EC-LEDS | Enhancing Capacity for Low Emission Development Strategies

Development Impact Assessment: Catalyzing Climate Action in Zambia

October 20, 2016

Webinar agenda

- **EC-LEDS and LEDS Global Partnership Overview**
- **DIA framework**

  Caroline Uriarte, LEDS Global Partnership Secretariat
- **Zambia case study**
  - INDC and NAMA activities – *Nancy Serenje, CEEEZ*
  - Rural electrification projects – *REA*
- **Q&A**

About EC-LEDS

- EC-LEDS helps countries accelerate their transition to climate-resilient, low-emission, sustainable economic development.
- EC-LEDS provides targeted technical assistance that supports the unique national development goals of each partner.
- EC-LEDS is a flagship U.S. government program that collaborates with more than 25 partner countries.

www.ec-leds.org

LEDS Global Partnership

LEDS GP Catalyzes Action and Collaboration Across more than 220 Countries and International Organizations

REGIONAL PLATFORMS
Define priorities and conduct peer learning and collaboration

GLOBAL WORKING GROUPS
Provide technical support and training

LEDS GP SECRETARIAT AND STEERING COMMITTEE

Planning and Subnational Integration

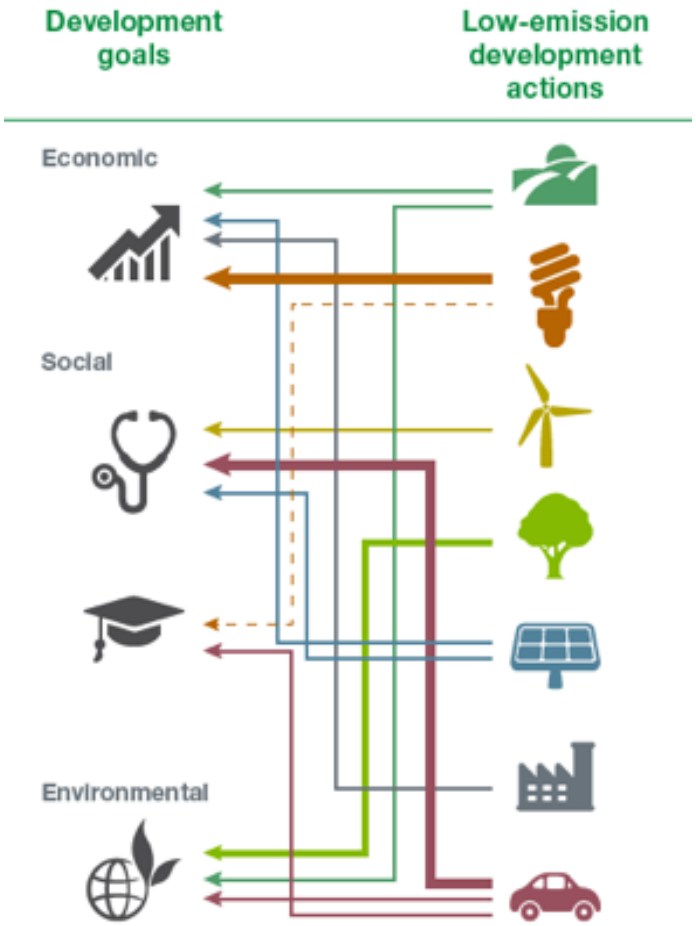
Analysis Tools – Benefits Assessment and Communications

Finance - Investment instruments, Public funds allocation, Donor financing

Sectors - AFOLU, Energy, Transport, Waste (with CCAC)

http://ledsgp.org/join/
Caroline.Uriarte@nrel.gov

What is Development Impact Assessment (DIA)?

