1st IAEE Online Student Conference - Online 09:00 CET Time
04/20/2026
Europe - Online 09:00 CET Time
Cross-Continental Perspectives on Energy Development in an Era of Uncertainty: Securing Sustainable and Affordable Energy Futures

09:00 - 09:30 CET	**Opening Plenary Session**	
	Welcome address: Prof. Aaron Praktiknjo, RWTH Aachen University, IAEE President	
	Assistant Prof. Ange Blanchard, Paris Saclay University, IAEE Student Representative	
09:30 - 10:00 CET	**How to publish? Energy Journal Editorial Session**	
	Prof. Pedro Linares, Univ Pontificia Comillas IIT, The Energy Journal Editor-in-Chief	
10:00 - 10:20 CET	Coffee break	
10:20 - 11:50 CET	**Concurrent Sessions**	**Abstracts**
CS01	***Energy Policy and Regulation***	
10:20-10:38 CET	How Effective is Carbon Pricing in Reducing Carbon Emissions Intensity? A Meta-Analysis of the Quasi-Experimental Research; Authors: MiLim Kim, David Stern, Stephan Bruns, Tarun Khanna Presenter: MiLim Kim (The Australian National University)	We conduct a systematic review and meta-analysis of econometric studies that estimate the causal impact of carbon pricing on carbon emissions intensity per unit of output, using quasi-experimental approaches such as difference-in-differences (DiD). Funnel plots and meta-regression models indicate significant publication selection bias in the literature. After correcting for this bias, the preferred meta-regression results based on 241 effect sizes from 40 studies show that the genuine effect of carbon pricing is -7.3% with a 95% confidence interval of -9.5% to -5.0%. Heterogeneity analysis shows that there are no significant differences in genuine effect size between studies of the Chinese emissions trading schemes (ETSs) and the EU ETS, between studies using macro-level or micro-level data or between different durations of treatment. Although these results suggest that carbon pricing has a large and statistically significant effect on reducing carbon intensity, the primary studies exhibit a high risk of bias. In particular, many studies do not discuss the variance-weighted parallel trends assumption or the potential presence of time-variant treatment effects among early-treated groups, which the heterogeneity analyze cannot rule out. Accordingly, the results should be interpreted with caution.
10:38-10:56 CET	Determinants of Hydrogen Electrolysis Project Progression to Final Investment Decision and Operation. Authors: Zainab Sheikh, Jihyo Kim; Presenter: Zainab Sheikh (KAIST)	Green hydrogen is extensively seen as an important choice for industrial decarbonization, yet very few announced projects move beyond the planning stage. According to the IEA, only around 4% of announced low-emission hydrogen projects have reached final investment decision (FID) or construction, while existing research has paid more attention to future demand, policy roadmaps, technology pathways, and infrastructure needs than to the empirical drivers of project-level advancement. This study examines dedicated renewable-based hydrogen electrolysis projects and asks which project and country characteristics increase the probability of reaching FID or operation. Using the IEA Hydrogen Production Projects Database, released in September 2025, I construct a global sample of 1,371 dedicated-renewable projects across 106 countries, drawn from a broader universe of 2,618 hydrogen production projects, and combine it with country-level indicators of governance, water stress, FDI restrictiveness, hydrogen policy intensity, renewable energy availability, and hydrogen-related infrastructure. Project success is defined as a binary outcome equal to one if a project has reached FID or operation and zero if it is in concept, feasibility study, or demo stages, and the baseline analysis estimates a logit model using approximately 1,195 observations. The results show that technology is a strong predictor of project advancement: compared with the reference category, alkaline electrolysis projects have about 9.5 times the odds of reaching FID or operation, while PEM projects have about 5.4 times the odds. Renewable energy availability is also positively associated with success, whereas larger project scale is negatively associated with observed advancement in the baseline model, likely reflecting maturity effects because many very large projects remain at early stages. Overall, the findings suggest that both technology maturity and country-level energy readiness matter for whether announced green hydrogen projects move toward implementation, contributing early global project-level evidence on the determinants of hydrogen project progression.
10:56-11:14 CET	Interconnection as Climate Policy? Assessing the impact of the EU 15% interconnection target on CO2 Emissions with PyPSA-Eur. Authors: Amady Léchenet Presenter: Amady Léchenet (EconomiX CNRS - University of Paris Nanterre)	This paper assesses whether the European Union’s target of achieving 15% cross-border electricity interconnection by 2030 can ease the mitigation of CO2 emissions. Using the open-source Python for Power System Analysis (PyPSA)-Eur modeling framework, we develop a large-scale linear optimization model of power systems of France, Germany, Belgium, the Netherlands, and Luxembourg. The model endogenously optimizes generation, storage, and transmission capacities under technical constraints, while incorporating policy constraints in the form of both a minimum interconnection requirement and alternative CO2 emission caps. Our results show that implementing the interconnection target alone yields only marginal carbon reductions relative to the baseline, despite inducing a reallocation of flexibility options, notably reductions in gas-fired capacity and increases in battery storage. However, when combined with stringent emission caps, enhanced interconnection significantly facilitates deeper de- carbonization by enabling higher renewable penetration, reducing fossil-based generation, and reshaping cross-border power flows.

11:14-11:34 CET	Energy Price Shocks and Foreign Exchange Reserves in Bangladesh: Do Remittances Act as a Buffer or a Mediator? Authors: Banna Banik; Presenter: Banna Banik (Australian National University)	This paper examines whether remittances buffer the effects of global energy price shocks on foreign exchange reserves in Bangladesh, a remittance-dependent, energy-importing economy. Using monthly data from 2004M6-2025M4, we estimate a structural vector autoregression (SVAR) to trace the transmission of energy shocks to reserves and the role of remittances in that process. The results show that positive energy price shocks systematically reduce reserves, with effects that are large, persistent, and consistent with balance-of-payments pressure in energy-importing economies. By contrast, remittances exert a strong and statistically significant positive impact on reserves in their own shocks, confirming their role as an independent source of external resilience. Remittances also display a modest countercyclical response to energy shocks, significant for about four months, but insufficient to fully offset the sustained reserve losses. Robustness checks using alternative energy price proxies, additional domestic controls, and different variable orderings confirm the stability of these findings. Extending the analysis to disaggregated corridors highlights substantial heterogeneity: remittances from oil-based countries, have stronger and more persistent effects on reserves, while non-oil inflows are weaker and shorter-lived. These results demonstrate that while remittances provide an important buffer against external shocks, their effectiveness depends heavily on the source region, leaving Bangladesh's reserve position structurally tied to global oil markets and migration corridors. The findings contribute to the literature on external vulnerability by offering high-frequency evidence on the remittance channel in the energy shock-reserve nexus, with broader implications for other remittance-dependent, energy-importing economies.
