

Dr. Andrew W. Thompson

ENERGY ASSOCIATE

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Dr. Thompson is an energy economist with a background in electrical engineering and expertise in wholesale electricity market design, regulatory economics, and policy analysis of network industries, particularly in the energy sector.

His work focuses on:

- Wholesale electricity market design and reform
- Capacity market/auction design
- Integration of emerging energy technologies
- Energy market regulation
- The hydrogen economy
- Energy finance, cost of capital estimation, and utility rate cases
- Economic damages assessments for renewable and battery storage assets

Dr. Thompson has supported clients and diverse stakeholder groups – including electricity system operators, energy regulators, governments, clean energy advocacy groups, market participants, institutional investors, and utilities – in several international jurisdictions. This includes PJM, CAISO, ERCOT, NYISO, ISO-NE, the Non-ISO/RTO United States, Ontario, Alberta, the United Kingdom, Spain, Colombia, Saudi Arabia, Australia, and New Zealand.

He has published thought leadership on the evolving hydrogen economy; the regulation of the energy sector; energy policy to integrate emerging resources (renewables, battery storage, long-duration energy storage, distributed energy resources, and flexible load); and the economic implications of lithium-ion battery degradation for energy storage and electric vehicle technologies.

AREAS OF EXPERTISE

- Electricity Wholesale Markets & Planning
- Regulatory Economics, Finance & Rates

EDUCATION

- **Université Paris-Saclay (Paris, France)**
PhD in Economics
- **Universidad Pontificia Comillas (Madrid, Spain)**
MS in Energy Economics
- **Delft University of Technology (Delft, The Netherlands)**
MSc in Engineering and Policy Analysis
- **Rowan University (New Jersey, USA)**
BSc in Electrical and Computer Engineering

PROFESSIONAL EXPERIENCE

- **The Brattle Group (2020–Present)**
Energy Associate
- **University of California Berkeley/Lawrence Berkeley National Laboratory (2017–2019)**
Visiting Researcher
- **US Department of Energy: ARPE-E (2018)**
Technology-to-Market Scholar
- **Institut Vedecom (2016–2018)**
Electric Vehicle and Battery Storage Researcher
- **Spanish and Portuguese Energy Market Operator (OMIE) (2014–2015)**
Energy Analyst

SELECTED CONSULTING EXPERIENCE

WHOLESALE ELECTRICITY MARKET DESIGN AND REFORM

- **Energy Storage Wholesale Market Reforms Roadmap:** For the American Clean Power Association (ACP) analyzed and developed a comprehensive roadmap for near-term wholesale market reforms needed to better integrate and enable energy storage resources, with a particular focus on implementing reform efforts in PJM, NYISO, and ISO-New England.
- **IESO Future Market Reforms Initiatives:** For the Ontario Independent Electricity System Operator (IESO) conducted a benefits assessment of near-term, mid-term, and long-term market reform initiatives.
- **AESO Market Pathways Initiative:** For the Alberta Electric System Operator (AESO) and the Executive Working Group (EWG), provided support for various inquiries into energy market enhancements as part of the Market Pathways initiative that aims to inform the future evolution of Alberta's electricity market design.

- **ERCOT CONE for 2026 Study:** For the Electric Reliability Council of Texas (ERCOT) developed an updated estimate of the Cost of New Entry (CONE) for use in setting the Peaker Net Margin (PNM) threshold, evaluating the cost of proposed reliability standards, analyzing the Market Equilibrium Reserve Margin (MERM) and Economically Optimal Reserve Margin (EORM), and potentially setting demand curves for a Performance Credit Mechanism (PCM). Developed updated model to calculate CONE accounting for fixed and variable costs, lifetime estimates, financial parameters, and levelization of future net revenue requirements.
- **South Carolina Wholesale Energy Market Reforms Study:** For the South Carolina State Legislature, conducted a comprehensive assessment of potential benefits and risks from competitive reforms to the state's electricity sector and regulatory model. Examined potential reforms to join or integrate with a regional transmission organization, introduce competition into resource planning, and pursue partial or full retail choice.
- **US Bulk System Reliability for Tomorrow's Grid:** For the Center for Applied Environmental Law and Policy (CAELP), co-authored a report submitted to the US EPA as public comments of the New Source Performance Standards for greenhouse gas emissions. The report outlines current and emerging reliability impacts on the bulk power system due to recent and projected changes in the energy sector and explains the suite of solutions grid operators have at their disposal to ensure reliability is maintained throughout the ongoing energy transition.
- **IESO Wholesale Market Participation Model Design for DERs:** Provided expert support to IESO staff for proposed changes to wholesale market participation models and rules to better enable DER and hybrid resource integration.
- **Costs of Decarbonizing the US Electricity Sector:** For the American Council on Renewable Energy (ACORE), a renewable energy advocacy group, evaluated costs to decarbonize the US electricity sector under alternative proposals to extend and expand renewable energy tax credits in 2021. Simulated investment, costs, prices, and emissions nationally to 2050 using gridSIM, Brattle's capacity expansion model. Informed client's policy position.

