

## Proceedings

# 2019 International Forum on Long-term Energy Scenarios for the Clean Energy Transition

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

10 – 12 April 2019, Berlin, Germany

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## Background – LTES Campaign

The world's energy systems are entering profoundly uncharted territory – unprecedented technological advances in power generation, transport and digitalisation are making predictions about future energy conversion and use highly uncertain. At the same time, urgent Sustainable Development Goals and the Paris climate accord insist on a transition to clean energy use as fast as possible, thus compounding the complexity of representing integrated energy systems in long-term scenarios. In this context, unobstructed views of the future energy landscape have become invaluable, and how those views are developed requires a sea change.

IRENA is coordinating a group of leading government institutions from 11 countries, seven technical institutions/associations as well as other interested stakeholders and agencies to explore these issues as part of the “Long-term Energy Scenarios (LTES) for the Clean Energy Transition” Clean Energy Ministerial (CEM) campaign. The campaign aims to promote the improved use of scenarios for the clean energy transition, enable the exchange of best practices and facilitate work to strengthen and broaden their use. The campaign has been running since May 2018 and has since organised eight events and 20 webinar sessions.

**This event was the first international forum to gather all members and partners of the LTES campaign, along with a broader range of subject experts and energy scenario end-users to discuss the issues that are critical to today's scenario practitioners. In bringing together both users and developers of scenarios, the forum explored how scenarios can better support energy transitions.**

**The forum consisted of a pre-forum side event at the Berlin Energy Transition Dialogue, two days of main Forum sessions, and two closed meeting sessions with LTES campaign members and partners. In total, over 130 people assisted this event.**

For any questions or more information, please contact [LTES@irena.org](mailto:LTES@irena.org).

## IRENA side event at the Berlin Energy Transition Dialogue: “Exploring the boundaries of a rapid clean energy transition: the role of long-term energy scenarios”

Date and time: 10 April 2019, 14:45 – 16:45

Location: Foreign Office of the Federal Republic of Germany. Berlin, Germany

Participants: 70



### Opening remarks

Two introductory interventions were made to provide background on the topic and frame the session.

**Francesco La Camera (DG, IRENA)** began by welcoming attendees and mentioning that opening this event is one of his first tasks as DG of IRENA. He presented an overview of IRENA's work and the rationale for the CEM LTES campaign, mentioning the leadership of Denmark and Germany in this sense. He briefly spoke about the three pillars of the campaign: 1) understand how to develop scenarios, 2) how to better use the scenarios and 3) how to develop the capacity for scenario development and use. The events that the LTES has carried out worldwide were referenced, as well as the vibrant webinar series. He officially inaugurated the first international Forum on LTES for the Clean Energy Transition.



**Kristoffer Bøttzauw (Director General, Danish Energy Agency)** then followed with a presentation which provided background on the role of model-based scenarios in the Danish green energy transition. He mentioned that all eight parties in Denmark's parliament agreed on green energy and that the only thing that can happen in the next political round is that the country will be more ambitious.



He stressed the importance of LTES to inform investors and planners on the cost of their decisions, and that advanced energy system modelling is the key for preparing and implementing measures. He mentioned that in Denmark, the modelling keeps surprising the political level in the sense that it is possible to move forward and onward, thus highlighting the importance of scenarios as a driver for change. He closed his intervention by mentioning that the government of Denmark is happy with the LTES campaign and thanked IRENA for taking the job to bring all stakeholders together on how to use scenarios.

## Part 1: Technical presentations

**Moderator: Prof. Brian O'Gallachoir (University College Cork and Energy Technology Systems Analysis Program)** Prof. O'Gallachoir opened the session by stating that the keyword for the side event is: "rapid" and that radical change and radical scenarios are needed, together with new modelling methods.



**Dr Angela Wilkinson (World Energy Council)** began by presenting the complexities in comparing and using global energy scenarios, and the work that WEC is doing to refresh the world energy insights brief, which includes a set of global scenario comparisons of at least 12 peers. She mentioned that WEC has not only been looking at the numbers but at the narratives: What do the narratives tell us regarding the modelling and what has been changing since scenarios were developed?



Dr Wilkson mentioned that primary energy demand is difficult to compare because scenarios are built with different things in mind. She added that for stock-taking of global scenarios, WEC had completed 100 interviews, in 14 different regions.

### Takeaways from the moderator:

- Not to focus on the number of scenarios, focus on narratives and patterns;
- Minting the name "visionaries";
- Hacking scenarios to capture disruption.

**Prof. Yongqiang Zhao (China National Renewable Energy Centre)** continued with a presentation on scenarios of high penetration of renewables and electric vehicles in China.

Prof. Zhao mentioned that China considers that the pillar for the clean energy transition is variable renewable energy (VRE) and electricity in transport and that scenarios are used in the sense of roadmaps to guide the necessary steps for transformation. He mentioned that 80% of electricity supply in China by 2050 will be from renewable sources. By the end of last year, there were already 2 million EVs, and by 2050 it is expected to have 400 million EVs in the market. He also added that critical issues for increased scale-up are safer and cheaper batteries, rapid charging technology, and understanding parking and charging behaviours based on surveys.



Prof. Zhao proceeded to present scenario modelling results for 2050. He showed an image in which wind and solar generation dominate supply during the day. Part of his results also showed that smart charging could defer peak loads and reduce the high price of electricity. According to their modelling, without smart charging, the massive deployment of EVs can be dangerous for the power system, but EVs are the most crucial source of flexibility in the future. He posed the question of how to make the best use of DSM: A system syncing is needed as well as developing a competitive market with new players as aggregators. It was mentioned that China has dozens of charging companies, but they still cannot aggregate EVs to have a mass demand response capability. There is hope that the market will enable charging with reduced costs for the consumer.

### Takeaways from the moderator:

- The different aspects of modelling the coordination between demand and supply are interesting;
- China's target is 80% of RE in electricity by 2050;
- EV is excellent to handle variability, but only if there are systems and market to develop them.

**Dr Sven Teske (University of Technology Sydney)** presented global and regional 100% renewable energy scenarios with non-energy GHG pathways for +1.5°C and +2.0°C, not only in terms of energy but in terms of land use change. He presented the modelling framework of his project, which consists of different models that interact and "teach" each other about the specifics of each sector assessed. Material flows are also calculated (Ag, Li, Co, Cu) for each scenario assessed. A renewable energy potential analysis was also carried out to answer the question: How much space is available for renewables? His results show that the 1.5°C scenario is impossible without negative emissions, and therefore forests were considered as carbon sinks, although CCS was not considered. He mentioned that according to his estimates, electricity demand is expected to grow threefold due to electromobility and electric heating. The results also show extensive deployment of solar and wind, while CSP is used for storage. Although this leads to an expensive system, Dr Teske makes the case that we could finance the change in the electricity sector by saving on fossil fuel consumption. He also highlighted the need for pumped hydro, batteries and hydrogen for storage. Regarding material flows, his results showed constraints in cobalt and lithium. Therefore hydrogen and renewable methane need to be used to recycle the gas network.



### Takeaways from moderator:

- Use of a multi-model approach;
- Quantify material flows; this is often neglected;
- Scenarios that can show 100% without BECCS and nuclear are fascinating.

### Clarifying questions from the moderator to all presenters:

**Brian O’Gallachoir** made the following question to all presenters: *Wind and solar are growing fast, but electricity is only 20% of the energy mix. So today, solar and wind only contribute 2% of energy demand. What is the estimate for the contribution for solar and wind in 2030 and 2050?*

**Sven Teske** answered the question by stating that he considers that final energy consumption by 2030 will be 56% RE and roughly half are solar and wind. By 2050 he considers that 100% will be RE and 65% will be solar and wind.

**Yongqiang Zhao** mentioned that for China by 2030, around 50% of electricity will be generated with renewables, of which 20% is solar and wind, which increases to 50% by 2050.

**Angela Wilkinson** answered that this depends on scenarios assessed by 2050: Normative show 30–50% RE, Outlooks show 15–30% and Plausibility show 17–23% RE.

