GLOBAL CLIMATE CHANGE AND CLEAN ENERGY

JULY 15, 2013

JENNY KANE

WELCOME

Days	Course
Tuesday-Wednesday	Integrating Global Climate Change Into Development
Thursday-Friday	Global Climate Change Adaptation
----------Weekend----------	
Monday-Tuesday	Global Climate Change and Clean Energy
Wednesday-Thursday	Global Climate Change and Sustainable Landscapes
Friday	GCC Monitoring and Reporting
----------Weekend----------	
Monday-Wednesday	Water and Climate Change Adaptation

2-DAY AGENDA FOR THIS COURSE

- **Day 1:**
  - Decoupling energy consumption and economic growth
  - Overview of renewable energy
  - Energy efficiency
  - Enabling environments for investments in clean energy
- **Day 2:**
  - Off-grid energy
  - Leveraging investments in clean energy
  - Low Emission Development Strategies (LEDS)
  - Nationally Appropriate Mitigating Actions (NAMAs)

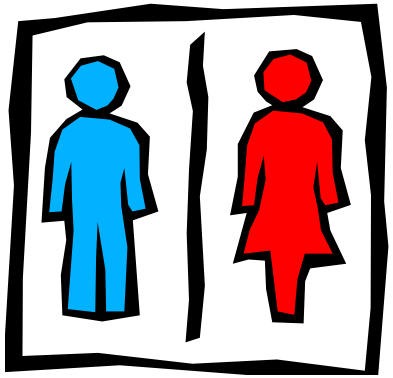
LEARNING OBJECTIVES

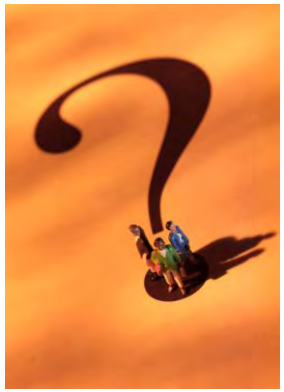
- Upon completion of this course on Global Climate Change and Clean Energy, participants should be able to describe:
  - How energy impacts economic development and climate change
  - The role that clean energy can play in mitigating greenhouse gas emissions and promoting economic development
  - What a Low Emission Development Strategy (LEDS) is and its various components
  - How USAID CE programs may be designed with CE Pillar funding

TRAINING TEAM

- **Trainers:**
  - Jenny Kane (USAID/E3, GCC Office)
  - Matthew Ogonowski (USAID/E3, GCC Office)
  - Gwen Andersen (Engility/IRG)
  - Todd Johnson (Engility/IRG Chief of Party)
  - Aieysha Kayani (Engility/IRG)
  - All of you!

TRAINING PROTOCOLS





PARTICIPANT INTRODUCTIONS

- Mission or Operating Unit
- Sector
- List one expectation of course

USAID
FROM THE AMERICAN PEOPLE

INTEGRATING CLEAN ENERGY INTO OTHER DEVELOPMENT SECTORS

JULY 15, 2013

GWEN ANDERSEN

ACTIVITY INSTRUCTIONS

- Discuss with your group various ways CE can be integrated into your assigned development sector
- Prepare the following on flip charts
  - 3 ways CE can be integrated
  - The business-case of why CE should be integrated. For example: **Agriculture**, solar water pumping on farms can be more cost-effective than ongoing use of expensive diesel fuel, and thus can save the farmer money.
- Be prepared to discuss your answers with the class

CAMBODIA IMPROVED COOKSTOVES

- Women‘s Empowerment
  - Increased Economic Power
  - Time Savings
  - Increased Voice
  - Strengthened Social Capital
  - Healthier Homes

ENERGY, DEVELOPMENT, AND CLIMATE CHALLENGE

JULY 15, 2013

GWEN ANDERSEN

SESSION OUTLINE

- Describe the links between energy, development, and climate change

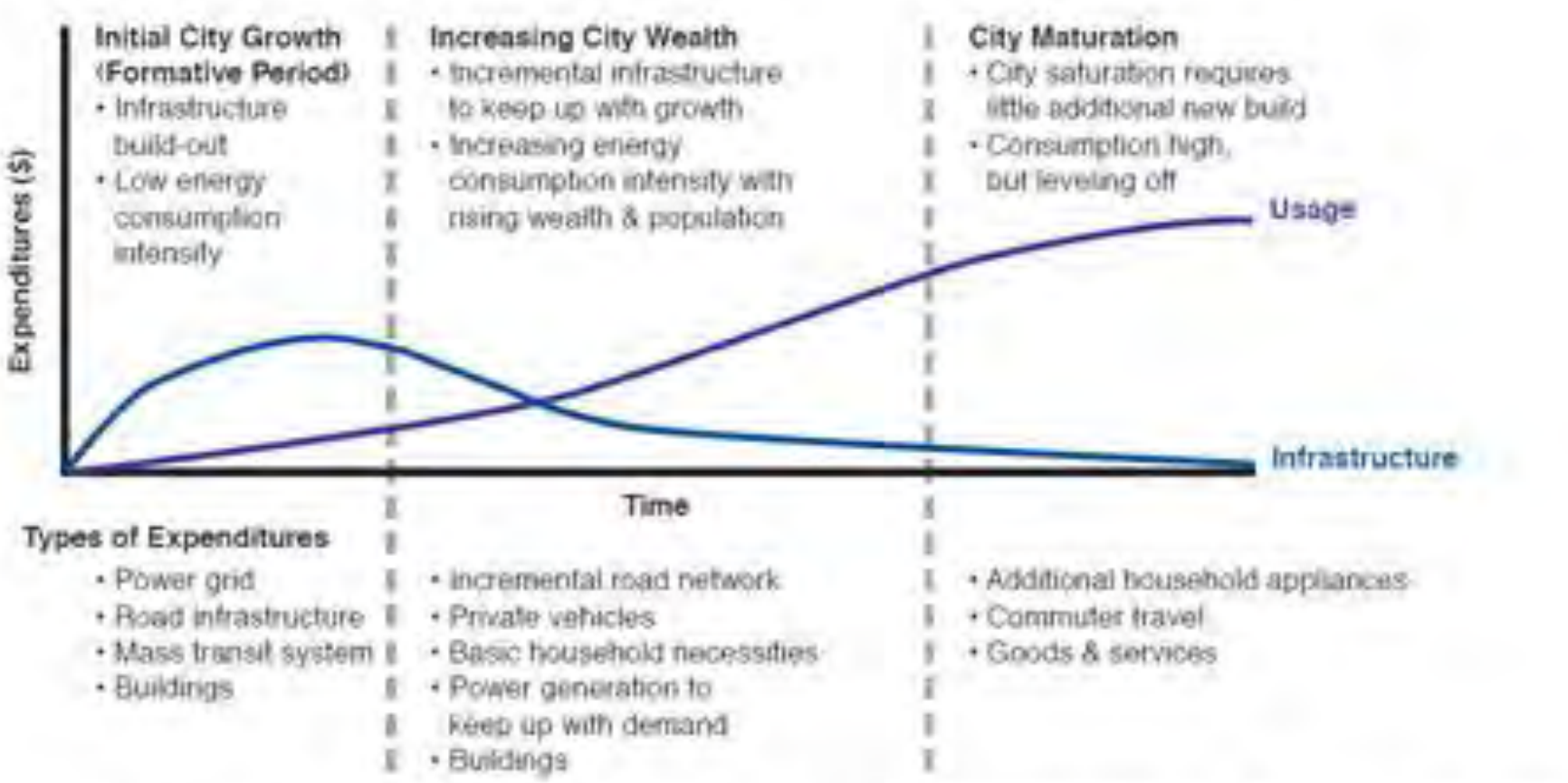
WHY IT MATTERS

- Modern Energy:
  - Electricity, liquid fuels for vehicles, natural gas for cooking
  - Critical input to economic development
- Virtually all economic activities require some inputs of energy

MODERN ENERGY: AN INVESTMENT IN PEOPLE

- Supports the effective delivery of health and education services
- Increases labor productivity
- Alleviates the disproportionate burden on women for water, food, and fuel supply
- Reduces environmental degradation
- Helps create and sustain democracy and good governance

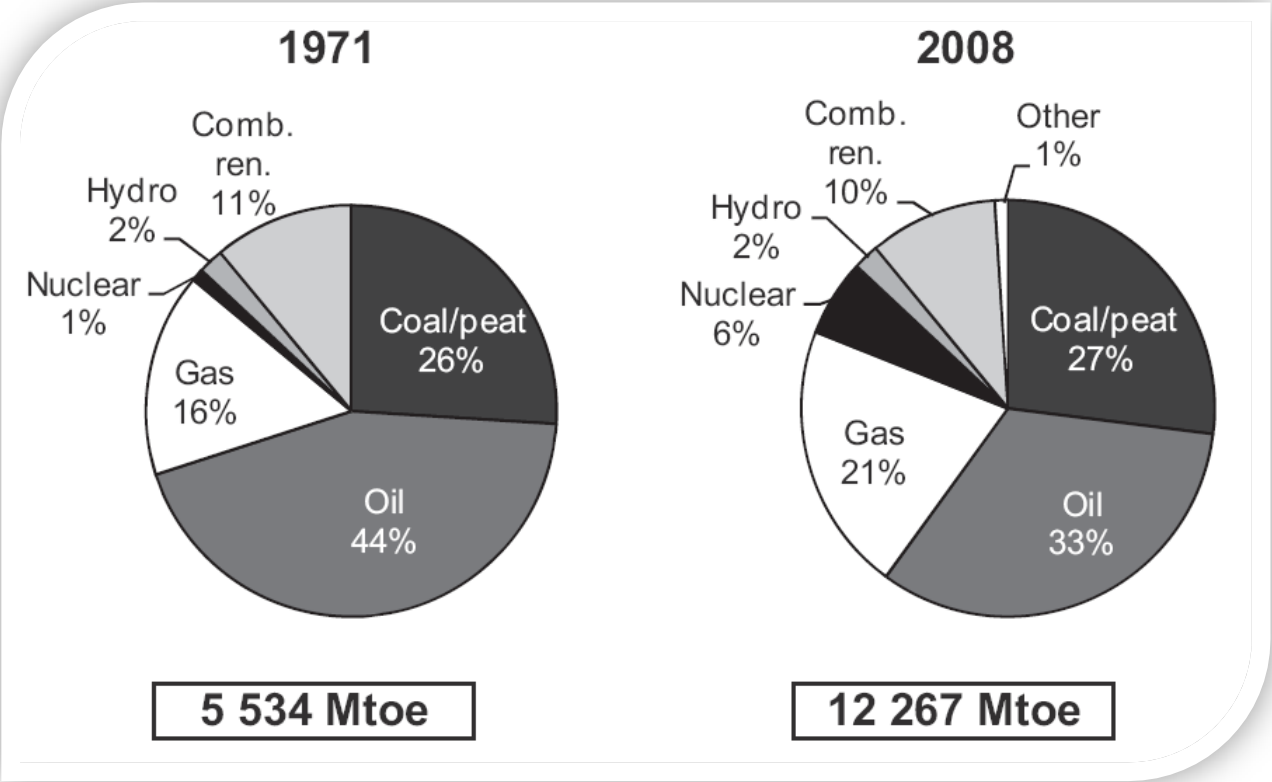
URBAN ENERGY CONSUMPTION INCREASES



Source: John E. Fernandez, "Resource Consumption of New Urban Construction in China," Journal of Industrial Ecology, Vol. 11, No. 2; Booz & Company analysis

GLOBAL ENERGY SUPPLY BY FUEL

- 81% of global energy consumption from fossil fuels
- Primarily oil [transport] and coal [electricity, heat]

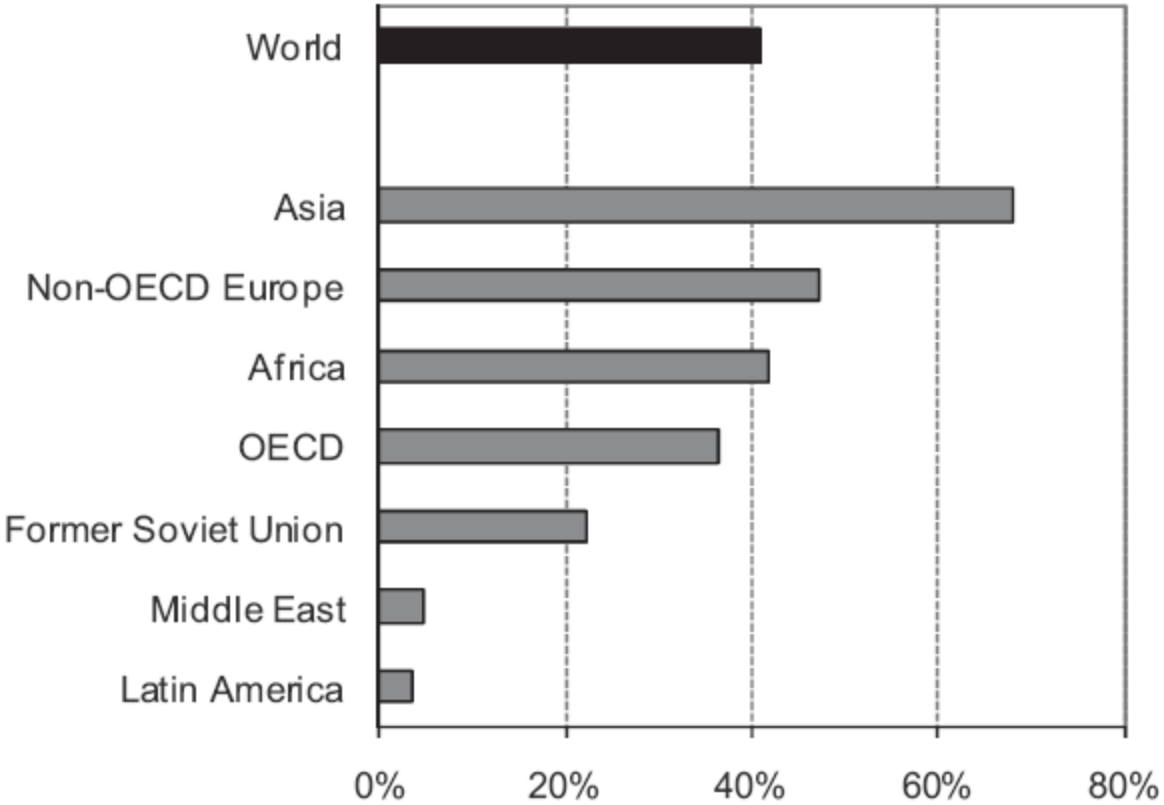


Mtoe = million tons of oil equivalent

International Energy Agency (IEA)

SHARE OF COAL IN ELECTRICITY GENERATION (2008)

- Coal provided 79% of electricity in China, 69% in India, and 41% in Indonesia



International Energy Agency (IEA)

CHINA'S COAL BOOM

- In the next 25 years, China is expected to consume more coal than US, Japan, and the EU put together
- China is world's largest coal producer (but can't dig it up fast enough)
- China will continue to import coal (mostly from Indonesia)

ENERGY, DEVELOPMENT, AND CLIMATE CHALLENGE

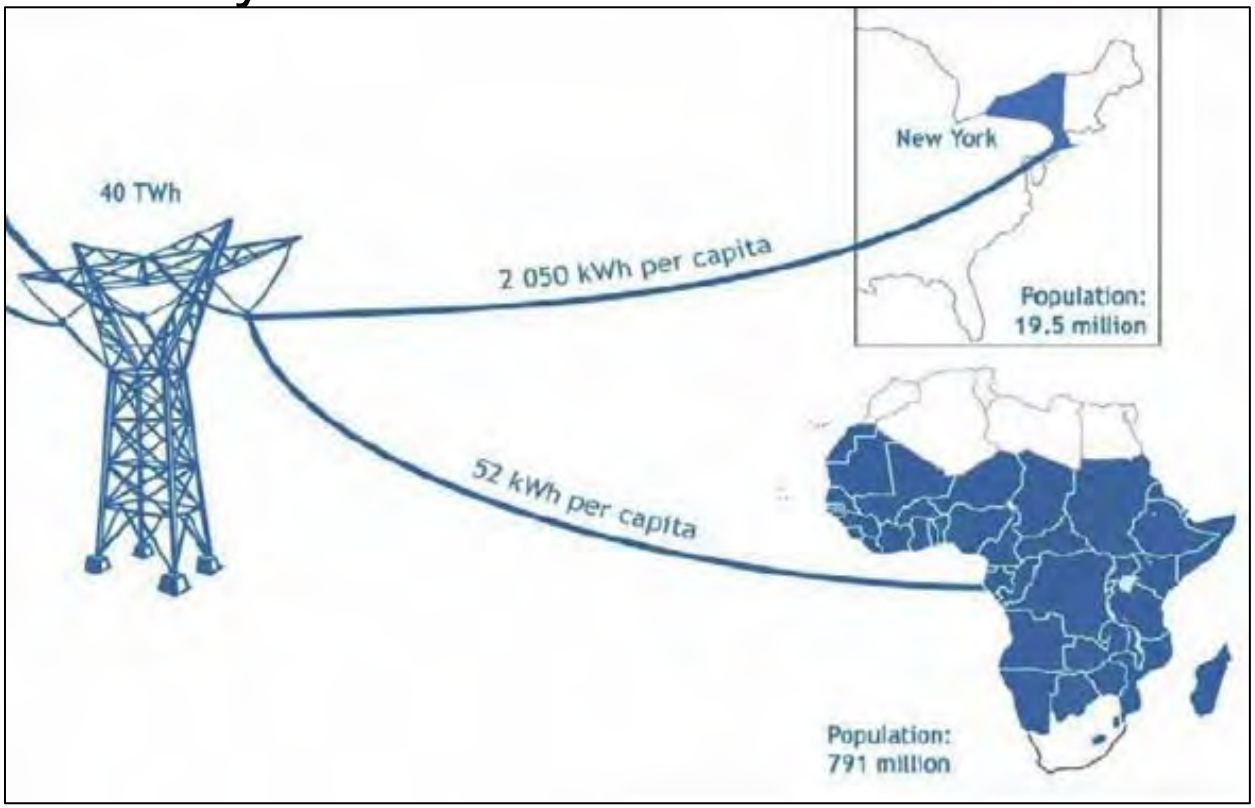
Key Challenge:

- Energy is crucial for development, but increasing fossil fuel energy use exacerbates climate change

ENERGY, DEVELOPMENT, AND CLIMATE CHALLENGE

Energy Poverty

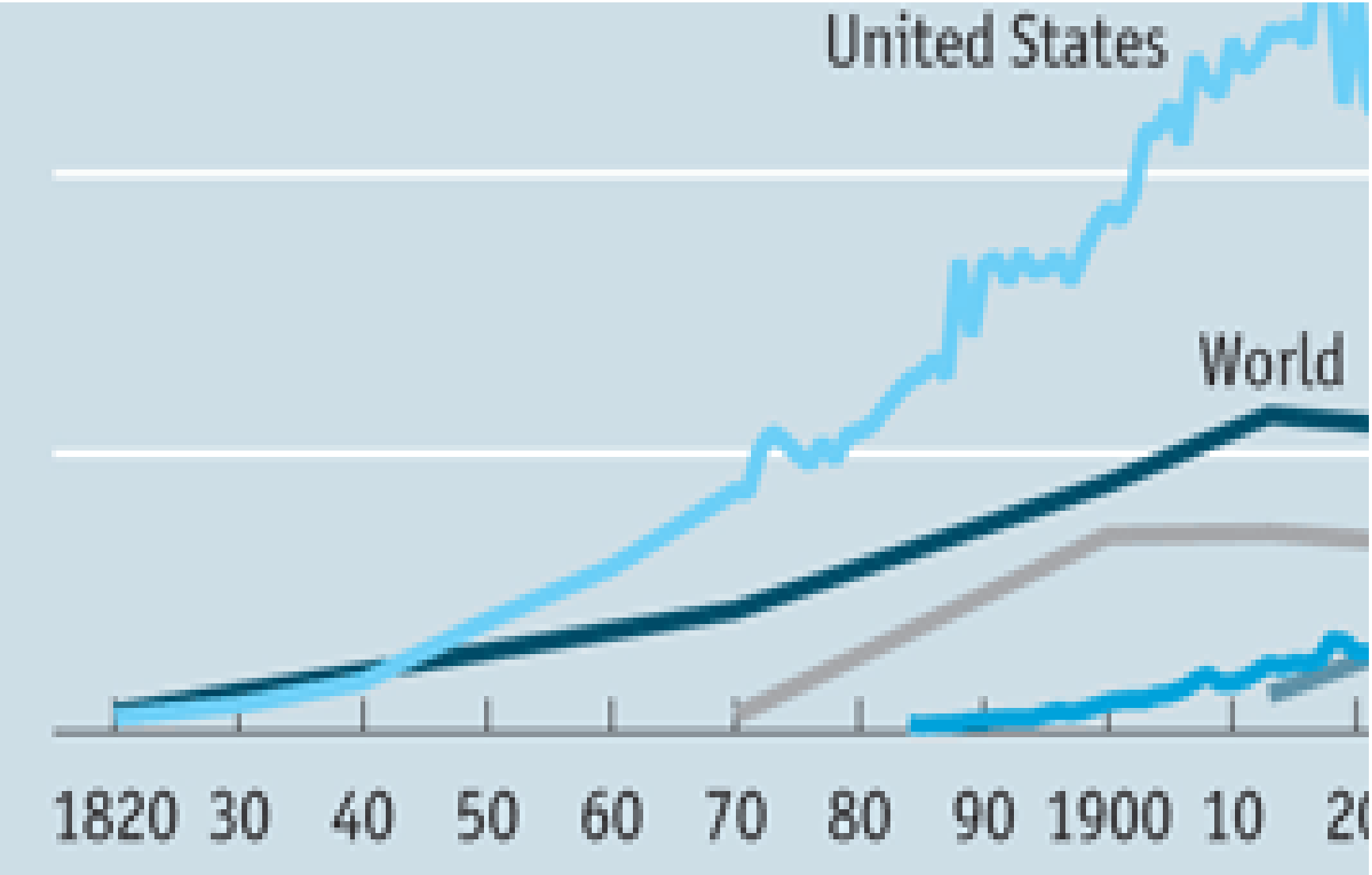
- 1.4 billion people without access to electricity
- 2.7 billion rely on traditional use of biomass for cooking



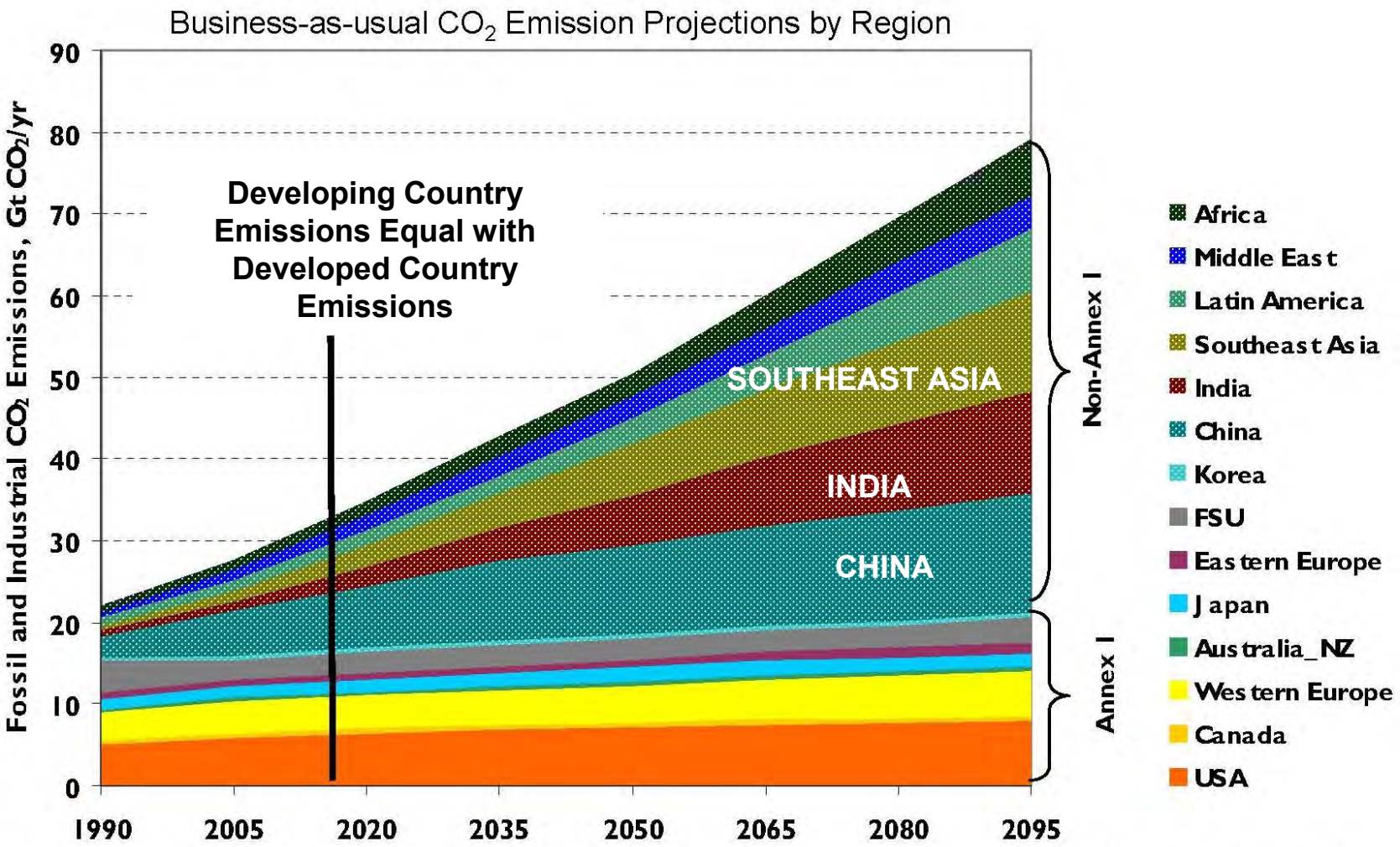
Source: IEA 2010

A GLOBAL VIEW OF EARTH AT NIGHT (NASA)

ECONOMIC GROWTH AND ENERGY USE



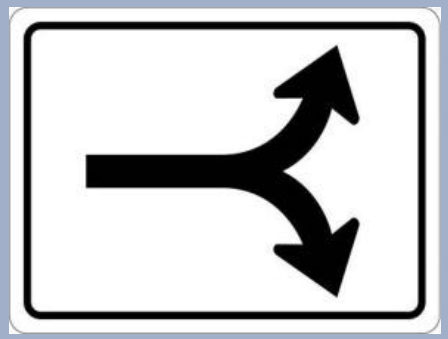
TRANSITIONS IN EMISSIONS BY REGION



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.

