# Monitoring Greenhouse Gas emissions to improve operations

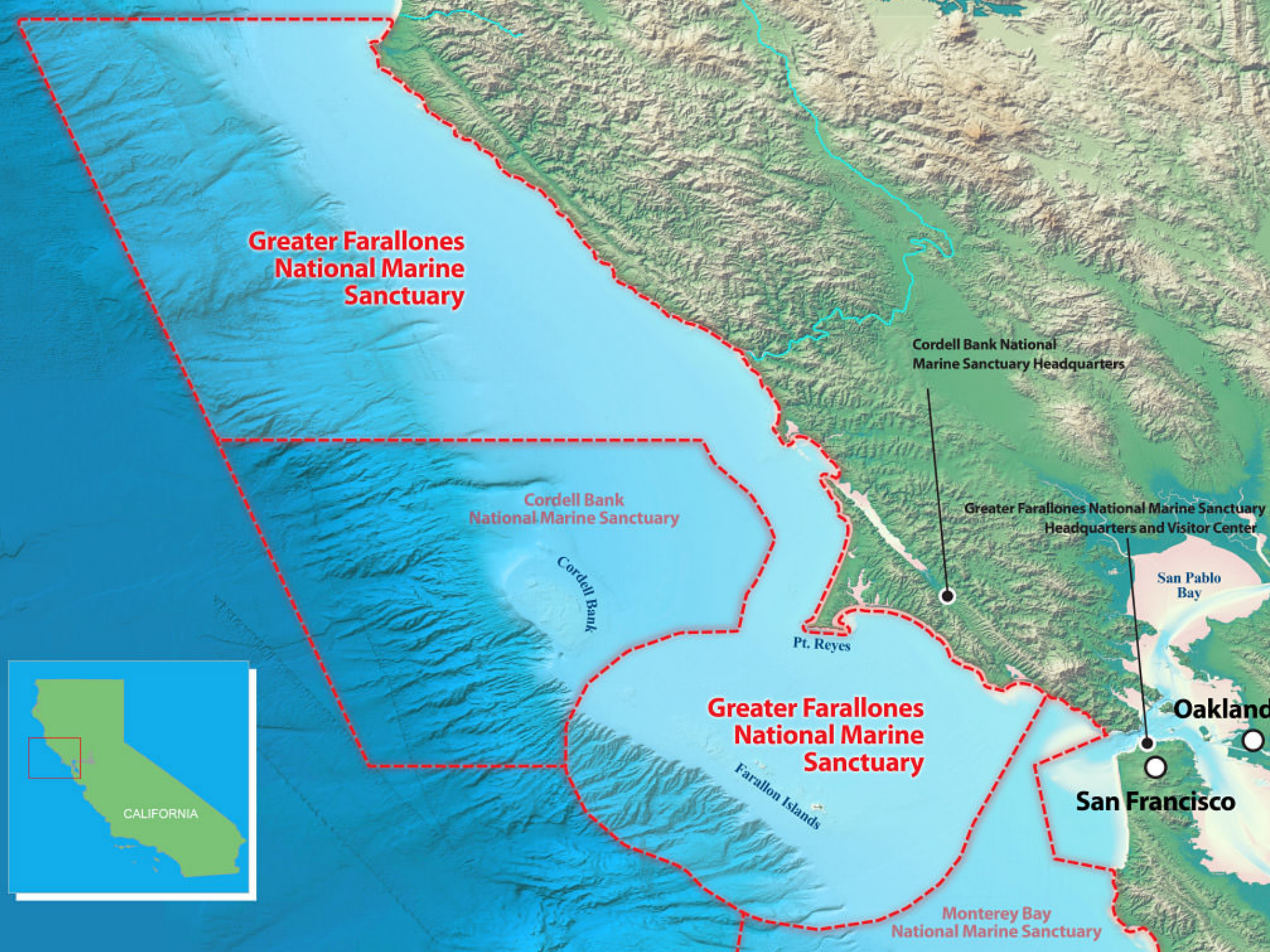
at

Greater Farallones National Marine Sanctuary

July 12, 2016

Golden Gate National Parks

Partner Meeting


Greater Farallones
National Marine
Sanctuary
Cordell Bank National
Marine Sanctuary Headquarters
Greater Farallones National Marine Sanctuary
Headquarters and Visitor Center
Cordell Bank
National Marine Sanctuary
Cordell Bank
San Pablo
Bay
Pt. Reyes
Greater Farallones
National Marine
Sanctuary
Oakland
Farallon Islands
San Francisco
CALIFORNIA
Monterey Bay
National Marine Sanctuary

# Greater Farallones National Marine Sanctuary

- We protect the wildlife and habitats of one of the most diverse and bountiful marine environments in the world
- 3,295 square miles of federally protected ocean waters off the northern and central California coast
- Internationally significant marine ecosystem
- Many threatened & endangered species, over 400 submerged cultural resources
- 30 staff, 3 buildings in Presidio

