

Introduction to Low Emission Development Strategies for Policymakers in the Asia Region

Course introduction

This course is designed to equip policymakers and low emission development practitioners in the Asia region with an understanding of the LEDS process and its benefits. The course provides information on steps to design and implement climate resilient low emission development strategies and includes a compilation of tools and resources to assist countries in this process. This course also provides examples from countries around the world that are undergoing the formulation and implementation of their LEDS.

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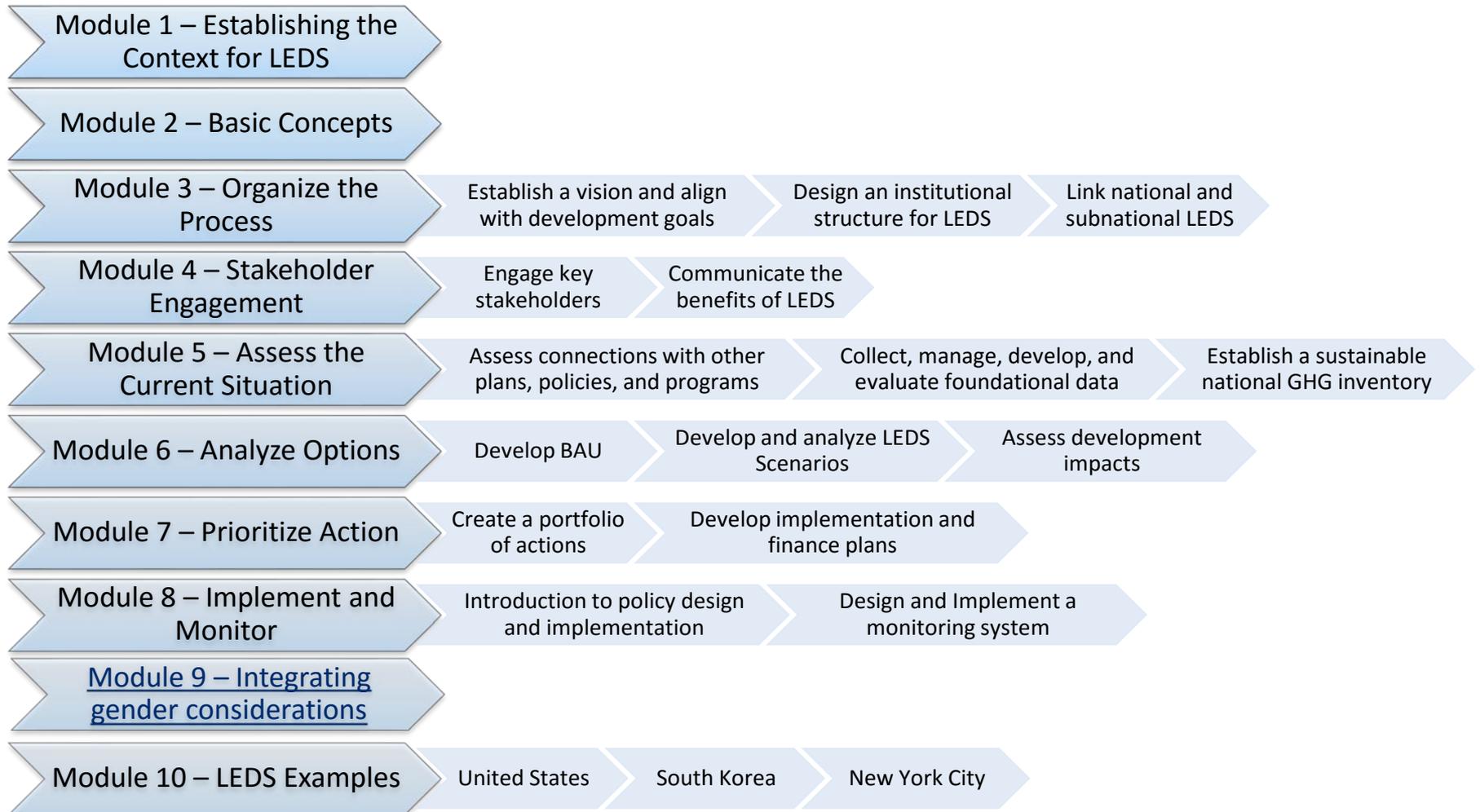
Learning Objectives for This Course

By the end of this course, you will be able to:

- Explain the key concepts behind low emission development as a vehicle for promoting green growth and increased economic productivity;
- Define low emission development strategies (LEDS) and explain their importance;
- Identify and describe in detail all key elements of LEDS; and
- Facilitate discussions on LEDS with policy makers from various ministries.

Course Navigation

Please click the module of interest below to navigate to the corresponding portion of this presentation.



Module 1.0

Establishing the Context for Low Emission Development Strategies

Establishing the Context for Low Emission Development Strategies: Learning Objectives and Key Messages

Learning Objectives:

- Explain the key concepts behind low emission development.
- Define LEDS and explain why LEDS are important.

Key Messages:

- Low emission development seeks to decouple economic growth from GHG emissions growth.
- National development goals provide the essential foundation for LEDS actions.
- A LEDS is a planning and implementation framework for long-term and economy-wide development that fulfills country development goals while reducing GHG emissions.
- A climate-resilient LEDS helps mainstream climate-change considerations into the functions of national and subnational governments.

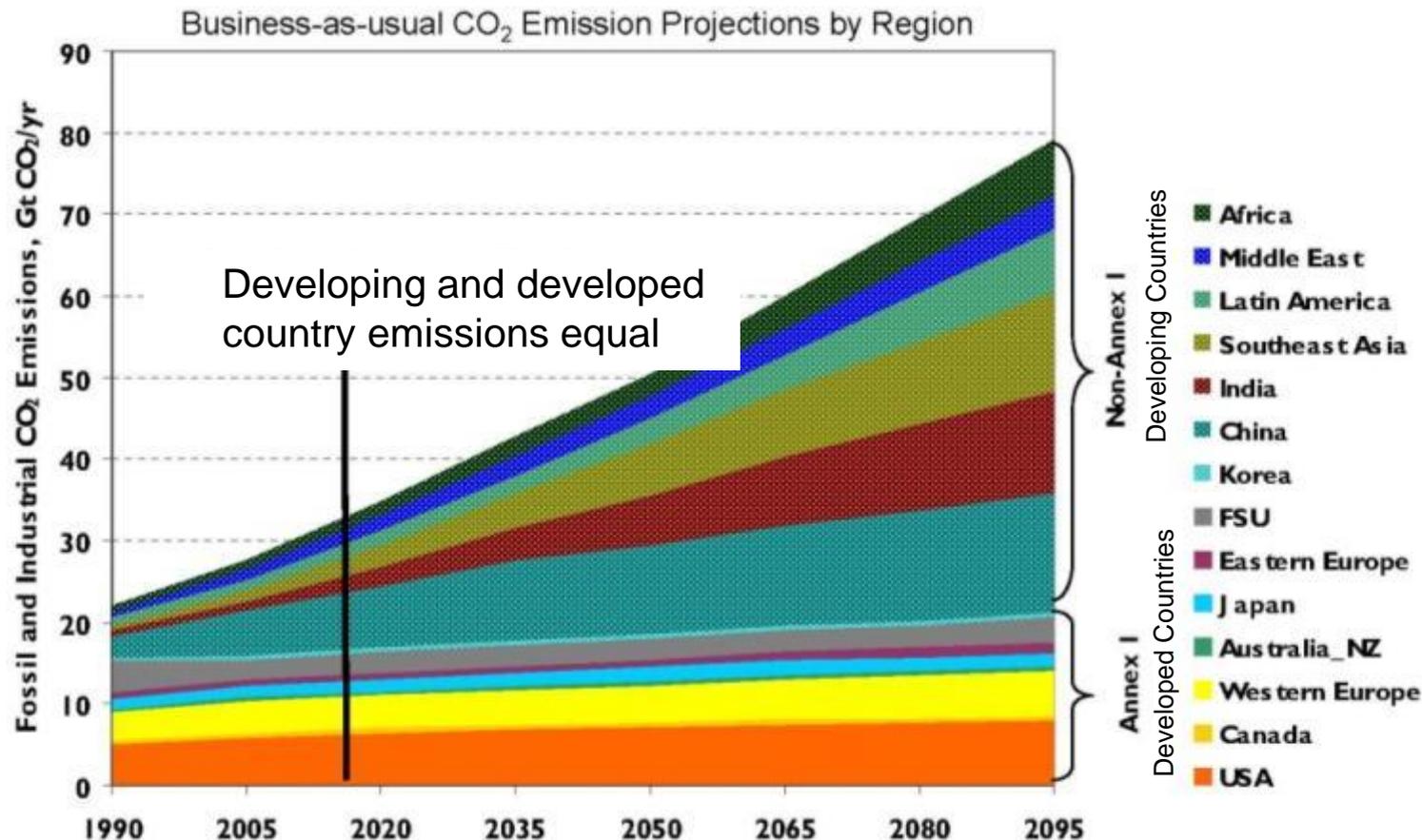
Why It Matters

“Continued emission of greenhouse gases will cause further warming and long-lasting changes in all components of the climate system, increasing the likelihood of severe, pervasive and irreversible impacts for people and ecosystems.”
—Fifth Assessment Report of the Intergovernmental Panel on Climate Change

- The scientific community almost unanimously agrees that the global climate is changing—and this change is strongly correlated to human activity.
- Greenhouse gas emissions are increasing rapidly in many developing countries, due in part to the pursuit of national development goals.
- Without additional GHG mitigation efforts, surface temperature warming is more likely than not to exceed 4 degrees Celsius above pre-industrial levels by 2100.
- Risks associated with this BAU level of warming include:
 - Substantial species extinction
 - Global and regional food insecurity
 - Adverse human health impacts
 - Limited potential for adaptation in some cases

Global GHG Emissions Profile Is Changing

Greenhouse gas emissions are likely to increase in many developing countries.



Data derived from *Global Energy Technology Strategy, Addressing Climate Change: Phase 2 Findings from an International Public-Private Sponsored Research Program*, Battelle Memorial Institute, 2007.

Greenhouse-Gas Mitigation Has Valuable Co-Benefits

Reduced reliance on fossil fuels



Reduced human and environmental health hazards posed by climate



Increased economic output through new industries and markets



Increased employment opportunities

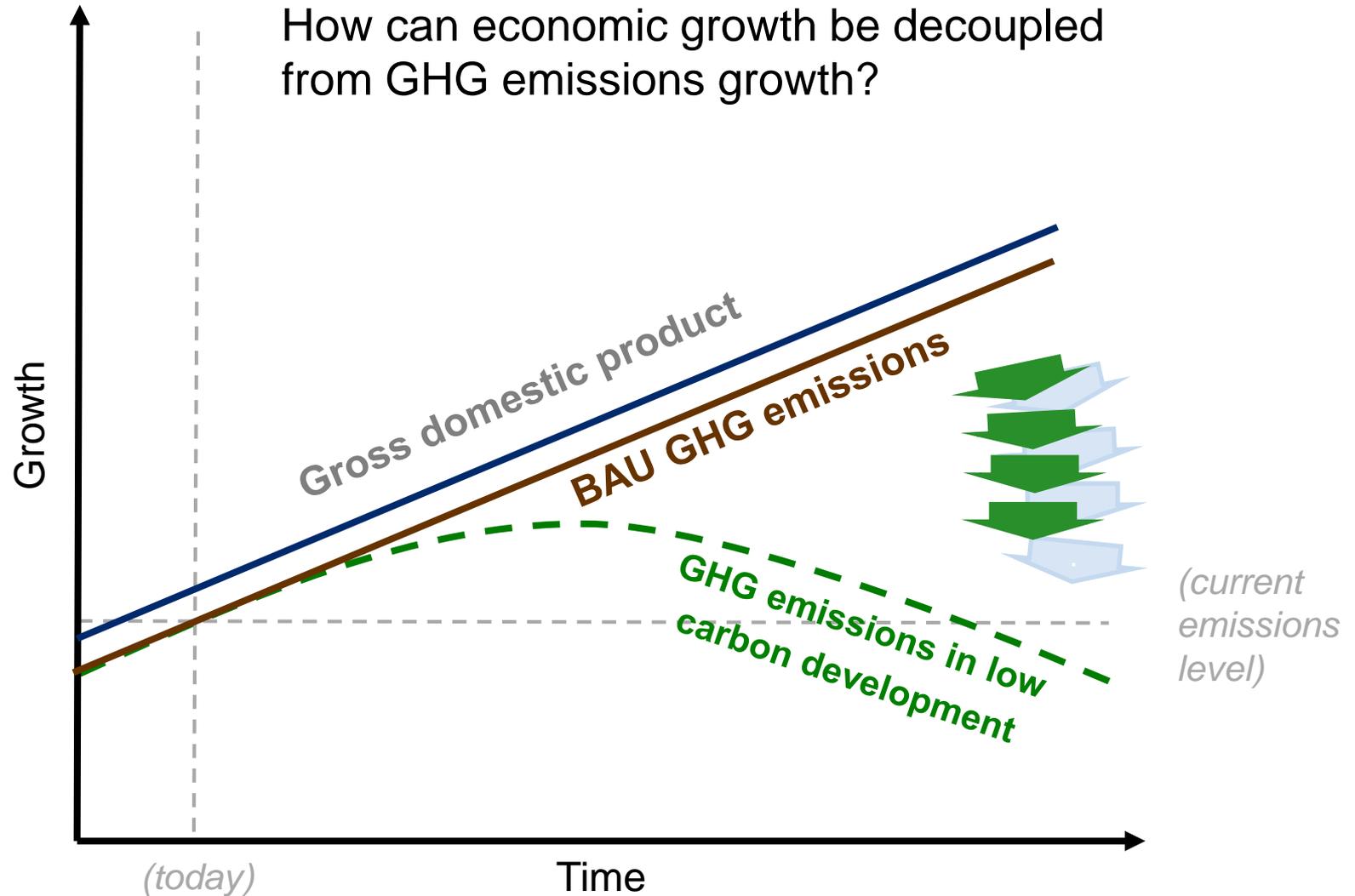


Increased access to modern energy



Enhanced environmental sustainability and climate resiliency

Key Concept of Low Emission Development



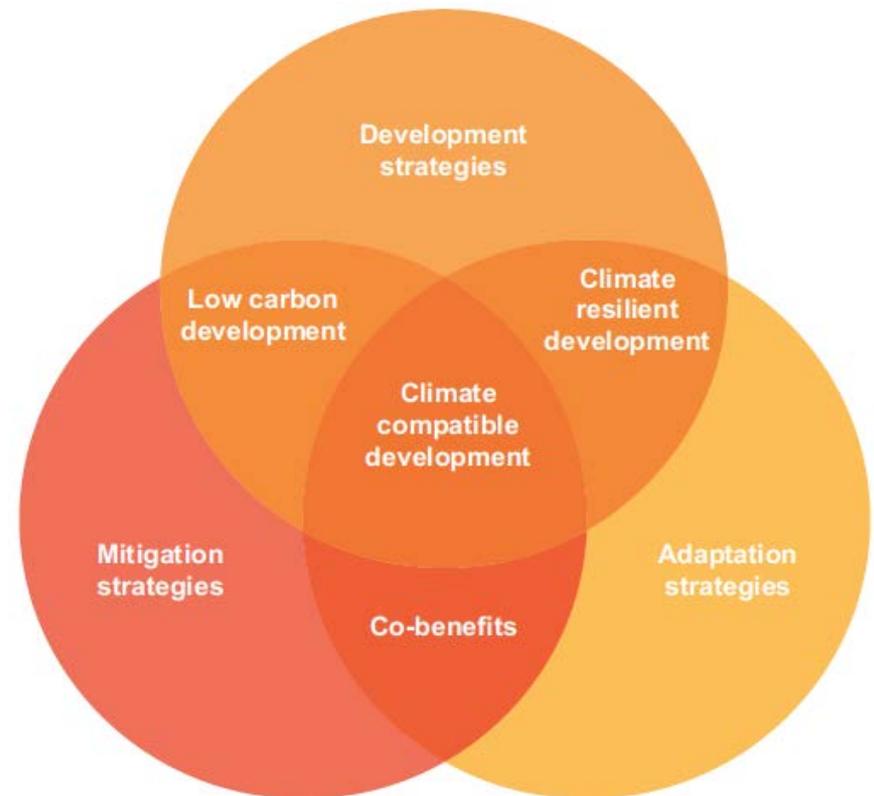
What Is a Low Emission Development Strategy (LEDS)?

A Low Emission Development Strategy Is:

A strategic economic and social development and environmental planning framework that articulates actionable programs and policies to put a country on a climate-resilient development path while working toward long-term, measurable GHG emission reductions.

LEDS and Related Plans and Strategies

- Not all countries have a formal document or process called a “LEDS”
- Many countries are incorporating LEDS-type concepts into other planning mechanisms, for example:
 - Green growth
 - Sustainable development
 - Climate-change resilience and response
 - Clean energy and sustainable land use



Source: Adapted from Zadek, 2009 and informal communication with staff from the UK Department for International Development

Regardless of their names, LEDS are distinguished by their focus on both *enhancing development* and *reducing GHG emission trajectories*.

LEDS and the International Climate-Change Landscape

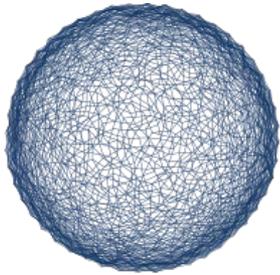


United Nations
Framework Convention on
Climate Change

Objective: “stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system”

- Climate-resilient LEDS provide a framework to help countries advance common objectives under the United Nations Framework Convention on Climate Change (UNFCCC), an international treaty ratified by 195 countries.
- Parties to the UNFCCC convene annually and make key decisions at the Conference of Parties (COP), the formal negotiating venue for the UNFCCC process.

LEDS in the Context of the UNFCCC



COP15
COPENHAGEN
UN CLIMATE CHANGE CONFERENCE 2009

Copenhagen Accord, December 2009
“A low emission development strategy is indispensable for sustainable development”

Subsequent Conference of Parties decisions have:

- Encouraged countries to develop LEDS plans and Nationally Appropriate Mitigation Actions (NAMAs) in the context of sustainable development.
- Invited assistance for developing countries in the development and implementation of LEDS.
- Organized technical workshops and material to build capacity in the formulation of LEDS.
- Established processes that build from LEDS, such as Biennial Update Reports, National Communications, and Intended Nationally Determined Contributions (INDCs).



UNITED NATIONS
CLIMATE CHANGE CONFERENCE
COP19/CMP9
WARSAW 2013

LEDS, Nationally Determined Contributions (NDCs), and Nationally Appropriate Mitigation Actions (NAMAs)

LEDS represent one of several internationally-utilized mechanisms to support climate change mitigation and can provide an development-focused, overarching framework for NDCs, NAMAs, and other climate action.

LEDS

Strategies to reduce GHG emissions while enhancing development

Development and mitigation focus

Long-term (e.g., through 2050)

Often economy-wide

NDCs

GHG mitigation goals, policies, or projects

Primary focus is mitigation

2025-2030 timeframe, updated and scaled up every 5 years

Sectoral or cross-sectoral focus

NAMAs

Strategies, policies, projects, or pledges to reduce GHG emissions

Primary focus is mitigation

Can be a means to reach near-term goals

Often focuses on specific projects or policies

Common LEDS and Green-Growth Drivers

- Save money by deploying advanced technologies and efficiently using resources.
- Create new industries and markets to support low emission development.
- Mitigate the hazards posed by climate change.
- Meet consumer demand for environmental responsibility.
- Improve local environmental quality.
- Reduce risk caused by uncertainty related to low emission development and environmental policy.

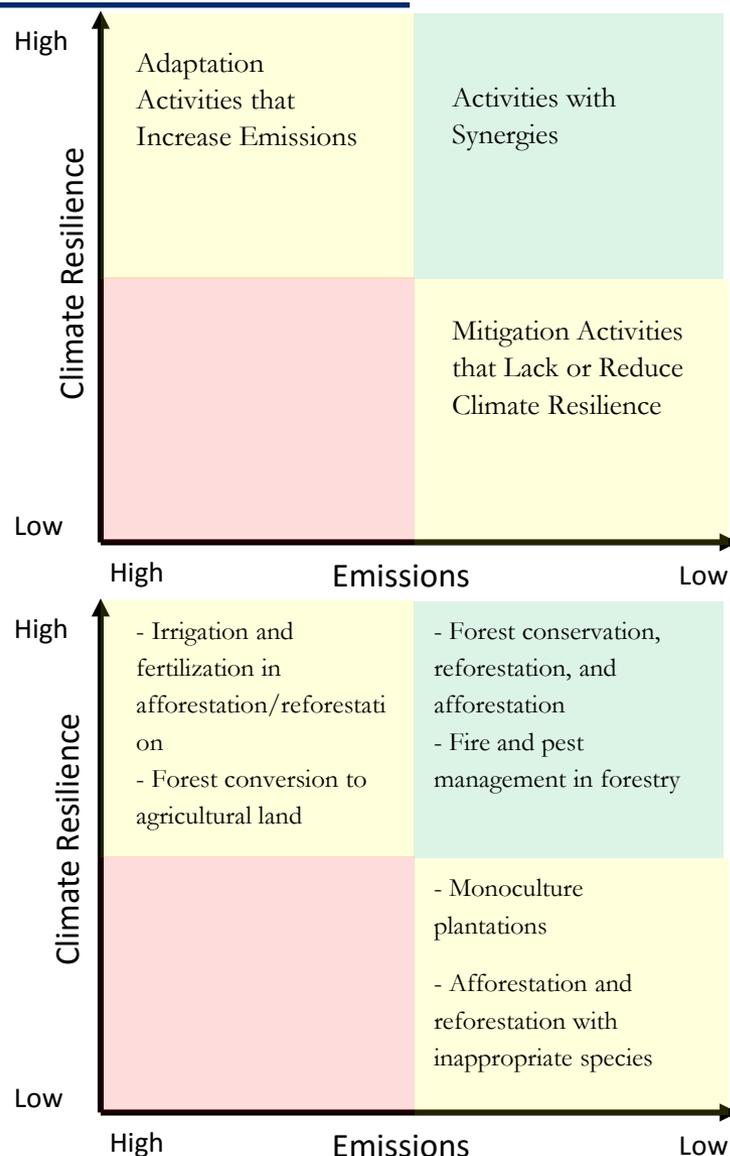
Adapted from "Green Growth in Practice: Lessons Learned from Country Experiences." June 2014. Available at <http://ggbp.org/wp-content/uploads/2014/06/Green-Growth-in-Practice-062014-Full.pdf>.

Linking LEDS and Climate Resilience

Using the LEDS process to *jointly* consider adaptation and mitigation objectives...

- Enables identification of activities that simultaneously reduce emissions and increase resilience, and avoid activities that have tradeoffs
- Increases the cost-effectiveness of projects and expands benefits to project stakeholders
- Makes projects more appealing to stakeholders
- Opens doors to additional financing

Source: USAID Climate Change Resilient Development, draft paper.



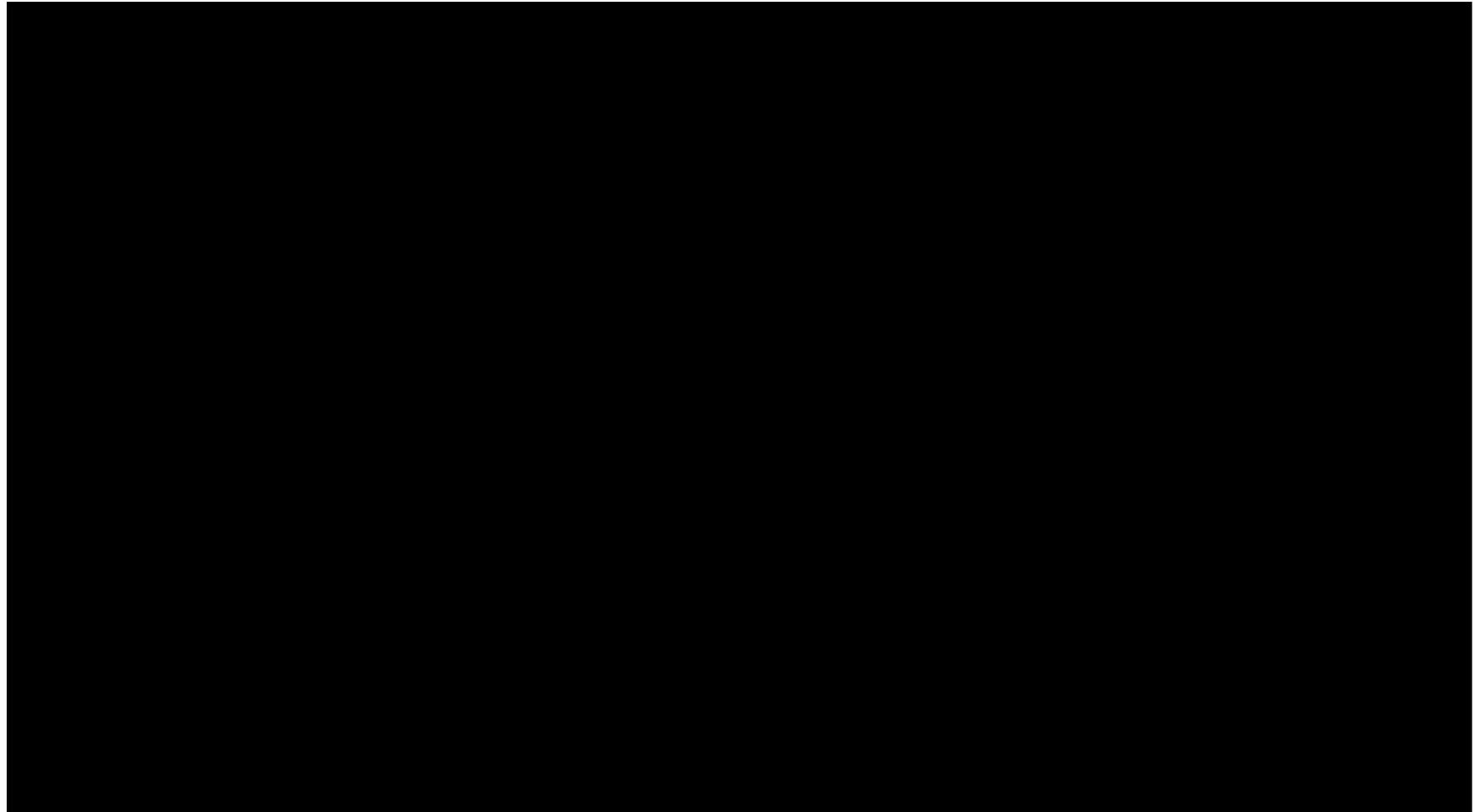
Examples of LEDS Efforts Around the World

At least 115 countries are developing LEDS, with support from over 75 international institutions



LEDS in Asia

Please double click the black box below to watch a short video on LEDS in Asia, or access the video on YouTube here: <https://www.youtube.com/watch?v=NXBopuAy00w>.



Discussion Questions

- How would you define low emission development?
- Why might climate-resilient LEDS be important for your ministry and/or sector of focus?
- How do you think you can use your specific skills to contribute to the LEDS process?
- How do national economic, social, and environmental planning and decision making systems (institutionally) currently function in your country? What do you think the planning and decision-making systems should be like, particularly in the context of LEDS?

Additional Resources

- Asia LEDS Partnership (ALP)
<http://asialeds.org>
- Green Growth Best Practices (GGBP)
Report <http://www.ggbp.org/report/green-growth-practice-lessons-country-experiences>
- Intergovernmental Panel on Climate Change Fifth Assessment Report
<http://www.ipcc.ch/report/ar5/>
- LEDS Global Partnership
<http://ledsgp.org>
- Training Manual on Gender and Climate Change
https://www.iucn.org/news_homepage/events/unfccc2/events/2011_durban/publications/?uPubsID=3592
- United Nations Framework Convention on Climate Change
<http://unfccc.int/2860.php>

Module 2.0

Basic Concepts

Qualities and Components of Low Emission Development Strategies

Qualities and Components of Low Emission Development Strategies: Learning Objectives and Key Messages

Learning Objectives:

- Describe the essential qualities of low emission development strategies (LEDS).
- Identify illustrative elements and components of low emission development strategies.

Key Messages:

- There is no one-size-fits-all LEDS framework. LEDS reflect a country's unique circumstances and development goals, building on existing frameworks and country progress in addressing climate change.
- Several cross-cutting qualities contribute to the success of a LEDS. These qualities include country owned and country driven; analytically sound; comprehensive; forward looking and long term; actionable; and transformative.
- LEDS generally have common components. These components include greenhouse-gas inventories, business-as-usual scenarios, alternative emissions scenarios, high-priority actions, implementation plans, and evaluation.

Essential Qualities of LEDS

- Country owned and country driven
- Analytically sound
- Comprehensive
- Forward looking and long term
- Actionable
- Transformative

Essential Qualities of LEDS

Country Owned and Country Driven

Does a LEDS:

- Have leadership support and strong champions within the government?
- Engage and reflect diverse and balanced stakeholder input from key actors in the country?
- Feed into the country's decision-making and budgeting apparatus?
- Integrate with existing strategies and plans?
- Rely on local capacity?
- Provide a framework for international engagement on climate?

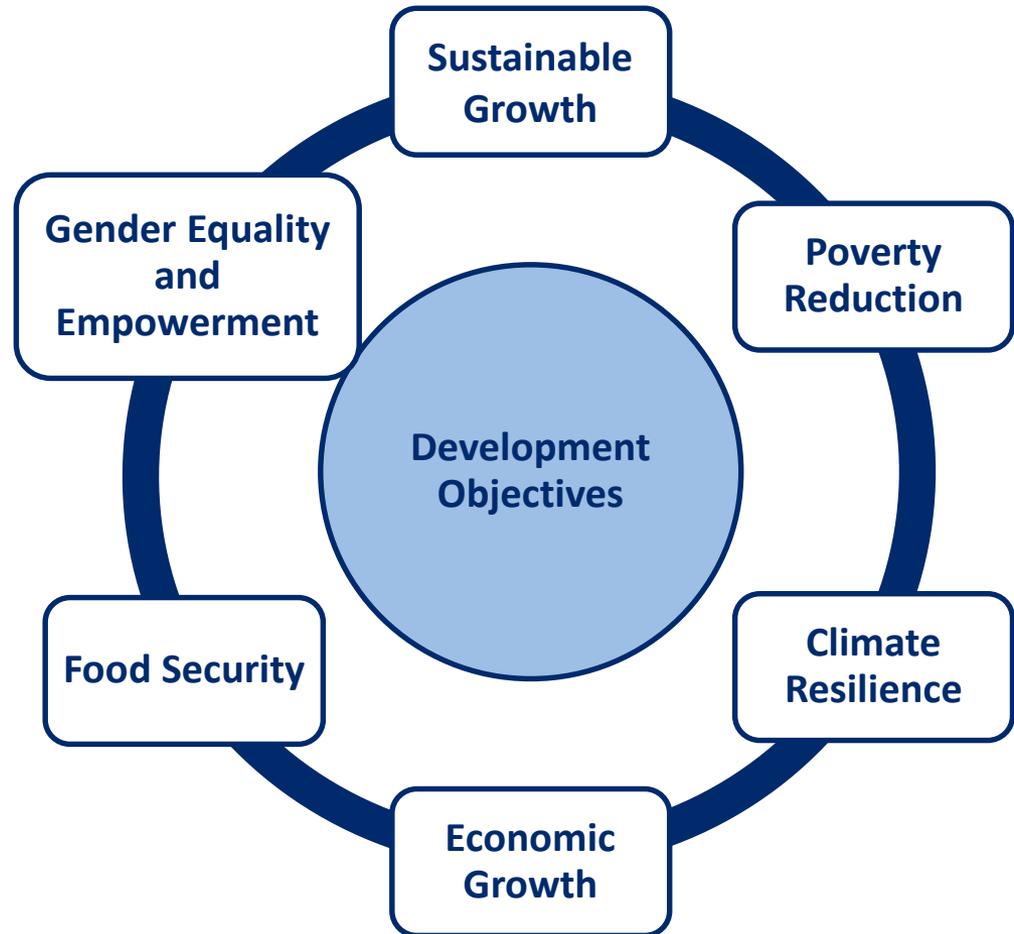
Essential Qualities of LEDS

Analytically Sound

- Reproducible data, that is documented, transparent, and based on accepted techniques (for example, *IPCC Guidelines for GHG Inventories*)
- Built upon sound analysis (defensible assumptions, models, and baseline forecasts)

Essential Qualities of LEDS

**Comprehensive
of ...
... Development
Objectives**



Objectives shown here are illustrative only

Essential Qualities of LEDS

Comprehensive of . . .

. . . Sources of Emissions and Economic Sectors

Chilean Inventory of Anthropogenic GHG Emissions, 2006

GHG source categories	CO ₂ Emission (Gg)	CO ₂ Sequestration (Gg)	CH ₄ (Gg)	N ₂ O (Gg)	CO (Gg)	NO _x (Gg)	NM VOC (Gg)	SO _x (Gg)
Total national emissions and sequestration	60,795.9	-22,043.4	591.7	27.1	316.3	6,745.2	427.3	947.0
1. Energy	55,117.2	0.0	110.0	1.3	291.5	1,544.8	248.8	432.7
1.A. Fuel combustion (sectorial method)	55,117.2		41.6	1.3	290.9	1,543.8	242.1	422.7
1.A.1. Energy Industries	20,681.5		0.3	0.2	60.8	5.3	1.4	368.6
1.A.2. Manufacturing, construction, and mining	13,119.7		0.7	0.1	36.8	6.8	1.4	0.0
1.A.3. Transport	16,970.2		2.6	0.2	168.6	873.6	165.4	0.0
1.A.4. Commercial, public, residential	4,033.8		0.7	0.0	5.5	4.3	0.6	0.0
1.A.5. Fishing	312.1		0.2	0.0	0.4	0.9	0.1	0.0
1.A.6. Wood and biomass fuel (non-CO ₂)			37.1	0.8	18.8	652.9	73.3	54.1
1.B. Fugitive fuel emissions			68.3		0.6	1.0	6.7	10.0
1.B.1. Solid fuels			1.8		0.0	0.0	0.0	0.0
1.B.2. Petroleum and natural gas			66.5		0.6	1.0	6.7	10.0
2. Industrial processes	4,902.6	0.0	6.4	0.7	8.6	18.3	178.5	514.3
2.H. Mineral products	3,007.4				0.0	0.0	137.0	1.2
2.I. Chemical industry	0.0		6.4	0.7	4.0	0.0	2.3	83.5
2.J. Metal production	1,895.2		0.0	0.0	0.1	1.7	0.2	408.8

Essential Qualities of LEDS

**Comprehensive
of ...
... Stakeholder
Perspectives**



Essential Qualities of LEDS

Forward Looking and Long Term



Coal-fired power plant in Andhra Pradesh, India.

- Power plants built today will impact emissions for decades
- Avoid undesirable technology infrastructure lock-in
- LEDS should model lifecycle costs and benefits of technology options



Concentrating solar thermal plant in California.

