Energy Indicators for Sustainable Development: **Guidelines and** Energy Indicators for Sustainable Development: Methodologies **Country Studies on Brazil,** Cuba, Lithuania, Mexico, Russian Federation, Slovakia and Thailand =//

Presentation by Kathleen Abdalla

Workshop on Capacity Development for Mainstreaming Sustainable Development Goals, Targes and Indicators into Statistical Programmes in Selected Latin American Countries Panama City, Panama, 4-6 February 2015

- Focus on presenting an integrated look at energy within the framework of sustainable development.
- Applying the entire set of indicators, can provide an overall picture of the state of energy and sustainable development in a given country
- Indicators can be used to measure progress in achieving sustainable development over time.

- Defined a conceptual framework that incorporated and identified specific indicators for sustainable energy development.
- Assistance to countries in the development and use of energy indicators for monitoring progress and for developing energy strategies in conformity with national objectives of sustainable development.

- EISD developed in the context of the international communities efforts on
- Promoting sustainable development Rio meeting in 1992, CSD, WSSD in 2002, MDGs
- Identifying an an international consensus on energy for sustainable development
- Work on developing and refining indicators on sustainable development and
- How to measure progress on achieving sustainable development

Interagency effort

- United Nations Department of Economic and Social Affairs
- International Atomic Energy Agency
- Eurostat
- International Energy Agency
- European Environmental Agency

Applied and tested in

-- Brazil

-- Cuba

-- Lithuania

-- Mexico

The Russian
 Federation

– Slovakia

– Thailand

Energy Indicators for Sustainable Development 30 indicators

- 3 major dimensions of sustainable development -- social, economic and environmental
 - 7 themes and 19 sub-themes
 4 indicators in the social dimension
 16 in the economic dimension and
 10 in the environmental dimension

- The energy indicators were selected by experts from international organizations and based on lessons learned from the the implementation phase in participating countries.
- The indicators, while not exhaustive, were found to be manageable for most analysts.
- They addresses the most important energy related issues of interest to countries worldwide.
- The selection criteria included considerations about data availability in developing countries and the feasibility to collect additional data considered essential to the development of important indicators.

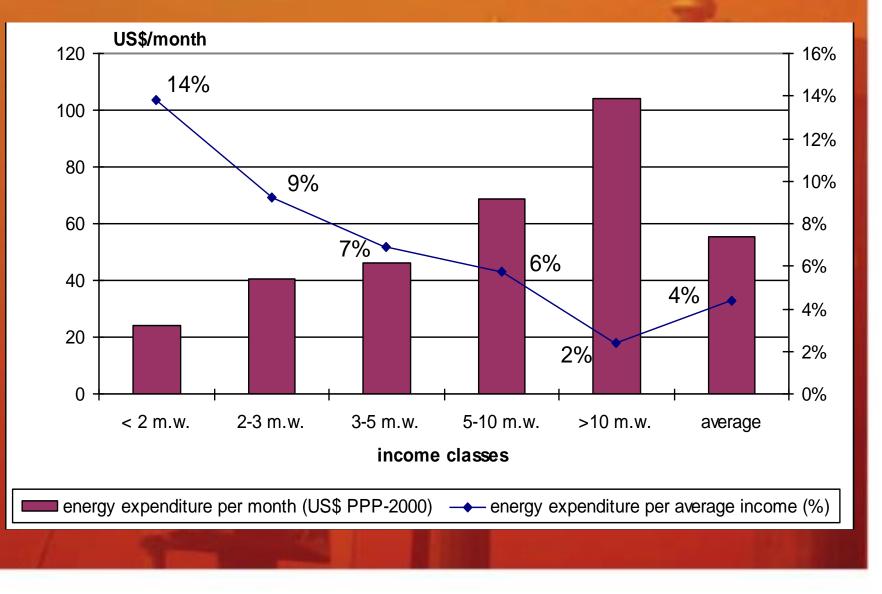
Social Dimension

- Access to modern energy services at affordable rates.
- Two themes are considered under the social dimension equity and health.
- **Equity** is addressed under the sub-themes of affordability, accessibility and disparity.
- Reliability of energy services not considered in the EISD has since been recognized by the international community as a necessary component of energy access
- Health impacts and safety are sub-themes addressed by energy indicators of the social dimension.
 - Fumes from the combustion of traditional or non-commercial fuels used for cooking and heating
 - Fire accidents are also common from the use of candles for lighting.

