

Aven Satre-Meloy, PhD

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Education

- 2017 – 2020** **University of Oxford**, Oxford, UK
Doctor of Philosophy, Environmental Change Institute
Advisors: Dr. Philipp Grünewald & Dr. Nick Eyre
- Dissertation Title:** Characterising temporal aspects of residential electricity consumption using statistical learning
- 2015 – 2017** **University of Oxford**, Oxford, UK
Master of Philosophy in Environmental Change and Management
- 2009 – 2013** **Santa Clara University**, Santa Clara, CA
Bachelor of Science degrees in Political Science and Environmental Studies
Minor in International Studies
Summa cum laude, University Honors Program

Research Experience

- Sep 2019 – Dec 2019** **Scientific Engineering Associate**
Lawrence Berkeley National Laboratory, Berkeley, CA (based in Washington, D.C.)
- Conducted analyses of technical energy, cost, and emissions savings potential of various building technologies in support of U.S. Dept. of Energy's Grid-interactive Efficient Buildings initiative.
 - Supported development of Scout, a Python-based modeling and simulation software for energy efficiency impact assessment, to inform Dept. of Energy's \$200bn building technologies R&D portfolio.
 - Developed data visualization and analysis tools for characterizing high-level metrics for U.S. building energy efficiency and flexibility (e.g., energy and peak demand, time-of-use and locational marginal pricing, marginal emissions).
- July 2018 – Oct 2018** **Research Assistant**
Lawrence Berkeley National Laboratory, Berkeley, CA (based in Washington, D.C.)
- Developed hourly baselines in energy use, cost, and emissions for U.S. residential and commercial buildings, disaggregated by end use, region, and season.
 - Assessed the time-sensitive value of energy efficiency and flexibility technology adoption in the U.S. building sector using Scout.
 - Conducted exploratory analyses of U.S. utility time-of-use rate structures, building end-use load shapes, and marginal power sector emissions data.

Oct 2018 – Oct 2019 **Data Analyst and Research Assistant**
Environmental Change Institute, University of Oxford, Oxford, UK

- Assisted with data collection and management tasks for a five-year, European Research Council-funded project on time use and energy demand.
- Applied analytical tools to a large MySQL database of high-resolution electricity usage and occupant activity data.
- Developed data analytics tools and techniques, including those for exploratory analysis, data visualization, model development, and sensitivity analyses.

Apr 2016 – Nov 2016 **Research Fellow**
Project Drawdown, Sausalito, CA

- Selected for 2016 cohort of Research Fellows at Project Drawdown, a global coalition of researchers working to define and model 100 social, ecological, and technological solutions that reduce and sequester greenhouse gas emissions.
- Created global adoption and financial models for specific climate and energy solutions including utility-scale solar PV, building energy efficiency, and peak demand management. Modeled financial and climate impacts of adopting these technologies over 30 years.
- Revised reports and individual models for each solution to prepare for external review and publication in New York Times' bestselling book *Drawdown* (Penguin Random House, 2017).

Publications

Peer-reviewed Journal Publications

- 2020**
- Satre-Meloy, A.**, Diakonova, M., Grünewald, P., 2020. Cluster analysis and prediction of residential peak demand profiles using occupant activity data. *Applied Energy* 260, 1142–46. <https://doi.org/10.1016/j.apenergy.2019.114246>.
- Satre-Meloy, A.**, Grünewald, P. Comparative analysis of clustering approaches for segmentation of residential electric load profiles. Manuscript in preparation for submission to *Energy and Buildings*.
- 2019**
- Satre-Meloy, A.**, Langevin, J., 2019. Assessing the time-sensitive impacts of energy efficiency and flexibility in the U.S. building sector. *Environmental Research Letters* 14 124012. <https://doi.org/10.1088/1748-9326/ab512e>.
- Satre-Meloy, A.**, 2019. Investigating structural and occupant drivers of annual residential electricity consumption using regularization in regression models. *Energy* 174, 148–168. <https://doi.org/10.1016/j.energy.2019.01.157>.
- Satre-Meloy, A.**, Diakonova, M., Grünewald, P., 2019. Daily life and demand: an analysis of intra-day variations in residential electricity consumption with time-use data. *Energy Efficiency* 1–26. <https://doi.org/10.1007/s12053-019-09791-1> **Invited submission*.

