

# Counting Carbon:

## Measuring and Reducing Your Business's Greenhouse Gas Emissions

Greening Up Your Bottom Line Conference Presentation  
*Burlington, Vermont*



Vermont Business  
Environmental  
Partnership

September 26, 2008



SPRING HILL | SOLUTIONS

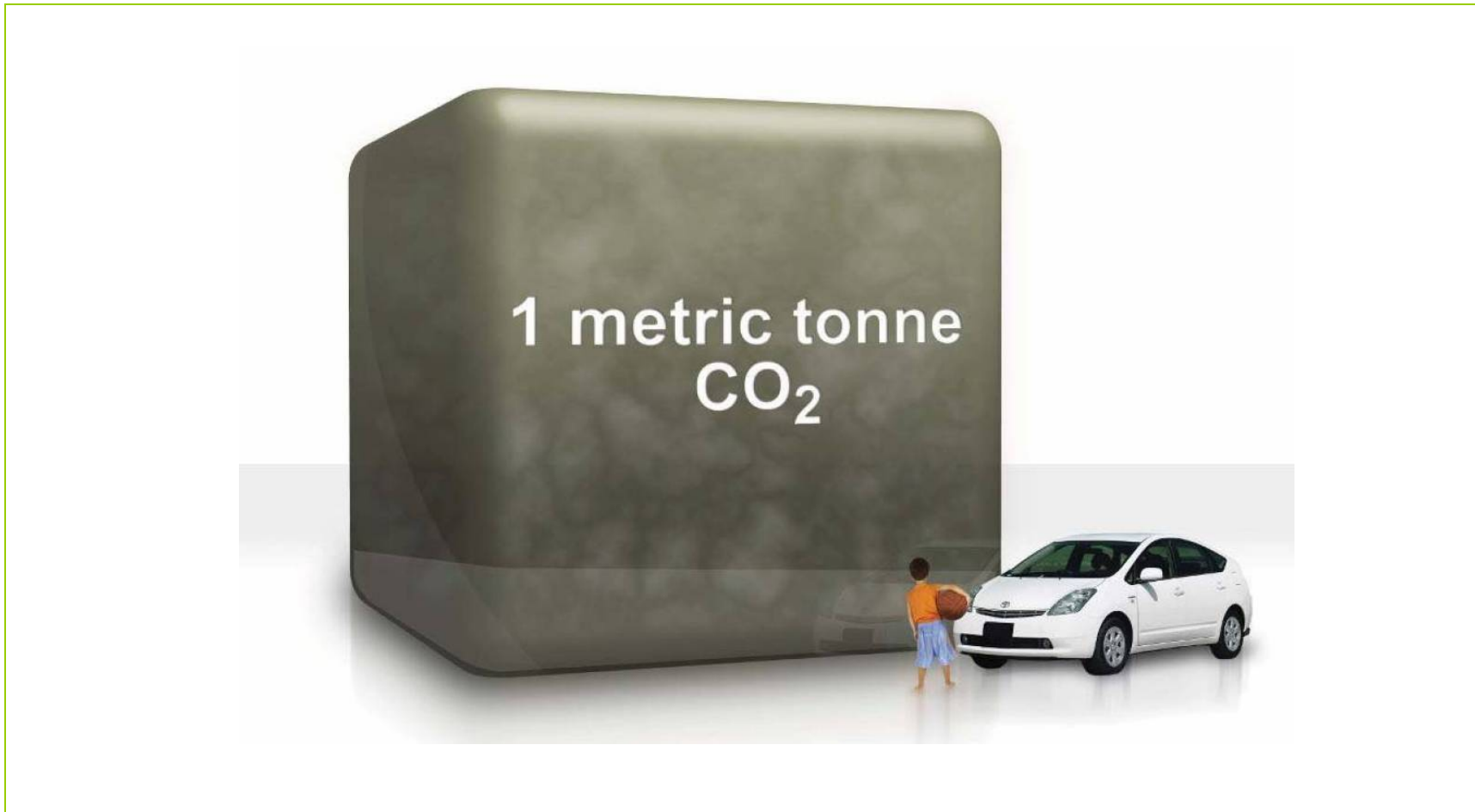
carbon management • clean energy • business sustainability



# What we'll cover...

- Some perspective on carbon
- Why measure carbon?
- What's the process?
- What does a carbon footprint look like?
- Some sample calculations
- Resources
- Q&A