# Ocean Climate Program

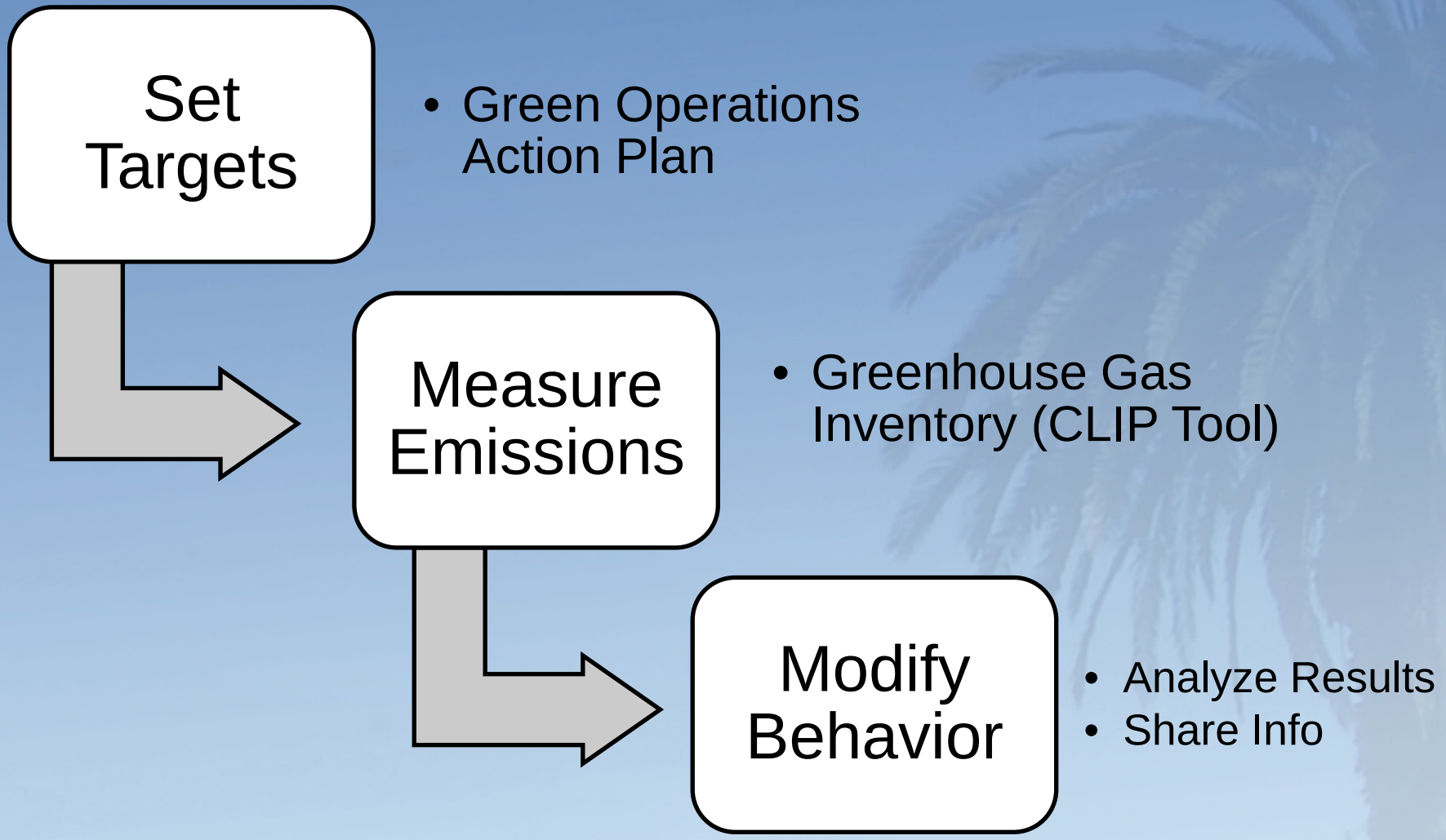
- Green Operations planning started in 2006 as the first initiative of our new Ocean Climate Program
- Address climate change impacts in the North-central California coast and ocean region
- Foster awareness, advocate solutions, and promote action among government agencies, public & private organizations, and individuals

# Vision

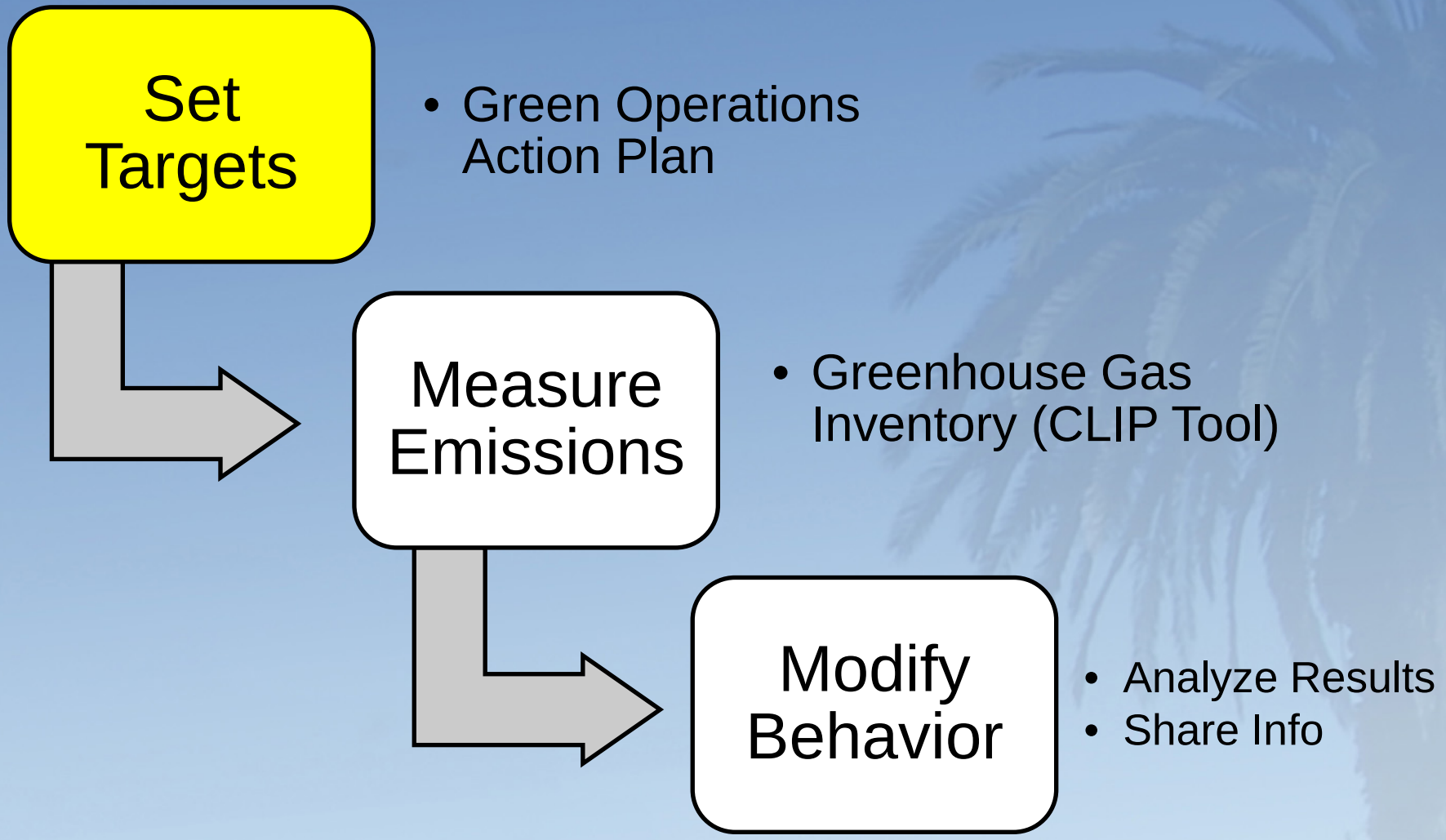
*Improve the energy conservation and efficiency of our Crissy Field campus*

