Grinnell College's Response to Climate Change

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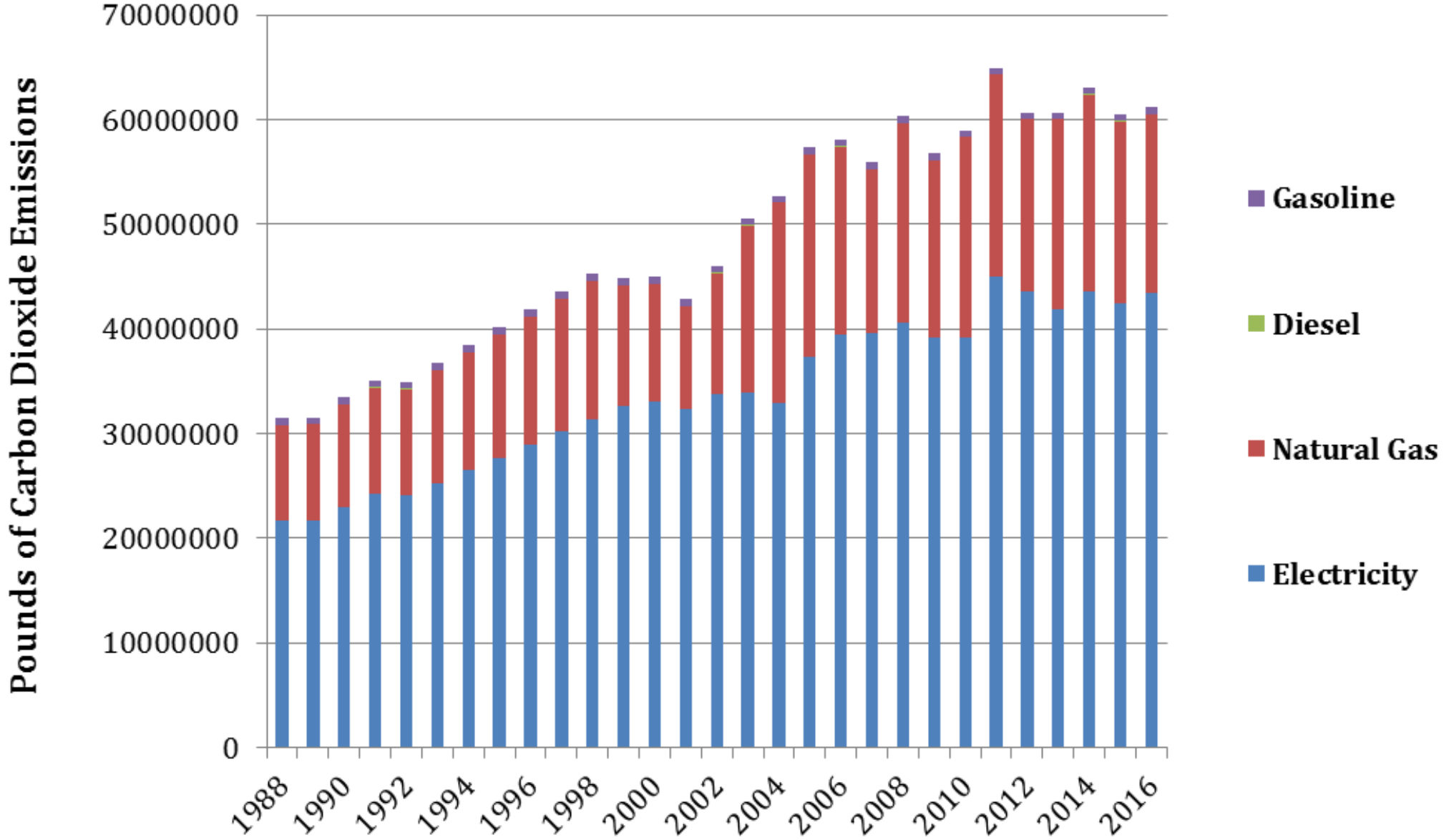
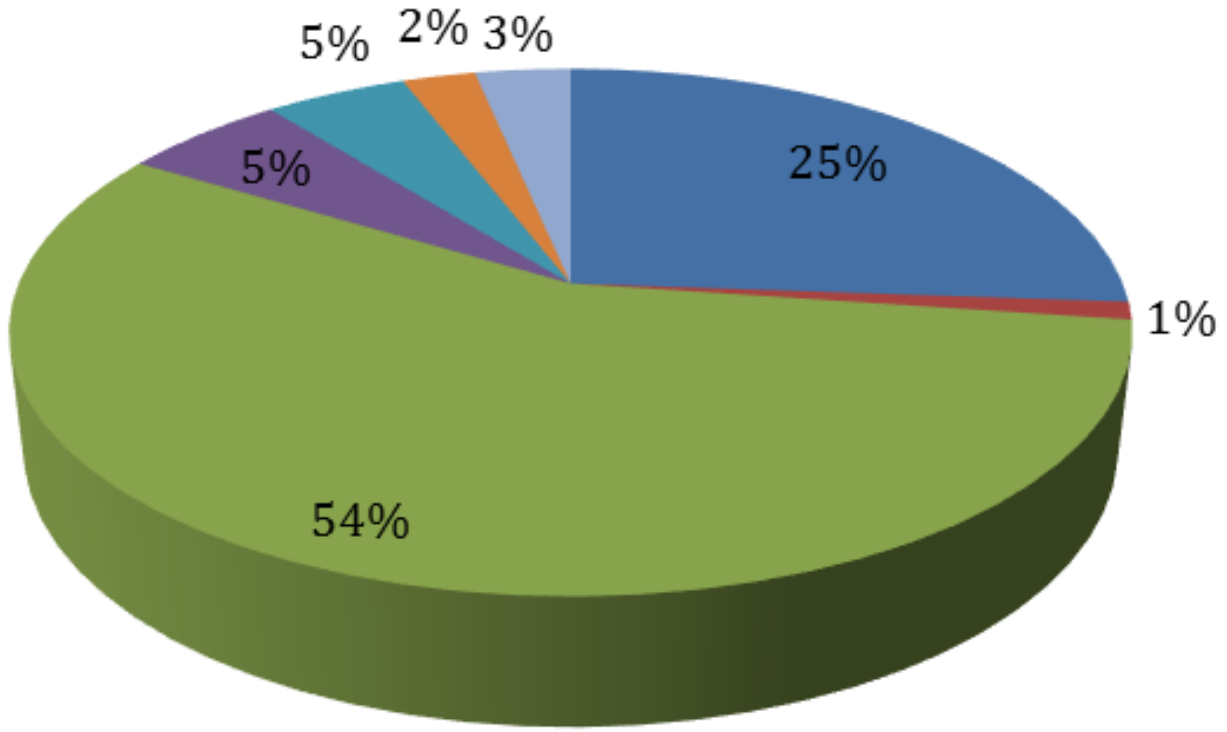
Talk Outline

1. Grinnell College's contribution to climate change
    1. Campus emissions & fuel sourcing
    2. How energy moves around campus
2. Steps we have taken to reduce our carbon footprint
3. The Grinnell College Sustainability Plan
    1. Overall Plan
    2. Energy, Emissions, & Construction Standards
    3. Follow-on actions
4. An exciting possibility for the future: Trusted Energy

