

Energy Efficiency Policy and Programs

Fridays 9 am – 12 pm, #211 Oakes Hall

Professors: Emily Levin and Elizabeth Palchak

Office Hours: By appointment

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Course Description: This course provides an overview of energy efficiency policies, programs and technologies at the federal, state, and local levels. We'll discuss the systems, policies and legal frameworks enabling energy efficiency to serve as an energy resource. We will also highlight new approaches to program design, including the role of behavioral science and energy cultures in engaging customers and expanding access to energy efficiency. Most classes will combine lecture, class discussion, and guest speakers.

What Success Looks Like: It's important that you do the readings before class and come to class prepared for the discussion. The success of this course relies on your involvement and your engagement with the material. As the course progresses, we may add or modify the readings to align with class interests and topics that arise as semester develops. We will give you plenty of notice.

Class Discussions: You and 1-2 classmates will be responsible for leading a discussion on the assigned readings, during a class of your choosing. You will be responsible for developing 2-3 guiding questions (similar to the questions developed as part of the "Short Topic Paper" assignment) to provoke discussion and critical thinking. All students are responsible for digging into these topics and coming to class prepared to contribute with references to the readings. Many of the links below are on the ACEEE website – you may have to create a free account to access these links.

Guest Speakers and Field Trip: The course will present an array of guest speakers working in various aspects of the energy efficiency field. Some guest speakers are tentatively booked; the schedule may change to accommodate their availability. We will inform you of any changes. There is a field trip to Vermont Energy Investment Corporation (VEIC) headquarters in Burlington, VT planned for July. The field trip will provide an intensive half-day session on the latest trends in energy efficiency and distributed energy resources.

Final Exam: The final will include 4-5 short essay questions on issues we cover throughout the semester. It will be a take home exam. If you do the readings, show up for class and engage with the discussions, you will do well on the final.

Text: *Energy Efficiency; Building a Clean, Secure Economy* by James Sweeney. Hoover Institution Press, c. 2016. Available as a hard cover or on Kindle [here](#).

Requirements:

1. Attend class;
2. Complete the required readings, consider the questions posed by the discussion facilitators, and be ready to participate in discussions;
3. Lead one class discussion with a partner or team of three;
4. Write a short paper on topic of your choice; and
5. Complete a take-home exam.

Grading:

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|----------------------|-----|
| Class Participation: | 20% |
| Short Topic Paper: | 20% |
| Led Class Discussion | 10% |
| Final Exam: | 50% |

Class 1: Friday June 7, 2019

Introduction to Energy Efficiency and Federal Policy

In the first class, we will explore how energy efficiency initiatives reshaped the United States' relationship with energy, including the relationship between energy efficiency, Gross Domestic Product, and decarbonization. This class will also introduce key definitions and provide an overview of energy efficiency technologies and practices. We'll also consider the role of federal energy efficiency policy, including both voluntary and mandatory approaches.

To prepare for the class, students should bring a list of existing or potential on-campus energy efficiency initiatives at VLS.

Readings

- 1) ACEEE, The Greatest Energy Story You Haven't Heard: How Investing in Energy Efficiency Changed the US Power Sector and Gave Us a Tool to Tackle Climate Change (2016). <https://aceee.org/research-report/u1604>
- 2) ACEEE, The Impact of Federal Energy Efficiency Programs (2018), <http://aceee.org/sites/default/files/pdf/fact-sheet/impact-federal-ee-programs.pdf>

Activities

- 1) Campus Energy Efficiency Tour
- 2) Sign up for class discussion day

Class 2: Friday June 14, 2019

State Actions and Utility Regulation

We'll explore the role that state governments play in energy efficiency and utility regulation. The class will look back at the history of state action on energy efficiency across the country and explore the work occurring in Vermont to move energy efficiency forward. Students will read and discuss energy efficiency resource standards, utility versus third-party program administrators, utility regulation, program funding sources, and more.

