



Advancing climate-resilient
low emission development
around the world

Training Session 2: Methods & tools for benefits analysis and hands-on economic impact training

Please join the LEDS GP and encourage others to join.
www.ledsgp.org



Format of the session

- **Framing the Issue**
 - Pamela Mathis, ICF International/RALI Project
- **Overview: DIA Visual Tool & JEDI Model**
 - Bethany Speer, National Renewable Energy Laboratory (NREL)
- **Country Experience: Zambia**
 - Professor Francis Yamba, Centre for Energy, Environment and Engineering (CEEEZ)
- **Hands-on Training on JEDI Model & Group Discussion**
 - Bethany Speer and Caroline Uriarte, NREL
- **Report out**

Objectives of the session

- **Build capacity** for participants to assess economic impacts of LEDS
- **Identify where/how the JEDI tool can be used** to support country efforts
- Identify key country **challenges** in assessing LEDS co-benefits and solutions to overcome these challenges
- Collect participant **recommendations** on where the LEDS GP can best support LEDS benefits assessments moving forward



Before we begin...



NAME

THAT

BENEFIT

(Speed round!)

umbrella



Top 10 benefits?





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around the world

Framing the Issues

Pamela Mathis

*ICF International/ USAID Resources to Advance LEDS
Implementation (RALI) Project*



Framing the Issue

- **The basics on LEDS benefits:**
 - **What?**
 - **Why?**
 - **How?**

- **Resources to help**

Benefits basics: what are they?

Social

- **Education** – assessing the impact of development on curriculum and learning approaches
- **Energy access** – evaluating how development changes energy supply and demand
- **Gender** – considering how national growth transforms social norms for men and women
- **Public health** – understanding how development impacts air quality and human wellbeing
- **Rural development** – gauging the impact of development on towns and non-urban communities

Economic

- **Jobs** – estimating the number of jobs (net) that will result from a proposed policy
- **Balance of payments** – understanding how national development impacts the global economy
- **Energy security** – considering how development affects a nation's dependence on foreign oil
- **Gross domestic product** – evaluating how national growth changes economic output
- **Local industry** – estimating the impact of development on small businesses and entrepreneurs
- **Trade** – assessing how development influences the way nations exchange goods and services

Environmental

- **Air** – considering how development impacts emissions levels and air quality
- **Biodiversity** – gauging the impact of development on plants, animals, and ecosystems
- **Climate resilience** – estimating how development influences environmental sustainability
- **Greenhouse gases** – understanding how national growth impacts global emissions
- **Water** – evaluating how development changes water supply and demand

Benefits basics: **why** assess them?

- **Inform policy** decisions to meet development objectives
- Help **build consensus** for action with stakeholders, including those not typically interested in climate protection
- Increase **access to climate and private finance**

Benefits basics: **how** to assess them?

- **5 steps:**
 1. Identify policy or program of interest
 2. Define impacts to consider
 3. Identify the options for examining impacts
 4. Conduct the analysis
 5. Share the results

Resources

- **DIA Toolkit (www.ledsgp.org)**
 - About the DIA Process
 - DIA Tool Finder—**we want your input!**
 - DIA Visual Tool
- **Remote Expert Assistance on LEDS (REAL)**
- **Coming soon: Country case studies on LEDS benefits**
 - By USAID RALI Project
 - **Be in touch if you'd like to collaborate**

LEDS GLOBAL PARTNERSHIP

to search, type and hit enter

Home Working groups Regions Resources Programs Technical assistance Fellowships Jobs

Development Impacts Assessment (DIA) Tool Finder

The Development Impacts Assessment (DIA) Toolkit 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.

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 [\[more\]](#).
11am, October 2, 2015

World Induced Technical Change Hybrid (WITCH) model
World Induced Technical Change Hybrid (WITCH) is a software model designed to assist in the study of the socio-economic dimensions of climate change and to help policy makers understand the economic [\[more\]](#).
11am, October 2, 2015

Wien Automatic System Planning (WASP) Package
The Wien Automatic System Planning Package (WASP) is an effective tool for power planning in developing countries. It helps to determine 'optimal' expansion plans for power generation within constraints identified [\[more\]](#).
10am, October 2, 2015

Ventana's Energy, Environment, Economy-Society (E3S) model
The Energy, Environment, Economy-Society (E3S) model is a macroscopic model encompassing the economy, energy, and the environment, which focuses on the exploration of the impact of policies on the patterns [\[more\]](#).
10am, October 2, 2015

Trip Reduction Impacts of Mobility Management Strategies (TRIMMS)
Trip Reduction Impacts of Mobility Management Strategies (TRIMMS) is a visual basic application spreadsheet model that estimates the impacts of a broad range of transportation demand initiatives and provides program [\[more\]](#).
10am, October 2, 2015

Transport Co-benefits Calculator
Together with the Transport Co-benefits Guidelines (TCG), the Transport Co-Benefits Calculator provides policymakers, practitioners and other stakeholders with a simple, intuitive tool to quantify co-benefits from transport projects in Asia. The [\[more\]](#).

