

# Greenhouse Gas Emission Inventory for the University of Nevada, Reno



**JOHN C. SAGEBIEL, PH.D., LEED AP**  
**UNIVERSITY OF NEVADA, RENO**  
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# Outline



- **Campus Sustainability Efforts**
- **ACUPCC**
- **GHG Categories**
- **Methodology**
- **Results**



# Campus Sustainability

- Broad-based effort
- Operations and academic efforts
- Education is important
- Want to stay data-driven

The screenshot shows the University of Nevada, Reno's Campus Sustainability website. The header includes the university logo and name, a search bar, and a navigation menu with categories: Home, Campus Sustainability (with sub-items: Food, Energy, Transportation, Recycling, Water), Academics, Sustainability Committee, Presidents Climate Commitment, Academy for the Environment, Resources, Events, and Contact Us. The main content area is divided into three columns: 'WHAT WE'RE DOING', 'GET INVOLVED', and 'FUTURE PLANS'. The 'WHAT WE'RE DOING' section is titled 'Working to Create a More Sustainable Campus' and includes a welcome message and a quote from President Milton Glick. The 'GET INVOLVED' section is titled 'Power down' and includes a quote about energy conservation. A digital display in the bottom right corner shows 'Energy Generated by the Solar Panels on the Joe Crowley Student Union' with a total of 434730 kilowatt hours generated since installation. Below the display, it states 'The Joe is currently generating 10418 watts of energy' and provides a brief explanation of the benefits of solar energy.

University of Nevada, Reno

CAMPUS SUSTAINABILITY

WHAT WE'RE DOING | GET INVOLVED | FUTURE PLANS

Home

Campus Sustainability

- Food
- Energy
- Transportation
- Recycling
- Water

Academics

Sustainability Committee

Presidents Climate Commitment

Academy for the Environment

Resources

Events

Contact Us

**Working to Create a More Sustainable Campus**

Welcome to the University of Nevada, Reno's Campus Sustainability website. We are pleased to have this central location to collect and present the many sustainability activities that are going on around campus.

The University of Nevada, Reno has a strong commitment to sustainability and I personally share this commitment and encourage and support these activities. Our range of sustainability efforts is reflective of the depth and breadth of our University, from the operations to food to academics.

I encourage all members of the University of Nevada, Reno and the local community to join us in our efforts to become a greener campus and community. Look at the website, see what we are doing and come join us - there are many ways to get involved.

Milton Glick  
President, University of Nevada, Reno

**Power down**

For example, if all the world's 1 billion PCs were powered down for just one night - it would save enough energy to light up New York City's Empire State Building - inside and out - for more than 30 years. Source: 1E Energy Awareness Campaign  
[More Tips](#)

Follow:

f t

**Energy Generated by the Solar Panels on the Joe Crowley Student Union**

Total Kilowatt Hours (KWh) Generated Since Installation:

**434730**

The Joe is currently generating **10418** watts of energy

Reducing our carbon footprint and saving money! Each KWh generated reduces CO2 emissions by 1.6 lb AND saves the University \$0.14. As of May 12, 2009 we have saved about 34,000 lbs of CO2 and about \$3,000.



AMERICAN COLLEGE & UNIVERSITY  
PRESIDENTS CLIMATE COMMITMENT



The fight against global warming will shape the 21st century.

# The American College & University Presidents Climate Commitment

*Climate Leadership in Higher Education*

“The crisis we face is first and foremost one of the mind, perception and values; hence, it is a challenge to those institutions presuming to shape minds, perceptions and values. It is an educational challenge.”- David Orr, 1992