Photo by International Rivers

Essential Qualities of LEDS

Actionable

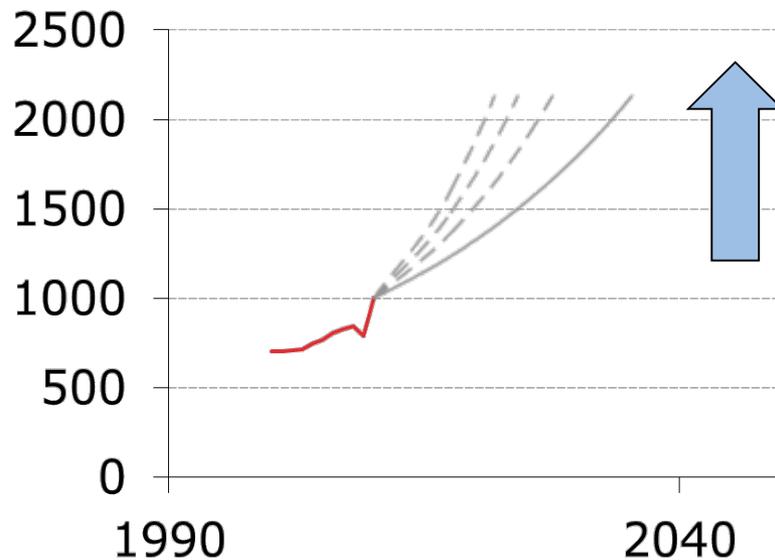
Can the government, donors, international financial institutions, the private sector, and other stakeholders readily adopt and implement pieces of the strategy?

- Identify specific projects for support and potential funding sources, with key beneficiaries identified.
- Provide a framework for investment.
- Promote access to international financing.

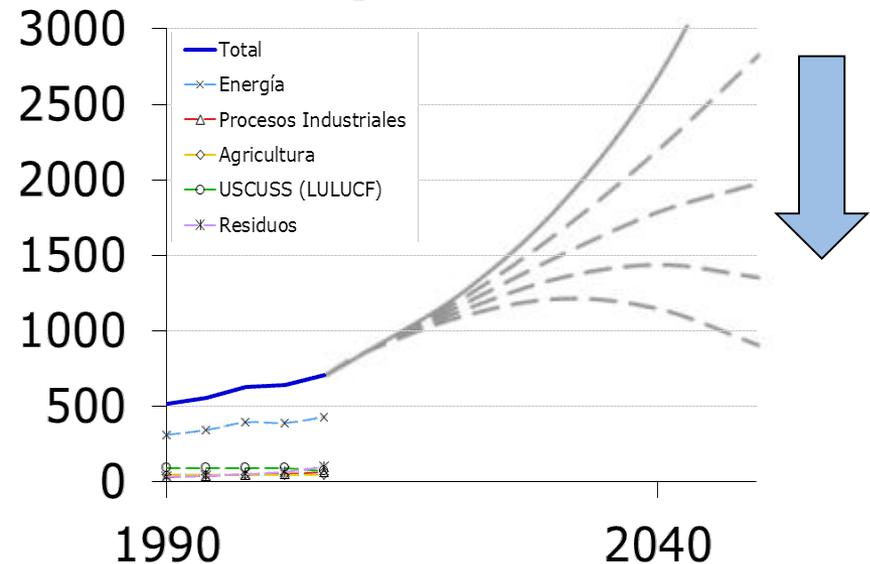
Essential Qualities of LEDS

Transformative

Mexico GDP (\$B)



Mexico GHG Emissions
(Teragram CO₂-e)



Decoupling economic growth from emissions reductions requires *transformational* changes in all sectors of the economy, as well as in planning processes.

Key Components of LEDS

**National greenhouse gas
emissions inventory**

**Business-as-usual
development and
emissions scenario(s)**

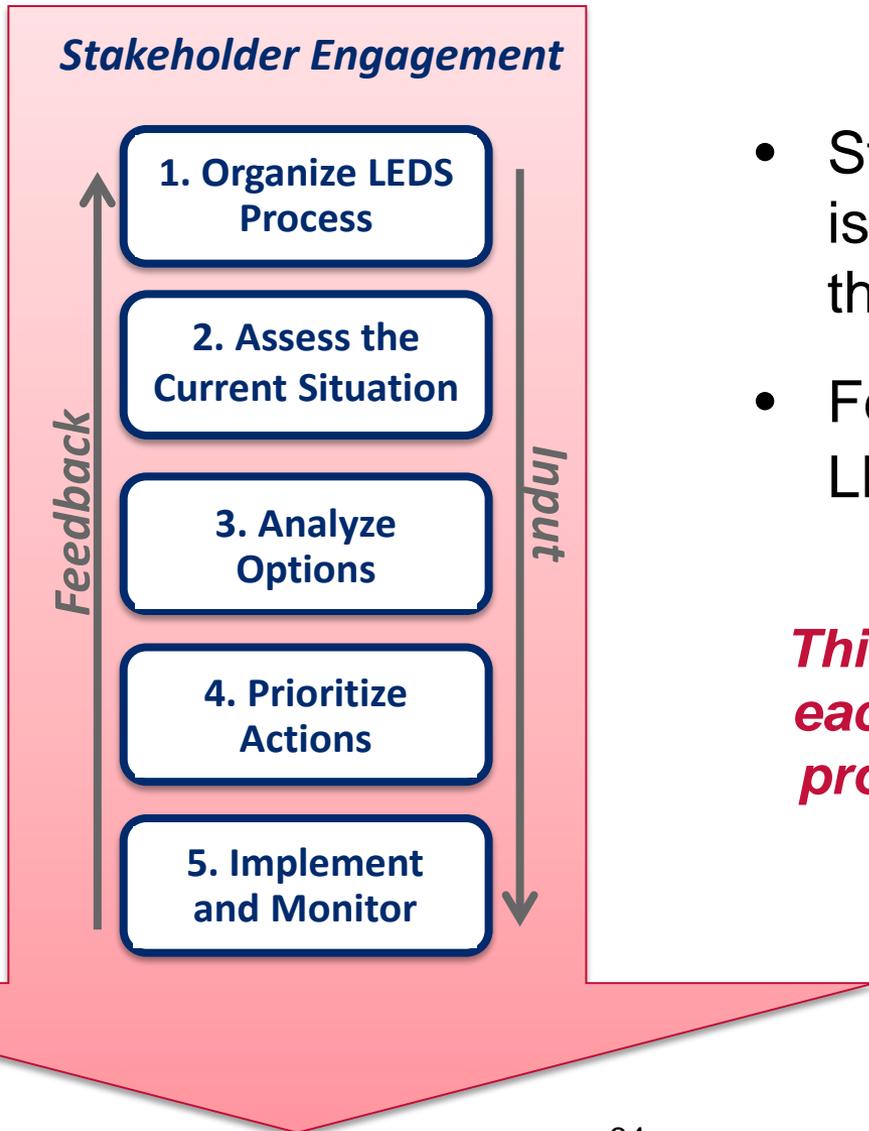
**Alternative low emission
development and
emissions scenarios**

**High-priority low
emission development
actions**

Implementation plans

Evaluation

Organizing, Developing, and Implementing LEDS



- Stakeholder engagement is critical to all steps in the process
- Feedback loops make LEDS process iterative

This process is illustrative; each country undertakes a process best suited for its unique context.

Discussion Questions

- Describe some examples of how planning in your country exhibits each LEDS quality (or lack thereof).
- What LEDS components or products already exist in your country?
- What types of products or analyses has your ministry produced that might help to inform climate-resilient LEDS in your country?

Additional Resources

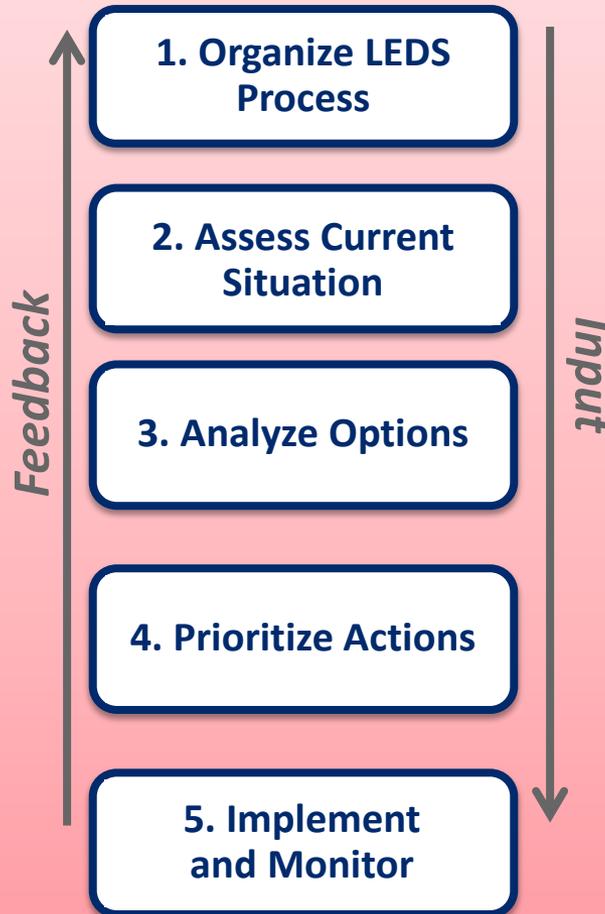
- Enhancing Capacity for Low Emission Development Strategies (EC-LEDS)
<https://www.ec-leds.org/>
- ESMAP Low Carbon Development Strategies Country Studies
<http://www.esmap.org/LowCarbonDevelopmentStudies>
- LEDS Framework Wiki on OpenEI
http://en.openei.org/wiki/Introduction_to_Framework
- International Partnership on Mitigation and Measurement, Reporting, and Verification (MRV)
<http://mitigationpartnership.net/low-emission-development-strategies-and-plans-leds-0>
- UNDP Low-Emission Climate-Resilient Development Strategies Resources
http://www.undp.org/content/undp/en/home/librarypage/environment-energy/low_emission_climateresilientdevelopment.html

Module 3.0

Stakeholder Engagement

Organizing the LEDS Process

Stakeholder Engagement



Elements:

- Engage key stakeholders
- Communicate benefits of LEDS

Stakeholder Engagement: Learning Objectives and Key Messages

Learning objectives:

- Identify strategies for stakeholder engagement in LEDS.
- Identify possible approaches for communicating the benefits of LEDS.

Key Messages:

- Engaging stakeholders from across and outside the government in every part of the LEDS design and implementation is essential to create a comprehensive and country-owned LEDS.
- Impacts of low-emission development go beyond greenhouse gas mitigation. Understanding and communicating development impacts effectively is critical to obtaining stakeholder buy-in, linking LEDS to national development goals, and to informing the process of prioritizing LEDS actions.

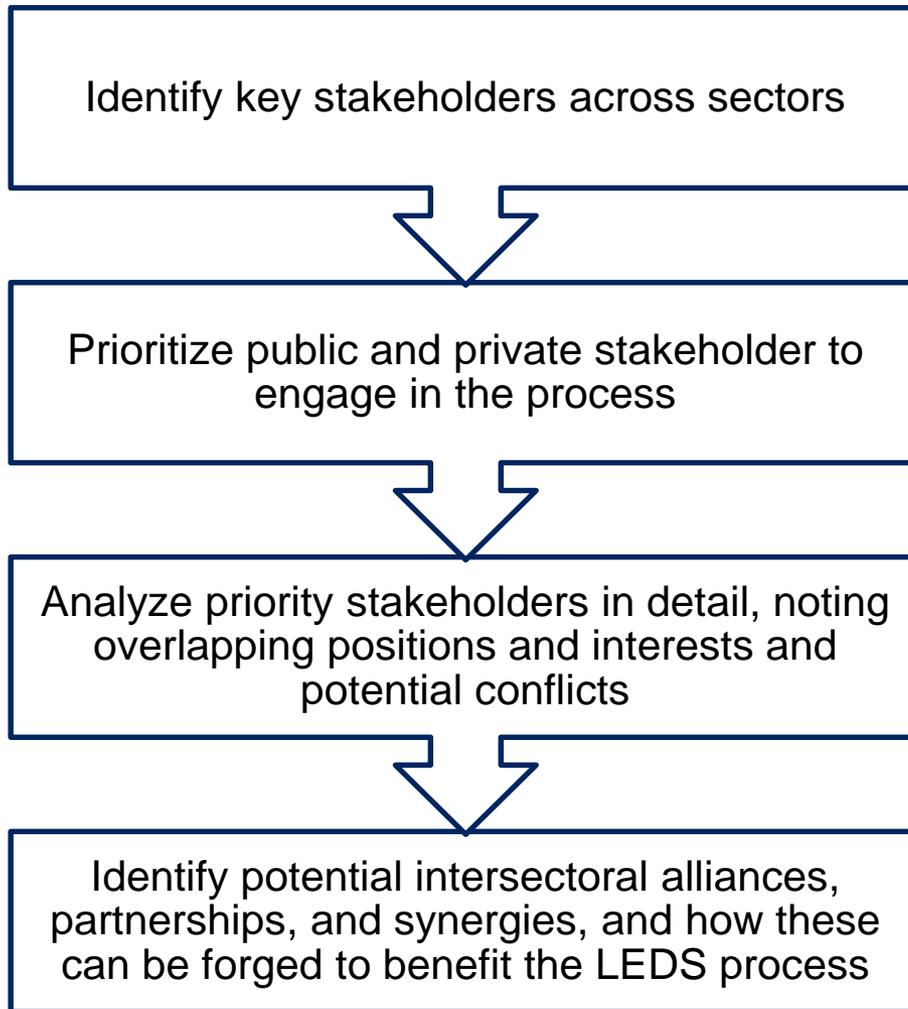
Importance of Stakeholder Engagement

- Stakeholder engagement enables:
 - Cross-sectoral dialogue to promote synergies and address cross-cutting priorities (including climate resilience) across the government;
 - Data-collection, analysis, and deliberation across diverse stakeholders and sectors
 - Establishment of shared LEDS assumptions;
 - Cross-departmental buy-in and coordination within government;
 - Mediation of national stakeholder positions and interests, including identifying and addressing tradeoffs and losers;
 - Broader awareness of and public support for change; and
 - Coordination structure at national and subnational levels.



Stakeholder engagement and input inform every stage of LEDS planning and implementation.

Selecting LEADS Stakeholders



Source: *UNDP Multi-Stakeholder Decision Making Guidebook*

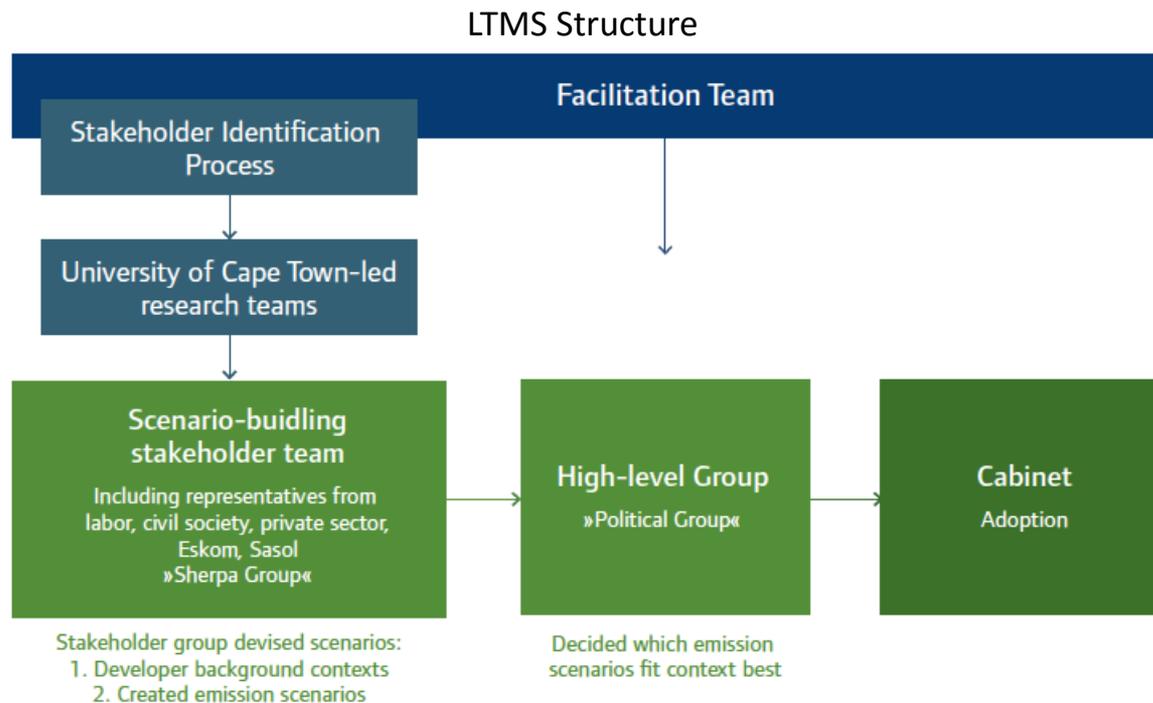
Example LEDS Country Planning Groups

Key Country Planning Groups	Composition	Roles
Primary Stakeholder Group (domestic)	<ul style="list-style-type: none"> National government (e.g., environment, social welfare, rural development, finance, water, utilities, and transportation agencies) State and local governments Business, academic, environmental, religious, and labor communities 	<ul style="list-style-type: none"> Leads the process Makes policy decision
Technical Teams (domestic and international)	<ul style="list-style-type: none"> In-country, sector-specific technical experts (including gender, REDD+, and adaptation specialists), for example, from public- and private-sector research institutions, and universities International technical experts 	<ul style="list-style-type: none"> Conduct technical work Analyze policy options and design implementation plans
High-Level Government Advisory Group (domestic)	<ul style="list-style-type: none"> Senior-level representatives from government ministries, businesses, and civil society 	<ul style="list-style-type: none"> Reviews and guides throughout the process Endorses stakeholder decisions and supports implementation

Source: OpenEI.org

Example: South Africa Long-Term Mitigation Scenarios (LTMS)

- Country ownership of South Africa's LTMS study driven by numerous entry points for stakeholder engagement.
- Scenario Building Team consisted of 80 individuals from government, industry, civil society, labor groups, and the technical community, spanning different sectors.
- Scenario teams commissioned research, identified mitigation actions, and debated and agreed on modeling inputs and assumptions.



Source: World Bank (2009). Low Carbon Study: South Africa, Presentation.

Example: Mexico City Climate Change Action Plan

- Brings together the city's environmental and development objectives and policies.
- Evaluated current conditions and low emission development scenarios and built consensus among diverse stakeholders.
- Planning meetings brought together city governments, civil society, academia, and businesses to discuss actions to support development and reduce emissions across sectors, and to examine communication and awareness-raising strategies.

Source: http://www.sma.df.gob.mx/sma/links/download/archivos/paccm_summary.pdf

Good Practices for Assessing and Communicating the Benefits of LEDS

- Establish monitoring and evaluation systems that track how LEDS is impacting current development goals and plans - **See the Module 8 of this training**
- Emphasize synergies among development outcomes (e.g., innovation, creation of jobs and industries, conserving natural resources, enhancing livelihoods)
- Manage expectations regarding costs, timeframes, trade-offs, and uncertainties
- Translate the overarching LEDS vision into a concrete set of social, economic, and environmental metrics.
- Utilize a broad and transparent analytic framework for analyzing benefits
- Use tailored and robust benefits messages to address the variety of audiences affected by LEDS
- Engage credible and trusted messengers in presenting robust, tailored, and balanced messages to offer evidence-based arguments for deviating from business-as-usual

Adapted from: "Green Growth in Practice: Lessons Learned from Country Experiences." June 2014. Available at <http://ggbp.org/wp-content/uploads/2014/06/Green-Growth-in-Practice-062014-Full.pdf>.

Example: Kenya's National Climate Change Action Plan (NCCAP)

- NCCAP 2013 was developed in an ambitious, participatory, and multi-stakeholder process that involved representatives from all relevant ministries, civil society, and the private sector.
- NCCAP is aligned with other national priorities to increase likelihood of country ownership.
- Development Impact Assessment visual tool provided a framework to summarize and communicate impacts and prioritize NCCAP actions.

	Climate			Sustainable Development				
	Abatement potential in 2030 (MtCO ₂)	Abatement cost 2030 (USD/tCO ₂)	Adaptation impact	Energy security	GDP growth	Employment	Improved waste management	Environmental impact
Expanding geothermal power	14.1	-19.9	●	●	●	■	■	■
Expanding wind power	1.4	-36.7	◐	◐	◐	■	■	■
Expanding hydro power	1.1	-13.2	◑	◐	◐	■	■	◑
Clean coal (USC)	1.1	-11.1	◐	■	◐	■	■	◑
Distributed solar PV	1.0	13.3	◐	◐	◐	◐	■	■
Landfill gas generation	0.5	-12.4	◐	◐	◐	■	●	◐

Visual mapping of mitigation actions to sustainable development impacts in the NCCAP

Source: "Assessing Development Impacts Associated with Low Emission Development Strategies: Lessons Learned from Efforts in Kenya and Montenegro." <http://www.nrel.gov/docs/fy14osti/58391.pdf>.

Case Study: South Africa's Experience in Communicating LEDS Impacts

Long-Term Mitigation Scenario (LTMS) process highlighted the following good practices.

- **Articulating Benefits in Concrete, Relevant Terms**
Impact assessments of LEDS actions were conducted and published by government, research, and international organizations.
- **Presenting an Objective, Balanced Assessment**
LTMS shows both positive and negative impacts of LEDS actions on GDP, employment, and poverty.
- **Enhancing Credibility**
LTMS included stakeholder engagement and dialogue to understand and address key concerns and support broad consensus.

Adapted from: ["Green Growth in Practice: Lessons Learned from Country Experiences."](#) June 2014.

Examples of approaches used to communicate LEDS in South Africa



Discussion Questions

- Which are the most important stakeholders to engage in the LEDS process in your country? How might you engage them?
- Which LEDS co-benefits might be most important for your country?
- What are the significant trade-offs you anticipate facing as LEDS activities are designed and implemented?
- Which types of analysis tools, data, or capacity would be most useful to you for LEDS-related activities, including trade-off analyses?

Additional Resources

- ESMAP - Planning for a Low Carbon Future: Lessons from Country Studies
<http://www.esmap.org/node/2091>
- Green Growth Best Practices (GGBP) Report
<http://www.ggbp.org/report/green-growth-practice-lessons-country-experiences>
- UNDP Multi-Stakeholder Decision Making Guidebook
http://www.undp.org/content/dam/undp/library/Environment%20and%20Energy/Climate%20Strategies/Multi-stakeholder%20Decision-Making_Sept%202012.pdf
- LEDS Global Partnership Development Impact Assessment (DIA) Toolkit
<http://ledsgp.org/DIA-Toolkit>
- World Bank–Climate-Smart Planning Platform (CSPP)
<http://www.climatesmartplanning.org>

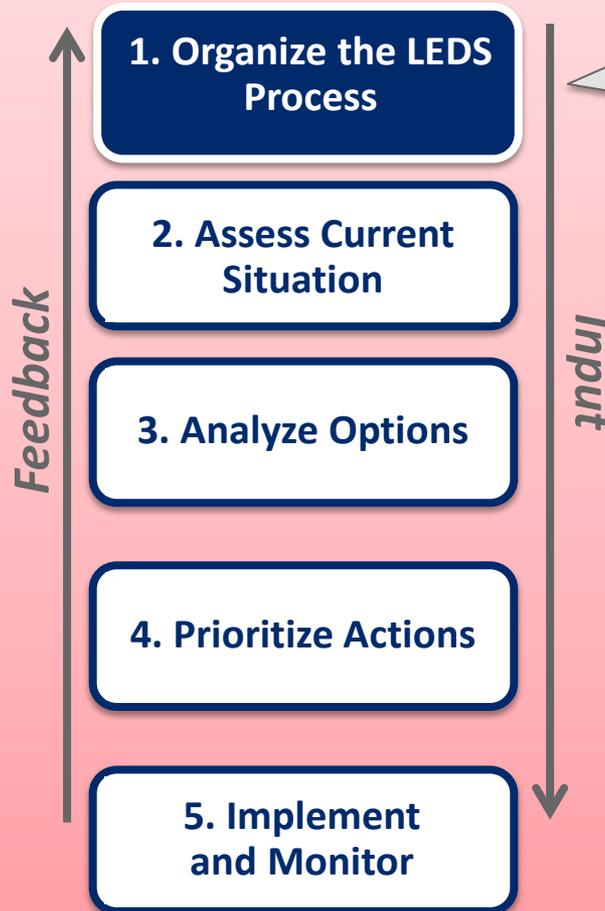
For additional examples of this part of the LEDS process in practice, see [Module 9.](#)

Module 4.0

Organizing the Low Emission Development Strategy Process

Organizing the LEDS Process

Stakeholder Engagement



Elements:

- Establish a Vision and Align with Development Goals
- Design Institutional Structure
- Link National and Subnational LEDS

Organizing the Low Emission Development Strategy Process: Learning Objectives and Key Messages

Learning objectives:

- Differentiate and identify the importance of LEDS visions and targets, and how to link to development objectives.
- Identify the key components of a LEDS institutional structure.
- Identify drivers, barriers, and possible strategies for linking national and subnational LEDS.

Key Messages:

- A clear vision for long-term, transformative LEDS is driven by high-level political support and consensus building with stakeholders at all levels.
- Linking LEDS vision and targets to national development goals is critical.
- A strong cross-sectoral, whole-of-government institutional structure to support the LEDS process helps to ensure robustness and longevity of LEDS.

Establishing a LEDS Vision

“A vision is a long-term and shared objective to guide policymaking.”

—Green Growth Best Practices (GGBP)

A clear vision for LEDS:

- Provides a common purpose for national, subnational, and regional targets and action;
- Defines a desired end-state for long-term, transformative change;
- Creates a framework for the development of concrete short-term and medium-term goals aligned with national and subnational objectives;
- Is driven by high-level political leadership;
- Is aligned with, and supported by, the political leadership of the country.

The LEDS vision is unique to the needs and objectives of a given country and can evolve over time.

Developing LEDS Targets

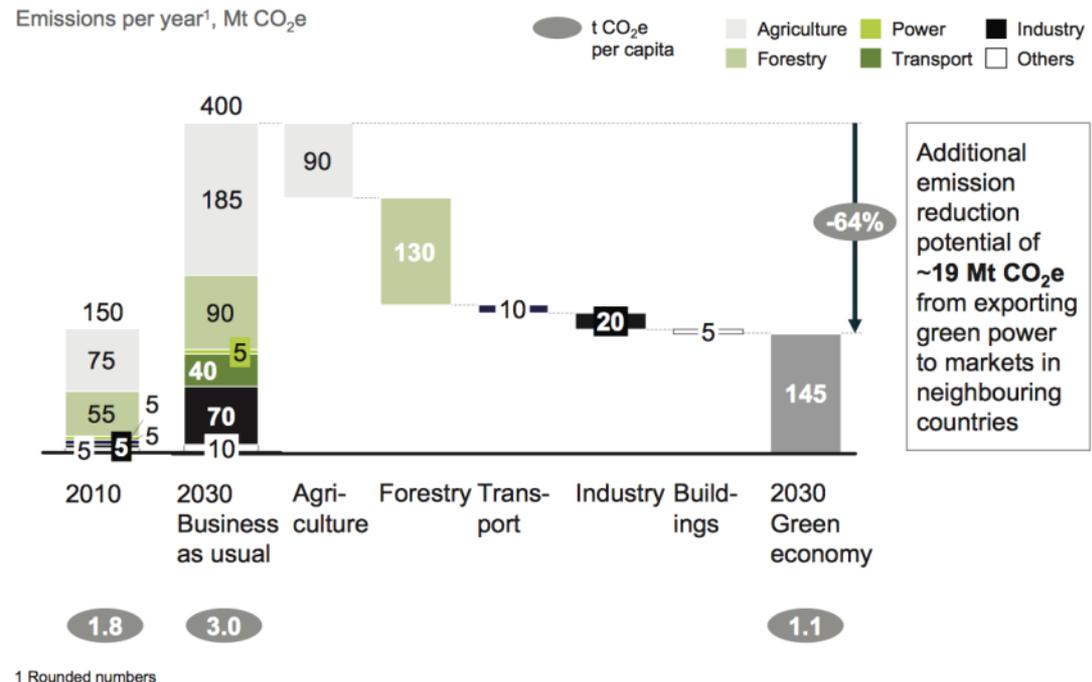
“Targets specify a desired outcome of policy action.”

—Green Growth Best Practices (GGBP)

Clear targets for LEDS:

- Align with domestic interests for priority economic, environmental, and social goals (including climate resilience and gender goals);
- Include both long- and short-term economy-wide targets and short-term sector-specific targets;
- Balance ambition with political feasibility and resource availability at the national and subnational levels.

Example: Ethiopia's low emission growth target



Adapted from "Green Growth in Practice: Lessons Learned from Country Experiences." June 2014. Available at <http://ggbp.org/wp-content/uploads/2014/06/Green-Growth-in-Practice-062014-Full.pdf>.

Example Vision and Target: Vietnam National Green Growth Strategy



Vision

“Green growth, as a means to achieve a low carbon economy and to enrich natural capital, will become the principal direction in sustainable economic development; reduction of greenhouse gas emissions and increased capability to absorb greenhouse gas are gradually becoming compulsory and important indicators in socio-economic development.”

Targets

- Reduce GHG emissions by 8% to 10% by 2020 from 2010 level.
- Reduce energy consumption per unit of GDP by 1% to 1.5% per year.
- Reduce GHG emissions from energy activities by 10% to 20% as compared to business-as-usual case.
- 42% to 45% of GDP delivered by green technology.
- 35% to 45% of transportation demand is met by public transportation in large and medium cities.
- 50% of large and medium cities meet green urban standards.

Aligning LEDS with Development Goals: Good Practices

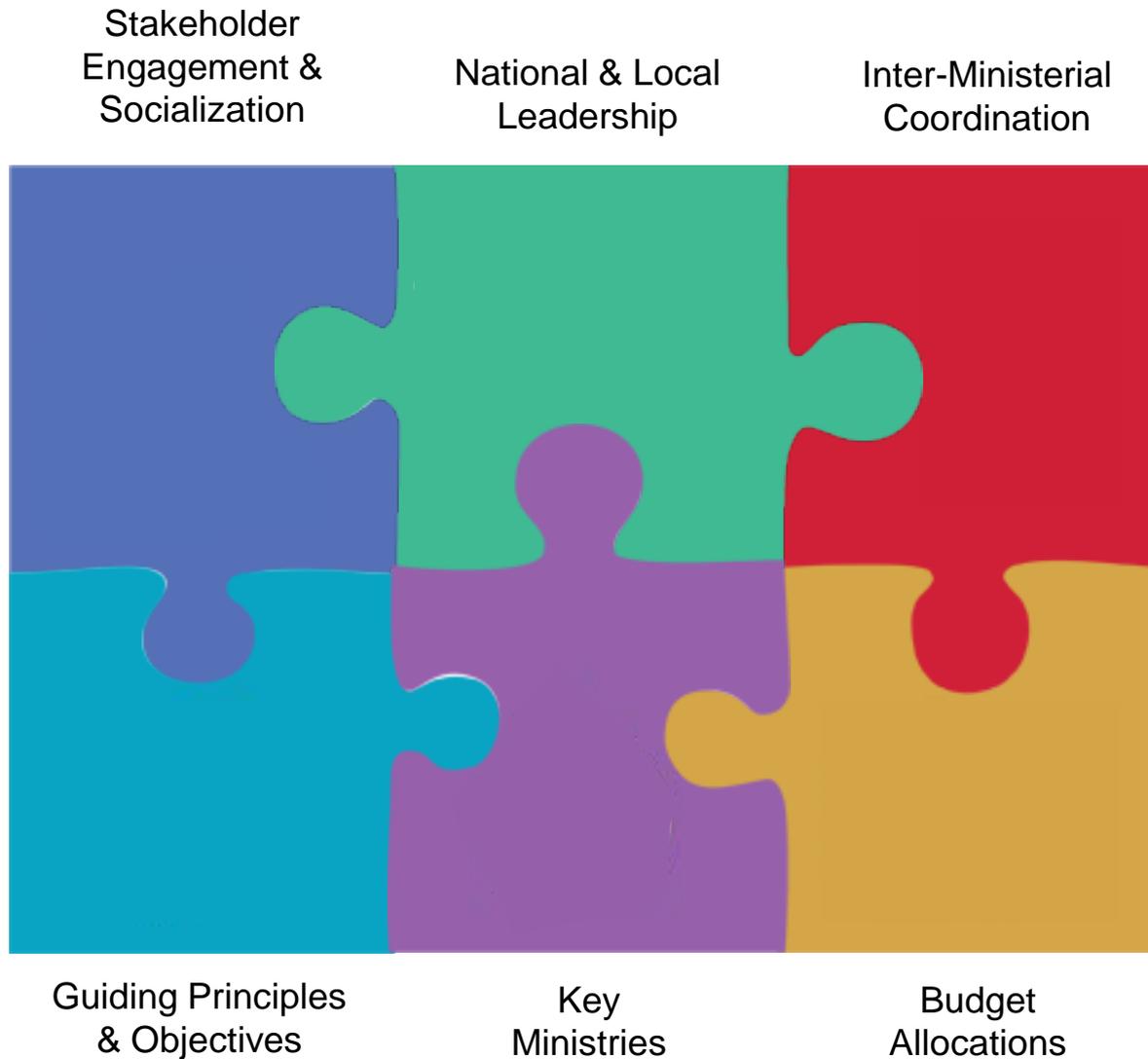
Integrate indicators for development at national and regional levels into the LEDS process

Incorporate or reference national statements on development goals into LEDS objectives

Make LEDS and development goals publicly available and reflective of stakeholder input

Empower senior public leadership to communicate the centrality of development goals to LEDS

What Comprises a LEDS Institutional Structure?



Key Observations on LEDS Institutions and Governing Structures

- Ideally, LEDS links climate-change planning and economic-development planning processes
- There is no one-size-fits-all governing structure
- Changes in leadership impact momentum
- The following are crucial:
 - Interministerial cooperation
 - Leadership at all levels of government
 - A multi-stakeholder LEDS task force

Examples: Institutionalizing Climate Change



The **Government of Colombia** has embedded climate change advisors in several key line ministries. Climate change is also integrated into national and sectoral plans, policies, and programs.



The **Government of the Philippines** established a Climate Change Commission (CCC), tasked to coordinate, monitor and evaluate climate change programs and action plans across several departments. The CCC is chaired by the President and composed of 23 government agencies; local government units; and representatives from academia, business sector, and nongovernment organizations.

Sources: 1) "Green Growth in Practice: Lessons Learned from Country Experiences." June 2014. Available at <http://ggbp.org/wp-content/uploads/2014/06/Green-Growth-in-Practice-062014-Full.pdf>. 2) Climate Change Commission. "National Climate Change Action Plan: 2011-2028." Available at http://adaptationmarketplace.org/data/library-documents/NCCAP_TechDoc.pdf.

Linking National and Subnational LEDS Processes: Drivers

- National governments often depend on cities and subnational governments (SNGs) to deliver mitigation action by directly implementing policies
- Subnational governments can strengthen and reinforce national policies to help reach higher goals
- Subnational governments often are best placed to identify local needs and benefits and to exploit synergies across investment priorities
- Subnational governments can influence policy, planning, and regulation
- Subnational governments can influence awareness, behavior, and collaboration
- Subnational governments can work together to create horizontal, cross-learning platforms

Taken from "What National Governments Can Do To Accelerate Subnational Action on Climate." June 2014. Available at http://prod-http-80-800498448.us-east-1.elb.amazonaws.com/w/images/8/88/LEDSP_SNI_Paper_Bonn_2014.pdf.