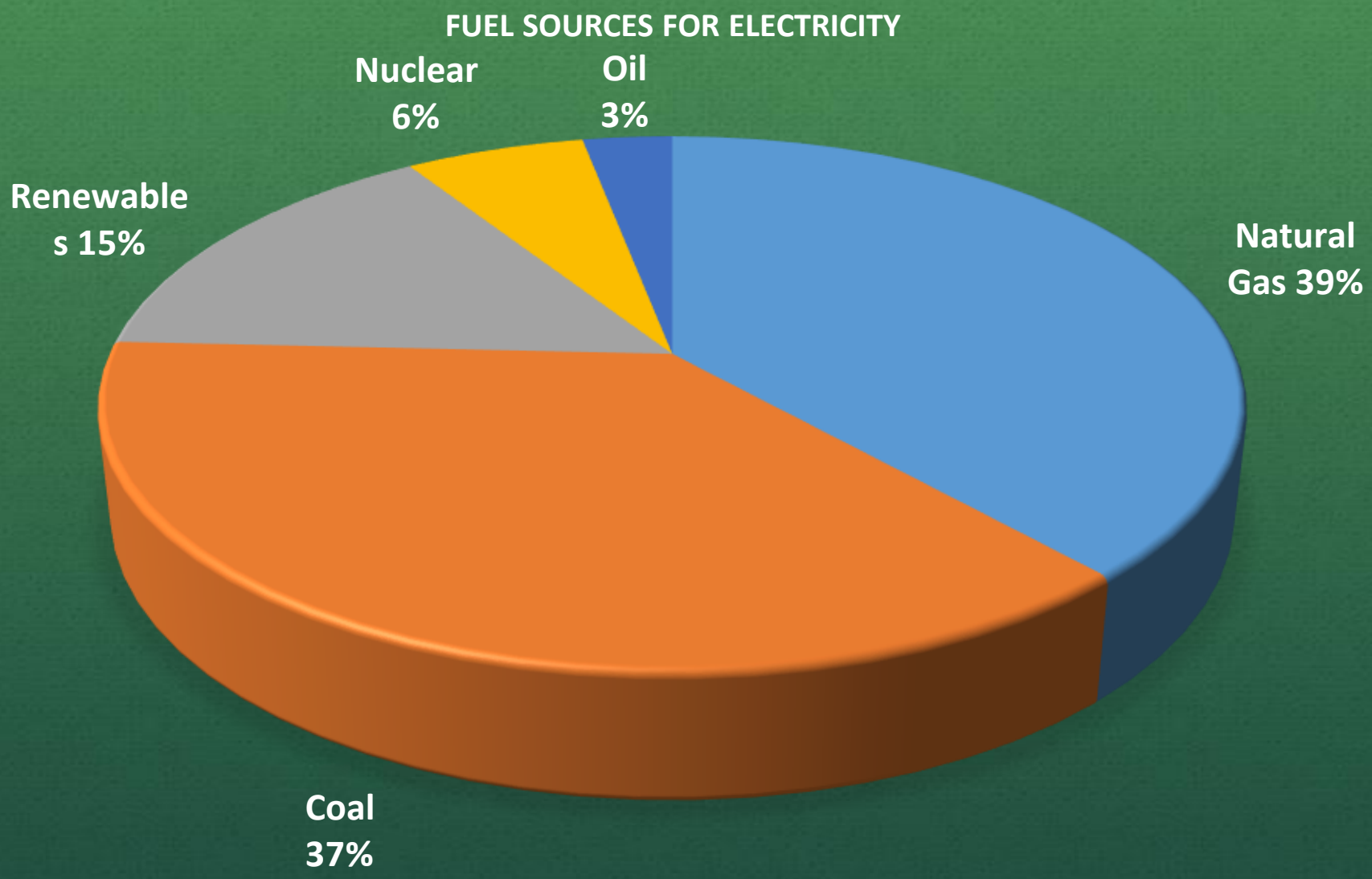
Campus Emissions 1988-2016



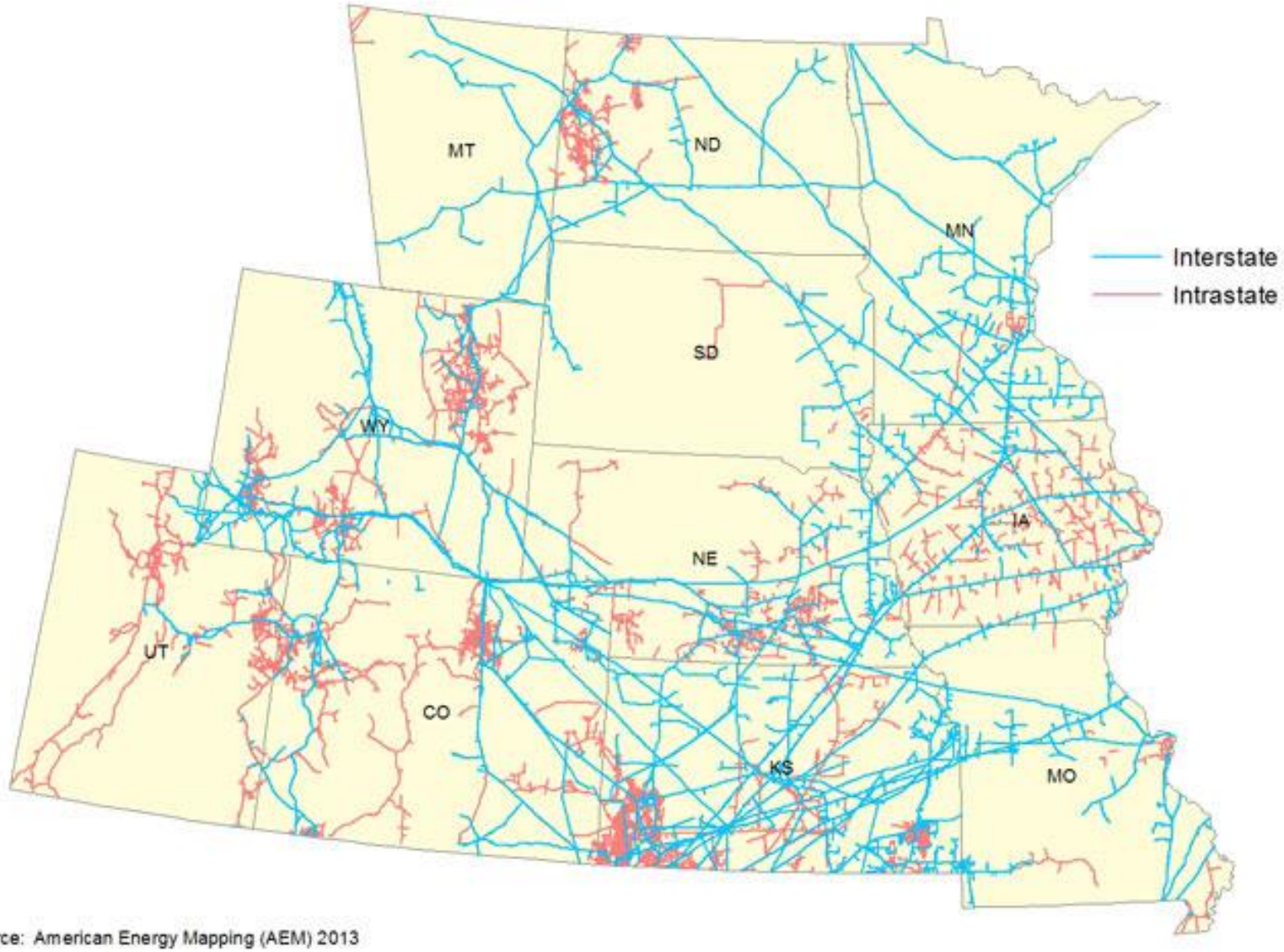
FY 2016 Campus Emissions



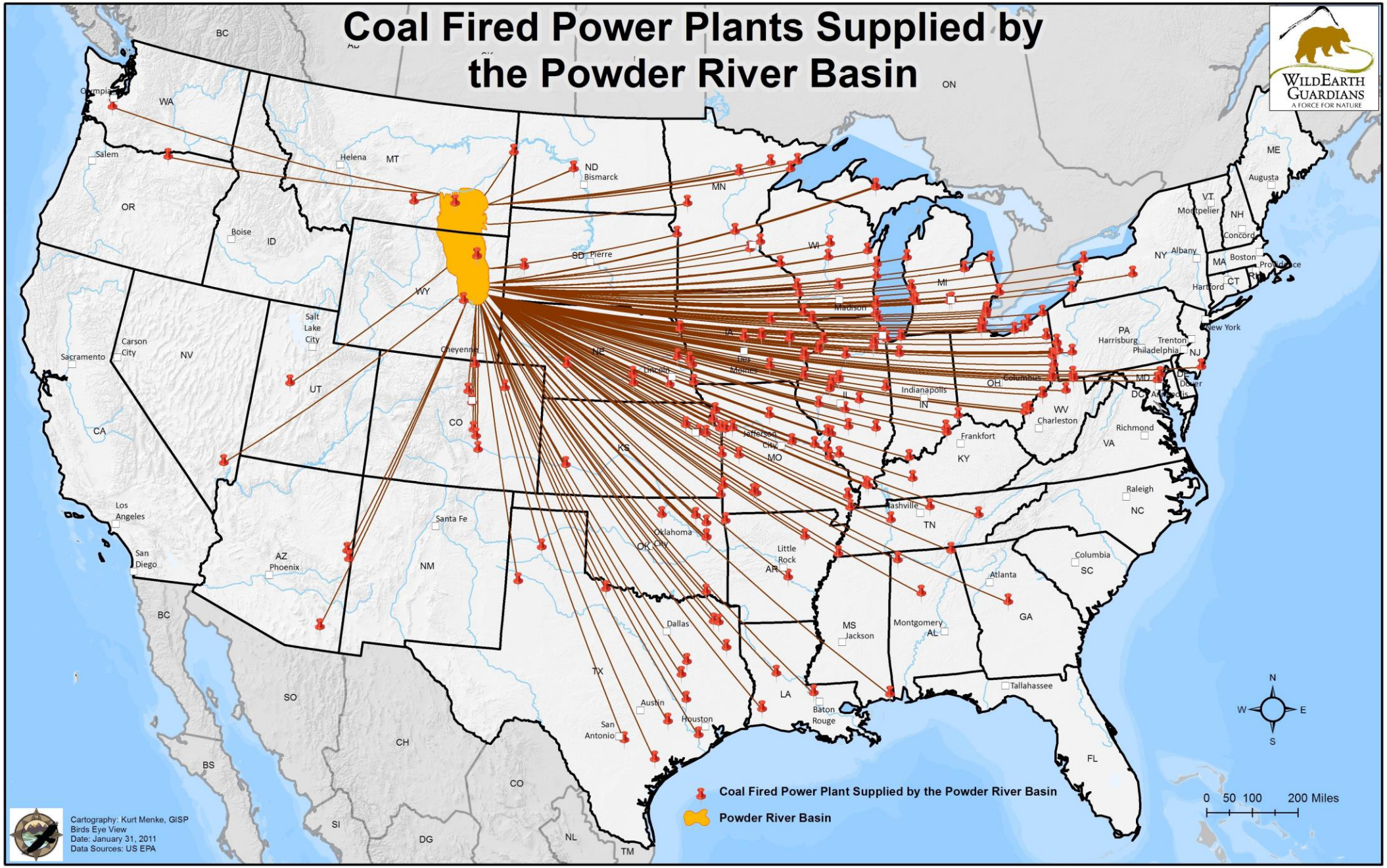
- On-campus Natural Gas
- Direct Transportation
- Purchased Electricity
- Faculty / Staff Commuting
- Directly Financed Air Travel
- Solid Waste
- Electricity Line Loss

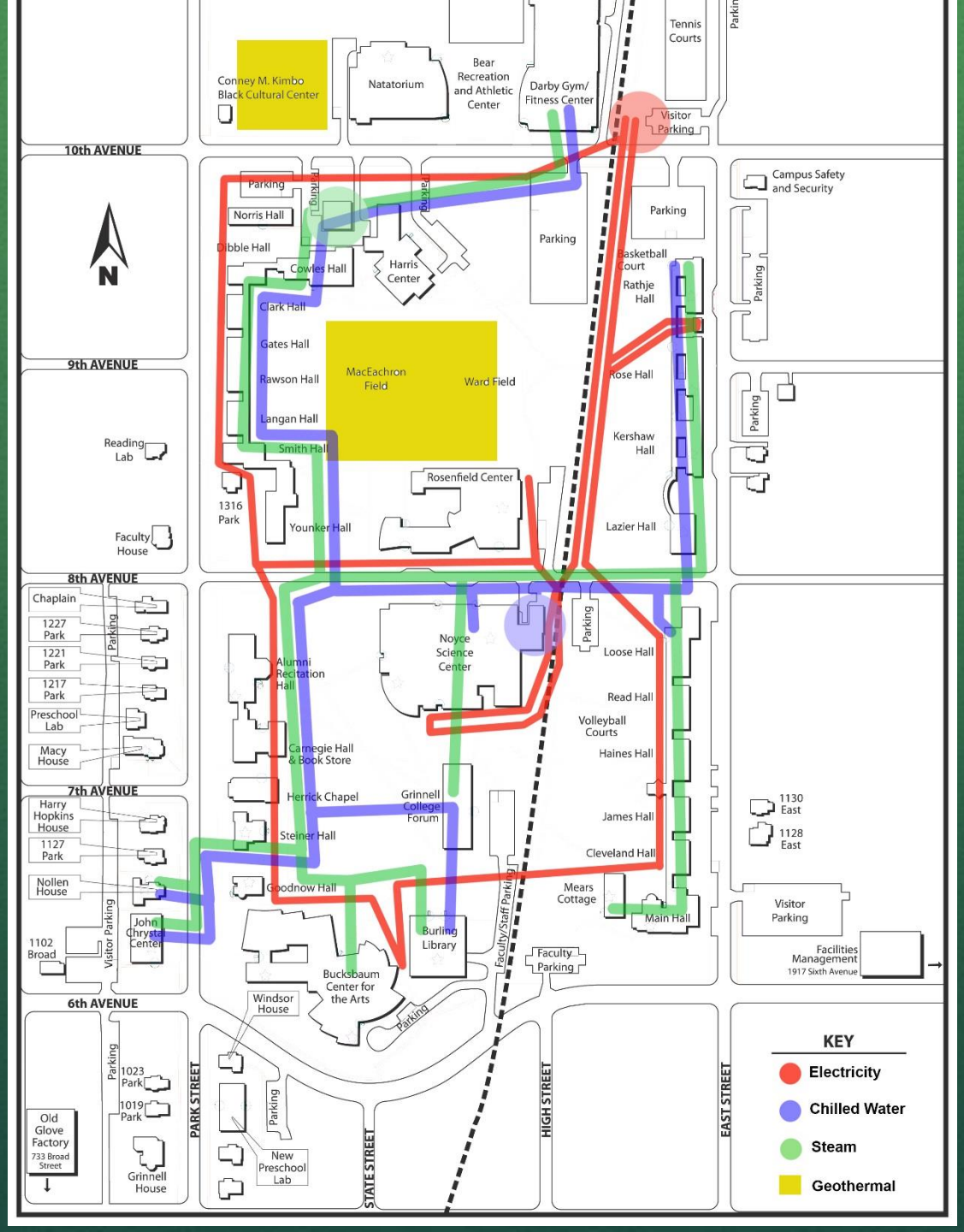

FUEL SOURCES FOR ELECTRICITY
Nuclear 6%
Oil 3%
Renewables 15%
Natural Gas 39%
Coal 37%

Region 6 (Great Plains and Rockies)
Natural Gas Pipelines



Source: American Energy Mapping (AEM) 2013


Coal Fired Power Plants Supplied by the Powder River Basin
WildEarth Guardians
A Force for Nature
Coal Fired Power Plant Supplied by the Powder River Basin
Powder River Basin
0 50 100 200 Miles
N
S
E
W
Cartography: Kurt Menke, GISP
Birds Eye View
Date: January 31, 2011
Data Sources: US EPA


Conney M. Kimbo Black Cultural Center
Natatorium
Bear Recreation and Athletic Center
Darby Gym/ Fitness Center
Tennis Courts
Visitor Parking
10th AVENUE
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Norris Hall
Dibble Hall
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Goodnow Hall
Loose Hall
Read Hall
Volleyball Courts
Haines Hall
James Hall
Cleveland Hall
Mears Cottage
Main Hall
Burling Library
Faculty/Staff Parking
Faculty Parking
Bucksbaum Center for the Arts
1130 East
1128 East
Visitor Parking
Facilities Management
1917 Sixth Avenue
6th AVENUE
Windsor House
Old Glove Factory
733 Broad Street
1023 Park
1019 Park
Grinnell House
New Preschool Lab
PARK STREET
STATE STREET
HIGH STREET
EAST STREET
KEY
Electricity
Chilled Water
Steam
Geothermal