# What is the ACUPCC?

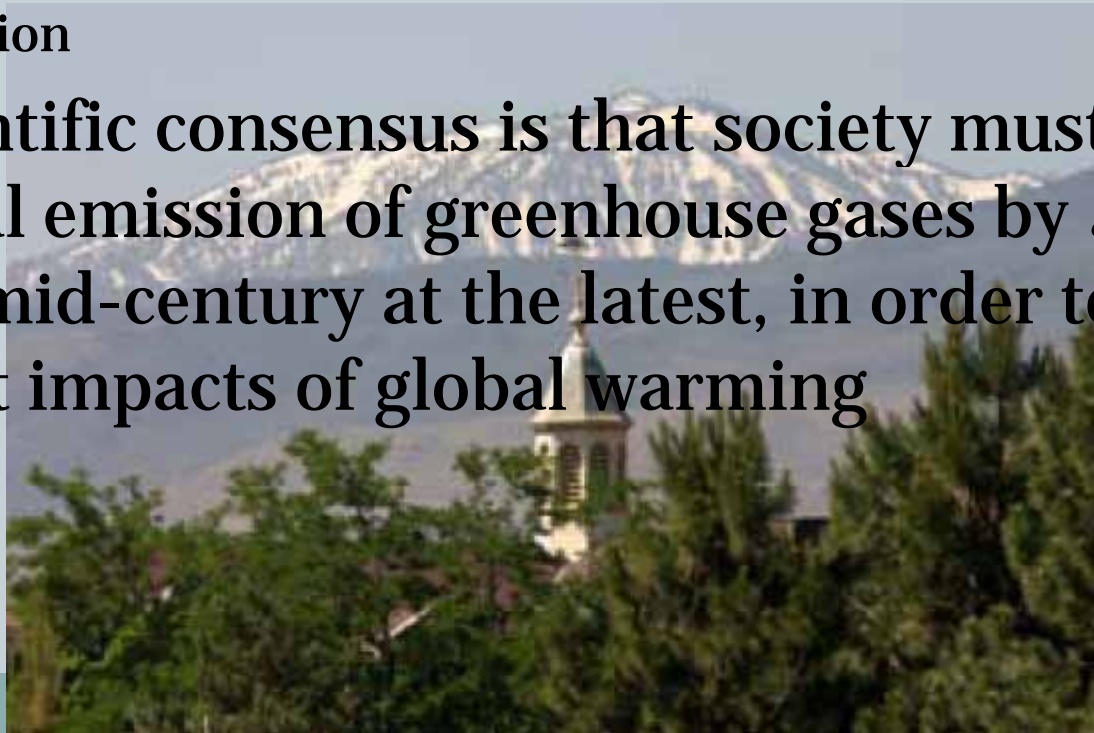


- “high-visibility effort to address global warming by garnering institutional commitments to neutralize greenhouse gas emissions, and to accelerate the research and educational efforts of higher education to equip society to re-stabilize the earth’s climate”
- Provides a framework and support for institutions
- UNR signed in Spring of 2007
- Currently, 650 signatories across the country

# What is Climate Neutrality?



- **Total net GHG emissions = 0**
  - Implementing ways to reduce specific emissions
    - ✦ Small and large scale reductions
    - ✦ Investing in renewable energy
    - ✦ Education
- **The scientific consensus is that society must reduce the global emission of greenhouse gases by *at least 80%* by mid-century at the latest, in order to avert the worst impacts of global warming**



# ACUPCC Steps



1. ✓ Establish a structure to address our emissions
2. ✓ Take interim steps- tangible actions
3. ✓ Report a complete greenhouse gas inventory (Due Sep 08)
4. Develop a plan to become climate neutral (Due Sep 09)

# ACUPCC Tangible Actions

(must complete 2/7)



1. Establish a policy that all new campus construction will be built to at least the U.S. Green Building Council's LEED Silver standard or equivalent.
2. Adopt an energy-efficient appliance purchasing policy requiring purchase of ENERGY STAR certified products in all areas for which such ratings exist.
3. Establish a policy of offsetting all greenhouse gas emissions generated by air travel paid for by our institution.
4. Encourage use of and provide access to public transportation for all faculty, staff, students and visitors at our institution.

## Tangible Actions (cont'd)



5. Within one year of signing this document, begin purchasing or producing at least 15% of our institution's electricity consumption from renewable sources.
6. Establish a policy or a committee that supports climate and sustainability shareholder proposals at companies where our institution's endowment is invested.
7. Participate in the Waste Minimization component of the national RecycleMania competition, and adopt 3 or more associated measures to reduce waste.

