

Day 1 | 5th October | Energy Security and Geopolitics for Fossil and Low-carbon Fuels

10:30-11:00	ECEMP Welcome	<ul style="list-style-type: none">· Vicky Pollard (DG CLIMA)· Johannes Emmerling (European Institute on Economics and the Environment)· William Usher (KTH Royal Institute of Technology)· Stephanie Bouckaert (International Energy Agency)
11:00-13:00	Plenary Panel I: Energy Security and Geopolitics for Fossil and Low-carbon Fuels	<p><i>This plenary session covers recent developments in the field of energy and climate policies in the EU, with a focus on the implications of geopolitical events and energy security, the RePowerEU plan, and relatedly the current challenges and opportunities of the transition to a low-carbon economy.</i></p> <p>Panel Chair: Will Usher (KTH Royal Institute of Technology)</p> <p>Presentations:</p> <ul style="list-style-type: none">· Europe and the energy crisis – where do we stand and key challenges ahead (Georg Zachmann, Bruegel)· Analysing the Energy System Impacts of the REPowerEU Communication (Alessia De Vita, E3 Modelling)· (Andreas Zucker, European Commission DG ENER)· Focus on the Energy Transition – insights from the World Energy Transitions Outlook (Ricardo Gorini, International Renewable Energy Agency)
13:00-14:00	<i>Lunch Break</i>	
14:00-16:00	Parallel Session 1: The Road to Net-Zero across Models and Diagnostic Exercises	<p><i>With the Climate Neutrality ambition of the EU, several global, EU, and national models have implemented the ambitious targets in order to provide quantified pathways and related cost estimates and energy system transformation pathways, and to identify bottlenecks and other aspects of this target. Notably, several model diagnostics and comparison exercises have been already launched aiming to provide robust and transparent insights from several modelling teams.</i></p> <p>ECEMP Session Chair: Johannes Emmerling (European Institute on Economics and the Environment)</p> <p>Presentations:</p> <ul style="list-style-type: none">· Diagnostic multi-model intercomparison exercise to inform EU climate neutrality pathways (Robert Pietzcker, Potsdam Institute for Climate Impact Research)· How to apply diagnostic indicators to models with focused sectoral coverage – A case study on the power sector model OSeMBE (Hauke Henke, KTH Royal Institute of Technology)· Characterization of energy models by means of diagnostic indicators (Mark Dekker, Netherlands Environmental Assessment Agency (PBL))· Model intercomparison analysis. Comparison between IAMC and energy models (Stratos Mikropoulos, Utrecht University)· A model comparison study on Germany's pathway to climate neutrality in 2045 (Gunnar Luderer, Potsdam Institute for Climate Impact Research (PIK))
	Parallel Session 2: How Energy Transition Models Can Support REPowerEU	<p><i>The RePowerEU plan with its aim to rapidly reduce dependence on Russian fossil fuels and fast forward the green transition presented in 2022 has already led to some effort to generate scientific evidence on its goals. Part of it is presented in this session.</i></p> <p>OPENENTRANCE Session Chair: Ingeborg Graabak (SINTEF Energy Research)</p> <p>Presentations:</p> <ul style="list-style-type: none">· Developing low carbon scenarios for the European energy system: the roles of electricity and hydrogen in the openENTRANCE storylines (Konstantin Löffler, TU Berlin)· An integrated methodology for power generation planning decision support: the case of Greece's green hydrogen economy (Diamantis Koutsandreas, DSSLab, National Technical University of Athens)· Linking energy power system models to analyse design options for climate-neutral Europe at the pan-European and regional level (Philipp Härtel, Fraunhofer Institute for Energy Economics and Energy System Technology (IEE))· Energy Imports and Infrastructure in a Climate-Neutral European Energy System (Fabian Neumann, TU Berlin)· 24/7 A new paradigm for power procurement? (Igor Riepin, TU Berlin)

Parallel Session 3:

Fossil Fuel Sanctions and Energy Security

The rise in energy price since last year and implications of the crisis in Ukraine including potential sanctions on fossil fuel exports on Russia have led to a turmoil in energy markets across Europe. Thus, understanding and estimating the costs of reducing or banning fossil fuel imports from Russia is of high priority. Preliminary findings from studies around this are presented in this session.

