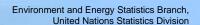# Environment and Energy:

# inter-linkages from the FDES perspective



Environment and Energy
Statistics Workshop for the
Arab Region

Amman, Jordan 8-12 September 2013

Environment and Energy Statistics Branch,
United Nations Statistics Division

---



- This presentation has been elaborated by the Environment Statistics Section of the United Nations Statistics Division (UNSD).

- It is based on Chapter 5 of the Framework for the Development of Environment Statistics (FDES) 2013 that can be downloaded here: http://unstats.un.org/unsd/statcom/doc13/BG-FDES-Environment.pdf

- All presentations, handouts and background materials for the workshop can be downloaded here: http://unstats.un.org/unsd/ENVIRONMENT/otherworkshops.htm

# Table of Contents

1. Cross-cutting issues analyzed in the FDES
2. Energy and the environment
3. Energy Production
4. Energy Consumption
5. Energy and Sustainable Development
6. Energy, development and the need for statistics
7. Energy-environment statistics are key
8. Applying the FDES to energy statistics
9. Energy-environment common indicators

---

# 1. Cross-cutting issues applications of the FDES

- Water and the environment
- Energy and the environment
- Climate change
- Agriculture and the environment

# 2. Energy and the environment

- Energy is a necessary input for human controlled processes.
- Amount of E in a physical system remains constant (and finite), though its quality or availability diminishes through transformation.
- Transformation of "available energy" to "unavailable energy" and conversion from "unusable" to "usable" form results in environmental effects
- Protection and mitigation activities of the society
- Policy context is highly relevant (recall 1st presentation day 1)

# 3. Energy production

- Dominated by fossil and non-renewable sources of energy, which leads to the depletion of non-renewable natural resources (i.e mineral)
- Increasing but still low renewable and clean energy production around the world
- Mining and extracting operations disturb ecosystems, restructure land, produce waste, etc.
- Hazards such as oil spills, well-head and pipeline explosions, fires, etc. are closely associated with the petrochemical industry.
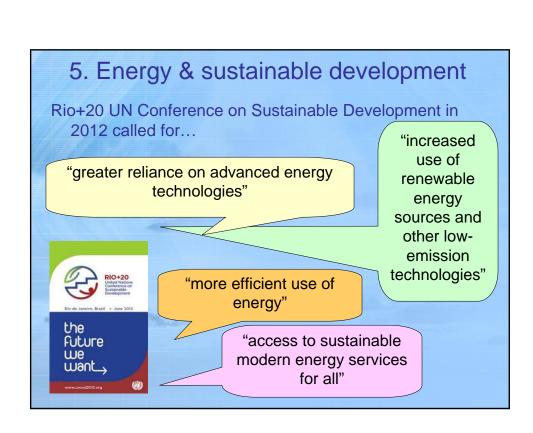
# 4. Energy consumption

- Fossil fuels represent 81% of total primary energy demand in 2010.
- Combustion of fossil fuels pollutes the air, affects human health, and results in significant GHG emissions.
- Renewable energy does not face the depletion problem, but harvesting of renewable energy can affect the natural environment (e.g.large hydro energy facilities, competing land uses i.e biofuels).
- Regardless of energy source, its distribution requires grid and facilities which can change land and affect natural areas.

# 5. Energy & sustainable development

Rio+20 UN Conference on Sustainable Development in 2012 called for…

"increased use of renewable energy sources and other low-emission technologies"

"greater reliance on advanced energy technologies"

"more efficient use of energy"

"access to sustainable modern energy services for all"

RIO+20
United Nations
Conference on
Sustainable
Development

Rio de Janeiro, Brazil • June 2012

the
future
we
want↲

www.uncsd2012.org

# 6. Energy, sustainable development and the need for statistics

- Challenge facing policy makers remains balancing the demand and need for energy with the impacts from its production and consumption.
- There is great need for harmonization and coordination of statistics production at all levels.
- Relevant statistics are needed for policy, regulation and for complementary analysis to economic and social aspects.
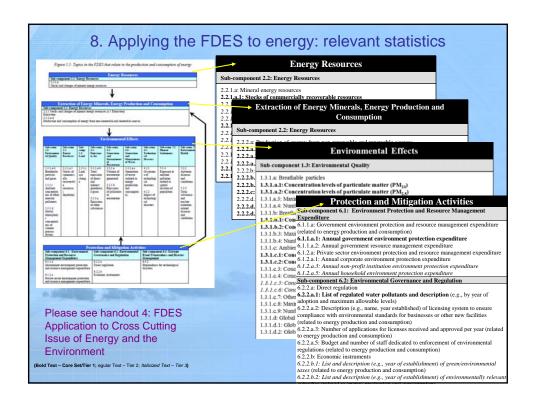
# 7. Energy-environment statistics are key
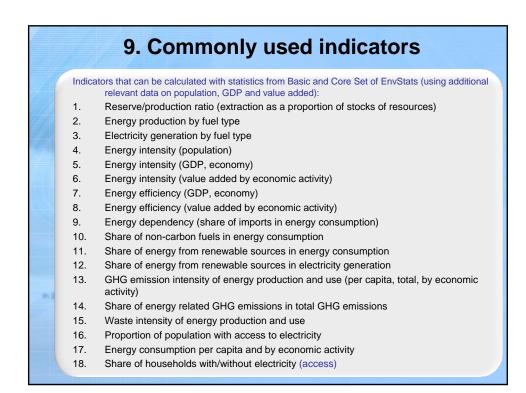
- Energy production and consumption statistics available in both physical and monetary terms. i.e: sale and expenditure of energy commodities.
- Physical measures of particular interest from an environment perspective.
- Impact of energy production and consumption in the environment is highly important (i.e. climate change and energy).
- UN Statistical Commission has adopted the *International Recommendations for Energy Statistics* and the FDES 2013 (including section 5.2 Energy and the environment statistics)

# 8. Applying the FDES to energy and the environment statistics

Please see handout 4: FDES Application to Cross Cutting Issue of Energy and the Environment

Figure 5.5: Topics in the FDES that relate to the production and consumption of energy



---

# 8. Applying the FDES to energy and env. statistics
## Relevant subcomponents

**Energy Resources**: Sub-component 2.2: Energy Resources. 2.2.1.a: Stocks and changes of mineral energy resources

**Energy Production and Consumption**: Sub-component 2.2: Energy Resources. 2.2.2.a-d: Production and consumption of energy from non-renewable and Renewable resources.

