

Proceedings of the IRENA Innovation Week Side Event:

Innovations and the future energy system: What's missing in today's Long-term scenarios?

Part of IRENA's CEM Campaign "Long-term Energy Scenarios for the Clean Energy Transition"

12:45 – 14:00, Thursday, September 6, 2018, Bonn

Event background

The world's energy system is facing profound changes. Innovations in the way energy is generated, distributed and used, as well as the ways in which energy systems operate and link with wider infrastructure, are paving the way for completely new landscapes around the world. In this complex and uncertain environment, decision makers who are responsible for policy and investments are looking to minimize the risk of poor choices and take full advantage of disruptive technologies. Long-term scenario analysis is an invaluable tool in this process, but **are today's long-term energy scenarios up to the task of capturing transformational change?**

As part of IRENA's new Clean Energy Ministerial Campaign (CEM) on "Long-term Energy Scenarios (LTES) for the Clean Energy Transition", this side event will aim to answer that question. Drawing on the expertise of government planners and private industry attendees at Innovation Week, the event will explore:

- » Which innovations in technology or business models should be reflected in long-term scenarios of clean energy transitions to 2030-2050;
- » To what extent those innovations are currently reflected in scenarios; and
- » How long-term scenarios in general can be made more relevant to business planning and policy making under large innovation-related uncertainties.

After brief interventions by an expert panel, the audience will be invited to share their thoughts on the topics above in an open and dynamic discussion, which will contribute to the output of IRENA's CEM LTES Campaign.

Programme

Moderator: Craig Morris (Senior Manager - Energy Systems, Renewables Grid Initiative)

12:45 - 12:55: Introductory remarks from Moderator and Dolf Gielen (Director, IRENA Innovation & Technology Centre)

12:55 - 13:15: Panel interventions

- » **Non-private perspective (e.g. government planning)**
 - Luiz Barroso (Former CEO, Energy Research Office (EPE) Brasil)
 - Robert Schroeder (Manager System Development, ENTSO-E)
- » **Private-sector perspective**
 - Klaus Willnow (Head of Innovation and Future Technologies, Siemens Gamesa Renewable Energy)
 - Ernesto Ciorra (Chief Innovability Officer, ENEL SPA)

13:15 - 13:25: Moderator questions and panel discussion

13:25 - 14:00: Open interventions and interactive discussion

Summary of the discussion

1. Introductory presentation

The session was opened by **moderator Craig Morris (Senior Manager - Energy Systems, Renewables Grid Initiative)**, who gave a brief introduction of the lunch time discussion topic, which aimed to answer “What’s missing in today’s long-term scenarios?”, and more precisely:

- » Which innovations in technology or business models should be reflected in long-term scenarios of clean energy transitions to 2030-2050;
- » To what extent those innovations are currently reflected in scenarios; and
- » How long-term scenarios in general can be made more relevant to business planning and policy making under large innovation-related uncertainties.

After this brief introduction, **Dolf Gielen (Director of IRENA Innovation and Technology Center)** welcomed the participants on behalf of IRENA and provided background information for having this side event.

Under the umbrella of the Clean Energy Ministerial (CEM), where energy ministers from around 25 countries discuss energy matters on an annual basis, Germany and Denmark with IRENA as an operating agent have taken the lead for a new campaign focussing on long term energy Scenarios (LTES). The LTES campaign has received an overwhelmingly positive response as quantitative modelling is becoming an increasingly necessary tool for national governments and major firms to guide policy making and investment in the face of uncertainty in the clean energy transition.

Challenges in scenario development arise from the fundamental changes that the energy sector will undergo in the next three decades. These changes involve, amongst others items, the integration of high shares of VRE, digitalization, technological progress and new innovations. To address these challenges, a number of events like this side event are planned and the results are to be communicated at the next CEM ministerial meeting in Vancouver.

2. Panel interventions

Luis Barroso (Former CEO, Energy Research Office (EPE) Brasil), addressing the importance of long term energy scenarios, began by giving an example of how policy decisions on energy auctions in Brasil were driven by issues identified in long term energy studies. He explained two important ways that the long-term scenarios are used – one is to identify the necessary policy interventions, and the other is to identify the short-term solutions to keep the power system up and running.

He explained that to improve the level of certainty in models, there is a need to increase their granularity in terms of distributed energy resources, distribution network, and representation of uncertainties. He called for a transparent consultation process, including public and private sector, in which model assumptions are made available. Including all stakeholders will increase acceptance and usefulness of models.

