**TRIAL COURSE OR NEW COURSE PROPOSAL**

**SUBMITTED BY:**

<table>
<thead>
<tr>
<th>Department</th>
<th>CRCD Department of Science</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prepared by</td>
<td>Tom Marsik</td>
</tr>
<tr>
<td>Email Contact</td>
<td><a href="mailto:tmarsik@alaska.edu">tmarsik@alaska.edu</a></td>
</tr>
<tr>
<td>College/School</td>
<td>CRCD</td>
</tr>
<tr>
<td>Phone</td>
<td>842-5109</td>
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<tr>
<td>Faculty Contact</td>
<td>same</td>
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See [http://www.uaf.edu/uafgov/faculty/cd/cdman.html](http://www.uaf.edu/uafgov/faculty/cd/cdman.html) for a complete description of the rules governing curriculum & course changes.

1. **ACTION DESIRED** (check one):
   - [ ] Trial Course
   - [x] New Course

2. **COURSE IDENTIFICATION:**
   - Dept: ENVI
   - Course #: 220
   - No. of Credits: 3
   - Justify upper/lower division status & number of credits:
     This course is designed to serve as a course in the Environmental Studies (ENVI) Certificate program and Renewable Resources (RR) A.A.S. degree program. These programs focus on delivering quality entry-level coursework relevant to rural Alaska students with the goal of skill set development in the field of environmental sciences and renewable resources. This course focuses on energy use and production in society and its environmental impacts, which are ever growing concerns.
     ENVI 220 requires basic knowledge of math that students typically gain during their first year. The course has three contact hours per week.

3. **PROPOSED COURSE TITLE:**
   - Intro to Sustainable Energy

4. **CROSS LISTED?**
   - YES/NO: NO
   - If yes, Dept: __________
   - Course #: __________
   - (Requires approval of both departments and deans involved. Add lines at end of form for such signatures.)

5. **STACKED?**
   - YES/NO: NO
   - If yes, Dept: __________
   - Course #: __________

6. **FREQUENCY OF OFFERING:**
   - Spring semester annually
   - (Every or Alternate) Fall, Spring, Summer — or As Demand Warrants

7. **SEMESTER & YEAR OF FIRST OFFERING** (if approved):
   - Spring 2011

8. **COURSE FORMAT:**
   - NOTE: Course hours may not be compressed into fewer than three days per credit. Any course compressed into fewer than six weeks must be approved by the college or school’s curriculum council. Furthermore, any core course compressed to less than six weeks must be approved by the core review committee.
   - **COURSE FORMAT** (check one):
     - [ ] 1
     - [ ] 2
     - [ ] 3
     - [ ] 4
     - [ ] 5
     - [x] 6 weeks to full semester
   - **OTHER FORMAT** (specify):
     - lectures + seminars + independent projects
   - Mode of delivery (specify lecture, field trips, labs, etc):
   - **CONTACT HOURS PER WEEK**:
     - LECTURE: 3 hours/weeks
     - LAB: __________
     - PRACTICUM: __________
   - Other hours (specify type):

9. **COMPLETE CATALOG DESCRIPTION including dept., number, title and credits (50 words or less, if possible):**
   - ENVI 220 – Intro to Sustainable Energy (3 cr) - Introduction to societal problems and solutions related to its energy use and production. Problems discussed are mainly related to the extent of sustainability of current energy practices. Solutions discussed cover both areas – energy efficiency and renewable energy.
11. COURSE CLASSIFICATIONS: (undergraduate courses only. Use approved criteria found on Page 10 & 17 of the manual. If justification is needed, attach on separate sheet.)

| H = Humanities | N = Natural Science | S = Social Sciences |

Will this course be used to fulfill a requirement for the baccalaureate core?  

Yes  X  No

If YES, check which core requirements it could be used to fulfill:

O = Oral Intensive, Format 6  W = Writing Intensive, Format 7  Natural Science, Format 8

12. COURSE REPEATABILITY:

Is this course repeatable for credit?  