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

Impacts Assessed: Economic
Select options

Costs
Select options

Maps Included
Select options

Expertise Required
Select options

Reset



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RESOURCES TO ADVANCE
LEDS IMPLEMENTATION



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IMPACTS ANALYSIS TRAINING

**Development Impacts Analysis (DIA)
Visual and Jobs and Economics
Development Impacts (JEDI) Tools**

Bethany Speer

October 14-16, 2015

LEDS GP Annual Workshop

Punta Cana, Dominican Republic

www.ledsgp.org



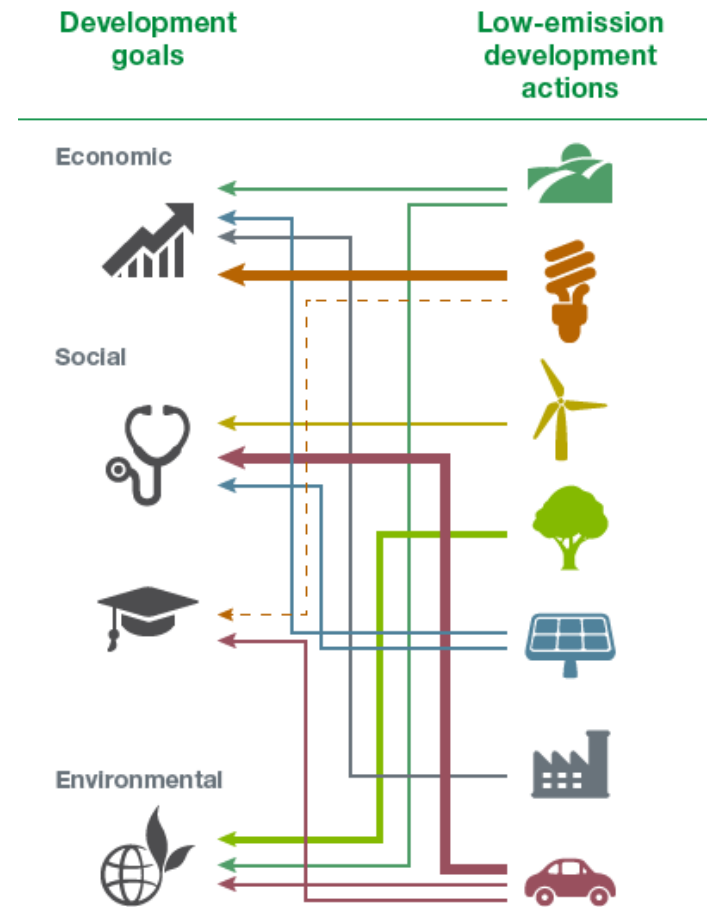
Outline

- Development Impacts Assessments (DIA) and the DIA Visual Tool
- Impacts Modeling
- Input-Output Models
- Jobs and Economic Impacts (JEDI) Tool

DIA Visual Tool

Why assess development impacts?

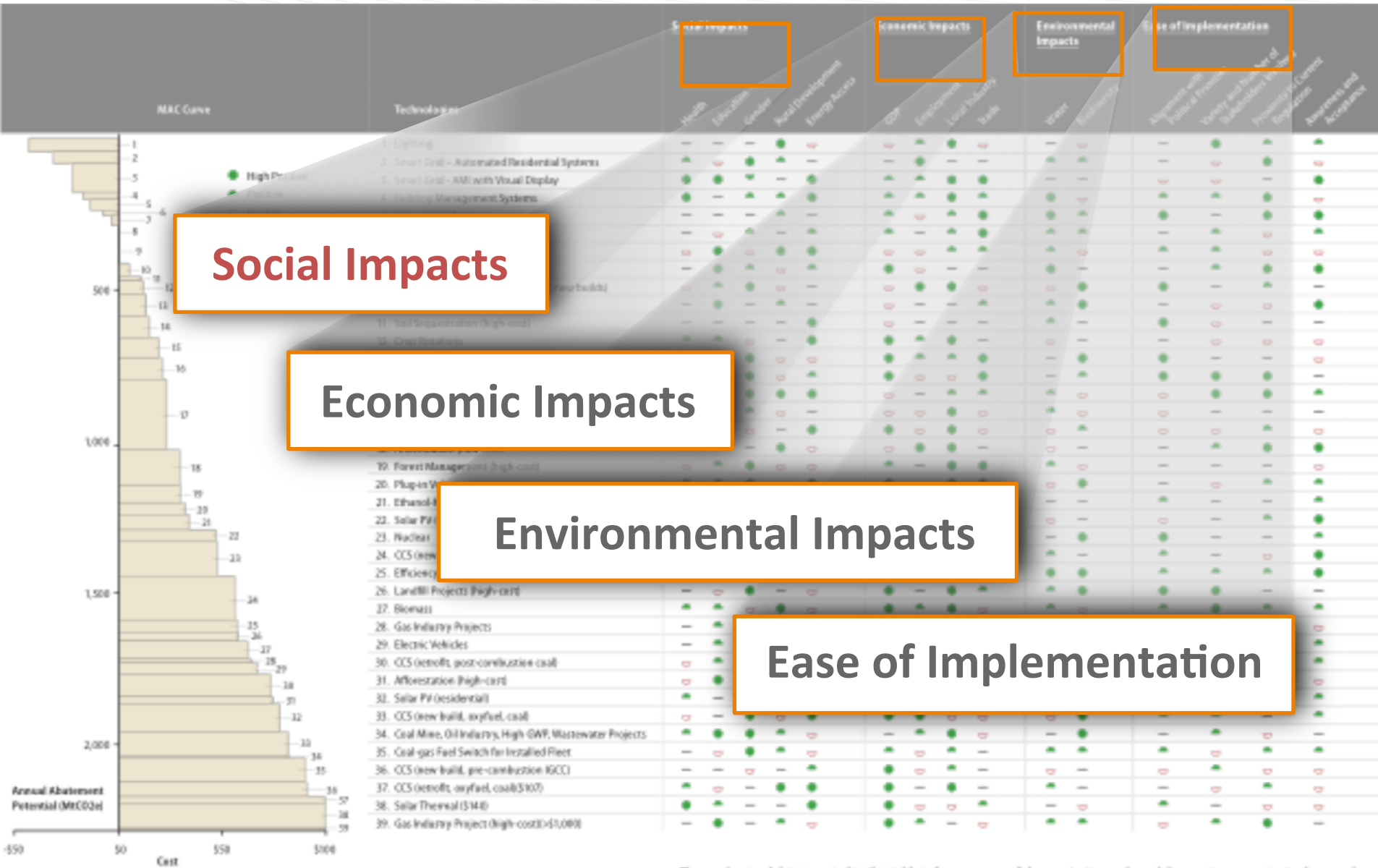
- **Vision for the future.** Supports explicit consideration of social and environmental as well as economic impacts of LEDS actions -- “well being” is more than just GDP
- Establishes **synergies among development outcomes** (e.g., access to electricity, creation of jobs and industries, conserving natural resources, enhancing livelihoods, facilitating gender equality, etc.)
- **Brings together new partners** and stakeholders
- **Early establishment of M&E** -- “What you measure is what you get”
- Increased **access to climate finance**



