

# Charles Gulian

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

New York, NY

*Consultant*

Working primarily with the bulk grid group at E3, Mr. Gulian applies his expertise in mathematics and statistics to develop and maintain E3's in-house loss-of-load-probability model, RECAP. Mr. Gulian has used RECAP to study resource adequacy for utilities in the desert Southwest and Pacific Northwest U.S., and also to study the value of long duration storage in New York and California. He has developed machine learning-based tools to forecast demand for operating reserves in power markets. Prior to joining E3, Mr. Gulian completed a combined bachelor's master's program at Johns Hopkins University, where he conducted independent research in scenario-based optimization with applications for transmission/generation expansion planning under uncertainty. He interned at Con Edison Clean Energy Businesses in 2019, where he worked with their wholesale power trading team to develop price forecasting models and trading strategies based on ISO load forecasting errors.

Selected project work at E3 includes:

- **Salt River Project ELCC Study + Coolidge Expansion Replacement Study.** Evaluated potential for solar + storage resources to replace proposed 800 MW expansion of natural gas-fired power plant.
- **Puget Sound Energy Resource Adequacy Study.** Evaluated ELCCs of all-source RFP bids for 2023 IRP. Implemented custom features in RECAP to suit client's modeling needs.
- **New York Storage Roadmap 2.0.** Assessed and compared ability of various long duration storage technologies to provide reliability in New York's 2040 power system for NYSERDA.
- **New York Climate Leadership and Community Protection Act (CLCPA).** Assessed potential for long duration storage technologies to replace clean, firm (dispatchable) generation in a decarbonized 2050 New York power system. Developed methods to incorporate climate change projections into resource planning tools, with a particular focus on resource adequacy and reliability assessments.
- **California Public Utilities Commission 2022 ELCC Study.** Designed ELCC study to support the CPUC's resource adequacy program.
- **RECAP 3.0 Model Development.** Led internal model development effort to update RECAP, E3's in-house loss-of-load-probability model. Designed and implemented Python code to directly optimize resource dispatch to maximize power system reliability

## **CON EDISON CLEAN ENERGY BUSINESSES**

New York, NY

*Energy Analyst Intern*

Summer 2019

- Worked with trading desk to implement physical and financial inter-ISO power trading strategies

- Built random forest regression-based price forecasting algorithms for daily use on trading floor
- Analyzed price arbitrage opportunities in power markets due to ISO load forecasting errors

**JOHN HOPKINS UNIVERSITY OFFICE OF SUSTAINABILITY**

*Graduate Student Instructor*

Baltimore, MD  
Fall Semester 2018

- Organized three successful events to promote sustainability on Johns Hopkins University's campus, including a "sustainable cider + trivia" event and a campus-wide networking event for sustainability-related student groups

*Teaching Assistant for Discrete Mathematics*

Fall Semester 2018

- Designed and delivered a weekly lesson plan to a class section of 25 students
- Proctored exams and graded weekly homework assignments

Extracurricular Work Experience

**INSTITUTE FOR RESEARCH TECHNOLOGY (IIT)**

*Research Associate*

Madrid, Spain  
Summer 2018-Present

- Wrote transmission/generation expansion planning models in Python to test a suite of optimization techniques for power grid planning under uncertainty in future wind power availability
- Studied representative day selection via k-means clustering of historical demand/production data

**INSTITUTE FOR DATA INTENSIVE ENGINEERING AND SCIENCE**

*Research Assistant*

Baltimore, MD  
Summer 2016-Spring 2018

- Published in Astronomy and Computing: "Robust Statistics for Image Deconvolution"
- Implemented a deconvolution algorithm to iteratively deblur astronomical images
- Created "update cooling" technique to ensure convergence of the image processing algorithm

Education

The Johns Hopkins University  
*Combined Bachelor/Master of Science, Applied Mathematics & Statistics*

Baltimore, MD  
December 2019

Citizenship

United States