11:32 -11:50 CET	Converging in the Dark? Night-Time Lights and Spatial Energy Development in South Africa Authors: WiZelle Kritzinger, Roula Inglesi-Lotz Presenter: WiZelle Kritzinger (University of Pretoria)	In the context of growing global uncertainty surrounding energy transitions, ensuring equitable energy access remains a central challenge for sustainable development. While national electrification rates have improved in many developing economies, such as South Africa, substantial spatial disparities persist within country borders. Understanding whether these disparities are narrowing is important for assessing the inclusiveness and sustainability of energy development. However, conventional macroeconomic energy access statistics often lack sufficient spatial detail, limiting the ability to monitor subnational dynamics. This study addresses this gap by using satellite-derived night-time lights (NTL) as a proxy for energy-based economic activity to examine spatial convergence in energy development across South African provinces. We use annual NTL data aggregated at the provincial level over a ten-year period. Two standard inequality measures, the Theil Index and the coefficient of variation, are employed to assess changes in the spatial distribution of luminosity across provinces. To evaluate provincial dynamics, growth rates of NTL intensity are calculated. A convergence regression is then estimated to test whether provinces with lower initial luminosity levels experience faster growth relative to those with higher levels. Preliminary results suggest evidence of declining dispersion in night-time light intensity across provinces, indicating possible convergence in spatial energy development. However, further analysis of provincial growth patterns suggests that convergence may not necessarily reflect uniform improvements. Instead, the results raise the possibility that convergence could partly be driven by deterioration in luminosity levels in historically brighter provinces, rather than gains in previously under-served regions. These findings contribute to the literature on spatial energy inequality by demonstrating the value of satellite-based indicators for monitoring subnational energy development. From a policy perspective, the results highlight the importance of distinguishing between convergence driven by improvements in energy access and convergence resulting from declining infrastructure performance, particularly in countries facing persistent energy supply challenges.

CS02 ***Energy Economics and Modeling***

10:20-10:38 CET	Climate-Induced Water Stress and Energy System Vulnerability: A Resilience Framework for Developing Countries Using Open-Source Modelling. Authors: Charlotte Newiadomsky; Presenter: Charlotte Newiadomsky (Hochschule Niederrhein University of Applied Sciences)	Energy systems in developing countries are increasingly under pressure from climate change, water scarcity, and infrastructure constraints. In many of these contexts, electricity generation remains heavily dependent on water-intensive technologies such as hydropower, coal, and nuclear power, making systems particularly vulnerable to rising temperatures, prolonged droughts, and hydrological variability. Yet, integrated and operational resilience assessment tools tailored to data-scarce and resource-constrained environments are still limited. This paper contributes to closing that gap as part of my ongoing PhD research. Building on a systematic literature review (Newiadomsky & Seeliger, 2025), which assessed 14 established energy and water system models, I identified three major shortcomings: limited integration of the water–energy nexus, low adaptability to data-constrained settings, and insufficient consideration of socio-economic and governance dimensions relevant to developing countries. In the current phase, I operationalize a resilience framework using PyPSA-Earth, an open-source, globally applicable power system model. The approach integrates high-resolution load data, technology-specific water demand parameters, and climate stress scenarios (reduced water availability, increased temperatures, and seasonal variability). Impacts on generation capacity, system reliability, and operational costs are assessed using resilience indicators such as loss-of-load probability, generation deficits, and operational risk metrics. Baseline simulations are validated against historical system patterns to ensure plausibility. Preliminary findings indicate high sensitivity of hydro- and thermally water-dependent systems to climate variability. Under drought and heat stress, hydropower output declines markedly, thermal plants experience curtailment, and system-level risks increase. However, early adaptation strategies—flexible dispatch, modified cooling technologies, and diversification toward low-water renewables—significantly improve resilience. The framework is designed to be scalable and transferable across vulnerable regions. Future work will incorporate regional climate projections, multi-sector demand pathways, and governance indicators to provide evidence-based guidance for energy planning and climate adaptation in developing countries.
10:38-10:56 CET	Decarbonizing China’s logistics: environmental and economic assessment of road-to-rail/water modal shift scenarios. Authors: Fangzhou Dai; Presenter: Fangzhou Dai (The University of Tokyo)	As China’s third-largest CO2 source, transport emissions surged from 248 Mt in 2000 to 969 Mt in 2021, accounting for ~9.1% of the national total. Within this sector, freight transport is the primary driver of emission growth due to its heavy reliance on fossil fuels. Despite lower intensities in rail and water, China’s freight remains road-dominant, carrying 72.41% of total volume in 2023. While national strategies prioritize a "Road-to-Rail/Water" transition, existing studies often evaluate carbon pricing or technology in isolation, leaving a gap in understanding coordinated policy synergies for the freight sector within a macroeconomic framework. This study develops a national CGE model to determine the most effective strategy for shifting China’s freight to lower-carbon modes. We designed a nine-scenario matrix to evaluate transition paths toward 2060, including a Business-As-Usual (BAU) baseline, Standalone Technology (S1), Standalone Pricing (S2), and six Integrated Policy Mix (S3) scenarios. The S3 framework crosses three technology intensity levels with two pricing levels to identify the optimal balance between short-term economic shocks and long-term emission benefits. Results show that under BAU, total emissions remain locked at 5.2 billion tons by 2060, failing neutrality targets. While Standalone Pricing (S2) inflicts a 2.19% GDP penalty with minimal structural change, the S3 matrix identifies a "Sweet Spot" where policy synergy maximizes decarbonization. The optimal S3 pathway successfully hits the 2.0-billion-ton neutrality threshold while managing the "Early Transition Shock"—where GDP loss peaks at 2.66% in 2030 before declining to 2.03% by 2060. We conclude that achieving China's 2060 goal requires a calibrated policy mix rather than isolated tools. This approach provides a strategic roadmap for deep decarbonization in the logistics sector.
10:56-11:14 CET	A Club Convergence Analysis of Energy Security Index: Evidence from Indian States. Authors: Priyanshu Chavda Presenter: Priyanshu Chavda (Pandit Deendayal Energy Univeristy)	Energy consumption is closely linked to the ongoing pursuit of economic growth. However, the unequal distribution of natural resources exposes numerous countries to energy supply insecurity resulting from internal or external threats. While energy security has long been a topic of global discussion with numerous studies redefining its concept and measurement, there is limited research examining energy security at the regional level. This study addresses this gap by constructing an Energy Security Index for Indian states for the period 2015-2022. The Energy Security Index is developed following the 4A framework, incorporating dimensions of availability, affordability, accessibility, and acceptability. This multidimensional structure facilitates both cross-sectional comparison and dynamic assessment across states. The results indicate substantial regional disparities, with Gujarat and Telangana consistently ranking among the most energy-secure states, while Bihar and Tripura remain the least energy-secure states. Beyond descriptive rankings, the study applies club convergence analysis to examine the dynamic evolution of energy security across states. The findings identify distinct convergence clubs, indicating heterogeneous transition paths rather than uniform convergence. This classification distinguishes leaders from laggards and provides a robust empirical basis for designing targeted, state-specific policy interventions to strengthen energy security in structurally disadvantaged regions.

