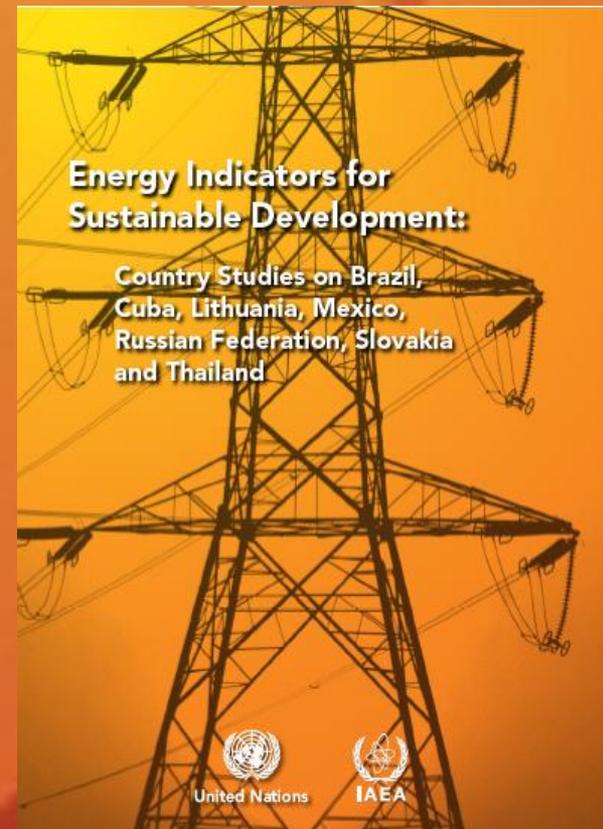
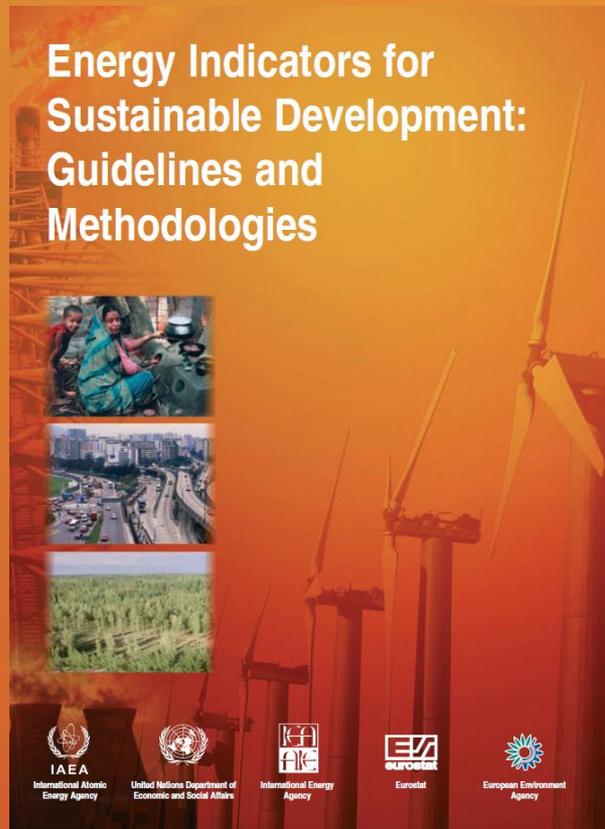


Energy Indicators for Sustainable Development



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Workshop on Capacity Development for Mainstreaming Sustainable Development Goals, Targets and Indicators into Statistical Programmes in Selected Latin American Countries

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Energy Indicators for Sustainable Development

- 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.

Energy Indicators for Sustainable Development

- 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.

Energy Indicators for 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

Energy Indicators for Sustainable Development

Interagency effort

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

Energy Indicators for Sustainable Development

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
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Energy Indicators for Sustainable Development