# What does a ton of GHG look like?

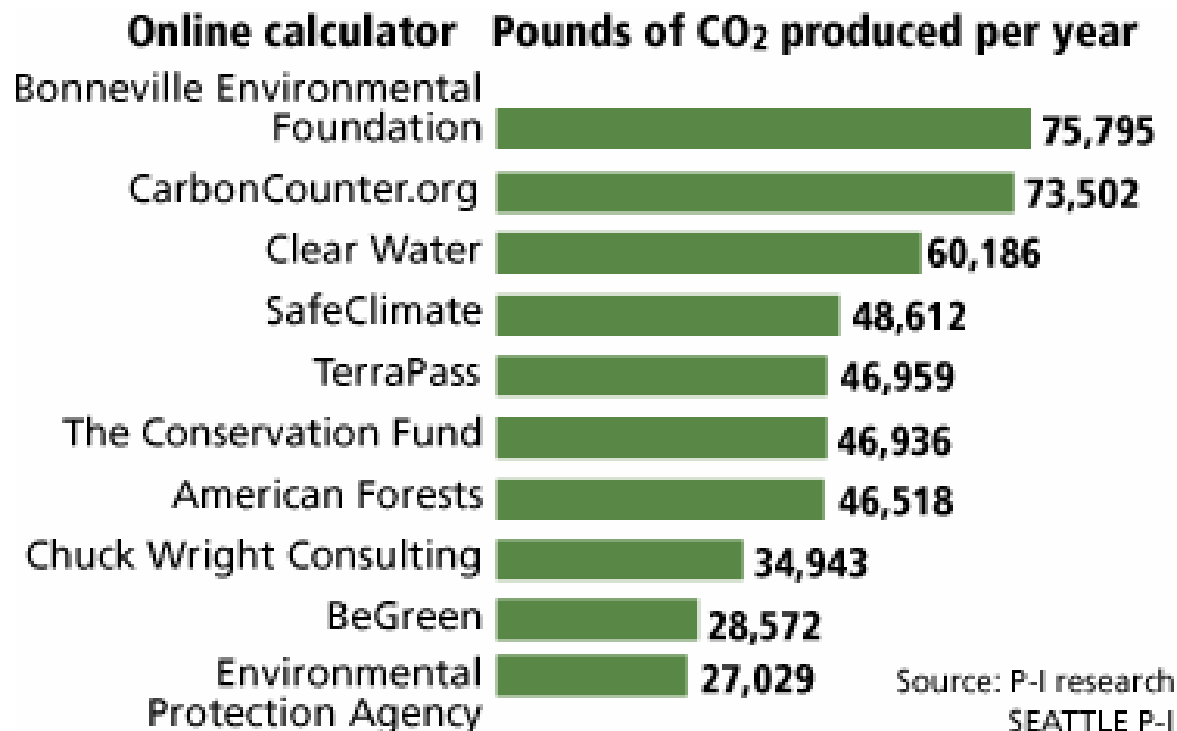


# Some perspective...

- World citizen: 5.6 tons/year
- U.S. citizen: 20 tons/year
- Vermont citizen: 15 tons/year

# Online carbon calculators...

## 'FOOTPRINT' SIZE VARIES



# Why measure business carbon?

- **Cost savings**
  - EPA: “Average” business can reduce energy use by 25-50%
- **Brand enhancement**
  - Pew: 47 percent of Americans consider climate change a serious problem
- **Preparation for regulation**
  - Pew: 90 percent of surveyed businesses believe regulation is imminent
- **Operational efficiencies**
  - Daylighting = reduced energy usage & increased productivity
- **Strategic planning**
  - Goldman Sachs: \$150-\$200 per barrel “likely” in next 6-24 months
- **Right thing to do, leadership, company pride**

# What is a carbon footprint?

Inventory of GHG emissions that includes:

- Heating fuels
- Transportation fuels
- Cooling system leaks
- Chemicals

- Electricity

- Solid waste
- Employee commuting
- Supply chain
- Products
- Etc.