- Draft and implement a Green Operations Action Plan
- Measure Greenhouse Gas Emissions each year
- Share information
- Modify behavior

# Process


Set Targets
• Green Operations Action Plan
Measure Emissions
• Greenhouse Gas Inventory (CLIP Tool)
Modify Behavior
• Analyze Results
• Share Info

# Process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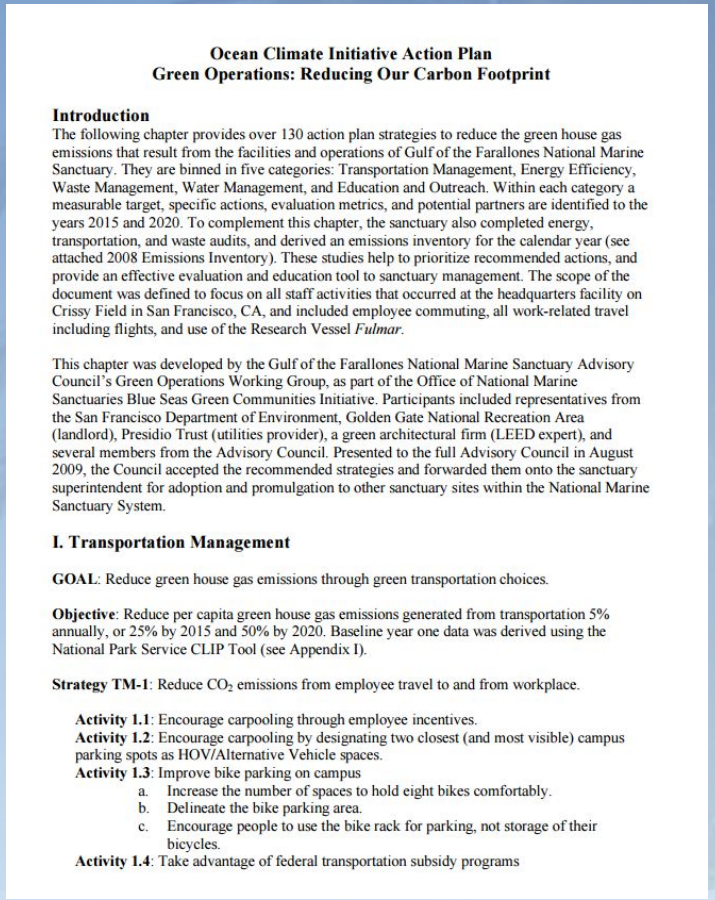
# Green Operations Action Plan

- Drafted plan with group of stakeholders; +130 actions
- 5 categories:
  - Energy
  - Transportation
  - Water
  - Waste
  - Education & Outreach
- Each category has specific actions, **measurable reduction target**, evaluation methods, and potential partners



**Ocean Climate Initiative Action Plan**
**Green Operations: Reducing Our Carbon Footprint**

**Introduction**

The following chapter provides over 130 action plan strategies to reduce the green house gas emissions that result from the facilities and operations of Gulf of the Farallones National Marine Sanctuary. They are binned in five categories: Transportation Management, Energy Efficiency, Waste Management, Water Management, and Education and Outreach. Within each category a measurable target, specific actions, evaluation metrics, and potential partners are identified to the years 2015 and 2020. To complement this chapter, the sanctuary also completed energy, transportation, and waste audits, and derived an emissions inventory for the calendar year (see attached 2008 Emissions Inventory). These studies help to prioritize recommended actions, and provide an effective evaluation and education tool to sanctuary management. The scope of the document was defined to focus on all staff activities that occurred at the headquarters facility on Crissy Field in San Francisco, CA, and included employee commuting, all work-related travel including flights, and use of the Research Vessel *Fulmar*.

This chapter was developed by the Gulf of the Farallones National Marine Sanctuary Advisory Council's Green Operations Working Group, as part of the Office of National Marine Sanctuaries Blue Seas Green Communities Initiative. Participants included representatives from the San Francisco Department of Environment, Golden Gate National Recreation Area (landlord), Presidio Trust (utilities provider), a green architectural firm (LEED expert), and several members from the Advisory Council. Presented to the full Advisory Council in August 2009, the Council accepted the recommended strategies and forwarded them onto the sanctuary superintendent for adoption and promulgation to other sanctuary sites within the National Marine Sanctuary System.

**I. Transportation Management**

**GOAL**: Reduce green house gas emissions through green transportation choices.

**Objective**: Reduce per capita green house gas emissions generated from transportation 5% annually, or 25% by 2015 and 50% by 2020. Baseline year one data was derived using the National Park Service CLIP Tool (see Appendix I).

