

# **University of Colorado Denver** **Sustainability and Climate Action** **Planning**



**Chancellor's Advisory Task  
Force on Sustainability**

**April 12, 2010**

# University of Colorado Denver

## Sustainability and Climate Action Planning

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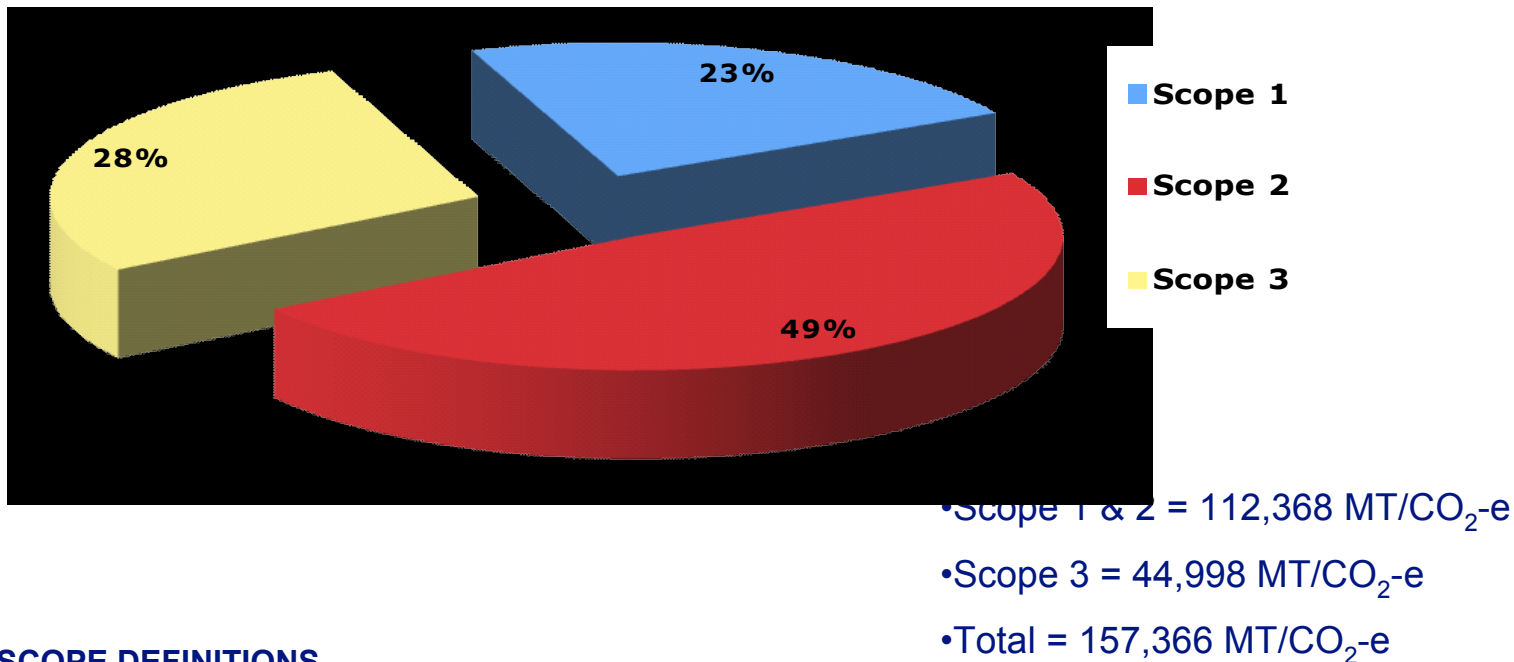
### FRAMING SUSTAINABILITY AND CLIMATE ACTION PLANNING

- AMERICAN COLLEGE AND UNIVERSITY PRESIDENT'S CLIMATE COMMITMENT (ACUPCC)
- CU BOARD OF REGENT'S SUSTAINABILITY RESOLUTION
- UPAC STRATEGIC PRIORITY #7 - RESOURCE STEWARDSHIP
- GREENING OF STATE GOVERNMENT EXECUTIVE ORDER

