Steven E. Letendre, PhD, Principal Associate

Synapse Energy Economics I 485 Massachusetts Avenue, Suite 2 I Cambridge, MA 02139 I 617-453-7045
sletendre@synapse-energy.com

PROFESSIONAL EXPERIENCE

Synapse Energy Economics, Inc., Cambridge, MA. *Principal Associate,* June 2019–present.

Provides economic and policy analysis of technology solutions to clients seeking to accelerate the transition to clean energy; assesses the impacts and potential of distributed energy resources, such as distributed solar and electric vehicles, related to grid integration and distribution system planning; provides project management and stakeholder engagement for complex projects; and evaluates utility investments in demand-side management.

Energy Economics Consultant, Middletown Springs, VT, 1997–2019.

Economic and energy research consultant to various organizations including: U.S. Department of Energy Research Labs, University of Vermont Transportation Research Center, Smart Electric Power Alliance, New York State Energy Research & Development Authority, Green Mountain Power, and Vermont Community Foundation.

Electric Vehicles and Grid Integration

- Original member of research team establishing the analytical basis for the vehicle-to-grid (V2G) concept, with multiple funded projects to identify the most promising market reforms and policies to advance power grid integration of electric vehicles to reduce carbon emissions from the transportation sector.
- Performed comprehensive analysis of market opportunities in New York State for grid interactive vehicles. Proposed common framework for analyzing grid interactive vehicle opportunities and produced gap analysis including market design critique to determine the market and regulatory reforms necessary to promote grid interactive vehicles in New York State. Facilitated stakeholder analysis and outreach. Co-authored final report titled, “New York State Grid-Interactive Vehicle Roadmap.”
- Analyzed consumer charging behaviors using “EV Project” data to determine the economic value created through the use of intelligent or smart charging vehicle technologies. Worked with large datasets and produced numerous quantitative analyses. Estimated the economic value of off-peak charging and the use of electric vehicles (EV) as grid resources based on EV project participants’ user profiles. Co-authored final report titled “Intelligent Vehicle Charging Benefits Assessment Using EV Project Data.”

Distributed Energy Resources Analysis

- Lead analyst on the use and value of renewable energy forecasting for the grid integration of solar photovoltaic systems, both utility-scale and consumer applications. Developed strategies for integrating renewable energy forecasting into grid and energy market operations.

- Led effort to evaluate utility perspectives and practices for net metering and interconnection standards to accelerate deployment of distributed solar photovoltaic systems in the residential sector for the Smart Electric Power Alliance (formerly Solar Electric Power Association).
- Analyzed the economic savings and carbon emissions reduction potential for heat pumps and electric vehicles to displace petroleum-based fuels with electricity in Vermont.
- Conducted analysis on the economics of distributed solar electric systems using self-designed spreadsheets to analyze large datasets, including both the economic and environmental benefits of solar electric technology co-located with energy storage systems.
- Research funded through U.S. Department of Energy modeling the economic benefits of distributed solar energy technology leading to published dissertation titled, "Photovoltaics for Sustainability: An Investigation of the Distributed Utility Concept as a Policy Framework."

Project Management and Advocacy

- Developed numerous energy research project proposals, with successful outcomes including funding from state agencies, non-profits, foundations, and academic institutes.
- Participant in multiple team projects addressing complex problems with diverse members, ranging from engineers to advocates and government representatives.
- Provided expert testimony to the Vermont State Legislature for special session on climate change and the U.S. Department of Energy serving on an invitation-only Technical Review Panel.
- Published over 50 articles/reports and delivered dozens of presentations at professional meetings on innovative energy topics, focusing on sustainable energy development and policy.

Green Mountain College*,* Poultney, VT, *Professor of Economics & Environmental Studies,* August 1997 – May 2019.

Developed and taught undergraduate and graduate courses in environmental economics, energy literacy, and renewable energy technology and policy. Served in a number of administrative roles including Chair of the Campus Sustainability Council.

Vermont Law School, South Royalton, VT, *Instructor,* 2014–2019.

Developed and teach online graduate courses in environmental economics and energy regulation and the environment.

University of Delaware, Newark, DE, *Graduate research assistant,* 1993–1997.

Research on the value of distributed solar plus storage supported by the U.S. Department of Energy.

Research Triangle Institute, Research Triangle Park, NC 1991–1993.

