**ASIC 220**

**Draft 4**

**June, 2012**

**Draft 4 of Course Outline**

 **Week 1 - Day 1**: *Introductory items*

*In class*: Introductions; Course objectives; discussion of major assignments; grading; start discussion of definitions of sustainability.

*Assign*: URL’s for reading, and request each student to bring what they judge to be the ‘best’ definition of sustainability to Class 2, and to be prepared to defend the choice.

*Hand in*: nothing

*Teaching Resources*:

Definitions of Sustainability:

1.  *'the ability of humans to coexist and ensure that our creative capacities for enterprise and discovery do not extend beyond the limits of the supporting ecosystems on which we depend.'*

2. Other definitions are discussed at:

A) <http://www.sustainablemeasures.com/node/35>

B) <http://www.ecifm.rdg.ac.uk/definitions.htm>

 This latter source is from the University of Reading (U.K.), and includes links to other useful sustainability related topics.

**Day 2:**

*Class focus*: Discussion of the various definitions of sustainability as discovered by students; What are the important differences among these definitions? Why do these difference arise? What are the commonalities? Lead into a discussion of the three pillars of sustainability (Science & Environment, Economics, Society);

Where is the 'Art" and where is the 'Science' in Sustainability?

*Assign*: Reading and Videos of sustainability efforts at UBC:

Reading: <http://www.sustain.ubc.ca/sites/sustain.ubc.ca/files/uploads/pdfs/Plans%20and%20Reports/Inspirations%20and%20Aspirations_Final%20Report_2011.pdf>

Video: <http://cirs.ubc.ca/>

Video: <http://www.youtube.com/watch?v=skYJ3Uij6Vs&feature=related>

*Hand in*: A one paragraph definition of sustainability.

*Teaching Resources:* The 'pillars' of Sustainability are identified on the UBC website as: **Environment, Society, and Economy & Technology**.

 (<http://www.sustain.ubc.ca/teaching-learning/curriculum/courses>)

In SCIE 120 the pillars are given as: **Science/Environment, Social/Political & Economics**.

**Day 3:** *Two sustainability topics as an Introduction and for discussion*

*Class focus*: Discussion of student definitions of sustainability; Introduction through lecture and discussion of a topic that leads into a conversation about the multi-faceted make-up of Sustainability as a subject.

*Assign*: Reading: (UBC Carbon Neutral Report) <http://www.sustain.ubc.ca/sites/sustain.ubc.ca/files/uploads/pdfs/Plans%20and%20Reports/UBCV_Carbon%20Neutral%20Action%20Report_2010.pdf>

Video: ??

*Hand in*:

*Hand back*: Student definitions of sustainability with comments.

*Class activities*:

A. Discussion of student definitions of sustainability;

Possible points for discussion: 1) Does each definition touch on all three pillars? 2) What is the source/origin of these definitions?; 3) Are all of these definitions ‘workable’? That is, do you see a way in which the parts of any given definition can be applied in practice? Or can be used to test whether a given operation is sustainable?

B. Introductory lecture on Energy sustainability

**Energy Sustainability** (Generation and Use) - An example of a current "hot topic" in Sustainability. This could start with a list of current (and potential??) sources of energy, followed by a discussion of student opinion on which sources are sustainable, and which are not, including the reasons for a particular opinion. A follow-up could be to re-consider each energy source for sustainability in the context of each of the three pillars.

 The social/political framework

 The economic framework

 The scientific framework

**Week 2 - Day 4: Analysis of UBC Carbon Neutral Report**

*Class focus*: Discussion of UBC Carbon Neutral Report; Introduction through lecture and discussion of a topic that leads into a conversation about the multi-faceted make-up of Sustainability as a subject.

*Assign*: Assign three papers to each student, or 1 per student group for later discussion.

1. Is Foreign Aid Helping or Hurting Africa? <http://globalenvision.org/2009/04/20/foreign-aid-helping-or-hurting-africa>

2. Foreign aid and development in Africa: What the literature says and what the reality is. <http://academicjournals.org/JASD/contents/2009cont/Nov.htm>

3. EIUDP, SFU, CIDA, and sustainability: <http://www.ulsf.org/pub_declaration_parvol22.html>

*Hand in*: No

*Hand back*: No

*Class activities:*

A. Finish any loose ends from the previous class;

B. Lecture and discussion on meaning of, and efforts to achieve, carbon ‘neutrality’.

Carbon off-sets, carbon-tax, etc.

C. Discussion of UBC Carbon Neutral Report; What was its main conclusion? Do you believe it? Is it more than a public relations effort? Which pillar(s) does it address?

**Day 5: Does Foreign Aid foster a sustainable society?**

*Class Focus***: A Nation’s Sustainability and** **Foreign Aid**: Does Foreign Aid promote or hinder sustainability within the recipient society?

Lecture on Foreign Aid and sustainability.

*Assign*: From Wikipedia (<http://en.wikipedia.org/wiki/Social_sustainability>)

*Hand in*:

*Hand back*:

*Class activities*:

Topic: Does Foreign Aid to a nation foster a sustainable society? What constitutes a sustainable society?

