Paving the way for low-carbon development strategies

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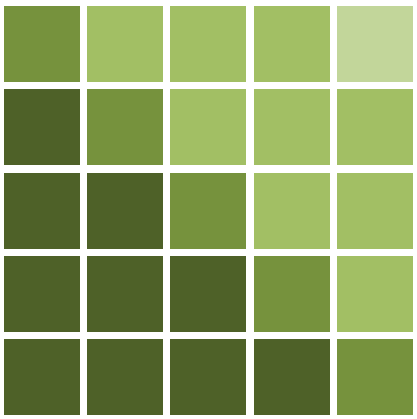

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Abstract

The aim of this report is to help move forward the discussion on low-carbon development strategies (LCDS) towards a useful climate policy instrument. It does so through a historical perspective on the use of an LCDS in a national and international context in order to provide high-level guidance to governments and experts who plan the development of an LCDS. The ultimate aim of a low-carbon development strategy is to catalyse concrete actions that support development with lower emissions. Therefore the process of LCDS development should not focus narrowly on producing a strategy document. Depending on the national context, an LCDS can serve different audiences and have different purposes, adding robustness to the attainment of mitigation actions. Rather than specifying a target or producing a document, an LCDS should provide a process that, depending on the developing country's readiness, meets needs to develop and to fill capacity, knowledge and information gaps., It should bring stakeholders from government, the private sector and civil society on the same page and eventually lead to greenhouse gas emissions that are lower compared to the situation in which the LCDS process had not been undertaken. International support could be sought for an LCDS process, but should not be made obligatory.

Energy research Centre of the Netherlands (ECN)

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Executive Summary

Low-carbon development strategies have attracted interest in the climate negotiations as a soft alternative to voluntary or obligatory greenhouse gas emission reduction targets in developing countries. Several developing countries have taken the initiative to embark on the process of drafting an LCDS. LCDSs are usually thought of as happening on the country level, but depending on the size or the situation of the country, provincial or sector-specific LCDSs are also possible.

Although there is no internationally agreed definition of low-carbon development strategies, in this study we focus on integrated climate and (low-carbon) development government strategies that cover the intersection of development and green house gas mitigation. Adaptation issues are included only if they are related to mitigation actions.

This study explores two questions related to LCDS. First, what are the prerequisites for developing an effective LCDS, and what can a country do if these prior conditions are not entirely met? Second, given the large variety in countries' development contexts and variation in 'readiness' to engage in an LCDS, how can international support for the development of LCDS work in practice? The analysis combines desk research, interviews with experts and on-the-ground study in two countries.

Purpose and building blocks

The ultimate *aim* of a low-carbon development strategy is to catalyse concrete actions that support development, but with less emissions than without intervention. To establish this, an LCDS can serve different audiences and have different purposes depending on the stakeholder. For governments an LCDS can be used to present a long term vision on climate and development and a strategic low-carbon development pathway. It can also be used to establish a policy framework in which policies across different sectors are put in place and aligned. Moreover, governments can use an LCDS to increase awareness on climate change with stakeholders and present to them what low-carbon development could mean for each of the stakeholders. To the private sector, an LCDS can identify what is needed to establish a favourable investment climate for low-carbon development actions, and signal to potential investors what the long-term ambitions and priority sectors are, and what interventions, such as regulatory frameworks or policies, the government will undertake to help achieve these ambitions. In addition, an LCDS may also have a purpose internationally. It can help identify needs and priorities, and be used to coordinate donor support. In relation to other international climate instruments, an LCDS can provide a coherent framework for NAMA priorities and for measurement, reporting and verification (MRV) needs. Lastly, an LCDS can function as a reporting platform to international climate change community. Signalling national emissions and expected impacts of climate change can provide insight in global trends on results of existing mitigation actions and prospect of future policies.

Evidence shows that countries differ significantly in terms of development context, possibilities and priorities. As a result of this variation it is ineffective to approach developing an LCDS with a a generalised template. That said, an LCDS development process can have different 'building blocks'. Although it would not be justified to say that some of the building blocks are optional, the specific (country) context may determine which of the building blocks below are included, and how much they are emphasised.

Assessment of the current situation	Analysis of low-carbon development alternatives	Identification of policy aims, actions, and interventions
• **Data collection**: What do the available data show on socio-economic indicators, greenhouse gas emissions, and existing policies and regulation. • **Capacity assessment:** Is there capacity available domestically to analyse the climate and development data? • **Stakeholder mapping:** Who has an interest in low-carbon development, and what are their roles and responsibilities? • **Institutional setup:** Which government ministries, departments and agencies are involved and what are their roles and mandates?	• **Identify actions:** What are costs, mitigation potential, and development benefits? • **Identify gaps and barriers:** What are the reasons that actions are not implemented currently? • **Scenarios and modelling:** What would be alternative development pathways and with what emissions impact? • **Baseline and targets:** What would be the business as usual situation (baseline) and what targets correspond to the alternative low-carbon development pathways. • **Policy and impact assessment:** Which policies and regulations can be used and what are the expected impacts on development and climate. • **Priorities:** What are the priority sectors and actions, and what are the trade-offs when choosing one over the other? • **Needs assessment:** What are the domestic needs in terms of finance, capacity building, technology and institutional setup.	• **Long term vision:** What is the preferred low-carbon development pathway (policy aim)? • **Targets and actions:** What are the targets that the government sets itself, quantitative or qualitative, and which actions do these require? • **Finance:** What budget is required and where does that come from (national budget, private investment, donor support)? • **Government intervention:** Which policies and regulations will the government establish to support low-carbon development? How are these integrated? • **Private sector investments:** What level of investments in low-carbon technologies is expected from private sector investors and entrepreneurs? • **International support:** How are the required actions linked to the international climate support framework (such as NAMAs and MRV)? • **Plan for implementation:** What are the roles and responsibilities of all stakeholders? • **International reporting:** Depending on the outcome of the negotiations, an LCDS may have to meet reporting requirements (future, if at all).

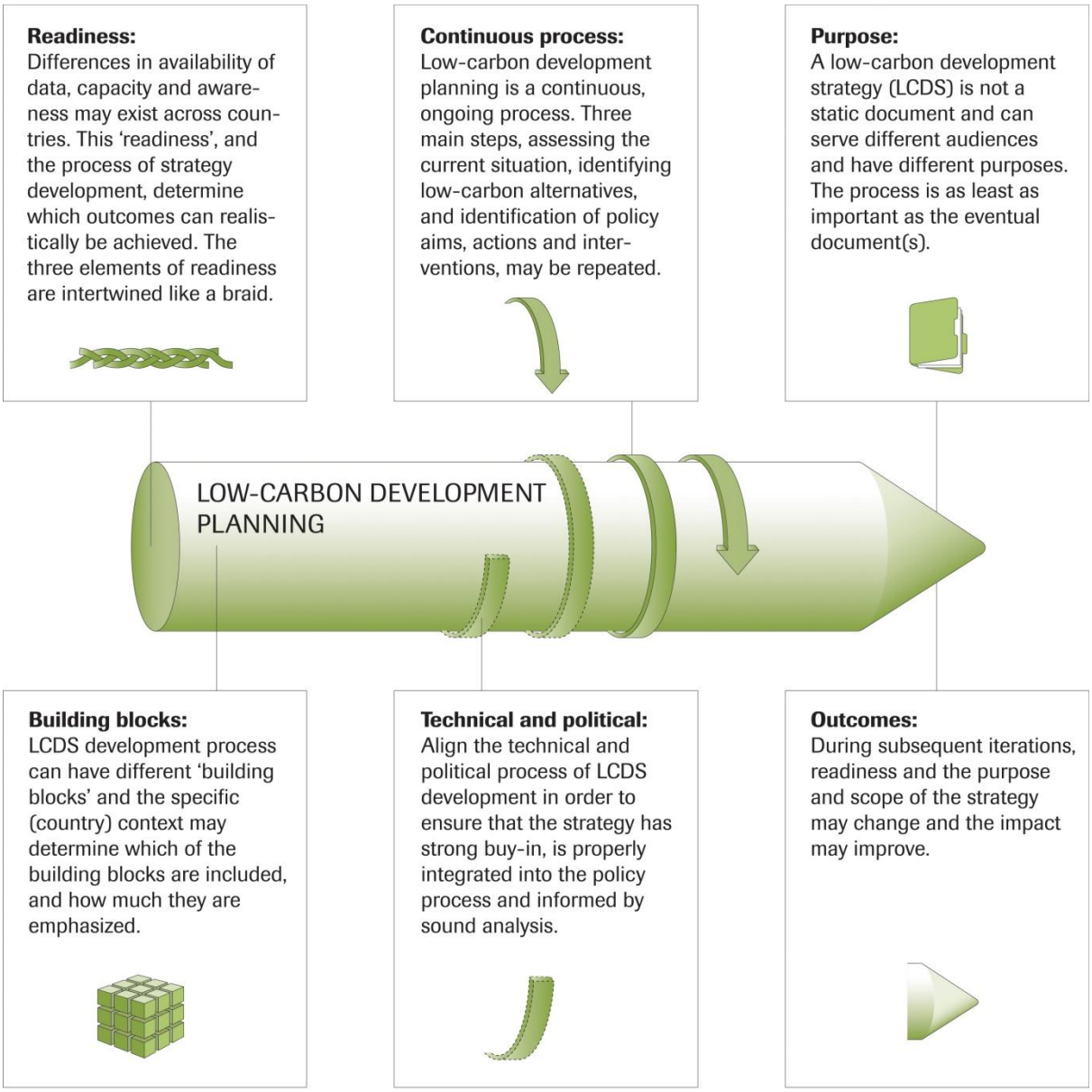
Lessons learned and readiness

Most of the emerging best practices and lessons learned for LCDS development suggest that the requirements for development of a successful LCDS are high. Creating an effective LCDS needs to be a participatory process under strong senior leadership within the government. It needs to involve relevant stakeholders from the start of the process to enable the creation of ownership of the outcomes. The process should work towards consensus on priority sectors and integrated policy interventions, and the decision making should build on sound data, and scientific and economic analysis as well as a high quality factual basis.

The ideal circumstances for starting the development of an LCDS are rarely met in practice, and there are substantial differences in the "readiness" among countries to develop an LCDS. In this context, readiness relates to strengths and weaknesses in three categories: the fact base, analytical and institutional capacity, and the awareness and engagement of all relevant stakeholders. Differences in

readiness and in the process of strategy development will determine which outcomes can realistically be achieved. Countries that are not very advanced in terms of low-carbon development planning, can effectively start the process of developing an LCDS at any time, as the process itself can be used to build the fact base, technical and institutional capacity to interpret the facts and awareness and buy-in among decision makers and stakeholders. By treating the development of an LCDS as an continuous process, data quality, technical and institutional capacity and awareness can improve over time, leading to better strategies and improved outcomes.

In addition to tailoring the process to the country context and readiness, this study shows that it is important to align the technical and political process of LCDS development in order to ensure that the strategy has strong buy-in, is properly integrated into the policy process and informed by sound analysis. As political processes may be unpredictable and because the outcomes of the strategy may only improve gradually in an iterative process, it is also important to be realistic in planning the LCDS process without expecting fast results.



It is safe to assume that no country, developed or developing, meets the ideal conditions for low-carbon economic development. Treating LCDS as a quick fix for lack of strategic orientation will therefore lead to yet another ineffective climate instrument.

International support for LCDS

The national context and the readiness to develop an LCDS differ greatly across countries, and therefore a detailed prescription of the instrument (the contents, methods and tools) may be impossible and counterproductive, and would not do justice to this variation across countries. A standardised methodology for developing an LCDS, or restrictions on the timing of its preparation process, may be ineffective, and rather than specifying a target or producing a document, an LCDS should facilitate or provide a process that, depending on the developing country's readiness, meets needs to develop and to fill capacity, knowledge and information gaps.

Technical assistance needs to support a process that has its own pace, and should allow for flexibility and tailoring to the national context and the specific expectations about the LCDS process. Support for developing an LCDS could focus on individual building blocks or on the process. Ensuring buy-in and ownership of the development and outcomes of the LCDS, requires stakeholder involvement and participation.

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Abbreviations

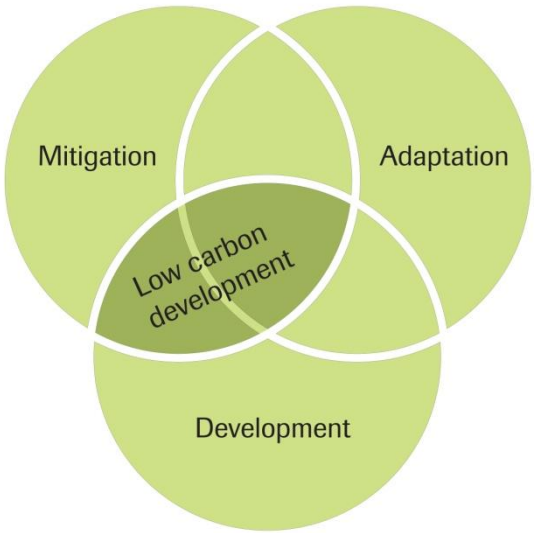
AWG-LCA	Ad-hoc Working Group for Long-term Action under the Convention
BAU	business as usual
CDM	Clean Development Mechanism
COP	Conference of the Parties to the UNFCCC
ESMAP	Energy Sector Management Assistance Program
GDP	Gross Domestic Product
GHG	Green house gas
IIED	International Institute for Environment and Development
IPCC	Intergovernmental Panel on Climate Change
LCDS	Low-carbon Development Strategy
LCGP	Low-carbon Growth Plan
LEDS	Low Emission Development Strategy
LTMS	Long Term Mitigation Scenarios
LULUCF	Land-use, Land-use change, and forestry
MDA	ministries, departments and agencies
MRV	Measurement, Reporting and Verification
NAMA	Nationally Appropriate Mitigation Action
NC	National communication to the UNFCCC
NREL	National Renewable Energy Laboratory
OECD	Organisation for Economic Co-operation and Development
REDD	Reducing Emissions from Deforestation and Degradation
TNA	Technology Needs Assessment
UNDP	United Nations Development Programme
UNEP	United National Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
Ghana	
EC	Energy Commission
ENRAC	Environmental and Natural Resources Advisory Council
EPA	Environmental Protection Agency
FC	Forestry Commission
MEST	Ministry of Science and Technology
MoFEP	Ministry of Finance and Economic Planning
NCCC	National Climate Change Committee
NCCPF	National Climate Change Policy Framework
NDPC	National Development Planning Commission
Indonesia	
DNPI	National Climate Change Commission
MoF	Ministry of Forestry
MoE	Ministry of Environment
MEMR	Ministry of Energy and Mineral Resources

1 INTRODUCTION

Finding a way to simultaneously address climate change and advance development may be regarded as one of the key challenges of the 21st century. Low-carbon development is a development paradigm that contributes to addressing these twin challenges. It seeks to promote economic growth or (sustainable) development while keeping greenhouse gas emissions low, or lower than without interventions.

The UNFCCC climate negotiations acknowledge that countries could benefit from developing a 'low-carbon development strategy' (LCDS). The Cancun Agreements indicate that there is a need to provide incentives to support the development of LCDSs. However, if and how this perceived need will be translated into concrete policies or actions is still under discussion.

The aim of this report is to help move forward the discussion on LCDS as a useful climate policy instrument. It does so through providing a perspective on existing experiences with the use of an LCDS in the national and international context in order to provide high-level guidance to governments and experts who plan the development of an LCDS. The report focuses on low-carbon development strategies in a developing country context, and on the way in which developing such strategies can be supported as part of international climate policy under the UNFCCC.