Session Chair: Francesco Ferioli (European Commission, DG ENER)

Presentations:

- Can the EU replace Russian gas? (Chuanlong Zhou, Le Laboratoire des Sciences du Climat et de l'Environnement)
- The Impact of a Sustained EU Energy Crisis on German Mitigation Pathways towards Climate Neutrality in 2045 (Felix Schreyer, PIK)
- Doing without Russian energy imports and still adhering to climate targets? The future German and European power mix (Christian Hauenstein, Europa Universität Flensburg)
- Indicative pathways to reduce dependency on the Russian natural gas (Alexandre Oudalov, Hitachi Energy & Andrzej Ceglaz, Renewables Grid Initiative)
- The impact of the Russian gas and oil bans on the global energy system (Lara Aleluia Reis, European Institute on Economics and the Environment)

Parallel Session 4:

Macro-economic Impacts of the Transition

The green transition will affect sectors and households in several ways and with a large degree of heterogeneity. In this session, we discuss the implications of policy measures on firms, notably carbon intensive sectors, households, and in particular affected workers and communities.

NAVIGATE Session Chair: Nico Bauer (Potsdam Institute for Climate Impact Research)

Presentations:

- Prices and standards for vertical and horizontal equity in climate policy (Toon Vandyck, European Commission Joint Research Centre (JRC))
- Mapping regional employment vulnerability to European low-carbon transition for four carbon-intensive industries (Will McDowall, UCL Institute for Sustainable Resources)
- The macroeconomic impact of policy measures, technological progress and societal attitude in energy transition scenarios (Hettie Boonman, TNO)
- Assessing and mitigating structural economic change in a sustainability transition (Cormac Lynch, University of Exeter)
- Economic implications of phasing out coal: Compensation levels of coal phase-outs within and beyond the EU (Lola Nacke, Chalmers University of Technology)

16:00-16:30 Coffee Break

16:30-18:00 Parallel Skills Workshops:

Skills Workshop 1:

How sustainable are your energy transition pathways? Assessing energy system optimization results with ENBIOS

In this skill workshop we will showcase ENBIOS and its linkages with other models. We will go through the technical aspects of its methodological design, explain some results and offer attendees the possibility of installing it and running a dummy in a Jupyter Notebook.

Organized by Cristina Madrid López, Miquel Sierra, Alexander de Tomás (ICTA-UAB)

Skills Workshop 2:

High Resolution time series processing

This session is designed for data scientists in the energy field. The objective is to present a methodology to assess high-resolution time series from smart meters. Participants will gain a general understanding of the basic steps to process big datasets and signify different behaviours of household electricity consumption.

Organized by Carlos Quesada Granja (University of Deusto)

Skills Workshop 3:
FAIR Data Management for
Energy Systems Modelling

This session is accessible to anyone interested in the data sharing aspects of open science. The FAIR principles support data discovery and data sharing with the community. In this workshop we show how data can be annotated with rich metadata supported by the Open Energy Ontology to make data more interoperable. We show a solution we developed with the Open Energy Platform and the Databus and provide some hand-on experience in annotating data and registering the data sets to the Databus.

Organized by Carsten Hoyen-Klick (Deutsches Zentrum für Luft- und Raumfahrt)

Day 2 | 6th October | Innovation, Societal and Technical Changes for Net-Zero

09:00-10:30 *Parallel Skills Workshops:*

Skills Workshop 4:
How to conduct a global sensitivity analysis of an energy system model

This session is designed for data scientists in the energy field. Global sensitivity analysis (GSA) provided a quantitative measure of the importance of model inputs on the model results. Despite the availability of software to conduct GSA, the energy system modelling community has been slow in incorporating these techniques. GSA provides very useful insights for modellers when using or developing new models and supports efforts towards transparency and openness when communicating results.