# UNR's Actions (4/7)



- **Establish a policy that all new campus construction will be built to at least the U.S. Green Building Council's LEED Silver standard or equivalent.**
  - Already in place
- **Adopt an energy-efficient appliance purchasing policy requiring purchase of ENERGY STAR certified products in all areas for which such ratings exist.**
  - Completed
- **Encourage use of and provide access to public transportation for all faculty, staff, students and visitors at our institution.**
  - Discounted bus pass, carpool stickers, bike lockers, support Sierra Spirit bus.
- **Participate in the Waste Minimization component of the national RecycleMania competition, and adopt 3 or more associated measures to reduce waste.**
  - In place, and improving.

## Inventory – Why?



- You can't manage what you don't measure.
- Will give us a more complete picture of UNR carbon footprint
- Will be able to focus on target areas where we can improve our impact

# GHG Inventory



- **Method- using the suggested Clean Air Cool Planet Campus Carbon Calculator**
- **Campus Calculator provides step by step instructions and suggestions on where and who to obtain the information from**
- **Outlines 9 different categories where data must be collected**

# Categories



- **Budget**
  - operating budget, research dollars and energy budget.
- **Energy**
  - campus sources (all fuels), electricity and steam/ chilled water.
- **Transportation**
  - university fleet fuel consumption.
- **Commuter traffic**
  - estimate the number of annual miles traveled by faculty, staff and students during their commute for one year.
- **Air travel**
  - number of miles traveled by faculty, staff and students for institutional activities. This includes athletics and student groups.

## Categories (cont'd)



- **Agriculture**
  - headcounts of livestock on university land and fertilizer type and amount applied.
- **Solid waste**
  - amount of solid waste generated by the university and what type of landfill it is sent to.
- **Refrigeration**
  - HFCs and PFCs emitted
- **Offsets**
  - forest lands, composting or TRECs purchased.