Addressing Barriers to National and Subnational LEDS Integration

Financial Barriers

- Providing direct subsidy or funding for SNG mitigation action
- Establishing dedicated funding entities
- Working through existing finance entities

Political and Institutional Barriers

- Providing clear mandates and ownership to SNGs
- Improving integration and coordination with other priorities and decision-making structures

Information and Knowledge Barriers

- Improving access to data and information
- Providing venues for exchange of lessons learned and good practices

Capacity and Skills Barriers

- Providing technical skills and knowledge support
- Supporting skills and knowledge development

Taken from "What National Governments Can Do to Accelerate Subnational Action on Climate." June 2014. Available at http://prod-http-80-800498448.us-east-1.elb.amazonaws.com/w/images/8/88/LEDSGP_SNI_Paper_Bonn_2014.pdf.

Examples: Linking National and Subnational LEDS



Vietnam's Green Growth Strategy

- To achieve the ambitious 2020 national targets, all 63 provinces are mandated to formulate their own Provincial Green Growth Action Plans (PGGAP) and integrate them into their local 5-year and annual Socio-Economic Development Plans.
- Of the 63 provinces, 10 are actively pursuing the definition of their PGGAP.
- Provinces expect guidance from the central management level for implementation of a PGGAP.

Adapted from: "The subnational integration of the Vietnam Green Growth Strategy." July 2014. Available at [http://prod-http-80-800498448.us-east-](http://prod-http-80-800498448.us-east-1.elb.amazonaws.com/w/images/d/dc/LEDSPG_SNI_CaseStudy.pdf)

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India Urban Renewal Mission

- The Jawaharlal Nehru National Urban Renewal Mission of India (JnNURM) effectively integrates green growth policies at national and subnational levels.
- The design of the program integrates national and subnational actions through:
 - Inviting states and local governments to enter into an agreement with national government to combine reforms (mandatory and optional) with financing for urban infrastructure and basic services provided; and
 - Enabling experience sharing and networking among city officials.

Adapted from "Green Growth in Practice: Lessons Learned from Country Experiences". June 2014. Available at <http://ggbp.org/wp-content/uploads/2014/06/Green-Growth-in-Practice-062014-Full.pdf>

[Course Navigation](#)

Discussion Questions

- What is the appropriate and sustainable pathway for your country in defining and achieving its LEDS vision? Which stakeholders are involved?
- Which institutional structures are in place in your country to support LEDS design and implementation? How can these structures be improved to support the LEDS process?
- Which barriers does your country face in engaging cities and subnational governments in LEDS? What can be done to address these barriers?
- To what extent are LEDS visions, targets, and institutions integrated with other important national development objectives, including climate resilience and gender equity?

Additional Resources

- Energy Sector Management Assistance Program (ESMAP)—“Planning for a Low Carbon Future: Lessons from Seven Country Studies”
<http://www.esmap.org/node/2091>
- LEADS Global Partnership Subnational-National Integration (SNI) Working Group (WG)
<http://ledsgp.org/planning/NationalSubnationalLEADS>
- Linkages between LEADS-NAMA-MRV
<http://www.mitigationpartnership.net/international-partnership-mitigation-and-mrv-leds-global-partnership-nama-partnership-2014-linkages>
- OECD-LEADS: Technical, Institutional, and Policy Lessons
<http://www.oecd.org/env/cc/46553489.pdf>
- UNDP—Green Low Emission Climate Resilient Development Strategies Guidance Manuals and Toolkits
http://www.undp.org/content/undp/en/home/ourwork/environmentandenergy/focus_areas/climate_strategies/green_lecrds_guidancemanualsandtoolkits.html
- Subnational involvement in NAMA development: Current and emerging practice towards vertical integration
http://www.ecofys.com/files/files/ecofys-giz-2013-sub-national-involvement-nama_02.pdf

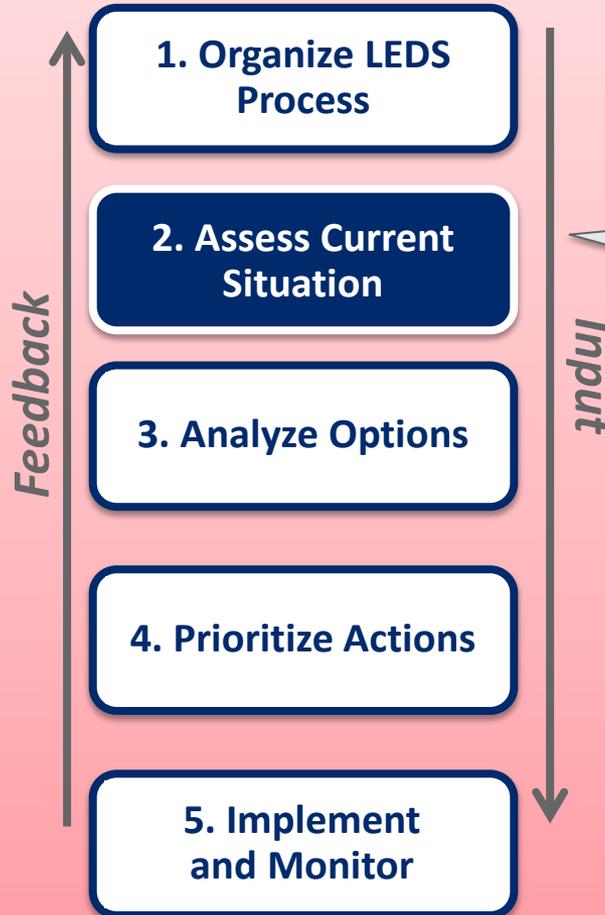
For additional examples of this part of the LEADS process in practice, see Module 9.

Module 5.0

Assessing the Current Situation

Assess the Current Situation

Stakeholder Engagement



Elements

- Assess connections with plans, policies, and programs
- Collect, manage, develop and evaluate data
- Establish a national GHG inventory

Assessing the Current Situation: Learning Objectives and Key Messages

Learning objectives:

- Describe the centrality of development objectives to LEDS design and implementation.
- Describe how existing analysis, policies, and planning processes inform LEDS development and implementation.
- Identify key data sources that serve as inputs to LEDS.
- Describe why greenhouse gas (GHG) inventories are critical to LEDS design and implementation, and identify the components of a national GHG inventory system.

Key Messages:

- A strong understanding of existing development objectives, analysis, policies, and planning processes will enable LEDS teams to build on existing efforts and engage key stakeholders in LEDS-related planning and implementation.
- LEDS aim to create an environment for better-informed, data-driven economic, social, and environmental decision-making. Comprehensive data on economic activity, development impacts, and GHG emissions are at the heart of such data-driven analysis.
- Developing a GHG inventory is a critical starting point for reducing GHG emissions.

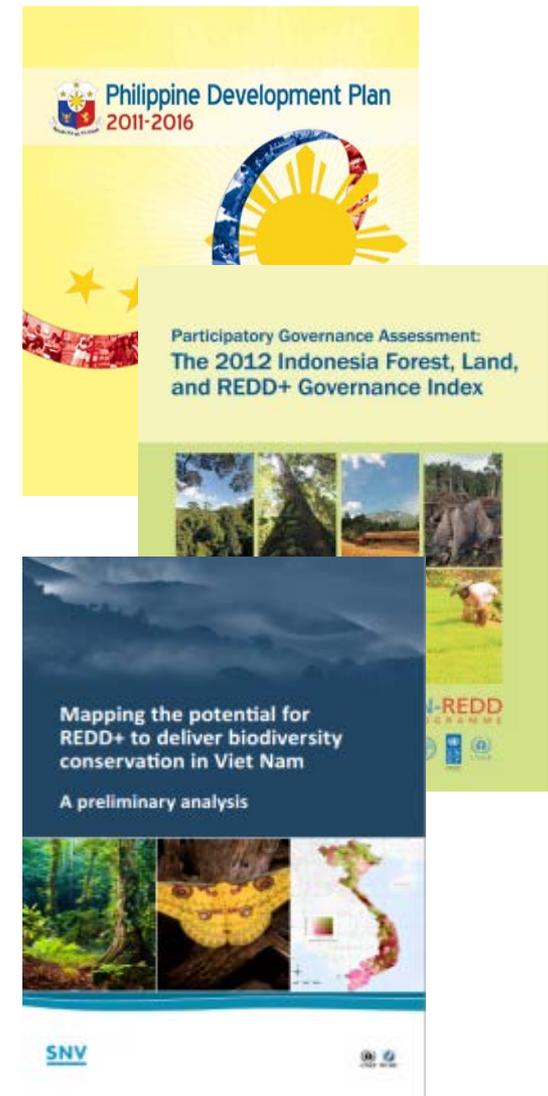
Assessing Current Country Objectives, Policies, and Capacities

Taking stock of the current LEDS policy and institutional environment in a country involves:

- **Identifying development objectives** to understand the country-specific context and drivers for LEDS;
- **Reviewing existing policies, practices, analyses, and technologies** (economy-wide and sector specific) to assess their possible impact on development and emission trends; and
- **Assessing existing institutional capacity** to develop and implement LEDS.

Identifying Development Objectives

- A *comprehensive* LEDS incorporates and complements national development objectives
 - Contribution to development goals is the foundation for prioritizing LEDS actions
 - Communicating the centrality of development goals in LEDS encourages long-term understanding and buy-in from stakeholders
- Development objectives can be found in a variety of sources, for example:
 - National development strategies;
 - Sectoral and cross-cutting development plans (e.g., REDD+ strategies; national energy policies gender and adaptation plans);
 - International treaties and communications (e.g., under UNFCCC and the Montreal Protocol); and
 - Speeches by and conversations with national political leaders.

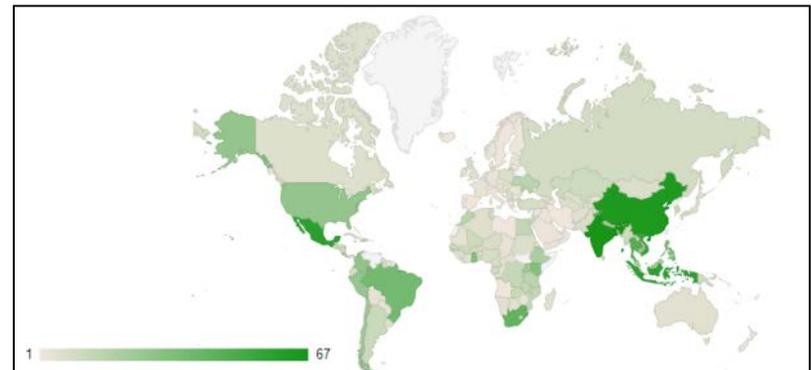


Reviewing Existing Policies, Practices, and Technologies

LEDS are informed and shaped by:

- Existing policies, technologies, and practices by sector, and how they affect emissions and removals in that sector and in others;
- Existing GHG emission reduction goals or strategies (if any);
- Existing analyses of sector development and emissions trends; and
- Lessons learned and good practices from previous policy reforms, technology transfer, and sustainable development efforts in the country.

Potential Data Source: A list of country-specific climate change, clean energy, and land-use programs and policies is available at <http://ledsgp.org/activities/all>.



Assessing Institutional Capacity

Understanding existing institutional capacity to develop and implement a LEDES informs identification of existing mechanisms for engagement and any gaps.

- Is LEDES development and implementation *country-owned*? Is the host country directing the process for all scenario, policy, and plan development and implementation?
- Which ministries are actively contributing to LEDES design and implementation? Are the number of staff members and their expertise commensurate with the roles these ministries are expected to play?
- To what extent can (and do) non-governmental technical, research, and outreach organizations contribute to LEDES development?
- What types of mechanisms are in place to sustain *long-term* LEDES activities across election cycles and turnover?
- What are the primary resources and needs for capacity building within the government or technical institutions to support key LEDES data collection and analysis?

Assessing Barriers and Opportunities: What Could Impede or Enhance LEDS?

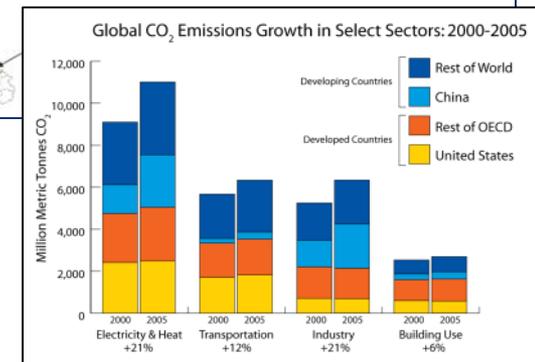
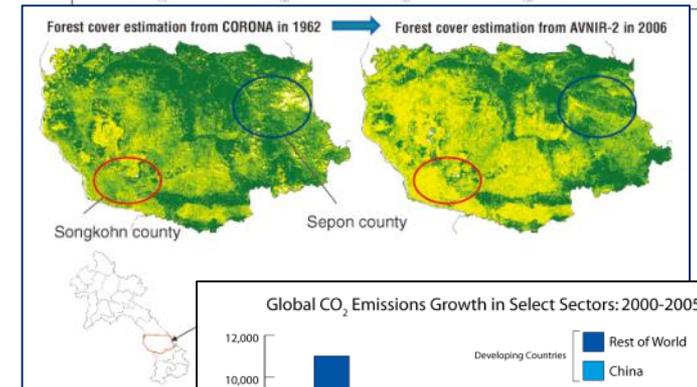
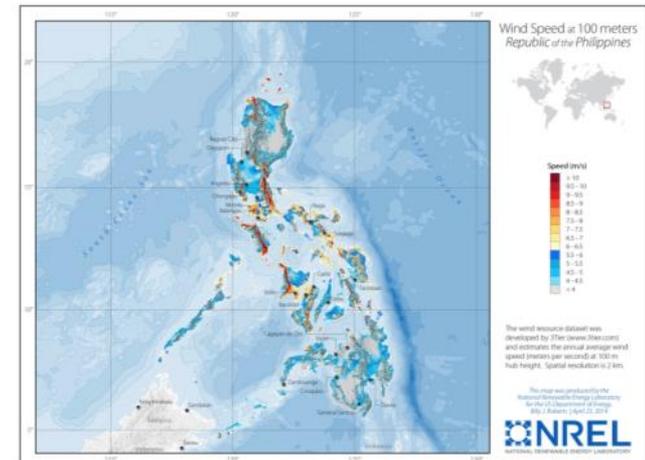
- Training and capacity development
- Continuity and consistency of objectives
- Follow-through on implementation
 - Finance
 - Enforcement and sustainability
- Adequate infrastructure
 - Platforms and networks for sharing information
 - Mobility and communications

Foundational Data for LEDS Analysis - Goals for Collecting, Managing, Developing and Evaluating

Data

- **Comprehensive**
Data and information for all key sectors are collected, managed, developed, and evaluated to be used as inputs for LEDS analyses
- **Transparent**
Data and information are peer reviewed with documented assumptions and made publicly available
- **Inclusive**
Stakeholders provide input on data collection, management, development, and evaluation processes
- **Sustainable and Long Term**
Budget is available to augment and sustain data process as needed to support LEDS

Data is key for effective strategy development, policy design, and measuring impact.



What Types of Data are Needed for LEDS Analyses?

Data should cover economy-wide considerations, with a particular focus on sectors responsible for significant proportions of a country's GHG emissions.

Energy

- Supply and demand data
- Average electricity usage per household or square foot
- Energy generation and transmission types, challenges, and opportunities
- Renewable energy resource assessments
- Policies, programs, trends and financial data

Transportation

- Demand for transport services
- Supply of transport fuel, infrastructure, and services
- Policies, programs, and trends
- Data on fuel types, vehicle efficiency, and vehicle miles

Agriculture, Forestry & Other Land Uses

- Standardized land monitoring and remote-sensing data
- Land use and land cover maps and soil surveys
- Types of livestock on pasture land, area of different crops, and crop yields.
- Type and level of irrigation, use and practices of nitrogen fertilization, manure management, aquaculture, and liming practices

Policy and Finance

- Macroeconomic: Average savings rates, import and export shares, government expenditure shares, average tax rates, consumer expenditure, socio-economic structure of the country, import/export policies and bans, most common economic drivers
- Microeconomic: Investment costs, site location, utility prices, land use plans, technology system data
- Political barriers and drivers

Greenhouse Gas Inventories

What is a GHG Inventory?

A GHG inventory is a database providing information on:

- *Type* of GHGs that are emitted over a given period (usually one year);
- *Magnitude* of these emissions; and
- Specific *sectors and activities* that are producing the emissions.

A GHG inventory provides a *baseline*, *establishes emission trends*, and provides a *mechanism for tracking emissions* over time to evaluate the impact of LEDS activities.

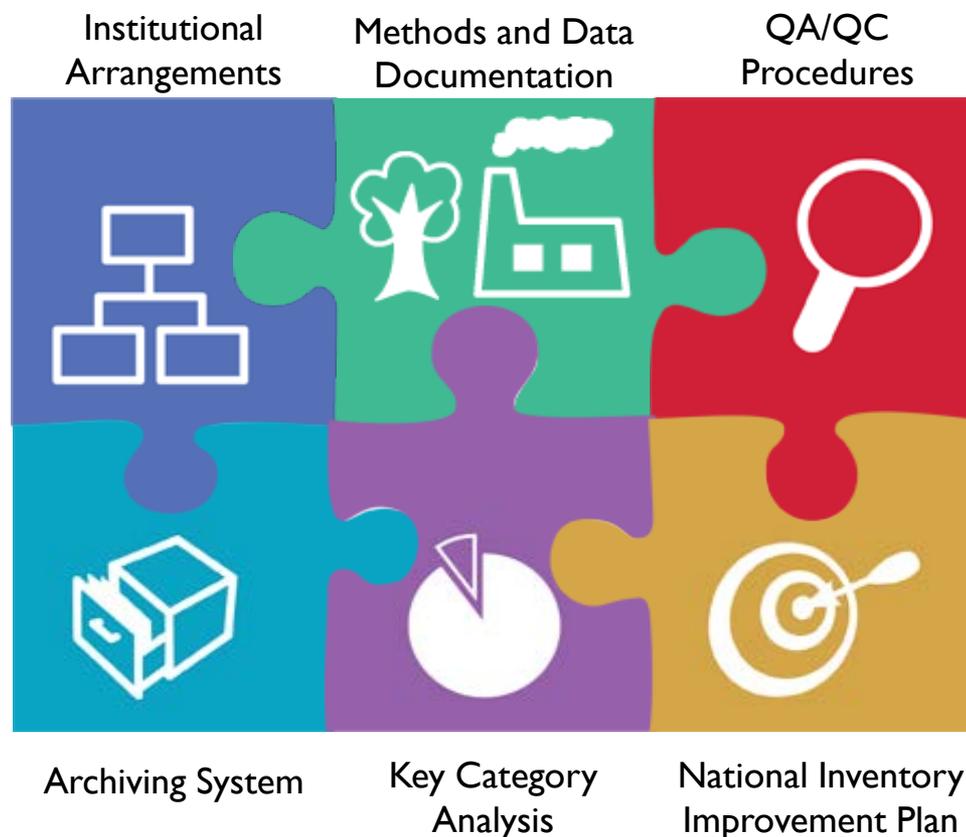
Why complete a GHG inventory?

- GHG inventories support better-informed, data-driven economic and climate policy decisions.
- GHG inventories help countries contribute to the UNFCCC process.
- Understanding a country's GHG emissions is a starting point for reducing those emissions.

***“You can't
manage what
you don't
measure!”***

National GHG Inventory Systems and Components

- A national inventory system incorporates all the elements necessary to estimate GHG emissions and sinks.
 - Sinks (or removals) absorb more carbon than they emit
- A national GHG inventory system involves:
 - A central coordination agency;
 - Arrangements between agency and institutions;
 - Identification of technical experts; and
 - Procedures for inventory development.



Challenges for Establishing National Inventory Systems and Inventory Compilation

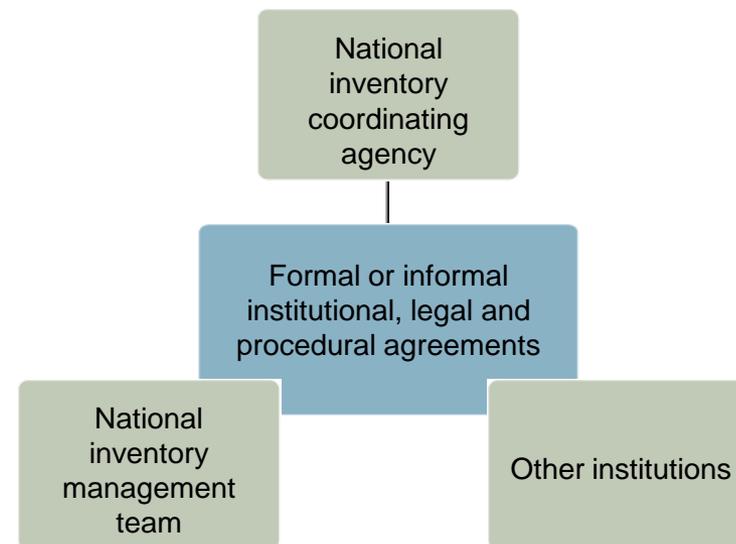
- Small teams with limited resources and multiple responsibilities
- Incomplete or non-existent activity data
- Lack of country-specific emission factors
- Insufficient documentation from previous inventories
- Difficulty retaining expertise

Source: U.S. Environmental Protection Agency. (2010). *Setting Up a Sustainable National GHG Inventory System*.

Institutional Arrangements for GHG Inventories

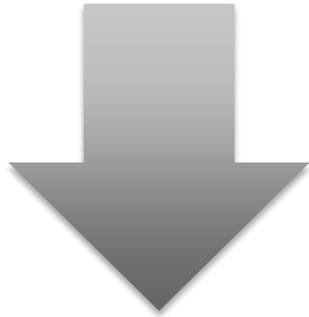
Numerous actors are involved in the development of a GHG inventory. Strong institutional arrangements:

- Identify key contacts for data
- Identify coordination gaps and opportunities for improvement; and
- Ensure long-term continuity of process and ease coordination of future inventories.



Example: Indonesia's system for collecting GHG inventory data (*Sistem Inventarisasi Gas rumah kaca Nasional*, or SIGN) allows sector ministries and local governments to collect and calculate GHG emissions and then submit them to the Ministry of Environment, which manages the system.

Top-Down and Bottom-Up Inventories



Top Down Inventories

- Include national GHG emissions inventories
- Rely on data collected and aggregated at the international, national, or state levels
- Are comprehensive of emissions sources and sectors but may lack detail

Bottom-Up Inventories

- Include local government, corporate, or other organizational inventories with smaller geographic or operational scope
- Rely on data collected and aggregated from local end users
- Are more detailed and accurate, but with limited coverage of emissions sources/sectors



Discussion Questions

- What are the most important development objectives for your country/sector/ministry? What are the tradeoffs and synergies between these objectives and low emission development?
- What economy-wide and/or sector-specific plans, policies, and practices should be reflected in your country's LEDS?
- Which structures or networks do you currently use for data/information access or sharing? (does not have to be LEDS specific)
- What tools would allow you to be even more successful in data/information access or sharing?
- What foundational data do you need for LEDS planning in your country?

Additional Resources

General Resources

- Geospatial Toolkits (GsT)
http://www.nrel.gov/international/geospatial_toolkits.html
- LEDS Framework Wiki on OpenEI
http://en.openei.org/wiki/Assess_current_country_plans,_policies,_practices,_and_capacities
- Reegle Policy Search Engine for Renewable Energy (RE) and Energy Efficiency (EE)
<http://www.reegle.info/policy-and-regulatory-overviews>
- UNFCCC—National Communications
http://unfccc.int/national_reports/non-annex_i_natcom/items/2979.php
- USAID —Low Emission Asian Development Program (LEAD)
<http://www.lowemissionsasia.org>
- U.S. EPA—National GHG Inventory Capacity Building
<http://www.epa.gov/climatechange/EPAactivities/internationalpartnerships/capacity-building.html>

GHG Inventory Tools

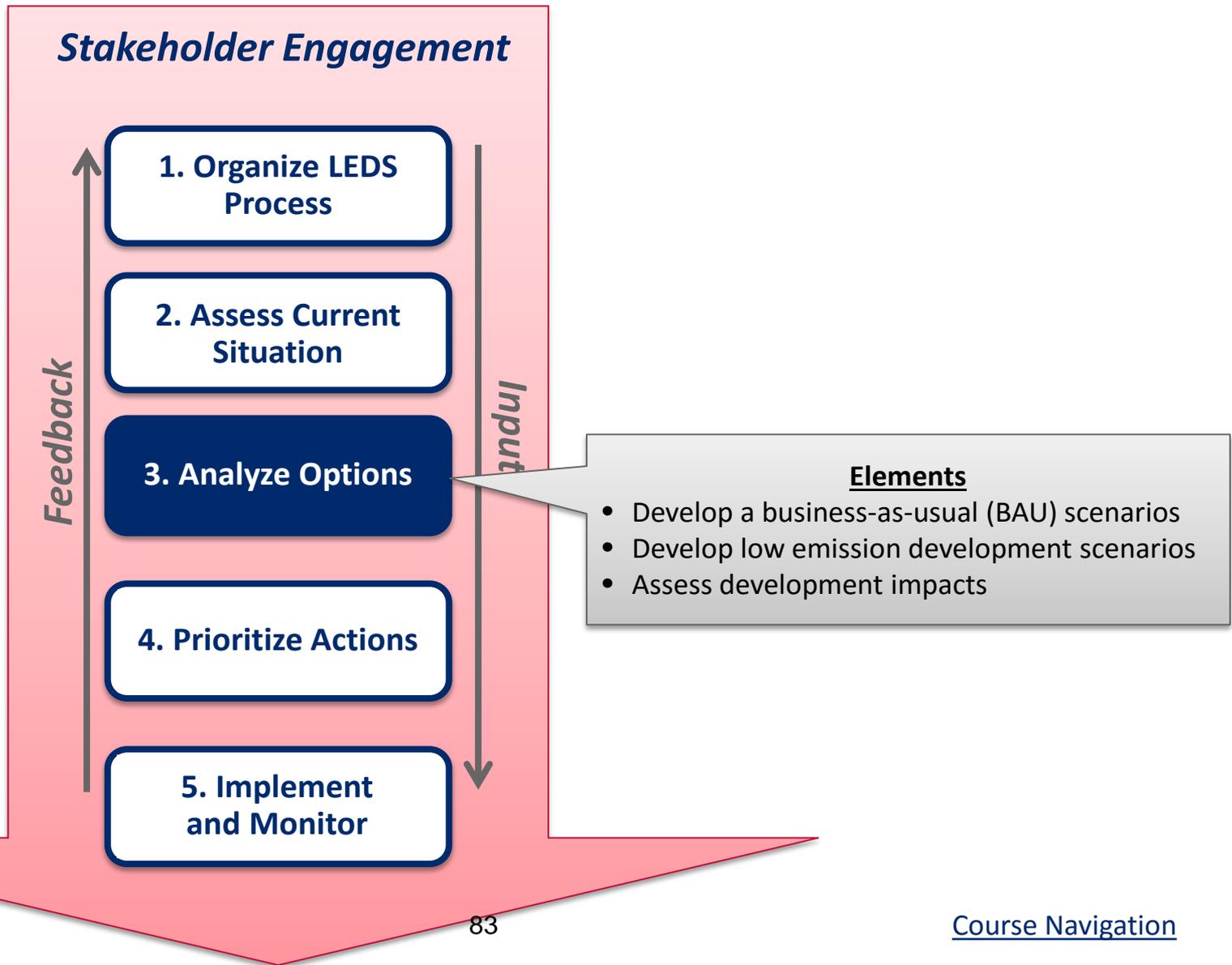
- UNFCCC GHG Inventory Software for Developing Countries
http://unfccc.int/national_reports/non-annex_i_national_communications/non-annex_i_inventory_software/items/7627.php
- IPCC Inventory Software
<http://www.ipcc-nggip.iges.or.jp/software/>
- U.S. Environmental Protection Agency's (US EPA) National Inventory System Complete Template Workbook and Key Category Analysis Tool
<http://www.epa.gov/climatechange/EPAactivities/internationalpartnerships/capacity-building.html#National>
- Agriculture and Land Use (ALU) Tool
<http://www.nrel.colostate.edu/projects/ALUsoftware/>

For additional examples of this part of the LEDS process in practice, see [Module 9.](#)

Module 6

Analyzing Options

Analyzing Options



Analyzing Options: Learning Objectives and Key Messages

Learning Objectives:

- Define a business-as-usual (BAU) scenario and describe how it can be developed.
- Describe the inputs into low emission development scenarios and explain generally when certain methods should be applied.
- Define development impact assessment and explain the value of this type of assessment to the LEDS process.

Key Messages:

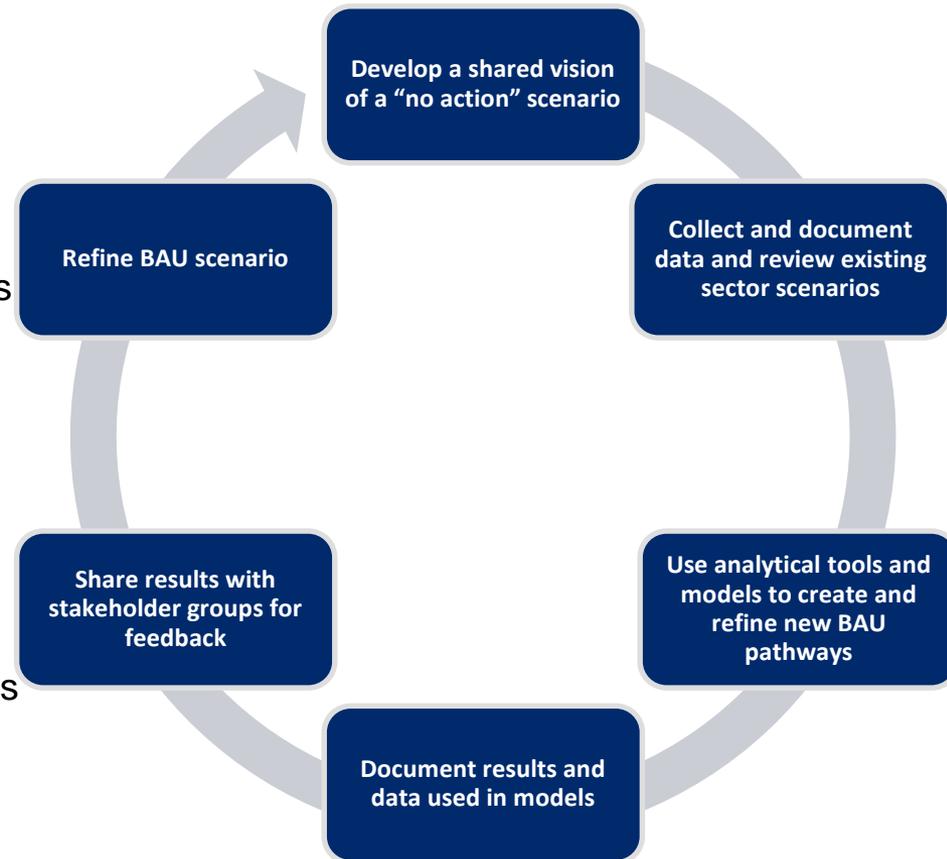
- The choice of specific tools and methods to analyze LEDS options depends on the questions of interest, and should reflect country priorities, data availability, and local expertise.
- A transparent, economy-wide BAU scenario serves as a baseline for defining targets and evaluating and tracking the impact of mitigation options.
- Low emission development scenarios provide information about how much and how fast emissions will change relative to the BAU scenario if low emission development takes place.
- Assessing the impacts of LEDS actions on development objectives informs analytically based decision making by identifying benefits and trade-offs to low emission development pathways and ensures alignment with national development goals.

Defining and Developing a BAU Scenario

“An economy-wide BAU scenario presents the expected GHG emissions for all sectors of the economy based on development prospects for these sectors over a certain period.”

—*Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ)*

- A BAU scenario represents the hypothetical emissions trajectory if LEDS are not undertaken.
 - Assumes that current energy and land-use policies, programs, and demand behavior are maintained over the analysis period
 - In many cases, assumes that emissions will grow with gross domestic product (GDP) or as a function of the GDP
 - Defines a reference for target-setting
 - Establishes a common benchmark against which the impact of various mitigation policies, programs, and projects can be evaluated
 - By-products include both sectoral pathways and documentation of data sources and assumptions



Tools and Models for BAU Scenario Development

- A variety of tools are available to develop BAU scenarios
- In many cases, simple, transparent approaches suffice when data and modeling expertise are unavailable
- Complex models might be better suited to analyzing complicated policy questions if the appropriate data and resources are available
- Using transparent methods, datasets, and assumptions builds credibility

Tool type	Description	Policy Impacts modeled
Projected trends	A projected trends approach uses emissions factors to project emissions trends.	Emissions
Bottom-up models	For example, energy system interactions, technology cost, and environmental performance	Emissions, and low-carbon technology deployment in a specific sector
Top-down models	Top-down models represent the economy as an integrated whole. One example is Computable General Equilibrium (CGE) models that simulate an aggregate economy and its supply and demand through a balanced price mechanism	Emissions, and economic structure and processes. CGEs model macro-economic impacts of climate change policy (e.g., GDP, terms of trade)
Hybrid models	Hybrid models combine both bottom-up technology detail (e.g., in the electricity sector) and some degree of top-down economic integration.	Technology deployment and some economic impacts

Source: "Green Growth in Practice: Lessons Learned from Country Experiences." June 2014. Available at <http://ggbp.org/wp-content/uploads/2014/06/Green-Growth-in-Practice-062014-Full.pdf>.

Example: Mexico's BAU Scenario

- Developed with broad stakeholder input
- Reflects recent economic and demographic trends
- Supported by a legal framework that requires regular updates to the BAU scenario
- Mexico is undertaking a comparative analysis of its baseline emissions scenario and an alternative scenario generated with a different model

rio alto:
-Crecimiento del PIB=4.2% anual
-Escenario energético de SENER

Escenario bajo:
-Crecimiento del PIB=2.3% anual
-Eliminación del carbón en generación eléctrica



Source: Federal Government of Mexico, *National Climate Change Strategy: 10-20-40 Vision* (2013).

Adapted from "Green Growth in Practice: Lessons Learned from Country Experiences." June 2014. Available at <http://ggbp.org/wp-content/uploads/2014/06/Green-Growth-in-Practice-062014-Full.pdf>.

