investment promotion agencies (IPAs) in many developing and developed countries have made low-carbon investment a key component of their promotion programmes. Due to the fast growing opportunities in this business, with accumulated foreign direct investment (FDI) of nearly half a trillion dollars between 2003 and 2012, and the benefits that it can bring in reaching green objectives, attaining technologies, creating jobs and attracting capital, competition for low-carbon investment is fierce.

Investment opportunities can be found in the introduction of low-carbon processes by transnational corporations (TNCs), in the generation of clean energy and in the production of low-carbon products and services. In fact, all business activities in traditional and new industries can potentially be included, given the wide-ranging possibilities of low-carbon business practices and technologies.

Although it is possible to envisage – as this guide does – investment promotion programmes specifically targeted at low-carbon investments, the attraction of such investment does not depend solely on IPAs. Any strategy to develop and promote a location's offer for low-carbon investment will comprise broader policies on energy, industry and the environment. A conducive policy framework that regulates the entry, treatment and protection of foreign investment is another fundamental component of such a strategy and can be further improved to encourage low-carbon FDI, for instance in strategic sectors such as energy, which some countries have opened up selectively for FDI in renewable energy.

Wider policies that are mostly beyond the direct remit of IPAs can also be used to build new business opportunities and create a market for low-carbon products, like solar panels or electric cars. These policies often involve incentives and subsidies which

could be costly and should be weighed against public expenditures in other priority areas, especially in developing countries. To maximize the benefit of low-carbon FDI to the local business community, policies could also help to diffuse low-carbon technologies by fostering the absorptive capacities of domestic firms and creating an environment that induces the development of linkages, such as clean technology clusters.

The role of IPAs in attracting low-carbon investment, therefore, includes a strong policy advocacy component. In many countries, IPAs are well suited to take a lead role in low-carbon investment promotion programmes as business facilitators and partners with a reactive and proactive role as policy advocates in creating new low-carbon investment opportunities. Direct promotional efforts should be selective and target subsectors with potential. The assessment of subsectors should be done with respect to investment policies and incentives, economic factors such as production costs, supplier–client proximity and availability of needed technologies and skills; also critical, however, is the effectiveness of the IPA as a business facilitator.

What is highlighted in this guide is that partnerships and networks have proven critical in many low-carbon investment promotion strategies. Examples of such partnerships are given in case studies from Brazil, China and Denmark. In the case of Pernambuco, Brazil, the partnering strategy started with cooperation between several State and federal institutions in an attempt to enhance local economic development. In Hong Kong, China, partnerships between city departments and authorities in mainland China led to the creation of an innovation cluster initiative and in Copenhagen, partnerships between Government, industry and the academic world were the building blocks in the promotion and development of a clean technology cluster.

Building a low-carbon economy is a long-term proposition in which FDI can play an important role. Governments that have recognized this role should embark on policies that accommodate such investments and create the right business opportunities. IPAs are a critical instrument in this journey, especially in the creation of the necessary partnerships to advocate the right policies, enhance the investment offer, improve a location's image, target low-carbon investors and provide the aftercare services that will develop a low-carbon business community.

Key messages on the promotion of low-carbon investment

- Globally, low-carbon FDI is substantial and occurs in the introduction of low-carbon processes in TNCs, the generation of clean energy and the production of low-carbon products and services.
- FDI plays a key role in building low-carbon economies by bringing in capital and green technology as well as management, organizational and marketing skills.
- Economic factors are important in attracting low-carbon investments, but a strategy that includes implementation of a policy framework with a low-carbon perspective, market-creation policies, measures to promote technology transfer and a targeted investment promotion programme considerably enhances a location's offer.
- Low-carbon target sectors should be carefully selected based on a government's greenhouse gas (GHG) mitigation and development objectives and solid research of a location's factor advantages compared to key competitors.
- Given the importance of special policy tools, including incentives, for the low-carbon sector, IPAs should pay special attention to their role as policy advocates and investment facilitators to help create the right opportunities for FDI in the sector and awareness among investors of the location's green offer.
- Due to the important role of partnerships and clusters in the development of a low-carbon business community, IPAs should dedicate considerable resources to aftercare services for the creation of business networks and linkages.

Introduction

Background

The fight against global climate change ranks high on the international political agenda. The current debate has moved beyond purely environmental issues and now extends to economic development under environmental constraints. While TNCs are a part of the problem of climate change, they are also part of the solution to it, and public policies should encourage corporations to make a more positive contribution. This requires, among other measures, the incorporation of these policies and climate change-related opportunities into investment promotion.

In the last half century, there has been increasing pressure to protect and conserve the Earth and its resources for present and future generations. The widest ranging international agreement aimed at reducing GHGs emissions is the United Nations Framework Convention on Climate Change (UNFCCC) of 1992. The 1997 Kyoto Protocol, which operationalizes the Convention, sets mandatory emission limits and commits industrialized countries to curbing emissions. The Kyoto Protocol also established flexible market-based mechanisms to assist the process. At the 2012 Rio+20 Conference, global leaders signed off on a plan to set global sustainable development goals and other measures, including the promotion of a green economy while reaffirming commitment to ensuring the promotion of an environmentally sustainable future.

Today companies are also adopting a clearer stance on sustainability and low-carbon issues and many provide annual reporting on both their corporate social responsibility and sustainability. Over 7,000 businesses have signed up to the United Nations Global Compact[1] pledging them to global citizenship in a number of areas including environmental protection.

[1] www.unglobalcompact.org.

What is low-carbon foreign investment?

In this publication, low-carbon foreign investment is defined as "the transfer of technologies, practices or products by TNCs to host countries – through equity FDI and non-equity forms of participation – such that their own and related operations, as well as use of their products and services, generate significantly lower GHG emissions than would otherwise prevail in the industry under business-as-usual circumstances".[2]

It is worth mentioning that following the method used in UNCTAD's *World Investment Report 2010: Investing in a Low-carbon Economy*, this guide focuses on "low-carbon" issues, which are in some cases different from related notions of "green" or "sustainable". Whereas "low-carbon" refers solely to a process or product that emits fewer GHGs than traditional ones, the terms "green" and "sustainable" are broader concepts that refer to activities that take into account a much larger set of environmental issues.[3]

For the purpose of this guide, we have divided low-carbon investment into three broad categories: (a) investment in production processes with a reduced GHG impact; (b) investment in clean energy generation; and (c) investment in research and production facilities to produce GHG reducing products and provide related services. Table 1 provides some examples of investments in these categories.

[2] UNCTAD (2010). *World Investment Report 2010: Investing in a Low-carbon Economy*, p. 103.

[3] Ibid., p. 148.

Table 1. Types of low-carbon investment

Types of low-carbon investment	Examples of investments
Investment in production processes with a reduced GHG impact	• Implementation of energy-saving processes • Introduction of processes and equipment that reduce GHG emissions • Use of green construction techniques in buildings
Investment in clean energy generation	• Solar energy • Windmill parks • Hydropower generation • Geothermal energy facilities
Investment in research and production facilities to manufacture GHG reducing products and provide related services	• Research in energy efficiency and recycling • Production of solar panels, windmills • Production of energy efficient products (electric cars, energy-efficient light bulbs, etc.) • Technology services • Waste management services

Source: UNCTAD.

Developing countries are confronted with two major challenges in responding to climate change mitigation and moving towards a low-carbon economy: first, mobilization of the necessary finance and investment; and second, generation and dissemination of the relevant technology. Both are areas in which foreign investment can make valuable contributions. This vast potential of international low-carbon investment has led to a rapidly growing number of countries – both developing and developed – actively promoting foreign investment in low-carbon activities. As more and more countries enter into the global competition for such investment projects, policymakers and investment promoters must

look for ways to place their locations on the "radar screen" of investors.

For some countries, low-carbon FDI may come without a promotional effort if business opportunities occur. However, most countries need a coherent investment promotion strategy to attract and benefit from low-carbon investment. Such a promotional strategy will have to take place within the broader framework that includes, among other things, a wider economic development strategy, an appropriate legal and institutional setting, as well as international collaboration and support. A wide range of stakeholders will have to be involved in the work, and success will depend on finding the right forms of collaboration for stakeholders.

Aim of this guide

This guide aims to help IPAs, especially those in developing countries, to promote low-carbon foreign investment with a view to maximizing the sustainable development impact on their host economies. The focus of the publication is on practical guidelines for identifying, targeting and servicing investors in line with defined development objectives.

Structure of this guide

Chapter 1 of this guide provides an overview of low-carbon investment opportunities, chapter 2 deals with the selection and development of investment opportunities, while the focus of chapter 3 is on targeting and servicing low-carbon investors in particular through partnership strategies. The conclusions of the guide are presented in chapter 4.

