Session 5: Policy Relevance and Decision-making in Energy Modelling: balancing Short-term and Long-term Goals for Policymakers
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Moderator: Asami.Miketa, Head of Energy Planning and Power Sector Transformation Team, IRENA

Panelists:
- Paul.Deane, Senior Lecturer, Clean Energy Futures, University College Cork
  - Policy Relevance and Decision-making in Energy Modelling: balancing Short-term and Long-term Goals for Policymakers
- Ezzat.Jaroudi, Project Lead, Environment and Climate Division, City of Toronto
  - Local Emissions for Net Zero (LENZ) Modelling Suite: A Tool to Guide the City of Toronto's TransformTO Net Zero Strategy Implementation
- Peter.Johnston, Economic Advisor, Integrated Climate Lens Centre of Expertise, ECCC
  - Modelling for informed decision-making: The Integrated Climate Lens as bridge
- Jean_Denis.Charlebois, Chief Economist, Canada Energy Regulator
  - Energy Modelling at the CER – Policy Relevance & Decision-making

Session Objective: Energy models are key in guiding policy decisions, from renewable energy goals to carbon pricing and energy transition plans. This session focused on making these models more relevant to policymakers by providing practical, evidence-based advice. Participants and panelists discussed the integration of policy limitations and the typically ignored political and institutional factors. The discussion also covered aligning short-term actions with long-term strategies and effectively communicating model outcomes, considering provincial or regional specifics and national coordination.

Key Takeaways:
- Alignment between different levels of government, national and sub-national, and across different government departments is vital during the scenario development process. Proper engagment during the modelling process is vital in ensuring alignment and in ensuring the generation of correct modelling results which will enrich the policy making process.
- To ensure effective engagement, modellers should share their provisional results with selected stakeholders to gain insights and feedback. Modellers should take into account the relevant feedback and communicate the reasoning behind the final model results and scenarios when communicating with stakeholders and policy makers.
- It is vital that modelers communicate clearly and concisely with policy makers and are transparent with all stakeholders. They should give details on the modelling approaches and clarify the different assumptions and limitations of models as this builds credibility.

Session Summary

Paul Dean (University College Cork, Ireland) noted that UCC provides direct technical assistance to the government of Ireland through MaREI Research Centre for Energy, Climate and Marine Research. He shared key insights on effective engagement with policy makers. First, given the time constraints faced by policy makers it is vital to communicate model results through concise policy briefs. In these briefs one should highlight the uniqueness of the research for instance when communicating the importance of reducing emissions communication should include potential solutions. Further, it is important to communicate the strengths and weaknesses of the modelling- this builds trust and ensures that the policy maker understands the constraints of the models and results. To build credibility in modelling one must distinguish between optimisation models which assume that it easy to achieve changes and simulation models which present a more realistic picture.

Secondly, he noted that modellers should ensure that they get the correct results as these impact policy decisions. To ensure that correct results are generated he encouraged modellers to create multiple hypothesis and use the models to experiment and test whether the hypothesis are true or not. Additionally, it is important to as the question "what.would.change.our.results.the.most?". For instance, when modelling the uptake and role of electric vehicles in decarbonising the transport sector modellers should consider issues such as the uncertainty around finance, availability of charging points amongst other factors that could change the modelling results.

Third when communicating modelling results, one should clarify whether the results are driven by the architecture of the model or by the data sets. For instance, in Europe modellers use synthetic data which may have a soothing effect in the results and thereby overvalue the role of storage and technology innovation in the energy transition, whereas this may not be the case when modelling for other regions. Fourth, it is important to reflect and understand the usefulness of added complexity in a model and only use complex models when necessary. He noted that reduced-form models can be more useful when planning for 20-30 years ahead whereas a more complex model may be useful for the short term.

Finally, to ensure that realistic scenarios are presented modellers should evaluate whether there is commonality in multiple models that reflect different future pathways and communicate these to policy makers. Additionally, given that modelling is complex it is important to take breaks and have multiple people review the results. Getting different perspectives ensures that models are realistic and robust and makes it easy to detect any errors.

Ezzat Jaroudi (City of Toronto) presented on the LENZ modelling suit used by the City of Toronto and insights on the LENZ model as a tool to guide policy making. He presented the history of the TransformTO Net Zero Strategy that was first launched in 2015 and aims to achieve net zero by 2040 and an intermediate reduction of emissions by 65% by 2030 in relation to 1990 levels. The technical analysis for TransfomTO presents 4 pathways, Business as Usual (BAU), Business as Planned, Net Zero by 2050 and Net zero by 2030. He noted that most of the emission reduction is expected between 2025 and 2030 and to reach net zero it is necessary to have a zero-carbon grid.

