



UNITED NATIONS  
Economic Commission for Europe



## COMMITTEE ON SUSTAINABLE ENERGY

Review of Activities of the Subsidiary Bodies of the Committee

25 November 2010

# Indicators of Energy Vulnerability

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# Introduction

- In 2009 a MOU was established between the ECE and the WEC in order to measure energy security risks
- The indicators of energy vulnerability developed by the WEC were presented during the 18th session of the Committee on Sustainable Energy

# Introduction

- **Factors that were considered comprise: dependency on energy imports, non diversity of energy supply, insecurity risks to import oil, gas, electricity and transportation fuels**
- **The methodology and application to 37 countries were summarised in a document on indicators of Energy Vulnerability (ECE/ENERGY/2009/3)**

# Objectives of the future activities

- **Refine, update the indicators and evaluate the vulnerability for other countries from ECE**
- **Provide an international benchmark to enhance the dialogue on energy security**

# Objectives of the future activities

- **Develop relevant indicators with respect to strategies of different sub-regions within the ECE region and translate them in indicators at national level**
- **Implement the indicators system on annual basis as well as on time series in order to investigate progress of energy security strategies or anticipate different promising future paths**

# Refinements of the national-based indicators

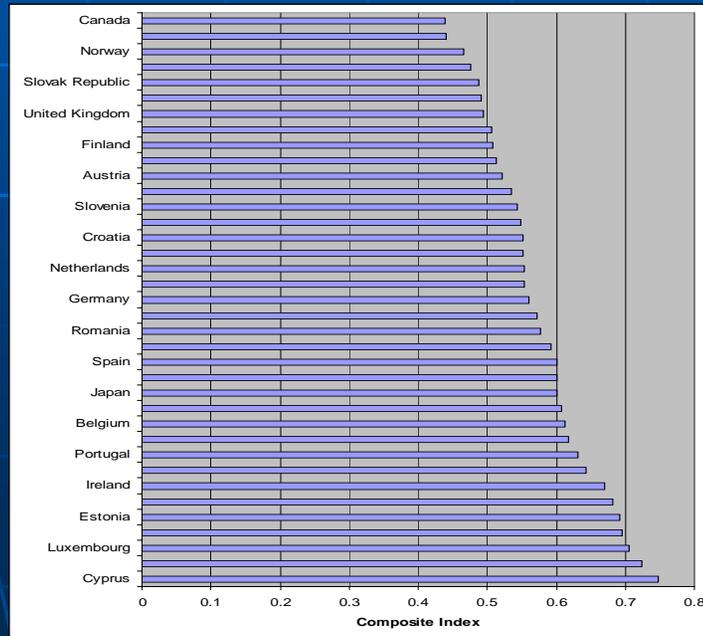
- *Energy import dependency will be estimated separately for oil and gas and relevant data for each country will be collected instead of default values*
- *Levels of dedicated emergency stocks of crude oil and/or petroleum products will be taken into account as part of the aggregate index*
- *Instruments for security of gas supply and emergency measures at national as well as multi-national levels will be taken into consideration*

# Refinements of the national-based indicators

- *Accounting for geopolitical factors based on the performances of cooperation between net consuming, net producing and transition sub-regions*
- *Electricity supply security will consider inter alia the development and access to sub-regional electricity market*

# An international benchmark to enhance the dialogue on energy security

- Update the international benchmark based on the refined indicators and on the extended list of countries for more recent years



# Sub-regional dimension

- The international benchmark was based on national data and distance to ideal case, the same for each country
- An additional benchmark will be performed within sub-regions, taking into account global commitments related to the sub-region and their implication in targets at country level (e.g. EU Burden sharing Agreement)

# Feasibility of Extension to additional countries from ECE

Data	Description	Sources	Availability	References
Total Primary Energy Supply TPES	Energy production + net import – net input to international marine and aviation bunkers – net input to stock	International Energy Agency (IEA)	High	IEA (2009a) EA (2009b)
Energy Intensity	Ratio of TPES to the Gross Domestic Product (GDP)	International Energy Agency (IEA)	High	idem
Ratio of net oil import to the TPES	Contribution of net oil import to the TPES	International Energy Agency (IEA)	High	idem
Petroleum Stocks	The stocks include : crude oil (including strategic reserves) natural gas plant liquids, refinery feedstocks, additives and oxygenates, other hydrocarbons, and refined petroleum products.	Energy Information Administration (EIA)	Average	Energy Information Administration (EIA)
Ratio of net gas import to the TPES	Net import gas is imports of Natural gas minus exports	International Energy Agency (IEA)	High	IEA (2009a) IEA (2009b)

