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Low-Emission Development Strategies (LEDS): Technical, Institutional and Policy Lessons

C. Clapp, G. Briner and K. Karousakis
(OECD)

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ABSTRACT

The term low-emission development strategies (LEDS) first emerged under the United Nations Framework Convention on Climate Change (UNFCCC) in 2008 and its possible role in a future climate framework continues to be debated. Though no formally agreed definition exists, LEDS are generally used to describe forward-looking national economic development plans or strategies that encompass low-emission and/or climate-resilient economic growth. LEDS can serve multiple purposes but are primarily intended to help advance national climate change and development policy in a more co-ordinated, coherent and strategic manner. A LEDS can provide value-added to the myriad of existing climate change and development related strategies and reports that already exist by providing integrated economic development and climate change planning.

This paper outlines how the concept of LEDS has evolved in the climate policy discourse and explores how it could usefully add to the large number of existing strategies, action plans, and reporting documents that are already available. The paper outlines gaps that LEDS could fill, the elements it could contain, and how LEDS can be prepared to ensure that they are effective and efficient in delivering their intended goals. To derive early lessons and insights on experiences, challenges, and approaches adopted in the preparation of national climate change strategies and LEDS, this paper examines seven countries in detail: Guyana, Indonesia, Israel, Mexico, Nigeria, Thailand and the UK.

Each country will face its own specific challenges in preparing a LEDS. Common challenges are likely to include: advancing agreement across government on priority policies; obtaining and analysing reliable data on mitigation costs and climate change impacts; identifying and addressing barriers to implementation; and limited financial and human resources. Despite these challenges, the process of preparing a LEDS can facilitate working towards agreement across government on economic development and climate change priorities, and can help attract political support and funding, both domestically and from the international community.

JEL Classification: F53, Q54, Q56, Q58
Keywords: Climate change; mitigation; adaptation; greenhouse gas; low emissions development strategy

RÉSUMÉ

La notion de Stratégie de développement à faible taux d'émission (SDFTE) est apparue pour la première fois en 2008 dans les travaux de la Convention-cadre des Nations Unies sur les changements climatiques (CCNUCC), et le débat se poursuit quant au rôle qui pourrait être le sien à l'avenir dans le contexte de la lutte contre le changement climatique. Bien qu'aucune définition n'ait été formellement entérinée, l'expression désigne généralement des plans ou stratégies nationaux de développement économique axés sur la prospective et sur une croissance économique à faible taux d'émission et/ou résiliente face au changement climatique. Les SDFTE peuvent servir des objectifs multiples, mais elles visent en premier lieu à faire avancer, de façon plus coordonnée, cohérente et stratégique, les politiques nationales de développement et de lutte contre le changement climatique. Une telle stratégie peut apporter une valeur ajoutée à la multitude de stratégies et de rapports déjà consacrés au changement climatique et au développement économique, en permettant une planification intégrée dans ces domaines.

Ce document montre l'évolution du concept de SDFTE dans la réflexion sur le changement climatique et s'interroge sur la manière dont il pourrait compléter utilement les nombreux programmes d'action, stratégies et rapports qui existent déjà. Il expose les lacunes qu'une SDFTE pourrait combler, ainsi que les éléments qu'elle pourrait contenir, et donne des pistes pour garantir sa pertinence et son efficacité au regard des objectifs fixés. Sept pays font l'objet d'un examen détaillé – Guyane, Indonésie, Israël, Mexique, Nigéria, Royaume-Uni et Thaïlande – afin de dégager une première série d'observations et d'enseignements sur les expériences, les enjeux et les approches liés à la définition de stratégies nationales face au changement climatique et de stratégies de développement à faible taux d'émission.

Les pays ne seront pas confrontés aux mêmes difficultés lors de la mise au point d'une SDFTE mais certaines d'entre elles devraient être largement partagées : concertation gouvernementale sur les actions prioritaires ; obtention et analyse de données fiables sur les coûts d'atténuation et les effets du changement climatique ; identification et levée des obstacles à la mise en œuvre ; ressources financières et humaines limitées. En dépit de ces difficultés, le processus d'élaboration d'une SDFTE pourra faciliter la concertation au sein des gouvernements quant aux priorités à établir en matière de développement économique et de changement climatique, et favorisera l'obtention d'un soutien politique et financier, tant au plan national qu'à l'échelle de la communauté internationale.

Classification JEL: F53, Q54, Q56, Q58
Mots-clés: Changement climatique, atténuation; gaz à effet de serre; stratégies de développement à faible intensité d'émissions

FOREWORD

This document was prepared by the OECD and IEA Secretariats in 2010 in response to a request from the Climate Change Expert Group on the United Nations Framework Convention on Climate Change (UNFCCC). The Climate Change Expert Group oversees development of analytical papers for the purpose of providing useful and timely input to the climate change negotiations. These papers may also be useful to national policy-makers and other decision-makers. In a collaborative effort, authors work with the Climate Change Expert Group to develop these papers. However, the papers do not necessarily represent the views of the OECD or the IEA, nor are they intended to prejudge the views of countries participating in the Climate Change Expert Group. Rather, they are Secretariat information papers intended to inform Member countries, as well as the UNFCCC audience. Members of the Climate Change Expert Group are Annex I and OECD countries. The Annex I Parties or countries referred to in this document are those listed in Annex I of the UNFCCC (as amended at the 3rd Conference of the Parties in December 1997): Australia, Austria, Belarus, Belgium, Bulgaria, Canada, Croatia, Czech Republic, Denmark, the European Community, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Japan, Latvia, Liechtenstein, Lithuania, Luxembourg, Monaco, Netherlands, New Zealand, Norway, Poland, Portugal, Romania, Russian Federation, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey, Ukraine, United Kingdom of Great Britain and Northern Ireland, and United States of America. Israel, Korea, Mexico and Chile, as OECD member countries, are also members of the Climate Change Expert Group. Where this document refers to "countries" or "governments", it is also intended to include "regional economic organizations", if appropriate.

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Questions and comments should be sent to:
Gregory Briner
OECD Environment Directorate
2, rue André-Pascal
75775 Paris Cedex 16
France
Email: gregory.briner@oecd.org

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Executive Summary

The term *low-emission development strategies* (LEDS) first emerged under the United Nations Framework Convention on Climate Change (UNFCCC) in 2008 and its possible role in a future climate framework continues to be debated. Though no formally agreed definition exists, LEDS are generally used to describe forward-looking national economic development plans or strategies that encompass low-emission and/or climate-resilient economic growth. LEDS can serve multiple purposes but are primarily intended to help advance national climate change and development policy in a more co-ordinated, coherent and strategic manner. LEDS have been specifically mentioned in negotiating texts from COP 15 and beyond, as well as in the Copenhagen Accord, which recognised that a LEDS is indispensible to sustainable development.

A LEDS can provide value-added to the myriad of existing climate change and development related strategies and reports that already exist by providing integrated economic development and climate change planning. A LEDS may serve a range of domestic purposes for government, the private sector and the general public as well as other institutions and stakeholders. For example, the process of establishing a LEDS can enhance co-ordination across different ministries, improve communication with other stakeholder groups such as businesses and civil society, and increase public awareness of climate change science and policy. A LEDS can help guide the diversification of an economy (e.g. away from fossil-fuels). Clarification on economic development and climate change priorities can in turn help provide early signals to the private sector for possible directions for investment, research and development.

Beyond the domestic functions that are served by a LEDS, such strategies can also inform the international community in a variety of ways. For example, LEDS can provide information to better assess global climate change impacts and actions and how mitigation actions are expected to impact emission trajectories. Another important purpose of a LEDS could be to highlight gaps and identify priority actions for funding to the international community. From an aid donor's perspective, financing for climate change programmes that also contribute to poverty reduction and development objectives can reduce the risk of fragmenting funding sources. Although very few reports that specifically refer to themselves as LEDS have actually been prepared to date, many elements of national climate change strategies that are aligned with economic and development priorities could be incorporated into a LEDS.

Many countries agree that preparing a LEDS should not hinder progress on implementing nationally appropriate mitigation actions (NAMAs). Although a LEDS could help attract financing, the preparation of a LEDS should not be a precondition for financial support. Rather, preparing a LEDS is an enabling exercise that can help prioritise NAMAs and is useful for considering how NAMAs can work together towards a national strategy in the longer-term.

Countries should carefully consider how LEDS fit with other existing planning tools and strategies to minimise the risk of additional burden and overlapping or conflicting strategies. LEDS can integrate, and build on, existing strategies including national sustainable development strategies, national climate change strategies and technology needs assessments. It is also important to consider how information contained in a LEDS (*e.g.* policy priorities, funding and capacity needs) could be communicated to the international community. This could involve making LEDS publically available, or voluntarily including some elements of a LEDS in a National Communication.

This paper outlines how the concept of LEDS has evolved in the climate policy discourse and explores how it could usefully add to the large number of existing strategies, action plans, and reporting documents that are already available. The paper outlines gaps that LEDS could fill, the elements it could contain, and how LEDS can be prepared to ensure that they are effective and efficient in delivering their intended goals.

Although no single formula for a LEDS can apply for all countries, a crucial first step in creating a LEDS is to identify the purpose(s) and key stakeholders, which will guide the important elements to include in a LEDS. Depending on national circumstances, these could be:

- **Vision/goal:** An over-arching vision or goal can help guide policy decisions across development and climate change priorities over the long-run.

- **Assessment of current situation:** A clear understanding of major greenhouse gas (GHG) emitting sectors and socio-economic indicators is fundamental to determining a path forward.

- **Emission projections, mitigation potential and costs:** Planned pathways for business-as-usual emissions can help provide a sense of the national emission trajectory, while mitigation potential and costs can be a first step towards identifying mitigation actions.

- **Vulnerability assessment:** Indications of how a country may be impacted by climate change can help engage stakeholders, including the general public, and can help identify adaptation needs and the range of possible adaptation outcomes.

- **Priority programmes and policies:** An indication of policy priorities for mitigation and adaptation integrated with an economic development strategy can identify synergies and trade-offs.

- **Finance:** Alignment of priority policies with national budget and an indication of financing needs can be important information to communicate to domestic and international stakeholders.

- **Institutional arrangements:** An explanation of which institutions are responsible for implementing actions can provide clarity on responsibilities across government and contribute to effective policy implementation.

The extent to which countries are able to prepare these elements, as well as the length of preparation time, may depend on their national circumstances and the funding and support available. Additional potential elements, such as adaptation action costs, could provide important information to both domestic and international stakeholders but may be more challenging to provide for some developing countries.

To derive early lessons and insights on experiences, challenges, and approaches adopted in the preparation of national climate change strategies and LEDS, this paper examines seven countries in detail: Guyana, Indonesia, Israel, Mexico, Nigeria, Thailand and the UK. These countries represent a range of national circumstances and stages in the process of preparing national climate change strategies and LEDS. Considering the unique attribute of a LEDS to be the integration of economic/development and climate change planning, the following criteria are applied in this paper to help assess the extent to which the national climate change strategies in these countries are integrated with development planning:

- the extent to which the climate change strategy relates to development plans;

- the extent to which senior economic policymakers are involved in preparing the strategy; and

- the extent to which policy priorities are incorporated into the national budget or aligned with other sources of financial support.

The broad technical, institutional and policy lessons learned from existing experience with preparing such strategies across these case studies are summarised in Table 1. Experience obtained across these strategies can provide insights for how LEDS preparation can be better structured and made more strategic, and how co-ordination can be enhanced to advance domestic climate change policy.

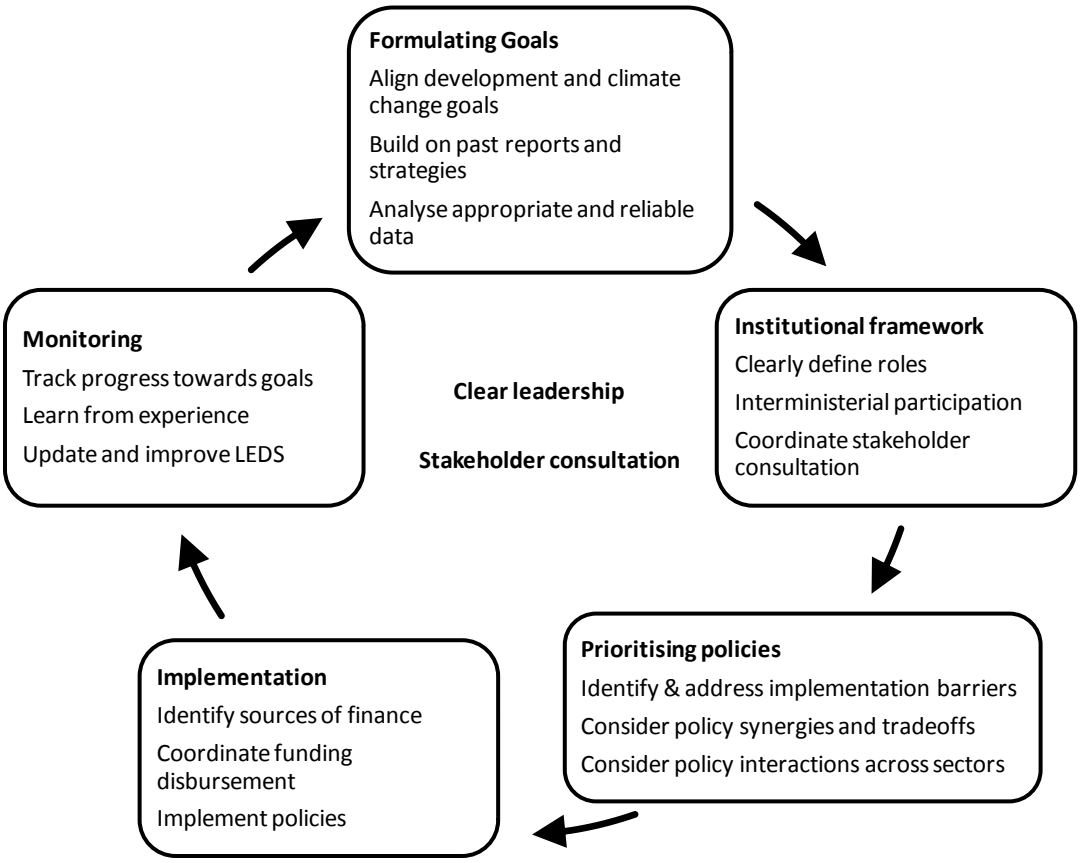
Table 1: Overview of lessons learned in preparation of national climate change strategies and LEDS

	Technical	**Institutional**	**Policy**
Expertise and resources	• Build an analytical foundation on GHG inventories • Gather and analyse reliable and timely data on emissions, mitigation policy options, and climate change impacts • Collaborate with international experts to improve data and analysis • Consider underlying assumptions of data and analysis • Establish systems to routinely collect data as a first step towards accountability	• Engage high level policy makers to increase awareness and support	• Identify priority policy options, barriers to implementation and means to address them • Prioritise policies according to cost-effectiveness
Government co-ordination	• Harness synergies and minimise duplication with other reports and strategies	• Co-ordinate across relevant ministries with clear leadership in key areas • Clearly define roles and policy mandates across different government ministries and agencies • Co-ordinate disbursement of funds to target climate actions and development priorities	• Align policies with development goals to increase participation and support (political and financial) • Utilise LEDS preparation to identify policy goals or to design plans to meet goals • Consider interactions across policies and sectors • Improve and revise LEDS over time • Delineate sources of finance, whether domestic or international
Stakeholder involvement	• Obtain reliable and timely data through stakeholder interaction, and use this information in turn to further engage with stakeholders	• Involve stakeholders from businesses, non-governmental organisations, and local/regional governments • Iterate with stakeholders to increase engagement • Provide assurance and early signals to businesses	• Engage stakeholders, enhance communication, and update of LEDS

Source: Authors

These lessons learned can contribute to the cycle of preparing coherent, co-ordinated and strategic LEDS (see Figure 1). The first stages of the planning cycle are to formulate goals and establish an institutional framework; the next stage is to align development and climate change priorities; and the final stages are to implement and monitor the strategy. Important throughout all aspects of this cycle are the cross-cutting elements of clear leadership and stakeholder consultation. Although it is useful to consider each step in the planning cycle, in reality many of these stages may occur simultaneously.

Figure 1: Planning cycle of a LEDS



Source: Authors; Adapted from IISD (2004)

The experience in the case study countries reveals important insights into the LEDS planning cycle:

- The first step of formulating goals includes assessing the current situation of a country, and aligning development with climate goals. In this regard, for example, the UK's Low Carbon Transition Plan aimed to eliminate fuel poverty in all households by 2016. In this early planning stage it is also important to harness synergies with other reports and strategies. One such example is how Mexico built on methods developed for their GHG inventory to project emissions into the future. Assessing the current situation requires reliable data and analysis, for which collaboration with international experts may be helpful. In Thailand, an improved co-ordination across the various existing development and climate change reports could help in preparing an overarching LEDS. For any data and analysis, it is important to understand the key underlying assumptions that can drive significant differences in results.

