

IAEE Energy Forum

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International Association for Energy Economics



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Editor: David L. Williams

President's Message

Dear fellow members of IAEE,

This year we are hosting our 40th International Conference in Singapore, June 18th – 21st, marking the 40th anniversary of the time a group of visionary energy experts in Washington, Boston, and Cambridge (UK) joined to create this wonderful organization. Our International Association for Energy Economics (IAEE) has grown steadily, and today it has more than 4100 members in over 100 countries with 30 regional affiliates. Each year IAEE holds an international conference, and through its affiliates, regional conferences. IAEE publishes two leading journals in the field, *The Energy Journal* published since 1980 and *The Economics of Energy & Environmental Policy* since 2012, and a newsletter, *The Energy Forum*, since 1985. During all these years, IAEE has been an open platform for communication and knowledge among those interested in energy economics, bringing together industry professionals, government officials, academia, students and the press, and has been an important contributor to the understanding of the economics underlying all energy issues. As we celebrate 40 years since the first seed of IAEE was planted, we pay tribute and offer sincere gratitude to IAEE's founding fathers, and to all those who have served and contributed to the success of this remarkable organization, known as the IAEE family.

Since those first days, many things have changed. World population has reached 7.4 billion, and 1.6 billion more are expected by 2040. Further, in the last decade and early in this one, we have seen a decline in the number of people living in extreme poverty, dropping from 1.8 billion in 1990 to 836 million in 2015. However, and regrettably, 1.2 billion people still don't have access to electricity, and 2.8 billion rely on wood or other biomass to cook and heat their homes. Future economic growth is expected to increase energy demand as well: energy demand is projected to increase almost 50% by 2040, mostly in non-OECD countries. This will require more than US \$40 trillion in energy investments by 2040, enough only to achieve the necessary incremental energy supply, close the gap in energy access and fuel economic development. An additional investment of US \$20 trillion will optimize the use of this new energy through energy efficiency (EE) measures. Without affordable energy sources, it will be difficult to close the gap in energy access and to promote sustainable economic development.

To bring in this needed investment, many economies face the challenge of improving their energy institutions and regulatory regimes. This is an area where there is a lot of opportunity for improvement, and where, worldwide, we see a wide diversity of business models in the energy sector, with different roles being assigned to the State and the private sector; and different practice levels in the pricing of energy services, energy subsidies, the rule of law, the exercise of property rights, the design and grant-



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President's Message (continued from page 1)

ing of operating and concession contracts, and the fiscal impact of resource rents and the management of sovereign wealth funds. Governance of the energy sector is therefore a big issue. In developing countries, especially, the institutional part needs to be better understood, as well as how to implement governance reforms. In addition, there is a need to determine the kind of incentives and mechanisms that should be set in place to integrate more private capital in the energy industry, in the production and distribution of energy.

The financial, economic and technical challenges faced by the energy sector are surrounded by the political environment, by an increasingly demanding civil society, and by the natural environment, including questions of sustainable development, GHG emissions and the links with climate change. There is a clear need to further advance our knowledge of mitigating the impacts the different energy projects have on the environment, locally and globally. Improving the engagement within energy developers, local communities, the Civil Society, and special interest groups is needed. Finding new approaches to enable energy projects that benefit both current and future generations are challenges of increasing complexity. The granting of proper concession and/or operating contracts, under a regulatory regime that allows the transformation of energy rents into wealth while protecting them from capture by interest groups is an issue. And at times, as is well known in the oil industry, the biggest risks are over the ground and not under the ground.

As we have observed in recent years, technological innovation is one of the biggest drivers of the change in the energy markets, and it is expected to stay so. Today, access to non-conventional fossil fuels (NC) and renewables (RE) are the result of game-changing technological innovations, uncovering energy resources that a few decades ago were uneconomic if not unknown. Today we see more energy sources than were foreseen 20 years ago, in fossil fuels (FF) and renewables, and there are challenges to better understand the role that nuclear energy can play in the future energy mix. We need to improve our economic knowledge of how these energy sources compare with conventional energy sources (CE) for different environments, where issues of intermittency and energy security are part of the equation. An ongoing issue is identifying the proper and efficient incentive mechanisms that should be put in place for an efficient deployment of RE and the development of NC. If these resources are put to work in a smart, efficient and sustainable way, the international community has a great opportunity to develop an efficient, affordable and sustainable energy system. There are great complementarities within the different energy sources, but the big challenge in many regions is to strengthen energy integration in a manner that does not jeopardize energy security.