1. Seizing the low-carbon opportunity

1.1 The low-carbon opportunity

The rise of low-carbon foreign investment

The efforts to fight climate change have already created a wealth of new investment opportunities. It is, however, difficult to estimate the overall level of low-carbon foreign investment because investment data do not always indicate if the production processes involved or outputs produced could be defined as low carbon. When looking at greenfield investments in three major areas, i.e., alternative/renewable energy, recycling activities and environmental technology manufacturing, it can be estimated that FDI between 2003 and 2012 accumulated to close to half a trillion dollars, with a steep annual increase between 2003 and 2008 and a decline after 2008 due to the financial crisis (figure 1). Despite the crisis, the $54 billion investments in 2012 were still nearly twice the pre-crisis (2005–2007) average of $29 billion. Most projects went to developed economies, but between 2003 and 2012, not less than 44 per cent of investments were in developing and transition economies. Jobs created through these greenfield foreign investments are substantial; in the renewable energy sector alone there were an estimated 210,000 new jobs between 2003 and 2012.[4]

Companies in areas of low-carbon business, such as clean technology firms, are chasing increased international market potential, while more traditional players may be reassessing their existing investments from the low-carbon perspective. As global awareness gathers pace, low-carbon investment across sectors presents not only a business opportunity but also the chance to improve corporate image through the application of more sustainable business models.

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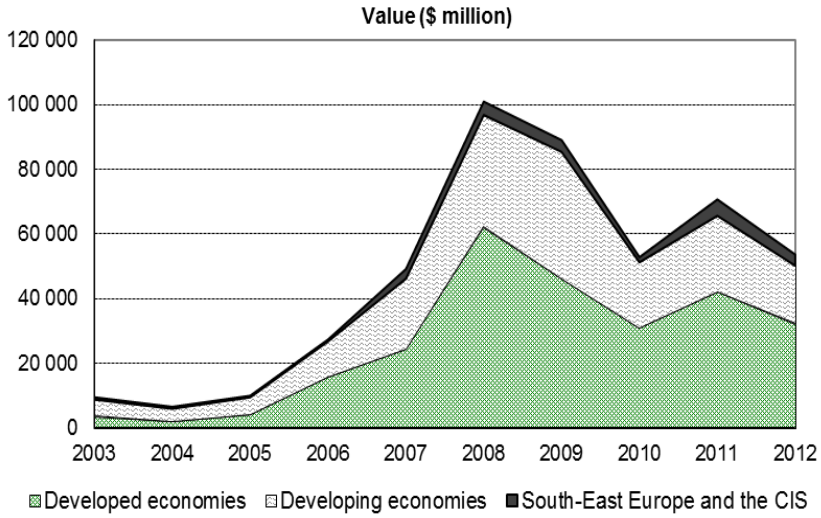
[4] IBM-Plant Location International, Global Investment Locations Database (GILD).

Figure 1. FDI in selected low-carbon business areas, by group of host countries



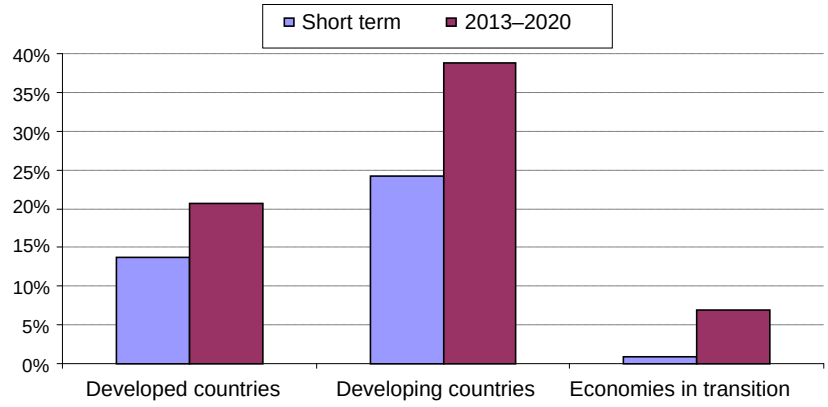
Source: UNCTAD, based on information from the Financial Times Ltd, fDi Markets (www.fDimarkets.com).
Note: Values refer to estimated amounts of capital investment.

A 2010 UNCTAD survey of 116 IPAs indicated that low-carbon business areas would play an increasingly important role in agencies' work programmes in the medium term.[5] This was true for developed and especially developing countries, with respectively around 20 per cent and 40 per cent of respondents expecting to place high or very high emphasis on low-carbon investments in the period 2013–2020 (figure 2). This is reflected in a 2013 survey of websites of IPAs with 48 per cent of 164 national agencies featuring information on green investments at the sectoral or subsectoral level.[6]

[5] UNCTAD (2011a).
[6] UNCTAD IPA website survey, 2013.

Figure 2. Emphasis of IPAs on attracting low-carbon FDI in the short and medium term

(Percentage of respondents indicating high/very high emphasis)



Source: UNCTAD Survey of IPAs, 2010.

Where can low-carbon investment opportunities be found?

As indicated in table 1, TNCs can introduce low-carbon processes, clean energy and low-carbon products and services. Potentially, any sector or business activity can be suited for low-carbon investment. Low-carbon investments in traditional sectors, with a view to improving their energy, material or resource efficiency, could have a significant impact on the carbon intensity of production in developing countries.[7] Moreover, existing FDI can have a low-carbon element added, for example by obtaining ISO 14000 certifications[8] or requiring existing projects to meet more rigorous emission standards. Along its value chain or in its other networks, a foreign investor can also require suppliers, industrial

[7] UNCTAD (2010). *World Investment Report 2010: Investing in a Low-carbon Economy*, p. 123.

[8] International Organization for Standardization certifications addressing aspects of environmental management.

customers or other partners to upgrade to low-carbon processes as part of its objective to switch to lower-carbon inputs.

Separate from the benefits that come with low-carbon investment, there are potentially a number of disadvantages that should be weighed against these benefits. The advantages of low-carbon FDI include the reduction or avoidance of GHG emissions through the enhancement of energy, material and resource efficiency in the host economy; the provision of needed finance and investment for low-carbon projects; the improvement of the image of a location that can create opportunities for diversification in related low-carbon and other economic activities; and the emergence of first mover advantages over competitors that results in possible export opportunities. The possible disadvantages of low-carbon FDI are the costs of incentive schemes for low-carbon investment and the potential overdependence on TNC technologies, goods and services.

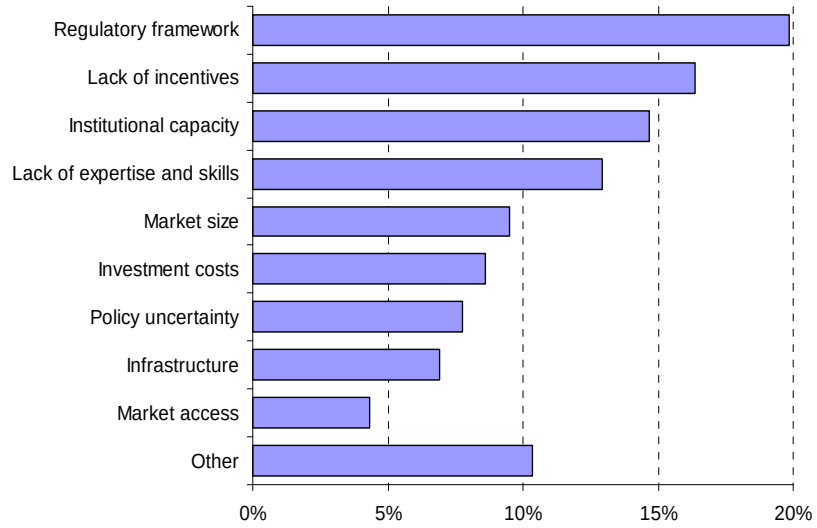
Challenges in promoting low-carbon FDI

Many countries, including developing economies, encounter difficulties in attracting low-carbon foreign investment. General problems that may emerge can be grouped into two categories: (a) legal/institutional and (b) socioeconomic/financial.

Legal and institutional difficulties include, above all, the absence of supportive regulatory frameworks that would drive low-carbon investments, notably the lack of sector-specific regulation and incentives, insufficient legal protection (such as intellectual property rights), lack of transparency and weak local non-governmental organizations (NGOs) unable to advocate an environmental agenda. As indicated in figure 3, the regulatory framework and lack of incentives and institutional capacities rank high among difficulties IPAs face in attracting low-carbon foreign investment.

Figure 3. Barriers to efforts to attract low-carbon FDI

(Percentage of respondents)



Source: UNCTAD Survey of IPAs, 2010.

Socioeconomic and financial challenges include the lack of skills, expertise or training in the host country. A low level of technological development may hamper a location's ability to attract knowledge-intensive types of low-carbon investment, as may the lack of providers of support services to low-carbon businesses (e.g. legal, accounting and information technology services). The insufficient size of the host market and the lack of adequate infrastructure also constitute key economic challenges to attracting investors in low-carbon business areas.

