

APRIL 3, 2006

www.time.com AOL Keyword: TIME

SPECIAL REPORT GLOBAL WARMING

TIME

**BE
WORRIED.
BE **VERY**
WORRIED.**

Climate change isn't some vague future problem—it's already damaging the planet at an alarming pace. Here's how it affects you, your kids and their kids as well

EARTH AT THE TIPPING POINT
HOW IT THREATENS YOUR HEALTH
HOW CHINA & INDIA CAN HELP
SAVE THE WORLD—OR DESTROY IT
THE CLIMATE CRUSADERS



VANITY FAIR

SPECIAL
[GREEN
ISSUE]

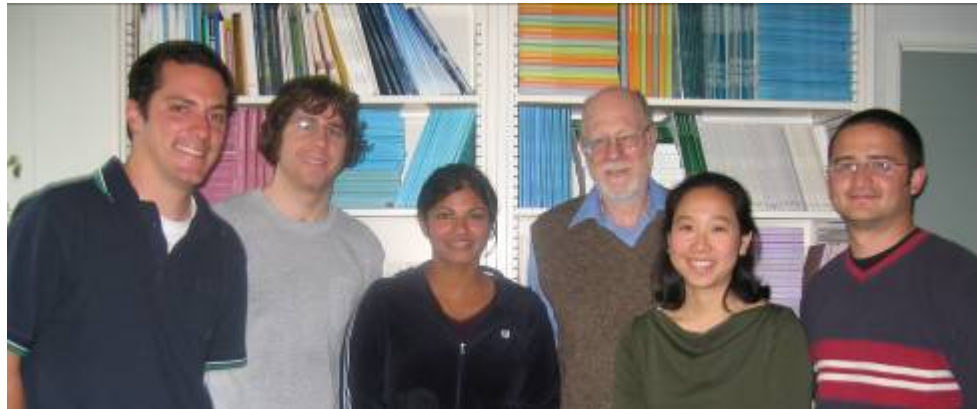
A THREAT
GRAVER THAN
TERRORISM:
GLOBAL WARMING

How much
of New York,
Washington,
and other
American
cities will be
underwater?

GEORGE CLOONEY,
JULIA ROBERTS,
ROBERT F. KENNEDY JR., AND AL GORE
and the call for
**A NEW AMERICAN
REVOLUTION**

PLUS
EXCLUSIVE BOOK EXCERPT!
THE BOSTON STRANGLER
MY MOTHER'S BRUSH WITH DEATH BY SEBASTIAN JUNGER

Changing the Campus Climate: Strategies to Reduce Greenhouse Gas Emissions at UCSB



