Roderick Go

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ENERGY AND ENVIRONMENTAL ECONOMICS, INC.   San Francisco, CA
Technical Manager & Associate Director

Mr. Go's work at E3 spans the resource planning, market analysis, and distributed energy resources (DERs) practice areas. As Technical Manager, he facilitates implementation of E3's corporate strategy to develop cutting-edge analysis & subject matter expertise. This includes overseeing the development and integration of E3's model ecosystem & practice areas to deliver tools and analyses that address emerging questions around the energy transition. Prior to his role at Technical Manager, Mr. Go played a critical role in the development & use of E3's RESOLVE, RECAP, RESTORE, IDSM, and EVGrid tools to help clients answer a range of bulk and distribution system planning questions.

Mr. Go joined E3 in 2016 upon receiving an M.S.E. in Environmental Management & Economics from the Johns Hopkins University. Prior to E3, Mr. Go's research experience focused on developing novel power system optimization models & solution algorithms to investigate the operational and planning questions related to transmission-constrained systems with high renewables. Select projects at E3 include:

- **California Energy Commission EPIC Grant EPC-19-056, Assessing the Value of Long Duration Storage, 2020-Present.** Managing EPIC-funded research study on the value of long duration energy storage to help California meet its economywide decarbonization goals. Additionally, leading development of a new modeling toolkit and dataset to ensure system planners have the tools necessary to value resources appropriately and investigate emerging planning challenges such as reliability, last-regrets investments, and cross-sectoral coupling.
- **California Independent System Operator Demand Response ELCC Analysis, 2019-2020.** Managed project to examine the effective load carrying capability of demand response programs using E3's RECAP model, in collaboration with CAISO and stakeholders in its ESDER 4 initiative.
- **California Public Utilities Commission Integrated Resource Plan. 2019-Present.** Supporting the CPUC's integrated resource plan by developing E3's RESOLVE model and updating key assumptions that underpin California's statewide electricity plan.
- **Hawaiian Electric Companies Integrated Grid Planning, 2019-Present.** Managed project to support HECO's Integrated Grid Planning process to develop updated system needs assumptions and evaluate bids on each of HECO's operating islands in the context of Hawaii's long-term energy policies.
- **Transmission Benefits Analyses for Confidential Developer Clients, 2016-Present.** Analyzed the long-term energy, capacity, and renewable procurement benefits associated with various transmission projects across the U.S., which clients used to determine whether to continue project development.
- **Western Energy Imbalance Market Benefits Studies, 2016-2019.** Analyzed potential operational benefits of subhourly wholesale market transactions via Western EIM integration for NorthWestern Energy, Portland General Electric, and el Centro Nacional de Energía (Baja

California). Managed studies for the Public Service Company of New Mexico and Bonneville Power Administration.

o **Orange & Rockland Utilities Non-Wires Analysis Toolkit & Bid Evaluation, 2017-Present.** Enhanced E3's spreadsheet-based integrated demand-side model to calculate the net benefits of portfolios of distributed energy resources to meet utility needs for transmission and distribution project deferral. Linked ORU's toolkit with E3's New York Storage Tool (developed for the New York State Energy Research & Development Agency) to enable detailed storage bid evaluations.

o **California Energy Commission Solar + Storage Tool, 2017-2019.** Expanded E3's RESTORE model to evaluate the system-wide and locational net benefits of a customer-sited portfolio of solar, storage, and other distributed energy resources.

o **Puget Sound Energy Flexibility Study, 2017.** Assisted in development of PSE's PLEXOS production cost model and assessed intra-hour flexibility challenges at high wind penetrations to support 2017 Integration Resource Plan.

o **Sacramento Municipal Utilities District, 2017.** Updated PLEXOS simulation of SMUD's system to understand the impact of increasing renewable generation and broader regional changes on the utility's energy supply costs.

o **Hawaiian Electric Companies Power Supply Improvement Plan, 2016.** Updated E3's RESOLVE model for HECO's December 2016 PSIP update. E3 worked with HECO and its stakeholders to develop a set of least cost investment pathways to reach 100% renewables by 2045, helping guide policy and investment decision-making. Additionally, developed a training course for HECO staff to run RESOLVE, RECAP, and hosting capacity analyses in-house to aid in future decision-making.

o **CPUC Locational Net Benefits Analysis Demonstration, 2016.** Developed a spreadsheet-based demonstration tool to determine the location-specific avoided costs associated with the installation of distributed energy resources.

SANDIA NATIONAL LABORATORIES   Albuquerque, NM
Technical Intern & Consultant   June 2015 - October 2018

o Created a mixed-integer model in Python (Pyomo) to co-optimize transmission, generation, and energy storage investments on a large-scale power network, leveraging PySP and high-performance computing to implement L-shaped method decomposition for large problems.

o Studied the economic value and interaction of energy storage investments with generation and transmission expansion planning decisions to support implementation of high renewables portfolio standards and other policy constraints.

JOHNS HOPKINS UNIVERSITY   Baltimore, MD
Research Assistant   June 2014 - May 2016

o Studied the accuracy of different *k*-means clustering and unit commitment approximations for high-renewables systems in Matlab and GAMS as a visiting researcher at el Instituto de Investigación Tecnológica (Madrid, Spain).

o Developed a bilevel optimization model in GAMS to compare siting and sizing decisions of energy storage merchant recovering costs via energy arbitrage to those of a welfare-maximizing central planner.

Education

Johns Hopkins University   Baltimore, MD
M.S.E., Environmental Management and Economics   2016

Johns Hopkins University   Baltimore, MD
B.S., Environmental Engineering   2015
Minor in Engineering for Sustainable Development – Urban Development

Presentations
1. "Optimal Portfolio Investment of an Energy Storage Merchant in the Energy Imbalance Market." INFORMS Annual Meeting, Philadelphia, PA. November 2015.
2. "Combining the L-Shaped Method and Lagrangian Relaxation for Expansion Planning with Storage Devices and RPS Constraints." INFORMS Annual Meeting, Houston, TX. November 2017.

Peer-Reviewed Publications
1. Go, R., Kahrl, F., Kolster, C. (2020). Planning for Low-Cost Renewable Energy. The Electricity Journal; 33(2).
2. Go, R.S., Munoz, F.D., Watson, J.-P. (2016). Assessing the Economic Value of Co-Optimized Grid-Scale Energy Storage Investments in Supporting High Renewable Portfolio Standards. Applied Energy; 183, 902-913.