Energy Indicators for the Economic Dimension of Sustainable Development

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Mainstreaming Energy Sustainable Development Goals (SDGs), Targets and Indicators into Statistical Programmes in Select African Countries

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What are indicators?

- Tools to analyse e.g. energy resources, production and use and renewable energy and energy efficiency trends.
- Based on detailed statistics of energy production/use and economic activity
- Each indicator addresses one aspect of energy
- Indicators need to be looked at in groups to understand the full picture
- Indicators need to be read in the context of each country’s economy and resources
- Indicators have proper applications and limitations
- Can inform policy decisions, help gauge policy effectiveness and unintended consequences
The indicators pyramid

IEA end-use coverage for indicators

EEA DPSIR framework

Source: European Environment Agency
The UN EISD initiative

- Work started by the UN in 1995.
- 5 agencies involved: UNDESA, OECD/IEA, IAEA, Eurostat, EEA.
- Initial project with 7 countries: Brazil, Cuba, Lithuania, Mexico, Russia, Slovakia, Thailand.
Modern economies depend on a reliable and adequate energy supply.

All sectors of the economy — residential, commercial, transport, service and agriculture — demand modern energy services.

These services in turn foster economic and social development at the local level by raising productivity and enabling local income generation.

Energy supply affects jobs, productivity and development.

Electricity is the dominant form of energy for communications, information technology, manufacturing and services.
Economic indicators and themes

The economic indicators have two themes. Divided into a number of sub-themes:

1. Use and production patterns

Overall Use, Overall Productivity, Supply Efficiency, Production, End Use, Diversification (Fuel Mix) and Prices.

2. Security

Imports and Strategic Fuel Stocks.
Use and production patterns (1)

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
Overall use and productivity

Ethiopia

Index (year 2004 = 100)

Overall use:
ECO1 - TPES per capita

Ethiopia

Index (year 2004 = 100)

Overall productivity:
ECO2 – TPES per unit of GDP

Supply Efficiency

ECO3 Efficiency of energy conversion and distribution
– Losses in transformation systems including losses in electricity generation, transmission and distribution
Supply efficiency: ECO3 - Efficiency of energy supply

Data taken from WEC: www.worldenergy.org/data/efficiency-indicators
Supply efficiency: ECO3 - Efficiency of energy distribution

Use and production patterns (3)

Production

ECO4 Reserves-to-production ratio
– Proven recoverable reserves
– Total energy production

ECO5 Resources-to-production ratio
– Total estimated resources
– Total energy production
Production: ECO4 - Reserves to production ratio

United Kingdom

Use and production patterns (4)

End Use

ECO6 Industrial energy intensities
ECO7 Agricultural energy intensities
ECO8 Service/ commercial energy intensities

– Energy use in industrial or commercial or agricultural sector
– Corresponding value added
End Use: ECO6 & ECO8 – Industrial and services energy intensities

Data taken from WEC: www.worldenergy.org/data/efficiency-indicators/
End Use (cont.)

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
End use: ECO9 – Household energy intensity

United Kingdom

Data taken from Department of Energy and Climate Change (2015) Energy consumption in the UK
End use: ECO10 – Transport energy intensities

United Kingdom

Index (year 2007 = 100)

Data taken from Department of Energy and Climate Change (2015) Energy consumption in the UK
Use and production patterns (6)

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
Diversification: ECO11 – Fuel shares in TPES

Kenya

Diversification: ECO11 – Fuel shares in final consumption

Kenya

Use and production patterns (7)

ECO12 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

ECO13 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
Diversification: ECO12 – Non-carbon energy share in electricity

Diversification: ECO13 – Renewable energy share in electricity

[Graph showing the share of electricity mix (%)]

Prices

ECO14 End-use energy prices by fuel and by sector
– Energy prices (with and without tax/subsidy)
Use and production patterns:
ECO14 - End use energy prices

Sweden

Price: SEK per MWh
Price without tax
Tax
Gas in industry
Electricity in industry

Security

Imports
ECO15 Net energy import dependency
– Energy imports
– Total primary energy supply

Strategic Fuel Stocks
ECO16 Stocks of critical fuels per corresponding fuel consumption
– Stocks of critical fuel (e.g. oil, gas, etc.)
– Critical fuel consumption
Imports: ECO15 - Net energy import dependency

United States

Imports as a share of total energy supply (%)

Net energy import dependency

Strategic fuel stocks: ECO16 - Stocks of critical fuels

United Kingdom

Final remarks

- Energy indicators covering the economic dimension should be used together with those examining the social and environmental dimensions.
- Unlike some other indicators, the EISD are meant to be used for national analyses.
- Not all indicators will be appropriate for all countries.
- Not all countries will currently have the data to construct all indicators.
- They are intended to help countries address their energy challenges in the most appropriate way.