These challenges, which are reflected in the determinants of low-carbon investments (section 1.2), can be addressed through an investment promotion strategy that includes policies and support measures for attracting low-carbon investments (chapter 2).

1.2 Determinants of low-carbon investments

Locational determinants, or pull factors, are factors specific to the host location that influence TNCs' decisions on where to set up their operations. Broadly speaking, these determinants can be related to economic factors, the policy framework and business facilitation, including investment promotion. *Economic factors* are, broadly speaking, the same as for foreign investment in general. Low-carbon investments can be market-seeking; e.g. electric carmakers or energy-saving appliance manufacturers may be motivated to invest abroad to access new or expanding markets – in such cases market-creation policies for low-carbon products and services can play a role in increasing demand. Low-carbon investments can also be of the natural resource seeking type, e.g. power producers may invest to access low-carbon energy sources. They can be efficiency-seeking, e.g. windmill manufacturing companies may move part of the production to a different location to lower the cost of production. And they can be strategic asset-seeking, e.g. clean technology companies may seek to enter new markets to gain access to created assets such as low-carbon technologies.

The policy framework

Governments, primarily those at the national level, set the rules for the markets in which investors seek profits. Factors of importance to FDI in general include economic, political and social stability; good governance; and policies on entry, establishment, treatment and protection of foreign companies.

Policy areas of specific importance to low-carbon investment include environmental policy, industrial policy and energy policy. If current market rules are failing to attract – or drive – private investors to lower GHG emissions, there are a number of measures governments can take to address these shortcomings.

Implementing such measures would have an influence on domestic as well as foreign sources of investment. Different types of regulatory and fiscal measures that help create a market for low-carbon investment are presented below. The role of IPAs in policy advocacy can be important here. In any case, a specific mandate for an IPA to actively promote low-carbon investment without the broader framework policies in place is potentially counterproductive.

Policymakers can *help investors overcome entry barriers*, for example by requiring regulated, monopoly providers (such as electricity grids) to provide access to and purchase power from power suppliers that use low-carbon sources of energy on financially attractive terms. One example of such a policy mechanism is feed-in tariffs (box 1). Reducing or removing standards that hold back implementation of low-carbon solutions (such as building codes) is another example.

Policies could also be designed to *encourage the use of advanced, less polluting technologies*. Examples of such policies include imposing GHG emission limits or performance standards on operations and products (such as vehicle emission standards); and imposing taxes or other charges on GHG emissions or fossil fuel use (such as a tax on coal use).

Box 1. Creating a market for low-carbon FDI: Feed-in tariffs

According to an UNCTAD survey of IPAs, the most important policy measures to attract low-carbon investment are those that help create a market for renewable energy. One incentive that can make a major contribution to attracting FDI in renewable energy is a feed-in tariff. Under such a mechanism, eligible electricity generators are paid a pre-defined price for the renewable electricity that they produce. This provides investors in renewable energy with a reasonable return on their investments.

The core elements of feed-in tariffs are:

- Defined, eligible technologies;
- Tariff pricing differentiated by technology;
- A standard offer (frequently expressed through a contract), for a guaranteed payment for renewable electricity generation;
- Payments over a long time frame.

New or recently amended feed-in tariffs have been introduced in many countries, for example Brazil, China, India, Japan, South Africa, Thailand, Uganda and the United Kingdom of Great Britain and Northern Ireland.

Source: UNCTAD.

Paying the innovator may also encourage low-carbon investors. Creating tradable rights to reward investments in reducing GHG emissions (such as a cap-and-trade regime)[9] is one way. Offering fiscal incentives for investments in low-carbon methods (such as production tax credits for renewable energy), tax incentives for the use of more environmentally friendly technologies (box 2) and providing direct public support for lower-

[9] A cap-and-trade regime places a limit on the amount of GHG emissions allowed (the cap) and permits the possibility of trading these allowances between firms internationally.

carbon activities (such as funding for research and development) are others.

Box 2. Random Depreciation of Environmental Investment in the Netherlands

In 1991, the Netherlands introduced the Random Depreciation of Environmental Investment (VAMIL) measure to promote the dissemination and market the introduction of newly developed environmental technologies by replacing environmentally less friendly technologies with more benign ones. The tax facility offer companies the opportunity to apply accelerated depreciation on environmentally friendly equipment. If the equipment is operational and paid for, it allows depreciation of the full purchase price in the year when the equipment is acquired, which results in the reduction of operating profit and tax payments. Accelerated depreciation is only applicable to equipment that is specified on the Government's "Environmental Technologies List" of approved technologies, which is regularly updated. In 2000, another support incentive was introduced, the "Investment Allowance", which allows a partial write-off of an investment in environmental technology against tax. The environmental technologies eligible and the level of deduction applicable for each technology appear again on the "Environmental Technologies List".

An evaluation of the measures in 2007 concluded that the response from the business community and banking sectors had been above expectations and that the measures had encouraged the introduction of innovation in the business sector, especially in small and medium-sized enterprises (SMEs).

Sources: OECD (2007) and European Commission (http://ec.europa.eu/environment/sme/cases/cases06_en.htm);
VROM (2007), *Evaluatie MIA, VAMIL en Groen Beleggen 2000–2004* (http://www.agentschapnl.nl).

Policymakers can also enact measures to *fill information gaps*, for example by requiring disclosure of data on GHG emissions from production operations or energy use by products; supporting voluntary efforts to make such data available; and by directly providing data helpful to potential investors (such as on wind resources or investment incentives).

Another measure that the public sector can take to encourage private low-carbon investment is through *public procurement* of energy efficient products. This could have a wide-reaching impact and act as a stimulus for technology inflows, joint ventures and other FDI. It would also raise general awareness of the importance of environmental matters. Specifications may also include requirements to develop local supply chains.

Governments can also help drive low-carbon investment by shifting *public investments*. The public sector tends to be responsible for 10–25 per cent of the investment in new physical assets and most of those investments are driven by local development priorities, whether they are jobs, power, transport, education, health or other public benefits. For developing countries in particular, shifting funding to climate change mitigation has to take social and development issues into account. The challenge is to shift more public investment into low-carbon, more climate-proof measures without sacrificing other development priorities. Integrating climate change adaptation and mitigation considerations into national planning (such as considering investments in clean technology or energy planning, or the costs associated with climate change impacts on new infrastructure, such as bridges or roads) is part of the solution.

Business facilitation

Despite the fact that 55 per cent of the respondents in a recent UNCTAD survey of IPAs indicated that they were targeting low-carbon investors, and that almost 40 per cent pointed to some cooperation with other government agencies in this area, only 17 per cent of the IPAs responded that they had a supporting policy or strategy document for low-carbon investment, either prepared by the IPA itself or that referred to a broader national strategy.[10] Therefore, although it is a relatively new area for national policymakers, adopting an explicit low-carbon development strategy would be a recommended first step.

IPAs and other support agencies are important players in attracting low-carbon investments, and promotional efforts need to be articulated around the three functions of policy advocacy, investor targeting and aftercare services. As such, IPAs may have to refocus some of their practices.

Since promoting low-carbon investment requires specific regulatory and policy measures, particular attention should be given to policy advocacy. As the primary interface between TNCs and Governments, IPAs can raise awareness on regulatory needs and ensure that the national policy framework serves the purpose of attracting low-carbon investment. Examples of key issues to be considered are market-creation mechanisms, FDI entry and treatment, and incentives for low-carbon investments.

Another important task of IPAs is the provision of detailed and accurate information on industrial, energy and environmental policies for the low-carbon sectors that they target and facilitation of access to incentives related to GHG emissions. Invest Sweden's work in attracting Facebook's first European data centre illustrates

[10] UNCTAD (2011a), p. 8.

how an IPA can be effective in preparing the business case, targeting and facilitating an investment decision (box 3).

Box 3. In search of a lighter carbon footprint: Facebook's data centre in cool and green Sweden

In 2011, the American social networking site Facebook decided to build its first data centre outside the United States of America, in the northern Swedish town of Luleå, to handle all data processing from Europe, the Middle East and Africa. The move will help Facebook to better serve more than one billion users, in addition to lightening its environmental footprint. This data centre will be the first to draw power primarily from renewables and will have a 70 per cent reduction in reliance on backup generators.

With Sweden being a global leader in green electricity, especially hydropower, and with data centres consuming more than 1.5 per cent of total electricity usage worldwide, Invest Sweden, the national Swedish IPA, decided to target data centres for locating in Sweden. In 2009, the agency made contact with Facebook, and that same year the online social network company invited a delegation of Swedish experts and regional representatives to its headquarters.

Given the demand from its growing international presence, Facebook was planning to expand outside the United States where it has its own data centres and leased capacity in the States of California, Oregon, North Carolina and Virginia. With the large electricity demand of its data centres, Facebook was considering a site with energy-saving systems and low-carbon power sources. Other considerations were the presence of a skilled workforce and security issues.