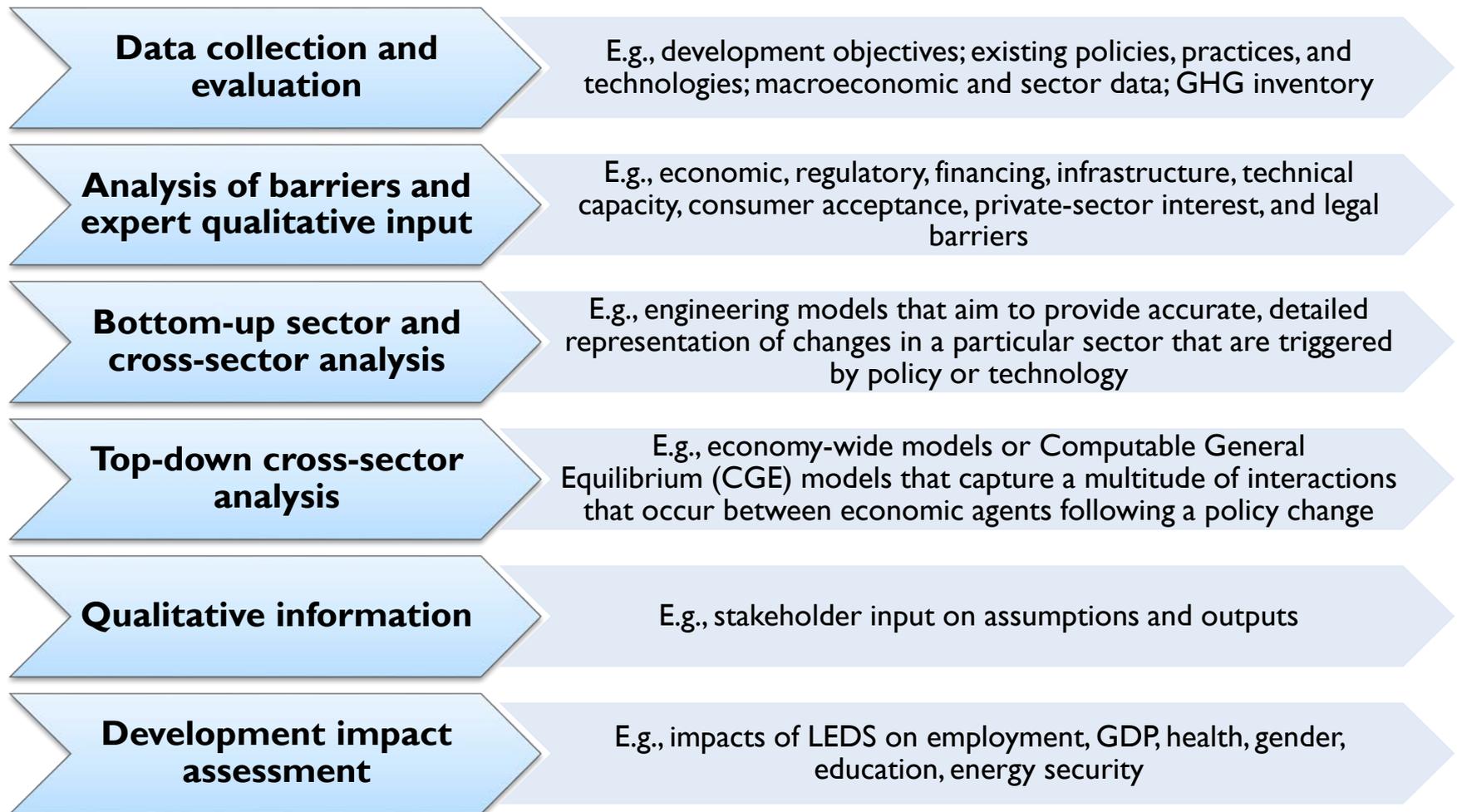
Good Practices for Developing and Analyzing Low Emission Development Scenarios

Low emission development scenarios provide an alternative picture of how the future might unfold if LEDS actions are implemented.

- Choices of analytical approaches and tools for developing low-emission pathways should be guided by the strategic priorities, policy questions, and resources available in a given country.
- Combining multiple tools and approaches (e.g., top-down and bottom-up analysis) can improve consistency, broaden the analysis, and address limitations of individual tools.
- Clear assumptions, appropriate data, and stakeholder engagement are critical inputs to robust, inclusive, and credible low emission–scenario analysis.
- Applying an iterative approach and planning for updates contributes to dynamic analyses that evolve with the country context.

Adapted from "Green Growth in Practice: Lessons Learned from Country Experiences." June 2014. Available at <http://ggbp.org/wp-content/uploads/2014/06/Green-Growth-in-Practice-062014-Full.pdf>.

Inputs to Low Emission Development Scenarios



Methods and Tools for Analyzing Low Emission Development Scenarios

	Individual Green Growth Issues (e.g. low-carbon energy, sustainable agriculture)	Multiple Green Growth Issues (e.g. sustainable growth / natural resource protection)
Bottom-Up or Option-Level Impact Analysis	<ul style="list-style-type: none"> • Cost-effectiveness analysis • Marginal abatement cost curves • Cost-benefit analysis • Accounting models (e.g. EFFECT, LEAP, MEDEE, 2050 Pathways) • Sector-based and geographical-based agri-environmental frameworks 	<ul style="list-style-type: none"> • Cost-effectiveness analysis • Multi-attribute analysis • Multi-criteria analysis • Multi-purpose spatial planning (GIS-based) models • Land-use models (e.g., CLUE) • Urban energy systems
Top-Down or System-Level Impact Analysis	<p><u>Optimization Approaches</u></p> <ul style="list-style-type: none"> • Energy system models (e.g. Markal, MESSAGE, EFOM WASP) • Computable general equilibrium models • Dynamic stochastic general equilibrium models • Integrated Assessment Models 	<p><u>Simulation Approaches</u></p> <ul style="list-style-type: none"> • Energy system models (Energy 20/20, POLES) • Macro-econometric models (e.g., E3MG) • Ecological macroeconomic models • Agent-based models • System dynamics models

Source: "Green Growth in Practice: Lessons Learned from Country Experiences." June 2014. Available at <http://ggbp.org/wp-content/uploads/2014/06/Green-Growth-in-Practice-062014-Full.pdf>.

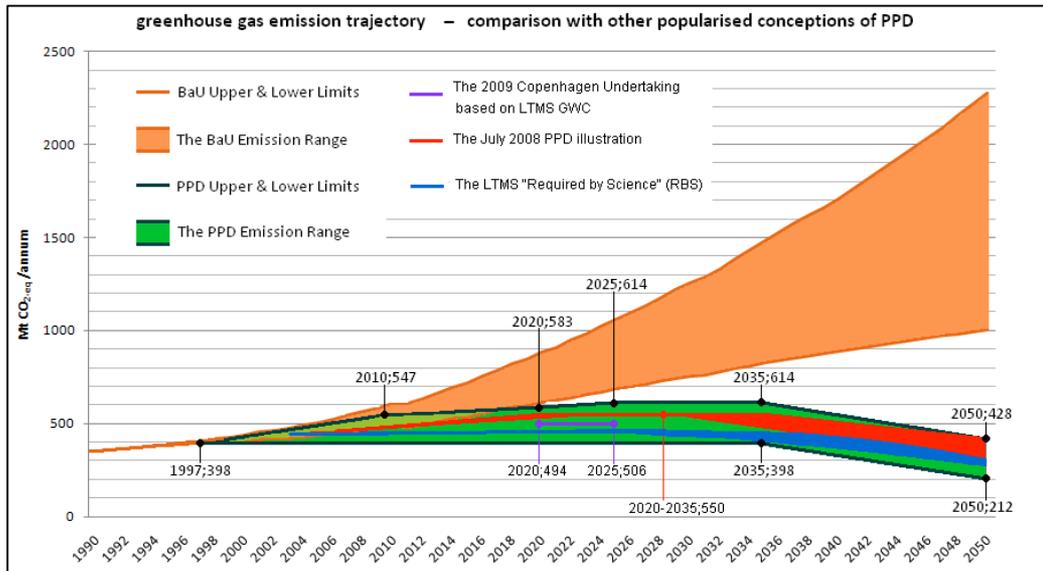
Example: South Africa's Long-Term Mitigation Scenarios (LTMS)

LTMS Analysis Questions:

- Why should South Africa be concerned with the mitigation of GHGs?
- What options for mitigation are available?
- How much can each option reduce emissions?
- At what cost?

Analytical approach

- Hybrid measures and modeling approach allowed for analysis of net costs and the interactions between measures
 - Energy sector analysis based on MARKAL adaptation
 - Non-energy sector addressed with a suite of spreadsheet models
 - Five mitigation scenarios defined by varying actions and costs
- BAU presented as a trajectory *range* to account for forecasting uncertainty



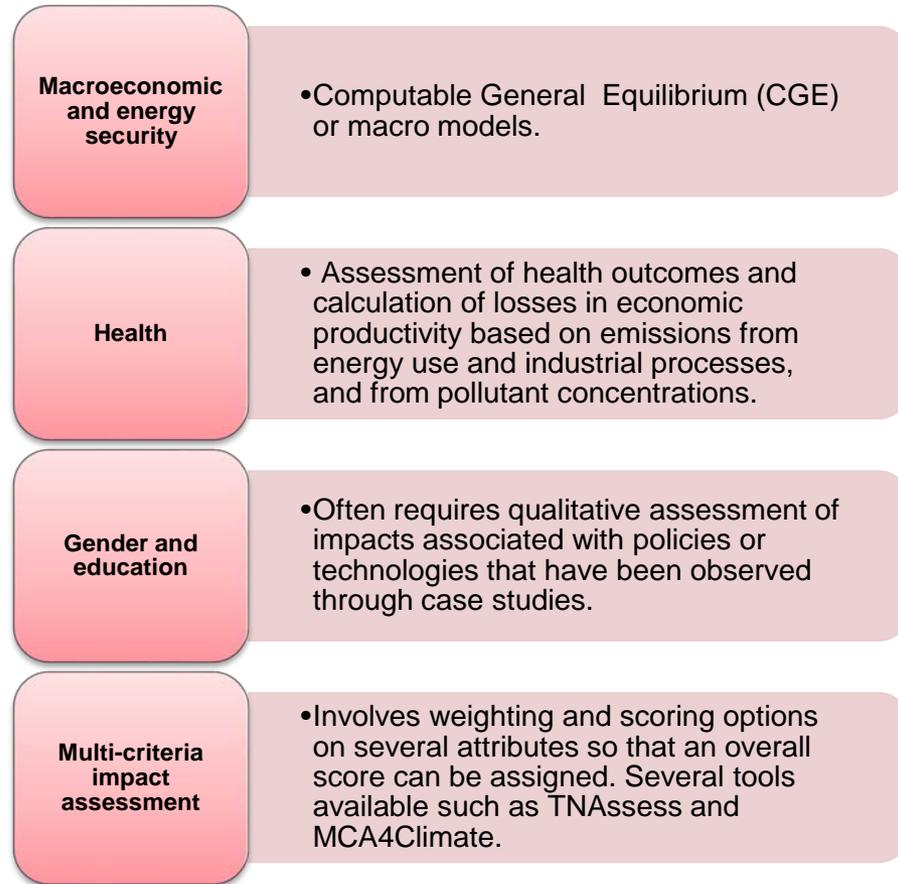
Development Impact Assessment (DIA)

- **What is a development impact assessment?** Development Impact Assessment explores the link between economic, environmental and social development objectives and LEDS actions.
- **Why conduct a development impact assessment?**
 - **Informs and supports decision making** on policies and programs to meet development objectives
 - Links key social and economic impacts with emission-mitigation potential and cost
 - Enhances the basis for more comprehensive decision making and communication
 - Identifies costly externalities or system inefficiencies that might not be accounted for in traditional cost-benefit analysis
 - Can be applied to national policies and programs, and to projects at the national, regional, and municipal levels
 - Takes into consideration social and environmental soundness of actions
 - **Involves new partners** that otherwise might not be interested in climate protection
 - **Can increase access to climate and private finance**

Good Practices and Tools for Assessing Development Impacts of LEDS

- Focus on a broad subset of impacts that are most critical, based on an overarching development vision, to help tailor DIA to a given country context.
- Use examples from other countries (in the absence of robust analytical tools and data) for a quick and compelling way to demonstrate LEDS development impacts.
- Extend standard cost-benefit analyses, macroeconomic assessments, and sector models (if possible) to enable analysis of other benefits of interest.
- Coordinate regularly and actively to ensure impact assessments are drawn together and knowledge gaps identified.

Example methods and tools to assess development impacts

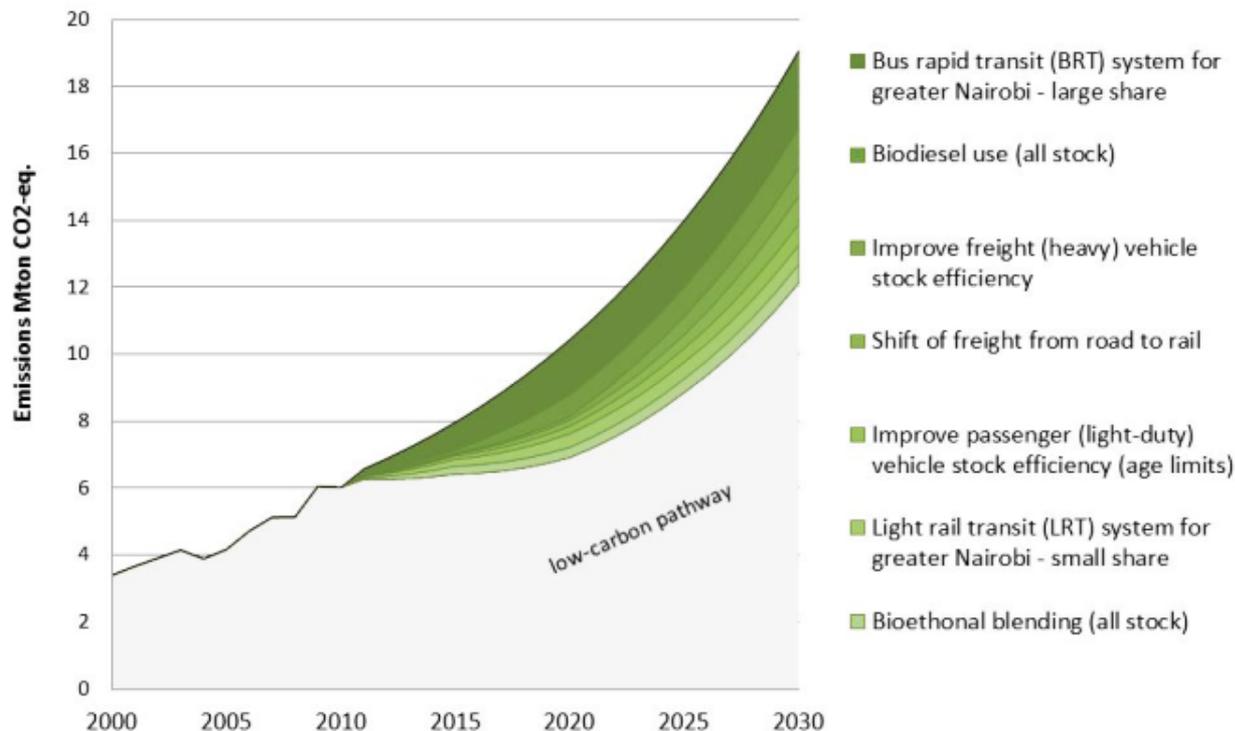


Adapted from "Green Growth in Practice: Lessons Learned from Country Experiences". June 2014. Available at <http://ggbp.org/wp-content/uploads/2014/06/Green-Growth-in-Practice-062014-Full.pdf>.

Example: Evaluating Development Impacts to Prioritize LEDS Actions in Kenya

Kenya's National Climate Change Action Plan (NCCAP) includes sector-specific mitigation opportunities assessments that consider: GHG emission reduction potential, economic costs, feasibility of implementation, **sustainable development impacts** (including adaptation co-benefits).

Mitigation Analysis



Source: Kenya's Climate Change Action Plan: Mitigation Executive Summary (August 2012).

Example: Evaluating Development Impacts to Prioritize LEDS Actions in Kenya

Development Impact Assessment

	Climate			Development			
	Abatement potential (MtCO ₂)	Adaptation impact	Congestion and road quality	Road safety	Air quality	Energy security	Food security
Improved passenger stock	0.6	■	■	◐	◐	◐	■
Improved HDV stock	0.8	■	■	◐	◐	◐	■
Bioethanol	0.55	◑	■	■	◐	◐	◑
Biodiesel	1.2	◑	■	■	◐	●	◑
BRT system for Nairobi	2.3	■	●	●	●	●	■
LRT system for Nairobi	0.6	■	◐	◐	◐	◐	■
Shift of freight to rail	0.8	■	●	◐	◐	◐	■

Source: Kenya's Climate Change Action Plan: Mitigation Executive Summary (August 2012).

Example: Evaluating Development Impacts to Prioritize LEDS Actions in Kenya

Prioritized Low Emission Development Options

Low carbon option	Abatement potential in 2030	Investment costs to 2030	Sustainable development impacts
Restoration of forests on degraded lands	32.6 MtCO ₂ e	Ksh 186 – 290 billion	<ul style="list-style-type: none"> - Contributes to constitution’s goal of 10% tree cover - Biodiversity benefits - Sustainable forest products contribute to improved livelihoods - <i>Conservation may remove access to forests for communities</i>
Geothermal	14.1 MtCO ₂ e	Ksh 877 – 1,115	<ul style="list-style-type: none"> - Energy security, economic growth - May require relocation of communities/villages
Reforestation of degraded forests	6.1 MtCO ₂ e	Ksh 48 – 61 billion	<ul style="list-style-type: none"> - Sustained water availability (generation of hydropower) - Contributes to constitution’s goal of 10% tree cover - Biodiversity benefits - Sustainable forest products contribute to improved livelihoods
Improved cookstoves and LPG cookstoves	5.6 + 1.7 MtCO ₂ e	Ksh 20 billion	<ul style="list-style-type: none"> - Health benefits from reduced indoor air pollution - Lower fuelwood demand and deforestation - Potential cost savings to households
Agroforestry	4.1 MtCO ₂ e	Ksh 70 – 117 billion	<ul style="list-style-type: none"> - Increased soil fertility and crop yields, improving livelihoods of farmers and food security - Improved climate resilience - Contributes to goal of 10% tree cover on farms
Bus rapid transit (BRT) with light rail transit (LRT) corridors	2.8 MtCO ₂ e	Ksh 170 billion	<ul style="list-style-type: none"> - Reduced traffic congestion - Improved local air quality - Improved road safety

Source: Kenya’s Climate Change Action Plan: Mitigation Executive Summary (August 2012) .

Discussion Questions

- How might sector analyses that your organization/ministry has sponsored inform development of an economy-wide low emission development scenario?
- What tools or methods does your country's government use for analyzing future trajectories and pathways for the economy as a whole or for certain sectors? What else is needed to evaluate the impacts of alternative development scenarios on climate-change mitigation?
- What are your country's major data or capacity limitations for conducting robust scenario planning?
- What types of forums are available for stakeholders to provide input into—and feedback on—LEDS-related analysis? How effective are these forums and how could they be improved?
- Which LEDS impacts could be most important for your country to assess? What assessments of impacts and co-benefits have been undertaken?
- What significant trade-offs do you anticipate your country/sector could face as LEDS activities are designed and implemented?

Additional Resources

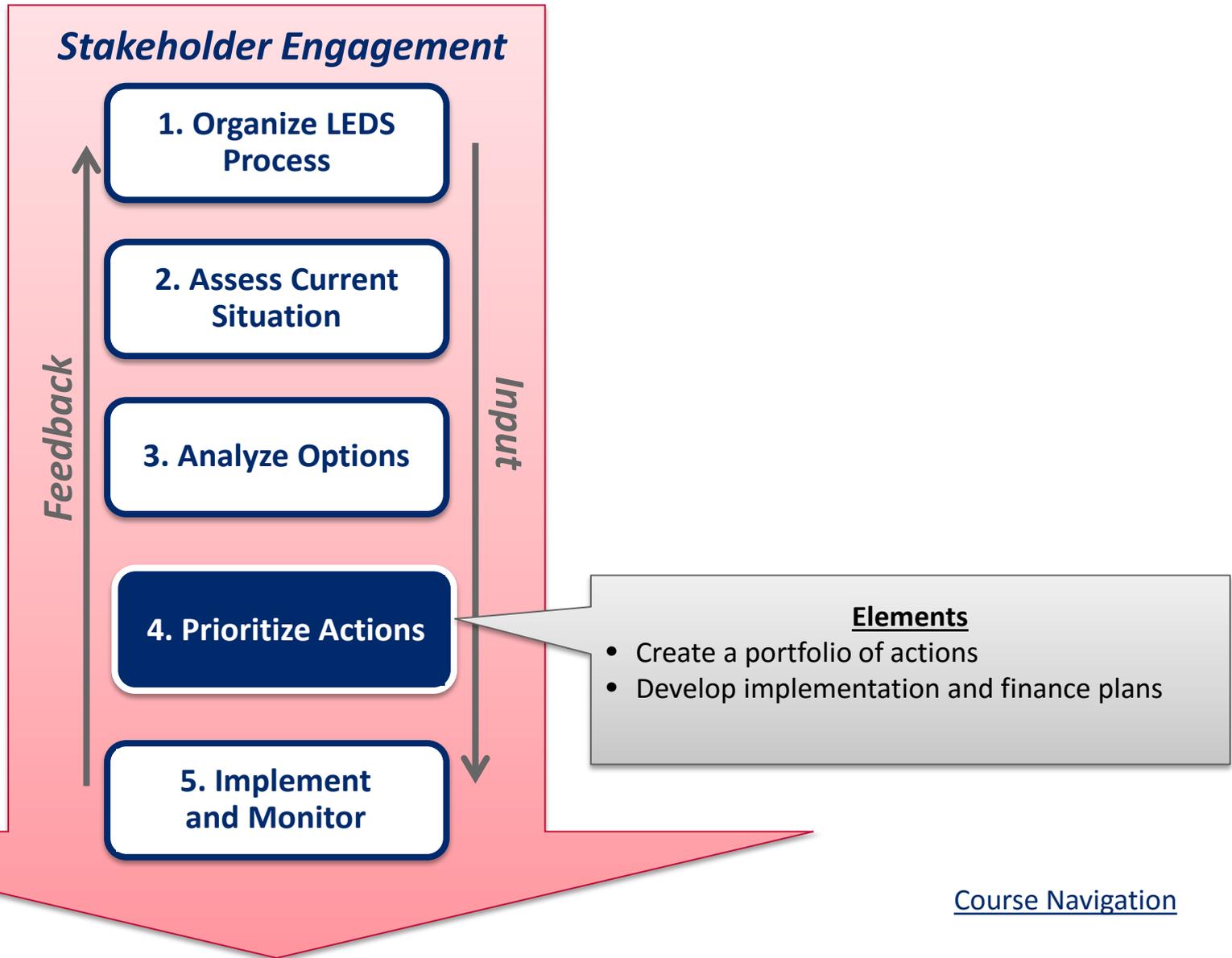
- Asian Co-Benefits Partnership
<http://www.cobenefit.org/>
- Green Growth Best Practices (GGBP) Report
<http://www.ggbp.org/report/green-growth-practice-lessons-country-experiences>
- LEDS Framework Wiki on OpenEI
http://en.openei.org/wiki/Develop_BAU
- LEDS Global Partnership Development Impact Assessment (DIA) Toolkit
<http://ledsgp.org/DIA-Toolkit>

For additional examples of this part of the LEDS process in practice, see [Module 9.](#)

Module 7.0

Prioritizing Actions and Planning for Implementation

Prioritizing Actions



Prioritizing Actions and Planning for Implementation: Learning Objectives and Key Messages

Learning objectives:

- Identify approaches to prioritize LEDS options and develop a portfolio of actions.
- Identify key components of a LEDS implementation plan.
- Describe financing mechanisms that governments can incorporate into LEDS implementation plans to encourage investment.

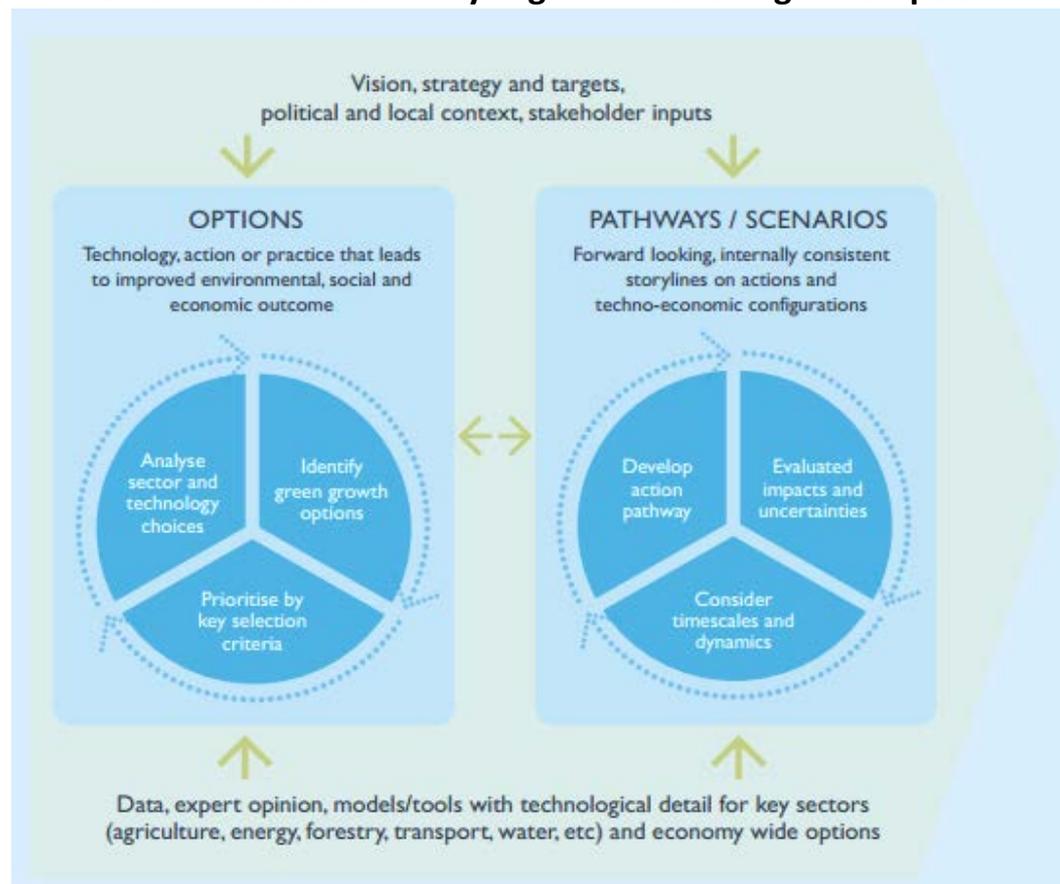
Key Messages:

- A key component of a LEDS is a portfolio of high-priority actions that, if enacted, have the potential to reduce emission trajectories and meet a country's development objectives.
- Prioritization of LEDS actions should be founded upon transparent and analytically robust decision-making processes, and should apply a broad set of criteria that reflect a country's specific development priorities.
- Implementation plans contribute to actionable LEDS by establishing finance, institutional, educational, and other enabling mechanisms for implementing high-priority actions.
- Implementation plans that incorporate strategies to generate investment opportunities, improve returns on investment, and reduce risks of implementing high-priority actions can help attract adequate financing to implement a LEDS.

Prioritizing LEDS Options for Action

- High-priority actions are those that, if enacted, have the potential to reduce emission trajectories and meet a country's development objectives.
- Identification of high-priority actions is informed by analytically sound business-as-usual and low emissions scenario modeling, as well as development impact assessments.
- LEDS analysis is iterative as priorities evolve and lessons are learned.

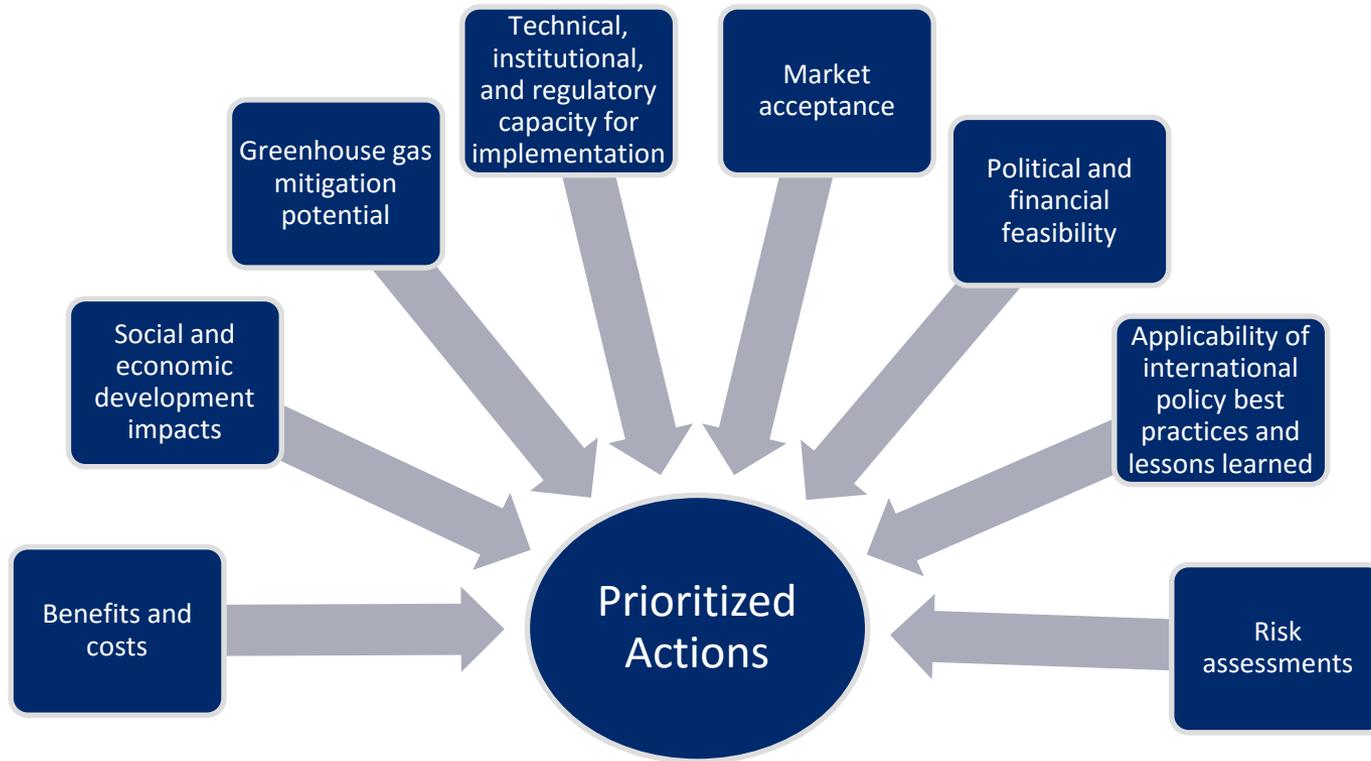
Iterative Process for Analyzing and Prioritizing LEDS Options



Source: "[Green Growth in Practice: Lessons Learned from Country Experiences](#)," June 2014. Figure adapted from World Bank. (2012). *Inclusive Green Growth: The Pathway to Sustainable Development*.

Criteria for Prioritizing LEADS Actions

Countries use a variety of criteria, methods, and analyses to prioritize LEADS options and establish a portfolio of actions.



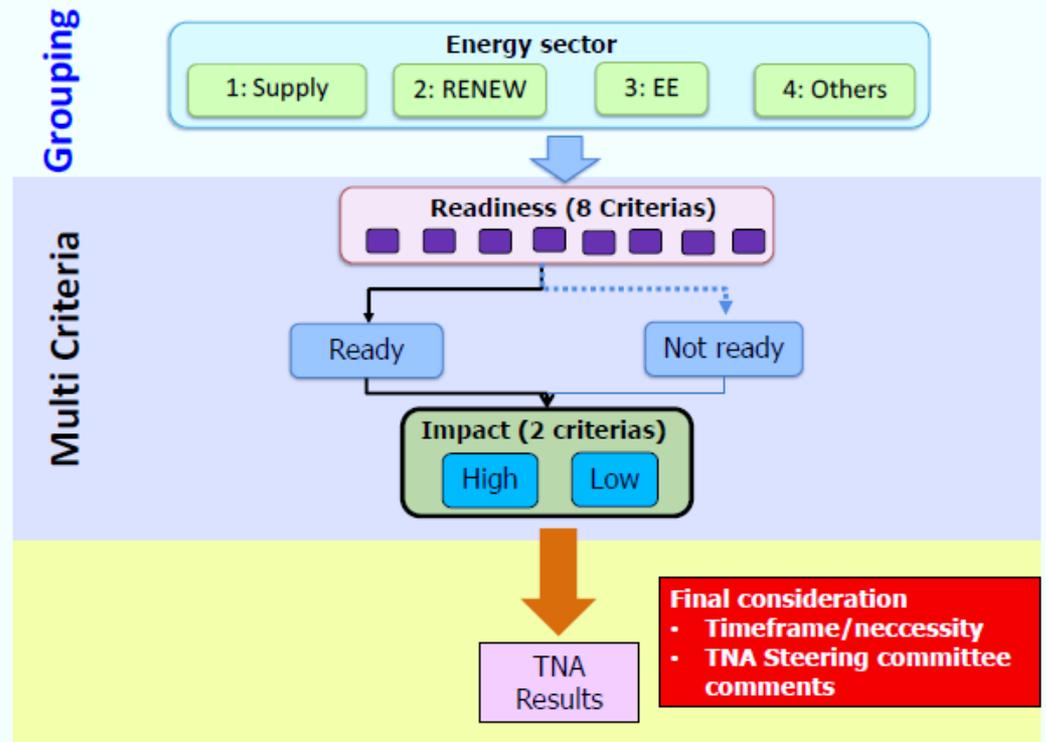
Good Practices for Prioritizing Options

- Prioritization of LEDS options is based on common criteria, defined to reflect a country's overarching LEDS vision.
 - BAU scenario can provide a common reference point for evaluating options.
 - Both short- and long-term impact analysis should inform prioritization.
- Prioritization criteria should cover a broad set of metrics beyond GHG mitigation potential, reflecting a country's development priorities.
- Transparency and good communication between analysts and decision makers is critical as implementation of prioritized actions is ultimately dependent on political decisions.

Adapted from "Green Growth in Practice: Lessons Learned from Country Experiences." June 2014. Available at <http://ggbp.org/wp-content/uploads/2014/06/Green-Growth-in-Practice-062014-Full.pdf>.

Example Approaches for Prioritizing Options: Multi-Criteria Analysis

- Facilitates comparison of options using factors beyond costs
- Involves weighting and scoring options on several attributes so that an overall score can be assigned
- Usually incorporates expert review or stakeholder consultation to develop scores
- Several techniques and tools available, for example:
 - Technology Needs Assessment (UNDP)
 - MCA4Climate framework (UNEP)



Process for prioritizing energy-sector mitigation technologies in Thailand's "Technology Needs Assessment."

Source: Thailand Technology Needs Assessments Report for Climate Change: Mitigation (2013). http://unfccc.int/ttclear/sunsetcms/storage/contents/stored-file-20130327165947778/TechnologyNeedsAssessment-Mitigation_Thailand.pdf.