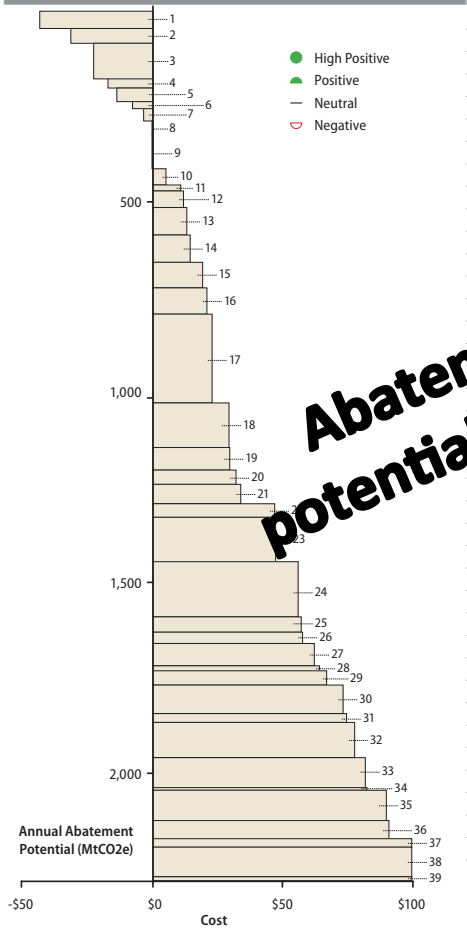


Why is Development Impact Assessment Valuable?

- Supports a **development-focused vision for the future** through explicit consideration of social, environmental, and economic impacts of LEDS and NDC actions -- "well being" is more than just GDP
- Explores linkages across development priorities (e.g., access to electricity, creation of jobs and industries, conserving natural resources, enhancing livelihoods, facilitating gender equality, etc.) and tradeoffs
- Allows for a **simple structure to summarize** and bring together available analytical information, expert opinions, and other data with **clear traceability** back to the information justifying a score
- Brings together **new partners and stakeholders** and supports **cross-sectoral prioritization** of LEDS and NDC actions
- Supports **early establishment of M&E**
- Facilitates **implementation** of actions and **access to finance**

Why was the DIA Framework and Process Developed?

- Over 115 countries developing LEDS around the world; development goals provide the essential foundation for LEDS
- Demand for a simple framework to:
  - assess development impacts of LEDS actions, qualitatively or quantitatively, and through leveraging existing analytical data and information
  - and clearly communicate impacts to inform high level decision-making and policies
- LEDS GP sought to meet this demand through developing the DIA framework and supporting complementary stakeholder processes to populate the tool and communicate impacts

