

## Clean Energy and Green Infrastructure – Innovation at the nexus of politics and society

---

Prof. [James Tansey](#)

### Course Outline

*Climate and energy policy in North America have evolved into a highly fragmented mosaic of initiatives, with a strong emphasis on action at the state and provincial level. This is due, to some degree, to the lack of political support at the federal level in the US and Canada for comprehensive climate and energy policy and reflects the high diverse energy sub-economies across the continent. For instance, within Canada, British Columbia has very large hydroelectric assets that account for around 88% of power generation in the province, while neighbouring Alberta is heavily dependent on coal fired power generation. Within the US, coal still plays a very significant role in the power generation on a regional basis. Add to this the overlapping constitutional issues--for instance energy resources in Canada are constitutionally the domain of provinces, but federal agencies including Environment Canada and Fisheries and Ocean have some regulatory oversight—and the result is a complex and fragmented regulatory regime.*

*In this course, we will look at some the key features of the regulatory landscape, with a focus on Canada and California's effort to price and regulate carbon. Given the vast land base of North America, we will examine the role of land base sequestration projects in achieving climate goals. Given the highly urbanized character of Canada, we will look at the role that cities can play as innovation laboratories, with a particular focus on the City of Vancouver and the University of British Columbia campus. In the final session, we will look at Westport Innovations, one of the more successful clean technology companies to emerge out of Canada and Nexterra, which introduced a sophisticated biomass heat and power solution into the market. The goal will be to understand the political and economic opportunities and challenges facing clean technology companies operating in North America.*

### Learning Objectives

*By the end of the week, the participants in the course will be able to:*

- 1. Identify the major forms of climate policy in North America and evaluate the differences between their effectiveness;*
- 2. Distinguish the major forms of land use change projects and describe the contribution they can make to achieve emission reductions goals.*
- 3. Describe the conditions for a successful research and demonstration through real examples on the UBC campus;*
- 4. Describe the main factors supporting the successful growth of clean technology companies.*

### **Lesson 1: Introduction to Sustainability**

This lesson introduces the key concepts and issues driving social and economic responses to sustainability. The class focus on the five global forces that bring sustainability to the fore and also create opportunities for companies to innovate, generating new sources of value and income. The class will set the context for the remaining five classes.



**GNAM Week Clean Energy and Green Infrastructure**

---

**Lesson 2. North America's Climate Policy Mosaic**

In the absence of Federal action on climate change in the US or Canada, a fragmented mosaic of climate policy has emerged. BC has a \$30 carbon tax, California and Quebec have established a cap and trade system and RGGI in the north east of North America prices carbon at the utility level. Renewable Portfolio Standard legislation has been established in over 30 states and Low Carbon Fuel Standards are driving change in the transportation sector. The class will provide an overview of the various regimes businesses spanning North America have to deal with.

**Lesson 3. Biological Carbon Projects**

Canada has the second largest land base in the world. While mitigation options have largely failed on the national level, there have been a number of successes through forest and agricultural carbon offset projects. The class will provide an introduction to biological carbon sequestration and storage projects drawing on experience from the Great Bear Forest Carbon project and internationally, from the Mai Ndombe forest carbon project, currently the largest in the world

**Lesson 4. Campus Living Laboratory**

The UBC campus provides an experimental platform for integrating clean energy technologies into campus infrastructure providing a testing and development platform for industrial partners and researchers. Projects include a Smart Grid initiative, waste to energy, the bioenergy facility and the CIRS Living Building project. Presentations by operational staff.

**Lesson 5. Bioenergy Technology and Potential**

Biological fuel sources such as wood and agricultural waste provide a low carbon alternative to conventional fuels. Class will examine the economics of bioenergy focused on North America and will involve a tour of the Nexterra/GE Bioenergy Research Development Facility.

**Lesson 6. Greening infrastructure**

Green buildings are increasingly sophisticated and integrated into the wider infrastructure of a city. The concept of a 'living building' is at the leading edge of green building design. Drawing on the experience at CIRS, the greenest building in North America, on the UBC campus, the class will examine both the technology and economics of the facility.

**Course Preparation and Participation:**

Prior to the course students should review the [Clean Capital News](#) Archive and [UBC Sustainability](#) and read at least **five articles** from these sources

Read the [UBC Annual Sustainability Report](#)

Any other articles assigned by the Instructor

Students are required to participate in all course activities and deliverables.

**Course Deliverables and Assessment:**

**Team Projects** – students will work in teams on proposing a clean energy solution to a variety of issues posed throughout the course.

**Case Day Presentations** - Final assessment is based on team presentations on the final day. Format will be shared during the course.