In this report the term LCDS is used to describe strategies that reconcile development and mitigation (see Figure 1), only including adaptation technologies that do have a mitigation component.

Figure 1: Low-carbon development at the intersection of development and mitigation

The development and climate challenges

If economic growth in developing countries follows the carbon-intensive path that fuelled the rise of most developed nations, this will have serious consequences for the global climate. It is estimated that to avoid potentially dangerous effects from climate change, global GHG emissions need to be reduced by 50% from 1990 levels in 2050. Analysis shows that the climate problem cannot be addressed by emissions reductions in developed countries alone (IEA, 2009), and a significant part of the reductions would have to come from developing countries (IPCC, 2007).

At the same time, the world population is projected to grow steadily, and economic development is (and should be) a key priority for most developing countries. To allow for growth while keeping

emissions below 'business as usual' in developing countries, a significant flow of technology, capacity and finance from the developed to the developing world will be required.

Projected emissions' increases are strongly linked to economic activity and energy use. In 2008, around two-thirds of global greenhouse gas (GHG) emissions were energy-related (IEA, 2010) and 90% of the growth in primary energy demand to 2030 is projected to take place in non-OECD countries (IEA, 2009). The 'business as usual' projections of the World Energy Outlook, which effectively describe a high-emissions growth path, puts the world on a trajectory to GHG concentrations of 1000 ppm CO_2 eq between 2100 and 2150, and potential global temperature rises of up to 6 degrees (IEA, 2009; IPCC, 2007).

A quarter of the current global population in developing countries lives in poverty, 1.6 billion people lack access to electricity, and 2.5 billion depend on traditional biomass for cooking (World Bank, 2010). At the same time, the global population is expected to grow up to 10 billion by 2050 and total economic activity may quadruple during that period. The associated growth in energy, industry and transport is projected to take place predominantly in low and middle income countries (IEA, 2009).

The relationship between climate and development goes two ways. While economic development under a business as usual scenario leads to higher GHG emissions causing climate change, in the medium and longer term, climate change can hurt development. Although not unequivocally linked to global climate change, consequences of locally-induced climate change can give an impression of what is coming. For example, in the fragile ecosystems of the Sahel zone in sub-Saharan Africa or Inner Mongolia in China, changing rainfall patterns already have huge impacts, affecting the livelihoods of thousands of people.

Support for low-carbon development under the UNFCCC

Over the years, various countries have developed national strategies that attempt to integrate sustainable development, economic growth and climate change mitigation. However, only recently has this notion of integrating these fields on a national policy making level been introduced in the international climate negotiations as low-carbon development strategies (also known as low-emission development strategies, or low-carbon growth plans). It has been included in the negotiating texts under the United Nations Framework Convention on Climate Change (UNFCCC) since the run up to COP15 in Copenhagen in 2009 and is part of both the Copenhagen Accord (UNFCCC, 2009a) and the Cancun Agreements (UNFCCC, 2011). Although the text states that creating an LCDS is 'indispensible for sustainable development', little guidance is given as to how an LCDS can be most effective. Furthermore, although the need for providing incentives in support of LCDS is acknowledged (UNFCCC, 2011), there has been limited progress towards making such support a reality.

Approach

Against this backdrop, this study explores the following questions:

1. What are the prerequisites for developing an effective LCDS, and what can a country do if these prior conditions are not (entirely) met from the start?
2. Given the large variety in countries' development contexts and in 'readiness' to engage in an LCDS, how can international support for the development of an LCDS work in practice?

Our analysis is based on a 'general track' and on two 'country tracks'. The general track uses a combination of desk research, interviews with experts, and interactions with the wider climate policy community at UNFCCC side events (COP15 in Copenhagen, SB32 in Bonn, and COP16 in Cancun). In

the two 'country tracks' national teams of government representatives and experts in Ghana and Indonesia worked together with the researchers from ECN to explore what an LCDS would mean for the two countries and how far they have progressed in the process of developing such as strategy (see Annex 1 for a detailed description of the research approach).

Reading guide

Chapter 2 presents background information on LCDS: It explains how LCDS is grounded in the literature on climate and development policy and how the concept emerged in the international climate negotiations. Chapter 2 also goes into a potential purpose and building blocks of an LCDS. Chapter 3 discusses practical experiences with LCDS, including four examples of national strategies, as well as the country case study findings of Ghana and Indonesia. Chapter 4 presents some reflections on the use of LCDS as an international climate policy instrument and how it may interact with other policy instruments currently under discussion under the UNFCCC climate change negotiations. Chapter 5 finally provides guidance and makes recommendations on the development of an LCDS and its use as an international instrument.

2 LOW-CARBON DEVELOPMENT STRATEGIES

This chapter first presents the background against which the concept of low-carbon development strategies (LCDS) has emerged and how it has been taken up in the climate negotiations. It then describes in more detail what the scope and purpose of an LCDS can be and which elements (or 'building blocks') an LCDS may contain.

2.1 Background

Low-carbon development seeks to promote economic development while keeping GHG emissions low, or lower than without interventions. Although the term low-carbon development has been introduced as part of the international climate negotiations only in 2009, aligning climate and development is not new, and various countries have designed and implemented integrated national strategies and policies (see examples in section 3.1). The discourse of integrating climate change and development builds on a large body of literature. The IPCC assessed much of this literature on climate change mitigation and sustainable development in its fourth assessment report (Sathaye *et al.*, 2007), distinguishing between the traditional "climate-first" approach and a "development-first" approach.

The "climate-first" approach focuses on mitigation policies and measures which are undertaken with the explicit goal to reduce GHG emissions. These policies and measures, which very often have development co-benefits, are expected to play an important part in mitigating the risk of climate change (Sathaye *et al.*, 2007). This climate-first approach, however, does not necessarily question more structural development choices and existing high-emission pathways. For this reason, combating climate change based on climate-first mitigation actions only (i.e. without rethinking the structure of the economy itself) is expected to be very difficult and costly (Morita *et al.*, 2001).

The "development-first" approach is an alternative approach for addressing climate change, which rethinks development planning and comes up with more structural solutions (such as alternative infrastructure and spatial planning) that have lower emissions to start with (mitigation co-benefits) (Morita *et al.* 2001). Due to its development perspective, the development-first approach is attractive since it can be aligned with the interests of local stakeholders (Winkler *et al.*, 2002). In practice, many policies and measures fit within both the climate-first and the development-first approach, but the difference between the approaches lies in the primary focus of the policy makers in terms of priorities.

How to make a development-first approach operational has been explored in work on "sustainable development policies and measures", or SD-PAMs (Winkler *et al.* 2002; Bradley *et al.*; 2005, Ellis *et al.*, 2007). Implementation of such integrated development and climate strategies is expected to take place mostly on the level of sectoral policies and programmes. A 2009 special issue of Climate Policy explores by means of six developing country case studies, how sectoral development policies can impact carbon emissions (Neuhoff, 2009). For instance, in the Brazilian transport sector new transport policies designed to reduce congestion, accidents and travel costs have significantly lower emissions: shifting from private road transport to buses, and moving freight transport from the road

to trains and ships therefore benefits development *and* climate (Machado-Filho, 2009). Similarly, in the Indian steel sector, a development-first approach to planning domestic policies has led to significant fuel savings and benefits to the broader Indian economy (Sreenivasamurthy, 2009). A long list of similar real-world examples exists (see also Sathaye *et al.*, 2007).

While peer-reviewed literature makes a strong case for the integration of climate and development policy, the question of how to achieve a full transformation to a low-emission development pathway is not answered in full (Metz, 2008). This transformation would not only challenge old habits and practices but also entrenched value systems. It is clear that, depending on national development prospects and capacities, each country needs to work out its own approach to low-carbon development (Mulugetta and Urban, 2011). Moreover, trade-offs exist: it is an illusion to think that pure win-win situations between addressing climate change and pursuing development exist in all cases (Kok *et al.* 2008). Especially in the short term, coal-fired power and grid extension and fossil-fuel-based transport constitute the most cost-effective options for many countries.

2.2 LCDS in the climate negotiations

In 2007, the Bali Action Plan (UNFCCC decision 1/CP.13) established the notion of a link between mitigation actions undertaken by developing countries, and support on finance, technology and capacity building by developed countries. In the two years leading up to the COP15 conference in Copenhagen, Parties worked to concretely define this link between mitigation actions and required support. Within this context, the term "low-carbon development strategy" (LCDS) first appeared in the April 2009 submission to the UNFCCC called 'A negotiation text for consideration at the AWG-LCA 6' by the European Commission (2009):

> [.] The EU proposes to include in the negotiation text the concept of low-carbon development strategies (LCDS), as the structure for developing countries to indicate their contribution to the global mitigation effort and to describe the nationally appropriate mitigation actions (NAMAs) they intend to undertake in order to realise this contribution, as well as to indicate what support would be necessary to enable these NAMAs.

The original text further specifies that the LCDS could include,

> [.] "when relevant, what type of support (in terms of finance, capacity-building and technology) [the developing country] considers most appropriate to enable the implementation of the NAMA".

Three months later, the concept was discussed under the name 'Low-carbon Growth Plans' at the Major Economies Forum on energy and climate in L'Aquila in Italy, where the leaders of 17 major economies pledged that their "countries will undertake transparent nationally appropriate mitigation actions, subject to applicable measurement, reporting, and verification, and prepare low-carbon growth plans" (White House, July 2009). Concepts similar to the LCDS proposal by the EU have been submitted by a number of other countries. McMahon (2009) presents a list of the terminology used by different parties.

During subsequent meetings of the ad-hoc working group on long term cooperative action (AWG-LCA) the LCDS concept remained in the negotiating text and was eventually adopted into the Copenhagen Accord (UNFCCC, 2009a) as 'low-emission development strategy'[1]:

> -/CP.15 [.] "and bearing in mind that social and economic development and poverty eradication are the first and overriding priorities of developing countries and that a low-emission development strategy is indispensable to sustainable development."

The Copenhagen Accord no longer establishes a direct link between LCDS and NAMAs (in contrast to the EU proposal). At the 2010 Cancun climate conference, phrasing of low-carbon development moved further towards a more general development paradigm. The Cancun Agreements (UNFCCC, March 2011) explicitly refer to the importance of national economic development priorities and propose that LCDS should be mandatory for developed countries and encouraged for developing countries:

> 1/CP.16.10. [.] Realizes that addressing climate change requires a paradigm shift towards building a low-carbon society that offers substantial opportunities and ensures continued high growth and sustainable development, based on innovative technologies and more sustainable production and consumption and lifestyles, while ensuring a just transition of the workforce that creates decent work and quality jobs;
>
> 1/CP.16.6 [.] Parties should cooperate in achieving the peaking of global and national greenhouse gas emissions as soon as possible, recognizing that the time frame for peaking will be longer in developing countries, and bearing in mind that social and economic development and poverty eradication are the first and overriding priorities of developing countries and that a low-carbon development strategy is indispensable to sustainable development;
>
> 1/CP.16.45 [.] *Decides* that developed countries should develop low-carbon development strategies or plans;
>
> 1/CP.16.65 [.] *Encourages* developing countries to develop low-carbon development strategies or plans in the context of sustainable development
>
> 1/CP.16.79 [.] *Aware* of the need to provide incentives in support of low-emission development strategies,

2.3 Purpose of an LCDS

Low-carbon development typically focuses on reducing emissions (e.g. in energy, industry and agriculture) and increasing carbon sequestration (e.g. through improved forest management). The term 'low-carbon' does not necessarily imply that overall emissions in a country will decrease , but it does mean an emissions trajectory *below* business as usual, i.e. below what would happen without additional policy interventions.

[1] It appears that in the UNFCCC negotiating texts the terms low-carbon development strategies (LCDS) and low emissions development strategies (LEDS) are used interchangeably.

Even though the term LCDS (or LEDS) has been in the negotiating texts of the international climate negotiations for almost two years, and the term low-carbon development has been used frequently, there is currently no internationally agreed definition (Mulugetta and Urban, 2010).

The ultimate *aim* of a low-carbon development strategy is to catalyse concrete actions that support development, but with less emissions than without intervention. To establish this, an LCDS can serve different audiences and have different purposes depending on the stakeholder.

Government

For governments an LCDS can be (1) used to present a long term vision on climate and development and a strategic low-carbon development pathway. As such the LCDS may be used to identify how a country can benefit from pursuing a low-carbon development pathway, and present opportunities, long-term goals, and country-driven priorities for actions in key sectors. As input for political decisions, an LCDS can present the evidence base in terms of potentials, costs, benefits and barriers to implementation and can be used as to guide implementation. Moreover it can report on the monitoring of progress and impacts.

An LCDS can also be used to (2) establish a policy framework in which policies across different sectors are put in place and aligned. This policy framework can provide the overview and show where more interventions are warranted.

In addition, an LCDS can be used to (3) increase awareness on climate change with stakeholders and present what low-carbon development could mean for them: how are the different government bodies involved, which sectors are given priority and what actions are foreseen, and how does it affect the day-to-day life of the general public. Increased awareness and engagement with stakeholders may give government an opportunity to solicit feedback on their current and planned interventions.

Climate support and private sector

Most low-carbon development actions require significant investments. While some investments will need to be done by government, many will require private sector investors. An LCDS can identify what is needed to (4) establish a favourable investment climate for low-carbon development actions, and signal to potential investors what the long-term ambitions and priority sectors are, and what interventions, such as regulatory frameworks or policies, the government will undertake to help achieve these ambitions.

International community

Developing countries typically have donor supported programmes for climate and development. An LCDS can help (5) to identify needs and priorities, and to coordinate donor support. In relation to other international climate instruments, an LCDS can provide a coherent framework for NAMA priorities and for measurement, reporting and verification (MRV) needs.

An LCDS can function as (6) a reporting platform to the international climate change community. Signalling national emissions and expected impacts of climate change can provide insight in global trends on impacts of existing mitigation actions and prospect of future policies.

Table 1 presents the potential outcomes of an LCDS for each of the six purposes identified above. It is based on an analysis of existing strategies and on purposes and outcomes identified by the experts interviewed in the frame of this research.

Table 1: Outcomes and purposes of an LCDS

Purpose	Outcome
1. Long term vision and low-carbon development pathway	A clear signal to government, private sector and civil society on the preferred national low-carbon development pathway, and the actions required to achieve this. In addition to the benefits, this may include the budget required and the sources of finance.
2. Proposed government interventions	Information on what policies and regulations the government seeks to establish to support and guide the low-carbon development process.
3. Increased awareness	Clarity how low-carbon development can be interesting for stakeholders, and what benefits and opportunities it can offer.
4. Required investments from the private sector	Insight in what is expected from the private sector in terms of investments in low-carbon technologies, and how the government will support a favourable investment climate.
5. Assessment of support needs	Present what the domestic needs are in terms of finance, capacity building, technology and institutional setup. This may include a link to international donor support.
6. Report to international community	Insight in past and future global efforts towards climate change mitigation.

2.4 Building blocks for an LCDS

Depending on the purpose(s) and the availability of resources, an LCDS may have different building blocks, or elements. It is proposed to consider the development of an LCDS in three main stages: (i) Assessing the current situation; (ii) analysing low-carbon alternatives, their consequences, and determine are national priorities; (iii) and identifying policy aims, required actions for all stakeholders involved, and the necessary government interventions to support these actions. Depending on the specific national circumstances and the purpose of the LCDS, the final strategy may include only a selection of building blocks and certain elements may be included more or less prominently. Moreover, specific circumstances may require additional elements. Table 2 presents a suggestion for building blocks that could make up an LCDS.