# GHG Inventory Results



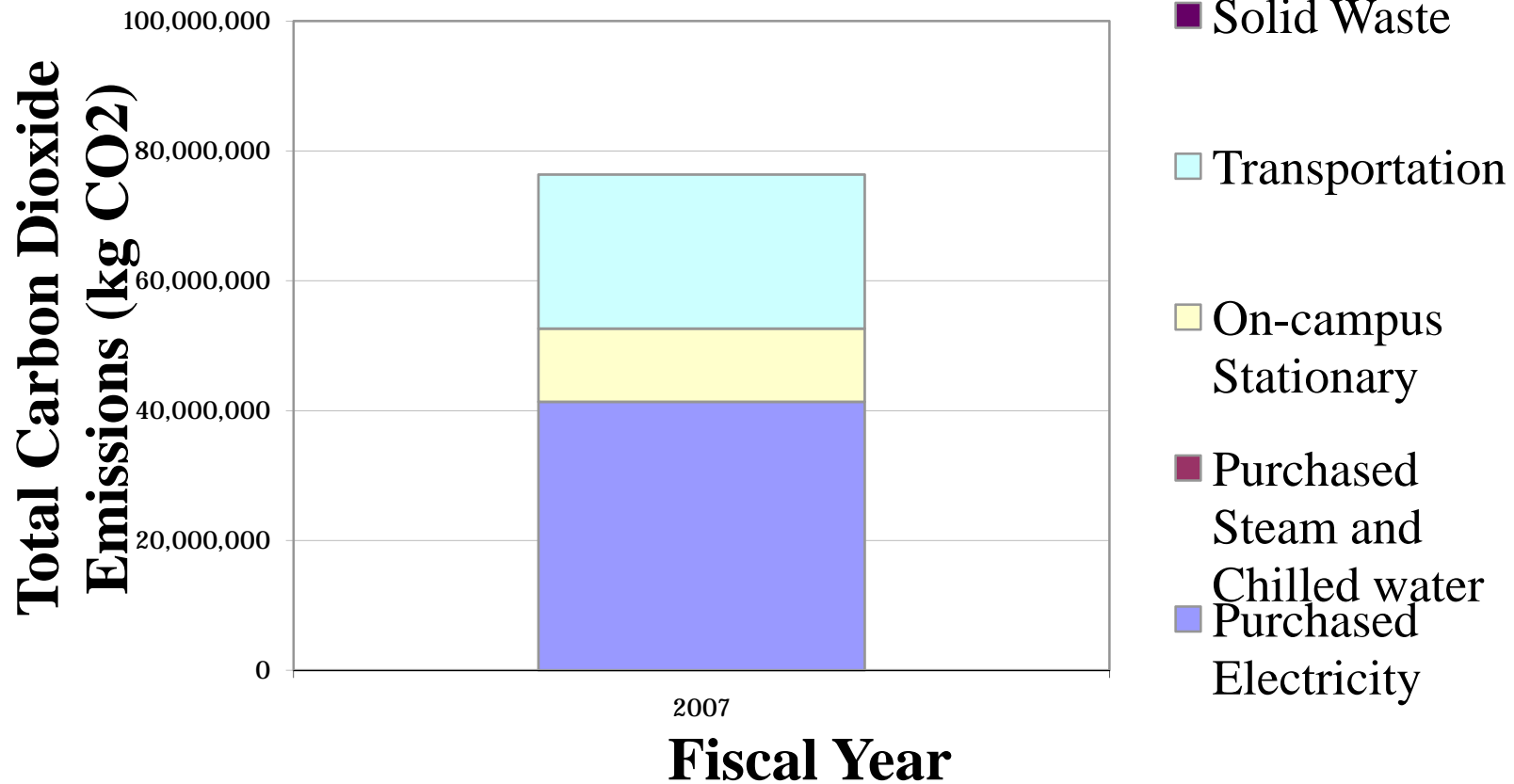
- **Scope 1- Direct emissions from sources owned or controlled by UNR (eCO<sub>2</sub> = metric tons, CO<sub>2</sub> equivalents)**
  - **Energy**
    - ✦ On-Campus Thermal- 11,300 eCO<sub>2</sub> (13.2%)
  - **Transportation**
    - ✦ University Fleet- 1,259 eCO<sub>2</sub> (1.5%)
  - **Agriculture**
    - ✦ Livestock & Fertilizer- 785 eCO<sub>2</sub> (0.9%)
  - **Refrigerants**
    - ✦ 1,014 eCO<sub>2</sub> (1.2%)