Implementation Plans for High-Priority Actions

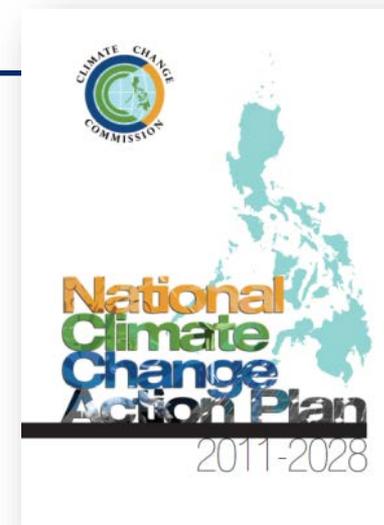
- Implementation plans are strategies for undertaking LEDS actions.
- Implementation plans establish enabling mechanisms, such as:
 - Policies and programs
 - Finance
 - Research and development
 - Institutional and governance structures
 - Education, awareness, and capacity building
 - Performance monitoring

Illustrative Process for Developing an Implementation Plan



Example: The Philippines' National Climate Change Action Plan: 2011–2028

The National Climate Change Action Plan includes implementation plans for each mitigation and adaptation outcome.



Outcome →

Immediate Outcome	
3. Environmentally sustainable transport promoted and adopted.	

Multiple outputs per outcome →

Output Area	
3.1. Environmentally sustainable transport strategies and fuel conservation measures integrated in development plans	

Indicators	
6100.3.1	Percentage increase in fuel efficiency and economy of existing and new vehicles.
6100.3.2	No. of cities and urban municipalities with formally developed integrated land use-transport plans.
6100.3.3	No. of new land developments using integrated mixed-use, medium-to-high density land-use and transport demand management measures.
6100.3.4	No. of public transport projects achieving transit-oriented development (TOD).

← **Indicators for each output**

Lead institution for each output →

Institutions Involved	
Lead Government Agencies: DOTC, HADC, DILG Coordinating Government Agencies: All, LGUs through the leagues.	

Activities	Outputs	2011-2016	2017-2022	2023-2028
3.1.1. Implement clean fleet program				
a. Forge partnership with the private sector group working on CC and clean fleet program	MOU signed.	■		
b. Conduct baseline measurements of all government vehicles	Baseline measurements for all government vehicles conducted.	■		
c. Conduct studies (economics, adaptability, impacts, etc.) on the use of hybrid transport systems such as electric and hydrogen-fueled vehicles	Studies (e.g., economics, adaptability, impacts, etc.) on the use of hybrid transport systems such as electric and hydrogen-fueled vehicles conducted		■	

← **Activities and timelines for achieving output**

Source: Philippines Climate Change Commission, *National Climate Change Action Plan*.

http://www.investphilippines.info/arangkada/wp-content/uploads/2012/05/NCCAP_TechDoc.pdf

Integrating Finance Mechanisms into LEDS Implementation Plans

Strong finance plans address key challenges and integrate good practices to catalyze public and private investment for long-term, transformational low emission development.

Key investment barriers

- Real and perceived investment risks
- Higher costs of some low-emission technologies or practices
- Competing, inconsistent, and distortionary subsidies and policies
- Insufficient capacity and technical expertise in the domestic financial sector
- Competing development priorities
- Lack of debt and equity markets
- Fragmented and poorly coordinated international cooperation efforts



Good practices to address barriers

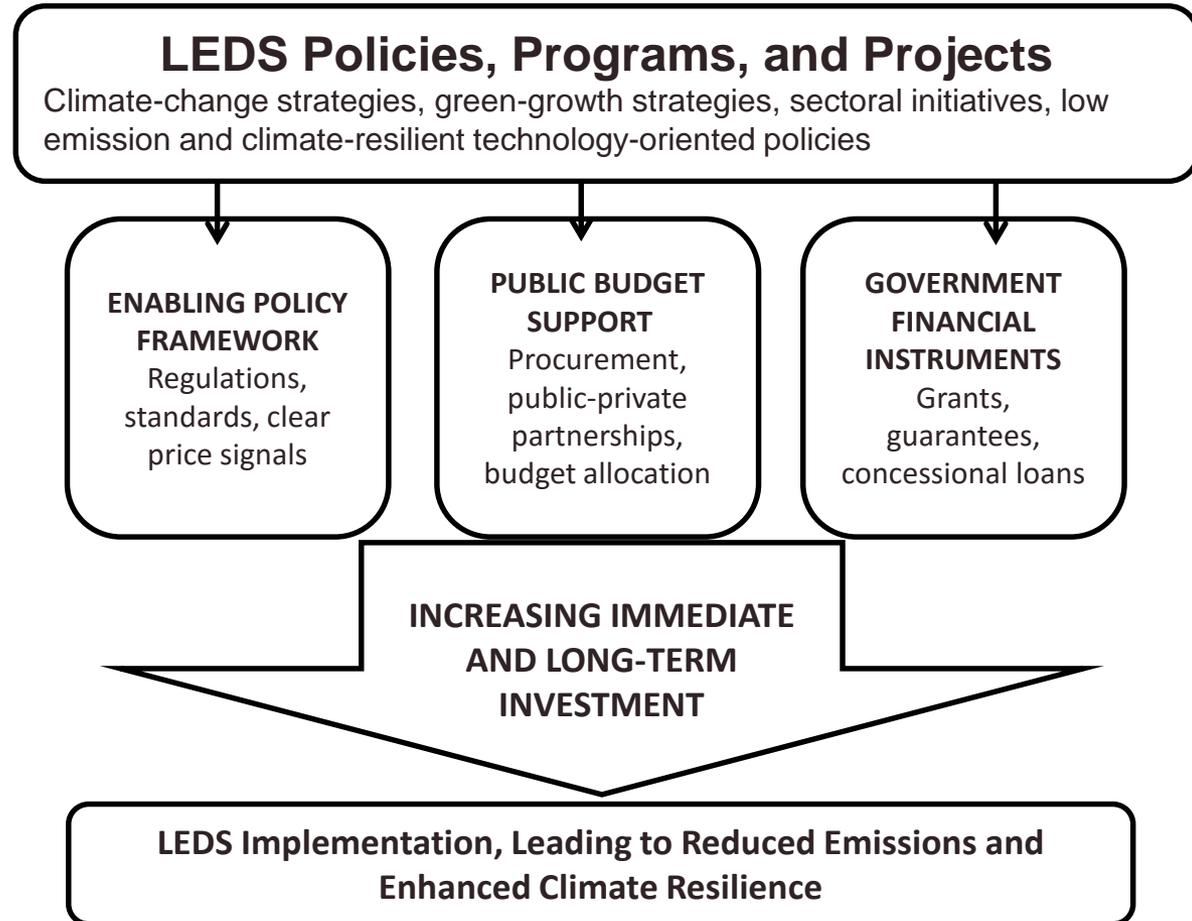
- Establish strong investment signals through clear, long-term, and binding policies and regulations;
- Align incentives and subsidies with LEDS goals;
- Create government programs to develop investable projects through direct investment and/or public-private partnerships;
- Establish dedicated and well-managed public funds for LEDS implementation;
- Encourage coherency among national and international funding streams; and
- Propagate policy and financial de-risking instruments (e.g., concessional loans, insurance).

Adapted from "[Green Growth in Practice: Lessons Learned from Country Experiences](#)". June 2014.

Public-Sector Role in LEDS Finance

Government can define:

- National priorities;
- Specific resources needs;
- Barriers to mobilizing private investment, and strategies to overcome risks and support increased rates of return;
- Domestic capacity to finance plans; and
- Role of international development partners.



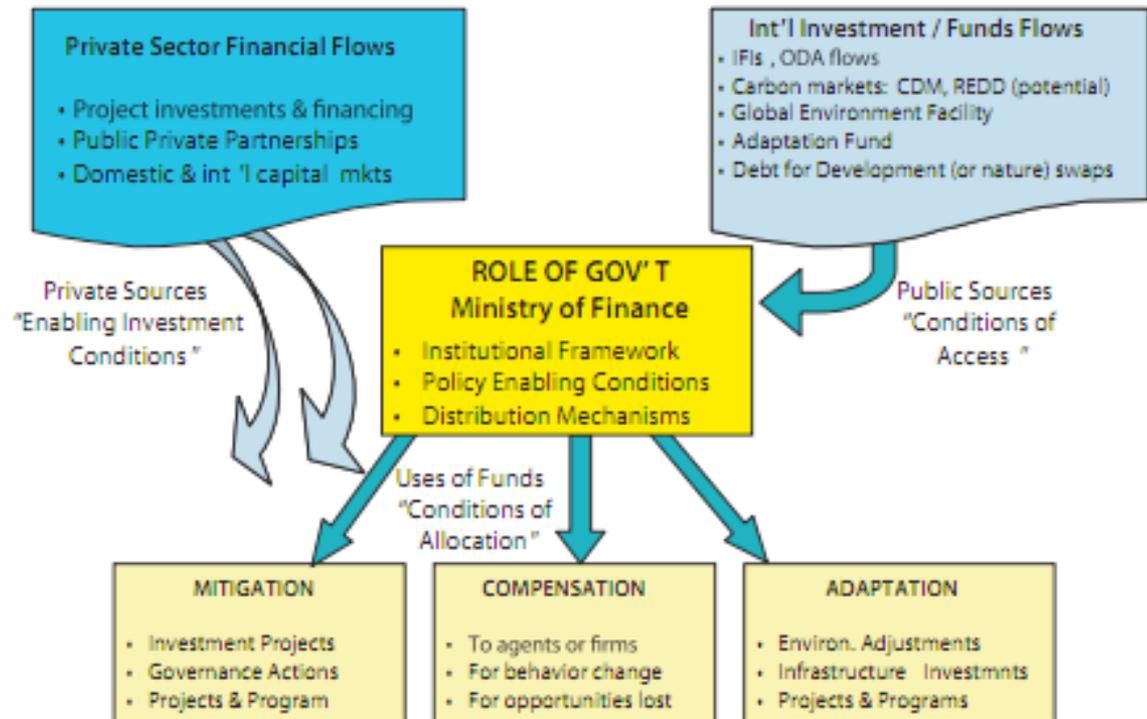
Private Sector and International Institutional Roles

Private sector supports:

- LEDS planning as key contributors to stakeholder consultations providing insights on investment risks and critical barriers to finance to inform action prioritization
- LEDS implementation through finance and investment of key actions supported by government policies and programs addressing barriers

International institutions support:

- LEDS planning and implementation through capacity building, technical assistance, knowledge sharing, and finance



Source: *Low Carbon Development Options for Indonesia, 2008*

Examples of LEDS and Green Growth Finance Measures

Bangladesh: Infrastructure Development Company channels international finance and offers grants and soft loans for low emission development projects

Korea: Government spends 2% of GDP on green growth implementation

Morocco: Equity investments to support emerging green businesses

Vietnam: Aggregates international funds with public funds via national budget to mainstream LEDS and green growth with development programs

South Africa: Green fund combines direct financing with guarantee & insurance mechanism to attract private investment

UK: Created new Green Investment Bank to fund green projects with at least 3:1 private leverage

Adapted from "Green Growth in Practice: Lessons Learned from Country Experiences." June 2014. Available at <http://ggbp.org/wp-content/uploads/2014/06/Green-Growth-in-Practice-062014-Full.pdf>.

Discussion Questions

- Identify mitigation actions that are high priority for your agency/ministry/sector. What specific prioritization criteria do you recommend using to evaluate these actions against other potential actions both within and outside of your sector of focus?
- What types of prioritization methods do you think would best align with national circumstances (e.g., data availability) and resonate most strongly with members of your government and other stakeholders (e.g., cost-benefit analysis; multi-criteria analysis)?
- How have sectoral plans been integrated with national development plans and related budgets? How have you successfully engaged ministries of finance and planning to reach this outcome?
- What implementation and financing plans have been developed for LEDES-related initiatives in your agency or government? How could these be improved?
- What are the primary barriers to investment in LEDES actions in your country? What mechanisms could be included in LEDES implementation plans to help overcome these barriers?

Additional Resources

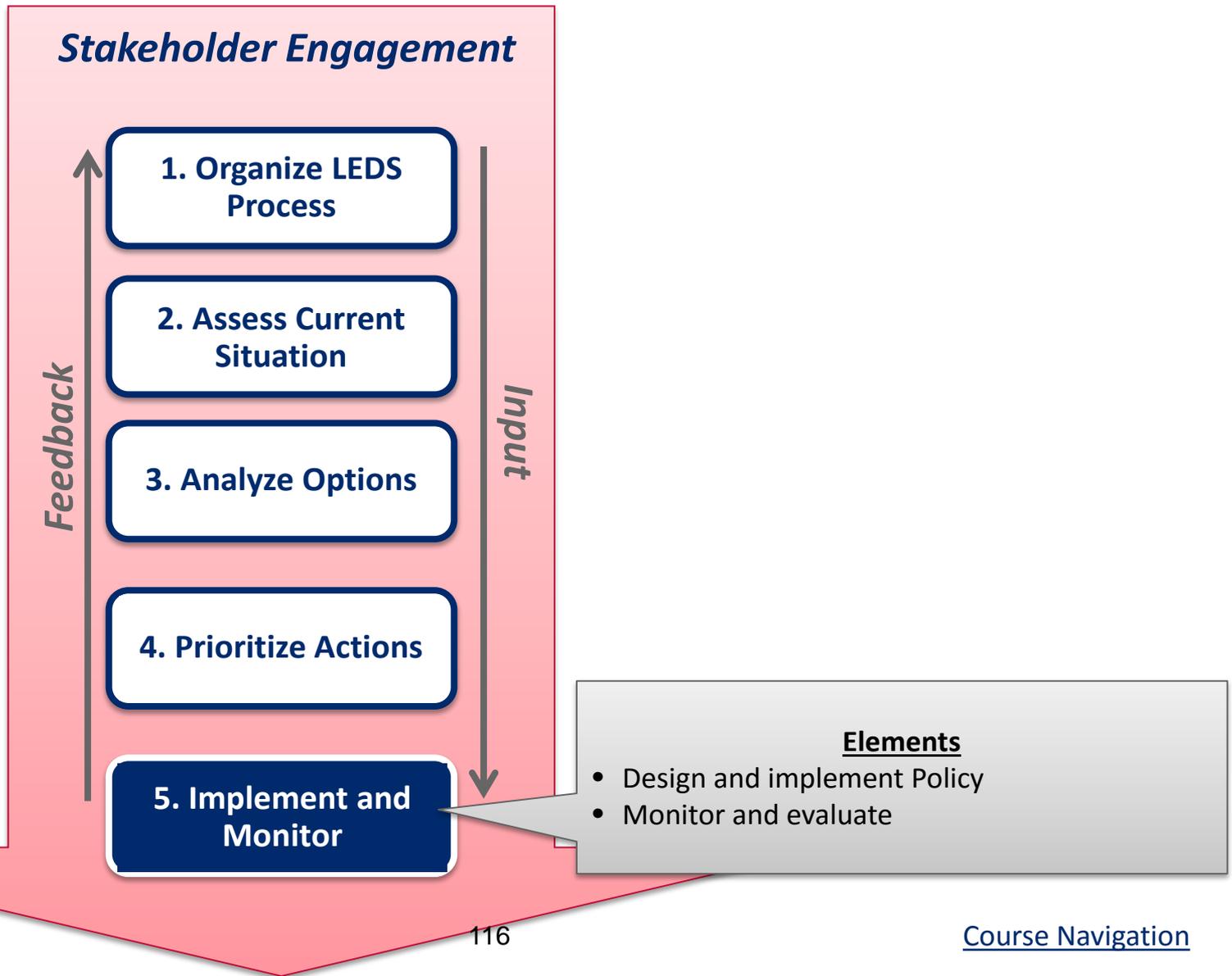
- Asian Co-Benefits Partnership
<http://www.cobenefit.org/>
- Green Growth Best Practices (GGBP) Report
<http://www.ggbp.org/report/best-practice-report/mobilizing-investment>
- LEDS Global Partnership Development Impact Assessment (DIA) Toolkit
<http://ledsgp.org/DIA-Toolkit>
- LEDS Global Partnership Remote Expert Assistance on LEDS
<http://ledsgp.org/assistance>
- Technology Needs Assessments (TNA)
http://unfccc.int/ttclear/templates/render cms_page?TNA_home
- UNEP's Multi-Criteria Analysis for Climate (MCA4Climate)
<http://www.mca4climate.info/>

For additional examples of this part of the LEDS process in practice, see [Module 9.](#)

Module 8.0

Implementation and Monitoring

Implement and Monitor



Implementation and Monitoring: Learning Objectives and Key Messages

Learning objectives:

- Identify major categories of LEDS policy instruments and provide examples.
- Describe the importance and major components of LEDS monitoring and evaluation.

Key Messages:

- LEDS implementation is founded on effective policy design that creates an enabling environment in which to undertake LEDS projects and programs and meet long-term development and greenhouse gas-mitigation objectives.
- Effective LEDS policy portfolios contain a coherent mix of fiscal and policy incentives; regulations and mandates; and enabling policies.
- Monitoring and evaluation facilitates LEDS implementation by increasing transparency and accountability, enhancing stakeholder trust, facilitating adaptive management, and informing future programs.

Introduction to LEDS Policy Design

- Policy design is the cornerstone of LEDS implementation
 - Creates an enabling environment in which to undertake LEDS projects and programs
 - Lays the groundwork for meeting long-term, transformational, economy-wide low emission development objectives
- A balanced LEDS policy portfolio includes a mix of sector-specific and economy-wide, national and sub-nationally focused, short- and long-term mechanisms
 - Early actions usually focus on individual policies and programs
 - Longer-term transformation requires coherent, complementary, and comprehensive portfolios



LEDS Policy Instruments

Fiscal and Pricing Policies

Shift incentives, subsidies, and other financial mechanisms to reward low emission development

Regulations and Standards

Mandate certain activities or actions that support low emission development

Enabling Policies

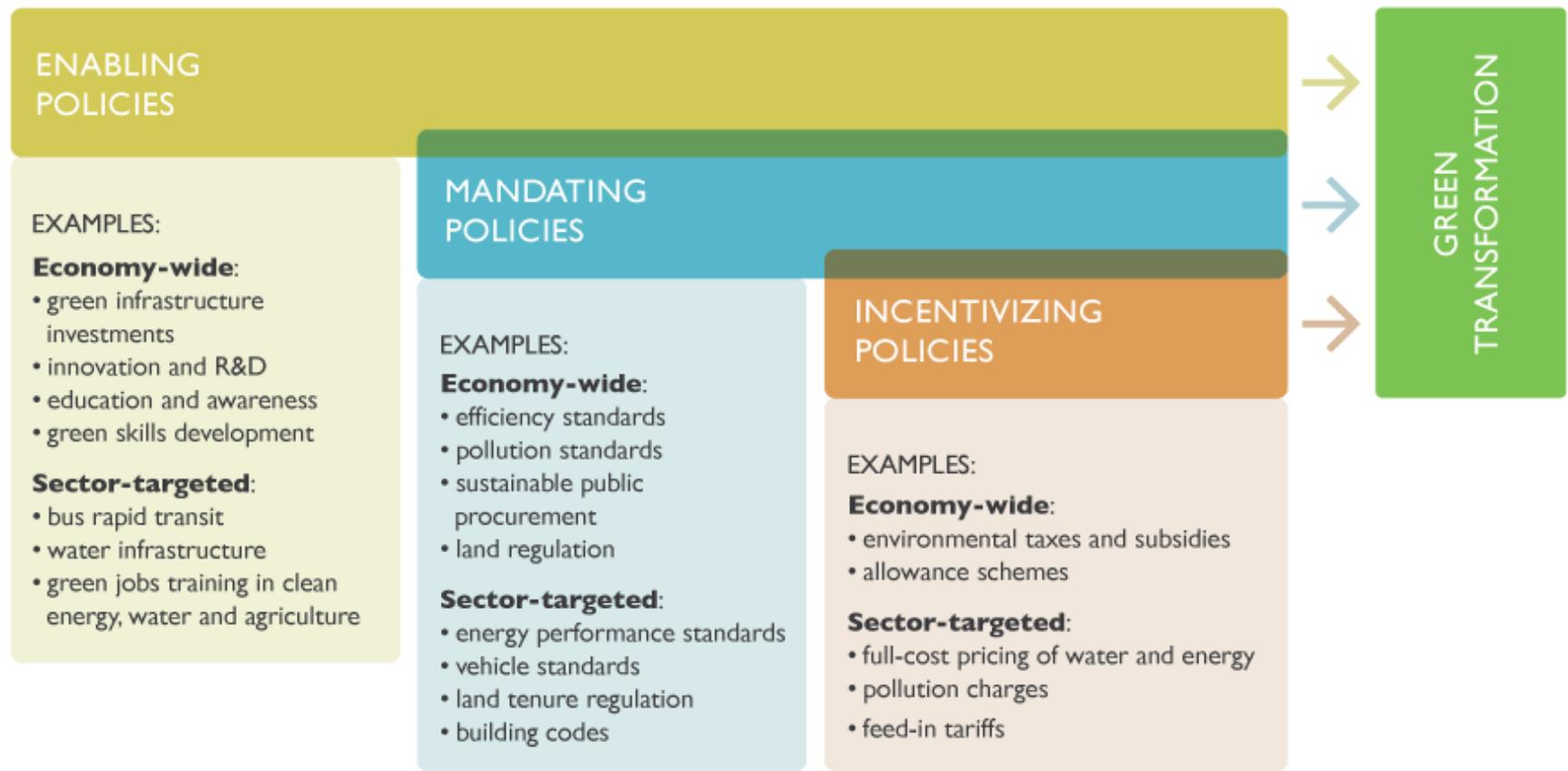
Direct government investment to support low emission development

Provide supports for improving the information and capacity that facilitate implementation of low emission development actions

Adapted from "Green Growth in Practice: Lessons Learned from Country Experiences." June 2014. Available at <http://ggbp.org/wp-content/uploads/2014/06/Green-Growth-in-Practice-062014-Full.pdf> .

LEDS Policy Instruments

Applying a mix of policy instruments can help achieve short-term gains and support long-term sustainable changes.



Source: "Green Growth in Practice: Lessons Learned from Country Experiences." June 2014. Available at <http://ggbp.org/wp-content/uploads/2014/06/Green-Growth-in-Practice-062014-Full.pdf>.

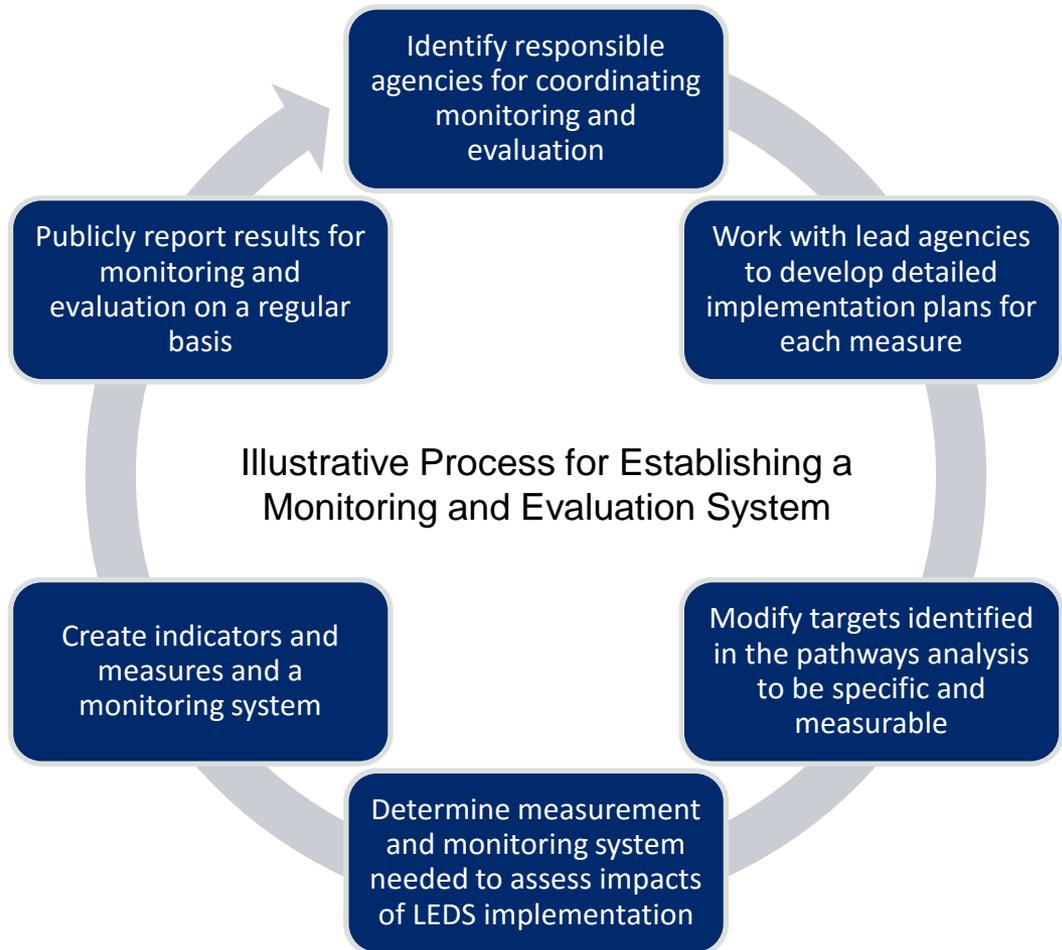
Example: Gabon's Approach to LEDES Implementation

- Incorporating LEDES measures into development plans and programs for ministries of energy, mining, forestry, agriculture, and national parks
- Developing specific land-use and energy efficiency low emission programs
 - Integrated low emission land-use planning and assessment, management and monitoring of forest and terrestrial carbon stocks
 - Initial clean energy efforts target public sector buildings to build broad support, with a focus on energy auditing, public metering, and building standards, along with creation of renewable energy department
- Exploring market instruments and incorporation of climate policies into the law on sustainable development in Gabon
- Mobilizing funding:
 - National budget
 - Private sector investment
 - International cooperation

Monitoring and Evaluation (M&E)

Effective monitoring and evaluation:

- Increases transparency and government accountability;
- Enhances public trust and stakeholder confidence;
- Facilitates adaptive management and informs adjustment of actions and targets based on real-world conditions; and
- Informs future LEDS and other development programs.



Adapted from "Green Growth in Practice: Lessons Learned from Country Experiences." June 2014. Available at <http://ggbp.org/wp-content/uploads/2014/06/Green-Growth-in-Practice-062014-Full.pdf>.

Korea's Green Growth Indicators

Korea has selected and analyzed over twenty green-growth indicators to monitor its national Green Growth Strategy.

1. Environmental & Resource Productivity

Subject	Indicators	Trend
Emission	GDP/GHG emission	Improving, but stagnant in 2009
Energy	GDP/Primary energy consumption	Improving, but stagnant in 2009–2010
	Share of Renewable energy	Improving, but short of target rate
Material	DMC/GDP	Improving
	Municipal waste per capita	Insufficient but improved in 2009
	Chemical fertilizer/arable land	Improving; improved greatly post-2008
Water	Municipal water per capita	Improving but stagnant in 2010

2. Natural asset base

Subject	Indicators	Trend
Water	Rainfall per capita	Stagnant
Forest	Area of forest	Decreasing
	Timber stock	Increasing
Biodiversity	Share of threatened wildlife	Improving
Fish	Share of aquaculture	Increasing

3. Environmental quality of life

Subject	Indicators	Trend
Environmentally induced health problem	Population exposure to urban air pollution	Improving; improved greatly post-2008
	Urban green space per capita	Improving
Access to sewage treatment & drinking water	Population connected to sewage treatment	Improving
	Population with access to safe drinking water	Improving

4. Policy response & Economic opportunities

Subject	Indicators	Trend
Green R&D	Government green R&D expenditure	Increasing; increased greatly post-2008
Green technology	International patent applications	Increasing
Environment al industry	Environmental sector employment	Was decreasing, but began increasing since 2008
Green finance	Share of Green ODA	Increasing
Environmentally related tax & recovery cost	Share of environmentally related tax	Was decreasing, but increased in 2010
	Environmental protection expenditure	Increasing

Adapted from "Green Growth in Practice: Lessons Learned from Country Experiences". June 2014. Available at <http://ggbp.org/wp-content/uploads/2014/06/Green-Growth-in-Practice-062014-Full.pdf>.

Good Practices – Institutional arrangements, communication and engagement

Institutional Arrangements

- Encourage transparency and accountability in LEDS monitoring and evaluation institutions
 - Independent third-party evaluation entities can help ensure autonomy
- Define clear roles, responsibilities, and processes for monitoring and evaluation
 - Monitoring plans can establish procedures and points of contact for data collection and validation
- Harmonize LEDS monitoring and evaluation systems with existing monitoring and evaluation systems to improve efficiency and avoid duplicating effort

Communication and Engagement

- Engage stakeholders in all stages of the monitoring and evaluation process, for example developing indicators, reviewing data, and communicating results.
- Use appropriate metrics and methods for different audiences (e.g., headline metrics for public communications; statistical sector-specific data for specialists).
- Create feedback loops for stakeholders to both provide and use information from monitoring and evaluation systems.

Adapted from "Green Growth in Practice: Lessons Learned from Country Experiences." June 2014. Available at <http://ggbp.org/wp-content/uploads/2014/06/Green-Growth-in-Practice-062014-Full.pdf>.

Measuring, Reporting, and Verifying GHG Emissions

- GHG emissions reduction plans should be implemented in a “measurable, reportable and verifiable” manner, as coined by the UNFCCC’s Bali Action Plan (2007) and referred to as MRV.
- MRV systems for GHG emissions:
 - Support a country’s broader LEDS M&E framework, specifically addressing the GHG mitigation impacts of LEDS.
 - Can be used to conduct validation for absolute GHG emissions and/or GHG emission reductions within a geographic area.
 - Underlie the development of emissions trading and mandatory reporting schemes, allocation of carbon credits, and GHG inventory development and monitoring.

Type of MRV	Applications
GHG Emissions at the Organizational Level	Emissions trading and mandatory GHG reporting schemes
GHG Reductions at the Project Level	Crediting and certification of project GHG reductions
GHG Emissions at the National Level	GHG inventories
GHG Reductions by Policy/Action	LEDS policy evaluation

Adapted from: IGES. (2012). Policy Brief: Classification of MRV of Greenhouse Gas (GHG) Emissions/Reductions: For the Discussions on NAMAs and MRV.

Discussion Questions

- What major policies are in place that support LEDS implementation in your country? Where do you see major policy gaps or conflicting policies that should be addressed to implement LEDS over the long term?
- How might progress on these LEDS activities in your country be monitored? What should be the key indicators of success? Does your country have a system in place for monitoring these indicators?
- Where might regional or international cooperation most support LEDS efforts in your country?
- What next steps are required in your organizations and ministries to continue with the development of the LEDS?

Additional Resources

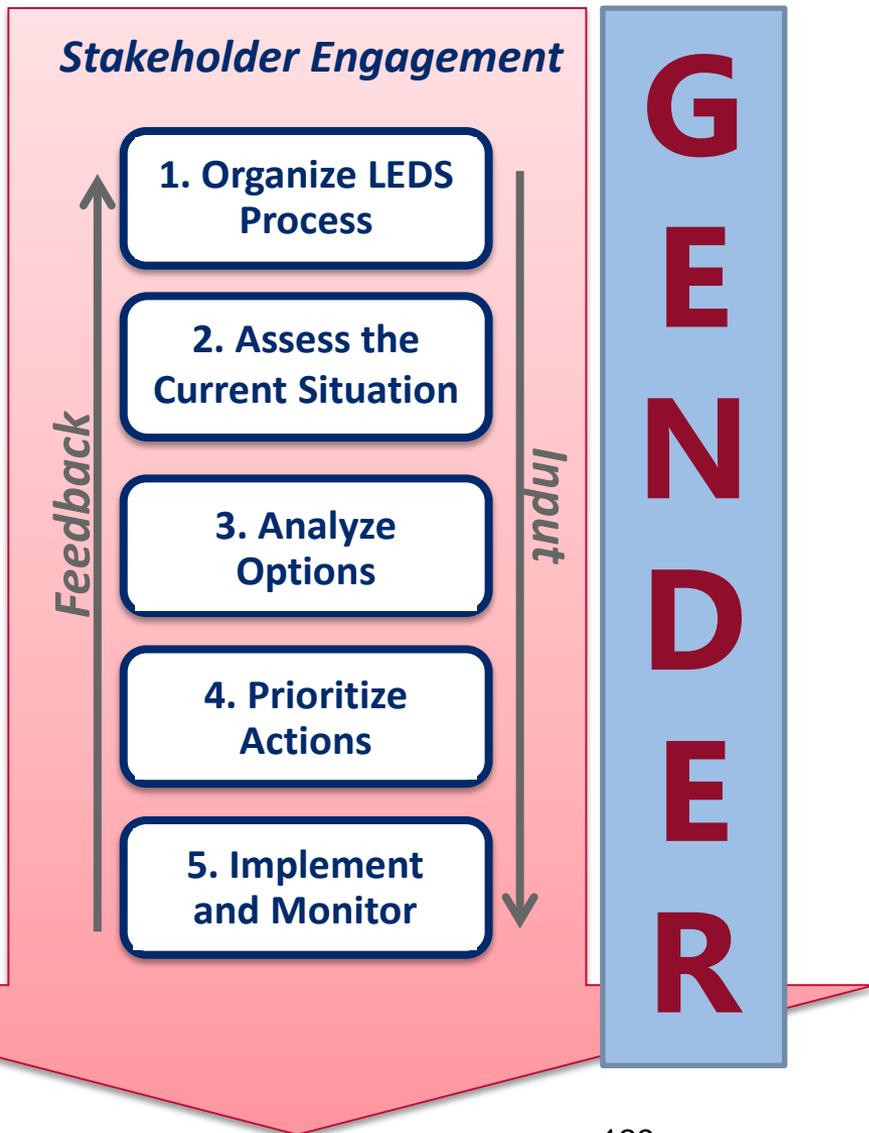
- Clean Energy Solutions Center
<https://cleanenergysolutions.org>
- Green Growth Best Practices (GGBP) Report
<http://www.ggbp.org/report/best-practice-report/integrating-subnational-action/reference/monitoring-and-evaluation>
- Institute for Global and Environmental Strategies (IGES) Policy Brief on MRV
http://mitigationpartnership.net/sites/default/files/iges_pb_mrv.pdf
- Linkages Between LEDS-NAMA-MRV
<http://www.mitigationpartnership.net/international-partnership-mitigation-and-mrv-leds-global-partnership-nama-partnership-2014-linkages>
- OECD MRV resources
<http://www.oecd.org/env/cc/measurementreportingandverificationofghgmitigation.htm>
- Reegle Policy Search Engine for Renewable Energy (RE) and Energy Efficiency (EE)
<http://www.reegle.info/policy-and-regulatory-overviews>
- World Resources Institute MRV Portal
<http://www.wri.org/tags/mrv>

For additional examples of this part of the LEDS process in practice, see [Module 9.](#)

Module 9.0

Integrating Gender Considerations

Gender is a Cross-Cutting LEDS Issue



LEDS and Gender: Learning Objectives and Key Messages

Learning objectives:

- Understand how gender relates to the United Nations Sustainable Development Goals
- Identify the linkage between gender and LEDS
- Define gender-related terms and definitions
- Recognize the case for gender in green growth
- Identify actions that can help address gender in green growth

Addressing Gender at the Global Level: Sustainable Development Goals (SDGs)

SDG 5: Achieve gender equality and empower all women and girls

Targets:

- End all forms of discrimination against all women and girls everywhere
- Eliminate all forms of violence against all women and girls in the public and private spheres, including trafficking and sexual and other types of exploitation



Overview of Gender Terms and Definitions

Theory

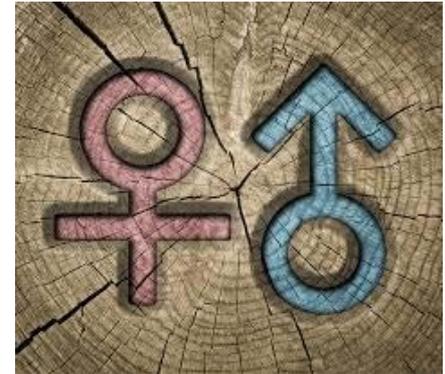
- Sex – biological differences between men and women
- Gender – Relations between men and women

Process

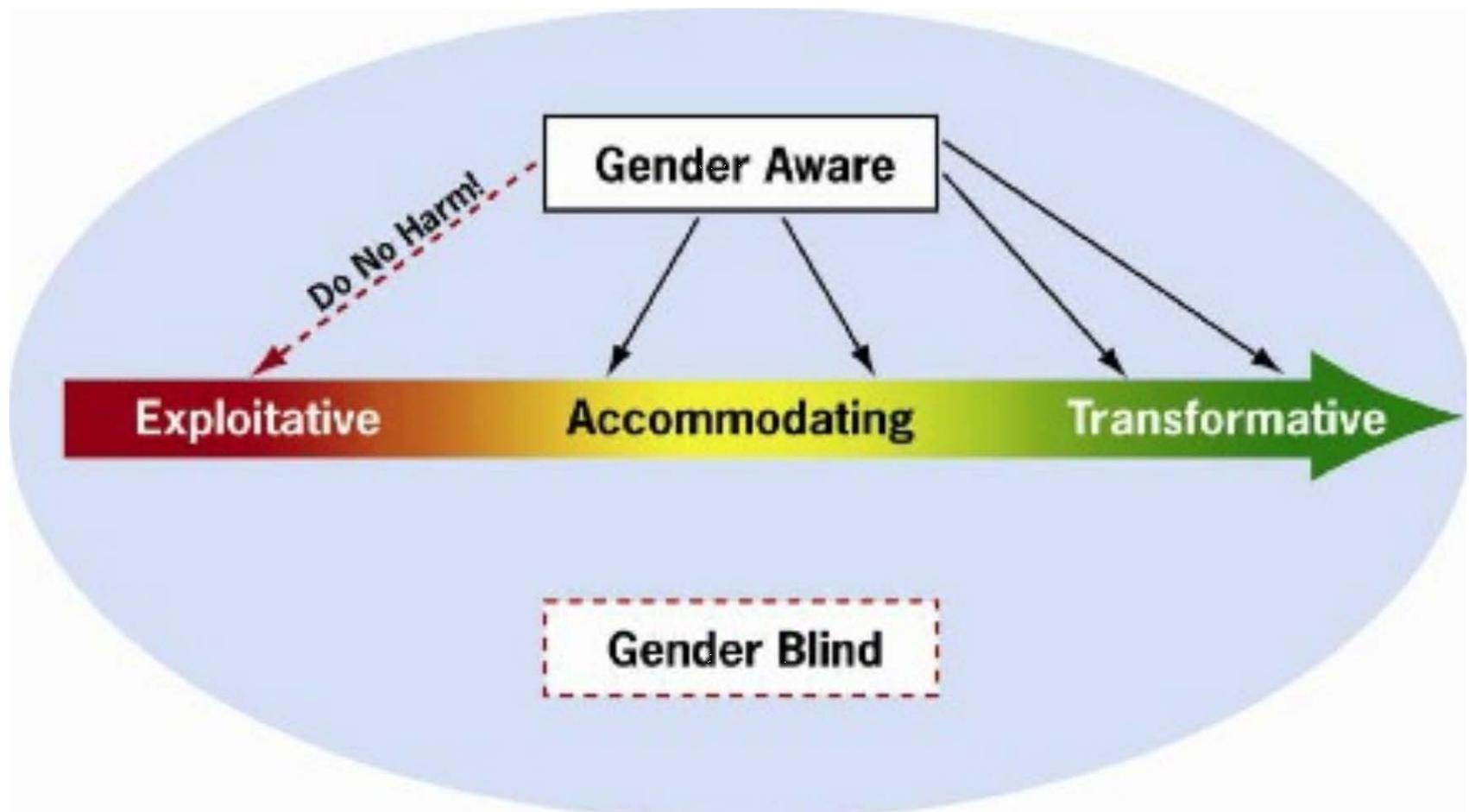
- Gender Equity – *process* of being fair to men and women
- Gender Equality – *state/condition* that affords men and women equal enjoyment of benefits

Practice

- Gender Analysis – identification and interpretation of gender differences and their impact
- Gender Assessment – carrying out gender analysis
- Gender Integration – addressing gender differences



Gender Transformative Approach



Gender in LEDS: Why focus?