Member of Energy Resource Planning Group serving the electric power sector conducting cost-benefit analysis for utility demand-side management programs. Led measurement and verification efforts and cost-benefit analysis for industrial and commercial high efficiency motors and drives demand-side management programs.

EDUCATION

University of Delaware, Newark, DE

Doctorate of Philosophy with a specialization in Energy Economics & Policy, 1997. Dissertation Title: "Photovoltaic Technology for Sustainability: An Investigation of the Distributed Utility Concept as a Policy Framework."

State University of New York, Binghamton, NY

Master of Arts in Economics, 1991.

Bryant College, Smithfield, RI

Bachelor of Science in Business Administration, 1989.

Professional Memberships

Renewable Energy Vermont Education Fund, Board treasurer, 2015–present

Renewable Energy Vermont, Board member and board treasurer, 2009–2017

SolarFest, Board member and board treasurer, 2000–2012

American Solar Energy Society, Member and conference session coordinator, 1997–present

Northeast Sustainable Energy Association, Member and conference session coordinator, 1999–present

Honors and Awards

Vermont Campus Compact Engaged Scholar Award, Exemplary Integration of civic engagement into scholarship and teaching–2012

Vermont Governor's Award for Environmental Excellence, The Poultney Change-a-Light Challenge – 2003

Mark Haskall Award, University of Delaware in recognition for superior performance in the field of urban affairs and public policy–1997

Bill N. Baron Fellowship, University of Delaware for major contribution to photovoltaic research–1996

Milton and Mary Edelstein Prize, University of Delaware for community and public service–1995

SELECTED PUBLICATIONS AND PRESENTATIONS

Letendre, S. and Van Hoesen, J. (2019). Publicly available renewable energy system production forecasts: Connecting consumers to nature's energy flows. *Solutions*, 10 (2), xx – xx.

Letendre, S. (2017). Solar PV installer selection guide: A simple guide for making solar PV quote comparisons. A free resource for homeowners and business considering investing in solar.

Green Mountain Power Lecture Series, Utility 2.0: Making the Transition to a Sustainable & Distributed Energy Future, Rutland, VT – January, 2016.

Ruder A., Morse, S., Malmgren, and Letendre, S. (2015). New York State grid-interactive vehicle study roadmap. A report prepared for the New York State Energy Research and Development Authority, Albany, NY.

Letendre, S., Dunn, D and Bentley, B. (2014). Back to the future: Assessing the fuel displacement potential using electricity in Vermont for residential space and water heating. *The Electricity Journal*, 27 (4), 96-101.

Letendre, S. Makhyoun, M. and Taylor, M. (2014). Predicting solar power production: Irradiance forecasting models, applications and future prospects. A report prepared for the Solar Electric Power Associations, Washington, DC.

Letendre, S., Gowri K., Kintner-Meyer, M. and Pratt, R. (2013). Intelligent vehicle charging benefits assessment using EV Project data. A report published by the Pacific Northwest National Laboratory, PNNL-23031.

Letendre, S. and Perotti, M. (2012). The business case for matching renewable energy production with vehicle charging. Proceedings of the EVS26 (26th Electric Vehicle Symposium), Los Angeles, CA.

Letendre, S. and Soto, N. (2011). Vermont's Feed-In Tariff: Progress and Challenges. Proceedings of the 2011 American Solar Energy Society Annual Conference, Boulder, CO.

Letendre, S., Van Hoesen, J., Robinson, J., and Welch, K. (2010). A community-based weatherization initiative in Vermont. Proceedings of the ACEEE 2010 Summer Study on Energy Efficiency in Buildings, American Council for an Energy Efficient Economy, Washington, DC.

Dowds, J., Hines, P., Farmer, C., Watts, R., and Letendre, S. (2010). Plug-in Hybrid Electric Vehicle Research Project: Phase II Report. A report prepared for the University of Vermont's Transportation Research Center, Burlington, VT.

Van Hoesen, J. and Letendre, S. (2010). Evaluating potential renewable energy resources in Poultney, Vermont: A GIS-based approach to supporting rural community energy planning. Renewable Energy, 35, 2114-2122.

Letendre, S. (2009). Solar Electricity as a Fuel for Light Vehicles Proceedings of the 2009 American Solar Energy Society Annual Conference, Boulder, CO.