11:14-11:34 CET	Empirical Stress Test of the Merit-Order Mechanism Under Extreme Price Shocks: A Unit-Level Analysis of Coal, Lignite, and CCGT Units in Poland during the European Energy Crisis. Authors: Bartosz Sobik; Presenter: Bartosz Sobik (SGH Warsaw School of Economics)	European electricity markets experienced an exceptional stress test in 2021–2023, raising renewed questions about how marginal pricing and the merit-order mechanism perform under extreme fuel and carbon price shocks. This paper provides a unit-level empirical assessment of these dynamics for Poland, an electricity system still dominated by coal, with a smaller but growing CCGT fleet and rapidly rising renewables. A transparent short-run marginal cost (SRMC) model for all centrally dispatched hard-coal, lignite, and gas-fired units has been constructed and presented annual merit-order stacks for 2021–2023. The analysis decomposes SRMC into fuel, transport (hard coal), and EU ETS components to attribute observed reranking to interpretable cost channels rather than aggregate price movements. The results document a clear crisis-era reshuffling: record gas prices in 2022 pushed CCGT units markedly rightwards, while the highest-cost tail remained anchored in the oldest hard-coal units in all three years. A structured ±25% sensitivity analysis demonstrates robust, technology-specific exposure profiles: SRMC is fuel-driven for CCGT, carbon-driven (EU-ETS) for lignite, and jointly driven by coal and EU ETS costs for hard coal. These findings provide an empirical, replicable stress test of merit-order behavior and clarify how fossil-price shocks transmit through marginal pricing in a fossil-heavy system. The evidence supports economically coherent phase-out sequencing by identifying structurally high-SRMC legacy coal units as early candidates for retirement, while informing market-design discussions that preserve marginal pricing for dispatch efficiency and reduce exposure to fossil-driven marginality via long-term contracting, targeted adequacy mechanisms, and accelerated deployment of low-carbon flexibility. This research is addressed to energy economists, market-design scholars, regulators, and system planners working on fossil-fuel-dependent electricity systems.
11:32 -11:50 CET	Impact of Stochastic Scenario Modeling of Power Sector Uncertainties on Expansion Pathways in Climate-Vulnerable Countries Authors: Oskar Antonik, Pablo Benalcazar, Jacek Kaminski; Presenter: Oskar Antonik (Mineral and Energy Economy Research Institute, Polish Academy of Sciences)	Effective planning and development of national energy systems, along with the formulation of long-term expansion strategies, present a major challenge for policymakers in developing countries. Despite the availability of various computational tools, traditional deterministic models cannot fully account for future uncertainties and the variability of input parameters needed for cost-effective planning. In this context, this study aims to propose and demonstrate the performance of a stochastic extension of the deterministic OSeMOSYS model. The model is applied to the case study of Ecuador, which plays a crucial role in developing the proposed extension. The structure of the Ecuadorian energy system makes it one of the most distinctive in the world. Ecuador combines a large share of hydroelectric capacity with significant crude oil reserves. Although the country remains the fifth-largest crude oil producer in Latin America, its limited refining capacity forces it to rely on external imports of oil derivatives. At the same time, heavy reliance on hydropower has left the country vulnerable to severe droughts, leading to a series of blackouts in 2024. By generating multiple input datasets using Monte Carlo and Latin Hypercube Sampling methodologies, the system's sensitivity to parameter fluctuations can be assessed, providing a more realistic depiction of energy system dynamics than deterministic models. Additionally, it helps identify potential vulnerabilities in the energy supply. Preliminary results suggest that incorporating stochastic variability significantly alters energy system expansion pathways. The model enhancements also show greater sensitivity to fuel price fluctuations and energy demand growth, with certain simulations exhibiting high variability during the mid- to late periods of the modeling horizon. These findings imply that stochastic modeling approaches can offer more robust insights for long-term energy planning and support the development of resilient policies under uncertainty.
CS03	***Energy Market Design***	
10:20-10:38 CET	Market Integration in Natural Gas: Evidence from the Spanish Market. Authors: Sonnur Bas Presenter: Sonnur Bas (CEMFI)	This paper studies how market integration reshapes spatial allocation and liquidity in infrastructure-dependent energy markets. I analyze Spain’s 2020 LNG reform, which replaced six fragmented terminal-specific markets with a unified virtual trading hub. I develop a simple theoretical model of spatial platform choice with search frictions and transport costs, which together give rise to endogenous participation. The model shows that local imbalances distort trade outcomes and prices, while market integration leads to greater efficiency -through an increase in the number of transactions and reduced transport costs- as well as to price convergence. Using shipment-level and transaction-level data, I document reduced concentration and shorter transport distances after integration. I develop a structural discrete choice model in which ships choose unloading terminals while valuing liquidity that itself depends on equilibrium participation. The model captures the feedback loop between sorting and market thickness and allows for the evaluation of alternative institutional regimes. The findings speak to a broader class of markets in which physical infrastructure and trading institutions interact. They highlight that market design can amplify or mitigate spatial inefficiencies. More generally, the paper contributes to understanding how integration policies can reshape equilibrium outcomes in markets where participation, coordination, and infrastructure constraints matter.