The moderator asked an additional question to the panellists: *What are the critical missing trends?*

**Yongqiang Zhao** answered that it is essential to reconcile the macro vs detailed approach.

**Angela Wilkinson** responded that geopolitics has shifted: Uncertainty is not the price of oil; it is the availability of data. Moreover, although digitalisation is mentioned constantly, it is still



unclear what it means. She also mentioned that power has shifted from the West to Asia (China), and from supply analysis to end-use demand.

## Part 2: Panel Discussion and open interventions

**Moderator: Dr Stathis Peteves (Joint Research Center, European Commission)** Dr Peteves opened the panel discussion by stating that the plethora of scenarios has complicated their use, i.e. it is difficult to compare the narratives, and therefore, this makes comparing scenarios difficult. He highlighted, however, that scenarios are essential to portray the vision of the future. However, engagement with policymakers, consumers, and prosumers is needed. He closed his opening statement by mentioning that the task for the panellists is to answer the question: What do you do with scenarios? Also, how do scenarios influence policymaking?



**Fatima AlFoora AlShamsi (Ministry of Energy and Industry, United Arab Emirates)** mentioned that scenarios are appreciated, but when carried out with the right models. The UAE is developing energy and water scenarios, and it launched a strategy for 50% clean energy scenario by 2050. She mentioned that the modelling tool used is continuously under review and improvements to go beyond the power sector - e.g. EVs - need further analysis.



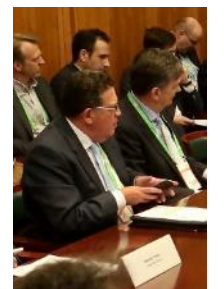
**Ellen von Zitzewitz (Ministry for Economic Affairs and Energy, Germany)** mentioned that Germany has a clear picture of where it wants to land and that there is a strong commitment to decarbonise the economy, according to the Paris Agreement. She stated that there are 12 scenarios which the Ministry is assessing, which are sourced from industry, science and NGOs. She highlighted that for Germany, having multiple scenarios is very important because they show different paths, and they allow the balancing of costs and implications. She finalised by mentioning that there is a complicated discussion around the role of hydrogen and that Germany is interested in learning about what other countries are doing with scenarios.



**Prof. Dr Tomas Kåberger (Swedish Energy Agency, former)** started with the statement: "Scenarios are useless, what is important are the lessons learnt when building them." He mentioned that all the developments that will happen in the energy system are impossible to predict, but when developing scenarios, the workings of feedback mechanisms can be understood. For example, he posed that researchers who studied learning curves have been right on with solar and wind price reductions. He ended by mentioning that energy modelling will be much more difficult but more exciting, and new tools will need to be developed.



**Prof. Medardo Cadena (Latin American Energy Organisation)** started by mentioning that he worked for ten years in energy planning in the Ministry of Electricity in Ecuador, and he had the opportunity to become Vice Minister and Minister of that institution. He reminded the audience that policymakers have a great responsibility and a necessity to make changes while managing risk, because decisions have a significant impact not only on energy and environment but also



on the economy and people's lives. He stated that academia and IOs could be explorative, but from a policy perspective, the conservative approach is more sensible.

**Michael Paunescu (Natural Resources Canada)** began by discussing the example of the Canadian National Energy Board, which has produced energy future scenarios every four years since 1967, bi-annually since 2007, and annually from 2016. He mentioned that Canada is a big consumer and producer of energy and a leader in renewable energy at the same time. He detailed how Canada has been planning its energy system with the use of multiple scenarios. Mr Paunescu mentioned that in 2016 a pan-Canadian framework for clean growth and climate change was launched and was informed by a Mid-century Strategy, which aimed at the abatement of 80% of GHG in 2050 from the 2005 level. What Mr Paunescu's policy group is doing for the mitigation strategy is to look at options for further decarbonisation, including VRE integration, and how to achieve electrification of the economy at large. He mentioned that in Canada consensus building around national objectives is vital. He closed by mentioning that long-term energy objectives are achieved through concrete short-term actions, and that although the energy system is complex, modelling that complexity is even more challenging.



### **Open questions and discussion:**

**Question [Moderator to Michael Paunescu]:** *How does Canada build consensus to go forward based on several scenarios?*

**Michael Paunescu** answered that the federal government relies on very recent modelling work to document and inform the energy discussion, and to propose a collaborative approach to all jurisdictions in Canada. All levels of government in Canada are involved in many efforts for consensus building. The pan-Canadian framework was a document signed by almost all jurisdictions in Canada. Another example is a recent first ministerial meeting in December 2018, which resulted in an agreement to work collaboratively on a clean electricity framework.

**Question [Moderator to Thomas Kåberger]:** *How will the industry sector be considered in scenarios?*

**Thomas Kåberger** responded that the Nordic countries have energy-intensive industries and that there are efforts looking into hydrogen to replace coal in the steel industry. He added that the residential sector can be squeezed with high prices, but not the industrial sector due to global competition.

**Question [Moderator to Fatima Alfoora AlShamsi]:** *How should scenarios be communicated? How should they be explained to citizens?*

**Fatima Alfoora AlShamsi** answered that what the audience wants to know is how decisions are going to impact the country, how it will impact investment, transport and the residential sector; this is the way to communicate.

**Question [Moderator to Panellists]:** *What are the issues with CCS? Gas might experience an uptake in a coal-free scenario, and labelled with names such as "green gas" or "blue gas"; this is confusing for consumers. Decarbonisation is talked about, but so is natural gas. How are fossil fuels included in scenarios?*

**Ellen von Zitzewitz** stated that in Germany, the situation is clear – a commitment to decarbonise 80–95% by 2050. For many years the Emission Trading Scheme was thought to be enough of a solution to deliver on this. Now it is clear that it is not. Ms. von Zitzewitz

mentioned that fortunately, Germany has a committed public which is willing to pay more to support green initiatives.

**Sven Teske** mentioned the importance of identifying the winners and losers of the transition.

**Fatima Alfoora AlShamsi** answered that decarbonisation is not equal to 100% VRE; it is equal to 100% clean energy in all of the system. She added that the UAE has commissioned its first CCS facility to learn how to use excess CO<sub>2</sub>. It was assumed that electricity storage would develop quicker, but still has not.

**Comment: Ellen von Zitzewitz** stated that: *Germany is technology open, which is the reason why there are different scenarios.* She highlighted that the downside of innovation is that countries might postpone decisions that need to be made today - the ghost of innovations makes people delay decisions.

**Comment: Thomas Kåberger** stated that: *Scenarios are worthless. It is the process of understanding how technologies interact and the impacts for the economy. Building scenarios is studying how to reach policy targets efficiently.*

**Wrap up of the session by MC: Dr Dolf Gielen (Director, IRENA IITC):**

Dr Gielen provided the following summary points and areas for further research:

- Scenarios can mean different things: narratives, pathways, roadmaps, forecasts, uncertainty mapping. It is important to clearly know the purpose of scenarios.
- In some cases, the number a scenario provides is essential, but sometimes the process on how to reach that number is more important. The number is essential to underpin uncertainty. The process is vital for consensus and discussion.
- Everything is accelerating: this has consequences for the modelling. There is a whole range of developments: e.g. flexibility, smart grids and EVs; which require adjustment and a rethink of tools.
- It is essential to capture material demand and flows.
- Electrification of end-use sectors is now the focus.
- It is important to build trust in models and scenarios.
- An area for further research is the modelling of integration costs of VRE.
- The brand of the model is not a synonym of quality. It is necessary to investigate the structure of the model.
- When using several scenarios, they must be considered in terms of plausibility.
- Policymakers want to minimise risk in decision making, which is different from trying to predict the truth - that this why there is friction between policymakers and modellers.





## Proceedings of the Main Forum

Date and time: 11–12 April 2019  
Location: The Westin Grand, Berlin, Germany  
Participants: 80



### Session 1: Opening – Long-term energy scenarios for the clean energy transition

Two introductory interventions were made to provide background on the topic.