- A supporting institutional framework that co-ordinates across relevant ministries and has a defined leadership function is essential. A lack of clearly defined roles where institutions overlap in responsibilities can severely hinder progress, as can be seen in the case of Nigeria. Engaging high level policy makers can increase awareness and support, as in Indonesia where the multi-stakeholder committee is led by the President.

- Preparing a LEDS can help prioritise national policy options. This is one of the most challenging steps, as Israel's working groups are finding now. A first step is to identify barriers to implementing policies and ways to address them, and then to consider policy synergies and trade-offs.

- Implementing policies to achieve LEDS goals is the key to concrete changes in investments and behaviours. Identifying potential sources of finance, whether domestic or international, can help move policies from the planning phase to the implementation phase. It may also be helpful to co-ordinate dispersion of funds within a country to target climate actions and development priorities.

- The monitoring phase includes tracking progress towards goals. For example, Guyana has developed a MRV roadmap in consultation with stakeholders. New data or learning obtained during the process should feed back into updating and improving the LEDS. A LEDS is a tool that will need to evolve over time.

Each country will face its own specific challenges in preparing a LEDS. Common challenges are likely to include: advancing agreement across government on priority policies; obtaining and analysing reliable data on mitigation costs and climate change impacts; identifying and addressing barriers to implementation; and limited financial and human resources. Despite these challenges, the process of preparing a LEDS can facilitate working towards agreement across government on economic development and climate change priorities, and can help attract political support and funding, both domestically and from the international community.

1. Introduction

Climate change policy, whether it focuses primarily on mitigation or adaptation, cuts across all sectors of the economy. The drivers of climate change are integrally linked with national and regional policies in many sectors including energy, transport and land use. Climate change policy may also impact broader national priorities, such as poverty alleviation, sustainable development and economic growth. Given these inter-linkages, aligning climate change priorities with economic development and/or growth strategies can help to advance national policy in a more co-ordinated, cohesive and strategic manner.

Several countries are now beginning to consider and prepare for more comprehensive, integrated climate change strategies of this kind. As countries pursue climate-friendly growth pathways or action plans, several terms have emerged under the auspices of the United Nations Framework Convention on Climate Change (UNFCCC) as well as in the general climate community to describe them, including low-emission development strategies or LEDS.[1] While there is no formal definition of a LEDS as yet, their potential value-added is integrated planning to advance national economic development and climate change policies. They are forward-looking, climate-friendly growth strategies that can highlight a country's priority actions for climate mitigation and adaptation, and a country's role in the global effort against climate change.

What is a LEDS?
In this paper the term LEDS is used to describe forward-looking national development plans or strategies that encompass low-emission and/or climate-resilient economic growth.

These plans can play an important role in both the national policy context and for the international climate change community. At the national level, LEDS provide a new opportunity to consider climate change and development in a more integrated, systematic and strategic way. The international climate change community also has an interest in better understanding planned growth pathways and future financial or technical support needs through a LEDS. Overall, LEDS can help to enhance transparency, foster exchange of information and lessons learned, build trust across countries, and provide international recognition for climate actions. A LEDS could also help to steer funding/support to country-driven priorities.

The aim of this paper is twofold. First, it aims to explore the potential purposes of a LEDS. This can help to clarify the unique role of LEDS amongst the myriad of other existing national strategies that countries prepare, and thus provide insights on how a LEDS may be most effectively designed and used to promote economic development while addressing climate change. Second, the paper aims to derive specific insights for good practice in the process of preparing a LEDS.[2] To do this, the paper draws on experience with the preparation of national climate change strategies and, where available, from early experience with LEDS. Seven country case studies are examined in-depth: Guyana, Indonesia, Israel, Mexico, Nigeria, Thailand and the UK. These case studies reflect a range of national circumstances in terms of economic development and structure of their economies, as well as a range of progress on, and approaches adopted for, preparing a national climate change strategy or LEDS. Lessons learned from these case studies can help advance national development and climate change planning, and potentially also international climate change policy.

The paper is organised as follows: Section 2 places LEDS in the context of the international UNFCCC negotiations and examines what their potential purpose may be. Section 3 provides a broad overview of the current status of national climate change strategies and LEDS in both developed and developing countries, highlights the key components that are addressed within them, and briefly reviews supporting institutions for LEDS preparation. In Section 4, the seven case studies of countries involved at various stages in the

[1] These strategies have also been referred to as 'low-carbon growth plans' (LCGP), 'low carbon development strategies' (LCDS), and 'climate-resilient growth strategies'.

[2] This study focuses primarily on the preparation (rather than the implementation) of a LEDS. Further work could focus on effective implementation.

preparation of national climate change strategies and LEDS are reviewed, and key challenges and lessons learned across the technical, institutional, and policy context are examined. Finally, Section 5 summarises the main conclusions and raises questions for further discussion.

2. LEDS and their Potential Role and Purpose

The term *low-emission development strategies* was first introduced in the UNFCCC negotiations in April 2008, in the context of a shared vision to ensure ambitious collective action on climate change. This section describes how the concept of LEDS has evolved in the climate change policy discourse, explores what their potential role and purpose may be, and considers the relationship between LEDS and other strategies.

2.1 LEDS in the climate policy discourse

Establishing a LEDS is, at present, a voluntary exercise; specific guidelines, recommendations or requirements for what elements it should contain have not been developed. Box 1 briefly outlines how the concept of LEDS has evolved in the UNFCCC negotiations to date.

Box 1. The evolution of LEDS in the climate negotiations

The initial proposal to introduce LEDS, put forward by the EU in 2008, highlighted how information on planned low-carbon pathways can help to inform the international community about funding needs and priorities and to help gauge the level of global climate change action (where this information is available). This concept was bolstered by the recent preparation of strategic climate change planning documents by a number of countries, with leaders at the Major Economies Forum at L'Aquila, Italy in July 2009 declaring that their countries would prepare low-carbon growth plans.

LEDS have been proposed in the UNFCCC climate negotiations as a type of nationally appropriate mitigation action (NAMA), and also referred to separately, most commonly in the context of UNFCCC Article 4.1, and particularly 4.1.b.* At the 15th Conference of Parties (COP-15) in Copenhagen, the draft decision for the Working Group on Long-term Cooperative Action (AWG-LCA) mentioned low-emission plans as a requirement for developed countries, and conditionally mentioned (in brackets) the preparation of low-emission plans by developing countries (UNFCCC, 2010a). The Copenhagen Accord also recognises that a "low-emission development strategy is indispensible to sustainable development" (Copenhagen Accord, 2009). Papua New Guinea's submission to the Copenhagen Accord aims to clarify this concept, by noting that it will finalise a "Climate Compatible Development Plan", and recognising that NAMAs will be undertaken on the basis of capability and international support. To this end, it encourages supporting frameworks for the delivery of finance based on country-led national climate compatible development plans (Papua New Guinea, 2010).

The latest draft LCA text includes a bracketed option for developed countries to prepare low-emission plans (UNFCCC, 2010c). The text also includes a bracketed option in the context of NAMAs for developing country parties to prepare low-emission development plans, noting in brackets that these will not be a precondition for support.

* Article 4 of the UNFCCC refers to 'Commitments', with article 4.1b indicating that "All Parties…shall…formulate, implement, publish and regularly update national…programmes containing measures to mitigate climate change…".

Some developing countries have raised concerns that producing a LEDS would be an additional barrier to receiving funds, in terms of both resources and time, and that they might be held accountable for achieving the plan in the future.[3] Other commentaries have also highlighted that care must be taken to ensure LEDS do not impose an external influence on the direction of economic development or reduce sovereignty in national planning (Project Catalyst, 2009).

[3] These concerns were raised *inter alia* at the October 2010 Major Economies Forum (MEF) in London.

There seems to be general agreement[4] that LEDS should not hinder or slow progress on implementing NAMAs. Further, although a LEDS could help attract financing, preparing a LEDS should not be a precondition for financial support.

Preparing a LEDS is an enabling exercise that can be an investment towards a more comprehensive, integrated, and thus effective national plan. This process can prioritise NAMAs and enhance their implementation through a longer-term consideration of the supporting institutional and policy framework. Some countries do not have the current capacity to develop a LEDS, and thus could continue to take action on NAMAs and consider moving towards a LEDS in the future. Preparing a LEDS is an opportunity to consider how NAMAs work together towards a national strategy over a longer time frame, and should be an evolving process over time.

LEDS can enhance transparency and facilitate the exchange of information, both within and across countries. Building on existing development plans and involving policy makers in economic planning can enhance the opportunity of climate change strategies to influence policy. Credible analysis of climate change issues can influence budget priorities if designed to feed into national policy planning documents (Drakenberg *et al.*, 2009). From an aid donors perspective, financing for climate change programmes that also contributes to poverty reduction and development objectives can help avoid fragmenting funding sources (OECD, 2009). Preparing LEDS could also be a first step towards indicating a sufficient level of capacity to effectively absorb and manage the financing, through an understanding of institutional responsibilities.

2.2 Purposes of a LEDS

Consideration of the potential purposes of LEDS and their intended audience can help to clarify their role, and thus provide insights on how a LEDS may be most effectively designed and used to promote economic development while addressing climate change in a coherent, co-ordinated and strategic manner. Table 1 outlines the range of possible functions that a LEDS could fulfil for different stakeholders, both domestic and international. The table also lists several core LEDS elements that could meet the purposes identified, which are discussed in further detail in Section 3.2.

A LEDS may serve a range of domestic purposes for government, the private sector, the general public and the international community, as well as other institutions and stakeholders. The process of establishing a LEDS can enhance co-ordination across different ministries and communication with other stakeholder groups such as businesses and civil society, and also increase public awareness of climate change science and policy. A LEDS can help guide diversification of an economy (*e.g.* from a fossil-fuel basis). Clarification on economic development and climate change priorities, including plans for domestic clean energy technologies, can in turn help provide early signals to investors in the private sector as well as for new possible directions for research and development (although this ultimately depends on how a LEDS is implemented). LEDS can identify priorities for climate actions and also identify needs for funding and support.

Beyond the domestic functions that are served by a LEDS, such strategies can also inform the international community in a variety of ways. For example, LEDS can provide information to better assess global climate change impacts and actions and how mitigation actions are expected to impact emission trajectories. Another important purpose of a LEDS could be to highlight gaps and identify priority actions for funding to the international community.

[4] Cf. discussions in the Climate Change Expert Group (CCXG) meeting, 23-24 September 2010, Paris. CCXG members include Annex I and OECD countries.

Table 2: What are the potential uses of LEDS?

Stakeholder	Possible uses	LEDS elements that can inform these uses
Government (national, regional and local)	Identify mid- and long-term mitigation goal (*e.g.*to 2020 and 2050)	Vision/goal
	Integrate national economic or development planning with climate change mitigation and adaptation policy priorities	Vision/goal
	Identify country-driven policy priorities for short- to medium-term mitigation and adaptation actions in key sectors (including NAMAs)	Identification of priority programmes and policies
	Provide estimates of the costs of possible future emission reductions – either in aggregate, groups of actions, or individual actions	Mitigation costs
	Identify barriers to implementing mitigation and adaptation actions and means to address them	Identification of priority programmes and policies
	Identify economic and distributional impacts of climate policies (winners and losers) and means to address regressive impacts on low-income households	Mitigation costs; Identification of priority programmes and policies
	Promote synergies between climate and development goals (*e.g.* employment opportunities, co-benefits with respect to health, air, biodiversity, etc.)	Vision/goal; Identification of priority programmes and policies
	Improve co-ordination between sectoral policies, including energy technology and RD&D strategies	Identification of priority programmes and policies; Institutional arrangements
	Improve policy coherence via increased inter-departmental co-ordination of policy priorities and planning	Identification of priority programmes and policies; Institutional arrangements
	Facilitate monitoring of data and/or trends	Assessment of current situation; Emission projections;
	Facilitate monitoring of progress (of both mitigation and adaptation actions and strategies), through tracking whether goals and targets are being met	Assessment of current situation; Emission projections; Emission reduction potential
	Identify support needs and priorities– either economy-wide or individual sectors/actions	Mitigation costs; Costs for adaptation actions; Finance
	Ensure mitigation actions are cost-effective	Mitigation costs; Costs for adaptation actions
	Build consensus and support across ministries for economic development and climate actions	Vision/goal
	Develop experience with planning tools and data	(all elements)
	Enhance engagement and raise awareness across all levels of government	(all elements)
Private sector (domestic and international)	Enhance regulatory certainty for investors by identifying mid- and long-term priorities, *e.g.* on technology RD&D	Vision/goal
	Provide information about actions the Government is taking, and a means of constructive engagement with these actions	Vision/goal; Identification of priority programmes and policies
Institutions (*e.g.* universities, research institutes)	Increase knowledge-base, transparency, strengthen institutions (including research) and build implementation capacity	(all elements)

Table 2 (continued): What are the potential uses of LEDS?

Stakeholder	Possible uses	LEDS elements that can inform these uses
General public	Provide an opportunity for broad stakeholder input into policy planning (*e.g.* through consultations)	(all elements)
	Provide information about actions the Government is planning, considering or taking	Vision/goal; Identification of priority programmes and policies
	Increase awareness of climate change science and policy	Vision/goal; Identification of priority programs and policies; Assessment of current situation; Emissions projections; Vulnerability assessment
International community	Provide inputs to more accurately project and assess global emission trends	Vision/goal; Identification of priority programmes and policies; Assessment of current situation; Emission projections
	Identify expected impacts of climate change (including on economic development); assess and prioritise adaptation actions; demonstrate successful adaptation programmes/actions; highlight adaptation needs	Vulnerability assessment; Costs of adaptation actions
	Provide international donors with information on country-driven priorities and needs for funding – help to steer donor policy with integrated development and climate priorities	Mitigation costs; Costs of adaptation actions; Finance
	Indicate how countries intend to meet their obligations under the Convention (and any subsequent targets/goals)	Vision/goal; Identification of priority programmes and policies
	Show how mitigation actions are affecting, or expected to affect, emissions trajectories	Emission projections; Emission reduction potential
	Aid the design of future international policy frameworks and highlight areas in which greater international co-operation would help to achieve common objectives, and share strategies with other countries	(all elements)

Source: Authors; adapted from Ellis *et al.* (2010a).

2.3 Relation to Other Strategies

The value-added of similar types of forward-looking strategies has been recognised under previous international environmental agreements. The Rio Summit under Agenda 21, for example, introduced the concept of National Sustainable Development Strategies (NSDS), and suggested that all countries 'should' develop one. These strategies aim to build upon and harmonise the various sectoral economic, social and environmental policies and plans that are operating in the country. As of 2009, 106 Member States of the UN were implementing an NSDS, as per their reporting to the Secretariat of the Convention on Sustainable Development.[5]

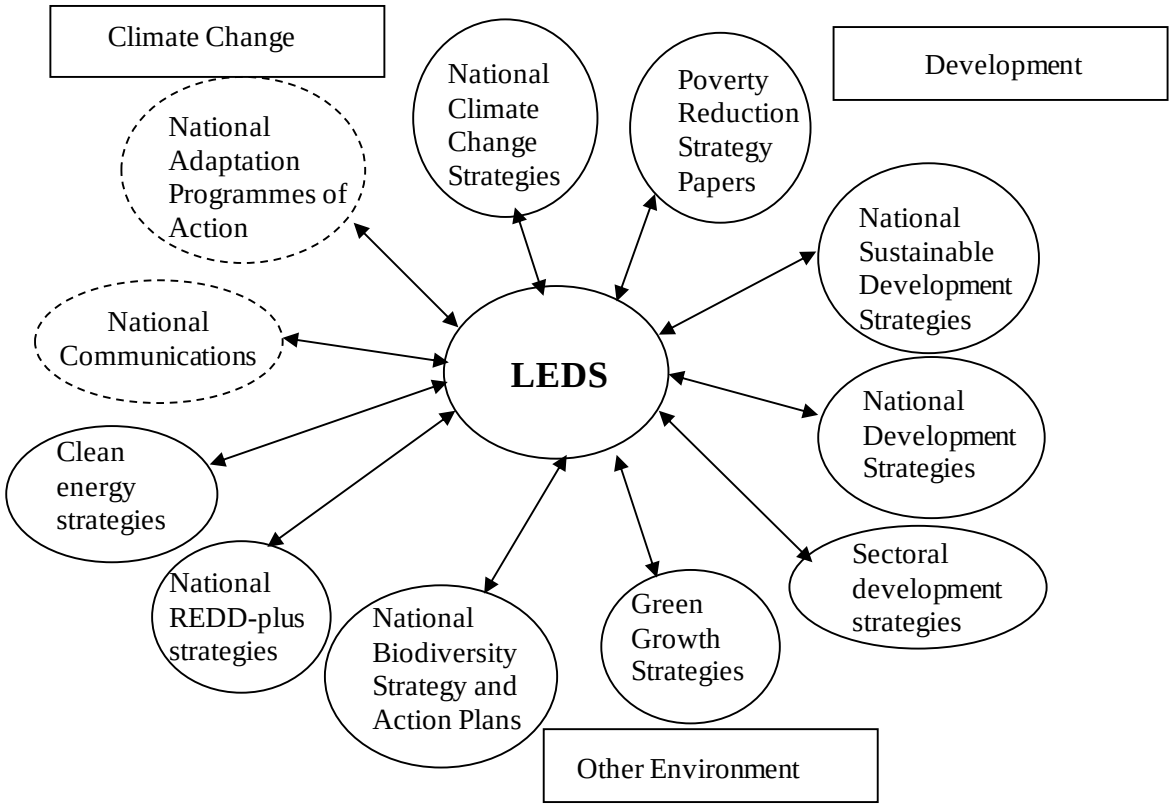
Existing development strategies vary with respect to the extent they incorporate climate change concerns. Equally, existing national climate change strategies may not necessarily be integrated with development planning. Whether a LEDS is primarily a development strategy with a strong climate component, or *vice versa*, is likely to depend on the country's national circumstances and priorities. For example, developing countries may focus on addressing poverty while taking into account climate change, whereas developed

[5] UN DESA website (http://www.un.org/esa/dsd/dsd_aofw_nsds/nsds_index.shtml, accessed on 19 August 2010).

countries may focus more on a comprehensive climate change strategy that encompasses economic growth planning.