Cursory overview of Foreign Aid, Sustainability, and 3 pillars.

 A. Social:

PLUS: Mitigates immediate cause of starvation and malnourishment;

NEGATIVE: reduces demand by recipients on own government to fix or ameliorate the problem (e.g. invest money into irrigation, dry-land crops, marketing tools).

 B. Science:

PLUS: none?

NEGATIVE: reduces demand for, and practice by, in-country trained scientists to carry out research on, e.g., more productive food crops, nutritional requirements and how to meet them with local resources.

 C. Economic:

PLUS: ?????

NEGATIVE: Suppresses local industries and small businesses. E.g. (1) Donation of food may suppress local farming industry, investment into more physically or biologically tolerant food crops. (2) Donation of used clothing may suppress local cotton production and make sit difficult for local small clothing businesses to make a profit (and hence to exist).

**For class Discussion**: Discuss how both the SCALE (local, national, continental,, global) and the PERSPECTIVE (user, donor, researcher, male, female) may influence perception of the sustainability of a particular foreign aid undertaking.

A. In Canada, who decides which country gets foreign aid, and how much is given?

B. For Canada, what % of foreign aid is given to be used to buy Canadian products (in other words is ‘tied’ aid?)? Is tied aid better or worse for the recipient? For the donor?

[See Fig 2 (*Figure 2. Tied Aid as a Percentage of Total ODA for OECD Countries 2007160)* in <http://www.opencanada.org/wp-content/uploads/2011/05/Reinventing-CIDA-Barry-Carin-Gordon-Smith.pdf>]

C. Is foreign aid given for humanitarian or self-interest? Does the motive matter to the recipient?

Concluding and summarizing question: What is the impact of foreign aid on a nation’s effort to be sustainable (e.g. increase its food production, promote production consumer products, promote education generally, and technological knowledge to sustain infrastructure)?

**Day 6: Society, Politics, and Sustainability**

*Class Focus*: What is the role of Social and Political considerations in shaping a successful sustainability policy?

***Assign for Class 7***: Holloway, M. 1996. Sounding out Science. Trends in Ecology. Scientific American, October: 106-112.

[Divide class into 8 groups of (3?? students), each two groups to answer 1 question from General Questions (See class 7) and each one group to answer one question from the Holloway list (See Class 7). Will finalize group answers in Class 7, and then discuss all questions in Class 7.]

*Reading:*

***Video App: (Shown in class?)***: **Time-lapse tools help people understand climate change (IPAD & IPOD app)** [**http://isis.sauder.ubc.ca/programs/climate-intelligence-program/news-scan/pics-climate-news-scan-01-may-2012/**](http://isis.sauder.ubc.ca/programs/climate-intelligence-program/news-scan/pics-climate-news-scan-01-may-2012/)

***NOTE: This video is a preparation for the discussion in Class 8, so should be shown at the end of this class***.

*Hand in*:

*Class Activites:*

1. Discussion based on (<http://en.wikipedia.org/wiki/Social_sustainability>)

A. Can a sustainable policy ‘work’ without the inclusion of the Social component?

B. Can a sustainable policy ‘work’ without the inclusion of the Political component?

C. The following is taken from: Western Australia Council of Social Services (WACOSS)[[1]](http://auspsa.anu.edu.au/proceedings/publications/Partridgepaper.pdf):

 “*Socially sustainable communities are equitable, diverse, connected and democratic and provide a good quality of life."*

1)Do you agree that this definition includes all the important components of Social Sustainability? Anything you would add?

 2) What is meant by the term ‘community’ in this definition?

 3) Are the components of this definition ‘measurable’? In other words can their presence in an action, and an improvement in their status, be measured?

From Wikipedia (<http://en.wikipedia.org/wiki/Social_sustainability>)

**Social sustainability** is one aspect of [sustainability](http://en.wikipedia.org/wiki/Sustainability) or [sustainable development](http://en.wikipedia.org/wiki/Sustainable_development). Social sustainability encompasses [human rights](http://en.wikipedia.org/wiki/Human_rights), [labor rights](http://en.wikipedia.org/wiki/Labor_rights), and [corporate governance](http://en.wikipedia.org/wiki/Corporate_governance). In common with [environmental sustainability](http://en.wikipedia.org/wiki/Environmental_sustainability), social sustainability is the idea that future generations should have the same or greater access to social resources as the current generation ("inter-generational equity"), while there should also be equal access to social resources *within* the current generation ("intra-generational equity"). Social resources include ideas as broad as other [cultures](http://en.wikipedia.org/wiki/Cultures) and basic human rights. Also we can speak of Sustainable Human Development that can be seen as development that promotes the capabilities of present people without compromising capabilities of future generations [1]. In the human development paradigm, environment and natural resources should constitute a means of achieving better standards of living just as income represents a means of increasing social expenditure and, in the end, well-being.[2].

