



**Exponent**<sup>®</sup>  
Engineering & Scientific Consulting

## Natalie Alvarado

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### Professional Profile

Ms. Alvarado is an Associate in Exponent's Construction Consulting Practice. She has over two years of experience in the energy sector, where she has provided project management on multiple federally funded projects. She managed complex hydrogen project scopes, facilitating discussions to drive decision making on initiatives, monitoring and managing key milestones and handoffs, preparing project status reports and executive briefings, and engaging with cross-functional stakeholders to ensure on-track progress.

Specializing in dependency processes and management, Ms. Alvarado has led teams in delivering state-specific permitting inventories, ensuring quality control and consistency to streamline execution of national infrastructure projects. She is also proficient in data analysis and automation. She consolidated resource information from numerous interviews that she conducted with major energy industry leaders and government agencies; synthesized the qualitative data using Python and Excel automation, and consolidated information onto a single public platform. This data platform provides one source of truth and improved accessibility and visibility of collected information for project developers, regulators, and other stakeholders.

Ms. Alvarado was a lead presenter at multiple stakeholder events with 100+ attendees while at the Department of Energy, communicating technical insights to industry, government, and non-technical audiences.

Ms. Alvarado holds a M.S. in Civil and Environmental Engineering from the University of California, Berkeley, with a focus on Energy, Civil Infrastructure, and Climate. Her academic work explored the interconnected challenges of energy, infrastructure, and climate by integrating engineering, environmental, economic, and management approaches to develop sustainable infrastructure solutions for modern society. As part of her graduate research, she contributed to a team that designed a machine learning optimization model to minimize costs for three hypothetical desalination plants. Leveraging four years of hourly climate and energy data, the model generated optimal configurations for solar panels, wind turbines, and battery storage, demonstrating her ability to integrate advanced analytics with practical engineering challenges.

### Academic Credentials & Professional Honors

M.S., Civil and Environmental Engineering, University of California, Berkeley, 2023

B.S., Environmental Engineering, University of Colorado, Boulder, 2022

### Prior Experience

Fellow, U.S. Department of Energy - Office of Energy Efficiency & Renewable Energy, 2023-2025

## Project Experience

### **Hydrogen Permitting Initiative**

Led a U.S. Department of Energy (DOE) permitting initiative aimed at streamlining hydrogen infrastructure development. Managed many inter-connected dependencies to ensure smooth handoffs from one workstream to subsequent workstreams and responsible parties. Engaged with stakeholders across industry, government, and national labs to identify systemic barriers, and designed a customized data framework to capture permitting requirements. Managed a team to aggregate and validate multi-jurisdictional data, resulting in a prototype that informed DOE funding priorities and laid the groundwork for future machine learning–driven permitting tools.

### **Renewable Energy Desalination Optimization**

Developed a machine learning optimization model using Python's CVXPY library to minimize operational costs for three hypothetical desalination plants across California. Trained the model on four years of hourly climate data to simulate real-world performance and energy demands. Generated optimal quantity of solar panels, wind turbines, and battery systems based on site-specific climate and generation profiles.

### **Transit-Oriented Development Socioeconomic Analysis**

Designed and implemented a multinomial logistic regression model using Python's PyLogit library to examine socioeconomic impacts of transit-oriented developments (TODs) in the San Francisco Bay Area. Utilized U.S. Census data to quantify relationships between TOD proximity, income levels, and demographic indicators. Managed project workflow, data processing, and model validation, producing results that highlighted equity considerations in regional transportation planning.