CAPACITY MARKET/AUCTION DESIGN

- **PJM Quadrennial Review of Capacity Market Design and Demand Curve Parameters:** For PJM, conducted periodic reviews of PJM's Reliability Pricing Model. Analyzed market functioning for resource adequacy, including uncertainty and volatility of prices, net cost of new entry (CONE) parameters, impacts of administrative parameters and regulatory uncertainties, locational mechanisms, demand curve shape, incremental auction procedures, and other market mechanisms. Developed a probabilistic simulation model evaluating the price volatility and reliability implications of alternative demand curve shapes and recommended a revised demand curve shape. Assisted expert support to stakeholder proceedings and testimony submitted before the Federal Energy Regulatory Commission.
- **PJM Development of Gross Avoidable Cost Rates:** For PJM, developed Avoidable Cost Rates (ACRs) for existing resource types for use in the Minimum Offer Price Rule (MOPR) and in Market Seller Offer Cap (MSOC). Contributed to submitted testimonies before FERC.

- **IESO Capacity Auction Design:** Provided expert support to IESO staff in support of a new capacity auction design and enhancements. Delivered detailed reports describing options, tradeoffs, and lessons learned on every aspect of capacity auction design. Developed analysis and design proposals for the capacity market demand curve, capacity accreditation methodologies, and penalty mechanism design. Supported IESO stakeholder engagement efforts and presented analyses of design alternatives in public forums.
- **Capacity Market Overview Study:** For a major renewable investment company, presented an overview of US and international capacity markets and resource adequacy mechanisms.
- **Capacity Accreditation Approaches for Hybrid Resources:** For a major renewable investment company, presented an assessment of current approaches to capacity accreditation using Effective Load Carrying Capability (ELCC) methods for evaluating hybrid resources.

INTEGRATION OF EMERGING ENERGY TECHNOLOGIES

- **Long-Duration Energy Storage (LDES) Technology Landscape:** For the Center for Climate and Energy Solutions (C2ES) provided expert support and research to an industry working group on the Long-duration Energy Storage (LDES) technology landscape. Assessed costs, technology readiness, and value proposition of Inter-day LDES (10-36 hrs) and Multi-day LDES (36+ hrs) technologies to address emerging system needs under deep decarbonization. Provided support on developing policy reforms to encourage greater LDES deployment at state and federal levels.
- **EPRI Long-Duration Energy Storage Working Group:** For the Electric Power Research Institute (EPRI) provided expert support and research to an industry working group on the Long-duration Energy Storage (LDES) technology landscape. Assessed costs, technology readiness, and value proposition of Inter-day LDES (10-36 hrs) and Multi-day LDES (36+ hrs) technologies to address emerging system needs under deep decarbonization. Provided support on developing policy reforms to encourage greater LDES deployment at state and federal levels.
- **IESO (Ontario) Long-term Contract Design for Renewable, Storage, and Hybrid Resources:** Provided expert support to IESO staff for long/mid-term RFP contract design to procure energy, capacity, and environmental attributes from emerging resources including renewables, energy storage, and hybrid storage assets in Ontario.
- **NEOM Saudi Arabia Load Flexibility Integration Study:** Developed supporting analysis and a load flexibility roadmap to assist the public utility (ENOWA) in developing their load flexibility integration plan for various sources of large-scale electricity demand within NEOM.

ENERGY MARKET REGULATION

- **Recent Developments in International Rate of Return Methods:** For Energy Networks Australia (ENA), developed an updated overview of international rate of return methods for regulators in the US, Great Britain, New Zealand, Italy, and The Netherlands. This paper also provided a review of the Australian Energy Regulator's draft 2022 Rate of Return Instrument and recommend improvements as well as a comparison on a like-for-like basis of recent rate of return decision from each regulator.