Organized by Will Usher (KTH Royal Institute of Technology)

Skills Workshop 5:
General Version Management & Collaborative Software Development (using GitHub)

In this Skills Workshop, methods for efficient model/software development will be discussed and shown. The first part will touch on methods for keeping track of model/software versions, and the second part will focus on how to use GitHub for collaborative model/software development with your team. Below, the two parts are briefly described.

Organized by Anastasis Giannousakis (Potsdam Institute for Climate Impact Research)

Skills Workshop 6:
The Python package pyam for scenario analysis and data visualization

In this session users will learn how to use the pyam package for simple scenario analysis, data visualization and computation of derived indicators. They will also learn how to retrieve scenario data from an IIASA Scenario Explorer instance (e.g., the scenario ensemble supporting the IPCC AR6 WG3 report) into their Python computing environment for processing and analysis.

Organized by Philip Hackstock (IIASA)

10:30-13:00 **Plenary Panel II:**
Innovation, Societal and Technical Changes for Net-Zero

Modelling the energy transition requires many assumptions regarding the dynamics of innovation, and how technological and societal change can affect energy demand and supply, and technology options chosen, among others. This session will shed some light on the importance for energy and climate modelling in the European and global context.

Panel Chair: Panagiotis Fragkos (E3 Modelling)

Presentations:

- (Alban Kitous, European Commission DG CLIMA)
- Diversity of options to eliminate fossil fuels and reach carbon neutrality across the entire European energy system (Stefan Pfenninger, TU Delft)
- (Christian von Hirschhausen, TU Berlin & Pao Yu Oei, Europa Universität Flensburg)
- Modeling Climate Policy for Developing Countries (Francis Dennig, World Bank)
- Delivering a Net Zero Energy System (Paul Deane, University College Cork)

13:00-14:00 *Lunch Break*

14:00-15:30

**Parallel Session 5:
Consumer Behavior and
Interventions**

The role of individual behavior has been increasingly studied in order to understand better households' decisions on investments such as EDV adoption or energy efficiency improvements, energy consumption, and reaction to policies and policy tools. This session looks at potential low energy demand pathways and how they can be rationalised from an individual basis, and potential societal tipping points affecting demand patterns and policy perception.

WHY Session Chair: Carlos Quesada Granja (University of Deusto)

Presentations:

- Nudge-based interventions to promote energy conservation and demand response among customers of an electricity retailer following the change of the electricity tariff in Spain (Cruz Enrique Borges Hernandez, University of Deusto)
- What are the most relevant factors that affect households' investment decisions on the energy transition? (Diego Casado Mansilla, University of Deusto)
- Social and Technological Innovation Pathways for Low Energy Demand (Leila Niamir, International Institute for Applied System Analysis)
- Understanding tipping points and feedback loops in energy transition pathways (Naud Loomans, TU Eindhoven)

**Parallel Session 6:
Embarking on a Just
Transition**

Promoting social fairness in the energy transition is an important global and local policy objective. To ensure no one is left behind requires understanding the sources and hot spots of job losses etc. and evaluating policy proposals to address them.

CINTRAN Session Chair: Jessica Jewell (Chalmers University of Technology)

Presentations:

- Towards a Just Transition: Identifying Regions at Risk (Zoi Vrontisi, E3 Modelling)
- Energy Jobs in Europe in a Net Zero World (Laurent Drouet, European Institute on Economics and the Environment)
- Distributional economic impacts of feasible European net-zero energy systems driven by socio-political storylines (Jakob Mayer, Wegener Center for Climate and Global Change, University of Graz)
- Workers loss due to low-carbon transition. The theory and application in CGE model (Jan Witajewski-Baltvilks, The National Centre for Emissions Management (KOBIZE))

**Parallel Session 7:
The Role of
Hydrogen**

The role of hydrogen has been widely discussed as a technology option across sectors, while several questions to its large-scale deployment remain, and are discussed in this session.