**Welcome remarks – Dr Dolf Gielen (Director, Innovation and Technology Centre, IRENA)** began by welcoming attendees and stressing that the clean energy transition makes economic sense. He mentioned that IRENA gets more questions on the economic aspects of the transition than on the policy aspects – e.g. the transitions can help reduce subsidies. He shared some background on the CEM LTES campaign, which was created last May in 2018 under the leadership of Germany and Denmark. He highlighted that during the past year, there had been a dozen events, with a total attendance of over 400 experts, and a vibrant webinar series with over 500 registrants has been established.



**Keynote address – Dr Christoph Reichle (Deputy Director General Energy, Federal Ministry for Economic Affairs and Energy, Germany)** started his intervention by mentioning that scenarios help to assess interrelationships in the system. He reminded the audience that Germany has committed to phasing out coal by 2038 and nuclear energy by 2022, and this can only happen if the energy sector embarks on a fast transition. Dr Reichle mentioned that the 'Energiekonzept' scenario document included several targets for the energy system: reducing emissions by 55% by 2030 and 80% to 95% by 2050; this requires 60% renewable energy by 2050 and includes 80% renewables in electricity by 2050. He closed his keynote address by saying that LTES are indispensable for policymaking and proper long-term planning, but that LTES have to be continuously updated.



## Session 2: Communication around scenarios – How can we improve the communication around long-term energy scenarios to make them more relevant to policymaking under transition?

**Moderator: Dr Tiina Koljonen (VTT Technical Research Centre of Finland)** Dr Koljonen started by thanking IRENA and by mentioning the challenges for the energy transition: digitalisation, consumers becoming prosumers, and heating.



### Technical presentations:

**Dr Elmar Kriegler (Potsdam Institute for Climate Impact Research)** stated that communication is essential because of the ever-increasing use of LTES. He mentioned three significant uncertainties that shape modelling results: 1) socio-economic drivers, 2) technology assumptions, and 3) policy assumptions (e.g. is it possible to accelerate the transition and meet NDCs within the Paris Agreement?). Dr Kriegler referred to the SENSES approach and LEARN model, which allow a basic understanding of Representative Concentration Pathways (RCPs) and models with a 30-minute read. He closed by stating that the use of spaghetti plots should be stopped, although the IPCC 1.5°C report uses funnel and spaghetti plots are used to show the robustness of modelling results.



**Question [Moderator]:** *Was such a big reaction expected with the IPCC 1.5°C report?*

**Dr Elmar Kriegler** answered that the report had a few risks and a very tight timeline. The discussion about carbon budgets is still an open one.

**Prof. Dr Evelina Trutnevyte (University of Geneva)** started by stating that some people are discouraged by the large number of scenarios. However, she wants to show how this variety can be used. She presented examples of past scenarios developed for the UK: even though the scenarios were quite off, they helped influence the discussion and make the transition happen. She mentioned that all types of scenarios are needed and then presented work done in Switzerland, where the country has committed to no nuclear power, which currently accounts for 1/3 of the power mix. She presented two approaches to handle the variety of scenarios: 1) quantitative: Modelling to Generate Alternatives (MGA) – a modification to the objective function of a bottom-up optimisation model, and 2) qualitative: informed citizen panel – a communication tool to show how citizen views differ from modelled scenarios.



**Question [Moderator]:** *How was the panel selected for the informed citizens' panel? Were they interested in energy?*

**Prof. Dr Evelina Trutnevyte** answered that they are people representing the social demographics of Switzerland, with diverse views and ideas on electricity technologies.

**Kaare Sandholt (China National Renewable Energy Centre)** started by mentioning that when talking about communication, it is necessary to identify the target audience. He mentioned that for CNREC, for example, the target is policymakers, for whom 5-year plans are developed. He elaborated on his experience in China, stating that in the Chinese context, it is understood that targets are to be met. Otherwise, they are the wrong targets. In this sense, he argued that, in China, there are no scenarios per se; instead, there are predictions that show how China will develop in the future. He added that for long-term scenarios, there are two milestones in China: 2035 and 2050, and it has chosen to have only two scenarios. He concluded by saying that renewable energy must be looked at for the energy system transition, and that it will be the backbone of the energy system of the future.



**Question [Moderator]:** *How many stakeholders are included in the scenario process and how is communication done?*

**Mr Sandholt** stated that it is an internal process. CNREC develops its annual planning, and then it is put out for discussion internally.

**Dr Kenneth Karlsson (Technical University of Denmark and IEA TCP-ETSAP)** presented about involving politicians in the use of scenarios through the concept of a 'war room' – putting decision makers together with all information and facilities to move forward. They have named this concept "Model Lab". They perform real-time iterative modelling through the Model Lab, and have an online communication platform to show the results. Dr Karlsson mentioned that launching the online tool and making a press release comparing CO2 emissions and carbon budget spending got politicians attention, which ended in a public hearing.



**Question [Moderator]:** *Did people in the Model Lab complain about numbers?*

**Dr Karlsson** mentioned that most of the people approached them before the meeting with suggestions about what can be implemented and what cannot.

#### **Questions from the audience:**

**Question [Markus Wolf (EPRI)]:** *Why does the range of presented scenarios differ so much from previous results? Does the TIMES modelling include behavioural aspects?*

**Dr Trutnevyte** answered that the model is built in a way that looks for extreme opposing scenario cases within the least-cost space.

**Dr Karlsson** mentioned that it is a challenge to include behaviour in energy system optimisation models. However, there is some representation of consumer behaviour in transport.

**Comment: Mr Morrison (OPENMOD)** commented that licenses and scenario datasets are not open. The problem of not having open sources is that results cannot be replicated downstream.

**Dr Kriegler** answered that methods and results are published by PIK in peer-reviewed papers, but it is recognized that open access would have more impact. Dr Kriegler mentioned that model code is more for academic use and that the public may not be able to do anything with it.

### Panel discussion:

**Thiago Vasconcellos Barral Ferreira (Energy Research Office, Brazil)** opened the interventions by saying that energy planning occurs at several levels (government/regional), and that mobilizing these different layers is vital for successful policy-making and to provide useful insights for the policy-making process. He added that for each of these layers, lack of consistency in proposed strategies must be identified and that modellers need to redesign their understandings and provide less conservative visions. He concluded his intervention by mentioning that LTES must provide the message that transition can be long and complicated processes; expecting quick results would lead to poor policymaking.



**Reshma Francy (Ministry of Energy, United Arab Emirates)** mentioned that the UAE has worked in setting long-term targets and have used LTES to do so. They have a specific target of 50% renewable power capacity by 2050. With the purpose of stress testing scenarios, the Ministry of Energy and Industry has created a communication tool, named "Future Lab" to reach political leaders, people of the cabinet, and members of climate and energy ministries. The Future Lab consists of a board game that includes role-playing for the energy sector (regulator, investor, government, etc.). Players pick targets, and surprisingly, Ms Francy stated that players picked targets close to what had been simulated.



**Dr Paul Koutstaal (PBL Netherlands Environmental Assessment Agency)** explained that PBL has a whole suite of scenarios which range from conservative to exploratory. They have used scenarios for setting targets for the climate agreement (by 2030). Five negotiation tables were set by PBL, in which scenarios have been discussed within different sectors.



**Dr Uwe Remme (International Energy Agency)** outlined the scenarios that the IEA is producing in its two scenario-based reports, the World Energy Outlook and Energy Technology Perspectives: 1) explorative what-if scenarios to analyse the impact of given policy measures and technology trends and 2) normative scenarios to assess how to sustainability goals or other policy targets can be reached. He mentioned that these scenarios are complemented by road-mapping exercises, e.g. what are the technological, regulatory and financial challenges to be overcome to reach the clean technology deployment levels envisioned in the scenarios. He closed his intervention by stating that the IEA participated in the development of a global version of UK's DECC calculator – a web-based tool with levers designed for different target audiences to interactively explore the impact of various decisions.



**Question [Moderator]:** *When should communication happen? Which messages are policymakers looking for? Who should communicate?*

**Ms Francy** mentioned that the Ministry of Energy and Industry was asked to develop scenarios in-house. The Ministry is the institution responsible for gathering the stakeholders. Ms Francy said that ranking and weighing scenarios is an on-going challenge.