Yes  X  No

Justification: Indicate why the course can be repeated (for example, the course follows a different theme each time).

How many times may the course be repeated for credit?  

Times

If the course can be repeated with variable credit, what is the maximum number of credit hours that may be earned for this course?  

Credits

13. GRADING SYSTEM:

Letter  X  Pass/Fail

14. PREREQUISITES

Any 100 level MATH course; or permission of instructor

These will be required before the student is allowed to enroll in the course.

Recommended

none

Classes, etc. that student is strongly encouraged to complete prior to this course.

15. SPECIAL RESTRICTIONS, CONDITIONS

16. PROPOSED COURSE FEES

Has a memo been submitted through your dean to the Provost & VCAS for fee approval?  Yes/No

17. PREVIOUS HISTORY

Has the course been offered as special topics or trial course previously?  Yes/No  Yes

If yes, give semester, year, course #, etc.:  Spring 2010 - ENVI 293 - Intro to Sustainable Energy

18. ESTIMATED IMPACT

What impact, if any, will this have on budget, facilities/space, faculty, etc.

This is a distance-delivered three-credit course with no lab, thus it should have minimal influence on budget, facility, and space resources. Faculty has been hired to teach this course.

Students will attend the course via E-Live sessions, Blackboard, and email. This can be done from any computer with sufficient internet connection. No new facilities or space will be required.

This course will broaden courses and topics in the ENVI and RR programs. This program enhancement should attract more students and help prepare students for higher degree studies or entry-level employment in the environmental studies and renewable resources fields.

This course will also broaden the spectrum of UAF courses in the area of sustainable energy, which is a field of quickly growing importance, and can serve as one of the courses for a potential Occupational Endorsement in Sustainable Energy. Sustainable energy is a high demand field across Alaska with a lot of potential for growth.

19. LIBRARY COLLECTIONS

Have you contacted the library collection development officer (ffklj@uaf.edu, 474-6695) with regard to the adequacy of library/media collections, equipment, and services available for the proposed course? If so, give date of contact and resolution. If not, explain why not.
**20. IMPACTS ON PROGRAMS/DEPTS**

*What programs/departments will be affected by this proposed action?*

*Include information on the Programs/Departments contacted (e.g., email, memo)*

<table>
<thead>
<tr>
<th>ENVI and RR:</th>
</tr>
</thead>
<tbody>
<tr>
<td>This course will have a positive impact on the ENVI and RR programs as it will broaden the courses and topics offered. This should attract more students into these programs. The impact was many times discussed in person and via email with Dr. Todd Radenbaugh, the academic director of these programs, who is very supportive of this new course offering.</td>
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<table>
<thead>
<tr>
<th>Electrical Engineering (EE):</th>
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<tr>
<td>The topics of sustainable energy are also discussed in the Power and Control branch of the Electrical Engineering B.S. program. The impact of this new course was discussed via phone and email with Dr. Richard Wies, who is the head of the Power and Control branch, and he supports this new course. Getting rural students excited about energy and engineering at a lower-level increases their interest to pursue a B.S., or even M.S., at the College of Engineering and Mines at UAF.</td>
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</table>

**21. POSITIVE AND NEGATIVE IMPACTS**

*Please specify positive and negative impacts on other courses, programs and departments resulting from the proposed action.*

Besides the impacts stated above (Section 20.), this course will also benefit non-degree students interested in sustainable energy.

No significant negative impacts are anticipated.

**JUSTIFICATION FOR ACTION REQUESTED**

The purpose of the department and campus-wide curriculum committees is to scrutinize course change and new course applications to make sure that the quality of UAF education is not lowered as a result of the proposed change. Please address this in your response. This section needs to be self-explanatory. Use as much space as needed to fully justify the proposed course.

Residents of rural Alaska are facing challenges with respect to the cost of home energy as well as environmental and social sustainability of current practices. They are seeking education to both deal with their personal issues related to energy and follow careers in the energy and environmental fields. This course will help satisfy that demand.