LOW EMISSIONS ECONOMIC GROWTH?

GDP



CO_2

Can these be decoupled?

CARBON INTENSITY OF AN ECONOMY

Country	tCO2e / Mill. $	Metric tons CO2e Per Person
World	471.7	5.8
Asia	625.1	3.9
United States of America	449.4	23.4
China	1,000.1	5.5
India	482.3	1.7
Indonesia	506.4	2.7
Vietnam	539.7	2.2
Philippines	278.6	1.6
Bangladesh	229.0	0.9

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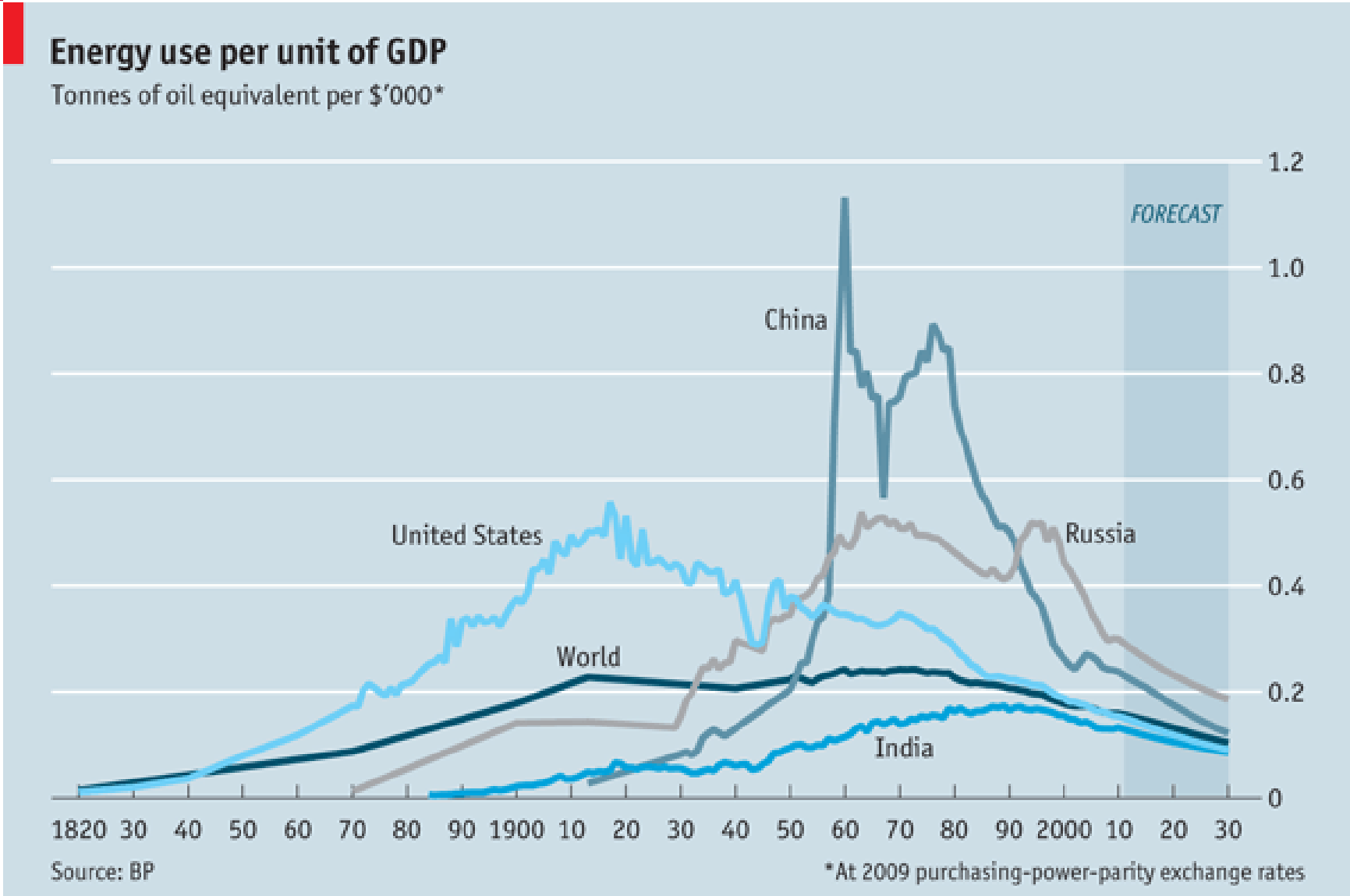
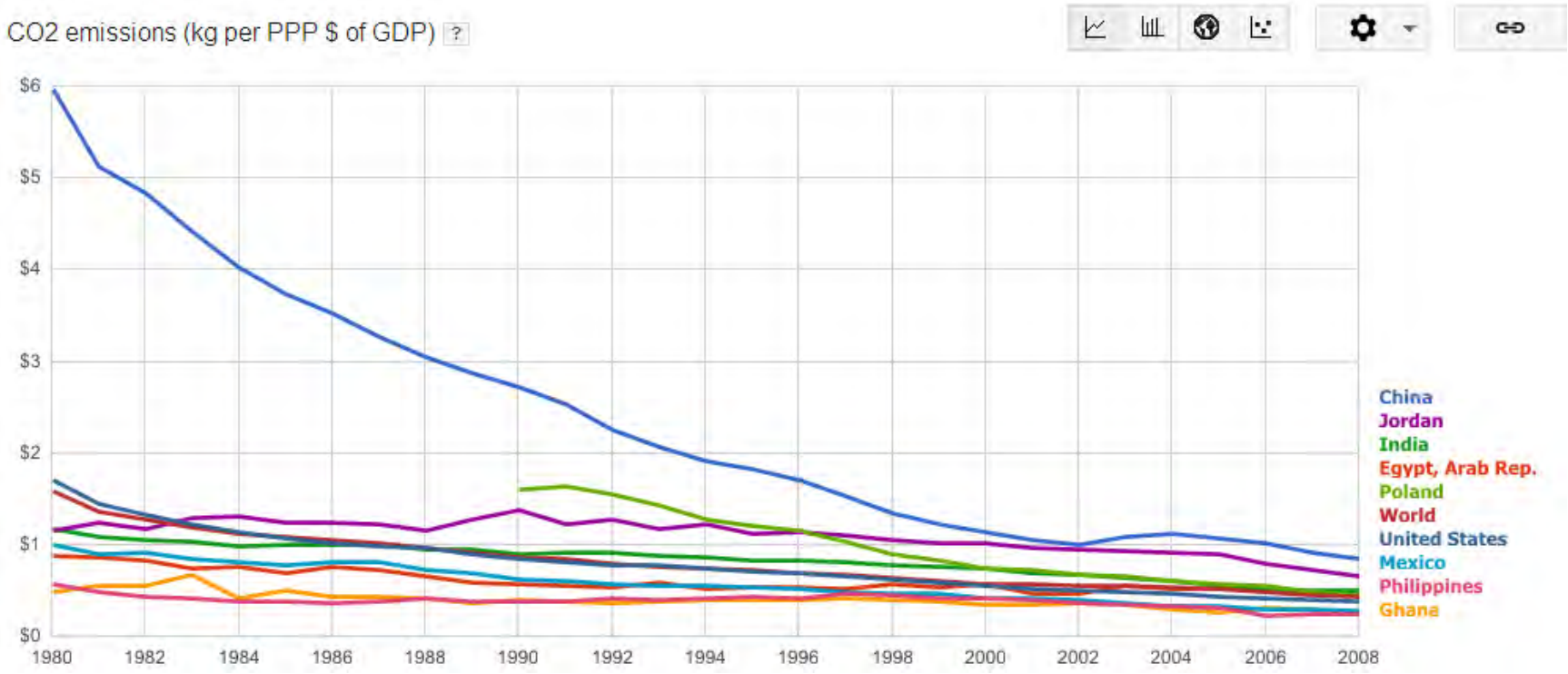
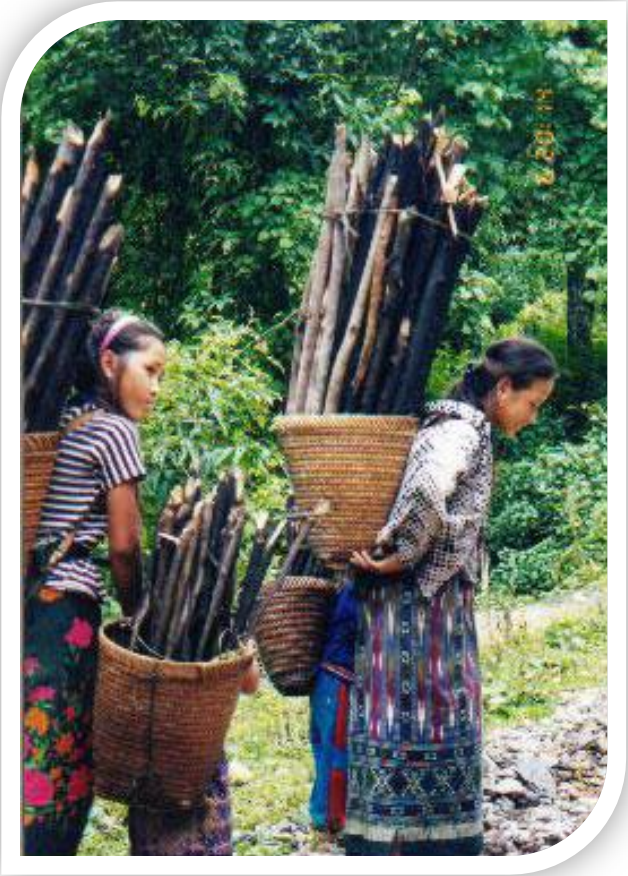
ENERGY INTENSITY DECREASES



CARBON INTENSITY OF ECONOMIES DECREASING



ENERGY, DEVELOPMENT, AND CLIMATE CHALLENGE



Top Development Priority:

Addressing energy poverty and providing the energy services necessary for development without significantly increasing GHG emissions

SESSION HIGHLIGHTS REVIEW

- Energy, economic growth, and GHG emissions are traditionally linked
- **Key Challenges:**
  - Energy is crucial for development, but increasing fossil fuel energy use exacerbates climate change
  - Addressing energy poverty without significantly increasing GHG emissions
  - How to achieve economic development and reduce long-term greenhouse gas emissions?

OVERVIEW OF USAID'S CLEAN ENERGY PILLAR

JULY 15, 2013

JENNY KANE & JEN LEISCH

OUTLINE – CLEAN ENERGY

- Context
- Pillar definition
- Programming guidance and indicators
- Programming examples

CONTEXT

- Developing countries making **energy investments** now that will impact **long-term** energy consumption and GHG emissions
- USAID sees energy as a **critical and cross-cutting input** with significant development impacts
  - Ex. Energy sector reform can strengthen democracy and governance
- USAID CE programming addresses **barriers to clean energy** development and deployment in developing countries
  - Ex. National policies and planning frameworks, energy sector reform, and creating and/or strengthening the enabling environment

USAID CLIMATE CHANGE BUDGET

	FY 2009 Estimates	FY 2010 Budget	FY 2011 Budget	FY 2012 Budget	FY 2013 Estimates
Adaptation	24	122	134.5	142	142.7
Sustainable Landscapes	90	74	139.9	114.5	107.9
Clean Energy	100	108	124	91.5	81.5
TOTAL	**214**	**305**	**398.4**	**348**	**332.1**

(millions of US$)

CC+D STRATEGY RESULTS FRAMEWORK

Goal: Climate-resilient low emissions development

Mitigation

SO 1 Accelerate transition to low emissions development

- **IR 1.1 Establish foundation for low carbon energy systems**
- **IR 1.2 Invest in land use practices that stop, slow, and reverse emissions from deforestation and degradation of forest and other landscapes**

Adaptation

SO 2 Increase resilience of people, places and livelihoods

- **IR 2.1 Improve access to science and analysis for decision-making**
- **IR 2.2 Establish effective governance systems**
- **IR 2.3 Identify and disseminate actions that increase climate resilience**

Integration

SO 3 Strengthen development outcomes by integrating climate change in Agency programming, learning, policy dialogues, and operations

- **IR 3.1 Integrate climate change across USAID's development portfolio**
- **IR 3.2 Elevate the role of development in climate change dialogues and policies**
- **IR 3.3 Lead by example through adoption of low emissions and energy-saving operations**

CC+D STRATEGY SO 1: MITIGATION

- **Anticipated outcomes**
  - Greenhouse gas (GHG) emissions reduced or sequestered through expanded use of clean energy or improved ecosystem management
  - Partner countries implement laws, policies, or regulations addressing climate change mitigation
  - Increased number of institutions with improved capacity to address climate change mitigation
  - Public or private resources leveraged for climate change
  - Low Emission Development Strategies supported in 20 partner countries

CLEAN ENERGY (CE) PILLAR DEFINITION

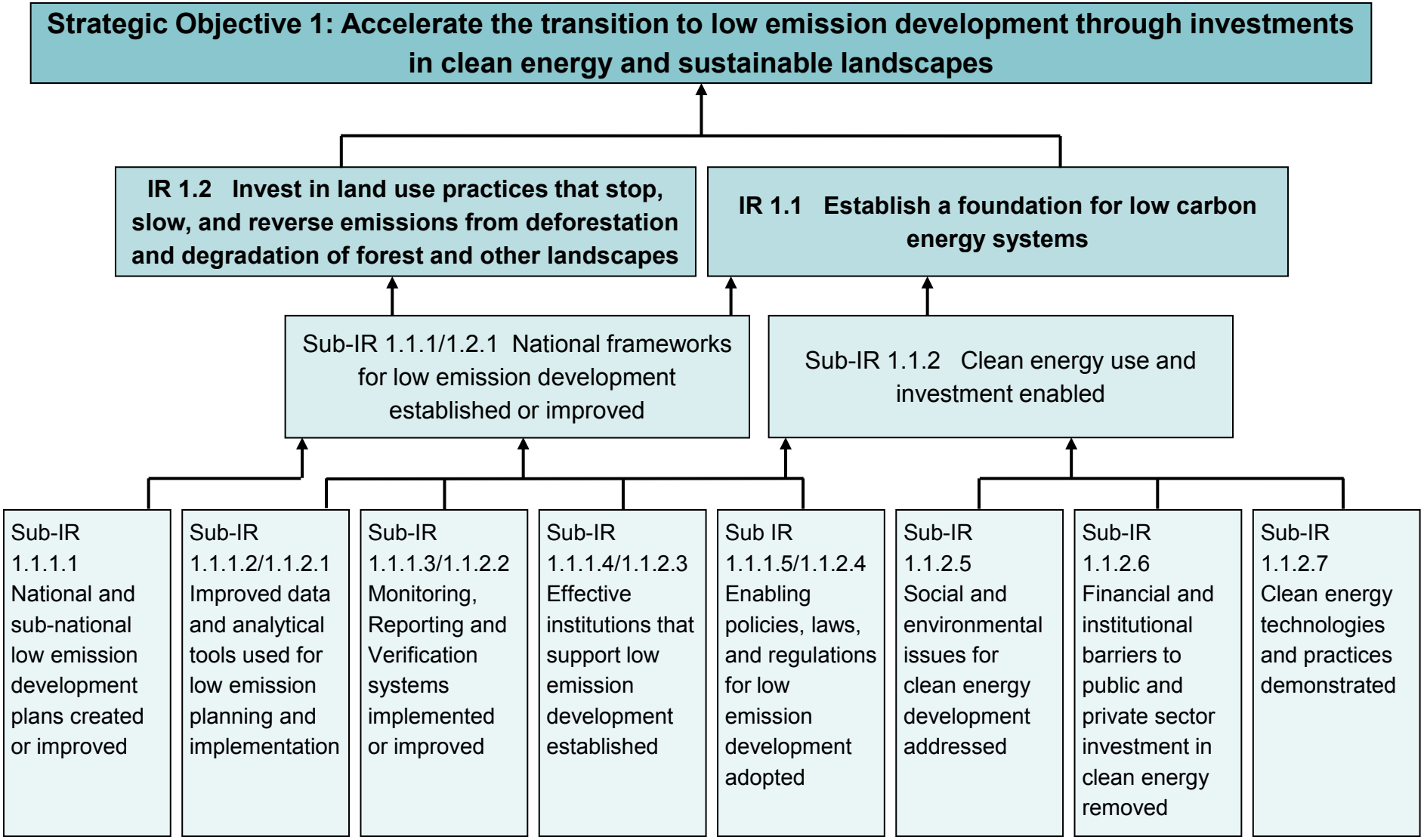
- **Goal:** enable countries to accelerate their transition to low emission development through investments in clean energy

- Programs work toward one or both of the following results:
  - **National frameworks for low emission development established or improved**
  - **Clean energy use and investment enabled**

- Supports activities that **reduce, mitigate, and/or sequester greenhouse gases** that contribute to global climate change

- Support and promote the **sustainable use of renewable energy technologies and end-use energy efficiency technologies, carbon sequestration, and carbon accounting**

DRAFT RESULTS FRAMEWORK FOR CLEAN ENERGY



USAID FY13 GUIDANCE ON CE PILLAR

Clean Energy Criteria Summary Table		
	Focused (Direct/Initiative)	**Indirect**
Funding Source	Focused Clean Energy control level	Any related sector outside of Focused GCC funds; including other Initiatives
Objective	Explicit, primary goal or objective of accelerating the transition to low emission development	Includes a climate change mitigation goal or objective
Priority Activities	• Creation and implementation of national and sub-national low emission development plans • MRV • Remove barriers to private sector investment in CE	Indirect funded programs encouraged, but not required, to address the Focused priorities
Required CE Reporting Sectors	• Renewable energy • Energy efficiency • Energy sector reform and Enabling Environment	Indirect funded programs also required to report against specific CE sub-sectors
Indicators	One or more GCC CE indicators, including **mandatory GCC CE indicator**: *Quantity of greenhouse gas emissions, measured in metric tons of CO_2-equivalent, reduced or sequestered as a result of USG assistance*	

ELIGIBLE CLEAN ENERGY PROGRAMMING EXAMPLES

- Assistance to develop and implement **Low Emission Development Strategies (LEDS)**
- **Renewable energy generation** and **demand-side energy efficiency**
- Strengthening **GHG inventory and accounting systems** and promoting **monitoring, reporting and verification** (MRV) systems, including carbon market readiness
- Developing or improving the **enabling environment** (policies, laws, regulations and institutions) for sustainable renewable energy and/or end-use energy efficiency programs

ELIGIBLE CE PROGRAMMING EXAMPLES (CONT.)

- Development and improvement in **energy transmission, distribution, and operating system infrastructure** (e.g. smart grids)
- **Regional power pool** development to enable renewable energy to be sold to markets without renewable energy resources
- **Efficient transportation** or comprehensive transportation planning, analysis, and strategy
- Creation of **domestic markets** and productive uses for the **previously flared gas**

NUCLEAR AND FOSSIL FUELS

- Expenditures on **nuclear power, gas, coal, and oil** for production, transmission, distribution, direct use, or electricity generation **do not qualify** for GCC-CE funding
- **Supply-side energy efficiency technologies** also **do not qualify** for GCC-CE funding
- In limited cases, an exception may be granted for electricity generation and gas transmission infrastructure using **gas that would otherwise be flared or vented**

EXAMPLES OF INDIRECT CE ACTIVITIES

- Promoting supply-side energy efficiency **through fuel switching of existing, high GHG-emitting fossil fuel power plants, retrofitting** these plants with more efficient turbines, and **installing more energy efficient transformers** in a power distribution grid with a large fossil generation component
- Replacing unregulated and highly polluting, small diesel generators with a few centrally located, **natural gas** generating facilities, **resulting in net greenhouse gas emissions reductions**
- Promoting **combined heat and power** (cogeneration) from fossil fuels (coal, oil and/or natural gas) in district heating

CLEAN ENERGY INDICATORS

Required Clean Energy Indicator:
Quantity of greenhouse gas emissions, estimated in metric tons of CO_2 equivalent, reduced, sequestered and/or avoided as a result of USG assistance

Other Clean Energy Standard Indicators:
Number of (national/subnational) laws, policies, strategies, plans, agreements, or regulations addressing climate change (proposed/adopted)
Institutions with improved capacity to address climate change issues
Investment leveraged (public/private)
Person-hours of training in climate change (or persons trained)
Number of beneficiaries with improved energy services (CE/other)
*Clean energy generation capacity installed or rehabilitated
*Expected lifetime savings from energy efficiency/ conservation

IMPROVING GHG INDICATOR REPORTING

CHALLENGES

- Diverse program types, structures, funding, project cycles
- Inconsistent reporting and methodologies; lack of standard internal protocol

RESPONSE

- Clean Energy Emission Reduction (CLEER) Protocol activity

APPROACH

- Improve reporting of the *GHG emission reductions* indicator through a 3-phase approach:
  1. Develop GHG Mitigation Indicator Protocol
  2. Conduct Pilot and Field Testing
  3. Design Tool to Estimate GHG Emissions Reduced

CLEER ACTIVITY COMPONENTS

- "General Approach" Tool and User Guide
  - Estimate GHG emission reductions from renewable energy, energy efficiency, and fuel switching
  - Users need to know electricity generated or conserved in reporting year
  - Will be available in Fall 2013 at: http://inside.usaid.gov/E3/offices/enviro_sci/climate/resources/GHGtools.cfm
- Reporting Guidance
- CLEER Protocol
- Tool with calculation modules for a wide variety of activity types (e.g., solar PV)
  - Provides methodologies for estimating energy savings if electricity generation or energy saved is not known
  - Will be available in 2014

CLEER PROTOCOL ACTIVITY

- **OUTCOMES**
  - Provide USAID Operating Units with a standardized methodology for measuring GHG impacts of GCCI programs, to help:
    - Streamline reporting
    - Identify high-impact activities
    - Monitor, evaluate, and verify program impacts
    - Deliver on Fast Start commitments
    - Reduce costs and staff resources
    - Assess emission reduction potential
    - Improve communication on impacts
    - Help align programs to GCCI & GCC Development Strategy
    - Measure benefits of indirect activities

- **ENGAGEMENT**
  - *Interested in participating*? The GCC Office is looking for OUs to pilot and field test the CLEER Protocol and tool
  - Contact: Jen Leisch (jleisch@usaid.gov)

SESSION HIGHLIGHTS REVIEW

- Key messages from this session:
  - **GCC-CE pillar activities should align with a country's low emission development strategy (LEDS)**
  - CE funding can be used for strengthening **legal/policy frameworks** (including energy sector reform), developing programs that enhance/facilitate **financing for CE technologies**, and **carbon market readiness**
  - Activities related to nuclear power and fossil fuels **do not qualify** for GCC-CE Pillar funding (exception for gas flaring in some cases)

RENEWABLE ENERGY OVERVIEW

JULY 15, 2013

MATTHEW OGONOWSKI & GWEN ANDERSEN

SESSION OUTLINE

- Understand why developing countries should promote renewable energy
- Gain a basic understanding of key barriers and drivers to RE development
- Understand examples of USAID Renewable Energy projects and lessons learned

WHY IT MATTERS

- Modern energy is the basis of economic growth of industrialized society
- Economic growth helps improve quality of life
- USAID is working in clean energy because it is a way to
  - Promote economic development
  - Reduce greenhouse gas emissions
  - Use domestic energy
  - Create local jobs
  - Reduce fossil fuel imports

KEY ASPECTS OF RENEWABLE ENERGY SOURCES

- Energy sources that are continuously replenished by natural processes
- Flows of energy rather than stocks of energy
- Few or no greenhouse gas emissions
- USAID Development Specific
  - Should have a net benefit to society

RENEWABLE ENERGY RESOURCES

- **Solar**
- Geothermal
- Biomass
- Wind
- Hydro

RENEWABLE ENERGY RESOURCES

- Solar
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RENEWABLE ENERGY RESOURCES

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- Hydro

RENEWABLE ENERGY RESOURCES

- Solar
- Geothermal
- Biomass
- **Wind**
- Hydro

RENEWABLE ENERGY RESOURCES

- Solar
- Geothermal
- Biomass
- Wind
- **Hydro**

RENEWABLE ENERGY COMMON OBJECTIVES

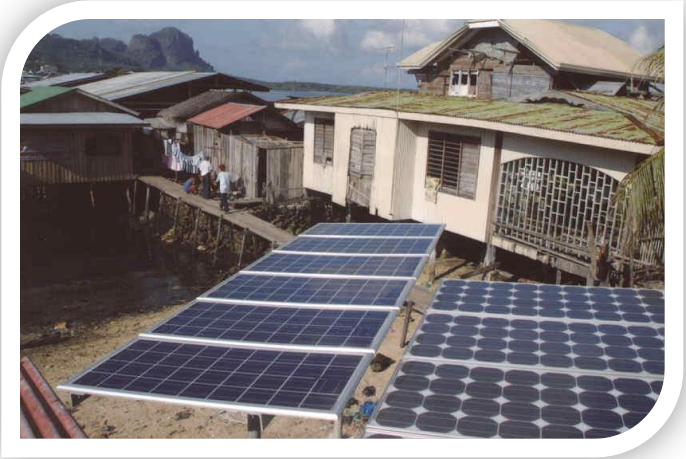
Why should developing countries promote RE?

What benefits does it bring to a country/economy?