It was noted that to achieve the Net Zero targets there are 5 critical steps to follow which include carbon accountability through carbon budgets; accelerate significant reduction of natural gas; establish building performance targets; increase low carbon transportation options and increase local renewable energy generation and storage capacity. To ensure success the importance of focusing on equity; alignment at all levels of government and scaling up innovative technologies was highlighted. Additionally, there ought to be a focus on the socio-economic factors that the transition will impact including labour markets and land use changes.

To achieve the City's Net Zero targets the LENZ tool was developed. The tool's main requirements were that it must be open source using python to ensure transparency; it should include an optimisation model with an objective function to reduce cost. Further, the tool had to include a detailed spatial and temporal model- which includes capacity expansion and production models; as the LENZ tool must include a linking tool and be user friendly using excel and have technical and non-technical supporting material functions.

The LENZ tool was developed by ESMER and a technical advisory group who delivered a set of models, the documentation and a case study to show the capabilities of the model. The LENZ tool is made up of three components:

i. a capacity expansion model that looks at how the energy and waste systems will evolve in the years to come (TEMOA-TO). The models developed can be used in policy-based model to test the impact of policies. A target based model is developed where GHG emissions targets are set as constraints, and the model provides versions of energy system that will meet targets. Additionally, there is a hybrid model that uses policy and GHG emission targets to develop scenarios.;

ii. a production cost model that looks at capturing the operational aspect of an energy system at an hourly level (SILVER-TO). The model uses output from the Linking Tool and determines electric loads that will be transmitted through the grid at an hourly resolution.; and

iii. a program (Linking Tool) to bridge the first two models by aligning the output data from TEMOA-TO with the input of SILVER-TO. The tool takes output from TEMOA-TEO and disaggregates spatially and temporal to determine demand of electricity and this is used as input for the Silver-TO Model.

The output from LENZ is be used by policy makers to examine energy affordability, analyse subsidies necessary for the transition and used for labour market projections. Further the output can be used to run sensitivity analysis to analyse how external factors can affect the City of Toronto's net zero plans.
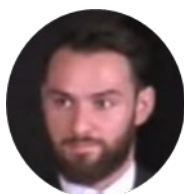
Peter Johnston (ECCC)- noted that Canada has a complex policy landscape and there is need for collaboration amongst territorial governments the federal government and international actors. The main climate policy and plans that Canada has in the sector include the 2030 Emissions Reduction Plan: Clean Air, Strong Economy; National Adaptation Strategy for Canada (2022) and Global Biodiversity Framework signed in 2022. He noted that when implementing policies the government works to address multiple concerns by various stakeholders including indigenous groups while implementing adaptation, resilience and mitigation initiatives.

The Integrated Climate Lens (ICL) is an assessment framework that aims to ensure that aspects of economy, environment and climate change are considered throughout the policy design process and are reflected in major Cabinet decisions. The ICL was launched in 2021 and in 2023 was in the second year of its pilot phase, with participation from 7 departments. The ICL is used to bridge the gap by building capacity for GHG estimation outside ECCC while understanding the connection between individual proposal estimation and economy-wide modelling. ICL bridges the gap between modellers and policy makers by supporting organizational capacity building, enabling departments to conduct robust and reliable analysis.

When estimating GHG emissions in the short term the ICL offers guidance & socialize principles for proposal GHG estimation. Further the ECCC uses the ICL to build community amongst environment and economy estimators to support continued analysis; a good example of community building is the Energy Modelling Hub. Finally, the ECCC improves awareness and transparency of GHG estimation efforts with policymakers. The ECCC works with academics to develop climate literacy modules to build the capacity of executives, policy makers and other government officials.

Jean-Denis Charlebois (Canada Energy Regulator)- noted that it is important for policy makers to consider the collective body of modelling work- understand the purpose of each tool and limitations to contextualise the results presented. He noted that the CER regulates infrastructure to ensure safe and efficient delivery of energy in Canada while protecting the environment, recognizing and respecting the rights of the Indigenous peoples, and providing timely and relevant energy information and analysis. The Minister of Energy & Natural Resources provides guidance to CER on the federal government's priorities; and the Canadian Energy Regulator Act guides the operation of the CER.