/…

Box 3. In search of a lighter carbon footprint: Facebook's data centre in cool and green Sweden (concluded)

Invest Sweden put forward a number of site proposals to assist Facebook in its decision-making process for a European data centre. In the final phases, Facebook vetted Swedish candidate locations from a list of pre-qualified sites, where Luleå and Östersund came out the strongest. In the two-year site selection period, Invest Sweden provided Facebook with continuous support, ranging from information on possible data centre sites, laws and procedures, local taxes, pricing and details of experts. The IPA helped organize site visits and meetings with potential suppliers and specialists on the energy market and connectivity. It also advised on contacts with Swedish companies and institutions.

As a result, Facebook concluded that Luleå, located just 100 km south of the Arctic Circle, offered the best package of resources, including a suitable climate for environmental cooling, clean power resources, available land, a talented regional workforce and a supportive business and corporate environment.

Source: UNCTAD based on Invest Sweden.
Note: As of 1 January 2013, Invest Sweden is known as the Swedish Trade and Invest Council.

Aftercare services should be designed to enhance the diffusion of low-carbon processes and know-how. Agencies can help build linkages between TNCs and local firms by looking at complementarities in skills and technologies and where possible should develop partnerships, as shown in chapter 3. Even companies that do not have a low-carbon profile can connect with low-carbon foreign investors.

Chapter 2 of this guide will focus on the work of IPAs within the development of an investment promotion strategy.

2. Developing a low-carbon investment promotion strategy

2.1 Components of a low-carbon investment promotion strategy

Promoting low-carbon investment requires an integrated marketing approach that combines product development, incentives and promotion within a broader framework that often includes international collaboration and support, wider economic development strategy and an appropriate legal and institutional setting. UNCTAD identified four key components of a strategy to attract low-carbon investment (*World Investment Report 2010: Investing in a Low-carbon Economy*):

(a) Implement a *conducive policy framework* for low-carbon investment. Among the key elements is the adoption of regulations that facilitate the entry, treatment and protection of foreign investment. Specific sector regulation should be enacted with a low-carbon perspective (e.g. a policy objective to attract FDI in renewable energy requires at least selective opening of the sector to foreign investment). Facilitating market access for TNCs and enlarging markets, notably through regional integration, can also be an important element of the policy framework as many internal markets are of insufficient size to justify local production of goods.

(b) Enact *market creation policies* that foster the demand for new low-carbon products and services. Such mechanisms, including the provision of incentives for domestic industries to shift to low-carbon production, have mainly been used in developed economies. Although developing countries have limited financial resources to set up such mechanisms, several policy instruments can be used according to sectors that are being prioritized. They include feed-in tariffs and renewable portfolio standards (in the case of renewable energy), blending mandates (in the case of biofuels), energy performance standards (in the case of increased energy efficiency) and public procurement.

(c) Develop measures to help the *diffusion of technology* such as prioritizing and targeting foreign low-carbon investments where technology dissemination to local firms is most favourable; promote technology transfer through linkages with domestic firms; and foster absorptive and adaptive capacities in domestic firms so that they are able to further develop the knowledge they have acquired. Special technology parks and clusters that support the development of business linkages could be an effective tool in this respect.

(d) Develop a *promotion programme for low-carbon investment*, with a key role for national and subnational IPAs. An important task of an IPA will be to develop and implement the investment promotion programme, but IPAs can also make significant contributions to the targeting and diffusion of low-carbon technology, as well as to identifying policies that help attract foreign investors and create new low-carbon investment opportunities.

An IPA that decides to pursue low-carbon FDI should aim to establish clear and measurable objectives against which to gauge its performance. Its investment promotion programme and targets will be dictated by a range of factors, including its government's objectives in the area of FDI and GHG emissions and the investment opportunities that a location has to offer. Therefore, a fundamental step is to assess the country's offer and possible targets in a step-by-step fashion, as set out in this chapter:

- Understanding the sectors and practices which make up low-carbon investment
- Identifying target subsectors
- Understanding value chains in high-potential subsectors
- Assessing the presence of success factors in the IPA's location.

2.2 Understanding sectors and practices which make up low-carbon investment

The first step in promoting low-carbon investment is for an IPA to understand exactly which sectors and practices impact the low-carbon agenda, with reference to the country's economic objectives and emerging sectors. This will include its current sectors and clusters and their potential in a future low-carbon strategy.

This creates the IPA's "long list" of sectors and subsectors which may be worth targeting. The IPA needs additional research to help it whittle down the list, similar to the process that an investor would follow in the site selection process. Subsectors that qualify for the short list will be those in which the IPA's country is most competitive and where it has the most to gain in terms of economic benefit and development, as will be seen in section 2.5.

Table 2 presents a list of sectors of emission in which TNCs can play a role in mitigating these emissions. An IPA should spell out opportunity areas for any sector which it knows to be of particular national priority. At this stage it is important to differentiate between companies that have the potential to mitigate emissions through their processes (e.g. in manufacturing, recycling of waste, use of energy) and those that provide low-carbon products or services (e.g. appliance manufacturers, environmental consulting firms).

For example, a low-carbon energy focus might develop the local production of renewable energy, thus targeting companies supplying the chain and at the same time encouraging existing/new investors to green their activity through energy-efficient practices and the incorporation of renewables in their processes. This makes the IPA's task of analysing its competitive position a complex one, since the target sectors and companies may have very different profiles, even if grouped under a single heading or initiative.

Table 2. Potential TNC involvement in sectors of emission

Sectors of emission	**Demand for low-carbon foreign investment**	
	Low-carbon *process* foreign investment (examples)	**Low-carbon *product/services* foreign investment (examples)**
Power	*Input switching*: Use renewable/low-carbon energy sources *Input reducing*: Increase efficiency of existing facilities *Enhanced recycling*: Capture heat for other uses; carbon capture and storage	- Power machinery and infrastructure manufacturers - Energy services companies - Grid optimizing firms - Engineering/ environmental consulting firms
Industry	*Input switching*: Source low-carbon energy; more use of biomass *Input reducing*: Process improvements; increase efficiency of existing facilities *Enhanced recycling*: Reduce or eliminate flaring oil and gas production and refining; carbon capture and storage *Value chain – upstream*: Support to and influence on suppliers	- Equipment manufacturers - Engineering/ environmental consulting firms
Transport	*Input switching*: Use biofuels, natural gas, electric *Input reducing*: Hybrid cars; make use of more efficient vehicles, planes, etc.	- Transportation equipment manufacturers (car, air, rail, etc.) - Systems providers (e.g. mass transit railways) - Engineering/ environmental consulting firms

Buildings	*Input switching*: Source low-carbon energy, generate own solar 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 - Energy services companies
Waste management	*Enhanced recycling*: Capture and use of methane emissions	- Waste management services firms - Engineering/ environmental consulting firms
Forestry	*Enhanced recycling*: Use biowaste *Value chain – upstream*: Wood and wood product manufacturers supporting and influencing their suppliers in the sector	- Technology services companies - Environmental services companies
Agriculture	*Input switching*: Less use or improved types of fertilizer *Enhanced recycling*: Use of biowaste *Value chain – upstream*: Food and beverage manufacturers, food retailers (supermarkets) supporting and influencing their suppliers (farmers, plantations) in the sector	- Seed companies - Fertilizer producers - Technology services

Source: *World Investment Report 2010: Investing in a Low-carbon Economy*.

An IPA considering promoting low-carbon investment should start with a clear reason for that focus and explicit objectives by which to measure its success. Is the IPA prioritizing low-carbon investment because it believes the country to be competitive in corresponding sectors? Does it want to ensure the country's

participation in a sector of the future? Or is it that policymakers want the IPA to help mitigate GHG emissions? The reason will dictate the objectives and affect what types of investments are sought. An example is the priority that the Government of Zambia is giving to the greening of the construction industry which is the fastest growing sector in the country. The IPA is playing a role in attracting foreign investors that can provide green technologies and green solutions and in creating business linkages with local companies (box 4).

Box 4. Promoting green FDI: UNCTAD's business linkages programme in Zambia

Driven largely by its burgeoning mining sector, Zambia has seen a boom in infrastructural investment in road and building construction. Contributing already 21 per cent to gross domestic product (2010), the construction sector is rapidly attracting foreign investors, including South–South FDI from countries such as China, Malaysia and South Africa.

Demand is growing strongly, in particular, from Zambia's emerging middle-income sector, with UN-Habitat estimating a need for 1.3 million additional housing units by 2030, attracting developers who are looking to adapt existing affordable housing models to the Zambian market.

Yet concerns have also emerged regarding the environmental impact of Zambia's construction boom, particularly with regard to the country's domestic small and medium-sized sub-contractors, which often continue to rely on outdated and inefficient building materials and methods, affecting their environmental performance and locking them into low value added activities. Recognizing this challenge, the Government of Zambia, with support from the United Nations, has engaged in a multi-year (2013–2017) initiative to promote the creation of "green jobs" and sustainability in the Zambian construction industry.

