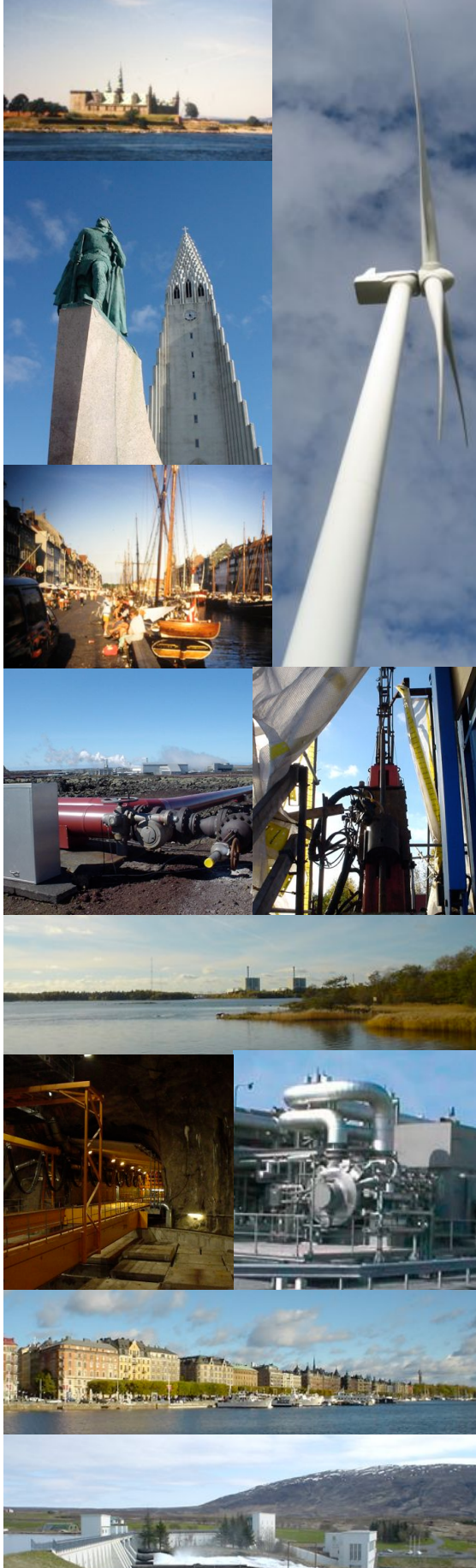


SUSTAINABLE ENERGY IN SCANDINAVIA: ONE REGION, MANY CHOICES



What: Students will explore and define key factors contributing to the evolution of energy choices in Scandinavia – and in particular towards a sustainable energy future. This region is of particular interest as it is geographically compact, with a common Nordic ancestry, but has selected broadly different modes of development that utilizes various mixtures of sustainable and non-renewable energy resources, as necessary. These principal resources include geothermal energy (Iceland), hydropower (Iceland and Norway), both oil (Norway) and gas (Netherlands) together with wind (Denmark) with a substantial reliance on nuclear power (Sweden and Finland).

This course will investigate the political, economic, scientific and technological factors driving the recovery and utilization of energy in contemporary society by contrasting past- and planned-development in Scandinavia, plus Finland and the Netherlands. In particular, we 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 each 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.

When: Spring (2 cr.), Summer (May 16-31 1 cr. to Scandinavia) and Fall (3 cr.) 2015 with grades awarded following the completion of a course report, due in December 2015, documenting material gathered during the field-trip. Students will register for EM SC 470W.

Where: Principally at University Park, but including a ~14 day research expedition to Iceland, Norway, Sweden, Denmark and the Netherlands, May ~16-30. Details of prior courses and expeditions are available at: <http://www.ems.psu.edu/~elsworth/>

Ground transportation and basic accommodation in Europe will be covered. Each student will be responsible for his/her return air travel to Amsterdam *via* Iceland (~\$1500), personal meals and miscellaneous personal expenses.

Who: The course is open to all students who will be enrolled through December 2015, including those in the social sciences, in the natural sciences and in engineering.

Students may use this course to fulfill the general education writing intensive requirement (W requirement). Depending on the student's project, it may also be appropriate for use as design credits for engineering majors.

Instructors: Derek Elsworth, Semih Eser and Jonathan Mathews

How: This course will use occasional guest lectures, instructor-guided discussions, student presentations, and research to address the important contemporary issues of energy supply and use, and the environmental consequences of energy choices.

Students must apply to join the course. There are no formal prerequisites.

Applications are available at: <http://www.ems.psu.edu/CAUSEapplication>

Applications will be accepted, and reviewed at the end of September, then October, and then until the date of registration for the course. The course will be closed when full. Invitations to join the course are merit-based and made on a first-come, first-served basis.