Jeff Brown, Todd Haurin, Fahmida Ahmed, Betty Seto, David Felix

Advisor: Dr. Oran Young

Sponsor: National Association of Environmental Law Societies

April 19, 2006



Today's Presentation

Background and Significance

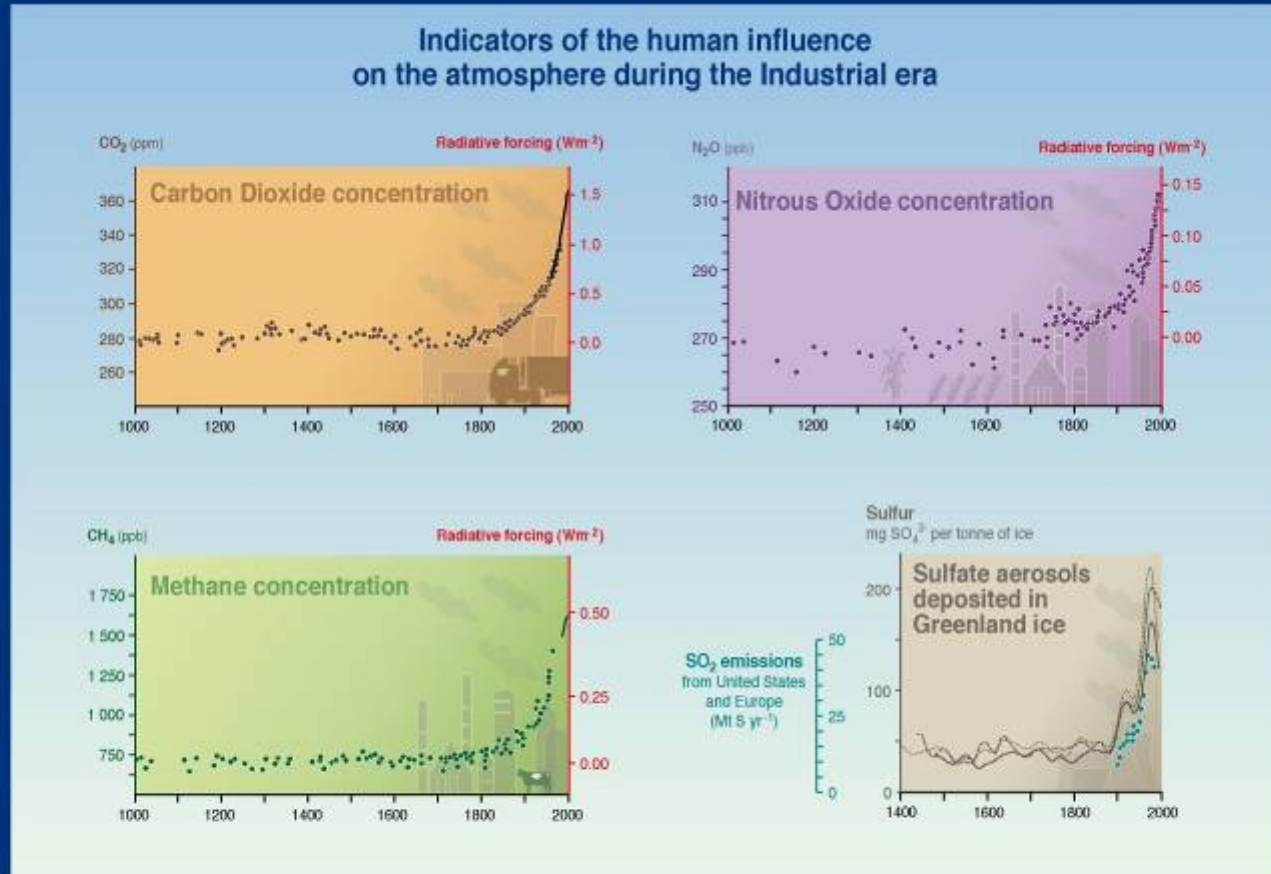
Policy Analysis

Implementation

Recommendations

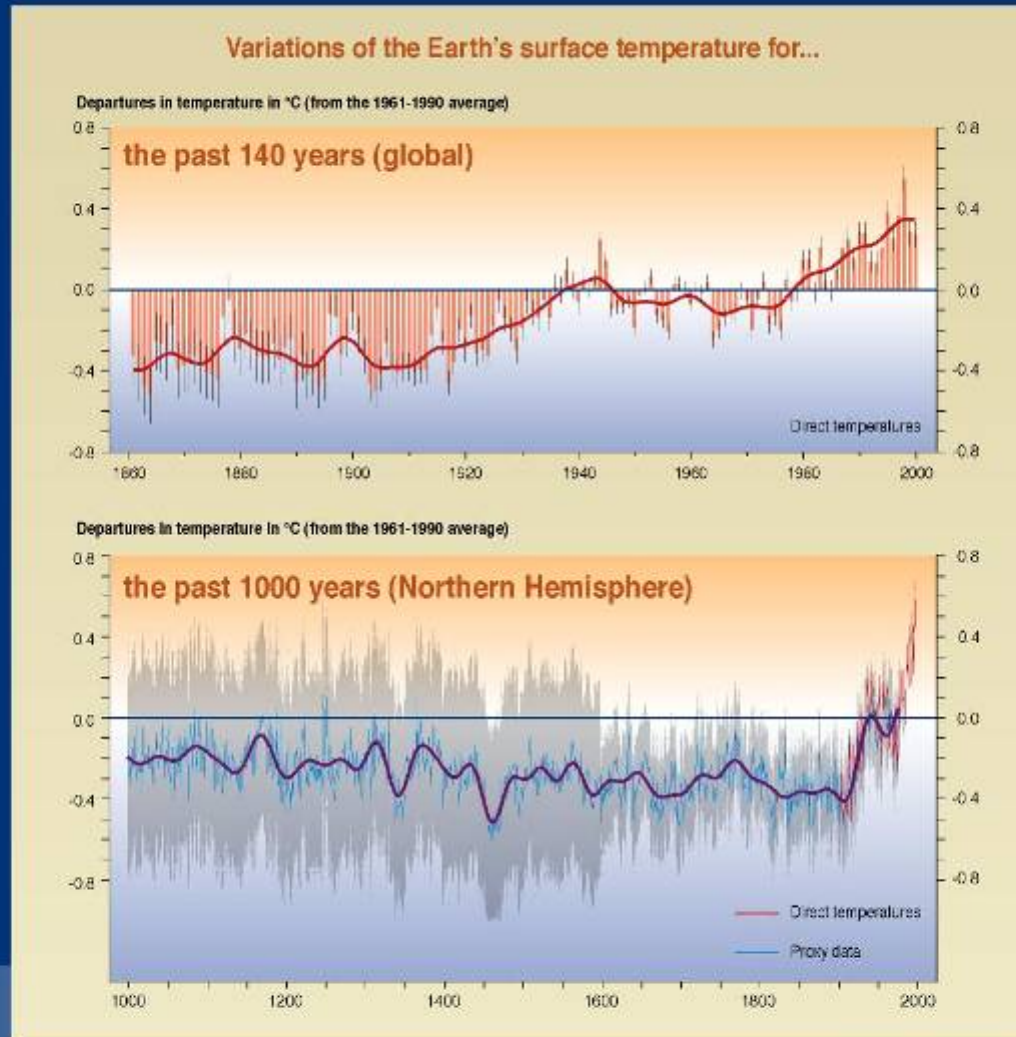
Conclusions

Climate Change Science



SYR - FIGURE 2-1
WG1 FIGURE SPM-2

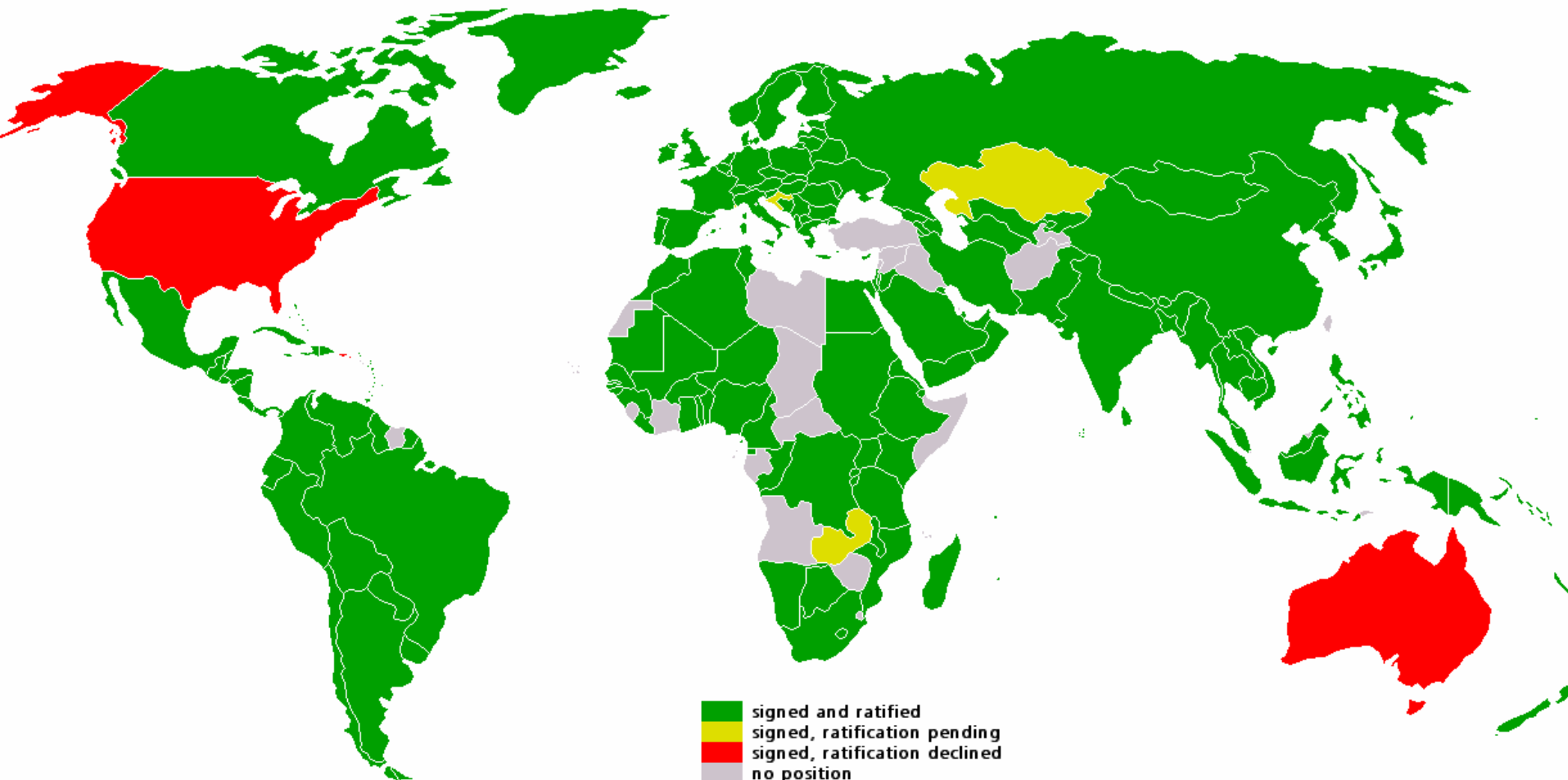
Climate Change Science



SYR - FIGURE 2-3

Action Taken – Worldwide

Kyoto Protocol – 5.2% below 1990 level by 2008-2012



Action Taken - Corporations



TOYOTA



ALCOA



bp



Shell



i n v e n t



LOCKHEED MARTIN



Why UCSB?

- Provide an institutional model for GHG reduction
 - Universities are a significant emission source
 - Over 4,000 US Universities, 16 Million Students*
- Educate tomorrow's leaders
- Prepare for future regulations
- Reinforce strong environmental track record at UCSB
- Save money!