PLANET Session Chair: Gabriele Fambri (Politecnico di Torino)

Presentations:

- Endogenous learning for green hydrogen in a sector-coupled energy model for Europe (Elisabeth Zeyen, TU Berlin)
- Probabilistic feasibility space of scaling up green hydrogen supply (Adrian Odenweller, Potsdam Institute for Climate Impact Research (PIK))
- Large-Scale Green Hydrogen deployment in Europe: Environmental and Climate Impacts (Pedro Crespo del Granado, Norwegian University of Science and Technology)
- On the cost competitiveness of blue and green hydrogen (Falko Ueckerdt, Potsdam Institute for Climate Impact Research (PIK))

**Parallel Session 8:
 Innovation, Technology and
 Competitiveness**

The role of innovation and technical change is pivotal for large-scale decarbonisation. This session contributes to better understanding the role of expert knowledge, the key role of game-changing innovations and technologies, spill-overs in knowledge creation and the role of digitalisation / societal change.

PARIS REINFORCE Session Chair: George Xexakis (HOLISTIC S.A.)

Presentations:

- What do experts perceive as critical game-changing innovations to consider in modelling and policy? (Sigit Perdana, EPFL)
- International and intertemporal knowledge spillovers in carbon-free and carbon-efficient technologies (Yeong Jae Kim, European Institute on Economics and the Environment)
- System Price Dynamics for Battery Storage (Magnus Schauf, TU Munich)
- A socio-economic energy model to include societal changes influenced by digitalization in Swiss net-zero energy scenarios (Lidia Stermieri, Paul Scherrer Institute)

15:30-16:00 Coffee Break

**16:00-17:30 Poster Session and
 Virtual Drinks Reception**

The poster session will be held on the interactive platform SpatialChat where attendees can visit virtual rooms where the posters will be presented by their respective authors.

Session Chair: Johannes Emmerling (European Institute on Economics and the Environment)

Presentations:

- The many faces of district heating transitions. Deeper understandings of future systems in Sweden and beyond (Nick Martin, Institute of Environmental Science and Technology - Autonomous University of Barcelona (ICTA-UAB))
- The Effects of Global Electricity Generation Infrastructure on Climate Crisis (Tayfun Büke, Muğla Sıtkı Koçman University)
- Social impact of the energy transition on young people (Carlos Quesada Granja, University of Deusto)
- A State Contingent Production Function Approach to Modeling Power System Disruptions from Variable Renewable Resources (Amanda Harker Steele, National Energy Technology Laboratory)
- Assessing the impacts of the energy transition on the Greek electricity market in 2030 (Nikolaos Kleanthis, TEESlab UPRC)
- Assessing Lifestyle Transformations in Energy-System and Integrated Assessment Models: A Review (Andreas Andreou, E3 Modelling)
- Energy-consuming mobility practices and the company car regime in Belgium (Line Vanparys, UCLouvain)
- Substituting clinker in cement with naturally occurring radioactive by-products: Non-technical challenges (Nazanin Love, Hasselt University)
- Understanding Regressivity: Challenges and Opportunities of European Carbon Pricing (Simon Feindt, MCC Berlin)
- Joint EERA – Open Entrance initiative: European Centre of Excellence on Energy Transition Models (Pieter Vingerhoets, EnergyVille - VITO)
- How much solar electric energy can potentially be supplied by rooftop PVs over European buildings? (Gergely Molnar Central European University)
- Stakeholder-informed modelling to decarbonise the Greek power sector in the light of today's energy crisis (Konstantinos Koasidis, National Technical University of Athens)
- Energy trade in a decarbonised world (Rafael Garaffa, European Commission, Joint Research Centre (JRC))
- European Forum for Energy and Climate Transition (Raquel Santos Jorge & Pedro Crespo del Granado, NTNU)
- Market integration analysis of heat recovery under the EMB3Rs platform: An industrial park case in Greece (António Sérgio Faria, INESC TEC)
- Climbing the causality ladder to understand the energy demand on the residential sector (Aritz Bilbao Jayo, University of Deusto)
- MAESHA project: Developing energy system models to assess decarbonisation of EU islands (Anna Flessa, E3 Modelling)
- NDC ASPECTS project: Tracing the transformation through a decade of mitigation scenarios (Dirk Jan van de Ven, BC3)
- NDC ASPECTS project: Is green recovery enough? Analysing the impacts of post-COVID-19 economic packages (Panagiotis Fragkos, E3 Modelling)
- EU Project Mopo: Comprehensive, fast, user-friendly and thoroughly validated energy system planning framework (Juha Kiviluoma, VTT Technical Research Centre of Finland)
- Coal Phase-out in the Turkish Power Sector towards net-zero emission targets: An Integrated Assessment of Energy-Economy-Environment Modeling (Ebru Voyvoda, Middle East Technical University)