1. Economic growth and stability
2. Energy security
3. Greenhouse gas (GHG) reductions

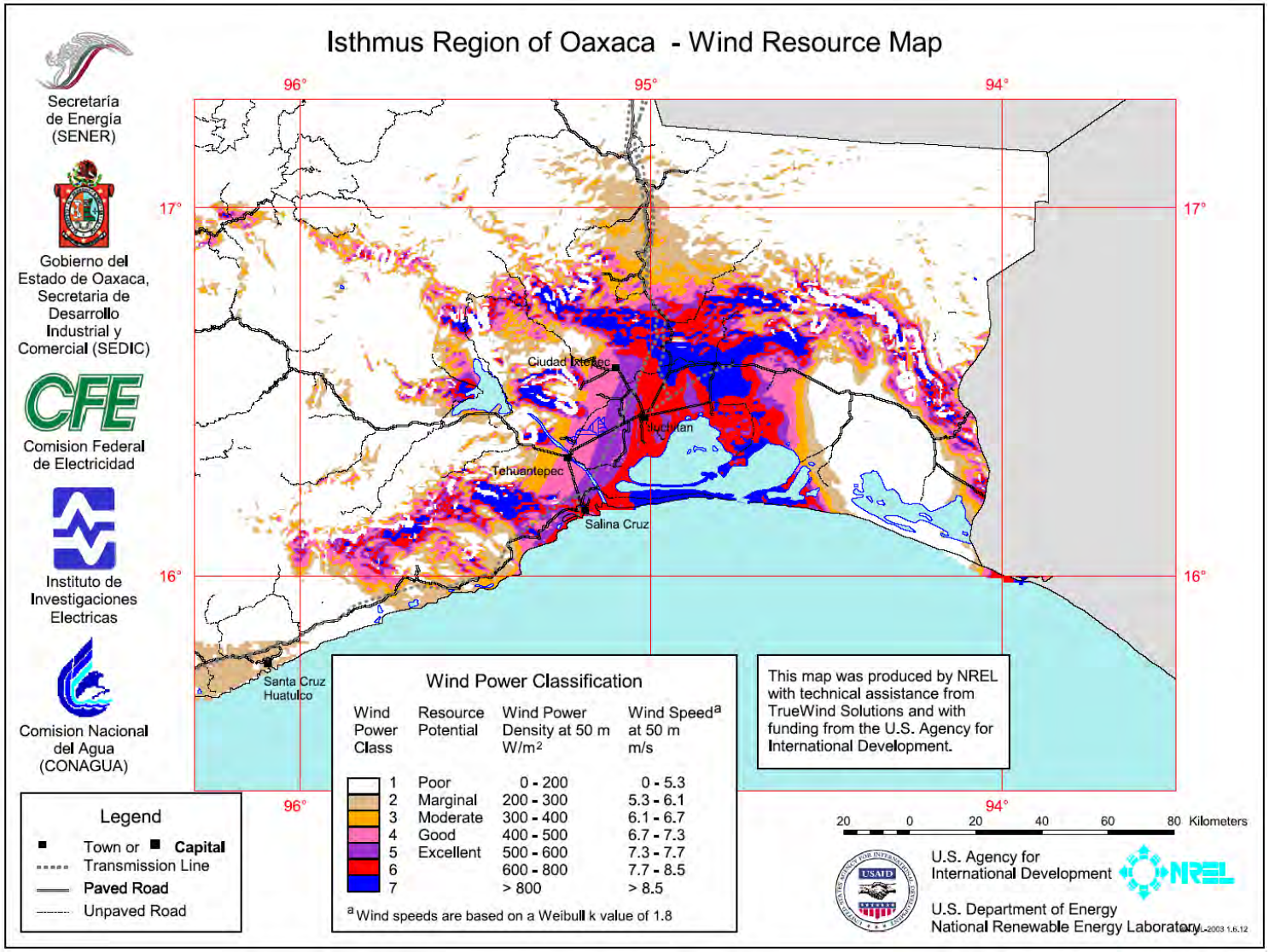
ALLIANCE FOR MINDANAO OFF-GRID RENEWABLE ENERGY IN THE PHILIPPINES (AMORE)

- Solar home systems and micro-hydro installations
- Over 400 remote communities
- Serving over 13,000 households



Technology	Components	Load
PV Battery Charging System (PV BCS)		
PV Solar Home System (PV SHS)	20 to 50 watt-peak	2-3 CFL lamps radio black & white TV
PV Communal System	210/300 watt-peak lighting systems in schools, health centers and/or community centers	4-5 units CFL lamps LCD TV DVD player sound system
Micro Hydro	20 to 45 kilowatts	

WIND RESOURCE MAPPING IN OAXACA, MEXICO



SESSION HIGHLIGHTS REVIEW

- Renewable energy can contribute to grid-connected generation, but also has significant potential for off-grid applications
  - Very suitable for remote and rural applications in developing countries
- The emphasis of USAID RE support is in creating a supportive market and regulatory climate, or ~~"~~enabling environment," to advance RE development
  - Enabling environment to be discussed more later

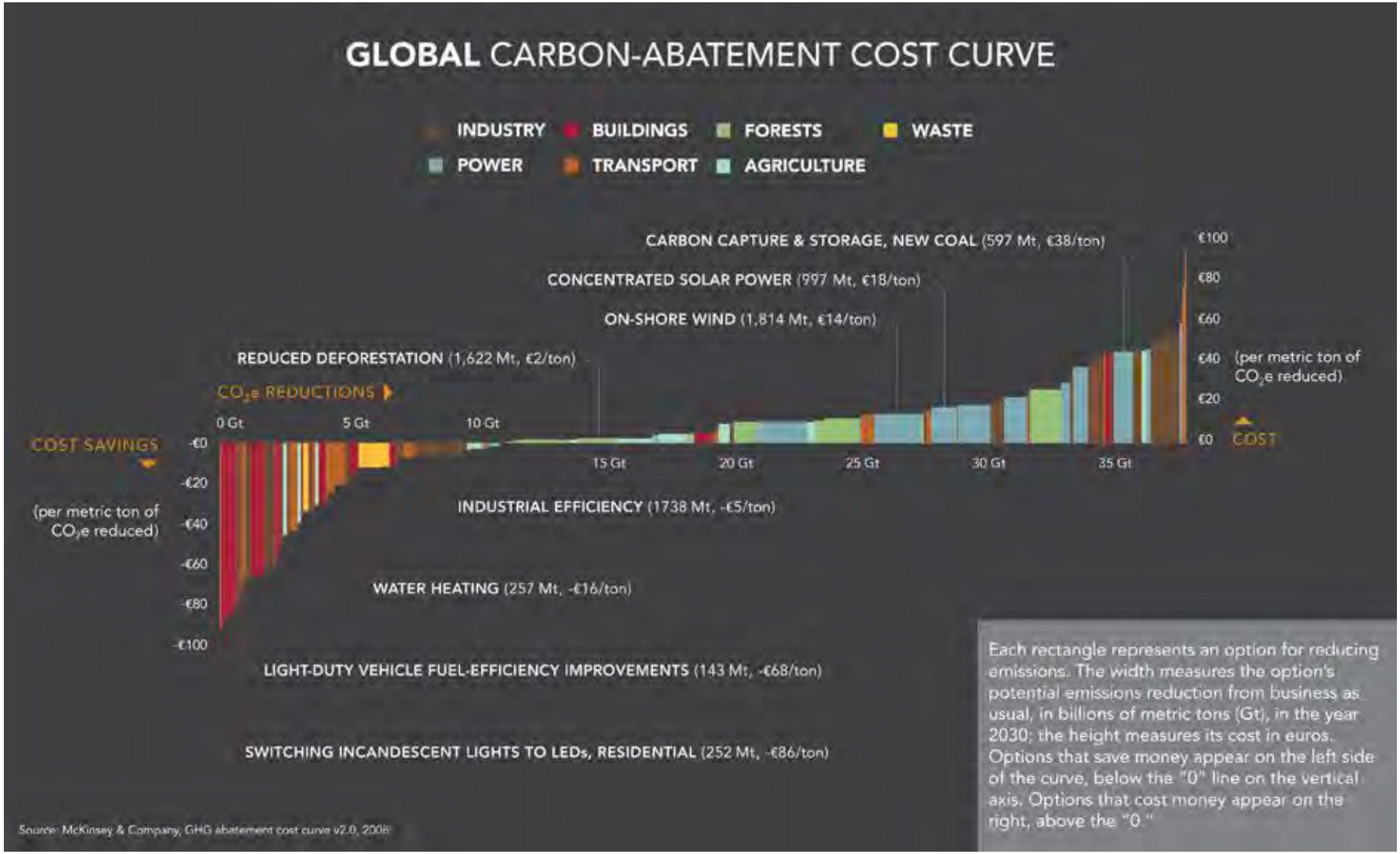
ENERGY AND BUILDING EFFICIENCY OVERVIEW

Gwen Andersen
July 15, 2013

SESSION OBJECTIVES & OUTLINE

- Understand basic principles of EE and BE
- Understand why developing countries should promote energy and building efficiency
- USAID/Mission project examples

WHY IT MATTERS



WHY SHOULD WE CARE AT USAID?

- EE and BE support USAID GCC mission of mitigating the impacts of climate change by reducing greenhouse gases
- Contribute to sustainable development, energy security, and independence
- Allows indigenous and primary resources to go further
- Benefits include improved air quality and health

KEY ASPECT OF ENERGY EFFICIENCY

- Reduce the amount of energy required to provide products and services

- Maximize the benefits of energy use while minimizing the cost and environmental impact

BENEFITS OF INCREASED ENERGY EFFICIENCY

- Reduces dependency on energy imports - potential national security benefit
- Extends the life of primary energy reserves
- Reduces costs to users
- Reduces needed investment in generation and transmission capacity
- Reduces negative environmental impact

WHAT IS SUPPLY SIDE ENERGY EFFICIENCY?

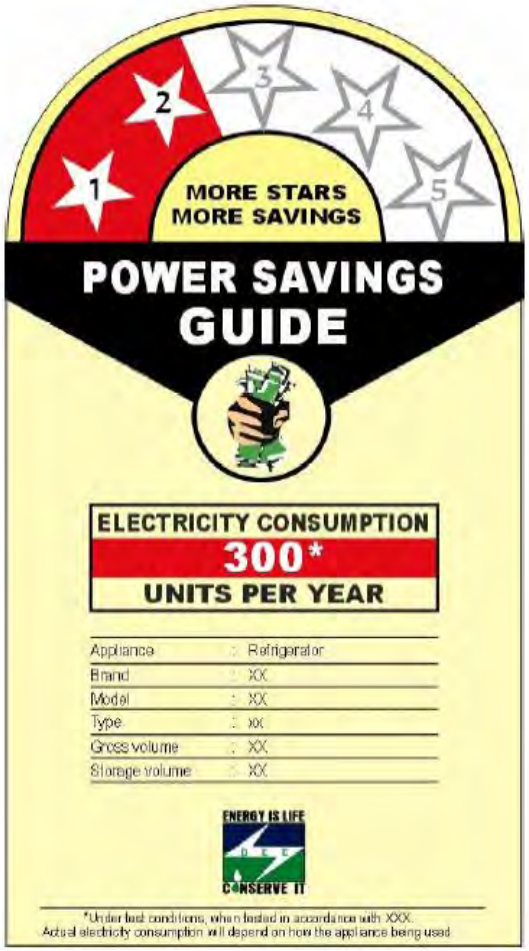
- **On the supply side (Utility side of the meter or fuel pump)**
  - More efficient generation/conversion
  - More efficient transmission and distribution systems

WHAT IS DEMAND SIDE ENERGY EFFICIENCY?

- **On the demand side (Customer's side of the meter)**
  - More efficient equipment
    - e.g. – lighting, motors, boilers
  - Improved equipment maintenance
  - Operational optimization
    - Improved metering of fuel, electricity and steam flows and of key operating parameters such as temperatures
  - Behavioral change on the part of the energy user

TYPES OF ENERGY EFFICIENCY PROGRAMS

- Development of —branding” programs (i.e. standards and labeling)
- Raising awareness of energy consumption issues
- Encouraging energy auditing and energy assessment
- Development of energy efficiency best practices
- Development of institutional capacity and human resources for implementation of EE interventions
- Support for technology R&D



BUILDINGS AND DEVELOPING COUNTRIES

- GHG emissions from buildings are expected to increase sharply, mainly due to construction booms in Asia, the Middle East and Latin America
  - Building GHG emissions could almost double by 2030 to reach 15.6 billion tons of $C0_2e$ (IPCC)
- Buildings and construction sector has large potential for cutting GHG emissions
  - Energy consumption in both new/old buildings can be cut by 30-50% without significantly increasing investment costs

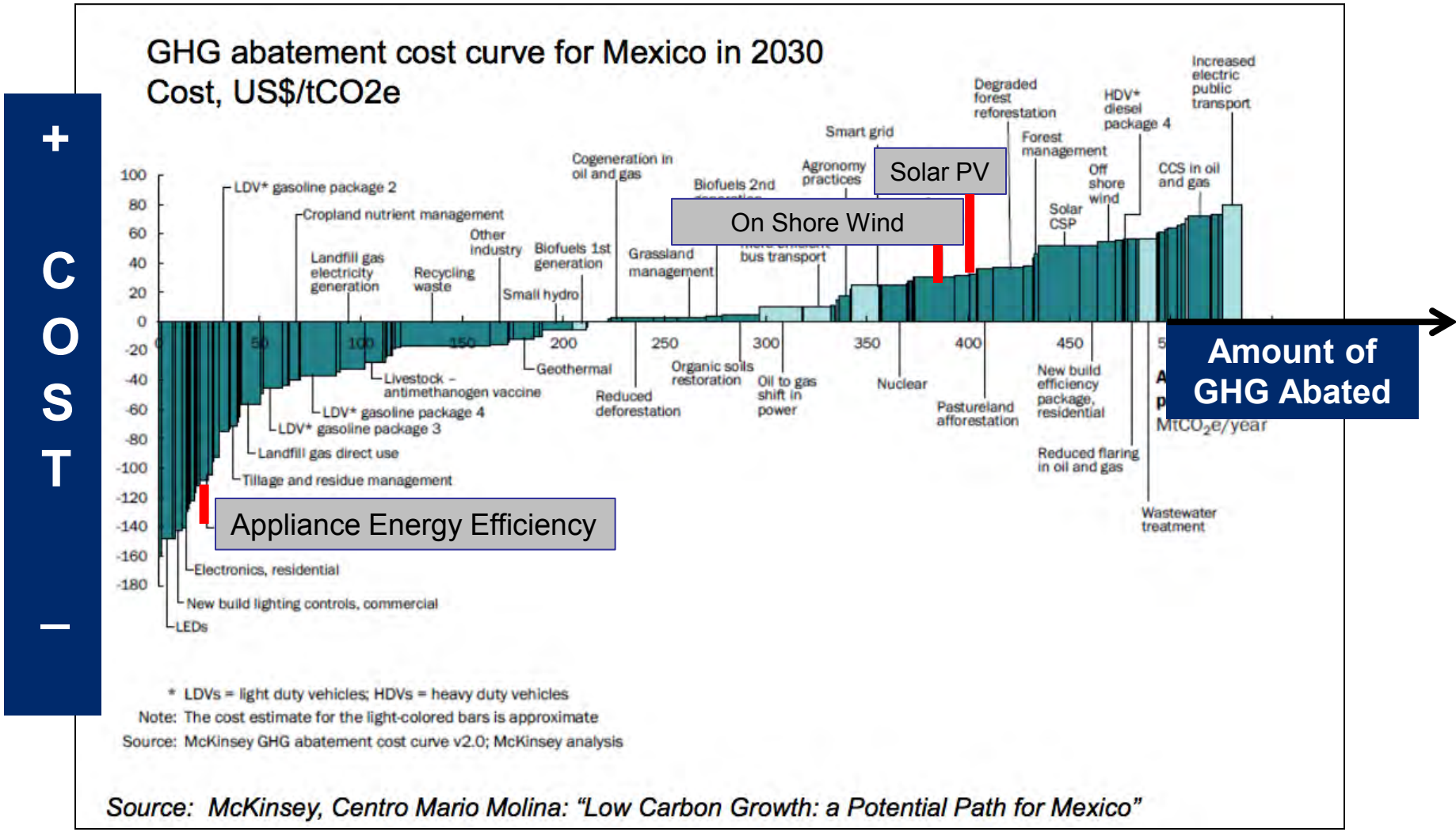
“GREEN” BUILDINGS: LEED CRITERIA

Characteristics
• **Sustainable sites (landscaping)** • **Water efficiency** • **Energy efficiency** • **View/access to daylight by all workers/students (increases productivity)** • **Waste reduction, recycling and sustainable purchasing** • **Indoor air quality (ventilation, plants, low VOC)** • **Regional considerations**

REPORTED BENEFITS OF "GREEN" BUILDINGS

- Reduced operating expenses in Denver building by ~$75,000/yr
- North Carolina: students consistently score higher on tests; workers reported productivity gains of up to 16%
- A grocery store headquarters diverted 88% of its construction waste from landfills
- EPA building in Sacramento saved $610,000/year
- Eastgate Centre in Harare, Zimbabwe: 90% energy savings (temperature regulated using design methods)

GHG ABATEMENT POTENTIAL AND COST EFFECTIVENESS

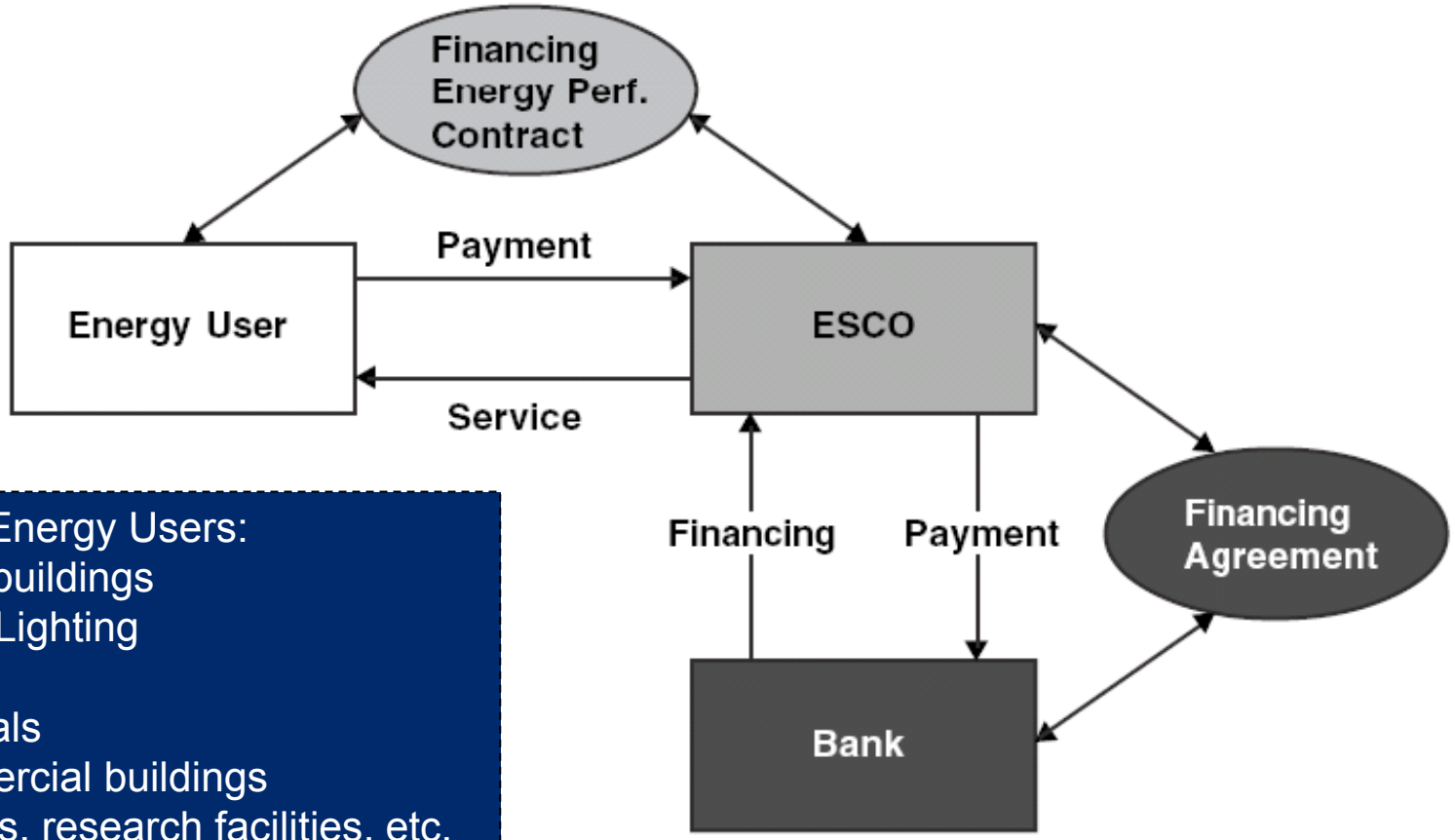


Source: McKinsey, Centro Mario Molina: "Low Carbon Growth: a Potential Path for Mexico"

COMMON BARRIERS TO ENERGY AND BUILDING EFFICIENCY IMPLEMENTATION

- Lack of policy and regulation
- Investors unaware of the potential of BE and EE
- Lack of technical capacity to identify, evaluate, justify and implement EE and BE projects
- Low tariffs for electricity
- Financial / investment barriers (short-term vision)

ENERGY SERVICE COMPANY (ESCO) MODEL



Example Energy Users:
- ✓ Office buildings
- ✓ Street Lighting
- ✓ Hotels
- ✓ Hospitals
- ✓ Commercial buildings
- ✓ Schools, research facilities, etc.
- ✓ Factories, etc: Industrial Fields.

USAID DEMAND SIDE ENERGY EFFICIENCY EXAMPLE

- Pakistan USAID Tubewell Efficiency Improvement Project (TWEIP)

USAID/INDIA: ECO PROJECT

- ECO Project: bilateral project between U.S. and Government of India
  - Phase I: helped India set up the Bureau of Energy Efficiency (BEE)
  - Phase II: helped develop energy conservation strategies and establish India‘s first energy efficiency codes for buildings
  - Phase III: helping BEE
    - Implement building codes
    - Improve energy efficiency in building sector
    - Develop capacity of states to implement energy efficiency programs
    - Establish efficiency centers and institutions

SESSION HIGHLIGHTS REVIEW

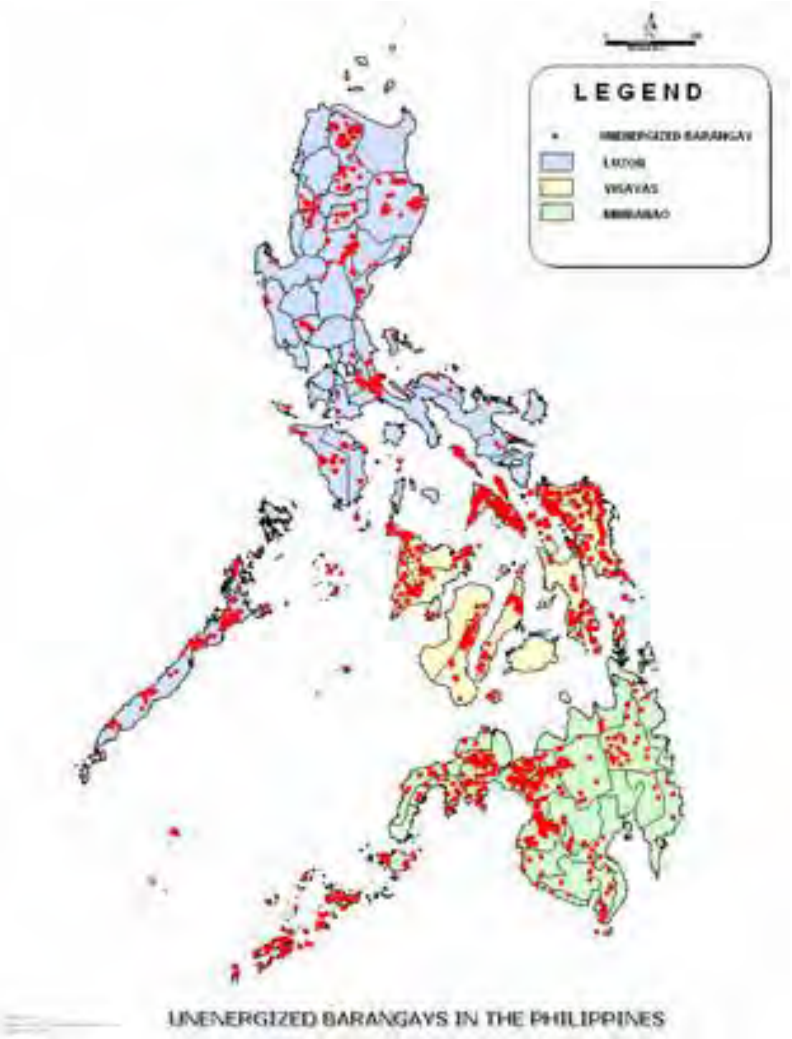
- EE is typically the cheapest way to reduce GHG emissions, often resulting in cost savings
- EE reduces the amount of energy required to achieve the same service
- Reducing energy use reduces energy costs and may improve economic competitiveness
- EE may slow down the rate at which domestic energy resources are depleted and provide other benefits (health, economic, national security, etc.)
- Buildings provide many cost effective opportunities to improve efficiency

Enabling Environments

A Story

Electrification in the Philippines

In 2004, 3,182 Barangays were without electricity



Provinces with Lowest Electrification Rates

PHILIPPINE ENERGY DIGEST

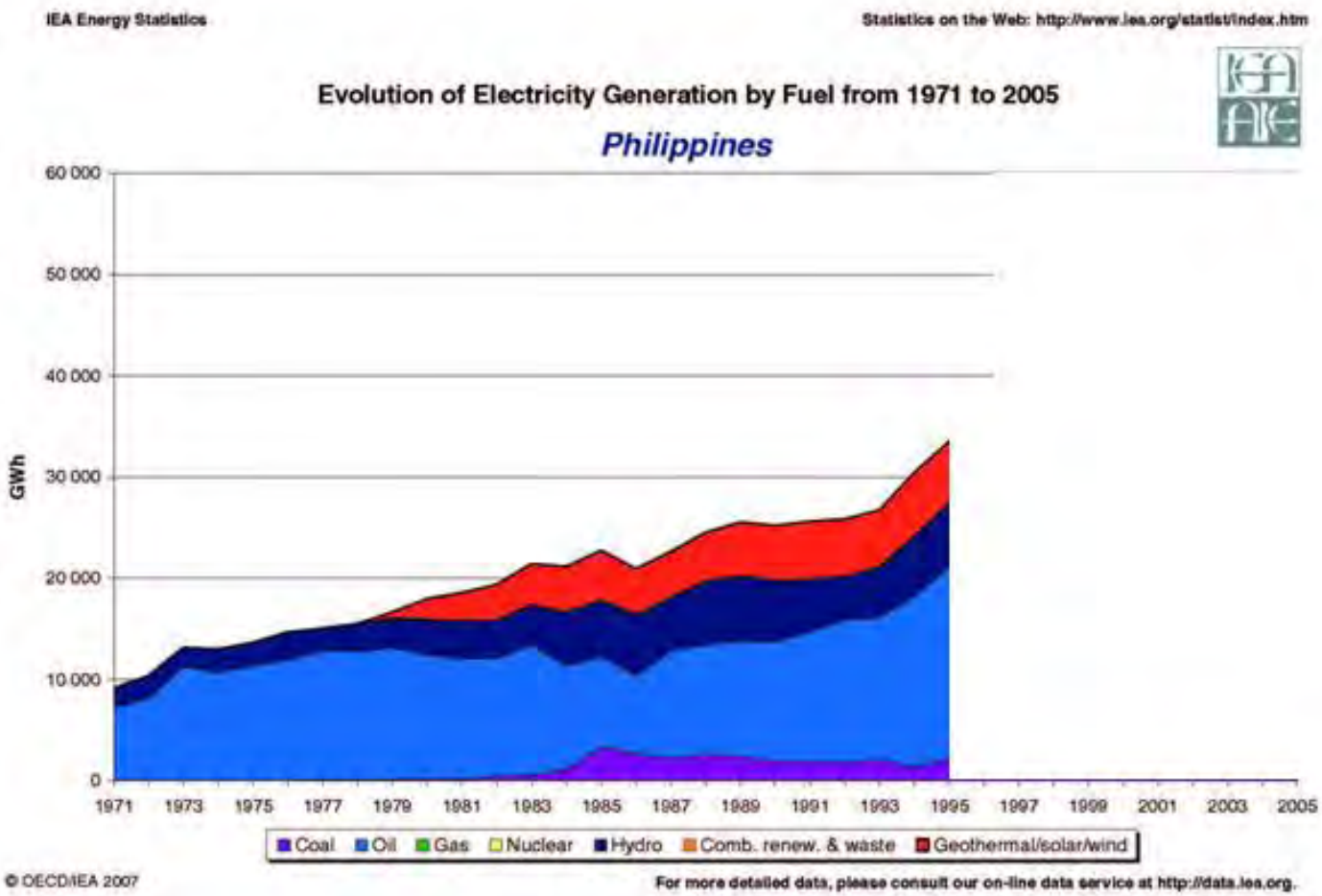
Tracking the sector's development towards reliable electricity and energy self-sufficiency

Why energy?