The transmission grid allows the transportation of electricity from power plants located at far distances, but transmission also is an important enabler of new energy projects, and in many cases energy investment lags because of the deficient electricity transmission infrastructure. And, for many economies, the lack of suitable institutions, planning, and pricing schemes to enable a timely and efficient expansion of the transmission grid and other energy infrastructure, such as pipelines, has not been solved. While, in other economies, the questions today are on the design of smart systems to take advantage of new technologies, and the greater interaction that it is expected between producers and consumers. Also, there is a recent trend, where small producers, even households or small companies, can sell electricity surpluses as distributed generators (net billing and net metering schemes). This is putting pressure on the standard electric utility` business model, raising questions regarding the role of the grid and who, and how to pay for it.

Worldwide we not only need more energy and to harness properly the different energy resources, CE, NC and RE, but also, we need to learn how doing more with less, in a more sustainable way. Some major improvements have been achieved, such as in transport, which uses more than 50% of the oil, where we are seeing big changes in automotive performance, measured in miles per gallon, or the increasing fleet of electric vehicles, reducing our need of oil while increasing our need for power generation. Also, no more than a few decades ago a few countries started to look at energy efficiency as an additional source of energy. This is an area where most economies lag as it is not clear what are the best practices, as applied, in some of the more advanced economies. The promotion of EE programs in productive and commercial activities, and at the household level, are a key part of the do-list for many economies.

As highlighted by the previous examples, the world faces a wide set of challenges in the energy sector. IAEE has played an important role in the past, and we expect that as population and economic growth continues, and technology enables new energy sources while others are depleted, the role of IAEE will be increasingly important as an open forum for economic ideas in the search for better solutions for the energy sector.

Finally, allow me to thank all those who have contributed to the great success of IAEE, past presidents, former council members, and those whose term in the Council ended last year, Omowumi Iledare, Jurgis Vilemas, Christophe Bonnery, Lori Smith Schell, Anthony D. Owen, Gerardo Ariel Rabinovich, James Smith, Lisa Marina Koch. Let me thank too, for a demanding and committed work, the editors of our Journals, Adonis Yatchew and Christian von Hirschhausen, and their editorial boards; our Executive Director, David Williams, and his

staff; and our General Counsel, John W. Jimison. But, overall, I want to thank you as IAEE members, because you are the ones who give life to this Association, sharing your analyses and research, participating in the different activities we have, and creating a unique environment for the exchange of ideas and networking on the topics of energy economics. You are the ones that make us in the Council eager to determine how to serve you better, serve better the purposes of this association, and promote its further development in an environment that every day brings forth new challenges. I invite you to actively participate in the activities that IAEE has prepared for you during this year, to stay alert to the news, information and our publications, let us know how we can improve our work, and, above all, continue to generate your own contributions to our great communal effort to understand the economics of energy.

Lastly, let me express my appreciation and gratitude to each of you for the vote of trust that you gave me to lead this organization in 2017, certainly a great privilege and honor for me.

Ricardo Raineri Bernain

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International
Association
for Energy
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IAEE Mission Statement

The International Association for Energy Economics is an independent, non-profit, global membership organisation for business, government, academic and other professionals concerned with energy and related issues in the international community. We advance the knowledge, understanding and application of economics across all aspects of energy and foster communication amongst energy concerned professionals.

We facilitate:

- Worldwide information flow and exchange of ideas on energy issues
- High quality research
- Development and education of students and energy professionals

We accomplish this through:

- Providing leading edge publications and electronic media
- Organizing international and regional conferences
- Building networks of energy concerned professionals

Editor's Notes

In late summer of last year IAEE held a very successful regional conference in Baku, Azerbaijan. We include a number of the papers presented there in this issue. In addition, a detailed report on the North American Conference held last fall is also included.

Yoshiki Ogawa analyzes PV and battery connections in the commercial and residential sectors to determine the most optimum. The target of zero purchased electricity is inefficient; the balance between purchased and sold PV electricity is crucial. The balancing between economics and battery capacity is also important. The cost reduction of batteries is indispensable.

Thomas Geissmann notes that the question of the economic viability of nuclear energy in today's increasingly liberalized western energy markets has not yet reached a consensus in the energy community. The estimation of a power project's economic viability by calculating the levelized cost of energy (LCOE) is a fundamental initial instrument for investment decisions. He sets forth a novel approach to calculate the LCOE using a probabilistic model that accounts for endogenous input parameters. The approach is applied to the example of a nuclear power project. Monte Carlo simulation results show that correlation in input parameters has a significant effect on the model outcome. By controlling for endogeneity, a statistically significant difference in the mean LCOE estimate and a change in the order of input leverages is observed.