Day 3 | 7th October | The Latest IPCC Findings and Implications for National and Short Term Policies

09:00-10:30 *Parallel Skills Workshops:*

**Skills Workshop 7:
The 5 “Ws” to Engaging
Stakeholders to your ESM**

This session is open to researchers, experts and students who have an interest in stakeholder engagement. Involving external stakeholders in the scenario-building and modelling processes is essential to increasing the impact of the modelling work, guarantee transparency and legitimacy, collect differentiated perspectives and confirm the data.

Organized by Andrzej Ceglaz and Amanda Schibline (Renewables Grid Initiative)

**Skills Workshop 8:
Using the EMB₃RS Heat
and Cold Matching
Platform**

This session is geared toward researchers, experts and students with a technical background who are interested in how business models can be linked to technical simulation and optimisation models to gain a comprehensive picture of the mechanics of energy transitions. Participants will familiarise and have hands-on experience with a platform created in the EU EMB₃RS project to assess least-cost and technically feasible options for matching heat demands with industrial excess heat sources through district heating networks and devise business models for them.

Organized by Jagruti Thakur, Francesco Gardumi & Shравan Kumar Pinayur Kannan (KTH Royal Institute of Technology)

**Skills Workshop 9:
Accounting for Climate Change
impacts on renewable resources**

In this session we will discuss how to gain awareness on the relevance of adapting a renewable energy asset to climate change.

Organized by Joan Saladich (Geoskop)

10:30-13:00 **Plenary Panel III:
The latest IPCC findings
and implications for
national and short term
policies**

Energy intensive manufacturing is often considered a sector facing high challenges towards decarbonisation. In recent years several promising mitigation options and technologies have been developed, but so far they are not commercially available. The session explores how the industrial sector can be decarbonised by mid-century, which options and technologies are required, with a focus on heavy industry and district heating networks.

Panel Chair: Johannes Emmerling (European Institute on Economics and the Environment)

Presentations:

- Bridging Climate and Energy Modelling (Philippe Tulkens, European Commission DG RTD.B3)
- Mitigation of climate change: insights from WGIII AR6 Report (Elena Verdolini, European Institute on Economics and the Environment)
- (Laura Diaz Anadon, University of Cambridge)
- (Detlef van Vuuren, Netherlands Environmental Assessment Agency (PBL))
- Regional cooperation on water and energy to accelerate climate action (Iva Brkic, UNECE)

13:00-14:00 *Lunch Break*

14:00-15:30 **Parallel Session 9:
Decarbonization of Industry**

Energy intensive manufacturing is often considered a sector facing high challenges towards decarbonisation. In recent years several promising mitigation options and technologies have been developed, but so far they are not commercially available. The session explores how the industrial sector can be decarbonised by mid-century, which options and technologies are required, with a focus on heavy industry and district heating networks.