JOHN DEERE

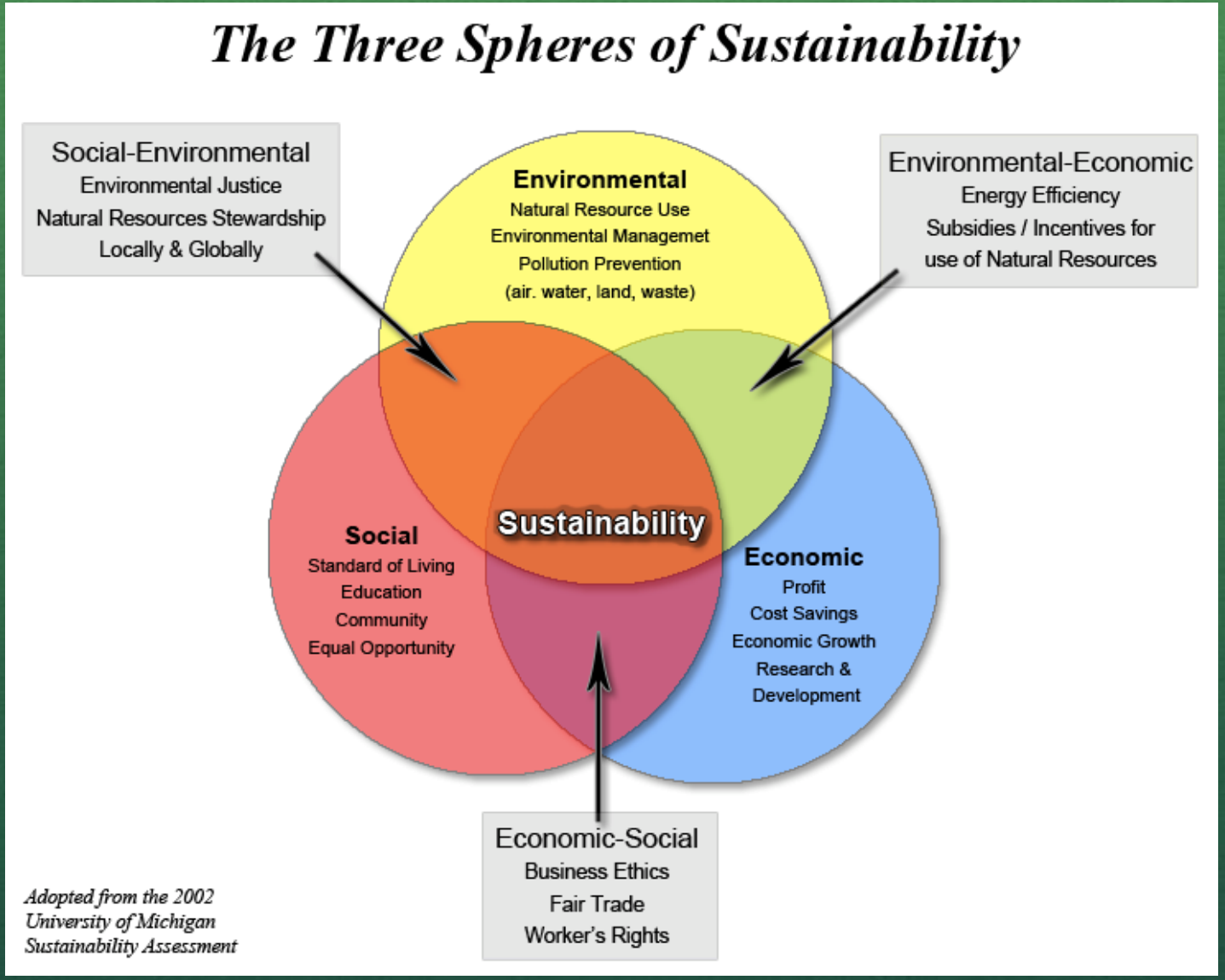
The Grinnell College Sustainability Plan

In the spring of 2011, President Raynard Kington appointed the *Environmental Responsibility and Sustainability Advisory Committee*, giving the following charge: "To further Grinnell College's goals of environmental responsibility by assessing current conditions, policies, and actions and advising the President of Grinnell College on strategies for furthering those goals, in ways that are consistent with the college's mission and core values." Areas under consideration were to include, but not necessarily be limited to:

- Energy consumption and carbon emissions
- Water use, quality, and run-off
- Landscaping and prairie plantings
- Waste reduction and diversion
- Goals for new construction and renovated buildings
- Community education for environmentally-friendly behaviors
- Business and academic processes (printing, mailing, etc.)
- Committee organization and other governance issues linked to environmental responsibility
- Integration of sustainability into education, including course content, majors and concentrations, and data repositories
- Local foods

The American College and University Presidents' Climate Commitment (now Second Nature)

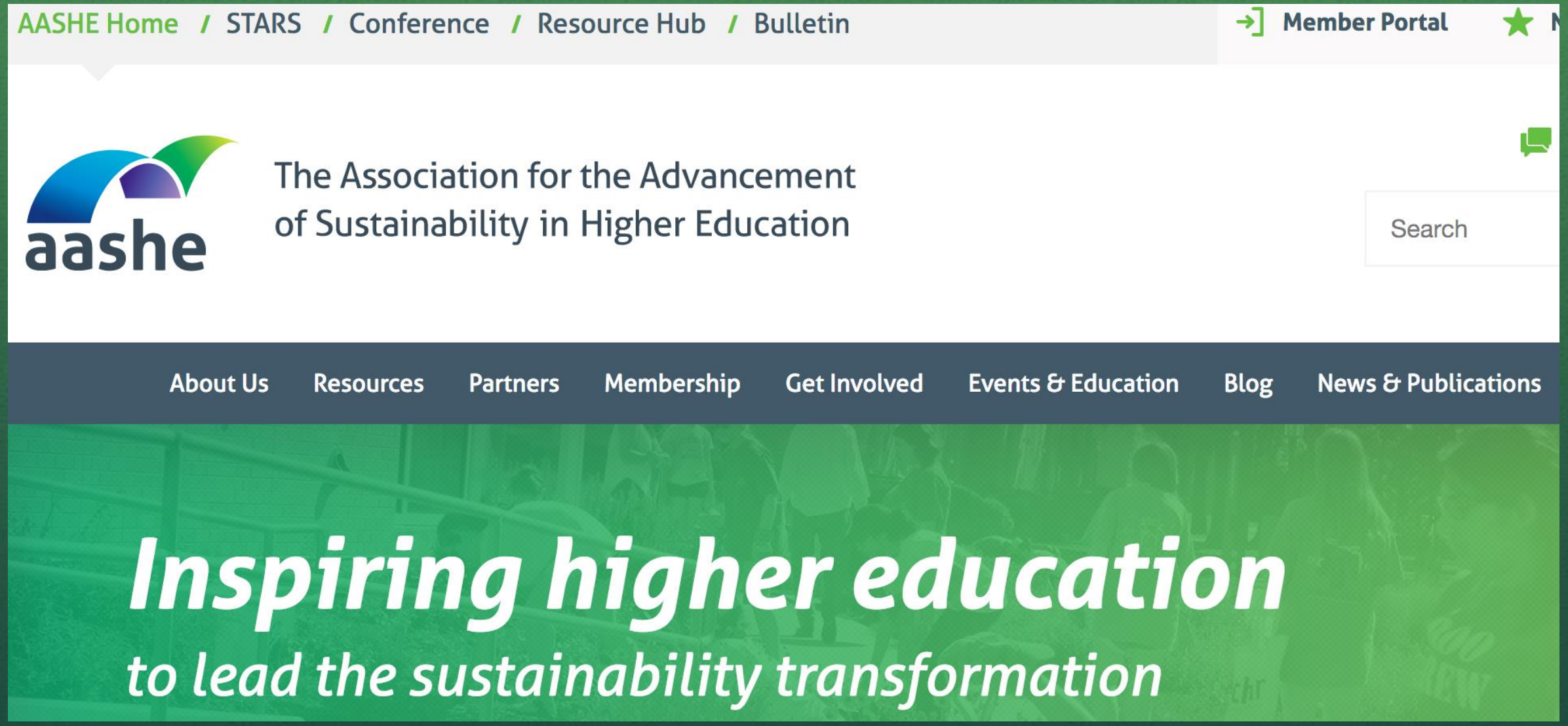
- Recognizing the importance of climate change as a global problem, President Kington signed the Climate Commitment in Fall 2011
- Commitment 1. Initiate the development of a comprehensive plan to achieve climate neutrality as soon as possible.
- This means making a plan that will get our campus to achieve net zero carbon emissions sometime in the foreseeable future
- We have the advantage of living in a state with strong wind resources and acceptable solar resources