Dimensions of Social Sustainability

According to the Western Australia Council of Social Services (WACOSS)[[1]](http://auspsa.anu.edu.au/proceedings/publications/Partridgepaper.pdf):

*"Social sustainability occurs when the formal and informal processes; systems; structures; and relationships actively support the capacity of current and future generations to create healthy and liveable communities. Socially sustainable communities are equitable, diverse, connected and democratic and provide a good quality of life."*

It has the following dimensions [[2]](http://integral-sustainability.net/wp-content/uploads/sas4-2-hodgson.pdf):

* **Equity** - the community provides equitable opportunities and outcomes for all its members, particularly the poorest and most vulnerable members of the community
* **Diversity** - the community promotes and encourages diversity
* **Interconnected/Social cohesions** - the community provides processes, systems and structures that promote connectedness within and outside the community at the formal, informal and institutional level
* **Quality of life** - the community ensures that basic needs are met and fosters a good quality of life for all members at the individual, group and community level (eg. health, housing, education, employment, safety)
* **Democracy and governance** - the community provides democratic processes and open and accountable governance structures.
* **Maturity** - the individual accept the responsibility of consistent growth and improvement through broader social attributes (eg. communication styles, behavioural patterns, indirect education and philosophical explorations)

**Show Video App in preparation for Class 7;**

**Week 3 - Day 7: Society, Politics, and Sustainability**

*Class Focus*: Shifting Baselines and Designing Sustainable Systems

***Assign*ed *Reading for Class 8:*** Historical Overfishing and the Recent Collapse of Coastal Ecosystems. Jackson et al. 2001; Science 293: 629-638.

**Reading due**: Holloway, M. 1996. Sounding out Science. Trends in Ecology. Scientific American, October: 106-112.

*Hand in*:

*Class Activities:*

1. Discussion of the role of baseline knowledge in analyzing change and in judging what constitutes a sustainable system.

**Time-lapse tools help people understand climate change (IPAD & IPOD app)**

[**http://isis.sauder.ubc.ca/programs/climate-intelligence-program/news-scan/pics-climate-news-scan-01-may-2012/**](http://isis.sauder.ubc.ca/programs/climate-intelligence-program/news-scan/pics-climate-news-scan-01-may-2012/)

**From: PICS Climate News Scan – 1 May 2012**

**Produced by ISIS, Sauder School of Business, UBC**

**Authors: Neil Thomson, Neil Salmond, Kristina Welch, Justin Bull, James Noble**

**Editors: James Tansey (ISIS), Jessica Worsley (PICS), Tom Pedersen (PICS)**

**Baselines – why are they important?**

*April 20, 2012.* Scientists and psychologists know that peoples' perception of climate change is heavily influenced by the tendency to take in the ‘here and now’, rather than long-term trends over their lifetime and even generations. Known as temporal myopia, it often prevents the public from understanding the true implications of climate change, which more often than not occurs in small incremental steps. Like the proverbial frog in a pot of boiling water, the small changes over time suppress and sometimes entirely remove the perception that action is required. A new iPad and iPhone application launched last week is aimed directly at bridging this gap in our comprehension by showing time-lapsed videos of retreating glaciers, natural disasters over time, and other climatic events that change over longer periods. A previous News Scan reported on how effective visual techniques are at helping people understand the effects of climate change. Techniques incorporating the time component of the discussion will further serve to inform the public.

Despite ongoing warming that is causing glaciers to retreat at rates of 25 to 50 metres a year in many areas in Western Canada, many people still struggle to understand why urgent action is required on climate change. The Illecillewaet glacier, located in the Glacier National Park in BC’s interior, is expected to disappear by 2030, leaving future generations without the fresh clean water it provides. The glaciers in this region are also considered a source of potential energy that contributes to the production of clean electricity in BC, as they provide a stream of snow and ice melt in summer. The future of that particular seasonal hydropower source is now under threat.

In class discussion of baselines:

General Questions:

1. What is a ‘baseline’?

2. Why do baselines often not exist when they are needed??

 E.g. Exxon Valdez oil spill example;

NOTE: (Rob DeWreede has applicable material for the Exxon Valdez oil spill).

3. There often is disagreement about what constitutes an appropriate baseline (e.g. baseline definitions of different interest groups around the Exxon Valdez spill looking to re-establish a natural and sustainable ecosystem). What is the basis for such disagreements? Different facts? Different interpretations of the same facts? Self interest? Dismissal of the facts?

4. Can you think of other examples where the same knowledge base has lead to very different suggestions for action? (Climate Change amelioration; mine tailing ponds?).

**Questions on Holloway 1996:** Use Holloway, M. 1996. Sounding out Science. Trends in Ecology. Scientific American, October: 106-112. This article discusses the social and political background to Exxon Valdez oil spill site restoration.

1. On what basis have the Exxon scientists concluded that the “Sound is well”? Do you concur with the conclusion and the basis on which it was made?