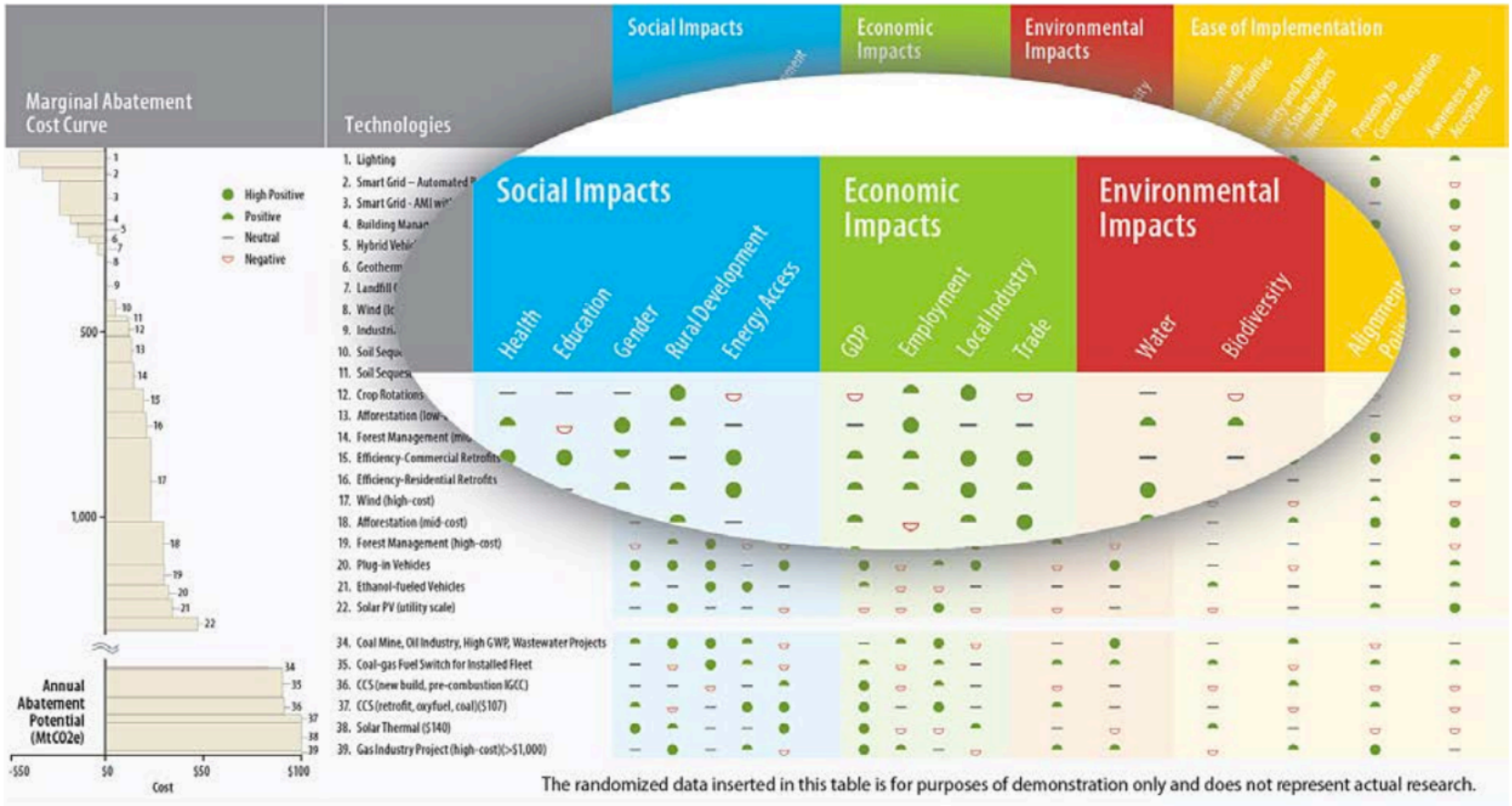


Technologies	Social Impacts					Economic Impacts				Environmental Impacts	
	Health	Education	Gender	Rural Development	Energy Access	GDP	Employment	Local Industry	Trade	Water	Biodiversity
1. Lighting	–	–	–	●	▽	▽	▲	●	▽	–	▽
2. Smart Grid – Automated Residential Systems	▲	▽	●	▲	–	–	●	–	–	▲	▲
3. Smart Grid - AMI with Visual Display	●	●	▲	–	●	▲	▲	●	●	–	–
4. Building Management Systems	●	–	▲	▲	●	▲	▲	●	▲	●	▽
5. Hybrid Vehicles	–	–	–	▲	–	▲	▽	▲	●	●	▲
6. Geothermal	–	▽	▲	–	▲	▲	–	▲	●	▲	▲
7. Landfill Gas Power Generation	▽	●	▽	●	●	▽	▽	▲	▲	▲	▽
8. Wind (low-cost)	–	●	▲	▽	▲	●	▽	–	–	●	–
9. Industrial Improvements (retrofits, new builds)	▽	▲	●	▽	–	▽	●	●	▽	▽	●
10. Soil Sequestration (mid-cost)	–	●	–	▲	–	▽	–	–	–	▲	●
11. Soil Sequestration (high-cost)	–	–	–	–	●	▽	–	–	–	▲	–
12. Crop Rotations	▲	▲	▽	–	●	▲	▲	●	–	▽	–
13. Afforestation (low-cost)	–	▲	●	▽	▽	●	▲	▲	●	–	●
14. Forest Management (mid-cost)	–	–	●	▽	▽	●	▽	●	●	–	▲
15. [illegible]mercial Retrofits	–	▲	●	▽	▽	▽	▽	▽	▲	▲	▽
[illegible]ency-Residential [illegible]	▲	●	●	▽	–	▽	▽	●	▽	▲	▽
17. Wind (high-cost)	–	▲	▽	–	●	●	▽	●	▽	▽	▲
18. Afforestation (high-cost)	–	▲	–	●	▽	▽	●	●	–	▽	–
19. Forest Management (high-cost)	▽	▲	●	▽	▽	▲	–	●	●	▲	▽
[illegible]Plug-In Vehicles	●	●	●	–	●	●	▽	▲	●	▽	●
21. Ethanol-fueled Vehicles	▲	–	●	●	–	▲	▽	▽	–	–	–
22. Solar PV (utility scale)	–	●	–	–	▽	▽	▽	●	▽	▽	–
23. Nuclear	●	▽	▽	▽	–	●	▲	▲	▽	–	●
24. CCS (new build, post-combustion coal)	▲	▽	●	▽	–	▲	●	●	▽	▲	–
25. Efficiency-Residential New Builds	▽	●	●	▽	▲	▲	–	▲	●	●	●
26. Landfill Projects (high-cost)	–	▽	●	–	▽	●	–	●	▲	▲	●
27. Biomass	▲	▲	▽	●	▽	●	▲	●	▽	▲	▽
28. Gas Industry Projects	–	▲	●	▽	▲	●	▲	–	▽	–	▲
29. Electric Vehicles	–	▲	●	–	▲	▽	●	▽	▽	▲	–
30. CCS (retrofit, post-combustion coal)	▽	▲	●	▽	▲	–	▲	▽	–	▲	▲
31. Afforestation (high-cost)	▽	●	●	▽	▲	–	–	–	▽	●	–
32. Solar PV (residential)	▲	–	–	▽	▲	▽	●	▲	–	▽	–
33. CCS (new build, oxyfuel, coal)	▽	–	●	▽	●	●	●	▽	▽	▽	●
34. Coal Mine, Oil Industry, High GWP, Wastewater Projects	▲	●	●	▲	▽	–	▲	●	▽	–	●
35. Coal-gas Fuel Switch for Installed Fleet	–	▽	●	▲	▽	▲	▽	▲	–	▲	▲
36. CCS (new build, pre-combustion IGCC)	–	–	▽	–	▲	●	▽	▲	–	▽	–
37. CCS (retrofit, oxyfuel, coal)($107)	▲	▽	–	●	●	●	–	●	–	▲	–
38. Solar Thermal ($140)	●	▲	–	–	●	●	▽	▽	▲	–	▽
39. Gas Industry Project (high-cost)(>$1,000)	–	●	–	▲	▽	●	▲	–	▽	▲	▲