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Box 4. Promoting green FDI: UNCTAD's business linkages programme in Zambia (concluded)

Under the programme, UNCTAD is working with the Zambia Development Agency (ZDA) to implement a targeted business linkages programme to enable Zambian contractors to acquire state-of-the-art sustainable construction know-how. The cornerstone of the programme is the attraction of international companies that can provide green technologies and solutions and the promotion of public–private sector partnerships with these technology leaders in areas such as the construction of energy-efficient buildings, retrofitting and the use of low-carbon building materials.

Leading international real estate developers now routinely emphasize the business case for sustainable and low-carbon construction methods and materials with regard to the often significant cost savings for owning, servicing and maintaining such an investment over the building's total life cycle. Accordingly, promotion activities by ZDA and UNCTAD include domestic awareness-raising as an important element to stimulate widespread uptake in the Zambian market.

Source: UNCTAD.

The different TNC activities that reduce emissions in various economic sectors, as mentioned in table 2, fall within one of the three main types of low-carbon investment that were distinguished in table 1. Examples that follow in this guide cover investment in each of these broad categories, but the focus will be on investment in research or production facilities to produce GHG-reducing products and related services.

2.3 Identifying target subsectors

Equipped with an understanding of the low-carbon industry, an IPA should next determine which subsectors have the greatest potential impact on investment inflows and GHG

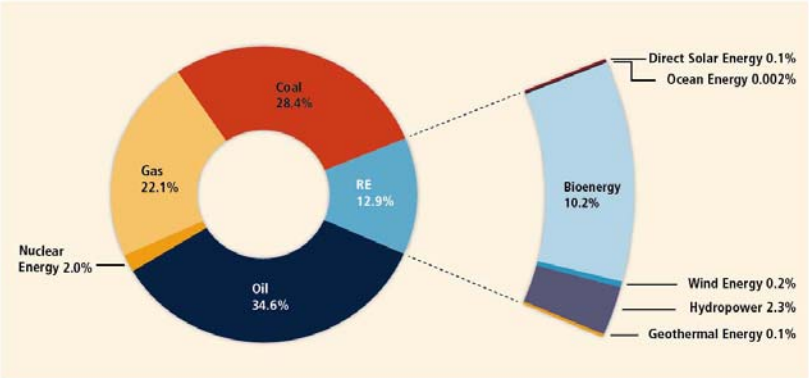
emissions. To do this, it may refine its assessment according to three key characteristics: (a) attractiveness of the subsector in terms of size and growth; (b) suitability of the subsector for the location; and (c) potential for GHG mitigation. A large and growing industry is most attractive in terms of investment potential, as it represents a big opportunity now and a larger one in the future. A location should also provide factor advantages through natural resources, created assets or other characteristics. Projections should also be made on the GHG mitigation potential.

For example, an IPA considering renewable energy generation should review available data sources. Figures from the Intergovernmental Panel on Climate Change (IPCC) show that renewable sources currently meet only 12.9 per cent of global energy supply (figure 4), but in the context of rising global energy demand and the drive to reduce dependency on fossil fuels, renewable energy is a relatively small but growing sector. Low-carbon energy production was worth $422 billion in 2009.[11]

In its *World Energy Outlook 2012*, the International Energy Agency (IEA) predicts a steady increase in hydropower and expansion of wind and solar power over the next 20 years. IEA forecasts that by 2035 renewables will account for almost one-third of total electricity output (from 19 per cent in 2009).[12] With a share of 26 per cent, energy supply is also the largest contributor to global anthropogenic GHG emissions, reinforcing the rationale for this sector.[13]

[11] HSBC Global Research (2010), p. 3.
[12] International Energy Agency (2012). *World Energy Outlook 2012*.
[13] IPCC (2007), p. 104.

Figure 4. Share of renewable energy in total global primary energy supply, 2008[14]



Source: IPCC (2011). *Special Report on Renewable Energy Sources and Climate Change Mitigation.*

Clearly, energy will constitute one of the primary areas for IPAs pursuing a low-carbon FDI strategy. Indeed this is borne out by UNCTAD research showing that in 2010 the energy sector was targeted by one-third of IPAs that attract low-carbon FDI, making it their main target for low-carbon investment.[15] However, it remains important for IPAs to validate this within the national framework, as indicated previously, and be aware of disqualifying weaknesses, such as the lack of a suitable regulatory framework. Government financial support has also played an important role in attracting FDI in renewables, although there are trends showing that companies are seeking to become more financially independent of subsidies.

The methodology used to identify sector groups can be applied to subsectors, thus determining those that best fit an IPA's

[14] Bioenergy is energy generated from biomass, e.g., wood, energy crops and organic wastes and residues (http://www.fao.org/energy/bioenergy/en/).

[15] UNCTAD IPA survey on investing in low-carbon FDI (2010).

objectives and its locational profile and taking into consideration the value, projected growth and potential for GHG mitigation of each segment. Operations in renewable subsectors, such as wind, solar or geothermal energy, can be divided into production, research and development, maintenance, logistics, sales and headquarter functions. One can also distinguish different company types within each subsector, from power plant manufacturers to component manufacturers, power generation plants and supply and repair companies.

A location's natural resource is an important factor in narrowing potential subsectors, but not the sole one. A sunny location is more likely to move towards solar, yet Germany, with its modest sunshine levels, has become one of the world's top solar installers due to its long-term vision and associated policies. Other indicators could be gathered to further help determine potential subsectors, including data on technical advancements, international mobility trends and skill demands by subsectors. This phase of the research process culminates in a list of subsectors with the greatest potential for low-carbon FDI. An IPA can then proceed to further investigate the chosen subsectors.

2.4 Understanding value chains in high-potential subsectors

An IPA's long list of subsectors is based on a clear understanding of the national framework in which a low-carbon FDI promotion strategy can operate, including the sectors matching the country's objectives and profile, and the subsectors that constitute the best growth and development potential. The next stage, involving the analysis of the value chains of selected subsectors, can become highly technical and the IPA may require support from other government departments and specialist partners or external providers.

This next stage helps determine the investment promotion strategy, improve in-house technical knowledge, provide data for marketing materials and ensure the effectiveness of the marketing message. The IPA will develop an understanding of markets, production processes, operating costs, suppliers, major constraints, major competitors, dominant trends and key location drivers. To illustrate this, the example used is of the photovoltaic value chain and the differences in investment characteristics and location requirements in each step in this value chain (figure 5).

It is of interest that companies run stand-alone operations for each step in this value chain, but also integrated operations in which two or more components of the supply chain are co-located. This provides multiple opportunities for IPAs to assess whether their location offers an attractive proposition for a stand-alone component or integrated operations.

Figure 5. Solar panel manufacturing process based on silicon

Profile	Capital intensive Energy intensive Space consuming Long construction			Labor intensive Market sensitive
Investment	Very high 1-1,5 billion dollars	High 500-750 million dollars	High 500-750 million dollars	Moderate 200-300 million dollars
Jobs	200-300	500-600	1400-1600	1800-2000
Implementation	36 months	24 months	18 months	15 months

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Figure 5. Solar panel manufacturing process based on silicon (concluded)

Critical location factors or "must haves"

Utilities	Power-water-heat Reliability & cost	Power reliability Water discharge	Power reliability Water discharge	
Human Resources	Skills availability	Skills availability	Skills availability & cost	Skills availability & cost
Logistics	Access to raw materials			Access to market

Source: IBM-Plant Location International, based on input from solar energy companies.

IPAs should therefore address the question of their competitive advantage in one or more links of the value chain. Certain answers to these questions will be obvious, such as the fact that assembly of solar panels usually occurs near the market given the prohibitive costs of transporting components. For this particular industry, activities closer to the end product are more mobile and easier to target, since investments in the beginning of the value chain are large and subject to specific local conditions which have led to a concentration of these operations in only a few countries.

Once an IPA has conducted this analysis, it will be in a position to eliminate subsectors from its list, if appropriate. The next step is to investigate the country's ability to provide the success factors for each subsector.

2.5 Assessing the presence of success factors in an IPA's location

Armed with a comprehensive understanding of potential target subsectors, an IPA should revisit its offer and ask what its location can do to meet subsector requirements. These are the determinants outlined in chapter 1, i.e. policy framework, economic factors and business facilitation. The importance of these factors to investors will vary by subsector and for the reasons described below. An in-depth analysis of a location's offer by subsector will also add important content to the materials for investor targeting and promotion.

Many low-carbon sectors are relatively new and may not be covered explicitly by existing *policies, laws and regulations.* Measures to encourage low-carbon investment as outlined in section 1.2 may be lacking or inadequate. This needs to be reviewed for each target subsector.

