

# Lakshmi Alagappan

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

San Francisco, CA

*Senior Partner*

Ms. Alagappan leads E3's transmission planning practice where she supports transmission owners, developers, system planners and operators, and state agencies on a wide-ranging set of issues related to transmission, including planning and needs identification, cost allocation and recovery, business case development, and regulatory strategy and policy development. She has worked extensively with system operators and transmission developers on improving transmission system planning practices to accommodate ambitious clean energy goals and provide resiliency in both the Western and Eastern Interconnections. Ms. Alagappan has deep experience working in the WECC market having supported multiple transmission developers for over 15 years on identifying potential transmission projects to better connect the West and evaluating their benefits. Examples of such projects include Cross-Tie, Ten West Link (formerly Delaney-Colorado River), Western Bounty, and Rio Sol. Ms. Alagappan also supports many utilities across the West in their integrated resource/system planning efforts through which needs for access to regional markets and resources is often identified. Given the chicken and egg nature of transmission planning, Ms. Alagappan's understanding of both sets of planning processes is important to develop actionable transmission plans. She has also supported a number of E3's efforts on regional market development including the recent Western Markets Exploratory Group's evaluation of CAISO's Extended Day Ahead Market (EDAM) and SPP's Markets+ day ahead market designs.

She also co-leads E3's asset valuation practice, where she advises clients on issues related to asset strategy, transactions, due diligence, and market entry. Her expertise extends across all thermal and renewable generation technologies, including offshore wind, as well as storage and transmission. Through this work, Ms. Alagappan has a pulse on current trends in the markets including pricing, contracting terms, permitting and siting, and supply chain dynamics which all are important indicators for the timing and feasibility of new transmission projects.

Highlights of her recent projects for a diverse client base of utilities, government agencies, developers, and investors include:

- **Western Regional Transmission Project Benefits Evaluation:** Directed a study of regional transmission solutions in the Desert Southwest and Pacific Northwest to help deliver renewables and storage to meet state energy and carbon goals for utilities in WECC. This study evaluated the benefits of transmission projects in isolation and in tandem through capacity expansion and production cost modeling to capture the savings associated with reductions in investment and operating costs. The study also evaluated different cost recovery options for the transmission projects based on project ownership structures and level of project offtake. The study results helped inform utilities of the benefits associated with each project to their customers, as well as helped the project developers understand the system wide benefits of their project(s).
- **CAISO Transmission Benefits Analyses:** Led the benefits analyses for 3 competitively solicited high-voltage transmission projects, including the first economically driven transmission project in

California (Delaney-Colorado River), that were approved by the CAISO: Harry Allen-Eldorado 500kV transmission project (constructed, supporting CAISO), Delaney-Colorado River 500kV transmission project (now Ten West Link, under construction, supporting TransCanyon), GatesGregg 230kV transmission project (approved and then canceled in subsequent transmission planning process due to market changes, supporting PG&E). All three projects included a mix benefits, many of which fall under the recent FERC NOPR's proposed benefit categories, and all required multiple evaluation methods (e.g., production cost (Gridview), capacity deferral, multiday storage/reliability analysis). The capacity deferral methodology that E3 developed as part of the Delaney-Colorado River analysis was adopted as part of CAISO's Transmission Economic Assessment Methodology for economic transmission.

- **Salt River Project Integrated System Plan (ISP):** Led E3's support of SRP's first ever integrated system planning process. This new planning process integrates resource, transmission, distribution, and customer program planning into one analytical framework. E3 supported SRP in developing the analytical framework for the ISP, including the coordination of resource and transmission planning processes. E3 ensured that the resource planning process was considering coordinated resource and transmission options in its capacity expansion modeling and that the appropriate transmission availability, costs, and configurations were utilized. E3 also worked with the transmission planning team to ensure that resource locations and profiles were included appropriately in transmission power flow models and that bulk system transmission was being evaluated across multiple scenarios. E3 also worked with members of both planning teams to ensure they were working from the same vintages of data and aligned their planning process timelines. An outcome from this work was an ISP system strategy related to "proactive transmission planning" to help guide SRP's power system planning over the next decade.
- **NARUC Interregional Transmission Process Evaluation:** Currently leading the development of a whitepaper for NARUC on the interregional transmission planning process and the barriers within and between regional planning entities to plan for interregional transmission projects. Through this work, Ms. Alagappan and her team have interviewed many entities in the transmission planning space including system planners, transmission developers, and state commissioners. The paper's goal is to discuss "low hanging fruit" solutions for policymaker to the barriers identified. The research and interviews for this work have created a strong foundation for understanding gaps in existing transmission planning processes and where various regional planning entities are evolving to close those gaps, such as capacity expansion for scenario analysis (currently under testing or expected to be used in NYISO, ISO-NE, and PJM).

Additional project experience includes:

- Contributing policy and regulatory recommendations for resource adequacy, resource planning and procurement, and markets and system operations to support a study identifying least-cost pathways for India's power sector in 2030.
- Identifying business models for rooftop solar and other distributed energy resources for TPDDL, and leading a Phase 2 cost-benefit analysis to recommend an optimal set of DER solutions
- Advising an investor-owned utility in the Western U.S. on opportunities to evolve its business model in response to emerging state clean energy initiatives, technology developments, and consumer demands
- Leading a market assessment for new transmission in New York needed to meet state clean energy goals

- Co-leading a technical and regulatory support consultancy for the National Association of Regulatory Utility Commissioners' (NARUC) partnership with India's CERC on international best practices for renewable energy regulation to help integrate large scale renewable development
- Developing a roadmap for a group of utilities looking to transition towards integrating higher penetrations of distributed energy resources
- Performing market valuation for energy storage technologies and analyzing the regulatory framework under which they could participate in wholesale energy markets in the U.S.

**ENERGY AND ENVIRONMENTAL ECONOMICS, INC.**

San Francisco, CA

*Intern*

Summer 2007

- Researched transmission interconnection and service policies for wind generators in North America.
- Research required extensive reading of government orders (particularly from the Federal Energy Regulatory Commission)

**NATURAL RESOURCES DEFENSE COUNCIL (NRDC)**

**AIR AND ENERGY DIVISION**

Washington, D. C.

MAP Sustainable Energy Fellow

Summer 2006

- Helped create a campaign to endorse oil savings policy in a road tour through the Midwest.
- Wrote a report on U.S. state oil intensities as a measure of economic vulnerability.

**CONSUMER ENERGY COUNCIL OF AMERICA (CECA)**

Washington, D. C.

*Energy Research and Policy Intern*

Summer 2005

- Helped with writing and researching white papers for CECA's Fuels and Technologies Forum.

Education

Stanford University

Palo Alto, CA

*M. S. Civil and Environmental Engineering*

June 2008

*Atmosphere/Energy Program*

Stanford University

Palo Alto, CA

*B. A. Economics/Minor in Human Biology*

June 2007

*Honors in Environmental Science, Technology and Policy*

Refereed Papers

1. Alagappan, L., C.K. Woo, R. Orans (2011) "What Drives Renewable Energy Development?" *Energy Policy*, 39:9, 5099-5104.