- 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

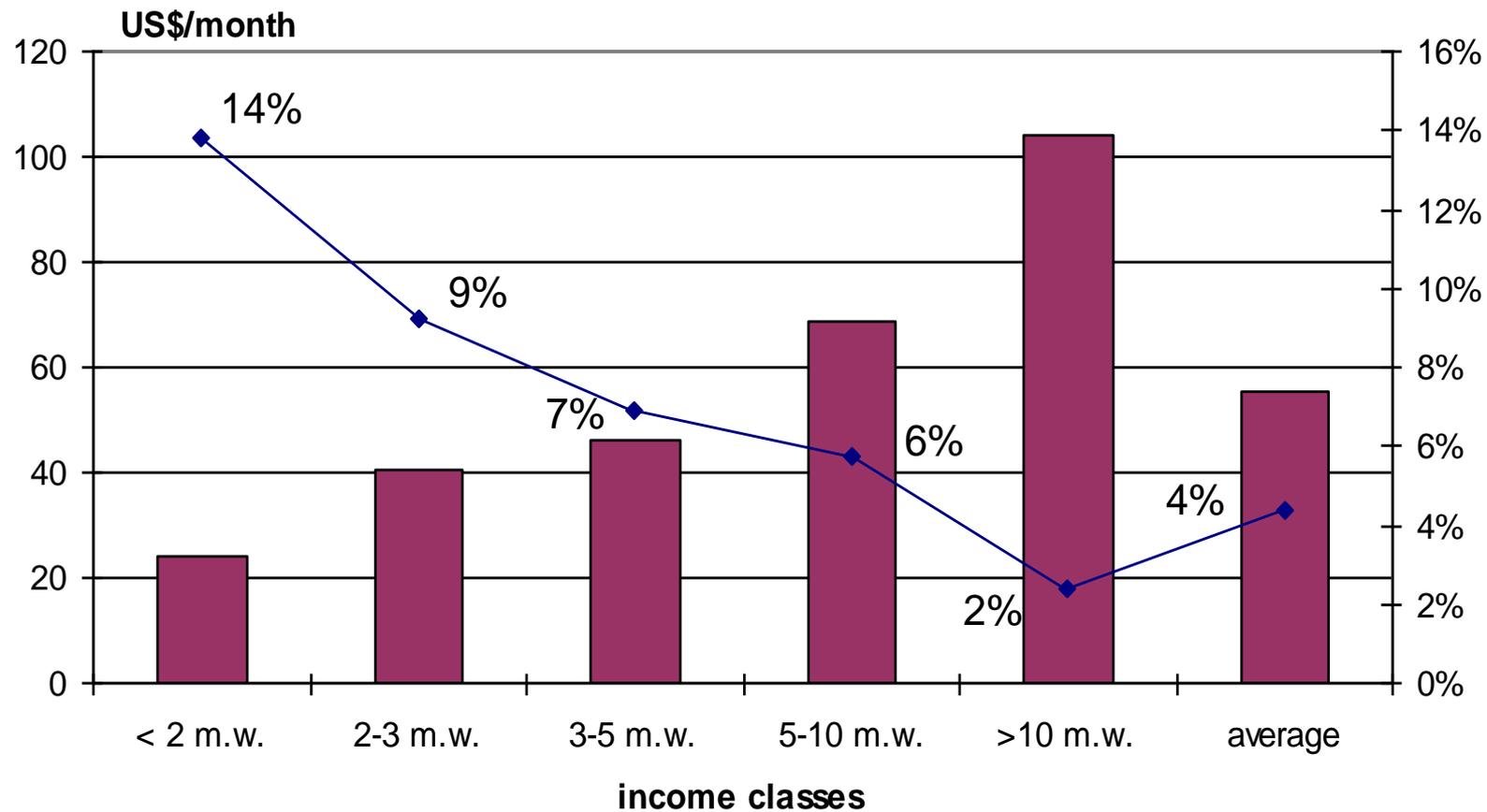
- **Access to modern energy services** at affordable rates.
- Two themes are considered under the social dimension - **equity and health**.
- **Equity** is addressed under the sub-themes of affordability, accessibility and disparity.
- **Reliability of energy services** – not considered in the EISD – 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 corresponding 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



■ energy expenditure per month (US\$ PPP-2000) ◆ energy expenditure per average income (%)