Kempton, W., Udo, V., Huber, K., Komara, K., Letendre, S., Baker, S., Brunner, D. and Pearre, N. (2009). A test of vehicle-to-grid (V2G) for energy storage and frequency regulation in the PJM system results from an industry-university research partnership: A report of the Mid-Atlantic Grid Interactive Car Consortium (MAGIC).

Letendre, S. and M. Taylor. (2008). Residential photovoltaic metering and interconnection study: Utility perspectives and practices. Report prepared for Solar Electric Power Association, Washington, DC.

Letendre, S. R. Watts, and M. Cross. (2008). Plug-in hybrid vehicles and the Vermont grid: A scoping analysis. A report prepared for the University of Vermont's Transportation Research Center, Burlington, VT.

Special Session of the Vermont Legislature on Energy and Climate Change, The Inevitable Transition to Electric Drive: Implications for Vermont, Montpelier, VT – January, 2007

Technical Review, Vehicle-to-Grid: Market and Revenue Potential, Washington, DC – March, 2007.

US Department of Energy Plug-In Hybrid Grid Impacts Denholm, P. & Letendre, S. (2007). Grid services from plug-in hybrid electric vehicles: A key to economic viability, Proceedings of the 2007 EEAST (Electrical Energy Storage - Applications and Technology) conference, San Francisco, CA.

Letendre, S. (2007). Vehicle integrated PV: Exploring the potential. Proceedings of the EVS23 (23rd Electric Vehicle Symposium), Anaheim, CA.

Letendre, S., Denholm, P., and Lilienthal, P. (2006). Plug-in hybrid and all-electric vehicles: new load or new resource. Public Utilities Fortnightly, 144, 28 – 37.

Letendre, S (2006). Ushering in an era of solar-power mobility. Proceedings of the 2006 International Workshop on Hybrid and Solar Vehicles, Salerno, Italy.

Letendre, S (2006). A quarter a kilowatt hour: getting serious about ushering in a solar energy future. Proceedings of the 2006 American Solar Energy Society Annual Conference, Boulder, CO.

Letendre, S. and Perez, R. (2006). Understanding the benefits of dispersed grid-connected photovoltaic: from avoiding the next major outage to taming wholesale power markets. The Electricity Journal, 19, 64-72.

Letendre, S., Perez, R., and Herig, C. (2006). Solar vehicles at last? Solar Today, 20, 26-29.

Perez, R., Collins, B., Margolis, R., Hoff, T,. Herig, C. Williams, J., and Letendre S. (2005). Summer blackouts? How dispersed solar power-generating systems can help prevent the next major outage, Solar Today, 19, 32–35.

Perez, R., Kmiecik, M., Hoff, T., Herig, C. Williams, J., Letendre, S., and Margolis, R. (2004). Availability of dispersed photovoltaic resource during the August 14th 2003 Northeast power outage. Proceedings of the 2004 American Solar Energy Society Annual Conference, Boulder, CO.

Letendre, S. (2004). PV integrated electric drive transit buses: Toward a sustainable urban transit system. Proceedings of the 2004 International Solar Cities Congress, Daegu, Korea.

Letendre, S., Perez, R., and Herig, C. (2003). Vehicle integrated PV: a clean and secure fuel for hybrid electric vehicles. Proceedings of the 2003 American Solar Energy Society Annual Conference, Boulder, CO.

Letendre, S., Perez, R., and Herig, C. (2003). Solar and power markets: peak power prices and PV availability for the summer of 2002. Proceedings of the 2003 American Solar Energy Society Annual Conference, Boulder, CO.

Letendre, S., Perez, R., and Herig, C. (2002). Battery-powered, electric-drive vehicles providing buffer storage for PV capacity value. Proceedings of the 2002 American Solar Energy Society Annual Conference, Boulder, CO.

Letendre, S., and Kempton, W. (2002). V2G: a new model for power. Public Utilities Fortnightly, 140, 16-26.

Kempton, W., Jasna T., Letendre, S., Brooks, A., and Lipman, T. (2001). Electric drive vehicles-battery, hybrid, and fuel cell-as resources for distributed electric power in California, University of California Davis, ITS-RR-01-03.

Letendre, S., Perez, R., and Herig, C. (2001). An assessment of photovoltaic energy availability during periods of peak power prices. Proceedings of the 2001 American Solar Energy Society Annual Conference, Boulder, CO.

Perez, R., Letendre, S., and Herig, C. (2001). PV and grid reliability: availability of PV power during capacity shortfalls. Proceedings of the 2001 American Solar Energy Society Annual Conference, Boulder, CO.