Through their work the CER appreciates the importance of meaningful engagement and expert input in the development of Canada's Energy Future (CEF) 2023. When developing the CEFs CER shares information with stakeholders to ensure that effective engagement. It was noted that CER has a mandate to publish timely and relevant information and relies on the expertise of energy modellers and feedback from external stakeholders. Additionally, CER has developed curricular for teachers and academics to ensure greater engagement. He noted that CEF scenarios are presented to Parliament and are influence policy making.

Plenary Discussion

Asami Miketa (IRENA) -thanked the presenters and noted that alignment within government departments is necessary to ensure successful implementation of energy and climate plans. She requested the panellists to share insights on the key mechanism used to ensure alignment in Government and what challenges had been encountered.

Alignment.in.Governments
Ezzat Jaroudi (City of Toronto)- noted the importance of clear communication and noted that models are useful for informed decision making. Additionally, he noted the importance of different

government institutions to share information on their work and approaches to energy and climate modelling and work.

Peter Johnston (ECCC)- responded that it is important to communicate form the beginning as decisions are made. Open communication is vital to ensure that assumptions are understood and a collaborative approach to analysis is adopted.

Jean-Denis Charlebois (Canada Energy Regulator)- noted that it is important to have meaningful and differentiated engagement in a manner that fulfils the needs of audience. Additionally, it is important to use different engagement methods when seeking feedback on modelling for the short term compared to feedback for modelling for the long term.

Paul Dean (University College Cork, Ireland) – noted that engagement is important as energy is about people and not the technical aspects only. Further, he noted that governments need to ensure there is better collaboration within different agencies

Audience.Question¿How.will.Toronto.work.towards.a.net.zero.grid.given.the.increase.in.usage.of. natural.gas.for.electricity.generation.in.Canada?.Further?who.delivers.the.climate.and.electricity. course.on.behalf.of.ECCC?

Ezzat Jaroudi (City of Toronto)- noted that currently Canada will need to contribute to carbon offset projects as the current renewable energy capacity is not sufficient to meet electricity demand.

Peter Johnston (ECCC) - noted that the climate literacy courses were delivered by colleagues from universities across Canada.

Level.of.Citizen.Engagement

Jean-Denis Charlebois (Canada Energy Regulator)- highlighted the importance of engagement and noted that the CER usually releases discussion papers ahead of workshops, this ensures that citizens understand the assumptions and premises of models. In one such consultation the CER received 60 responses which is a good signal that the public is interested. Currently, the CER is considering implementing methods that ensure that consultations are done in an informative and efficient manner.

Peter Johnston (ECCC)-noted that when the ECCC develops policies and strategies they request for feedback and are transparent. Responses received are usually aggregated and used in the policy development process.

Ezzat Jaroudi (City of Toronto)- to ensure 2 way communication the City of Toronto has established a climate advisory group which includes different experts, and they meet with the City who present their ongoing work and the advisory group provides feedback on the presentation and additional insights from their external work and the industry.

Paul Dean (University College Cork, Ireland) – noted that proper communication also includes modellers listening to feedback and using these in their work to ensure the generation of realistic results and pathways for the transition.

Panellists.were.asked.to.share.what.they.need.from.the.scientific.community.and.in.turn.the. scientific.community.was.asked.to.share.insights.on.what.they.need.from.government.planners¡.

Jean-Denis Charlebois (Canada Energy Regulator)- noted that CER need sustainable funding from the government. Additionally, it is vital that the government preserves and respects the governance system to ensure certainty. The CER would benefit from the scientific community, including modellers, through continuous engagement that allows for cross pollination and sharing of ideas.

Peter Johnston (ECCC) - from the scientific community the ECCC requests continuous engagement and collaboration with the government on ongoing research. He reiterated that both governments and the scientific community should strive to communicate research in a clear manner that allows for engagement.

Ezzat Jaroudi (City of Toronto)- responded that scientists should continue working towards addressing the limitations of current models to ensure that results can be used for more robust policy making that will enable an efficient energy transition.

Paul Dean (University College Cork, Ireland) – from an academic standpoint he noted that governments need to conduct capacity building for countries to build institutional energy and climate planning memory. He noted that without inhouse modelling and planning capacity countries become reliant on large consultancies which is unstainable in the long run.