EMB₃RS Session Chair: José Maria Cunha (Institute of Science and Innovation in Mechanical and Industrial Engineering (INEGI))

Presentations:

- Next-generation modeling approach for decarbonisation in heavy industry (Marius Neuwirth, Fraunhofer Institute for Systems- and Innovation Research (ISI))
- Techno-economic and spatial analysis of integrating excess heat in Swedish District Heating System (Shравan Kumar Kannan, KTH Royal Institute of Technology)
- Residential district heating network with peer-to-peer market structure: The case of Nordhavn district (António Sérgio Faria, INESC TEC)



Parallel Session 10:
**Policy Making - Modelling
Interactions at the National
Level**

The session develops an enhanced understanding of national and sub-national transformation pathways, focusing on European countries, and how these can pave the way towards meeting the EU net zero goals by mid-century.

SENTINEL Session Chair: Alexandros Flamos & Vassilis Stavrakas (TEESlab University of Piraeus)

Presentations:

- Switzerland's national mitigation pathways: towards net-zero CO₂ emissions in 2050 (Evangelos Panos, Paul Scherrer Institute)
- A Methodology to Improve the Predictability of Electricity Load in the Presence of Distributed Renewable Energy: The Case of Ireland (Kevin Forbes, Energy and Environmental Data Science)
- A methodology for the impact assessment of local energy communities on the expansion of centralized storage and the grid, as well as the operation of the system in Norway and Spain (Erik Francisco Alvarez, Comillas Pontifical University)
- Energy transition in the residential sector in Greece: Is the current planning for natural gas working, or should we invest in electrification? (Dimitris Papantonis, TEESlab UPRC)
- Downscaling IAMs results to the country level – a new algorithm (Fabio Sferra, IIASA - International Institute for Applied System Analysis)

Parallel Session 11:
**Mitigation, Impacts and
Adaptation**

As climate change is already present in our societies, there is an increasing need to better understand the complex interlinkages between climate impacts, adaptation and mitigation strategies. This session aims to provide improved evidence on these linkages, focusing on how climate change influences the energy transition and on the synergies and trade-offs between mitigation and adaptation strategies.

Session Chair: Stefano Nicola Granata (European Commission DG CLIMA)

Presentations:

- Hydropower and Climate Change, insights from the Integrated Water-Energy modelling of the Drin Basin (Youssef Almulla, KTH Royal Institute of Technology)
- Air-conditioning adoption and electricity demand: implications of climate change adoption on power systems resilience (Francesco Colelli, Ca' Foscari University)
- Climate Change impacts on wind energy: evaluating the climate modeling chain (Jan Wohland, Climate Service Center Germany (GERICS))
- Aligning long-term climate goals with short-term policies: How robust is the EU ETS against decision-makers' myopia? (Joanna Sitarz, Potsdam Institute for Climate Impact Research (PIK))

Parallel Session 12:
**Net-Zero and Behavioural Trends
in the Building Transition**

There are several options to decarbonise the buildings sector in Europe and beyond, but most of them face high implementation challenges, related to large financial requirements, limited social acceptance, lack of appropriate policy incentives, limited behavioural changes, investors' short-sightedness etc. This session analyses the key options to decarbonise the EU buildings sector by 2050, including heat pumps, net zero buildings, energy efficiency and hydrogen.

NEWTRENDS Session Chairs: Songmin Yu & Heike Brugger (Fraunhofer Institute for Systems and Innovation Research ISI)

Presentations:

- Net-zero building sector- A European dream or reality? (Souran Chatterjee, Central European University)
- Impact of variable electricity price on heat pump operated buildings (Philipp Mascherbauer, TU-Wien EEG)
- The European residential sector towards net-zero under different sustainable development pathways (Alessio Mastrucci, IIASA)
- System-level Effects of Increased Energy Efficiency in Global Low-carbon Scenarios (Panagiotis Fragkos, E3 Modelling)

15:30-15:45 *Coffee Break*

15:45-17:00

**Official conference closing
session and selection of key
themes for 2022**

Jasna Resic (European Commission CINEA)

Johannes Emmerling (European Institute on Economics and the Environment), Francesco Gardumi (KTH Royal Institute of Technology) & Panagiotis Fragkos (E3 Modelling)

17:00

End of the Conference