There is a risk of additional burden with too many overlapping, and potentially conflicting, strategies. Countries should consider carefully how these planning tools fit together and build upon each other. Figure 1 illustrates some existing national strategies that are relevant to both climate and development goals and could be used to feed into an effective LEDS.[6]

Figure 2: Existing strategies of relevance to LEDS



Notes: National Communications and NAPAs are not strategies *per se* (hence dotted lines) but can be of relevance to LEDS. This is not intended to be an exhaustive list of strategies and reports; the point here is to illustrate that a multitude of different strategies and reporting channels already exists in many countries.

It is also useful to consider how a LEDS is different to these existing strategies – in other words, how is a LEDS unique, and what is its value-added? This can help to clarify what elements may usefully be included in a LEDS versus what may be redundant of other exercises and thus left out to avoid duplication. For example, while many existing national climate change strategies may also contain forward-looking components, they may not adequately integrate economic development with climate change, so this could be a core objective of a LEDS.[7] Moreover, several of the existing national climate change strategies prepared to date only plan forward for the short-term, *i.e.* up to 2012. Examples include Austria, Belgium, Chile, China, Ireland and Sweden. LEDS should ideally include mid-term planning as well, *e.g.* to 2020-2030.[8] See Section 4.1.2 for examples of how countries have built upon existing strategies.

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6 This issue is examined further in section 4.1.2.

7 See Appendix A for a general purpose of these other strategies.

8 See Appendix B for a selection of national climate change strategies and LEDS.

The reporting aspect of LEDS remains undecided in the ongoing UNFCCC negotiations. However, it is useful to consider how important information in a LEDS could be communicated to the international community. Some options are explored in Box 2.

Box 2. Reporting of LEDS

It is important to communicate at least some of the information contained in a LEDS to the international community, particularly to relay policy priorities and (for developing countries) to highlight funding and capacity needs. Thus it is worthwhile to consider voluntary reporting of at least some of the elements of a LEDS. The most recent LCA text includes bracketed options for developed countries to submit low-emission plans in Parties' next National Communication, and for developing countries' first National Communication to contain a LEDS (UNFCC, 2010c).

One option could be for governments to make their LEDS publically available in a UN language and/or English. This would allow for transparency of the complete LEDS. However, this could also complicate information gathering, as some similar or related information might be available in different types of reports (*e.g.* National Communications).

Another option could be to enhance reporting of some of the key elements of a LEDS in a National Communication (NC). Many of these are already regularly reported in NCs (*e.g.* GHG inventories, projections, medium-term policy priorities). This would allow for more consistent reporting, and could facilitate comparison of information across LEDS. It might also be useful to consider whether there is a case for establishing international guidelines, *e.g.* for developing baselines and abatement costs. Yet this involves a risk of expanding the length of the NCs and adding to the reporting burden, while potentially excluding some important contextual information found in the full LEDS.

Regardless of whether LEDS are reported to the international community, there would likely be some degree of overlap between LEDS and National Communications that would require further consideration. While LEDS may be more development-focused and forward-looking than some National Communications, several elements are likely to be common to both. This may be especially the case for Annex I National Communications, as they already contain forward-looking emission projections.

Thus, the reporting of LEDS and National Communications should be considered holistically. Despite guidance for what countries "shall" include in a National Communication, there is still some flexibility for what could be included, both within Annex I countries and between non-Annex I countries (Ellis et al., 2010b). The scope of NCs could be expanded to include forward-looking elements that might otherwise be included in a LEDS, such as a long-term emissions goal and a strategy for achieving it. Alternatively, LEDS could be developed separately to NCs, so that they become a forward-looking update of certain parts of countries' National Communications.*

* For additional discussion on climate-related reporting and of the potential relationship between LEDS and National Communications, refer to Annex A of Ellis *et al.* (2010a). In addition, Ellis *et al.* (2010b) focuses on updating guidelines for National Communications, which can be useful framing for considering the interaction with LEDS.

3. Overview of existing NCCS, LEDS and initiatives to support LEDS preparation

This section examines national climate change strategies and LEDS, highlights several elements that are widespread across these strategies, and provides an overview of recent initiatives that provide support for LEDS preparation.

3.1 Overview of existing LEDS and national climate change strategies

Although the introduction of LEDS terminology to the UNFCCC negotiations emerged recently, planning for economic development and/or climate change mitigation, or adaptation, is not a new concept. Over the past two decades, both developed and developing countries have been active in producing national climate change plans and sustainable development strategies. More recently, several countries have prepared strategies that are more clearly defined as LEDS (*e.g.* Guyana's Draft Low-Carbon Development Strategy, and the UK's Low Carbon Transition Plan).

If the unique attribute of a LEDS is the integration of economic/development and climate change planning, then the following criteria could be examined to help assess the extent to which a national climate change strategy is integrated with development planning:

- Does the national climate change strategy build on existing development plans (*e.g.* NSDS)? To what extent are economic and distributional impacts of climate change policies addressed? To what extent are policy synergies and trade-offs considered (*e.g.* health, water, air, biodiversity, etc.)?

- To what extent is the leadership of the national climate strategy reflective of economic policymaking? (*e.g.* are the development and/or economic ministries engaged in the preparation of the national climate change strategy?)

- Are policy priorities aligned with the domestic budget and, if necessary, considered with other sources of financial support?

This study identifies at least 30 Annex I countries and 16 non-Annex I countries that have produced a national climate change strategy or LEDS to date (see Appendix B). While this paper does not explore all of these plans in detail, Section 4 considers to what extent the current strategies in each of the case study countries contain elements of, or can provide insights for, a LEDS.

Each of the national climate plans or LEDS that have been identified for this study vary in scope and in the elements they contain, reflecting the country's particular national circumstances and priorities. Some countries focus largely on one sector, such as Guyana's focus on forestry[9], whereas other countries such as the UK have a broader, economy-wide scope. Ellis *et al.* (2009) identify four country-specific factors on which the scope of a LEDS could depend:

1) economic development priorities;

2) major sources and sinks of greenhouse gas emissions;

3) vulnerability to the impacts of climate change; and

4) resources available for preparation of the LEDS itself.

[9] About 80% of Guyana's territory consists of forests that are still largely untouched (Guyana, 2010).

A country's economic development priorities can influence the scope of the document. For countries with pledged GHG emission reduction commitments, a LEDS or national climate change strategy typically focuses on mitigation actions, with some including an adaptation component. On the other hand, all of the non-Annex I strategies, except for South Africa, include adaptation.

Several of the strategies examined here also provide information on the expected implementation costs of meeting objectives and/or identified actions. Implementation costs should be considered in the broader sense, *i.e.* inclusive of capacity development required in preparation for implementing a specific action. It is useful for a LEDS to prioritise programmes and policies for implementation, taking into account principles of cost-effectiveness, such as in Mexico's long-term mitigation vision within the Special Programme on Climate Change or PECC (ICCC, 2009) (see Section 4.3.2). A LEDS can also indicate to what extent domestic funding may be available. Some climate change strategies also include this information, such as Peru's proposal (CONAM, 2008) which indicates the total expected level of funding required, and how much of this could be made available domestically.

3.2 Common elements in existing national climate change strategies and LEDS

Recognising that the content of a LEDS is likely to be driven by the purpose (*i.e.* to foster a co-ordinated and effective approach for a country's mitigation and adaptation pathway) and its audience (as identified in Section 2), and that it will reflect specific national circumstances and priorities, there are several elements that might be important to include in a LEDS. Broadly, the key areas frequently covered in existing national climate change strategies and LEDS include a long-term emissions pathway, the strategy needed to achieve the pathway, a description of the potential climate impacts, and a description of proposed associated mitigation and adaptation actions. A summary of elements that have been frequently included in existing national climate change strategies and LEDS is shown in Table 3.

Including adaptation elements in a LEDS may help integrate national climate change resiliency planning with economic development priorities. Cross-government strategic planning can be a primary purpose of a LEDS and benefit domestic stakeholders. Least Developed Countries (LDCs) already prepare National Adaptation Programmes of Action (NAPAs) to help identify priority activities which can be supported by the Least Developed Countries Fund (LDCF). These identify immediate adaptation priorities. An adaptation component of a LEDS could build on NAPAs, by considering the longer-term adaptation priorities to help prepare for these in a more pro-active manner.

National circumstances will also affect the timeframe for determining climate-related actions and priorities. For domestic stakeholders, outlining and agreeing on a longer-term vision on economic development and climate change in a LEDS can help build political consensus for policy planning across the government and help to obtain domestic budgetary resources to support the strategy. In addition, the inclusion of clear plans for mitigation and adaptation actions in the short- and medium-term can help provide signals to domestic stakeholders.

Table 3: Overview of elements in existing national climate change strategies and LEDS

Theme	Element	Function	Time Frame
National economic development and climate priorities and objectives	Vision/goal	Set out the goal of the strategy and outline long-term guiding vision	Forward-looking (mid- to long-term)
	Identification of priority programmes and policies	Identify action and policy priorities for mitigation, adaptation, economic growth/development including synergies and trade-offs	Forward-looking (short- to mid-term)
Emission levels, projections and objectives	GHG inventory (national or sectoral)	Identify main sources and sinks of GHG emissions	Historic and current
	Emission projections	Identify potential baseline emission trajectory	Forward-looking
Mitigation actions	Emission reduction potential	Identify emission reduction potential of mitigation actions	Forward-looking (short- to mid-term)
	Mitigation Costs	Estimate potential costs of mitigation actions, assess who bears the costs (distributional implications), and minimise regressive effects	Forward-looking (short- to mid-term)
Adaptation actions	Vulnerability assessment	Explain how country could be affected by climate change	Forward-looking (mid- to long-term)
	Costs of adaptation actions	Estimate potential costs of adaptation actions, where quantification is possible	Forward-looking (short- to mid-term)
Finance, technology and capacity building needs	Finance	Explain how the costs of the actions described in the strategy could be financed (potentially for international funding purposes)	Forward-looking (short- to mid-term)
	Institutional arrangements	Explain which institutions are responsible for implementing actions or co-ordinating funding	Current and forward-looking

Source: Authors

3.3 Initiatives to support LEDS preparation

Several international initiatives have recently been set up to help prepare, and ultimately implement, LEDS, particularly in non-Annex I countries where the institutional capacity and resources may be limited. Table 4 provides a brief overview of some of the supporting initiatives currently underway in this field. In addition, there are many bi-lateral initiatives underway, including support for LEDS or related capacity development from the EU, Japan, Norway and the US. Growth in the number of such catalysing initiatives is to be welcomed, and co-ordination could help ensure that these initiatives are implemented in an efficient and consistent manner.

Inevitably, the preparation of a LEDS (let alone its implementation) requires financial resources. Financial support could come from a combination of sources, both domestic and international, and public and private. In one estimate, costs for preparing Low-Carbon Growth Studies (ESMAP, 2009) ranged from 0.5 to 1.5 million USD. The level of funding available to institutions to carry out the preparation of a LEDS can be a barrier, particularly in non-Annex I countries. Recognising this, there are now some initiatives that have been set up to provide funding for preparation of LEDS or for components of LEDS, such as the World Bank ESMAP programme and the US Country Studies programme (see Table 4).There are also bilateral funding agreements. For example in Guyana much of the funding for LEDS preparation is coming from the Government of Norway. Additional options for funding could be through the UNFCCC mechanisms or as a component of "fast-start" financing.

Table 4: List of initiatives related to LEDS support

Initiative	Aim	Brief description	Key partner countries to date	Source of funding*	LEDS specific or related	
					Specific	Related
International Partnership on Mitigation and MRV	MRV and mitigation	A series of meetings co-chaired by Germany and South Africa, aimed at implementation and information exchange on a range of issues related to MRV and mitigation including identifying mitigation priorities in the context of sustainable development.	*Global*	Germany		✓
World Bank Energy Sector Management Assistance Program (ESMAP)	General LEDS development	The World Bank ESMAP supported the development of low-carbon growth strategies in six countries via the Low Carbon Growth Country Studies Program through knowledge and technical assistance (ESMAP, 2009).	Brazil, China, India, Indonesia, Mexico, South Africa	World Bank	✓	
Project Catalyst	General LEDS development	Project Catalyst was launched in May 2008 to provide an informal forum for key participants in the UNFCCC negotiations to discuss climate change issues. It includes a 'climate-compatible growth plans' working group, which provides technical support and a forum to share experiences (Project Catalyst, 2009).	China, Guyana, India, Indonesia, Mexico	Private foundations through Climate Works (*e.g.* Hewlett Foundation)		✓
McKinsey studies	Emissions projections and mitigation costs	McKinsey is a global management consulting firm which has undertaken national-level MACC studies for several countries, and provides analytical support to Project Catalyst.	Australia, Belgium, Brazil, China, Czech , Germany Republic, Israel, Poland, Russia, Switzerland, Sweden, UK, US	McKinsey & Company		✓
Co-ordinated Low-Emissions Assistance Network (CLEAN)	General LEDS development	The CLEAN aims to "improve communication and co-ordination by bringing together national and international organisations that are assisting developing countries with … preparation and implementation of low greenhouse gas emission plans and strategies." (CLEAN, 2010)	*Global*	UNEP, US National Renewable Energy Labs (NREL)	✓	
EU – US Development Dialogue	General LEDS development	The EU and the US plan to co-ordinate and complement their support for LEDS activities in developing countries. (EU-US, 2010)	*Multiple countries (to be determined)*	EU, US	✓	

* Sources of funding for international organisations (*e.g.* World Bank) are generally from donor/member countries. Private sector organisations (*e.g.* McKinsey & Company) may receive funding from governments or other funders.