# University of Colorado Denver

## Sustainability and Climate Action Planning

### Baseline Greenhouse Gas Inventory by Scope FY 05/06 (Metric Tons of Carbon Dioxide equivalent gases)



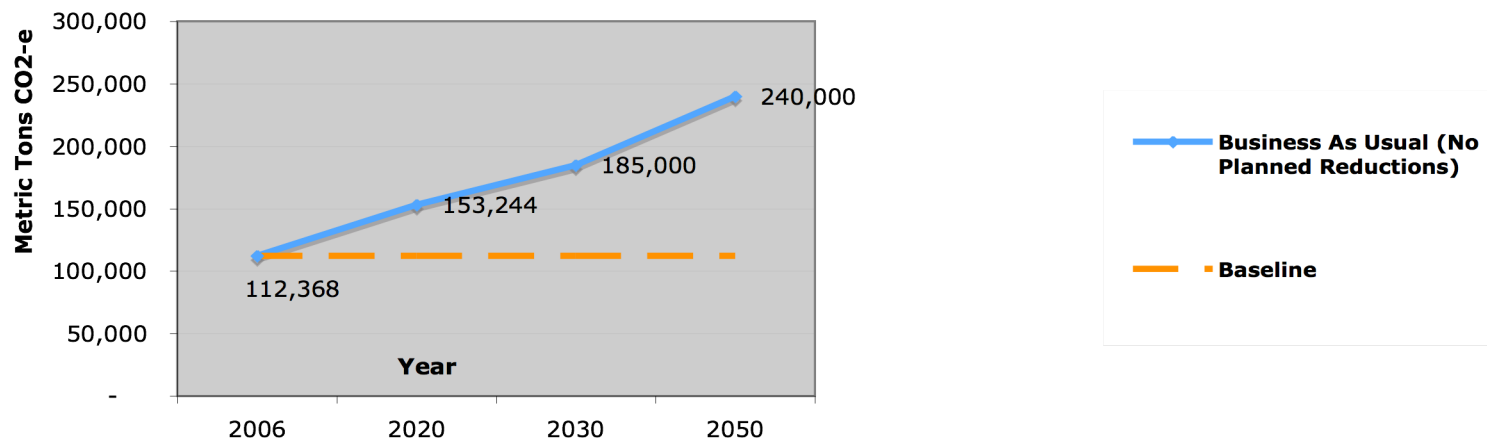
#### SCOPE DEFINITIONS

- 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
  - Allows for more options in reducing total GHGs

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## Sustainability and Climate Action Planning

### Greenhouse Gas Trajectory and Reduction Phases



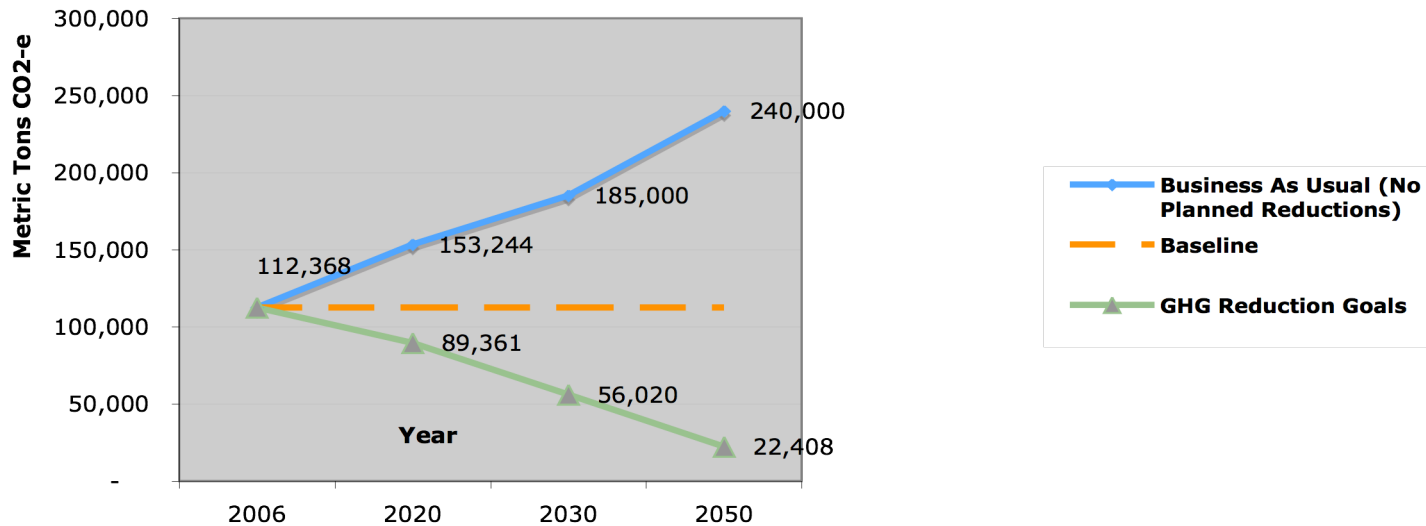
\* Energy Initiatives completed and proposed for new buildings will lower trajectory by 27,991 MT/CO<sub>2</sub>-e