Project Approach

Engage with campus decision makers

- Involving stakeholders
- Establishing credibility and buy-in



Policy Analysis

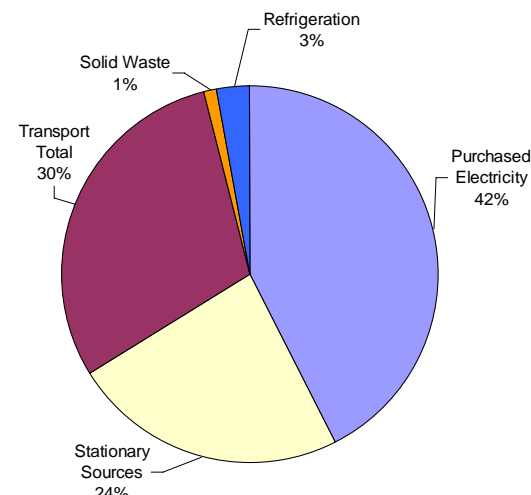
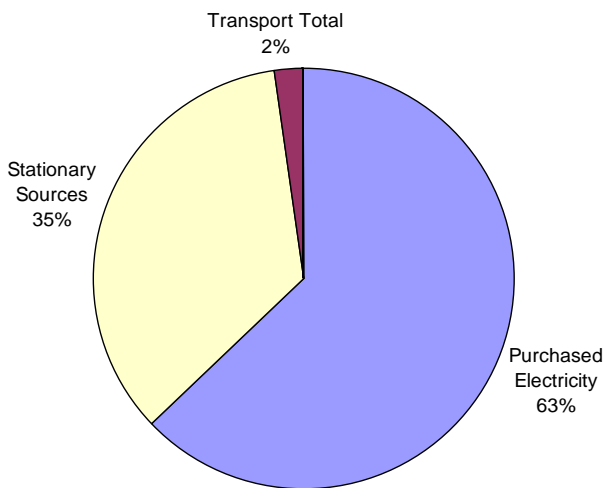
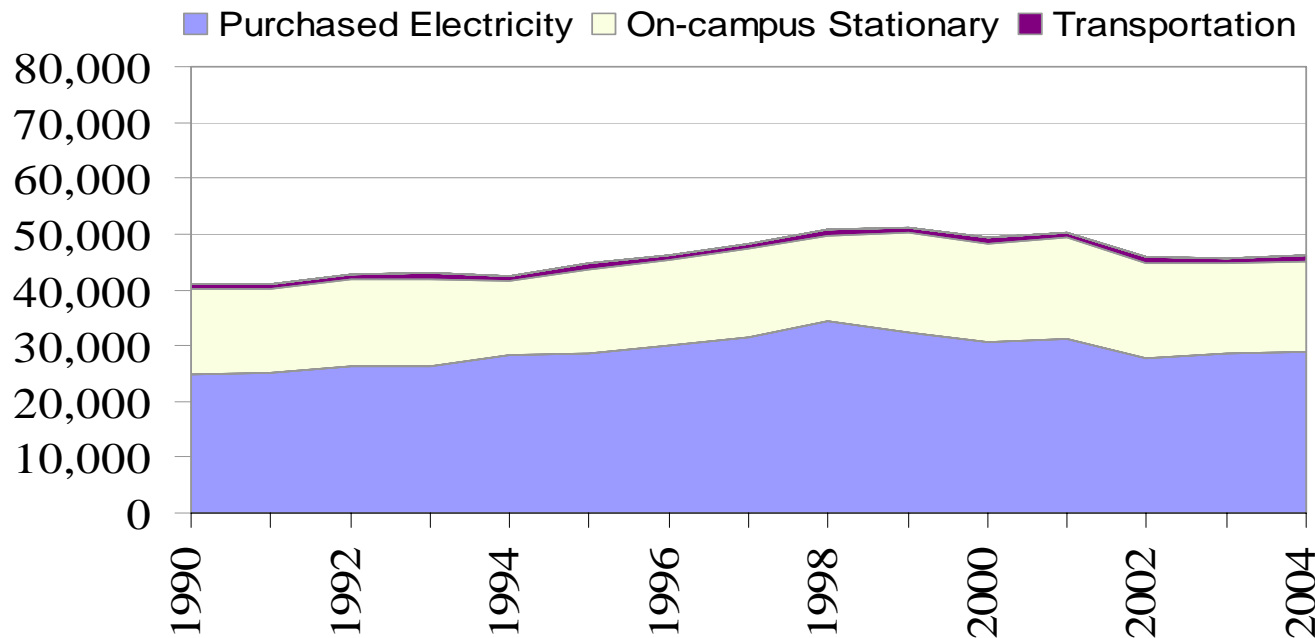
Implementation

- ❑ Inventory GHG emissions
- ❑ Analyze GHG emission targets
- ❑ Evaluate policy options to meet targets