Table 4 (continued): List of initiatives related to LEDS support

Initiative	Aim	Brief description	Key partner countries to date	Source of funding*	LEDS specific or related	
					Specific	Related
Climate Investment Funds (CIF)	Financial support for low-carbon technology, forestry, and climate-resilience programs	CIFs are "a unique pair of financing instruments designed to pilot what can be achieved to initiate transformational change towards low-carbon and climate-resilient development through scaled-up financing channelled through the multilateral development banks." As part of the CIFs, the Clean Technology Fund (CTF) accelerate diffusion and transfer of clean technologies in middle-income countries by "scaling-up development through funding low-carbon programs and projects that are embedded in national plans and strategies". The other arm of the CIFs is the Strategic Climate Fund, which consists of the Forest Investment Program (FIP), Pilot Program for Climate Resilience (PPCR), and Scaling Up Renewable Energy Program in Low Income Countries (SREP) (CIF, 2010).	*CTF:* Columbia, Egypt, Indonesia, Kazakhstan, Mexico, Morocco, Philippines, South Africa, Thailand, Turkey, Ukraine, Vietnam *FIP:* Brazil, Burkina Faso, Democratic Republic of Congo, Ghana, Indonesia, Laos, Mexico, Peru *PPCR:* Bangladesh, Bolivia, Cambodia, Kingdom of Mozambique, Republic of Nepal, Niger, Republic of Tajikistan, Republic of Yemen, Zambia (and several regional programs) *SREP* : *to be determined*	Multi-lateral Development Banks (*e.g.* World Bank)		✓
US Country Studies Program; LEDS Gateway; and Enhancing LEDS Program	Financial and technical support for LEDS development	Support for National Action Plans (SNAP) "provides financial and technical assistance to help countries use the results of their climate change country studies and to develop action plans for implementing a portfolio of mitigation and adaptation measures." (US GCRIO, 2010) A LEDS Gateway website has been established by Dep't of Energy and National Renewable Energy Labs as a technical resources for preparing and implementing LEDS. (http://en.openei.org/apps/LEDS/) The Enhancing LEDS program is part of the fast-track climate financing, with the goal of building LEDS capacity in 20 countries by 2013 through in-country technical assistance and knowledge-sharing.	*Multiple countries*	US	✓	
Energy Research Centre of the Netherlands (ECN) LCDS Project	LEDS development methodology	Aims to "assist countries in moving to a starting position for developing a LEDS … to provide clarity on the concept and assess what a LEDS development methodology could look like".	Ghana, Indonesia	Netherlands	✓	

* Sources of funding for international organisations (*e.g.* World Bank) are generally from donor/member countries. Private sector organisations (*e.g.* McKinsey & Company) may receive funding from governments or other funders.

Table 4 (continued): List of initiatives related to LEDS support

Initiative	Aim	Brief description	Key partner countries to date	Source of funding*	LEDS specific or related	
					Specific	Related
Global Green Growth Institute (GGGI)	Promotion of green growth in developing countries	GGGI is a "non-profit institute dedicated to the promotion of economic growth and development while reducing carbon emissions, increasing sustainability, and strengthening climate resilience". (GGGI, 2010). Activities include support for LEDS development. (http://www.gggi.org/)	Brazil, Ethiopia, Indonesia	Korea (host), Climate Works, Climate Policy Initiative		✓
International Research Network for Low Carbon Societies (LCS-RNET)	Sharing research on low-carbon development	A network for information exchange and research cooperation on issues related to low-carbon societies (http://lcs-rnet.org/about.html)	*Global*	Research institutions (*e.g.* Wuppertal Institute)		✓
UNDP Portal on Low Carbon and Climate Resilient Development	Capacity building	"To disseminate knowledge and expertise in developing the capacity of national and sub-national governments to formulate, finance, and implement low-carbon and climate change-resilient strategies" (http://www.lowcarbonportal.org/)	*Global*	UNDP		✓
Climate and Development Knowledge Network (CDKN)	Support and research for LEDS	CDKN "aims to help decision-makers in developing countries design and deliver climate compatible development…by providing demand-led research and technical assistance…to support policy processes at the country level." (http://www.cdkn.org/)	*Up to 60 countries (to be determined)*	UK DFID	✓	
UNEP Technology Needs Assessment (TNA)	Technology	TNA assists countries in "determining their technology priorities regarding mitigation of greenhouse gas emissions and adaptation to climate change" (http://tech-action.org/)	Argentina, Bangladesh, Cambodia, Costa Rica, Cote d'Ivoire, Georgia, Guatemala, Indonesia, Kenya, Mali, Morocco, Peru, Senegal, Thailand, Vietnam	UNEP		✓
International Energy Agency Technology Roadmaps	Technology	Low-carbon energy technology roadmaps will identify "priority actions for governments, industry, financial partners and civil society that will advance technology development and uptake to achieve international climate change goals." (http://www.iea.org/subjectqueries/keyresult.asp?KEYWORD_ID=4156)	International and regional; China (for wind)	IEA		✓

* Sources of funding for international organisations (*e.g.* World Bank) are generally from donor/member countries. Private sector organisations (*e.g.* McKinsey & Company) may receive funding from governments or other funders.

4. Lessons from Existing Experience with Preparing National Climate Change Strategies and LEDS

Experience with the preparation of national climate change strategies and the LEDS that have been prepared to date can provide insights for how LEDS preparation can be better structured, made more strategic, and how co-ordination can be enhanced. Seven country case studies are examined to derive insights on the technical, institutional and policy challenges associated with preparing national climate change strategies and LEDS, and the approaches that have been taken to address them. Key issues examined here include:

- **Technical -** data collection and handling, and challenges in developing inventories, projections and mitigation cost estimates;

- **Institutional -** inter-ministerial co-ordination, building on existing reports and strategies, and organising stakeholder participation; and

- **Policy** - how goals are set, how strategies are elaborated to achieve them, and to what extent the interface between development and climate change planning is addressed.

For this analysis, the national strategies of the following seven countries were examined in greater detail: Guyana, Indonesia, Israel, Mexico, Nigeria, Thailand and the UK. This group of countries was chosen to encompass a broad range of economic and geographical circumstances, across Annex I and non-Annex I countries (as well as OECD/non-OECD members). LEDS in these countries are also at different stages of preparation, and different in scope, as illustrated in Table 5.

Table 5: Summary of national climate change strategies and LEDS in case study countries

National climate strategy or related plan	Time frame	Vision/goal	Identification of priority programmes	GHG Inventory	Emission projections
Guyana Draft Low-Carbon Development Strategy (2009, updated in 2010)	Mitigation: 2009-2020 Adaptation: 2009-2030	✓ The creation of a low-deforestation, low-carbon, climate-resilient economy	✓ Focus on deforestation	✓	✘ But includes projections of forest cover from the FAO Forest Resources Assessment 2005
Indonesia National Action Plan Addressing Climate Change (2007)	Four periods: 2007-2009; 2009-2012; 2012-2025; 2025-2050	✓ To integrate mitigation and adaptation into the Long Term Development Action Plan 2005-2025 and the Medium Term Development Action Plan. Mitigation goal: -26% below BAU by 2020	✓ Agriculture Forestry Water resource Marine and Fisheries Energy Mining; Processing & Manufacture Public works Tourism Population (quantity, quality, and mobility of distribution)	✓	✓ Contains projections for energy sector to 2025
Mexico National Strategy on Climate Change (ENACC) (2007) Mexico Special Program on Climate Change (PECC) (2009)	ENACC 2007-2012; PECC 2009-2012 (with long-term mitigation vision to 2050)	✓ To integrate adaptation and mitigation into the National Development Plans. Mitigation aspirational goals: -50% reduction from 2000 levels by 2050; and interim aspirational goals for 2020 and 2030. Domestically binding mitigation goals for 2012 as well.	✓ Priorities identified for each economic sector	✓	✓ Contains projections to 2050 broken down by sector
UK Low Carbon Transition Plan (2009)	2009-2020	✓ To decarbonise the UK while increasing energy security, maximising economic opportunities and protecting the most vulnerable. Mitigation goal: -34% from 1990 levels by 2020	✓ Priorities identified for each economic sector	✓	✓ DECC energy and emissions projections published annually
Nigeria	No LEDS is currently under development in Nigeria.				
Israel	Israel's National Climate Change Strategy is currently under development and due to be published in Autumn 2010. Israel has stated a mitigation objective of -20% from BAU by 2020. Estimated marginal abatement costs through 2030 have been published in a McKinsey study (McKinsey, 2010).				
Thailand	Strategic Plan on Climate Change (2008-2012) was approved by the Cabinet in 2008, available in Thai only.*				

Table 5 (continued): Summary of climate change strategies and LEDS in case study countries

National climate strategy or related plan	Emission reduction potential	Mitigation costs	Vulnerability assessment	Adaptation costs	Finance	Institutions
Guyana Draft Low-Carbon Development Strategy (2009, updated in 2010)	✓ Could avoid emissions of 1.5 gigatons of CO_2e by 2020	✓ Estimates abatement cost of avoided deforestation at 2-11 USD/tonne, based on McKinsey and Vattenfall studies	✓ Flooding only	✓ Flooding only	✓ Interim forestry payments from Norwegian Government, REDD program	✓ Office of Climate Change, Low Carbon Strategy Project Management Office, Guyana Low-Carbon Finance Authority
Indonesia National Action Plan Addressing Climate Change (2007)	✗ Estimations of reduction potential by sector in Indonesia Climate Change Sectoral Roadmap (BAPPENAS, 2010a)	✗	✓	✗	✓ Indonesia government, bilateral and multilateral funding, Climate Change Trust Fund, CDM	✓ National Development Planning Agency (BAPPENAS), National Committee for Climate Change, National Commission on CDM, National Climate Change Council
Mexico National Strategy on Climate Change (ENACC) (2007) Mexico Special Program on Climate Change (PECC) (2009)	✓ PECC estimates emission reduction potential to 2050	✓ PECC refers to cost effectiveness ranges of potential mitigation actions to 2030 derived from marginal abatement cost curve calculations contained in independent national studies	✓	✗	✓ Aligned with Climate Investment Funds Plan, PECC aligned with federal budget through 2012	✓ Interministerial Commission on Climate Change (ICCC), Climate Change Advisory Council
UK Low Carbon Transition Plan (2009)	✓	✓ Provided in analytical annex to LCTP	✓	✗	✓ UK Government	✓ DECC, Committee on Climate Change
Nigeria	No LEDS is currently under development in Nigeria.					
Israel	Israel's National Climate Change Strategy is currently under development and due to be published in Autumn 2010. Israel has stated a mitigation objective of -20% from BAU by 2020. Estimated marginal abatement costs through 2030 have been published in a McKinsey study (McKinsey, 2010).					
Thailand	Strategic Plan on Climate Change (2008-2012) was approved by the Cabinet in 2008, available in Thai only.*					

Some of these countries have produced a document that is more clearly considered a LEDS, while others countries have integrated economic or development planning into their national climate change strategies, to one degree or another. Table 6 examines how each of these case studies has embarked on a LEDS-type exercise. The criteria used (as described in Section 3.1) are:

- the extent to which the climate change strategy relates to development plans;
- the extent to which senior economic policymakers are involved in preparing the strategy; and
- the extent to which policy priorities are incorporated into the national budget or aligned with other sources of financial support.

Table 6: LEDS criteria applied to case studies

National climate strategy or related plan	Relation to development plans	Economic and development involvement	Mapping to economic planning/budget
Guyana Draft Low-Carbon Development Strategy (LCDS) (2009, updated in 2010)	Builds on National Development Strategy and National Competitiveness Strategy	Office of the President has strong role. However, the Ministry of Finance and the Ministry of Local Government and Regional Development is not on the Multi-Stakeholder Steering Committee of the LCDS	All financial revenue for the LCDS implementation is intended to come from abroad via REDD-plus financing
Indonesia National Action Plan Addressing Climate Change (2007)	Following the National Action Plan, to integrate climate change into development planning, the Ministry of National Development Planning issued the report National Development Planning: Indonesian Responses to Climate Change, 2007 (since updated in BAPPENAS, 2010)	The National Development Planning Agency was a contributor to the National Action Plan Addressing Climate Change	The National Development Planning report contributes to the Medium-Term National Development Plan (2010-2014), which feeds into the national budgeting process
Mexico National Strategy on Climate Change (ENACC) (2007) Mexico Special Program on Climate Change (PECC) (2009)	PECC objectives are clearly mapped to specific objectives of National Development Plan	Ministry of Finance involved in development of PECC, and will soon become a member of Inter-ministerial Commission on Climate Change (ICCC). Ministry of Social Development is a member of ICCC.	All PECC actions incorporated into federal budget 2009-2012
UK Low Carbon Transition Plan (LCTP) (2009)	The LCTP aims to double the size of the economy by 2020 and meet the UK's carbon objectives at the same time.	The HM Treasury designed their own plan to meet their carbon budget which fed into the LCTP (likewise with all government departments)	Climate Change Act legislated in 2008 mandated level of carbon budget and duty to prepare LCTP
Nigeria (no LEDS published to date)	Nigeria's Vision 2020 and Agenda 21 development plans contain climate change component	The Ministry of Finance is a member of both the Inter-ministerial Council on Climate Change (ICCC) and the National Committee on Climate Change (NCCC)	Funding for Special Climate Change Unit comes from national budget; international agencies expected to play a key role, *e.g.* UNDP
Israel (National Climate Change Strategy, forthcoming 2010)	(not yet clear)	Ministry of Finance leads inter-ministerial committee for preparing National Climate Change Strategy (forthcoming)	(not yet clear)
Thailand National Strategy on Climate Change (2008)	National Strategy on Climate Change linked to 10th Social and Economic Development Plan	(not yet clear)	(not yet clear)

4.1 Technical pre-requisites for LEDS preparation and lessons learned

Analytical exercises including data collection and processing have been undertaken to fulfil reporting requirements under the UNFCCC, or to inform the preparation of LEDS or other such strategies, including the development of GHG inventories, emissions projections, mitigation costs, and estimations of adaptation costs. The extent to which such quantitative tools are used in the preparation of a LEDS varies widely according to country circumstances, resource availability, expertise, and data availability. The lessons regarding the use and importance of such quantitative tools are highlighted here. These lessons can help highlight to countries that are considering producing a LEDS the value of the process and how a LEDS can be used to advance climate change policy within a broader economic development strategy.

4.1.1 Analysing appropriate and reliable data

Establishing the underlying technical data and information to guide strategies in prioritising sectors and defining any applicable targets can be a significant challenge. Some LEDS may also include data or information on potential climate impacts and vulnerable sectors or areas. The degree to which data supports economy-wide planning may depend on national circumstances as well as the resource and expertise availability of the country.

Data on emission projections, mitigation potential and costs are not always readily available, and can be a particular challenge for developing countries. For example, "the 2004 Millennium Development Goals Report scored Nigeria as 'very weak' in its capacity to gather data, statistical tracking, monitoring and evaluation mechanisms and the incorporation of statistical analysis into policy, planning and resource allocation mechanisms".[10] In fact, the Global Environment Facility (GEF) allocation to support Nigeria's second National Communications was agreed in 2006, but work has not yet been initiated (UNFCCC, 2010b).[11] In some cases, Nigerian agencies may have the mandate to collect data, but cannot translate that into action. Nigeria's National Meteorological Agency for example has limited access to advanced computer facilities to develop climate and weather data.

Thus there is a need for collaboration with domestic or international researchers. Indeed, in Guyana, one of the methods highlighted to fill data gaps outlined in the Low Carbon Development Strategy (LCDS) is to "establish mechanisms and partnerships with relevant data sources (*e.g.* satellite data) to facilitate availability to Guyana in a continuous and consistent manner" (Guyana, 2010). Academic institutions can also be a key source of technical input to the LEDS planning cycle. In Thailand there are four major publicly-funded research groups, housed in different universities which are working on various aspects of Thailand's transition to a low-carbon economy. Their products include the GHG inventory data that will be used for Thailand's next National Communication, emissions scenarios, analysis of adaptation and mitigation policies, and work on the links between climate change, water and food security in Thailand. A Climate Change Knowledge Management (CCKM) group has also been set up within the Ministry of Science and Technology as an information clearing-house that will collect and disseminate climate change data to the general public. This initiative could be build upon to co-ordinate data collection for a future LEDS[12]. An international collaboration between Sirindhorn International Institute of Technology and Japan's National Institute for Environmental Studies, along with other institutions, has developed low-carbon growth scenarios for Thailand which outlines mitigation policy options (SIIT *et al*., 2010).

Furthermore, data on mitigation potential and costs can be particularly subject to political influence. Thus gaining consensus among government ministries on a baseline projection or cost information can be a

[10] Input provided by Huzi Mshelia, Clean Energy Consult, Abuja, Nigeria.

[11] Project activities of GHG inventories, vulnerability and adapatation analysis, mitigation, national circumstances, and constraints and gaps.

[12] Input provided by Sitanon Jesdapipat, Climate Policy Initiative, SEA START Regional Center, Chulalongkorn University, Bangkok, Thailand.

challenge. For example, Indonesia's National Action Plan (NAP) Addressing Climate Change was developed in 2007, yet reference level business-as-usual emission pathways have yet to be adopted (Hadad, 2010). In an effort to gain the attention of high levels of government, Israel's Ministry of Environmental Protection sought outside expertise, commissioning McKinsey to develop a GHG abatement cost curve which provided a quantitative foundation for the determination of Israel's GHG reduction target (Nezer, 2010). Other countries also use McKinsey estimates (see Table 4). For instance, Guyana's LCDS is based on a December 2008 McKinsey report to estimate how much Guyana's forests are worth if extracted versus left standing (referred to as the Economic Value to the Nation – EVN, vs. the Economic Value to the World - EVW).