Scope 1  
(Direct)

Scope 2  
(Indirect)

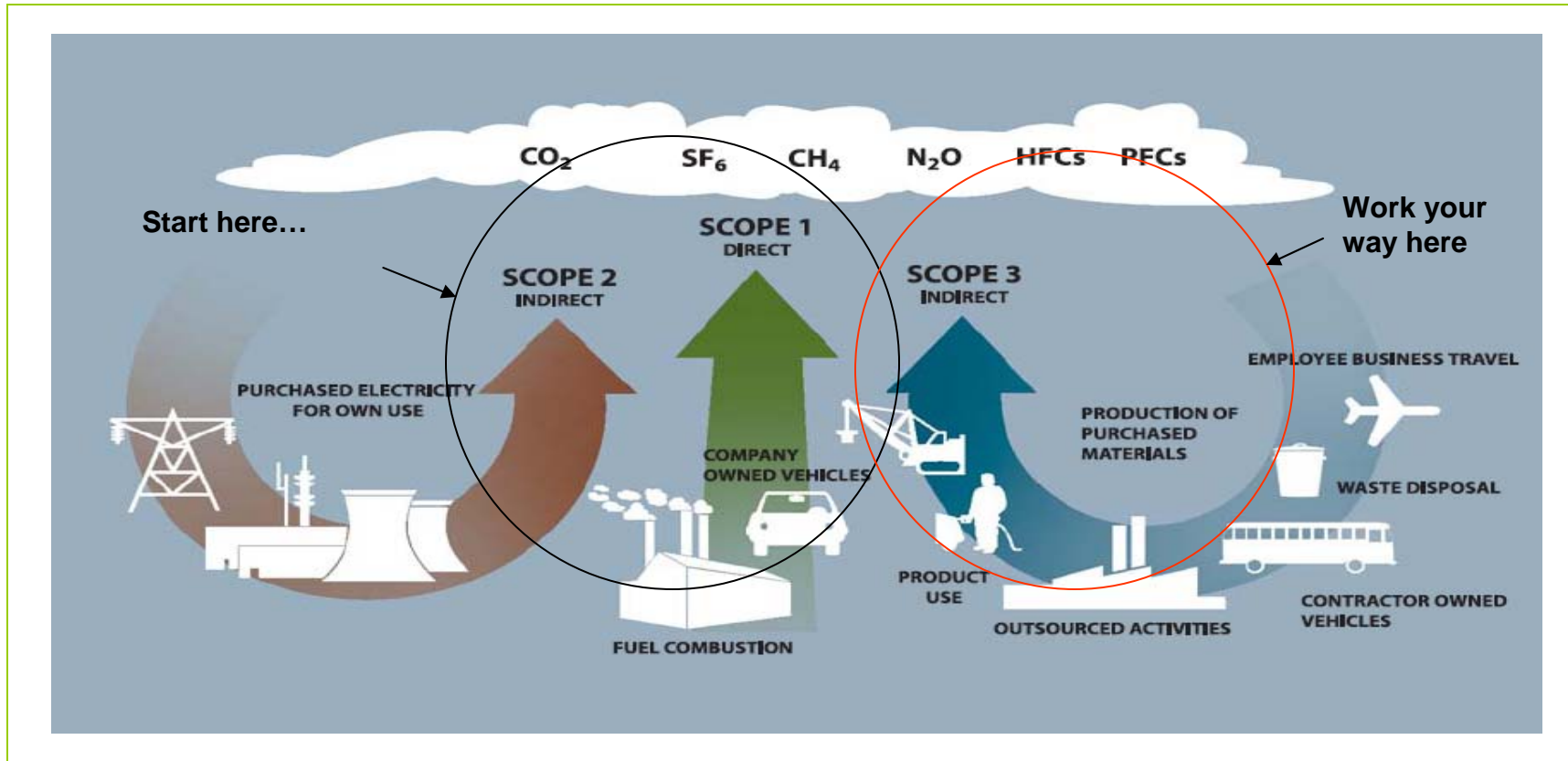
Scope 3  
(Indirect)



# A framework for measuring

- Greenhouse Gas Protocol:
  - Framework for nearly every GHG standard and program in the world, including the Chicago Climate Exchange and the California Climate Action Registry.
- Decisions to Make:
  - What do we own/control?
  - How far out do we measure?
  - Base year

# Boundaries...



# Reducing carbon...

## Sources

Heating fuels  
Transportation  
fuels  
Cooling system  
leaks  
Process  
emissions