Zauresh Atakhanova and **Peter Howie** discuss Kazakhstan's growing household coal use noting that reducing this requires reforming energy subsidies, incentivizing weatherization, and developing renewables. They estimate the effects of increasing coal prices and growing income on household coal demand.

Robert Brooks addresses the question whether it is possible to compensate for loss of Russian gas pipeline exports through Ukraine to Europe with the currently envisioned new gas pipeline and LNG import projects, with particular emphasis on gas sourced from the Caspian region.

Ulrike Lehr, Anke Mönning, Rachel Zaken and **Edi Bet-Hazadi** illustrate the economic effects of increasing energy efficiency in Israel. Applying a macro-driven Input-Output-Model, the economic implications under three scenarios are simulated: a baseline, business-as-usual scenario and two efficiency scenarios. The effects of the efficiency scenarios on GDP and employment are positive.

Aiyngul Kerimray, Rocco De Miglio, Luis Rojas-Solórzano, and **Brian Ó Gallachóir** review residential energy consumption trends in Kazakhstan. They discuss the energy efficiency potential in buildings as well as the incidence of energy poverty across the regions of the country.

Brantley Liddle models energy demand at several different levels of aggregation by analyzing U.S. state-based panel data. Nonlinear relationships between energy consumption and income and possible asymmetric relationships with respect to income growth and price are considered as well.

Hongbo Duan, Jianlei Mo, Ying Fan and **Shouyang Wang** posit that without taking any further policy measures, it is almost impossible for China to peak its carbon emissions in 2030, and the probability of carbon emissions peaking does not reach 50% until 2040. They discuss the effect of a subsidy policy for renewables and a carbon tax policy each separately and then together and conclude that the policy mix of carbon tax and renewable energy subsidy is more effective.

Nathaniel Babajide notes that given the Caspian region is an important net oil exporting area, it is highly vulnerable to oil shocks, and the consequent impact on economic growth and competitiveness of member economies. His studies show that diversification of foreign earning sources is essential for meaningful economic and energy security amongst the region's economies. In addition, a large investment in renewable energy technologies (wind, solar, hydro and biomass) is required to reduce the Caspian's heavy dependence on oil.

DLW

IAEE/Affiliate Master Calendar of Events

(Note: All conferences are presented in English unless otherwise noted)

Date	Event, Event Title and Language	Location	Supporting Organization(s)	Contact
2017				
April 3-5	6th ELAEE Conference <i>New Energy Landscape: Challenges For Latin America</i>	Rio de Janeiro	ALADEE	Luciano Losekann luciano.dias.losekann@gmail.com
April 23-25	10th NAEE/IAEE International Conference <i>Theme to be Announced</i>	Abuja, Nigeria	NAEE	Wumi Iledar wumi.iledare@yahoo.com
June 18-21	40th IAEE International Conference <i>Meeting the Energy Demands of Emerging Economic Powers: Implications for Energy And Environmental Markets</i>	Singapore	OAE/IAEE	Tony Owen esiadow@nus.edu.sg
September 3-6	15th IAEE European Conference <i>Heading Towards Sustainability Energy Systems: by Evolution or Revolution?</i>	Vienna, Austria	AAEE/IAEE	Reinhard Haas haas@eeg.tuwien.ac.at
November 12-16	35th USAEE/IAEE North American Conference <i>Riding the Energy Cycles</i>	Houston, TX, USA	USAEE	David Williams usaee@usaee.org
2018				
June 10-13	41st IAEE International Conference <i>Security of Supply, Sustainability and Affordability: Assessing the Trade-offs Of Energy Policy</i>	Groningen, The Netherlands	BAEE/IAEE	Machiel Mulder machiel.mulder@rug.nl
September 19-21	12th BIEE Academic Conference <i>Theme to be Announced</i>	Oxford, UK	BIEE	BIEE Administration conference@biee.org
2019				
May 26-29	42nd IAEE International Conference <i>Local Energy, Global Markets</i>	Montreal, Canada	CAEE/IAEE	Pierre-Olivier Pineau pierre-olivier.pineau@hec.ca
August 25-28	16th IAEE European Conference <i>Energy Challenges for the Next Decade: The Way Ahead Towards a Competitive, Secure and Sustainable Energy System</i>	Ljubljana, Slovenia	SAEE/IAEE	Nevenka Hrovatin nevenka.hrovatin@ef.uni-lj.si

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