Any estimates of emission projections, mitigation potential and costs, and climate impacts, are subject to inherent uncertainty. In Mexico, an analysis of projections from the Mexican Ministry of Environment and Natural Resources (SEMARNAT), the World Bank, OECD, and McKinsey, indicate a range of projected GHG emissions growth from 26% to 65% for the period from 2010 to 2030 (Clapp *et al*., 2009). For mitigation potential and cost data, key underlying assumptions, such as energy prices which can fluctuate substantially, can impact the timeliness and robustness of the data. When possible, it is useful to look across a range of projections given these uncertainties, and also to understand the model used and the underlying data and assumptions. Regarding emission projections, this is even more important for fast-growing economies. Furthermore, some LEDS plan key mitigation actions based on information from one assessment of mitigation potential, such as a marginal abatement cost curve, which does not take into consideration any barriers to implementing mitigation options identified. Thus while data can be very useful, it requires further analysis and consideration with a country's circumstances before such information can lead to practical policy decisions. Given such uncertainties, examining a range of data from a variety of sources when available can help to guide a forward-looking pathway on emissions, impacts, and actions.

Timeliness and reliability are particularly stressed for data on climate impacts, which can change rapidly, but can prove a major challenge. Nigeria's first National Communication was produced in 2003, identifying ecosystems and water resources that were highly susceptible to climate change effects. However, some of the data used in the report was collated as far back as 1994, thereby making the information outdated and less reliable as to its accuracy.[13]

In Thailand, the Strategic Plan on Climate Change identifies data and information gaps. Though there are several studies related to climate change impacts, most of these studies are either outdated, or too crude to be useful for policy decisions. To this end, models need to be selected, databases need to be normalised, and mechanisms need to be established to manage the investigation of the result, as well as the communication to the public and policy decision makers.

A lack of quality and timely data can hinder a country's ability to make informed decisions on priority policies for climate change mitigation and adaptation. Data gaps can also be a barrier to stakeholder participation, as further information on science, predicted impacts, and costs to address climate change are of interest both to the general public and the private sector. As data provides a particular challenge for developing countries, an important step in preparing a LEDS could be to share best practice in data development and collection with other counties and international expert groups. However it is critical for key government stakeholders to understand any underlying assumptions or political influences that can impact the data.

4.1.2 Harnessing synergies between LEDS and other reports and strategies

To maximise an efficient use of resources, producing a LEDS should capitalise on experience and tools developed in the production of related strategies and documents. Mainstreaming environmental planning

[13] Input provided by Huzi Mshelia, Clean Energy Consult, Abuja, Nigeria.

into development planning is not a new idea. A LEDS should build on existing strategies and reports, such as National Communications, National Sustainable Development Strategies (NSDS), Technology Needs Assessments (TNAs) and Poverty Reduction Strategies (PRS), whenever possible to minimise overlapping efforts.

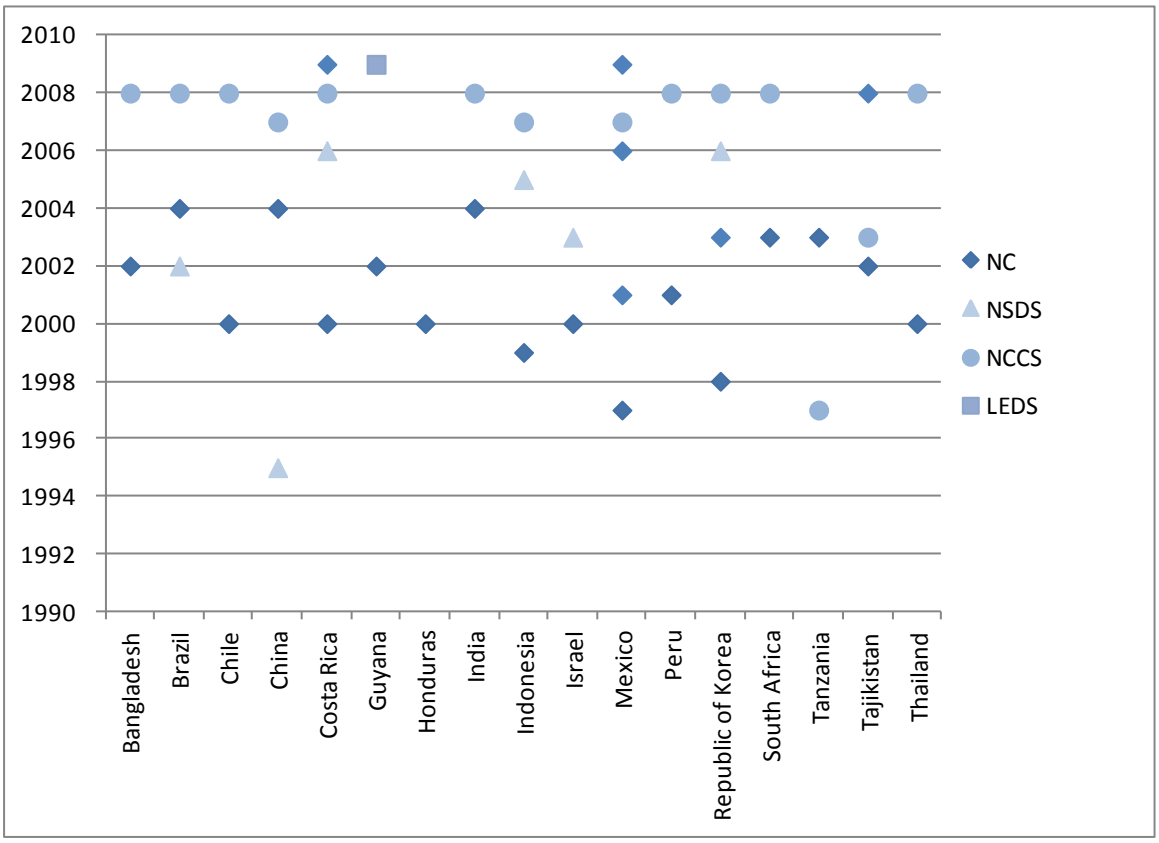
Experience in producing National Communications to the UNFCCC can provide a foundation of information that is useful in creating a LEDS. In fact, all of the 17 non-Annex I countries identified in this study as having published a national climate change strategy or LEDS (or in the case of Israel and Honduras are expected to produce one in 2010) have submitted at least one National Communication prior to preparing these strategies (see Figure 3). This implies that the process of developing a National Communication in non-Annex I countries can help, in part, to lay a foundation of data and expertise that could be useful in developing a forward-looking strategy such as a LEDS. With regards to National Communications, NSDS and Technology Needs Assessments, LEDS can build on technical expertise and data collection developed in their preparation, especially for GHG inventories. In Annex I countries, national climate change strategies may have informed the forward-looking elements of National Communications.

Mexico has a solid base of technical data and expertise in GHG inventories, having submitted four National Communications. Methods developed in calculating GHG emissions for the inventory in Mexico's National Communication were then subsequently drawn upon to develop baseline emissions projections for the National Strategy on Climate Change (ENACC) and the Special Program on Climate Change (PECC) (Mata, 2010). To develop the national baseline emission projections for the PECC, global GHG emission trends from the *OECD Environmental Outlook to 2030* were originally taken into account as well as population and GDP national forecasts. Methods originally developed to calculate GHG emissions for the inventory were later drawn upon for validation purposes (Mata, 2010). In order to estimate the long-term mitigation scenarios, Mexico's PECC also built upon other previous initiatives, *e.g.* Mexico's Project Catalyst study, the Stern-type study for Mexico "The Economics of Climate Change", the MEDEC[14] modelling study conducted in collaboration with the World Bank, and a Clean Technology Fund (CTF) Investment Plan[15] developed in 2009 (Mata, 2010). Opportunities described within the CTF Investment Plan to use credits from multilateral funding institutions to fund mitigation actions (such as development of Bus Rapid Transit systems) are integrated into other parts of the PECC. Mexico is also currently preparing a national REDD strategy and national adaptation strategy with assistance from UNDP, and these too will be aligned with the PECC (Mata, 2010).

[14] Low Carbon Development Study for Mexico (México: Estudio sobre la Disminución de Emisiones de Carbono-MEDEC)

[15] In partnership with the World Bank, the Inter-American Development Bank (IADB) and the International Finance Corporation (IFC)

Figure 3: Timetable of development and climate strategies and reports for selected on-Annex I countries



Note: Both Israel and Honduras are in the process of preparing a LEDS (forthcoming 2010). Guyana has a produced a LEDS; other countries have produced a national climate change strategy, the extent to which they contain elements integrating climate change and development priorities is not explored in this paper.

In Guyana, the starting point for the LCDS was Guyana's National Development Strategy (NDS) and National Competitiveness Strategy (NCS). According to the LCDS, "The NDS sets out the country's overall development framework, with the NCS taking forward specific economic development priorities." However, both were written before the impact of climate change was fully understood, and the Low Carbon Development Strategy augments them with an updated analysis on how some of the goals of the NDS and NCS can be achieved, with a focus on doing so in a low-carbon manner. The LCDS also "builds on the progress made within the international framework for REDD+ and broader climate change negotiations and initiatives". Mexico has also clarified the link between the PECC and the National Development Plan. Each objective in the PECC is mapped to a specific objective of the development strategy.

A LEDS can also inform or build upon related sectoral strategies. In the UK, the Low Carbon Transition Plan (LCTP) was supported by a series of related government publications focused on sectoral strategies that were published at the same time, including the UK Low Carbon Industrial Strategy, the UK Renewable Energy Strategy, and Low Carbon Transport: A Greener Future (UK HM Government, 2010).

4.1.3 GHG inventories as an analytical basis

The preparation of GHG inventories is a fundamental step in understanding a national GHG emission portfolio and underlying trends. Inventory preparation can facilitate the understanding of key national sources and sinks of GHG emissions, which is a prerequisite for projecting baseline emissions and determining priority policies for mitigation.

Mexico's GHG inventory, originally set up in order to provide input for their National Communications to the UNFCCC, formed the basis of its first National Climate Change Strategy (ENACC) published by the Interministerial Commission on Climate Change (ICCC) in 2007 (see Section 4.1.2). The inventory facilitated understanding of emissions trends and enabled the Commission to identify opportunities for GHG mitigation in the energy use and vegetation and land use sectors (ICCC, 2007). Similarly, Indonesia's GHG inventory played a key role in identifying NAMAs for their National Action Plan Addressing Climate Change (Sulistiyowati, 2010). Thus, the preparation and improvement of the national GHG inventory system can be an important first step in the LEDS preparation process.[16]

4.1.4 Establishing supporting data systems

If and how LEDS fit in the measurement, reporting and verification (MRV) framework is currently under discussion in the UNFCCC negotiations (see **Error! Reference source not found.**). However, in preparing for a LEDS with accountable actions, some countries such as Indonesia have already developed a cohesive MRV strategy or guidelines to follow up on the implementation of their LEDS. In Indonesia the preparation of sectoral mitigation activities includes: a measurement plan, which outlines the methodology and indicators that will be used to measure progress; a reporting plan, which includes the cost allocation used and the achievement of the activity in terms of GHG reduction; and a verification plan, which includes cross-checking activities between the plan and the real results achieved on an annual basis by an independent expert panel (Sulistiyowati, 2010).

Guyana's LCDS lays out a more specific MRV roadmap for forest carbon stocks. It identifies the REDD Secretariat at the Guyana Forestry Commission as the implementing agency for implementing "REDD readiness" activities, including the preparation and implementation of a MRV system. The roadmap was developed based on a series of workshops with national and international experts. The roadmap is based on (i) the requirements of a domestic MRV system (*e.g.* that the principles and procedures should meet criteria specified by the IPCC Good Practice Guidelines and Guidance for reporting at the international level); and (ii) the need to bridge the capacity gap through a detailed plan to establish sustained MRV capacity within the country (see Guyana, 2010, Appendix VI).

Establishing a reporting system for GHG emissions from key emitting sources can be a first step towards a system of accountability. GHG reporting systems can also supplement a GHG inventory in identifying emission trends and areas of high mitigation potential. Israel has introduced a voluntary national GHG registry, based on WRI/WBCSD GHG Protocol, which will become mandatory in a few years. The Israeli Ministry of Environmental Protection is providing guidance to businesses and organisations on how to calculate their emissions. The registry will be used to identify reduction potential, to lay the foundations for a future reporting mechanism, and to establish support for a long-term climate scheme (Nezer, 2010). Countries such as Australia and the US are also in the process of establishing such a GHG reporting system.

4.2 Institutional insights for LEDS preparation and lessons learned

Institutional arrangements are an important element to facilitate the preparation of a LEDS. The key institutional challenge is to build leadership, trust, and mutual accountability in advancing a LEDS (OECD, 2006). Due to the multi-sectoral and inter–disciplinary nature of climate change and economic development, many different ministries within a government are relevant to establishing and implementing a LEDS. Inter-ministerial involvement is critical to cross-government support of a national climate change strategy. Institutional arrangements can also help communication flows with other stakeholders such as business, NGOs and the general public. Securing and managing funds for the preparation of a LEDS, and also for implementing actions outlined in a LEDS, requires institutional setups to get national budget appropriations (further discussed in Section 4.3.5) and to co-ordinate across multiple donors and recipient

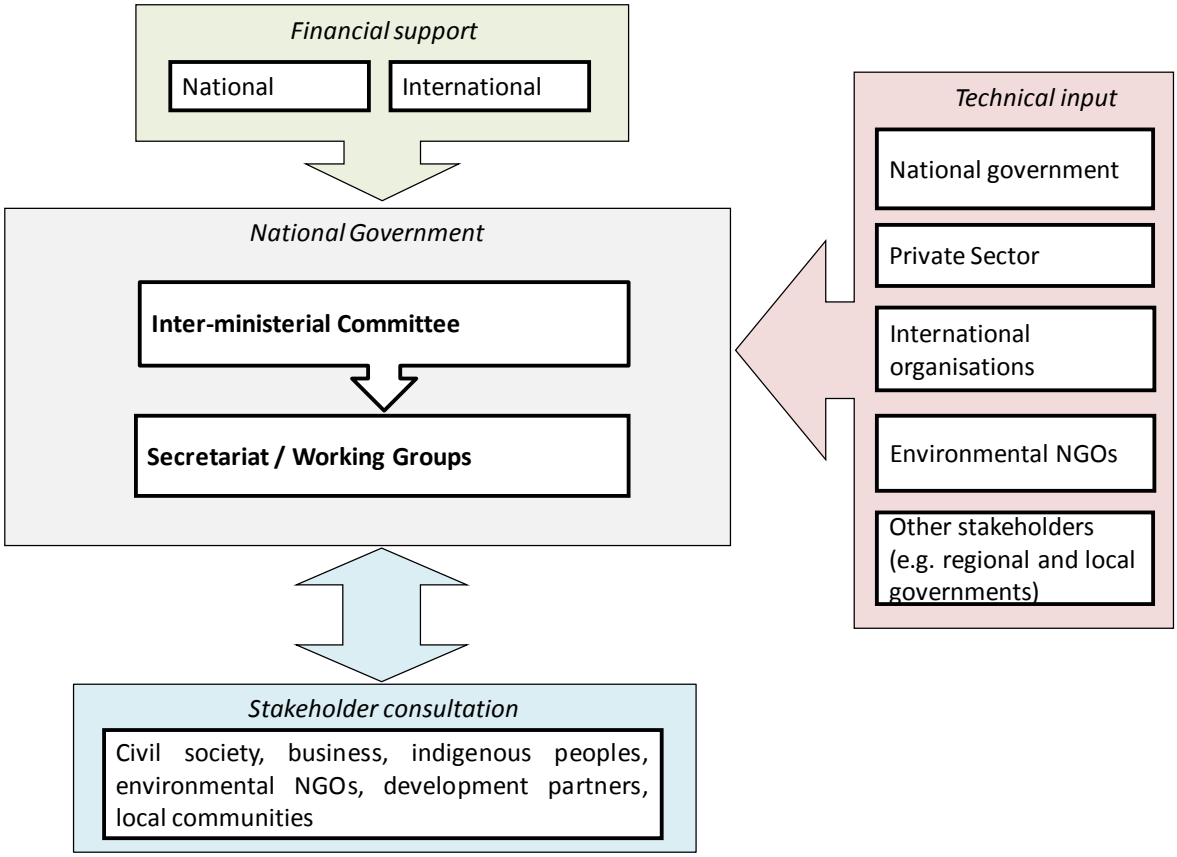
[16] Not all countries have updated their national GHG inventory for the preparation of their LEDS. Guyana for example has based their Low Carbon Development Strategy on data from their 1998 National GHG Inventory.

activities. Underlying all of these functions of an institutional framework is the importance of clearly defined roles and responsibilities for participating ministries and other stakeholders.

