The President's Climate Action Task Force (CATF)

Energy Workgroup
Meeting Notes
October 22, 2008

Meeting attendees: Denise Beal (Dining Services), Alexandra Cooper (Chemical Engineering), Timothy Dzurilla (Political Science), Laura Eichert (Environmental Policy), Ross Friedberg (Law School/MPH Program), Scott Gallo (Residential Life), Z Grabowski (Environmental Policy; Ecology & Evolutionary Biology), Hassan Haghpanah (Architectural & Engineering Services), Rachelle Howard (Chemical Engineering), Wayne Landry (Central Stores & Motor Pool; Workgroup Co-Chair), Philip Lang (Purchasing), Lee Langston (Mechanical Engineering Dept.), Alysse Lembo (Environmental Policy), Mark Mazzola (First Choice Construction), Peter McQueeney (Facilities EMS), Rich Miller (Environmental Policy; CATF Co-Chair), Stanley Nolan (Facilities), Meghan Ruta (Environmental Policy; Natural Resources Mgmt & Eng.), Jennifer Sayers (Environmental Policy), Damiana Serafini (Agricultural & Resource Economics), Tim Tussing (Facilities Ops), Stefan Wawzyniecki (Environmental Health & Safety), Steven Werth (Facilities)

*Note: The attendee list is based upon the meeting sign-in sheet. If you or someone else were present at the meeting but not listed above, please email Meghan.ruta@uconn.edu to ensure that the notes are distributed to all attendees. (Thank you.)

I. Welcome & Introductions – Rich Miller

a. Rich introduced himself and the workgroup co-chairs – Ron Gaudet and Dr. Mehdi Anwar. Meeting attendees followed by introducing themselves and the department/office that they represent.

II. Background: The President's Climate Commitment – Meghan Ruta

a. Meg reviewed the PCC signing, the commitment outline, and the institutional structure that has been developed to support the process (Climate Action Task Force and affiliated workgroups.).
b. The charge of the Energy Workgroup was clarified (to develop mitigation strategies for GHG emissions resulting from university operations and activities) and an overview of the 2006 GHG emissions inventory was reviewed.

III. 'Brainstorming Session

a. Workgroup members rotated between 3 brainstorming stations (see results below):
    i. Efficiency, Conservation, Installations & Retrofits
    ii. Renewable Energies
    iii. Supply & Infrastructure

b. Rich Miller review the evaluation criteria that will be used to prioritize proposed strategies/initiatives and assess their feasibility. The criteria include:
    i. Potential to avoid or reduce GHG emissions
    ii. Flexibility to achieve ongoing GHG reductions
    iii. Cost benefit – ROI and financial impact
    iv. Potential for positive or negative social and environmental side-effects
    v. Relationship to other mitigation strategies and opportunity for synergies
    vi. Potential to be scaled upward if successful
    vii. Potential to involve students and faculty

IV. Brainstorming Session Results:

Please note: All items/discussion points raised during brainstorming were recorded and are listed below. The proposed strategies/initiates are listed in random order; order is not meant to imply prioritization. The strategies proposed will next be examined for feasibility based upon the criteria presented above; presence on the lists to follow is not a guarantee of

endorsement by this workgroup or inclusion in the Climate Action Plan – more research will be required before making those decisions. If you feel that a strategy is missing from this list that you would like to be added/explored please email the Climate Action Plan project manager, Meghan.ruta@uconn.edu.

AUDITS & SUBMETERING

- Determine areas in need of retrofits via work order study
- Lighting audit, windows, envelopes
- Use student volunteers (e.g. ESCU) w/ help from CL&P
- Data trending to identify scale backs, etc. (show where changes could "bear fruit")
- Evaluate further metering applications
- Audit for building transformer size
- Use metering as 'dashboards' to educate people about building usage

SUPPLY & INFRASTRUCTURE

- Evaluate current CO2 emissions sources for:
    - Potential efficiency upgrades?
    - Actual need? (e.g. back-up diesel generators)
- Expand central utility systems as much as possible
    - Chill water, electricity, emergency power, steam
- Evaluate motor applications for VFDs
- Steam trap program
- Recover waste heat – refrigeration, laundry dryers, showers
    - Heat recovery ventilation
- Expand to use:
    - Geothermal
    - Fuel cells
- Implement appropriate sizing of building transformers
- Modify power plant operation strategy to reduce emissions

BUILDING CONTRUCTION & RETROFITS

- All new buildings must be LEED certified
    - Emphasize energy credits
- Fume Hoods
    - Each costs about $5,000 per year; if made more efficient could realize millions of dollars in savings!
    - Can earn LEED points by addressing
    - Approach utility company/state for grant monies to analyze fume hood performance
- Heating issues
    - Occupancy sensors for heating (*problems in residence halls if sleeping)
    - Upgrade building systems – automation and remote monitoring
    - All individual set temperatures
    - Design new buildings more efficiently
    - Heat zoning
- Retrocommissioning – Andover?
- Upgrade buildings without automation to allow for monitoring
- Automate building HVAC controls
- Building design
    - Utilize radiant floor heating
    - Windows (consider R values, replacement projects)
    - Design with split systems to avoid fresh air/window AC use
    - Building seals – windows, doors, insulation
- Phoenix controls
- Lighting retrofits