Social Dimension

Social						
Theme	Sub-theme	Energy	indicator	Components		
Equity	Accessibility	SOC1	Share of households (or population) without electricity or commercial energy, or heavily dependent on non- commercial energy	-Households (or population) without electricity or commercial energy, or heavily dependent on non- commercial energy -Total number of households or population		
	Affordability	SOC2	Share of household income spent on fuel and electricity	 -Household income spent on fuel and electricity - Household income (total and poorest 20% of population) 		
	Disparities	SOC3	Household energy use for each income group and corre- sponding fuel mix	 -Energy use per household for each income group (quintiles) -Household income for each income group (quintiles) -Corresponding fuel mix for each income group (quintiles) 		
Health	Safety	SOC4	Accident fatalities per energy produced by fuel chain	-Annual fatalities by fuel chain -Annual energy produced		

Monthly Household Energy Expenditures by Income levels Brazil



Economic Dimension

Use and production patterns

- Sub-themes overall use and productivity, supply efficiency, production, end-use productivity, fuel mix and prices
- Security of supply
 - The security theme includes dependency on imports and strategic fuel stocks.

Economic Dimension

Theme Sub-theme Energy Indicator Components Use and Production Overall Use ECO1 Energy use per capita - Total population Patterns Overall ECO2 Energy use per unit of GDP - Total population Overall Productivity ECO3 Efficiency of energy conver- sion and energy conver- sion and - Total population Supply ECO3 Efficiency of energy conver- sion and energy conver- sion and - Total energy use (total primary energy supply, total finaty energy enduction Production ECO3 Efficiency of energy conver- sion and electricity generation, mation - Losses in transformation systems including losses in electricity generation, electricity generation, energy use in masterior energy and do by munfacturing branch - Total energy use in moustrial sector energy use in moustrial sector energy - commercial energy use in assenter/ energy use in passenger travel and by enurfact ensolds, floor area, persons per household, appliance ownership ECO10 Fuenspring energy and electricity - Energy use in passenger travel and freight sectors and by mode - formary usergy supply and final consumption, elece					
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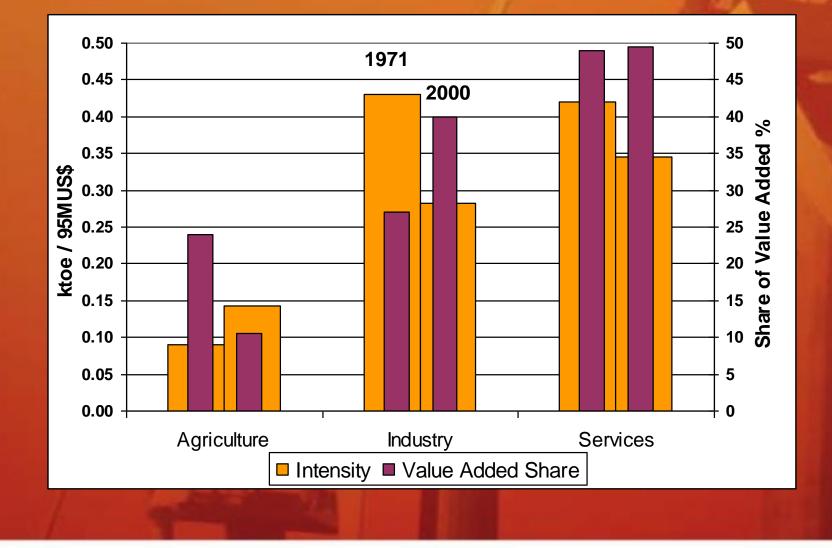
Economic Dimension, cont

	Prices Imports	ECO13	Fuel shares energy and electricity		generation and -Total primary electricity gen	gy supply and final consumption, electricity d generating capacity by fuel type energy supply, total final consumption, total eration and total generating capacity
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Strategic Fuel Stocks		ECO16	End-use energy prices by fuel and by sector		-Energy prices (with and without tax/subsidy)	
Security	Security Net e impor			-Energy imports -Total primary energy supply		

Security		import dependency	-Total primary energy supply
		Stocks of critical fuels per corre- sponding fuel consumption	-Stocks of critical fuel (e.g. oil, gas, etc.) -Critical fuel consumption