Electricity

Solid waste  
Employee  
commuting  
Supply chain  
Products  
Etc



## Solutions

### Conservation

- "Turn-off" campaigns
- Waste reduction initiatives
- Cultural awareness

### Energy efficiency

- Lighting upgrades
- Heating/cooling upgrades
- Combined heat and power

### On-site renewable energy

- Solar thermal and electric
- Geothermal

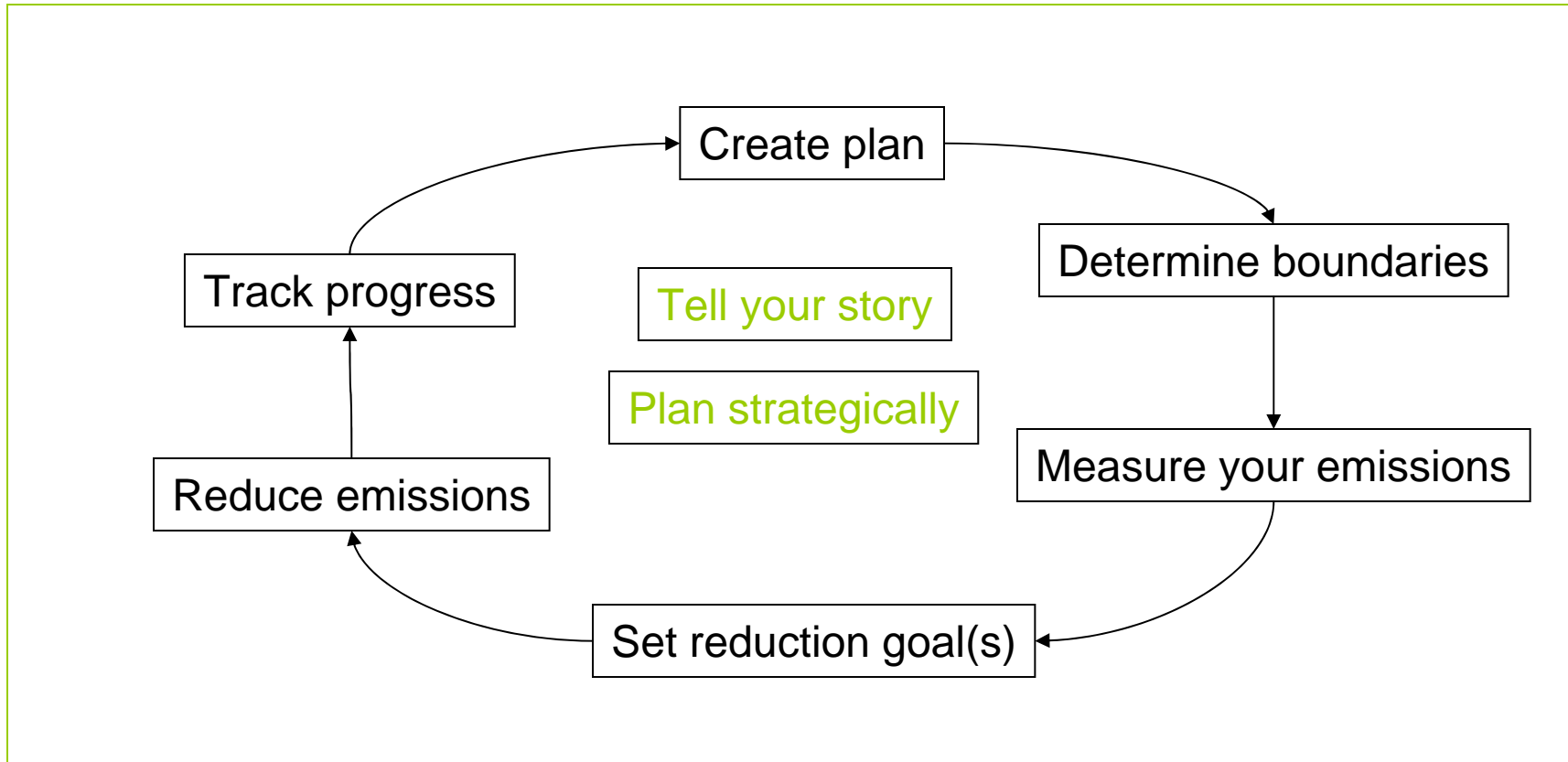
### Purchased renewable energy

- Utility-provided renewable energy

### Carbon offsets

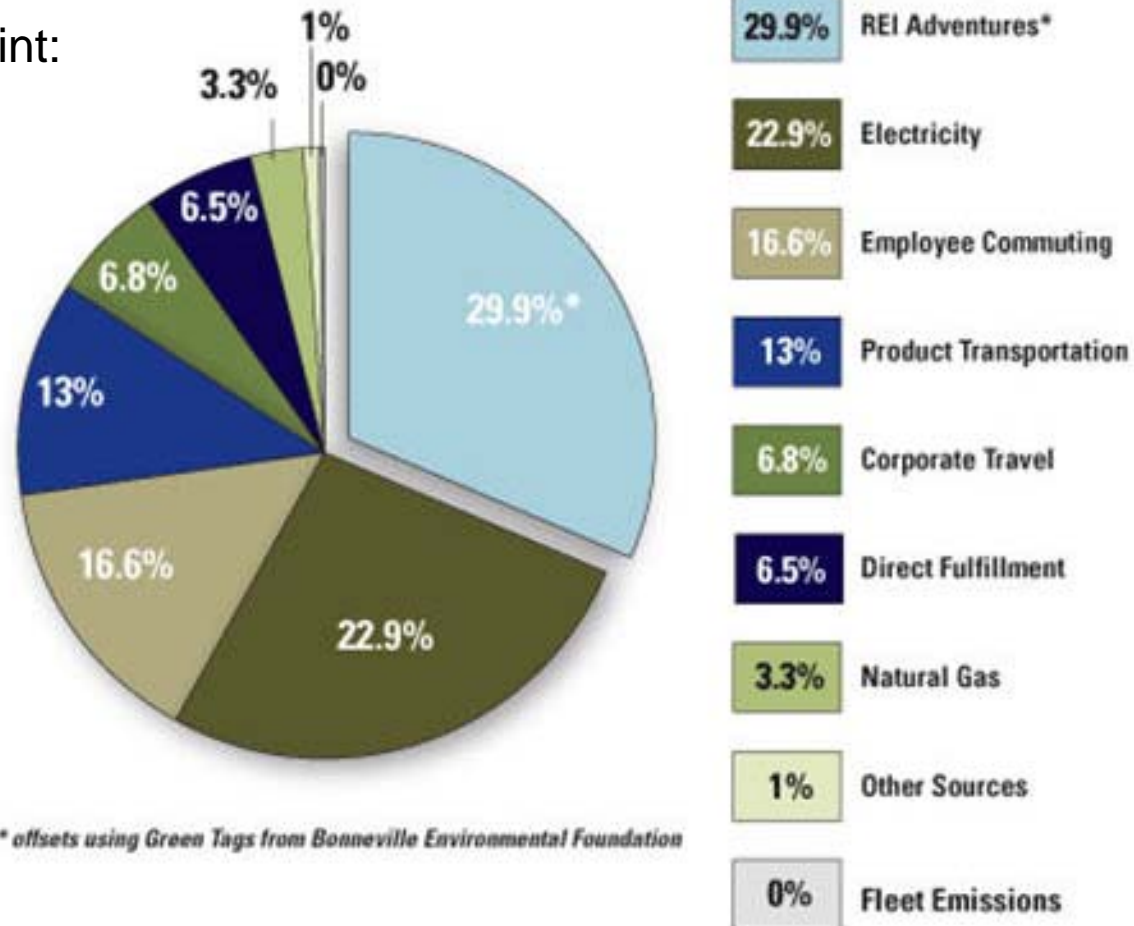
- Reducing emissions indirectly

# What's the process?



# What does a footprint look like?

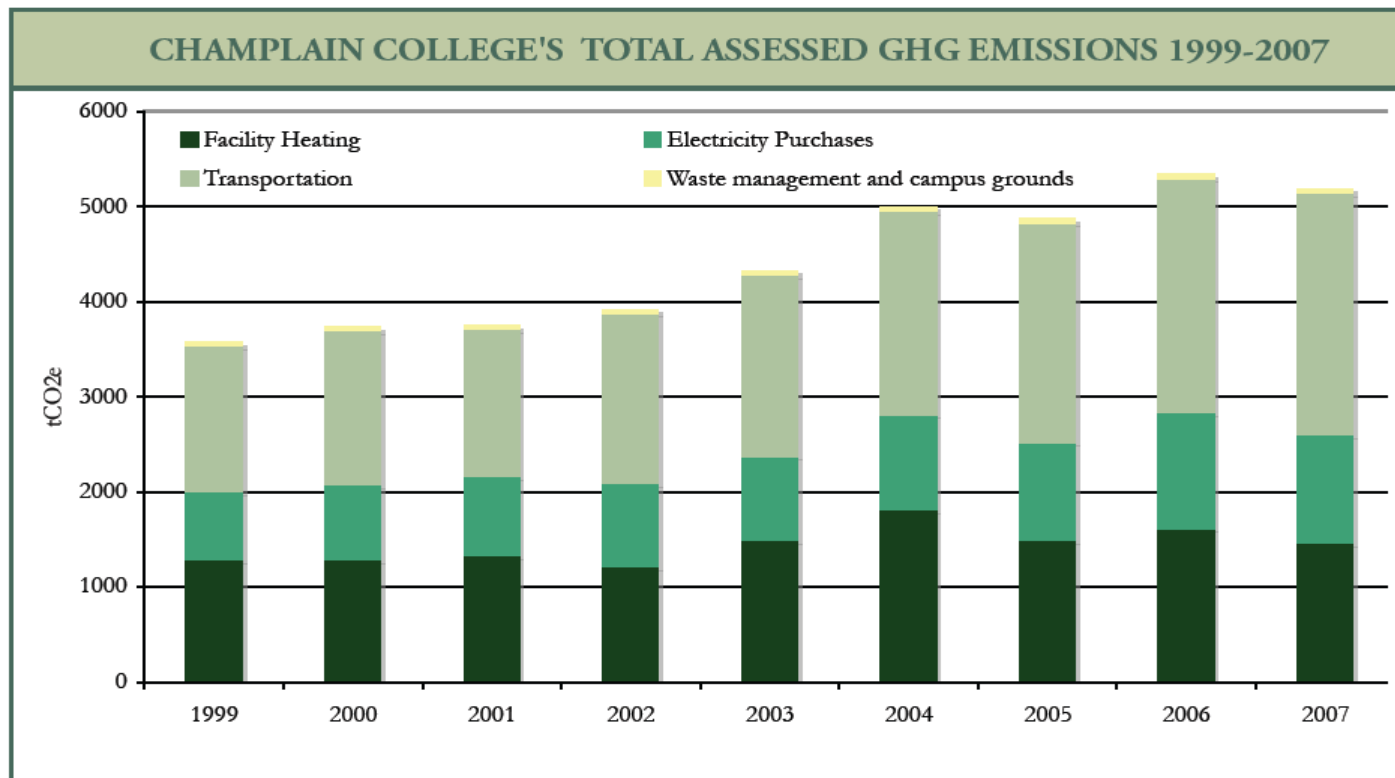
REI's footprint:



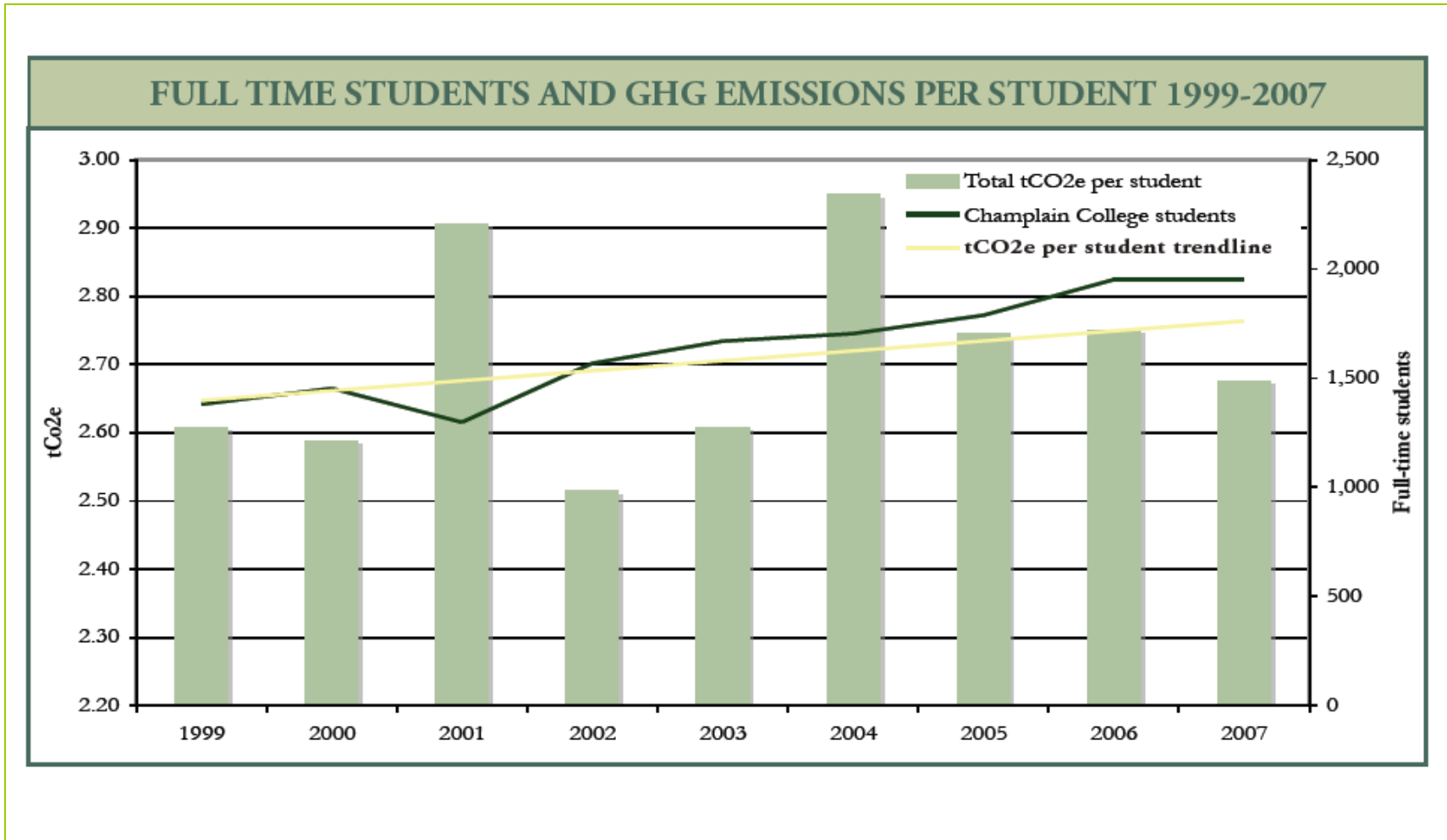
\* offsets using Green Tags from Bonneville Environmental Foundation

# What's a footprint look like?