Intensified gender inequalities

- Policies don't reflect effects of climate change on women's needs and priorities
- Male dominated hierarchical structures → limited number of women in decision-making roles

Limited Recognition

- Limited recognition of women's roles and accomplishments

Unequal opportunities

- Training and advancement opportunities are limited; women often receive less information on new technologies or lack access to financing to purchase assets

Inequitable benefit sharing

- Lack access to and control of resources which impacts livelihoods

Exposure to adverse health impacts

- Gender-based violence and health impacts of large projects

Moving Forward to Address Gender in LEDS

In Planning and Design

- Assess the different implications of green growth policy and programs for women and men
- Understand women and men's knowledge concerning the risks and coping mechanisms, gender-specific needs, choices, and technology uses
- Seek out and engage with appropriate stakeholders (women's organizations, female leaders)
- Ensure that women participate equally alongside men, take leadership positions, and that their voices are being heard

Ensure that these gender assessments inform your work

Two Fundamental Questions

- How will gender relations **affect the achievement** of sustainable results?
- How will proposed results **affect the relative status of men and women**? (i.e., will it exacerbate inequalities or accommodate or transform gender relations?)



Evaluating Gender Initiatives: Design and Management Considerations

- How will the different roles and status of women and men within the organization and surrounding community affect the work that is currently undertaken? Any inequalities or differences that will impede achieving green growth activities? ***What are the consequences?***
- How will the current goals and objectives affect men and women differently? ***What are the implications?***
- Do the proposed green growth initiatives provide men and women equal opportunity to receive benefits? ***What are the benefits?***
- Do the proposed initiatives give **equal opportunity** to men and women to develop and implement green growth activities?



Moving Forward in Addressing Gender

- Build targeted objectives for incorporating gender equality into policies' and programs' plans and budgets.
- Use female project implementers, agents, and trainers
- Set targets for female participation in activities
- Make women's equality, access to information, and resources a priority
- Monitor and evaluate changes in gender relations



Final Thoughts: Addressing Gender Awareness



Go beyond counting numbers to:

- Better recognize the leadership role of both men and women in our work
- Give equal opportunity to men and women to contribute in program development and implementation
- Address inequalities that prevent women and men from participating or benefiting from program activities or policies
- Recognizing men and women as 'change agents' and stakeholders

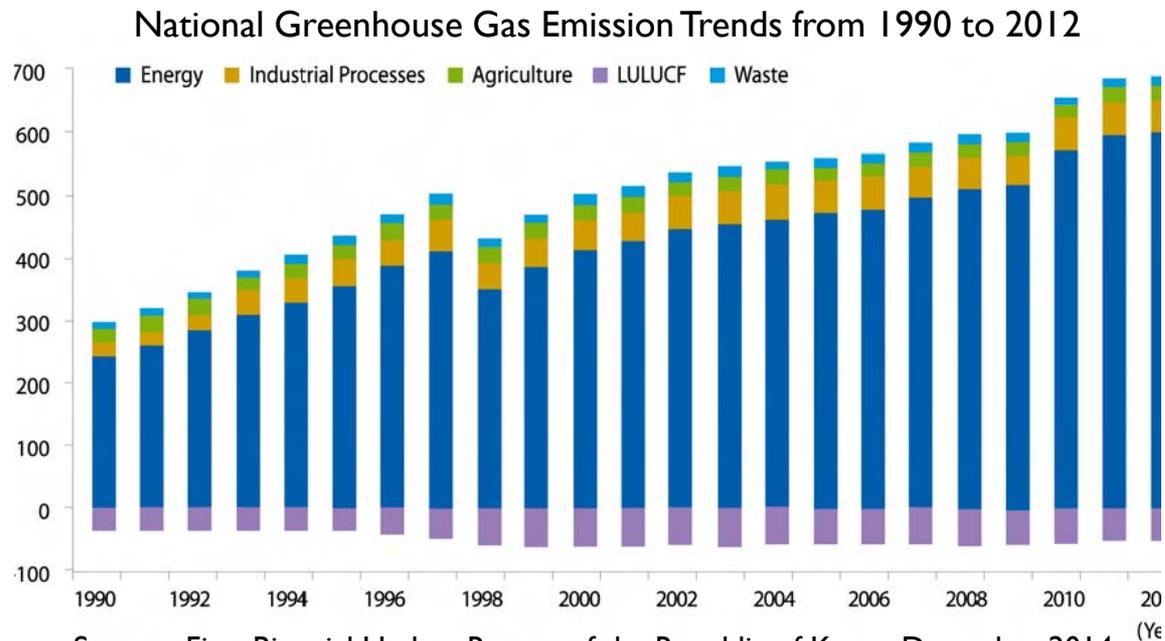
Module 10.0

Case Studies of the LEDS Process at the National and Subnational Levels

Case Study 1: Republic of Korea Strategy for Low Carbon Green Growth

LEDS Context: Korea's GHG Emissions

- The Republic of Korea is the seventh largest GHG emitter in the world.
- Total GHG Emissions in Korea in 2012 were 688.3 tons of CO₂eq (excluding land use, land use change, and forestry sequestration).
- Total GHG emissions increased **132.9%** from 1990 to 2012.
- GHG Emissions from the energy sector accounted for **87.2%** of total emissions in 2012.



Source: First Biennial Update Report of the Republic of Korea, December 2014.
Available at unfccc.int/resource/docs/natcl/rkorbur1.pdf

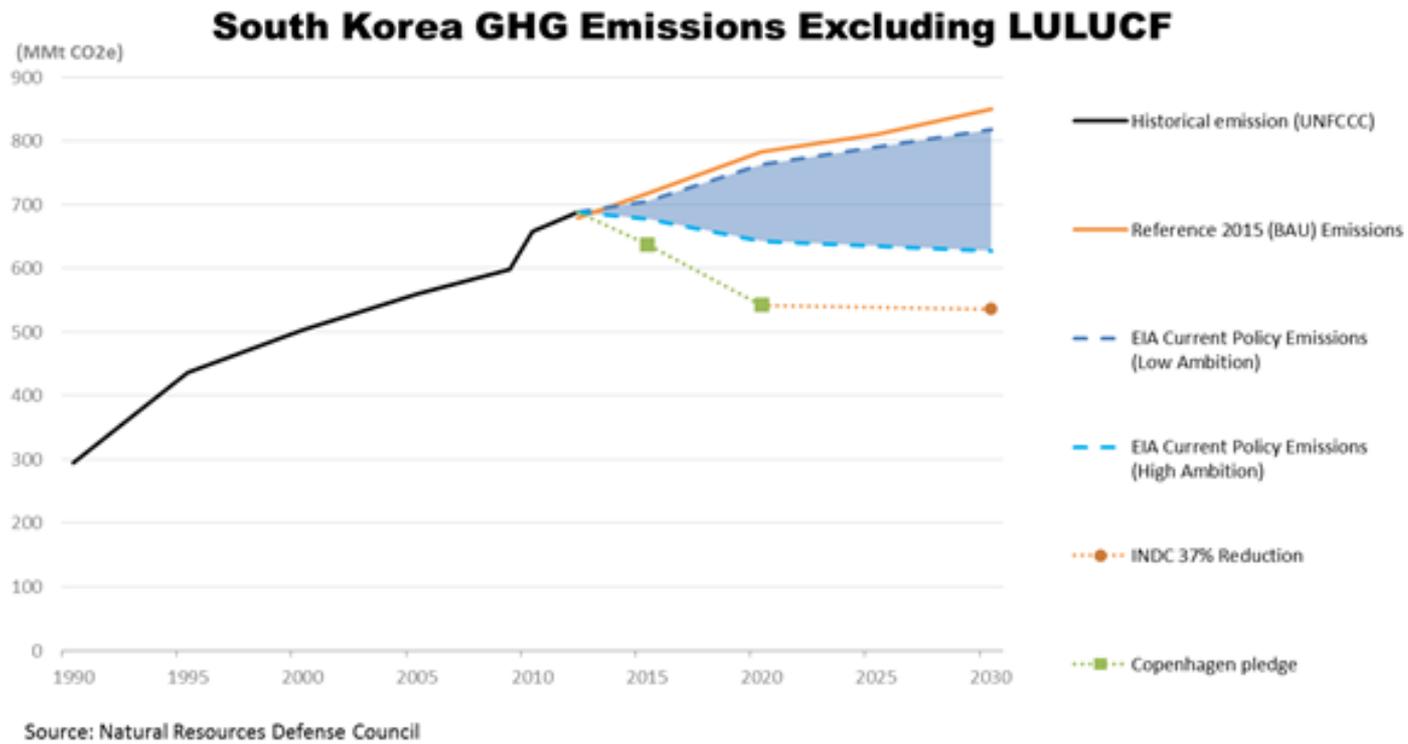
LEDS Vision and Targets: Korea's Commitment to Reducing GHG Emissions

- In 2008 President Lee Myunk-Bak announced a new vision to guide the Republic of Korea onto a “**low-carbon, green growth**” path of development.
- In January 2009, **79%** of a \$US 38.1 billion stimulus package was allocated to promote low-carbon, renewable, and energy efficient industrial development.
- The National Strategy for Green Growth of 2009 included a mitigation target of **30% reduction** in GHG emissions from the business-as-usual (BAU) level by 2020.
- On January 1, 2015, South Korea launched the world's second largest Emissions Trading Scheme, including **525 companies** and covering **67.7%** of GHG emissions.

Source: unfccc.int/resource/docs/natc/rkorbur1.pdf

LEDS Vision and Targets: Korea's Commitment to Reducing GHG Emissions (cont.)

In June 2015, Korea submitted its **Intended Nationally Determined Contribution** to the **UNFCCC** with an extended emission reduction target of **37% below** BAU levels by 2030, which represents a **4%** reduction from GHG emissions in 2005.



Source: unfccc.int/resource/docs/natc/rkorbur1.pdf

Stakeholder Engagement: Korea's Approach

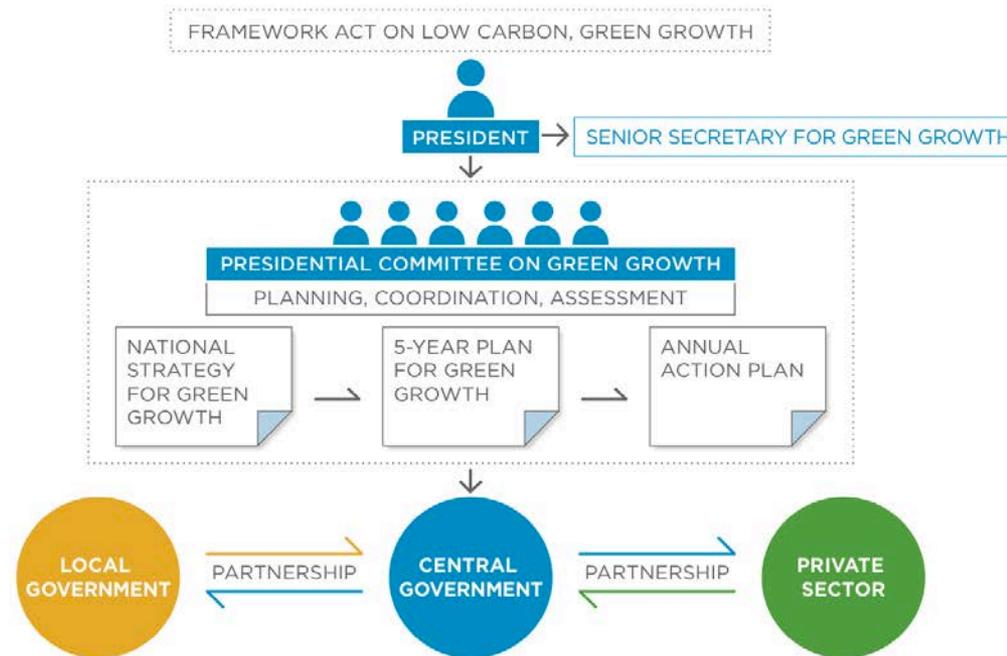
- Public-private cooperation projects, including five public forums known as the Green Growth Private Sector Consultative Bodies, bring together businesses, civil society and scientists to exchange expert advice and promote private sector involvement.
- Korea is actively fostering public awareness and education about climate change.
- Since 2010, the Save Energy, Save Earth (SESE) NARA program targets children and youth to develop interest in climate change.
- The government of Korea distributes various types of energy-saving publicity materials to encourage energy-saving practice in daily life.
- In 2011, The 8th Korean Energy Day encouraged individuals, organizations, and corporations in 16 regions to turn off all air conditioners and lights, saving 400,000kW in one day.
- Government officials, NGOs, and related corporate bodies take part in commemorating Environment Day every June 5th.



Publicity poster to promote energy conservation

Institutional Structures: Korea's Framework for Climate Change

- Since 1998, the Special Committee on Climate Change, headed by the prime minister and including the heads of major government offices, promoted in-depth discussion of climate change issues and formed the Comprehensive Action Plans for the UNFCCC.
- Established in 2009, the Presidential Committee on Green Growth (PCGG) brings together top government officials such as the Minister of Strategy and Finance, the Minister of Economy, the Minister of Environment, and the Minister of Land, Transport and Maritime Affairs, as well as scientists, civil servants and private sector professionals.
- The PCGG is co-chaired by the Prime Minister and a representative from the private sector.

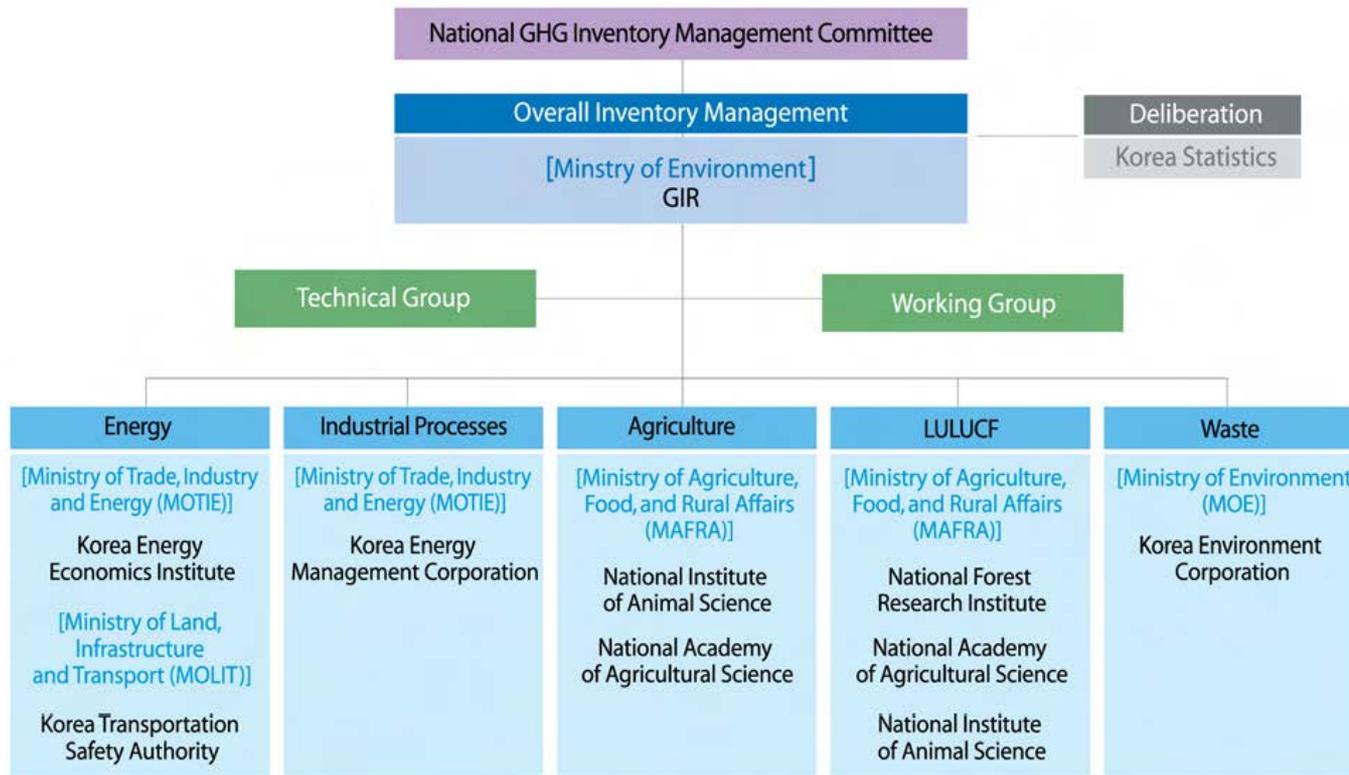


Source: http://www.greengrowthknowledge.org/sites/default/files/kggp_knowledge%20note%20series_01.pdf

Assessing the Current Situation: National Greenhouse Gas Management System

The national greenhouse gas management system brings together specialized agencies to objectively verify GHG and Energy statements submitted by government entities, set mitigation targets and review green growth strategies.

Schematic diagram of the national greenhouse gas inventory management institutional structure

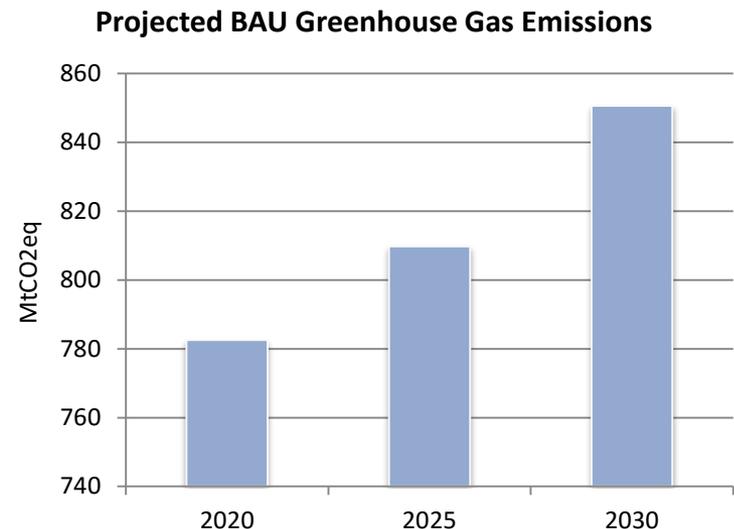


Source: unfccc.int/resource/docs/natc/rkorbur1.pdf

Analyzing Options: Korea's Business-As-Usual Scenario

“The Korean Presidential Committee on Green Growth estimates that under a business-as-usual scenario, the Republic of Korea's carbon emissions are estimated to increase by 30 per cent by 2020” (relative to 2005 levels).

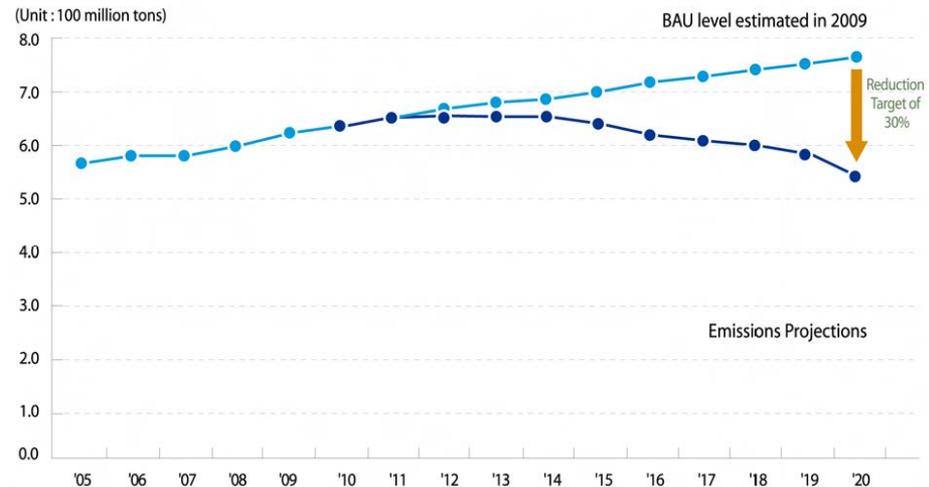
- Under the BAU scenario, F-gas emissions, primarily from industrial practices, are estimated to increase by **235%** in 2020 compared to 2005 levels.
- CO₂ emissions from fuel combustion are estimated to increase by **32%** in 2020 compared to 2005 levels.
- Net GHG sinks from land use, land use change, and forestry are estimated to decrease by **26%** in 2020 compared to 2005 levels.
- Korea's INDC submission indicates that economy-wide emissions will further increase by **52%** by 2030 relative to 2005 levels.



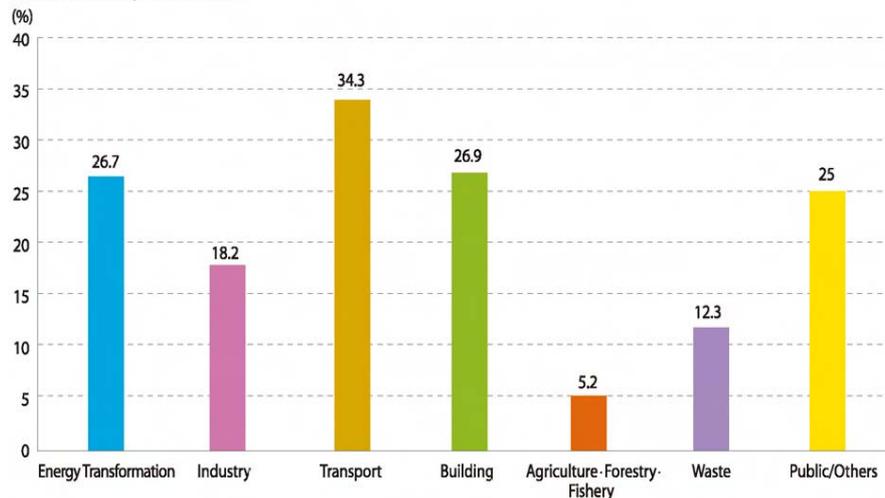
Data Source: INDC Submission by the Republic of Korea on June 30, 2015

Analyzing Options: Developing Korea's Low Emission Targets

- In 2009, the Republic of Korea adopted a **30%** GHG emissions reduction target for 2020 compared with BAU levels.
- The Presidential Committee on Green Growth decided on the 30% emissions reduction target, which was the most ambitious of three mitigation options that were being considered.



Reduction Rates by Sector in 2020



- The transportation sector has the largest targeted GHG reduction target of **34.3%** in 2020 compared with BAU levels.
- In June 2015, in the **Intended Nationally Determined Contribution** submitted to the **UNFCCC**, Korea set an additional target of **37% below BAU levels by 2030**.

Financing Korea's Green Growth Plan

- The Korean government established fiscal policies and budget resources to implement green-growth initiatives.
- Under the Green New Deal, launched in 2009, the government established an investment plan of USD 38.5 billion for 2009 to 2012 to target projects focused on green growth strategies and technologies.
- Korea also committed to allocating 2% of GDP over five years for the implementation of green growth strategies.
- A key element of the government's strategy was a particular emphasis on the private sector as a core contributor. Representatives of the private sector were engaged through public forum, events, and industry collaboration through the PCGG.
- As a result, private green investment showed a **75%** annual increase between 2008 and 2010.



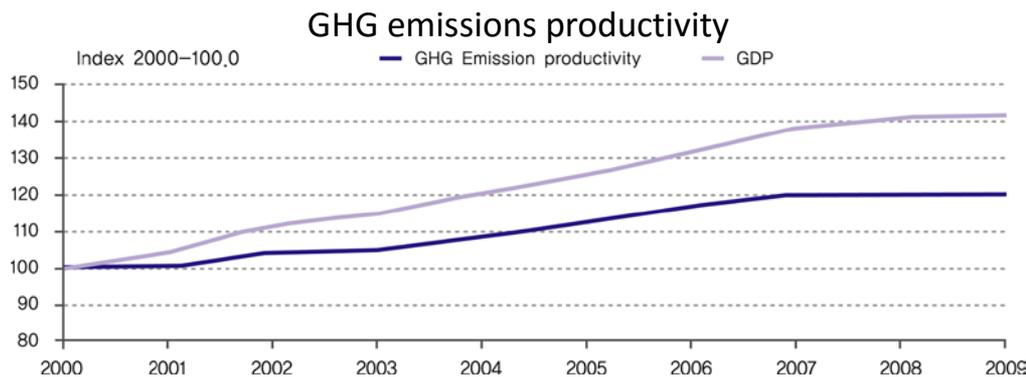
Source: HSBC Global Research

Monitoring and Evaluation: Korea's

Approach

- Korea has an organized institutional structure designed to monitor, evaluate progress, and make policy recommendations towards achieving green growth targets.
- South Korea's green growth monitoring strategy includes 23 indicators distributed across four thematic areas: socio-economic context; environmental and resource productivity; natural asset base; and economic opportunities and policies (Statistics Korea, 2012).

Institutional Structure for GHG Management System

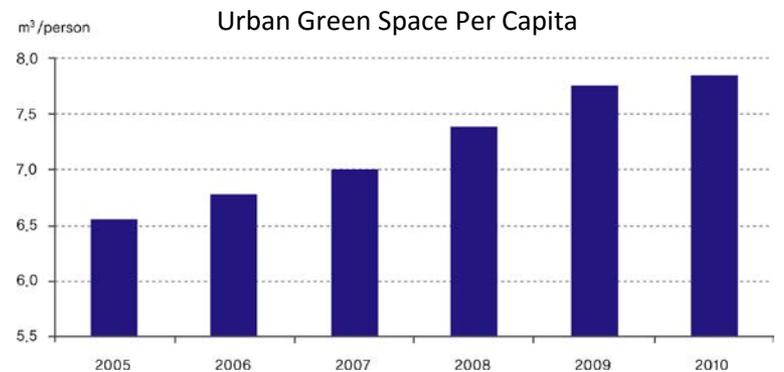
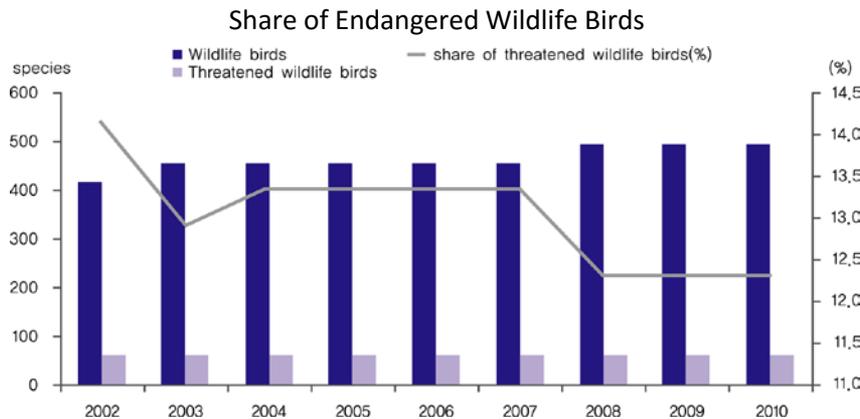
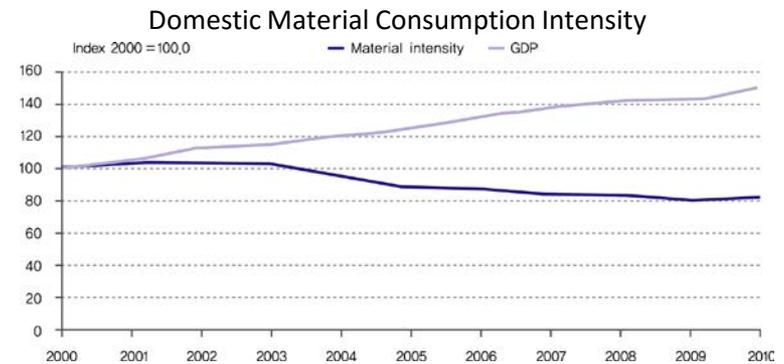
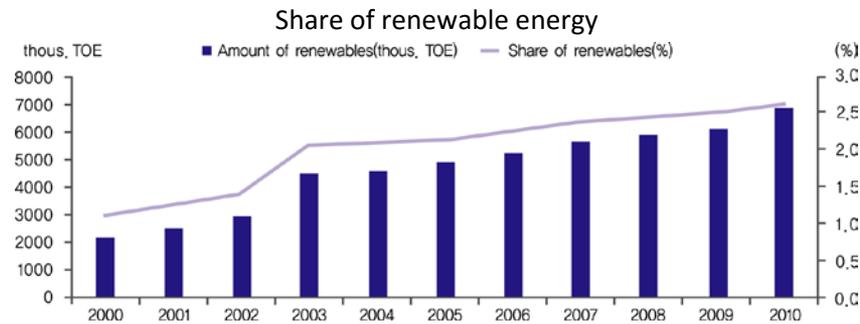


- As of 2012, twenty-four out of thirty green growth indicators showed improvement
- GHG emissions productivity increased by **19.5%** from 2000 to 2009, a signal that economic growth is decoupling from environmental pollution

Sources: http://www.greengrowthknowledge.org/sites/default/files/downloads/resource/Korea_GG_report_OECD_indicators_KOREA.pdf, <http://unfccc.int/resource/docs/natc/kornc3.pdf>

Monitoring and Evaluation: Green Growth Indicators

In addition to indicators proposed by the OECD[†], Korea developed five unique green growth indicators to monitor and evaluate progress in three key areas: Climate Change Responses and Energy Self-reliance, Creating New Growth Engines, and Improving Quality of Life.



†Organization for Economic Cooperation and Development

Source: <http://www.oecd.org/greengrowth/Korea's%20GG%20report%20with%20OECD%20indicators.pdf>

Key Takeaways

- A strong commitment to action initiated by the Prime Minister garners support at the highest levels of government.
- A formalized institutional framework headed by the Presidential Committee on Green Growth helps to ensure collaboration across government agencies, includes the private sector as a core contributor, and opens channels for public feedback.
- Achievement of ambitious GHG reduction targets is aided by industry-specific mitigation goals and detailed implementation plans with clearly defined strategies and timelines.
- Public outreach campaigns, updated school curriculums, and public forums raise awareness of climate change issues in the public dialog and foster a supportive culture for Green Growth initiatives.
- Institutionalized monitoring and verification through the National GHG Management System builds confidence and supports transparency by incorporating third-party verification and review.
- A diverse set of thirty Green Growth indicators enables decision makers to monitor progress, identify key areas of focus, and update strategies to efficiently achieve mitigation targets while meeting a variety of development objectives.

Case Study 2: LEDS Process in the United States

LEDS Context: Key Drivers for Low Emission Development in the U.S.