**Mr Barral** commented that EPE is a public institution under the Ministry of Mines and Energy that provides data, statistics and scenarios for the assessment of energy policy. Mr Barral mentioned that it is a struggle to help policymakers see ahead. He said that Brazil is currently working on a 2050 energy master plan and parallel to this, the EPE has been organising a series



of workshops, publishing papers and attending public events to engage in discussions with different crowds.

**Dr Koutstaal** mentioned that PBL leads discussion sessions with different stakeholders that are open to all types of people. PBL also seeks to be transparent in its modelling approach.

**Dr Remme** stressed that what policymakers need is the "space to act"; scenarios to 2050 need to be assessed in light of the decisions that need to be made today, i.e. backcasting.

**Question [Moderator]:** *Are policymakers reading the reports produced?*

**Dr Remme** stated that policymakers have a short attention span and that messages need to be distilled to something short and concise.

**Dr Koutstaal** agreed that messages to policymakers need to be brief, but on the other hand, other audiences like and need a lot of detail. He mentioned that PBL produces background reports with a lot of data and details for people to understand what has been done.

**Mr Barral** added that it is not only politicians that have short attention spans – few people are watching anything for more than 30 seconds nowadays. He mentioned that it is more a matter of asking questions that are interesting for the people. He shared an example for Brazil: The NDC process in Brazil was produced with scenarios developed by EPE. Although the president was reached, engagement with the public failed.

**Question [Carlos Gasco (Abu Dhabi DoE)]:** *Should concepts be favoured over numbers?*

**Dr Remme** mentioned that scenarios are the only tools for exploring the future, and given that experiments cannot be carried out with the actual energy system, the numbers and insights that scenarios provide are important.

**Dr Koutstaal** stressed the fact that even though PBL has made it clear that there is uncertainty around scenario results, stakeholders still doubt the numbers given that they are updated year after year.

**Question [Moderator]:** *How can policymakers trust scenario results?*

**Mr Barral** stated that politicians do not trust the scenarios per se; they trust the institution behind the scenarios.

**Mr Sandholt** added that it is also good to include short-term decisions into the long-term perspective and have iterations when doing the scenario process.

**Final remarks from moderator:**

Dr Koljonen closed the session mentioning that the transition is a long process, which is a never-ending one. She also highlighted that the ownership of the targets is essential and that sectoral negotiation processes for scenario building are necessary to achieve this.



### Session 3: Going beyond energy systems analysis – How can long-term energy scenarios be more relevant to climate policy making?

**Moderator: Dr George Giannakidis, Project Head, IEA TCP – ETSAP** Dr Giannakidis welcomed all presenters and stated that climate change issues are now relying heavily on long-term energy scenarios and that many climate scenarios are now a main part of energy planning.



#### Technical presentations:

**Prof. Brian O'Gallachoir (UCC and IEA TCP – ETSAP)** mentioned that LTES need to be improved, and that capacity needs to be built so scenarios that are relevant can be produced. He also noted that it is necessary to develop scenarios that can underpin policy. He stressed that policymakers look for answers, and scenarios can only provide insights.



**Dr Harry Lehmann (Federal Environmental Agency of Germany)** mentioned that the agency started drawing scenarios 10–20 years ago. In 2010, UBA concluded that Germany could be carbon free, but it needed to solve the issue of agriculture as well as maritime and air transport. He noted that energy and climate are related to materials, e.g. better insulation for energy efficiency requires more materials. Thus, he stressed that the energy transition must be looked at in a cross-sectoral manner.

**Dr Bernd Hackmann (United Nations Framework Convention on Climate Change)** mentioned that five and even ten years is not enough to fight climate change; therefore, the LTES view is necessary. He cited what the Paris Agreements states related to LTES: "All Parties should strive to formulate and communicate long-term low greenhouse gas emission development strategies," mindful of Article 2: "Taking into account their common but differentiated responsibilities and respective capabilities, in the light of different national circumstances." He mentioned that for developing countries, it is necessary to convert NDCs into national development policy. He concluded his presentation by stating that it is necessary to reconcile the need for development and happiness with the fight against emissions.



**Dr Xavier Garcia-Casals (Policy Unit, Knowledge, Policy and Finance Centre, IRENA)** mentioned that energy scenarios and energy planning only exists on paper - it is the result of how these interact with the socio-economic system that will bring them to succeed. He said that we often tend to have an approach that is convenient for modellers, i.e. a closed framework in which we introduce data and optimise it. However, he reminded the audience that leaving externalities and learning curves out of optimisation goals can distort the message. He closed his intervention by mentioning that if systems are viewed independently, many synergies are omitted, therefore an integrated view is needed.



#### Questions from the audience:

**Question [Representative from Ukraine]:** *How to deal with the issues of ambition vs fairness regarding climate change action?*

**Dr Hackmann** mentioned that when a government is asked about the issue of 'fairness', the outcome is typically that their NDC is fair, justified by their context as a developing country, existence of poverty, etc.

**Final remarks from moderator:**

Dr Giannakidis mentioned that standalone transitions do not exist, a whole system approach is needed.

**Panel discussion:**

**Elzo Molenberg:** Mentioned the Netherland's goal for 20% emissions reduction in 2020, and carbon neutrality by 2050.

**Bernd Hackmann:** Commented that more and more the issue of climate change is being integrated into climate and energy policies. However, he mentioned that there is still a long distance to meet the Paris Agreement.



**Question [George Giannakidis]:** *To what extent do governments consider climate issues on one side and energy issues on the other side? Moreover, how does this interaction work?*

**Mr Paunescu** mentioned that in Canada, there is a national target, but there are also jurisdictional targets. He said that jurisdictional objectives do not always match national goals.

**Comment [Former GIZ staff]:** A suggestion is made to also look at countries that are in the low-income band. It is mentioned that NDC numbers, on some occasions, do not have strong justification.

**Question [Brian O'Gallachoir]:** Dr O'Gallachoir added that when looking at NDCs, they can appear very short-sighted and it is hard to see the level of rigour underpinning them. He asked how sustained capacity to overcome this can be built?

**Dr Hackmann** answered that most of the NDCs were prepared prior to Paris and countries had only a year to put them together. However, he mentioned that now that the ratcheting process has started, many countries are going back to the drawing board to assess what they are committing to.

**Question [George Giannakidis]:** Dr Giannakidis asked the panellists to name one essential suggestion in regard to how LTES can be more relevant to climate policy.

**Mr Molenberg** suggested to leave the national level and enter the regional level - electricity does not stop at the border.

**Dr Hackmann** reiterated that LTES is necessary for climate policy.

**Dr Lehmann** highlighted that energy scenarios should be connected to other sectors in an integrated approach.

**Dr O'Gallachoir** mentioned that when talking about energy system analysis, technologies are discussed, but people and society tend to be forgotten.

## Session 4: Corporate and financial sector perspective on long-term energy scenarios for the clean energy transition

**Moderator: Niels Bisgaard Pedersen (Danish Energy Agency)**



### Technical presentations:

**Ryan Barrett (Bank of England)** started by mentioning that he comes from the perspective of the economic and financial system. He pondered the question of why certain technologies cannot obtain financing, and noted that policy uncertainty results in less investment. He discussed that it is still uncertain what type of economy will exist after this system-wide energy transition happens, and that this has substantial impacts in financial terms. From the Bank of England's perspective, Mr Barrett mentioned that the Bank had been asked to produce long-term interest rate and inflation values towards the end of the century, because large companies have annuities that last that long. He concluded his intervention by stating that there is a need to translate scenarios (technology) for the financial sector and economists.



**Question [from the audience]:** *How does the Bank of England select scenarios?*

**Mr Barret** answered that they use scenarios produced by IEA and IRENA. He also mentioned that, given that the Bank of England is a central bank, they look at the system as a whole and look at larger actors in the economy.

**Question [from the audience]:** *Is it hard to get funding for grid extension and large power infrastructure?*

**Mr Barrett** answered that it is indeed hard to get financing for RE and low carbon projects. The risk is that large parts of the economy will be transitioned out, and there could be stranded assets and layoffs. He reminded the audience that reductions in lending happen, and that in a world with adverse macroeconomic conditions, it can be hard to fund the energy transition.

