Behavior Change for Sustainability

Pete McEvoy
Vice President Administration
Associated Universities, Inc (AUI)
Low-energy astrophysics: How scientists are trying to save the Earth

Listen to the scientists. That's what we say. When lots of different scientists, working separately, are turning up evidence that the Earth is getting warmer and human activities are to blame, then we should heed their warnings.

Scientists, from many different disciplines, say that their research shows we should be concerned about climate change. If we want to reduce our risk, we'll have to start using less fossil fuels. That's a big shift in the way the world thinks about energy. It's bound to change our lives—and we
Mauna Kea, Hawaii: 33% Distribution of Gemini’s Energy Consumption (kWh)

Hilo, Hawaii: 16%

La Serena, Chile: 9%

Cerro Pachón, Chile: 42%
43% DISTRIBUTION OF GEMINI’S ENERGY COSTS (US$)

23% Hilo, Hawaii

28% Cerro Pachón, Chile

6% La Serena, Chile

Mauna Kea, Hawaii
Gemini Observatory will begin a “green” facilities program in 2009; an issue that is of interest to many of our staff. So, as part of the planning process for next year, we want to obtain staff comments on the subject and have created a blog for this purpose.

We want to encourage all staff to use this communication channel to establish a knowledge base on green issues that should be of relevance to Gemini. Our aims are high levels of sharing and collaboration on the subject; building a productive green building program from the contributions from all that are interested in the topic, from whatever angle........
Where did the ideas come from?

- Gemini North: 64%
- Gemini South: 24%
- Anonymous: 12%
Where did the ideas come from?

- Science: 41%
- Admin: 22%
- Anonymous: 17%
- Engineering: 15%
- Outreach: 5%
What type of change?

- Transportation, behaviour change: 15%
- Water, behaviour change: 2%
- Behaviour change for energy savings: 17%
- Install technology for energy savings: 29%
- Energy Planning Process: 3%
- Recycling, behaviour change: 10%
- Misc: 7%
- Materials use, behaviour change: 15%
What type of change?

31% of comments promoted technology

59% promoted behavior change
What type of change?

Gemini approached the challenge in two ways.....

- Created an internal structure for energy planning
- Began implementing changes where a good start could be made quickly ("low hanging fruit")
An Energy Planning Oversight & Control Committee was created to set the overall direction of the energy plan and oversee the development of the early initiatives.

The Committee comprises personnel from all areas with a direct involvement in energy issues, including facilities management, engineering, information systems, administration and finance.
Electricity consumption is reviewed monthly and posted on our website.

The information is segregated per each facility and identifies long term and seasonal fluctuations.
Oversight & Direction

GEMINI GREEN MISSION

“Gemini is committed to operating responsibly in the interests of our communities, local and global, now and always. Our corporate citizenship promotes sustainability through effective, efficient operations and positive environmental stewardship...”

“.....We will carefully consider and protect Earth’s valuable environmental resources, while fulfilling our commitment to science and applying solid financial principles to our operations....”
AIR CONDITIONING

- Installed programmable thermostats at base facilities
- New program implemented for telescope control device managing the way the observing floor is cooled at the beginning of the observing night
- Replacement of old chillers with more efficient models
Energy ingenuity and the double-whammy

Telescope mirror temperature > dome air temperature = Bad (blurring of image)

Either cool dome via air-conditioning, or cool mirror directly

Blurring of image caused by refraction of light waves when traveling through layers of air of differing temperature

So, ensure that the telescope dome tracks the outside temperatures as close as possible at the beginning of the night, when the shutters open, and through the night
PRINTER & COMPUTER EFFICIENCY

- (More electronic, and fewer paper, forms)
- Rationalizing the number of printers
  - Fewer “personal” printers
  - Intelligent group printers
- Monitoring printer usage
- Discouraging printer use
PLEASE DO NOT PRINT LARGE JOBS
PRINTER & COMPUTER EFFICIENCY

- Survey found 400+ pieces of electrical equipment per site plugged in out of hours and 100+ turned on but not in use.
- Getting staff to turn-off when not in use
- New computer monitoring system provides system-wide uptime and usage statistics
- Initial experimentation with virtualization
Initiatives

TRANSPORTATION

- Collective transport options from base to summit are in place at Gemini South and pending further consideration at Gemini North
- Fuel economy is now much more an issue
- Bicycle racks for staff
Providing specialized bicycles for employees
Initiatives