Readings

- 1) Ch. 1 and 3, *Energy Efficiency*, Sweeney
- 2) An Energy Efficiency Primer for Governors, National Governors Association, Greg Dierkers, Read pg. 1-16.
https://classic.nga.org/files/live/sites/NGA/files/pdf/2013/1309_An_Energy_Efficiency_Primer_For_Governors_Paper.pdf
- 3) ACEEE – The 2018 State Energy Efficiency Scorecard (2017). Read Chapter 1.
<https://aceee.org/research-report/u1808>
- 4) ACEEE – State Energy Scorecard website, <http://aceee.org/state-policy/scorecard> (find and read up on your state).
- 5) “Economic Benefits and Energy Savings through Low-Cost Carbon Management” by the Regulatory Assistance Project and “Reducing CO2 Emissions from Vermont Buildings” by the Energy Futures Group. Read pg. 1-13, 36-50.
<https://ljfo.vermont.gov/assets/Uploads/a5e545b014/rap-carbon-management-VT-JFO-february-2019-updated.pdf>

Guest Speaker

Abby White, Director of Marketing, Communications and Public Affairs at VEIC

Class 3: Friday June 21, 2019

Energy Efficiency as a Resource: Utility and Market Mechanisms

Is energy efficiency a resource? How does it fit into utility and grid operator planning processes? In this class, we will look at how energy efficiency is changing distribution and transmission planning processes and the regional integration of energy efficiency into wholesale electricity and carbon markets. We will also explore options to pay for energy efficiency, including utility direct investment, public benefit charges, and market mechanisms.

We will dig into utility business model consideration and discuss strategies to overcome barriers to utility investment in energy efficiency.

- 1) Demand Response Compensation in Organized Wholesale Energy Markets, Order #745; United States of America Federal Energy Regulatory Commission. Read pg. 1 -17 of pdf (pg. 13 as numbered), <https://www.ferc.gov/EventCalendar/Files/20110315105757-RM10-17-000.pdf>
- 2) Utility Dive, What the Supreme Court decision on FERC Order 745 means for demand response and DERs. <https://www.utilitydive.com/news/what-the-supreme-court-decision-on-ferc-order-745-means-for-demand-response/413092/>
- 3) Playing with the Big Boys: Energy Efficiency as a Resource in the ISO New England Forward Capacity Market Cheryl Jenkins, Blair Hamilton, and Chris Neme, Vermont Energy Investment Corporation, <http://www.veic.org/documents/default-source/resources/reports/playing-with-the-big-boys.pdf>
- 4) Decoupling Policies: Options to Encourage Energy Efficiency Policies for Utilities, NREL. <http://www.nrel.gov/docs/fy10osti/46606.pdf>
- 5) ACEEE – Role of Energy Efficiency in a Distributed Energy Future (2018). Read pg. 1-19 (12-30 of PDF). <https://aceee.org/research-report/u1802>
- 6) RGGI Proceeds Report 2016. Read pg. 1-14. https://www.rggi.org/sites/default/files/Uploads/Proceeds/RGGI_Proceeds_Report_2016.pdf

Guest Speaker

Rick Weston, Principal and Director, Policy, The Regulatory Assistance Project

Class 4: Friday June 28, 2019

Understanding Customers and Overcoming Barriers with Behavioral Science and Design Thinking

In this class, we'll explore the coming "customer revolution" in the energy efficiency industry. We'll investigate the role of behavioral science in policy and program design and play with design thinking tools that program designers leverage to improve customer experiences. We'll cover mechanisms for overcoming barriers, like technical assistance, incentives and financing for energy efficiency programs.

Readings

- 1) Ch. 6, *Energy Efficiency*, Sweeney
- 2) "MINDSPACE" Report, The Behavioural Insights Team
<https://www.bi.team/publications/mindspace/>
- 3) "Evaluating the Nest Learning Thermostat: A report by the Behavioural Insights Team"
<https://www.bi.team/wp-content/uploads/2017/11/311013-Evaluating-Nest-BIT-Exec-Tech-Summaries.pdf>

- 4) "Behavior and Energy Policy", Science, by Allcott and Mullainathan
https://scholar.harvard.edu/files/sendhil/files/behavior_and_energy_policy.pdf
- 5) Watch: TED talk, "How behavioral science can lower your energy bill" by Laskey
https://www.ted.com/talks/alex_laskey_how_behavioral_science_can_lower_your_energy_bill?language=en

Activity

Design thinking exercises

Class 5: Friday July 12, 2019

Broadening the conversation: Who pays? Who benefits? How do we know?