2. What is the definition of recovery used by the Trustees? Do you agree with this definition?

3. Why was the State study stopped in 1991? For what other use was the oil spill damage money to be used?

4. What technique was used by the NOAA Team? What was the purpose of the studies they did?

5. What did the NOAA team conclude about the usefulness of the cleaning techniques used on the beaches?

6. What is the controversy over the dynamics of *Fucus (a common brown seaweed)*?

7. What is your reaction to the conclusion that “Nobody actually knows much about anything in the Sound”.

8. What other “complicating” factors may be confounding the results?

9. Do nothing?

**Day 8:**

*Class Focus*: What is the role of Social and Political considerations in shaping a successful sustainability policy? [Continued] Jackson et al. 2001 reading.

*Assigned for today*:Historical Overfishing and the Recent Collapse of Coastal Ecosystems. Jackson et al. 2001; Science 293: 629-638.

<http://web.ebscohost.com/ehost/detail?sid=a88bc4a1-34ef-4e03-af85-940c84afc3db%40sessionmgr12&vid=1&hid=24&bdata=JnNpdGU9ZWhvc3QtbGl2ZQ%3d%3d#db=aph&AN=5022336>

*Video* :

*Reading:*

*Video*

*Hand in*:

*Class Activites:*

1. Finalize discussion from Day 7, and tie up loose ends.

2. Specific discussion of Jackson et al. 2001

The following questions, based on Jackson’s et al. paper, could serve as the basis for a discussion in class:

A. What is the main message from this paper?

B. To what extent do Economical considerations shape this ‘message?

C. To what extent do Political considerations shape this ‘message?

D. To what extent do Societal considerations shape this ‘message?

E. Is the message supported by data? What is the nature of these data (historical, experimental, objective, subjective)?

2. General summary discussion of how Social, Political, Economical, and Scientific considerations affect the establishment of an acceptable baseline. In your opinion, is any one of these four considerations more important than any other in establishing an **acceptable** baseline?

**Day 9:**

Left open for now, as preceeding two days may be too much material. This could also be a time for a retro-active discussion on material covered, and possibly for a **sample** quiz.

**Week 4 – Days 10, 11, & 12. Society, Politics, and Sustainability**

 **City of Vancouver Social Policy Report: Definition of Social Sustainability**

 <http://vancouver.ca/ctyclerk/cclerk/20050524/documents/p1.pdf>

A possibility for this week is to use the City of Vancouver Social Policy Report as the basis for written and in-class work.

For example, the Report includes a series of recommendations and examples of what the City of Vancouver might undertake to become more sustainable. Many of the recommendations are very general, and a useful exercise for the class might be to provide specific examples of these recommendations. An example is the following extract from the Report:

“The City’s commitment to sustainability reflects the growing awareness that actions taken by governments must conserve resources and minimize negative impacts on the environment and community. **Social sustainability deals with complex issues such as *quality of life*, *health*, *equity*, *liveability*, and *social inclusion*.** The overall objective of social sustainability has significant implications for the long-term health of communities and citizens. A common definition and understanding of social sustainability principles are important to move forward.

This report responds to Council’s request for clarity regarding social sustainability and builds on previous information presented to Council in 2005.”

1) Students can be assigned the task of coming up with 2 specific examples of each of the bold-faced and italicized terms in the paragraph above. These could then serve as the basis of comparison and discussion.

2) What examples can students provide of efforts in Vancouver (or, failing that, at UBC or in their own home town) that address items in the paragraph above?

**Week 5 – Days 13, 14 & 15:** *The Scientific components of Sustainability 1*

 Environment/Science and Sustainability 1

**Day 13**: Environment and Sustainability – discussion

1. Discuss Part 1) below with the class as a whole, using the question as a prompt.

2. A. Divide students into 4 groups and ask them to develop an answer to each of the questions (2 & 3 below, parts A – E);

B. Then ask each group with the same questions to get together and see if a common “best answer” can be agreed upon.

C. Bring the answers to the class and discuss any interesting components in the context of the Science and Sustainability.

D. Pose the questions in (4) below to the class as a whole.

1) *What constitutes the ‘environment’?*

 A. Biological components and their dynamics;

 B. Physical factors and their range and rate of change;

 C. The interaction between A & B.

2) In an environment where humans are absent:

 A. Does the environment change over time?

 B. Do species go extinct?

 C. Are resources depleted?

 D. Are new species introduced?

 E. Does biodiversity change?

3) In an environment where humans are present:

 A. Does the environment change over time?

 B. Do species go extinct?

 C. Are resources depleted?

 D. Are new species introduced?

 E. Does biodiversity change?

4) A. Is one of the above environments more sustainable than another?

 B. What differs in these two environments with reference to factors A – E?

 C. What is Environmental Science? Is it relevant to a discussion of Sustainability?

**Day 14:**

 **Environmental Science at UBC and its relationship to Sustainability:**

Two faculties at UBC offer Environmental Science Programs and courses, the Faculty of Science and the Faculty of Arts.

If possible, a representative of each program will be available to describe thero program, and its role in Sustainability studies.