    - Light motion sensors
    - CFLs, T5s, indirect pendant lighting
    - Do an audit of the entire building before investing in lighting retrofits
    - Safety concerns – determine minimum use necessary
    - Encourage day lighting
- Dining services refrigerators and washers
    - Monitor use and eventually replace
    - Utilize waste heat from refrigerators and freezers (issue with falsely raising the head pressure)

EFFICIENCY & CONSERVATION

- Go beyond Energy Star requirements
    - Consider separation of research vs. operations for requirements/policies
- Evaluate replacements to upgrade energy efficiency
- Building occupancy schedules – e.g. Gampel
- Labs 21 EPC
- Lab water recirculation – closed loop cooling
- Recapture waste energy
    - Locker rooms & shower areas
    - Grey water heat recovery
- Change class scheduling
    - Less classes in winter to reduce heating requirements
    - Consolidate classes into fewer buildings (e.g. by discipline, on weekends)
    - Prioritize building usage based upon efficiency of building (use most efficient buildings first)
- Reduce water usage
    - Shower head retrofits (residence halls, athletics, department showers)
    - Behavioral campaign (e.g. shorter showers)
    - South campus chilled water – reuse for nearby dorms?
- Education campaigns
    - Q. How do you *show* people the impact of their behavioral changes?
    - Signage to raise awareness of energy use/conservation by building – both in energy and monetary units (e.g. Univ of Buffalo signage program)
    - Residence hall competitions
    - Plug loads/phantom loads
- More efficient window AC units
    - Hoods/covers to prevent winter heat losses
    - Buy energy star but better to not buy at all (use split system rather than fresh air)
- Establish temperature set points (e.g. 68 winter, 74 summer)
- Minimize waste coming into campus to minimize energy needs associated with its removal
- Turn the lights off!

RENEWABLE ENERGIES

- Wind
    - Need to plan for extremes/blackout situations (e.g. Texas)
    - Pinpoint potential locations on campus
        - Small designs that take advantage of updraft
        - Work from central facility out to the legs of campus
    - More efficient in winter
    - Can generate 700 KW
- Biomass
    - Evaluate biodiesel applications as a fuel source
    - Some campuses use compost to generate heat
    - Big screw composting system uses a lot of energy
- Geothermal

    - Ground temperature based – big return on investment
    - Hot steam geothermal is not an option in CT
- Solar
    - Photovoltaic vs. solar thermal
        - Solar thermal can be used to heat oil (large thermal inertia) to generate steam
        - Do not need to heat entire buildings by solar thermal – can select particular areas
    - Limited sunlight & clouds
    - Generation vs. installation costs (return on investment?)
    - Roadblock: utility companies were not making enough money to offer
    - Examples:
        - Pinepoint School – 2/3 energy from solar
        - Boston – similar to geothermal
        - New Britain schools
- Fuel Cells
    - Expensive generators
    - Clean water as a by-product

CAMPUS DEMONSTRATION PROJECTS

- Reclaim hydraulic energy off the wastewater plant discharge - hydroturbines
- Existing/On-going:
    - Mirror Lake island solar PV up light display
    - Horsebarn Hill polo arena (proposed) geothermal project
    - Ecogarden solar house & sustainable dwelling
- Proposed:
    - Solar
    - Wind
    - Geothermal – Dr. Gary Robbins
    - Fuel Cell
        - Partner with a company; allow them to showcase their product with the stipulation that we can use it for educational purposes.
        - Work with Global Fuel Cell Center
- Strategies
    - Trial in one building – establish baseline and monitor results
    - If successful, upscale to larger area of campus
    - Employ engineer(s) to study the building structure
    - Demos can be temporary but need to think of long-term suitability of locations, building condition, etc.
- Housing-Based Demos
    - EcoHouse
        - Explore LEED standards and beyond
        - Reclaim heat from showers, dryers, computers
        - Reuse gray water for energy production
        - Inter-dorm competitions
    - Develop a graduate student & faculty cooperative house similar to EcoHouse

OTHER IDEAS/COMMENTS:

- *Q. How do we use and/or lose less?*
    - Infrastructural – Reduce energy losses
        - Energy Waste
            - Building envelope (e.g. window seals)
        - Inefficiencies in Production
            - Distributive power
    - Behavioral - Reduce energy use within buildings
        - Think smaller in terms of building needs

        - Consolidate building uses to maximum heating/cooling usage
        - Competitions
        - Visual displays of energy use – e.g. signs, meters
- Energy Storage
    - Hydroelectric (pump water up with excess energy, release down through generator when energy/water is needed)
    - Ice bank storage (energy for cooling)
- System designs
    - Roof systems
    - Co-generation facility
    - Irrigation
    - Thermal locks
- Need lobbying for Hartford
    - Partner with industry and the state for new technology
        - E.g. fuel cell generation
    - University initiative
- Consider creative uses for water supply and sanitation
- Establish energy-efficient purchasing mechanisms
- Which counts against us less – making or purchasing electricity? Should we export power?

V. Questions/Comments:

- Underlying question: Which solutions are the most economical for Storrs? (i.e. need to calculate return on investment for each proposed strategy/project.)
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