

SUV's, smoky kitchens, & the hydrogen economy? linking energy, air pollution, and human health
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Topic: SUV's, smoky kitchens, & the hydrogen economy? linking energy, air pollution, and human health

Bridge students: Eric Mazzi, Elaina MacIntyre

Bridge faculty: suggested faculty: Michael Brauer, Hadi Dowlatabadi

Target Audience: undergraduate students at UBC with an interest in air pollution (ranging from pre-med to engineering students). Possibly professionals involved in energy and air pollution (government, utility, industry).

Module Delivery: ~ 3 weeks

Delivery Options: mixed mode (in-class and on-line), video a possibility

Module Outline: (based on series of 1 hour lectures, 3 per week)

L1: basic physics of energy (1st & 2nd laws)

L2: fossil energy sources: coal, oil, gas; extraction, transmission, conversion

L3: renewable energy resources: hydro, wind, solar, tidal, ...

L4: air pollutants: particles, NO_x, SO_x, CO, ozone, lead, mercury, other toxics

L5: air pollution sources & exposure paths: transportation, electricity, industry, commercial/residential

L6: health effects: disease endpoints (acute & chronic) and causal pollutants

L7: health impacts: morbidity, mortality, economic costs (use GBD results, other)

L8: relevant policies: energy, urban planning, transportation, environmental

L9: interventions, options, & synthesis: future energy forms (hydrogen), technology (distributed generation), exposure control, links to economic development.

Framework: engineering, policy, and health aspects.

Assignments (evaluation): (i) practice exercises weekly (ii) weekly quiz (iii) Students write a brief discussion paper on agreed topic: their own chosen undergraduate project (e.g. engineering student on combustion & pollution; med student on engineering of energy systems), **or** specific case study (e.g. compare air pollution regulation in Washington state to BC), **or** article review. First draft of paper/analysis/review due one week after end of module (scope, methods, deliverables). Could be one final exam for course with each module contributing questions.

Desired Learning Outcomes

- Students grasp basics of energy (production & consumption) and air pollution in Canada & other developed countries
- Compare differences (e.g. in sources, exposure, & policies) between developed and developing countries
- Demonstrate knowledge about engineering, policy, and health issues in energy and air pollution.