Maybe you remember the 80s. We do. A brownout a day kept everything else away. Now, we're on the road to reform. Self-sufficiency? Low-cost energy? Reliable, continuous supply of energy? The journey is far from over.

We don't like brownouts, whether they're scheduled, rotating or caused by jellyfish. We don't like oil and electricity price hikes. We like energy. Cheap, reliable energy.

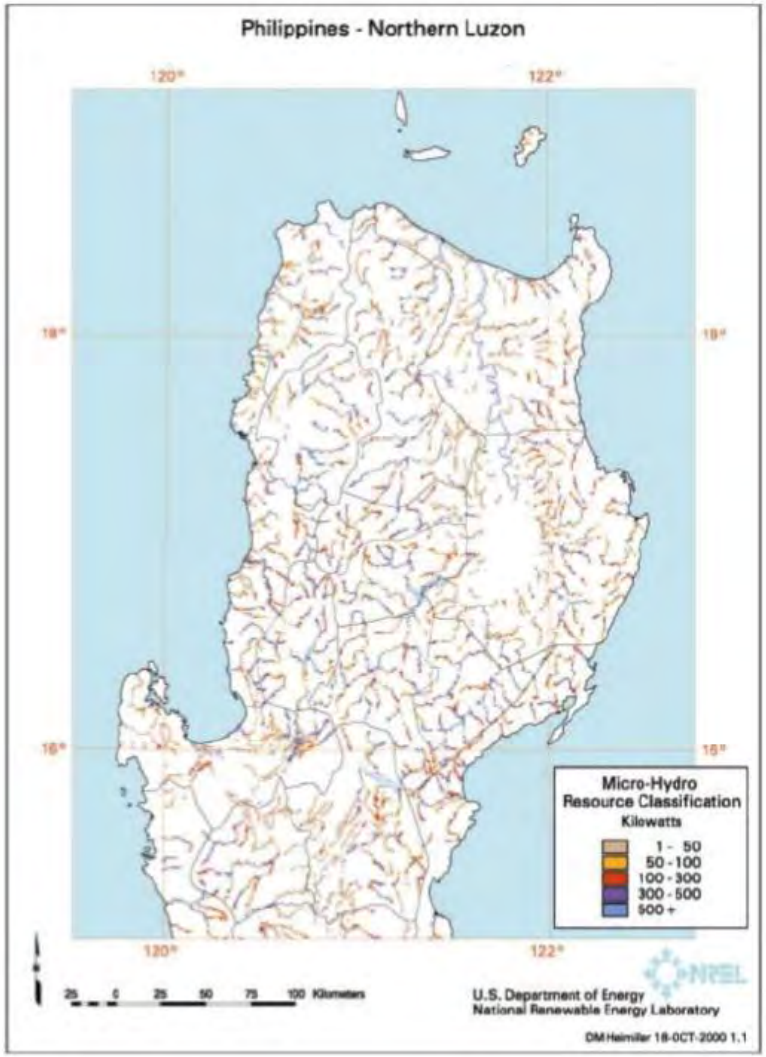
Sources of Electricity in 1995



Electricity Use 1995

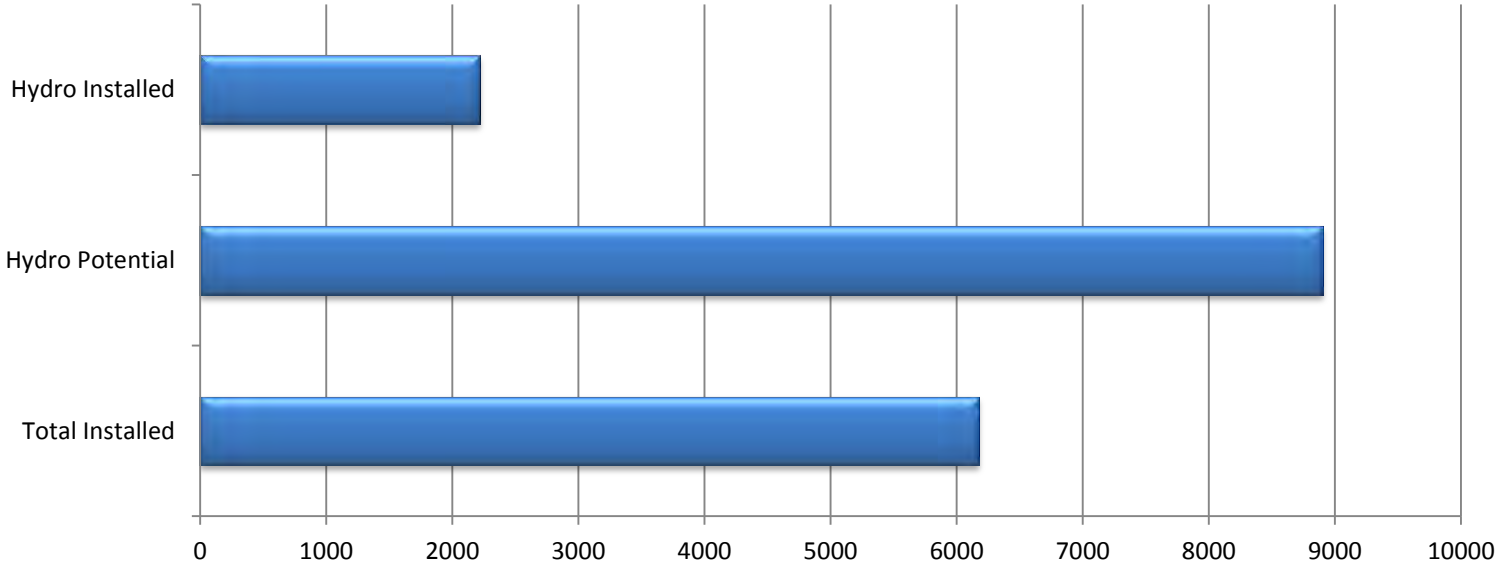
- Total installed electrical capacity = 6174 MW
- Geothermal potential in 1990s estimated > 4000 MW
- Installed geothermal was meeting 22% of power needs but estimated potential could have met much more

Micro Hydro Resource Map

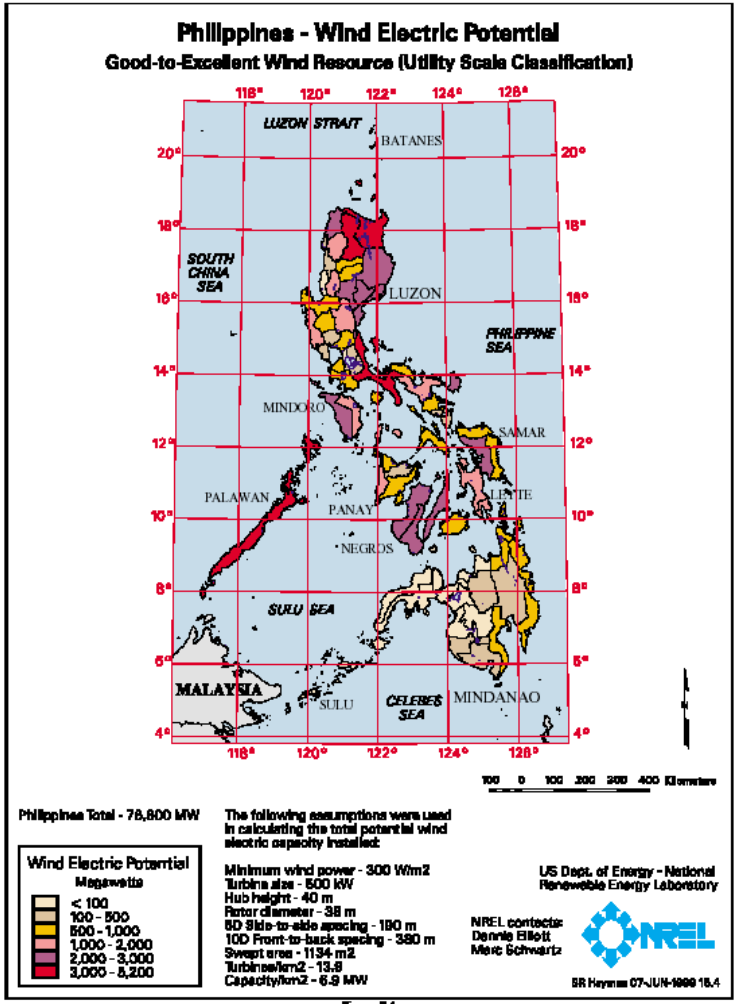


Electricity Use 1995

- Total installed electrical capacity = 6174 MW
- Hydro had 8,900 MW potential
- As of 1990, 2,217 MW developed

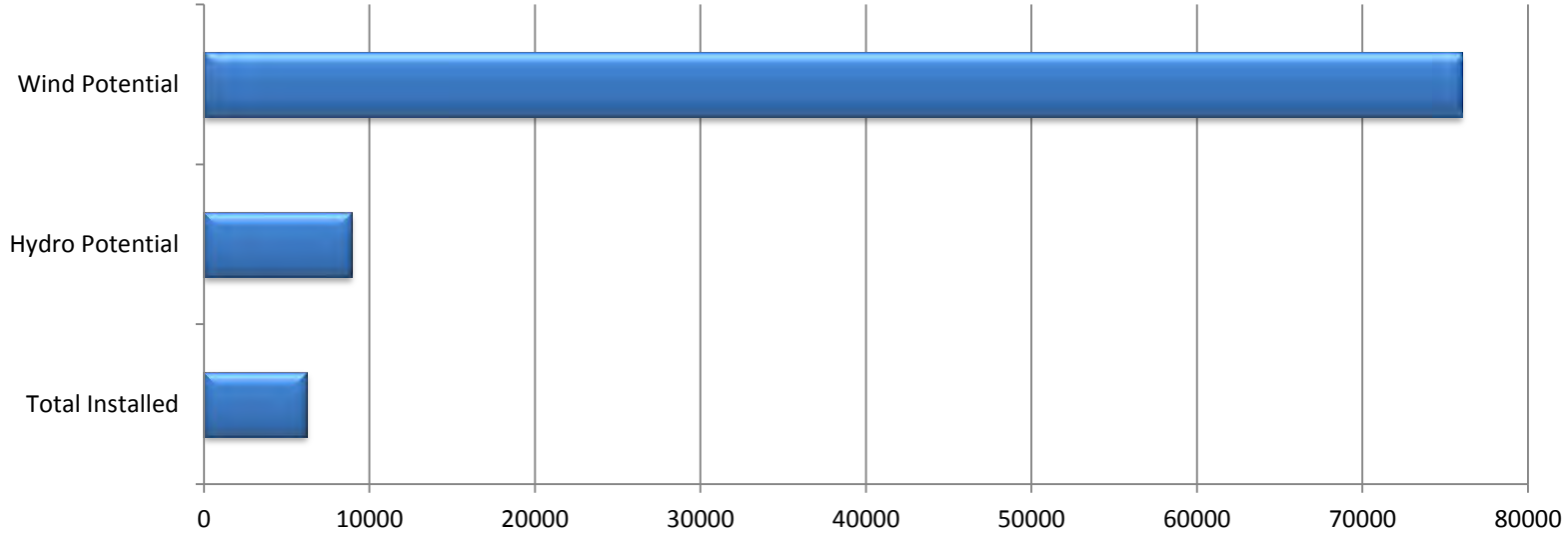


Wind Resource Map

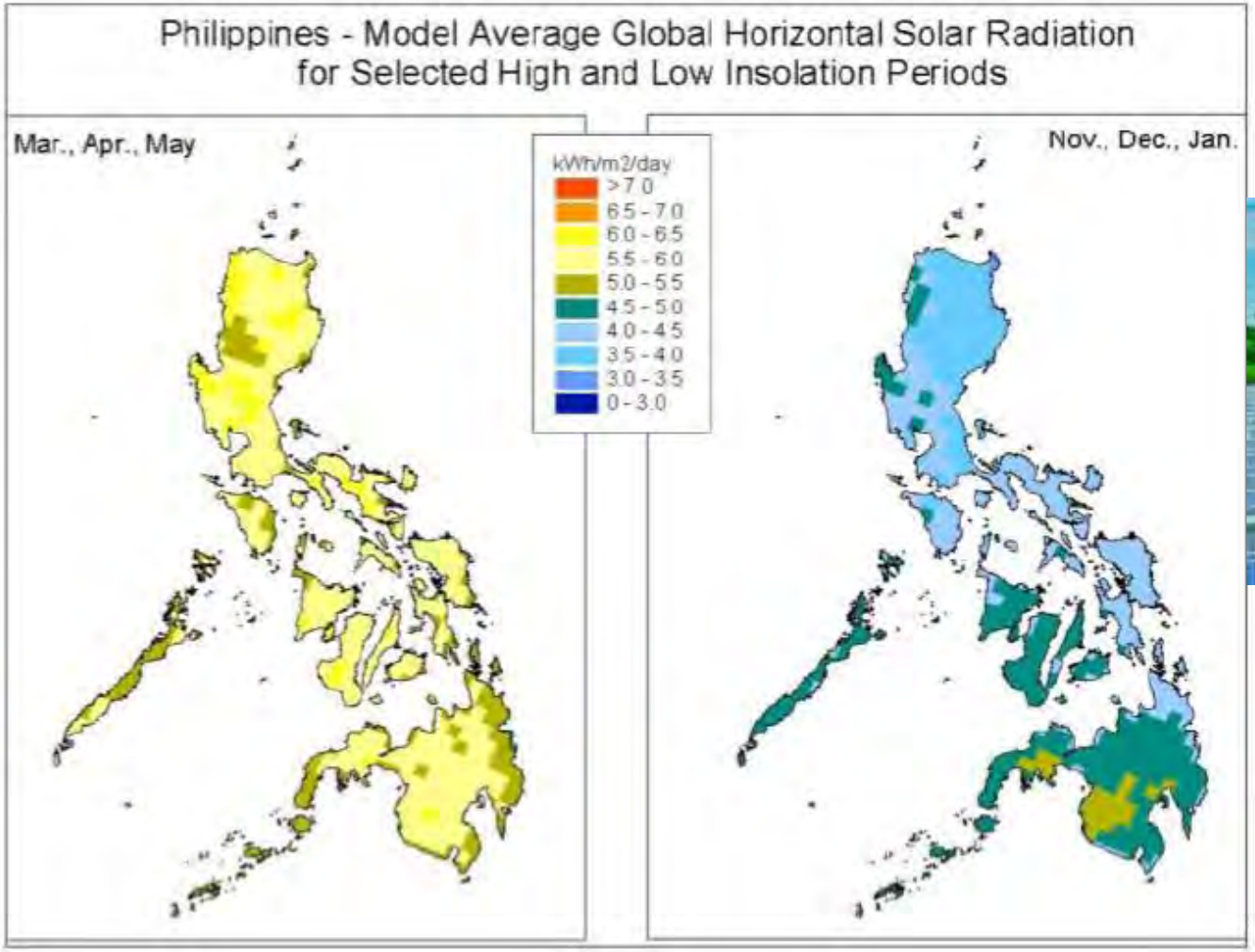


Electricity Use 1995

- Total installed electrical capacity = 6174 MW
- NREL 2000 wind potential showed 76,000 MW potential



Solar Resource Map



Enter Our Intrepid Entrepreneur

Small Wind Turbine Installed

- Quality turbine
- Reputable installer
- Villagers connected
- Mayor refuses to pay

Corruption

“Since its inception in 1994, the Transperency International Corruption Perception Index has placed the Philippines among the most corrupt countries in East Asia”

Current Situation

Feed In Tariff

Philippines Finally Approves Feed-in Tariff Program

July 27, 2012

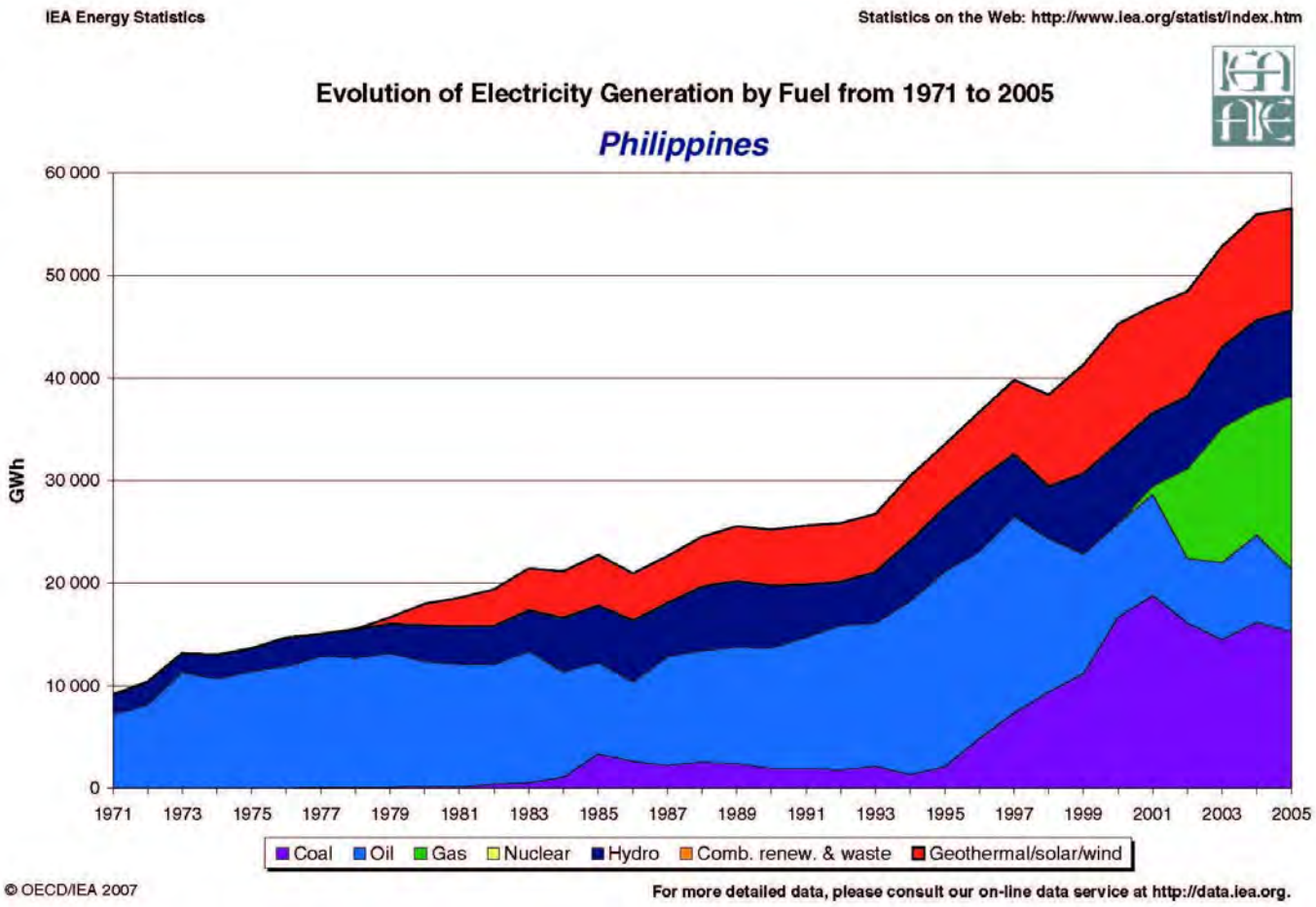
By Paul Gipe

Renewable Tariffs in the Philippines					
27-Jul-12					
			51.923	1.244	1.237
	Years	Php/kWh	€/kWh	CAD/kWh	USD/kWh
Hydro	20	5.900	0.114	0.141	0.141
Biomass	20	6.630	0.128	0.159	0.158
Wind	20	8.530	0.164	0.204	0.203
Solar	20	9.680	0.186	0.232	0.231
Ocean (delayed)					
http://www.erc.gov.ph/new/07-27-2012_PR_ERC%20Approves%20Feed-in%20Tariffs%20Rates.html					

Philippines Approves 3 New Wind Farms

- 2005 one 33 MW wind farm
- 20 May 2013 three new wind farms approved
- Construction to begin this year and be complete in 2015
- fixed kilowatt hour rate of 8.52 pesos (~$0.21)
  - 87 MW by Energy Development Corp
  - 67.5 MW in Alternergy Wind One Corp - 67.5MW
  - 54 MW Trans-Asia Oil and Energy Development Corp
  - Total New Wind = 208.5 MW

Change in Electrification Sources 2005



Businesses and Corruption

ORLANDO ALTAMIRANO (USAID/EL SALVADOR)

- Joined USAID on November 28, 2006 as a regional Environmental Specialist.
  - COR for the USAID Regional Clean Energy Initiative to develop the enabling environment to improve Central America‘s investment climate for Renewable Energy (RE) while reducing its overall energy consumption.
  - Co- Manages the Private Financing Advisory Network (PFAN) that identifies promising clean energy projects at an early stage and provides mentoring for development of a business plan, investment pitch, and growth strategy, significantly enhancing the possibility of financial closure.

CREATING ENABLING ENVIRONMENTS FOR CLEAN ENERGY DEVELOPMENT

Effective Regulatory Frameworks & Policy Support Mechanisms

Matthew Ogonowski
July 15, 2013

SESSION OUTLINE

- Provide an overview of how regulatory frameworks define an enabling environment and drive sectoral change.

- Provide examples of typical enabling environment policy instruments that support expanded investments in clean energy.