- **International Approaches to Regulated Rates of Return:** For the Australian Energy Regulator (AER), researched international approaches to rate of return and WACC estimations across six countries: Australia, Italy, the Netherlands, New Zealand, the US, and the UK. This report reviewed and summarized international regulators' approaches to utility regulation and compared the rate of return approach of each regulator to that of the AER as part of the 2022 Rate of Return Instrument.

THE HYDROGEN ECONOMY

- **Future of Hydrogen in the Power Sector:** For the Environmental Defense Fund (EDF), developed an assessment of the potential role of hydrogen in a decarbonized power sector. Explained the nature of reliability needs in renewable power systems and assessed hydrogen technologies' ability to address system reliability, resiliency, and resource adequacy challenges.

ENERGY FINANCE, COST OF CAPITAL ESTIMATION, UTILITY RATE CASES

- **PacifiCorp Rate Case 2024:** Supported Mr. John Tsoukalis' expert testimony before the Wyoming Public Service Commission regarding the reliability value of inter-state transmission, the risks and costs of operating the Bulk Electricity System (BES) in non-compliance with NERC standards, the economic impact of reliability events particularly to large industrial customers, and transmission cost allocation approaches in multi-state jurisdictions.
- **Alberta Utilities Commission Generic Cost of Capital (GCOC) Estimation:** Supported Dr. Bente Villadsen's expert testimony on the cost of equity and appropriate capital structure presented before the Alberta Utilities Commission (AUC).
- **Cost of Capital Estimation for North American regulated gas utility:** For a major North American regulated gas utility, performed economic research and analyses to support expert testimony estimating allowed Return on Equity to inform an upcoming rate case hearing.
- **Cost of Capital Estimation for North American regulated electric utility:** For a major North American regulated gas utility, performed economic research and analyses to support expert testimony estimating allowed Return on Equity to inform an upcoming rate case hearing.

ENERGY ASSET EVALUATION AND ECONOMIC DAMAGES ASSESSMENTS

- **PJM Battery Storage Asset Valuation and Damages:** For a major renewable energy developer, developed economic damages estimation due to an alleged breach in contractual performance warranties of a battery storage asset in PJM Interconnection LLC for litigation support.
- **Report on Spanish Wind Asset Regulatory Impacts:** For a major renewable energy developer, contributed to expert report on the financial impact on wind assets of a mid-stream switch in the regulatory regime for Spanish renewables.
- **Spanish Solar PV Asset Valuation and Damages:** For a major renewable energy developer, contributed to litigation support and damages estimation of an international arbitration

concerning the financial impact of a mid-stream switch in the regulatory regime for Spanish renewables. The damages estimate considers the valuation of both the reduction in remuneration and financial instruments related to the project financing.

- **Spanish Wind Asset Valuation and Damages:** For a major renewable energy developer, contributed to litigation support and damages estimation of an international arbitration concerning the financial impact of a mid-stream switch in the regulatory regime for Spanish renewables. The damages estimate considers the valuation of both the reduction in remuneration and financial instruments related to the project financing.
- **Spanish Concentrated Solar Power (CSP) Asset Valuation and Damages:** For a major renewable energy developer, contributed to litigation support and damages estimation of an international arbitration concerning the financial impact of a mid-stream switch in the regulatory regime for Spanish renewables. The damages estimate considers the valuation of both the reduction in remuneration and financial instruments related to the project financing.
- **Colombia Energy Investors Dispute:** For a group of investors in electricity companies, contributed to analysis for expert testimony regarding a dispute over dividend payments before the Bogotá Chamber of Commerce Arbitration Centre.

ARTICLES & PUBLICATIONS

- [“LDES Scoping Report”](#), with J. Michael Hagerty and Andrew Levitt, prepared for the Center for the Center for Climate and Energy Solutions (C2ES) (March 2024)
- [“ERCOT CONE for 2026,”](#) with Samuel A. Newell and Rohan Janakiraman, prepared for the Electric Reliability Council of Texas, Inc. (ERCOT) (June 2024)
- [“Bulk System Reliability for Tomorrow’s Grid,”](#) with Metin Celebi, Andrew Levitt, and Ragini Sreenath, prepared for prepared for the Center for Applied Environmental Law and Policy (CAELP) (December 2023)
- [“Ontario’s Experience with the Single Buyer Contracting Model,”](#) with Kathleen Spees, Andrew Levitt, and Xander Bartone, prepared for the Alberta Electric System Operator (AESO) and the Executive Working Group (EWG)(November 2023)
- [“Assessment of Potential Market Reforms for South Carolina’s Electricity Sector,”](#) with John H. Tsoukalis, Kathleen Spees, Johannes P. Pfeifenberger, Andrew Levitt, and Oleksandr Kuzura, prepared for the South Carolina General Assembly Electricity Market Reform Measures Committee (April 2023)
- [“Gross Avoidable Costs for Existing Generation,”](#) with Samuel Newell, prepared for PJM Interconnection, L.L.C. (January 2023)
- [“International Rate of Return Methods – Recent Developments,”](#) with Bente Villadsen and Toby Brown, prepared for Energy Networks Australia (September 2022)
- [“Fifth Review of PJM’s Variable Resource Requirement Curve,”](#) with Kathleen Spees and Samuel Newell, prepared for PJM Interconnection (April 2022)