Peer-reviewed Conference Proceedings

- 2020** Langevin, J., **Satre-Meloy, A.**, Fadali, L. Attaching public health benefits to building efficiency measures at the national scale. To be presented in: *Proceedings of the 2020 ACEEE Summer Study on Energy Efficiency in Buildings*, American Council for an Energy Efficient Economy, August 17-22, 2020, Pacific Grove, CA.
- 2019** **Satre-Meloy, A.**, Diakonova, M., Grünewald, P. What makes you peak? Cluster analysis of household activities and electricity demand. In: *Proceedings of the 2019 ECEEE Summer Study on Energy Efficiency in Buildings*, European Council for an Energy Efficient Economy, June 3-6, 2019 Presqu'île de Giens, France.
- Salzman, M., **Satre-Meloy, A.**, Langevin, J., Bergmann, H., Specian, M. Grid-interactive, Efficient Buildings: Expanding Value Streams through Optimised Control of Flexible Building Technologies. In: *Proceedings of the 2019 ECEEE Summer Study on Energy Efficiency in Buildings*, European Council for an Energy Efficient Economy, June 3-6, 2019 Presqu'île de Giens, France.
- 2018** **Satre-Meloy, A.**, Diakonova, M., Grünewald, P. Daily life and demand: New data on behavioral drivers of residential electricity use patterns. In: *Proceedings of the 2018 ACEEE Summer Study on Energy Efficiency in Buildings*, American Council for an Energy Efficient Economy, August 12-17, 2018, Pacific Grove, CA. **Top paper*
- Grünewald, P., Diakonova, M., **Satre-Meloy, A.** Diversity behind the meter – machine learning from household activities. In: *Proceedings of the 2018 BIEE Oxford Research Conference*, British Institute for Energy Economics, September 18-19, 2018, Oxford, UK.

Technical Reports, White Papers, and Book Contributions

- 2020** Sofos, M., Langevin, J., Deru, M., Gupta, E., Benne, K.S., Blum, D., Bohn, T., Fares, R., Fernandez, N., Fink, G., Frank, S., Gerbi, J., Granderson, J., Hoffmeyer, D., Hong, T., Jiron, A., Johnson, S., Katipamula, S., Kuruganti, T., Langevin, J., Livingood, W.C., Muehleisen, R., Neukomm, M., Nubbe, V., Phelan, P., Piette, M., Reyna, J., Roth, A., **Satre-Meloy, A.**, Specian, M., Vrabie, D., Wetter, M., Widergren, S., 2020. Innovations in Sensors and Controls for Building Energy Management: Research and Development Opportunities Report for Emerging Technologies (No. NREL/TP-5500-75601, 1601591). <https://doi.org/10.2172/1601591>.
- 2018** Williamson, K., **Satre-Meloy, A.**, Velasco, K., Green, K., 2018. Climate Change Needs Behavior Change: Making the Case for Behavioral Solutions to Reduce Global Warming. Rare, Arlington, VA. <https://www.rare.org/sites/default/files/2018%20CCNBC%20Report.pdf>.
- 2017** Hawken, P., [and 60 other contributing authors, including **Satre-Meloy, A.**], 2017. Drawdown: The Most Comprehensive Plan Ever Proposed to Reverse Global Warming. Penguin.