4.2.1 Inter-ministerial participation with clear leadership

A first step in preparing a national climate change strategy is to set up an effective mode for working across relevant institutions. Countries such as Bangladesh, Brazil, Chile, Mexico, the UK and others have established cross-ministerial committees on climate change to facilitate communication across ministries and to create a broad-based buy-in to the strategy[17]. To provide leadership to this process of working across government, in some cases a relevant ministry is chosen to serve as the Secretariat for the inter-ministerial committee. Stakeholder consultation with a wide range of stakeholders often plays a key role in the preparation process. Technical and financial input for preparing the strategy may come from a range of both public and private sources. Figure 4 summarises a typical institutional set up for existing national climate change strategies.

Figure 4: Typical institutional set up for preparing LEDS



Source: Authors

Political commitment at the highest level can help facilitate the necessary institutional arrangements and co-ordination across ministries. Two such examples of high-level political engagement are in Indonesia and in Guyana, where the National Council on Climate Change and the Multi-Stakeholder Steering Committee are led by their respective Presidents. High level political support can increase engagement and awareness both domestically and internationally. Project Catalyst also identified that "establishing a mandate and ownership at the highest levels of government" is critical in their analysis of nine LEDS in

[17] Examples include, *inter alia*, the Steering Committee on Climate Change in Bangladesh, Interministerial Committee on Climate Change in Brazil, Interministerial Commission on Climate Change (ICCC) in Mexico and the National Advisory Committee on Global Climate Change in Chile.

developing countries (Project Catalyst, 2009a). While in many cases the ministries of environment are very active and bring the benefit of co-ordinating climate action with other environmental issues (UNFCCC, 2005), they are not always the leading ministries for the preparation of a plan, nor are they best placed to integrate climate change into development planning. In countries where other ministries have more political weight, it can be useful to involve the ministry of environment but assign another leading ministry to lead the plan development effort, so as to gain attention at a higher level of government.

Involvement of finance ministries can help ensure that climate policy is tied to fiscal priorities. Previous analysis of experience with National Sustainable Development Strategies concluded that the involvement of finance ministries facilitates the integration of environmental development priorities with fiscal priority setting and national expenditure and revenue generation (IISD, 2004; OECD, 2006). In Israel, the inter-ministerial committee established to implement the emission reduction targets, announced in Copenhagen, is chaired by the Ministry of Finance (Nezer, 2010). Indonesia's Ministry of Finance also collaborated with the Low-Carbon Growth Study team (ESMAP, 2009) to develop expertise through domestic and international collaborations. In Mexico, regular meetings between the Ministry of Finance and the inter-ministerial committee allowed for feedback and dialogue (ESMAP, 2009).

As large inter-ministerial committees can be cumbersome to co-ordinate and slow in decision-making, the process can be streamlined by tasking a small cross-government group to produce a LEDS. The UK established a central team of 10-12 people to develop the Low Carbon Transition Plan (LCTP). The team took six months to develop the LCTP, working to gain agreement and support across the government (UK HM Government, 2009). This may only have been possible because sectoral building blocks were already in place. However this shortened and focused approach may risk having a lesser degree of buy-in across the government. In contrast, it took two years to develop Mexico's PECC. In the case of Mexico, two ad-hoc task groups were created from the Inter-ministerial Commission: the PECC-TG (previously known as the ENAC Task Group) and the Adaptation-TG which also expedited the cross-government technical process. However, other variables accounted for the two-year span to finally publish Mexico's PECC: a strong social awareness on the subject which prolonged two public consultation processes, and the effects of the international economic crisis on the Mexican Federal Budget shortening already allocated resources to mitigate GHG domestically.

Participation across ministries can strengthen and expand support for implementing a LEDS. Co-ordination across government can also provide clear and consistent early signals to domestic stakeholders including businesses and investors. The UK identified several advantages for domestic stakeholders in producing the LCTP, including 1) to develop a coherent plan linking climate and energy planning with social and economic objectives, 2) to gain agreement and support across the government, and 3) to provide clarity and increase confidence for business and the public (UK HM Government, 2009). Another benefit to stakeholder engagement is increased buy-in and political support by those who will be affected.

4.2.2 Clear roles and responsibilities for actors

Regardless of the structure of any inter-ministerial group, relevant ministries and institutions need to have clearly defined roles, responsibilities and relationships (Hadad, 2010; OECD, 2001). This can help to uphold accountability in implementing a LEDS. Without appropriate co-ordination, inter-ministerial committees can have overlapping or unclear mandates that can at best result in confusion, and can at worst undermine the strategy (Project Catalyst, 2009b).

In some cases, new institutions may be needed to address emerging policy and institutional gaps. To lay the groundwork for an effective implementation of the LCDS, Guyana is developing institutional capacity in five new or enhanced areas, with the following roles and responsibilities:

(1) an Office of Climate Change (OCC) - to consolidate and streamline Government efforts on climate change, including the co-ordination of engagement with multilateral processes and UNFCCC negotiations;

(2) a Low Carbon Strategy Project Management Office (PMO) - to drive key projects as part of the LCDS;

(3) a Guyana REDD Investment Fund (GRIF) - to manage forest payments, to reduce the cost of capital on other essential investments, and over the long-term to act as a permanent investment fund for low-carbon investments[18];

(4) a strengthened Environmental Protection Agency - to ensure that social and environmental safeguards are applied to the appropriate internationally recognised standards for all GRIF investments; and

(5) the REDD Secretariat at the Guyana Forestry Commission - to be the implementing agency for undertaking "REDD readiness" activities, including the development and implementation of a MRV system.

In the case of Nigeria, many committees exist but it is not clear how they feed into a decision-making process. The Inter-Ministerial Committee on Climate Change (ICCC)[19] has the mandate to advise the government on policy issues relating to climate change. Nigeria also has a National Committee on Climate Change (NCCC)[20], which has a different membership of selected ministries and other stakeholders, and is charged with preparing technical documents including the National Communications. Both the ICCC and the NCCC serve an advisory role to the Minister of Environment, which is obliged to make major pronouncements on climate change issues. The government has also established the National Roundtable on Climate Change, which charges public officials with the mission to prepare a national low-carbon growth pathway. The Roundtable has yet to release any details on its strategy or actions. Strikingly, the Roundtable is not linked to any other formal government programme. It is not clear how the Roundtable will relate to the status of any future outcomes from the ICCC.[21]

Similar complications in roles and mandates can be seen in Thailand, but the push for an updated development plan may help co-ordination across the government. The Thailand Greenhouse Gas Management Office, an independent entity established to manage greenhouse gases through CDM projects, is now venturing into policy making, leaving the climate change mandate of the Office of Natural Resources and Environmental Policy unclear. The National Economic and Social Development Board (NESDB) is currently preparing to draft Thailand's 11th National Economic and Social Development Plan (2012-2017). Climate change, especially the low carbon economy, is expected to take a central role in the new plan and it is hoped that the plan will encourage more policy integration and consistency.[22]

4.2.3 Stakeholder consultation supports widespread engagement

Beyond communication between relevant ministries, it is also important to involve other relevant stakeholders in the process of establishing a national strategy. Analysis by the UN DESA found that "there is a positive correlation between effectiveness of a [sustainable development] strategy and its continuity

[18] The World Bank has been invited to manage this Fund.

[19] Nigeria's ICCC is comprised of representatives from the Ministries of Agriculture, Water Resources, Finance, Industry, Justice, Petroleum Resources, Foreign Affairs, Nigerian Metrological Agency, Planning Commission, Energy Commission and the National Electric Power Authority (NEPA), now Power Holding Company of Nigeria (PHCN).

[20] Nigeria's NCCC is comprised of the Ministries of Finance, Foreign Affairs, Petroleum Resources, Metrological Agency and Energy Commission, plus representatives from academia, private sector and NGOs.

[21] Input provided by Huzi Mshelia, Clean Energy Consult, Abuja, Nigeria.

[22] Input provided by Sitanon Jesdapipat, Climate Policy Initiative, SEA START Regional Center, Chulalongkorn University, Bangkok, Thailand.

and the degree of public participation" (UN DESA, 2002). These stakeholders can include business, industry, non-governmental organisations and local and regional authorities. In their analysis of LEDS in nine developing countries, Project Catalyst found that "stakeholder engagement is crucial, but there are differences in approach taken, in terms of the extent and sequencing of dialogue within the planning process. There are clearly trade-offs between time needed to develop the strategy and the need to involve and mobilise a broad range of stakeholders." (Project Catalyst, 2009a)

To facilitate widespread stakeholder input, inter-ministerial committees can be broader in scope than just the national government, as in Guyana where the LCDS Multi-Stakeholder Steering Committee is composed of 30 representatives, including the President, several ministries, and international non-governmental organisations.[23] Other countries, *e.g.* Mexico, utilise their inter-ministerial committee to co-ordinate communication with non-governmental stakeholders. Mexico's Intersecretarial Commission on Climate Change (ICCC)[24] oversees several working groups (*e.g.* on the CDM, mitigation, adaptation, international affairs, and REDD), including one targeted specifically to interact with the private sector. Inter-ministerial committees can also provide a focal point for interaction with the international community. Guyana has established an Office of Climate Change (OCC), which consolidates and streamlines government efforts on climate change, including the co-ordination of engagement with multilateral processes and UNFCCC negotiations. For the preparation of Thailand's National Economic and Social Development Plans, the National Economic and Social Development Board (NESDB) tours around major cities, staging a consultation in each city. Such an approach could also be used for the preparation of a LEDS .[25]

Regular stakeholder consultation can increase political support for a LEDS. During the process of establishing a GHG registry, the Ministry of Environmental Protection in Israel has held several stakeholder meetings including the army, energy companies and industry, and several cities. The reporting protocol now has the agreement of the Ministry of Finance and the stakeholder groups consulted (Nezer, 2010).

Limited engagement with the private sector can weaken early signals that the government is moving towards low-carbon growth. While Nigeria has collaborated with environmental non-governmental organisation partners on its National Adaptation Strategy Plan[26], the government has had limited engagement with business stakeholders. Their involvement has been limited and occasional. Lack of private sector engagement by the government provides a weak signal to businesses regarding their potential investments.[27]

Other countries are working to develop their strategies in iterative and transparent consultation with independent organisations. For example, the first draft of Guyana's LCDS involved a four month consultative process involving national stakeholders. The process is overseen by a 30 member Multi-Stakeholder Steering Committee, which includes the President, different Ministries, as well as international NGO's such as Conservation International and WWF. Moreover, the first phase of the consultation process

[23] Including the International Institute for Environment and Development (IIED), Conservation International (CI), and World Wildlife Fund (WWF).

[24] Mexico's ICCC currently includes representatives from seven different ministries; environment, energy, transport, economics, social development, agriculture and foreign affairs. Plans are underway to expand it to include the finance, interior, tourism and health ministries.

[25] Input provided by Sitanon Jesdapipat, Climate Policy Initiative, SEA START Regional Center, Chulalongkorn University, Bangkok, Thailand.

[26] NASPA was initiated in collaboration with the Nigerian Environmental Study Team (NEST), an NGO, the Henrich Boell Foundation, and the Nigerian Climate Action Network (NigeriaCAN), a network funded by the UNDP.

[27] Input provided by Huzi Mshelia, Clean Energy Consult, Abuja, Nigeria.

was monitored by the international NGO IIED.[28] IIED prepared a report noting both strengths and weaknesses in the national consultative process (and is publicly available on the LCDS website). Each subsequent LCDS draft has also allowed for public consultations. Guyana has also been working closely with Norway to present an annual progress report and to establish an MOU.

Reaching out to local stakeholders can help lay the groundwork for effective implementation of a LEDS. Yet, the stakeholder process can be complex particularly when involving governments at multiple levels. For example in Indonesia, it is yet to be determined what contributions to the National Action Plan will come from national and sub-national (provincial and district) jurisdiction. To this end, several provinces have completed a low-carbon growth strategy, while other provinces await funding support to develop their strategies (Hadad, 2010).

4.2.4 Co-ordinating funding disbursement to feed priority programmes

In anticipation of funding for implementation of LEDS or climate related activities, several countries have been proactive in establishing mechanisms to centralise funding and co-ordinate disbursement. While this is not always necessary, it could be helpful for co-ordinating funding and targeting priority projects. Central co-ordination of funds can help align funds to support priority policies. For example, Mexico has established the Clean Technology Fund (CTF) Investment Plan to co-ordinate multilateral funding for its National Development Plan, National Climate Change Strategy and the Special Climate Change Program. This Investment Plan is considered a "business plan" between the government of Mexico and several multi-lateral banks[29]. The plan proposes programs in the areas of transport, renewable energy and energy efficiency for co-financing to the CTF Trust Fund Committee (Climate Investment Funds, 2009).

A separate fund can also help disburse funds centrally. Indonesia has established funds to receive and disburse funding for their National Action Plan, for multi-lateral and bi-lateral sources as well as private sector funding[30]. In Guyana, the GRIF is being established to manage forest payments, to reduce the cost of capital on other essential investments, and over the long-term to act as a permanent investment fund for low-carbon investments. The World Bank will act as the Fund manager. However, one of the challenges associated with a separate fund is the oversight mechanism. As Hadad (2010) points out, an oversight body for the Indonesian fund has yet to be created, and the distribution mechanisms still need to be articulated.

4.3 Policy issues and lessons learned

Determining the appropriate policies and measures to implement a LEDS involves several steps. In considering a country's climate goals, a range of policies and measures should be considered and compared according to factors such as their cost-effectiveness, co-benefits, and the feasibility of implementation, including the ability to address any barriers to implementation or effectiveness. Establishing an enabling policy framework that addresses any barriers is an important part of preparing a LEDS. This policy framework requires consideration of the appropriate policies and measures to implement a LEDS, and evaluation of legal, institutional and behavioural barriers to implementing those measures. In addition, the interaction of multiple measures and their impact on existing policies is important to consider. Thus the policy framework needs to be considered holistically to avoid unintended consequences. Furthermore, prioritising policies should consider cost-effectiveness.

[28] International Institute for Environment and Development, UK.

[29] The International Bank for Reconstruction and Development (IBRD), the Inter-American Development Bank (IADB) and the International Finance Corporation (IFC).

[30] The Indonesia Climate Change Trust Fund (ICCTF) for public sector financing, and the Indonesian Green Investment Fund (IGIF) for private sector financing.

4.3.1 LEDS in the goal-setting process

One of the purposes of a LEDS can be to identify options for economic development that are compatible with climate change mitigation and adaptation goals. This study of existing LEDS found different types of goals that were set, and different processes by which goals were identified.

First, goals may be qualitative or quantitative. For example, the Bangladesh Climate Change Strategy and Action Plan contains a qualitative goal to "eradicate poverty and achieve economic and social well-being for all the people. This will be achieved through a pro-poor climate change strategy, which prioritises adaptation and disaster risk reduction, and also addresses low-carbon development, mitigation, technology transfer and the provision of adequate finance" (MOEF, 2008). By contrast, Mexico's PECC identifies quantitative emissions reduction goals for 2012 (domestically binding goal), 2020 and 2050 (aspirational goals). Meanwhile India's National Action Plan on Climate Change refers to a conditional goal to ensure that its "per capita greenhouse gas emissions will at no point exceed that of developing countries, even as we pursue our development objectives." (Government of India, 2008)

Goals may be set before, simultaneously, or after the preparation of a LEDS. In the case of the UK Low Carbon Transition Plan, mitigation goals for 2020 and 2050 had been set previously in legislation by the 2008 Climate Change Act[31] thereby setting legally binding targets. In the case of Mexico's PECC, intense negotiations regarding the scale of emissions reductions took place during the preparation of the strategy and the mitigation goal was adjusted several times during the 2-year preparation period (Mata, 2010). Alternatively, preparation of a LEDS may facilitate the goal-setting process in the future. In South Africa the Long Term Mitigation Scenarios project laid out the potential mitigation pathways available to South Africa and assisted in their goal-setting process. Thus the process of preparing a LEDS can be helpful in goal-setting, and can also provide options for achieving a goal.

4.3.2 Identifying and prioritising policy options

An important part of developing a LEDS is to identify policy options to support a LEDS, which involves examining an array of policy options, and analysing any barriers to implementation. This process can ultimately help determine priority policies appropriate for a country's specific situation.

To determine the appropriate policy mix, Israel's inter-ministerial committee has organised four working groups along the target mitigation areas highlighted in the McKinsey report: energy efficiency, renewable energy, transport, and green buildings (Nezer, 2010). While a marginal abatement curve such as presented in the McKinsey report can help to highlight sectors with large mitigation potential, they provide theoretical abatement potential and need to be considered carefully against institutional capacity and other existing policies that may impact the effectiveness of the recommended climate policy measure. To this end, Israel's committee has three objectives across each of the sectoral working groups: 1) to identify barriers to policy implementation, 2) to identify policies and measures to achieve the reduction targets, and 3) to determine the optimal blend of these policies and measures.