Letendre, S. (2001) Biopower's potential. Northeast Sun, 19, 11-13.

Letendre, S. (2000) Electric utility deregulation comes to the northeast. Northeast Sun, 18, 8-11.

Letendre, S. (2000) SolarFest: energy education through the arts. Proceedings of the 2000 American Solar Energy Society Annual Conference, Boulder, CO.

Letendre, S. (1999). Fostering sustainability in the northern forest region: the role of renewable energy. Proceedings of the 1999 American Solar Energy Society Annual Conference, Boulder, CO.

Letendre, S., Weinberg, C., Byrne, J., and Wang, Y. (1998). Commercializing photovoltaics: the importance of capturing distributed benefits. Proceedings of the 1998 American Solar Energy Society Annual Conference, Boulder, CO.

Letendre, S., Aitken, D., Byrne, B., Agbemabiese, L., Bouton, D., and Kliesch, J. (1998). Photovoltaics as an energy services technology: a case study of pv sited at the union of concerned scientists' headquarters. Proceedings of the 1998 American Solar Energy Society Annual Conference, Boulder, CO.

Letendre, S. (1997). Photovoltaics for sustainability: An Investigation of the Distributed Utility Concept as a Policy Framework. Dissertation published through the University of Delaware, Newark, DE.

Kempton, W., and Letendre, S. (1997). Electric vehicles as a new power source for electric utilities. Transportation Research-D, 2, 157-175.

Byrne, J., Letendre, S., Agbemabiese, L., Redlin, D., and Nigro, R. (1997). Commercial building integrated photovoltaics: market and policy implications. Proceedings of the 26th IEEE Photovoltaics Specialists Conference.

Byrne, J., Letendre, S., Nigro, R., Ferguson, B., and Wang, Y. (1997). Building load analysis of dispatchable peak-shaving photovoltaic systems: a regional analysis of technical and economic potential. Proceedings of the 1997 American Solar Energy Society Annual Conference, Boulder, CO.

Letendre, S., Byrne, J., and Wang, Y. (1996) The distributed utility concept: toward a sustainable electric utility sector. Proceedings of the ACEEE 1996 Summer Study on Energy Efficiency in Buildings, American Council for an Energy Efficient Economy, Washington, DC.

Byrne, J., Letendre, S., Wang, Y., Govindarajalu, C., and Nigro, R. (1996). Evaluating the economics of photovoltaics in a demand-side management role. Energy Policy, 24, 177-185.

Byrne, J., Letendre, S., Nigro, R., Wallace, W., Wang, Y., and Govindarajalu, C. (1995). PV-DSM: opportunities for early commercialization. Proceedings of the 1997 American Solar Energy Society Annual Conference, Boulder, CO.

Byrne, J., Letendre, S., Wang, Y., Govindarajalu, C., and Nigro, R. (1995). Photovoltaics: a dispatchable peak- shaving option. Public Utilities Fortnightly, 133.

Byrne, J., Wang, Y., Letendre, S., Govindarajalu, C., Nigro, R., and Bottenberg, W. (1994). Deployment of dispatchable photovoltaic systems: technical and economic results. Proceedings of the First World Conference on Photovoltaic Energy Conversion, Waikoloa, HI.

Byrne, J., Nigro, R., Letendre, S., Govindarajalu, C., Wallace, W., and Wang, Y. (1994). Photovoltaics for demand-side management utility markets: a utility/customer partnership approach. Proceedings of the First World Conference on Photovoltaic Energy Conversion, Waikoloa, HI.

Byrne, J., Wang, Y., Nigro, R., and Letendre, S. (1994). Photovoltaics in a demand-side management role. Proceedings of the ACEEE 1994 Summer Study on Energy Efficiency in Buildings, American Council for an Energy Efficient Economy, Washington, DC.

Byrne, J., Nigro, R., Wallace, W., Wang, Y., and Letendre, S. (1994). Photovoltaics in high-value, utility markets: a demand-side management strategy. Proceedings of the 1994 American Solar Energy Society Annual Conference, Boulder, CO.

Byrne, J., Nigro, R., Wang, Y. and Letendres, S. (1994). PV-DSM as a green investment strategy. Proceedings of the Fifth National Conference on Integrated Resource Planning, National Association of Regulatory Utility Commissions, Washington, DC.

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