Invited Seminars and Presentations

- 2020** **Satre-Meloy, A.** Achieving further efficiency and flexibility in buildings: Physical and social determinants of electricity demand. Presented at: Energy and Environmental Economics Seminar Series, April 8, 2020, San Francisco, CA (presented remotely).
- 2019** **Satre-Meloy, A.** Assessing the time-sensitive benefits of energy efficiency and flexibility in the U.S. building sector. Presented at: Building Technologies Office Seminar Series, October 28, 2019, Washington, D.C.
- Satre-Meloy, A.** Characterizing temporal aspects of residential electricity consumption using statistical learning. Presented at: 2019 Computational Sustainability Doctoral Consortium, October 18-19, 2019, Pittsburgh, PA.
- Satre-Meloy, A.** Climate change and behavior change. Presented at: Project Drawdown Seminar Series, March 20, 2019, Sausalito, CA (presented remotely).
- 2018** **Satre-Meloy, A.** Quantifying hourly variations in energy, cost, and emissions for the U.S. buildings sector to develop a national baseline for time-sensitive efficiency valuation. Presented at Environmental Change Institute Energy Programme Seminar, November 1, 2018, Oxford, UK.
- Satre-Meloy, A.** Daily life and demand: new data on behavioral drivers of residential electricity use patterns. Presented at: LBNL Building Simulation Group Weekly Meeting, August 20, 2018, Berkeley, CA.
- Satre-Meloy, A.** Measuring and evaluating time- and energy-use relationships. Presented at: Building Technologies Office Seminar Series, September 19, 2018, Washington, D.C.
- 2017** **Satre-Meloy, A.** Understanding drivers of residential electricity consumption: A comparative analysis of structural and occupant factors in California households. Presented at: Environmental Change Institute Energy Programme Seminar, November 23, 2017, Oxford, UK.
- 2015** **Satre-Meloy, A.** How a race car ended up at the West Wing: Stories from a recent Energy & Climate Change Intern at the White House. Presented at: Environmental Studies and Sciences Seminar, May 15, 2015, Santa Clara, CA.
- Satre-Meloy, A.** Global citizenship for sustainability. Presented at: Guest lecture for Global Fellows Program, May 4, 2015, Santa Clara, CA.
- Satre-Meloy, A.** Environmental policy at the White House: The Obama Administration's efforts to address climate change. Presented at: Guest lecture for POLI 123 Global Environmental Politics course, March 9, 2015, Santa Clara, CA.

Selected Awards & Fellowships

- 2018** **Top paper from ACEEE 2018 Summer Study in Buildings**
Conference paper was invited for publication in the journal *Energy Efficiency*.
- 2017** **Distinction Award for Master's Thesis**
Awarded a Distinction, the top possible classification, for both master's thesis and for overall master's degree.
- 2016** **Oxford University Carbon Innovator Award**
Won Oxford University's inaugural Carbon Innovator Award for managing a project to reduce energy use and carbon emissions from the Oxford Chemistry Research Lab.

- 2016** **UBS-Oxford Smith School Annual Essay Competition**
Won third annual competition on challenges in environment and enterprise for an essay on the role of impact investing in financing public goods.
- 2015 – 2018** **Rhodes Scholarship**
Elected as one of 32 Americans to attend Oxford University for graduate studies.
- 2015** **Presidential Fellowship**
Asked by President of Santa Clara University to serve as Presidential Fellow on campus for six months to give public speeches and lectures on leadership and ethics.
- 2013 – 2014** **Fulbright Scholarship**
Awarded Fulbright English Teaching Assistantship to Kırıkkale University in Turkey.
- 2013** **Markkula Prize**
Awarded to one Santa Clara University senior in recognition of outstanding work in applied ethics.
- 2013** **Nobili Medal**
Awarded to the male graduate at Santa Clara University judged most outstanding in academic performance, personal character, school activities, and constructive contribution to the University by the faculty and the provost.
- 2012-2013** **Hackworth Fellowship**
Awarded one of three year-long fellowships at Santa Clara University's Markkula Center for Applied Ethics to create and implement a university-wide honor code for academic integrity.
- 2012** **Phi Beta Kappa**
Elected as a junior undergraduate to the oldest honor society in the U.S. for excellence in liberal arts and sciences.

Technical Skills

Programming Skills

Python: numpy, pandas, seaborn, matplotlib, plot.ly, scikit-learn, scipy, statsmodels

R Statistics: tidyr, dplyr, stringr, lubridate, ggplot2, glmnet, caret, NbClust, R Markdown

SQL: MySQL, PostgreSQL

Others: Git, Shell, LaTeX, MS Excel

Analytical Skills

Machine learning: regression and classification, linear model selection and regularization, cluster analysis, dimensionality reduction, tree-based methods, time series analysis and forecasting

Data visualization: geospatial data, time series, interactive visualizations and dashboards

Design Skills

Adobe Creative Suite (Photoshop, Illustrator, InDesign), WordPress