A key barrier that has been identified in Guyana's LCDS is addressing land tenure issues. Guyana, with about 80 % of its territory covered by forests, has estimated that it can avoid cumulative forest-based emissions of 1.5 Gt CO_2e by 2020 and that approximately 30 percent of non-forestry emissions can be reduced through the use of clean energy (Guyana LCDS, 2010). A proposal for a National Forest Certification scheme forms a large part of the emission reduction strategy for the forestry sector.

Prioritising policies should also take cost-effectiveness into account. Mexico's long-term mitigation vision within the PECC (ICCC, 2009) groups the potential mitigation actions to 2030 into four quadrants by combining positive and negative implementation cost ranges, along with low and high potential mitigation

[31] http://www.legislation.gov.uk/ukpga/2008/27/contents

impacts. This array was done based on independent national studies containing marginal abatement cost curve calculations.

Developing countries may also consider how accessing market mechanisms such as the Clean Development Mechanism (CDM) can align with national priorities. In Mexico the CDM is the focus of one of the ICCC's[32] working groups, underscoring the importance of CDM projects in their LEDS. The ICCC also acts as the Designated National Authority for CDM projects. In approving projects, the ICCC considers contributions to GHG reductions and also alignment with the national climate change strategy (GTAI, 2009). Cross-government co-ordination of CDM projects in relation to a LEDS could also help raise awareness of CDM to the private sector. Nigeria has established a Presidential Committee on CDM, but the Committee has an overlapping agenda with the Nigerian National Petroleum Corporation. Despite a number of CDM projects, the lack of cross-government co-ordination on CDM in Nigeria has confused some prospective investors.[33]

4.3.3 Aligning policies with national economic and development goals

Climate policies that are aligned with economic development priorities can help generate political will across different areas and levels of government, and keep priority policies relevant to the national economic circumstances. In this way, a LEDS can help align support across government for priority policies.

Integrated planning is important for all countries. For developed countries, climate change policies could be situated in terms of opportunities for economic growth in the current recession. Integrated planning is also important for developing countries, where poverty reduction and adapting to climate change impacts are priorities. In concert with sustainable development frameworks, a successful LEDS should be integrated with the "economic, social and environmental objectives of society, in order to maximise human well-being in the present without compromising the ability of future generations to meet their needs" (OECD, 2001). In the case of Nigeria, most of the government policies related to climate change identify their primary policy objective as poverty alleviation or improved standards of living.[34] This can help facilitate a broad-based buy-in for their future implementation.

However, the practical integration of climate policy programmes and policies with economic planning and budgets can be a challenge. Economic development plans that are produced independently of climate change planning can result in a budget that does not reflect climate change priorities. Indonesia provides an example of this challenge. While it has identified a three-pronged environmental strategy that is "pro-poor, pro-job, and pro-growth" (Project Catalyst, 2009a), it needs support to integrate its planning with annual work plans, budgets, and development processes (ESMAP, 2009).

A LEDS can be used to elaborate a country's strategy to move towards a competitive low-carbon economy by reorienting its manufacturing base and the organisation of its labour force. For example, the UK Low Carbon Transition Plan describes how the UK's goal is to become a centre of green industry and consolidate its position as a leading manufacturer of offshore wind turbines, marine renewable energy technologies, low-carbon construction and electric vehicles. In addition, a LEDS can be aligned with goals to reduce fuel poverty and reduce inequality in access to services. For example, the UK government set a target to eliminate fuel poverty in all households by 2016. The UK Low Carbon Transition Plan describes policies that will contribute towards achieving this target, such as mandated social price support, with resources focussed on old pensioners with low incomes, higher Warm Front grants for loft insulation and a Renewable Heat Incentive that will help to reduce bills for fuel poor households (DECC, 2009).

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[32] Intersecretarial Commission on Climate Change (Comisión Intersecretarial de Cambio Climático)

[33] Input provided by Huzi Mshelia, Clean Energy Consult, Abuja, Nigeria.

[34] Input provided by Huzi Mshelia, Clean Energy Consult, Abuja, Nigeria.

Furthermore, local projects that also have GHG mitigation or adaptation benefits, such as improved air quality or transportation infrastructure, can broaden support to include local levels. While reduced local pollution can be realised in the near-term, climate change benefits accrue over the long-term. Thus pursuing policies with climate change co-benefits can help to offset some of the long-term net costs of climate change mitigation, thereby providing an additional incentive for local stakeholders, and national governments, to participate in climate change mitigation (Bollen *et al*., 2009).

4.3.4 Policy coherence across sectors and ministries

Policies can have overlapping effects on the same sector. Thus determining the optimal policy mix requires a good understanding of the implications of policies, both direct and indirect. According to Nezer (2010), the most challenging issue for the inter-ministerial committee in Israel is to determine the optimal blend of policies and measures. In Mexico, help is needed to co-ordinate across the government to review cross-sector policies more efficiently (ESMAP, 2009).

To capture synergies with other policies, a LEDS can build on existing processes to identify policies and measures. For instance, many countries have established development strategies and related policies and measures, which can provide a foundation upon which LEDS can be designed. For the UK LCTP, a key element for implementing the strategy is the existing EU ETS. Additional action has also been identified in the plan to complement the EU ETS, such as improving electricity grid services, rolling out smart meters, and engaging local communities through the Green Villages, Cities and Towns competition (UK HM Government, 2010).

The act of producing a LEDS that is coherent with existing policies and measures can help establish the enabling policy framework to support its future implementation. The case of Nigeria highlights the ineffective nature of uncoordinated policy implementation. Nigeria's draft Biofuel Policy was drafted by the Nigerian National Petroleum Corporation (NNPC), a government owned corporation that is responsible for Nigeria's petroleum sector, without participation or awareness from the Energy Commission of Nigeria (ECN), which is empowered to make energy policies for the country. To address this general lack of co-ordination in implementing government policies, a bill to establish a National Climate Change Commission has been proposed.[35] The proposed Commission would co-ordinate all climate change issues in Nigeria, including co-ordinating national response to climate change across government agencies and producing and implementing a LEDS.[36]

4.3.5 Sources of finance for policy priorities

Given limited financial resources and the current economic crisis, sources of finance for LEDS implementation should be considered during the process of preparing a LEDS. While specific sources of finance are a broad subject not treated in this paper, a LEDS can indicate which activities and policies have priority for domestic budgetary support and which may require international support. This can indicate resource needs and priorities to the international community, a potential key function of LEDS in the international context.

Aligning policy priorities with the national budget can facilitate implementation of a LEDS. When Mexico's PECC was published in 2009, the Presidency was concerned about the budget, and required that the document's goals had assured domestic budget allocation. Because the priority actions outlined in the PECC (to 2012) are directly tied to the budget, they are considered mandatory for the current government. Involving finance ministries, as well as high-level political engagement, in the LEDS process can also help to align sustainable development priorities with fiscal planning (Drakenberg *et al*., 2009, and IISD, 2004). A lack of awareness in the Finance Ministries of how environmental programmes can contribute to

[35] The Bill has been passed by both houses of the National Assembly, and is now awaiting harmonisation.

[36] Input provided by Huzi Mshelia, Clean Energy Consult, Abuja, Nigeria.

economic growth can constrain the ability of aid-recipient countries to obtain adequate support for their environmental programmes (Petkova, 2009). High-level political engagement can also help translate this into law and annual budget planning.

More ambitious actions may fall outside of the national budget planning and require international support. When the strategy is detailed for the next Presidency in Mexico for the following period, it is expected to indicate which actions require international support. In Guyana, Norway has tied funding to achieved outcomes. Provided that the expected results are achieved and that other elements of the partnership fall into place, Norwegian support for the years up to 2015 could add up to as much as USD 250 million. The financial support from Norway will be channelled through the Guyana REDD+ Investment Fund (GRIF), administered by a reputable international institution. Thus a LEDS can signal to the international community what actions may be realised if support is made available. In this case, a LEDS also helped to establish an MRV function to track performance and thereby help to ensure additional support based on forthcoming performance.

4.3.6 Improving and revising LEDS over time

Mapping out a long-term vision and identifying short-term policy priorities can help facilitate specific policy changes, and also generate political support (OECD, 2006). In order to provide early signals to stakeholders such as the private sector and the international community, a LEDS could provide a long-term vision to frame the policy priorities. New governments can then build on previous work to align current priorities for short-term policy-making. Indonesia's plan maps out short-term (to 2012), mid-term (to 2025), and long-term (to 2050) actions (Project Catalyst, 2009a).

A legal framework to design and implement a climate change strategy or LEDS provides assurance that future governments will continue on the pathway. The initiative of the General Law on Climate Change in Mexico would legally mandate the future continuation of national climate change planning, including the implementation through policy instruments, with a secured budget (Mata, 2010). The law would also protect institutional arrangements that contribute to the planning and implementation of the strategy. If this law is passed, it will help ensure that the next Presidency, beginning in 2013, will continue the strategy for the following period, using the long-term vision as guidance, and building on the existing PECC as a foundation.

Further, LEDS should not be considered as an end goal, but rather a roadmap-in-progress that will require updating and improving as national circumstances change and new learning takes place. Changing circumstances could be based on new information (*e.g.* revealing unexpected or accelerating climate change impacts), or on changing political circumstances (*e.g.* change in government or institutional arrangements). The UK provides a recent example of a change in government. The new government is revisiting the LCTP and may revise or update some of the strategy. This illustrates that LEDS can be considered "dynamic documents" designed to be reviewed and updated (Project Catalyst, 2009a).

5. Concluding Remarks and Further Work

This paper has explored the potential value-added of LEDS amongst the wide range of existing strategies and reports that governments already prepare. It has also examined insights from existing experiences with national climate change strategies and LEDS for how the process of LEDS preparation can best be undertaken to ensure that its goals are met. While there is no single common formula for a LEDS and the scope and content will depend on national circumstances, an important first step in creating a LEDS is to identify the purpose(s) and key stakeholders, as this will guide the important elements to include in a LEDS. The following elements could be included in a LEDS:

- **Vision/goal:** An over-arching vision or goal can help guide policy decisions across development and climate change priorities over the long-run.

- **Assessment of current situation:** A clear understanding of major GHG-emitting sectors and socio-economic indicators is fundamental to determining a path forward.

- **Emission projections, mitigation potential and costs:** Planned pathways for business-as-usual emissions can help provide a sense of the national emission trajectory, while mitigation potential and costs can be a first step towards identifying mitigation actions.

- **Vulnerability assessment:** Indications of how a country may be impacted by climate change can help engage stakeholders, including the general public, and can help identify adaptation needs and the range of possible adaptation outcomes.

- **Priority programmes and policies:** An indication of policy priorities for mitigation and adaptation integrated with an economic development strategy can identify synergies and trade-offs.

- **Finance:** Alignment of priority policies with national budget and an indication of financing needs can be important information to communicate to domestic and international stakeholders.

- **Institutional arrangements:** An explanation of which institutions are responsible for implementing actions can provide clarity on responsibilities across government and contribute to effective policy implementation.

It is important to note that the extent to which a country is able to prepare these elements, and the length of preparation time, depends on their national circumstances, and international support could be made available to help address this issue. Other potential elements of a LEDS provide important information to both domestic and international stakeholders, but may be more challenging to provide for some developing countries (*e.g.* costs of adaptation action).

The case studies examined in the paper reveal a range of lessons to help advance domestic, and potentially international, climate change policy across the technical, institutional and policy aspects. The preparation and implementation of a LEDS requires information, institutions and investments (Ebinger, 2010). Indeed, these lessons can be considered across the broad themes of expertise and resources, government co-ordination and stakeholder involvement, as summarised in Table 7. In summary, the lessons learned in this study confirm the critical factors for success identified by ESMAP (2009): identify priorities, maintain a flexible approach in line with national economic development priorities, and provide transparent and objective analysis through a collaborative process.

Table 7: Overview of lessons learned in preparation of national climate change strategies and LEDS

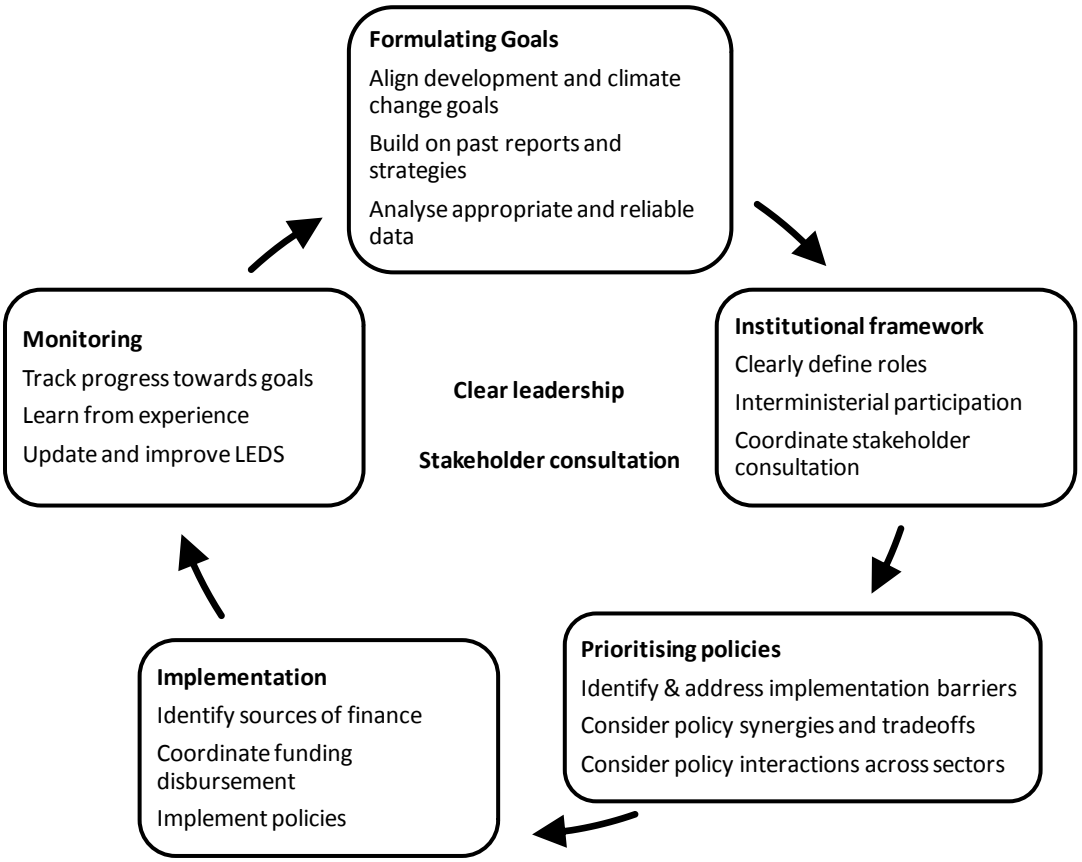
	Technical	Institutional	Policy
Expertise and resources	• Build an analytical foundation on GHG inventories • Gather and analyse quality and timely data on emissions, mitigation policy options, and climate change impacts • Collaborate with international experts to improve data and analysis • Consider underlying assumptions of data and analysis • Establish systems to routinely collect data as a first step towards accountability	• Engage high level policy makers to increase awareness and support	• Identify policy options and barriers to implementation • Prioritise policies according to cost-effectiveness
Government co-ordination	• Harness synergies with other reports and strategies	• Co-ordinate across relevant ministries with clear leadership • Clearly define roles and policy mandates • Co-ordinate dispersion of funds to target climate actions and development priorities	• Align policies with development goals to increase participation and support • Utilise LEDS preparation to identify goals or to design plans to meet goals • Consider interactions across policies and sectors • Improve and revise LEDS over time • Delineate sources of finance, whether domestic or international
Stakeholder involvement	• Obtain reliable and timely data through stakeholder interaction, and use this information in turn to further engage with stakeholders	• Involve stakeholders from businesses, non-governmental organisations, and local/regional governments • Iterate with stakeholders to increase engagement • Provide assurance and early signals to businesses	• Engage stakeholders, and communicate, updates of LEDS

Source: Authors

The lessons learned from similar comprehensive strategies (such as NSDS) can contribute to the cycle of preparing coherent, co-ordinated and strategic LEDS (see Figure 5)[37]. The first stages of the planning cycle are to formulate goals and establish an institutional framework; the next stage is to align development and climate change priorities; and the final stages are to implement and monitor the strategy. Important throughout all aspects of this cycle are the cross-cutting elements of clear leadership and stakeholder consultation. Although it is useful to consider each step in the planning cycle, in reality many of these stages may occur simultaneously.