# Results (cont'd)

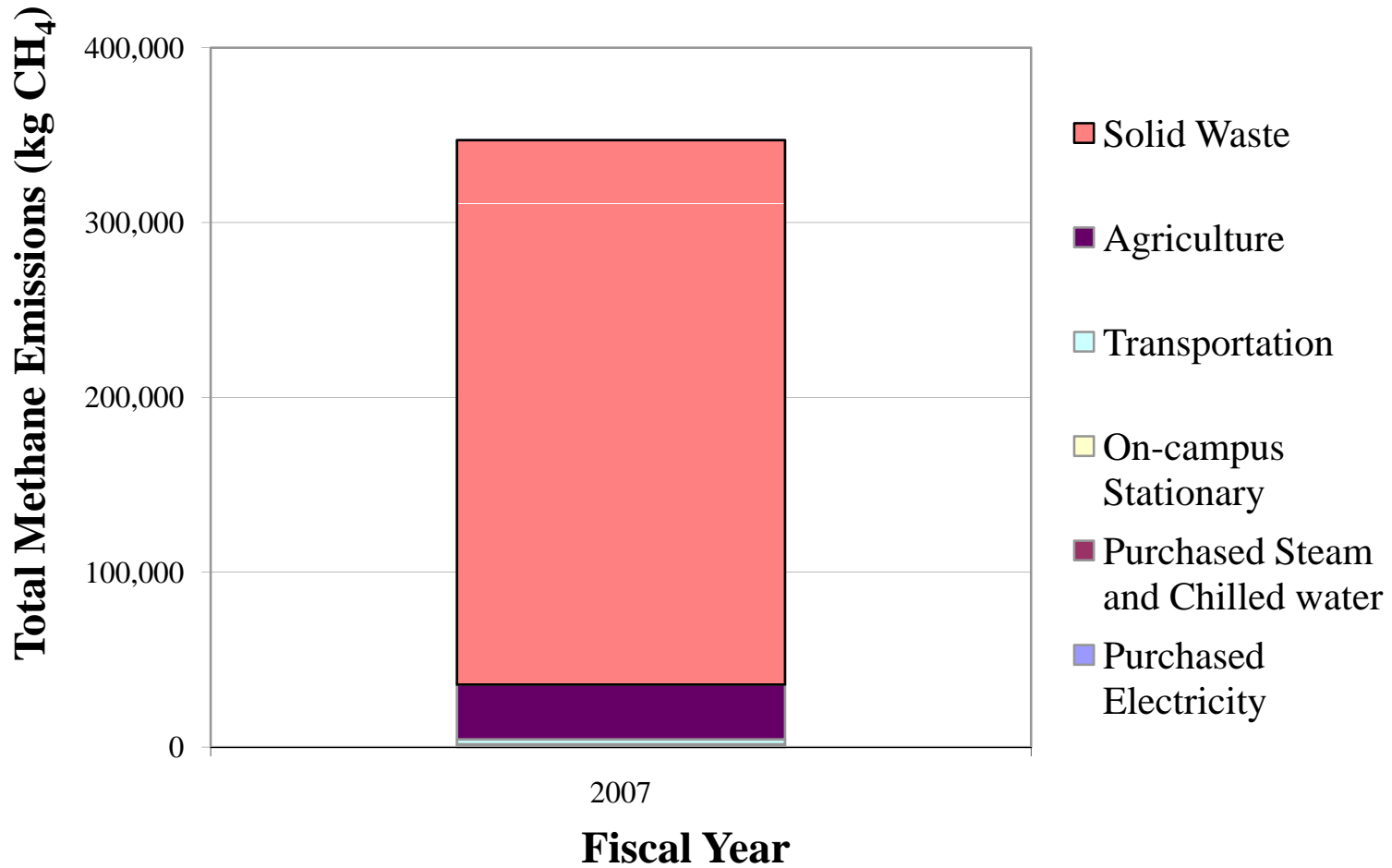


- **Scope 2- Indirect emissions generated by the production of electricity**
  - **Energy**
    - ✦ Electricity- 41,536 eCO<sub>2</sub> (48.4%)
- **Scope 3- All other indirect emissions resulting from the activities of UNR**
  - **Commuter Travel**
    - ✦ Student Travel- 8,177 eCO<sub>2</sub> (9.5%)
    - ✦ Faculty/Staff Travel- 4,841 eCO<sub>2</sub> (5.6%)
  - **Air Travel**
    - ✦ Faculty/Staff & Student Travel- 9,828 eCO<sub>2</sub> (11.4%)
  - **Solid Waste**
    - ✦ Landfill w/ no CH<sub>4</sub> recovery- 7,161 eCO<sub>2</sub> (8.3%)
- **Total: 85,901 mT**

