Session Learning Objectives

At the end of this elective, students will be able to:

- Describe how climate change affects human health
- Outline the relationship between the operations of healthcare impacts and the environment
- Identify current UCSFH efforts to reduce waste, energy, carbon emissions
- Describe practical steps that can be taken to reduce greenhouse gases in health care
- Describe how health care providers can serve as advocates for sustainability in their communities
PollEverywhere

To: 223-33
Who's in the audience?

- School of Pharmacy
- School of Medicine
- School of Nursing
- School of Dentistry
- FAS
- UCSF Health
- Other
Why are carbon emissions an issue?

- Each year climate-related natural disasters are worsening
- 2017 racked up as most expensive year - $306 billion in total US damages
- Hurricanes/Storms in the East and South
- Wildfires in the West
- Severe Drought in South Africa, CA
- The climate crisis is making weather more extreme
Climate change contributes to disease - It’s all about health

- Extreme weather events – damages crops, heat exhaustion
- Flooding – contaminates water supplies, mold, displacement
- Food instability – drought, reduces crop production, malnutrition
- Insect-borne disease: lyme disease, west nile, malaria, chikungunya
- Increase allergens: asthma, emphysema, respiratory disease
Higher Temperatures Worsen Air Pollution

Ozone versus Temperature

Riverside, 2003-2005
Fresno, 2003-2005

4/26/2018
Climate changes health.
Air pollution increases the risk of preterm delivery for her.

Many people at UCSF help to reduce climate impact by:
→ Eating less beef
→ Walking and biking to work
→ Buying energy efficient equipment
“Climate change threatens our fragile existence on this planet.”
J. Kim, World Bank

“Climate change is affecting agriculture, water resources, human health, and ecosystems on land and in the oceans. It poses sweeping risks for economic stability and the security of nations. We can avert these risks if we take bold, decisive action now.”
Ban Ki-Moon

“Climate change is the biggest global health threat of the 21st century.”
The Lancet
# Health-Care Costs of Climate Events

**Knowlton, Health Affairs, 2011**

<table>
<thead>
<tr>
<th>Climate-related health stressor</th>
<th>Premature Deaths</th>
<th>Hospitalizations</th>
<th>Total Health-care Costs $$ (thousands)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ozone pollution</td>
<td>795</td>
<td>4,150</td>
<td>6,534,642</td>
</tr>
<tr>
<td>Heat wave</td>
<td>655</td>
<td>1,620</td>
<td>5,353,425</td>
</tr>
<tr>
<td>Hurricane</td>
<td>144</td>
<td>2,197</td>
<td>1,392,833</td>
</tr>
<tr>
<td>Infectious disease</td>
<td>24</td>
<td>204</td>
<td>207,447</td>
</tr>
<tr>
<td>River flooding</td>
<td>2</td>
<td>43</td>
<td>20,357</td>
</tr>
<tr>
<td>Wildfires</td>
<td>69</td>
<td>778</td>
<td>578,640</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>1,699</strong></td>
<td><strong>8,992</strong></td>
<td><strong>$14,087,344</strong></td>
</tr>
</tbody>
</table>

**Climate change could cost more than $100 billion a year**

*By Ivana Kottasova, CNN*

March 31, 2014 – Updated 1303 GMT (2103 HKT)
Climate Change and Health

- Climate change has direct impact on health and well-being
- Climate change is a threat multiplier
- Climate change exacerbates existing health challenges
- Climate change impacts vulnerable populations and disadvantaged communities
- Climate changes effects the systems on which human life depends – air, water, food, shelter, security
- Co-benefits offer many opportunities to simultaneously improve health and address climate change
Co-Benefits

- Addressing causes of climate change will also address poor population health
  - Local sustainable agriculture
  - Alternative Transportation
  - Clean Energy
  - Reduce meat consumption
  - Urban greening
State Policy and UC Policy and Goals

- UC policy goal 1990 levels by 2020
- CA goal is 40% below 1990 levels by 2030
- UC President committed to Carbon Neutrality by 2025
- If we don’t do it, who will?
- University Climate Change Coalition
University Climate Change Coalition

- Arizona State University
- California Institute of Technology
- Tecnológico de Monterrey
- La Universidad Nacional Autónoma de México
- The Ohio State University
- The State University of New York
- The University of British Columbia
- The University of California
- University of Colorado, Boulder
- University of Maryland, College Park
- The University of New Mexico
- The University of Toronto
- The University of Washington
UCSF’s Carbon Reduction Past Efforts:

Past Projects for 21% reduction from 2009-2017

- Energy efficient heating/cooling, Electric chiller upgrade, Turbine upgrade, EE Ultra-low temperature freezers, sterilizer removal or replacements
- Lighting retrofits, Solar panels (GH, 3rd St garage)
- Purchase UCOP Solar Power, some CleanPowerSF

UC has reduced system-wide emissions by 15% since 2009
UCSF’s Carbon Reduction Future Efforts:

Future Projects for additional 41% Reduction

- 3.3 MW solar panels in MB Hospitals, Garages (Hospital, OP, & Rutter Center, Fresno, Oyster Point, Dental School lot)
- More Energy efficiency projects, Commissioning
- Purchase CCSF Hydropower, Purchase UCOP Biogas
- Electric shuttle fleet and EV/Hybrid Dept vehicle fleet
- Design/construct energy efficient all new buildings
Behavior Change and new ideas are needed to address the 38% gap.
Quiz: What are UCSF’s largest carbon emissions?

- Vehicle exhaust
- Burning natural gas (heating, hot water, steam)
- Purchased electricity (natural gas, coal)
- Refrigerant leaks
- Anesthesia gases
- Emergency generators
What are UCSF's largest carbon emissions?

- Vehicle exhaust
- Burning natural gas (heating, hot water, steam)
- Purchased electricity (made from natural gas/coal)
- Refrigerants
- Anesthesia gases
- Emergency generators
Who is most responsible for UCSF's emissions

- Facilities
- Capital Programs
- Buyers of equipment
- Users of energy
- Buyers of vehicles
- Building occupants
FAS Strategic Priority
Solutions for Eight Contributing Factors for Emissions

<table>
<thead>
<tr>
<th>Ranked by Impact</th>
<th>Bldgs Total Cost of Ownership</th>
<th>Energy Staffing (FTE)</th>
<th>Energy efficient purchasing</th>
<th>ZEV/Hybrid by 2025</th>
<th>Outreach (people)</th>
<th>Wet Lab Space Utilization</th>
<th>Central Plant Emissions</th>
<th>Zero Carbon Electricity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current Condition</td>
<td>not included</td>
<td>1 FTE</td>
<td>no data available</td>
<td>33% of fleet</td>
<td>4000 reached</td>
<td>56% lab sf</td>
<td>~50% total emissions</td>
<td>27.8% total electricity</td>
</tr>
</tbody>
</table>
UC Sustainable Practices Policy Status

Water
- Reduce 36% water use by 2020

Waste
- Achieve Zero Waste by 2020 (90% diversion, UCSFH 50%)
- Green Buildings
  - LEED-NC or CI Silver min, seeking Gold >$5M
- Exceed Title 24 by 20% or establish EUI targets by bldg usage

Food
- Achieve 20% sustainable food purchases by 2020

Purchasing
Purchase/track Energy Star, EPEAT, GreenGuard, Green Seal, and Water Sense where available (on track)

http://policy.ucop.edu/doc/3100155/SustainablePractices
Session Learning Objectives

At the end of this elective, students will be able to:

- Describe how climate change affects human health
- Outline the relationship between the operations of healthcare impacts and the environment
- Identify current UCSFH efforts to reduce waste, energy, carbon emissions
- Describe practical steps that can be taken to reduce greenhouse gases in health care
- Describe how health care providers can serve as advocates for sustainability in their communities
How does the operations of a healthcare system impact climate change?
Quiz: What percentage of US emissions are attributed to healthcare and higher education combined?

- 1%
- 6%
- 12%
- 18%
- 24%
What percent of US emissions are attributed to healthcare and higher education combined?
Operations of the university also contributes to climate change despite our mission of Advancing Health Worldwide

US Emissions from universities/hospitals

- 10% of US greenhouse gas emissions - from healthcare
- 2% of UC greenhouse gas emissions - from higher education

“EPA estimates that the U.S. healthcare sector's current annual electricity use of 73 trillion kilowatt-hours (kWh) contributes $600 million per year to healthcare costs via increased asthma and other respiratory illness.”
Energy

- Hospitals are among the biggest US energy consumers by sector.
  - 24/7 operations with sophisticated energy needs
    OSHPD req’d ACH and HVAC

- Large hospitals, >200,000 SF accounted for less than 1 percent of all commercial buildings but consumed 5.5 percent of total energy used in 2007

- From 2014-2017, double the percentage of facilities with written plan to address climate change mitigation

- More hospitals are relying on renewable energy—the percentage of facilities that generate or purchase renewable energy has increased by 81%.