Table 2: Building blocks for an LCDS

Assessment of the current situation	Analysis of low-carbon development alternatives	Identification of policy aims, actions, and interventions
• **Data collection**: What do the available data show on socio-economic indicators, greenhouse gas emissions, and existing policies and regulation. • **Capacity assessment:** Is there capacity available domestically to analyse the climate and development data? • **Stakeholder mapping:** Who has an interest in low-carbon development, and what are their roles and responsibilities? • **Institutional setup:** Which government ministries, departments and agencies are involved and what are their roles and mandates?	• **Identify actions:** What are costs, mitigation potential, and development benefits? • **Identify gaps and barriers:** What are the reasons that actions are not implemented currently? • **Scenarios and modelling:** What would be alternative development pathways and with what emissions impact? • **Baseline and targets:** What would be the business as usual situation (baseline) and what targets correspond to the alternative low-carbon development pathways. • **Policy and impact assessment:** Which policies and regulations can be used and what are the expected impacts on development and climate. • **Priorities:** What are the priority sectors and actions, and what are the trade-offs when choosing one over the other? • **Needs assessment:** What are the domestic needs in terms of finance, capacity building, technology and institutional setup.	• **Long term vision:** What is the preferred low-carbon development pathway (policy aim)? • **Targets and actions:** What are the targets that the government sets itself, quantitative or qualitative, and which actions do these require? • **Finance:** What budget is required and where does that come from (national budget, private investment, donor support)? • **Government intervention:** Which policies and regulations will the government establish to support low-carbon development? How are these integrated? • **Private sector investments:** What level of investments in low-carbon technologies is expected from private sector investors and entrepreneurs? • **International support:** How are the required actions linked to the international climate support framework (such as NAMAs and MRV)? • **Plan for implementation:** What are the roles and responsibilities of all stakeholders? • **International reporting:** Depending on the outcome of the negotiations, an LCDS may have to meet reporting requirements (future, if at all).

Source: NREL (2009); Clapp *et al.*(2010) and own research

3 PRACTICAL EXPERIENCE WITH LCDS

3.1 Examples of national strategies

There are a number of existing experiences with the development of LCDS, or integrated national climate strategies, which can provide lessons for future ones. The earliest climate strategies date back more than 20 years, some of which contain elements of a low-carbon development strategy. For example, in 1990, the German "Inquiry Commission on Preventive Measures to Protect the Earth's Atmosphere" already suggested an emission reduction target for (West) Germany of 25% until 2005 relative to 1989. In the years following the adoption of the 1997 Kyoto Protocol, climate strategies with ample attention for economic development emerged in many developed countries, which were faced with implementing the emission reduction commitments they had agreed upon. That is not to say that developed countries have progressed to having exemplary low-carbon development strategies: the German 2005 emission reduction target was never met (Michaelowa, 2010) and in The Netherlands, for example, the 2007 Clean and Efficient programme (VROM, 2007) was abandoned in 2010 as a result of shifting political priorities.

Over the past five years, several emerging economies with substantial GHG emissions, notably Brazil, China, India, Indonesia, South Africa and South Korea have developed integrated strategies on climate change and development or low-carbon growth. Moreover, a number of least-developed countries have elaborated integrated climate and development strategies, or are currently in the process of doing so, for instance Guyana, Papua New Guinea, Bangladesh, Rwanda and Kenya. Due to the limited data, resources and capacities in these countries, many developing country processes rely strongly on international support both for funding and for technical assistance.

Annex 2 presents a selection of existing plans by developed and developing countries[2]. These plans have varying degrees of detail, and national implementation efforts differ. The strategies resemble LCDSs in the sense that most of them have both a national focus, assigning responsibilities to government bodies and outlining measures for implementation of mitigation actions, as well as an international focus, stating GHG emission reduction targets and/or the need for international support for mitigation measures.

When asked for successful existing integrated climate strategies in developing countries that stand out for the impacts they achieve, experts interviewed found it difficult to name examples, as it was deemed too early to tell if existing strategies have the desired effects. However, it was mentioned that some countries, e.g. Mexico and Guyana, succeeded in attracting international finance by being an early mover and showing a pro-active approach. South Africa was mentioned as an example of a thorough stakeholder process that developed a stronger awareness and buy-in among decision-makers in the country on alternative development paths, including the private sector. South Korea

[2] Due to the rapid development in this field and the large number of plans, the table may not be comprehensive.

was mentioned a case in point for aiming to integrate climate and industry politics at a high-level of political decision making. To illustrate the differences in purposes and approaches of the integrated national climate strategies in these four countries, their strategy development processes are described in more detail below.

South Africa

The "Long Term Mitigation Scenario" (LTMS) process in South Africa is frequently cited as a model example for a successful bottom-up and stakeholder centred process of modelling low-carbon development paths. This LTMS-process explored how the country could meet international commitment to help stabilise greenhouse gas emissions while sustaining its priorities of poverty alleviation and job creation (Raubenheimer, 2007). The LTMS process was initiated by the Department of Environment and Tourism in 2005. The associated participatory, research-based scenario building process, which involved a large number of stakeholders, was conducted by the Energy Research Centre of the University of Cape Town. After 3 years, the scenario building process was finalised with the publication of the LTMS strategy paper in July 2008 (Winkler, 2008), the outcomes of which were presented to and endorsed by the South African Cabinet.

The original goal was to initiate a participatory climate change policy development process following the analysis. Since then, the South African Cabinet has taken some overarching decisions, such as a commitment to follow a "peak, stabilisation and decline" greenhouse gas trajectory over the next 60 years, and strengthen existing initiatives in the fields of energy efficiency, renewable energy, and the development of "green" industries. The government is now working on a comprehensive Climate Change Response Policy (Ellis *et al.*, 2009b; Government of South-Africa, 2009). A draft National Climate Change Response Green Paper was published for stakeholder consultation in November 2010. The final White Paper on the climate change response strategy is expected to be completed in the course of 2011 and to be translated into a legislative, regulatory and fiscal package by the end of 2012 (Ellis *et al.*, 2009b; Government of South-Africa, 2009). Although initially driven by the goal of defining South Africa's position in the international climate negotiations, the extensive participatory process seems to have contributed to national awareness and stakeholder buy-in which is expected to facilitate the adoption and implementation of concrete climate change related policies.

Mexico

In 2005, The Mexican Government formed a commission on climate change, which developed the National Climate Change Strategy (Estrategia Nacional de Cambio Climático)[3]. In 2007, this strategy was followed by a three-year Special Programme on Climate Change (Programa Especial de Cambio Climático) 2009 - 2012, based on the strategy, the National Development Plan and 17 sectoral reviews (WRI, 2009).

The three-year programme aims at implementing concrete policies and measures, and demonstrating that it is possible for Mexico to take on mitigation measures without compromising development. It is presented as a voluntary programme undertaken with national resources, and containing about

[3] Available at http://www.semarnat.gob.mx/queessemarnat/politica_ambiental/cambioclimatico/Pages/estrategia.aspx (last accessed May 2011)

100 qualitative and quantitative targets, most of which have a deadline in 2012. In addition, the document presents a long-term vision and scenario until 2050. It is based on internal analysis of the Ministry of Environment and Natural Resources, on work undertaken in the frame of the World Bank's Low-Carbon Growth Country Studies Programme (see Section 3.2) and on a study by McKinsey and the Centro Mario Molina (Mexico Comisión Intersecretarial de Cambio Climático, 2009; WRI, 2009). The extensive technical analysis, a parallel iterative policy making process and strong international interest in supporting Mexico's efforts all assisted in attracted international financing for implementation of some measures. For instance the World Bank's Clean Technology Fund Investment Plan for Mexico bases its strategy on the measures suggested in the Special Programme on Climate Change.

According to Mr. Fernando Tudela, Vice Minister for Planning and Environmental Policy, the following were considered success factors for the development of the Special Programme on Climate Change: [4]

- Strong commitment by the President of Mexico;
- An inter-sectoral institutional structure that allows for cooperation across ministries (in the case of Mexico this is the Inter-ministerial Climate Change Commission, supported by an advisory council on climate change);
- Voluntary GHG emissions reporting by businesses and the establishment of a comprehensive system for GHG inventories.

Guyana

Among developing countries, Guyana, a South American country with a population of under one million, is one of the first movers on creating a low-carbon development strategy. Guyana started the development of an LCDS at the end of 2008, and published the first draft strategy called "Transforming Guyana's Economy While Combating Climate Change – A Low-carbon Development Strategy" in June 2009 (Republic of Guyana, 2009). The efforts were initiated and led by President Bharrat Jagdeo, who is a strong advocate of the LCDS concept. The technical analysis for the strategy, including a valuation of Guyana's forest, was undertaken by McKinsey. The LCDS addresses both mitigation and adaptation, with abatement opportunities focusing on avoided deforestation. It includes a detailed description of how a REDD+ (Reducing Emissions from Deforestation and Forest Degradation) mechanism could work in Guyana. In addition there is a description of further measures and investments needed to create a low-carbon economy, to adapt to climate change and to include indigenous communities into the planning (Republic of Guyana, 2009).

Stakeholder engagement took place after data collection and technical analysis were done, and after the draft policy recommendations had been published. This led to some criticism especially by the country's indigenous communities on the top-down process and the initially limited input by civil society.[5] A review of the stakeholder consultation process by the International Institute for Environ-

[4] Statement made at the UNFCCC Climate Conference in August 2010 in Bonn.

[5] For a critical voices on Guyana's LCDS, see for example the following links (last accessed May 2011):

ment and Development (IIED) found that it could be considered credible, transparent and inclusive. However, the review team did note that limitations included, *inter alia* (IIED, 2009):

- Exclusion of the political opposition from the consultation;
- Inadequate ability for remote communities without access to internet to give feedback;
- Lack of understanding of the public of certain instruments in the LCDS, e.g. of the carbon market and the forests as carbon storage;
- Insufficient analysis of the potential advantages and disadvantages of the LCDS, which would help the public to better understand the risks of the strategy.

Following the stakeholder consultation process and the latest developments in the international climate negotiations, in May 2010 the third version of the Low-carbon Development Strategy was published (Republic of Guyana, 2010). In parallel, the government moved forward with securing financing: in July 2010, the presidents of Norway and Guyana announced the establishment of the Guyana REDD+ Investment Fund (GRIF), to be managed by the World Bank. Norway intends to contribute an initial USD 30 million to the fund at its establishment, and up to USD 250 million between 2010 and 2015, depending on Guyana's performance in avoiding deforestation and forest degradation, and strengthening inclusive and transparent forest management. Guyana intends to invest the funds in the implementation of the LCDS. In addition, the country is actively seeking for private investors in agri-industrial ventures in order to diversify its economy away from a higher carbon business-as-usual pathway (Republic of Guyana, 2010).

South Korea

South Korea has taken strong action on low-carbon development or, as the government calls it "Green Growth". South Korea's proactive stance can be largely attributed to several factors:

- South Korea is highly dependent on fossil-fuel imports, i.e. 97% of South Korea's total energy is imported.
- Prior to the 2009 Copenhagen climate conference, the United States, the EU and Japan put sustained pressure on South Korea to reduce emissions, as it is a non-Annex I country, but belongs to the OECD, has a per capita income higher than that of many Annex-I countries, and has per capita emissions of over 10 tCO_2 eq/year.
- GDP growth rates had fallen from previously 7 to 9 percent to around 4 percent over the past two decades, and the government felt that there was a need for new growth drivers.
- South Korea's economy is based on industry and equipment suppliers. In order to maintain a significant market share in the long term, a local market for more sustainable products would help.

In August 2008, during celebrations of the 60th anniversary of the establishment of the Republic of South Korea, President Lee Myung-bak announced a new national vision of "Low-carbon, Green

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- http://www.stabroeknews.com/2010/news/stories/03/23/suggestions-about-amerindians-not-understanding-lcds-%E2%80%98insulting%E2%80%99-sukhai/
- http://www.chrisram.net/?tag=low-carbon-development-strategy
- http://www.kaieteurnewsonline.com/2010/04/10/amerindians-divided-over-lcds-minister-joins-protest/

Growth", which would rely on a reinforcing, synergistic relationship between environmental sustainability and economic development rather than the traditional paradigm of economic growth. This vision of Green Growth consists of four elements: a 'green' energy paradigm, a new growth engine through investment in green technology, improvements in the quality of life for the public, and contributing to the global community by addressing climate change (Duerden, 2010; Lee Maan-ee, 2010; Ministry of Foreign Affairs and Trade of the Republic of Korea, 2010; UNEP, 2010).

As first steps towards the vision, the Presidential Commission on Green Growth (PCGG) headed by the Prime Minister was established in February 2009, and includes representatives from all ministries, the private sector, academia and civil society. The PCGG adopted a long-term National Strategy for Green Growth with a time horizon until 2050, and suggested the Framework Act on Low-carbon Green Growth[6], which was passed by the National Assembly in December 2009, followed by the Enforcement Decree of the Framework Act on Low-carbon, Green Growth[7], which was adopted by the government in April 2010. The regulatory framework includes a mandatory system of reporting on carbon emissions by carbon intensive industries, and sets the basis for a carbon trading system by mandating a cap on emissions. The implementation of these plans will be supported by the newly established *GHG Inventory & Research Center of Korea* (Duerden, 2010; Lee Maan-ee, 2010; UNEP, 2010).

Before COP15 in Copenhagen in 2009, South Korea announced a mid-term target of reducing 30 percent of greenhouse gas emissions on a BAU basis by 2020. The target is voluntary and unilateral, and according to the Korean government, represents the upper band of reduction levels recommended by the IPCC for developing countries.

Korea's long-term strategy and legislative framework on low-carbon growth are complemented by the Five-Year Plan for Green Growth, which plans investments into energy efficiency measures, renewable energy and into the development of green technologies which should serve as future growth engines. According to the plan, 2% of Korea's annual GDP is to be invested in green infrastructure and R&D for green technologies.

The above-mentioned efforts are supported by incentives for companies and private investors, e.g. tax benefits and long-term, low-interest green bonds, and by a public education campaign that promotes simple rules for a lower carbon lifestyle.

Korea's efforts on Green Growth constitute arguably the most comprehensive new framework that has emerged over the past 2 years. While there is a certain international component to it, the whole programme is strongly focused on national implementation and closely links climate change policies to industry policy on clean technologies and to large-scale economic stimulus efforts .

In summary

Out of the four integrated national climate strategies described here, Korea's Green Growth strategy is most integrated into mainstream policy making. However, in terms of fully integrating climate

[6] Available at http://www.moleg.go.kr/FileDownload.mo?flSeq=30719 (last accessed May 2011).
[7] Available at http://www.moleg.go.kr/FileDownload.mo?flSeq=30708 (last accessed May 2011)

change considerations into national development planning, even Korea is surpassed by China. The Chinese 12th 5-year plan is probably among the most high-level national development plans which contain concrete climate mitigation targets: Amongst others the plan sets a target of reducing CO_2 emissions per unit of GDP by 17% between 2011 and 2015, increasing energy efficiency by 16% and forest cover by about 22%, and raise the use of non-fossil fuels to 11.4% of energy use (KPMG, 2011).

3.2 Practitioners

Especially in developing countries, early efforts for the development and implementation of LCDS rely heavily on international support for analytical work, process support and implementation, as national capacity is often limited. Given the complexity of the issues at hand and the cross-sectoral nature of most integrated climate strategies, emerging markets and developed country governments equally rely on external support, even if there is stronger capacity within the government.

