Faculty of Engineering Distinguished Lecture Series

Navigating the Turbulence of the Global Energy System

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Date: September 6, 2017 (Wednesday)
Time: 4:30 PM - 5:45 PM
Venue: Lecture Theatre 2, Yasumoto International Academic Park

Abstract

After more than a hundred years of historic success, the fundamentals of the energy industry are rapidly changing driven by three "Ds", namely: (i) Decarbonization, to reduce greenhouse gas emissions, especially in view of the Paris Agreement; (ii) Diversification, to offer more choices for fuels, electricity generation and options for mobility as well as national security; (iii) Digitization, to automate, increase efficiency and lower costs. The world still faces three big energy challenges, namely: (a) How can one continue the exponential economic growth while decarbonizing the economy cost-effectively?; (b) How can the energy system be made resilient, adaptable and secure against various threats – climate, cyber...?; (c) How can one provide access to affordable modern energy to every human being in the world, noting that there are about 1.2 billion people who don't have access to modern energy and another 1 billion people who have marginal access? History has taught us that for our energy policies to be truly sustainable for the long term, they must maintain a balance between three securities - economic, national and environmental—while also ensuring social equity. The paramount question can be summarized as: What pathways or approaches should a business, an industry, nation or a region adopt to address the future challenges while navigating, leveraging and shaping the three "D" landscape? This talk will provide a snapshot of various trends in the 3Ds and offer some thoughts on addressing this paramount challenge. It will also highlight the need to innovate – to experiment with new ideas, knowing some of them will fail, but hopefully fail quickly, and more importantly, teach a lot in the process.

Biography

Dr. Arun Majumdar is the Jay Precourt Professor at Stanford University, a faculty member of the Departments of Mechanical Engineering and Materials Science and Engineering (by courtesy) and co-director of the Precourt Institute for Energy, which integrates and coordinates research and education activities across all seven Schools and the Hoover Institution at Stanford.

Dr. Majumdar's research in the past has involved the science and engineering of nanoscale materials and devices, especially in the areas of energy conversion, transport and storage as well as biomolecular analysis. His current research focuses on using electrochemical reactions for thermal energy conversion, thermochemical water splitting reactions to produce carbon-free hydrogen, understanding the limits of heat transport in nanostructured materials and a new effort to re-engineer the electricity grid.

In October 2009, Dr. Majumdar was nominated by President Obama and confirmed by the Senate to become the Founding Director of the Advanced Research Projects Agency - Energy (ARPA-E), where he served till June 2012 and helped ARPA-E become a model of excellence for the government with bipartisan support from Congress and other stakeholders. Between March 2011 and June 2012, he also served as the Acting Under Secretary of Energy, enabling the portfolio that reported to him: Office of Energy Efficiency and Renewable Energy, Office of Electricity Delivery and Reliability, Office of Nuclear Energy and the Office of Fossil Energy, as well as multiple cross-cutting efforts such as Sunshot, Grid Tech Team and others that he had initiated. Furthermore, he was a Senior Advisor to the Secretary of Energy on a variety of matters related to management, personnel, budget, and policy.

After leaving Washington, DC and before joining Stanford, Dr. Majumdar was the Vice President for Energy at Google, where he created several energy technology initiatives, especially at the intersection of data, computing and electricity grid, and advised the company on its broader energy strategy.

Prior to joining the Department of Energy, Dr. Majumdar was the Almy & Agnes Maynard Chair Professor of Mechanical Engineering and Materials Science & Engineering at University of California–Berkeley and the Associate Laboratory Director for energy and environment at Lawrence Berkeley National Laboratory.

Dr. Majumdar is a member of the National Academy of Engineering and the American Academy of Arts and Sciences. He served as the Vice Chairman of the Advisory Board to US Secretary of Energy, Ernest Moniz, and was also a Science Envoy for the US Department of State with focus on energy and technology innovation in the Baltics and Poland. He served as a member of the Councils of the National Academy of Engineering, and now sits on the Council of the Electric Power Research Institute, as well as the Science Advisory Board of the Oak Ridge National Laboratory. He is a member of the International Advisory Panel for Energy of the Singapore Ministry of Trade and Industry and sits on the Board of Envision Energy.

Dr. Majumdar received his bachelor's degree in Mechanical Engineering at the Indian Institute of Technology, Bombay in 1985 and his Ph.D. from the University of California, Berkeley in 1989.

All are welcome.