WHY IT MATTERS

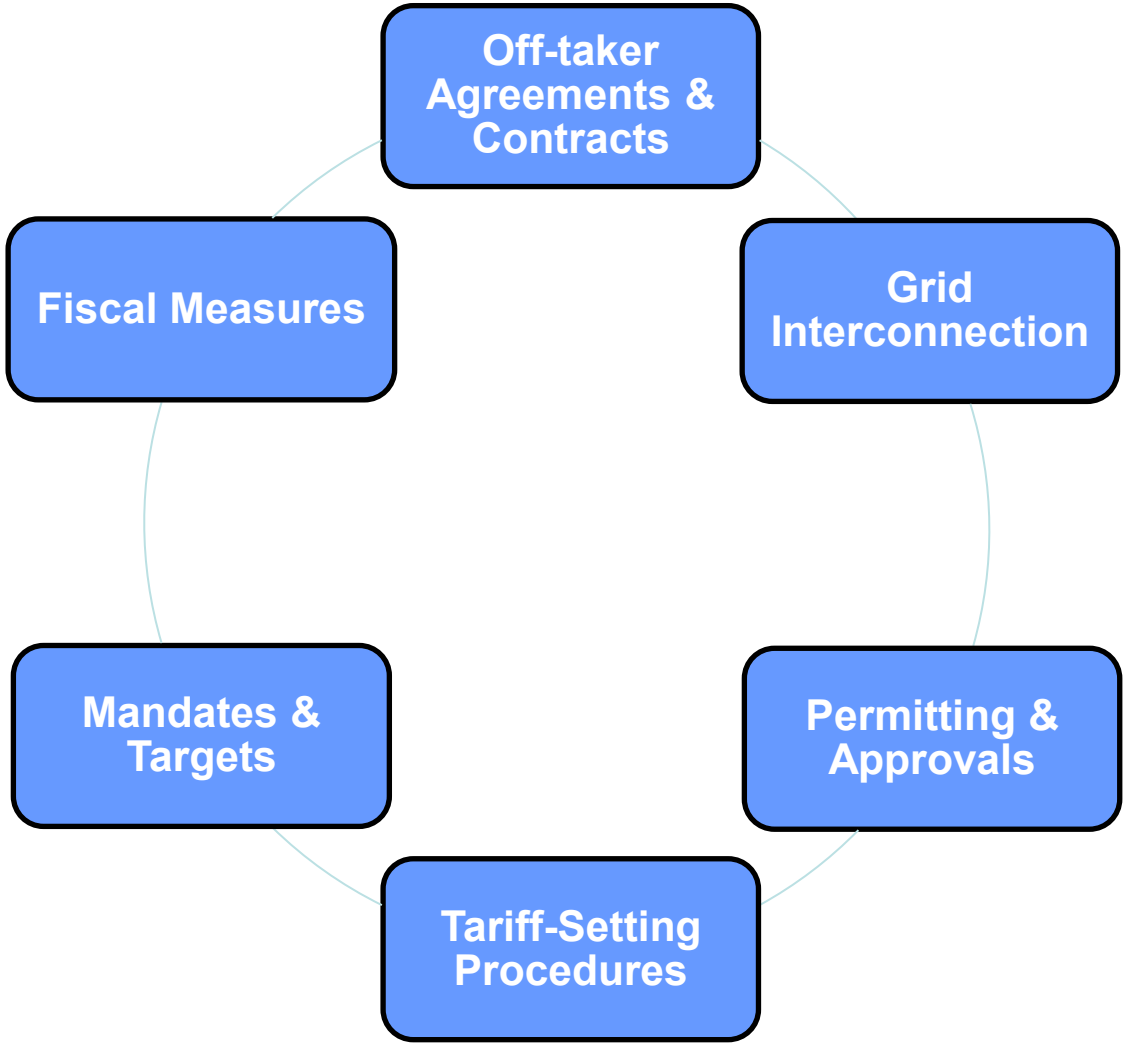
- Effectiveness of USG dollars spent

- *–Public funds pale in comparison to the magnitude of the climate change and development problem, so official development assistance must be used to address market barriers and create the enabling environments conducive to private investment."* USAID Climate Change and Development Strategy/2012-2016, p. 12

EFFECTIVE REGULATORY FRAMEWORK

- The creation of a regulatory ecosystem that comprehensively supports infrastructure development for clean energy
  - Includes specific policy instruments
    - Permitting
    - Tariffs
    - Mandates and targets
    - Purchase Agreements
    - Concessions
    - Fiscal measures
    - Etc
  - Includes strategic design of process to ensure transparency, efficiency, efficacy, and legitimacy

INDICATIVE POLICY AREAS



OFF-TAKER AGREEMENTS AND CONTRACTS

- What are they?
  - Contracts and agreements that specify purchase terms of supplied energy
  - Determine economics, feasibility, etc. of projects.
  - Between the buyers and sellers of the energy
- Critical aspects and examples:
  - Long term and standardized (PPAs)
  - Secure (disconnected from political parties and administrations)
  - Priority dispatch for RE
  - Comprehensive in legal terms and structure to minimize opportunities for default, litigation, etc.

TARIFF-SETTING PROCEDURES

- What are they?
  - Decisions and regulations that determine price of energy to be paid in the market
  - Based on understanding of fundamental energy economics, technology targets, and leveling of the playing field for renewables
- Critical aspects and examples:
  - Cost-reflective pricing to satisfy investors‘ risk appetite and minimize waste
  - TOU (Time-of-Use) pricing schemes designed to discourage use of costly and inefficient energy
  - Special tariffs for renewable generators (FITs)
  - Strategically designed to ensure reasonable sector investment

GRID INTERCONNECTION

- What is it?
  - The rules and regulations governing how generators can connect to the grid
  - Defines the infrastructure boundaries of plant development
  - Provides legal framework guaranteeing access to _gridmarket‘
- Critical aspects and examples:
  - Proper infrastructure in place to support intermittency
  - Regulations ensuring access from renewable generators from various locations and access points
  - Enforceable contracts for generators to ensure energy is purchased onto grid – typically with priority dispatch for RE.

MANDATES & TARGETS

- What are they?
  - Government mandates on clean energy for electric utilities, industry, buildings
  - Planned targets and concessions made for bids to meet targets
  - Building codes, restrictions
  - Management and operations guidelines and training requirements
- **Mandatory target examples**
  - Green Building Codes
  - Renewable Portfolio Standards (RPS)
  - Renewable Electricity Standards (RES)

FISCAL MEASURES

- What are they?
  - Taxation of revenue streams
  - Taxation of equipment
  - Taxation of investments
  - Land leases and site permitting
  - Exemptions
- **Financial Incentives**
  - Grants
  - Loans
  - Tax incentives
  - Carbon credits

PERMITTING & APPROVALS

- What are they?
  - Help define who is responsible for what?
  - Clarify jurisdictional responsibilities
  - Legal framework that helps ensure rights and recourse actions.
- Critical Aspects:
  - Comprehensive and simplified approval procedures
  - Needs to be expedient and efficient
  - Clarify jurisdictional responsibilities
  - Who handles applications, permitting, interconnection, etc.?
  - Establish a recourse mechanism in the event of disputes

ENERGY EFFICIENCY POLICIES

- Pricing mechanisms
- Regulatory and control mechanisms
- Fiscal measures and tax incentives
- Promotional and market transformation mechanism
- Technology development
- Commercial development and capacity building
- Financial remediation

SESSION HIGHLIGHTS REVIEW

- Measures to create enabling environments include
  - Effective regulatory framework
  - Off-taker agreements to ensure power will be bought
  - Tariffs that ensure sector investment
  - Grid interconnection to ensure access to transmission
  - Mandates and targets such as RPS
  - Fiscal measures to incentivize and streamline
  - Permitting and approvals to define responsibilities
  - Energy efficiency policies

PLENARY DISCUSSION TO RECAP THE DAY AND ADDRESS ANY REMAINING QUESTIONS

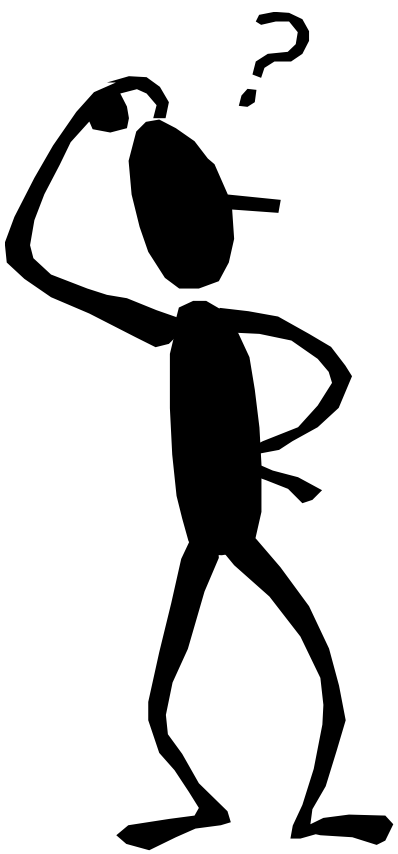
JULY 15, 2013

MATTHEW OGONOWSKI, GWEN ANDERSEN

OBJECTIVES

- Ensure that all participants have understood the material covered earlier in the day
- Answer any remaining questions on the material
- Provide an opportunity for participants to ask any other questions about Clean Energy programming

ANY LINGERING QUESTIONS?



- Keywords
  - Any of these that you need us to review?
- Name a benefit of energy efficiency
- Clean Energy pillar funding
  - Any of the guidance that is puzzling?
- Parking lot

TOMORROW

- Leveraging Investments
- Low Emission Development Strategies
- Off-grid Renewable Energy

DAY 1 REVIEW

JULY 16, 2013
JENNY KANE

ACTIVITY INSTRUCTIONS

- Each group formulates two questions
- Questions must be based on materials covered to this point
- No True/False questions
- Groups will ask other groups their questions
- Groups gets one minute to prepare answer
- **Close your books – NO open book**

OFF-GRID ENERGY SOLUTIONS AND ENERGY SERVICE DELIVERY MODELS

July 16, 2013

GWEN ANDERSEN

SESSION OUTLINE

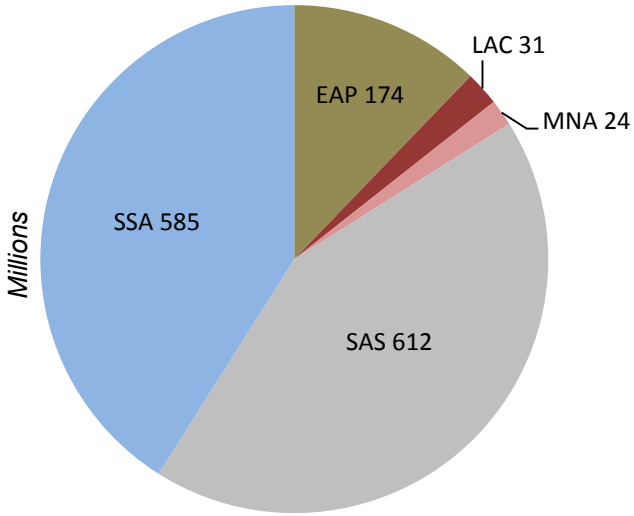
- Understand how modern energy access impacts quality of life
- Understand how energy needs currently are or are not being met in rural areas
- Identify renewable energy solutions for rural energy needs

WHY IT MATTERS

- Modern energy makes a dramatic difference in quality of life and in the effectiveness of development programs for the 3 billion people who live in rural areas

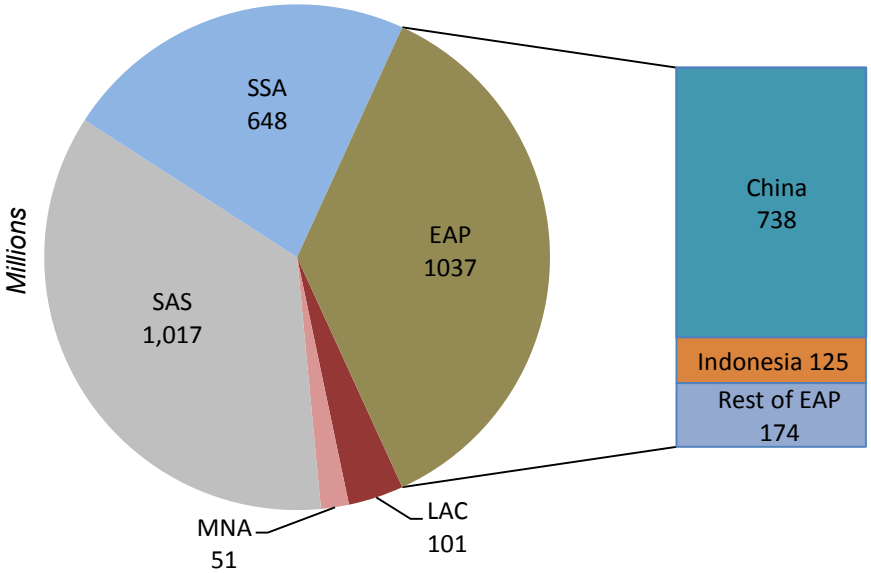
POPULATION WITHOUT ACCESS TO MODERN ENERGY

Population without electricity access, 2009



Sources: IEA 2012, WB 2011

Population without access to modern cooking fuels, 2007



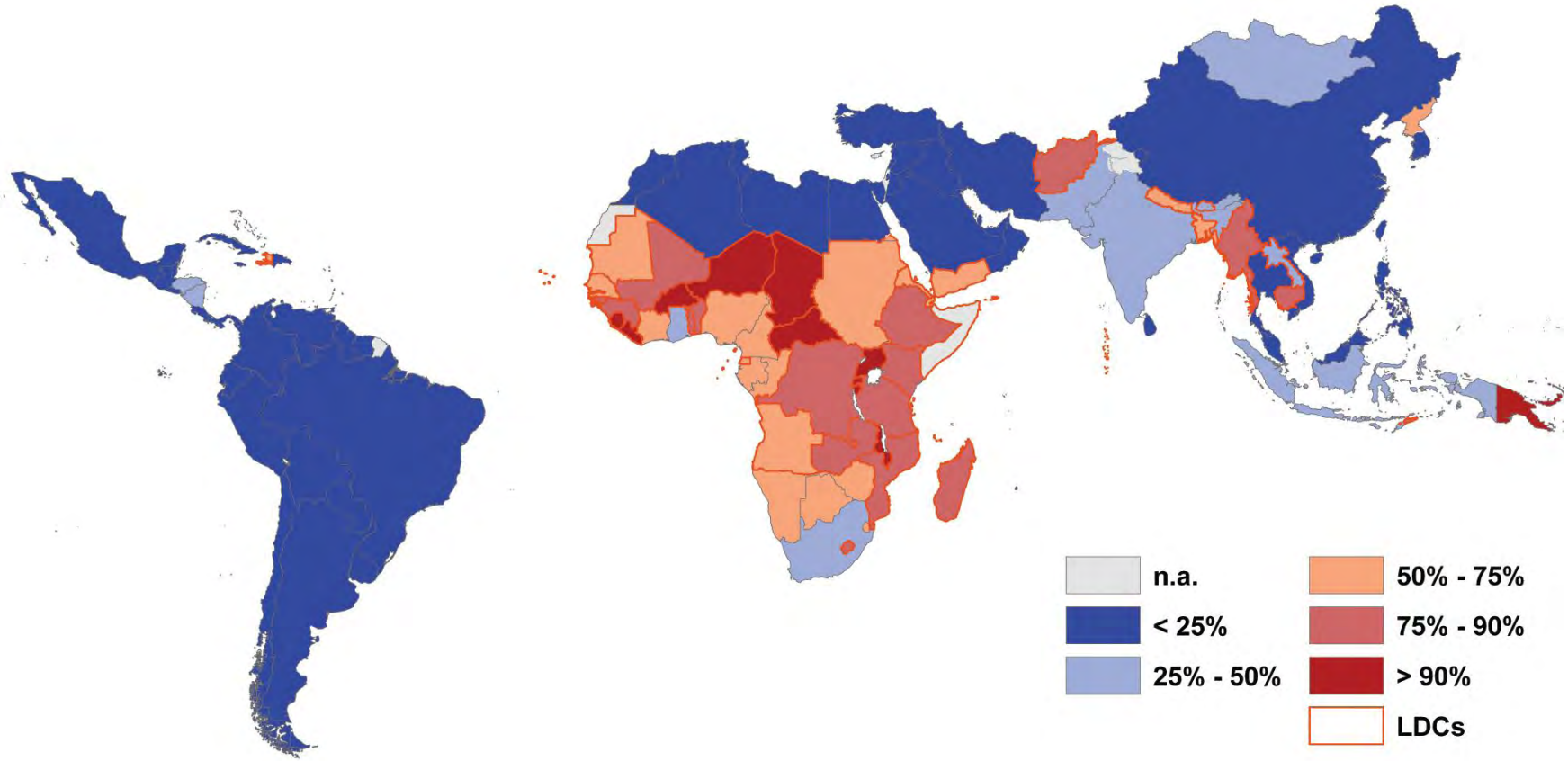
Sources: WHO and UNDP 2009

ELECTRICITY ACCESS

Country	Electricity access *(%)*	Population without electricity *(mil)*
Indonesia	64.5	81.6
India	75	288.8
Philippines	84	15.0
China	99.4	8.0
Cambodia	24	11.3
Colombia	93.6	2.9
Vietnam	97.6	2.1
Gabon	36.7	0.9
Peru	85.7	4.2
Thailand	99.3	0.5

Source: IEA, World Energy Outlook, 2011

WITHOUT ELECTRICITY ACCESS, 2008

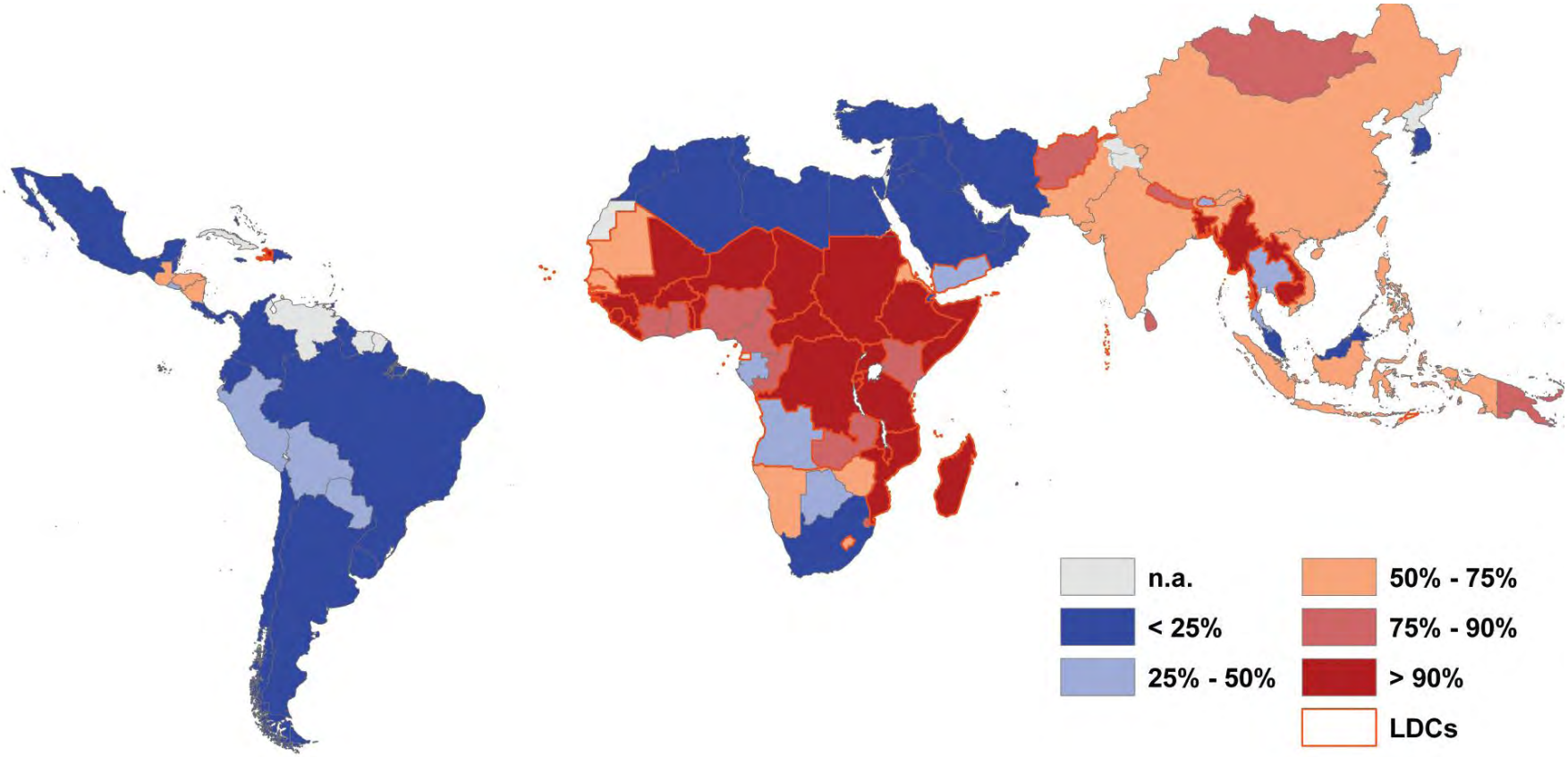


Source: UNDP, 2009

MODERN COOKING FUELS ACCESS

Country	Modern cooking fuel access (%)
Indonesia	45.6
India	28.8
Philippines	49.4
China	42
Cambodia	7.5
Colombia	82.5
Vietnam	34
Gabon	68.3
Peru	61
Thailand	63.1

WITHOUT MODERN COOKING FUELS ACCESS, 2007



Source: UNDP 2009

RURAL ENERGY SERVICES

- Lighting, communications and other small electric needs
- Cooking
- Heating and cooling
- Motive power
- Water pumping

LIGHTING, COMMUNICATIONS AND OTHER SMALL ELECTRIC NEEDS

Rural Energy Service	Existing Off-Grid Rural Energy Sources	Examples of Renewable Energy Technologies
Lighting and other small electric needs (homes, schools, street lighting, phone charging, hand tools, vaccine storage, refrigeration)	Candles, kerosene, batteries, small diesel generators, central battery recharging by carting batteries to grid	▪ Hydropower (pico, micro-scale, small-scale) ▪ Biogas from household-scale digester ▪ Small-scale biomass gasifier with gas engine ▪ Village-scale mini-grids and solar/wind/hydro hybrid systems ▪ Solar home systems ▪ Pico-scale PV system, including solar lamps
Communications (televisions, radios, mobile phones)	Dry cell batteries, small diesel generators, central battery recharging by carting batteries to grid	

Source: REN21, 2011

KEROSENE LIGHTING

BATTERY CHARGING STATION – DIESEL GENERATOR

SOLAR OPTIONS

PV Solar lanterns

- Alternative to kerosene for lighting
- Target the bottom of pyramid
- Establishing distribution networks is a challenge
- Lanterns can be locally assembled

PV Solar home systems

- Displace inefficient car batteries
- Target medium income rural households
- Synergies with lanterns

PV Solar battery stations

- Potential charging fee reduction
- Payback is greater than a few years
- Large investment for a low revenue business

COOKING

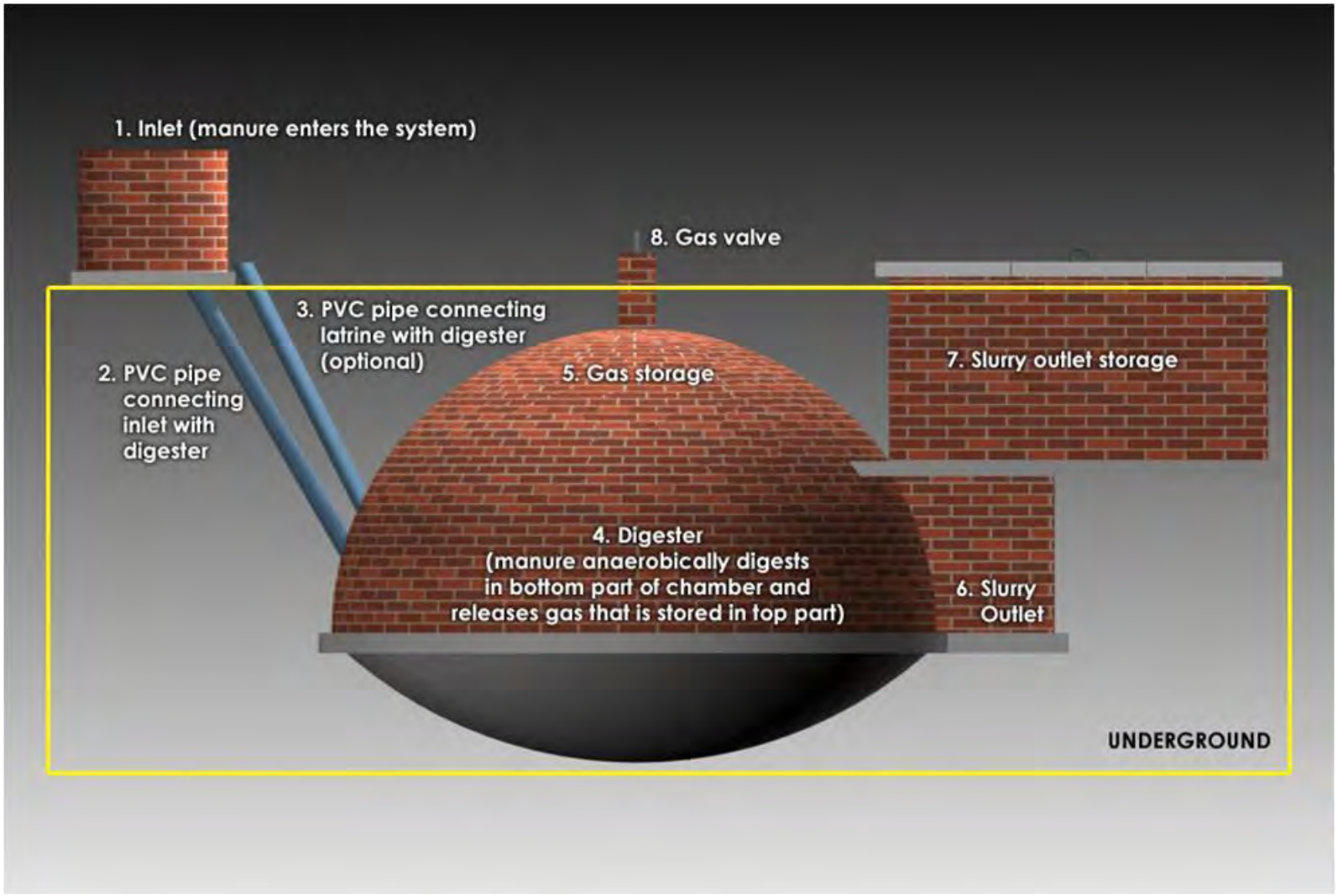
Rural Energy Service	Existing Off-Grid Rural Energy Sources	Examples of Renewable Energy Technologies
Cooking (domestic, commercial stoves and ovens)	Burning wood, dung, or straw in open fire at about 10-15 percent efficiency	▪ Improved cooking stoves (fuel wood, crop wastes) with efficiencies above 25 percent ▪ Biogas from household-scale biodigester and biogas stove ▪ Solar cookers

Source: REN21, 2011

IMPROVED COOK STOVE PRODUCTION

Study by the WHO and UNDP estimates 166 million households are using improved cook stoves.