- [“Vehicle-to-Everything \(V2X\) Energy Services, Values Streams, and Regulatory Policy Implications,”](#) with Yannick Perez, *Energy Policy*, 137, Article 111136 (2020)
- [“Economic implications of lithium-ion battery degradation for Vehicle-to-Grid \(V2X\) services,”](#) *The Journal of Power Sources*, 396, pp. 691–709 (2018)

PRESENTATIONS & SPEAKING ENGAGEMENTS

- [“Sixth Review of PJM’s RPM VRR Curve Parameters: Preliminary VRR Curve Analysis,”](#) with Kathleen Spees and Samuel Newell, PJM Market Implementation Committee (December, 2024)
- [“Sixth Review of PJM’s RPM VRR Curve Parameters: Preliminary Gross CONE and E&AS Methodology,”](#) with Samuel Newell, PJM Market Implementation Committee (November, 2024)
- [“Sixth Review of PJM’s RPM VRR Curve Parameters: Reference Technology Initial Screening Analysis,”](#) with Samuel Newell, PJM Market Implementation Committee (November, 2024)
- [“The Need for Mechanisms to Support Flexibility or Capacity” and “Aligning the Security of Supply and Decarbonization Targets,”](#) Panel Discussions at the 7th Capacity Mechanisms Forum: Ensuring the European Electricity Supply (October 2024)
- [“Resource Adequacy Trends of the Energy Transition: Experience from North America,”](#) 7th Capacity Mechanisms Forum: Ensuring the European Electricity Supply (October 2024)
- [“Sixth Review of PJM’s RPM VRR Curve Parameters: Kickoff and Request for Stakeholder Input,”](#) with Samuel Newell and Kathleen Spees, PJM Market Implementation Committee (September, 2024)
- [“Modeling Storage Adequacy in Capacity Expansion Models,”](#) with Kate Peters, EPRI Long-Duration Energy Storage Working Group (July 2024)
- [“Long-duration Energy Storage Scoping Report,”](#) with Andrew Levitt and Michael Hagerty, C2ES LDES Working Group, (March 2024)
- [“Resource Adequacy Trends of the Energy Transition: Experience from North America,”](#) NTNU Energy Transition Week: Power Markets (March 2024)
- [“Role of Hydrogen in a Decarbonized Future,”](#) with Josh Figueroa and Metin Celebi, Bank of America Global Research US Alternative Energy Hydrogen Conference (December 2023)
- [“Discussion on Demand Curve Review,”](#) IESO Technical Session (October 2022)
- “PJM Market Implementation Committee Special Session: Quadrennial Review,” with Kathleen Spees and Samuel Newell, PJM Interconnection (December 2021)
- [“Vehicle-to-Everything \(V2X\) Energy Services,”](#) presented to Smart Charging Webinar hosted by Newcastle University in conjunction with The Alan Turing Institute, CESI and Supergen Energy Networks, (October 2020)

- [“Vehicle-to-Everything \(V2X\) Energy Services,”](#) presented to the International Smart Grid Action Network (ISGAN), (April 2019)
 - [“Economic Feasibility of Wind Energy Participation in Secondary Reserves Markets,”](#) *Proceedings of the 1st Italian Association of Energy Economists (IAEE) Energy Symposium*, Milan, Italy (2016)
 - [“PV by-pass diode performance in landscape and portrait modalities,”](#) with Carlos Barreiro, Peter M. Jansson, and John L. Schmalzel, *37th IEEE Photovoltaic Specialists Conference* (2011)
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PROFESSIONAL ASSOCIATIONS & MEMBERSHIPS

International Association for Energy Economics (IAEE)

Institute of Electrical and Electronics Engineers (IEEE) Power and Energy Society

LANGUAGES

- Spanish (fluent), French (conversational)