This course will serve as a course in the ENVI Certificate program and RR A.A.S. degree program, which will broaden and enhance the topics covered by these and other programs, which in turn will attract more students.

UAF Bristol Bay Campus has the experience in environmental science with focus on sustainable energy, as demonstrated by the newly established Sustainable Energy Initiative, headed by Dr. Tom Marsik.
**APPROVALS**

<table>
<thead>
<tr>
<th>Signature, Chair, Program/Department of:</th>
<th>Date</th>
</tr>
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<tbody>
<tr>
<td>Signature, Division Chair CRCD of:</td>
<td>Date</td>
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<tr>
<td>Signature, Chair, College/School Curriculum Council for:</td>
<td>Date</td>
</tr>
<tr>
<td>Signature, Dean, College/School of:</td>
<td>Date</td>
</tr>
<tr>
<td>Signature of Provost (if applicable)</td>
<td>Date</td>
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</tbody>
</table>

*Offerings above the level of approved programs must be approved in advance by the Provost.*

**ALL SIGNATURES MUST BE OBTAINED PRIOR TO SUBMISSION TO THE GOVERNANCE OFFICE**

| Signature, Chair, UAF Faculty Senate Curriculum Review Committee | Date |

**ADDITIONAL SIGNATURES (If required)**

<table>
<thead>
<tr>
<th>Signature, Chair, Program/Department of:</th>
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<tbody>
<tr>
<td>Signature, Chair, College/School Curriculum Council for:</td>
<td>Date</td>
</tr>
<tr>
<td>Signature, Dean, College/School of:</td>
<td>Date</td>
</tr>
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</table>
ATTACH COMPLETE SYLLABUS (as part of this application).

Note: syllabus must follow the guidelines discussed in the Faculty Senate Guide http://www.uaf.edu/uafgov/faculty/cd/syllabus.html. The department and campus wide curriculum committees will review the syllabus to ensure that each of the items listed below are included. If items are missing or unclear, the proposed course change will be denied.

SYLLABUS CHECKLIST FOR ALL UAF COURSES
During the first week of class, instructors will distribute a course syllabus. Although modifications may be made throughout the semester, this document will contain the following information (as applicable to the discipline):

1. Course information:
   - Title, □ number, □ credits, □ prerequisites, □ location, □ meeting time (make sure that contact hours are in line with credits).

2. Instructor (and if applicable, Teaching Assistant) information:
   - □ Name, □ office location, □ office hours, □ telephone, □ email address.

3. Course readings/materials:
   - □ Course textbook title, □ author, □ edition/publisher.
   - □ Supplementary readings (indicate whether □ required or □ recommended) and □ any supplies required.

4. Course description:
   - □ Content of the course and how it fits into the broader curriculum;
   - □ Expected proficiencies required to undertake the course, if applicable.
   - □ Inclusion of catalog description is strongly recommended, and □ Description in syllabus must be consistent with catalog course description.

5. □ Course Goals (general) and □ Student Learning Outcomes (more specific)

6. Instructional methods:
   - □ Describe the teaching techniques (eg: lecture, case study, small group discussion, private instruction, studio instruction, values clarification, games, journal writing, use of Blackboard, audio/video conferencing, etc.).

7. Course calendar:
   - □ A schedule of class topics and assignments must be included. Be specific so that it is clear that the instructor has thought this through and will not be making it up on the fly (e.g. it is not adequate to say “lab”. Instead, give each lab a title that describes its content). You may call the outline Tentative or Work in Progress to allow for modifications during the semester.

8. Course policies:
   - □ Specify course rules, including your policies on attendance, tardiness, class participation, make-up exams, and plagiarism/academic integrity.

9. Evaluation:
   - □ Specify how students will be evaluated, □ what factors will be included, □ their relative value, and □ how they will be tabulated into grades (on a curve, absolute scores, etc.)

10. Support Services:
    - □ Describe the student support services such as tutoring (local and/or regional) appropriate for the course.