In addition to the policy framework and legal protections, many competitive investment locations provide active support to individual companies in low-carbon sectors in the form of tax breaks, grants, low-interest loans and loan guarantees. Low-carbon special economic zones (SEZs) have also been used successfully as a tool to implement special regulatory regimes with incentives that are not available outside the zones for the promotion of low-carbon investment or for the greening of existing industries (box 5). A concise explanation of the package of support should be prepared not only for informational purposes, but also to support efforts to brand a location as a forward-looking green location, which can be important for jump-starting the industry.

Box 5. Low-carbon zones for the promotion of low-carbon investment and greening of industries

In many developing countries, industrial parks or SEZs have played a central role in fostering industrial development, but have also been major contributors of GHG emissions. This means that SEZs can be platforms to systematically reduce GHG emissions in industrial sectors as well as to attract companies producing low-carbon goods and services and to promote energy-efficient solutions within the zones. Low-carbon SEZs that are set up for this purpose can be defined as industrial zones which aim at lowering the carbon footprint within the zones in a consistent, cost-effective way with eco-friendly policy frameworks in place.

Some industrial parks have evolved into eco-industrial parks, driven by tenant-identified opportunities to find cost-saving and income-generating uses for their waste. For example, the industrial park at Kalundborg, Denmark, developed a complex web of bilateral exchanges of waste energy and materials between its tenants and nearby entities based on the principle that "one's company's waste is another company's wealth". These waste products include steam, heated salt water, sulfur, fly ash, gypsum, sludge, yeast and fish by-products. This has resulted in less pollution in air, water and land, conserved water and other resources and led to substantial savings to participants. Recognizing the environmental as well as economic benefits of such eco-friendly zones, many developing countries such as Bangladesh, China, India, the Republic of Korea and the United Arab Emirates are moving fast to adopt low-carbon SEZ concepts and practices. For instance, Governments can take the initiative, like in the Republic of Korea, where the Government in 2005 started a pilot project for the greening of 915 industrial parks, aiming at transforming them into eco-industrial parks. The project includes inter-company collaboration based on industrial symbiosis, shared services and facilities, as well as the exchange of material, energy, water and waste between companies.

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Box 5. Low-carbon zones for the promotion of low-carbon investment and greening of industries (concluded)

To scale up this approach, the International Finance Corporation (IFC) launched in 2011 a low-carbon zone project in the Chittagong Export Processing Zone of Bangladesh, with support from the European Union, the Republic of Korea and the United Kingdom. Through the development of a low-carbon zone road map and voluntary low-carbon zone guidelines, the project identified promising mitigation opportunities in the zone, which companies could take on in commercially viable ways. Some of the "low-hanging" mitigation opportunities were materialized through energy efficiency measures such as waste-heat recovery which helped the greening of existing industries.

Source: International Finance Corporation, World Bank Group.

An IPA will consider *economic factors* in relation to the subsectors identified, since locational determinants and key drivers may vary by sector, company and activity type. Companies driven by market opportunity are likely to locate in or near their strategic markets. Others may favour proximity to suppliers, depending on their product or service, and many suppliers will follow large, client TNCs. It is to be noted that in the newer low-carbon sectors, large market leaders of this type are still emerging.

For a manufacturer of energy-efficient products used in construction, lighting and HVAC (heating, ventilation and air conditioning), the public sector market can be especially important. Consumer markets for these products are still relatively small, partly because of price competitiveness issues. However, a public procurement policy that favours energy-efficient products may jump-start a market and provides at the same time energy savings and GHG emission reductions. Such a policy can also introduce consumers to innovative products through public places, while providing firms with the production orders needed to achieve

economies of scale and consequent price competitiveness in consumer markets. In South Africa, for instance, national energy savings policies have led to a joint venture between Philips (the Netherlands), the Central Energy Fund (South Africa) and Karebo Systems (South Africa) which opened a new plant in Lesotho in 2009 to produce energy-saving light bulbs. A large part of the plant's output is now sold to South Africa's power utility Eskom.[16]

The cost of electricity is a key consideration for energy-intensive production. Transport costs may be decisive for companies importing heavy components. Rare earth metals, many of which make low-carbon technologies possible, may be critical for others. For solar energy production, the cost and availability of land close to transmission lines are factors that will influence an investor's decision. For the majority of companies, particularly high-technology firms, finding the right skills amongst technicians and engineers will be essential to operations such as maintenance and research and development activity. For a wider perspective on skills and green jobs, see research by the International Labour Organization (ILO).[17]

An IPA wishing to methodically assess its ability to compete in terms of subsector-specific requirements may produce a competitiveness worksheet that includes success factors by subsector, such as "cheap energy", "proximity to suppliers" or "availability of specialized technicians". Beside each factor it

[16] UNCTAD, based on "Philips to build CFL plant in Lesotho", SouthAfrica.info, 28 March 2008, available at www.southafrica.info/africa/cfli-280308.htm and "Lesotho plant supplies first million CFLs to Eskom", Engineering News, 10 May 2010, available at http://www.engineeringnews.co.za/article/lesotho-jv-supplies-first-million-cfls-to-eskom-2010-05-10.

[17] International Labour Organization (2011). *Skills for Green Jobs: A Global View.*

should list what its location has to offer, doing its best to quantify that offering. In this way, the IPA begins to collect the ingredients for a compelling business case for its location and the basis for objective comparison against its competitors.

A detailed review of the *business facilitation* requirements for low-carbon FDI, by subsector, including what the location currently offers or needs to offer, is important in assessing the success factors in the IPA's country or region. With increased global competition from IPAs, business facilitation, ranging from network introductions to aftercare services, is an important success factor in attracting low-carbon investors, given the important links between the policy framework, incentives and the potential of the local market. Strong business support and facilitation will add value to investors in navigating the often complex and technical environment of low-carbon business.

At each stage of the process of identifying opportunities and building a business case, an IPA's knowledge of subsectors deepens and it becomes clear where a location can be most competitive, in line with overall national GHG and FDI objectives. Ideally, an IPA should limit its list of potential subsectors for targeting to only a few industries.

Comparing the country to its key competitors

Having assessed its position and offer in target subsectors, it is essential for an IPA to benchmark its location against regions and countries that could compete for the same investments. Companies will consider a range of locations prior to their final decision. In cases of globally mobile projects, a company's long list may include locations in different regions of the world.

An analysis of identified subsectors in competing locations could provide insight into the IPA offer and strategies of competitors as well as their partner networks and clusters. Although

this research may entail challenges, data should be available through sector-specific sources, official government publications and third-party reports. An IPA could engage a consultant or market research firm to benchmark its location against those of competitors, just as an investor might. IPAs should also follow investment trends in the industry. In the renewable energy sector, for instance, companies such as Enel from Italy now focus more on emerging economies such as Brazil, Chile and Mexico and less on their traditional European markets.[18]

Proximity to markets is one of the criteria for cross-country comparison. Another is factor costs, which is more challenging to determine. The costs and availability of land and a particular medium-technology skill, for example, are not easily compared across countries. Comparing competitive advantages of locations across countries can start from an analysis of the location of market leaders in each subsector, since potential investors will likely first turn to locations where other companies have already demonstrated that they can profitably operate and have stimulated the growth of support industries. Table 3 provides a listing of market leaders in alternative and renewable electricity generation for the period 2003–2012.

As can be seen in the final step to building a business case for low-carbon investment, the process of location benchmarking generates important data about other locations and reveals new factors about an IPA's country, especially when performed from an investor's perspective. It is important to note that competitors can also offer opportunities, such as partnerships with other IPAs in the same country or across national boundaries. It has also been established that clusters are particularly effective in promoting low-carbon projects. Developing networks and partnerships or being a member of a larger cluster can make an important contribution to

[18] *International Herald Tribune* (2013). Clean energy learns how to compete. 16 May 2013.

the business facilitation and investment promotion process, as shall be seen in chapter 3.

Table 3. Top 10 investors* in alternative/renewable electricity generation, 2003–2012
(Number of greenfield projects)

TNC name	World	Developed economies	Developing economies	Transition economies
Iberdrola (Spain)	47	39	8	-
Electricite de France (EDF)	39	37	2	-
Enel (Italy)	37	30	7	-
Acciona (Spain)	27	18	8	1
E.On (Germany)	27	27	-	-
RWE (Germany)	27	25	1	1
GDF SUEZ (Gaz de France)	22	14	8	-
Energias de Portugal (EDP)	20	18	2	-
Tokyo Electric Power (Tepco) (Japan)	15	13	2	-
MEMC Electronic Materials (United States)	14	7	7	-

Source: UNCTAD, based on data from the *Financial Times* (fDiIntelligence database).

* Greenfield projects only.