TRAVEL

- Astronomy @ Gemini = international collaboration = international travel
- Encourage staff to limit travel wherever possible
- We promote virtual meeting technologies
- We remind staff of their “travel CO2 footprint”
- We publicize our “travel carbon footprint”
Hi Pete,
Here is your itinerary for your trip to San Diego. Please review it and confirm if I should issue the tickets.
Thank you,
Edith

Environmental Note:
We know that air travel is often an inevitable requirement for Gemini staff, but we are also aware that it is an activity that has an unfortunate environmental impact and our CO2 footprint from travel has been significant. For example, in 2008, the carbon dioxide (CO2) produced by staff travel was about twice the CO2 caused by our consumption of electricity on Mauna Kea. Gemini is publishing tables indicating our miles traveled by air to promote general awareness of this issue.

To learn more about the environmental impact of air travel and “carbon footprints,” please visit:
http://www.sightline.org/research/energy/res_pubs/rel_air_travel_aug04

Staff who would like to understand the carbon footprint associated with their travel can consult the carbon calculator at http://www.carbonfund.org/Calculators/

Information about Gemini’s travel CO2 footprint is published on the internal web at http://internal.gemini.edu/index.php?q=afg/afg_goes_green

Edith Bastias
Gemini South Travel Coordinator
Gemini Accumulated Travel Miles - Total

24% reduction in travel CO2 footprint in 1 year
RECYCLING

- Gemini North already had a developed recycling program, based on Hawaii’s successful HI-5 beverage deposit program.
- Chile lags way behind in recycling and Gemini South had to research and patch together its own recycling program.
- The sites now have distinct, but comprehensive recycling plans and their influence is spreading.
- Paper
- Cardboard
- Glass
- Plastics
- Aluminum cans
- Tetrapak
- Plastics
- Batteries
- E-waste
- Light bulbs & tubes
- Metals
- Tires

Recycling
Recycling Point
Punto de Reciclaje
GREEN CLEANING

- Some cleaning products can negatively impact health and the environment
- Cleaning practices can be based as much on perceived risk as actual risk
- We have reviewed and changed some of our practices and amended our purchases of cleaning products
- Our Janitorial staff have played an important part in this initiative and improved our ecological standards
MISCELLANEOUS

ELIMINATION OF DISPOSABLE CUPS

Objections to disposable cups are environmental concerns

They’re cheap but are produced from hydrocarbons such as oil and gas, producing pentane emissions

As they are inert, they remain in landfills for a very long time
UTILITY COMPANY INVOLVEMENT

We sought advice from HELCO in Hawaii and CONAFE in Chile.

Nothing new for HELCO. A total novelty for CONAFE in Chile’s IV Region.

Rebates from HELCO.

Good tips from both.
A FEW “KISS” INITIATIVES

We have reduced lighting in some areas by as much as 50%.

Staff are pleased with the changes.

Motion sensors have been placed in kitchens, bathrooms and places infrequently used (e.g. electrical rooms)
MISCELLANEOUS

A FEW “KISS” INITIATIVES

During hot summer days, when we can take advantage of cooling breezes, we sometimes take the dramatic step.....

.....of opening the base facility doors just before the office opens, so that staff feel far less inclined to use their air conditioning controls
More recent changes

- Data center with smart airflow; more efficient channeling of cold and warm air.

- HVAC Green Timer system. On/off timers switch pumps, chillers, and boilers on at 06.30 and off at 18.30.
2nd highest photovoltaic solar panel installation in the World (highest in Tibet by 200 feet approx.) 10% reduction in facility electricity. Limited PV footprint due to
GEMINI OBSERVATORY
Our working culture
Nuestra cultura de trabajo

Taking responsibility and accountability for our actions
Asumiendo la responsabilidad de nuestras acciones

- Acting with integrity in all we do
- Actuando con integridad en todo lo que hacemos
- Having mutual trust in all relationships
- Confianza mutuamente en todas nuestras relaciones
- Nurturing safety of people and equipment in all our actions
- Fomentando la seguridad de las personas y equipos en todas nuestras acciones
GEMINI OBSERVATORY
Our working culture
Nuestra cultura de trabajo

- Treating others as we would like to be treated
- Tratando a los demás como queremos ser tratados
- Striving for personal and institutional growth over status quo
- Luchando tanto por el crecimiento personal como por el crecimiento institucional sobre el status quo
- Taking responsibility and accountability for our actions
- Asumiendo la responsabilidad de nuestras acciones
- Acting with integrity in all we do
- Actuando con integridad en todo lo que hacemos
- Having mutual trust in all relationships
- Confianza mutuamente en todas nuestras relaciones
- Nurturing safety of people and equipment in all our actions
- Fomentando la seguridad de las personas y equipos en todas nuestras acciones
ONE DOES NOT CHANGE