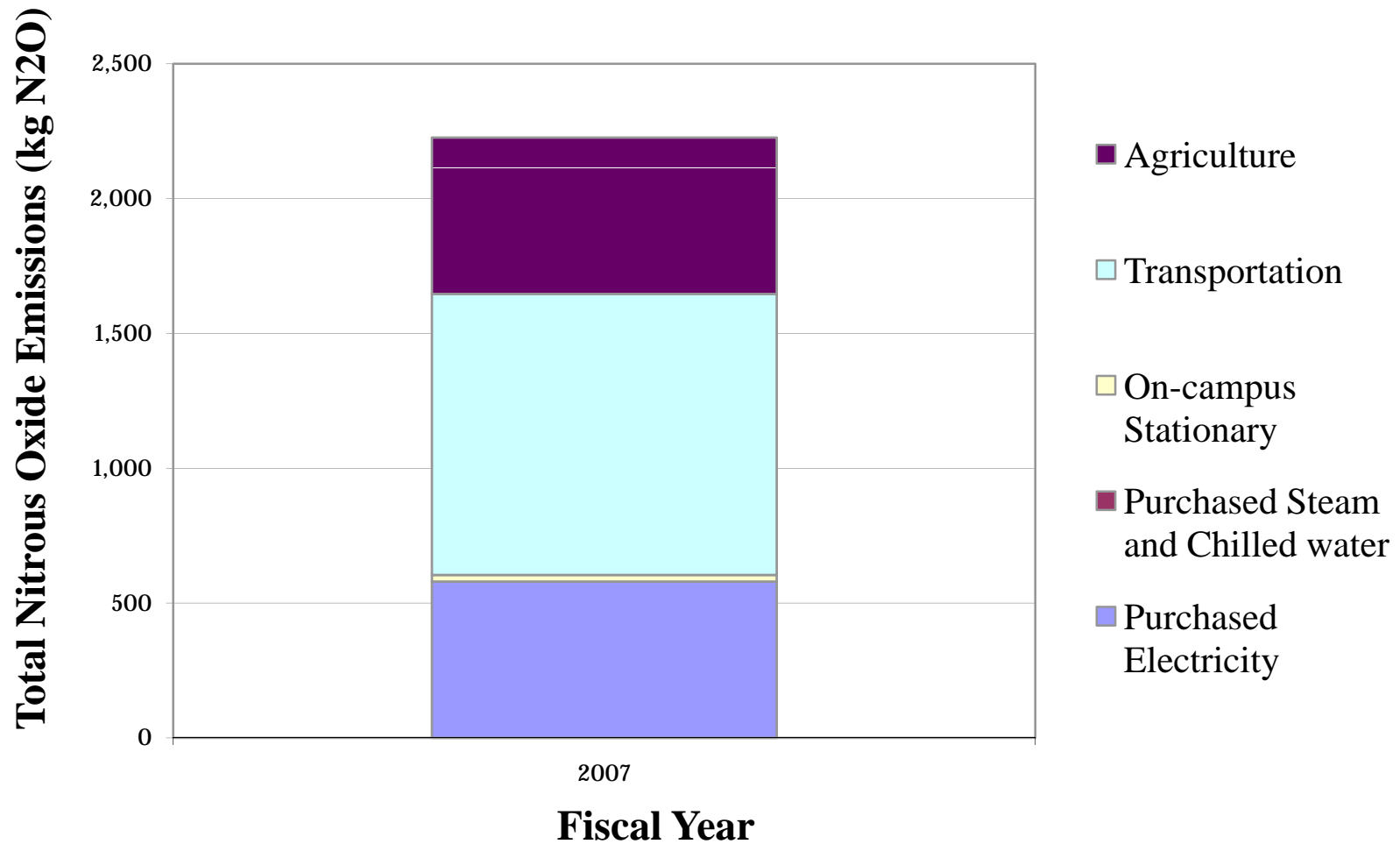
# GHG Emissions By Sector



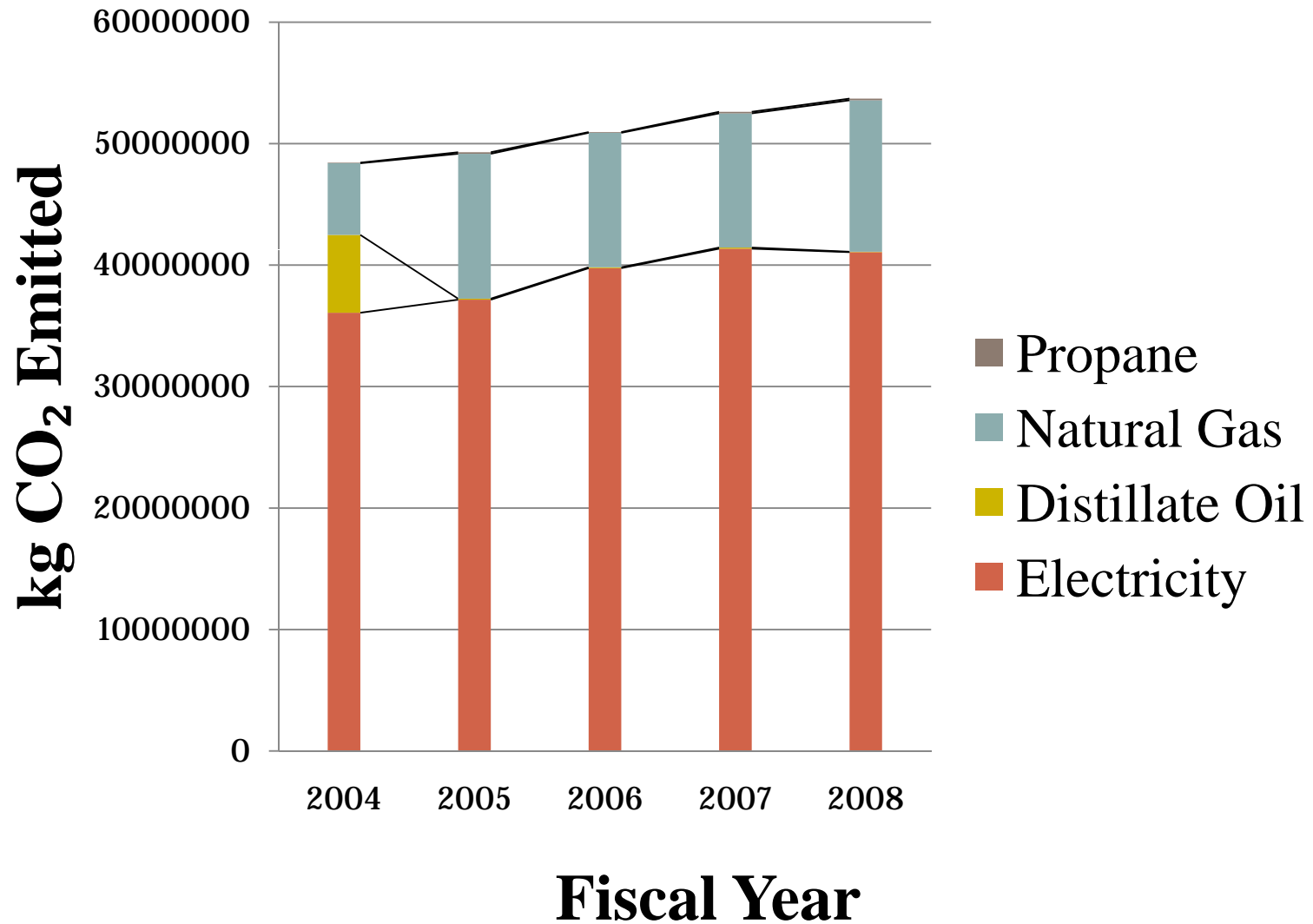
# Methane Emissions by Sector



# Nitrous Oxide by Sector



# Historical GHG By Sector



# Data Sources



- Bills (electricity, nat. gas, propane, distillate oil, fleet gas & diesel, trash)
- Purchase records (fertilizer, refrigerants)
- Travel Office (air travel)
- Parking and Transportation (commuter data, see next slide)

# Challenges – Commuter Travel



- **Commuter Traffic:**
  - Obtained database of parking permit holders zip codes
  - Estimated average distance to each zip code
  - Separated Faculty, Staff, & Students
  - Created trip/week frequency distribution for each category
  - Scaled up based on actual headcounts (vs. #permits)
  - Calculated total distance driven by all commuters
  - Clearly, this is an estimate



# Challenges – Air Travel



- **Air Travel:**
  - Obtained database of origin and destination airport code.
  - Sorted for frequency count data
  - Distance from webflyer.com
  - Totals calculated

# Next Steps – Reductions



- New buildings are very efficient
- Lighting retrofit work continuing
- Renewable energy projects
- Trash reduction efforts
- Using the inventory to target areas for improvement



# Other Efforts



- Sustainability Committee
- Target areas (working groups):
  - Energy
  - Transportation
  - Campus Life (includes food)
  - Curriculum



# Thank You



- Lots to do...
- but much accomplished