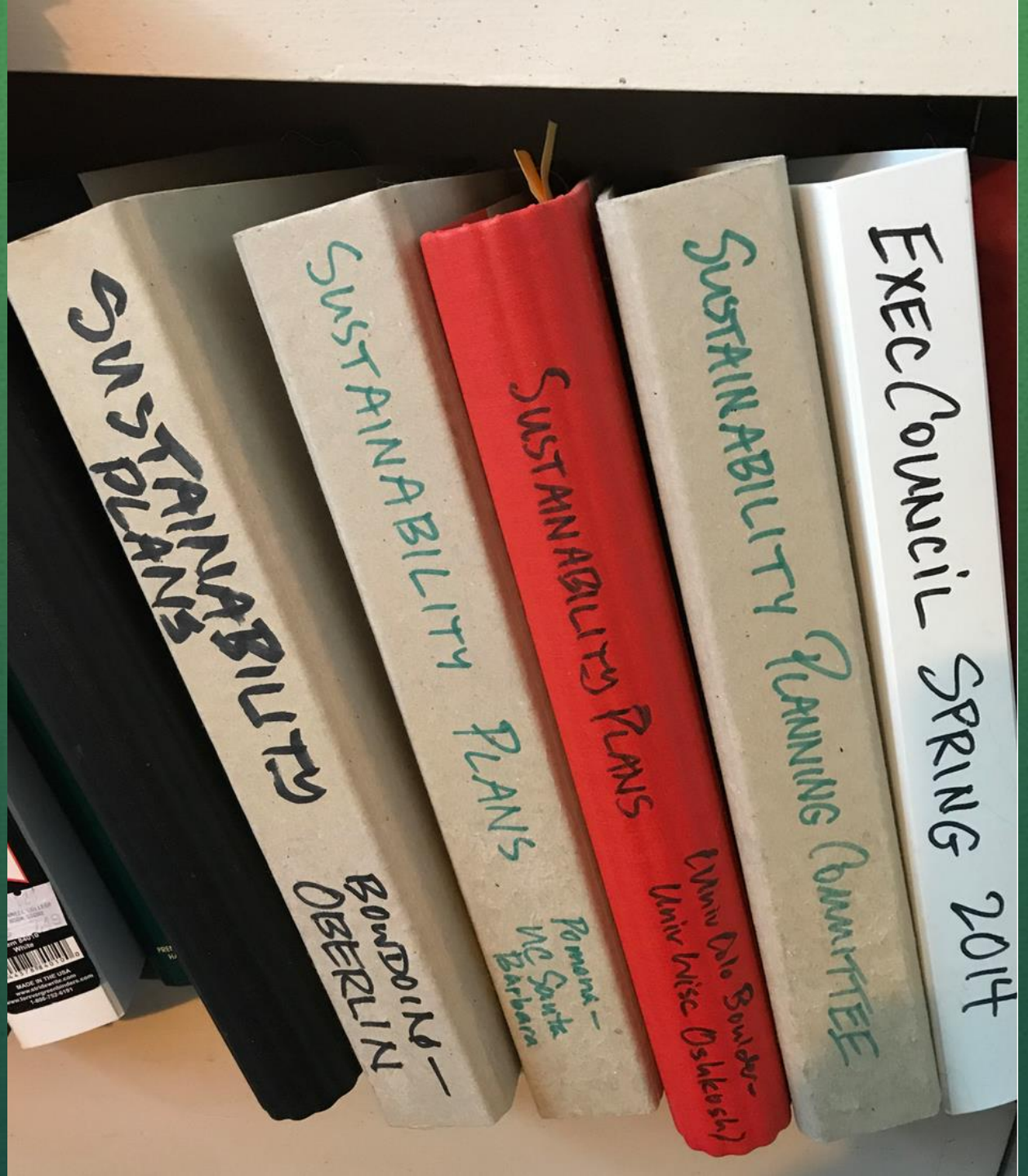
The Committee developed a vision of a sustainable Grinnell College that:

- Engages students, faculty, and staff in reducing the campus' environmental footprint by using our sense of place to live, work, eat, and consume other resources sustainably
- Increases sustainable energy use and reduces consumption until the College becomes carbon neutral
- Teaches sustainability as a pervasive principle for public good

We drew on the resources of the organization that keeps track of how schools plan to meet their climate commitment through a Climate Action Plan



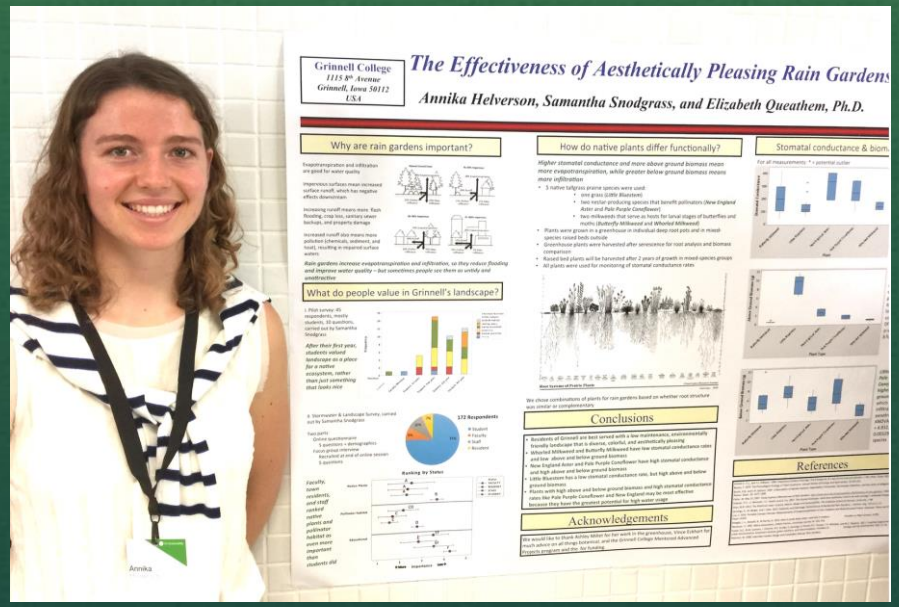
We read all of the Climate Action Plans that other schools had submitted

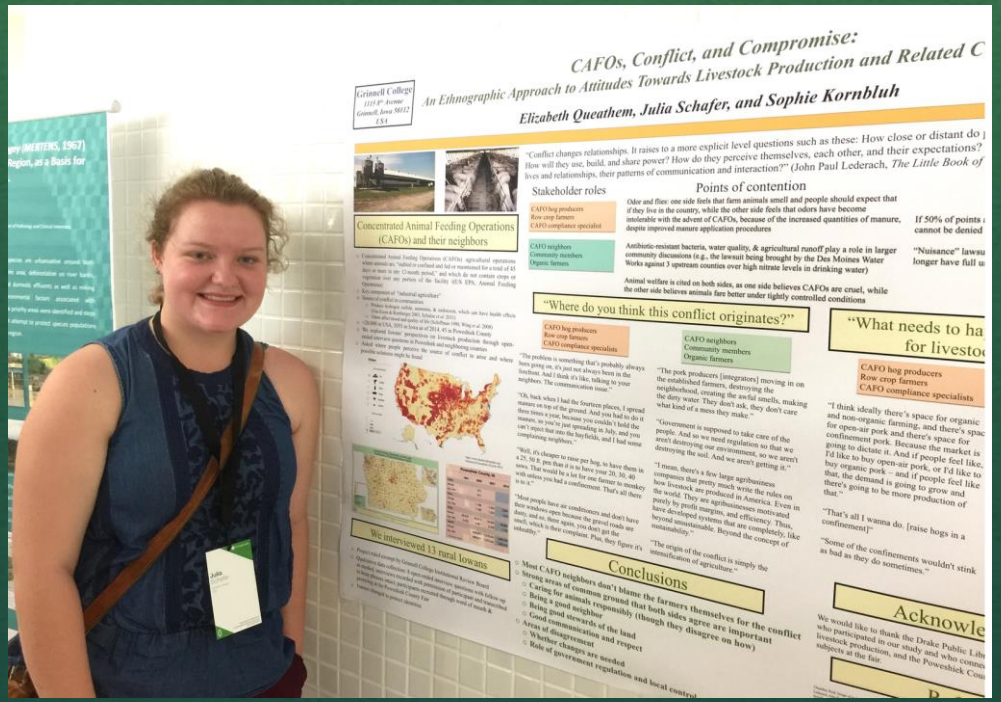


Areas of sustainability covered by the Plan:

1. Energy, emissions, & construction standards

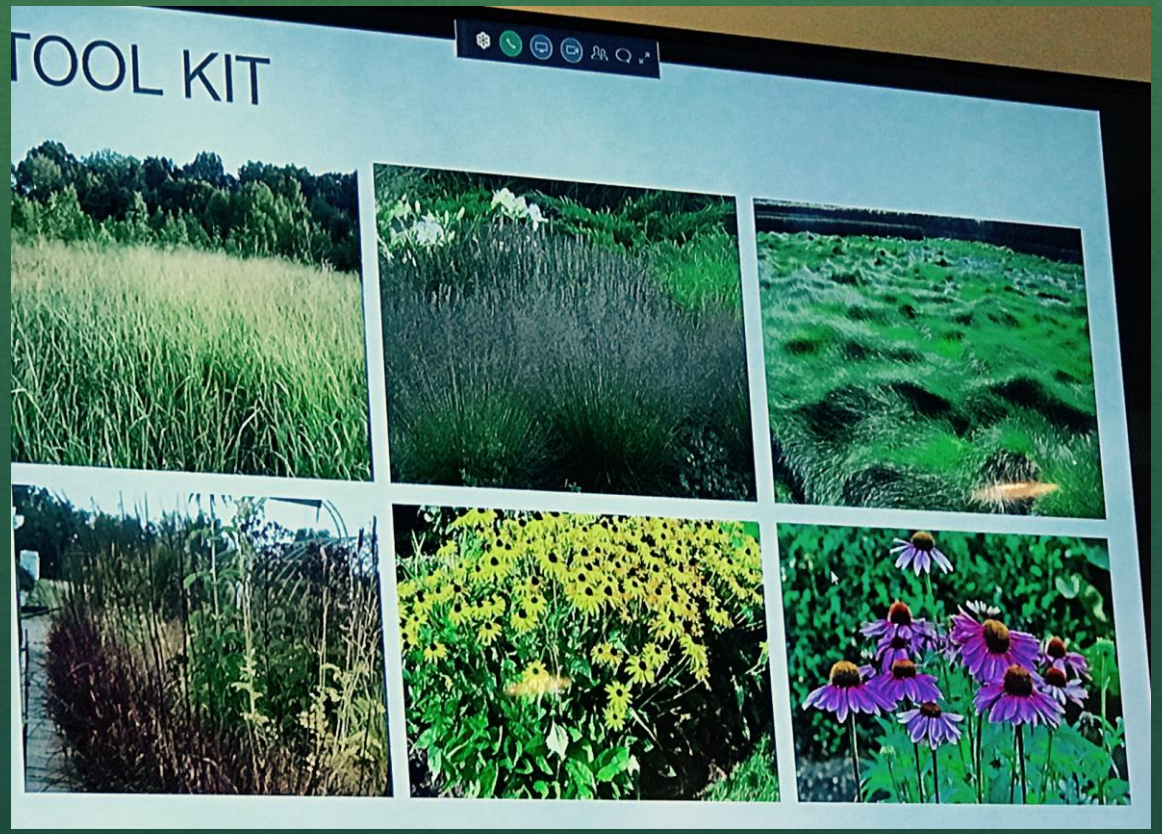
2. Travel





Areas of sustainability covered by the Plan:

3. Water consumption



By Category (cubic feet)	5,425,600	
Student Housing	1,721,100	32%
Boiler/Chiller Plants	1,342,000	25%
Academic Buildings/Offices	1,291,500	24%
Athletic Fields	580,000	11%
Student Center	491,000	9%

4. Water runoff & landscaping

5. Food

6. Solid waste & recycling

7. Communications

8. Curriculum

Pitzer College's Scope 1 & 2 2017 emissions data

2. Emissions Data

Scope One	
*Stationary Combustion	1,358 MTCO2e
*Mobile Combustion	17 MTCO2e
*Process Emissions	1 MTCO2e
*Fugitive Emissions	0 MTCO2e
Total Scope 1 emissions	1,376 MTCO2e
Scope Two	
*Purchased Electricity	1,532 MTCO2e
*Purchased Heating	0 MTCO2e
*Purchased Cooling	0 MTCO2e
*Purchased Steam	0 MTCO2e
Total Scope 2 emissions	1,532 MTCO2e

- When you live in southern California, you don't have to heat and cool buildings the way we do
- Our commitment to AASHE means putting together a climate action plan for our climate
- So we really needed to go after our carbon footprint

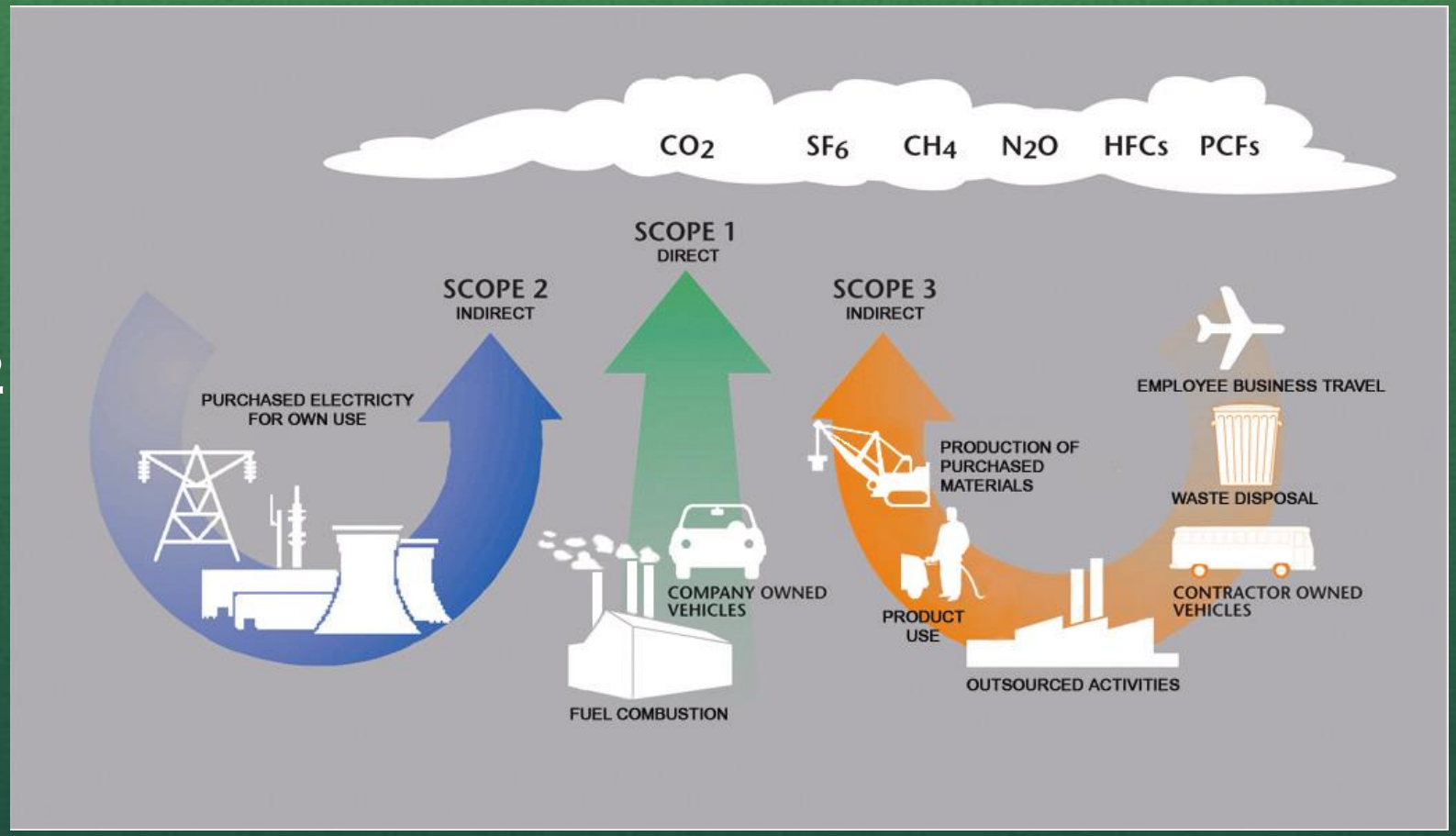
Energy, emissions, & construction standards

Ultimate Goals:

1. Approach carbon neutrality with regard to Scope 1 and Scope 2 emissions by 2040.

2. Reduce total electricity and natural gas consumption on campus by 25% from FY2012 levels within 10 years.

3. Use Green Funds to investigate pilot projects for possible adoption campus-wide.



Four-year Goals:

- Obtain 60 % of campus electricity from renewable resources.
- Sub-meter all of our residence halls for electricity and water.
- Reduce non-renewable energy consumption in sub-metered residence halls by 15%.