As a result, national and international development organisations, research institutes and private consultants have been actively working on developing and refining methodological approaches to support countries on low-carbon development planning. Table 3 and Annex 3, however, provide details of selected initiatives focusing specifically on providing technical assistance to developing country governments. Annex 3 specifically gives information on some of the evolving methodological approaches to developing an LCDS.

Table 3: Overview of LCDS practitioners and their approach

Practitioner	Approach
World Bank: Low-carbon Growth Country Studies	ESMAP took a country-specific approach, where the priorities and focus areas of the work are determined in close collaboration with the partners in the national governments. Consequently, the scope of the studies differs.
US Government LEDS program	The US Government has launched a programme to provide support to up to 20 developing countries and emerging economies in the development of LCDS. The programme aims to provide tailored technical assistance and capacity building activities that enable each partner country to prepare its own LEDS.
The Climate & Development Knowledge Network (CDKN)	The UK and Dutch governments funded CDKN aims to support developing countries in their efforts for climate-compatible development. CDKN offers advice, technical assistance, research services, strategic knowledge sharing and capacity building to decision makers in developing countries.
The Mitigation Action Plans and Scenarios (MAPS) program	The programme aims to support government-mandated stakeholder processes in developing scenarios for long-term mitigation planning.
NREL's "Generalized Methodology for Preparation and Implementation of LEDS"	In support of the US government's LEDS programme, the NREL prepared a "Generalized Methodology for Preparation and Implementation of LEDS" to provide a framework for understanding how low-carbon planning actions and assessments that have already been undertaken in a country may fit into a comprehensive LEDS.
McKinsey and Company	McKinsey & Company has been actively offering developing countries support on low-carbon growth planning. Its analytical approach is based heavily on Marginal Abatement Cost curves and therefore take development benefits into account to a limited extent.

NB: Details and references can be found in Annex 3.

There is significant diversity in the approaches taken. Some are more stakeholder- and process-focussed, while others are stronger on products, reports and data. Limited funding and the requirements from donors to be result-oriented and accountable frequently lead to an emphasis on reports and data. Such studies, however, run a higher risk of not being implemented than a process which includes data and reporting but also stakeholder involvement, political engagement and attention to co-benefits.

3.3 Country case study: Ghana

Ghana is situated in West Africa and has a population of 24 million. It has experienced high GDP growth over the past years. According to the latest government statistics, the country has recently acquired lower middle-income country status, but a majority of its society still depends on small-scale agriculture. The main export products for Ghana are gold and cocoa, and about 80 percent of the households in one way or another depends on cocoa farming for their livelihood. Recently, oil was found of the coast of Ghana, which has fuelled high hopes that oil revenues will improve average incomes and that the associated gas will help the country to generate electricity to power its growth. Although it is relatively stable politically, Ghana is expected to be (heavily) dependent on continued donor aid in the years to come (Colijn, 2010). Additional background information on Ghana and climate change related questions can be found in Annex 4.

With estimated per capita emissions of around 1.1 tCO_2 equivalent, GHG emissions are very low. Ghana is not expected to become a significant emitter of GHG emissions over the coming years. Ghana's priority in terms of addressing climate change lies with adaptation (MEST, 2010). The impacts of changing weather patterns (possibly climate change related) are starting to become visible: an increasing temperature in the north of the country, and more frequent droughts and floods which impact agricultural yields and practices, as well as land fertility and biodiversity. As a consequence increased migration adds to pressure on urban areas (MEST, 2010).

Despite low emissions and fully justifiable adaptation priorities, there are reasons for Ghana to be interested in low-carbon development planning. In the short term, the process of developing an LCDS can help define actions that have positive economic consequences, such as improving energy efficiency, in addition to lower GHG emissions. Moreover, having an integrated strategy on how to combine climate and development and mainstream it across government policies, may put Ghana in a favourable position to attract international climate support with significant development (co)benefits. In the longer term, low-carbon technologies may help Ghana's industry, energy and transport infrastructure to keep up with the high projected growth (Würtenberger *et al.*, 2011)

Current status of LCDS and institutional setting in Ghana

Ghana has been active in the field of climate change for many years, with a history of initiatives and programmes dating back to the early 1990s. Moreover, for a long time Ghana has played an active role in the African group and on diverse thematic areas in the international climate negotiations. Würtenberger *et al.* (2011b) present an overview of the most prominent climate initiatives in the country. The majority of these initiatives fall into three thematic areas: general adaptation, forestry, and energy. Some projects have led to effective implementation, like the placement of 6 million efficient light bulbs in Ghanaian households, while other projects encounter serious barriers such as stakeholder opposition (in the case of public transport reform) or energy price regulation (in the case of renewable energy).

Climate change policy is the responsibility of the Ministry of Science, Environment and Technology (MEST), but most of the institutional knowledge and expertise on climate change resides with the implementing agencies. The climate change unit in the Environmental Protection Agency (EPA) historically has strong links to the international climate community, while experts in the Energy Commission and the Forestry Commission have a more national focus. In 2007, the National Climate Change Committee (NCCC) was (re)instituted to coordinate climate change activities and advise the Minister of MEST. The National Climate Change Committee (NCCC) consists of 20 people representing ministries, departments and agencies (MDAs), civil society and development partners. It is an advisory body that convenes irregularly and membership is not a full-time occupation. At the policy level, climate change is the responsibility of MEST, but the recently re-instated ministry is currently understaffed. In addition, the Environmental and Natural Resources Advisory Council (ENRAC), chaired by Vice President Mahama, has recently been introduced. The National Development Planning Committee (NDPC) is in charge of development planning, while the Ministry of Finance and Economic Planning (MoFEP) is responsible for the budget allocation process.

The Government of Ghana currently has no explicit climate change policy, but in 2010 it has started the development of a National Climate Change Policy Framework (NCCPF), with the aim of "ensuring a climate resilient and compatible economy while achieving sustainable development and equitable low-carbon economic growth for Ghana" (MEST, 2010). The NCCPF contributes to the GSGDA (Ghana Shared Growth and Development Agenda), the main development policy strategy. At the time of writing, part one of the NCCPF (i.e. the 'Ghana goes for green growth' discussion document) has been published and presented both to a national audience in Accra and to the international community in Cancun.

There are currently no ongoing low-carbon development studies in Ghana. Several studies related to climate change have been conducted, most of which focus on adaptation. In cooperation with Ghanaian experts, ECN has recently published a series of policy briefs on concepts and topics related to low-carbon development (Tilburg and Würtenberger, 2010).

Challenges

In general terms, Ghana faces three challenges when pursuing low-carbon development: a low availability of high quality data on emissions, low availability of analytical capacity, and the low awareness of the opportunities offered by low-carbon technologies. These factors pose challenges for developing a complete LCDS without first improving the "readiness" of Ghana.

The quality of economic and emissions data is low and uncertainties are high. Data are not collected for climate change purposes, so an interpretation step is always needed. It is only compiled when requested for and funded through the National Communications to the UNFCCC. The second national communication was finalised at the end of 2010, covering data until 2005. Data collection is further complicated by the fact that the "owners" of the data are not always willing to share them, and sometimes require payment. Work on the GHG inventory is led by the Environmental Protection Agency (EPA). There are no links to the Ghana Statistical Service and no adequate archiving strategy for the data exists.

Although there are knowledgeable experts in government, academia and research NGOs on different climate change in the countries, overall capacity to analyse and interpret climate change-related information in Ghana is still limited. Moreover, there is a strong pull for specialised experts to pursue

job opportunities abroad. Consequently, there have been discontinuities in the institutional capacity on climate change. In addition, although a few individual experts do have a good overview of the activities in their field of expertise, the information seems to be inaccessible to a wider group of stakeholders. In addition, stakeholders do not share information much (Würtenberger *et al.*, 2011b).

The awareness that low-carbon technologies may support an alternative, attractive economic development pathway for Ghana – and that it may pose business opportunities – is limited, which doesn't provide a strong basis for low-carbon development planning.

3.4 Country case study: Indonesia

Indonesia is a nation consisting of thousands of islands in Southeast Asia, and with 243 million inhabitants, the fourth most populated country in the world. Indonesia is an emerging economy which has experienced high growth rates of around 6% over the past years, and is expected to continue to grow at this pace (Maasdam, 2010). At the same time, around one-fifth of the population is currently living below the poverty line. In recent years, the demand for energy has outgrown domestic production and Indonesia has become a net importer of oil and gas[8]. Indonesia is, however, the second largest exporter of coal (IEA, 2009). The industry and services sectors are the main contributors to the Indonesian economy (see Table 9 in Annex 5), but at the same time a large number of households still depend on agriculture (over 40% of the work force). Additional information on Indonesia and climate change related questions can be found in Annex 5.

With highly fluctuating GHG emissions of over 6 tCO_2 equivalent per capita, emissions are relatively high compared to the level of economic development. In absolute terms, Indonesia ranks among the world's top emitters – mainly as a result of the emissions from land use change and forestry. Peat lands are a major source of emissions (through fires and degradation). GHG emissions vary significantly from one year to the next as the extent of forest fires on peat land strongly depends on local weather conditions, which to some extents are result of extreme weather due to climate change.

Why would Indonesia be interested in a low-carbon development strategy? Developing an LCDS can identify low-carbon technologies and measures that offer economic opportunities. On the issue of forestry and land use, an LCDS may identify how international cooperation can help create an alternative livelihood for those who depend on forestry and certain types of land use, similar to Guyana (see Section 3.1). Energy efficiency is another area that can be explored by developing LCDS. Energy efficiency can lift some of the burden of Indonesia's power system, which is hardly keeping up with growth levels. For the medium to long term, moving away from a high carbon pathway can improve energy security of supply by diversifying energy sources. However, the Indonesian energy sector is complex and there are a number of barriers preventing a switch to low-carbon options: Although domestic oil reserves are declining, Indonesia does have large local coal reserves and is one of the world's largest coal exporters. Moreover, electricity prices are subsidised, and various previous efforts to reform the subsidy system have not led to any lasting changes. Relatively low electricity

[8] It has left OPEC in 2008.

prices provide little incentives for energy efficiency measures or for private investments in power generation capacity (including alternative sources such as geothermal and marine energy).

Current status of LCDS in Indonesia

Current legislation on environmental issues is extensive and detailed, but enforcement is often weak (University of Gothenburg, 2010)). In August 2009, the Government of Indonesia enacted Act no. 32/2009 on Environmental Protection and Management to replace the Act no. 23/1997 on Environmental Management. Under the new act, procedures and enforcement are clearly defined. At the time of writing though, the relevant Government Regulations as the guidance for its implementation are not yet finalised.

Over the past years the Government of Indonesia has been active in the field of climate change, highlighted in 2007 when the 13th annual COP meeting was held in Bali. Furthermore, at the Pittsburgh G20 meeting, Indonesia committed to voluntary, non-binding emission targets of 26% by own actions and up to 41% with international support. This pledge was reiterated in Copenhagen at COP15. Given Indonesia's especially highly variability in annual GHG emissions, the choice of the emissions baseline is key when measuring progress against this target.

Indonesia has secured substantial support from donor countries for addressing climate change[9]. Attracting this funding for climate change has not been without controversy, as critics assert that it may not be spent effectively to address the effects of climate[10]. Similarly, some donor countries have claimed their support to Indonesia as part of their climate change funding without clear criteria and definition.

Indonesia has done various studies and strategies on climate change, both on the national and on sectoral levels – although some strategic studies exist on regional/district level (e.g. for East Kalimantan). The studies have been carried out by different government bodies (e.g. DNPI, Bappenas, Ministry of Finance) in cooperation with international (donor) organisations such as the World Bank, GTZ and McKinsey & Company. Most of the efforts have been made with bilateral or multilateral support in the form of technical assistance (see Annex 6 for an overview).

Challenges

Our case study in Annex 6, conducted mid-2010, revealed limited coordination and information exchange between the various initiatives. There is a general lack of overview in terms of which efforts are underway or have already been undertaken. Interviewed experts share the observation that there is little coordination in Indonesia within the government or between the donors and intergovernmental organisations. This lack of coordination could potentially lead to overlap between studies and differences in assumptions and approaches. On the positive side, having multiple efforts run in parallel can help raise awareness, and foster engagement and discussion.

Although technical capacity and availability of data can both also be improved, these are currently not the bottleneck in the process towards an LCDS. The challenge is to work towards a common set

[9] USD 900 million worth of loans from the World Bank, Japan and France and a USD 1 billion grant from Norway.

[10] As one expert suggested, the governance structure doesn't require the spending to be subject to performance indicators and periodical review, so this built-in incentive for being output focused on climate change is missing.

of assumptions for low-carbon development studies, and eventually bring the views together before it can be the basis for a nationally integrated and broadly accepted ‘low-carbon development strategy’.

4 INTERNATIONAL SUPPORT FOR LCDS

The previous chapter presented practical experience on LCDS development on a national level where it interacts with existing national policies and strategies such as sectoral development plans, poverty reduction strategies and environmental policies. Because support for developing an LCDS has been proposed as an international climate policy instrument, this chapter discusses potential interactions with selected international climate policy instruments, both existing and new. The chapter concludes by discussing reactions to the introduction of LCDS under the UNFCCC, and lists some of the open questions.

4.1 Linking LCDSs with international climate instruments

In the context of the current international climate policy arrangements, the UNFCCC and its Kyoto Protocol, there are a number of existing international policy instruments which could be linked, or have interaction, with LCDS at the national level. Following the Cancun Agreements of December 2010, a number of new instruments are under discussion. A selection of current and new international climate policy instruments is listed in Table 4. The existing instruments, the Clean Development Mechanism, Technology Needs Assessments and National Communications, are mature. The role that LCDS can play next to these instruments can be readily examined. This is different for the new international climate policy instruments: as there is no consensus yet on how to operationalise them , their potential links to LCDS will merely be explored here.

Table 4: Selected international climate policy instruments on mitigation

Basis	Instrument	Status
United Nations Framework Convention on Climate Change (UNFCCC)	National Communications	Existing
	Technology Needs Assessments (TNAs)	
Kyoto Protocol	Clean Development Mechanism (CDM)	
Cancun Agreements	Low-carbon Development Strategies (LCDS)	Established but rules under discussion
	Nationally Appropriate Mitigation Actions (NAMAs)	
	Measurement, Reporting and Verification (MRV)	
	Technology Mechanism	
	Green Climate Fund	

Kyoto Protocol and the Clean Development Mechanism

The Kyoto Protocol, which was adopted in 1997 and entered into force in February 2005, establishes binding emission reduction targets for 37 industrialised countries listed its Annex B. The Kyoto Protocol does not introduce any new commitments for non-Annex B countries, but reaffirms the principle of "common but differentiated responsibilities" and refers to (non-binding) commitments under the UNFCCC. Thus LCDS by developing countries do not interfere with any commitments under the Kyoto Protocol.

The future of Kyoto is currently uncertain, as the protocol's first commitment period ends in 2012, and negotiations for a second commitment period are not expected to lead to new commitments.

The CDM, which is defined in Article 12 of the Kyoto Protocol, permits an Annex-B country under the Kyoto Protocol to purchase emission reduction credits generated by projects in developing countries and count these credits towards meeting its commitment. The CDM so far has led to thousands of projects in many countries.