1. In Earth, Ocean, and Atmospheric Sciences (EOAS):

<http://www.ensc.ubc.ca/about/about.html>

The University of British Columbia's Faculty of Science offers a Bachelor of Science (Major or Honours) in Environmental Sciences. The Environmental Sciences Program is designed to give students a broad perspective on the environment. It concentrates on understanding the major environmental issues facing human societies and adopts an integrative cross-deiciplinary approach to the study of these issues.

Graduates from the program have found that it provides excellent preparation for the workplace and further study.

The curriculum in the program provides a significant background in chemistry, social sciences, life sciences, and earth and ocean sciences. The core courses, ENVR 200, 300, 400 and 449 examine environmental issues through seminars and student projects. Students select electives from areas of concentration.

Both Major and Honours programs are offered. For the honours program, students require a minimum 72% average in prior courses for admission, and must maintain at least a 68% average for continuation in the program. Students normally apply to the Major or Honours program after first year. However, it is possible to apply after second year. To students who wish to apply to the Environmental Sciences Program please go to the following link at The Faculty of Science: [**http://www.science.ubc.ca/students/degree/secondyear**](http://www.science.ubc.ca/students/degree/secondyear). For more information, please contact the Director of the Environmental Sciences Program.

Contact for EOAS Program: Environmental Sciences Program The University of British Columbia Earth and Ocean Sciences EOS-D.H. Copp Building 2604 (Main Floor) - 2146 Health Sciences Mall Vancouver, B.C. V6T 1Z3  Tel: 604-822-3278 - Fax: 604-822-6091 Website: http://www.ensc.ubc.ca E-mail:  **ensc-inquiries AT eos DOT ubc DOT ca**

Also, the ESSA (Environmental Sciences Students Association) at [**http://clubs.ams.ubc.ca/clubs/essa/**](http://clubs.ams.ubc.ca/clubs/essa/)

2. Environment and Sustainability in Geography:

<http://www.geog.ubc.ca/research/environment_sustainability.html>

|  |
| --- |
| Those studying environmental geography attempt to address the ways in which human and non-human systems interact to alter environmental conditions. Students may enter environmental geography from natural science or social science perspectives and the [Sustainable Development Research Initiative](http://www.ires.ubc.ca/) provides opportunities for new research initiatives.From the natural sciences, faculty research interests include changes in biogeochemistryas a result of hydrological or geomorphological processes, biogeography, and water andatmospheric quality. In the social sciences, faculty interests incorporate analyses of naturalresource allocation and policy, social and ethical issues of sustainability, environmentalimpact assessment, and local community development and resource use.Efforts are made to develop research topics in environmental geography, which would integrate natural and social science perspectives. In addition, there is strong faculty supportfor research in environmental history, and several graduate students in human geography are working on the 'culture of nature' and the cultural politics of environmentalism. |

**The Department of Geography is located at:**

1984 West Mall Vancouver, BC V6T 1Z2 Phone: (604) 822-2663 Fax: (604) 822-6150

**Day 15:**

**If you supply the facts, will sustainable practices follow?**

Possible example: Peak Oil

Need readings, discussion points, and clear conclusion.

Assign articles for reading and discussion – critically read for: Facts, logic of arguments, source, conclusion based on facts presented?

Facts and Opinion on Peak Oil:

1. “Peak Oil is Real …………. “

<http://www.publicserviceeurope.com/article/1648/peak-oil-is-real-and-will-stunt-any-economic-recovery>

Citations for above article: Charles Hall: Biophysical Economics, State University of New York, Syracuse; developer of "Net Energy Analysis". Charles Hall, Stephen Balogh, David Murphy, Energies Journal, 2009: "What is the Minimum EROI that a Sustainable Society Must Have".

Dr. Charles Hall, Dr. Cutler Cleveland, 1986, Energy and Resource Quality: The Ecology of the Economic Process.

2. Peak Oil – True or False?

<http://www.globalresearch.ca/index.php?context=va&aid=8260>

3. “Peak Oil, Entirely Nonsense ………….. “

<http://www.forbes.com/sites/timworstall/2011/10/19/peak-oil-entirely-nonsense-as-is-peak-gas/>

4. “Countries by Peak Oil Date ………. “

<http://truecostblog.com/2012/01/21/countries-by-peak-oil-date-2011-data-update/>

5. Peak Oil Primer

<http://futureproofkilkenny.org/?page_id=110>

6. A visual presentation of data on Peak Oil:

<http://www.businessinsider.com/jeremy-gilbert-peak-oil-2011-5?op=1>

7. Peak Oil Information with comments:

<http://www.energytrove.com/peak-oil-facts.html>

**Week 6** *The Scientific components of Sustainability 2*

*What is Science?*

Formally, the practice of Science consists of the following steps:

 A. Observation

 B. Formulation of a testable hypothesis and its statement in a clear and concise manner.

 C. Tests of the hypothesis using experimental and/or observational techniques;

 D. Formulating conclusions that derive in a logical manner from the experimental or observational data.

 E. Make a decision on whether the hypothesis has been supported or rejected.

***Questions for discussion***:

A. If a hypothesis is supported by data, **is that hypothesis proven True? Proven False?**

B. If a hypothesis is rejected by the data, **is that hypothesis proven True? Proven False?**

Summary Table:

|  |
| --- |
|  Hypothesis Proven TRUE FALSE SUPPORTSData REJECTS  |

C. What scientific experiment could you design to test the hypothesis that we have reached “Peak Energy” (our energy use of today is no longer sustainable).

