Frequently Asked Questions – 2011 World energy Council (WEC) Energy Sustainability Index

What is the goal of the Index?
The World Energy Council's *Energy Sustainability Index* ("Index") ranks the energy sustainability performance of the 90-plus WEC member countries according to WEC's definition of energy sustainability, which is based on three core dimensions – energy security, social equity and environmental impact mitigation.

The goal of the annual Index is to understand and provide high-level insights into a country's likely ability to provide a stable, affordable and environmentally sensitive energy system. The 2011 Index is a continuation of the 2010 Index, which has been developing and improving since 2009.

The Index is published within the WEC's annual report.

How is the index structured?
The index has two main components 1) Energy performance and 2) Country contextual performance.

The Index captures a snapshot of *energy performance* using WEC's three dimensions of energy sustainability:

- Energy security - For both net energy importers and exporters this includes the effective management of primary energy supply from domestic and external sources; the reliability of energy infrastructure; and the ability of participating energy companies to meet current and future demand. For countries that are net energy exporters, this also relates to an ability to maintain revenues from external sales markets
- Social equity - Accessibility and affordability of energy supply across the population
- Environmental impact mitigation - Encompasses the achievement of supply and demand-side of energy efficiencies and the development of energy supply from renewable and other low-carbon sources.

The Index also captures a snapshot of a country's *contextual performance, which* considers the broader circumstances of a country's energy performance including standard of living, and the economic and political climate.

What does the Index say?
The Index shows the aggregate effect of energy policies applied over time in the context of each country relative to the performance of all the countries and broadly measures the aggregate outcome of those policy environments; for example, the level of country CO2 emissions or energy consumption growth relative to other countries.

What is the Index based on?
Each country's overall Index ranking is based on 22 underlying indicators – some of which are supported by multiple data sets (over 60 data sets).

For example, the environmental impact mitigation dimension is measured using 4 indicators each of which is supported by multiple data sets. One of the 4 indicators is "Effect of air and water", which is constructed from "Air pollution (effects on humans)", "Water (effects on humans)", "Air pollution (effects on ecosystem)", and "Water (effects on ecosystem)".

How are indicators selected?
Indicators were selected because of their high degree of relevance to the research goals and ability to measure and capture key elements of the WEC's definition of energy sustainability. The indicators also exhibit a low correlation – which minimizes the impact of possible double counting of energy performance effects. Finally, it was critical that the indicators could be consistently and readily derived from reputable sources and cover a high proportion of WEC member countries. Some potential indicators were not suitable to incorporate into the Index because of limited country coverage.

What time period does the 2011 Index capture?
Due to constraints on the collection, processing, and dissemination of data the 2011 Index generally reflects data from 2009-2010, but selected data sets may be slightly earlier if more recent data does not exist. Therefore, recent world events that could affect the Index's outcomes are not captured (e.g., turbulence in global nuclear industry due to Fukushima, or the geopolitical unrest in the Middle East). While events can happen swiftly, policies generally take two to three years or more to become fully implemented and it may take longer for their effects to become evident in the data.

How can a country move up or down the Index?
The Index is weighted in favour of the energy performance versus contextual performance (axes) by a factor of 3:1, with the indicators for each dimension carrying equal weight within their axis. Therefore, changes in energy performance will have a greater effect on a country's ranking than contextual dimensions.

The Index is a relative ranking. Country position can change due to measured changes in its performance or due to the relative changes in other countries' performances. As an example, a country's ranking on the indicator "Diversity of electricity production" will depend on how its diversity (e.g. hydroelectric, nuclear, wind, conventional thermal) ranks against other countries. Put differently, a country with broadly unchanged underlying data year-ion-year could move down the Index if other countries in the Index make improvements in those areas – no changes in performance could impact Index position in the same way as retrograde motion of the energy performance raw data.

How do policies affect a country's position on the Index?
The Index aggregates many different data points and it is often very difficult to pinpoint how any single policy affects a country's performance on any indicator or overall dimension. Also, factors beyond policies or even outside the country may affect the Index ranking. For example, "Grammes CO2 per kilowatt-hour" could change to due multiple policies implemented over time aimed at reducing CO2 emissions. Technological factors within specific industries (e.g. changes in generating technology) can also have an impact, and are not directly measured by the Index.

Those factors noted, countries which implement a range of policies resulting in an overall framework that addresses the three aspects of energy sustainability are expected to rank higher on the index.

What are the limitations of the Index?
The Index cannot capture real-time energy sustainability performance due to the challenges of capturing large volumes of reliable data for a wide range of countries.

The Index cannot isolate the impact of a single policy or even a group of policies. Since the Index shows the aggregate effect of all energy policies, it does not identify the effectiveness of one particular policy within one country and does not allow comparing the effectiveness of particular policies across countries.

The Index provides a relative view of energy performance of all countries simultaneously. The movement of any given country is the effect of its own and of every other country's index data.

What does the 2011 Index reveal?

- Policymaker choice is a key discriminating factor of energy performance: while countries may exhibit similar contextual positioning and resource endowments, it is ultimately the choices made by policymakers that cause the energy performance scores of otherwise similar countries scores to diverge (e.g., Korea, Republic, and Japan).
- National resources, wealth, and contextual performance are not the dominating factors that drive the energy-sustainability performances of individual countries. The Index suggests that countries may each need to determine their unique trade-offs for success when it comes to policy implementation to support energy sustainability.
- The Index empirically reveals the "energy sustainability trilemma" – meaning when examining energy performance across the three dimensions, no country leads in all three areas. Currently, countries achieve stronger performance in two dimensions, suggesting trade-offs between energy sustainability dimensions. For example, some energy exporting countries may lead on social equity (highly affordable and accessible energy) and also on energy security (high energy exports) but may face lower scores on environmental impact mitigation (due to intense energy use). Other countries may seemingly rank well in environmental impact mitigation (low emissions per population) - yet this can be due to low industrialization or inaccessible energy.
- Exporters are not necessarily good at long-term energy security, as they often tend towards a regime of over-dependence on fuel exports and low domestic-energy costs to maintain social equity (either directly or indirectly). Middle East countries in particular tend to exhibit strong social equity, due to subsidies on fuel prices, with resulting negative impacts on energy security and environmental impact mitigation (e.g., Qatar, Kuwait, and United Arab Emirates).

- Energy security can change quickly in the short-term through minor policy adjustments, but long-term energy security can be eroded by an over-reliance on energy commodities, a lack of energy-asset diversification, and a lack of energy autonomy. In contrast, social equity and environmental impact mitigation metrics respond more slowly to policy signals or energy-regime developments.

What questions/ discussion are revealed by the Index?
The Index prompts an analysis of clusters of countries to better understand why some are performing better and other not. The clustering of countries is sometimes obvious and other times it requires more analysis to understand why certain clusters occur.

This leads to further dialog:

- What is the country's perspective/ priority on energy sustainability?
- How does the country want to achieve energy sustainability?
- What policies are appropriate to drive energy sustainability (e.g. raise fuels taxes to encourage energy efficiency or encourage greater use of electric cars)? How do these policies need to evolve over time?
- What are the situational and contextual barriers the country faces in terms of energy sustainability, and how might these barriers be overcome?