There are a number of open questions on how the CDM would interact with new international climate policy instruments. There does not seem to be a direct conflict with LCDS; the project-based, concrete nature of the CDM and the high-level guidance that an LCDS provides could actually be helpful. If the CDM continues to be a significant market, an LCDS could contain a CDM strategy as a means to finance some of the low-carbon actions envisaged in the LCDS.

National Communications

Currently, non-Annex I countries, with an undetermined frequency, submit National Communications to the UNFCCC in which they, *inter alia,* report on their climate change situation, emissions, the steps they have taken and plan to implement under the Convention. The Cancun Agreements aim at increasing the frequency of National Communications of non-Annex I parties and introduce biannual update reports to be submitted by developing countries[11]. A fundamental difference between National Communications and LCDS is that LCDS are forward-looking strategic documents representing political intentions and plans, whereas National Communications are factual reports, which, although they may contain forward looking elements, are in itself not an expression of political commitment. In spite of this fundamental difference, certain building blocks of an LCDS and a National Communication may be similar such as GHG emission projections and policy priorities.

The importance of the national process of developing an LCDS, as argued in this report, requires flexibility in timing and focus, which may conflict with the more standardised nature of international reporting such as National Communications. Thus, where the National Communication can present an update on the status of low-carbon development planning, it is unlikely to replace or fully integrate an LCDS. If an LCDS is reported in the NC, an advantage internationally could make its contents available (in English) to an international audience.

Technology Needs Assessments

[11] Consistent with their capabilities and the level of support provided for reporting.

Technology Needs Assessments (TNAs) are an instrument under the UNFCCC in response to Article 4 related to technology transfer. The parties of the UNFCCC have agreed that developed countries help developing countries with access to technology. In order to organise the actual demand for technology that the developing countries have, TNAs are written.

The current TNAs (around 60, mostly dating from the 1990s) were written without much methodological guidance. Currently, a process is ongoing that structures the TNA writing and provides rather strong methodological guidance, including a "technology familiarisation phase", a prioritisation and a multi-criteria analysis (UNDP, 2009). This approach is currently implemented, depending on the country for adaptation, mitigation or both, in 20 countries (UNEP/Risoe, 2011).

The new process for making TNAs has some aspects in common with what is commonly seen as an LCDS process. It is therefore likely that the activities will interact. If no coordination is arranged in a country, the process for an LCDS and a TNA might compete for stakeholders' involvement and policymakers' attention. Coordination is therefore of the utmost importance.

Nationally Appropriate Mitigation Actions

Nationally Appropriate Mitigation Actions (NAMAs) originate from the Bali Action Plan, in which Parties called for

> "Nationally Appropriate Mitigation Actions by developing country Parties in the context of sustainable development, supported and enabled by technology, financing and capacity building, in a measurable, reportable and verifiable manner".

Currently, NAMAs are becoming a central concept in the emerging international climate architecture, as they link financial pledges made in Copenhagen (UNFCCC, 2009a) with concrete mitigation actions by developing countries. The Cancun Agreements specify further details on NAMAs, such as the establishment of a registry to record NAMAs seeking international support. Such a registry could also facilitate the matching of finance, technology and capacity-building support for these actions.

The general consensus is that a NAMA is a voluntary action by a developing country government that leads to a "deviation in emissions relative to 'business as usual' emissions in 2020" (UNFCCC, 2011). This definition has a lot in common with an LCDS, but it generally considered to be on a lower level of abstractness. NAMAs are designed to repair some of the consequences of the project-based nature of the CDM, which provides limited opportunities for large-scale reductions. It is foreseen that NAMAs could be implemented[12] (a) only with domestic resources (unilateral), (b) be supported by international finance, technology and capacity building or (c) use a flexible market mechanism (see Figure 4.1).

[12] This typology has been introduced in the AWG-LCA negotiations in 2009, see for example UNFCCC non-paper 51 (UNFCCC, 2009b)

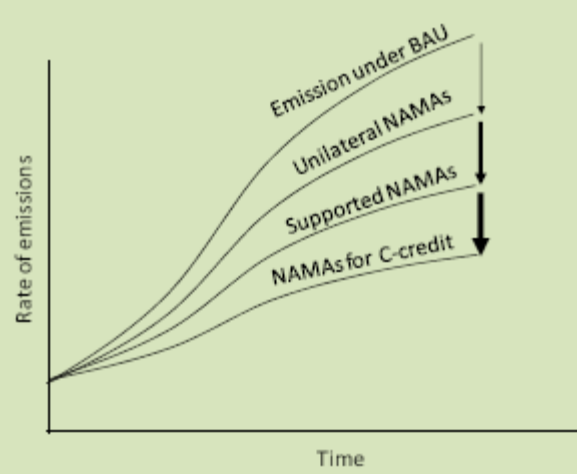

Figure 2: Three types of NAMAs

source: courtesy of R. Boer

There are various ways in which an LCDS may interact with NAMAs:

- **Framework for identifying NAMAs**: An LCDS can provide the framework to identify NAMAs and present them in a broader, integrated national perspective, indicating how the NAMAs fit in the national priorities and contribute to the longer term goals. An LCDS creates a coherent process in which NAMAs are identified among different stakeholders and coherency and synergy between mitigation actions within and between different sectors is enhanced.
- **Sources of finance**: An LCDS can include a clear methodology to make the distinction between the three types of NAMAs (unilateral, supported or credited).
- **Signal to donors**: From the developed (donor) country perspective, it makes sense to give priority to NAMAs that are effective in mitigation, and whose development (co)benefits are aligned to domestic development priorities. An LCDS can provide this overview and make the case for supporting specific NAMAs. However, it is still open how the registry, to be established by the UNFCCC, would facilitate matching of finance, technology and capacity-building support for proposed NAMAs.

The development of an LCDS itself, or the establishment of its building blocks, can be part of a technical assistance (TA) package for mitigation support, which can be (partly) financed under the NAMA mechanism.

NAMAs may have interaction with other international climate instruments as well. Especially the relation between CDM and NAMAs is notable. The aim of both mechanisms is the same: to reduce emissions compared to business as usual. Emission reduction credits from the CDM are currently used to count towards developed country targets and NAMA could also potentially be included as carbon credit mechanism, which could lead to double counting if not properly managed. However, while the CDM is project- and private sector-driven, NAMAs are understood to be government-led programmes or policies, so in that sense they are complementary as they serve different communities.

In the context of CDM and NAMAs, an LCDS could be used to clarify how the carbon market and government-led emission reduction programmes interact in a country and which emission reductions will be used to count towards the domestic mitigation contribution against national targets and which are generated for the international carbon markets.

Measurement, Reporting and Verification (MRV)

Measurement, Reporting and Verification (MRV) is another widely discussed concept in the climate negotiations, concerning the accountability of both mitigation actions and support. Successful implementation of policies always requires monitoring and evaluation at the local and national level,

and therefore MRV is not a new concept. However, it is contentious at an international level due to fears of compromising national sovereignty.

In the climate negotiations, MRV is an issue on various levels. Concerning developing country mitigation actions, the Cancun Agreements state that

> 1/CP.16.61 [... internationally supported mitigation actions will be measured, reported and verified domestically and will be subject to international measurement, reporting and verification in accordance with guidelines to be developed under the Convention;
>
> 1/CP.16.62. Further decides that domestically supported mitigation actions will be measured, reported and verified domestically in accordance with general guidelines to be developed under the Convention;

Significant support for climate to developing countries was pledged in the 2009 Copenhagen Agreements. Since then, both NAMAs and MRV have been in the centre of negotiations:

> -/CP.15.8 "The collective commitment by developed countries is to provide new and additional resources, including forestry and investments through international institutions, approaching USD 30 billion for the period 2010 -. 2012 …developed countries commit to a goal of mobilizing jointly USD 100 billion dollars a year by 2020 to address the needs of developing countries."

The Cancun Agreements also calls for:

> 1/CP.16. [...] measurement, reporting and verification of support provided to developing country Parties [by Annex-I Parties]

While the general concept and its implications as well as the concrete guidelines are still being discussed, there appears to be consensus that MRV should not be a burden but that it should facilitate further action. The MRV of NAMAs needs to be simpler than the methodologies prescribed for CDM projects, which are generally considered to be complex, and may be a barrier for mitigation projects (Bakker and Würtenberger, 2011). However, whether MRV is really an incentive for undertaking mitigation actions is another matter.

Perhaps LCDS could play a role in this: an LCDS can be used to indicate national approaches to MRV and the required level of detail. An LCDS can also indicate the current status of a country with respect to policy monitoring, data collection and management systems, the gaps therein, and the need for support to bridge these (see also the section on National Communications). In South Korea, the Framework Act on Low-carbon Green Growth includes for example a mandatory system for reporting on carbon emissions by carbon intensive industries. Moreover, during the process of developing the policy framework a GHG inventory and research centre was newly established. These measures may contribute to measuring the impacts of the Korea's green growth policies. During implementation of an LCDS, MRV can provide useful feedback to improve the evidence base and give feedback on policy effectiveness. In that way, MRV and LCDS could be in a positive feedback loop.

Finally, the development and implementation of an LCDS itself could be monitored[13]. The development of an LCDS could be assessed based on criteria such as the inclusion of the relevant building blocks (see Section 2.4) and the readiness as determined by the fact base, capacity and awareness (see Section 5.2). Assessment of the LCDS process could create understanding of the gaps and the needs to overcome these, thereby moving forward in the process. The implementation could be monitored by MRV of NAMAs, the GHG inventories and updates of emission projections. These elements are covered by the National Communications and the Biennial Reports.

Technology Mechanism

At COP16 in Cancun in December 2010, it was also decided to establish a Technology Mechanism. Consisting of an international, UNFCCC-based Technology Executive Committee (TEC) and a "Climate Technology Centre and Network" (CTC&N), it aims at advancing technology development and transfer for adaptation and mitigation. It particularly focuses on how to bring innovation across the technology development cycle, including diffusion, forward in developing countries, where the innovation system is often poorly developed. One of the proposed functions of the CTC&N is that it would respond to questions from developing countries and provide technical assistance. As the financial mechanism operational modalities under the UNFCCC are not yet agreed on, it is unclear how the Technology Mechanism will be funded.

A country's innovation system has much in common with analytical and institutional capacity to develop an LCDS. Which technologies and sectors are prioritised under an LCDS requires technological insights which the Technology Mechanism, and other organisations, could provide. The CTC&N could provide part of the technical assistance that can help develop an LCDS.

4.2 Reactions and open questions

In the current negotiating texts, support for LCDS has been discussed on a general level. With respect to detailing, some concerns and questions have been raised by governments and civil society, some of which remain unaddressed as of yet. The following list gives an overview of these concerns based on observations at UNFCCC meetings and literature (see for example Dubash (2009); Project Catalyst (2009); Ellis (2009)):

- **Additional barrier for support**: if support for NAMAs and other forms of climate support would be conditional on the development of an LCDS, this may impose an additional barrier for supported action. According to UNEP (2010b), the notion of LCDS (or LEDS) was initially opposed by the Group of 77 and China as "it would open the door to conditions on nationally appropriate mitigation actions". In addition, there was a fear that an LCDS, as suggested by the EU, would be a backdoor to emission reduction commitments.
- **Sovereign policy choices:** Making an LCDS obligatory and/or linking its ambition to legally binding actions may impose restrictions on the freedom countries have in shaping their development and climate policies over time. International requirements may thereby influence political deci-

[13] Here, we use 'monitoring' rather than MRV, as the latter, as used in the Cancun Agreements, is not likely to be applicable to LCDS: there is no need to verify the development of an LCDS

sions and effectively reduce policy sovereignty. While this was a point of discussion around COP15, currently, linking an LCDS to legally binding actions is not a point of discussion in the negotiations, as LCDS is marked as 'voluntary' for developing countries in the Cancun Agreements (UNFCCC, 2011).

- **Overly prescriptive**: Countries differ greatly in level of development and climate/development context. If the form and function of an LCDS is prescribed in too much detail, it may not be suitable for the specific national context and thereby be of limited national use.
- **Time and resource constraints**: time and resource constraints may result in the development of an LCDS without ensuring sufficient ownership and stakeholder involvement. The result is likely to be a paper tiger.
- **National perspective leading**: There is a risk that when an LCDS becomes part of the international climate policy toolkit, its international (climate-related) functions may interfere with its national (development-related) purposes[14]. This has been acknowledged in the Cancun Agreements, which make explicit reference to the fact that in developing countries "social and economic development and poverty eradication are the first and overriding priorities".

Regarding the detailing of LCDS, the Cancun agreements refer to 'the need to provide incentives in support of low-emission development strategies'. For the development of an LCDS, such incentives for developing countries are typically provided in the form of financial resources and technical assistance for the development of the strategy. The following chapter will discuss some of the lessons-learned from previous efforts, which may guide support for strategy development.

[14] As an illustration of the tension between the national and the international requirements, China had developed a National Climate Change Programme (see Annex I) prior to COP15, which has possible parallels to the suggested elements of an LCDS (Van Asselt *et al.*, 2010). China considered it unfeasible to quantify its future emissions due to high margins of uncertainties, whilst an LCDS, according to the original EU proposal, would ask developing countries to specify their emission pathways (Teng, 2009 cited in Van Asselt *et al*., 2010).

5 LESSONS LEARNED AND DISCUSSION

5.1 Lessons learned and best practices

Chapter 3 explained that various countries have recent experience with integrating development and climate mitigation policies and strategies. Despite these encouraging examples, there is limited evidence on how countries can actively influence their development pathway towards lower emissions. Regarding the process of strategy development, despite significant differences across countries, key success factors and lessons learned can be derived from experience with recent and previous, comparable efforts. Many of these are not specific to low-carbon development strategies, but are presented in earlier work on integrated or multi-sectoral planning (see for example Maxwell and Conway, 2000) or reflect best-practice thinking on development theory, such as the requirement for national ownership and a perspective for action.

Perspective for action (e.g. an implementation plan) is repeated by experts interviewed as an important part of any LCDS. Experts stressed that an LCDS is not to be a goal in itself, but should be a means of getting mitigation actions going on the ground. As an international policy instrument, it would be a failure if it were to be another 'paper tiger' that does not catalyse the implementation of concrete actions. Some interviewees were wary of specific examples of past instruments that have not fully met expectations of catalysing actions, e.g. National Sustainable Development Strategies, or within the UNFCCC process, TNAs and NAPAs.

Regarding best practices and lessons learned from previous efforts, Clapp *et al.* (2010) present guidance regarding technical, institutional and policy related aspects of the preparation of national climate change strategies and LEDS. In doing so, they give guidance on the required expertise and resources, government coordination and stakeholder involvement. Key points include the need for an iterative approach to policy development and stakeholder engagement, coordination across ministries and funding streams, engagement of private sector parties and consideration of interactions with other strategies and policies.

Similar points are reflected in key success factors for the integration of climate change into different policy areas and the development of an LCDS identified by Kok *et al. (*2008), Project Catalyst (2009) and ESMAP (2009b). Project Catalyst (2009) also presents pitfalls to be avoided in the development of an LCDS based on earlier work by IIED, OECD and UNEP. Such pitfalls include external imposition and lack of local ownership as well as lack of integration into the country's mainstream decision-making system. Table 4 gives an overview of the main lessons learned as identified by previous studies and this research, organised in five categories.

The first three categories, fact base, capacity, and awareness and leadership, concern the *starting position* (or readiness) for developing the strategy. The last two categories, government coordination and stakeholder involvement, are related to the strategy process. The categories are discussed in turn below under the headings *Readiness for developing an LCDS* and *Developing an LCDS as an ongoing process*.