**Dr Lothar Rieth (EnBW Energie Baden-Württemberg AG, Germany)** started by reflecting on the global financial crisis and the thoughts of the founders of the Task Force on Climate-related Financial Disclosures (TCFD): the need for a stable macroeconomic system that protects the financial sector from instability. He mentioned that every single company uses its own scenarios, metrics and narratives, which are likely conservative. Dr Rieth reflected on how the TCFD recommends that companies assess the risks and opportunities of decarbonisation.



- Governance: How often the board talks about climate and therefore about scenario analysis.
- Strategy: How climate risks and opportunities are considered in the business model.
- Risk management: Focus on climate risk.
- Metrics and targets: Long-term objectives.

Dr Rieth mentioned that the EU is still working on defining what green business activity is. He stated that at the heart of the debate is how to reconcile companies with climate and how this affects the financial bottom-line of the company in the short term.

He concluded his intervention by mentioning that there is a lack of information, not on the side of modeller, policy and financial actors, but in bridging the gap between these actors. The TCFD has several tools for this; they just released their second report based on these challenges, which suggests necessary tools.

#### **Panel discussion:**

**Karin Ohlenforst (Global Wind Energy Council)** opened her intervention stating that the wind market uses forecasts for 5–10 years, but there is a need to make integrated projections that include growth of other competing technologies. She added that the corporate world usually needs a strategy for 1–2 years and that getting them to look at something until 2030 is difficult to achieve. Ms Ohlenforst concluded her intervention by mentioning that LTES help and guide their analysis, to understand the magnitude of opportunities for the wind industry.



**Barbara Jinks (Gas Infrastructure Europe)** started her intervention introducing GIE: present in 26 countries, with 65 member companies. She mentioned that in terms of value, 90% of energy trade in the EU is gas, while only 10% is electricity. For gas companies, LTES are not scary given that gas contracts are usually signed for 30-year periods. She mentioned that board members of gas companies do look at scenarios, but it varies from 0% gas in 2050 to 20% gas in 2050. She closed her interventions by mentioning that CCS makes sense for gas companies and that the same companies working with gas are usually also involved in the power sector.



**Martin Haigh (Shell)** started by stating that the future is uncertain, and scenarios are used to ask what-if questions. He mentioned that Shell used to consider their scenario cases with and without climate action. However, now it is clear for them that climate action will happen, it is only a matter of when and how. He also added that in the past Shell produced scenarios as an internal exercise, but now the world has changed, and there is an open landscape in which people want to know what everybody is doing. In terms of challenges, Mr Haigh mentioned that scenarios need to be assessed in terms of their short-term plausibility.



#### **Questions form the audience:**

**Question [Moderator to panellists]:** *How can we link macroeconomic models and financial models with the long-term of energy?*

**Mr Barrett** said that macroeconomic models have a different purpose, although in a way they are being used to capture shocks due to the energy transition.

**Question [Former GIZ from audience]:** *How is GDP considered in your models when catastrophes happen?*

**Mr Haigh** answered that Shell has its own GDP model and that they have discovered that modelling economic cycles and disruptions is distracting to people, so they now only present trends.

**Question [Dr. Ahmed Badr (RCREEE)]:** *Do corporates consider taking more risk and investing in renewable energy? The trillion USD needed for the transition cannot come from development banks.*

**Mr Haigh** answered that the strategy of Shell is to diversify in terms of investment and geography across the energy industry. He mentioned that Shell is looking into gas and also into chemicals due to the increasing demand for materials.

**Ms Jinks** added that investing in renewables should be considered as low risk and what is risky is staying in the current line of only fossil business.

**Question [Kaare Sandholt (CNREC)]:** LTES (optimisation) models use a very rudimentary NPV approach, i.e. discount rate as if all technologies have the same risks.

**Mr Barrett** answered that there is no use in doing in-depth discount rate analysis. In terms of who is bearing the risk, it is not only investors but also governments which are investing in infrastructure. He suggested that it is necessary to identify who is carrying the risk.

**Dr Reith** mentioned that if the markets are convinced, then the policymakers will be. Big oil companies are moving towards utilities, and they are actual giants compared to the traditional size of utilities. He stressed that there is a new energy market.

**Comment: Ms Ohlenforst** stated that it is necessary to move away from discount rates, and to rather consider "value". She added that the LCOE is a well-established metric, but it is insufficient.

**Comment: Dr Reith** mentioned that in the energy business, he did not know of any company that is not using scenario analysis. He insisted that the challenge for companies in the future is to determine the degree to which they want to be transparent about how scenarios are used and which ones are used.

**Comment: Mr Barret** commented that he is surprised to hear that energy companies are using scenarios, while most banks and insurers are not.

**Question [from the audience]:** *Where does the modelling finish, and when does the political economy start to assess the plausibility of a scenario?*

**Mr Haigh** replied that scenarios must be embedded within a political storyline: the story comes first and then the energy model.

**Question [Brian O'Gallachoir]:** *Would a meta-analysis for scenarios be useful to assess why we have so many diverging results? Is it harder to finance large infrastructures compared to small projects, for example, a wind farm?*

**Mr Barrett** answered that a meta-analysis would be hugely helpful, and something already exists in this regard: the IPCC (AR5) presented a summary of different scenarios.

**Comment: Ms Jinks** said that every project has a business case if there is a business case; the project will happen subject to context limitations.



## Session 5: insourcing and outsourcing scenario planning capability – How much scenario planning capacity needs to reside within governments?

**Moderator: Prof. Riccardo Bracho, National Renewable Energy Laboratory** Prof. Bracho opened the session by saying that in the earlier days of modelling, simple things were in play such as high oil prices and low demand profiles. However, now with the transition, there are new and disruptive technologies, socio-economic challenges, environmental risks and decarbonisation commitments. He mentioned that LTES is much more than just maintaining models, that there are many more capabilities needed, and the decision of insourcing or outsourcing is hard.



### Technical presentations:

**Dr Giada Venturini (Danish Energy Agency, Denmark)** presented how Denmark bridges institutions for scenario building with the support of DEA, which is part of the Ministry of Energy and is where most of the modelling capacity is allocated. She explained how DEA established cooperation for data and the modelling community in Denmark. They produce technology catalogues, which are a databases for technologies and are continuously revised. She also commented on the DEA Energy and Environment Outlook. The most recent scenarios were produced in 2014, after the climate agreement of 2012, where commitments were established for carbon neutrality with a 2050 horizon. With a new climate agreement in 2018, more scenarios will be produced.



**Carlos Gascó Travesedo (Department of Energy, Abu Dhabi)** started by asking how a sub-national institution can actually contribute to long-term goals. He mentioned that Abu Dhabi accounts for around 2/3 of the UAE energy demand. The Department of Energy of the Emirate has built an electricity model, and are developing a policy framework that started with the running of the model. The electricity model has six modules, and each one of those contains several policies that are very well defined. The model is run to explore the impact of those policies in the long-run. He mentions that according to modelling results, demand will grow slowly and that by 2035 1/3 should be renewable energy (a mix of nuclear and solar).



**Question [Moderator]:** *It looks like in Abu Dhabi's case, it was decided to in-source the modelling capacity. Was there reasoning for having this insourced? Does the DOE envision having more interaction or receiving capabilities from outside?*

**Mr Gasco** confirmed the fact that they have the model in-house, but added that they have actually hired several suppliers to provide the modelling tool. They are in the process of owning the model and also in the process of expanding it to the rest of the Emirates.

**Dr Eckehard Rosenbaum (Joint Research Centre, European Commission)** presented an EC perspective on insourcing vs outsourcing. He mentioned that by law, the EU needs impact assessments for all policy proposals; the most famous case is the impact assessment for GHG scenarios. They are increasingly forced to buy expertise in the market, but they have constraints to buy. Dr Rosenbaum stressed that the question "to buy or not to buy" depends on the capacity and resource they have in-house. He closed his intervention by stating that apart from the financial considerations, a downside of outsourcing is that they cannot control the expertise, which is usually a black box.