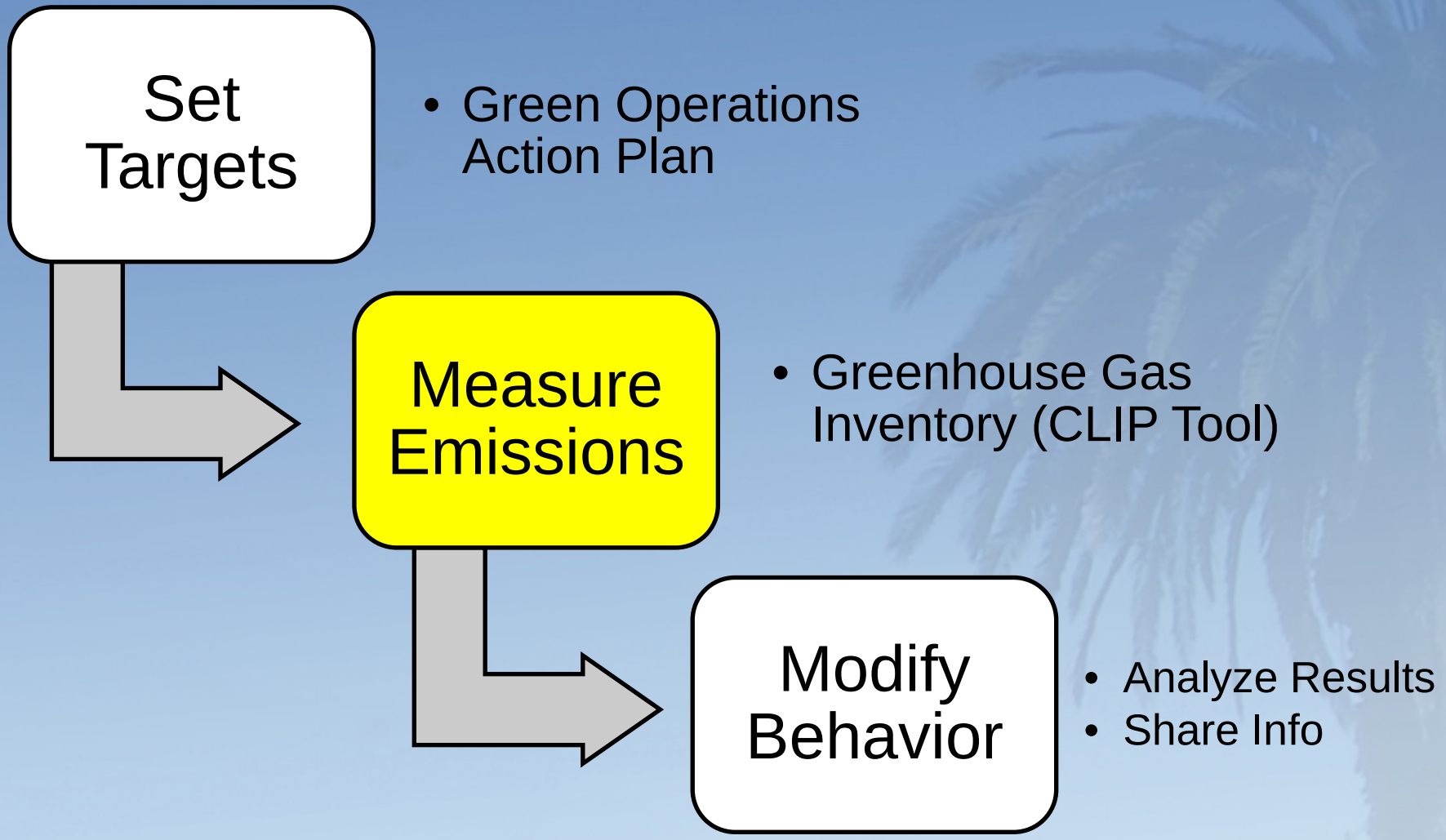
**Strategy TM-1**: Reduce $CO_2$ emissions from employee travel to and from workplace.

**Activity 1.1**: Encourage carpooling through employee incentives.
**Activity 1.2**: Encourage carpooling by designating two closest (and most visible) campus parking spots as HOV/Alternative Vehicle spaces.
**Activity 1.3**: Improve bike parking on campus
a. Increase the number of spaces to hold eight bikes comfortably.
b. Delineate the bike parking area.
c. Encourage people to use the bike rack for parking, not storage of their bicycles.
**Activity 1.4**: Take advantage of federal transportation subsidy programs

# Reduction Targets

- Energy: **Reduce** 15% by 2015 and 30% by 2020
- Transportation: **Reduce** 25% by 2015 and 50% by 2020
- Water: **Reduce** 10% by 2015 and 20% by 2020
- Waste: **Reduce** 95% by 2015 and 100% by 2020

# Process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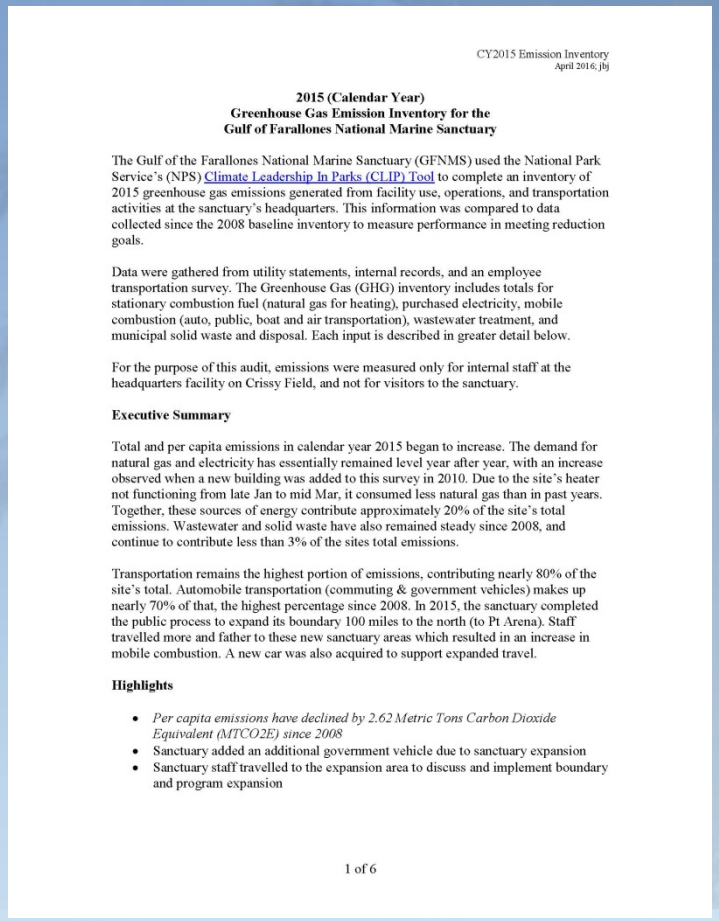
# Greenhouse Gas Inventory