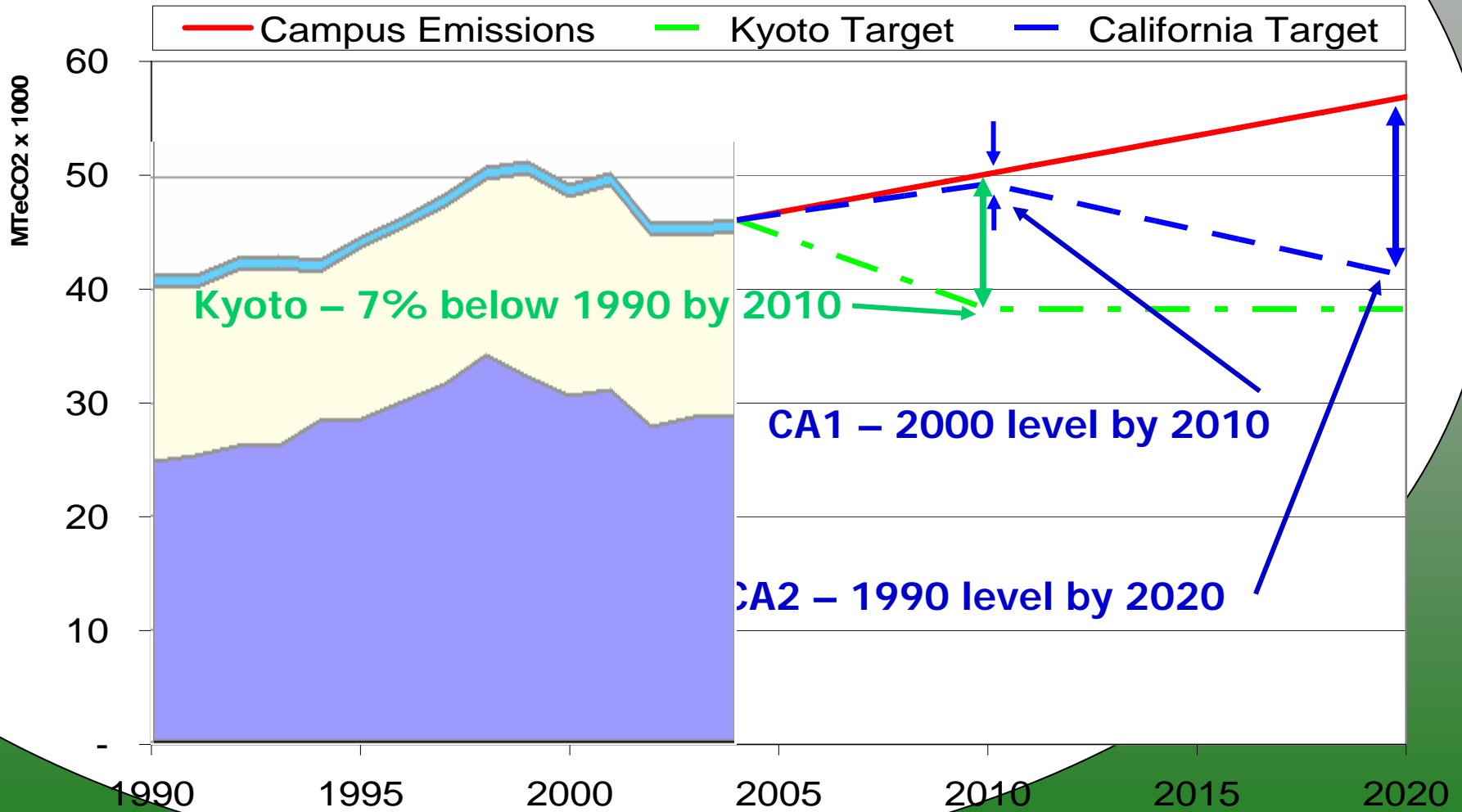
Inventory GHG Emissions



Total Emissions (Metric Tonnes eCO₂)



Kyoto and California Targets for UCSB



Policy Mechanism Examples

- **Electricity & Natural Gas**
 - Energy Efficiency: HVAC & lighting upgrades
 - Energy Conservation: Computer management
- **Transportation**
 - Purchase efficient vehicles, use alternative fuels
- **Indirect**
 - Offsets and Renewable Energy Certificates