In this class we'll discuss models for identifying and understanding customers. We'll review programs currently running around the country and the benefits of these programs. We'll investigate issues of diversity, equity and inclusion in the energy industry and efforts to better understand the impacts of policies and programs. Through the readings and in class we'll look at the energy cultures framework as a mechanism for broadening the conversation about energy to extend beyond kWh to a more comprehensive accounting of what influences residential energy use.

Readings

- 1) "Social Equity in Energy State Policy: Indicators for Michigan's Energy State Policy: Indicators for Michigan's Energy Efficiency Programs" from the Urban Energy Justice Lab
<https://justurbanenergy.files.wordpress.com/2017/12/equity-in-energy-efficiency-investment-and-savings-report-2017.pdf>
- 2) "Justice for All: Measures of Equity for Low-Income Programs" by Chant and Huessy
<https://aceee.org/files/proceedings/2018/index.html#/paper/event-data/p394>
- 3) "Energy Costs and Burdens in Vermont: Burdensome for Whom?" by the Energy Security and Justice Program of Vermont Law School
<https://legislature.vermont.gov/Documents/2020/WorkGroups/Senate%20Natural%20Resources/Highlights/VLS%20IEE%20Energy%20Burden%20Report.pdf>
- 4) "Energy Cultures: Implications for Policy Makers" by Barton et. al
<https://www.otago.ac.nz/centre-sustainability/staff/otago055630.pdf>
- 5) Borgeson, Merrian. "The Limits of Financing for Energy Efficiency." *ACEEE 2012 Summer Study on Energy Efficiency in Buildings* (2014).
<http://aceee.org/files/proceedings/2012/data/papers/0193-000155.pdf>

Potential Guest Speakers

Elizabeth Chant, Senior Consultant at Optimal Energy and expert on energy equity

Lauren Wentz, Program Manager at Efficiency Vermont, Low-income and Multifamily Housing

Class 6: Friday July 19, 2019

EM&V – Negawatts, Externalities, and Valuing Efficiency’s Benefits

This class will focus on the role of evaluation, measurement and verification (EM&V) to answer questions like “can you count on the results of efficiency” and “how do we know negawatts are real”? We will examine techniques for quantifying energy efficiency savings and review the economic tests, known as cost-effectiveness screening, that represent choices for determining how much energy efficiency may be accomplished and at what cost. This class will also explore the non-energy benefits of energy efficiency. From health care to justice issues, air quality to carbon, externalities represent a method to consider the additional benefits of enacting energy efficiency. Finally, the class will look at innovative ways to unlock new value streams and revenue sources for energy efficiency, including strategies to compensate energy efficiency more fully for its value to the grid and garner funding from the health care industry.

- 1) State and Local Energy Efficiency Action Network. 2012. Energy Efficiency Program Impact Evaluation Guide. Prepared by Steven R. Schiller, Schiller Consulting, Inc. Read Executive Summary. Read pg. xiii-xix.
https://www4.eere.energy.gov/seeaction/system/files/documents/emv_ee_program_impact_guide_0.pdf
- 2) “The Efficiency Dilemma: If our machines use less energy, will we just use them more?” The New Yorker, David Owen, December 20, 2010.
<http://www.newyorker.com/magazine/2010/12/20/the-efficiency-dilemma>
- 3) National Standard Practice Manual for Assessing Energy Efficiency Resources – Executive Summary (2017). https://nationalefficiencyscreening.org/wp-content/uploads/2017/05/NSPM_Exec_Summary_5-17-17.pdf
- 4) Dunsky, Philippe and Boulanger, Francois. "Screening DSM: When the TRC Blocks Efficiency, What’s Next?" 2012 ACEEE Summer Study on Energy Efficiency in Buildings, <http://aceee.org/files/proceedings/2012/data/papers/0193-000199.pdf>
- 5) ACEEE, Role of Energy Efficiency in a Distributed Energy Future (2018). Read pg. 36-50 (46-61 of PDF). <https://aceee.org/research-report/u1802>
- 6) SCE, Application of Southern California Edison Company (U 338-E) for Approval of its Clean Energy Optimization Pilot. Read pg. 1-5 (pilot description).
[http://www3.sce.com/sscc/law/dis/dbattach5e.nsf/0/45EB1679CFDDB07F8825828F00010F51/\\$FILE/A1805xxx-SCE%202018%20CEOP%20Application.pdf](http://www3.sce.com/sscc/law/dis/dbattach5e.nsf/0/45EB1679CFDDB07F8825828F00010F51/$FILE/A1805xxx-SCE%202018%20CEOP%20Application.pdf)
- 7) Kravatz et al., “Co-Funded Health-Focused Housing Intervention Measure Benefits: Establishing a Co-Funded Low-Income Residential Program Model,” 2018 ACEEE Summer Study on Energy Efficiency in Buildings, <https://www.optenergy.com/wp-content/uploads/2018/12/Kravatz-Belliveau-Tonn-Clendenning-Co-Funded-Housing-Intervention.pdf>