## Past UCSFH Energy Efficiency Projects

### Medical Center Energy/Water Savings Accomplishments (12-16)

<table>
<thead>
<tr>
<th></th>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Avoided cost ($/yr)</td>
<td>$1,300,000</td>
<td>$5,750</td>
<td>$41,850</td>
<td>$98,500</td>
<td>$43,665</td>
<td>$24,320</td>
<td>$19,350</td>
<td>$1,533,435</td>
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<tr>
<td>Water savings</td>
<td>3,740,000</td>
<td>1,050,000</td>
<td>NA</td>
<td>NA</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>4,790,000</td>
</tr>
<tr>
<td>Emissions reduction (MT CO2e)</td>
<td>3628</td>
<td>10</td>
<td>72</td>
<td>89</td>
<td>55</td>
<td>34</td>
<td>208</td>
<td>4,096</td>
</tr>
<tr>
<td>PG&amp;E rebate</td>
<td>$757,100</td>
<td>$10,620</td>
<td>$88,880</td>
<td>$84,590</td>
<td>$68,718</td>
<td>$41,692</td>
<td>$34,133</td>
<td>$1,085,733</td>
</tr>
<tr>
<td>kWh saved/yr</td>
<td>410,950</td>
<td>50,909</td>
<td>370,332</td>
<td>459,897</td>
<td>285,325</td>
<td>173,717</td>
<td>N/A</td>
<td>1,752,130</td>
</tr>
<tr>
<td>Therms saved/yr</td>
<td>658,475</td>
<td>NA</td>
<td>NA</td>
<td>46,180</td>
<td>N/A</td>
<td>N/A</td>
<td>34,133</td>
<td>738,788</td>
</tr>
<tr>
<td>Project cost</td>
<td>$7,500,000</td>
<td>$1,104,400</td>
<td>$308,950</td>
<td>$169,179</td>
<td>$258,242</td>
<td>$90,129</td>
<td>$58,700</td>
<td></td>
</tr>
</tbody>
</table>
# Future UCSFH Energy Projects

<table>
<thead>
<tr>
<th>Project Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>M/L Lighting Retrofit Phase 1 &amp; 2</td>
</tr>
<tr>
<td>M/L Steam Trap Replacement Phase 1</td>
</tr>
<tr>
<td>MB 1MW PV onsite purchase</td>
</tr>
<tr>
<td>Moffitt 2nd Chiller Replacement</td>
</tr>
<tr>
<td>MB PCMB Savings By Design</td>
</tr>
<tr>
<td>M/L Steam Trap Replacement Phase 2</td>
</tr>
<tr>
<td>MZ MOB1 &amp; MOB2 Commissioning</td>
</tr>
<tr>
<td>MZ Teco Chiller Replacement</td>
</tr>
<tr>
<td>M/L MBCx</td>
</tr>
</tbody>
</table>

Behavior change – turn off lights, equipment, use timers, power strips
Water

- The average large hospital used **43.6 million** gallons of water, which cost about **$202,200** per building.

- By 2030, studies show that global water supplies will meet just 60% of total demand.

- Due to historic droughts happening both in our nation and around the world, hospitals are monitoring, and strategies to reduce water use.

- Currently, U.S. hospitals use >7% our US commercial water supply.

**UCSFH**

- Removed 11 autoclaves saving ~1M gal/yr each

- Upgraded Medical Air/Electric Chiller saving 4.8M gal and $1.3M avoided cost

Waste

- Hospitals in the U.S. produce more than 4.67 million tons of waste each year. Hospitals also recognize that waste disposal can have a health impact on communities.

- Nationwide, Operating rooms in the U.S. produce more than 2,000 tons of waste per day. Spinal procedures, for example, are among the most wasteful.

- RUCSF research, published 2017 Journal of Neurosurgery, examined 58 neurosurgeries performed by 14 different surgeons at UCSFH found $1000 wasted per OR procedure.

- Leading hospitals are routinely achieving a 30% recycling rate by generating ~1400 pounds of recycling per full time employee.

What is the most impactful action to take on waste?

- Sorting recycling better
- Sorting compost better
- Reduce amount of medical waste
- Reduce amount of hazardous waste
<table>
<thead>
<tr>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sorting Recycling better</td>
</tr>
<tr>
<td>Sorting Compost better</td>
</tr>
<tr>
<td>Reduce amount of medical waste</td>
</tr>
<tr>
<td>Reduce amount of hazardous waste</td>
</tr>
</tbody>
</table>
Zero Waste
UCSFH Solid Waste Trends
Currently 49% diversion, Goal is 50%
Food

- The U.S. spends $ billions/yr to treat diet-related, chronic diseases: $147 billion for obesity, $116 billion for diabetes, and hundreds of billions for CVD and cancer.

