

Syllabus

Three Essentials of the Electric Grid, Module C: Business Essentials

The Environmental Law Center, Vermont Law School

Summer Session 2018, Term I, ENV5511

Instructor

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Course overview

This one-credit course is the third module in *Three Essentials of the Electric Grid*, a three-part overview of the engineering, legal and business dimensions of the U.S. electricity sector.

Students may enroll in this module (Module C: Business Essentials) even if they have not taken the other two modules.

Electric vehicles (EVs) are at once an emerging and disruptive technology, a key piece of the climate puzzle, and the biggest growth opportunity for our electric utilities in nearly a century. This module will explore issues at the intersection of the rapidly changing electricity and transportation sectors, with a particular focus on how EVs fit into the utility business model and can support a smarter, cleaner, more efficient “grid-of-the-future.” The course will include background on the state of the EV market and technology, as well as a review of state and federal policy drivers that support transportation electrification.

Course Schedule & Location

This course consists of four three-hour sessions. We will begin on Monday, June 11 and will conclude on Thursday, June 14. We will meet each day from 1:00 – 4:00 PM in Oakes Hall, #110.

Course Objectives

To have students understand:

- The need to electrify our on- and off-road vehicles;
- The status of the EV market and vehicle technologies, as well as state and federal policy drivers for transportation electrification;
- The opportunities and challenges that lie at the intersection of the transportation and electricity sectors for electric utilities, their regulators, EV market participants and stakeholders, and the policy solutions that have been pursued or proposed to date;

- How to understand, analyze and issue-spot different policy approaches in the transportation space;
- The varying perspectives and concerns of the diverse stakeholders in the world of transportation electrification.

Course Requirements and Grading

Our class sessions will be organized around lectures, discussion, exercises and simulations.

Preparation for, attendance at, and active participation in every class session is expected. Please read the assigned readings for each class in advance of that class.

Grades will be determined by class participation (20%), homework to be assigned and distributed in class on Monday and Tuesday (10%), a class presentation to be assigned on the first day (20%), and a take-home final exam (50%).

The take-home final exam will be made available on the morning of Friday, June 15 and must be completed by 12:00 PM on Sunday, June 17.

Reading Materials

There is no textbook for this course.

The readings for each class are listed below, and **all** readings are accessible on the TWEN site for this course in the “Course Materials” tab.

Two notes: First, pay close attention to the reading assignments. In many cases I have assigned only specific sections for you to read, rather than the entire piece. Second, the readings are meant to be read in the order listed.

Overview of classes and reading assignments

Class #1 (Monday, June 11)

Setting the stage: transportation and the grid

Our first class will focus on the transportation pollution problem, the need to electrify, and the potential for EVs to support a cheaper, cleaner and smarter grid. We will talk about the various market players and value streams in the EV marketplace, and the grid services that EVs can provide through successful “vehicle-grid integration,” as well as the technology, infrastructure and regulatory challenges that may stand in the way. I will also assign the class presentation and first homework assignment.

Readings for Class #1

Background: the modern electric car

Kevin B. Jones, Benjamin Jervey, Matthew Roche, & Sara Barnowski, THE ELECTRIC BATTERY: CHARGING FORWARD TO A LOW-CARBON FUTURE, Chapter 4, **please read pages 69-82.**

Transportation pollution and the need to electrify...or not

David Vox, The Key to Tackling Climate Change: Electrify Everything, Vox (October 27, 2017).

Jonathan Lesser, “Are electric cars worse for the environment?,” Politico (May 15, 2018).

Electric Power Research Institute, *Environmental Impact of Electric Vehicles* (May 2018).

The utility business model and electric vehicles, Part I

Travis Kavulla, Excerpt from “There Is No Free Market for Electricity: Can There Ever Be?,” American Affairs (May 20, 2017).

“Adapting to plug-ins: Electric cars could help save power utilities from a ‘death spiral,’” The Economist (October 4, 2014).

Vehicle-Grid Integration

Regulatory Assistance Project, *Getting from Here to There: Regulatory Considerations for Transportation Electrification* (May 2017), **please read pages 15-24.**

Smart Electric Power Alliance, *Utilities and Electric Vehicles: The Case for Managed Charging* (April 2017), **please read pages 5-7, 14-17.**

Class #2 (Tuesday, June 12)

God is in the detail: designing utility-driven EV programs

Our second class will focus on the utility role in the deployment of EV charging infrastructure. We'll consider the justifications for utility investment in this space, where utilities should focus their efforts, and how regulators should judge those investments. We will also consider the perspectives of various interested stakeholders.

