

EGEE 497 – SUSTAINABLE ENERGY IN NEW ZEALAND

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| Meeting: | Thursday 6:00p-9:00p |
| Credits: | 3 |
| Location: | 101 Electrical Engineering East |
| Prior Classes: | http://www.ems.psu.edu/~elsworth/courses/egEE_497/2018/ |
| Itinerary: | http://www.ems.psu.edu/~elsworth/courses/egEE_497/travel_itinerary_egEE_497.docx |
| Texts: | "The Quest: Energy, Security, and the Remaking of the Modern World," <i>Daniel Yergin</i> . 2011. ISBN-10:1594202834 (TQ) |
| Instructor: | <i>Derek Elsworth</i> 231 Hosler elsworth@psu.edu |

Course Description and Objectives

Students will investigate the political, economic, scientific and technological factors driving the recovery and utilization of energy in contemporary society by examining past- and planned-development in New Zealand. In particular, we will view evolution of energy utilization in New Zealand through a prism of two contrasting and relevant locales: the largest and most energy-intensive economy in the world (the United States) and an economy largely-fueled by tourism and agriculture (New Zealand). In particular, students will chart the catalysts of enabling energy technologies, the necessity of abundant sources of inexpensive energy, and the evolution from agrarian to industrial economies in both of these countries. Current status and future developments will be viewed from constraints on natural resources, contemporary views of environmental protection, and new trends in green engineering and industrial ecology of energy and materials flows.

Case studies/class presentations will focus on the significant role that energy resources have played in the evolution of the economies of these countries. Findings will be compiled in an oral report from a 7 day study tour to New Zealand over spring break.

COURSE OBJECTIVES

Content

- Review the scientific principles of energy conversion and power generation for a technical understanding of transforming natural resources into desired forms of energy.
- Survey the environmental impact of power generation in different energy systems in the context of their social, cultural, political, economic, technological and environmental conditions.
- Track the development of energy conversion technologies as applied in the US and in New Zealand, and compare and contrast them.

Process

- Conduct effective teamwork and collaborative learning
- Read critically, analyze thoughtfully and communicate effectively
- Give good and insightful oral presentations
- Develop video and audio communication skills

SCHEDULE AND TOPICS

1. Introduction - UP

January 10: Introduction: Themes, Teams, Practices and Travel Information

2. Contemporary View of Energy and Society – Global (TQ) – UP

Prepare by watching: <https://www.youtube.com/watch?v=Yaf0DGVAJAg>
....and tributary articles therein...

January 17: Energy, Environment, and Economy. **DE**

January 31: The New World of Oil. TQ Part I. **Team 1**

February 7: Securing the Supply. TQ Part II. **Team 2**

February 14: The Electric Age – Climate and Carbon. TQ Part III & IV. **Team 3**
New Energies – The Road to the Future. TQ V & VI. **Team 4**

February 21: Review “**Resources on Energy and Society**” from course resources page

https://www.ems.psu.edu/~elsworth/courses/egee_497/2019/index.html
<https://doi.org/10.1038/d41586-017-07507-y> (via PSU VPN from *Nature*, 2017)

3. Study Tour - New Zealand – March 2-9th (Spring Break)

We will travel to New Zealand. You will make your own flight arrangements to arrive in Auckland by noon on Monday March 4th (depart US on Saturday). You will be returned to the airport at noon on Saturday March 9th for departure (arriving US also on Saturday). You are free (indeed encouraged) to arrive before or depart after these times.

Travel within New Zealand will be by road and exclusively on the North Island. Accommodation will be arranged for you.

The lab fee will cover dormitory accommodation (Youth Hostels) and ground transportation in New Zealand. You will be responsible for all other expenses, including arranging your own air travel and for food.

Details of similar travel arrangements/destinations are available, to give you some idea of past travel and course deliverables: http://www.ems.psu.edu/~elsworth/courses/egee_497/2018/

4. Reporting of Individual Projects – UP

We will discuss individual projects during travel in New Zealand with students providing a topical area and plan as they return to the US. We will meet only sparingly in the final part of the semester, with one meeting for closeout presentations.

March 21 - class

1. Outline presentation topic in class. ~5 mins. Single ppt slide. Title/Objective/Approach/Expected-results
2. Submit your final electronic dispatch for posting (canvas).

April 11 - class

1. Final presentation (~15 min per person) on an investigative topic of your choice.

COURSE REQUIREMENTS

Assignments

Oral presentations (1) compiled and presented in class

An electronic file of the presentation (.ppt/.pdf) should be submitted electronically one day before the presentation. **Team**

Research project (1) compiled and presented in class at the end of the semester.

Individuals will present a research project or reflective evaluation of the material covered in the course, in the context of energy supply in New Zealand. This will be completed in class in late April. ~15 minutes per presentation/person or possibly in teams, as appropriate.

Grading

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| Team Oral Presentations | 40% |
| Dispatch | 20% |
| Individual Oral Presentation | 40% |
| Total | 100% |

ADDITIONAL INFORMATION

Organization of the Course

This course is organized around two anchors: oral presentations and overseas expedition.

Academic Conduct: Penn State's policy on academic integrity applies to all aspects of course deliverables. Students are encouraged to work together, in groups, but to submit independent contributions where appropriate, and collaborative contributions where noted. Further details are available at:

http://www.ems.psu.edu/current_undergrad_students/academics/integrity_policy

Attendance Policy: Attendance, participation and engagement are required. Absence will be questioned.