Regarding the impact of scenarios, Luis Barroso identified issues in the way scenarios are communicated to decision makers. It is important that the benefits and limitations of scenarios are communicated in an understandable way to people who do not deal with scenarios on a regular basis.

Robert Schroeder (Manager System Development, ENTSO-E) continued by expressing his agreement with points raised in the first intervention, particularly with regard to the stakeholder process which he

described as absolutely key. Commonly accepted scenarios in societies are central for building policy decisions on.

He stated the importance of being humble and realistic when using energy scenarios. In this context long time horizons scenarios should be looked at with caution as the future is incredibly uncertain.

Regarding modelling, Robert Schroeder explained that decarbonization as agreed upon in the Paris Agreement can act as the basis for scenarios and believes this should be a consensus in the modelling community. Future development of innovations and technologies on the other hand can only be predicted with high uncertainty, so he proposes to work on developing no-regret options/solutions.

Klaus Willnow (Head of Innovation and Future Technologies, Siemens Gamesa Renewable Energy) started off by describing scenarios as “pictures of the future” which are a tool for discussion.

Siemens Gamesa uses different ways to develop their “pictures of the future”, one being ex-trapolation and another being re-trapolation. Ex-trapolation is considered the use today’s knowledge to understand what the future could look like. Re-trapolation is a method that starts with the goal, working its way backwards, looking at what needs to be done to achieve this goal.

Concluding his intervention Klaus Willnow said that scenarios essentially allow us to get a better picture of complexity. Scenarios can be used to derive the largest uncertainties, but disruptive innovations and technologies cannot be predicted.

Ernesto Ciorra (Chief Innovability Officer, ENEL SPA) started off his intervention by explaining the word “Innovability” which is put together from the words innovation and sustainability. He went on to tell the story of how Nokia used scenarios as decision making tools in 2005. They predicted there would be no market for smartphones but technology development overtook scenarios. In Ernesto Ciorra’s opinion a company dies without innovation.

Regarding technologies that might be able to change the landscape Ernesto Ciorra believes that Hydrogen, ocean energy, and cost of storage are the disruptive technologies of the future.

3. Open interventions from the audience

Following the planned interventions, the audience was given the opportunity to give opinions and ask question which were then answered by the panellists.

The first question concerned uncertainty and disruption, more precisely how one can know which technology will succeed or break through? As an example, off shore wind was used, which just a few years back did not look like an competitive alternative to other energy sources.

Robert Schroeder initially addressed this question by pointing out that assumptions must be made on factors like the speed of the learning curve and cost of generation. For infrastructure investments he proposed to use no regret options.

Luis Barroso agreed that uncertainty is difficult to represent in models and thus assumptions have to be made. He went on to say that it is important to look at extreme scenarios to understand how to prepare the system for new challenges.

Klaus Willnow addressed the reason why wind off shore could succeed. He noted that becoming competitive had to do with size, price and building a supply chain for this industry. For future models he

wishes that planning tools would look more closely at the supply chain to gain a better understanding of additional uncertainties.

Ernesto Ciorra commented on uncertainty, saying that if there is no uncertainty there is no potential. He thinks companies should not avoid uncertainty but diversify uncertainty to minimize risk. To incentivize people to share their lessons from taking risks ENEL set up the “best failure” program, where people present a failure so that it can be avoided in the future.

The next question was asked by R. Rau from GIZ. He said that the energy sector has gone through many transitions but further technologies might be missing – do we include the possible “unthinkable”?

Klaus Willnow answered by saying the scenarios are only pictures of possible futures, so there is a possibility that technologies might be missing. He also told the audience that he could imagine drastic changes in the energy market such as future business models where data on electricity use is sold.

Further questions raised by the audience were, if the public-sector fears that it could put a technology out of business by saying it will not make it? And how climate change is incorporated into scenarios?

Regarding the first question **Robert Schroeder** agreed that market design has a great influence on future technology growth. **Luis Barroso** added that in the case of Brasil the government tries to be as transparent and predictable as possible to allow companies to adapt.

Concerning the question of how climate change is and should be incorporated in scenarios the panellists said that target setting is an important aspect. Targets should be kept and not be changed overnight to give certainty to decision makers.

Ernesto Ciorra wrapped up the discussion by explaining that change does not just happen in technology, but that a main driver will be cultural change which can create a demand for quicker change in the energy industry. His final lesson was that one should have a vision of the future market and act accordingly. He underlined this statement by giving the example of China’s pursuit of electric mobility, which is not pushed by a grand idea but by predicting the future trends of the market.

For any questions or more information, please contact LTES@irena.org.