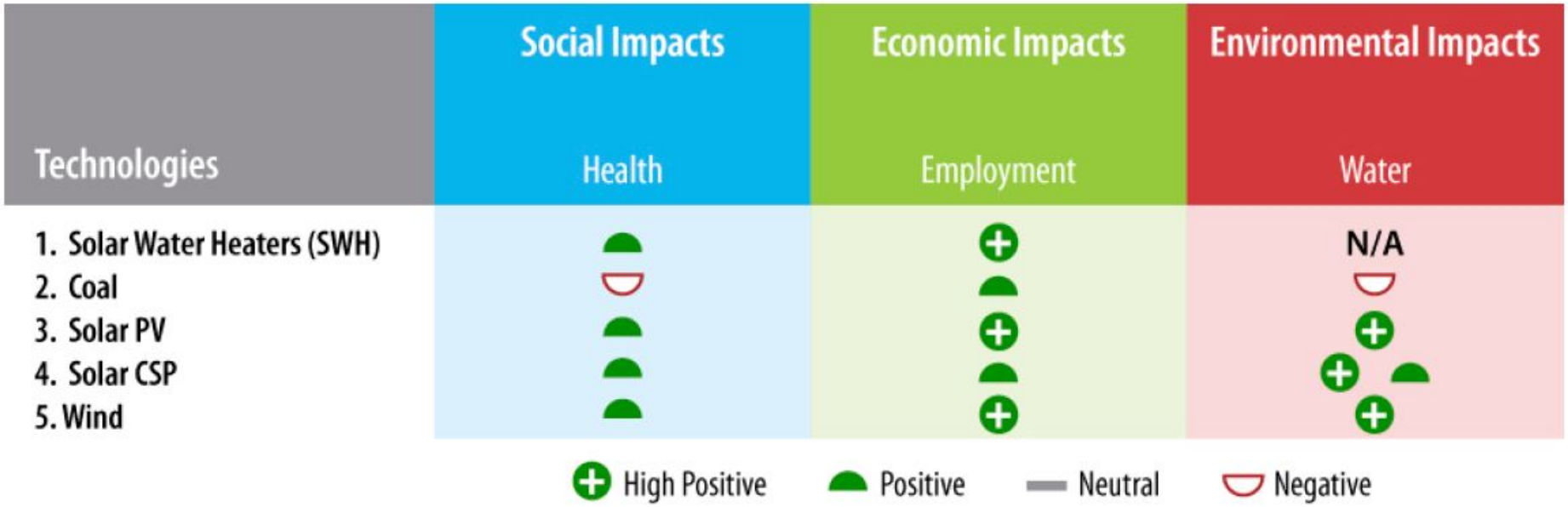
Development impacts

The randomized data inserted in this table is for purposes of demonstration only

https://ases.conference-services.net/resources/252/2859/pdf/SOLAR2012_0717_full%20paper.pdf