Evaluation Criteria

- **Capital Cost, Payback (years), \$/MTCO₂e, GHG Potential (MT)**

Decision Making Criteria

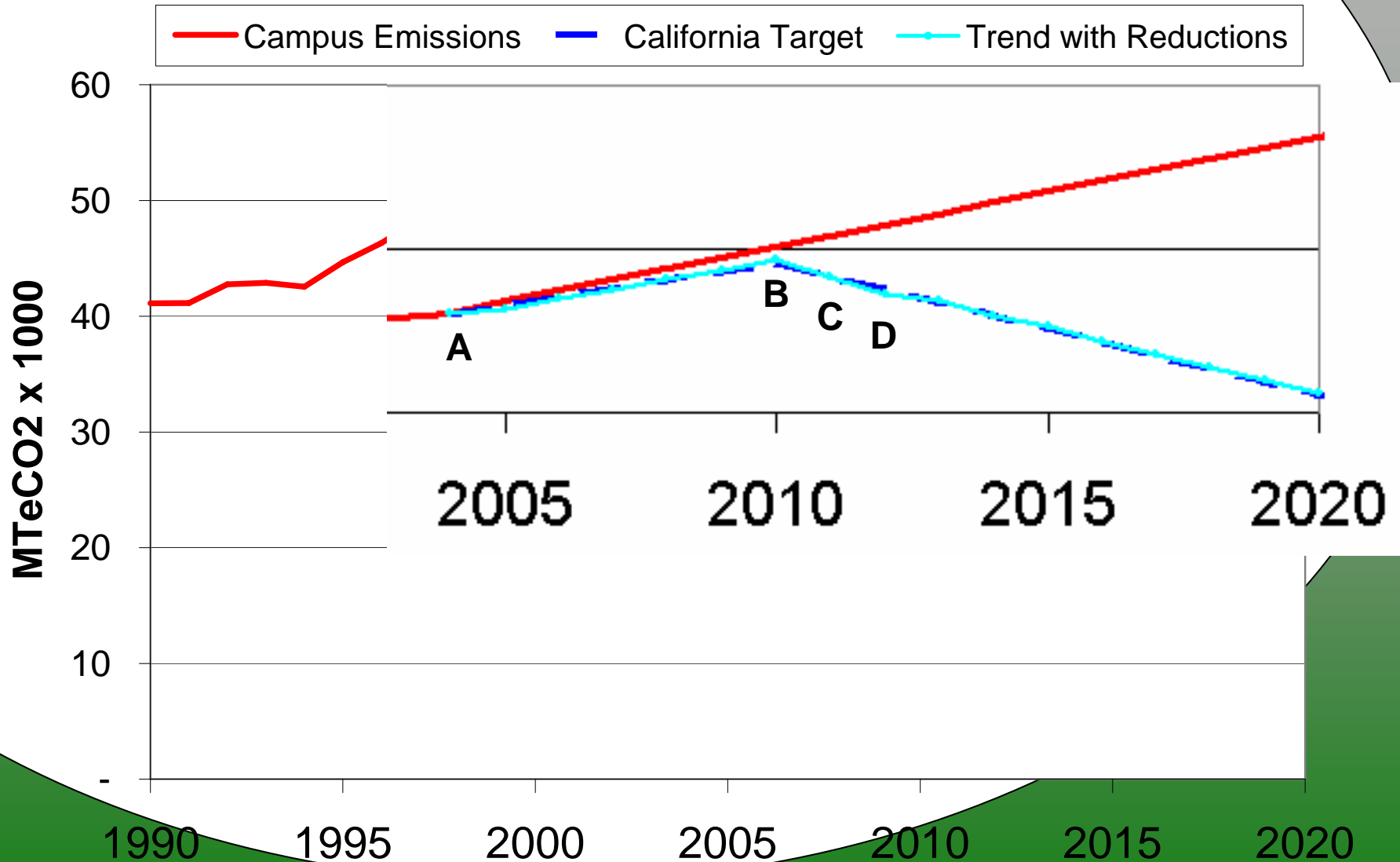
1. Zero cost policies
2. Highest net present value per tonne of GHG
3. Purchase offsets

Implementation schedule depends on target

Policy to Reach California Targets - Schedule

| Year Stage | Mechanisms | Potential MT/year | Capital Cost | NPV/MT | Annual Saving |
|-----------------|-------------------------------|----------------------|--------------|--------|------------------|
| ASAP Stage A | Energy star computer settings | 310 | \$0 | 196 | \$94,000 |
| | Fleet smaller vehicles | 33 | \$0 | 215 | \$9,545 |
| | Fleet ethanol | 1 | \$0 | | \$0 |
| 2011 Stage B | HVAC Upgrade – Air Handlers 1 | 573 | \$200,000 | 245 | \$112,000 |
| | HVAC Commissioning | 340 | \$120,000 | 241 | \$71,159 |
| | HVAC Upgrade – Filters | 607 | \$372,323 | 196 | \$184,053 |
| | EE – Fume Hoods | 55 | \$80,000 | 156 | \$14,298 |
| | Building baseline awards | 14 | \$15,000 | 127 | \$4,385 |
| 2012 Stage C | HVAC Upgrade – Fans | 914 | \$1,574,464 | 125 | \$277,048 |
| | Lighting Upgrades | 835 | \$1,797,762 | 97 | \$252,919 |
| 2013 Stage D | HVAC Upgrade – Air Handlers 2 | 174 | \$550,000 | 42 | \$45,328 |
| | Reduce fleet driving – bikes | 1 | \$2,500 | 11 | \$27 |
| | Begin purchasing offsets | 763 | \$8,091 | -11 | \$0 |