10:38-10:56 CET	Countertrading mechanisms and intraday price effects across electricity interconnectors in Great Britain, Germany, and Denmark. Authors: Joseph Cary, Thomas Morstyn; Presenter: Joseph Cary (University of Oxford)	Electricity transmission system operators (TSOs) in interconnected grids can utilise the inherent flexibility in cross-border flows to assist system balancing. The TSO in Great Britain (NESO) and one TSO in Germany (TenneT) have developed innovative but distinct mechanisms to reverse interconnector flows by selling power to a connected (namely Danish) intraday power market (IDM). This strategy (countertrading) manages predictable balancing need hours ahead of real time. NESO relies on ad hoc auctions in which speculative traders bid to realise balancing requirements, while TenneT uses regular announcements and appoint one firm to trade their requirement. The TSOs receive the proceeds from countertrade sales, which partially offset the cost of internal redispatch. However, countertrading represents a supply shock to the Danish IDM, which absorbs additional supply. After a countertrade request, we might expect downward pressure on prices, which reduces the benefit of countertrading to the TSOs who receive lower revenues. In this presentation, we answer the research question: Which countertrade mechanism preserves higher prices (i.e. revenue) for the requesting TSO? We isolate the influence of countertrade requests on 2024 intraday prices using an event study framework based on announcement times, volumes, and high-frequency price data. Our research contribution is twofold: both mechanisms overlap in the Danish IDM, enabling the first comparative analysis of countertrade mechanisms, and we infer price impacts by applying local projections to electricity markets for the first time. Preliminary results indicate that intraday prices drop by €21.6/MWh per GW of countertrade request two hours after a NESO announcement, whereas intraday price changes after a TenneT request are not significantly different from €0/MWh/GW. In our presentation, we explain this stark disparity, and discuss lessons from this experience for future TSO-TSO collaboration on interconnector countertrade between any connected bidding zones, particularly in Europe, to reduce balancing costs for consumers.
10:56-11:14 CET	The Option to Contract: Long-Term Agreements in Incomplete Electricity Markets Authors: Louis Soumoy, Jules Welgryn Presenter: Louis Soumoy, (CentraleSupélec)	Long-term electricity contracting remains a central challenge in European markets, with important implications for decarbonising industries. This ‘missing market' leaves investors exposed to electricity price risk, raising the cost of capital and constraining investment in clean generation and electrification. We study the formation of bilateral contracts, such as Power Purchase Agreements (PPAs), in an incomplete market with risk averse agents and irreversible investment. We model the interaction between consumers and producers as a symmetric real-options problem where firms choose between investing independently, contracting, or postponing commitment. This framework identifies conditions under which the value of flexibility outweighs incentives to contract. We apply this model to a case study of PPA negotiations between ArcelorMittal and EDF, showing that crisis-induced volatility can widen a contracting gap by increasing the value of flexibility despite rising uncertainty aversion, and discuss policy implications to support coordinated low-carbon investment.
11:14-11:34 CET	Price elasticity of residential electricity demand in Spain: temporal evolution and regional heterogeneity during the 2022 energy crisis. Authors: Daniele Stampatori, Sanchayan Banerjee, Wouter Botzen, José Pablo Chaves Ávila; Presenter: Daniele Stampatori (Comillas Pontifical University)	Residential electricity demand is widely recognised as structurally inelastic. However, the extent to which this holds in the future under conditions of sustained price volatility and dynamic retail tariffs remains an open question. This paper estimates the own-price elasticity of residential electricity demand under the regulated dynamic retail tariff in Spain over the period 2021–2024, exploiting the exceptional price increase and variability of the 2022 energy crisis as a natural experiment. using an instrumental variable control function approach on an hourly panel of the peninsular autonomous communities, and instrumenting the electricity price with wind generation, we allow the elasticity to vary across regions, seasons, and calendar time through a piecewise-linear spline specification. We find demand is quite inelastic, but with substantial heterogeneity across seasons and regions, with a ratio of approximately 1.8 between the most and least price-responsive communities. elasticity increased continuously over the sample period. These findings suggest that electricity end users exposed to dynamic retail tariffs are capable of adjusting their consumption in response to price signals, and that the seasonal and regional heterogeneity in price responsiveness has important implications for the design of future electricity tariffs.

11:32 -11:50 CET	From Duck to Turtle: When Flexible Demand Overloads the Grid Authors: Zihan Yang, Boris Ortega, Joachim Geske; Presenter: Zihan Yang (Interdisciplinary Centre for Security, Reliability and Trust - SnT, University of Luxembourg)	The electrification of household heating and mobility is reshaping electricity demand. Households are increasingly equipped with electric vehicles (EVs), heat pumps (HPs), rooftop photovoltaics (PVs), and batteries, allowing flexible participation in energy markets. Dynamic pricing is promoted as a mechanism to unlock this household flexibility, but its impacts on local grids remain unclear. Although the benefits derived from household demand-side flexibility at the system level have received increasing attention, little is known about its effects at the transformer level. When many households simultaneously respond to identical price signals, synchronized consumption patterns may emerge, reshaping load profiles and potentially exacerbating local congestion risks. This raises the question whether price-based flexibility smooths distribution grid loads or instead creates new congestion risks, particularly as the adoption of household energy technology increases. This paper develops a household-level linear optimization model to quantify the distributional effects of technology adoption and behavioral flexibility. Households equipped with EVs, PVs, batteries, and HPs are modeled as either flexible (i.e., optimizing electricity use in response to hourly prices) or inflexible (i.e., minimizing energy consumption). Using Luxembourg as a case study, we simulate transformer-level load under 2040 scenarios assuming different shares of technology-equipped households. In the baseline scenario without flexible households, daily aggregate demand exhibits a conventional “duck curve.” As the share of flexible households increases, the load profiles progressively invert. High flexibility penetration creates a pronounced “turtle curve,” characterized by midday demand peaks from synchronized low-price charging and evening valleys driven by battery discharge and arbitrage. While flexibility reduces evening peak demand and lowers household electricity expenditures, it substantially increases transformer overload hours as flexibility penetration rises. These findings highlight the need for adaptive tariff design, forward-looking grid planning, and potentially demand coordination or locational price signals to ensure that household flexibility supports, rather than destabilizes, distribution networks.
CS04	***Energy Demand, Access and Rural Electrification***	
10:20-10:38 CET	Heterogeneous effect of temperature on household electricity consumption in South Africa. Authors: Saien Moodley, Yuxiang Ye; Presenter: Saien Moodley (University of the Witwatersrand)	This research investigates the relationship between climatic shifts and power grid strain in South Africa, characterized by load shedding and escalating median temperatures. Using high-frequency data from the Domestic Electrical Load (DEL) survey alongside South African Weather Services temperature records, we employ econometric panel models to analyze hourly household electricity consumption across 611 households and multiple climatic regions. Our analysis reveals a departure from the conventional U-shaped demand curve typically observed in global literature. Instead, electricity use increases moderately at very cold temperatures, then electricity use remains largely inelastic between approximately 2 °C and 16 °C, and decreases significantly as temperatures exceed 16 °C. This is largely driven by the low penetration of cooling appliances and reliance on electric heating in predominantly rural and low income settings. These results indicate that regional warming may lead to a net reduction in residential demand, diverging from the trends found in high-income, air-conditioned economies. These results underscore the importance of localized analysis incorporating regional climate and socio-economic factors to accurately forecast electricity demand and inform energy policy in Africa. This research contributes insights for grid stability, capacity planning, and mitigating load shedding risks as climate change intensifies, highlighting the complex and heterogeneous impacts of temperature shifts on energy consumption in developing countries like South Africa.