Marginal Abatement Cost Curve
Technologies
Social Impacts
Economic Impacts
Environmental Impacts
Ease of Implementation
High Positive
Positive
Neutral
Negative
$00
1,000
Annual Abatement Potential (MtCO2e)
-$50
$0
$50
$100
Cost
1. Lighting
2. Smart Grid – Automated
3. Smart Grid - AMI wi
4. Building Manag
5. Hybrid Vehi
6. Geotherm
7. Landfill (
8. Wind (lc
9. Industri
10. Soil Sequ
11. Soil Seques
12. Crop Rotations
13. Afforestation (low-
14. Forest Management (mi
15. Efficiency-Commercial Retrofits
16. Efficiency-Residential Retrofits
17. Wind (high-cost)
18. Afforestation (mid-cost)
19. Forest Management (high-cost)
20. Plug-in Vehicles
21. Ethanol-fueled Vehicles
22. Solar PV (utility scale)
34. Coal Mine, Oil Industry, High GWP, Wastewater Projects
35. Coal-gas Fuel Switch for Installed Fleet
36. CCS (new build, pre-combustion IGCC)
37. CCS (retrofit, oxyfuel, coal)($107)
38. Solar Thermal ($140)
39. Gas Industry Project (high-cost)(>$1,000)
Social Impacts
Health
Education
Gender
Rural Development
Energy Access
Economic Impacts
GDP
Employment
Local Industry
Trade
Environmental Impacts
Water
Biodiversity
Alignment
Pol
The randomized data inserted in this table is for purposes of demonstration only and does not represent actual research.

Illustrative DIA Framework



Source: http://ledsgp.org/wp-content/uploads/2015/10/Development-Impacts-Assessment-case-study-South-Africa.pdf

Illustrative Scoring Methodology Table

National Development Priority	Unit of Measurement	Scoring		Data Source for Prioritization Framework
		Positive	High Positive	
Employment	Gross jobs per MW (construction and O&M phases)	1-15	16-31	ERC 2010
Water use	Gallons of water saver/MWh from coal power substitution	26-439	>439	Wassung
Health	Qualitative improvement in health from coal power substitution	• Technologies that can offset coal power production are assumed to have a positive impact on health • SWHs are assumed to have a positive impact on health	NOTE: To err on the conservative side, qualitative health impacts were scored positive, rather than high positive, as further analysis of the literature would be needed to make the distinction between positive and high positive.	Spalding-Fecher and Matibe 2003 and "Impact and validation" 2014

Source: http://ledsgp.org/wp-content/uploads/2015/10/Development-Impacts-Assessment-case-study-South-Africa.pdf

Complementary Quantitative Tools to Assess Impacts within the Framework

www.ledsgp.org/development-impact-assessments-tools

Development Impacts Assessment (DIA) Toolkit

The Development Impacts Assessment (DIA) tool search helps country, regional, and local policymakers find tools and resources to assess the impacts of and links between national development priorities and low emission development strategies. This toolkit equips decision makers with information to explore policy options and build consensus with stakeholders to achieve low-emission development that supports national development objectives.

For more information see how to assess development impacts and ways to use the Development Impacts Assessment tool search.

WorldScan

WorldScan is a recursively dynamic general equilibrium model for the world economy, developed for the analysis of long-term issues in international economics. The model is used both as a tool [more]…

posted: 11am, October 2, 2015

Threshold 21 (T21)

Threshold 21 (T21) is a dynamic simulation tool designed to support comprehensive, integrated long-term national development planning by comparing different policy options across a wide range of sectors and identifying [more]…

posted: 9am, October 2, 2015

Regional Economic Models, Inc. (REMI) model

The REMI model is a dynamic forecasting and policy analysis tool that can be variously referred to as an econometric model, an input-output model, or even a computable general equilibrium [more]…

posted: 9am, October 2, 2015

Filter By

Regions
Select options

Sectors of Focus
Select options

Geographic Scope
Select options

Activity Scale
Select options

Impacts Assessed: Social
Select options

Impacts Assessed: Environmental
Select options

Stakeholder Processes to Assess Impacts within the Framework

- Under a more qualitative approach, the DIA visual tool can also be populated through stakeholder and expert-led discussions on potential impacts of LEDS actions.
- Country partners may also choose to use some combination of qualitative stakeholder input and quantitative analysis tools to populate the DIA framework.

Photo: Zambian woman describes benefits of solar electrification of her home to inform development impact assessment. Photo by CEEEZ.