BIODIGESTERS



SOLAR COOKERS

HEATING AND COOLING

Rural Energy Service	Existing Off-Grid Rural Energy Sources	Examples of Renewable Energy Technologies
Heating and cooling (crop drying and other agricultural processing, hot water)	Mostly open fire from wood, dung, and straw	▪ Improved heating stoves ▪ Biogas from small- and medium scale digesters ▪ Solar crop dryers ▪ Solar water heating ▪ Fans from small grid renewable systems

Source: REN21, 2011

SOLAR OPTIONS

Solar dryers

- Increased quality of dry food (particularly fish)
- Increased production capacity
- Large investment = $15,000 for 100kg/day of fresh fish processed
- Payback >2.5 years

Solar water heating

- Applicable in urban areas, hotels, and hospitals
- Very simple maintenance
- Payback < 2 years (depending on hot water consumption)

PROCESS MOTIVE POWER

Rural Energy Service	Existing Off-Grid Rural Energy Sources	Examples of Renewable Energy Technologies
Process motive power (small industry)	Diesel engines and generators	▪ Small and large solar home systems ▪ Small wind turbines ▪ Mini-grid with hybrid system (e.g. combination of microhydro, gasifiers, direct combustion, large biodigesters, and other renewables)

Source: REN21, 2011

WATER PUMPING

Rural Energy Service	Existing Off-Grid Rural Energy Sources	Examples of Renewable Energy Technologies
Water pumping (agriculture and drinking water)	Diesel pumps and generators	▪ Mechanical wind pumps ▪ Solar PV pumps ▪ Mini-grid with hybrid system

Source: REN21, 2011

RE WATER PUMPING OPTIONS

PV water pump

- Potential income boost due to second rice harvest or cash crops
- Displaced diesel pumps
- Large investment = $3,500
- Risk of being stolen in isolated rural areas

Wind pump

- Income boost due to a second crop
- Water access to the village
- Displaced electrical or diesel pumps
- Operative with at least 1.5 m/s
- Relative high investment = $3,000

KEY ISSUES

- Provide access to finance
- Establish delivery infrastructure
- Adopt inclusive rural electrification policy
- Guarantee minimum quality of (after sales) service
- Understand customer needs and increase service awareness
- Scale up capacity building

FINANCE

- Finance for service providers
- Finance for end users
- Micro-finance

DELIVERY INFRASTRUCTURE

CUSTOMER NEEDS/CONSTRAINTS AND AWARENESS

AFTER-SALES SERVICES – SPARE PARTS

POLICY AND REGULATION

- Level playing field and inclusive rural electrification planning
- Fiscal policy rationalization
- Technical specifications and after sales services

BUSINESS MODELS

- Dealer model
- Fee-for-service model
  - Leasing or hire-purchase
  - Energy service company (ESCO)
  - Concession

SESSION HIGHLIGHTS REVIEW

- Even small amounts of electricity can dramatically improve quality of life in rural areas
- Renewable energy can meet rural energy needs, often more reliably and less expensively than other options
- For programs to be successful, they must simultaneously provide access to finance, establish delivery infrastructure, be accompanied by a rational rural electrification policy, guarantee minimum quality of service, increase customer awareness, and engage in capacity building
- There are multiple successful business models

OVERCOMING BARRIERS TO CLEAN ENERGY DEVELOPMENT

JULY 16, 2013

MATTHEW OGONOWSKI AND GWEN ANDERSEN

ACTIVITY INSTRUCTIONS

- Join groups
- Review barriers listed in your handout
- List the types of USAID support that can help overcome the barrier
- Name the likely beneficiary of the USAID assistance and other stakeholders involved in the process
- Present to the class

EXAMPLE

Barriers	Strategies and Tools	Stakeholders
Legal, Policy and Regulatory Framework		
Lack of legal framework to support policies and regulations that promote development of renewable energy systems and energy efficiency measures	USAID can: - Support the detailed investigation of the legal framework and provide recommendations to promote competition and clean energy development as amendments in existing legislation or creation of new primary and secondary legislation	Ministry responsible for Energy, Energy Regulators

LOW EMISSION DEVELOPMENT

LOWERING EMISSIONS WHILE GROWING THE ECONOMY

JULY 16 2013

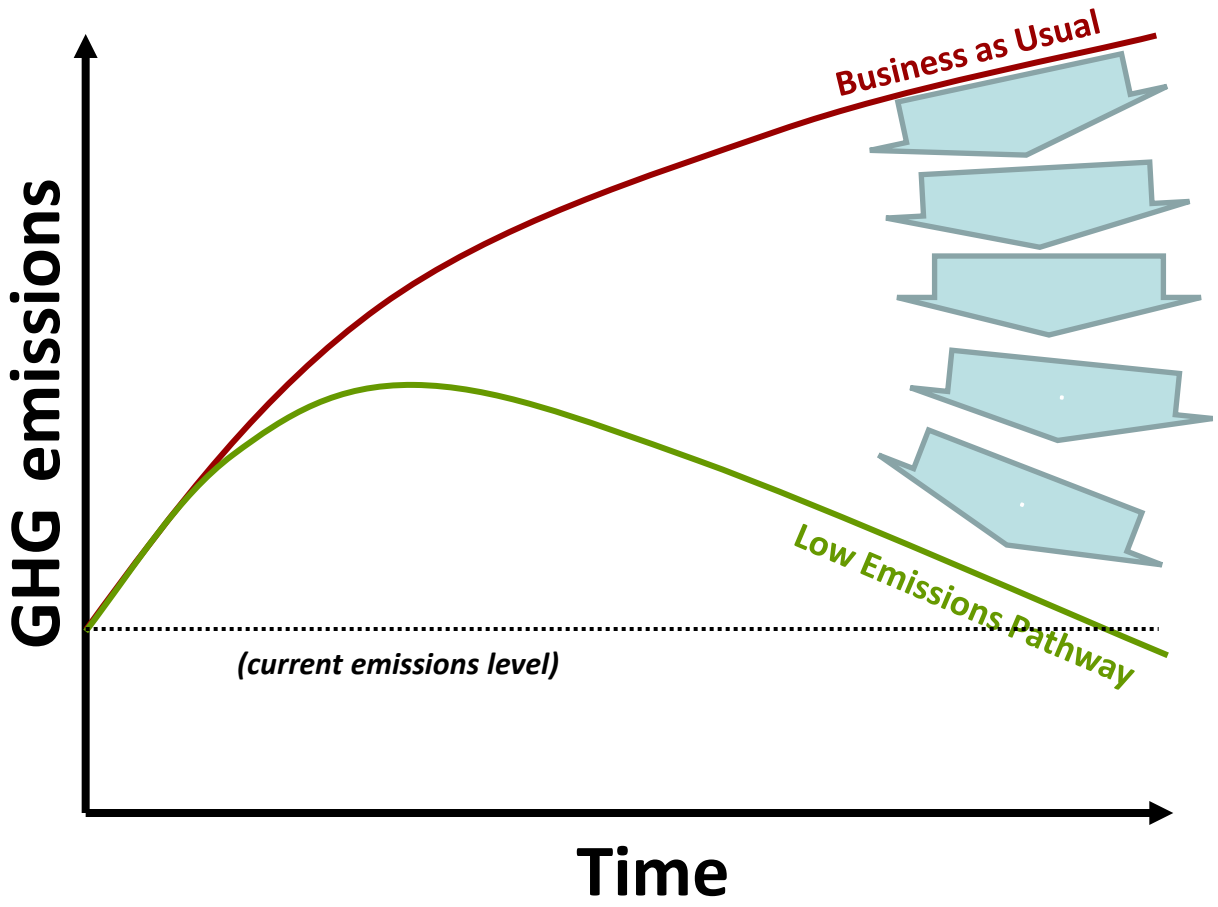
JEN LEISCH

SESSION OUTLINE

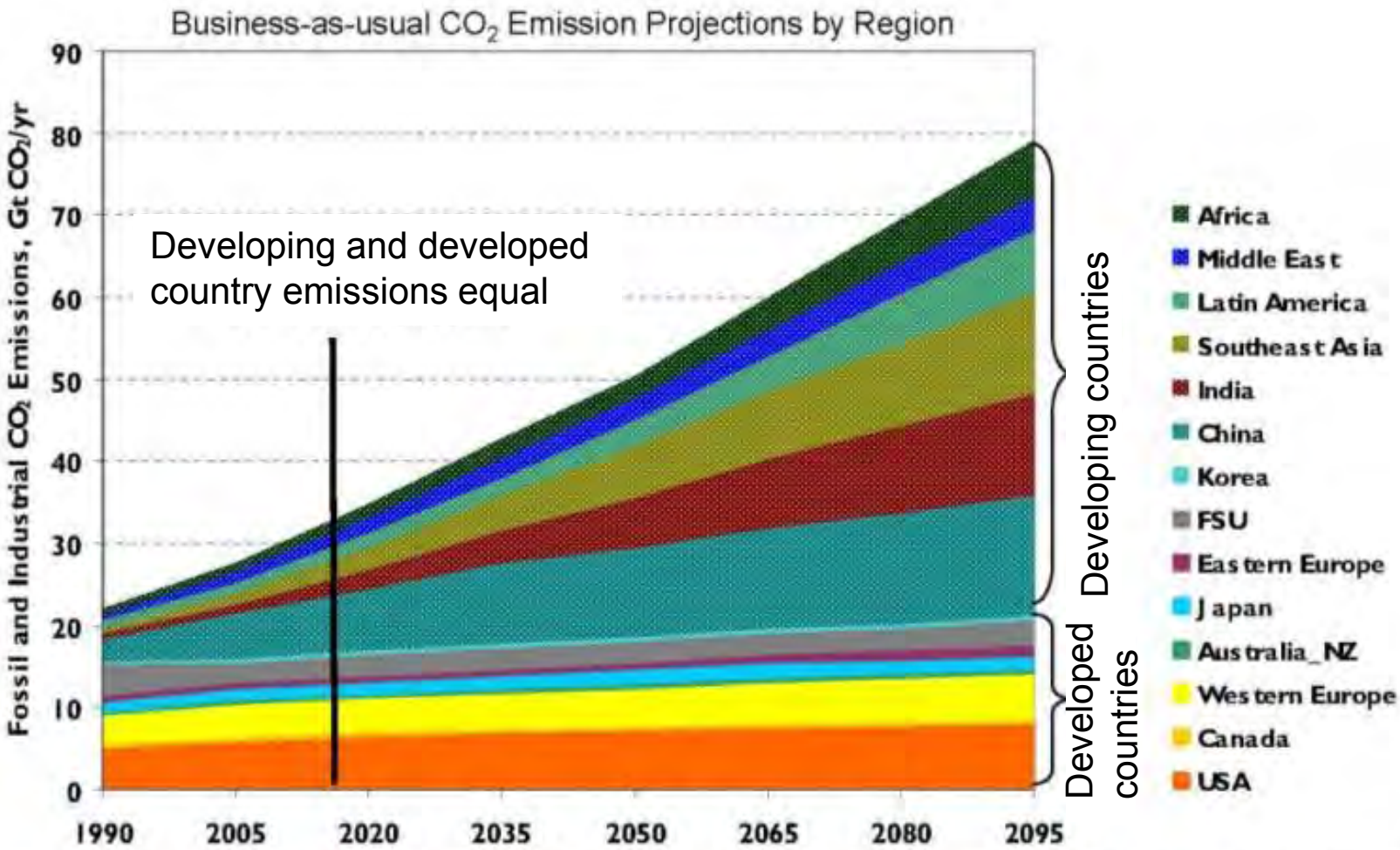
- What is a LEDS?
- The LEDS Process
- U.S. Support for LEDS: Enhancing Capacity for Low Emission Development Strategies

TO AVOID 2 DEGREES…

… we need to bend emissions curves



GLOBAL GHG EMISSIONS PROFILE IS CHANGING



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.

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"

COP18 Agreed Outcome, December 2012:

- Encourages developing countries to develop LEDS
- Recognizes the need for financial and technical support from developed countries
- Requests technical workshops and material, in part to build capacity in the formulation of LEDS

DOHA 2012
UN CLIMATE CHANGE CONFERENCE
COP18·CMP8

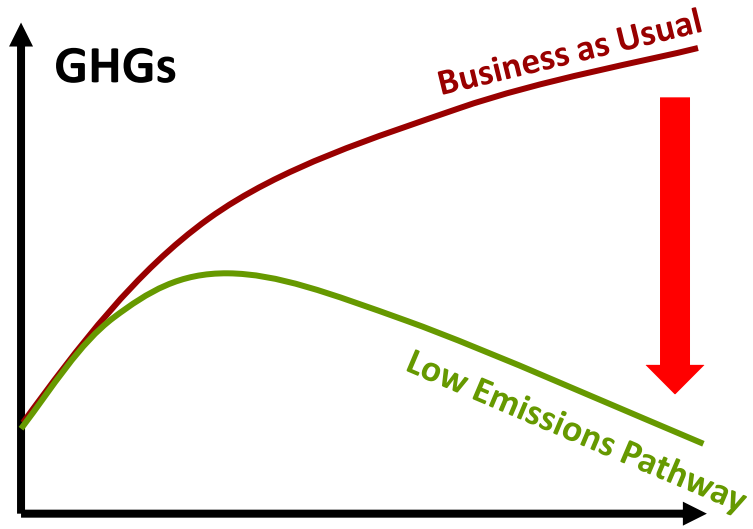
WHAT IS A LEDS?

- **A Low Emission Development Strategy is…**
  - …a strategic economic 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.

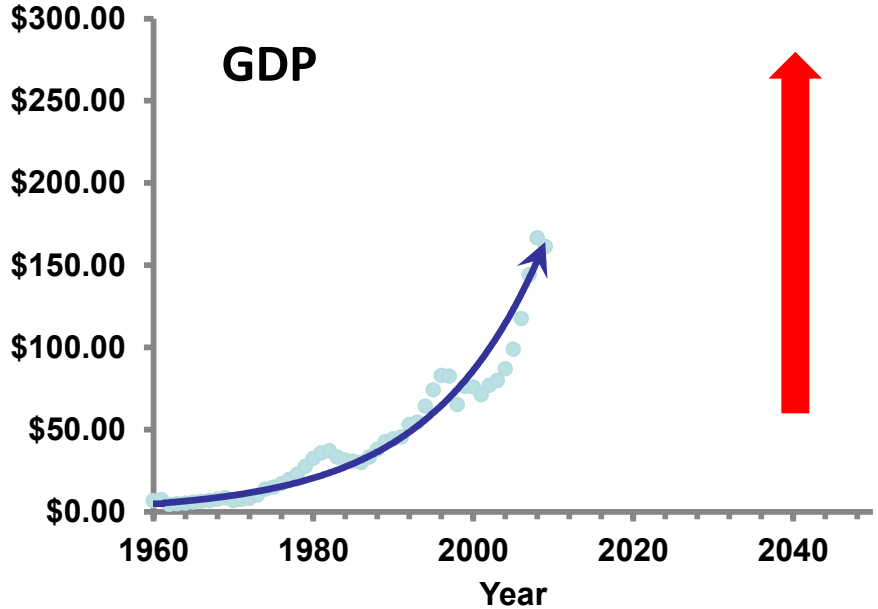
WHAT IS A LEDS?

A **Low Emission Development Strategy (LEDS)** is a national level, country-led, and country-specific strategic plan to promote economic growth and reduce long-term greenhouse gas (GHG) emissions trajectories.

Reduce emissions:



While growing the economy:

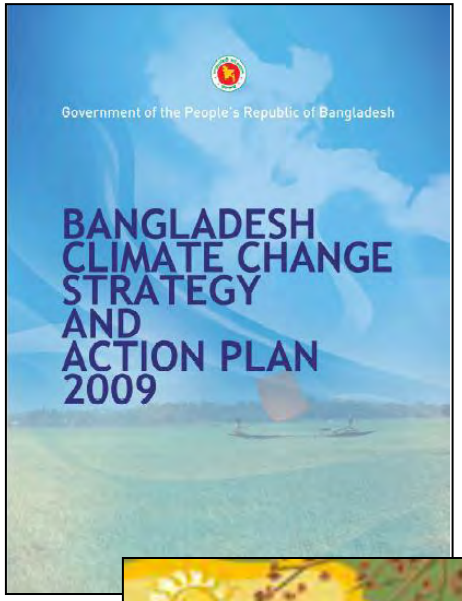


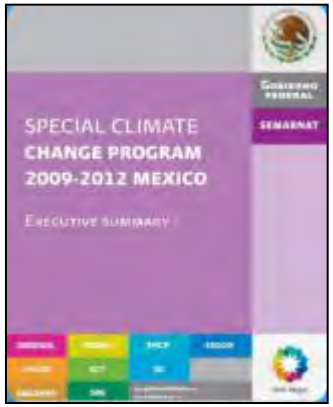
LEDS IS SMART DEVELOPMENT

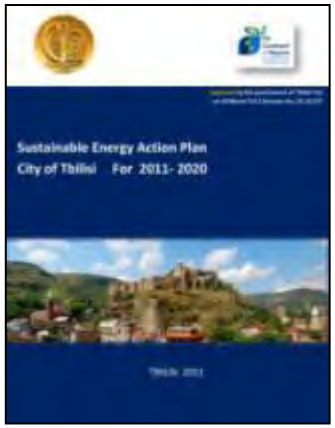
- Designed and implemented appropriately, a LEDS will:
  - Country-led and owned
  - Provide an integrated, comprehensive pathway for long-term, sustainable development
  - Take into account a country's development objectives and unique circumstances
  - Help a country meet international climate change commitments
  - Help countries access financing from both public and private sources

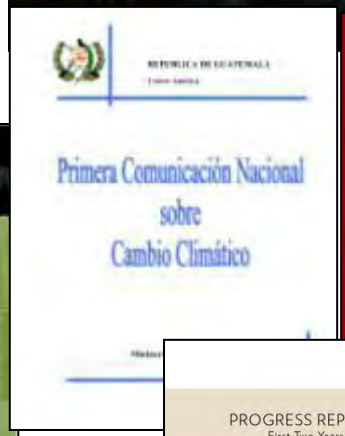
Countries that map and implement LEDS will be the best positioned to benefit from the new global low carbon future.

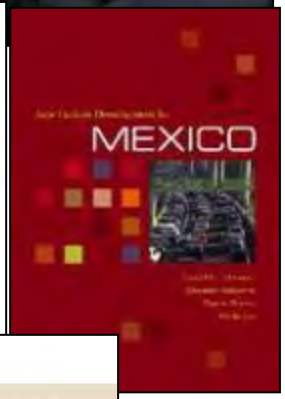
LEDS EFFORTS AROUND THE WORLD

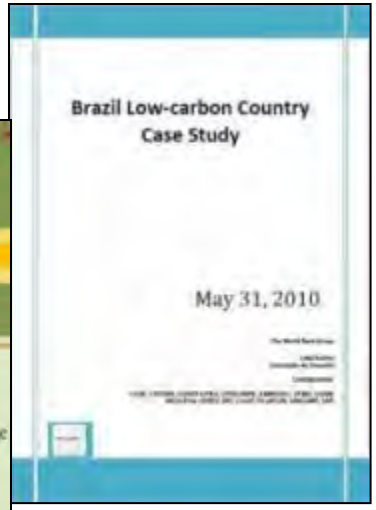


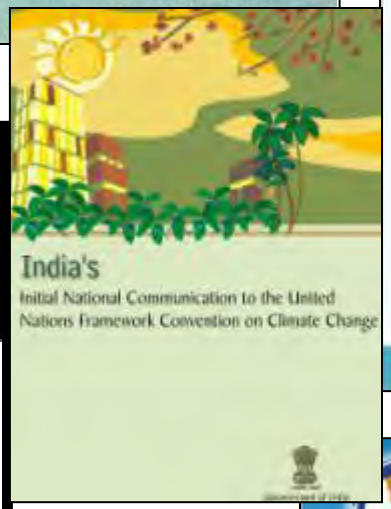












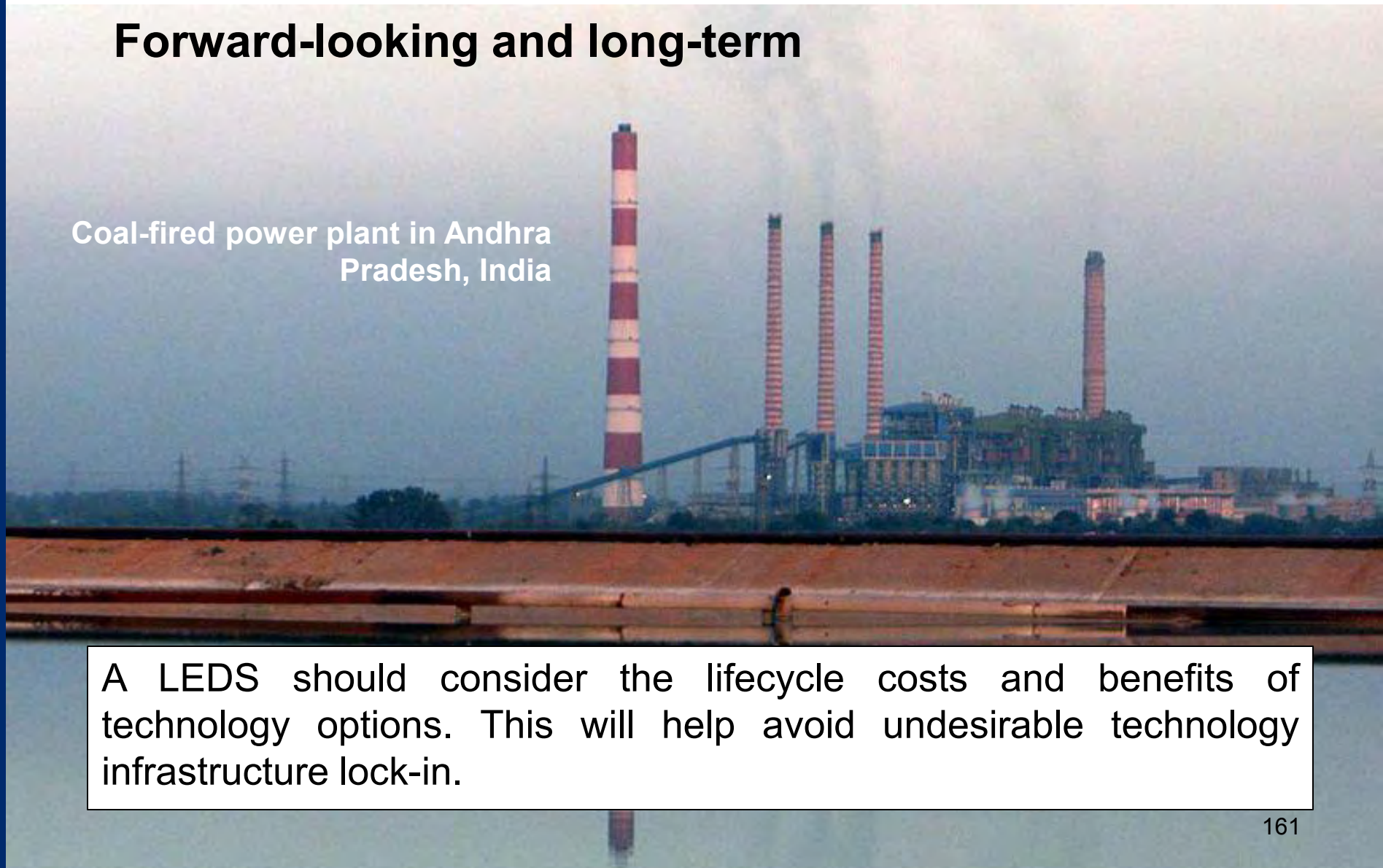
planYC

ESSENTIAL QUALITIES OF LEDS

1. **Analytically sound**
2. **Comprehensive**
3. **Forward-looking and long term**
4. **Actionable**
5. **Country-owned and country-driven**
6. **Transformative**

ESSENTIAL QUALITIES OF LEDS

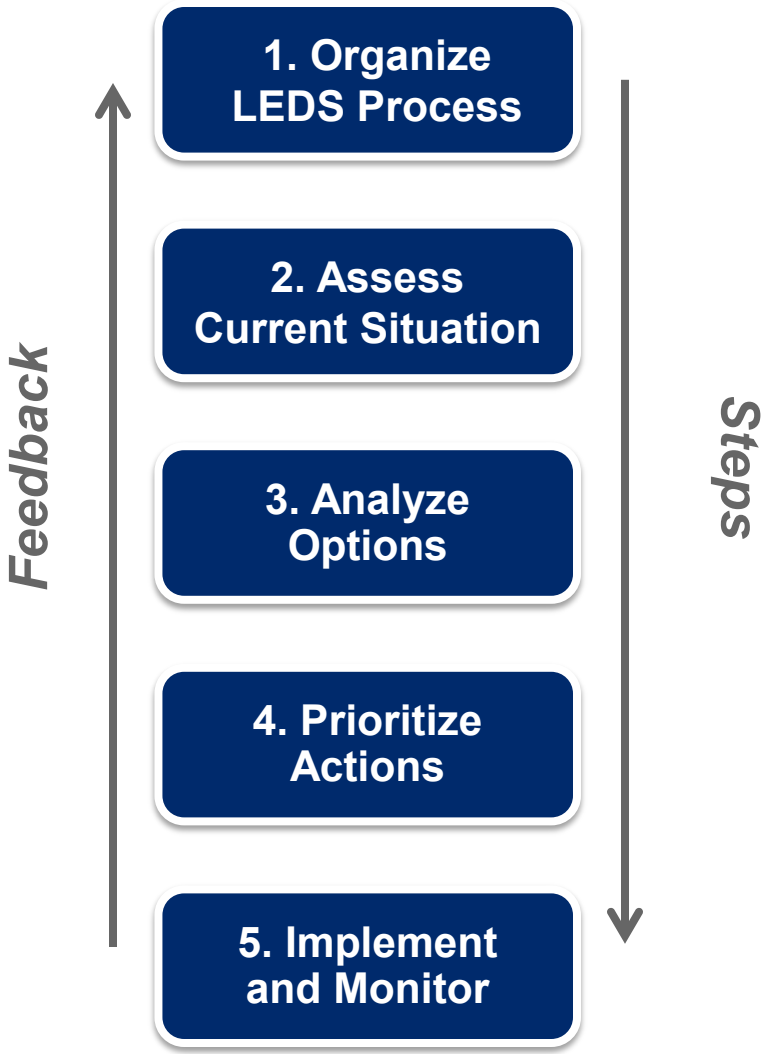
Forward-looking and long-term



Coal-fired power plant in Andhra Pradesh, India

A LEDS should consider the lifecycle costs and benefits of technology options. This will help avoid undesirable technology infrastructure lock-in.