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## Sustainability and Climate Action Planning

### Greenhouse Gas Trajectory and Reduction Phases

Climate Action Plan targets reducing GHGs by 80% in 3 incremental phases over the next 40 years with emphasis on a 20% reduction by 2020

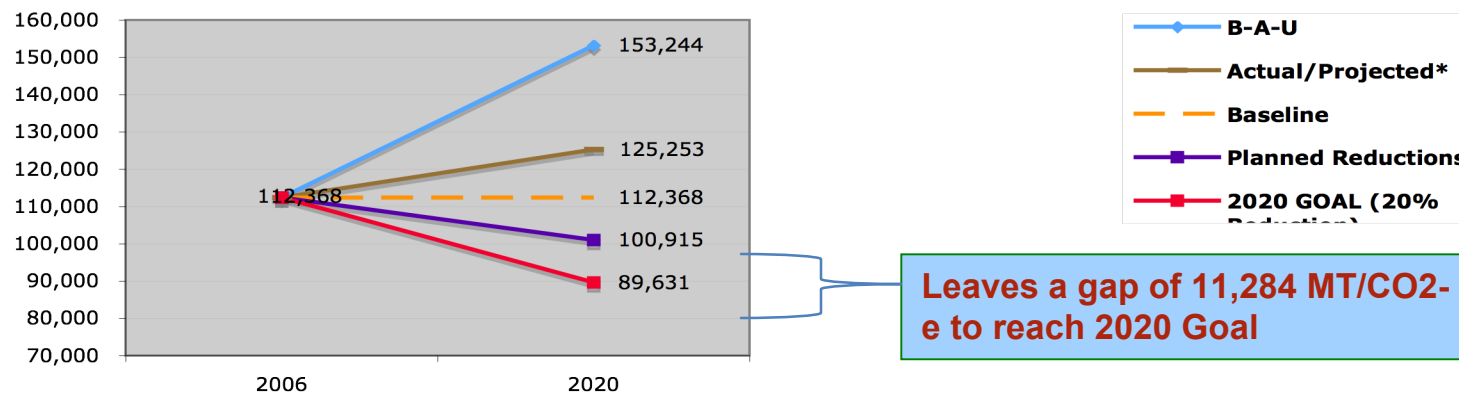


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## Sustainability and Climate Action Planning

### Greenhouse Gas Trajectory and Reduction Phases

#### Phase 1: Energy efficiency, conservation and small renewable energy installations



#### Phase 1 has begun with Energy Efficiency upgrades in Research 1

- All projects completed is will reduce total campus GHGs by 10%
- Funded in part by interest-free Energy Conservation Bonds with a payback in saved energy costs

\* Energy Initiatives completed and proposed for new buildings will lower trajectory by 27,991 MT/CO<sub>2</sub>-e

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## Sustainability and Climate Action Planning

### Greenhouse Gas Trajectory and Reduction Phases

#### GHG Reductions for Phase 1

- **GHG Avoidance:** New buildings (departure from 9th & CO), Efficiency Technologies, Set-point temperature changes = (27,991) MT/CO<sub>2</sub>-e
  - Reduces B-A-U to projected = **125,253**

#### Planned Reductions:

- **Total Planned Reductions = (24,338)**
- **Estimated GHG Inventory in 2020 = 100,915**
- **2020 Goal (20% Reduction) = 89,631**
- **Difference = 11,284 MT/CO<sub>2</sub>-e**