- Healthier/sustainable options for patients and staff: local, organic, antibiotic-free, less red meat and consider the entire lifecycle of the food (production, processing, transport)

- 62% of hospitals have a policy to provide healthier sustainable food. 72% purchase locally and/or sustainably grown/produced food.

- 50% hospitals reduced meat purchases; 54% partial antibiotic free meat/poultry

- Copia collects food from Moffitt Cafes to share with shelters daily

- Food4UCSFStudents notifies students of left over catering

https://saa.ucsf.edu/food

Carbon emissions of your food choices

- Post Farmgate Emissions (includes processing, transport, retail, cooking, waste disposal)
- Production Emissions (includes all emissions before product leaves the farm)
Sustainable Food

- Estancia beef - 100% grass fed and finished, never ever
- 2 farmers Markets, tracking/donating food waste
- Challenged by retail food facilities lack of an accurate tool and verifiable results
- Eat less beef/lamb

![Sustainable Food Spend Chart](image)

Target 20%
Green Procurement

- Negotiated contracts for 50% more energy efficient ULT freezers
- 100% PCW copy paper, custodial paper
- Print Management System with Energy Star Multi-Function Printers, 100% PCW paper, scanning, reusable cartridges, privacy codes

More can be done:

- Reusable totes vs cardboard boxes from Office Depot, VWR, Medline
- Include sustainability in value analysis and RFPs
- Include sustainability, LCA in all purchasing
- Include producer responsibility language in contracts (take back)
- Demand Energy Star and energy efficient equipment (freezers, refrigerators, sterilizers, monitors, computers, etc)
Green Building

Eight New LEED bldg projects and another 1M SF

- Psychiatry
- 23A
- PCMB
- Housing x 2
- ZSFG Lab
- Block 33 mixed use
- Childcare Ctr
- M/L Replacement

29 completed LEED certified projects

Technical Performance Criteria features energy/water stds beyond LEED
**Toxics Reduction**

- Only UC campus focusing on this
- Green Seal cleaning supplies, campus and UCSFH
- Adopted IPM except for bed bugs in housing
- No herbicides as general practice
- Low/No VOC paints in renovations or new construction
- Education tools for clinicians, pregnant women and children to avoid chemical exposures from typical household products – *The Story of Health* and *Toxic Matters*
- Adoption of *The Living Building Challenge’s The Red List* in Technical Performance Criteria for PCMB and replacement hospital
- Eliminated Triclosan in hand soaps
Climate Changes Health Campaigns

“Being green protects our children’s health.”

Sam Hawgood, MB, BS
Chancellor, School of Medicine

Join the Race to Certification
livinggreen.ucsf.edu/getcertified

Are you tossing paper towels into the compost bin?
Requesting a compost bin service earns your workplace 3 points!

Get Started at
livinggreen.ucsf.edu/getcertified

Climate changes health.
More pollen means more asthma and more allergies for her.

Many people at UCSF help to reduce climate impact by:
- Taking the stairs
- Taking alternate transportation
- Turning off display monitors

4/26/2018
UCSF Health’s role

- Continue to enhance UCSFH efforts to reduce energy demand and use
- Continue to engage UCSF and UCSFH community to support sustainability
- Provide Sustainability Leadership system-wide, nationally
- Share sustainability best practices with Affiliates, other campuses, health systems
- Practice Green Health membership to share best practices, continuous improvement
Wordcloud: What will you do?

- **Advocate** for Climate Action
- **Organize** your own Living Green event
- **March** for Science or March for Climate
- **Take** Alternate Transit
- **Try** Teleworking
- **Do** Something New you haven’t done before!
- **Other ideas?**
what will you do?
Session Learning Objectives

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- Describe how health care providers can serve as advocates for sustainability in their communities
Thank you!

Sustainability.ucsf.edu
Gail Lee@ucsf.edu
The Petroleum Industry's Future Ambitions Made Clear

$ Billion Invested in the Last Decade

- Renewable energy
- Developing tar sands technology

The Carbon Problem

- Maximum amount of additional CO2 emissions to avoid the most severe consequences of Climate Change
- CO2 Potential in Fossil Fuel Reserves

Gigatons CO2

https://docs.google.com/file/d/0BxLi8k2KLP3XLTZ1UHFhMEg4OE0/edit
(UCSB Academic Senate Fact Sheet)
FAS Strategic Priority: Carbon Neutrality by 2025

1. BACKGROUND

Scope: Carbon Emissions from energy usage from UCSF owned buildings and fleet vehicles

In 2015, UC was the first major university to have a policy goal of achieving carbon neutrality by 2025. Past campus funding and operation decisions did not incorporate carbon emissions. In recognition of rising energy costs, air pollution, and climate change impacts, the UC President’s leadership and participation at the Paris Climate Conference has made supporting carbon neutrality a high priority for UC. During a time of unprecedented campus growth and with a short time frame to achieve the goal, FAS has made this a strategic priority.