[37] *e.g.* see OECD, 2001; UN DESA, 2002; IISD, 2004

Figure 5: Planning cycle of a LEDS



Source: Authors; adapted from IISD (2004)

Some of the key benefits of producing a LEDS can be to facilitate a process to work towards agreement across government on development and climate change priorities, and to increase policy coherence. Producing a LEDS has also helped to foster increased communication between ministries and across sectoral policy areas. A LEDS which provides a clear framework supported by credible policies allows investors and businesses to anticipate market opportunities in a low-carbon future (Neuhoff *et al*., 2009). Although not a prerequisite for funding, a key benefit to creating a LEDS in non-Annex I countries can be to attract funding for priority actions (*e.g.* Guyana).

Although the challenges of producing a LEDS are specific to each country, some of the key challenges include advancing agreement across government on priority policies, including consideration of implementation barriers and overlapping policies. Another major challenge is in obtaining and analysing quality data and information, not only on mitigation costs, but also for climate change impacts. These can be compounded by a lack of financial and human resources. Many of these challenges are not LEDS-specific, but also apply to other areas of cross-sectoral decision-making.

Based on this preliminary work, there are several key questions that merit further discussion:

- What information could be included in a LEDS? Should all countries prepare a LEDS?

- What are the biggest opportunities and challenges in preparing and implementing LEDS? How can donors help advance capacity to prepare and implement a LEDS? How effective has donor support on LEDS been to date?

- How do LEDS relate to other development and climate strategies? What is the best way to minimise duplication?

- How can effective LEDS implementation be ensured? How effective has the elaboration of previous national strategies been in translating to concrete policy implementation?

- How do NAMAs relate to LEDS?

- How could a LEDS be communicated to international stakeholders?

- If some portion of a LEDS were to be reported in a National Communications, what elements would be important to incorporate?

Depending on the progression of the LEDS discussion in the international negotiations, further work could usefully examine some of these questions.

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Glossary

AWG-LCA	Ad Hoc Working Group on Long-term Cooperative Action under the Convention
BAU	Business As Usual
CBD	Convention on Biological Diversity
CCKM	Climate Change Knowledge Management
CCXG	OECD/IEA Climate Change Expert Group
CDKN	Climate and Development Knowledge Network
CDM	Clean Development Mechanism
CIF	Climate Investment Funds
CLEAN	Co-ordinated Low-Emissions Assistance Network
CTF	Clean Technology Fund
COP	Conference of the Parties
DAC	Development Assistance Committee (of the OECD)
ENACC	Mexico's National Strategy on Climate Change
ESMAP	Energy Sector Management Assistance Program
ETS	Emissions Trading Scheme
EVN	Economic Value to the Nation
EVW	Economic Value to the World
FAO	Food and Agricultural Organisation
FIP	Forest Investment Program
GDP	Gross Domestic Product
GEF	Global Environment Facility
GGGI	Global Green Growth Institute
GHG	Greenhouse Gas
GRIF	Guyana REDD Investment Fund
ICCC	Interministerial Commission on Climate Change
IEA	International Energy Agency
IIED	International Institute for Environment and Development
IPCC	Intergovernmental Panel on Climate Change
LCGP	Low-Carbon Growth Plan
LCDF	Least Developed Countries Fund
LCDS	Low-Carbon Development Strategy
LCS-RNET	International Research Network for Low Carbon Societies
LCTP	Low Carbon Transition Plan
LDC	Least Developed Country
LEDS	Low-Emission Development Strategy
LULUCF	Land Use, Land Use Change and Forestry

MACC	Marginal Abatement Cost Curve
MRV	Measurable, Reportable and Verifiable
NAI	Countries that are not listed in Annex I of the UNFCCC
NAMA	Nationally Appropriate Mitigation Action
NAPA	National Adaptation Programme of Action
NC	National Communication
NCCS	National Climate Change Strategy
NGO	Non-Governmental Organisation
NSDS	National Sustainable Development Strategy
OECD	Organisation for Economic Co-operation and Development
PECC	Mexico's Special Programme on Climate Change
PRS	Poverty Reduction Strategy
PPCR	Pilot Program for Climate Resilience
RD&D	Research, Development and Deployment
REDD	Reducing Emissions from Deforestation and Forest Degradation
SNAP	Support for National Action Plans
SREP	Scaling Up Renewable Energy Program
TNA	Technology Needs Assessment
UN CSD	United Nations Commission on Sustainable Development
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change

Appendix A: Overview of Existing Strategies of Relevance to LEDS

Table 8: Overview of Existing Strategies of Relevance to LEDS

Existing strategies of relevance to LEDS	**Description**	**Timescale**
National climate change strategy	A voluntary national strategy focussed on climate change. Can contain short or long-term goals and elaborate a strategy for achieving them. The scope is typically broad and can include mitigation, adaptation, technology, finance and capacity building.	Forward-looking (short to long-term)
National Communication (UNFCCC)	The core elements of the national communications for both Annex I and non-Annex I Parties are information on emissions and removals of greenhouse gases (GHGs) and details of the activities a Party has undertaken to implement the UNFCCC. National communications usually contain information on national circumstances, vulnerability assessment, financial resources and transfer of technology, and education, training and public awareness; but the ones from Annex I Parties additionally contain information on policies and measures.	Historical, current (and short-term future)
National REDD Strategy (UNFCCC)	Identify drivers of deforestation and degradation and means to address them	Forward looking
National Biodiversity Strategy and Action Plans (UN CBD)	Develop national strategies, plans or programmes for the conservation and sustainable use of biological diversity or adapt for this purpose existing strategies, plans or programmes which shall reflect, inter alia, the measures set out in the CBD relevant to the Party concerned. Integrate, as far as possible and as appropriate, the conservation and sustainable use of biological diversity into relevant sectoral or cross-sectoral plans, programmes and policies.	Forward looking
Green Growth Strategies	Strategies to pursue economic growth and development, while preventing environmental degradation and loss. All environment areas (*e.g.*, climate change, biodiversity and natural resources); identifying opportunities for employment, green technology, etc.	Forward-looking (short and long-term)
Poverty Reduction Strategies	National strategies encompassing country's macroeconomic, structural and social policies and programs to promote growth and reduce poverty	Forward looking
National Sustainable Development Strategies (UN CSD)	Aim to build upon and harmonise the various sectoral economic, social and environmental policies and plans that are operating in the country.	Forward looking
National development plans	Describes a country's economic priorities and objectives for the future. Can focus on a long term vision and/or a detailed plan for a fixed period in the short-term, *e.g.* 5-years.	Forward looking
Sectoral development plans	Describes a country's economic priorities and objectives for a given sector in the future.	Forward looking

Appendix B: Selection of NCCS and existing LEDS

Table 9: Selection of NCCS and existing LEDS

	Country	Name and timeframe
Annex I*	Australia	Australia's Action on Climate Change
	Austria	Austria Climate Strategy (2008-2012)
	Belarus	Belarus National Program for Climate Change Mitigation Measures in 2008-2012 (pending)
	Belgium	The Flemish Climate Policy Plan 2006-2012 Walloon Sustainable Development Plan to 2020 (PMDE) (2009-2020)
	Bulgaria	Bulgaria National Action Plan on Climate Change 2005-2008
	Croatia	Croatia National Climate Change Strategy and Action Plan
	Czech Republic	National Program to Abate the Climate Change Impacts in the Czech Republic (2004-2020)
	EU	EU Climate and Energy Package (2008-2020)
	Finland	Finland National Climate and Energy Strategy (2008-2020) Finland Foresight Report on Long-term Climate and Energy Policy (2009-2050)
	France	Le Plan Climat de la France (2005-2020)
	Germany	Germany Integrated Energy and Climate Program (2007-2020)
	Hungary	Hungary National Strategy on Climate Change (2008)
	Iceland	Iceland Climate Change Strategy (2007-2050)
	Ireland	Ireland National Climate Change Strategy 2007-2012
	Italy	Italy Climate Change Action Plan (pending)
	Japan	Japan Action Plan for Achieving A Low-Carbon Society (2008-2050) Japan Innovation for Green Economy and Society (2009) The New Growth Strategy (Basic Policies): Toward a Radiant Japan (2009)
	Latvia	Latvia Climate Change Mitigation Programme for 2005-2010
	Luxembourg	Luxembourg CO_2 Reduction Action Plan (2006)
	Netherlands	Netherlands Clean and Efficient: New Energy for Climate Policy (2007)
	New Zealand	New Zealand Climate Change Solutions: An Overview (2007)
	Norway	Norwegian Climate Policy (2008)
	Poland	Poland's National Climate Strategy (2003-2020)
	Portugal	Portugal National Climate Change Programme (2004)
	Romania	National Action Plan on Climate Change of Romania 2005-2007
	Russia	Russia Green Growth Plan of Action
	Slovenia	Slovenia Operational Programme for Limiting Greenhouse Gas Emissions (2006)
	Spain	Spanish Climate Change and Clean Energy Strategy (2007-2020)
	Sweden	Sweden: Towards a Low Carbon Society (2009-2011)
	Tanzania	Tanzania National Action Plan on Climate Change (1997)
	Turkey	Turkey National Climate Change Action Plan (pending)
	UK	UK Low Carbon Transition Plan (2009-2020)
Non-Annex I	Bangladesh	Bangladesh Climate Change Strategy and Action Plan (BCCSAP) (2008-2018)
	Brazil	Brazil National Plan on Climate Change (2008-2030)
	Chile	Chile National Climate Change Plan (2008-2012)
	Costa Rica	Costa Rica National Strategy on Climate Change
	China	China National Climate Change Program (2007-2010)
	Guyana	Transforming Guyana's Economy While Combating Climate Change (2010-2030)
	Honduras	Honduras National Climate Change Strategy
	India	India National Action Plan on Climate Change (2008-2017)
	Indonesia	Indonesia National Action Plan Addressing Climate Change (2007-2050) Climate Change Sectoral Roadmap (pending)
	Israel	Israel Climate Change Action Plan (pending)
	Korea	Korea Green Growth Strategy (2008-2068) Korea 1st National Basic Energy Plan (2008-2030) Korea Comprehensive Plan on Combating Climate Change

* The US Climate Change Action Plan (1993) was not included as it has not been endorsed by subsequent administrations.

Table 9 (continued): Selection of NCCS and existing LEDS

	Country	Name and timeframe
Non-Annex I	Mexico	Mexico National Strategy on Climate Change (ENACC) (2007-2012, Energy sector forecasts to 2014) Mexico Special Program on Climate Change (PECC) (2009-2012, with long-term vision to 2050)
	Peru	Peru National Strategy on Climate Change (2008-2020)
	South Africa	South Africa Long Term Mitigation Scenarios (2008-2050)
	Tajikistan	Tajikistan National Action Plan for Climate Change Mitigation
	Thailand	Thailand Strategic Plan on Climate Change (2008-2012)

Table 10: Detail of selected LEDS and related documents in non-Annex I countries*

Country	Name and timeframe	Sectors/topics	Emissions projections	Mitigation Costs
Bangladesh	Bangladesh Climate Change Strategy and Action Plan (BCCSAP) (2008-2018)	**Mitigation** Mitigation and low-carbon development **Adaptation** Food security, social protection and health Comprehensive disaster management Infrastructure Research and knowledge management Capacity building and institutional strengthening	No	The Ministry of Environment and Forests is currently working out the cost of implementing the ten-year Action Plan. It is estimated that a $500 million programme will need to be initiated in Years 1 and 2, and that the total cost of programmes commencing in the first 5 years could be of the order of $5 billion. No MACC provided.
Brazil	Brazil National Plan on Climate Change (2008)	**Mitigation** Energy efficiency Renewable electricity Biofuels Reduce deforestation rate Increase forest coverage **Adaptation** Vulnerability and adaptation Research and development	No (although projections by sector to 2030 in World Bank study)	No quantitative information provided (although estimates of costs made in subsequent McKinsey and World Bank studies)
Chile	Chile National Climate Change Plan (2008-2012)	**Mitigation** Update emission inventories Assessment of mitigation potential Mitigation scenarios **Adaptation** Water resources Biodiversity Agriculture and forestry Energy sector Infrastructure and coastal urban areas Fisheries Health sector	Sets out plans to generate mitigation scenarios in 2009-2010	No quantitative information provided

* Other Non-Annex I plans that the authors were aware of, but for which details were not available: Korea Green Growth Strategy (2008-2068), Korea 1st National Basic Energy Plan (2008-2030), Korea Comprehensive Plan on Combating Climate Change, Costa Rica National Strategy on Climate Change, Honduras National Climate Change Strategy, and Tajikistan National Action Plan for Climate Change Mitigation.

Table 10 (continued): Detail of selected LEDS and related documents in non-Annex I countries*

Country	Name and timeframe	Sectors/topics	Emissions projections	Mitigation Costs
China	China National Climate Change Program (2007-2010)	**Mitigation** Energy production and transformation Energy efficiency improvement and energy conservation Industrial processes Agriculture Forestry Municipal wastes **Adaptation** Agriculture Forests and other natural ecosystems Water resources Coastal zones and coastal regions	No, although projections for GHG emissions from the energy sector were subsequently produced for the 2050 China Energy and CO2 Emissions report, a research exercise commissioned in 2009	No quantitative information provided
Guyana	Guyana Draft Low-Carbon Development Strategy (2009-2030)	**Mitigation** Forestry	No, but includes projections of forest cover from the FAO Forest Resources Assessment 2005	Estimates the Economic Value to the Nation (EVN) and Economic Value to the World (EVW) of Guyana's rainforest (EVN = 580 million USD, EVW = 40 billion USD). Estimates abatement cost of avoided deforestation in Guyana at 2-11 USD/tonne, based on McKinsey/Vattenfall studies
India	India National Action Plan on Climate Change (2008-2017)	**Mitigation** National solar mission National mission for enhanced energy efficiency National mission on sustainable habitat National mission for a green India **Adaptation** National water mission National mission for sustaining the Himalayan ecosystem National mission for sustainable agriculture **Both** National mission on strategic knowledge for climate change	No	No quantitative information provided, although MACCs for the power, steel and cement sectors presented by Sethi (2006)

* Other Non-Annex I plans that the authors were aware of, but for which details were not available: Korea Green Growth Strategy (2008-2068), Korea 1st National Basic Energy Plan (2008-2030), Korea Comprehensive Plan on Combating Climate Change, Costa Rica National Strategy on Climate Change, Honduras National Climate Change Strategy, and Tajikistan National Action Plan for Climate Change Mitigation.

Table 10 (continued): Detail of selected LEDS and related documents in non-Annex I countries*

Country	Name and timeframe	Sectors/topics	Emissions projections	Mitigation Costs
Indonesia	Indonesia National Action Plan Addressing Climate Change (2007-2050)	**Mitigation** Energy sector LULUCF Marine and fisheries sector **Adaptation** Water resource sector Agriculture sector Coastal, marine and fisheries sector Infrastructure sector Health sector Forestry and biodiversity sector	Contains projections for energy sector to 2025	No quantitative information provided, although a GHG emissions cost curve was subsequently produced by the National Council on Climate Change (DNPI) in 2009
Mexico	Mexico National Strategy on Climate Change (ENACC) (2007-2012) Mexico Special Program on Climate Change (PECC) (2009-2012, with long-term vision to 2050)	**Mitigation** Oil and gas Power generation Transport Residential, commerce Industry Agriculture Land use and land use change Waste Industrial processes **Adaptation** Risk management Water resources Agriculture, forestry and fishing Ecosystems Energy, industry and services Transport and communications infrastructure Land use and urban development Public health	Contains baseline projections broken down by sectors, as well as mitigation scenarios to 2050. Short-term mitigation goal of 51 $MtCO_2e$ to 2012 domestically financed.	PECC estimates mitigation opportunities and costs to 2030
Peru	Peru National Strategy on Climate Change (2008-2020)	**Mitigation** Focus on forestry Agriculture Waste Energy Transport Industry **Adaptation**	No	Estimated total cost of mitigation actions is 347 USD million per year
South Africa	South Africa Long Term Mitigation Scenarios (2008-2050)	**Mitigation** Energy Transport Industry Waste, agriculture and forestry	Contains several scenarios for projections to 2050, broken down by sector	Contains a MACC for South Africa

* Other Non-Annex I plans that the authors were aware of, but for which details were not available: Korea Green Growth Strategy (2008-2068), Korea 1st National Basic Energy Plan (2008-2030), Korea Comprehensive Plan on Combating Climate Change, Costa Rica National Strategy on Climate Change, Honduras National Climate Change Strategy, and Tajikistan National Action Plan for Climate Change Mitigation.

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