Table 5: Lessons learned for developing an LCDS

Category	Lessons learned
1. Fact base	An LCDS needs to build on a strong basis of high-quality and timely data on GHG emissions and socio-economic indicators, and the credibility of the research critically depends on the quality of and availability of data.
2. Capacity	Analytical capacity is needed for various tasks in the process, such as assessing current situation and identifying alternative low-carbon development pathways. Collaboration with international experts may improve the analysis, but national capacity is essential to ensure that the strategy is sufficiently rooted in the reality of the specific country.
3. Awareness and leadership	Government, private sector and civil society stakeholders need to be aware of how low-carbon development can affect them. This awareness is essential to create buy-in for the strategy and its implementation. Evidence suggests that strong, senior leadership from the government is a key success factor for developing an LCDS that is properly integrated across all policy areas.
4. Government coordination	Clear roles and policy mandates need to be established. Government on the sub-national level needs to be engaged in the strategy as early as possible, since they are typically crucial for the implementation. To establish momentum for implementation, an LCDS ideally needs to be integrated into the mainstream national decision making process.
5. Stakeholder involvement	Engage stakeholders from the start of the process to provide and improve input, and to create support for the strategy. Lack of time, resources and commitment may lead to late involvement and a narrow base for participation, which in turn may create a gap between the strategy and on-the-ground realities.

Source: Project Catalyst (2009), Clapp *et al.* (2010) , Kok *et al.* (2008), ESMAP (2009b) and authors' own research.

5.2 "Readiness" for developing an LCDS

The lessons learned suggest that in an ideal case the requirements for starting the development of an LCDS are high. Creating an effective LCDS needs to be a participatory process under strong high-level leadership within the government. It needs to involve relevant stakeholders from the start of the process to enable the creation of ownership of the outcomes. The process should work towards consensus on priority sectors and technologies, as well as integrated policy interventions. Moreover, the decision-making should build on sound data, and scientific and economic analysis as well as a high quality fact base. Preferably it would be undertaken not as a standalone process, but as an important part of existing development strategy processes in a country or region.

Reality, however, requires developing an LCDS under circumstances that are not ideal in most countries. Based on the analysis of the situations in Ghana and Indonesia, and other reviewed case studies, this report identifies three dimensions of "readiness" for the development of an LCDS. In this context, readiness relates to strengths and weaknesses in the first three categories in Table 5: the fact base, analytical and institutional capacity to interpret the fact base, and the awareness and engagement of decision makers and stakeholders.

Fact base

The fact base is needed to assess the current situation, the low-carbon alternatives and their costs, (co-)benefits and trade-offs, potentials, and barriers for implementation. If the fact base is weak, rough estimates and proxies can be used to construct a baseline and projections for the future. But a weak fact base may lead to decisions and priorities that may not be informed by the reality in the country.

Capacity

Analytical and institutional capacities are needed to analyse and interpret the data, to organise and participate in meaningful stakeholder involvement, and to translate background information into (policy) action. Although collaboration with international experts may compensate for absence of specialist knowledge, it is important that national experts are able to connect the findings to the country-specific situation.

If there are weaknesses in the technical capacity available in a country, technical assistance with a specific capacity building component could be considered. Donors should realise that this will lengthen the LCDS process considerably. In addition, if the role of the international experts in the strategy process is too large, this could lead to low legitimacy of the LCDS and lack of ownership. Moreover, a lack of local expertise may lead to an analysis that insufficiently takes local circumstances into account, and cannot be interpreted or updated by the government itself.

Attracting and building analytical and institutional capacity is an important issue that should be addressed with care.

Awareness, engagement and buy-in

A third component of readiness is awareness and buy-in. Insufficient buy-in results unavoidably result in an LCDS that will not be implemented, which is why this is arguably the most important precondition for readiness. To give meaningful input to the strategy, and increase the chances of acceptance, stakeholders need to be aware of what low-carbon development could mean for their country and how it would benefit them. If awareness is low, even a small team of (external) experts can still create a strategy that on first inspection looks good. However, this does come at a price: there is a risk of poor policy integration and lack of credible signals to stakeholders (such as investors). If stakeholders are not sufficiently engaged in the decision process, the barriers to action and the interests of involved actors are unlikely to be taken into account properly and the strategy may not result in concrete action.

Generally, leadership and buy-in from the government are considered prerequisites for starting the process of developing an LCDS. NREL (2009) suggests “Strong in-country leadership” as a guiding principle, and Project Catalyst (2009a) describes “establishing a mandate and ownership at the highest levels of government” as a critical process step. However, in many countries climate mitigation and low-carbon development are not part of the short- to medium-term priorities of government, in particular because the potential benefits of low-carbon development may not yet be fully understood by government decision makers or have not been sufficiently demonstrated. Initial experience has shown that strategies that were initiated by senior government decision makers, preferably heads of state, have been successful in the phases of development and start of implementation, as least with regards to attracting international funding for implementation. Examples of initiatives that

had high-level political support from the start are the ones of South Korea, Mexico and Guyana (see Chapter 3).

For continuity, government buy-in for an LCDS should ideally not concentrate on the current government only, but also involve opposition parties, depending on the structure of political decision-making in the country. In addition, capacity building within government should be institutionalised in a way that makes it less vulnerable to political or personnel changes. In governmental structures where senior civil servants' positions depend on the government in place, resistance against involving the opposition may be encountered.

5.3 LCDS development as a continuous process

The ideal circumstances for starting the development of an LCDS are rarely met in practice. But even when the readiness is low, there can still be value in developing an LCDS, as the strategy development process itself can be used to improve the readiness in all three categories.

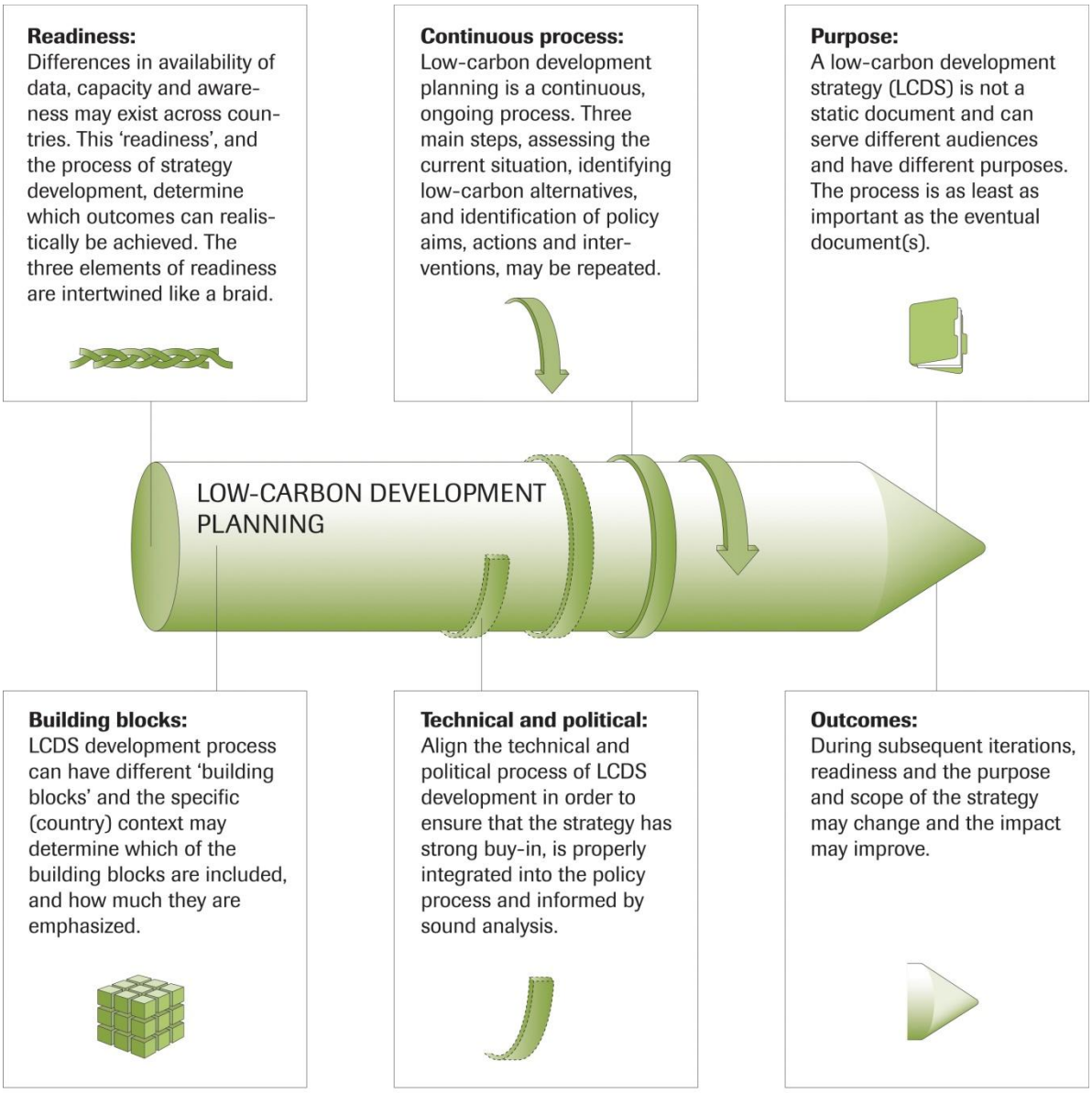

Figure 3: Iterative approach to developing an LCDS

By treating the development of an LCDS as a continuous, iterative process, data quality, technical and institutional capacity and awareness can improve over time, leading to better strategies (see Figure 3).

For Ghana, an output of this study and subsequent work was a recommendation to government and development partners to in parallel improve the fact base, the analytical and institutional capacity and awareness and buy-in for low-carbon development planning in the frame of the ongoing development of a National Climate Change Policy Framework and in other climate change related interventions in the country (Tilburg and Würtenberger, 2011b). As a preparation for the development of the initial discussion document on a National Climate Change Policy Framework, an external expert team in cooperation with national consultants and stakeholders explored what low-carbon growth would mean for key sectors of the Ghanaian economy, thus aiming to build the fact base and technical capacity in the country (Tilburg and Würtenberger, 2011a).

An iterative process of developing an LCDS can be observed in many real-world examples including the examples described in Chapter 3. In South Africa, the LTMS process focused on improving the fact base by developing scenarios and undertaking extensive modelling of low-carbon development pathways. In parallel there was a strong focus on improving awareness and buy-in achieved through an extensive stakeholder involvement process. The resulting LTMS strategy paper, which was endorsed by the Cabinet, could be considered to be version one of the country's LCDS, while the draft National Climate Change Response Policy is a second version containing less detailed background information but more concrete political ambitions.

In Guyana, the first draft of the country's LCDS was published in mid 2009. However, the initial process had not had a strong focus on building awareness and buy-in. Thus the government used the first draft as a basis for a stakeholder consultation process. Based upon the input of this process consecutive versions of the LCDS were published, which, however, do not yet differ significantly from the initial version.

In Mexico, the 2007 "National Climate Change Strategy" was followed by the document on the "Special Programme on Climate Change 2009-2012". The latter contains a concrete long-term vision, an outline of envisioned activities until 2050, and a list of actions to be implemented by sectors. This example also shows that subsequent version of an LCDS process frequently include more of the building blocks identified in Chapter 2 or add more detail to the building blocks. This in turn can lead to improved outcomes and ultimately increase the impact of the LCDS, i.e. catalysing concrete actions on low-carbon development.

This report argues that, although in an ideal case requirements for starting the development of an LCDS would be high, it is possible to develop an LCDS with limited capacity and resources through a continuous and iterative process. This long-term value (i.e. the extent to which the outcomes are achieved) comes at the expense of short-term costs. An LCDS process should be carefully aligned to the readiness of the country.

With regard to methodological guidance for an LCDS, experts interviewed invariably felt that while it is useful to have an understanding of potential building blocks which an LCDS may contain, the contents and structure of the actual LCDS are dependent on what best fits the country's context and the intended purpose(s). This is consistent with our findings in Ghana and Indonesia (Sections 3.3 and 3.4) which also showed very different circumstances and needs. Similarly, the experts indicated no a

priori preference for tools or methods to be used. The interviewees did indicate that the process of developing an LCDS is considered as least as important as the strategy itself. The last two categories of the lessons learned (Table 4) are related to this process.

Government coordination

Ownership of an LCDS is typically with the government, and coordination is done either by a single ministry (such as the Ministry of Environment), or a dedicated inter-ministerial body (such as a national climate change committee), or, as is frequently the case, a combination of both, where coordination lies with one ministry which relies on input from an inter-ministerial body. Tasks in the development of an LCDS in which the government takes the lead include aligning the LCDS to other national plans and strategies, identifying and prioritising policy options, and defining a package of policy interventions that is consistent across sectors and ministries, integrated into the national budget (Clapp *et al.* ,2010).

Within a government, clear roles and policy mandates need to be established. To establish momentum for implementation, an LCDS ideally needs to be integrated into the mainstream national decision making process. This may pose a challenge as ministries beyond the traditional "owners" of environmental issues, such as ministries for energy or agriculture, have lower awareness of the concept of low-carbon development and why it would matter to them. Moreover, government on the sub-national level needs to be engaged in the strategy as early as possible, since they are typically crucial for the implementation. Especially in Indonesia, a lack of coordination between different MDAs emerged as one of the major barriers to the development of one national LCDS. As Indonesia is undergoing a process of decentralisation, the development of regional LCDS such as the low-carbon growth plans for Central and East Kalimantan seems to be a positive trend towards actively involving provincial governments in LCDS processes.

It is important to note that in the absence of high level political endorsement, civil servants from ministries, departments and agencies outside of the traditional hosts for climate change, may not be available to participate fully in the process due to high work load from other assignments, making meaningful involvement difficult. This could be felt at times in Ghana, for example, where strong commitment for an LCDS by the most senior government decision makers was found to be lacking.

Stakeholder involvement

Stakeholder involvement is generally considered a prerequisite for smooth development of any cross-sectoral strategy like an LCDS (Maxwell and Conway, 2000; Kok *et al*., 2009; Project Catalyst, 2009). Stakeholder involvement can help improve the quality of the data and identify barriers, development (co)benefits and potential negative social impacts. Moreover, stakeholder involvement may build awareness, consensus, acceptance and ownership with stakeholders, which is crucial to the success of implementation of the strategy. Stakeholders in a low-carbon development strategy include relevant ministries, development partners, local authorities, industry and business, investors and bankers, and civil society and NGOs (ESMAP,2009b).

Experience in Ghana and Indonesia shows that there may be substantial differences in awareness and level of understanding among stakeholder that need to be taken into account. In addition, we found that the involvement of stakeholders is most effective when based on voluntary participation, and based on own incentives, needs or benefits. Sometimes, stakeholders need to be made aware of such benefits or interests. In Ghana, for example, engagement by the private sector in climate

change related activities is still limited (Würtenberger *et al.*, 2011). A participatory process that does justice to the differences in level of awareness and understanding of different stakeholders is inherently time-consuming: the South African LTMS process, for example, took almost three years.

Aligning the technical and political process

The alignment of and interaction between technical and political aspects of the low-carbon development process, and the associated uncertainties in timelines, are not often mentioned in the LCDS literature, but potentially important. Part of the input to the LCDS process, such as assessments of development benefits, abatement potentials and costs and potential, is analytical (or technical) in nature. This type of input is frequently provided by technical experts outside of government. In the case of international support for LCDS development in developing countries, such expert support is mostly made available by international technical assistance in cooperation with local experts from within or outside government. Other input for an LCDS such as emission baselines and the prioritisation of interventions and their support, require political, or politically sensitive, choices and input.