DIA Visual Tool

Objective is to support identification, understanding and communication of **links between LEDS actions and development priorities** to facilitate decision-making

- Provides **structured approach** to considering impacts beyond primary objectives, across sectors
- Supports representation of **qualitative as well as quantitative** information
- Explores linkages across development **priorities and trade-offs**
- Facilitates comparability among **technology options**
- Provide input to design of **monitoring and reporting** systems
- Provides a mechanism for **communicating** impacts
- Helps identify key actions and impacts **for further study**



The randomized data inserted in this table is for purposes of demonstration only and does not represent actual research.

Development Impact Assessment Steps

- *Identify* – what are the key impacts of interest?
 - Should focus on a few critical priorities
 - Consider how easily can they be analyzed
- *Assess* – what is the extent of the impact?
 - What data is available?
 - What tools are available? Analysis need not be complex.
 - How do these impacts affect different groups?
 - How do these impacts change over time?
 - Quantified impacts will likely be better received by ministries, but even qualitative assessments
 - Are there negative impacts (e.g., impact on employment)?
- *Communicate* – what does this mean for me?
 - Summarize key impacts and considerations, including synergies and tradeoffs
 - Targeted to individual stakeholders – to what they care about



JOBS AND ECONOMIC IMPACT ANALYSIS TOOL

Why Do Impact Modeling?

- Evaluate potential **scenarios** – current or future
- **Inform** residents, stakeholders, decision makers
- Assist businesses
 - Identify potential customers
 - Evaluate economic development efforts
- Assist government
 - Representing public interest
 - Planning and evaluating
 - Community development



Photo Credit: Wouter Gots / AP/WIDE WORLD

Who uses impact models?

- Consultancies
- Non-governmental organizations
- Governments
- Developers
- Industry organizations
- Universities
- Stakeholders
- Consumer advocates



Input-Output Models – One Type of Impact Model

- Snapshot of the **relationships between sectors** of an economy at a single point in time
 - Industries, labor, households, capital, investments, government, imports/exports
- **Expenditures in an economy**
 - Inputs: goods/services from other industries, payments for labor, capital, taxes, imports
 - Outputs: goods/services to other industries, households, and governments, exports
- **Captures ripple effects within a region**, i.e. an increase in demand for electricity might increase demand for generators; production of generators will further increase demand for electricity

Examples Input-Output Studies in Africa

- Chipunza, Chikuta, Nkomazana (Midlands State University, Zimbabwe) “Economic benefits from the 2010 FIFA World Cup: The case of Zimbabwe’s hotel and lodging sector”
- Bocoum (African Development Bank): “The Mineral and Energy Sectors and Stages of Economic Development: A Comparative Input-Output Analysis”
- Kweka, Morissey, Blake (University of Nottingham, UK) “Is Tourism a Key Sector in Tanzania?”
- Saayman, Merwe, Rossouw (North-West University, South Africa) “The Economic Impact of Hunting in the Northern Cape Province”

Jobs and Economic Development Impacts (JEDI)

- Available for download at <http://www.nrel.gov/analysis/jedi/download.html>
- An Excel-based input-output (I-O) model that can be used to quantify economic impacts of energy development and operation scenarios.
- The model also allows for the quantification of non-energy impacts from scenarios such as changes in land use or household income.