Policy to Reach California Targets

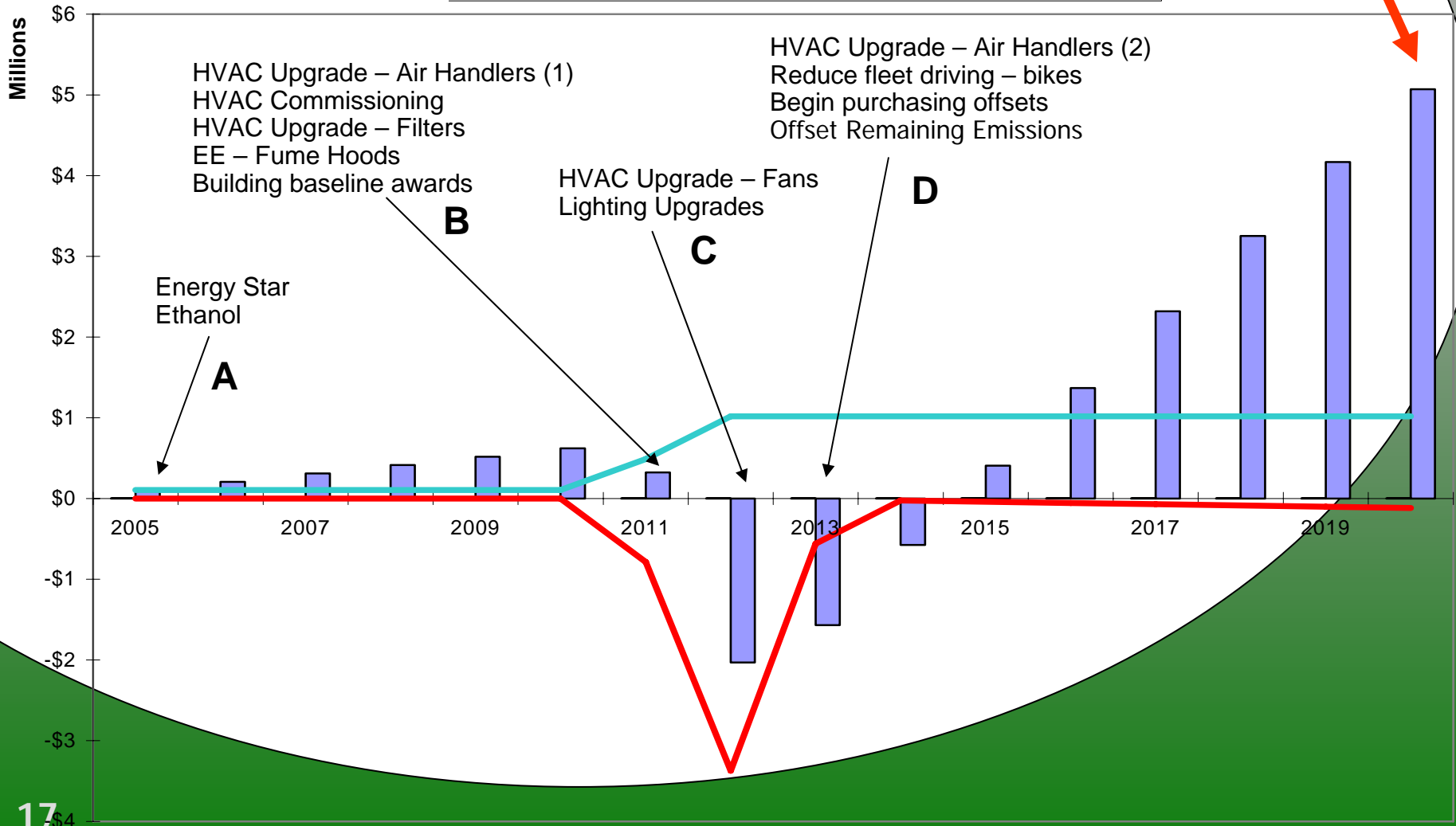


Policy to Reach California Targets – Cash Flow

\$5 Million Saved by 2020

Cash Flow Analysis - California Targets

Cumulative Cash Flow Annual Costs Annual Savings



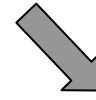
Project Approach

Engage with campus decision makers

- Involving stakeholders
- Establishing credibility and buy-in



Policy Analysis



Implementation

- ❑ Understand decision making at UCSB
- ❑ Identify institutional barriers and strategies to address them

Implementation at UCSB – Simultaneous Analysis and Action

**Formed Partnerships
within UCSB
Sustainability
network**

**Incorporated
GHG emissions
reduction message
into that network**

**Identified
Challenges to
Implementation**

Funding Constraints

- Capital vs Operating Budget
- Capital Project Bidding Process (Bid Reversion)

To Overcome Constraint

- Lobby to State
- Engage with Energy Services Companies
- Seek External Fund Sources
- Match Student Fee

Our contribution –
The Green Initiative Fund (TGIF)



GHG Information Management Constraints

To Overcome Constraint

- Establish a formal Office of Sustainability
- Create an Environmental Information Management System
- Assign Sustainability Coordinators

Our contribution –

UCSB joining the California Climate Action Registry



Institutional Inertia



To overcome constraint

- Chancellor's formal commitment
- Incorporate GHG reduction in the campus plans
- Incorporate GHG reduction in academic curriculum