- Measure energy (natural gas & electricity), transportation, wastewater, and solid waste
- National Park Service CLIP Tool
- Convert emissions to $MTCO_2E$ (per capita)
- Use 2008 as baseline

# How we measure emissions

- Staff transportation survey (Google Forms)
- Gather utility data
  - natural gas (PGE)
  - water, electricity (Trust)
  - waste (Recology)
  - vehicles (GSA + staff survey)
- Assemble data in Emissions Inventory document that serves as our final report
- Enter data in CLIP Tool



CY2015 Emission Inventory
April 2016, jbj

**2015 (Calendar Year)**
**Greenhouse Gas Emission Inventory for the**
**Gulf of Farallones National Marine Sanctuary**

The Gulf of the Farallones National Marine Sanctuary (GFNMS) used the National Park Service's (NPS) Climate Leadership In Parks (CLIP) Tool to complete an inventory of 2015 greenhouse gas emissions generated from facility use, operations, and transportation activities at the sanctuary's headquarters. This information was compared to data collected since the 2008 baseline inventory to measure performance in meeting reduction goals.

Data were gathered from utility statements, internal records, and an employee transportation survey. The Greenhouse Gas (GHG) inventory includes totals for stationary combustion fuel (natural gas for heating), purchased electricity, mobile combustion (auto, public, boat and air transportation), wastewater treatment, and municipal solid waste and disposal. Each input is described in greater detail below.

For the purpose of this audit, emissions were measured only for internal staff at the headquarters facility on Crissy Field, and not for visitors to the sanctuary.

**Executive Summary**

Total and per capita emissions in calendar year 2015 began to increase. The demand for natural gas and electricity has essentially remained level year after year, with an increase observed when a new building was added to this survey in 2010. Due to the site's heater not functioning from late Jan to mid Mar, it consumed less natural gas than in past years. Together, these sources of energy contribute approximately 20% of the site's total emissions. Wastewater and solid waste have also remained steady since 2008, and continue to contribute less than 3% of the sites total emissions.

Transportation remains the highest portion of emissions, contributing nearly 80% of the site's total. Automobile transportation (commuting & government vehicles) makes up nearly 70% of that, the highest percentage since 2008. In 2015, the sanctuary completed the public process to expand its boundary 100 miles to the north (to Pt Arena). Staff travelled more and father to these new sanctuary areas which resulted in an increase in mobile combustion. A new car was also acquired to support expanded travel.

**Highlights**

- *Per capita emissions have declined by 2.62 Metric Tons Carbon Dioxide Equivalent (MTCO2E) since 2008*
- Sanctuary added an additional government vehicle due to sanctuary expansion
- Sanctuary staff travelled to the expansion area to discuss and implement boundary and program expansion