Due to the iterative nature of developing an effective LCDS and due to the nature of political decision-making processes, low-carbon development planning can be unpredictable at times. Tension may arise between the political process and the delivery of technical assistance. Technical assistance is typically based on fixed budgets and set deadlines for deliverables, while the process that delivers the optimal outcome may require more time and resources than foreseen, and may not follow a linear and foreseeable sequence. Even when it is impossible in advance to outline the LCDS process in such a way that the analytical process is closely aligned with the national political process, interactions between the analytical team and the political decision-makers can be regularly planned. Such interactions may include:

- **Guidance to the process**: the analytical team may facilitate the political process, e.g. by organising a stakeholder engagement process or facilitating the cooperation across different levels of government.
- **Strategy choices**: the analytical expert team may suggest information to decision-makers that helps them make the choices that form the actual strategy. Such analytical input can include scenarios for economic growth, infrastructure and GHG emissions, as well as assessments of benefits, risks and other implications of choices for policy interventions, regulation or technologies.
- **Alignment to policy**: The (intermediate) output of the LCDS process should be timed to coincide with the right periods in the policy cycle, for example to feed into the budget allocation process, or to capture opportunities for policy changes.
- **Backing political statements**: decision-makers could consider making political claims (and promises) that are based on (preliminary) findings of the LCDS. Good communication and timing are essential to avoid false or poorly backed statements.

Attempting to rush the political process because of time constraints and budget restrictions for the provision of the technical assistance is likely to go at the expense of stakeholder engagement and broader ownership, which are essential for the strategy to eventually catalyse actions. Preferably technical assistance should take the iterative nature of the LCDS process into account, which is most feasible if the assistance is based on a longer term engagement that goes beyond the initially estimated duration of the LCDS development.

6 RECOMMENDATIONS

6.1 International support for LCDS

There is consensus that 'a low-carbon development strategy is indispensible to sustainable development' and awareness that there is a 'need to provide incentives to support low-emission development strategies', (UNFCCC, 2011). However, there is currently neither full clarity on the role of LCDS as part of an international climate policy regime, nor on how support for LCDS development and implementation in developing countries can best be provided.

As discussed above, best practices and lessons learned suggest that the requirements for effectively developing and implementing an LCDS are high. Ideally there is a solid starting position in terms of "readiness", i.e. availability of data, capacity and buy-in. In addition, evidence shows that for the development of the strategy stakeholder participation is crucial, but may result in a time-consuming and sometimes unpredictable process. Importantly, if a country does not meet the ideal requirements, there can still be a potential benefit for a country in developing an LCDS and iteratively working towards improving its readiness and subsequent outcomes. Depending on the circumstances and the intended purpose of the LCDS, it may include only a selection of (more or less prominent) building blocks as described in Section 2.4.

As a consequence, support for developing an LCDS could focus on providing technical assistance on the individual building blocks and on the process. The aim of an LCDS is to ultimately catalyse concrete actions. The effectiveness of the LCDS therefore depends on whether implementation picks up successfully. This indicates that specifically tailoring assistance to the country context may be more important than putting emphasis on the delivery of the strategy itself.

Based on the analysis in this report, several additional recommendations can be made to guide the discussion on LCDS as an international climate policy instrument:

- **Detailed prescription ineffective**: The national context and the readiness to develop an LCDS differ greatly across countries. Detailed prescription of the instrument (the contents, methods and tools) may be impossible and counterproductive, and would not do justice to this variation across countries. However, it is possible, as described in Section 5.1 and earlier in Section 2.4, to define building blocks for an LCDS and derive lessons learned and give guidance for the process of developing an LCDS.
- **Flexibility in the process**: Ensuring buy-in and ownership of the development and outcomes of the LCDS, requires stakeholder involvement and participation. Moreover, development of an LCDS requires political decisions, whose timing is frequently difficult to plan. This typically makes the preparation of an LCDS time-consuming and to a certain extent unpredictable. For international support to be effective, it will need to take this need for flexibility into account.

Against this background, a standardised methodology for developing an LCDS, or restrictions on the timing of its preparation process, may be ineffective. Moreover, it may be unrealistic to expect fast results. Technical assistance needs to support a process that has its own pace, and should allow for flexibility and tailoring to the national context and the specific expectations about the LCDS process.

6.2 Guidance for developing a national LCDS

The aim of low-carbon development strategies is to catalyse actions that support development, but with less emissions than without intervention. Therefore the process of LCDS development should be aligned towards this aim rather than focusing narrowly on producing a strategy document. Depending on the national context, an LCDS can serve different audiences and have different purposes. This also implied that the different building blocks of an LCDS may not need to be equally detailed and emphasised in every case.

Most of the emerging best practices and lessons learned for LCDS development suggest that the requirements for development of a successful LCDS are high. Creating an effective LCDS needs to be a participatory process under strong senior leadership within the government. It needs to involve relevant stakeholders from the start of the process to enable the creation of ownership of the outcomes. The process should work towards consensus on priority sectors and integrated policy interventions, and the decision making should build on sound data, and scientific and economic analysis as well as a high quality factual basis.

However, this report argues that there are substantial differences in the "readiness" among countries to develop an LCDS. In this context, readiness relates to strengths and weaknesses in three categories: the fact base, analytical and institutional capacity, and the awareness and engagement of all relevant stakeholders. Differences in readiness and in the process of strategy development will determine which outcomes can realistically be achieved.

The ideal circumstances for starting the development of an LCDS are rarely met in practice. However, there may still be value in starting the process of developing an LCDS, as the strategy development process itself can be used to build the fact base, technical and institutional capacity to interpret the facts and awareness and buy-in among decision makers and stakeholders. By treating the development of an LCDS as an ongoing, iterative process, data quality, technical and institutional capacity and awareness can improve over time, leading to better strategies and improved outcomes.

In addition, this study shows that it is important to align the technical and political process of LCDS development in order to ensure that the strategy has strong buy-in, is properly integrated into the policy process and informed by sound analysis. As political processes may be unpredictable and because the outcomes of the strategy may only improve gradually in an iterative process, it is also important to be realistic in planning the LCDS process without expecting fast results. It is safe to assume that no country, developed or developing, meets the ideal conditions for low-carbon economic development. Treating LCDS as a quick fix for lack of strategic orientation will therefore lead to yet another ineffective climate instrument.

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ANNEX 1 – RESEARCH APPROACH

Research approach for the in-country tracks

The in-country tracks of the study were jointly carried out by ECN, an Indonesian team lead by professor Rizaldi Boer from CER Indonesia, and a Ghanaian team lead by Mr. Daniel Benefoh Tutu from the Ghana Environment Protection Agency (EPA).

In both countries the teams decided to focus the first phase of the work on a description and analysis of the current situation around climate mitigation and its overlap with economic growth and poverty reduction.

From discussions with key stakeholders in Ghana at the end of 2009, it became clear that although some people are well aware of the opportunities and threats posed by climate change and of the links between climate change and development issues, the majority of senior government decision makers in Ghana are not fully familiar with it. Moreover, given that the fact base on climate change and the technical capacity to generate and interpret this fact base are limited, it was decided to focus on an approach that could help building awareness and drawing attention to some basic but non-trivial issues like data collection and management and on next steps for detailing NAMAs.

In Indonesia, several low-carbon planning efforts exist, with varying scope and detail. However, it was found that there was little or no coordination of studies concerning low-carbon development – neither within the government, nor between international donor organisations supporting these efforts. The project scope for Indonesia was therefore defined to be 1) analysing the current situation in terms of data, policies and measures and the institutional structure, 2) assessing current thinking on low-carbon development across stakeholders by conducting semi-structured interviews and 3) comparing existing efforts and contrasting these against possible building blocks of a low-carbon development strategy.

The table below shows the work packages of the in-country tracks and their main focus.

Table 6: Work packages of Ghanaian and Indonesian country studies

	Ghana	Indonesia
Work package 1	Analysis of the current situation: Key emissions sources Policies and measures Institutional structure	Analysis of the current situation: Data quality and availability Policies and measures Institutional structure
Work package 2	Issues related to GHG emissions data	Stakeholder expectations
Work package 3	Exploring how NAMAs could be taken further	Matching current efforts and international expectations on the concept

Expert interviews (part of the general track)

In the frame of the general track of the project, ten semi-structured interviews were undertaken with negotiators, experts, practitioners and academics involved in Low-carbon Development Strate-

gies in different ways. A number of additional interviews took place with local experts in Ghana and Indonesia.

Interviewees were asked the following questions:

- What is the respondent's personal opinion on LCDS?
- What is the current status of thinking regarding LCDS among negotiators?
- What could be the relevance of LCDS in multilateral and bilateral climate cooperation?
- Are there examples of very successful LCDSs? And of failed attempts?
- Broad political support is widely quoted as an important prerequisite. It may however not be present from the start – how can this best be dealt with? Is it important?
- What are points of criticism and controversy surrounding LCDS?
- Why is an LCDS useful? Under what conditions can it be useful?
- What methods are useful for the preparation of an LCDS?

ANNEX 2 – EXAMPLES OF NATIONAL CLIMATE CHANGE STRATEGIES

Table 7: National climate change strategies (as of end 2009)

Country	Date	Name	Time horizon	Initiators/Authors
Bangladesh	Sep 2008	Climate change strategy and action plan	**2009-2018**	Ministry of Environment and Forests
Brazil	Dec 2008	National Plan on Climate Change	**2030** (time windows up to)	President / inter-ministerial committee on climate change
Caribbean Community	Jul 2009	Climate Change and the Caribbean: A Regional Framework for Achieving Development Resilient to Climate Change	**2009-2015**	Caribbean Community Climate Change Centre
Chile	Sep 2008	National Action Plan on Climate Change	**2007-2012**	Ministry of the Environment
China	Jun 2007	National Climate Change Programme (supporting the 11th 5 year program)	**2010**	National Development and Reform Commission
	Oct 2008	China's Policies and Actions for Addressing Climate Change	**Current policies**	Information Office of the State Council of the PRC
EU	Jan 2008	EU Climate and Energy Package	**2020**	European Commission
Germany	Dec 2007	The Integrated Energy and Climate Programme of the German Government	**2020**	Ministry of Environment
Guyana	May 2009	Transforming Guyana´s Economy While Combating Climate Change	**2020/2030**	Office of the President
India	Jul 2008	National Action Plan on Climate Change (11th and 12th 5 year plans)	**2017**	Prime Minister's Council on Climate Change
	2008	Eleventh five year programme 2008	**2007-2012**	Planning Commission, Government of India
Indonesia	Nov 2007	National action plan to combat climate change	**2050** (time windows up to)	
Japan	Jul 2008	Action plan for achieving a low-carbon society	**2050**	Council on the Global Warming Issue
Mexico	2007	National Strategy on Climate Change	**2050**	President's office
	Mar2009	Special Programme on Climate Change 2009	**2007-2012**	Secretariat for Environment and National Resources
South Africa	Jul 2008	Long Term Mitigation Scenarios and policy framework	**2050**	Department of Env. Affairs and Tourism
	Mar 2009	National Climate Change Response Policy	**50 years**	

South Korea	Aug 2008	"Low-carbon, Green Growth" Vision - 1st National Basic Energy plan and Comprehensive Plan on Combating Climate Change	Green Growth: **60 years** Climate plan **2008-2030**	Presidential decree & inter-ministerial committee
UK	Jul 2009	Low-carbon Transition Plan (National Strategy for Energy and Climate)	**2020/2050**	Department of Energy and Climate Change

ANNEX 3 – PRACTITIONERS

The World Bank's Low-carbon Growth Country Studies

The World Bank, with its Low-carbon Growth Country Studies in the frame of its Energy Sector Management Assistance Programme (ESMAP), was one of the early movers in providing assistance on low-carbon growth. In 2008, the programme started to work with six emerging economies (Brazil, China, India, Indonesia, Mexico, and South Africa) to assess the countries' development goals and priorities, in conjunction with greenhouse gas (GHG) mitigation opportunities (ESMAP, 2009b). The studies examined the additional costs and benefits of low-carbon growth.

ESMAP took a country-specific approach, in which the priorities and focus areas of the work are determined in close collaboration with the partners in the national governments. Consequently, the scope of the studies differs. The studies in Mexico and Indonesia were relatively broad in scope, focusing on a comprehensive low-carbon programme and strategic options for development. In South Africa, with the support for the implementation of energy efficiency measures, and in Brazil, with a land use (change) model, the work was more specific and focused (ESMAP, 2009).[15] At the end of 2009, the ESMAP (2009b) team drew initial lessons from common experiences in the six countries:

- Transparency with regard to the modelling, data and assumptions used in the studies.
- Active participation of national stakeholders is considered a prerequisite for the sustainability of the process. Especially a cross-sectoral dialogue is seen as crucial.
- External advisory services can be used to build local capacity. A low-cost, and user-friendly approach to the analysis of low-carbon growth has been successful and can be used as the basis for further work. It is important for the analysis to be demand-driven.
- Political questions around the international climate negotiations can hinder collaboration between countries.
- Availability of high-quality data is often limited and collecting data specifically for the low-carbon growth analysis is difficult and time consuming.
- It can be difficult to use technical studies as the basis for policy recommendations due to political sensitivities. Sometimes, results can be contrary to what was expected in advance.
- Technical assistance should be flexible and well-targeted to be helpful for implementation. Coordination of funding streams and cross-sectoral collaboration is challenging and the support of larger ministries such as energy and industry is crucial.

US Government LEDS programme

The U.S. Government has launched a programme to provide support to up to 20 developing countries and emerging economies in the development of LCDS, managed by a team including the U.S.

[15] For the country reports published to date see http://www.esmap.org/esmap/LCGS.

Agency for International Development, Departments of Agriculture and Energy, State Department, Environmental Protection Agency, and several other agencies. The programme aims to provide tailored technical assistance and capacity building activities that enable each partner country to prepare its own LEDS. At the end of 2010, the inter-agency team started working with the first set of target countries. The U.S. Government is also preparing tool-kits to describe available models, data bases, and other technical resources that countries can use in each phase of work on a LEDS. The programme will establish expert teams to provide assistance to each country and forums for countries to share their experiences and learn from each other.

The Climate & Development Knowledge Network (CDKN)

The Climate & Development Knowledge Network (CDKN) [16] comprises of an alliance of organisations funded by the UK and Dutch governments to supports developing countries in their efforts for climate-compatible development. CDKN offers advice, technical assistance, research services, strategic knowledge sharing and capacity building to decision makers in developing countries. The focus of CDKN's work encompasses both climate resilient and low-carbon development and much of the work is undertaken in least developed countries. In the area of low-carbon development, CDKN currently for example supports the Government of Rwanda in developing a strategic climate change framework.

The Mitigation Action Plans and Scenarios (MAPS) program

The MAPS programme is funded by the Children's Investment Fund Foundation, a UK based charity. The programme aims to support government-mandated stakeholder processes in developing scenarios for long-term mitigation planning. In its first phase in 2010/2011 work will be undertaken in Brazil, Peru, Chile, and Colombia with potentially 5 other countries to follow in the second phase between 2011 and 2013 (Raubenheimer, 2010)

Other multi-lateral organisations working on low-carbon development planning with developing countries include UNDP[17], DFID [18] and UNEP[19,] Moreover, various other organisations are working on methodological approaches to low-carbon development planning.