JEDI (Continued)

- Based on user-entered **project-specific** data or default input (derived from industrial norms)
- JEDI models include models for **conventional hydro electric, solar photovoltaic, geothermal, biofuels, wind and general impacts** (for non Energy specific)
- JEDI models can be used by **local or national decision makers, potential project developers, project owners and others that are interested in getting estimates for number of jobs and economic impacts** that could be supported by implementing an energy project

Country Experience: Zambia

Professor Francis Yamba

*Zambia's Centre for Energy, Environment
and Engineering*

Outline

1. Overview of LEDS Priorities & Process in Zambia
2. Use of DIA Visual Tool
3. Use of JEDI Model
4. Opportunities & Challenges

LEDS Priorities in Zambia

- Zambia's long term development target stated in the Vision 2030 is to become *"A Prosperous Middle Income Nation by 2030"*
- Zambia's Policies and Strategies in Energy, Forestry, Agriculture, Sanitation and Water, and Transport are aligned with the Vision 2030 and Revised Sixth National Development Plan (RSNDP) and are Climate compatible,
- And both of which support development of a low carbon, and climate resilient pathway
- Other related LEDS initiatives include:
 - National Response Strategy,
 - Second National Communication (SNC),
 - Technology Needs Assessment (TNA),
 - REDD+, and
 - INDC

Overview of LEDS Process in Zambia

- DIA Visual Tool was used to assess the impacts of 4 NAMAs and INDC
- The four NAMAs are:
 - Increasing Efficiency in Harvesting, Processing and use of Charcoal
 - Sustainable Agriculture through Integrated Crop and Livestock farming
 - Integrated Waste Management in Selected Councils
 - Implementation of Four Selected Small hydro Projects

Overview of LEDS Process in Zambia

- The INDC comprises the Mitigation and Adaptation components.
- The DIA tool was used for assessing the developmental impacts for the Mitigation component.
- Three programmes were identified and these are:
 - Sustainable Agriculture
 - Renewable Energy and Energy Efficiency
 - Improved Charcoal Production
- The INDC was submitted to the UNFCCC by September 30, 2015

Development Impact Assessment (DIA) Steps

DIA Visual Tool is a framework to support identification, understanding and communication of **links between LEDS actions and development priorities** to facilitate decision-making.

Step 1: Identification of impacts and indicators applicable to proposed technology or action

- **DIA Visual Tool** was used to assess impacts on health, education and food security

Step 2: Identification of supporting documents or literature based on national development goals and priorities related to LEDS

- Rural Electrification Master Plan (REMP) 2008-2030
- Zambia Vision 2030
- National Energy Policy (2008)
- Revised Sixth National Development Plan (2013- 2016)

Step 3: Definition of impacts and indicators according to supporting documents or literature based on national development goals and priorities related to LEDS

Step 4: Identification of targets based on supporting documents or literature based on national development goals and priorities related to LEDS

- Reduce by **two- thirds, between 1990 and 2015, the death rate of children under the age of five** (REMP, MDGs)
- Increase **access to electricity in rural areas from 3% to 15% by 2030** (REMP, NEP)
- Ensure that, **by 2015, children everywhere** will be able to **complete a full course of primary schooling** (MDGs)

Step 5: Scoring of impacts

Step 6: Development of DIA Framework- Summary of Steps 1- 5

NAMAs/INDC Development Impact Assessment process in Zambia

STAKEHOLDER ENGAGEMENT PROCESS

- ✓ CEEZ formally approached the Ministry of Lands, Natural Resources and Environmental Protection (MLNREP) being the Climate Change focal point
- ✓ Key stakeholders were then identified with assistance from the MLNREP. These were mainly institutions/ organizations/ individuals whose work was in line with a known specific NAMA



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

NAMAs/INDC Development Impact Assessment Process in Zambia

- ✓ **Concept notes** containing project description and associated impacts/indicators were suggested and sent to the potential key stakeholders with a letter requesting an appointment to discuss collaboration/their participation in development of the framework(s)
- ✓ This was followed by the stakeholders initially undergoing **capacity building in DIA tool**, and understanding their roles in the process of identifying and providing country documents in support of information related to DIA Framework required
- ✓ Consequent meetings followed to **identify impacts/indicators** applicable to the proposed projects/programmes
- ✓ **Validation of impacts/indicators** at workshops was undertaken with broader number of stakeholders from within and across sectors
- ✓ The MLNREP would then pass on the validated documents for **Ministry approval**

