

University of California, Merced

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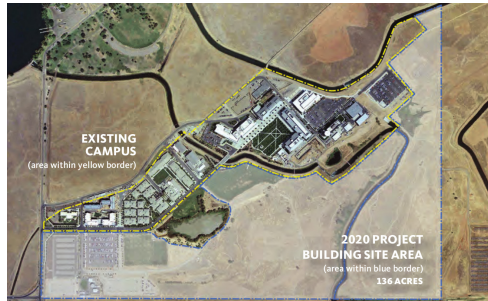
May 15, 2014

The 10th UC Campus



- Founded 2005 starting with 875 students
- Currently 6,200 students

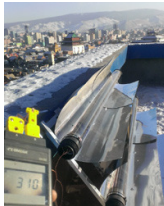
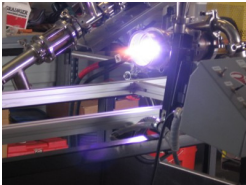
Project 2020



2020 Campus Growth Goals:

- Increase student population from 6,200 to 10,000
- More than double the footprint of the campus
- 110 acres to 246 acres

Living Lab



- Plasma Gasification
- Solar Research
- Sustainability (5,030 acres of protected land with ongoing research)

Living Lab: Building Efficiency



- Research in building controls, efficiency, and fault detection
- Benchmarking Development: UC now moving toward 50% below 1999 levels

Triple Net Zero



By 2020, the campus goal is to achieve:

- Produce as much energy as we consume
- Reduce and offset all green house gas emissions produced
- Divert all waste from landfill

Utility Partnerships

Partnerships are crucial for us to reach our growth, energy, and sustainability goals.



Core Priorities

Priorities where utilities can play a role:

Triple-Net Zero by 2020

- Energy Generation
- Energy Efficiency Projects
- Reduction of Green House Gasses

Water

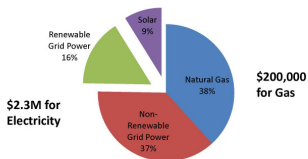
- Reduction and infrastructure support

Support Education and Research

- Proposals and Grants
- Financial Support

Energy Generation & Storage

UCM Energy Breakdown



- Our goal is net-zero energy by 2020
- Currently, campus has a peak demand of 3.5 MW and consumes about 17 MWH
- Inverted load due to our 30,000 ton-hrs of thermal energy storage

Solar



- Currently have a 1 MW PPA through Sunpower
- Final stages of a rooftop solar RFP for 12 buildings (1.5 MW)
- Anticipate 30% of our electric energy will be from solar by end of Spring next year

Fuel Cell



- Plans for RFP in the near future
- Offset load at night
- Net reduction of gas by using the hot water byproduct instead of our boilers
- Strong interest in Bio-gas: UC Merced has committed to purchase 30% Bio-gas

Wind



- Not ideally located for wind, but some potential exists
- Examining options for low wind speeds

Energy Storage



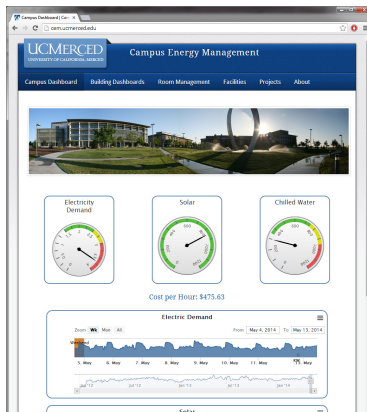
- Currently, we have 30,000 ton-hrs of thermal energy storage
- We have strong interest in battery storage

Ongoing Projects



All our work in energy is done in-house with minimal work by consultants.

- Energy Audits
- Retro Commissioning
- LEED EBOM
- etc.



HVAC Inefficiencies

- HVAC systems often assume maximum occupancy for rooms
- Rooms are often unoccupied or partially occupied
- This assumption leads to inefficient environmental conditioning



Occupancy Controlled HVAC



- Our new Science and Engineering 2 building has occupancy based HVAC control
- We are now planning a retrofit occupancy sensing system for HVAC control in our older Science and Engineering 1 building
- Dynamic Scheduling

Smart Labs



Reduction of air changes based on:

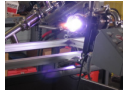
- Occupied/Unoccupied state
- Chemicals detected rather than static set-points

Lighting



- Occupancy sensors
- Daylight sensors
- Better zoning for lighting
- Increased use of task lighting
- Combining DCV, HVAC, and occupancy sensors into control sequence

Education & Research Support



- Unlike established universities, we have a very small alumni base for donations
- Financial support for education and research from companies makes a enormous impact
- Partnerships with utilities for grants is another method of support and can be mutually beneficial

UC Advanced Solar Technologies Institute



UCMERCED

Cal

UCSB

UCDAVIS
UNIVERSITY OF CALIFORNIA

UC San Diego

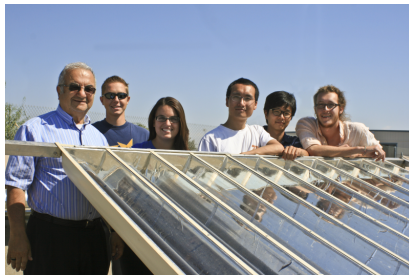
UCIRVINE

UCRIVERSIDE
UNIVERSITY OF CALIFORNIA

UC SANTA CRUZ

UCLA

Merced Irrigation District UC Solar Institute Partnership



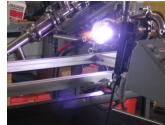
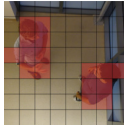
- First public utility to sponsor the University of California Advanced Solar Technologies Institute based at UC Merced

PG&E Service Learning Lab



- \$1,000,000 donation to School of Engineering
- Donation of two natural gas cars

Grants



- We regularly participate in research grants
- We are interested in helping research groups test and apply bleeding edge technology.

Closing

Partnerships are key:

- UC System Partnership
- CalState System Partnership
- Private University Partnership
- Partner and learning from each other for best practices

title I

[DOE, 2011]



DOE (2011).
2010 Building Energy Data Book.
U.S. Dept. of Energy.