3. Attracting low-carbon investment and the role of partnerships

Chapter 2 laid out the components of an investment promotion strategy and the process for developing the sector intelligence and location knowledge needed on the most competitive low-carbon subsectors. Once the opportunity areas are determined and an investment promotion strategy is developed, promoting low-carbon FDI is applied as in other sectors, in areas such as location-branding, investor-targeting, aftercare or policy advocacy. Nevertheless, as pointed out earlier, policy advocacy and aftercare in the low-carbon sector may be even more important due to the considerable role of special instruments and incentives and the creation of networks in this sector.

Promoting investment in green technologies or greening more traditional sectors, like agriculture and manufacturing, will require the same systematic approach used by an IPA in other priority sectors. However, across the board IPAs have realized that partnerships are key to amplifying the effectiveness of traditional promotion techniques in cutting-edge, low-carbon sectors. Partnerships extend widely to include many types of networks and organizations that impact the IPA investment promotion effort, ranging from local to international, public to private and also developing technology clusters between universities, businesses and governments.

Although there is a fair number of big energy and utility companies operating in the low-carbon sector, many enterprises are still in their infancy with quality information on competitors and companies in the supply chain hard to come by. This makes partnerships with local firms, existing investors and industry experts an invaluable source of investment leads and a confidence-enhancing mechanism. The sections below offer a close look at the experiences of three IPAs with different operating environments and levels of institutional development that have set themselves the target of attracting green FDI and used partnerships effectively for investment promotion.

3.1 Jumpstarting promotion: Pernambuco, Brazil[19]

In September 2008, IMPSA, an Argentine manufacturer of renewable energy equipment, established a wind generator manufacturing plant in Pernambuco, a State located in the northeast of Brazil and one of the least developed parts of the country. At the time, IMPSA was the only low-carbon company in the region. Pernambuco's three investment promotion bodies – the Executive Secretary for Business Development, the Suape Port and Industrial Complex and the Agência de Desenvolvimento Econômico de Pernambuco, which were not fully coordinated – had yet to identify renewable energy as a priority sector, and none of them was undertaking proactive promotion.

In 2009, the challenge for the state of Pernambuco was to parallel track the urgency of economic development and the long time frames to build capacity and reform existing institutional arrangements. In this context, front-loading aftercare seemed like the safest and least costly option. In order to overcome its limited resources and experience in investment promotion, Pernambuco decided to extend its reach through the adoption of a partnering strategy, inclusive of both government and the private sector. Several steps were taken.

Step 1: Pernambuco's three investment promotion bodies partnered under the umbrella of Invest in Pernambuco, along with the incentive-administering body, while retaining their current mandates. The Invest in Pernambuco virtual IPA then engaged in a key partnership with APEX-Brasil, the national IPA, to benefit from capacity-building assistance and undertake joint investment promotion.

[19] UNCTAD, based on information provided by the Economic Development Secretariat (SDEC) of Pernambuco.

In cooperation with APEX, the Invest in Pernambuco platform mapped out major foreign investors in the last two years and interviewed them to understand the key drivers behind their investment decisions. The interview with IMPSA was an eye-opener, as promoters learned about their own location advantages for heavy equipment manufacturing and power generation in renewables. IMPSA made Pernambucan officials aware of their network of partner companies and the rationale for them to locate nearby. It also indicated the bottlenecks for further sector growth, including human resources, government planning for land, for housing and for transportation, and private and public sources of innovation and technology.

Step 2: In cooperation with APEX, Invest in Pernambuco commissioned a sector competitiveness study and used the data to develop a promotional message to target IMPSA suppliers based elsewhere in Brazil, as well as other international companies that could fill the gaps in Pernambuco's wind-power production chain. The results of this highly focused targeting campaign came fast. IMPSA's wind turbines are now complemented by a tower manufacturer from Spain, Gonvarri, and were joined in 2013 by a manufacturer of blades and flanges, a joint venture between LM Wind Power of Denmark and Eolice of Brazil. IMPSA's production chain has been reinforced to a point where the company has confidently expanded twice since 2008. IMPSA is now planning on diversifying its Pernambucan facilities to include hydroturbines. Development plans ahead represent over $200 million in investments and 2,500 new jobs in green technologies.

Step 3: Invest in Pernambuco also partnered with over 50 stakeholders, including firms, government bodies, universities and research institutions through a public–private forum. This policy advocacy and aftercare vehicle is dedicated to developing the renewable energy sector through the recommendations developed by six working groups. The groups are focused on issues, looking at human resource development, business climate, innovation and

technology, government planning, housing and transportation, the environment and public relations. Company concerns are addressed, such as formalizing land titles. In this way Italian giant Enel Green Power has secured the area needed for its wind turbines. Issues are also focused on sectors, such as establishing in 2013 Brazil's first technical school to specialize in wind, solar and biomass.

Step 4: Finally, Invest in Pernambuco's direct partnerships with renewable energy companies is generating solid leads for more industry suppliers to accelerate the State's cluster development. The sector's largest companies gladly join business development meetings organized by Invest in Pernambuco for the explicit purpose of targeting the best international and domestic prospects for the next generation of investments, a model that strengthens the cluster and encourages reinvestment.

Pernambuco has no formal IPA nor are there plans to reform the current institutional set-up. However the virtual Invest in Pernambuco initiative is a good example of how sector-specific promotion can be effectively undertaken by several agencies with a clear vision and a well-coordinated platform.

3.2 Improving location competitiveness: Invest Hong Kong, China[20]

Hong Kong, China's reputation as a world-class financial and logistics hub has, in large part, underpinned its successful FDI strategy to date. When the head of the government of Hong Kong, China, identified green industries as one of the six industries crucial to the city's long-term development, Invest Hong Kong aligned itself to target green investment. In pursuing such a strategy, it faced strong competition from other locations, including nearby Singapore. Part of the solution was for Invest Hong Kong to

[20] UNCTAD, based on information provided by Invest Hong Kong (China).

leverage a green strategic partnership programme in order to improve its competitive position. The "Shenzhen/Hong Kong Innovation Circle", its initiative with the city of Shenzhen, was a key component of this new approach.

Invest Hong Kong combined the city's traditional strengths with new low-carbon policies, some early low-carbon success stories and the city's broader strengths in capital-intensive, high-technology industries to build it a new image as Asia's "innovation and technology services hub". It held private–public consultations to identify competitive subsectors and adopted a three-track strategy in pursuit of these, comprising (a) a cross-cutting "green" policy for image-building and market creation, (b) sector-specific policies to create a compelling business case and (c) strategic partnerships and joint promotions.

First, Invest Hong Kong supported and helped to promote a series of general policies to build the image of Hong Kong, China, as a green city. These included, for example, the exemption of electric vehicles from the First Registration Tax and the Pilot Green Transport Fund to cover the initial outlay of transport companies buying low-emission vehicles. With the First Registration Tax close to 100 per cent of the cost of new, luxury vehicles, exemption from this tax for electric vehicles makes ownership much more attractive and has had a definite impact on electric vehicle adoption. This policy has helped to create a market for electric vehicles and attract an FDI project from the United States company Tesla Motors, a manufacturer of zero-emission luxury electric vehicles, to set up its second-largest East Asian sales operation and service centre in Hong Kong, China.

The Commerce and Economic Development Bureau, the policy formulation bureau of the government of Hong Kong, China, on matters relating to innovation and technology, having identified thin-film photovoltaic research and development as a priority subsector, proceeded to establish a photovoltaic cluster at the Hong

Kong Science and Technology Park. The decision-making process was intense and inclusive, as picking this priority subsector implied a long-term commitment and investment from the public sector in installing and maintaining a specialized photovoltaic laboratory. The laboratory has been made available to all companies involved in related research and development activities at subsidized rates, providing savings in capital, installation and maintenance costs.

The investment signalled to DuPont Apollo that the government of Hong Kong, China, was committed to supporting green technology development. DuPont became the anchor operator and was granted the first project under the "Shenzhen/Hong Kong Innovation Circle" initiative, creating a thin-film photovoltaic business and research and development operation with over 100 highly-skilled jobs in Hong Kong, China, and about 300 additional manufacturing jobs in the nearby Shenzhen Special Economic Zone, where it established a manufacturing plant. This joint effort is geared towards establishing a strong solar energy research and industrial platform in the region, with Hong Kong, China, as the research and development hub and Shenzhen as the manufacturing base, forming a full value chain for the photovoltaic industry.

The "Shenzhen/Hong Kong Innovation Circle" was launched in 2007 to establish the region as a hub for sustainable technologies. In addition to strengthening exchange in innovative talent, equipment, and project information, the initiative sets out to foster research and development excellence, cooperation throughout the network and funding support. Joint promotion of this collaborative innovation platform encompasses attracting investments. This makes up a key part of the value proposition that Invest Hong Kong and its Shenzhen partners now jointly promote internationally.

3.3 Cluster expansion: Copenhagen Capacity, Denmark[21]

The Copenhagen Cleantech Cluster (CCC) was established to foster and promote Danish clean technology companies, organizations, joint ventures and research and development activities. International investors and their technology and research capabilities are essential to the mix in a leading cluster. Therefore the vision of CCC is to attract these investors by developing one of the world's leading clean technology clusters, creating superior value for the cluster companies and the research environment. CCC has already demonstrated that a well-managed and promoted cluster can achieve tangible results and international recognition in a short period.