1 of 6

# Transportation

**TARGET:** **Reduce** 25% by 2015 and 50% by 2020

**RESULTS:** **Reduced** 23% since 2008 (77% of 2015 emissions)

**Challenges** - Lack of public transit (Only PresidiGo, No Muni), long commutes for some staff, large management area

**Successes** - Carpool parking, hybrids, reduced Air travel due to budget constraints*

# Energy

**TARGET:** **Reduce** 15% by 2015 and 30% by 2020
**RESULTS:** **Reduced** 15% since 2008 (21% of 2015 emissions)

**Challenges** - Vampire loads, new building, old heater, drafty windows

**Successes** - HVAC serviced, Energy Star fridge & dishwasher, LED lights, new computers, broken heater* being replaced

# Water

**TARGET: Reduce** 10% by 2015 and 20% by 2020
**RESULT: Increased** 100% since 2008 (1% of 2015 emissions)

**Challenges** - Manual sprinkler system, recycled water source, drought, watering "historic landscape"

**Successes** - High-efficiency toilets & sinks, utilities improvements, dishwasher

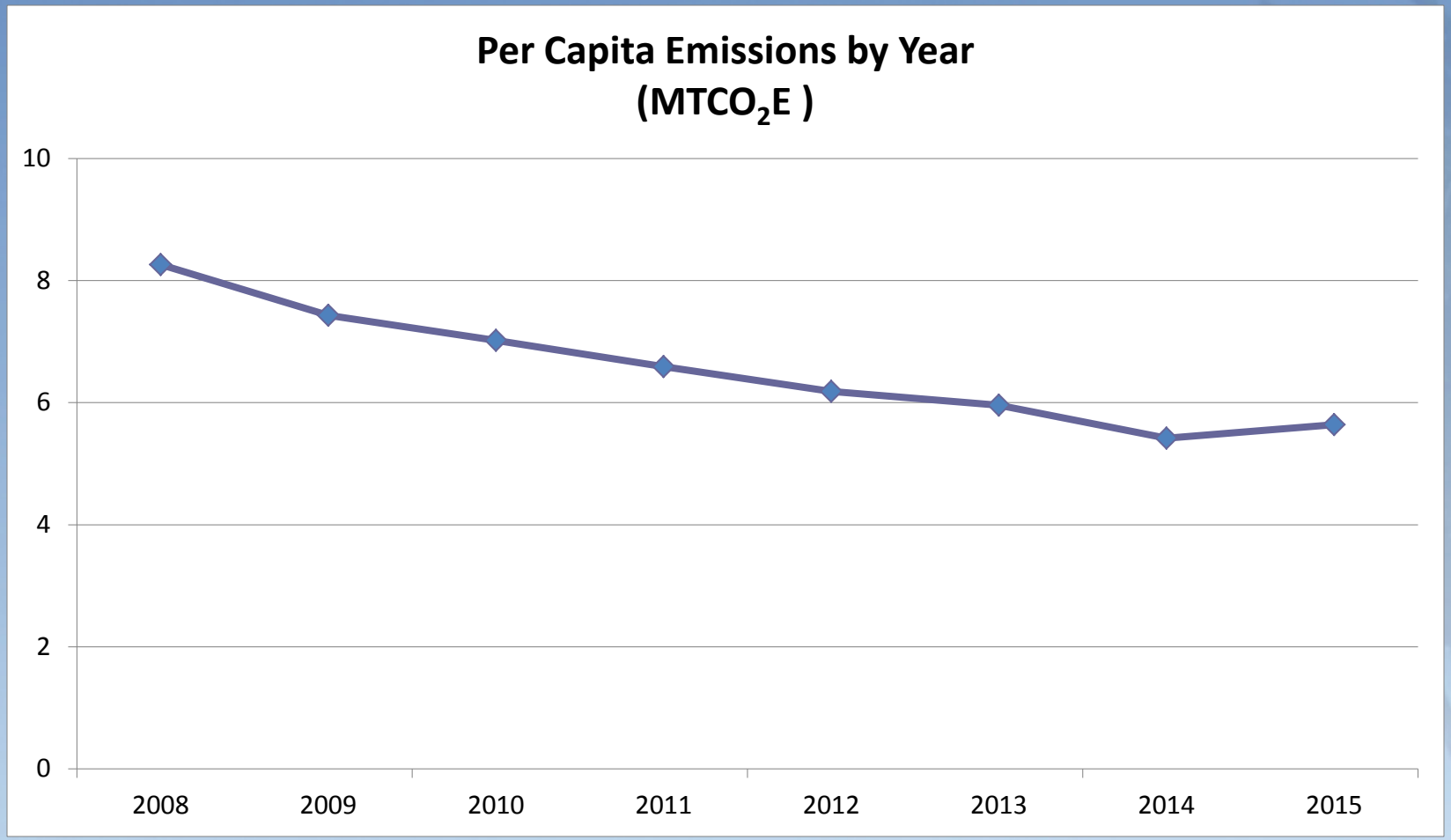
# Waste

**TARGET:** **Reduce** 95% by 2015 and 100% by 2020.
**RESULT:** **Reduced** 50% since 2008 (1% of 2015 emissions)

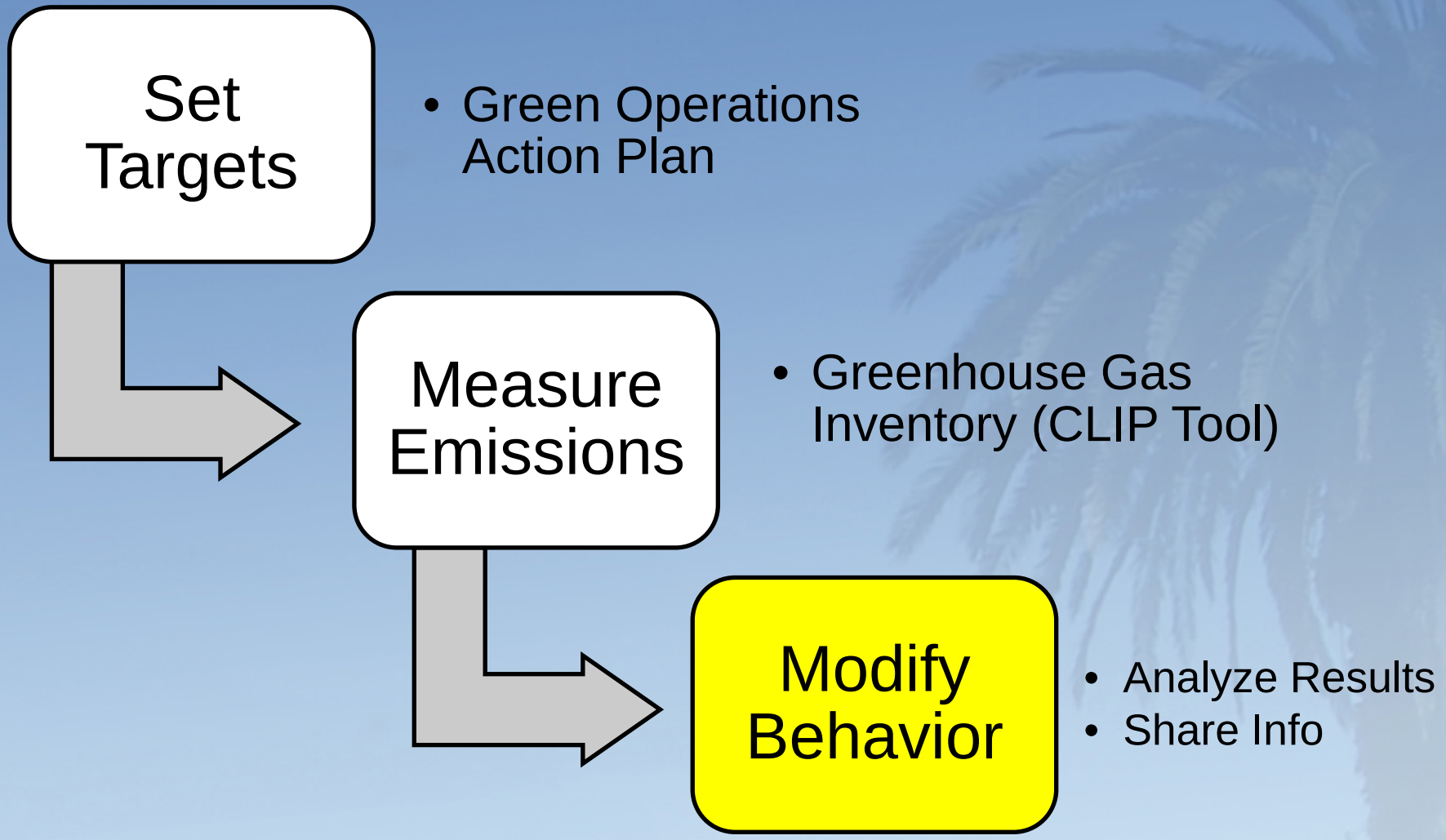
**Challenges** - Following Recology targets; unrecyclable items