10:38-10:56 CET	Market Design Reform and Demand Response as Strategic Flexibility Tools for Renewable Integration in the Saudi Electricity Sector Authors:Mohammad Al-Haj. Presenter: Mohammad Al-Haj (Qassim University)	Saudi Arabia's electricity sector is executing one of the world's most ambitious renewable energy programmes under Vision 2030: a commitment to 50% renewable generation (58.7 GW) by 2030 and net-zero by 2060. This paper presents an integrated analysis of electricity market design reform and demand response (DR) as co-dependent strategic flexibility tools for achieving these targets. Using a Mixed-Integer Linear Programme (MILP) calibrated to official data from SERA, SEC, REPDO, KAPSARC, and GASTAT, four policy scenarios are evaluated. The model minimises total system cost subject to supply-demand balance, reserve adequacy, and frequency stability constraints — Rate of Change of Frequency (RoCoF) and frequency nadir — that become binding above 35% renewable penetration. A Behavioural Adjustment Factor (BAF), derived from an AHP-weighted social barrier matrix, reduces theoretical DR potential by 29–71% to yield realistic participation estimates. Results demonstrate that the Full Integration scenario achieves USD 10.4 billion in annual system cost savings (27%), reduces CO2 emissions by 39.6%, achieves the 50% renewable target, and is the only scenario maintaining frequency stability at 50% variable renewable penetration. Balancing costs are 55.4% lower than baseline, confirming DR provides genuine system balancing value. A co-evolution model linking smart meter deployment to DR participation rates identifies infrastructure readiness as the binding implementation constraint. Cross-study validation against eight international studies confirms all results lie within 1–1.5 standard deviations of the literature mean. The framework is generalisable to all hot-arid developing economies facing the affordability-reliability-decarbonisation trilemma.
10:56-11:14 CET	Evaluating the welfare impacts of lifeline tariffs amid market volatility: Evidence from South Africa. Authors: Julia Tatham; Presenter: Julia Tatham (University of Cape Town)	Securing affordable energy futures in the Global South requires moving beyond mere grid connectivity to actively shield vulnerable populations from market volatility. Using South Africa as a case study, this paper examines the efficacy of protective lifeline tariffs amidst macroeconomic shocks and severe power shortages. While South Africa executed one of the most successful electrification programs globally, recent structural planning failures and generation shortfalls have triggered rapid tariff escalations. Prohibitive costs that undermine energy access can be actively managed through protective measures. Although the fiscal sustainability of energy subsidies is widely debated, empirical evidence regarding their welfare impacts remains scarce. To address this gap, we analyse South Africa's Free Basic Electricity policy, a lifeline tariff providing 50 kWh per month to indigent households. This study provides the first quantitative evaluation of the policy's welfare effects. By applying Propensity Score Matching to the 2019 General Household Survey and 2022 Income and Expenditure Survey data, we isolate the causal impact of the subsidy across the disruptions of the pandemic and a national energy crisis. Findings reveal that receiving the subsidy is associated with a statistically significant reduction in energy poverty. Subsidized households show a measurable energy transition, with a 3.5% increase in electricity use for cooking, a 1.2% increase in electric stove ownership, and a 3% decrease in reliance on solid fuels relative to matched non-recipients. FBE receipt is also associated with higher rates of electric lighting use (1.1%) and asset ownership (1.9% for fridges, 1.5% for TVs). Recipients exhibit slightly better literacy and numeracy outcomes (1.1%–1.5% higher), potentially attributable to improved study lighting. By demonstrating that a modest 50 kWh lifeline tariff yields measurable welfare gains, this research provides vital empirical validation for policymakers worldwide to justify targeted social protection mechanisms amid energy market volatility.

11:14-11:34 CET	Linking energy transition and rural inequality: state-level impacts of decentralized solar irrigation in India Authors: Soumya Basu, Lawrence Swaminathan Xavier Prince Presenter: Soumya Basu (Kyoto University)	Energy transitions in developing economies must simultaneously address decarbonization, rural livelihoods and structural inequalities. In India, caste-based disparities in landholding and access to modern energy constrain agricultural productivity and perpetuate energy poverty among marginalized Scheduled Caste (SC) and Scheduled Tribe (ST) communities. Here we evaluate the potential of decentralized, grid-connected solar photovoltaic (SPV) irrigation systems to advance energy justice while supporting agricultural productivity. Using state-level census and agricultural datasets disaggregated by caste, combined with climatic, technoeconomic and policy data, we develop a mixed-method empirical model linking land inequality, crop water demand, irrigation energy requirements and farm-level income. The framework evaluates four scenarios: business-as-usual diesel irrigation, improved fertilizer access, SPV-powered furrow irrigation, and SPV-powered drip irrigation with yield-enhancing inputs. We find that decentralized SPV irrigation deployed on fallow land can provide both irrigation energy and surplus electricity for grid export, creating an additional income stream for marginalized farmers. Under conservative assumptions, SPV-based irrigation scenarios enable SC communities to surpass poverty baselines in most Indian states, with even broader impacts for ST communities. Yield improvements from efficient irrigation further enhance income gains while reducing diesel consumption and associated emissions. Sensitivity analyses show that SPV capital subsidies and fertilizer access strongly influence outcomes, whereas diesel subsidies reduce incentives for transition. Regression analysis identifies average landholding, solar resource availability and electricity feed-in tariffs as key determinants of poverty alleviation potential. Our results highlight the importance of integrating social equity considerations into energy transition planning. By linking decentralized renewable energy deployment with agricultural productivity and rural income diversification, SPV irrigation can simultaneously address energy poverty, structural inequality and decarbonization objectives. These findings provide a state-level policy framework for designing inclusive energy transitions in India and other developing economies facing similar agricultural and social constraints.
