"Powering the Future" is an exclusive graduate seminar co-sponsored by the Institute for Sustainability and Energy at Northwestern (ISEN) and facilitated by Edison International. In the seminar, C-level clean technology executives will lead discussions on new technologies and novel financing structures that are presently disrupting U.S. power markets. The setting will act as a forum for senior industry leaders and top students to discuss and network, providing mutually beneficial employment opportunities. Each seminar will be followed by a provided dinner to allow participants to continue building relationships.

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Instructors

Bert Valdman
President and CEO, Optimum Energy
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Gary Kremen
Founder, Clean Power Finance, & Chairman, Santa Clara Valley Water District
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Nat Kreamer
CEO, Clean Power Finance, & Chairman, Solar Energy Industries Association
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For questions pertaining to anything besides curriculum, please contact Jeff Henderson, Asst. Dir. of Marketing & Communications, at ISEN (jeffhenderson@northwestern.edu).

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WEEKLY SEMINARS

March 31: The Electric Power System: An Engineering Overview
Discuss how the electric system works from generation to transmission to distribution to end user. What are the current system constants and what is changing due to technology and policy? What are the emerging trends that will define the electric system of the future?

Lead Instructors: Bert Valdman, Nat Kreamer, Gary Kremen
Additional Lecturer: Russ Ragsdale, Electric Systems Planning Manager, Southern California Edison

April 7: The Electric Power System and its Stakeholders: Why Public Policy Matters
How public policy has shaped the electric system and the economic recovery of infrastructure investments. How will current public policy themes in the public arena define the future? How do politics shape policy, regulation, market design, markets, and technology?

**Lead Instructor:** Bert Valdman, Gary Kremen  
**Additional Lecturer:** Madeleine Klein, SVP of Policy and Strategy, SoCore Energy  
**Additional Lecturer:** Jon Wellinghoff, former Chairman, FERC, Partner, Stoel Rives

**April 14: Electric Consumers: Forgotten and Forlorn or Emboldened and Empowered**  
What do electric customers want and how has their relationship with electricity supply evolved over the past decade?

**Lead Instructor:** Gary Kremen  
**Additional Lecturer:** James Tong, VP Strategy and Government Affairs, Clean Power Finance

**April 21: Electricity and Entrepreneurship: Business Models of the Future**  
Where are the areas for new growth in the electric sector?

**Lead Instructor:** Gary Kremen  
**Additional Lecturer:**

**April 28: The Solar Challenge: From Niche Product to Mainstream Generation Resource**  
What is the future of solar as one of many renewable generation resources and how will innovation in material science and financing drive higher levels of solar penetration world-wide? How will markets use technology and financing drive innovation to integrate solar into the grid at large scale?

**Lead Instructor:** Nat Kreamer  
**Additional Lecturer:** <none>

**May 5: The Electricity-Water Nexus**  
How electricity, water, and food are inextricably linked and the future business models that might emerge.

**Lead Instructor:** Gary Kremen

**May 12: Energy Efficiency: The First Fuel**
How public policy and technology innovation (sensors, big data analytics) have reduced electricity consumption. What are the future implications for the electric system and its stakeholders?

Lead Instructor: Bert Valdman
Additional Lecturer: Mark Johnson, Smart Cities, Schneider Electric
Additional Lecturer: Aurelie Richard, SVP Strategy and Business Development, Schneider Electric

May 19: Class Choice
Class vote three weeks before will determine the course topic.

Lead Instructor: Dependent on topic
Additional Lecturer: <none>

May 26: Class Designated Deep Dive Topic
Lead Instructor: Dependent on topic
Additional Lecturer: Steve Threnholm, Chairman, E.ON North America

June 2: Class Presentations

Required Reading
These materials will inform our classroom discussions and make sure you are ready to engage with senior industry leaders that teach each seminar.

- “The Math,” The New Math,” and “Beyond the Math,” Greg Aliff, Vice Chairman, Deloitte†
- *Renewable Energy Integration Part 1*, pages 3-36, Jones, Lawrence E.‡
- *Reinventing Fire, Chapter 5*, Amory Lovins, Rocky Mountain Institute†

* Hard copy is available via Amazon, or individual chapters can be accessed electronically by searching for the title on the NU Library Website
† PDF versions are available on Canvas
‡ Part 1 can be accessed in its entirety on Google Books

Recommended Reading
If you are interested in broadening your knowledge about energy or learning more about how solar works, then consider reading:

- *Photovoltaic Systems*, Dunlop

**Recommended Prerequisite Coursework**

Functional familiarity with the following subject matters will enhance your experience and learning in this course:

- Corporate finance (for a good online course, take: Applied Corporate Finance at [http://people.stern.nyu.edu/adamodar/](http://people.stern.nyu.edu/adamodar/))
- Corporate strategy (for a basic primer, read *Competitive Strategy*, Michael Porter)

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**Class Presentations**

Participants will be asked to present the conclusions of a 5 page essay in response to one of the two below prompts:

1) Over the course of the quarter you will hear directly from a number of leaders in the energy sector about disruptive change in the areas of public policy, technology innovation, and customer preference. What area of the evolving electric sector do you believe has the most potential to be disruptive? When do you anticipate that this disruption will be severe enough to severe economic pain and ultimately displace incumbents? What are the catalysts that will lead to this disruption?

2) Discuss the top three technology and market innovations in the power sector and the role of public policy and politics for each.

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**Grading**

This seminar is NOT eligible for academic credit; accordingly students will not receive a formal grade at the conclusion of the quarter. Career exploration and/or advancement are ‘credits’ you will earn.

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**Absence**

Seminar enrollment is highly competitive. You are expected to attend the seminar EVERY week. Unavoidable absence should be communicated to the ISEN Administrator as early as possible; one (pre-arranged) absence may be accommodated at the discretion of the instructor core, but multiple absences may result in termination of the student’s placement in the seminar.