**Successes** - Reusable meeting supplies, composting, junk mail, more recycle bins

# Per Capita Results



# Process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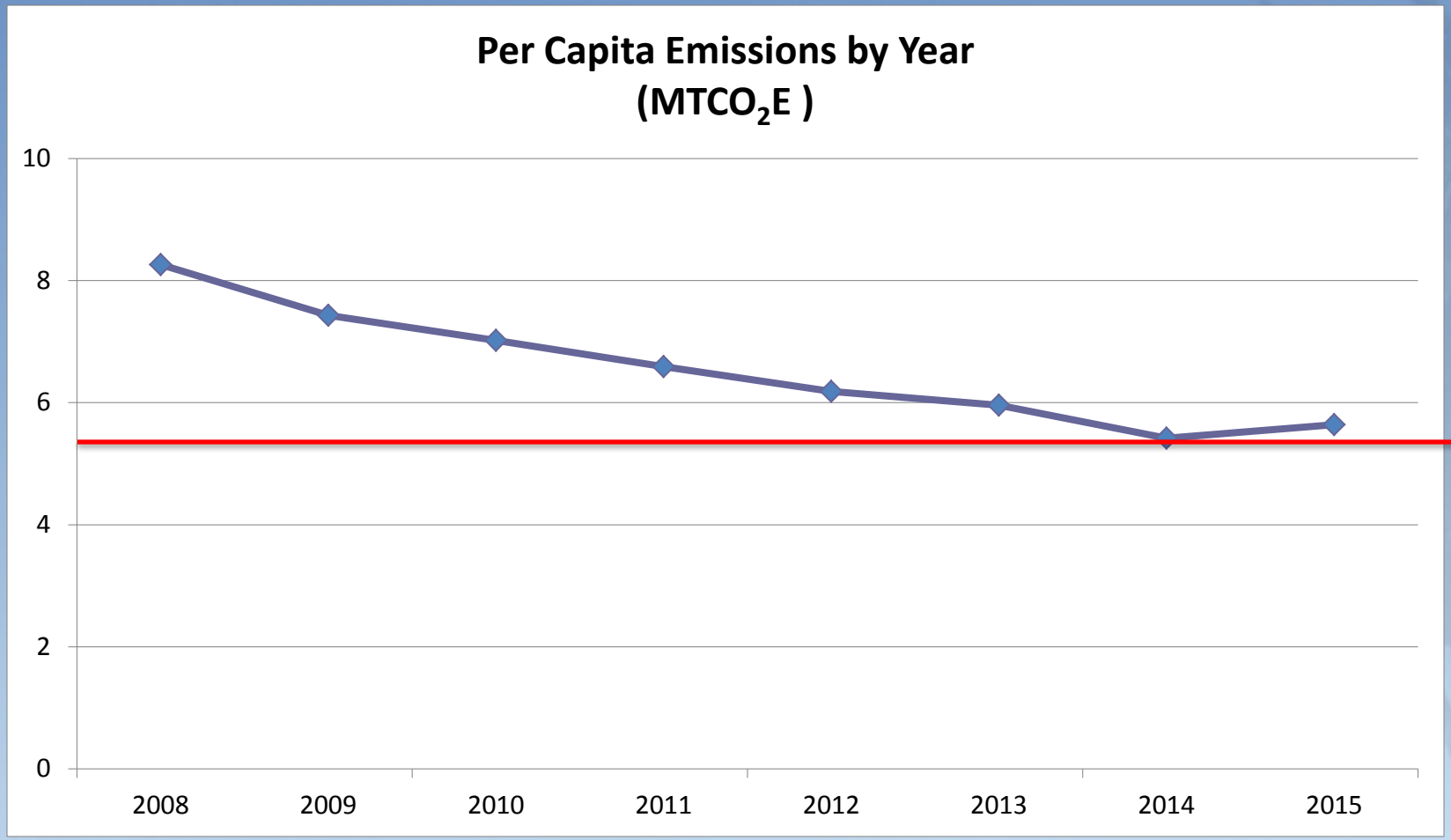
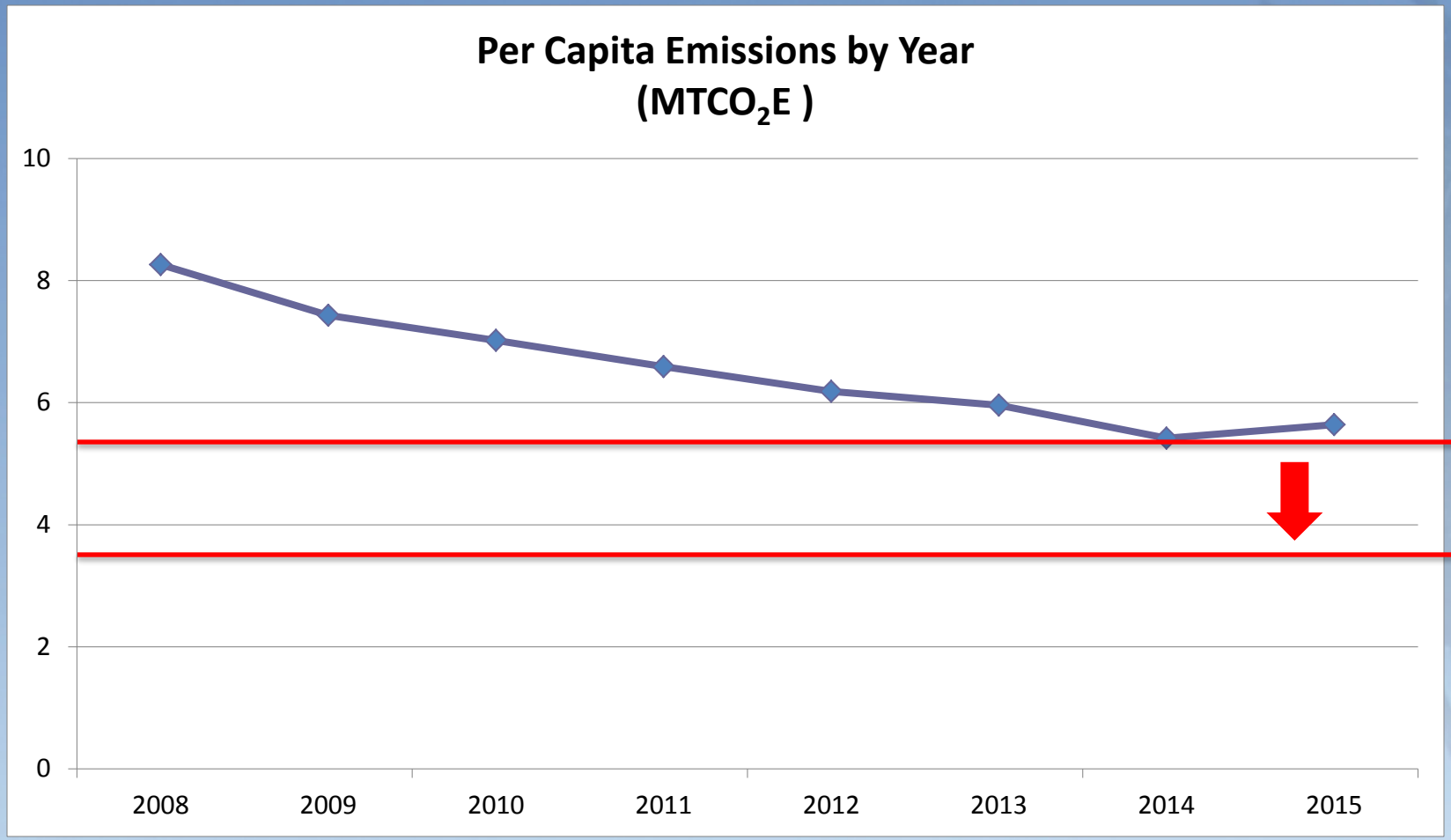
# Per Capita Results