**Dr Philipp Trotter (University of Oxford)** talked about energy planning in Africa, which focuses on energy access. Projections in most of Africa are typically based on one scenario that explores how to provide access to people more quickly. Dr Trotter presented two case studies: South Africa and Ghana. The planning is in-house in both countries within the Ministry of Energy (RSA) and Energy Commission (Ghana). Energy planning in Africa is typically done with a top-down perspective. He mentioned that there is political support to insource modelling capacity. The Ghanaian case shows that capability barriers which may exist early on can be addressed through a staged approach of initial concentrated capability building efforts which can then be reduced gradually as local ownership increases. He closed his intervention by stating that countries that have been successful in providing energy access have insourced capacity in the government.



**Comment: Dr Bracho** mentioned that it is interesting how energy access is the driver for scenario planning in Africa. He added that insourcing modelling capacity seems reasonable during the first stages of any country; firstly because there is not out-sourcing capacity available in the country and secondly because international cooperation works with government officials.

#### Questions to panellists:

**Question [Brian O'Gallachoir to Giada Venturini]:** *In Ireland, the regulator plans the network planning, not the energy agency. How is this different in Denmark?*

**Dr Venturini** answered that the Power and Gas Infrastructure Outlook was moved from the transmission operator to the DEA because it had the capacity of long-term planning and a more integrated view than the transmission operator did.

**Question [Brian O'Gallachoir to Carlos Gasco]:** *In Ireland, PLEXOS is used for electricity similar to the case of the Abu Dhabi Department of Energy. What models are being used for fuels in Abu Dhabi?*

**Mr Gasco** answered that at this stage the modelling focuses on the power sector; the rest of the energy sector still has not been assessed.

**Comment: Mr Morrison (OPENMOD)** commented that civil society is doing its own modelling and that the OPENMOD community has over 500 members.

#### Panel discussion:

**Mr Michael Paunescu (Natural Resources Canada)** started his intervention by elaborating on how much scenario capacity needs to be in a government. He argued that it should be enough to understand scenarios, analyse confidential data, validate international consulting models and ensure sufficient diversity in the source of modelling. He explained that there is a reason why Canada insources and why they also outsource: insourcing is less expensive and gives more control over the results, whereas outsourcing can provide high expertise, computing possibilities and consultants that can respond to last-minute requests. Mr Paunescu said that the electricity target in Canada is 90% non-emitting electricity by 2030. He added that focus is shifting from price (grid parity) to the technical issues of integrating wind and solar into the system.



**Ubiratan Castellano (Technical Consultant and Former Director at Ministry of Mines and Energy, Brazil)** started his intervention by saying that Brazil has developed good planning capacity, and that working on building capacity on qualitative aspects of scenarios within the government is very relevant. He mentioned that EPE is considered to be a “think tank” that supports the Ministry of Mines and Energy in the studies supporting policy work. He added the ministry's planning secretariat held a public consultation about long-term planning procedures, which indicates the centrality of building qualitative scenarios complemented by quantitative approaches and use of models. The replies received confirmed strong interest from market players and civil society organizations in participating more actively in the process including the discussion of setting up prospective scenarios, and not just commenting on the final documents.



**Carolyn Schenuit (DENA)** opened her intervention with the background of DENA. They are an independent player, owned by the government, to be a bridge between the government and private sector. She mentioned an inter-comparison and a sector coupling study carried out by DENA. She highlighted that although different methods were used in these studies, the results were pointing in the same direction. She concluded that there needs to be a mix between insourcing and outsourcing, but the whole process needs to be owned and led by the government.



**Dr Miriam Bueno Lorenzo (Ministry for the Ecological Transition, Spain)** mentioned that at the end of 2016, the EU launched regulation which included the obligation to have long-term energy integrated plans until 2019. Given the limited flexibility to assign this task to a new team in the government, they opted for outsourcing. However, she mentioned that in Spain, they are using a mixed structure of working with public-private consultancy enterprises. The ministry establishes the conditions of the contract, e.g. quality of the data, creating a network of knowledge with other stakeholders, and knowledge transfer activities. She closed by mentioning that this was a very challenging exercise.



**Mr Bansidhar Bandi (The National Institution for Transforming India)** stated that both SDG7 and GHG emission targets are relevant for India. He mentioned that the country is divided between rural areas with no energy access and highly industrialised cities. He gave background details of NITI Aayog - a think tank created to work close to the states of India to see what is needed. NITI Aayog is coordinating all the ministries that manage energy topics. He also mentioned that in 2013, the India Energy Security Scenarios (IESS) started; however, the modelling is too scattered and people are still working in silos. He mentioned that a critical aspect of the new energy policy is to have a unified energy ministry and an environmental protection agency. Regarding recent efforts in modelling, India recently hosted the inaugural India Energy Modelling Forum, where people from the EU, the USA, DFID, and Indian modellers sat together for two days, discussing who is doing what.



**Question [Moderator to panellists]:** *What is the threshold for minimum requirements for insourcing your capabilities?*

**Mr Castellano** responded that there is a minimum mass of capacity that is first needed to understand what to contract, whom to contact, and what for. Therefore the need to enable technical people inside government is crucial.

**Ms Bueno** stated that a tool must be adopted to develop scenarios in-house, and for this academic capacity within the country is essential. Having a big team of modellers in the country makes everything much more comfortable. She added that in the Ministry, the team

had used models before, so they have the knowledge. She also added that it is key to construct a network, with stakeholders in the energy system, but also stakeholders in transport, industry and households.

**Mr Paunescu** answered that government always needs a minimum amount of in-house capability. In Canada, there is a strong push in the government to build academic and private capacity that will bring consistency and reality to modelling exercises. He mentioned that the government in Canada embraces diversity and looks to have a strong academic and private sector that uses many models and produces many scenarios.

**Ms Schenuit** argued that from the German perspective there is not a threshold - there is so much competent capacity to procure from that it makes no sense to insource capacity in the government. She advocates for private sector competition.

**Comments from the audience:**

**Comment: Dr Lehmann** argued that outsourcing in Germany works because there is already strong in-house capacity in the government.

**Comment [former GIZ]:** It is mentioned that there should be a distinction between government, agencies and institutes (e.g. ex-university).

**Comment: Dr O'Gallachoir** mentioned that there is a need to develop absorptive capacity - the capacity to take in information from scenarios and turn those insights into policy decisions.

## Session 6: Launch of the IRENA Energy Transition Scenarios Network

**Moderator: Prof. Brian O'Gallachoir (UCC and IEA TCP-ETSAP)** The moderator mentioned the objective of the session: to answer what are the gaps that existing partnerships are not addressing? What would make the Energy Transition Scenario Network (ETS-Net) a success?



### Technical presentation:

**Dr Asami Miketa (IRENA)** presented an overview of the CEM LTES campaign and launched the IRENA Energy Transition Scenario-Network (ETS-Net). She mentioned that the ETS-Net would have roughly the same objectives that the LTES campaign, but it would be open to a broader audience beyond the group of CEM countries.



**Dr Thibaud Voïta (NDC Partnership)** presented the NDC partnership, which is involved in NDC enhancement and makes sure that the implementing agencies get the information they need. He mentioned that the partnership has a tool called the Climate Finance Explorer, which offers peer-to-peer learning and works on how countries can learn from another.



**Question [Moderator]:** *How can LTES be improved to feed into the NDC process?*

**Dr Voïta** stated that it is essential to consider issues beyond the energy system.

**Caroline Uriarte (Low Emission Development Strategies Global Partnership)** presented the Low Emission Development Strategies Global Partnership (LEDS GP), which provides LTS-LEDS and NDC support according to regions. They would like to learn more about issues in LATAM and around bioelectricity. They have a supporting framework for long-term strategies (low emission) ) and focus on peer-to-peer learning and technical assistance through regional communities of practice on specific topics of interest.



**Question [Moderator]:** *How do the efforts of the LEDS GP overlap with those of the NDC partnership? What is the biggest mistake of LTES?*

**Ms Uriarte** mentioned that the LEDS GP and the NDC Partnership work closely together to deliver technical support to countries on NDC priorities coupled with peer-to-peer support on LTS-LEDS and NDCs. She suggested that LTES have to be tailor-made for each country depending on where the country is in their transition, and what the economy depends on. Furthermore, she mentioned is it important to consider modelling tools and capacity existent in the country as much as possible.



