

# Saamrat Kasina, Ph.D.

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415.391.5100, ext. 327

## **ENERGY AND ENVIRONMENTAL ECONOMICS, INC.** *Consultant*

San Francisco, CA

Dr. Kasina joined E3 in 2017 as a Consultant upon receiving his Ph.D. in Environmental Health and Engineering as well as his Masters of Science in Engineering from the Johns Hopkins University. At E3, he focuses on market design and resource planning. He has also worked with CCAs to assist them in their resource procurement and rate analyses. He holds a Bachelor of Technology from the Indian Institute of Technology (IIT), Guwahati, India. Dr. Kasina has extensive experience with Equilibrium modeling, Multi-Stage Stochastic Capacity Investments, Microeconomics, Data Analytics, Optimization, Game Theory, Mixed-Integer, and Non-linear programming using various modeling and analysis tools such as R, SQL, MATLAB, Python, GAMS, and AIMMS. Select projects include:

- Developed Integrated Resource Planning models for two CCAs as part of their strategic planning processes.
- Worked with the Public Service Company of New Mexico (PNM) to evaluate the impact of them joining the Western Energy Imbalance Market (EIM). Provided PLEXOS modeling support.
- Provided AURORA modeling support to assist a renewable energy developer in their evaluation of the future of California's energy market.
- Assisted in asset evaluation for a power producer in the Western US and analyzed the impacts of regulations on their market position.

## *Intern*

Summer 2016

Hawaii long-term investment planning: Worked on developing a set of long-term investment decisions aiding the islands of Hawaii meet their renewable energy goals. This project used E3's resource planning model, RESOLVE.

Worked on identifying current market and planning practices in the Indian electricity sector. The larger goal of this work was a report that was presented to the state regulators.

## **JOHNS HOPKINS UNIVERSITY - Doctoral Program**

Select Projects:

### *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* Jul 2013 - Ongoing

- Developed a tight linear approximation of the Unit Commitment MIP model.
- Bridging 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 WECC model.

## Education

Johns Hopkins University Baltimore, MD  
*Ph.D. in Environmental Health and Engineering* August 2017

*Dissertation: Essays on unit commitment and interregional cooperation in transmission planning*

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

Indian Institute of Technology Guwahati, India  
*Bachelor of Technology, Biotechnology* June 2010

## Selected Presentations

1. Kasina, S., "Unit Commitment Approximations For Resource Planning", *University of Washington, Seattle, Seminar for the [Next Generation of Researchers in Power Systems](#)*. Sep 2015.
2. Kasina, S., "Non-cooperative Multi-Regional Transmission Planning", *Nashville, TN, INFORMS*, Nov 2016

## Publications and Reports

1. Kasina, S.; Hobbs, B.F., "An Equilibrium Model for Non-cooperative Multiregional Transmission Planning," *Power Systems, IEEE Transactions on*, (In Review)
2. Kasina, S.; Wogrin, S.; Hobbs, B.F., "A Comparison of Unit Commitment Approximations for Generation Production Costing," *Power Systems, IEEE Transactions on*, (In Review)
3. Hobbs, B. F.; Kasina, S.; Xu, Q.; Park, S. W.; Ouyang, J.; Ho, J.; Donohoo-Vallett, P, "What is the Benefit of Including Uncertainty in Transmission Planning? A WECC Case Study," in Tung X. Bui & Ralph H. Sprague Jr., ed., 'HICSS', IEEE Computer Society, pp. 2364-2371., 2016

4. Ho, J.; Hobbs, B.F.; Donohoo-Valett, P.; Xu, Q.; Kasina, S.; Park, S.; Ouyang, Y., "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.; Hobbs, B.F.; Ho, J.L.; Kasina, S., "An Engineering-Economic Approach to Transmission Planning Under Market and Regulatory Uncertainties: WECC Case Study," Power Systems, IEEE Transactions on, vol.29, no.1, pp.307,317, Jan. 2014
6. Munoz, F. D.; Hobbs, B.F.; Kasina, S., "Efficient proactive transmission planning to accommodate renewables," Power and Energy Society General Meeting, 2012 IEEE, vol., no., pp.1,7, 22-26 July 2012

## Citizenship

India