APPLICATION OF DIA TOOL IN ZAMBIA

Example of DIA Tool Framework: Small hydro NAMA

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 DIA TOOL IN ZAMBIA

Example of DIA Tool Framework: INDC- Sustainable

Technology	Co – Benefits	Contribution to National Development Plans Policies/ Targets
Green manure and cover crops for soil improvements	Reduced Rural Poverty Reduction	Increased and stable yields will increase incomes of rural farmers and contribute to the RSNDP objective of low levels of employment in the economy especially in rural areas.
	GHG reduction due to reduced fertilizer use	Decrease in GHG emissions per hectare ranging from 625 -1105 kg/CO2/e and this will contribute reduction of global GHG emissions aimed at attainment of the set goal of below 2 ^o Celsius
Reduced Tillage	GHG reduction due to less turning of soil	Decrease in GHG emissions per hectare ranging from 625 -1105 kg/CO2/e and this will contribute reduction of global GHG emissions aimed at attainment of the set goal of below 2 ^o Celsius
	Biodiversity preservation due to reduced tillage	Reduced clearing of forested or grassland for cultivation improves soil environment and hence increases the number and species of soil organisms contributing to the attainment of the Policy objective for promoting soil management for sustainable agriculture production and growth under the agriculture sector RSNDP

How the Results were Used

- The results from analysis with DIA visual tool for the NAMAs and INDC were used as inputs into NAMAs and INDC Monitoring and Evaluation Frameworks
- The results aided the **comparison** of outcomes across technologies/sectors/scenarios leading to more **informed** decision making
- The resulting DIA frameworks displayed **linkages** of LEDS actions and development impacts thereby making it easy to communicate to decision/policy makers and other stakeholders

Use of the JEDI Model in Zambia

- Assessing economic impacts of implementing projects in Zambia has become a requirement for monitoring development
- However, so far only direct impacts are assessed
- Energy is one of the important driving forces behind the development of an economy as it cuts across most economic and social activities
- The strategy for the **National Energy Policy (NEP)** of 2008 is to create conditions that will ensure the availability of adequate supply of energy from various sources, which are dependable, at the lowest economic, financial, social and environmental cost consistent with national development goals
- In view of the above importance, JEDI can be used to quantify economic impacts (i.e., jobs, earnings and outputs) of Energy development

Use of the JEDI Model in Zambia

- Jobs Economic Development Impact (JEDI) is a model that estimates economic impacts threefold, viz direct, indirect and induced
- The REA is working with CEEZ to incorporate the JEDI model into three (2 energy and 1 non-energy) projects to enable them report on estimated number of jobs created during construction and O&M phases, directly and indirectly
- Another important output of JEDI analysis is GDP estimation which indicates value addition across sectors

CHALLENGES OF USING JEDI IN ZAMBIA

- Lack of project specific data
- Inadequate training on how to apply the model for different technologies/project types. For example, how to apply the tool for non energy projects

HOW TO OVERCOME THEM

- More training on application of model
- Derive cost data from feasibility studies undertaken

Results of use of JEDI in Zambia for a potential 20 MW PV solar plant

CONSTRUCTION PHASE (single year equivalent)				
	DIRECT	INDIRECT	INDUCED	TOTAL
Jobs	362	748	604	1,714
Earnings (Total)	7.2	14.9	4.5	26.6
<i>Workers with Less than Primary Schooling</i>	0.7	1.5	2.0	4.2
<i>Workers with Primary Schooling</i>	2.1	4.4	1.4	7.9
<i>Workers with Secondary Schooling</i>	1.6	3.8	0.5	5.9
<i>Workers with Post-Secondary Schooling</i>	2.9	5.2	0.5	8.6
Value Added (GDP)	13.2	50.1	7.7	71.0
OPERATION AND MAINTENANCE PHASE (annual)				
Jobs	76.6	5.8	63.8	146.3
Earnings (Total)	2.5	0.1	0.5	3.1
<i>Workers with Less than Primary Schooling</i>	0.0	0.0	0.2	0.2
<i>Workers with Primary Schooling</i>	0.6	0.0	0.2	0.8
<i>Workers with Secondary Schooling</i>	0.6	0.0	0.1	0.7
<i>Workers with Post-Secondary Schooling</i>	1.2	0.1	0.1	1.4
Value Added (GDP)	2.6	0.3	0.9	3.7

Opportunities to Apply DIA & JEDI Tools in Zambia

- Currently, CEEZ is working with the Rural Electrification Authority (REA) initially to incorporate the DIA and JEDI tool for M&E of three projects and then later into their overall M&E Framework:
 - **Grid extension Project-** Construction of Maimwene Grid Extension project began in 2013 in Central Zambia.



Opportunities for Applying DIA and JEDI tools in Zambia

- Although completed, It is yet to be commissioned. A field visit of the project area was conducted to establish the indicators and targets to be included in the DIA Visual framework for M&E.
- Indicators identified include for households, schools, clinics, type of businesses, and farmers to benefit when electricity once it is energized
- A baseline has already been established
- **Solar PV** – The 60kWp Mpanta PV mini solar grid, located in Northern Zambia, was commissioned in September 2015. A field visit to the project area will be undertaken to establish the indicators and targets of this technology for M&E
- **Mini hydro**- Kasanjiku mini hydro of size 590KW to be developed in North West Zambia is at pre-feasibility stage. The DIA tool and JEDI model will be used to assess indicators, targets and economic impacts for M&E.