ORGANIZING, DEVELOPING, & IMPLEMENTING LEDS



- Iterative, updated, ongoing

ORGANIZING, DEVELOPING, & IMPLEMENTING LEDS

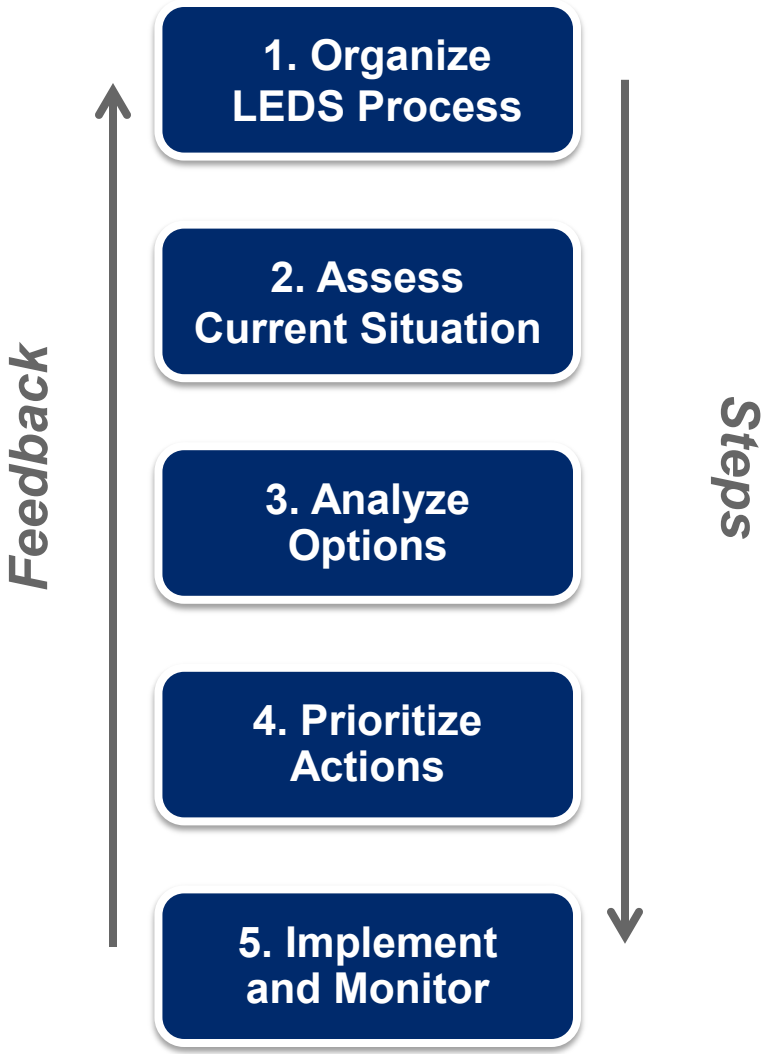


Table of Contents

- Goals and Objectives
- Data
  - GHG Inventory, Economic Data, Vulnerability
- GHG and Economic Pathways
- Prioritized Actions
- Implementation, Finance, Monitoring Plans

ORGANIZING, DEVELOPING, & IMPLEMENTING LEDS

Feedback

Steps

1. Organize LEDS Process

2. Assess Current Situation

3. Analyze Options

4. Prioritize Actions

5. Implement and Monitor

Stakeholder Engagement & Socialization

National & Local Leadership

Inter-Ministerial Coordination

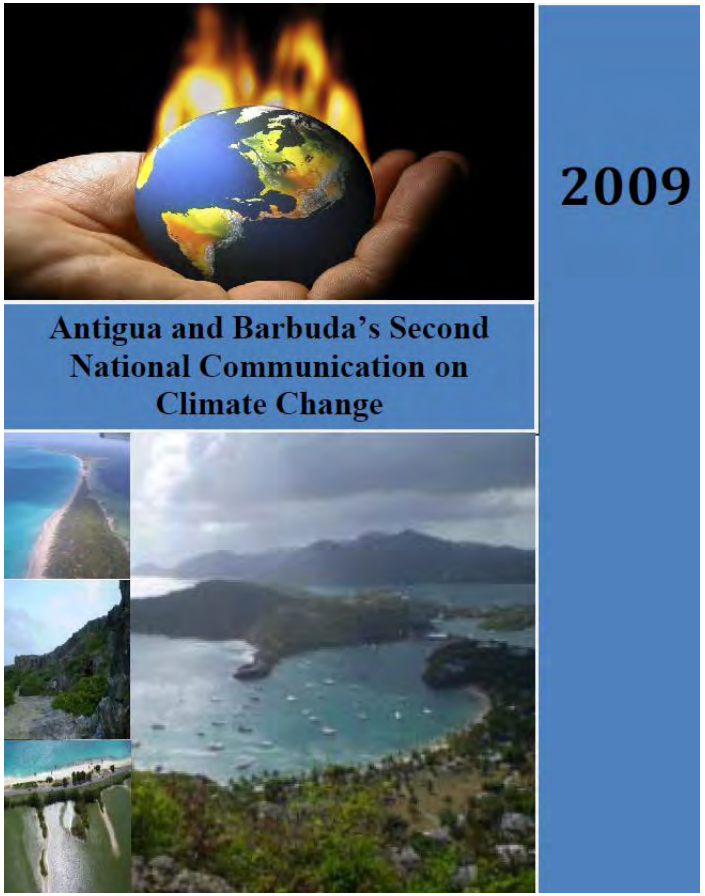
Guiding Principles & Objectives

Key Ministries

Budget Allocations

ANATOMY OF A LEDS: GREENHOUSE GAS (GHG) INVENTORY

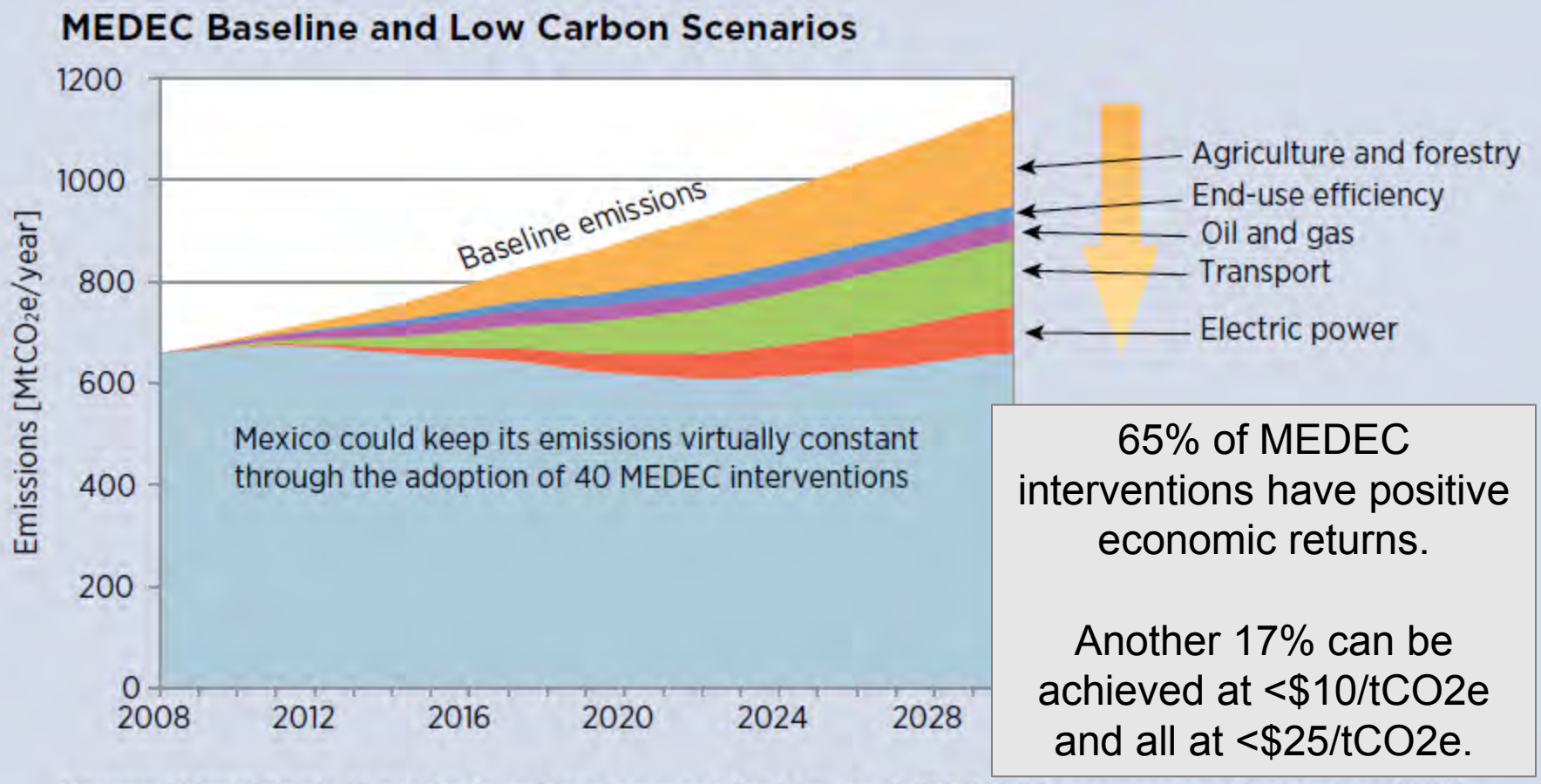
- GHG Inventory: Assessment of GHG emissions and sinks, across economic sectors, for a given time period.



Inventories are a required component of National Communications (bi-annual UNFCCC requirement for developing countries)

"You can't manage what you can't measure"

ANATOMY OF A LEDS: EMISSIONS PATHWAYS



65% of MEDEC interventions have positive economic returns.

Another 17% can be achieved at <$10/tCO2e and all at <$25/tCO2e.

Source: World Bank, "Low Carbon Development for Mexico (MEDEC)," Presentation, September 2009.

ORGANIZING, DEVELOPING, & IMPLEMENTING LEDS

1. Organize LEDS Process

2. Assess Current Situation

3. Analyze Options

4. Prioritize Actions

5. Implement and Monitor

- How might a country prioritize?
  - Costs and benefits, cost effectiveness
  - GHG mitigation potential
  - Climate resilience
  - Barriers to implementation, such as political feasibility
  - Social, cultural and economic impacts/benefits
  - "No regrets" actions/policies
  - Capacity for implementation
  - Available financial resources

KEY TAKEAWAYS

1. Low emission development seeks to decouple economic growth from GHG emissions growth

1. LEDS are a decision-making and implementation framework for long-term, low emission development

2. LEDS help mainstream climate change considerations into the functions of national and subnational governments

3. A LEDS helps a country meet international commitments, and positions a country to benefit from the global low-carbon future

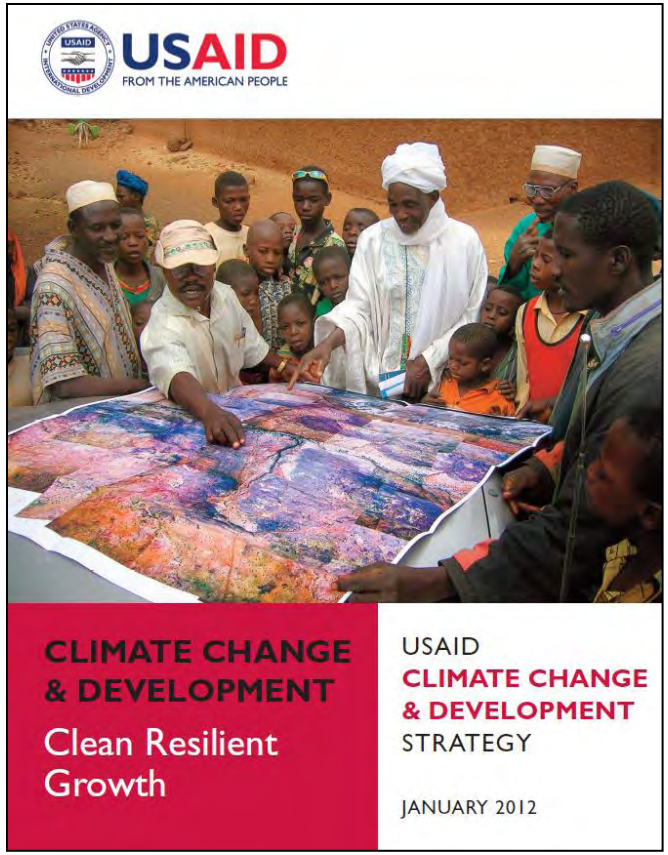
REVIEW AND KEY MESSAGES

- The LEDS Process is country-driven and country-owned
- The LEDS process should be integrated into existing or ongoing processes and structures, so that it is mainstreamed into the country‘s development process.
- Prioritization of LEDS activities varies
- A GHG Inventory allows countries to measure where they are, and where they are going
- A LEDS is actionable, and should seek to access finance from public and private sector (including national budgets!)

ENHANCING CAPACITY FOR LOW EMISSION DEVELOPMENT STRATEGIES (EC-LEDS)

A U.S. PROGRAM OF LEDS SUPPORT

USAID CLIMATE CHANGE & DEVELOPMENT STRATEGY



<u>Goal:</u>

To help countries accelerate their transition to climate-resilient, low-emission development

WHAT IS EC-LEDS?

A whole-of-government U.S. initiative to support partner countries' efforts to pursue long-term, transformative development and accelerate sustainable, climate-resilient economic growth while slowing the growth of greenhouse gas (GHG) emissions

1. Provide **targeted technical assistance** for LEDS design and implementation

2. Build global **dialogue** and a shared international **knowledge base** on LEDS

EC-LEDS IS WHOLE-OF-GOVERNMENT

- EC-LEDS is a joint initiative led by USAID and the Department of State.

- EC-LEDS brings to bear the resources and expertise of numerous U.S. Government agencies.

- These agencies provide support through scoping, assessments, technical assistance, expert exchange and capacity building activities.

WHY IS EC-LEDS IMPORTANT?

"Climate change is one of the century's greatest challenges; rising to this challenge is one of the President's highest diplomatic and development priorities… I encourage missions to support partner countries… to develop Low Emissions Development Strategies"

- Administrator Shah, Letter to Mission Directors, May 2010

Diplomatic priority: Enhancing relationships and meeting the USG contribution to the developed country fast start financing commitment

Development priority: Promoting strategic and sustainable economic growth in partner countries

Agency Performance Goal: Serving as the single OMB Goal for the entire USG Climate Change Initiative

AGENCY PRIORITY GOAL

"By the end of 2013, U.S. assistance to support the **development and implementation of LEDS will reach 20 countries**."

Benchmarks

- Number of countries expressing interest and/or engaged in cooperation on LEDS
- Number of agreed work programs established
- Number of countries in which U.S. Government technical assistance for EC-LEDS has been initiated
- Strengthened capacity for and measurable progress on developing and implementing LEDS

EC-LEDS PARTNER COUNTRIES

As of July 2013

TARGETED ASSISTANCE

EC-LEDS *supports* a partner country to develop their own LEDS, it does not *create* a LEDS for them

Assistance

EC-LEDS PROGRAM DESIGN AND FUNDING

Mission Climate Change Mitigation Program

Clean Energy Pillar

Sustainable Landscapes Pillar

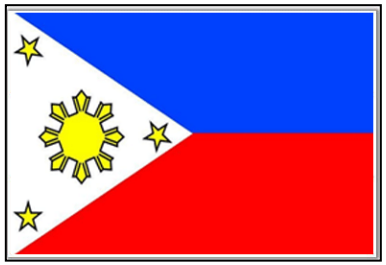
Clean Energy Implementation

LEDS Build/Improve

Sustainable Landscapes Implementation

- GHG inventory capacity building
- Economic modeling
- Data and resource assessments
- Stakeholder engagement support
- Financial analysis of LEDS opportunities
- Measuring, reporting, and verification (MRV) systems

CASE STUDY: EC-LEDS IN THE PHILIPPINES



Key Areas of Technical Assistance:

Focus Area	Technical Assistance
Organize the LEDS Process	• Working with Climate Change Commission to enhance coordination among government agencies, build understanding and capacity for LEDS development
GHG Inventory	• Assist in institutionalizing GHG inventory system
Economic and Emissions Modeling	• Training in renewable energy resource assessments • Geospatial analysis of demographic, resource, infrastructure and land use data to support planning.
Implementation, Monitoring and Mitigation	• Energy: Support design and implementation of policy measures to promote clean energy utilization and energy efficiency • Forestry: Support forest cover mapping using remote sensing and forest land use planning at the local government level

INTERNATIONAL COLLABORATION ON LEDS

- **Multilateral examples**
  - LEDS Global Partnership
  - Global Green Growth Institute (GGGI)
  - World Bank and World Bank Institute (WBI)
  - UNDP‘s Low Emission Capacity Building Programme
  - UNEP Risoe Centre‘s Low Carbon Development Programme

- **Bilateral examples**
  - US Enhancing Capacity for Low Emission Development Strategies (EC-LEDS) Program
  - Japan International Cooperation Agency (JICA)
  - UK Department for International Development (DfID or UKAID)
  - Australian Agency for International Development (AusAID)
  - Many more…

ENGAGEMENT THROUGH LEDS GP

Purpose: Launched in 2011 to advance low emission growth through coordination, information exchange, and cooperation

Objectives:

- Foster information exchange and collaboration
- Minimize duplication
- Build awareness of and support for LEDS

Regional platforms:

- Asia
- Africa
- Latin America and Caribbean

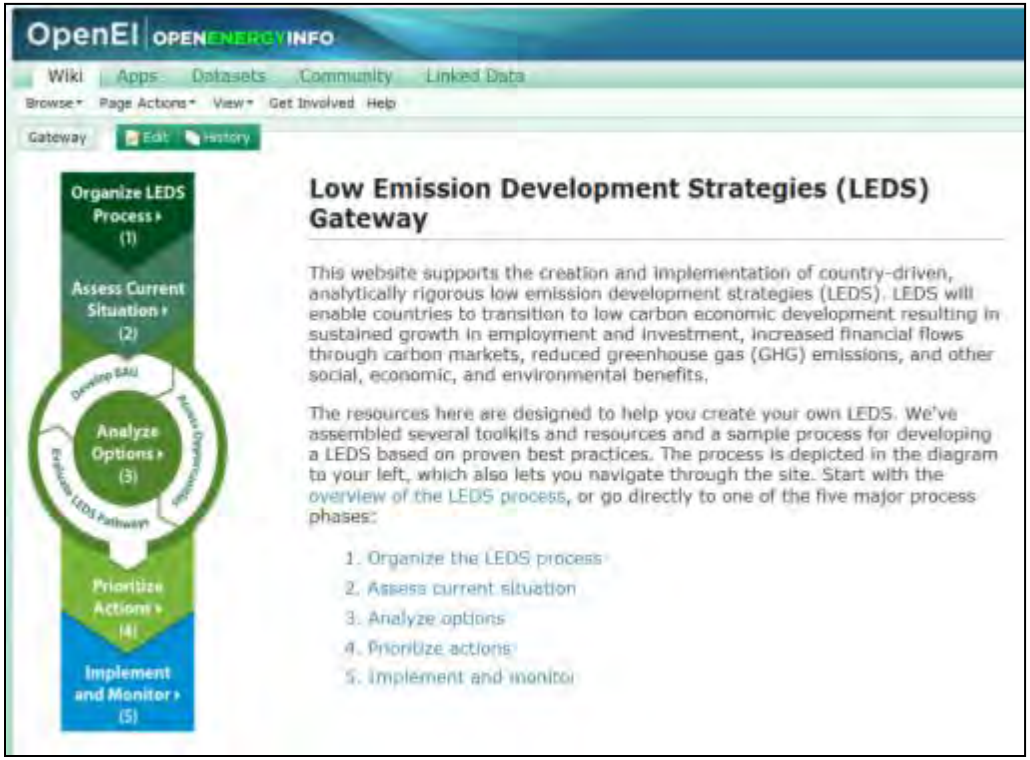
Technical working groups:

- Transportation
- Agriculture
- Energy
- Waste
- Finance
- GHG reporting

LEDS RESOURCE PORTAL

www.OpenEI.org/LEDS

Framework for developing a LEDS based on proven best practices



Sector-specific toolkits and resources to support LEDS

REVIEW AND KEY MESSAGES

- **The EC-LEDS Program is:**
  - A U.S. Government diplomatic and development priority and serves as an OMB Agency Priority Goal (over 20 partners)
  - Building capacity for, not leading development of, countries' LEDS A whole-of-government initiative
  - Seeking to collaborate and complement existing efforts
  - Supported by Mission GCC Clean Energy and Sustainable Landscapes programs
  - Providing a framework for future Mission climate change programming
  - Collaborating globally through the LEDS Global Partnership

RESOURCES

- Internal USAID GCC website

- EC-LEDS fact sheet

- EC-LEDS wikispace

- UNFCCC (http://unfccc.Int)

- LEDS global partnership (http://en.Openei.Org/wiki/LEDSGP)

*"Low carbon planning should be seen as a **continuous process**. As consensus is built around the initial studies and the data collection and modeling that go into them**, this work and this thinking becomes part of the broader economic planning cycle within governments**." Rohit Khanna, Program Manager, ESMAP*

KNOWLEDGE CHECK

QUIZ

- **Question**: The Ministry of the Environment is always best positioned to govern the LEDS process. True or False?

- **Answer**: False. While this might be true in some countries, there is no one-size-fits-all institutional structure for governing the development of LEDS. In some cases other ministries may be better suited, or new governing bodies may be created—such as a national commission on climate change—that include representative leaders from across ministries and from the public and private sectors.

QUIZ

- **Question**: Which of the following is not an essential quality of a LEDS?
  - Forward-looking
  - Actionable
  - Transformational
  - Donor driven (incorrect answer).

Answer: LEDS should be country-owned and country-driven, with support from donors.

QUIZ

- **Question**: During the process of prioritizing LEDS actions, the first and most important criteria to take into consideration are always costs and GHG mitigation potentials. True or False?

- **Answer**: False. While cost and GHG mitigation potentials are important prioritization criteria, they are not always the first or most important criteria that should be considered. Since there is no one-size-fits-all LEDS process, social, economic and other environmental co-benefits may be of highest interest in list of prioritization criteria to certain countries, particularly as they relate to contributing to achieving national development goals.

QUIZ

- **Question**: Match the following characteristics to either EC-LEDS or LEDS:
  - A U.S. Government Initiative (match: EC-LEDS)
  - Provides capacity building assistance (match: EC-LEDS)
  - Helps partner countries in long-term low-carbon planning (match: EC-LEDS)
  - A long-term country strategy (match: LEDS)
  - Articulates development goals (match: LEDS)
  - Achieves reductions in GHG emissions (match: LEDS)

ENERGIZER ACTIVITY

JULY 16, 2013
GWEN ANDERSEN

NATIONALLY APPROPRIATE MITIGATION ACTIONS AND LOW EMISSION DEVELOPMENT

JULY 16, 2013

MATTHEW OGONOWSKI

SESSION OUTLINE

- Origin and Introduction
- Key Features and Implementation
- NAMA Design and Examples

NAMAS AND OTHER MITIGATION ACTIVITIES

- Other mitigation options:
  - Non-climate change development projects
  - Clean Development Mechanism (CDM),
  - Reducing Emissions from Deforestation and Forest Degradation (REDD+)
  - LEDS, green growth programs, etc.

