

Joint IRENA-RETD workshop: Recent energy sector developments and their impact on renewable energy prospects

29 June 2011, Bonn

Conclusions

Introduction

Energy demand continues to rise at a rapid pace. World primary energy consumption increased by 6% and CO₂ emissions rose by 5% in 2010 compared to 2008. Latest developments such as the Fukushima accident and Arabian Spring (security of supply issue) have changed the framework conditions for energy decision making.

IRENA and IEA-RETD jointly organized a workshop to discuss the impact of the drivers on energy scenarios for the period of 2015-2050 and its possible implications on the long term renewable energy outlook and the resulting short term policy needs. The workshop provided a basis for the future work of IRENA and IEA-RETD in this field.

A total of 18 experts from international organizations, research institutes, and universities presented their latest insights in this field. 35 experts discussed the renewable energy outlook and mapped scenario and strategy needs.

There was general agreement that scenarios can help guide policy decisions. There was also a common understanding that the methodology of scenario design and the process of scenario development can and should be improved as to enhance its policy relevance further. One important issue identified during the workshop was to translate the language and complexity of energy modelling into policy relevant messages and clear and transparent strategies and targets.

1) Reassessment of potential of deployment for RE

There is a need for a fundamental reassessment of the potential of deployment for RE. Examples are:

- The IEA is counting on an average **oil price** of USD 100/bbl for the next five years but prices are already at this level and a further rise is likely.
- PV is entering into **grid parity** with growth rates of 50-60% per year and may become the cheapest power supply technology in the coming years in terms of residential power supply. This is not properly reflected in many recent energy scenario studies.
- **Electricity retail prices** are rising fast in many countries. In combination with falling cost of renewables, the renewables option may be the most economic soon.
- There is a feeling that the existing **utility business model** of large, centralized power plants does not adequately capture the cost and benefits of renewables. RE deployment will require a new view of markets and systems that is currently not well addressed in scenario modelling. The trend, for example, of a transition from energy commodities to energy infrastructure (products, systems, energy service contracting, buildings that inherently produce their own energy or provide energy services in a very efficient way), means there will be a change of qualitative nature, where the product/infrastructure cannot be seen separately from the energy. Scalability of renewable power generation, distributed energy

generation and flexibility requirements will change current business models towards a “world beyond marginal costs” and may be a major advantage of different RE technologies.

- RE deployment in **non-annex 1/developing countries** may be quicker than currently foreseen in many scenarios.
- The key for scenario comparison is the **transparency of the input factors** and the relations reflected in the underlying model. Assessing the role of qualitative factors such as policy, financing, public acceptance, and technological advances is important. **Standardization** of input parameter for scenario is also important. Availability of coherent statistical data, especially for developing countries is necessary. In general, to assess the renewables contribution and for target setting the displacement method should be used instead of primary energy equivalents based on IEA accounting practice.
- Production of **unconventional gas (shale gas)** has risen significantly in recent years, especially in the US. As a consequence the gas price has dropped significantly and decoupled from the oil price, converging at a regional level. The same effect cannot be discerned elsewhere. Climate impact of the shale gas needs to be assessed carefully; some estimates suggest these are substantial. Also radiation from waste water and ground water pollution are issues that require more attention. Policy priorities will determine how the gas and renewable energies complement each other.
- On the other hand, the **Deep Water Horizon** disaster in the Gulf of Mexico did not have a long-lasting effect on deep-sea drilling activities. Drilling rigs have been moved from the Gulf to other world regions and impact on production is a reduction of about 0.3 Mbd. New projects in the Gulf of Mexico are delayed by 1-2 years.
- In the last couple of years there was a “renaissance of interest” in nuclear. However the **Fukushima accident** has resulted in a rethinking of the major safety and other issues around nuclear that is still on-going. Projections for 2030 capacity have fallen by 8% since last year. This should be considered in the projections of nuclear power use. Fukushima’s immediate impact is a certain cool-down in activity (especially in Europe) but the real effects are still to be seen. There will be a certain impact on new and especially existing nuclear power plants (the degree depends on the retrofit requirements set in the stress tests). If a shift occurs from probabilistic risk assessment to deterministic risk assessment, this would drive up the cost of reactors considerably. Future energy models are required to transparently substantiate the real costs for risk insurance and waste storage issues of nuclear power. For new reactors, higher cost due to new safety features may be balanced by new, smaller reactor designs of less than 300 MW that have shorter construction time and therefore lower financing cost. So far there has been ordered only one reactor of this type.
- The **cost reduction of renewable energy** is a key factor for the renewables prospects. The current scenarios do not seem to properly reflect the cost reduction and growth potential of renewables. More analysis on cost aspects of renewables and competing options is useful.
- However, **costs represent only one parameter**. How markets work and how business models are designed can determine the renewables increase. Policy makers have a range of options to influence economic decisions, for example through investment subsidies, risk guarantees or soft loans for certain options. Policy makers are also looking at job creation, economic development, and environmental protection. Thus scenario analysis should reflect such real world factors and not focus exclusively on costs.
- **Many aspects drive scenarios results**; quantitative known factors (costs, avoided costs, and efficiency gains of absolute energy consumption) and qualitative ones (changes in behaviour and business models). On the other hand, policies can be driven by many factors including climate change, economic development, energy security, and volatility of prices, and

combination of all. **Risk and uncertainty** should be considered in development of scenarios. Current models reflect decision making based on least cost or price levels, which neglects uncertainty. Various types of external effects should be considered if scenarios are meant to support policy making.

