University of Colorado Denver
Climate Action Plan

Prepared by the
Chancellor’s Advisory Task Force on Sustainability
June 2010

Developed as a

SIGNATORY OF
AMERICAN COLLEGE & UNIVERSITY PRESIDENTS’ CLIMATE COMMITMENT
American College and University President’s Climate Commitment (ACUPCC) Requires Signatories to:

- Create a group to coordinate efforts that represents all sectors of campus
- Develop of a Greenhouse Gas (GHG) Inventory
- Develop of Climate Action Plan
- Have ongoing measures of progress
- Periodically report to campus community

Climate Action Plan must include:

- Projects, policies and procedures to reduce emissions
- Target dates for emissions reductions
- Interim targets to track progress
- Actions to make climate neutrality/sustainability a part of the educational experience
- Transparent processes
Framing Climate Action Planning/Sustainability at UC Denver

- American College and University President’s Climate Commitment (ACUPCC)
- Charge to the Chancellor’s Advisory Task Force on Sustainability
- Board of Regent’s Sustainability Resolution (10/09)
- University Planning and Accreditation Committee Strategic Priority 7 - Resource Stewardship
- Greening of State Government Executive Order (D12 07)
Academic and Research Programs

UC Denver has established nationally recognized programs at graduate, undergraduate and professional levels concerned with climate change and general sustainability education and research. These programs have informed the university itself on the need for cross-disciplinary efforts to address challenges.

- College of Architecture and Planning
- Business School
- College of Engineering and Applied Sciences
- College of Liberal Arts and Sciences
- School of Public Affairs
- Colorado School of Public Health
- Colorado Center for Sustainable Urbanism
- IGERT Center for Sustainable Urban Infrastructure
- Downtown Signature Initiative in Sustainability
- Sustainable Campus Program on Auraria

Association for the Advancement of Sustainability in Higher Education (AASHE)

National Conference Denver, CO October 10-12
Baseline Greenhouse Gas Inventory by Scope FY 05/06
(Metric Tons of Carbon Dioxide equivalent gases)

Scope Definitions
• **Scope 1**: Natural Gas/Transport Fuel burned
• **Scope 2**: Electricity Purchased
  • Scopes 1 & 2 required by ACUPCC and relate mostly to energy in campus buildings.
• **Scope 3**: Outside of direct UC Denver control
  • Majority of Scope 3 is commuting

- **Scope 1 & 2** = 112,368 MT/CO$_2$e
- **Scope 3** = 44,998 MT/CO$_2$e
- **Total** = 157,366 MT/CO$_2$e

Typical Denver area home emits about 42 MT/CO$_2$e per year.
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Greenhouse Gas Trajectory - Business as Usual (BAU)

- Assumes that the University makes no GHG reduction efforts
Climate Action Plan targets reducing GHGs by 80% below 2005 – 2006 Baseline by 2050 in 3 phases with an emphasis on a Phase 1 – 20% GHG reduction by 2020.
Phase 1 Goal: 20% GHG Reduction by 2020

Energy efficiency, conservation and small renewable energy installations

- The Phase 1 reduction of 20% in GHG from the 2005/2006 Baseline will be accomplished through incremental reductions in the estimated BAU model
  - 2006 – 2012 Already completed building projects and projects in progress
  - 2010 – 2020 Planned projects and other energy efficiency initiatives
Phase 1 Goal: 20% GHG Reduction by 2020

Actual and Planned GHG Reductions 2006 through 2012

- **GHG Avoidance**: Development of new energy efficient buildings at Anschutz Campus reduces BAU emissions by \( (27,991) \) MT/CO\(_2\)-e
  - Reduces GHG emissions to \( 125,253 \)

Additional Planned GHG Reductions 2010 through 2020

- Total Planned Reductions* = \( (24,338) \)
- Estimated GHG Inventory in 2020 = \( 100,915 \)
- 2020 Goal (20% Total Reduction) = \( 89,631 \)

- **Difference** = \( 11,284 \) MT-CO\(_2\)e

*Planned reductions include: Behavioral conservation, Xcel electric grid changes, IT greening, LEED buildings, Campus energy efficiency projects
Phase 1 Goal: 20% GHG Reduction by 2020

Closing the Gap

Gap of 11,284 MT-CO2e = 15.8 million kWh of electricity
- Equivalent GHG emissions from electricity of 1,377 homes for one year
- Equivalent of electricity produced by 2 large wind turbines in one year
  - 2.5 MW

Direct Reduction Options (Total Cost):
- Geothermal Heating/Cooling: $1,500 per ton of capacity ≈ $4.5 million
- Solar Photovoltaic: $3 - $5 million
- Passive Solar Hot Water: small applications only
- Localized Wind Power: 20, 250kW Turbines, 120 ft high = $12- $14 million

Indirect Reduction Options (Annual Cost):
- Purchased Wind Power = + $251,200 to electricity costs per year
- Renewable Energy Certificates = + $40,022 ($0.00259 p/kWh/year)
- Carbon Offsets = + $225,680 ($20 per ton/year)

Solution will likely be a mix of all of the above
Phase 2 Goal: 50% GHG reduction by 2030

Large-Scale Renewables

This will include the construction of large wind farms & solar energy plants to meet community energy needs. Could also include small-scale nuclear power.
Phase 3 Goal: 80% GHG Reduction by 2050

New and Emerging Technologies

These technologies are only in research and development phases now. This includes technologies such as nuclear fusion & hydrogen energy.
Prioritizing and Funding Reduction Projects

• University will weigh social and potentially mandated requirements for GHG reductions with responsibility as **stewards of public funds**

• **Guidelines for investments** will include project payback, cost avoidance, improved operations and reliability, lifecycle cost and overall benefit to the university

• Funding will come from **various sources**:
  • **Internal** - general fund allocations, user fees, treasury bonds, & development of revolving loan fund
  • **External** - local, state and federal grants, private contributions, third party financing & performance contracting
Measuring Progress

- Task Force will work with the administration to **verify success** at conclusion of projects

- **Data gathered** from projects will be collected, GHG reductions evaluated and emissions projections altered as necessary

- Task Force will provide an **annual report card** on achievement of goals

- Changes to the plan will be **vetted** through university governance groups and executive administration

- **All information shared** on Climate Action Plan webpage on the Sustainability section of the UC Denver website

- **Reports made yearly** to ACUPCC

- **Continued education** on climate plan, progress and campus sustainability
Conclusions

• **University cannot provide a hard date** for complete carbon neutrality: too many variables involved including university growth, revenues, future regulatory frameworks, development of new technologies, etc.

• Must **look at other university initiatives** that could assist with achieving goals

• Vital to **concentrate on the immediate and near future** to reduce GHG emissions and drive trajectory downward

• Significant investments will need to be made to reach 2020 goals. Declining budgets will affect successes in the early years; hope is for state revenues to increase so that these goals can be reached. **Creativity will be vital**

• **Plan will remain a fluid** document that will change as policies, requirements and technologies develop. Adjustments and updates will likely be needed every year, yet, this plan charts a realistic path forward