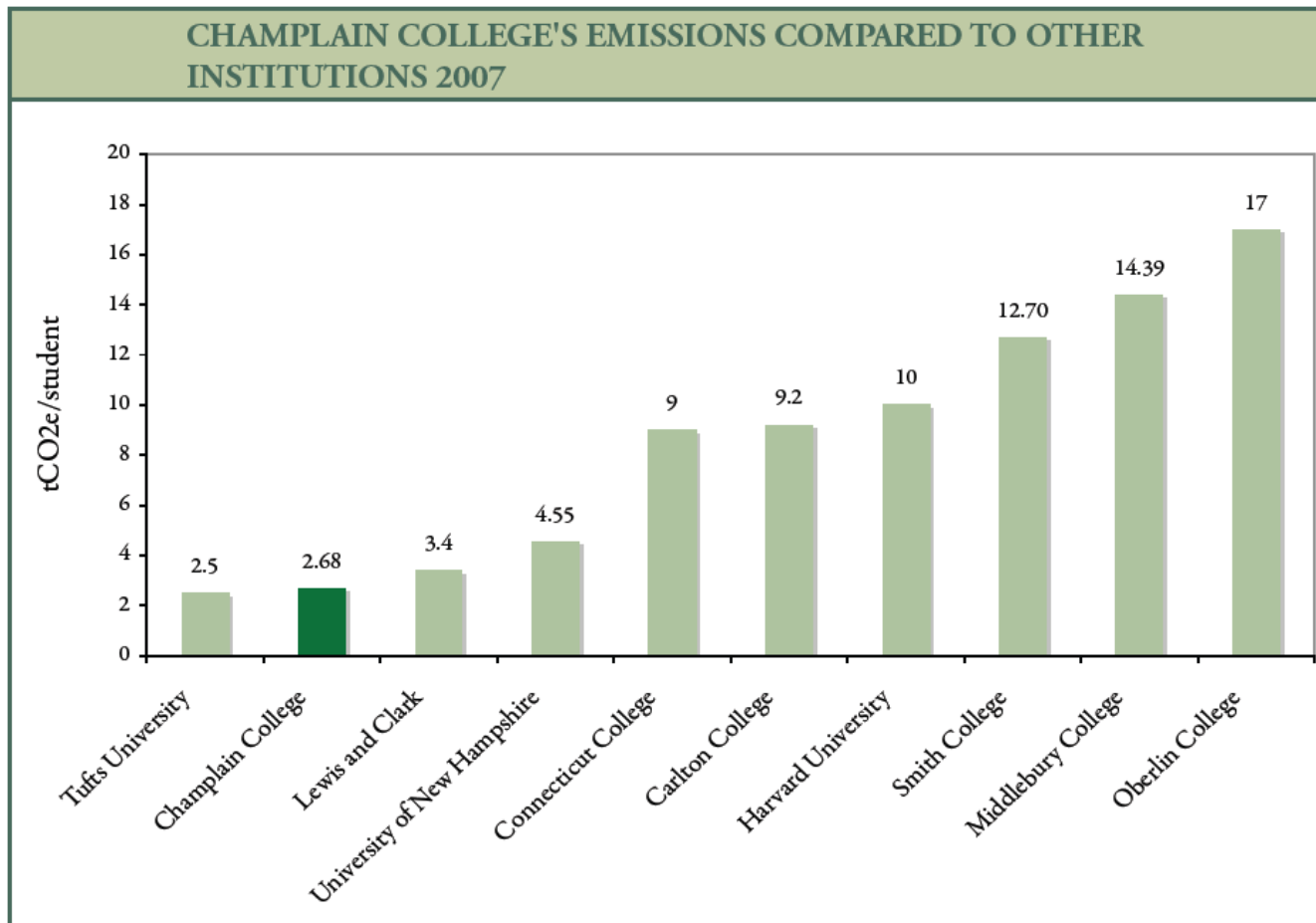
Champlain College: 5,237 metric tons of GHG emissions,  
July 2006 - June 2007