2. CURRENT CONDITION

UCSF identifies and measures all carbon emission sources and continues to explore all possible strategies to reduce those emissions, which includes existing utility-funded partnerships and currently identified and funded strategies. Concurrent efforts to develop strategies to address Space Utilization, Central Plant operations, Zero Carbon Electricity, and outreach are underway and being monitored.

UCSF has identified all contributing factors listed here that need to be included to go beyond our current efforts to reach our goal. They are prioritized in the following table with the top four selected for this A3.

3. TARGET CONDITION (GOALS)

The top four contributing factors currently do not go far enough in planning and operations to reduce carbon emissions to meet the 025 goals.

4. GAP ANALYSIS

5. EXPERIMENTS (PROPOSED COUNTERMEASURES)

Root Cause 1. Funding model algorithm does not include Total Cost of Ownership in the Business Case Analysis with carbon and O&M costs for building projects

Root Cause 2. No priority for energy staff to implement SEP projects.

Root Cause 3. No Environmentally Preferable Purchasing (EPP) policy to ensure energy efficiency. TCO, and metrics to track policy compliance

Root Cause 4. Vehicle fleet purchasing policy does not encourage or enforce use of zero carbon vehicles.

Root Cause 5. UCSF has not explored sustainable development with donors.

6. ACTION PLAN

7. STUDY, REFLECT, PLAN NEXT STEPS (PDCA)

Owner will conduct periodic "checks" with each A3 team to ensure countermeasures achieve the expected results. Currently, efforts underway for the other contributing factors to develop solutions for Space, Central Plant, Zero Carbon Electricity and Outreach are outside the scope of this A3-T but will be monitored to evaluate results to target and shared with FET.
UCSF Strengths

- Research
  - basic, clinical, social and behavioral, and population sciences
- Teaching
  - “tomorrow’s leaders in the life sciences, health care and health policy”
- Patient Care
  - “rapid translation of research to improvements in patient and community health”
- Public Service
  - “With an overarching mission of “advancing health worldwide,” UCSF is devoted at every level to serving the public.”
Problem Statement (Gap)

The top four contributing factors currently do not go far enough in planning and operations to reduce carbon emissions to meet the 2025 goals.

Identified Solutions

Projected Gap 60,103 MTCO\textsubscript{2}e

3. TARGET CONDITION (GOALS)

<table>
<thead>
<tr>
<th>Metric (Public)</th>
<th>Baseline as of</th>
<th>1-Year Target (Target by 6/30/17)</th>
<th>3-Year Target (Target by 7/1/19)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zero carbon electricity over total electricity</td>
<td>27.8%</td>
<td>32.8%</td>
<td>49.4%</td>
</tr>
<tr>
<td>(leading)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Metric Tons of CO\textsubscript{2} emitted</td>
<td>114,536*</td>
<td>113,356*</td>
<td>68,541*</td>
</tr>
<tr>
<td>(lagging)</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

*Target is calculated on a CY basis, so won’t be complete until Dec 31 and confirmed mid-year following.
ULT Freezer REBATES!
Replacement or new purchase

$5000 Cash-Back rebates for -80C Freezer Replacements!
$2500 Cash-Back rebate for qualifying new -80C Freezer Purchases!

Labs sought rebates for 29 ULTs saving $165,700 in energy costs over life of each ULT

Closing Fume hoods in when not used (CVRB and Diller)
Annual Projected savings ~$18,000

Be GOOD in the HOOD... and win the fume hood competition!

Shut your sash & panels to SAVE ENERGY & BE SAFE!

Join these universities with good sash etiquette:
- Harvard University
- Massachusetts Institute of Technology
- North Carolina State University
- University of British Columbia
- University of California, Berkeley
- University of California, Davis
- University of California, Irvine
- University of California, Los Angeles
- University of California, Riverside
- University of California, San Diego
- University of California, Santa Barbara
- University of Central Florida
- University of Colorado, Boulder
- University of Toronto

Mar 5- May 5, 2015
First place winners will be recognized at the Living Green Awards Ceremony AND earn a pizza party!

UCSF LivingGreen Contact: sustainability@ucsf.edu
Join our listserv at livinggreen.ucsf.edu