Climate Action Master Planning
for colleges and universities

planning and design for consequential climate action

100
12.5
mm tc 02e
Scope 1 and 2 emissions
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600 mm
c02e
19.6 ft
Scope 1 and 2 emissions

Source: Greenhouse Gas Emissions from U.S. Institutions of Higher Education: Copyright 2010 Air & Waste Management Association

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4,250 mm
c02e
121 ft
2005 emissions

Source: Greenhouse Gas Emissions from U.S. Institutions of Higher Education: Copyright 2010 Air & Waste Management Association
**Why colleges and universities**

...activist constituency  
...increasingly committed to climate action  
...have aspirational plans in place  
...first-hand knowledge of uncertainties and risks  
...defined boundaries and facilities portfolios  
...ready to invest  

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**Why climate action master planning**

...sustainability plans tend to be aspirational  
...there is no accounting for growth or for investments in energy efficiency or renewable resources  
...LEED doesn’t serve as a measurable data base, nor are the outcomes necessarily consequential  
...programming and design is demand oriented
Keys to climate action master planning

shift in resources management thinking
from a demand based outcome to the management of a finite supply of resources

finite resources programming
across a portfolio of facilities projects

growth, reconstruction, and renovation as investments
as a means to climate action

advanced design thinking
design excellence as a measure and a means to achieve consequential outcomes

What is climate action master planning

ACTIONS
POMONA COLLEGE
CAMPUS MASTER PLAN

“These recommendations deal with a dream for the future. It is a practical dream.” Myron Hunt, Pomona Bulletin 2008

ASPIRATIONS
**What** a climate action master plan does

...delineates a measurable course for climate action implementation ... with predictable, long-term outcomes

...informs the application of energy resources for zero net or carbon neutrality at a campus scale

...provides a framework for the application of capital resources for energy efficiencies and renewables

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**Planning** the future campus

...campus master planning is the **physical future**

...climate action master planning is the **energy future**
...outline institutional goals and aspirations for climate action

...select a portfolio of projects

...model the application of energy resources

...develop platforms for energy data and management

...initiate advanced design measures

Guidelines for finite, supply driven, energy budgets

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Program energy budgets for portfolio projects

SCIENCE 1 / Millikan Andrew Lab 2016
Reconstruction +13.6KGSF
3.1 BBtu
20 40 60 80 100 120
108
4.2 BBtu

ACADEMIC/SU / PC MUA 2019
Reconstruction +15.9KGSF
124

ATHLETIC/SUR / Rains Center 2019
Reconstruction/Addition +7.7KGSF
3.1 BBtu
60
5.1 BBtu

ASSEMBLY/SUA / Bridges Aud 2025
Reconstruction/Addition +125KSF
100

RR / Mudd/Blais 2020
Renovation
102

R / 2nd Street Res 2020
New
36
1.0 BBtu

Model energy resources and outcomes

select a project portfolio
...29 projects representing 89% of facilities’ fossil fuel use
...new, renovation, reconstruction

define finite energy budgets

test outcomes

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<tr>
<th>Action Date</th>
<th>Building</th>
<th>Program</th>
<th>Year</th>
<th>Total GFF</th>
<th>Elec Use</th>
<th>Gas Use</th>
<th>Total BBtu</th>
<th>New GFF</th>
<th>Change GFF</th>
<th>Program MBtu</th>
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<td>ALL PROJECTS</td>
<td>1,941,800</td>
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<td>121,803,920</td>
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<td>185,910,000</td>
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**Principles** for climate action design

- Program finite energy budgets as a *functional* element
  - A measure of how well a building works
- Design to the energy budget from the beginning
  - Early, whole design decisions have the greatest effect
    - Energy modeling
      - Early and constant
    - User operating manual
- Expand the definitions of design excellence
  - Favoring social, functional, and environmental interests

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**2030 implementation dashboard**

- Add **200K SF**
- Reduce campus EUI **48%**
- Reduce GHG about **50%**
- Invest **$20M** for energy/GHG reductions
- Save **$1.6M/year**
  - Today’s dollars
- Tied “live” to cloud-based energy analytic and management platforms

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Thank you for taking ACTION

...for more information, and to download the energy model template and instructions

email: scott.adc@gmail.com
subject: PERM template