11:32 -11:50 CET	Analysis of the Effects of TOU Period Redefinition on Commercial Electricity Demand in Jeju. Authors: Kyubin Oh, Jihyo Kim; Presenter: Kyubin Oh (KAIST)	Since the early 1990s, Korea has operated a nationwide time-of-use(TOU) tariff with common seasonal and load-period definitions to manage demand from large electricity users. In Jeju, however, rapid solar deployment shifted net-load pressure toward the evening, prompting a Jeju-specific TOU reform on September 1, 2021 that redefined peak, mid-peak, and off-peak periods. While most existing TOU studies focus on the introduction of TOU pricing, often in residential opt-in settings, much less is known about whether redefining time blocks within an already established TOU system changes when non-residential customers use electricity. This paper addresses the gap using hourly panel data for commercial-service customers under the TOU tariff in Jeju from September 2020 to August 2022. We estimate a high dimensional fixed-effects model with customer, hour-of-week, and month-of-year fixed effects, allowing post reform effects to vary flexibly across all 168 hours of the week through post × hour-of-week interactions. To address endogeneity in realized average prices, we implement a control function approach. Standard errors are two way clustered by customer and calendar day. As robustness checks, we re-estimate the model using hourly shares and conduct separate estimations for sectoral subsamples. The results show that, after the reform, electricity demand increased during 08:00–16:00, when volumetric charges became relatively lower, whereas demand growth was more muted during 16:00–22:00, when charges became relatively higher. This pattern remains broadly consistent across specifications based on both electricity consumption levels and hourly consumption shares. Sectoral estimates further suggest that operational schedules shape TOU responsiveness. Sectors with regular business hours tend to shift load toward the newly cheaper mid-peak period, whereas around-the-clock sectors show a stronger tendency to expand off-peak use. Overall, the findings suggest that TOU designs calibrated to regional net-load conditions can serve as an effective instrument for enhancing demand-side flexibility.
11:50 – 12:30 CET	Lunch Break	
12:30 – 13:15 CET	**From Ideas to Academic Paper: Workshop session. Prof. Nils-Henrik M von der Fehr, University of Oslo, Vice President for Academic Affairs** This session will explore how abstracts can be strengthened and advanced for conference submission and publication. Conference participants will have the opportunity to engage in a Q&A session to ask questions, seek clarification, and discuss matters related to their research and prospective submissions	
13:15 – 13:35 CET	Coffee break	
13:35 – 15:05 CET	**Concurrent Sessions**	
CS 05	***Energy Uncertainty, Risk and Resilience***	

13:35 - 13:55 CET	Does Climate Policy Uncertainty Alter the Growth-Emissions Nexus in Energy Resource-Rich African Countries? Authors: Dasauki Musa Presenter: Dasauki Musa (Univerisity of South Africa)	Climate policy uncertainty has become a defining feature of the global energy transition, with important implications for investment decisions, energy markets, and environmental outcomes. While a growing body of literature examines the effects of policy uncertainty on emissions and energy systems, little empirical evidence exists on how climate policy uncertainty affects the relationship between economic growth and carbon emissions in African economies. This study investigates whether climate policy uncertainty alters the growth–emissions nexus in seven energy resource-rich African countries that are among the continent's largest carbon emitters: Algeria, Angola, Egypt, Libya, Morocco, Nigeria, and South Africa. These economies depend heavily on fossil fuel resources for economic development and therefore face significant challenges in balancing economic growth with environmental sustainability. The analysis is conducted within the Environmental Kuznets Curve (EKC) framework and incorporates climate policy uncertainty as a moderating factor in the relationship between economic growth, energy structure, and carbon emissions. Using panel data for the selected countries, the study employs both static and dynamic econometric techniques. Static panel estimators—pooled OLS, fixed effects, and random effects—are complemented by a panel autoregressive distributed lag (ARDL) model estimated using pooled mean group (PMG), mean group (MG), and dynamic fixed effects (DFE) estimators to capture both short-run dynamics and long-run relationships. The results provide evidence of a non-linear relationship between income and carbon emissions consistent with the EKC hypothesis. Importantly, climate policy uncertainty significantly modifies this relationship by amplifying the emissions effects of economic growth and fossil energy consumption while weakening the mitigating role of renewable energy. EKC turning-point estimates further suggest that higher policy uncertainty shifts the income threshold at which emissions begin to decline. These findings highlight the importance of stable and credible climate policy frameworks for supporting sustainable energy transitions in resource-rich African economies.
13:55 - 14:15 CET	The Baltic Sea on the Frontline of Hybrid Threats: Implications for Europe's Energy Resilience in the 2020s. Authors: Maciej Skuza; Presenter: Maciej Skuza (Maria Curie-Sklodowska University)	The Baltic Sea has become a particularly important area on Europe's energy map in the third decade of the 21st century. Many countries in the region are increasing their dependence on the Baltic in energy-related matters, through the expansion and development of their own LNG infrastructure, nuclear power plants, offshore wind farms, as well as subsea infrastructure, including gas pipelines and electricity cables, and through the advancement of international cooperation in the field of energy. At the same time, the Russian Federation remains highly active in the Baltic Sea basin, which—despite becoming a "de facto NATO lake" following the accession of Sweden and Finland to the Alliance—continues to be exposed to numerous hybrid attacks in this domain. In this presentation, the author will outline the essence and specific characteristics of the region's energy resilience in the context of maritime infrastructure and its specific conditions, as well as the opportunities and risks associated with basing the region's energy security on Baltic Sea infrastructure during a period of extraordinary geopolitical turbulence and hostile hybrid activities conducted by the Russian Federation against European states.

14:15 - 14:35 CET	Energy Infrastructure as a Global Public Good: Legal and Economic Frameworks for Resilient Cross-Continental Interconnectors in Conflict-Prone Eras Authors: Mohammed Merrouni Presenter: Mohammed Merrouni (Paris 1 Panthéon-Sorbonne University)	In an "Era of Uncertainty," the physical and economic security of energy transit has become a global priority. As the world transitions toward decentralized renewables, the reliance on cross-continental interconnectors—spanning the Mediterranean and Atlantic—has increased the systemic vulnerability of energy markets. This paper argues for a paradigm shift: treating large-scale energy infrastructure as a "Global Public Good" to ensure sustainable and affordable energy futures. Drawing on the intersection of International Energy Law and Economic Regulation, this research evaluates the dual threats of geopolitical sabotage and market volatility on regional energy stability. By analyzing the proposed Atlantic and Euro-Mediterranean energy corridors, the study examines how "Legal Resilience"—through enhanced investment protection treaties and the application of International Humanitarian Law principles to energy assets—can lower the risk premium for private capital. The findings suggest that the "affordability" of the energy transition is inextricably linked to the "security" of its transit. The paper proposes a new regulatory framework for "Energy Sovereignty 2.0," which balances national interests with the collective need for uninterrupted green energy flows. This research provides a cross-regional perspective on how institutional innovation can shield the energy transition from the shocks of a fractured global order. Keywords: Energy Security, Global Public Goods, Infrastructure Regulation, Euro-Mediterranean Energy, Legal Resilience.