**Beni Suryadi** (ASEAN Centre for Energy) opened with some context remarks about the ASEAN region: a 600 million people region with ten countries. ACE, in the context of the ASEAN Economic Community, works in the energy arm of this community. He mentioned that ACE works in four pillars: energy security, affordability, accessibility and sustainability. ACE supports country policy implementation and assists in scenario development, but it does not carry out scenarios per se. He argued that policymakers are not looking at the national level; they are looking at what the developed countries in the region are doing to imitate.



**Dr Ryan Hogarth** (Roundtable on Strategic Energy Planning) started by stating that models do not make decisions and that models need to be worked into the decision-making process. However, he mentioned that this can become messy due to the number of vested interests. He mentioned five principles endorsed by members of the "Roundtable for strategic energy planning" but clarified that they will not police the implementation of these principles. They have developed some texts to include in modelling contracts, so the contractors comply with the five principles.



**Prof. Medardo Cadena** (Latin American Network) mentioned that the RedLAC (Latin American and Caribbean network) was created in the "Regional energy planners forum", a platform organised by UN ECLAC. They have done some studies that compare NDCs for countries in the region. They also provide capacity building in energy statistics and have a database of energy for all countries in the region.



#### Questions from the audience:

**Q [Moderator]:** *What can the new ETS-Net contribute to the LTES discussion? What are the gaps that the ETS-Net could fill? Also, what actions could this network provide?*

**Mr Suryadi** mentioned that they would like to learn from countries outside of the region that have the same level of development as those in the ASEAN region.

**Ms Uriarte** answered that it would be relevant to build on existing paths and experiences that are already in place. For example, looking beyond NDCs into disruptive technologies and avoid stranded assets.

**Dr Voïta** mentioned that it would be interesting to see how countries are developing NDCs and long-term energy plans.

**Dr Hogarth** presented some points from an African context, in the sense that the significant gaps of knowledge are on the demand side.

**Mr Cadena** suggested that there is a need to join the vision of academics developing the scenarios and the vision of the policymakers.

**Dr Trutnevyte** suggested that the subnational level (cities) also should be assessed.

**Comment: Dr O'Gallachoir** summarised some of the suggestions mentioned in the session: 1) listen to what the needs are; 2) build on existing networks; 3) focus on energy demand; 4) share case studies from other regions; 5) engagement between policymakers and the modellers; 6) the role of scenarios and where; it fits; and 7) knowledge around model use.

**Comment: Anna Riekkola (Luleå UT, Sweden)** mentioned that the ETS-Net could help generate trust around scenarios.

**Comment: Ms Uriarte** suggested that an approach could be to create a forum where programmes can share information, what has been learned, and what the demands are. In other words: "A Forum for programmes."

**Comment: Victoria Healey (NREL)** suggested working together with the network of CREES. There are eight in the world, which are in touch with countries and can shed light on what is needed.

## Forum Agenda

# 2019 International Forum on Long-term Energy Scenarios for the Clean Energy Transition

10-12 April 2019, Berlin, Germany

Wednesday, 10<sup>th</sup> April 2019

**Venue:** Willy-Brandt, Foreign Office of the Federal Republic of Germany. Werderscher Markt 1, Berlin

**Side event during the Berlin Energy Transition Dialogue:**

**EXPLORING THE BOUNDARIES OF RAPID CLEAN ENERGY TRANSITION – THE ROLE OF LONG-TERM ENERGY SCENARIOS**

**MC:** **Dr. Dolf Gielen**, Director, Innovation and Technology Centre at IRENA

**14:45 – 15:00** Opening remarks – **Francesco La Camera**, Director General, IRENA

Keynote address – **Kristoffer Bøttzauw**, Director General, Danish Energy Agency

**15:00 – 15:40** **Part 1 – Scenarios to better reflect rapid clean energy transition**

Moderator: **Prof. Brian O’Gallachoir**, Director, Centre for Marine and Renewable Energy Ireland, University College Cork (UCC); and Chair, Executive Committee of the International Energy Agency Technology Collaboration Programme (IEA TCP) – Energy Technology Systems Analysis Program (ETSAP)

**Comparing and using global energy scenarios** – **Dr. Angela Wilkinson**, Senior Director, Scenarios and Business Insights, World Energy Council

**High VRE and EV** – **Prof. Yongqiang Zhao**, Deputy Director, China National Renewable Energy Centre

**Achieving the Paris Climate Agreement Goals – Global and Regional 100% Renewable Energy Scenarios with Non-energy GHG Pathways for +1.5C and +2.0C** – **Dr. Sven Teske**, Research Director, Institute for Sustainable Futures, University of Technology, Sydney

**15:40 – 16:40** **Part 2 – Panel discussion with planners from the public sector**

Moderator: **Dr. Stathis Peteves**, Head of Unit of Energy, Transport and Climate Directorate, Joint Research Center, European Commission

**Fatima AlFoora AlShamsi**, Assistant Undersecretary for Electricity, Water and Future Energy Affairs, Ministry of Energy and Industry, United Arab Emirates

**Prof. Medardo Cadena**, Director of Integration, Latin American Energy Organisation

**Prof. Dr. Tomas Kåberger**, Member of the Swedish Climate Policy Council, Former Head of the Swedish Energy Agency

**Michael Paunescu**, Deputy Director Policy, Renewable and Electrical Energy Division, Natural Resources Canada

**Ellen von Zitzewitz**, Federal Ministry for Economic Affairs and Energy, Germany

**16:40 – 16:45** Conclusions – **Dr. Dolf Gielen**, Director, Innovation and Technology Centre, IRENA

### **LTES MEMBERS AND PARTNERS PRE-FORUM MEETING (CLOSED)**

**Venue:** Salon Heine, Hilton Berlin – Mohrenstraße 30, Berlin

**17:15 – 18:30** Discussion (a separate agenda is available for the LTES campaign members and partners)

### **FORUM RECEPTION**

**Venue:** Restaurant Coelln, The Westin Grand Berlin, first floor – Friedrichstraße 158/164, Berlin, Germany

**19:00 – 21:00** Open to all participants of the Forum and the BETD side event.

Thursday, 11<sup>th</sup> April 2019

**Venue:** Salon Unter den Linden, The Westin Grand Berlin – Friedrichstraße 158/164, Berlin  
**MC:** **Dr. Paul Durrant**, Strategy & Engagement Lead, Renewable Energy Innovation, IRENA

**8:00 REGISTRATION OPENS (IN FOYER)**

**8:30 – 9:00 COFFEE AND TEA**

## **SESSION 1: OPENING – LONG-TERM ENERGY SCENARIOS FOR THE CLEAN ENERGY TRANSITION**

**9:00 – 9:20** Welcome remarks – **Dr. Dolf Gielen**, Director, Innovation and Technology Centre, IRENA

Keynote address – **Dr. Christoph Reichle**, Deputy Director General Energy, Federal Ministry for Economic Affairs and Energy, Germany

## **SESSION 2: COMMUNICATION AROUND SCENARIOS – HOW CAN WE IMPROVE THE COMMUNICATION AROUND LONG-TERM ENERGY SCENARIOS TO MAKE THEM MORE RELEVANT TO POLICYMAKING UNDER TRANSITION?**

Moderator: **Dr. Tiina Koljonen**, Research Team Leader, Energy Systems and Climate research team VTT Technical Research Centre of Finland

**9:20 – 9:25** Introduction to the session by the moderator

**9:25 – 10:25 Better communication of scenarios – Dr. Elmar Kriegler**, Head of the Transformation Pathways department, Potsdam Institute for Climate Impact Research

**Using scenarios to expand our thinking about energy futures – Prof. Dr. Evelina Trutnevyte**, Head of Renewable Energy Systems group, University of Geneva

**Chinese experience on scenario results for policy making – Kaare Sandholt**, Chief Expert, China National Renewable Energy Centre

**Interaction with politicians through “model lab” exercise – Dr. Kenneth Karlsson**, Head of Energy Systems Analysis Group, Sustainability Division, Technical University of Denmark and Operating Agent, IEA TCP – ETSAP