Challenges of Applying DIA and JEDI tools in Zambia

- The main challenge has been the **availability of data**: It is difficult to obtain information on some projects or programmes that are on-going or planned for the future.
- The other notable challenge is **resources** to obtain the necessary data: In a case where information is not readily available or just not there, field visits to project sites would help to fill in the missing data, but financial resources are limiting.

Overcoming barriers to Applying DIA and JEDI tools in Zambia

- Using information of similar projects/programmes that have been undertaken in Countries with similar country situation
- With some financial assistance, conduct field visits to project areas to collect the required data for analysis

Other Opportunities for Applying DIA and JEDI tools in Zambia

- Zambia is in the process of preparing its Seventh National Development Plan and the DIA tool has been identified as a tool to facilitate the preparations of this important document
- Having successfully developed four NAMAs, a fifth NAMA on Transport is being proposed, and the DIA tool will be used to prepare this NAMA

Lessons Learned

- Engaging the policy makers and other stakeholders from the onset has led to success of incorporating DIA tool and JEDI model.
- Creating a **'sense of ownership'** of the documents prepared with support of the DIA tool and JEDI, i.e. definitions of impacts/ indicators, referencing a country's national documents.
- The DIA visual framework is a moving (or not fixed) framework that can change as data is made available, hence a **good tool for M&E**. This applies to the JEDI model as well
- All information about a technology is outlined in a framework, **making it easy for third parties to make decisions** or conclusion. That is from technology to indicator to target to supporting document or evidence.

Thank You

Group Work

Illustration of Input Datasheet

Project Data	Project Navigator (Main Menu)
Conventional Hydroelectric	
Enter values in to the shaded cells	
Click ? for more information	

Project Nameplate
Currency Year

Construction Phase

Expenditure Item
Equipment (turbines, etc.)
Civil works and other
etc.)
Planning and Design
Fees, Permits, Licenses
Construction Total

Operating Phase

INPUTS ARE IN GREEN BOXES

?	?	?
Expenditure Item	Cost (ZMW, Millions)	% of Expenditures Made in Zambia
Site Services and Personnel		
Replacement Parts and Other Services		
Insurance	-	
Fees, Permits, Licenses	-	
Operating total	-	
	View Results	Save Energy Scenario Data

Types of Impacts: Direct

- Labor force, other economic needs immediately related specified project expenditures
- Design, construction, installation, component manufacturing, utilities, transportation and logistics



Photo credit: Dennis Schroeder / NREL PIX #20097

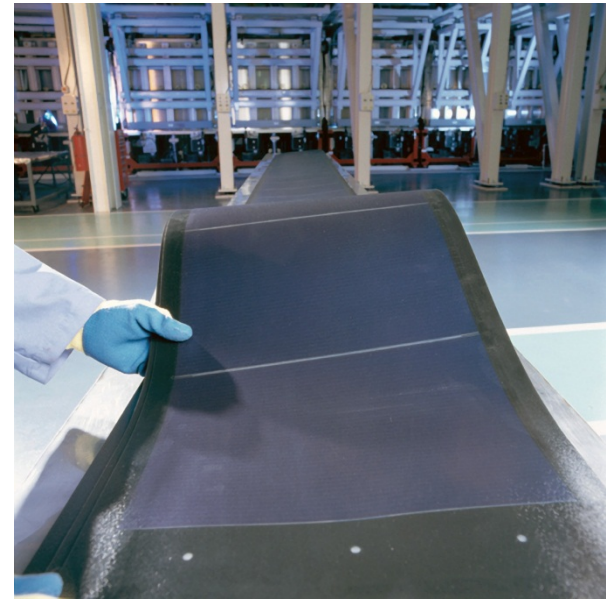


Photo credit: United Solar Ovonic / NREL PIX # 15779

Types of Impacts: Indirect

- Impacts needed to supply inputs for direct effects
- Natural resource extraction, material suppliers, manufacturing, business services



Photo credit: Dennis Schroeder / NREL PIX # 29518



Photo credit: Ernie Sistek / NREL PIX #6988

Types of Impacts: Induced

- Arise as a result of household expenditures for goods and services in the economy
- Food and agriculture, housing, health care, education, retail



Photo credit: David and Associates / NREL PIX # 2896



Photo credit: Keith Wipke / NREL PIX #17322

Time Frame of Impacts

- **Construction**
 - One time impact that is the equivalent to a single year
 - Example: Project supports 200 jobs and you know that it will take two years – this is an average of 100 jobs per year
- **Operations and Maintenance (O&M)**
 - Annual impact that is assumed to be ongoing for the life of the facility

In general, duration of impact is dependent on the duration of specified expenditures