11. Disabilities Services:
    - The Office of Disability Services implements the Americans with Disabilities Act (ADA), and insures that UAF students have equal access to the campus and course materials.
    - □ State that you will work with the Office of Disabilities Services (203 WHIT, 474-7043) to provide reasonable accommodation to students with disabilities.”
ENVI 220 - Intro to Sustainable Energy

<table>
<thead>
<tr>
<th>Term:</th>
<th>Spring 2011</th>
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<tbody>
<tr>
<td>Course Title:</td>
<td>Intro to Sustainable Energy</td>
</tr>
<tr>
<td>Dept. &amp; Num:</td>
<td>ENVI 220</td>
</tr>
<tr>
<td>Credits:</td>
<td>3</td>
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<tr>
<td>Prerequisites:</td>
<td>Any 100 level MATH course; or permission of instructor</td>
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<tr>
<td>Dates:</td>
<td>Spring 2011 – all semester</td>
</tr>
<tr>
<td>Days and Times:</td>
<td>Tuesday, Thursday 6:50-8:20pm</td>
</tr>
<tr>
<td>Location:</td>
<td>Online; Distance-delivered from UAF BBC</td>
</tr>
</tbody>
</table>

**Instructor:** Dr. Tom Marsik  
**Office Location:** UAF Bristol Bay Campus, Room 117  
**Position:** Assistant Professor  
**Phone:** 842-5109  
**Fax:** 842-5692  
**Email:** tmarsik@alaska.edu  
**Hours Available:** By Appt.

**Text:** David J.C. MacKay. Sustainable Energy – without the hot air.  

**Course Description:**  
Introduction to societal problems and solutions related to its energy use and production. Problems discussed are mainly related to the extent of sustainability of current energy practices. Solutions discussed cover both areas – energy efficiency and renewable energy. Students actively participate via presentations in seminar sessions and independent projects dealing with real-life issues.

**Course Goals:**  
The general goals of this course are to provide education that will help students analyze problems with various practices of energy production and use, and to evaluate the feasibility of possible solutions to these problems.

**Student Learning Outcomes:**  
Upon successful completion of this course, the student will be able to:  
- Recognize basic science concepts related to energy.  
- Perform basic analysis of energy systems (electricity, space heating, transportation)  
- Explain problems with current energy practices  
- Discuss economic aspects of sustainable energy  
- Describe possible solutions to current energy problems  
- Distinguish between energy efficiency and renewable energy approaches to the fossil fuel use reduction  
- Review literature and compile information related to sustainable energy  
- Demonstrate presentation skills regarding sustainable energy  
- Apply the knowledge gained in the course to small real-life energy management issues

**Instructional Methods:**  
E-live/teleconference lectures and seminar sessions are closely integrated with homework exercises and independent projects. Email and Blackboard are used for off-class communication, sharing material, and exams.

**Course Calendar:**  
See attached.
Course Policies:
1. UAF requires students to conduct themselves honestly and responsibly, and to respect the rights of others.
2. You are expected to attend and actively participate in all lectures and seminars.
3. Homework will be assigned each Tuesday and due at the beginning of class the following Tuesday. You are encouraged to discuss homework questions with your peers, but you are not allowed to copy.
4. Late assignments will not be accepted without prior approval of instructor.
5. Student presentations must be delivered when scheduled.
6. Project reports are due on April 19, 2011. Late reports will not be accepted.
7. The instructor reserves the right to amend this course outline as needed.

Evaluation:
Final grades are calculated from the points earned in the following areas:

Attendance and Participation ................................................................. 10%
Students are expected to attend and actively participate in all classroom sessions.

Homework .......................................................................................... 10%
It will consist of problems and questions related to recently covered material in lectures (see the attached tentative schedule for lecture topics). It will be assigned each Tuesday and due at the beginning of class the following Tuesday.

Presentations in seminar sessions ......................................................... 25%
Every student will deliver a 20-25 min presentation followed by a 10-15 min discussion. The presentation is based on a literature review of a topic of student’s choice related to sustainable energy.