- Scenarios should be translated into relevant terms for policy makers.
- Resource (solar radiation, wind speed) databases used in a number of scenarios need to be updated and improved, as oversimplifying assumptions on available resources may lead to underestimations in the share of RE in the energy system.

2) Importance of strategies and policies

- For the policy making process it is important to produce short and medium strategies in order to ensure the targets of the long term scenarios.
- There have been a lot of studies on economics but not on **policy barriers**. It is important to consider which policies are the most effective and efficient and to assess their feasibility.
- There is a need for **detailed policy strategies** and measures that could ensure certain desirable levels of deployment of RE, regionally and globally. The UN 30% RE target for 2030 may help to establish (regional / national) RE targets for OECD and non-OECD areas supplementing the current EU renewables initiative.
- The way how messages are conveyed is of high importance. Scenario experts and policy makers speak different languages. IRENA can play a key role in **translating scenario findings into policy relevant messages**. One of the most useful functions of IRENA would be to make scenarios transparent and comparable. Development of new scenarios should be of lower priority. The international climate negotiations (as well as Rio-plus 20 and other processes) require clear guidance, “one liners”, that policy makers can adhere to. (In the Rio process, energy is only one of some 15 topics, creation of a framework for implementation and financing of national plans should be a priority).
- In Durban, no targets / commitments on RE or specific technology solutions in general are to be expected. However the **political momentum** is there including COP17, UNGA 2011, Rio+10, and 2012 “International year of sustainable energy for all”. These initiatives can benefit from for the insights of renewable energy scenarios work but more work is needed to translate model outcomes and scenarios into policy relevant messages.

3) Need for more analysis

- Although certain models already include costs of adaptation and externalities, there is a need for **more analysis on issues like adaptation, mitigation, residual damages, global fossil fuel dependence costs including environmental costs** (including extraction, i.e. full life-cycle), for renewable and non-renewable options alike. RETD estimates that the external cost for non-renewable power generation options is in the range of at least 1-2 US cents/ kWh (final energy). External cost estimations of nuclear power generation will have to be revisited after the experience of Fukushima. Some studies have suggested to look at the potential insurance cost for nuclear power stations in order to come to a realistic estimation of external cost of the risks of nuclear energy. More analysis will be necessary. Integrated research to evaluate resource competition and interconnection (e.g. between energy, land and water) also becomes important in view of evolving global food and water shortage/security issues. Research from different sectors (climate, water, health, access to energy, security) needs to be taken into consideration in the calculation of externalities.

- RETD has done its part by giving an overview of current studies, comments on the WEOs and also made proposals for a methodology of how to include these costs in scenario models. Now it would be up to other groups including IRENA to go into more detail.
- Apart from externalities, there is also a **need to update RE technology cost** in scenarios and models as they continue to fall rapidly. As the share of renewables rises, the system integration of RE in combination with storage will become more and more important. As for transmission and distribution a combination of electricity transport with road, water and other infrastructure may speed up approval and reduce cost.
- Non-economic barriers (e.g. lack of trained installers, administrative procedures) to RE deployment need further analysis on how they affect policy. Policy recommendation should also take such non-economic issues into considerations.

Other recommendations to IRENA:

- Create an **annual report** on market development and perhaps a renewables “state of the world/renewables for human development” report every couple of years
- Make available a **peer-reviewed database** on LCOEs, integration and storage costs, learning rates, resource potentials
- Act as a **catalyst to guide the necessary analysis** including resource potentials, technology prospects, and policies on renewable energies and facilitate the translation of existing scenarios into policy relevant messages, rather than developing a new scenario.
- Help **bridge policies and scenarios** that have different time scales. Focusing on short term policies will miss the long term climate targets, while focusing on long term scenario without impact on short term policies is an academic exercise.
- In order for RE to be better represented in the energy models, IRENA can **take part in scenario discussion** and facilitate a number of institutes which are active in RE modelling to help them improving their models, rather than reinventing its own scenarios. For example, IRENA could play a role in coordinating research collaborations on the improvement of RE modelling in scenarios and strategies formulation.
- Provide **policy experience** and information including scenarios and models for policy makers.
- Provide **advanced technology support** both industry and research levels at an international level.

Next steps:

- It was suggested that this group should be kept, for example by organising a similar event within the next 6-12 months.
- It is suggested to define a **joint activity** of IEA-RETD and IRENA with contribution from a number of organizations to develop an approach how to deal with these issues and to assess their impact on the outlook for renewable energy.