**Environmental Effects**: Sub-component 1.3: Environmental Quality. 1.3.1.a-c: Air quality. Sub-component 2.3: Land. 2.3.1.i: Land use change. Sub-component 3.1: Emissions to air. 3.1.1.a-b: Emissions of greenhouse gases.

**Protection and Mitigation Activities**: Sub-component 6.1: Environment Protection and Resource Management Expenditure. 6.1.1.a: Government environment protection and resource management expenditure. Sub-component 6.2: Environmental Governance and Regulation. 6.2.2.a: Environmental regulation and instruments.

# 8. Applying the FDES to energy: relevant statistics

*Figure 5.5: Topics in the FDES that relate to the production and consumption of energy*

**Energy Resources**

Sub-component 2.2: Energy Resources

2.2.1.a: Mineral energy resources
**2.2.1.a.1: Stocks of commercially recoverable resources**

**Extraction of Energy Minerals, Energy Production and Consumption**

Sub-component 2.2: Energy Resources

2.2.2.a: Production of energy from non-renewable and renewable sources

**Environmental Effects**

Sub-component 1.3: Environmental Quality

1.3.1.a: Breathable particles
**1.3.1.a.1: Concentration levels of particulate matter (PM$_{10}$)**
**1.3.1.a.2: Concentration levels of particulate matter (PM$_{2.5}$)**
1.3.1.a.3: Maxi
1.3.1.a.4: Num
1.3.1.b: Breath
**1.3.1.b.1: Con**
**1.3.1.b.2: Con**
1.3.1.b.3: Maxi
1.3.1.b.4: Num
1.3.1.c: Ambien
**1.3.1.c.1: Con**
**1.3.1.c.2: Con**
1.3.1.c.3: Conc
1.3.1.c.4: Conc
*1.3.1.c.5: Conc*
*1.3.1.c.6: Conc*
1.3.1.c.7: Other
1.3.1.c.8: Maxi
1.3.1.c.9: Num
1.3.1.d: Global
1.3.1.d.1: Glob
1.3.1.d.2: Glob

**Protection and Mitigation Activities**

Sub-component 6.1: Environment Protection and Resource Management Expenditure

6.1.1.a: Government environment protection and resource management expenditure (related to energy production and consumption)
**6.1.1.a.1: Annual government environment protection expenditure**
6.1.1.a.2: Annual government resource management expenditure
6.1.2.a: Private sector environment protection and resource management expenditure
6.1.2.a.1: Annual corporate environment protection expenditure
*6.1.2.a.3: Annual non-profit institution environment protection expenditure*
*6.1.2.a.5: Annual household environment protection expenditure*

Sub-component 6.2: Environmental Governance and Regulation

6.2.2.a: Direct regulation
**6.2.2.a.1: List of regulated water pollutants and description** (e.g., by year of adoption and maximum allowable levels)
6.2.2.a.2: Description (e.g., name, year established) of licensing system to ensure compliance with environmental standards for businesses or other new facilities (related to energy production and consumption)
6.2.2.a.3: Number of applications for licenses received and approved per year (related to energy production and consumption)
6.2.2.a.5: Budget and number of staff dedicated to enforcement of environmental regulations (related to energy production and consumption)
6.2.2.b: Economic instruments
*6.2.2.b.1: List and description (e.g., year of establishment) of green/environmental taxes* (related to energy production and consumption)
*6.2.2.b.2: List and description (e.g., year of establishment) of environmentally relevant*

Please see handout 4: FDES Application to Cross Cutting Issue of Energy and the Environment

**(Bold Text – Core Set/Tier 1;** egular Text – Tier 2; *Italicized Text – Tier 3)*

---

# 9. Commonly used indicators

Indicators that can be calculated with statistics from Basic and Core Set of EnvStats (using additional relevant data on population, GDP and value added):

1. Reserve/production ratio (extraction as a proportion of stocks of resources)
2. Energy production by fuel type
3. Electricity generation by fuel type
4. Energy intensity (population)
5. Energy intensity (GDP, economy)
6. Energy intensity (value added by economic activity)
7. Energy efficiency (GDP, economy)
8. Energy efficiency (value added by economic activity)
9. Energy dependency (share of imports in energy consumption)
10. Share of non-carbon fuels in energy consumption
11. Share of energy from renewable sources in energy consumption
12. Share of energy from renewable sources in electricity generation
13. GHG emission intensity of energy production and use (per capita, total, by economic activity)
14. Share of energy related GHG emissions in total GHG emissions
15. Waste intensity of energy production and use
16. Proportion of population with access to electricity
17. Energy consumption per capita and by economic activity
18. Share of households with/without electricity (access)

# Thank you for your attention!

For more information please contact the Environment Statistics Section
at the United Nations Statistics Division

E-mail: envstats@un.org

website: http://unstats.un.org/unsd/ENVIRONMENT/