Support Resources for Development Impact Assessment

- EC-LEDS website – Download the visual tool and find further resources on the DIA process at www.ec-leds.org/DIA
- LEDS GP Remote Expert Assistance for LEDS – Receive up to 40 hours of no-cost remote support for development impact assessment at http://ledsgp.org/assistance
- LEDS GP DIA toolkit – Search a user-friendly database of tools to assess specific development impacts that can feed into DIA processes - http://ledsgp.org/development-impact-assessments-tools

- For more information on the DIA framework and process, please contact: Sadie.Cox@nrel.gov

DIA to Support Zambia's Climate and Development Goals

Zambia's Intended Nationally Determined Contribution

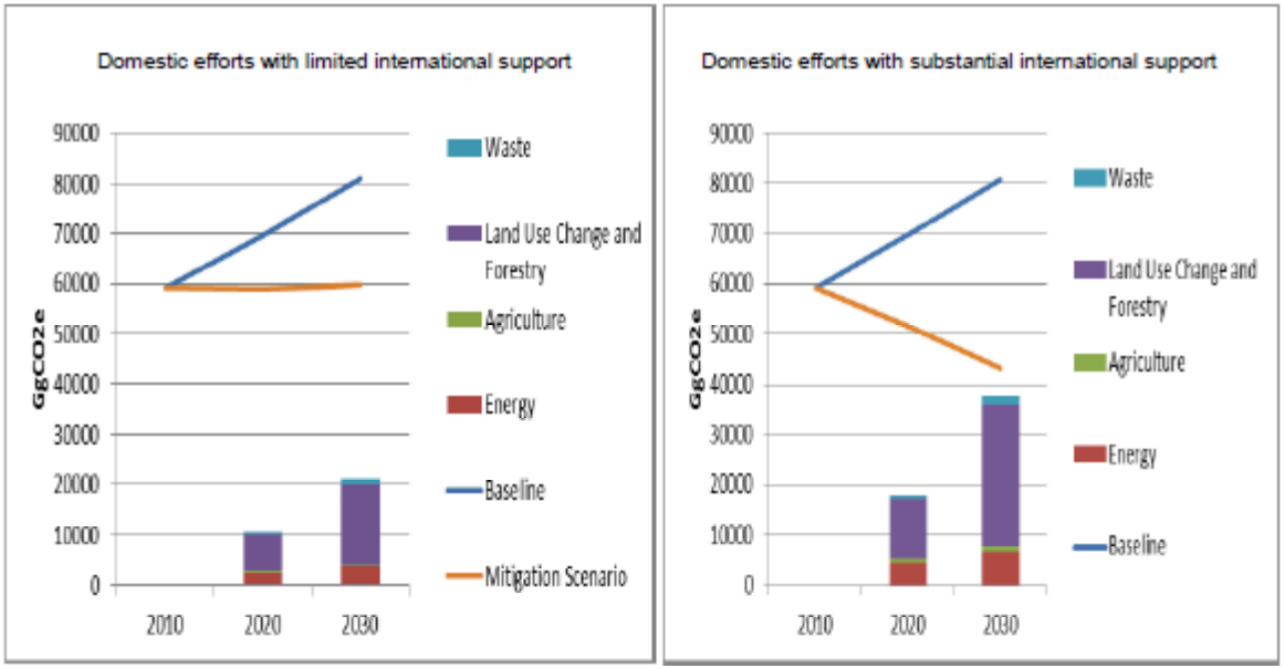
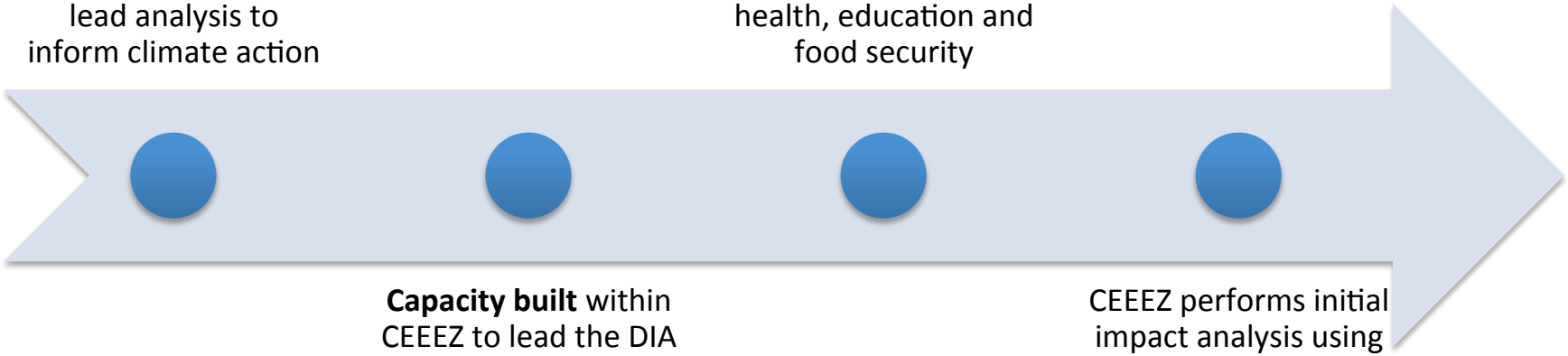


Photo: Electrification of a school in Zambia to support energy access; a key national development goal.

