Saamrat Kasina, Ph.D.

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ENERGY AND ENVIRONMENTAL ECONOMICS, INC. San Francisco, CA
Managing Consultant

Dr. Saamrat Kasina joined E3 in 2017 and focuses primarily on issues related to resource planning and market design. He also conducts sophisticated benefit-cost analysis at the distribution level, supporting utility initiatives related to grid modernization and distributed energy resources (DER) in the U.S. and abroad. His work includes supporting a Northeastern utility's grid modernization filing, advising a Southwestern utility on joining the Western Energy Imbalance Market, and developing Integrated Resource Planning models for several Community Choice Aggregators (CCAs) in California. Dr. Kasina joined E3 upon receiving both his Ph.D. in Environmental Engineering and his Master of Science in Engineering from Johns Hopkins University. Select projects at E3 include:

- Developed a grid modernization roadmap to support National Grid's Advanced Metering Functionality (AMF) and Grid Modernization Plan (GMP) filings in Rhode Island. Led benefit/cost analysis of AMF and GMP proposals.
- Developed Integrated Resource Planning models for two California-based CCAs to support their strategic planning processes
- Worked with a team of developers and utility personnel to investigate the economic benefits of flexibly operating solar power plants: allowing them to dispatch on a sub-hourly basis and provide grid reliability services. The study received a "Top Innovator 2018" award from *Public Utilities Fortnightly*.
- Co-led a study for one Southwestern utility and provided modeling support for another to quantify the prospective economic benefits of joining the Western Energy Imbalance Market (EIM)
- Provided AURORA modeling support to assist a renewable energy developer in evaluating the future of California's energy market
- Assisted in asset evaluation for a power producer in the Western U.S. and analyzed the impacts of regulations on their market position
- As an intern, helped develop a set of long-term investment decisions to support the islands of Hawaii in achieving their goal of reaching 100 percent renewable energy using RESOLVE, E3's resource planning model
- As an intern, identified current market and planning practices in the Indian electricity sector as part of an advisory report to state electricity regulators

JOHNS HOPKINS UNIVERSITY – Doctoral Program Baltimore, MD
Select projects 2012 – 2017

Non-cooperative multi-regional transmission and generation planning Sep 2015 – July 2017

- Modeled strategic interaction between intra-regional stakeholders in transmission and generation investment models as Mathematical Programs with Equilibrium Constraints (MPECs)

- Quantified the value of cooperation in planning to adjacent ISOs by solving Equilibrium Problems with Equilibrium Constraints (EPECs)

Unit commitment approximations for capacity investment models July 2013 – July 2017
- Developed a tight linear approximation of the Unit Commitment MIP model
- Bridged long-term transmission planning and short-term operations using the UC approximation

Benefits of additional decision stages in Multi-Stage Stochastic Transmission planning 2014 – 2015
- Developed a multi-stage, stochastic transmission and generation co-optimization investment model to quantify the benefits of additional decision stages
- Applied mathematical decomposition techniques to solve this large-scale Western Electricity Coordinating Council (WECC) model

Education

Johns Hopkins University — Baltimore, MD
Ph.D., Environmental Health and Engineering — 2017

Johns Hopkins University — Baltimore, MD
M.S.E., Environmental Economics and Management — 2011

Indian Institute of Technology — Guwahati, India
Bachelor of Technology, Biotechnology — 2010

Selected Presentations

1. Kasina, S., "Non-cooperative Multi-Regional Transmission Planning," Nashville, Tenn. *INFORMS.* November 2016.

2. Kasina, S., "Unit Commitment Approximations for Resource Planning," University of Washington, Seattle, Wash. *Seminar for the Next Generation of Researchers in Power Systems*. September 2015.

Publications and Reports

1. Kasina, S., B.F. Hobbs. "An Equilibrium Model for Non-cooperative Multiregional Transmission Planning." *European Journal of Operations Research.* (In Review.)

2. Nelson, J., S. Kasina, J. Stevens, J. Moore, A. Olson, M. Morjaria, J. Smolenski, J. Aponte. "Investigating the Economic Value of Flexible Solar Power Plant Operation," Energy and Environmental Economics, Inc. (E3), October 2018. (White paper.)

3. Hobbs, B. F., S. Kasina, Q. Xu, S. W. Park, J. Ouyang, J. Ho, P. Donohoo-Vallett. “What is the Benefit of Including Uncertainty in Transmission Planning? A WECC Case Study." In Tung X. Bui & Ralph H. Sprague Jr., Eds., *“HICSS,”* IEEE Computer Society, pp. 2364-2371. 2016.

4. Ho, J., B. F. Hobbs, P. Donohoo-Valett, Q. Xu, S. Kasina, S. Park, Y. Ouyang. “Planning Transmission for Uncertainty: Applications and Lessons with the Western Interconnection." Report prepared for the Western Electricity Coordinating Council (WECC). July 2015.

5. Munoz, F. D., B. F. Hobbs, J. L. Ho, S. Kasina. “An Engineering-Economic Approach to Transmission Planning Under Market and Regulatory Uncertainties: WECC Case Study." *IEEE Transactions on Power Systems*, Vol. 29, No. 1, pp. 307-317. January 2014.

6. Munoz, F. D., B. F. Hobbs, S. Kasina. “Efficient proactive transmission planning to accommodate renewables." *IEEE 2012 Power and Energy Society General Meeting*, pp. 1, 7, 22-26. July 2012.

Citizenship

India