Is this a question amenable to scientific experimentation? Why or why not?

D. What scientific experiment could you design to test the hypothesis that “Biofuels are a Sustainable source of Energy”?

Is this a question amenable to scientific experimentation? Why or why not?

E. Pick a process or concept that relates to Sustainability and construct a testable hypothesis (and suggest some way to test it) about that process or concept.

Conclusions from the above exercises.

**Week 7** *The Economics of Sustainability 1*

Video: <http://www.youtube.com/watch?v=xMu0ZLLHvHI&feature=related>

Matt O'Reilly - Green Circle Projects and Dynamic Earth (50 minutes)

Note: This is an excellent introduction to the topic of Economics/Politics and Sustainability.

Book alluded to: Natural Capitalism

Weak and Strong Sustainability (10:30)

**PICS Climate News Scan – 1 May 2012**

**Produced by ISIS, Sauder School of Business, UBC**

**Authors: Neil Thomson, Neil Salmond, Kristina Welch, Justin Bull, James Noble**

**Editors: James Tansey (ISIS), Jessica Worsley (PICS), Tom Pedersen (PICS)**

**Environmental and economic concerns emerge about forest bioenergy**

*April 18, 2012.* Researchers have found that deriving energy from forest biomass could accelerate climate change, deplete biodiversity and harm forests. Working in Germany, Austria, France, Switzerland, and the US, the analysts explored a scenario where 20% of global energy originates from forest biomass. This figure was chosen to align with existing European efforts to produce 20% of energy from renewable sources by 2020, with bioenergy playing a major role. In order to achieve 20% of global energy from forest biomass, 60% of annual global forest growth would need to be harvested. This would have an adverse impact

on forest health and would require the intensive use of fertilizers to ensure adequate tree growth.

BC is a major source of bioenergy from forest biomass. In 2011, the export of pellets from BC hit an all-time high, part of a North America wide increase of almost 300% over 2008 levels.

However, the cost of harvesting, along with slow tree growth, makes it unlikely that large scale harvesting for energy use will ever make economic sense in BC. Nevertheless, forest biomass can be a sustainable source of energy under some circumstances. Researchers in Washington State, for example, are investigating the feasibility of producing biofuels through forest thinning, providing energy while improving forest health. The issues are complex, however: in the southern US, while the economics are more favourable, harvesting forest biomass for energy production has negative climate change impacts. Civil society is thus

concerned that the demand for bioenergy could “fuel a biomess”, should economic incentives outweigh environmental concerns. What is clear is that forest biomass can be a viable energy source, but only in moderation. Looking to forests to provide 20% of global energy could result in environmental disaster and do little to abate climate change.

**Week 8** *The Economics of Sustainability 2*

 Economics and Sustainability 2

**The Economics of Sustainability: U.S. Environmental Protection Agency**

<http://www.epa.gov/owow/watershed/wacademy/acad2000/pdf/economics_of_sustainability.pdf>

**Why should business think about Sustainability?**

**Idea (**[**http://www.economist.com/node/14301474**](http://www.economist.com/node/14301474)**)**

**Consumers and employees have made a strong business case for firms to adopt sustainability** Sep 1st 2009

**The Economics of Sustainability in Commercial Real Estate (2010 IFMA Foundation)**

<http://www.ifmafoundation.org/documents/public/EcoofSustainability.pdf>

**Houston Advanced Research Centre: Economics of Sustainability Research Program**

<http://www.harc.edu/ProgramAreasProjects/LandWaterPeople/EconomicsofSustainability/tabid/877/Default.aspx>

*Sustainability* **2010**, *2*, 3399-3417; doi:10.3390/su2113399

**Deliberative Ecological Economics for Sustainability Governance**

**Christos Zografos 1,\* and Richard B. Howarth 2**

[www.mdpi.com/2071-1050/2/11/3399/pdf](http://www.mdpi.com/2071-1050/2/11/3399/pdf)

**Economics of Sustainability (A very brief introduction)** *©Wayne Hayes, Ph.D. | Initialized: 12/9/2010 | Last Update: 03/16/2011 | V. 0.4 Build #8*

[*http://profwork.org/eee/ess/economics.html*](http://profwork.org/eee/ess/economics.html)

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<http://profwork.org/eee/ess/economics.html>

***Economics of Sustainability: Economics***

**Summary:** Economics is defined and critically examined in the context of sustainability. Note: This page is preliminary and meant to provide a brief explanation of economics for class use.

[**WSY Home**](http://profwork.org/index.html) **|** [**Project**](http://profwork.org/wsy/do_project.html)

**Defining Economics**

This standard definition of economics comes from the authoritative International Encyclopedia of the Social Sciences: "Economics . . . is the study of the allocation of scarce resources among unlimited and competing uses" (Vol. 4 472). This definition must be unpacked for the pursuit of the *Economics of Sustainability*.