Energy intensities by sectors and corresponding value added share, Thailand



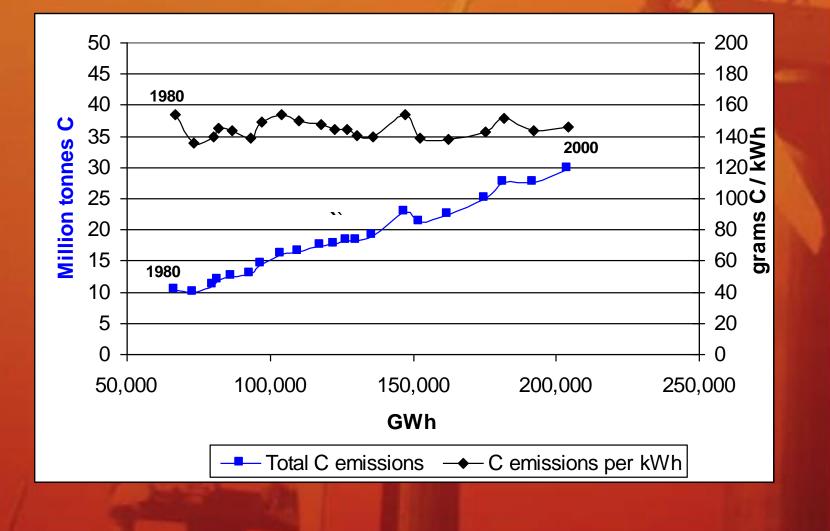
Environmental Dimension

- Three themes of energy-related impacts on the atmosphere, water and land are included here
- For assessing the **atmosphere**, greenhouse gas emissions, linked to climate change, and pollutants that degrade air quality are considered.
- The theme of water specifically covers water quality as determined by contaminant discharges.
- The **land** theme addresses soil quality directly as well as deforestation and waste generation and disposal.

Environmental Dimension

Environmental				
Theme	Sub-theme	Energy Indicator		
Atmosphere	Climate	ENV1 GHG emissions from energy production and use		
	Change		per capita, per GDP and per unit of electricity	
	Air quality	ENV2	Ambient concentrations of air pollutants in urban areas	
		ENV3	Air pollutant emissions from energy systems	
Water	Water quality	ENV4	Contaminant discharges into liquid effluents from energy systems	
Land	Soil quality	ENV5	Concentration of contaminants from energy systems in soils	
	Forest	ENV6	Rate of deforestation attributed to energy use	
	Solid Waste generation &	ENV7	Solid waste generation by type per energy produced	
	management	ENV8	Ratio of solid waste properly disposed of to total generated solid waste	
		ENV9	Solid radioactive waste generation per energy produced	
		ENV10	Ratio of solid radioactive waste awaiting disposal to total generated solid radioactive waste	

Carbon emissions from power sector (Total and per kWh) and electricity per capita, Mexico



- Designed to by used by policy makers, energy analysts and statisticians at the national level
- Assessment of current conditions of energy systems, effectiveness of energy policies in place and in the definition of energy strategies for sustainable development
- Useful for encouraging improvements in statistical analysis and to expansion of national and regional energy statistical databases.
- By raising awareness of utilizing Sustainable Development principles in the formulation of energy projects, programs and strategies
- Promoting an integrated approach towards energy development and sustainability.

- Procedures and processes for developing and using indicators for sustainable energy development vary from country to country.
- Country specific conditions, national energy priorities and sustainability and development criteria and objectives vary by country.
- Using and effectively implementing EISD depends on the existing statistical capability, expertise and the availability of energy data and other related information for decisionmaking.
- EISD requires the allocation of human and financial resources, a pragmatic and cost-effective approach is essential.

- Each country needs to select the energy indicators most relevant to the country's
 - particular energy system
 - and policy priorities
 - when assessing and monitoring the status and progress of specific strategies towards a more sustainable energy future
- Additional energy indicators specifically designed to address conditions or priorities unique to a given country might need to be developed.

- EISD represent an integrated approach to energy and policy analysis at the national level.
- The indicators can assist efforts to assess progress made achieving sustainable development goals in the area of energy
- Their application at the national level can help in identifying specific areas in which targeted measures and policies should be directed.
- The indicators are designed to be utilized with leastcost data available, but more concerted efforts at data collection and coordination are often needed among relevant institutions at the national level

- Country Profiles on Energy for Sustainable Development
 - Brazil
 - Cuba
 - South Africa
- Utilized energy indicators in a holistic assessment and analysis of energy within the context of national sustainable development goals, policies and strategies

- Next steps....
 - At the international level
 - At the national level
- Need to assess and update EISD
- Improving capabilities at the national level to use EISD as a tool
 - to measure and assess progress made
 - to identify gaps and
 - fEnergy Indicators for Sustainable
 - **Development**urther policy options and actions needed