



Andrew DeBenedictis, Ph.D.

One Broadway, 9th Floor, Cambridge, MA 02142

andrew@ethree.com

ENERGY AND ENVIRONMENTAL ECONOMICS, INC.

Cambridge, MA

Director

Dr. DeBenedictis rejoined E3 in 2018. He works in E3's Boston office, where he helps clients in New England and elsewhere work towards a cleaner, more efficient energy sector. A member of E3's DER team, Dr. DeBenedictis embraces opportunities to practice integrated system planning by elucidating the many connections between DER and rates to the bulk system and long-term policy goals. This interest draws him to topics including rate design, electric utility cost of service, performance incentive mechanisms (PIMs), avoided costs, benefit cost analysis, DER incentive design, grid modernization, building electrification, wildfire risk analysis, resource adequacy, and integrated resource planning. This work has connected him with clients including the Massachusetts Clean Energy Center (MassCEC), Massachusetts Department of Energy Resources (DOER), the New York State Energy Research and Development Authority (NYSERDA), the Illinois Commerce Commission (ICC), the District of Columbia Public Service Commission (DC PSC), National Grid, Pacific Gas and Electric (PG&E), BC Hydro, and others. Dr. DeBenedictis originally worked at E3 for five years before attending graduate school. During that time, he contributed to E3's landmark study, published in the journal *Science*, that analyzed the technology path to deep decarbonization by 2050. Dr. DeBenedictis received a Ph.D. and M.S. in Physics from Tufts University, and a B.A. in Physics and Astronomy from Bowdoin College. Recent projects include:

- **Massachusetts Clean Energy Center (MassCEC), Rate Design for Electrification and Affordability (2024-Present).** Leading an E3 team that is supporting the Massachusetts Interagency Rates Working Group (IRWG), by conducting a study on how rate design can be used to improve customer bill impacts from electrification and to promote energy affordability in general. The study consists of phases focusing on today, the near future, and long-term rate strategy. For the study, E3 developed a Household Energy Expenditure Model and presents approaches and findings regularly to the IRWG and a public stakeholder group.
- **Illinois Commerce Commission (ICC), Value of DER Support (2024-Present).** Leading an E3 team currently supporting the ICC in their investigation into the value of and compensation for DERs. The support includes development of long-term hourly avoided costs and creation of a cost/benefit model to compile DER compensation and non-monetized benefits and costs across a variety of cost test perspectives. Based on these analytical results, the team will work with ICC to propose a DER compensation framework in accordance with the Climate and Equitable Jobs Act (CEJA), and to assist ICC in preparing this compensation proposal for a to-be-opened docket on the topic.
- **Confidential State Agency, Cost of Service and Rate Impacts of Data Center Expansion (2024-present).** Overseeing an E3 team examining various utilities' methods of incorporating new data center customers into new or existing rate classes. The team is focused on the core question of whether each utility is creating cost transfers between classes due to their functionalization, classification, and allocation of costs related to new data center load. The study places special emphasis on how the scale of future data center load growth may create cost transfers through mechanisms that have negligible impact today.

- **District of Columbia Public Service Commission (DC PSC), Benefit Cost Analysis Model (2024-Present).** Leading an E3 team partnered with local firm Energy Shrink to build a highly flexible benefit cost analysis tool for the DC PSC. The tool will include inputs and calculations to assess the costs and benefits of a wide variety of utility-proposed programs. Specified by the PSC, 41 different cost and benefit categories will capture costs and benefits to the electric sector, the gas sector, host customers, and the district as a whole. A guidebook describing methodologies, data benchmarking, and model use will accompany the tool.
- **Pacific Gas and Electric (PG&E), Wildfire Distribution Risk Model Assessment, (2020-2024).** Led or oversaw each of three phases of E3's independent review of PG&E's Wildfire Distribution Risk Model (WDRM) and Transmission Composite Model (TCM) as well as the models' accompanying documentation. The team used a combination of model documentation, extensive interviews with PG&E subject matter experts, data requests to PG&E, and interviews with an ad-hoc technical advisory committee to produce a thorough review of PG&E's models, including several recommendations for model and process improvement. Many of the recommendations from previous project iterations have been adopted by PG&E and the CPUC to improve wildfire risk analysis and planning.
- **Massachusetts Clean Energy Center (MassCEC), Energy Storage Market Update and Long Duration Storage Study (2023).** Led an E3 team that assessed the current deployment of short-duration storage and evaluated the future role of long-duration storage in providing effective capacity to the region. The project team analyzed several storage use cases to help the state understand impacts of current incentive programs and used loss-of-load probability modeling to predict the reliability value of long-duration storage to the future energy system. The study contained robust stakeholder engagement through workshops and interviews, and culminated with the *Charging Forward* report, which included actionable policy recommendations for the state.
- **New York State Energy Research and Development Authority (NYSERDA), Building Efficiency and Electrification Model Support (2019-2024).** Led E3's support for NYSERDA's Building Efficiency and Electrification Model (BEEM) toolset. This included building, managing, and running most of the component modules of the toolset for a variety of projects, including assessment of the impact of upfront incentives on heat pump adoption, evaluation of efficiency measures in support of statewide potential studies, examination of the impact of appliance standards on technology adoption, and analysis of impacts on customer utility bills resulting from building electrification with special focus on low-income residents. Analysis for each of these projects hinged on evaluation and summary of financial and societal impacts across thousands of building typologies paired with a variety of electrification and efficiency measures.
- **National Grid Advanced Metering Functionality and Grid Modernization Plan (2018-2022).** Led an E3 team supporting National Grid in developing and progressing their Advanced Metering Infrastructure (AMI) and Grid Modernization Plan (GMP) filings in New York, Rhode Island, and Massachusetts. This support included coordination among internal utility teams, development of benefit/cost models, and creation of business cases for each jurisdiction. A key component of progressing the filings included working with internal National Grid teams to engage external stakeholders through series of stakeholder workshops at which E3 regularly presented.