Guest Speaker

Ethan Goldman, Director of Customer Solutions, Recurve

Class 7: Friday July 26, 2019 – Emily

Emerging Trends in Energy Efficiency: DERs, Devices, and Decarbonization

This class will center on a field trip to VEIC headquarters to explore the future of energy efficiency. We will look at innovations in energy efficiency delivery models and emerging technologies such as connected devices and zero energy buildings. We'll also consider how energy efficiency integrates with distributed energy resources, transportation electrification, peak demand reduction, flexible load, and a decarbonized grid.

For this class, we will meet at VEIC in Burlington, VT. We'll discuss carpooling options and other logistics in our first class.

Readings

- 1) Listen: The Energy Gang (podcast), Energy Efficiency is Going Through Another Transformation. <https://www.greentechmedia.com/articles/read/a-new-paradigm-for-energy-efficiency>
- 2) Grueneich, D.M., The Next Level of Energy Efficiency: The Five Challenges Ahead. Electr. J. (2015). <http://dx.doi.org/10.1016/j.tej.2015.07.001>
- 3) Amory B. Lovins, "How big is the energy efficiency resource?" 2018 Environ. Res. Lett.13 090401. <https://iopscience.iop.org/article/10.1088/1748-9326/aad965>
- 4) Utility Dive, "Integration is the next step in demand side management: Here's how 3 utilities are pursuing it," Dec. 5, 2018. <https://www.utilitydive.com/news/integration-is-the-next-step-in-demand-side-management-heres-how-3-utility/543636/>
- 5) Acadia Center, 2018 Clean Energy Legislation in Massachusetts. <https://acadiacenter.org/wp-content/uploads/2018/08/Acadia-Center-Summary-of-2018-Clean-Energy-Legislation-in-MA.pdf>
- 6) NRDC (blog), Slashing Emissions from Fossil Fuels Burned in Buildings. <https://www.nrdc.org/experts/merrian-borgeson/slashing-emissions-fossil-fuels-burned-buildings>
- 7) Building Decarbonization Coalition, A Roadmap to Decarbonize California's Buildings. http://www.buildingdecarb.org/uploads/3/0/7/3/30734489/bdc_roadmap_2_12_19.pdf

VEIC Field Trip

Jennifer Wallace-Brodeur – Managing Consultant and expert in transportation electrification
Dan Fredman – Senior Consultant and expert in smart grid, connected devices, and behavior
Damon Lane – Senior Analyst and expert in distributed energy resources
Lara Bonn – Director of Emerging Technologies and Services at Efficiency Vermont
Hilary Andrews – Manager of Communications and Marketing

Class 8: Friday August 2, 2019

Where Are We Headed?

In this final class, we will spend time synthesizing what we have covered through the semester, debriefing our VEIC trip, and discussing the final exam. We'll discuss readings that cover recent news related to energy efficiency and energy policy and explore where the field might be headed.

Readings

- 1) Ch. 7, *Energy Efficiency*, Sweeney
- 2) NRDC v. Perry – Complaint (2017). Read pages 1-12, 28-31.
- 3) NRDC v. Perry – Appellant Brief (2018), pg. 1-15.
- 4) H. Res. 109 – Recognizing the duty of the Federal Government to create a Green New Deal. <https://www.congress.gov/bill/116th-congress/house-resolution/109/text>
- 5) Friedman, L. “What is the Green New Deal? A Climate Proposal, Explained,” *The New York Times*. <https://www.nytimes.com/2019/02/21/climate/green-new-deal-questions-answers.html>
- 6) ACEEE, 2017 City Energy Efficiency Scorecard. Read Chapter 1. <https://aceee.org/research-report/u1705>