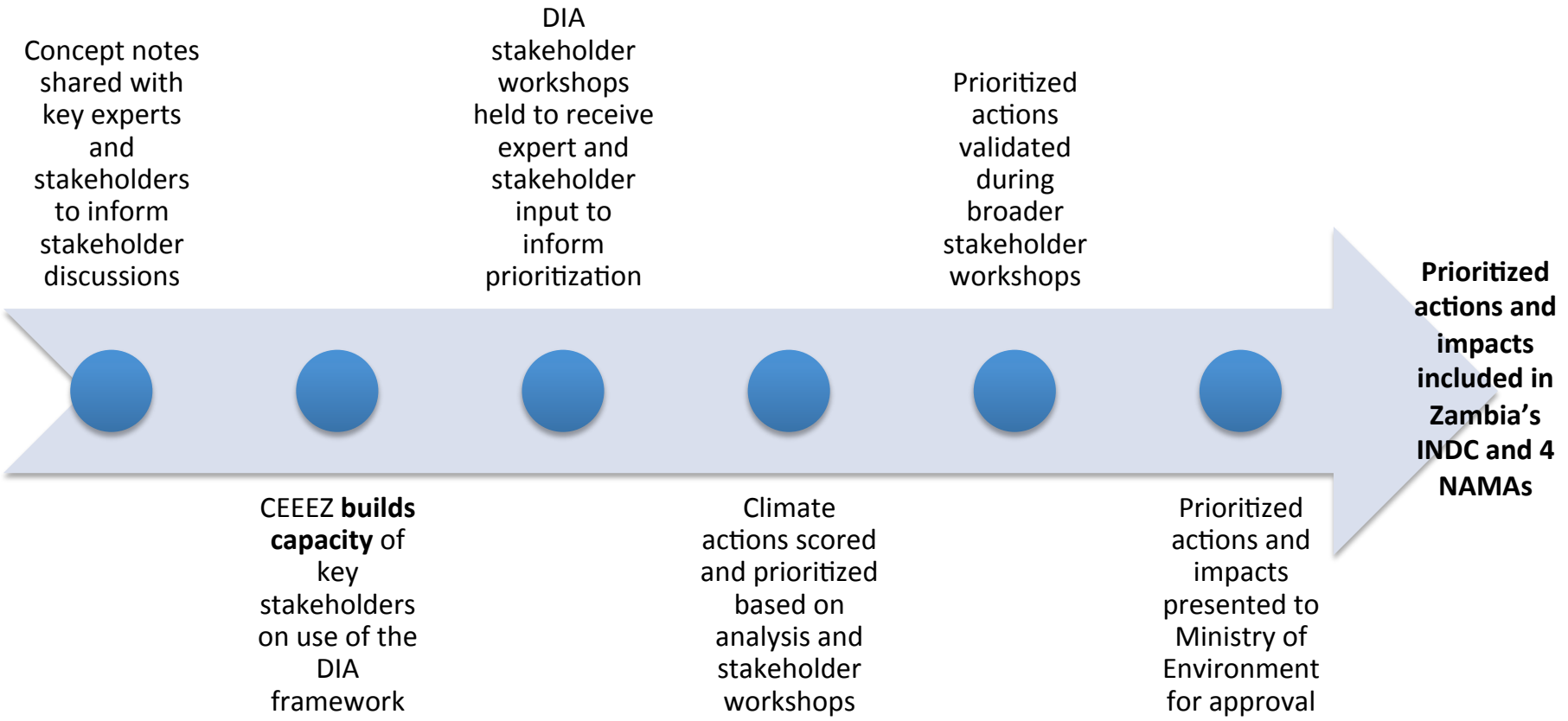
Zambia's DIA Approach for INDC and NAMA Development – Part I