Readings for Class #2

Weighing the utility role in the deployment of charging infrastructure

Brandon Hofmeister, *Electric Vehicle Charging Infrastructure: Navigating Choices Regarding Regulation, Subsidy, and Competition in a Complex Regulatory Environment*, JOURNAL OF ENERGY AND ENVIRONMENTAL LAW (Winter 2014), **please read pages 47-53 (beginning with section II)**.

Defining the utility role (and others), and applying standards

Declaratory Ruling on Jurisdiction Over Publicly Available Electric Vehicle Charging Stations, Case 13-E-0199, In the Matter of Electric Vehicle Policies (filed November 22, 2013), New York Public Service Commission.

Contrast approaches in “Standards of review for EV-Utility programs.”

Order Adopting Stipulation in Part, UM 1810, Oregon Public Utilities Commission, **please: skim pages 1-2, read pages 3-9**.

Utility program design and areas of focus

Comments of Sierra Club & Natural Resources Defense Council on Electric Vehicles, File No. EW-2017-0245, Missouri Public Service Commission.

Natural Resources Defense Council, *Guiding Principles for Utility Programs to Accelerate Transportation Electrification* (August 2017).

Toward alignment on EV program design

Robert Walton, “Maryland is 290K shy of its EV goal; Can a broad stakeholder process get it there?,” Utility Dive (March 7, 2018).

The utility business model and electric vehicles, Part II

Jim Lazar, *Electricity Regulation in the United States*, Regulatory Assistance Project (2nd ed., June 2016), **please read pages 86-92**.

Max Baumhefner, “Are Efficiency and Electrification Policies in Conflict?,” Natural Resources Defense Council (March 29, 2018).

Class #3 (Wednesday, June 13)

Enabling the future: state and federal policy drivers for EVs

Our third class will consider how efforts at the state, regional and federal levels are advancing transportation electrification, from federal efficiency standards and California's clean cars program to implementation of the settlement resulting from Volkswagen's "dieselgate" scandal. We will also consider the impact of the Trump administration.

Readings for Class #3

"Cooperative" federalism: efficiency, emissions standards and the California waiver

Kevin B. Jones, Benjamin Jervey, Matthew Roche, & Sara Barnowski, THE ELECTRIC BATTERY: CHARGING FORWARD TO A LOW-CARBON FUTURE, Chapter 4, **please read pages 65-67.**

Congressional Research Service, EPA's Mid-Term Evaluation of Vehicle Greenhouse Gas Emissions Standards (March 29, 2017).

Nadja Popovich, "California Is Ready for a Fight Over Tailpipe Emissions. Here's Why." New York Times (April 30, 2018).

Union of Concerned Scientists, "What will it take for automakers to meet California's ZEV requirements? Not as much as you might think," (April 2017).

Clean Air Act, Section 177

Automaker bad behavior: the Volkswagen settlement and future enforcement

Sierra Club, Volkswagen Settlement Overview.

Comments of faith-based, environmental, energy, and citizen organizations on Missouri Department of Natural Resources Draft VW Mitigation Plan.

Jefferson Sessions III, "Memorandum for All Component Heads and United States Attorneys: Prohibition on Settlement Payments to Third Parties," (June 2017).

State and regional efforts

ICCT, Evaluation of State-Level U.S. Electric Vehicle Incentives (October 2014), **please read pages 3-6 and 29-30.**

Zero Emission Vehicle Memorandum of Understanding.

Senate Bill 1975 (New Jersey), **please read page 2.**

REV West Memorandum of Understanding, **please read pages 1-2.**

Class #4 (Thursday, June 14)

“What’s next?”: the future of mobility and the grid

For our final class, we will spend the first half talking about disruptive innovation and policy at both the distribution utility level and transportation system-wide. The second half of the class will be spent on class presentations. Finally, the take-home will be explained.

Readings

The utility business model and electric vehicles, Part III

Steve Fine & Matt Robison, A Dramatic New Proposal in Utility Regulation, ICF (April 17, 2018).

Funding our transportation infrastructure in a world without gasoline

David Roberts, “Buying an electric vehicle? A growing list of states will charge you extra yearly fees,” Vox (February 2017).

Vermont Energy Investment Corporation, Alternative Fuel Vehicle User Fee Options (December 2012), **please read pages 14-18.**

Disruptive policy

Chris Morris, A California Lawmaker Is Trying to Ban all Gasoline-Powered Cars in the State by 2040, Fortune (December 6, 2017).

Clean Cars 2040 Act (Assemblymember Ting).

James B. Slaughter & James M. Auslander, Preemption Litigation Strategies Under Environmental Law, Natural Resources & Environment, Volume 22, Number 4, Spring 2008, **please read PDF pages 1-2.**

Dan Farber, Excerpt from CLIMATE CHANGE LAW (2016).

Disruptive innovation

Rocky Mountain Institute, “Peak Car Ownership: The Market Opportunity of Electric Automated Mobility Services” (2016).