**10:25 – 11:00 GROUP PHOTO AND COFFEE BREAK**

**11:00 – 12:15** Panel discussion and audience interventions

**Thiago Vasconcellos Barral Ferreira**, President, Energy Research Office, Brazil

**Reshma Francy**, Project Manager – Energy Strategies and Policies, Ministry of Energy, United Arab Emirates

**Dr. Paul Koutstaal**, Deputy head of the Climate, Air and Energy department, PBL Netherlands Environmental Assessment Agency, Netherlands

**Dr. Uwe Remme**, Lead, Energy-supply technology analysis, International Energy Agency

**12:15 – 13:15 LUNCH BREAK**



## **SESSION 3: GOING BEYOND ENERGY SYSTEMS ANALYSIS – HOW CAN LONG-TERM ENERGY SCENARIOS BE MORE RELEVANT TO CLIMATE POLICY MAKING?**

Moderator: **Dr. George Giannakidis**, Project Head, IEA TCP – ETSAP

**13:15 – 13:20** Introduction of the session by the moderator

**13:20 – 14:20** **How can long-term energy scenarios be more relevant to climate policy making? – Prof. Brian O’Gallachoir**, Director, Centre for Marine and Renewable Energy Ireland, UCC; and Chair, Executive Committee of the IEA TCP – ETSAP

**Resource efficient pathways towards a greenhouse gas neutral and more sustainable Germany – Dr. Harry Lehmann**, General Director, Federal Environmental Agency of Germany

**Article 4 of the Paris Agreement: Alignment of long-term climate objectives with national development planning processes – Dr. Bernd Hackmann**, Programme Officer, United Nations Framework Convention on Climate Change

**Socio-economic footprint of the energy transition – Dr. Xavier Garcia-Casals**, Senior Consultant, Policy Unit, Knowledge, Policy and Finance Centre, IRENA

**14:20 – 15:30** Panel discussion and audience interventions

**Nataliya Kushko**, Advisor, Ministry of Ecology and Natural Resources of Ukraine

**Dr. Harry Lehmann**, General Director, Federal Environmental Agency of Germany

**Elzo Molenberg**, Senior policy officer, bilateral, European Union and international energy relations, Ministry of Economic Affairs, Netherlands

India, speaker TBC

**15:30 – 16:00** **COFFEE BREAK**

## **SESSION 4: CORPORATE AND FINANCIAL SECTOR PERSPECTIVE ON LONG-TERM ENERGY SCENARIOS FOR CLEAN ENERGY TRANSITION**

Moderator: **Niels Bisgaard Pedersen**, Adviser, Danish Energy Agency, Denmark

**16:00 – 16:05** Introduction to the session by the moderator

**16:05 – 16:45** **Incorporating climate risks into corporate management and reporting – Dr. Lothar Rieth**, Group Expert Sustainability, EnBW Energie Baden-Württemberg AG, Germany

**Scenarios for assessing financial stability risks – Chris Faint**, Head of the Peer Supervision and Risks Division, International Banks Directorate, Bank of England

**16:45 – 18:10** Panel discussion and audience interventions

**Dr. Klaus Willnow**, Head of Innovation and Future Technologies, Siemens Gamesa Renewable Energy

**Karin Ohlenforst**, Director of Market Intelligence, Global Wind Energy Council

**Barbara Jinks**, Director of Government Relations, Gas Infrastructure Europe

**Martin Haigh**, Senior Energy Advisor, Shell

**18:10 – 18:15** **WRAP UP AND CLOSING OF DAY 1**

Friday, 12<sup>th</sup> April 2019

**Venue:** Salon Unter den Linden, The Westin Grand Berlin – Friedrichstraße 158/164, Berlin

**MC:** **Dr. Paul Durrant** – Strategy & Engagement Lead, Renewable Energy Innovation, IRENA

**8:00 REGISTRATION OPENS (IN FOYER)**

**9:00 – 9:30 COFFEE AND TEA**

## **SESSION 5: INSOURCING AND OUTSOURCING SCENARIO PLANNING CAPABILITY – HOW MUCH SCENARIO PLANNING CAPACITY NEEDS TO RESIDE WITHIN GOVERNMENTS?**

**Moderator:** **Prof. Riccardo Bracho**, Senior International Programs Manager – Integrated Applications Center, National Renewable Energy Laboratory

**09:30 – 9:35** Introduction to the session from the moderator

**09:35 – 10:50** **How Denmark built cooperation across government, academia and technical institutions – Dr. Giada Venturini**, Advisor, Danish Energy Agency, Denmark

**Perspective from the sub-national government, how Abu Dhabi has built scenario planning capacity – Carlos Gascó Travesedo**, Executive Director for Policy, Department of Energy, Abu Dhabi

**European perspective – Dr. Ekehard Rosenbaum**, Scientific / Technical Project Officer, European Commission Joint Research Centre, Directorate I – Competences, Unit I.2 – Foresight, Modelling, Behavioural Insights and Design for Policy

**Energy planning in Africa: Challenges and opportunities for insourcing capabilities – Philipp Trotter**, Research Associate in Renewable Energy, University of Oxford

**10:50 – 11:10 COFFEE BREAK**

**11:10 – 12:30** Panel discussion and audience interventions

**Michael Paunescu**, Deputy Director of Policy, Renewable and Electrical Energy Division, Natural Resources Canada

**Ubiratan Francisco Castellano**, Technical Consultant and Former Director at Ministry of Mines and Energy, Brasil.

**Carolyn Schenuit**, Team leader System and Market Integration Renewable Energies, German Energy Agency (DENA), Germany

**Dr. Miriam Bueno Lorenzo**, Technical advisor, Directorate of Renewable Energies and Studies, Ministry for the Ecological Transition, Spain

**Bansidhar Bandi**, Energy and Climate Change Specialist, The National Institution for Transforming India, Government of India

**12:30 – 13:30 LUNCH BREAK**

## SESSION 6: LAUNCH OF THE ENERGY TRANSITION SCENARIOS NETWORK

Moderator: **Prof. Brian O’Gallachoir**, Director, Centre for Marine and Renewable Energy Ireland, UCC; and Chair, Executive Committee of the IEA TCP – ETSAP

**13:30 – 13:35** Introduction to the session from the moderator

**13:35 – 13:45** **IRENA’s Energy Transition Scenarios Network – Dr. Asami Miketa**, Senior Programme Officer, Power Sector Investment Planning, IRENA

**13:45 – 14:45** Brief introduction to global networks to support long-term clean energy transition

**Overview of the NDC Partnership – Thibaud Voïta**, Head of Knowledge Products

**LEDs Global Partnership – Caroline Uriarte**, Leader of the Low Emission Development Strategies Global Partnership program, Deutsche Gesellschaft für Internationale Zusammenarbeit, GIZ

**Global Green Growth Institute – Dr. Dereje Senshaw**, Principal Energy Specialist, Global Green Growth Institute

**ASEAN Clean Energy Centre – Beni Suryadi**, Manager of Policy, Research and Analytics Programme, ASEAN Energy Centre

**Roundtable on Strategic Energy Planning – Dr. Ryan Hogarth**, Head of Research and Engagement, Energy and Economic Growth Programme, led by Oxford Policy Management and funded by the UK Department for International Development

**Latin American Network – Prof. Medardo Cadena**, Director of Integration, Latin American Energy Organisation

**14:45 – 16:00** Panel discussion and audience interventions

**Panellists:** Medardo Cadena, Ryan Hogarth, Dereje Senshaw, Beni Suryadi, Caroline Uriarte, Thibaud Voïta

**16:00 – 16:30** **CLOSING OF THE EVENT AND REFRESHMENTS**

## LTES MEMBERS AND PARTNERS POST-FORUM MEETING (CLOSED)

**Venue:** The Westin Grand Berlin – Friedrichstraße 158/164, 10117 Berlin, Germany

**16:30 – 18:00** Discussion (a separate agenda is available for the LTES campaign members and partners)

## Notes

For any questions or more information, please contact [LTES@irena.org](mailto:LTES@irena.org).

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