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### Balance of Phase 1: Reaching a 20% Reduction

**Gap of 11,284 MT-CO<sub>2</sub>-e = 15.8 million kWh of electricity**

- Enough electricity to power 1,377 homes for one year
- Equivalent of electricity produced by 2 large wind turbines in one year (2.5 MW)

#### **DIRECT REDUCTION OPTIONS:**

- 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:**

- Purchased Wind Power = + \$251,200 to electricity costs per year
- Renewable Energy Certificates = + \$40,022 (\$0.00259 p/kWh/year)
- Carbon Offsets = + \$112,840 (\$10 per ton/year)

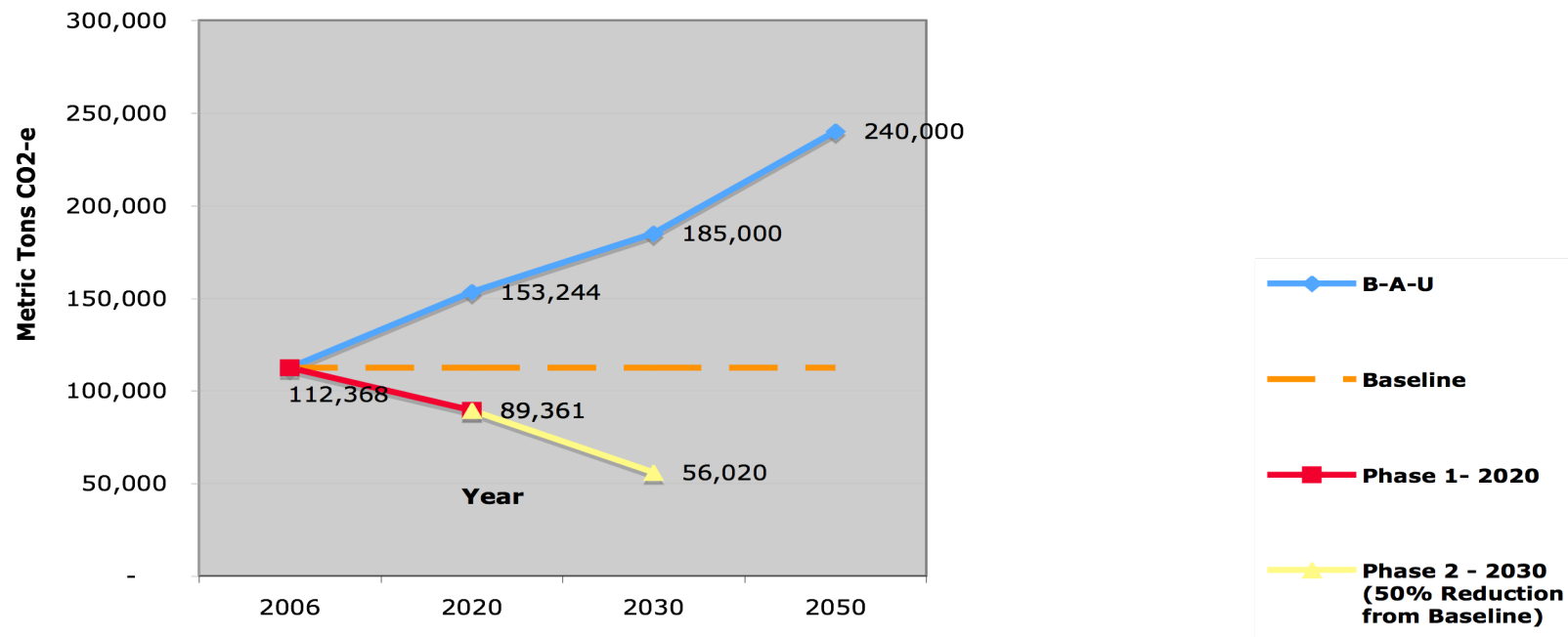


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## Sustainability and Climate Action Planning

### Greenhouse Gas Trajectory and Reduction Phases

#### Phase 2: Large-Scale Renewables



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## Sustainability and Climate Action Planning

### Greenhouse Gas Trajectory and Reduction Phases

#### PHASE 3: New and Emerging Technologies