PHYSICS AND ASTRONOMY DEPARTMENT*Tufts University – Research Assistant*

Medford, MA

2013 – 2018

- Developed Mathematica-based finite element model with adaptive moving mesh to solve shape/field coevolution problems
- Created C-based finite difference model to investigate liquid crystal behavior between patterned substrates
- Shared research findings through presentations and posters at more than 10 conferences
- Collaborated on research with peers and faculty from Tufts University Department of Mathematics, UNSW Chemical Engineering, UC Merced Department of Physics, UPenn Materials Science and Engineering, and Sheffield Hallam University Materials and Engineering Research Institute

ENERGY AND ENVIRONMENTAL ECONOMICS, INC. (E3)*Consultant*

San Francisco, CA

2008 – 2013

- Supported projects involving resource planning, rate design, cost-effectiveness evaluation, and modeling future emissions scenarios
- Provided modeling support to the California Public Utilities Commission to develop a successor to its net energy metering (NEM) tariffs
- Helped design a robust industry-leading resource adequacy modeling platform
- Conducted extensive rate design analysis for large commercial and industrial customers in BC Hydro service territory.

PHYSICS AND ASTRONOMY DEPARTMENT*Bowdoin College – Research Assistant*

Brunswick, ME

2007 – 2008

- Created Mathematica computer programs to calculate parameters for and investigate various string theory configurations

RESEARCH EXPERIENCE FOR UNDERGRADUATES (REU)*Michigan State University – Research Assistant*

East Lansing, MI

Summer 2007

- Built FORTRAN computer program to model bulk-heterojunction polymer solar cells to optimize cell efficiency

Education

Tufts University

*Ph.D., Physics**Burlingame Fellowship*

Medford, MA

2018

2017

Tufts University

*M.S., Physics**Provost Fellowship*

Medford, MA

2015

2013 – 2015

Bowdoin College
B.A., Physics and Astronomy (Highest Honors)
Sarah and James Bowdoin Scholar (Dean's List)

Brunswick, ME
2008
2004 – 2005, 2005 – 2006, 2007 – 2008

Selected Academic Publications

- Xia Y., **DeBenedictis A.**, Kim D.S., Chen S., Kim S.U., Cleaver D.J., Atherton T.J., Yang, S. *Programming emergent symmetries with saddle-splay elasticity*. Nature Communications (2019), 10, 5104
- **DeBenedictis A.**, Rodarte A.L., Hirst L.S., Atherton T.J. *Modeling deformation and chaining of flexible shells in a nematic solvent with finite elements on an adaptive moving mesh*. Physical Review E (2018), 97:3, 032701.
- Dahiya, P., **DeBenedictis A.**, Atherton T.J., Caggioni, M., Prescott, S.W., Harteld, R.W., Spicer, P.T. *Arrested coalescence of viscoelastic droplets: triplet shape and restructuring*. Soft Matter (2017), 13, 2686-2697.
- **DeBenedictis A.**, Atherton T.J. *Shape minimisation problems in liquid crystals*. Liquid Crystals (2016), 43:13, 2352-2362.
- **DeBenedictis A.**, Anquetil-Deck C., Cleaver D.J., Emerson D.B., Wolak M., Adler J.H., Atherton T.J. *Competition of lattice and basis for alignment of nematic liquid crystals*. Physical Review E (2015), 92:4, 042501.
- **DeBenedictis A.**, Haley B., Woo C.K., Cutter E. *Operational energy-efficiency improvement of municipal water pumping in California*. Energy (2013), 53:5, 237-243.
- Williams J., **DeBenedictis A.**, Ghanadan R., Mahone A., Moore J., Morrow W., Price S., Torn M. *The Technology Path to Deep Greenhouse Gas Emissions Cuts by 2050: The Pivotal Role of Electricity*. Science (2012), 335:6064, 53-59.
- **DeBenedictis A.**, Hoff T.E., Price S., Woo C.K. *Statistically adjusted engineering (SAE) modeling of metered roof-top photovoltaic (PV) output: California evidence*. Energy (2010), 35:10, 4178-4183.
- Orans R., Woo C.K., Horii B., Chait M., **DeBenedictis A.** *Electricity Pricing for Conservation and Load Shifting*. Electricity Journal (2010), 23:3, 7-14.