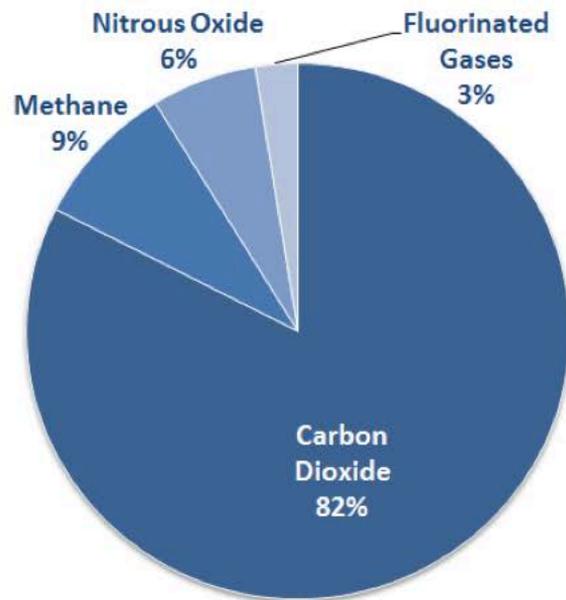
- Increased frequency and severity of extreme weather events
- Energy security
- Jobs and economic competitiveness
- Improved air quality & health
- Lessen traffic congestion
- Public desire for mitigation



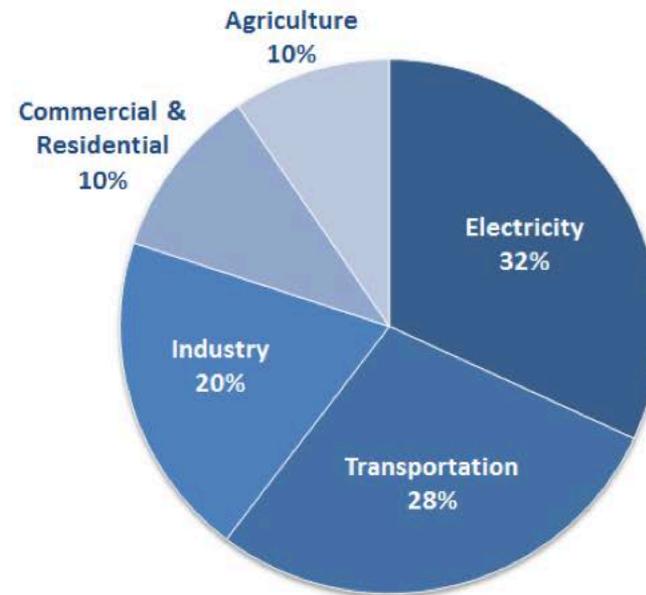
Source: *The Pew Charitable Trusts*

Assessing the Current Situation: U.S. GHG Emission Inventory (2012)

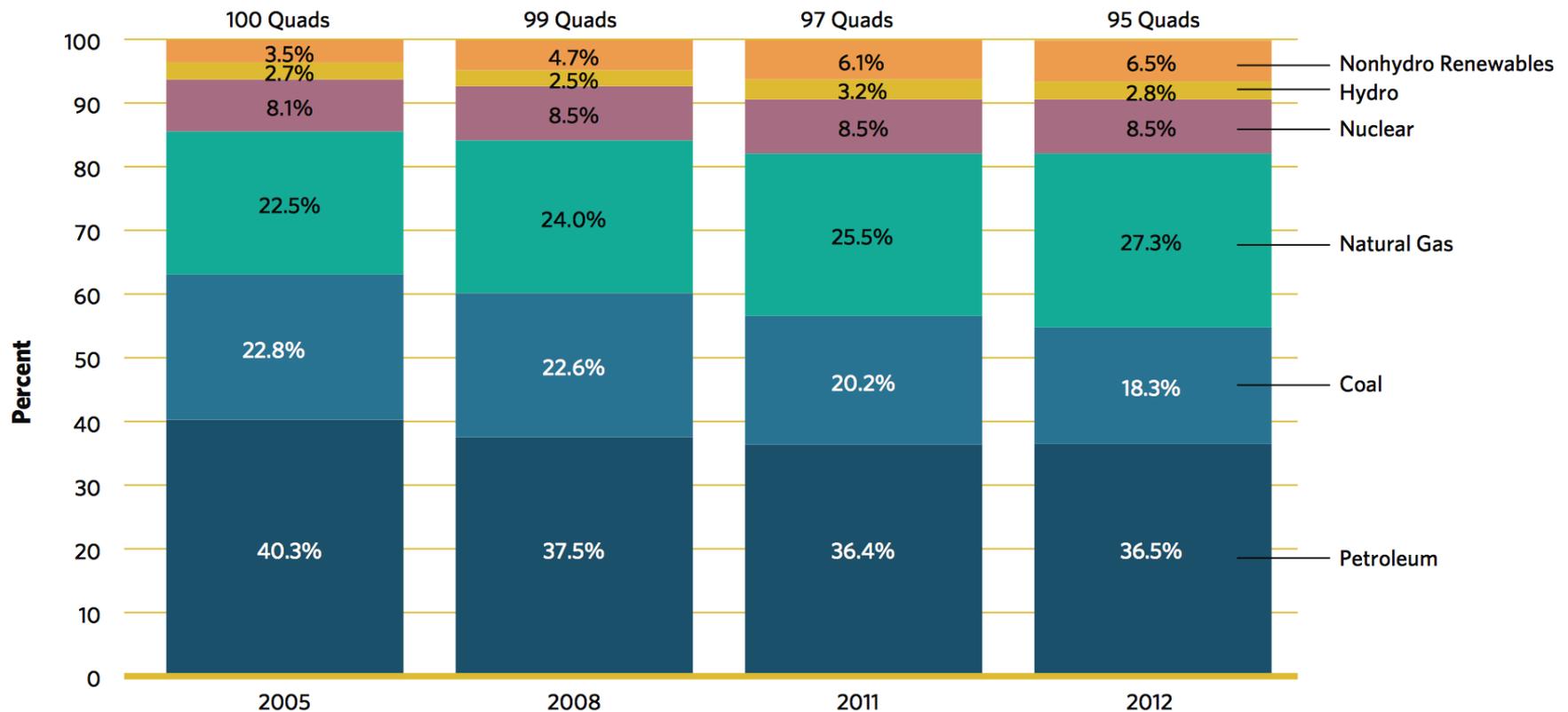
Overview of Greenhouse Gases



Sources of Greenhouse Gas Emissions



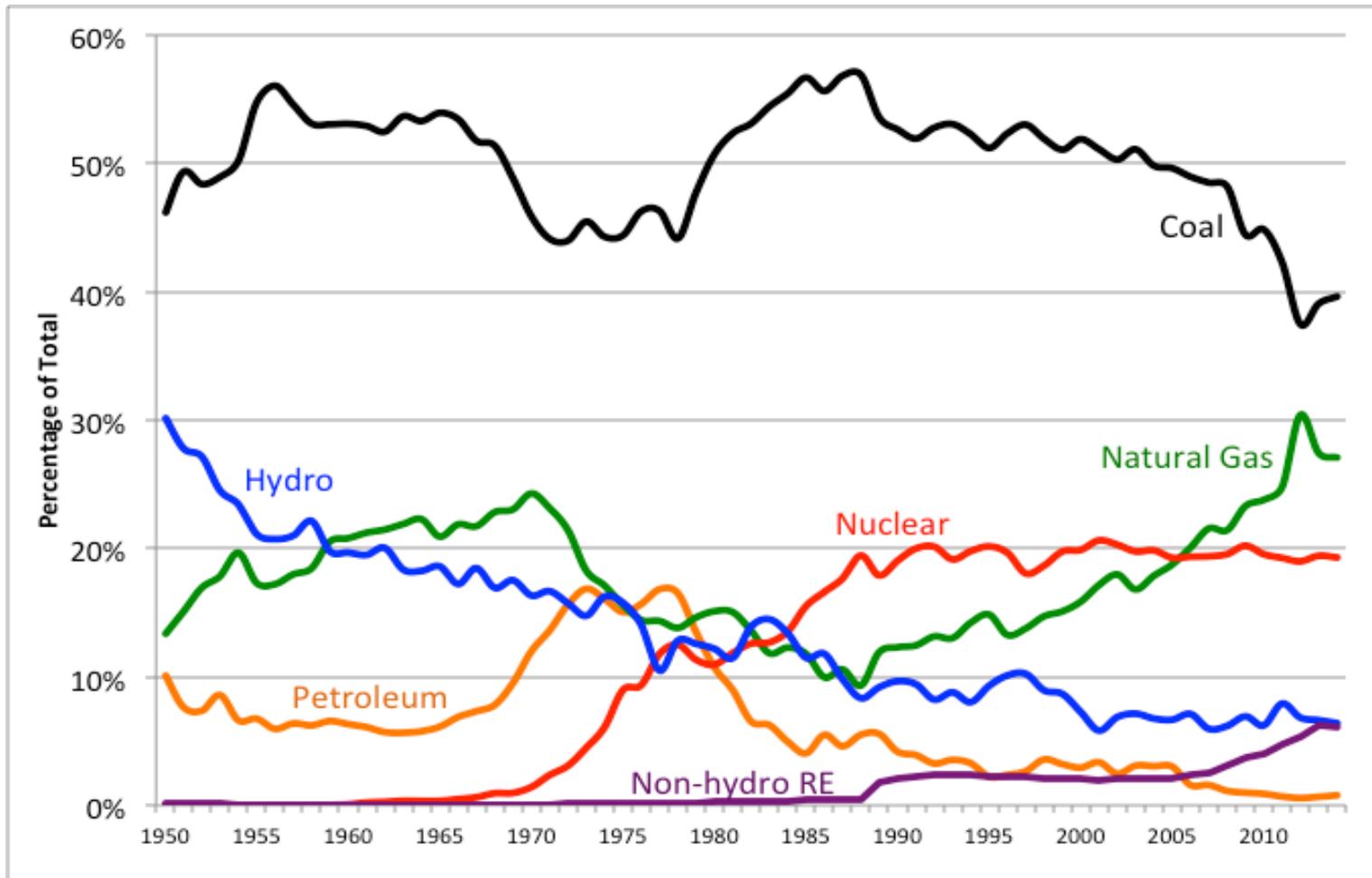
Assessing the Current Situation: U.S. Energy Demand



- ❖ Nearly 60% of petroleum is imported
- ❖ Coal supplies 50% of power generation
- ❖ Nuclear, hydro stagnant

- ❖ Wind, solar, other renewable energy sources growing rapidly, but from a small base
- ❖ Large new supplies of domestic natural gas

Assessing the Current Situation: U.S. Power Sector Upheaval



**Coal Generation Fell by ~25% Between 2008 and 2012;
Partially Reversed Since Then Given Higher NG Prices**

Analyzing Options: Historical and Projected GHG Emissions

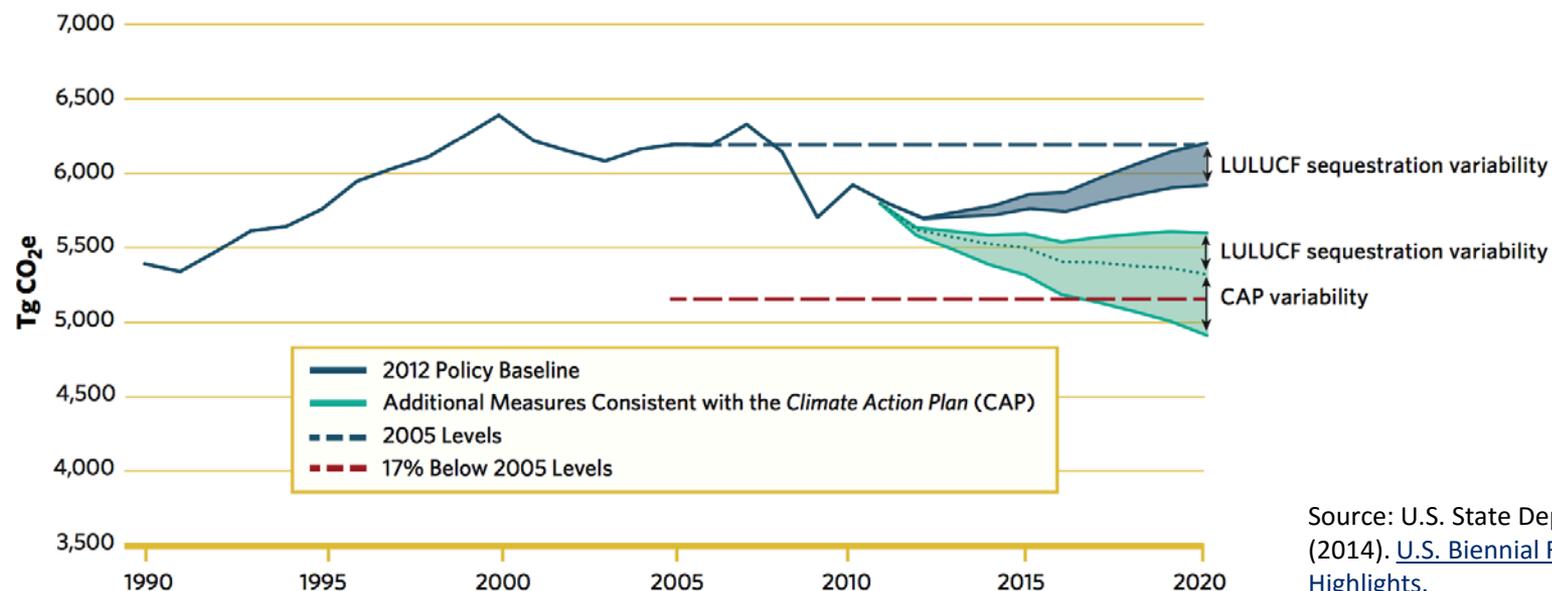
– Business-As-Usual Scenario

Sectors ^b	Historical GHG Emissions ^a				Projected GHG Emissions				
	2000	2005	2010	2011	2015	2020	2025	2030	
Energy	4,258	4,321	4,104	3,981	3,936	4,038	4,141	4,207	
Transportation	1,861	1,931	1,786	1,765	1,710	1,702	1,660	1,627	
Industrial Processes	357	335	308	331	378	438	504	536	
Agriculture	432	446	462	461	461	485	498	512	
Forestry and Land Use	31	25	20	37	30	27	40	35	
Waste	136	137	131	128	127	126	125	123	
Total Gross Emissions	7,076	7,195	6,812	6,702	6,643	6,815	6,967	7,041	
Forestry and Land Use (Sinks) ^c	high sequestration	-682	-998	-889	-905	-884	-898	-917	-937
	low sequestration					-787	-614	-573	-565
Total Net Emissions	high sequestration	6,395	6,197	5,923	5,797	5,759	5,918	6,050	6,104
	low sequestration					5,856	6,201	6,394	6,476

LEDS Vision and Targets: How is the U.S. Addressing Climate Change?

President's Climate Action Plan Target: Reduce GHG emissions by 17% below 2005 levels by 2020 (2011 inventory indicates that the U.S. is currently 6.5% below 2005 levels)

Figure 4 **U.S. Emission Projections—2012 Policy Baseline Compared with Potential Reductions from Additional Measures Consistent with the *Climate Action Plan***



Source: U.S. State Department. (2014). [U.S. Biennial Report-Highlights](#).

Additionally, in 2014 the U.S. put forward an ***intended nationally determined contribution*** to reduce economy-wide GHG emissions by 26-28% below 2005 levels by 2025.

[Course Navigation](#)

Prioritizing Actions: President's Climate Action Plan

President Obama released a Climate Action Plan on June 2013, which includes three key pillars:

- ✓ Reduce harmful pollution in the US
- ✓ Lead international efforts to combat global climate change
- ✓ Prepare to adapt to the impacts of climate change

Prioritizing Actions: Key Actions in the President's Climate Action Plan

- Develop carbon pollution standards for new and existing power plants – EPA Clean Air Act
- Establish advanced fuel efficiency and GHG emission standards from heavy duty vehicles
- Double electricity generation from wind and solar power
- Improve energy efficiency in appliances, homes, buildings and industries
- Reduce emissions of potent hydrofluorocarbons
- Develop a comprehensive methane emissions reduction strategy
- Advance efforts to protect forests and other critical landscapes

Policy Design: EPA Clean Air Act Sec. 111(d)

Goal: Reduce CO₂ Emissions from Existing Power Plants, which are responsible for 40% of US CO₂ emissions

- EPA **working closely with stakeholders** (states, energy industry, NGO, academia and the community) to establish CO₂ standards for existing power plants.
- 120 day comment period and various public hearings ensure an **open and transparent process**. Final regulation to be published in June 2015.
- EPA allows flexibility for states to design a plan to meet the targets, taking into consideration the **unique characteristics and priorities of subnational governments**.

Policy Design: Other Federal Policies and Measures

- Transport
 - National Program for Heavy-Duty Vehicle GHG Emissions and Fuel Efficiency Standards
 - Renewable Fuel Standard Program
 - Light-Duty Vehicle Fuel Economy and Environment Label
 - Aviation Low Emissions, Fuel Efficiency, and Renewable Fuels Measures
 - State and Alternative Fuel Provider Fleet Program
 - Federal Transit, Highway, and Railway Programs
- Energy (supply)
 - Clean Energy Supply Programs
 - The Rural Energy for America Program
 - Offshore Renewable Energy Program—Bureau of Ocean Energy Management
 - Biofuel Regional Feedstock Partnerships

Other Federal Policies and Measures (cont.)

- Energy (Residential, Commercial and Industrial End-Use)
 - Appliance and Equipment Energy Efficiency Standards
 - Lighting Energy Efficiency Standards
 - ENERGY STAR Labeled Products
 - Building Energy Codes
- Industrial Processes
 - Federal Air Standards for the Oil and Natural Gas Industry
 - Significant New Alternatives Policy Program
 - Fluorinated Greenhouse Gas Programs
- Agriculture
 - Conservation Reserve Program
 - Environmental Quality Incentives Program
 - Conservation Technical Assistance Program

Other Federal Policies and Measures (cont.)

- Forestry
 - Forest Ecosystem Restoration and Hazardous Fuels Reduction Programs
 - Woody Biomass Utilization Grant Program
- Waste
 - Landfill Air Regulations
 - Landfill Methane Outreach Program
 - Sustainable Materials Management Programs

Implementation: Federal Government Leading by Example

Federal Government – largest single user of energy in the US

Target: To reduce federal sector GHG emissions by 28% by 2020; 20% RE use by federal government by 2020

- Federal Energy Management Program: promotes RE and EE use in federal buildings, facilities and operations. Estimated mitigations impact for 2020: **14.4 Tg CO₂e**
- National Parks Service Program: supports mitigation efforts and sustainable practices. Estimated mitigations impact for 2020: **0.2 Tg CO₂e**
- Department of Defense: goal to reduce consumption of fossil fuels by facilities and vehicles and increase use of RE. Target to reduce emissions by **35% from 2008 levels by 2020.**

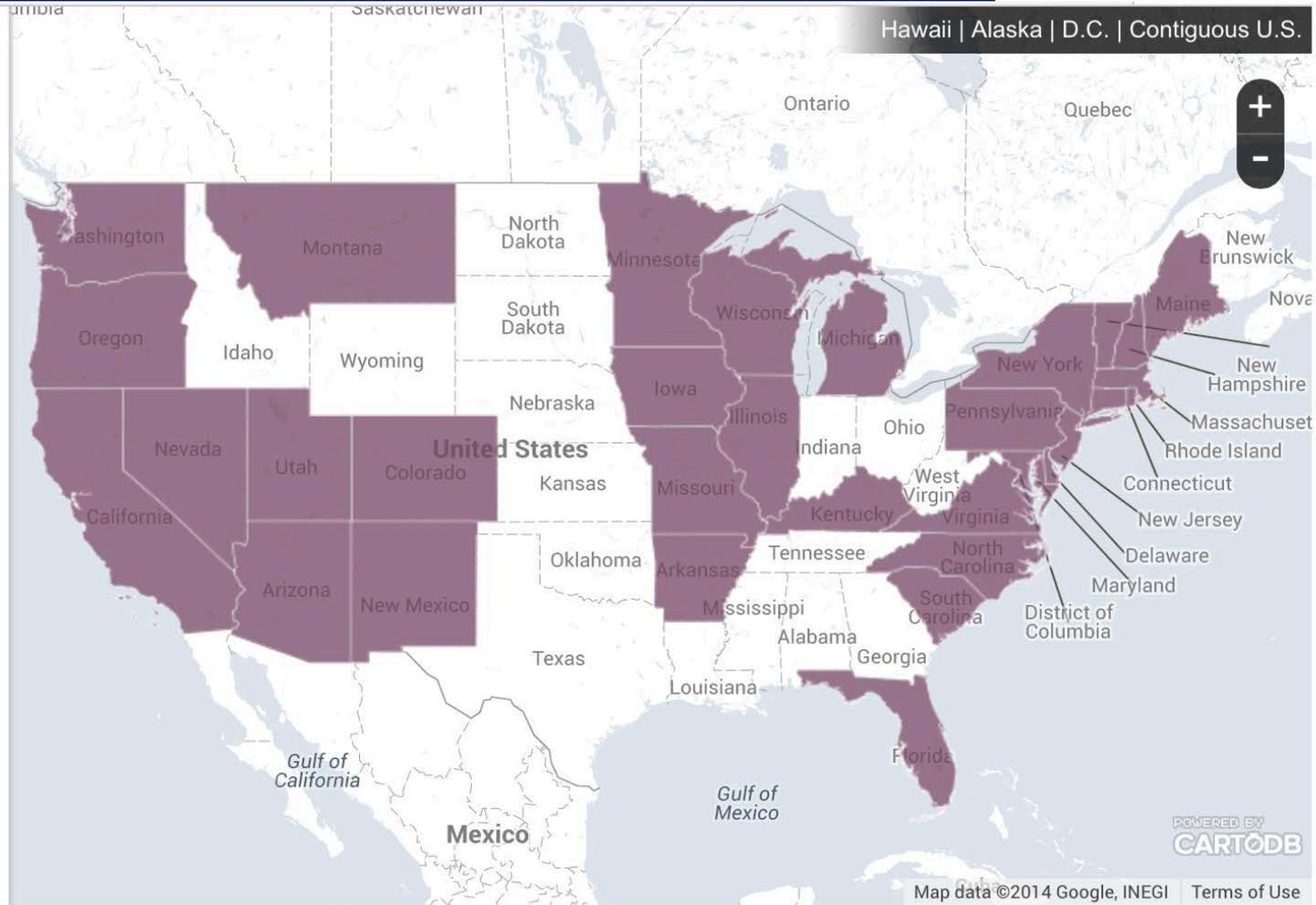
LEDS at the Subnational Level: State Climate Action Planning

LEGEND

Category

Completed (34 States plus DC)

[View data table](#)



National/Subnational Linkages

California Global Warming Solution Act

- Reduce GHG emissions by 25% from 2009 levels by 2020
- Establishes cap limit on emissions sources including refineries, power plants, industrial facilities and transportation fuels
- Renewable energy portfolio standard – 33% renewables by 2020
- Energy efficiency measures and incentives.

New York – PlaNYC

- Reduce GHGs by 30% below 2005 level by 2030
- \$1 billion devoted to improving energy efficiency of all city-owned buildings over the next decade - nearly three-quarters of emissions come from energy used in buildings
- Continues to grow its economy and address climate resiliency in the wake of Hurricane Sandy

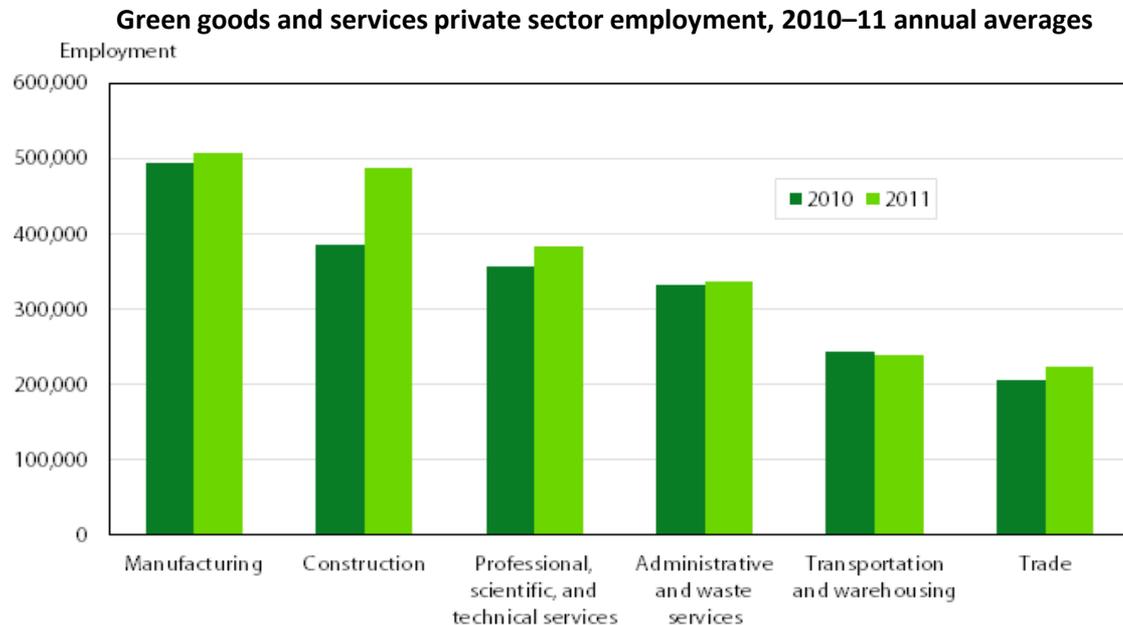
Evaluating Impacts: Project-Specific Jobs and Economic Impacts (Renewable Energy Focus)

- In 2009 – 2011, the U.S. government made significant renewable energy investments under the **\$1603 Treasury Grant Program**
- These investments contributed between **52,000 – 75,000** average jobs per year during project construction. Total earnings from construction and installation expenditures were **\$9.2 - \$14 billion**, supporting **\$26 - \$44 billion** in economic output
- In the long run, an estimated **5,100 – 5,500** new jobs will be created on average each year during the operational system life of projects completed in 2009 – 2011, generating **\$1.7 - \$1.8 billion** in additional economic output

Summary Estimates of the Direct and Indirect Jobs, Earnings, and Output Supported			
	Average Jobs per year (FTE/year)	Total Earnings (Billions \$)	Total Economic Output (Billions \$)
During Construction Period (2009-2011)			
Large Wind	44,000-66,000	\$7.7-\$12.0	\$23.0-\$39.0
Photovoltaic	8,300-9,700	\$1.5-\$1.8	\$3.5-\$4.7
Total Direct + Indirect	52,000-75,000	\$9.2-\$14.0	\$26.0-\$44.0
During Operational Period (annual for system lifetime)			
Large Wind	4,500-4,900	\$0.26-\$0.29	\$1.60-\$1.70
Photovoltaic	610-630	\$0.04	\$0.09
Total Direct + Indirect	5,100-5,500	\$0.3-\$0.3	\$1.7-\$1.8

Assessing Impacts: Green Goods and Services Jobs

- In 2011, there were 3.4 million Green Goods and Services (GGS) jobs, accounting for 2.6 percent of total US employment.
- Among private sector industries, construction had the largest employment rate increase, from 7.0 to 8.9 percentage points between 2010-11, while manufacturing had the most GGS jobs in 2011 (507,168).



Source: U.S. Bureau of Labor Statistics.

Key Takeaways

- Transparent and participative processes for establishing regulations and standards
- Strong support from high level officials – case of New York
- Actions taken by cities and states can drive market and advance action in other states, cities and at the federal level
- Politicization of climate change slows progress at the national legislative level. Focus of action have been at the administrative, state and local levels.

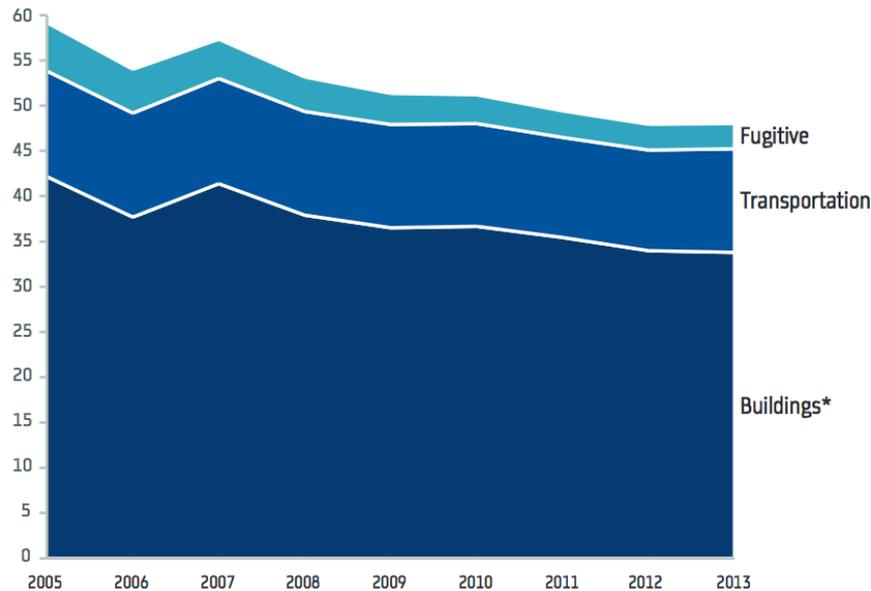
Case Study 3: Low Emission Development in New York City



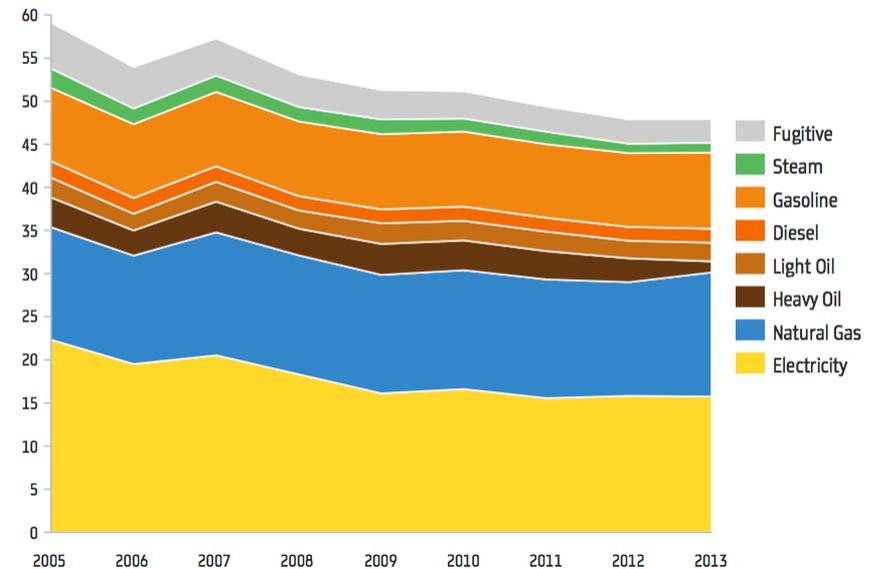
LEDS Context: NYC GHG Emissions

Total 2013 GHG emissions in New York City were 48.02 MtCO₂e

(Million tCO₂e)



(Million tCO₂e)



*includes streetlights

Source: NYC Mayor's Office

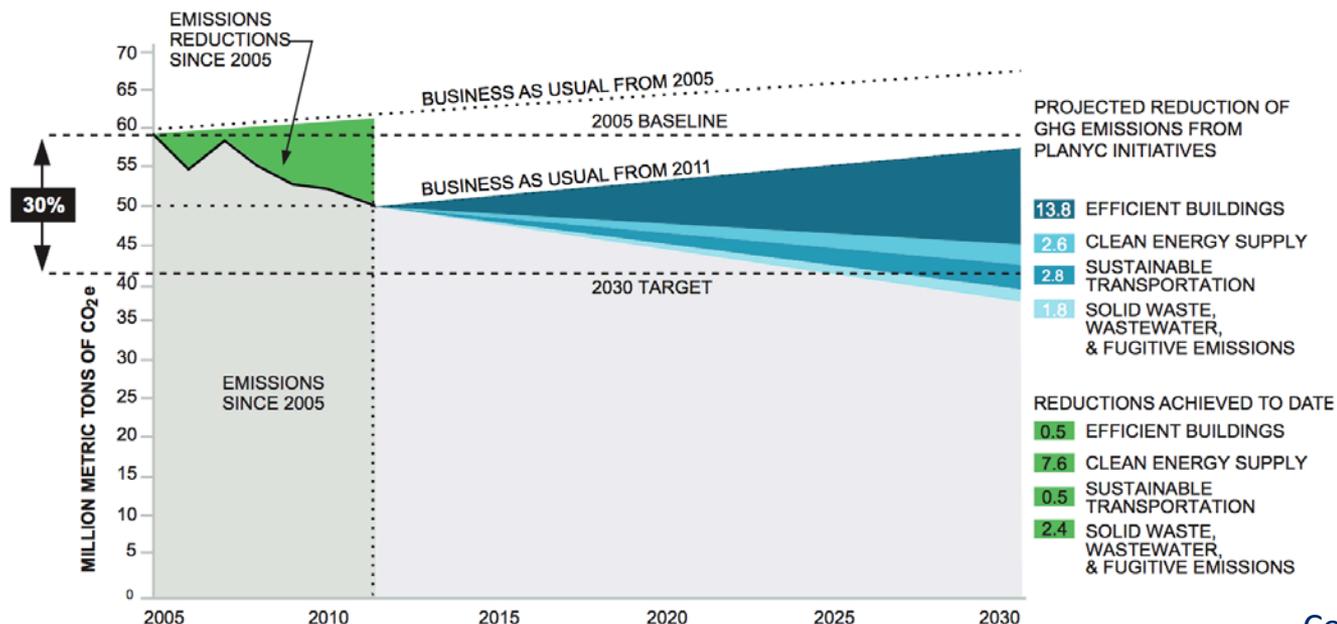
GHG Emissions by sector

GHG Emissions by source

Buildings contribute nearly 75% of citywide GHG emissions

LEDS Vision: PlaNYC Overview

- Launched in 2007 under the Bloomberg (mayor) administration
- Goal to reduce GHG emissions by 30% below 2005 levels by 2030.
- City government goal to reduce emissions by 30% by 2017.
- September 2014: Mayor announced new commitment to reduce GHG emissions by 80% below 2005 levels by 2050 – largest city in the world to commit to this goal; 35% reduction from city government by 2025
- Focuses on 10 key issues: housing, open space, brownfields, water quality, water network, transportation, air quality, solid waste and climate change
- 127 initiatives being implemented, each with a specified timeline, budget, and lead organization



PlaNYC Stakeholder Engagement Process

- Transparent and inclusive planning process: plan development phase involved stakeholders from public and private sectors, academia, and civil society.
- Public outreach performed by the City through interactive website, town hall style meetings, and small stakeholder meetings to understand public concerns and ensure plan targets and strategies would address those concerns, and educate public on the need to take action to mitigate GHG emissions.
- Sustainability advisory board included a variety of stakeholders to give advice to OLTPS on goals and initiatives considered within the PlaNYC.
- OLTPS met with approximately 50 key advocacy groups to obtain their feedback on the plan and its goals.

