

## EGEE 497 – SUSTAINABLE ENERGY IN NEW ZEALAND

<b>Meeting:</b>	Thursday 6:00p-9:00p
<b>Credits:</b>	3
<b>Location:</b>	101 Electrical Engineering East
<b>Prior Classes:</b>	<a href="http://www.ems.psu.edu/~elsworth/courses/egEE_497/2017/">http://www.ems.psu.edu/~elsworth/courses/egEE_497/2017/</a>
<b>Itinerary:</b>	<a href="http://www.ems.psu.edu/~elsworth/courses/egEE_497/travel_itinerary_egEE_497.docx">http://www.ems.psu.edu/~elsworth/courses/egEE_497/travel_itinerary_egEE_497.docx</a>
<b>Texts:</b>	"The Quest: Energy, Security, and the Remaking of the Modern World," <i>Daniel Yergin</i> . 2011. ISBN-10:1594202834 (TQ)
<b>Instructor:</b>	<i>Derek Elsworth</i> 231 Hosler <a href="mailto:elsworth@psu.edu">elsworth@psu.edu</a>

### 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 three contrasting and relevant locales: the largest and most energy-intensive economy in the world (the United States), a premier energy- and mineral-rich resource-based economy (Australia) and an economy largely-fuelled by tourism and agriculture (New Zealand). 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 some or all 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 a 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, in Australia 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 11:** Introduction: Themes, Teams, Practices and Travel Information

Prepare by watching:

<https://www.youtube.com/watch?v=Yaf0DGVAJAg>

And by reading (*via* PSU VPN):

<https://doi.org/10.1038/d41586-017-07507-y>

....and tributary articles therein...

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

**January 18:** Energy, Environment, and Economy. **DE**

**February 15:** The New World of Oil. TQ Part I. **Team 1**

**February 15:** Securing the Supply. TQ Part II. **Team 2**

**February 22:** The Electric Age – Climate and Carbon. TQ Part III & IV. **Team 3**

**February 22:** New Energies – The Road to the Future. TQ V & VI. **Team 4**

### 3. Study Tour - New Zealand – March 3-10<sup>th</sup> (Spring Break)

We will travel to New Zealand. You will make your own flight arrangements to arrive in Auckland by noon on Monday March 5<sup>th</sup> (depart US on Saturday). You will be returned to the airport at noon on Saturday March 10<sup>th</sup> 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 you 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\\_497/2017/](http://www.ems.psu.edu/~elsworth/courses/egee_497/2017/)

### 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.

**April 26:** TBD

### 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

Team Oral Presentations	40%
Dispatch	20%
Individual Oral Presentation	40%
<b>Total</b>	<b>100%</b>

### 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](http://www.ems.psu.edu/current_undergrad_students/academics/integrity_policy)

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