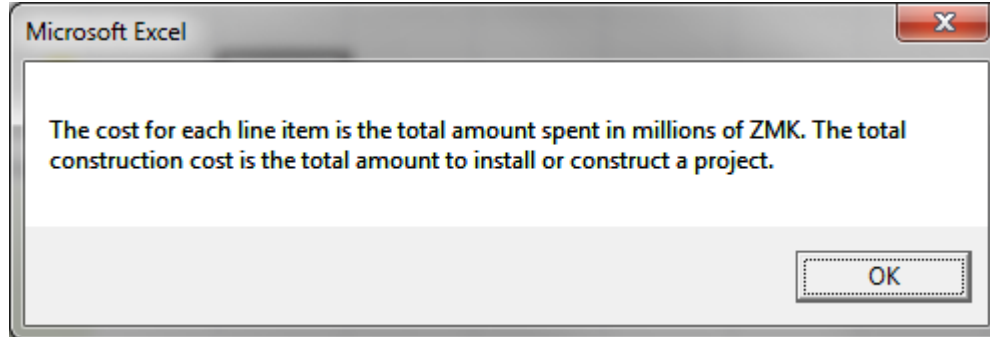
Interpreting Results and Model Limitations

- I-JEDI results are **gross**, not net
- I-JEDI **does not factor in far-reaching impacts** from development such as changes in utility rates, greenhouse gas emissions, property values, public health, or displaced economic activity
- I-JEDI **cannot estimate impacts from supply-side changes** such as technological improvements, price changes, or changes in taxes/subsidies
- I-JEDI **does not evaluate a project's feasibility or profitability**
- NREL is not responsible for how the model is used, applied or results interpreted

Help and Documentation



- Click on
- Either a popup with more information or documentation page



- Further questions? E-mail jedisupport@nrel.gov

Obtaining Project Information

- Interpreting how the information that you have about a project can be translated in to a project (expenditure, content) scenario is not always straightforward
- Keep in mind how the model reads information – as expenditures within industries
- Not always easy – may be proprietary, too detailed to interpret, developers may not want to cooperate
- Sources include government publications, feasibility/assessment studies, regulatory agencies, and developers themselves
- Often people with project-level knowledge are more willing to share information if you provide estimates and ask them if these are reasonable

Sample Scenario

The screenshot shows a web browser displaying the esi-africa.com website. The browser's address bar shows the URL 'esi-africa.com'. The website's header features the 'ESI AFRICA' logo and the tagline 'AFRICA'S POWER JOURNAL'. A navigation menu includes 'Home', 'News and Commentary', 'Resources', 'Events', 'Tenders', and 'About Us'. A search bar is located on the right side of the navigation menu. The main content area displays a news article titled 'Renewable energy: Zambia to up solar power generation by 2016', posted by Ashley Theron on August 14, 2015. The article text states that the minister of Mines, Energy and Water Development, Christopher Yaluma, announced that Zambia expects to add 1,200MW of solar power to the national grid by August 2016. A sidebar on the left contains links for 'Register', 'Subscribe', 'Advertise', and 'Contact'. A sidebar on the right includes 'Sign up' and 'Login' buttons, an email newsletter sign-up form, and social media icons for Facebook, Twitter, YouTube, RSS, and LinkedIn. A banner for 'Eaton' is visible, with the text 'Manage power quality to improve efficiency' and contact information. A small image of the Zambian flag is also present, with the caption 'Zambia to add 1,200MW of solar power by August 2016'. A sidebar advertisement for 'HellermannTyton Perfect Cable Management Solutions' is located on the left. A webinar advertisement for 'ESI Africa Webinar 28th October' is located on the right.

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Renewable energy: Zambia to up solar power generation by 2016

Posted by: Ashley Theron August 14, 2015 Leave a Comment

In Zambia, the minister of Mines, Energy and Water Development Christopher Yaluma said that the country expects to add 1,200MW of solar power to the national grid by August 2016, the Zambia Daily Mail reported.

Zambia to add 1,200MW of solar power by August 2016

HellermannTyton Perfect Cable Management Solutions

Learn the latest in solar technology and its future in Africa ESI Africa Webinar 28th October

Zambia Currency Exchange Rate

- Currency rate is:
 - \$1 = 5194.81 Zambian Kwacha
- Construction Costs
 - Roughly \$4 billion USD = 21,000,000,000,000 or 21,000,000 Million Zambian Kwacha
- Operating costs
 - Roughly \$90 Million
- \$3,333 per kW
- Model uses 2013 Kwacha

Exercise 1a: Enter Cost Inputs

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General

D15

	A	B	C	D	E
2	Project Data	Project Navigator (Main Menu)			
3	Solar Photovoltaics (PV)				
4	<i>Enter values into the shaded cells</i>				
5	Click ? for more information				
6					
7	Project Nameplate Capacity (MW)	1200			
8	Currency Year	2013 (rebased ZMW)			<i>The currency year indicated uses the rebased kwacha (ZMW)</i>
9					
10	Construction Phase (One-Time Expenditures)				
11	Expenditure Item	Cost (ZMK, Millions)	% of Expenditures Made in Zambia		
12	Equipment (modules, mounting hardware, etc.)	7,000,000.000	5.0%		
13	Installation	10,000,000.000	75%		
14	Planning and Development	3,000,000.000	10%		
15	Fees, Permits, Licenses	1,000,000.000	100%		
16	Construction Total	21,000,000.00	44%		
17					
18	Operating Phase (Annual Expenditures)				
19	Expenditure Item	Cost (ZMK, Millions)	% of Expenditures Made in Zambia		
20	Site Services and Personnel	250,000.000	100%		
21	Replacement Parts	150,000.000	0%		
22	Insurance	50,000.000	5%		
23	Fees, Permits, Licenses	25,000.000	100%		
24	Operating total	475,000.000	58%		
25					
26					
27					
28		View Results	Save Energy Scenario Data		
29					