Note the presuppositions of pervasive scarcity, of the lack of limits to which scarcity must be devoted, and of the competition (not cooperation) among ends. The obvious goal of economics, given these premises, is efficiency of allocation of scarce means towards satisfying insatiable ends through the ever-increasing cornucopia of production. The presumed mechanism for the economic problem of efficiency is the market. The ultimate end of economic production is more production.

The **means of production**, called **resources**, are neatly bundled among three broad categories: **land**, **labor**, and **capital**. These are the **factors of production** that must be efficiently applied to maintain production. The solution to the economic problem is thus rendered as a neutral and technical application of scarce resources to efficiently produce output, goods and services that can be confidently measured by price in the marketplace. The product of the economy by definition can only partially satiate the unlimited appetite for goods and services. The solution involves more production, called **economic growth**.

Efficiency is the domain of **micro-economics** and growth is the domain of **macro-economics**. Efficiency and sustainability complement each other through the explicit acknowledgement of side-effects and subsidies. To explain efficiency, we should examine separately the [factors of production](http://profwork.org/eee/ess/factors.html).

**Growth Versus Development: The Physical Economy, Not the Money Economy**

The paradigmatic shift to Sustainable Development requires that we think in terms of matter and energy, not money. This plays on what economists call the money illusion (Fischer) and the veil of money (Keynes).The paradigmatic shift to Sustainable Development requires that we think in terms of matter and energy, not money.

Growth in the **physical scale of the economy must be distinguished from development**, which is defined by Herman Daly in this way:

"Development" refers to qualitative change, realization of potentialities, transition to a fuller or better state. . . . **Sustainable development is development without growth in the scale of the economy** beyond some point that is within biospheric carrying capacity. (167, highlights added)

Therefore, the Economics of Sustainability fundamentally redefines the mission of economics, tailoring economics to promote sustainability. This is beyond tinkering with economics to incrementally adjust to sustainable development. The first act in the Economics of Sustainability is to dethrone, not to deprecate or to discard, economics.

Put simply, to think about economics and sustainability, define the problem in this way:

**SY = VA / ( E + M )** where SY = sustainability VA = value added E = energy M = matter

This succinct formulation captures Daly's point: distinguish the money economy from the physical economy. Related to this is a distinction made by Aristotle between economics (real, physical, social) and [Chrematics](http://www.gaianeconomics.org/chrematistics.htm), the manipulation of money for the acquisition of more money. This was acknowledged by Karl Marx as the forerunner of another famous and pithy model:

**C --> M --> C** and **M --> C --> M'** where C = commodity M = money and M' = money after the transaction is fulfilled (Marx, Capital Vol. 1)

Aristotle appears to have identified the source of an important [distinction between use value and exchange value](http://www.economictheories.org/2008/10/aristotle-economic-thought.html), which was also picked up by Marx. Clearly, sustainability is based on what is real, use value. To the extent that use value and exchange value diverge, which is basic to [Daly's formulation](http://books.google.com/books?id=TZAIU1yqyRkC&pg=PA138&lpg=PA138&dq=chrematistics+aristotle&source=bl&ots=ozzcCETkH3&sig=HXtMsJS0GrBv3c2WwK0x5Ci-9nQ&hl=en&ei=sTUJTcafNI2ssAOIwfzkDg&sa=X&oi=book_result&ct=result&resnum=4&ved=0CCsQ6AEwAw#v=onepage&q=chrematistics%20aristotle&f=false) of ecological economics, orthodox micr- and macro-economics sends out the wrong information.*©Wayne Hayes, Ph.D. | Initialized: 12/9/2010 | Last Update: 03/16/2011 | V. 0.4 Build #8*

***Review of the Economics of Sustainable Development***

[*http://archive.defra.gov.uk/evidence/economics/susdev/documents/091015-interim-report-rev.pdf*](http://archive.defra.gov.uk/evidence/economics/susdev/documents/091015-interim-report-rev.pdf)

**Week 9** *Life cycle Analysis and the Triple Bottom Line*

 Life Cycle Analysis: Is this operation really sustainable ('life cycle' analysis of a sustainable process)?

 **Wikipedia article on Life Cycle Analysis**

 <http://en.wikipedia.org/wiki/Life-cycle_assessment>

 **Canadian Architect discussion of Life Cycle Analysis**

 <http://www.canadianarchitect.com/asf/perspectives_sustainibility/measures_of_sustainablity/measures_of_sustainablity_lca.htm>

 **Canada Wood discussion of Life Cycle Analysis of Canadian Wood products:**

<http://www.canadawood.cn/english/downloads/pdf/sustainability/sustainability_english.pdf>

Triple Bottom Line: Does this provide a useful insight into sustainability action?