Action Steps:

- Support the work of the Trustees' Task Force on the Divestment of Fossil Fuels in analyzing how the College should comport itself with regard to fossil fuel use and investments, with support from faculty and staff.

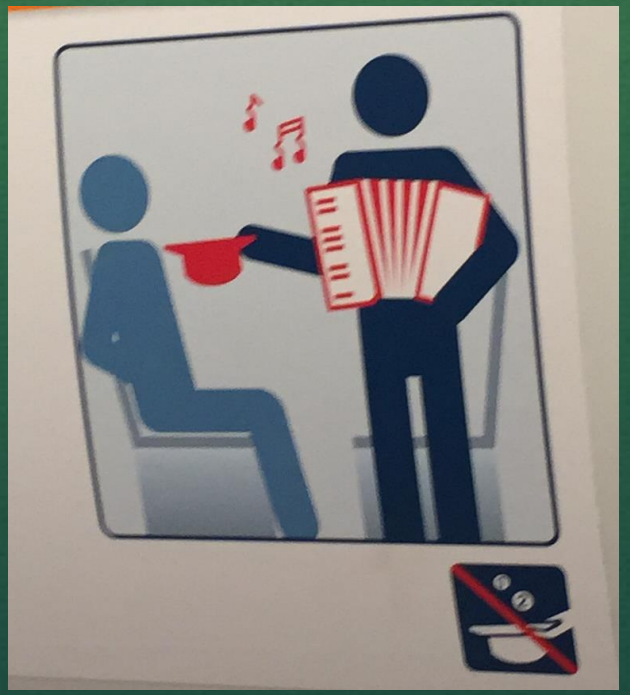
- Explore a relationship with Trusted Energy that could potentially provide all of our electricity through a combination of a solar farm close to campus and purchase of wind energy from wind farms in northwest Iowa.

- Continually assess renewable energy opportunities including, but not limited to, solar hot water, solar photovoltaics, wind, and geothermal, as technologies, markets, and regulations evolve.

- Conduct in-house energy audits for potential lighting upgrades and building automation schedules (i.e. turning off lights and changing thermostat settings based on time of day and season).

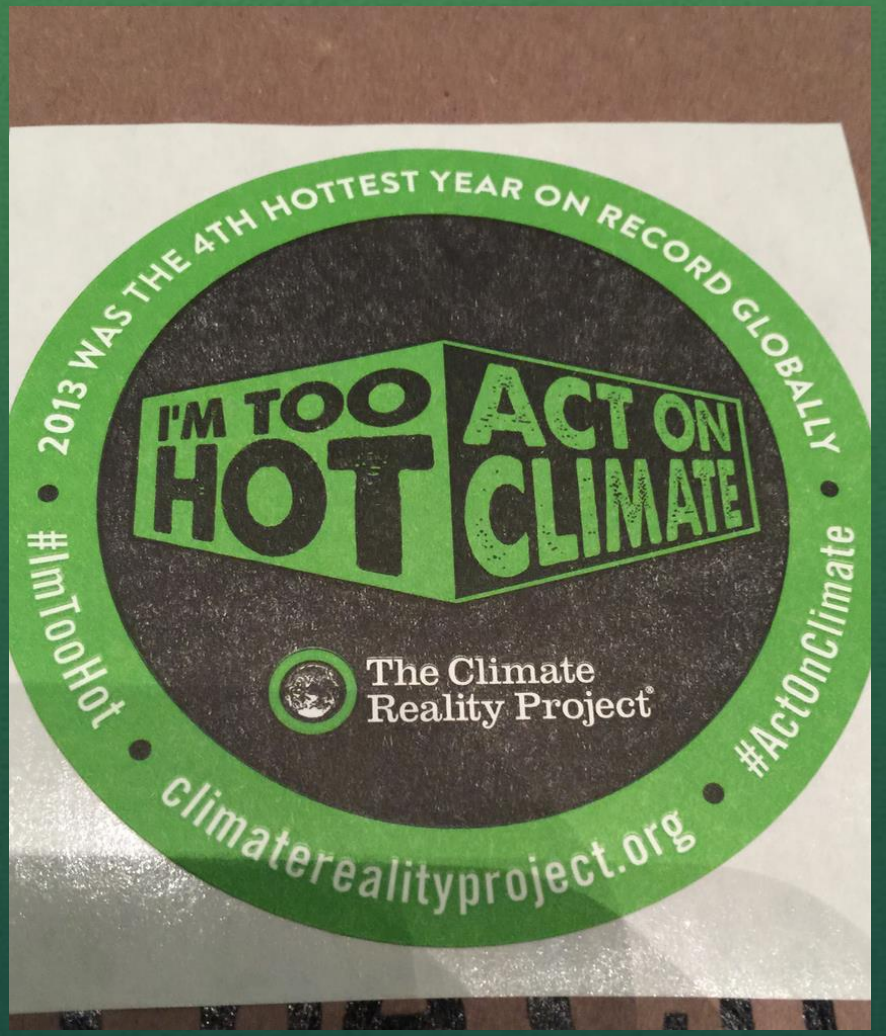
- Generate an educational campaign aimed at reducing energy consumption via behavioral changes by students, staff, and faculty.
- Toward that end, sub-meter all campus buildings (mechanically or virtually) with respect to steam, electricity, and chilled water, starting with electricity.
- Investigate third-party audits for large-scale energy upgrades and performance contracts.
- Design master planning policies that place sustainability at the forefront as a design principle for all campus construction.
- Regardless of whether we formally seek LEED Silver certification, build to the standards that would be necessary to achieve or surpass it.

- In 2013, Chris Bair, Lee Sharpe, Rick Whitney, and I took 6 MAP students to Germany to study sustainability practices there
- As Rick Lancaster mentioned yesterday, Germany is way ahead of the United States in renewables
- We also learned about green roof technology, so part of the roof on the HSSC will be a green roof



- We presented our findings at the annual meeting of the Association for the Advancement of Sustainability in Higher Education, to the City of Grinnell, and to the Iowa Economic Development Authority
- And we have used them to inform the Sustainability Plan and Master Landscaping Plan

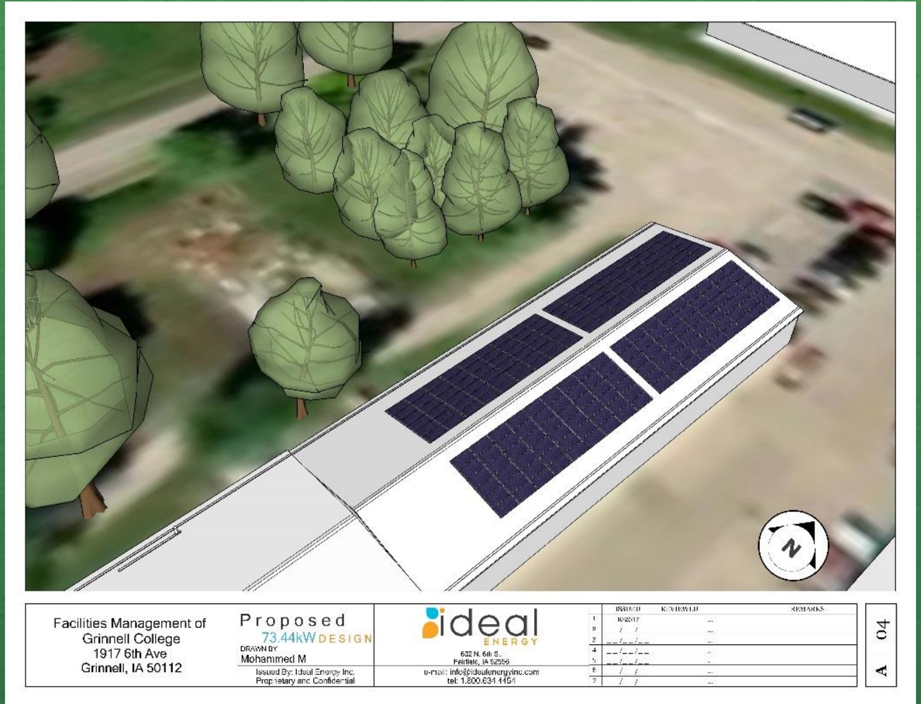
- In 2015, I took Al Gore's leadership training
- My husband and I took out a $ 17,000 loan to purchase solar panels for our house
- We are all in