Run and SAVE SCENARIO

- Saving scenario data in this model is important – “EnergyScenario” data will be erased when you start a new scenario
- Click “Save Scenario Data” button
- Option to create a new worksheet within the current Excel file or create an entirely new file
- Both options save only the data that you entered and results
- Other option is to simply save the entire file, but it’s still good to save the scenario data somewhere separately

Exercise 1b: Adjust % of Expenditures

Solar PV_JEDI-Intl-Zambia-051214-Public-DIAJEDITraining-080415%5b2%5d.x

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D15

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6					
7	Project Nameplate Capacity (MW)	1200			
8	Currency Year	2013 (rebased ZMW)	?		<i>the currency year indicated uses the rebased kwacha (ZMW)</i>
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26					
27					
28		View Results	Save Energy Scenario Data		
29					

Saving Scenarios

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Exercise 1: Enter Costs and Adjust % Expenditures

Initial group discussion and then reporting to the room to raise unanswered questions and key takeaways

- What were your results?
- What did you think was interesting?
- What do you have questions about?
- How did you adjust the local content and why?
- What were the impacts of these adjustments on your results?
- What do you think the policy implications are?

Exercise 2: Consider Broader Impacts

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	A	B	C	D	E	F	G	H	
1	Jobs and Economic Development Impacts (JEDI) International - Zambia								
2	General Gross Economic Impact Estimates - Zambia					Project Navigator (Main Menu)			
3	Enter in values in the shaded area below								
4									
5	Year of Currency (1986 to 2013)	2013 (rebased ZMW)							
6	<i>The currency year indicated uses the rebased kwacha (ZMW). Please ensure that expenditures are not in pre-2013 ZMK</i>								
7	Enter Change in Final Demand for Goods or Services from Each Industry (2013 ZMW)					Results			
8	Industry	Enter Change in Shaded Area Below (ZMW)				Direct	Indirect	Induced	Total
9	Agriculture - Maize	-			Jobs	0.01	0.02	0.02	0.02
10	Agriculture - Drought tolerant staples	-			Earnings (Total, K2013)	234	311	119	119
11	Agriculture - Groundnuts (Peanuts)	-			Workers with Less than Primary Schooling	40	68	54	54
12	Agriculture - Sugar	-			Workers with Primary Schooling	85	112	38	38
13	Agriculture - Cotton	(100)			Workers with Secondary Schooling	36	48	13	13
14	Agriculture - Tobacco	-			Workers with Post-Secondary Schooling	72	84	13	13
15	Agriculture - Coffee	50			Value Added (GDP) (K2013)	317	500	201	201
16	Agriculture - Wheat	-			<p>Total Jobs</p> <ul style="list-style-type: none"> Agriculture: 0, 50% Mining: 0, 38% Manufacturing and Construction: 0, 10% Trade, Transportation, Warehousing: 0, 1% Public Service and Utilities: 0, 1% 				
17	Agriculture - Horticulture	-							
18	Agriculture - Other Crops	-							
19	Agriculture - Livestock	-							
20	Fishing	-							
21	Forestry	-							
22	Mining	-							
23	Food and beverage manufacturing	600							
24	Textile manufacturing	-							
25	Wood and furniture manufacturing	-							
26	Fertilizer and industrial chemical manufacturing	-							
27	Other manufacturing	-							
28	Electricity and water	-							
29	Equipment and machinery	-							
30	Construction	-							
31	Trade, transportation	-							
32	Tourism	-							
33	Other private and community services	700							
34	Financial services and insurance	-							
35	Public services	-							

EnergyScenarioResults saved706 EnergyScenario GeneralImpactEstimates documentation ZIO2 ZCIM-CALC GCALC Inflation Note

Exercise 2: Consider Broader Impacts

Initial group discussion and then reporting to the room to raise unanswered questions and key takeaways

- How might energy projects interact with other policies?
- How would you model this in other sectors?
- How could these interactions impact policy

Group Discussion: Reactions to Model and Wrap Up

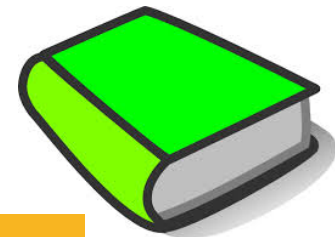
Open discussion across the room

1. **What kind of LEDS benefits assessment** has been done in your country, and **what tools** have been used for that purpose?
2. What **challenges** has your country faced in assessing or communicating LEDS co-benefits? How have they been **overcome**?
3. How **might the JEDI Model be used** in your country to build capacity for assessing the economic impacts of LEDS? Do you have recommendations for improving the model?
4. What **additional tools or support** would be helpful from the LEDS GP?

Hearing back from you

- Main insights
- New ideas
- Commitments and actions

Please hand your output sheet to
the moderator



Please join the LEDS GP and encourage others to join.

www.ledsgp.org



Thank You