Independent projects ........................................................................... 25%
Every student is required to spend 10-20 hours on an independent project dealing with a real-life energy management issue, submit a 3-5 page report, and deliver a 10 min presentation.

Midterm Exam ..................................................................................... 10%
Midterm exam will be open book, open notes, and will be taken via Blackboard. It will cover all material covered up to that point.

Final Exam ......................................................................................... 20%
Final exam will be open book, open notes, and will be taken via Blackboard. It will cover all material from the whole semester.

Grading Policy:
Letter Grades
A+  96.7 – 100%
A   93.3 – 96.7%
A–  90.0 – 93.3%
B+  86.7 – 90.0%
B   83.3 – 86.7%
B–  80.0 – 83.3%
C+  76.7 – 80.0%
C   73.3 – 76.7%
C–  70.0 – 73.3%
D+  66.7 – 70.0%
D   63.3 – 66.7%
D–  60.0 – 63.3%
F   Below 60%

Support and Disability Services:
University of Alaska Fairbanks
Bristol Bay Campus – Student Services
Students can also go to the UAF website [http://www.uaf.edu](http://www.uaf.edu) or to the College of Rural and Community Development website [http://www.uaf.edu/rural/](http://www.uaf.edu/rural/) or to Bristol Bay Campus website [http://www.uaf.edu/bbc/index.html](http://www.uaf.edu/bbc/index.html).

**UAF Disability Services for Distance Students**

UAF has a Disability Services office that operates in conjunction with the College of Rural and Community Development (CRCD) campuses and UAF’s Center for Distance Education (CDE). Disability Services, a part of UAF’s Center for Health and Counseling, provides academic accommodations to enrolled students who are identified as being eligible for these services. If you believe you are eligible, please visit [http://www.uaf.edu/cht/disability.html](http://www.uaf.edu/cht/disability.html) on the web or contact a student affairs staff person at your nearest local campus. You can also contact Disability Services on the Fairbanks Campus at (907) 474-7043, fydso@uaf.edu
<table>
<thead>
<tr>
<th>Tuesday</th>
<th>Thursday</th>
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<tbody>
<tr>
<td>18-Jan</td>
<td>20-Jan</td>
</tr>
<tr>
<td>Course Introduction</td>
<td>Discussion of topics for student presentations and projects</td>
</tr>
<tr>
<td>Session 1</td>
<td>Reading assignment: pages 2 - 21</td>
</tr>
<tr>
<td>25-Jan</td>
<td>27-Jan</td>
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<tr>
<td>Basic intro to sustainable energy; Divide presentation topics; Lecture on presenting</td>
<td>Guest speaker Ashish Agrawal – Sustainable energy projects at Fort Wainwright, Fairbanks</td>
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<tr>
<td>Session 3</td>
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<tr>
<td>1-Feb</td>
<td>3-Feb</td>
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<tr>
<td>Divide project topics</td>
<td>Energy efficiency vs. renewable energy; Electricity – basic physics</td>
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<tr>
<td>Sample student presentation (Tom Marsik)</td>
<td>Reading assignment: pages 22 - 28</td>
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<tr>
<td>Session 5</td>
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<tr>
<td>8-Feb</td>
<td>10-Feb</td>
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<tr>
<td>Student presentations + discussions</td>
<td>Heat – basic physics</td>
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<tr>
<td>Session 7</td>
<td>Reading assignments: pages 50 - 54</td>
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<tr>
<td>15-Feb</td>
<td>17-Feb</td>
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<tr>
<td>Student presentations + discussions</td>
<td>Economic analysis; Life cycle</td>
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<tr>
<td>Session 9</td>
<td></td>
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<td>22-Feb</td>
<td>24-Feb</td>
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<tr>
<td>Review for midterm</td>
<td>Lighting;</td>
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<tr>
<td>Session 11</td>
<td>Reading assignment: pages 57 – 59; 155 - 156</td>
</tr>
<tr>
<td>1-Mar</td>
<td>3-Mar</td>
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<tr>
<td>Midterm</td>
<td>Lighting – Cont’d</td>
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<td>Session 13</td>
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<td>8-Mar</td>
<td>10-Mar</td>
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<tr>
<td>Student project updates</td>
<td>Green buildings; Energy and indoor air quality; Insulation</td>
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<tr>
<td>Session 15</td>
<td>Reading assignment: pages 140 - 154</td>
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<tr>
<td>15-Mar</td>
<td>17-Mar</td>
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<tr>
<td>Spring break</td>
<td>Spring break</td>
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<tr>
<td>22-Mar</td>
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<tr>
<td>Student presentations + discussions</td>
<td></td>
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<tr>
<td>Session 17</td>
<td>24-Mar</td>
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<tr>
<td>Session 17</td>
<td>Intro to renewable energy</td>
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<tr>
<td>29-Mar</td>
<td>31-Mar</td>
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<tr>
<td>Student presentations + discussions</td>
<td>Solar energy</td>
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<tr>
<td>Session 19</td>
<td>Reading assignment: pages 38 – 49</td>
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<tr>
<td>5-Apr</td>
<td>7-Apr</td>
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<tr>
<td>Student presentations + discussions</td>
<td>Guest speaker Brian Hirsch, NREL - biomass</td>
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<tr>
<td>Session 21</td>
<td></td>
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<tr>
<td>12-Apr</td>
<td>14-Apr</td>
</tr>
<tr>
<td>Student presentations + discussions</td>
<td>Wind energy</td>
</tr>
<tr>
<td>Session 23</td>
<td>Reading assignment: pages 263 - 268</td>
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</tbody>
</table>
Ideas for student presentations (first on list) and projects (last on list) include, but are not limited to:

- LED lighting – presence and perspective for future
- Induction lighting - presence and perspective for future (http://uslightingtech.com/)
- High-efficiency organic photovoltaic materials
- Energy payback of photovoltaic panels – in Alaska and generally
- Energy payback of solar-hot-water panels – in Alaska and generally
- Energy payback of wind turbines
- Super capacitors for electrical energy storage – presence and perspective for future
- New battery technologies (e.g. lithium, flow batteries, etc.)
- Hybrid and electric cars – environmental impact of batteries
- Fast growing biomass in Alaska – perspectives for future
- Diesel vs. gasoline engines – efficiency, emissions, cold-climate operation, etc.
- Biodiesel from algae – presence and perspective for future
- Biodiesel and increased NOx emissions – does it outweigh the benefits?
- Modern airships – perspective solution for energy efficient long-distance transport?
- Magnetic couplings (http://www.magnadrive.com/)
- Payback of low rolling resistance tires?
- Flying vs. driving – which one is worse?
- CO2 emissions from 1kWh of electricity consumed in your area?
- Fluorescent lamps – switch them off (and thus reduce lifespan) or leave them on?
- Health effects of mercury gas in broken fluorescent bulbs (thrown in trashcan)
- Locally grown food – always better than imported food?
- Feasibility of upgrading outdoor/indoor lighting at UA campuses (LED?, induction?, fluorescent?)
- Feasibility of better control of outdoor/indoor lighting at UA campuses
- Feasibility of other lighting upgrades at UA campuses (better fixtures?, remove lights in overlit areas?)
- Feasibility of better control of headbolt outlets at UA campuses
- How much does a blanket over a hood help reduce electricity needed for plugging in vehicles?
- Honors house retrofit (design PV system, insulation, solar hot water collectors, ...)
- Feasibility of putting computers on UA campuses in sleep mode?
- Feasibility of using VendMisers for the vending machine power control on UA campuses.
- Feasibility of energy efficiency upgrades in students’ homes.
- Contribute to Alaska Energy Wiki (http://www.energy-alaska.com/) (e.g. regional project inventory)
- Contribute to the energy section of the Dillingham Comprehensive Plan update.
- Contribute to the Wind for Schools program as part of a University Wind Working Group.
- Label all light switches at UAF showing annual cost and CO2 emissions if they are left on.
- Do a survey of households in Dillingham – breakdown of their energy cost by heat, electricity, etc.