- Many of the principles we will discuss apply to mitigation activities in general, not just NAMAs

NAMAS: ORIGIN

- The United Nations Framework Convention on Climate Change (UNFCCC) has recognized that —deep cuts in global greenhouse gas emissions are required according to science … so as to hold the increase in global average temperature below 2° C above pre-industrial levels…" (*Durban Platform, 2011)*
- In the coming decades, developing countries are projected to account for most of the global growth in greenhouse gas (GHG) emissions
- NAMAs originated in the UNFCCC as one key pathway to allow developing countries to contribute to global emissions reductions

NAMAS: BACKGROUND

- 2007 Bali Action Plan (UNFCCC COP 13): called for *~~n~~ationally appropriate mitigation actions by developing country Parties in the context of sustainable development, supported and enabled by technology, financing and capacity-building, in a measurable, reportable and verifiable manner*" [emphasis added]
- 2010 Cancun decision (UNFCCC COP 16): NAMAs should contribute to reducing developing country emissions relative to projected business-as-usual levels in 2020

NAMAS: BACKGROUND

- Criteria for NAMAs in the agreed text in the UNFCCC:
  - "Nationally appropriate"
  - Implemented in the context of sustainable development
  - MRV-able
- A wide variety of GHG mitigating activities, polices and programs from developing countries can thus be proposed as NAMAs
- Bilateral and multilateral donors to supported NAMAs are free to set their own criteria and requirements

GOALS OF NAMAS

- Mitigate developing country emissions
- Contribute to sustainable economic and social development
- Help to build and implement low emission development strategies (LEDS)
- Enhance international cooperation on climate change between developed and developing countries

GOALS OF NAMAS: LOW EMISSION TRANSFORMATION

- Transformational options can include:
  - Large-scale NAMAs that cover a wider range of individual sources and/or achieve greater emission reductions than small-scale projects
  - Transition sectors to renewables
  - Supported NAMAs that transfer advanced technologies and production processes

POTENTIAL NAMA ACTIVITIES

- Economy-wide goals or targets based on emissions, energy intensity, technology, etc.
- Sector-specific goals or targets
- Cross-cutting policies: renewable portfolio standards (RPS), feed-in tariffs (FiTs), etc.
- Regulatory and financial reforms to encourage private sector clean energy development
- Stand-alone emission mitigation projects

NAMA TYPES

- Domestic NAMAs
- Supported NAMAS
- Crediting NAMAs

NAMAS AND DEVELOPMENT PROJECTS

- Many economic development projects may already reduce GHG emissions
- NAMAs are intended to reduce GHG emissions, and must be able to measure, report and verify the reductions
- NAMAs may also be higher cost actions that would not otherwise be undertaken without the climate benefits

NAMAS VERSUS CDM

CDM

- The Clean Development Mechanism (CDM): Developed country Parties invest in projects in developing countries, then gain credit for GHG reductions
- Offset developed countries‘ emissions

NAMAs

- NAMAs do not offset developed country emissions
- Ideally implemented on a broader scale than CDM
  - South Africa Renewables Initiative: 18 GW renewables
- Government-led, policy-based

NAMAS UNDER DEVELOPMENT: EXAMPLES

- The Ecofys *NAMA Database*: 66 NAMAs and 35 feasibility studies in 35 countries
- South Africa Renewables Initiative
- Mexico Eco Casa
- Vietnam Cement NAMA

NAMA FINANCE

- Domestic NAMAs likely will target negative or lower-cost actions
- Financing for large-scale NAMAs can be significant
- Existing funding for NAMA development is mainly bilateral
- Development banks also fund NAMAs
- The new UNFCCC Green Climate Fund will be key
- Private sector investment critical, esp. over longer term

BENEFITS FOR DEVELOPING COUNTRIES

- Help build an advanced, low emission economy
- Contribute to global emission reductions, national reduction commitments under UNFCCC
- Achieve economic and development co-benefits
- Technology transfer
- Implement higher cost actions with international support
- Develop sectors with untapped emission reduction potential

CAPACITY DEVELOPMENT

- Capacity will vary among developing countries, sectors
- Lower-cost actions can still be candidates for NAMAs
- Capacity building may be substantial for some NAMAs
- Some state institutions may have minimal experience with GHG mitigation
- In-country data and collection procedures may be inconsistent, low quality, updated irregularly

CAPACITY VS. COST: ILLUSTRATIVE DECISION MATRIX

CAPACITY	COST	
	Low	High
High	Domestic	Supported (with financing)
Low	Joint (Support for capacity bulding; Domestic implementation)	Supported

IMPLEMENTATION: SCALE

- NAMAs may involve collaboration among a wide range of institutions, players, sectors and/or geographic regions
- Possible challenges
- Developing countries may focus on medium-scale actions
- Can utilize international support for more expansive actions, training on coordination

IMPLEMENTATION: MRV OF EMISSIONS, REDUCTIONS

- MRV of policy- and regulatory-based NAMAs will require developing new methodologies
- Standards for supported NAMAs funded through bilateral programs will differ according to donor
- Past experience with CDM can help with NAMA MRV

IMPLEMENTATION: ROLE OF CO-BENEFITS

- Can include economic, social and environmental benefits
- Some co-benefits (e.g., air pollution) more easy to quantify and track than others (e.g., gender equity)
- Also relative importance of co-benefits vs. emission reductions; role in funding decisions

BASIC ELEMENTS OF SUPPORTED NAMA PROPOSALS

- Sector(s) and technologies targeted
- Implementation policies/measures to be employed
- Ministries/agencies involved
- Estimated prep time needed for implementation
- Estimated GHG reductions and performance period
- Expected development impacts, co-benefits
- Cost (ideally both up-front and net total)
- Domestic and international resources committed
- Level of additional assistance sought (dollars)
- Type of assistance sought (e.g., capacity building, technology transfer, financing)
- Estimated impact on reductions achieved

NAMA DESIGN: OVERVIEW

- Many activities can be proposed as NAMAs
- Some NAMA designs will be more likely to succeed, achieve sustainable long-term emission reductions
- Funding process will be competitive
- More advanced and comprehensive NAMA proposals that go beyond the basics can be more effective, have an edge in funding

NAMA DESIGN ELEMENTS: ADVANCED

- Larger-scale programs (sector-wide, multi-sectoral, cross-cutting)
- Link domestic with supported resources/actions: One option is developed/developing country ~~-co~~-financing”
- Initiate transition to a long-term low emission path in key sectors
- Link closely with broader LEDS, green growth initiatives

NAMA DESIGN ELEMENTS: ADVANCED

- Focus on technologies, sectors with co-benefit potential
- Strategies for addressing leakage
- Strategies for addressing permanence and sustainability of activities, emission reductions
- Coordination among institutions ministries (horizontal)
- Coordination and eventual integration of sub-national level NAMAs with national LEDS (vertical)

USAID PROGRAMS: INITIATING THE TRANSITION TO LARGE-SCALE LED

- In January 2012, Kazakhstan passed legislation establishing a GHG emissions trading system (ETS)
- The ETS covers 200 entities in the industrial, power, and fossil fuel sectors
- EC-LEDS is building government capacity to implement the ETS and business capacity to comply with the law
- The ETS will help Kazakhstan to meet its national GHG reduction target of 15% below 1992 levels by 2020

USAID PROGRAMS: LINKING DOMESTIC AND SUPPORTED EFFORTS

- In India, the Partnership to Advance Clean Energy (PACE) includes PACE-Research, a $125 million public-private research center to explore clean energy solutions
- US Department of Energy and Government of India have each contributed $25 million over five years
- PACE-Deployment: a second $20 million five-year USAID technical assistance program to support clean energy development
- Through PACE, more than $1.7 billion has been mobilized for clean energy finance (public and private)

USAID PROGRAMS: ASSISTING INTER-MINISTERIAL COORDINATION

- EC-LEDS supports Colombia‘s National Climate Change Committee
- Facilitates political buy-in across the government and establish links with broader sustainable development goals

- USAID is building long-term capacity in seven Colombian ministries through staff sponsorship and targeted trainings
- Regular workshops and coordination sessions

Thank you!

Matthew Ogonowski
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ONLINE NAMA INFORMATION

- Ecofys NAMA Database: http://www.nama-database.org
- UNFCCC NAMAs Page: http://unfccc.int/focus/mitigation/items/7172.php
- Mitigation Momentum Project: http://www.mitigationmomentum.org
- Center for Clean Air Policy (CCAP) Mitigation Action Implementation Network (MAIN): http://ccap.org/programs/mitigation-action-implementation-network-main
- World Resources Institute (WRI) Measurement and Performance Tracking (MAPT) Project: http://www.wri.org/project/low-carbon-development/measurement-and-performance-tracking

CLEAN ENERGY PROGRAM DESIGN

JULY 16, 2013

GWEN ANDERSEN & MATTHEW OGONOWSKI

USAID PROGRAMS TO LEVERAGE INVESTMENTS IN CLEAN ENERGY

JULY 16, 2013

JENNY KANE

SESSION OUTLINE

- Learn about USAID programs that leverage public and private sector investments in clean energy

WHY IT MATTERS

- The International Energy Agency showed $48 billion per year of investment is necessary to provide universal energy access by 2030

- The International Energy Agency is calling for an additional $36 trillion of funding for clean energy by 2050 to hold climate change at an —acceptable level”

WHY IT MATTERS

- Costs of climate change:
  - 2-3°C warming → 0-3% loss in global GDP
  - 5-6°C warming → 5-10% loss in global GDP, with poor countries suffering costs in excess of 10% of GDP
- Costs of mitigation:
  - Stabilization at 550ppm CO2e → 1% of global GDP by 2050

"The benefits of strong, early action on climate change outweigh the costs"

– *Stern Review: The Economics of Climate Change*

WHY IT MATTERS

- USAID and our partner agencies cannot fund all of the needed energy investment
- Private sector investment is necessary
- There are mechanisms by which we can leverage our funding to achieve low emission development goals by assisting the private sector

BARRIERS TO CLEAN ENERGY

- ***Lack of access*** to finance is one of the largest barriers to the advancement of clean energy (CE) in developing countries
- Renewable energy (RE) and energy efficiency (EE) projects are still viewed as higher risk investments
- Need for specific policy interventions and capacity building efforts

LEVERAGING PRIVATE SECTOR INVESTMENT

- Development Credit Authority (DCA) Guarantees
- Global Development Alliance (GDA)
- Private Financing Advisory Network (PFAN)

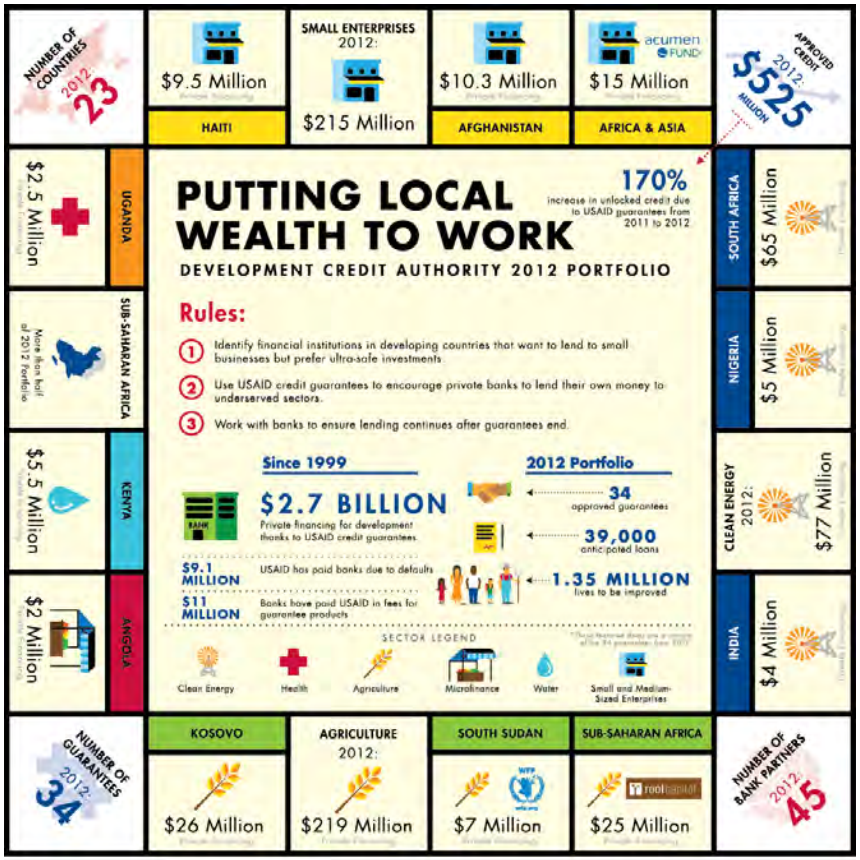
USAID DCA VIDEO

DEVELOPMENT CREDIT AUTHORITY GUARANTEES

- A **guarantee** buys down the risk for the lender
- Provides comfort to lender
  - Increased lending to sector
  - Lower collateral requirements
  - Lower interest rates
  - Fewer lending limits
- Supports the lender directly (covers losses) / supports the borrower indirectly

DEVELOPMENT CREDIT AUTHORITY (CONT.)

- 2012 DCA accomplishments:
  - Worked with 45 financial institutions in 23 countries
  - Unlock up to $525 million in private capital, $77 million for renewable energy
  - 34 partial credit guarantees (annual record)
- Focus on small and medium-sized enterprises (SMEs) in energy sector



INDIA DCA LOAN GUARANTEE

Kerry in Delhi as USAID Announces $100M Investment in India's Clean Energy

By Press Trust of India
Jun 23, 2013

Rate This

Secretary of State John Kerry being greeted by an Indian government official at Palam Air Force Station in New Delhi on June 23 as Ambassador Nancy J. Powell (c) looks on. (Getty Images)

NEW DELHI, India

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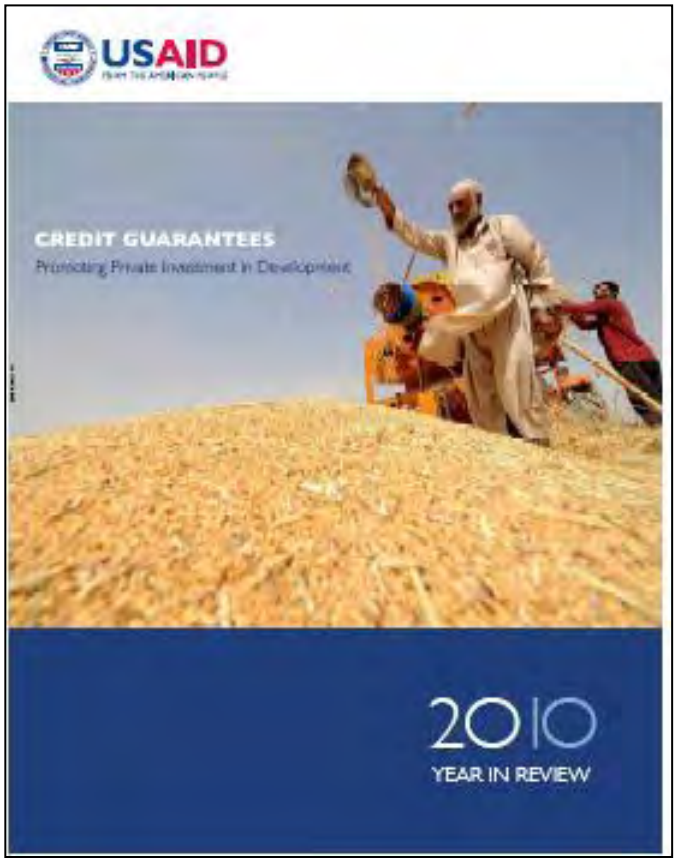
INDIA DCA LOAN GUARANTEE

- June 2013 DCA loan guarantee for **$100 million investment** in clean energy production
- Expected to create **300-400 additional megawatts** of energy = light homes of tens of thousands of Indian families
- Catalyze 4-5 medium-scale CE projects directly and 10-12 indirectly in **wind, hydro, solar, biomass**
- First time DCA has partnered with a **clean energy investment fund**

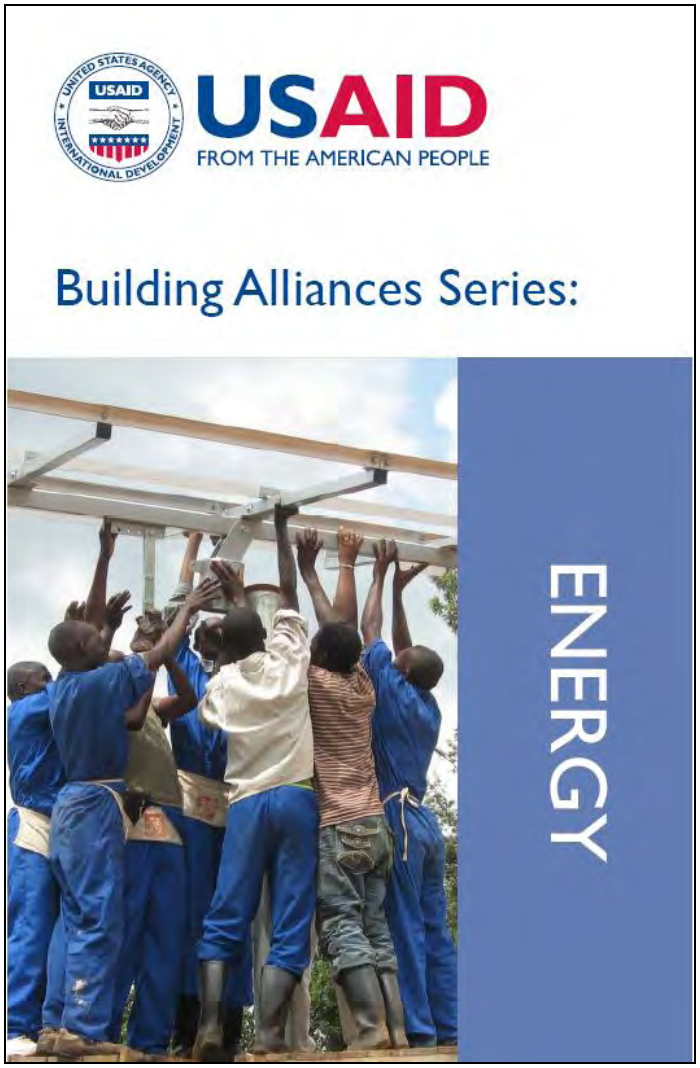
DCA KEY TAKE-HOME MESSAGES

- Credit guarantees can increase lending to a sector with more attractive terms – buys down the bank's risk
- Maintains some risk to keep lender incentivized
- Focuses on small and medium sized enterprises
- Low default rate = enormous leveraging of US taxpayer dollar
- DCA available to all USAID missions



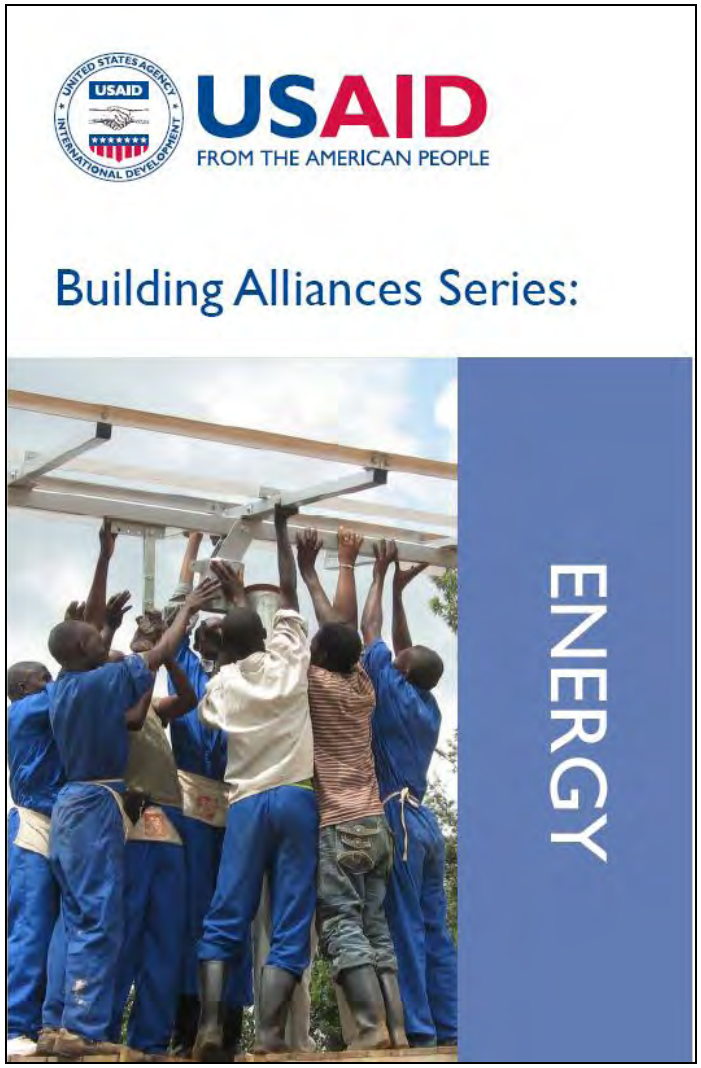
GLOBAL DEVELOPMENT ALLIANCE (GDA)

- Leverage private sector's expertise and financing
- Alliances are co-funded and co-managed with partners
- Catalyze public / private partnerships
- Aligning the interests of the private sector with the development objectives of USAID



GDA KEY TAKE-HOME MESSAGES

- Mechanism for leveraging public-private resources for development
- Brings the talent of the private sector to the development arena
- **For more information:**
  - ***Website:*** http://idea.usaid.gov/gp/about-gp
  - ***Alliance Energy Guide:*** http://idea.usaid.gov/sites/default/files/attachments/Energy_Guide.pdf

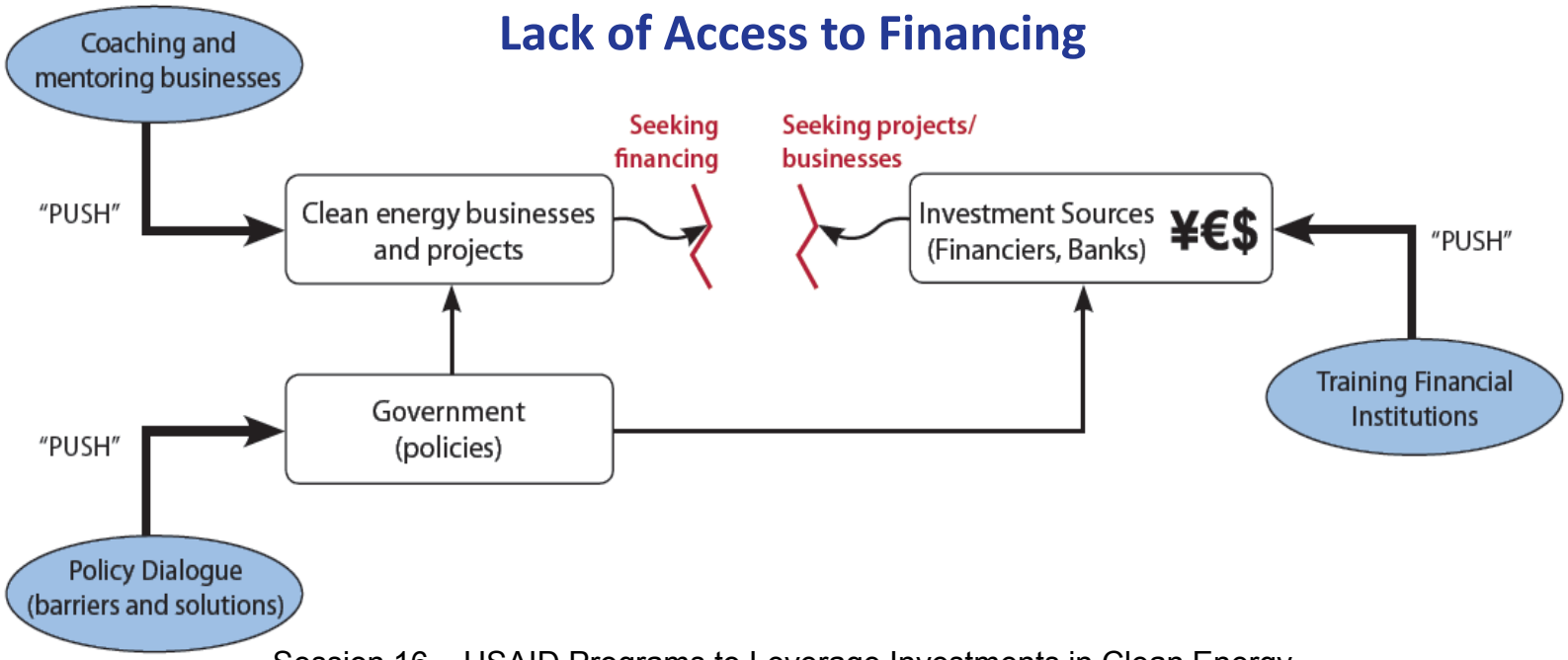


PFAN: PRIVATE FINANCING ADVISORY NETWORK

- Advice and Guidance
- Technical Assistance
- Matching Projects with Investors
- Network of Private Sector Professionals

CTI PFAN
CTI PRIVATE FINANCING ADVISORY NETWORK

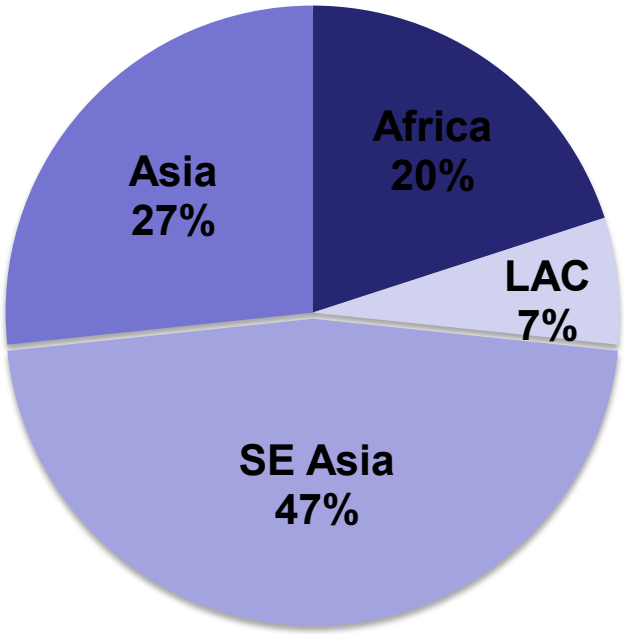
The Missing Middle: Lack of Access to Financing



PFAN EXPERIENCE

- 39 clean energy projects have achieved financial closure, with total investment of $493 million
- Combined, these projects will mitigate over 1.9 million tons of CO_2 per year
- Examples:
  - **Mexico:** Small hydropower
  - **Brazil:** Biodiesel from soya and tallow
- PFAN pipeline (April 2013):
  - 164 projects, potential: 7 billion tons of CO_2 per year

Closed Projects by Region



PFAN KEY TAKE-HOME MESSAGES

- PFAN works with project developers to develop comprehensive and bankable project proposals
- This helps developers get over the initial financing hump that viable renewable energy projects often face
- For more information: http://www.cti-pfan.net/

SESSION HIGHLIGHTS REVIEW

- Lack of access to finance is critical barrier to CE
- The USG has programs to address this:
  - DCA reduces risk to banks to lend for CE
  - GDA catalyzes public/private partnerships
  - PFAN helps businesses develop bankable projects

ACTIVITY OBJECTIVES

- Provide participants practice designing CE related activities
- Discuss the strengths and weaknesses of approaches identified

CLEAN ENERGY PROGRAM DESIGN

JULY 16, 2013

GWEN ANDERSEN & MATTHEW OGONOWSKI

ACTIVITY INSTRUCTIONS

- Review materials
- Discuss with your group
- Groups with same scenario will be combined
- Present responses using any format you like.
- **BE CREATIVE!**

COURSE WRAP-UP & NEXT STEPS

JULY 16, 2013
JENNY KANE

REVIEW: OUR LEARNING OBJECTIVES

- Upon completion of this course on **Global Climate Change and Clean Energy**, participants should be able to describe:
  - How energy impacts economic development and climate change
  - The role that clean energy can play in mitigating greenhouse gas emissions
  - What a Low Emission Development Strategy (LEDS) is and its various components
  - How USAID CE programs may be designed with CE Pillar funding

CONGRATULATIONS!

- You have now completed the **Global Climate Change and Clean Energy** course.
- Please take 15 minutes to fill out your course evaluation, and hand it in at the front.
- You will receive your training certificate upon handing in the course evaluation.