Sustainability advisory board included 17 members:

- Elected city officials
- Businesses
- Real estate community
- Environmental community
- Academia
- Philanthropic community
- Labor community

Source: "The Process Behind PlaNYC". April 2010. Available at: <http://www.icleiusa.org/action-center/planning/sustainability-planning-resources/planyc-case-study-the-process-behind-the-plan>

Institutional Structures for PlaNYC

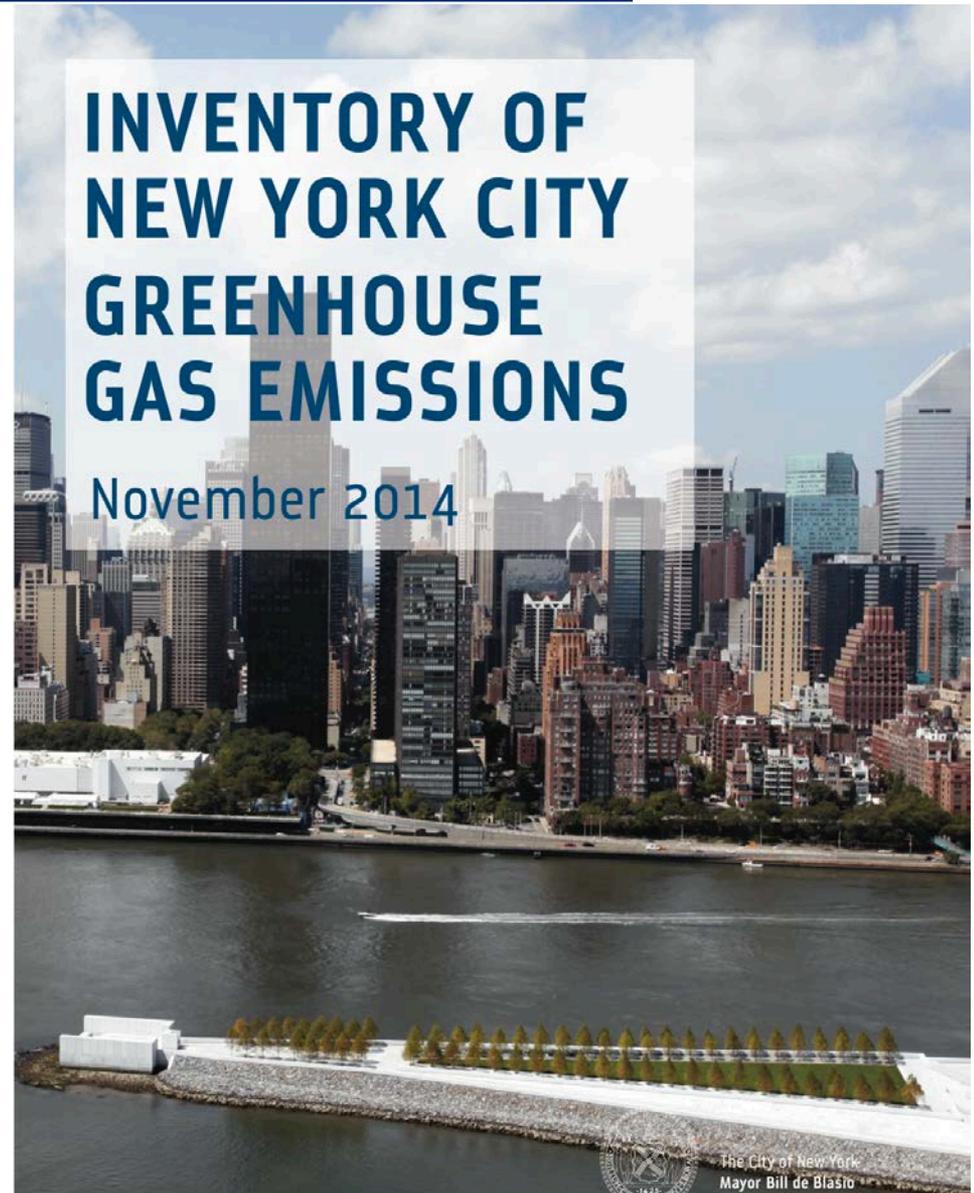
- PlaNYC institutionalization is facilitated by strong support from the Mayor and cooperation between the Mayor's Office and City Council.
- Mayor's Office of Long-Term Planning and Sustainability (OLTPS) and Mayor's Office of Recovery and Resiliency (ORR) ensure implementation.
- OLTPS and ORR update the PlaNYC every four years to ensure new circumstances are taken into consideration, and provide annual progress reports to ensure accountability.
- Topical working groups have been formed to review initiatives and policy recommendations.

Working Groups:

- Energy Efficiency/Green Building
- Energy Supply and Distribution
- Transportation
- Green Infrastructure
- Land use and brownfields
- Waste Management
- Climate Change Adaptation

Assessing the Current Situation: GHG inventories

- NYC has conducted annual GHG emission inventories since 2007
- GHG emissions are tracked by sector and source
- City-specific electricity emission coefficients are calculated to improve accuracy

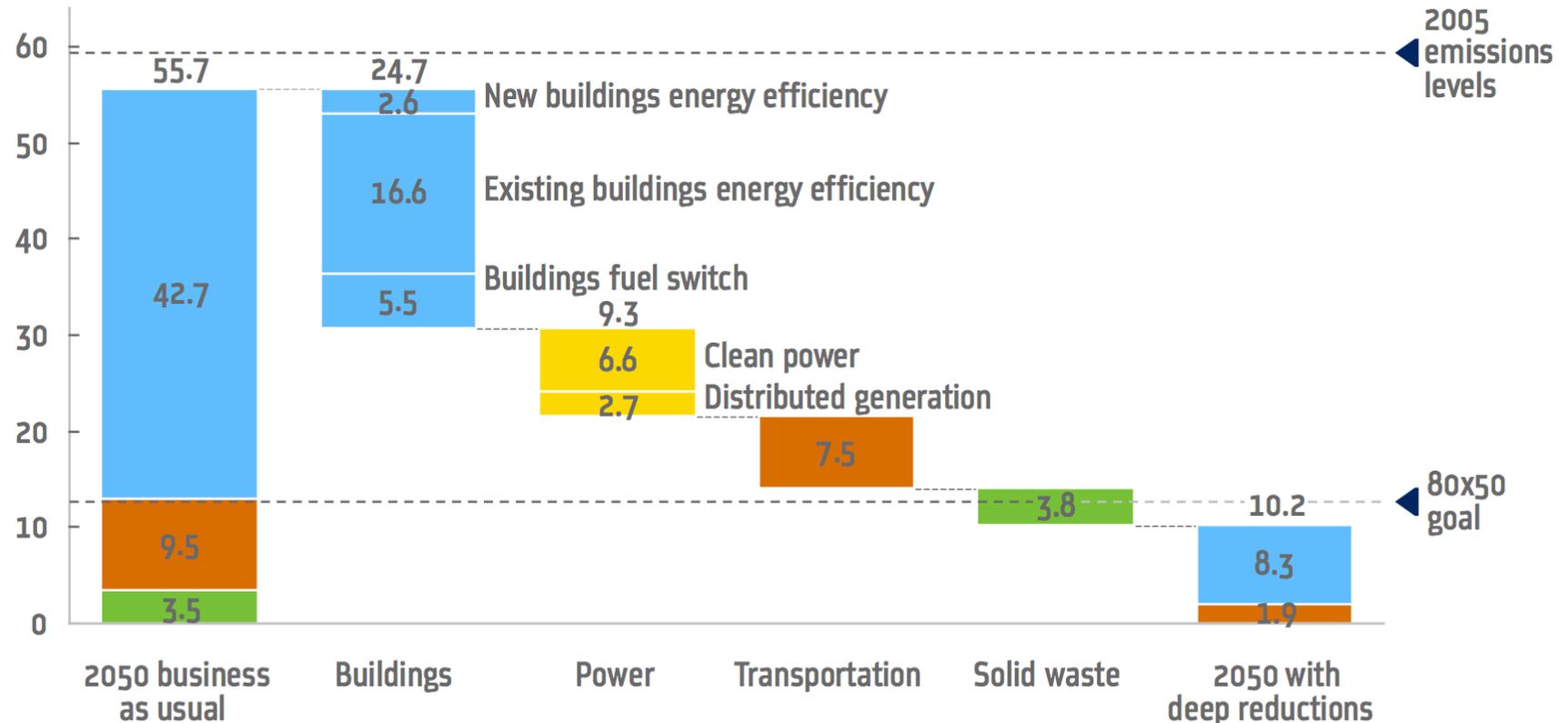


Analyzing Options: Assessment of GHG Emission Reduction Potential by Sector to Meet the 80% by 2050

Goal

Abatement Potential by Sector

Million Metric tons of Carbon Dioxide Equivalent (MtCO₂e)



Source: "New York City's Pathways to Deep Carbon Reductions". December 2013. Available at: http://s-media.nyc.gov/agencies/planyc2030/pdf/nyc_pathways.pdf

Assessing the Benefits: Linking a Variety of Objectives

OLTPS analyzed the co-benefits of each of the 127 initiatives considered under the original PlaNYC, including the potential to reduce GHG emissions.

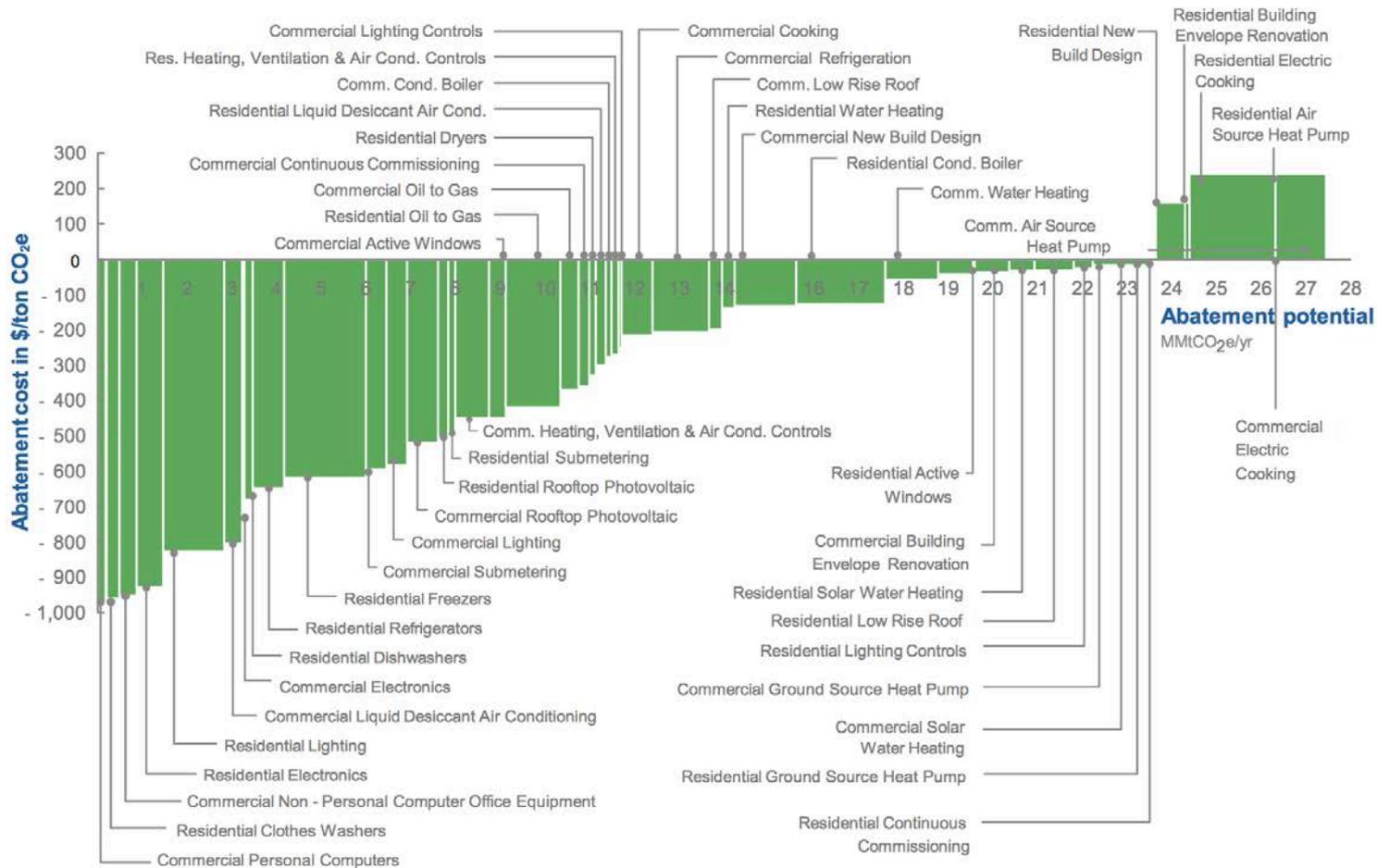
Table 2: Goals Matrix for Water Quality Initiatives

Strategy	Initiative	Housing	Open Space	Brownfields	Water Quality	Water Network	Congestion	State of Good Repair	Energy	Air Quality	Climate Change
Continue implementing infrastructure upgrades	1. Develop and implement Long-Term Control Plans			✓							
	2. Expand wet weather capacity at treatment plans			✓							
Pursue proven solutions to prevent water from entering system	3. Increase use of High Level Storm Sewers (HLSS)			✓							
	4. Capture the benefits of our open space plan	✓		✓				✓		✓	
	5. Expand the Bluebelt program	✓		✓				✓	✓	✓	
Expand, Track, and Analyze new Best Management Practices (BMPs) on a broad scale	6. Form interagency BMP Task Force			✓				✓	✓	✓	
	7. Pilot promising BMPs			✓				✓	✓	✓	
	8. Require greening of parking lots			✓				✓	✓	✓	
	9. Provide incentives for green roofs			✓				✓	✓	✓	
	10. Protect wetlands			✓					✓	✓	

Source: "The Process Behind PlaNYC". April 2010. Available at: <http://www.iclei.usa.org/action-center/planning/sustainability-planning-resources/planyc-case-study-the-process-behind-the-plan>

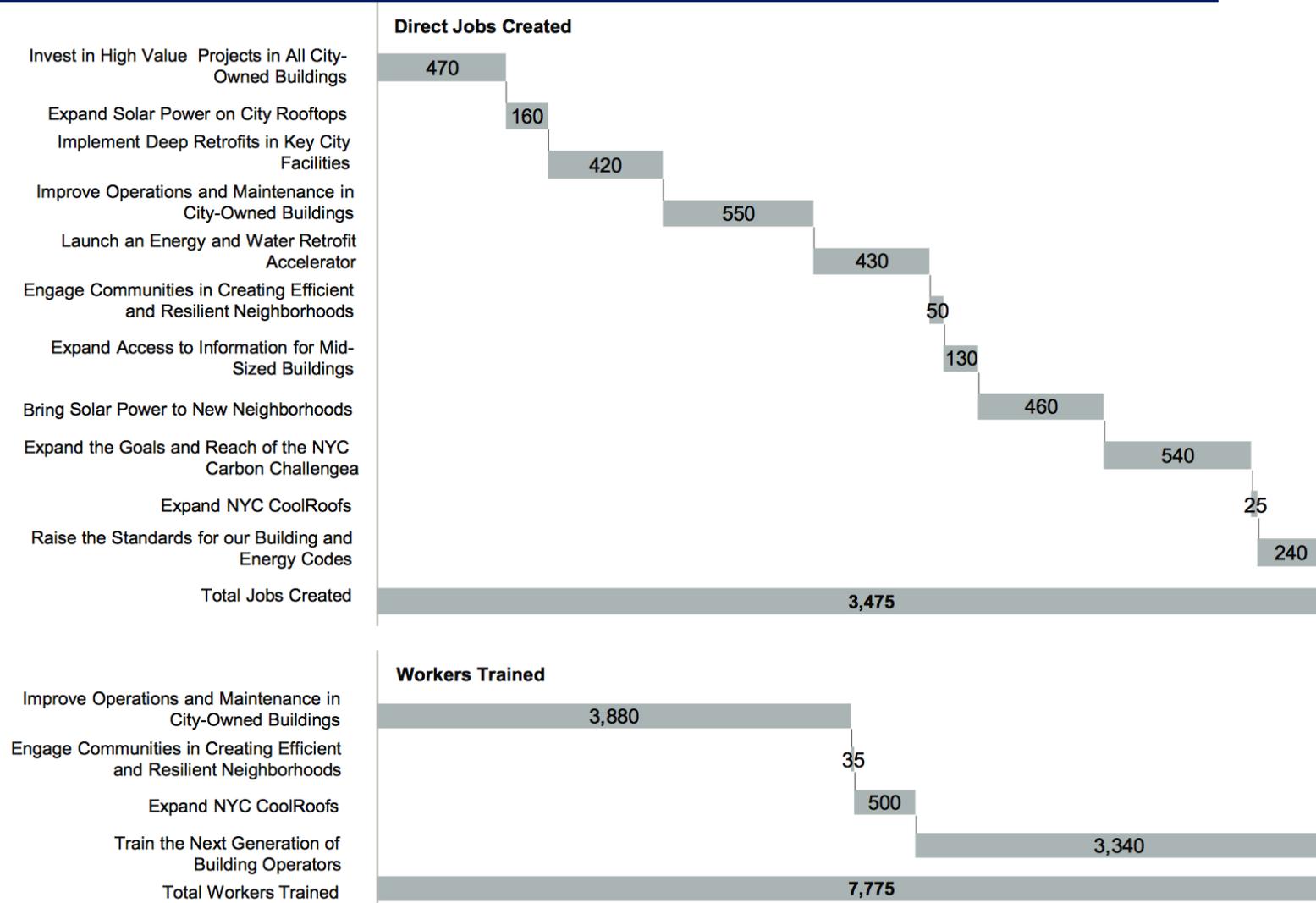
Assessing the Benefits: Marginal Abatement Cost Curve

2050 Marginal Abatement Cost Curve for New York City Buildings Sector



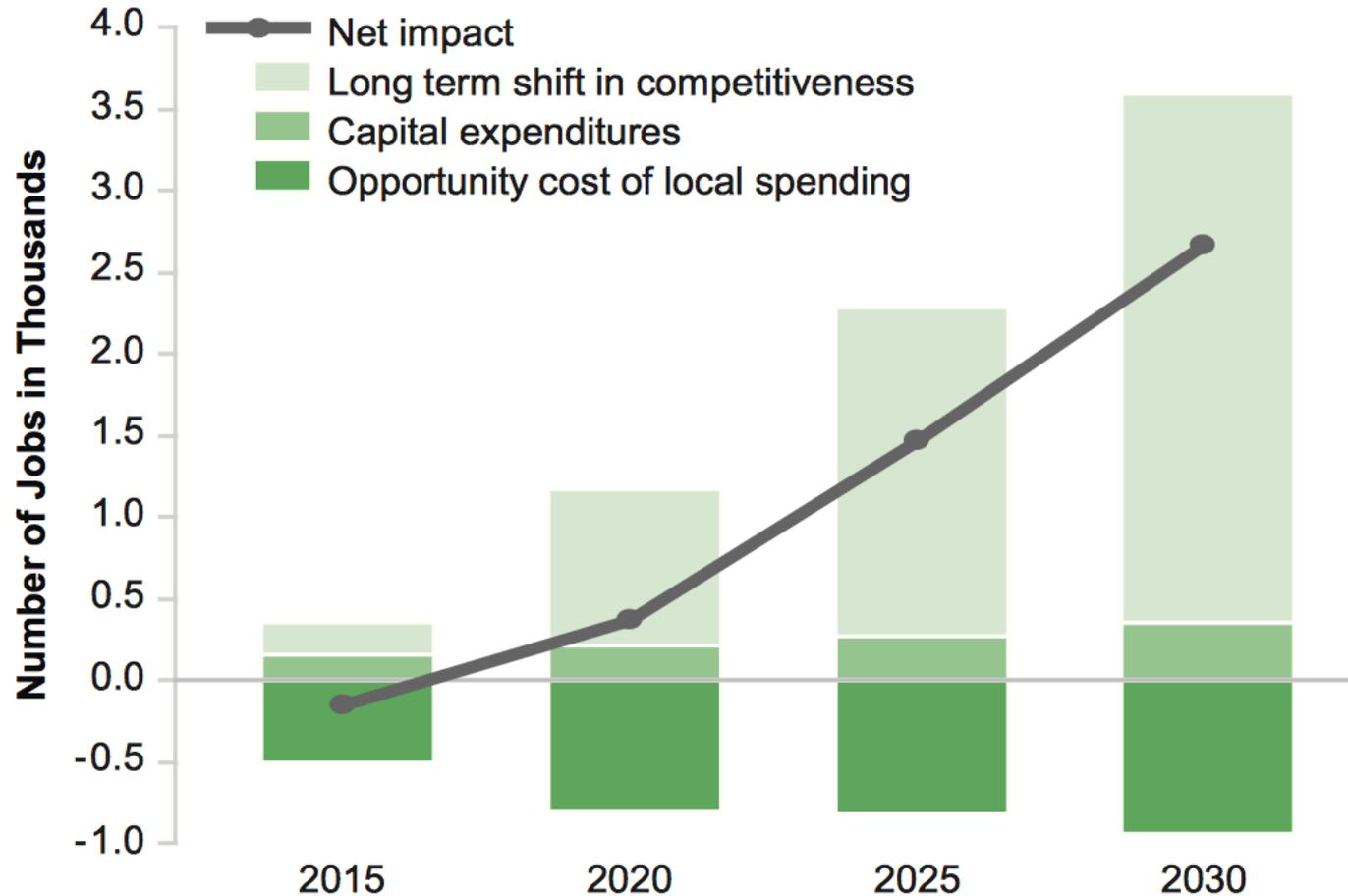
Source: "One City Built to Last". Available at: <http://www.nyc.gov/html/builttolast/assets/downloads/pdf/OneCity.pdf>

Assessing the Benefits: *One City Built to Last* Expected to Create 3,475 Direct Jobs



Source: "One City Built to Last". Available at: <http://www.nyc.gov/html/builttolast/assets/downloads/pdf/OneCity.pdf>

Assessing the Benefits: Employment Impacts of GHG Mitigation Strategies in Buildings



Source: "One City Built to Last". Available at: <http://www.nyc.gov/html/builttolast/assets/downloads/pdf/OneCity.pdf>

Prioritizing Actions: NYC's Approach

- City agencies provided data and ran analysis to help OLTPS prioritize initiatives under the Plan.
- OLTPS also reviewed best practices and took into consideration feedback from the public.
- For each initiative considered under the plan, the following were defined:
 - Lead organization responsible for implementation
 - Non-city action needed to progress
 - Milestone for completion by 2009 and 2015
 - Capital and operating budget
 - Other funding sources needed

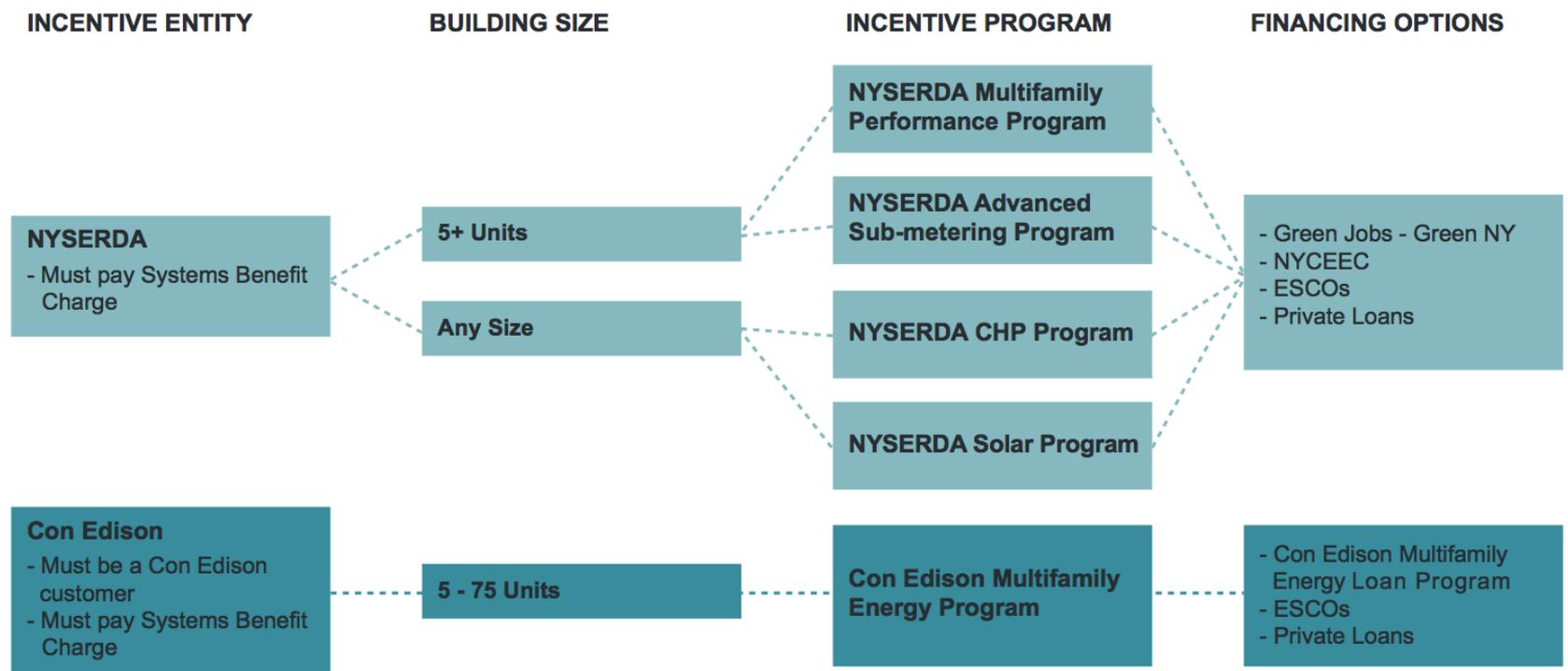
Source: "The Process Behind PlaNYC". April 2010. Available at: <http://www.iclei.usa.org/action-center/planning/sustainability-planning-resources/planyc-case-study-the-process-behind-the-plan>

Developing and Implementing a Financing Plan

- Federal funding for energy efficiency and green buildings projects
 - Weatherization program for low income houses
 - Federal tax credits for energy efficient homes
 - American Recovery and Reinvestment Act (ARRA) funded projects
- State incentives for energy efficiency projects
 - NY Green Bank created to finance energy efficiency and clean energy projects
 - NYSERDA, a State-run authority, provides financing
- City funding to fill in gaps
 - Tax abatement program for green roofs and solar panels
 - New York City Energy Efficiency Cooperation (NYCEEC) created to finance clean energy projects – offers green mortgage, direct loan and energy service agreements

Financing: Energy Efficiency Retrofitting of Multifamily Buildings

Multifamily Financing and Incentive Options in New York City



Implementation Plans

Long-term Plan for Reducing Energy Consumption and GHG Emissions from Municipal Buildings and Operations Initiative

- Approved in 2008, plan sets targets and actions for energy consumption and emissions from municipal buildings.

Greater, Greener Building Plan

- Approved in 2009, plan requires efficiency improvements in existing large buildings.
- Addresses the city's energy code, lighting upgrades, audits and retrofits, benchmarking, green workforce development training, and green building finance.

Implementation Plans (cont.)

One City: Built to Last-Transforming New York City's Buildings for a Low Carbon Future

- 10-year plan to improve the energy efficiency of buildings. Goal to reduce the city's building-based GHG emissions 30% by 2025.
NYC Carbon Challenge
- Initiative to encourage private sector to reduce carbon emissions by 30% in 10 years.
- Provides resources for participants to develop individualized strategies to reduce energy consumption and a platform to share lessons learned.
- 17 universities, 11 large hospital organizations, 12 global companies, and 17 residential management firms have accepted the NYC Carbon Challenge.

Implementation Plans (cont.)

A Stronger, More Resilient New York

- Launched in 2013, the plan contains recommendations on actions to rebuild city after Hurricane Sandy and increase infrastructure resilience.

Retrofit Accelerator Plan

- Aims to upgrade 20,000 private buildings, making up 15% of citywide built square footage.
- Two-thirds will be multifamily buildings, and roughly 40% will be low income housing.

Source: <http://www.nyc.gov/html/sirr/html/report/report.shtml>

Monitoring and Evaluation

- Local Law 17 of 2008 - OLTPS coordinates with city agencies to track & report progress of PlaNYC
- PlaNYC Progress report released annually
- Biannual Mayor's Management Report on overall City performance trends
- Citywide Performance Report - reports on agency-specific indicators
- GHG inventory annual updates and report on progress of climate change initiatives
- Sustainability indicators to measure progress towards the 10 goals of the PlaNYC
- Bi-weekly meetings with all relevant agencies to review the status of each initiative
- Bi-weekly newsletter to update City staff on progress

Monitoring and Evaluation: Sustainability Indicators

CATEGORY	METRIC	2030 TARGET	TREND SINCE BASE YEAR
HOUSING AND NEIGHBORHOODS	Create homes for almost a million more New Yorkers while making housing and neighborhoods more affordable and sustainable		
	Increase in new housing units since January, 2007	314,000	↗
	% of new units within a 1/2 mile of transit	> 70%	NEUTRAL
	Affordable housing units preserved or added (cumulative since 200	165,000	↗
PARKS AND PUBLIC SPACE	Ensure all New Yorkers live within a 10-minute walk of a park		
	% of New Yorkers that live within a 1/4 mile of a park	85%	↗
	Cumulative number of trees planted through Million Trees initiative	1,000,000	↗
ENERGY	Reduce energy consumption and make our energy systems cleaner and more reliable		
	Greenhouse gas emissions per unit of electrical power (lbs CO ₂ e/MWh)	DECREASE	↗
CLIMATE CHANGE	Reduce greenhouse gas emissions by over 30%		
	Increase the resiliency of our communities, natural systems, and infrastructure to climate risks		
	Greenhouse gas emissions (MTCO ₂ e)	DECREASE 30% ₃	↘

1 Results are for FY or CY 2013

2 Results are for FY or CY 2012

3 From 2005 levels

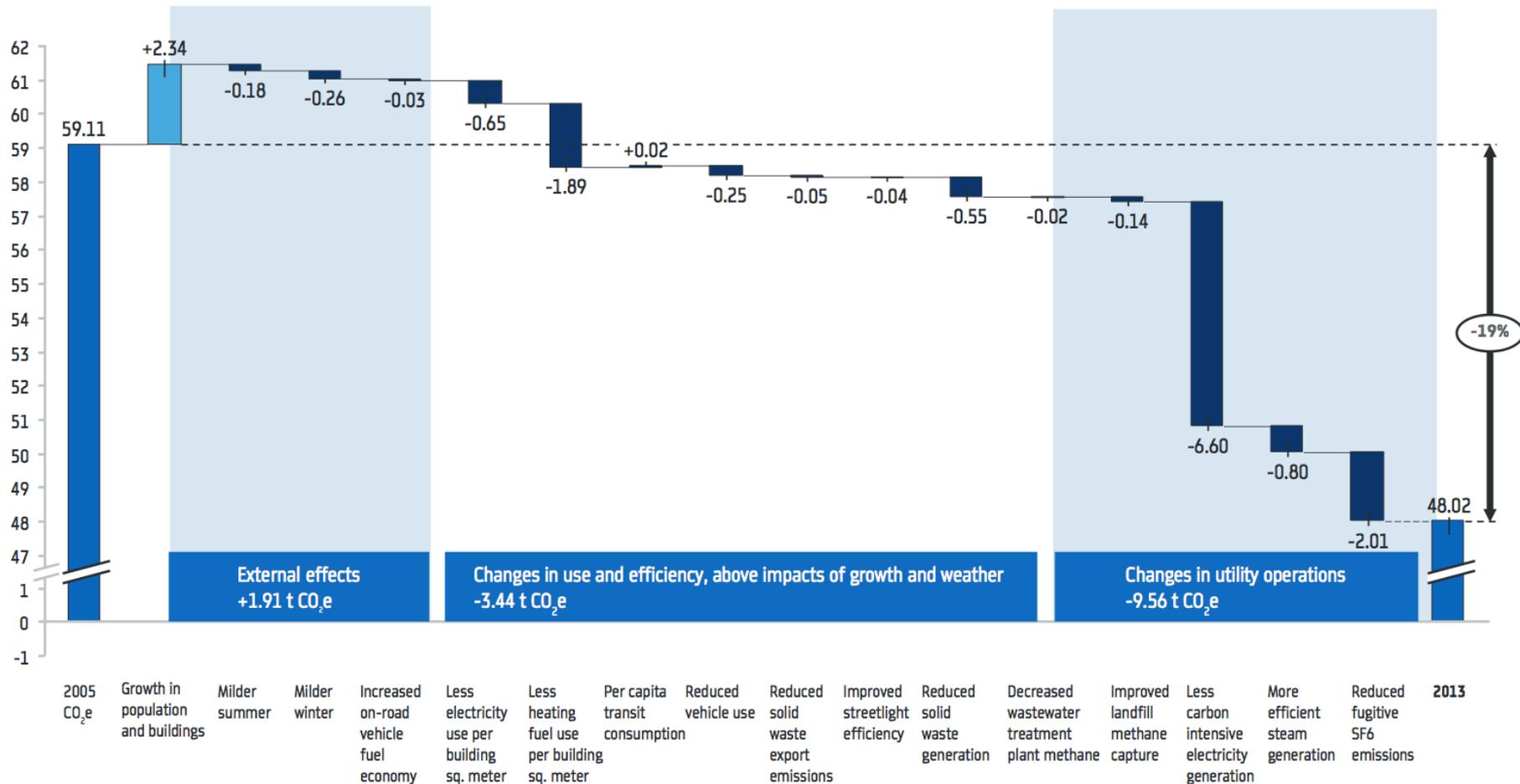
 Not on Track

 On Track

Achievements to Date

- 19% reduction in GHG emissions in 2013 from 2005 levels
- 11% reduction from electricity generation in 2013 from 2005 levels
- Decrease in total energy consumption by 8.1% in 2013 from 2005 levels despite population growth of 3.89% during this period
- Reduction in electricity and heating fuel use per unit of building floor area, and reduction in per capita vehicle use and solid waste generation
- Increase in biofuel use in buildings by over 1000% (76% reduction in fuel oil consumption)
- Enactment of stringent building energy efficiency laws; expansion of sustainable transport options; investment in infrastructure; and transition from coal and oil to natural gas for electricity generation
- Allocation of \$1 billion to improving energy efficiency of all city-owned buildings over the next decade

19% Reduction in GHG Emissions To-Date



Source: http://www.nyc.gov/html/planyc/downloads/pdf/NYC_GHG_Inventory_2014.pdf

Key Takeaways

- Support from Mayor and key administration officials was essential to success of plan.
- Involvement of 20 city agencies in research and analysis of city's challenges and solutions ensured **stakeholder engagement** in line with city's development objectives.
- Institutionalization through the Mayor's Office of Long-Term Planning and Sustainability provided **central management and coordination** of the Plan.
- External sustainability advisory board was valuable for providing **guidance for implementation**.
- Transparent and comprehensive public outreach process in the early stages of plan development was key to obtain **public support** and educate public on NYC climate change challenges.
- **Ambitious but achievable** goals help to build early wins and motivate continuous implementation.
- Defining **timeline for implementation**, responsible parties for each initiative, and allocated budget enhanced implementation of the Plan.

For more information, please
visit www.ec-leds.org and
[http://en.openei.org/wiki/Gate
way:Low_Emission_Developm
ent_Strategies](http://en.openei.org/wiki/Gateway:Low_Emission_Development_Strategies)