Key Stakeholders

MLNREP • Department of Energy • Ministry of Agriculture • Ministry of Local Government • UNZA • Lusaka University • ZEMA • Lunsemfwa Hydro Power • REA • Metro Consultants • Zambia Climate Change Association of Zambia • National Secretariat on Climate Change

Zambia's DIA Approach for INDC and NAMA Development – Part II



Application of DIA framework and process to inform sustainable agriculture practices included in INDC

Name of Programme	Description	Objectives of the Programme	Co-benefits [5]
Sustainable Forest Management	Program involves implementing - Forest enhancement including natural regeneration and afforestation/reforestation - Sustainable charcoal production to include improved kilns - Improved cooking devices to include improved biomass stoves, use of ethanol and LPG stoves, and switch to electric stoves - Participatory forest management (CFM, JFM, PFM) - Forest fire management	To promote natural regeneration, afforestation/ reforestation, sustainable charcoal production and utilization practices, and generation of electricity from forest waste and residues.	- Creation of job opportunities and alternative livelihoods contributing to rural poverty reduction - Enhanced information awareness on forest management - Increased biodiversity preservation - Restored hydrological balance in the river basin - Increased resource productivity leading to watershed services, and ecosystem protection restoration of natural habitats - Increased rural household incomes from SMEs - Local community empowerment and capacity building, - Reduced GHG emissions - Improved air quality
Renewable Energy and Energy Efficiency	Program involves implementing - Fuel switch (diesel/HFO to biodiesel) - Fuel switch (coal to biomass) - Switch from existing isolated diesel to mini-hydro - Introduce and increase blending of bio-fuels with fossil fuels and where possible substitution with bio-fuels - Off grid RE to non-electrified rural – P.V and Wind - On grid expansion program to support economic growth and grid extension through inter-basin water transfer - Grid extension to non-electrified rural areas	To promote the switching from conventional and traditional energy sources to sustainable and renewable energy sources and practices, and use of off grid renewable energy technologies for rural electrification as decentralized systems.	- Improved health impacts due to child and maternal mortality and retention of medical personnel - Improved education impacts due to longer hours of study and advanced teaching methods, safety, creation of opportunity for girl child and women's education - Improved food security due to increased agriculture production resulting from use of irrigation especially for women - Increased rural development impacts due to increased economic activities through SMEs - Reduced indoor air pollution and load shedding - Reduced GHG impacts and improved air quality - Reduced energy deficits

Application of DIA Framework and Process to Assess Mini-Hydro

Sector	Technology	Impact			Score (#s in parentheses correspond to reference list at end of references/rationale document)			
			Category	Description	High Positive	Positive	Neutral	Negative
ENERGY	Mini Hydro	Social	Education	Impact on children and young adults completing their education		Ensure that, by 2015, children everywhere will be able to complete a full course of primary schooling (7,28)		
			Energy Access	Impact on access to enrgy		Increased rural energy access from 3% to 8% by 2016 (26). Increased access to electricity in rural areas from 3% to 50% by 2030 (13)		
		Economic	Employment	Net increase in jobs associated with construction and maintenance, and indirect jobs created		Net increase in direct, indirect and induced jobs from mini hydro-related development (11,13,20)		
		Environment	GHG Emissions	Impact on GHG emissions		Reduction in GHG emissions by 0.8kg/kW.hr (12,18)		
		Ease of Implementation	Supportive policy framework in place	Policy framework in place		NEP, REMP, R-SNDP, Zambia vision 2030, Electricity Act of 1995, Rural Electrification Act of 2003, Energy Regulation Act of 1995, zmabia grid Code of 2006 (16,21,22,26)		

Application of a specific quantitative tool, "IJEDI", to support analysis within the DIA process

Good Practices and Lessons Learned to Support Successful DIA Processes

- Ensure strong government buy-in and participation across ministries
- Customize the DIA framework and process to specific circumstances (e.g., in relation to national development priorities, key technologies/actions/sectors, and data availability)
- Engage stakeholders across sectors early and regularly to ensure value of the process is understood, ownership is created, and silos are broken down
  - Build strong capacity of lead institutions and stakeholders
  - Identify a champion technical institution to lead the analysis and process through a "train the trainer" approach
  - Support lead institution in providing robust and targeted training to key stakeholders and experts to provide input to the framework and process
  - Provide key resources and information to stakeholders throughout DIA process (e.g., primers, summaries, and background information on each type of impact and technology)
- Support iterative and sustained engagement with the process
  - Ensure DIA framework is a "living framework" that can change as data is made available and/or goals and priorities shift

THANK YOU!