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

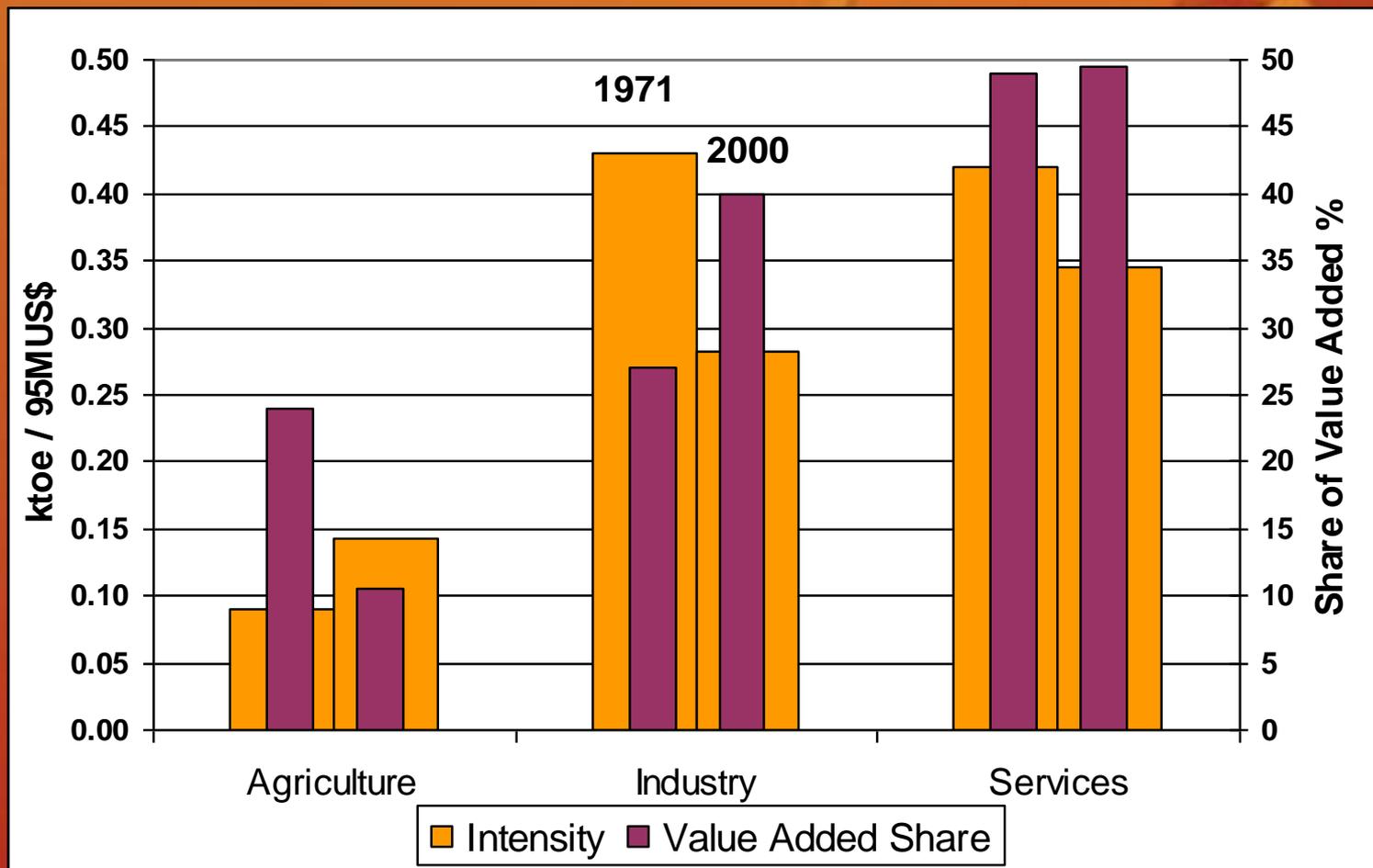
Theme	Sub-theme	Energy Indicator		Components
Use and Production Patterns	Overall Use	ECO1	Energy use per capita	-Energy use (total primary energy supply, total final consumption and electricity use) -Total population
	Overall Productivity	ECO2	Energy use per unit of GDP	-Energy use (total primary energy supply, total final consumption and electricity use) -GDP
	Supply Efficiency	ECO3	Efficiency of energy conversion and distribution	-Losses in transformation systems including losses in electricity generation, transmission and distribution
	Production	ECO4	Reserves-to-production ratio	-Proven recoverable reserves -Total energy production
			Resources-to-production ratio	-Total estimated resources -Total energy production
	End Use	ECO6	Industrial energy intensities	-Energy use in industrial sector and by manufacturing branch -Corresponding value added
			Agricultural energy intensities	-Energy use in agricultural sector -Corresponding value added
		ECO8	Service/commercial energy intensities	-Energy use in service/commercial sector -Corresponding value added
		ECO9	Household energy intensities	-Energy use in households and by key end use -Number of households, floor area, persons per household, appliance ownership
		ECO10	Transport energy intensities	-Energy use in passenger travel and freight sectors and by mode -Passenger-km travel and tonne-km freight and by mode
	Diversification (Fuel Mix)	ECO11	Fuel shares in energy and electricity	-Primary energy supply and final consumption, electricity generation and generating capacity by fuel type -Total primary energy supply, total final consumption, total electricity generation and total generating capacity
			ECO12	Non-carbon energy share in energy and electricity

Economic Dimension, cont

Prices Imports	ECO13	Fuel shares in energy and electricity	-Primary energy supply and final consumption, electricity generation and generating capacity by fuel type -Total primary energy supply, total final consumption, total electricity generation and total generating capacity
	ECO14	Non-carbon energy share in energy and electricity	-Primary supply, electricity generation and generating capacity by non-carbon energy -Total primary energy supply, total electricity generation and total generating capacity
	ECO15	Renewable energy share in energy and electricity	-Primary energy supply, final consumption and electricity generation and generating capacity by renewable energy -Total primary energy supply, total final consumption, total electricity generation and total generating capacity
Strategic Fuel Stocks	ECO16	End-use energy prices by fuel and by sector	-Energy prices (with and without tax/subsidy)