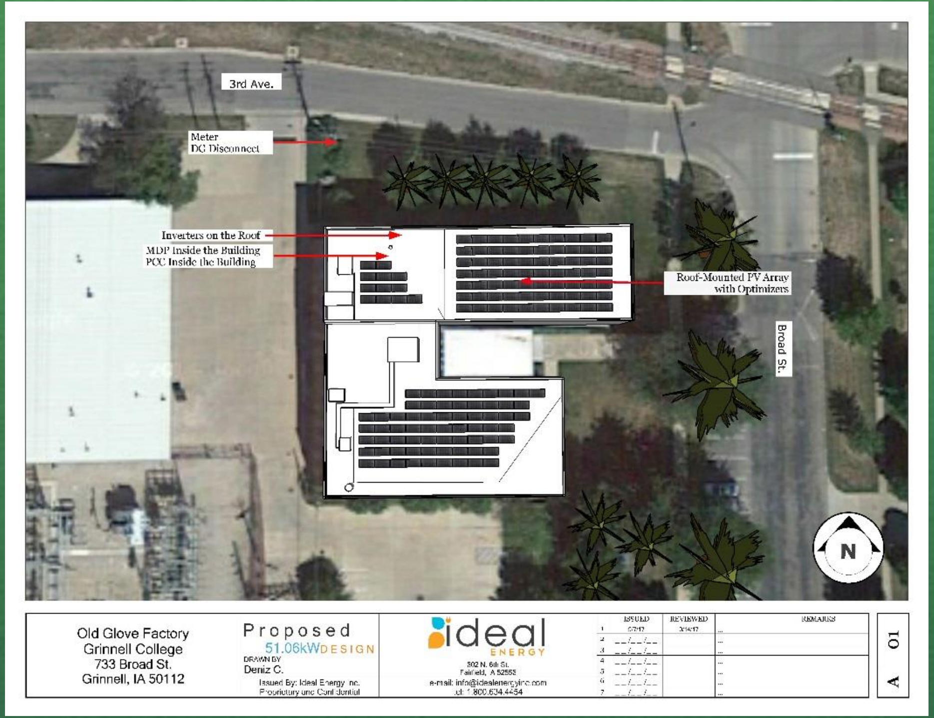


- This photo is from the Farm to Table dinner that took place on 8th Avenue last month
- The empty seat at the table is for you – keep participating in the process!
- Now, back to Chris Bair, then Trusted Energy

New Buildings: HSSC and AFA

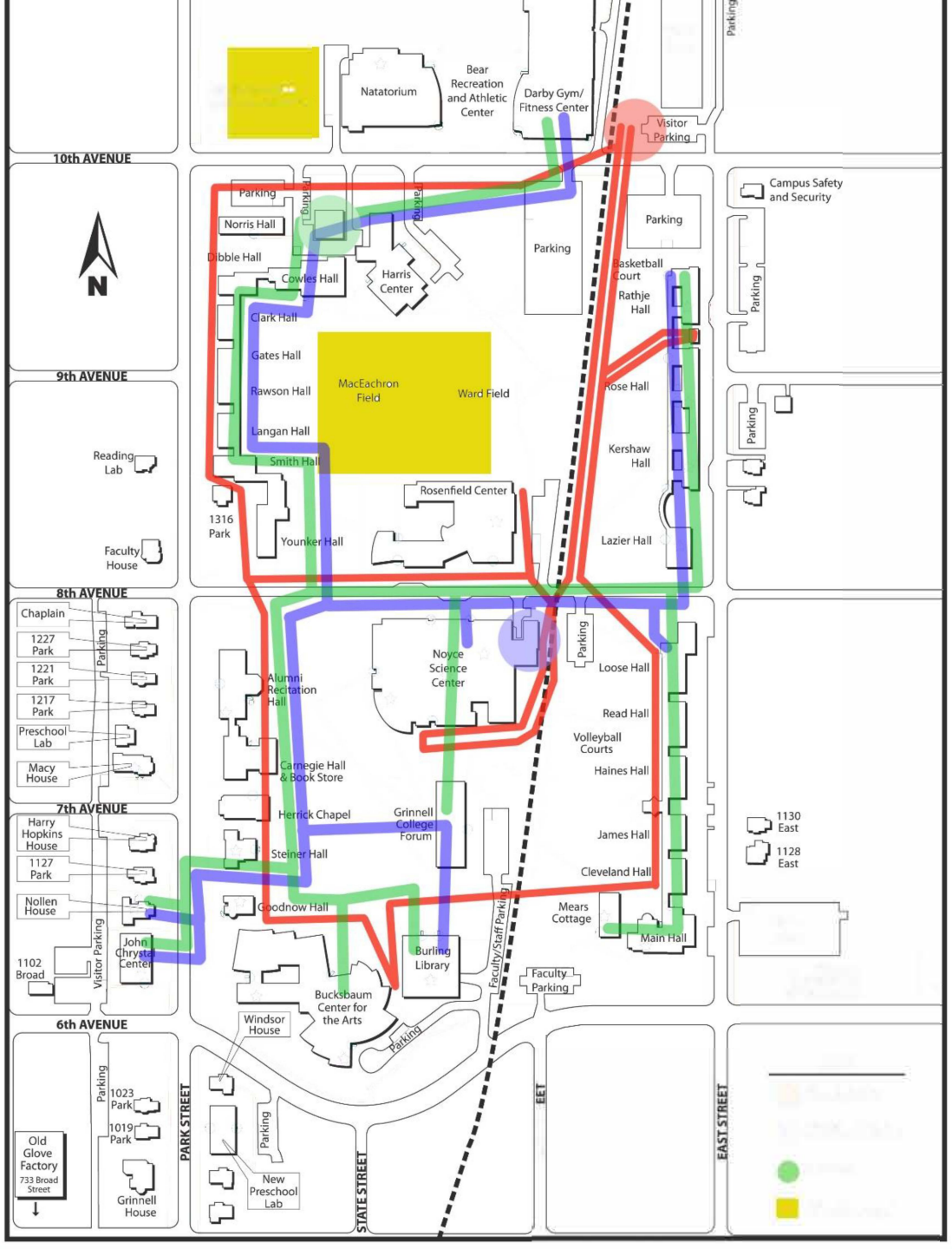
- Geothermal Heating and Cooling
- LED lighting,
- Exporting energy to other buildings
- Daylighting
- Chilled beam technology
- Solar PV
- Car charging station


Facilities Management of Grinnell College
1917 6th Ave
Grinnell, IA 50112
Proposed
73.44kW DESIGN
Mohammed M
ideal
ENERGY
A
04


3rd Ave.
Meter
DC Disconnect
Inverters on the Roof
MDP Inside the Building
PCC Inside the Building
Roof-Mounted PV Array with Optimizers
Broad St.
N
Old Glove Factory
Grinnell College
733 Broad St.
Grinnell, IA 50112
Proposed
51.06kW DESIGN
Deniz C.
ideal
ENERGY
A
01


Food House of Grinnell College
1128 E. St.
Grinnell, IA 50112
Proposed
17.68kW DESIGN
Deniz C.
ideal
ENERGY
A
02


ELECTRIC VEHICLE PARKING ONLY
ELECTRIC VEHICLE PARKING ONLY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