NREL's "Generalized Methodology for Preparation and Implementation of LEDS"

In support of the US government's LEDS programme, the National Renewable Energy Laboratory (NREL) prepared a "Generalized Methodology for Preparation and Implementation of LEDS"[20]. The methodology is not intended to be prescriptive, but rather to provide a framework for understanding how related low-carbon planning actions and assessments that have already been undertaken in a country may fit into a comprehensive LEDS. In some cases this may mean focusing primarily on implementation of a plan that has already been developed. The methodological approach is split into 6 stages, which are 1) scoping and planning, 2) determining business-as-usual scenario, 3) as-

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16 See http://www.cdknetwork.net
17 See http://www.lowcarbonportal.org/
18 See http://collections.europarchive.org/tna/20100423085705/http://www.dfid.gov.uk/Global-Issues/Policy-and-Research/Climate-and-environment/Climate-Change/
19 See for example http://tech-action.org/
20 Available at http://openei.org/LEDS

sessing potential and establishing goals, 4) pathways analysis, 5) evaluating and selecting policies, 6) preparing and implementing plans. For each stage the methodology offers guidance on the primary questions to be addressed and gives an overview of available tools and instruments (US DOE & NREL, 2010)[21].

McKinsey & Company

As one of the early movers on low-carbon development, McKinsey & Company has been actively offering developing countries support on low-carbon growth planning. Its analytical approach is based heavily on Marginal Abatement Cost (MAC) curves. In 2007, McKinsey published its first global MAC curve, which it revised in early 2009 (McKinsey & Company, 2009). For non-Annex I countries McKinsey supported the development of MAC curves in Brazil, China, Indonesia, Mexico and Guyana (Project Catalyst, 2009). However, the approach and focus on abatement costs is not without controversy[22].

Other

Various groups of experts from the private sector, research institutes and academia, have supported low-carbon development planning. Several development partners, notably DFID and GIZ, have actively supported low-carbon development. Collaborative partnerships on research and technical assistance for low-carbon development planning include CLEAN (Coordinated Low Emissions Assistance Network)[23] and LCSR-NET (Low-carbon Society Research Network)[24].

[21] These steps and available tools are presented in more detail at www.openei.org/LEDS

[22] McKinsey & Company has been criticized for not being transparent about the assumptions underlying their MAC curves. Moreover, using MAC curves as a basis for low-carbon development planning is controversial due to the two-dimensional focus on abatement potential and costs (van Tilburg *et al.*, 2010).

[23] See http://en.openei.org/wiki/Gateway:Coordinated_Low_Emissions_Assistance_Network_%28CLEAN%29

[24] See http://lcs-rnet.org

ANNEX 4 – GHANA: BACKGROUND

Figure 4: Ghana

Source: CIA (2010)

Ghana is situated in West Africa, with a surface area covering 239 thousand square km and a population of just under 24 million. With a GDP of around USD 1500 per capita (PPP), 28.5 percent of the population living below the poverty line, and a public debt half the size of its GDP, Ghana is a low-income country according to the World Bank classification. It has experienced high GDP growth over the past years and, according to the latest government statistics, the country has recently acquired lower middle-income country status. However, a majority of its society still depends on small-scale agriculture. A large part of its national budget relies on international support.

However, in the region, it is one of the more stable and prosperous countries, which is why it has been a long-standing favourite for donor interventions. Ghana is a parliamentary republic, and the President is Mr. John Atta Mills, who came to power in 2006.

Table 8: Economic indicators Ghana

Economic indicators		Trade	
Nominal GDP (bln USD)	14	**Export goods/services (bln.bln. USD)**	**7**
Nominal GDP (PPP, bln USD)	34	*Gold (%)*	43
Nominal GDP (USD per capita)	601	*Cocoa (%)*	30
Nominal GDP (PPP, USD per capita)	1412	*Wood (%)*	4
		Cocoa products (%)	2
Real GDP growth (%)	7.3		
Agriculture (% GDP)	41	**Import goods/services (bln.bln. USD)**	**12**
Industry (%GDP)	30	*Manufactures (%)*	22
Services (%GDP)	27	*Fuels (%)*	7
		Non-fuel primary products (%)	2

Source: CIA (2010); Rabobank (2009a)

The Ghanaian economy revolves around agriculture and mining (gold, bauxite, etc.), with agriculture accounting for a third of the GDP and over half of all employment. Agricultural products include cocoa, rice, cassava and timber (CIA, 2010; Maasdam, 2010).

Emissions profile and some comments on trends and causes

The greenhouse gas emissions of Ghana are low[25], both in absolute terms (21 Mton CO_2 eq.) and per capita (~1 tonne CO_2 eq.). The major emission sources are forestry, energy and agriculture. (EPA, 2010).

Table 9: Emission profile Ghana 2005

Category	Emissions [Mton CO_2 eq.]
Energy	7.6
Industrial processes	0.1
Agriculture	5.6
Land use change and forestry	5.6
Waste	2.3
Total	**21.2**

Source: private communication GHG Inventory team

In the forestry sector, illegal logging, ambiguous definition of land titles and the enforcement of forestry regulation remain serious problems and the rate of deforestation has been high - the country's forest cover has been halved over the past 15-20 years. Whereas in the first national communication (EPA, 2001) land use (change) and forestry (LULUCF) was reported to be a net *sink*, according to the most recent data it has become a net *source* of emissions. Around two thirds of primary energy consumption in Ghana is based on traditional biomass (fuel wood and char coal), and 26 percent on petroleum products (Energy Policy 2009:8). Power generation capacity is a combination of large scale hydropower and oil/gas fired plants that currently mainly run on light crude oil. Distribution losses in the power grid amount to 25%. Around three quarters of the additional generating capacity in the coming years is foreseen to be thermal (gas/oil) capacity (Energy Commission, 2010).

Agriculture is the largest sector in the Ghanaian economy, with over half the employment and around one third of GDP. The bulk of agriculture related emissions come in the form of CH_4 from Enteric Fermentation (by cattle), additional emissions stem from rice cultivation and field/waste burning practices (Oppong *et al.*, 2010).

Since 2007, there have been substantial oil and gas finds off the coast of Ghana, which can potentially benefit the country and have a structural impact on the energy sector (Tullow Oil, 2010; Moss and Young, 2010). With exploitation planned for start in the fourth quarter of 2010, initially at a pro-

[25] Americans, on average, have an annual emission footprint of 20 tonnes CO_2 eq. The emissions in OECD-Europe are around 8 tonnes per person annually, and in Chinese closer to four tonnes. On an individual basis, 2.4 bln. people emit less than 1 tCO_2 eq. annually (Chakravatry *et al.*, 2009).

duction of 120.000 bbl/day, Ghana is potentially looking at a boost to its economy. With this however, it is also confronted with a new source of GHG emissions.

ANNEX 5 – INDONESIA: BACKGROUND

Figure 5: Indonesia

Source: CIA World fact book

Indonesia consists of over 13000 islands with a surface area covering 1.9 million square km. The capital Jakarta is on Java, one of the five large islands that houses over half of Indonesia's population of 243 million. With a GDP of around 4000 USD per capita (PPP), 17.8 percent its population living below the poverty line, and a public debt of 27.4 percent of its GDP, Indonesia is a lower-middle income country in the World Bank classification. Indonesia is a republic in Southeast Asia, under president Susilo Bambang Yudhoyono, who has been in office since 2004 (CIA, 2010).

Indonesia has an abundance of natural resources, the most important of which are timber, oil and natural gas. In recent years, the demand for energy has outgrown own production and Indonesia has become a net importer of oil[26]. The industry and services sectors are the main contributors to the Indonesian economy (see Table 7.), but at the same time a large number of households still depend on agriculture (over 40% of the work force). Compared to other countries in South-East Asia, the Indonesian economy has done well under pressure of the global economic and financial crises (Maasdam, 2010).

[26] It has left the OPEC cartel in 2008.

Table 10: Economic indicators Indonesia

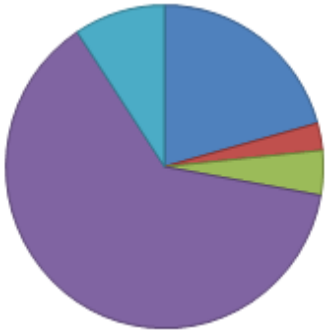
Economic indicators		Trade	
Nominal GDP **(bln USD)**	540	Export goods/services (bln USD)	132
Nominal GDP (PPP**, bln USD)**	963	*Mineral products (%)*	17
Nominal GDP **(USD** per **capita)**	2249	*LNG, crude petrol and products (%)*	15
Nominal GDP (PPP**, USD** per **capita)**	4009	*Fats, oils and waxes (%)*	10
Real GDP growth (%)	5.7	Import goods/services (bln USD)	12
Agriculture (% GDP)	15	*Intermediate goods (%)*	72
Industry (%GDP)	47	*Capital goods (%)*	21
Services (%GDP)	40	*Consumer goods (%)*	7

Source: CIA, 2010; Maasdam, 2010

Emissions profile and some comments on trends and causes

The main source of emissions is land use change and forestry (LUCF) and to a lesser extent energy and waste.

Table 11: Emission profile Indonesia 2005



Category	Emissions [Mton CO_2 eq.]
Energy	369.8
Industrial processes	48.7
Agriculture	80.2
Land use change and forestry	1125.8
Waste	166.4
Total	**1790.9**

Source: Indonesia's second national Communication under the UNFCCC (Draft)[27]

Most notable sources[28] of LUCF emissions are peat fires and peat oxidation through drainage, frequently related to the result of lowering water levels in preparation of palm oil plantations. Deforestation and palm oil and timber production are responsible for a quarter of LUCF emissions. Note that LUCF emissions data have a high degree of uncertainty and variability, and vary among sources. The 2007 publication "Indonesia and Climate Change" has given the country the infamous title of being the third largest emitter of GHG worldwide (Pelangi Energi Abadi Citra Enviro, 2007). Emissions vary significantly from year to year, depending on weather conditions – for example in 2002 when the *El*

[27] Based on Indonesia Second National Communication under the UNFCFCC, November 2010, the nett emission from LUCF is 1,057.4 Mton CO2eq (2004) and net emission from waste is: 166.8 Mton CO2eq (2005).

[28] Peat is responsible for the bulk of LUCF emissions, with estimates varying from just over half to more than two-thirds.

Niño induced droughts caused major fires, doubling the total emissions (2.6 Gtonne in 2002, compared to 1.3 Gton in 2001). The figures above a based on the January 2010 draft of the Second National Communication.

Reported emissions from LULUCF vary considerably among sources. Where the (draft) second national communication reports 821 $MtCO_2$ eq. for the year 2000, Pelangi Energi Abadi Citra Enviro (2007) asserts that the actual emissions were 2563 Mton CO_2 eq.; Similarly, the 2005 emissions from LUCF as reported by the second national communication is 1057 Mton CO_2 eq. (for 2004), McKinsey & Company (2009) reports 1880 Mton CO_2 eq. in 2005.

Projections made for the second national communication reveal that in 2020, the emissions are expected to be around 2.95 Gton CO_2 eq. per year (almost double the 2000 emissions). LUCF will still be the main source of emissions, but energy demand will grow fast and is expected to cause 33% of total emissions in 2020.

Box 1: National Council on Climate Change (DNPI)

Climate change is spread over various ministries and agencies in the Indonesian government, with DNPI being the specially designated body directly under the president with the mandate to develop and coordinate national policy and strategy for climate change.

Responsibilities and mandate of DNPI

- Develop and coordinate national policy and strategy for climate change.
- Coordinate national ministries and industry climate change activities.
- Develop and coordinate a carbon trade mechanism.
- National monitoring and evaluation.
- Focal point for international climate change related activities.

DNPI is a council of 17 Ministers and Head of the Meteorological and Climate Agency which directly chaired by the President. To conduct the day-to-day work, an Executive Chair of DNPI is supported by a Secretariat with five divisions. DNPI is also supported by 8 (eight) working groups, namely on: mitigation, adaptation, financial mechanisms, technology, LULUCF, scientific data, marine and international negotiation. Chair and Vice-Chair of each working group are high rank officers from relevant ministries with members from relevant stakeholders not only from government but also NGOs and business sector. As LCDS will deal and focus more in development planning, the institution to develop LCDS would logically be Bappenas - as the national development planning agency with input from relevant sectors and agencies (including DNPI).

Some highlights in terms of climate and development challenges

The main climate related challenge in Indonesia is to stop deforestation and protect the existing peat lands. Deforestation in the past 50 years has resulted in the loss of 40% of the total forest cover, and deforestation rates are very high (1.8% annually; University of Gothenburg, 2008). Not only does this put pressure on the country's forest resources and biodiversity, it also increases vulnerability to climate impacts (e.g. floods and landslides) and causes massive greenhouse gas emissions. The high rate of deforestation is mainly due to a combination of factors. On one hand, there are strong economic incentives to increase timber production and convert forest to palm oil plantations, while on the other hand there is only weak enforcement of existing regulation to protect forest and nature reserves (University of Gothenburg, 2008). Recently, the President issued the Presidential Instruction no. 10/2011 on forest and peatland moratorium as an effort to reduce the exploitation of forests and peat land.

Besides the emissions from peat and forestry, the major emission source is energy. With the high economic growth projections, emissions are also expected to rise substantially over the next decade(s). This poses two challenges. First, providing access to modern energy sources to the broad population, while 110 million people currently have no access to electricity (reference). Second, keeping up a stable and affordable energy supply to keep up with the high economic growth expectation, while protecting the natural resource base, curbing emissions and reducing dependency on imported fossil fuels.

Table 12: Voluntary emissions targets Indonesia – attribution to sectors

Sectors	Emission reduction plan [Mton CO_2 eq.)			Ministries involved
	26%	15%	Total (41%)	
Forestry and peat	672	367	1039	Forestry, Environment, Public Works, Agriculture
Waste	48	30	78	Environment, Public Works
Agriculture	8	3	11	Environment, Agriculture
Industry	1	4	5	Industry
Energy and Transportation	38	18	56	Transportation, Energy and Mineral Resources, Public Works
Total	**767**	**422**	**1189**	

Source: presentations Mr. Rachmat Witoelar, Executive Chair of DNPI (July, 2010); Ms. Umiyatun Hayati Triastuti (Feb, 2010).

ANNEX 6 – INDONESIAN STRATEGIES AND STUDIES

Table 13: Indonesia strategies and studies (as of 2010)

Title	Government	External assistance	Published
National Action Plan on Climate Change (RAN-PI)	Ministry of Environment	-	2007
Second National Communication	Ministry of Environment	UNDP	2010
Technology Needs Assessment	Ministry of R&T and BPPT	GTZ	2009/2010
Indonesian Energy Outlook 2009	MEMR - Pusdatin		2009
Indonesian GHG Abatement Cost Curve	DNPI	McKinsey	2010
Indonesia's Climate Change Sectoral Road Map	Bappenas	GTZ	2010
Yellow Book	Bappenas	GTZ	2010
Low-carbon Development Options		World Bank	2008
National Action Plan of Climate Change (RAN-GRK)	Bappenas	Under Preparation	
National Economic, Environment and Development Study for Climate Change	DNPI	UNFCCC	2009
Low-carbon Society Scenario toward 2050: Indonesian energy sector		ITB, Kyoto university, IGES, NIES	
Developing vision for low-carbon development options in Indonesian Energy Sector		WWF	
Reducing carbon emissions from Indonesia's peat lands	BAPPENAS	DFID	2010
Green Paper Economic and Fiscal Policy Strategies for Climate Change Mitigation	Ministry of Finance	AUSAID	November 2009