<http://en.wikipedia.org/wiki/Triple_bottom_line>

**Week 10** *Promoting Sustainability in Society - Science, Politics, and Society*

 This could be a series of small group presentations on such topics as are suggested below; [BUT SEE ALSO AN ALTERNATIVE AS PRESENTED IN WEEK X]

Today’s class is dedicated to forming a group, picking a topic, having it approved by the instructor, and for the group to organize its work in preparation for discussion next week.

**For each topic include the following:**

A. A clear statement of the hypothesis/thesis;

B. A brief argument as to why this topic is important in the context of Sustainability (the justification for choosing this topic);

C. Evidence to support the hypothesis/thesis;

D. A summary (with reasons) of the likelihood the proposal encompassed by the thesis will be adopted by our current society; in this summary include as separate categories the political, economic, and scientific reasons as to why this proposal will/will-not be adopted.

E. Use the previously discussed tools (Life Cycle Analysis, Triple Bottom Line) or other tools to analyze the problem; NOTE: need to check the suggested topics for their analysis as suggested here.

F. Identify the major societal/economic/scientific barrier(s) to achieving a solution to this specific problem.

G. How does the problem and its solution (or lack of a solution) relate to your daily life? What personal actions could you take to help in implementing a solution?

**Suggestions for topics:**

A. More of our energy should/should not be derived from biofuels;

B. Think globally/act locally is an essential tenet for promoting sustainable societies;

C. The hundred-mile diet can make a significant contribution to constructing a sustainable society;

D. Wind power/solar power should be promoted, despite the fact it is not economically viable;

E. Sustainability can best be promoted by privatizing resources, to prevent the “Tragedy of the Commons”;

F. Until a sustainable resource is economically competitive, it will never be adopted by the general populace;

**Week 11**

 Promoting Sustainability in Society - Science, Politics, and Society

 Presentations by small groups of students on previously approved topics; see Week 10 for details.

A paper submitted by the group or individually is due at the end of class on Week 12.

**Week 12**

 Summary discussion.

 Final Exam??

USEFUL LINKS

1. <http://www.pics.uvic.ca/news_scan.php> (Pacific Institute for Climate Solutions)

2.

Useful Reading:

1. Leonard, Annie: The Story of Stuff: How are Obsession with Stuff is Trashing the Planet, Our Communities, and a Vision for Change (New York: Free Press, 2010)
2. McKibben, Bill: Deep Economy (New York: Times Books, 2007)

Other resources:

BC MINISTRY OF EDUCATION GUIDELINES FOR SUSTAINABILITY COURSES IN HIGH SCHOOL:

<http://www.bced.gov.bc.ca/greenschools/pdfs/sustcoursecontent.pdf>

McGill “Sustainability, Science and Society” program (a major)

**Week x:** *Design an effective sustainability policy for selected companies or institutions.*

NOTE: This is an alternative or added week to address specifically the Higher level goal: *Design an effective sustainability policy for selected companies or institutions.*

See this Wikipedia article for a discussion of corporate sustainability:

<http://en.wikipedia.org/wiki/Corporate_sustainability>

See also this article on: How to prepare a sustainability policy:

<http://blogs.whattheythink.com/going-green/2009/04/green-week-how-to-prepare-a-sustainability-policy/>

also:

<http://www.british-assessment.co.uk/articles/writing-a-sustainability-policy.htm>

 and this article on Sustainability policies as they relate to Universities:

<http://www.adm.uwaterloo.ca/infowast/watgreen/projects/library/w04institutionalizingsustainability.pdf>

And this on one way to ensure failure of a sustainability policy in a company:

<http://www.guardian.co.uk/sustainable-business/blog/integrating-sustainability-business-company-strategy>

Comments on the sustainability policy of Starbucks:

<http://www.sustainabilitypartners.com/site/our_clients/starbucks.html>

Examples of specific sustainability policies are:

For Toyota:

[http://www.toyota global.com/sustainability/csr\_initiatives/csr\_concepts/policy.html](http://www.toyota-global.com/sustainability/csr_initiatives/csr_concepts/policy.html)

For the University of British Columbia:

<http://www.horizons.gc.ca/page.asp?pagenm=2011-0081_01>

For High Liner Foods:

<http://www.highlinersustainability.com/en/sustainability-at-high-liner/our-sustainability-policies>

For World Cup 2010

<http://www.goodwinsustainabledevelopment.com/uncategorized/the-world-cup-is-gold-but-is-it-also-green/>

Can you compose a sustainability policy for the Canadian military? See the following for background:

<http://www.corporateknights.com/article/how-green-canadas-military?page=show>

and the following article:

<http://www.frontline-canada.com/Defence/index_archives.php?page=1503>

Pick a single company sustainability policy to analyze and discuss. Form groups of 4 and within your own group identify:

A. The highlights of the policy (what is good and what seems realistic);

B. The lowlights of the policy (what is vague and likely ineffective);

C. Any omissions that should be in the policy;

D. What seems merely self-serving and unlikely to further sustainability;

Each member of the group should take one of the above topics and be prepared to discuss this in the larger group discussion.

CLASS FORMAT:

*Class Focus*:

*Assign*:

Reading/*Video* :

*Hand in*:

*Class Activities:*