14:35 - 14:55 CET	Assessing the Impact of Eminent Domain Reforms on Renewable Energy Expansion: A U.S. State-Level Analysis Authors: Abdul Khaliq, Jamal Mamkhezri Presenter: Abdul Khaliq (New Mexico State University)	This paper examines how eminent domain reforms shape the stringency of Renewable Portfolio Standards (RPS) across U.S. states. Following Kelo v. City of New London (2005), many states adopted statutory and constitutional reforms strengthening protections for private property. While these reforms were intended to protect private property, their implications for large-scale infrastructure and renewable energy policy remain underexplored. This paper addresses that gap by analyzing whether stronger institutional constraints on eminent-domain authority affect state-level RPS policies. The empirical analysis uses an annual panel of all 50 states from 2000 to 2022. RPS stringency is measured through a Renewable Portfolio Standard Index (RPSI), and the key explanatory variable is an Eminent Domain Reform Index (EDRI). Control variables include real GDP per capita, real total average energy prices, and governors' political affiliation. To account for policy persistence, endogeneity, and panel-specific heteroskedasticity, the study employs two-step system generalized method of moments (system-GMM) and feasible generalized least squares (FGLS) estimators. The results indicate that stronger property rights protections are associated with significantly lower RPS stringency across estimation methods. Real GDP per capita is positively related to RPS intensity, suggesting that wealthier states adopt more ambitious renewable mandates. Higher real energy prices are negatively associated with RPS stringency, while Democratic gubernatorial leadership is positively and significantly related to stronger RPS policies. This study contributes to the literature by showing that renewable energy policy outcomes are shaped not only by political factors but also by property rights institutions and economic conditions, both of which deserve greater attention in policy design. Keywords: Eminent Domain Reforms, Renewable Portfolio Standards, Energy Prices, Economic Growth, Political Ideology, USA.
CS 06		***Strategic Tensions in Energy Security, Affordability and Net Zero Pathways***
13:35 - 13:55 CET	Institutions, Geoeconomics, and Inertia in Energy Transitions: An Empirical Exploration of the Cross-National Clean Energy Gap. Authors: Maria Eugenia Polegri Santoni, Natalia Zugravu-Soilita. Presenter: Maria Eugenia Polegri Santoni (Institut de recherche pour le développement)	Countries with abundant renewable potential often remain dependent on fossil energy imports, despite rapid declines in renewable costs and major gains in technology maturity. Structural lock-in sustains a persistent disconnect between energy systems and local resource endowments, at a well-documented developmental, environmental, and macro-financial cost. We quantify this discrepancy with a novel empirical indicator, the Clean Energy Gap (CEG), defined as the difference between a country's technically viable renewable potential and the share realized in its energy supply mix. The CEG operationalizes potential on techno-physical grounds, while economic, institutional, financial, and social factors are examined separately as determinants in a cross-national panel econometric framework. Preliminary findings on the CEG's magnitude and persistence point to institutional and political-economy frictions as central mediators of low-carbon transitions, highlighting limits of purely technological or price-based accounts.

13:55 - 14:15 CET	Drill Here, Drill Now, Pay Less: Labor Market and Air Quality Trade-offs of Oil and Gas Extraction. Authors: Thuy Nguyen Presenter: University of Pittsburgh	This work uses spatial econometric modeling to investigate the local and regional labor market and air quality trade-offs of oil and gas extraction in Pennsylvania, Ohio, and West Virginia. The results reveal a double disparity that is as much generational as it is geographical. While younger, mobile workers, particularly non-locals, capture most of the economic benefits from oil and gas, local seniors living near production activity bear the bulk of the environmental health costs. Specifically, I find that oil and gas do not create jobs for local residents who work in their home county. Only a subset of locals, those who commute to jobs outside their home county, experience measurable gains, averaging eight additional jobs and $525,000 in earnings per 100,000 barrels of oil equivalent (BOE) produced. In comparison, the same level of production generates about 12 jobs and $1.2 million in earnings for non-local workers, amounting to about 40% more jobs and more than double the earnings compared to commuting locals. In contrast, air quality impacts are the most severe when production occurs nearby. An additional 100,000 BOE produced within 1 to 2 km of a gridded cell increases its PM2.5 concentration by 1.2 µg/m3 , on average. Leveraging fine-grained, age-specific population and vital statistics, I estimate that oil and gas extraction resulted in $62 billion in health damage—roughly one-quarter of total oil and gas revenue—in the tri-state region between 2001 and 2020. Local seniors suffered 80% of the health burden.
14:15 - 14:35 CET	Assessing Community Capacity for Self-Help Solar Photovoltaic Infrastructure in Urban Informal Settlements. A Case Study of Accra, Ghana.Authors: Keren-Happuch Obeku, Margaret Reams, James Spencer; Presenter: Keren-Happuch Obeku (Louisisna State University)	As part of the global agenda to transition towards clean and sustainable energy options, enhancing inclusive and participatory governance approaches to energy development is integral to ensuring resilient communities. Within the context of developing economies, limited resources, coupled with rapid urban transition, have led people to reside in spaces outside the formally planned cities, resulting in limited, nonexistent, or informal access to basic services, including energy. Consequently, concerns have arisen regarding mechanisms to promote participatory, decentralized, and sustainable communities by enhancing community capacity and self-help initiatives of informal settlers in the provision of energy services. In view of this, our study employed a mixed-method approach to investigate the community capacity of informal settlements for community self-help solar photovoltaic initiatives. A Chi-square test of independence was used to determine the association between categorical variables, while a density plot and a spider graph provided a visual representation of the ratings of community capacity indicators. Findings revealed that trust, asset-based approach, resource mobilization, and problem-solving capacity were rated low to moderate, while communication, participation, and shared vision were rated moderate to high. Further findings revealed that education, a history of self-help projects in the community, and belonging to a community group were associated with a household's willingness to participate in a shared community solar project. Our study proposed four main factors for building community capacity for community solar in informal settlements: (1) developing asset-based resources, (2) recognizing education, (3) acknowledging the leading role of local leaders, and (4) conducting a related community pilot project. This provides a basis for planning and designing strategic policies for informal communities in developing their overall capacity to undertake sustainable self-help energy initiatives to promote resilient communities and equitable energy access.
14:35 - 14:55 CET	Electricity Access Beyond the Grid: Community Solar Mini-Grid Adoption and User Experience in Nigeria. Authors: Busrat Ali-Balogun; Presenter: Busrat Ali-Balogun (Oregon State University)	Abstract Access to reliable electricity remains a major challenge in Nigeria, despite the country's abundant renewable energy resources and ongoing reforms in the power sector. In response to persistent grid unreliability, privately community-based solar mini-grids have emerged as an alternative electricity supply option in many peri-urban and rural communities. While these systems are increasingly promoted as solutions to energy poverty, limited empirical evidence exists on how they compare with grid-based electricity in similar community settings, particularly in terms of adoption dynamics, electricity-related outcomes, and everyday user experiences. This study examines privately community solar mini-grids through a comparative analysis of two communities in Ogun State, Nigeria: Ibaragun, which has adopted a community solar mini-grid, and Akute, which relies primarily on the national electricity grid. The study adopts a mixed-methods research design, combining household survey data with qualitative analysis to capture both measurable electricity outcomes and residents lived experiences. The comparative case selection allows for an examination of how different electricity supply arrangements shape adoption decisions, electricity reliability, and household perceptions within similar geographic and socio-economic contexts. By integrating quantitative and qualitative approaches, the study seeks to provide a more comprehensive understanding of decentralized solar mini-grids beyond technical performance alone. The research emphasis the importance of everyday user experiences in evaluating alternative electricity systems and contributes context-specific insights to ongoing debates on decentralized electrification and energy access in Nigeria. The findings are expected to inform more socially responsive and evidence-based energy policy and planning, particularly in the design and governance of community-based renewable energy solutions.