Our contribution

- ✓ Chancellor's support
- ✓ Incorporation in Campus Sustainability Plan

Our Recommendation for UCSB

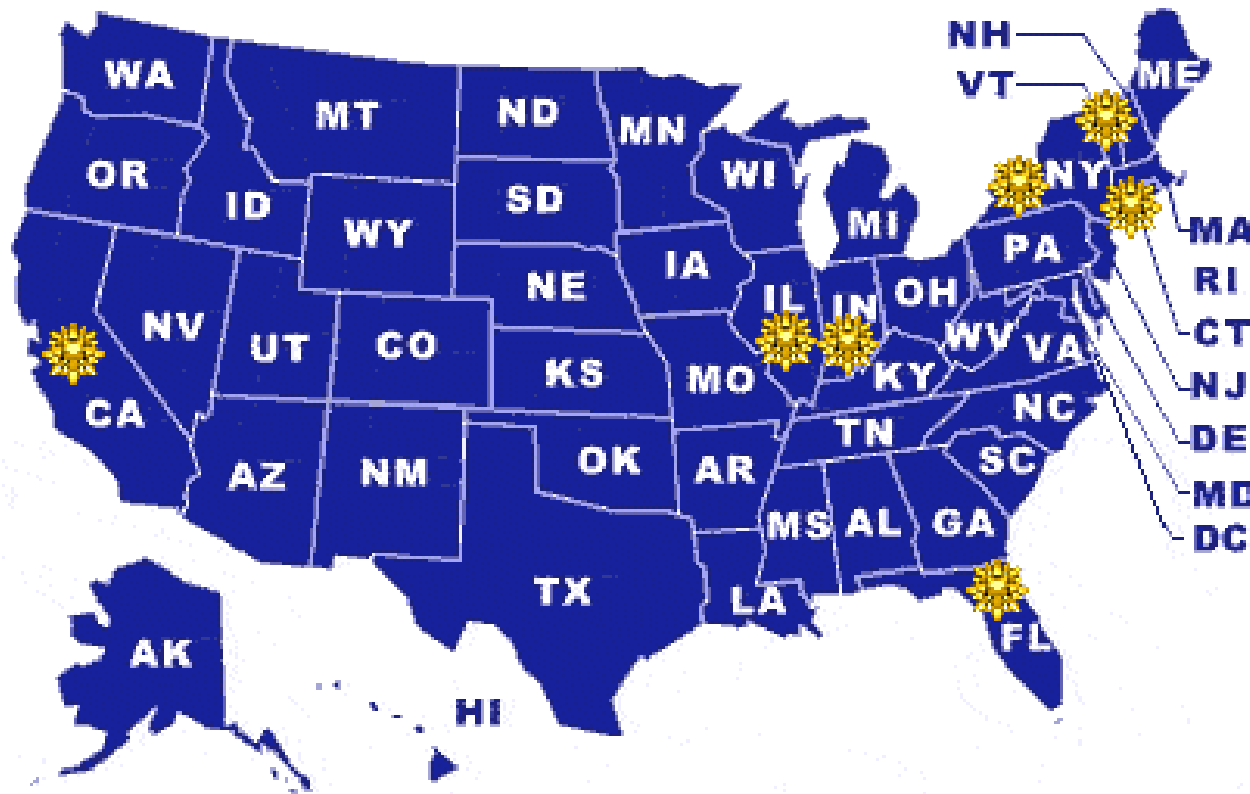
Make a **firm commitment** to meet California's GHG emissions reduction targets:

- ⇒ 2000 emission level by 2010
- ⇒ 1990 emission level by 2020

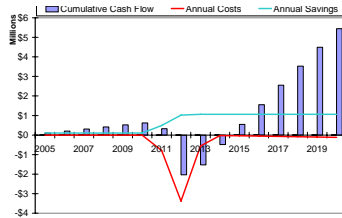
To Meet The Target

- Establish a **formal Office of Sustainability**, and empower it to manage GHG emission information.
- Incorporate GHG emission reduction in long-term **campus planning**.
- Implement **zero cost projects first**, followed by projects with the lowest cost per tonne GHG reduction.
- Identify **additional cost-effective GHG mitigation** opportunities.
- Work with UC Office of the President to press the state legislature to **reform capital and operating budget policy**.

Our Project as a Model



Conclusion



Reaching California targets is feasible at a profit.



UCSB can overcome institutional challenges to expedite implementation.



UCSB can be a prominent leader in climate change mitigation.

California Matters

“California is the 12th largest source of climate change emissions in the world, exceeding most nations. Actions taken in this State make a difference; not only because we are a major contributor to the problem but also because California is known throughout the world as a leader in addressing public health and environmental issues.”

-Executive Summary of the Governor's Climate Action Report, April 3, 2006



Contact us: ccn@bren.ucsb.edu
Homepage: <http://www.bren.ucsb.edu/~ccn/>

Thank you to all who have helped us along the way!

UCSB Staff and Administration:

Jim Dewey, Marc Fisher, George Lewis, Todd Lee, Mo Lovegreen, Gene Lucas, Asger Pedersen, Perrin Pellegrin, Mark Peppers, Tom Roberts, Mark Rousseau, Arjun Sarker, John Behlman, Jamey Wagner and Chancellor Henry Yang.

An aerial photograph of the University of California, Santa Barbara campus. The image shows the university buildings, green spaces, and the coastline with the ocean on the left. The text is overlaid on the top half of the image.

Bren Staff and Faculty:

Dennis Aigner, B.J. Danetra, Maria Gordon, Charles Kolstad, John Melack, Connie Meza, Jill Richardson, David Stoms, Bob Wilkinson and Durwood Zaelke.

UCSB Student Leaders:

Eric Cummings, Logan Green, Katie Maynard & Soumil Mehta

An aerial photograph of Santa Barbara, California, showing the city, coastline, and mountains. The image is darkened to serve as a background for the text.

*Santa Barbara community leaders:
Anna Davidson, Tam Hunt and Nick
Welsh*

Experts:

*Rick Heede, Matt St. Clair and
Rachael Tornek*

*And a special thank you to Dan
Worth, our sponsor and our advisor
Dr. Oran Young.*