THE BEHAVIOR OF OTHERS
BY COMMENTING ON FACEBOOK
Compliance v. Commitment Framework

Compliance
“I have to do it this new way”

Reaction
“I will react to change if I must”

Testing
“I will absorb this change”

Negative Perception
“I feel threatened by this change”

Commitment
“I want to continue this way”

Action
“I will act to achieve this change”

Testing
“I will put myself at stake for this change”

Positive Perception
“I see the opportunities in this change”

Engagement
“I see the implications for me/us”

Understanding
“I know what it is”

Awareness
“I am being told about something”
Control v. Creativity Framework

**PREDICTABLE**
- Standard, Uniform

**CREATIVE**
- Innovation, Growth

**CONTROLLED**
- Contained, Disciplined

**UNPREDICTABLE**
- Variable, Volatile
Behavior Change

Participation

participate (v.)
1530s, back-formation from participation, or else from Latin participatus, past participle of participare "to share, share in, participate in; to impart," from particeps "partaking, sharing," from parti, past participle of partire "to divide" (see part (n.)) + -cip-, weak form of stem of capere "to take" (see capable). Related: Participated; participating.

Engagement

engage (v.)
early 15c., "to pledge" (something, as security for payment), from Old French engagier "bind (by promise or oath), pledge; pawn" (12c.), from phrase en gage "under pledge," from en "in" (see en- (1)) + gage "pledge," through Frankish from Proto-Germanic *wadiare "pledge" (see wed). It shows the common evolution of Germanic -w- to central French -g- (see gu-). Meaning "attract and occupy the attention of" is from 1640s; that of "employ, secure for aid, employment or use" is from 1640s, from notion of "binding as by a pledge;" meaning "enter into combat or contest with" is from 1640s. Specific sense of "promise to marry" is 1610s (implied in engaged). Machinery sense is from 1884. Also from the French word are German engagiren, Dutch engageren, Danish engagere.
Behavior Change

Participation

"to share, share in, participate in;" from participable. R 1530s, back formation from participation, or else from Latin participare, past participle of participare "to share, share in, participate in, to impact," from particeps "partaking, sharing." From partem past participle of partire "to divide" (see nunt (n) -cip-, weak form of stem of capere "to take" (see capable). R

Engagement

"attract and occupy the attention of;" from en "in" (see en- (1)); common evolution of Germanic -w- to central F aid, employment or use" is from 1640s, from no of "binding as by a pledge;" promise to marry. Also from the French word are German engagiren, Dutch engageren,
Standards & Models about Employee Engagement for Sustainability

**ISO 14000**
- Family of standards setting requirements for an Environmental Management System.
- "increase leadership and engagement of employees."

**ISO 26000**
- 7 Principles of Social Responsibility e.g. Accountability, Transparency, Ethical Behavior etc.
- Recognizing social responsibility and engaging stakeholders
- 7 core social responsibility subjects/issues e.g. Labor issues
- Ways to integrate social responsibility into the organization

**BSI 8900**
- Key Principles of Sustainable Development: Inclusivity; Integrity; Stewardship; Transparency are minimum principles
- Sustainability development maturity matrices for different types of organizations
Standards & Models about Employee Engagement for Sustainability

ISO 10018

- Standard to aid Quality Assurance System ISO 9000
- Competence – the “ability to apply knowledge and skills to achieve intended results.”
- Involvement – “engaging in, and contributing to shared objectives.”

Figure 1: The people involvement and competence process.
### Stakeholder Management Steps