CS Award Session		***Best Student Paper Award***

13:35 - 14:05 CET	Geopolitical uncertainty and critical mineral investments: A real option approach Authors: Lan Huong Hoang.Presenter: Lan Huong Hoang (University College Dublin)	Securing access to energy transition critical minerals including lithium, nickel, cobalt, and rare earth elements is now central to policy and academic discourse, given surging demand required for low-carbon technologies. Scholars in international business, political economy, and energy economics increasingly recognise that investment in critical minerals is exposed to both market volatility and geopolitical risks stemming from sanctions, export controls, trade fragmentation, and resource nationalism. Despite this progress, existing studies insufficiently capture how foreign investors dynamically adjust their investment strategies after project initiation when geopolitical uncertainty intensifies. Meanwhile, recent geopolitical shocks have disrupted critical mineral supply chains and altered the feasibility of large, irreversible investments. As a result, observed investor behaviour such as prolonged project delays, phased capital deployment, and shifts toward joint ventures remains underexplained by conventional models. This lack of understanding risks overstating the effectiveness of energy transition policies, while underestimating the strategic constraints faced by foreign investors. This study draws on real options theory to examine how foreign investors dynamically adjust post-entry strategies when geopolitical risk intensifies. It examines how geopolitical uncertainty shapes the exercise of real options through capital staging and investment timing. Using firm- and project-level data, the study employs panel econometric analyses with firm and country fixed effects to assess how geopolitical uncertainty affects capital expenditures and delays between project announcement and final investment decisions. The analysis further considers strategic foreign ownership, prior geopolitical uncertainty exposure and institutional distance as moderating factors influencing option recognition and execution. The study extends real options theory by shifting attention to post-entry option exercise and exploring contingent conditions. It provides empirical evidence on how firms restructure investments in geopolitically sensitive critical mineral value chains, offering guidance for managers and policymakers seeking to balance investment stability with energy security during the global energy transition.
14:05- 14:35 CET	Optimal Carbon Pricing for Green Hydrogen Adoption: Insights from a Firm-Production Model. Authors: Monica Pereira Henriques, Boris Ortega, Gilbert Fridgen Presenter: Monica Pereira Henrique (Interdisciplinary Centre for Security, Reliability and Trust - SnT, University of Luxembourg)	The European Union (EU) has a legally binding commitment to reach climate neutrality by 2050, and hydrogen is identified as a key enabler of this transition. The EU places particular focus on the development of green hydrogen, which is projected to supply 10% of the EU's total energy demand by 2050. Despite this ambitious target, the deployment of green hydrogen remains limited, mostly due to its high production costs relative to existing renewable and conventional technologies. While policy instruments such as carbon pricing or cap-and-trade programs could improve the competitiveness of green hydrogen, it remains unclear how to design these instruments to make green hydrogen economically competitive with fossil fuels in industrial applications. This paper uses an optimization-based approach to estimate the carbon price levels required for green hydrogen to become cost-competitive with fossil fuel in industrial applications. The model relies on a two-level constant elasticity of substitution (CES) production function and is calibrated using observed energy prices and consumption data to represent a stylised industrial firm in Luxembourg. The framework simulates how firms adjust their energy mix in response to different carbon price levels, allowing identification of the carbon price threshold at which green hydrogen becomes a substitute for fossil fuels. Preliminary results indicate that the carbon price required for green hydrogen to become competitive is relatively high, ranging from 240€ to 3,000€ per ton of CO_2 depending on model specifications, such as production function (including Cobb-Douglas and nested CES) and the assumed substitution elasticities. Even the lower bound will require doubling the current highest carbon price of 123€ in Switzerland. This suggests that carbon pricing alone is unlikely to drive large-scale adoption of green hydrogen under current cost conditions, highlighting the need for complementary measures (e.g., reducing hydrogen production costs, lowering electricity prices, or expanding hydrogen infrastructure).

14:35 - 15:05 CET	Electric vehicle adoption and petrol consumption: Evidence of a decrease in fossil fuels for the private passenger vehicle market. Authors: Jacobus Nel; Presenter: Jacobus Nel (University of Pretoria)	This study investigates the relationship between electric vehicles (EVs) and petroleum consumption to establish if the estimates of a 6% reduction in oil demand by 2030 could be feasible, as estimated by the IEA (2024). As EV stocks increase and the stock of internal combustion engine vehicles (ICEVs) plateaus and declines, demand for (and therefore consumption of) petroleum fuels is expected to follow a similar trajectory. A reduction in oil consumption for transport could be the next step to energy security, which many countries have been pushing for after the 2022 invasion of Ukraine and the recent war in Iran. For this analysis, we consider a panel of 20 European countries over the period 2015–2022. Estimates from a dynamic fixed-effects model to determine petrol demand elasticities indicate that the impact of EV adoption on petrol consumption is likely homogeneous across countries, with EV adoption substantially increasing after the Covid-19 pandemic. As a robustness check, we employ an alternative measure based on energy use from cars and light trucks, which corroborates the main results. Furthermore, the findings suggest the potential for reductions in transport-sector energy intensity. These results have important implications for both petroleum industry stakeholders and policymakers, underscoring the importance of incorporating EV adoption into modelling exercises and using ex post empirical evidence to parameterise models. It should be noted that any policy to advance transport electrification to increase energy security should be accompanied by increasing the energy security of the electricity supply industry.
15:05 – 15:25 CET	Coffee break	
15:25 – 16:15 CET	Closing Plenary Session: Many Paths, One Global Academic Stage Assistant Prof. Alanda Venter, RWTH Aachen University Christophe Bonnery, IAEE and FAEE Past President Associate Prof. Clair Bergaentzlé, DTU Assistant Prof. Pablo Benalcazar, Polish Academy of Science. Past IAEE Student representative	
16:15 – 16:30 CET	Closing Ceremony and IAEE Emerging Student Research Award	