In a survey of 245 foreign and national clean technology companies in Denmark, Copenhagen Capacity (CopCap), the region's investment promotion and business development agency, established that innovation partnerships, both business and technological, are rated as the most important success factor for creating growth. With a strong track record in promoting its core industry and technology strengths through local and global clustering strategies, the CCC was a logical step. Medicon Valley Alliance, a fully integrated life science cluster that CopCap jointly operates with Invest in Skåne (Sweden) is an early example of this approach.

Established in 2009 by Danish clean technology companies, research institutions and public organizations, CCC was Denmark's largest ever European Union Structural Funds project. With a budget of €20 million over five years, financing is split 50 per cent from the European Union, 25 per cent from Region Zealand and the Copenhagen Region and 25 per cent from the founding partner organizations and companies. CCC is a consortium based on a model of university-industry-government

[21] UNCTAD, based on information provided by Copenhagen Capacity.

interactions, key to innovation in knowledge-based societies. CopCap is one of nine founding partners, responsible for the overall promotion, coordination and facilitation of the cluster, reporting to a board of directors comprised of 12 key stakeholders. The secretariat manages the interface between directors, executive partners, members and stakeholders.

With ambitious targets for job creation, foreign investors, research collaborations and international cluster partnering, CCC carries out projects in five focus areas: facilitation, matchmaking, test and demonstration, innovation and entrepreneurship. CCC is engaged in two large international projects, the International Cleantech Network (ICN) and Complex Cleantech Solutions (CCS).

The ICN is a proactive network of visionary and leading clean technology clusters around the world, sharing a collaborative platform to provide each cluster with the best opportunities for their cluster members (companies, universities/research institutions and local authorities). Today, ICN has 10 partners, from Europe, North America and Asia. In 2011, CCC initiated an innovation platform for smart cities and in March 2012 hosted "Open Smart City 2012", where ICN members and other international clean technology players met to discuss the smart city of the future with the aim of creating cross-regional green growth.

CCS has a technology focus, initiating joint business projects that deliver integrated green solutions globally, via the CCC network. Such projects are geared towards combining the best aspects of a wide range of technologies to deal with the low-carbon challenge. In this manner, CCS also helps Danish clean technology companies to gain markets, knowledge and business opportunities.

The Copenhagen Cleantech Cluster's most important task is to bring key clean technology players together. The matchmaking

activity consists of business-to-business networks and research-to-business programmes. The matchmaking working group and investor-targeting team focus research efforts on four sources of data to identify potential foreign investors and partners: (a) existing cluster members; (b) a "Scout Network" of lawyers, consultants and representative organizations of foreign companies in Denmark; (c) CopCap offices and agents based in five target foreign markets – China, Germany, India, the United Kingdom and the United States; and (d) the International Cleantech Network and other clusters such as the European Cluster Consortium.

The CopCap investor targeting team and its CCC partners are then able to engage with potential investors through face-to-face meetings, presentations of opportunities, matchmaking events at industry fairs and conferences, business days in target markets and facilitating business missions for visiting companies and officials. In this case, CopCap and CCC network members combined their outreach skills, sector knowledge and technical expertise to produce a compelling investment proposition.

With the right team, clear goals, targeted activities and funding, CCC has reaped quick successes in its first two years. It has attracted five new foreign companies, representing 230 high-skill, high-paying jobs in smart grids, electric vehicles, biofuels, water and energy efficiency. CCC has also sourced gap funding for the world's first interoperability test centre for electric cars and mapped the Danish smart grid, water and waste sectors, providing further relevant materials for the FDI attraction effort. CCC's reputation is beginning to grow; a member of the Global Cleantech Cluster Association, it is now regularly cited as one of the world's leading clean technology clusters.

The key role played by CopCap in building the cluster through domestic and international partnering is important in the City of Copenhagen's long-term objectives to turn Copenhagen into the world's first carbon-neutral capital. CCC has targeted, by 2014,

1,000 new jobs, 25 foreign investors, 30 new research and innovation collaborations and work with 15 international clean technology clusters. In 2014, the European Union grant will run out, meaning CCC partners will be responsible for the full cost of the platform, based in part on its service-oriented formula. From that point on, CCC members will contribute according to the benefits and returns that the cluster provides.

3.4 Summary: Best practices in partnering

As has been shown in the above examples, partnering strategies, whether these are based on aftercare, through the development of strong low-carbon technology clusters or with a focus on research and development, can provide tangible benefits in terms of image-raising, international promotion, lead generation and securing new investments. To enhance investment propositions and to anticipate investor needs, IPAs should consider partnerships as a fundamental building block in their low-carbon strategies.

Cluster development is a key policy tool, vital to developing a pipeline of emerging companies and to creating a favourable infrastructure and environment for foreign investment. Securing active participation and support from universities, research bodies and local companies is an important success factor.

An IPA that becomes a credible facilitator in the provision of advice on regulation, incentives and networking will be in a position to add greater value to the site selection process. This expertise should be developed both in-house and through rapid access to external experts in the partnering network. An IPA committed to a low-carbon investment strategy will therefore seek to engage regularly with near networks but also establish strong relationships in the wider base of stakeholders, so as to strengthen the partnering services offered to investors.

Effectively communicating the services and the value of an IPA to its potential investors is a prerequisite to a successful low-carbon FDI programme, and there again, a partnering platform can be used smartly to build and disseminate information in a credible and cost-effective fashion.

4. Conclusions

Worldwide concern about global warming and local demands to reduce the negative environmental impacts of human activity have reached a critical mass for widespread demand of low-carbon products and processes. With increasing speed and effect, Governments are promulgating and refining public policies to stimulate the economic competitiveness of alternative technologies and industries. In many cases, these policies have created markets, accelerated their growth or guaranteed their survival. This presents investors with the potential for good returns over an extended period, and it also provides IPAs with opportunities to play their part in building clusters, generating wealth and greening economies, through the promotion of inward investment.

"Low-carbon FDI" is a label that encompasses many sectors with highly diverse benefits in terms of GHG mitigation, job creation and technology transfer. It is not a panacea and should only be pursued by Governments and their IPAs if this fits with the location's profile, needs and goals. A Government hoping to reduce energy consumption, keep the country's air and water clean or comply with international environmental commitments can do so by resorting to various sources of finance which may or may not include FDI.

Rather, low-carbon FDI should be pursued when an IPA can present a strong case for investing in specific subsectors, identified as competitive and important to the economic and low-carbon future of a location. The process for determining a country's competitiveness in a particular low-carbon subsector as illustrated earlier provides the elements for building a compelling case to appeal to investors.

Policies and investment promotion practices have proven to be important elements of a strategy to attract low-carbon FDI. Table 4 gives an overview of different policy tools and IPA practices that were referred to in this guide. In addition to these, for many industries in the low-carbon sector it is also critical to create a green image of a location. Such an image is not built overnight and efforts

to develop it will involve many stakeholders, including IPAs as part of their targeting campaign.

The strong interdependency between business success in low-carbon sectors and the achievement of national environmental goals makes low-carbon investors the perfect subjects for aftercare and crucial sources for inputs to the critical task of IPAs as policy advocates. A clear IPA position on long-term relationship-building from the outset will reassure new investors, help a Government fine-tune its policies for maximum impact and help both sides identify and convert opportunities for low-carbon economic growth.

Table 4. Promotion of low-carbon investment: A selection of policy tools and IPA practices

Policy tools
• Emission standards • Product standards • Taxation rebates on environmentally friendly equipment • Fuel taxes, fuel efficiency standards and biofuel blending mandates • Subsidies for research and development in low-carbon technologies • Subsidies for households to install solar panels • Special credit lines for renewable energy projects • Feed-in tariffs • Public procurement of energy-efficient products • Industrial development tools, like green SEZs, including clean technology parks • Programmes to promote business linkages in low-carbon industries and foster absorptive and adaptive capacities in domestic firms • Encouraging corporate social responsibility

/…

Table 4. Promotion of low-carbon investment: A selection of policy tools and IPA practices (concluded)

IPA practices
• *Targeted promotion* of low-carbon investment, in which IPAs select and target low-carbon subsectors that match the country's development objectives and for which a location is competitive, e.g. attracting FDI in the manufacturing of solar panels for a fast expanding local market. • *Facilitation and aftercare* with a specific focus on networking, matchmaking and the forging of partnerships between low-carbon development stakeholders, including international and domestic companies, local authorities and research institutions, e.g., support in the development of clean technology clusters. • *Policy advocacy*, promoting low-carbon friendly policies and measures for target sectors, e.g. encourage the use of feed-in tariffs mechanisms for renewable energies.

Source: UNCTAD.

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