<b>Data</b>	<b>Description</b>	<b>Sources</b>	<b>Availability</b>	<b>References</b>
<b>Share of various origins in the net oil import</b>	<b>Distribution of the net oil import between the different import origins</b>	<b>International Energy Agency (IEA)</b>	<b>Average</b>	<b>IEA (2009c)</b>
<b>Share of various origins in the net gas import</b>	<b>Distribution of the net gas import between the different import origins</b>	<b>International Energy Agency (IEA)</b>	<b>High</b>	<b>IEA (2009d)</b>
<b>Ratio of the CO<sub>2</sub> emissions to the TPES</b>	<b>CO<sub>2</sub> are from fuels combustion, for biofuels combustion the emission factors are based on <i>IPCC Guidelines</i></b>	<b>International Energy Agency (IEA)</b>	<b>High</b>	<b>IEA (2009e) IEA (2008)</b>
<b>Self-sufficiency in electricity supply</b>	<b>Ratio of electricity generation to apparent electricity consumption</b>	<b>International Energy Agency (IEA)</b>	<b>High</b>	<b>IEA (2009a) IEA (2009b) IEA (2009f)</b>
<b>Electricity generation mix</b>	<b>Annual electricity generation by fuel type</b>	<b>International Energy Agency (IEA)</b>	<b>High</b>	<b>IEA (2009f)</b>
<b>Transport fuels mix</b>	<b>Transport energy consumption by fuel type</b>	<b>International Energy Agency (IEA)</b>	<b>High</b>	<b>IEA (2009a) EA (2009b)</b>
<b>Energy affordability</b>	<b>Energy expenses related to the income of a vulnerable household</b>	<b>Research works</b>	<b>Low</b>	<b>e.g. Fankhauser and Tepic (2007)</b>

# Data requirement and sources

- The data requirement will be more demanding
- The main data sources were IEA and EUROSTAT
- The activities in the future will need additional data collection with the support of the WEC national committees

# Enhancing Energy Security Dialogue: Potential Role of Indicators

- Quantify improvement of mutual energy security with regard to secure energy trade among the ECE countries
- Benchmark the national efforts and identify best practices among the countries from ECE
- Sub-regional solidarity: benchmark the national efforts within sub-region, based on sub-regional to national shared targets
- Cooperation between sub-regions: develop geopolitical measures based on the performances of dialogue and cooperation between sub-regions

# Enhancing Energy Security Dialogue: Potential Role of Indicators

## ➤ Promote common initiatives for :

- Improving diversity in transportation fuels mix
- Fostering R&D on clean fossil fuels and renewable energy technologies
- Improving the safety of nuclear power plants
- Enhancing safe transit of energy
- Reinforcing energy interconnection network within sub-regions
- Reinforcing emergency procedures at multi-national levels as well as with sub-regions

# Enhancing Energy Security Dialogue: Potential Role of Indicators

**Perspectives: Develop the indicators system not only for analyses of the past and present situations, but also as a tool for simulating the potential outcomes of enhanced energy security dialogue**

## Multi-year planning of the activities

- **2011: Refine the indicators system; update its application to an extended list of countries from ECE; propose new sub-region based indicators for an additional benchmark**
- **2012: Update the international benchmark; Implement the additional benchmark for a selected sub-region (e.g. EU)**
- **2013: Update the international benchmark; Extend the additional benchmark to other selected sub-regions**
- **Further years : Develop indicators based on simulation of potential outcomes of enhanced energy security dialogue**

# Yearly deliverables

- A report including the results of the benchmarks and the analysis on the progress of each country under investigation
- A presentation at the annual session of the ECE Committee on Sustainable Energy

# Required annual resources

- **National WEC Committees for additional data collection**
- **50 days of work by a WEC Consultant**
- **Consultant travel costs when contacts in the countries are required to speed-up the collection of data**