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

Energy intensities by sectors and corresponding value added share, Thailand



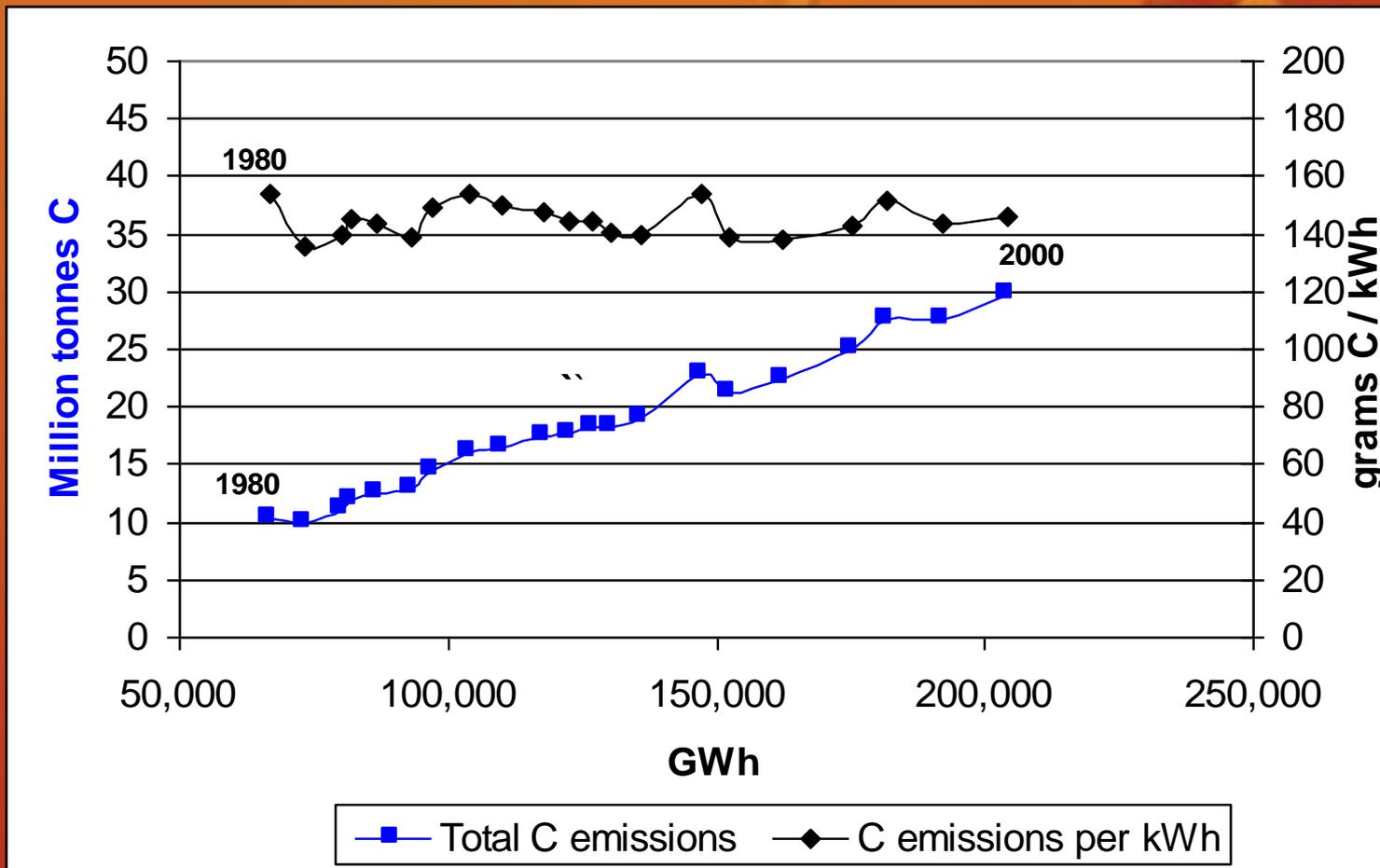
Environmental Dimension

- 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 Change	ENV1	GHG emissions from energy production and use 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 & management	ENV7	Solid waste generation by type per energy produced
		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



Energy Indicators for Sustainable Development

- Designed to be 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.

Energy Indicators for Sustainable Development

- 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 decision-making.
- EISD requires the allocation of human and financial resources, a pragmatic and cost-effective approach is essential.

Energy Indicators for Sustainable Development

- 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.

Energy Indicators for Sustainable Development

- 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 least-cost data available, but more concerted efforts at data collection and coordination are often needed among relevant institutions at the national level

Energy Indicators for Sustainable Development

- 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

Energy Indicators for Sustainable Development

- 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* further policy options and actions needed