# Adjusted for “productivity”



# How do you stack up?



# GHG calculation example #1

$\text{CO}_2\text{e emissions} = \text{usage} * \text{emissions factor}$

Example #1:

Used 100 gallons of diesel in your fleet

EF = 10.15 kgCO<sub>2</sub>e/gallon (Source: WRI)

Emissions = 100 gallons \* 10.15 kgCO<sub>2</sub>e/gallon  
= 1015 kgCO<sub>2</sub>e

1015 kgCO<sub>2</sub>e/1000 = 1.015 metric tons CO<sub>2</sub>e

1.015 metric tons CO<sub>2</sub>e \* 1.103 = 1.119 short tons CO<sub>2</sub>e

# GHG calculation example #2

$\text{CO}_2\text{e emissions} = \text{usage} * \text{emissions factor}$

Example #2:

Used 10,000 kWh of in your facility

EF = 0.243 kgCO<sub>2</sub>e/kWh (source: BED fuel mix)

Emissions = 10,000 kWh \* 0.243 kgCO<sub>2</sub>e/kWh  
= 2,430 kgCO<sub>2</sub>e

2,430 kgCO<sub>2</sub>e/1000 = 2.430 metric tons CO<sub>2</sub>e

2.430 metric tons CO<sub>2</sub>e \* 1.103 = 2.68 short tons CO<sub>2</sub>e

# GHG calculation example #3

$\text{CO}_2\text{e emissions} = \text{usage} * \text{emissions factor}$

Example #3:

Flew roundtrip from Burlington to Los Angeles (4,980 miles)

EF = 0.36 kgCO<sub>2</sub>e/passenger-mile (source: GHG Protocol)

Emissions = 4,980 miles \* 0.36 kgCO<sub>2</sub>e/passenger-mile  
= 1,793 kgCO<sub>2</sub>e

1,793 kgCO<sub>2</sub>e/1000 = 1.79 metric tons CO<sub>2</sub>e

1.79 metric tons CO<sub>2</sub>e \* 1.103 = 1.98 short tons CO<sub>2</sub>e

# Emissions Factor Sources

Greenhouse Gas Protocol / World Resources Institute

[www.ghgprotocol.org](http://www.ghgprotocol.org)

U.S. Energy Information Administration

[www.eia.doe.gov](http://www.eia.doe.gov)

U.S. Environmental Protection

[www.epa.gov](http://www.epa.gov)

International Energy Agency Data Services

<http://data.iea.org>

# The final word

Business is the most influential institution on the planet – through its values and practices it has the power to change the world...



AMERICAN  
**FLATBREAD**



MAIN STREET LANDING



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