<table>
<thead>
<tr>
<th>Step 1</th>
<th>Step 2</th>
<th>Step 3</th>
<th>Step 4</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Evaluate Stakeholder Readiness to Change</strong></td>
<td><strong>State the Desired Outcomes</strong></td>
<td><strong>Diagnose the Sources of Resistance</strong></td>
<td><strong>Evaluate Action’s Effectiveness</strong></td>
</tr>
<tr>
<td>• Does the individual feel that the vision for change is the right one?</td>
<td>• What do you expect as a result of this change?</td>
<td>• Inadequate communication related to the change</td>
<td>• Do stakeholders understand the vision?</td>
</tr>
<tr>
<td>• What action should you take to clarify or adjust the vision?</td>
<td>• What will it take to make the changes happen?</td>
<td>• Lack of involvement in the change process</td>
<td>• Do employees understand the vision?</td>
</tr>
<tr>
<td>• How will the changes affect each person’s responsibility or role?</td>
<td>• What are the risks/barriers?</td>
<td>• Diminished rewards</td>
<td>• What additional information do employees need about the vision?</td>
</tr>
<tr>
<td>• Do those who follow your leadership know you are committed to change?</td>
<td>• What can be done to address the risk and barriers?</td>
<td>• Inability to identify with the organization's values</td>
<td>• Are employees aware of the risks of not changing?</td>
</tr>
<tr>
<td>• Are employees committed to change?</td>
<td>• What will happen to each individual if s/he does not change?</td>
<td>• Inappropriate timing of change</td>
<td>• Are employees clear about their role in implementing the vision?</td>
</tr>
<tr>
<td>• How well does the organization, at all levels, adapt to change?</td>
<td></td>
<td>• Low level of trust</td>
<td>• Are employees aware of your commitment to the change?</td>
</tr>
</tbody>
</table>
# Employee Actions

<table>
<thead>
<tr>
<th>Paper</th>
<th>Recycling</th>
<th>Food &amp; Drink</th>
<th>Energy</th>
<th>Transportation</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paperless Paychecks and Company Information</td>
<td>Office Products Reuse/Recycling Area</td>
<td>Reusable Food &amp; Drink Containers &amp; Utensils</td>
<td>Energy Saving Computer Settings</td>
<td>Bike to Work</td>
<td>Hoteling &amp; Hot Desking</td>
</tr>
<tr>
<td>Centralized Planning</td>
<td>Centralized Waste and Recycling Areas/Containers</td>
<td>Dishwasher Use</td>
<td>Personal Area/Office Shutdown Procedures</td>
<td>Carpooling</td>
<td>Telecommuting</td>
</tr>
<tr>
<td>Personal Printing Code and Expense Report</td>
<td>Waste Audits</td>
<td>Purified Water</td>
<td>Power Strip Use</td>
<td>Public Transportation</td>
<td>Virtual Meetings</td>
</tr>
<tr>
<td>Double-sided Printing</td>
<td>Composting</td>
<td>Sustainable and/or Local Food</td>
<td>Lighting Reduction Program</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(Institute for Building Efficiency, Johnson Controls, 2013)
## Employer-Employee Engagement Methods

<table>
<thead>
<tr>
<th>Acknowledgement</th>
<th>Team Activities</th>
<th>Communications</th>
<th>Education</th>
<th>Training</th>
</tr>
</thead>
<tbody>
<tr>
<td>Employee Discounts</td>
<td>Employee Volunteerism</td>
<td>Sustainability Website</td>
<td>Sustainability/ Green Building Tours/LEED certification</td>
<td>Energy Efficiency Training</td>
</tr>
<tr>
<td>Employee Rewards/ Recognition</td>
<td>Green Teams and/ or Green Leaders</td>
<td>E-newsletter</td>
<td>Interactive Kiosks</td>
<td>Water Conservation Training</td>
</tr>
<tr>
<td>Personal Sustainability Plan</td>
<td>Challenges and Competitions</td>
<td>Sustainability Program Feedback</td>
<td>Interactive Games</td>
<td>Efficient Driving/ Transportation Training</td>
</tr>
<tr>
<td>Personal Pledges</td>
<td>Fundraising Campaign</td>
<td>Social Media and Knowledge Sharing Network</td>
<td>Personal Environmental Foot-printing Tools</td>
<td>Waste, Recycling and Material Use Training</td>
</tr>
</tbody>
</table>

(Institute for Building Efficiency, Johnson Controls, 2013)
“All Other Things Being Equal, I would take a 15% pay cut . . . .

<table>
<thead>
<tr>
<th>Reason</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>. . . . to work for a company committed to corporate social responsibility.</td>
<td>35%</td>
</tr>
<tr>
<td>. . . . for a job that made a positive social or environmental impact.</td>
<td>45%</td>
</tr>
<tr>
<td>. . . . to work for an organization with values like my own.</td>
<td>58%</td>
</tr>
</tbody>
</table>

“Creativity is intelligence having fun.”
Albert Einstein

Think “network” not hierarchy.
Leadership = fewer decisions

Make “significance” the goal

“Make meaning, not money.”
Gary Hamel
(“What Matters Now”)
Circles of Sustainability

THE THEORY
Circles of Sustainability

THE REALITY
Behavior Change for Sustainability

THANK YOU