# Per Capita Results

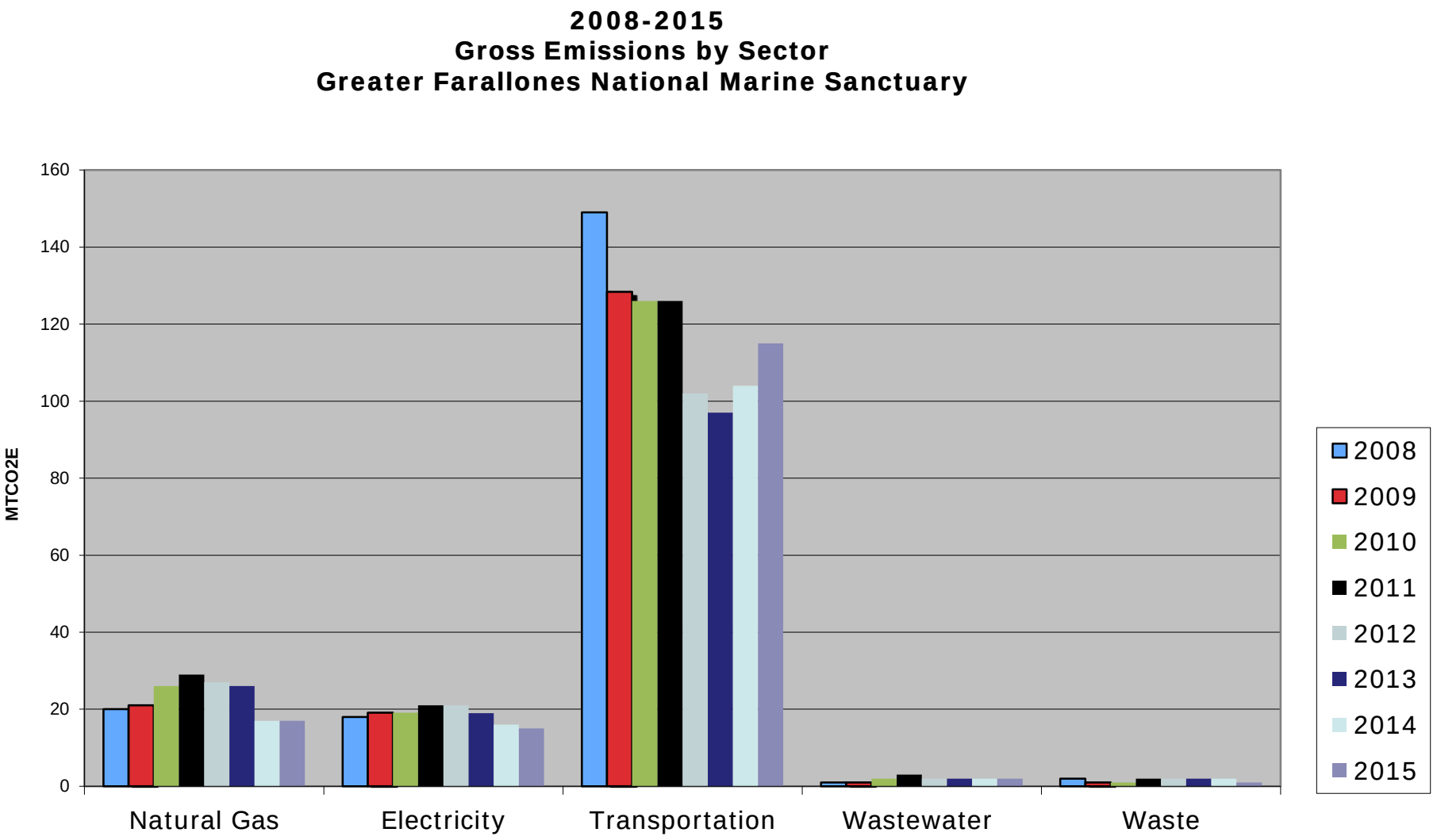


# How do we accomplish this?

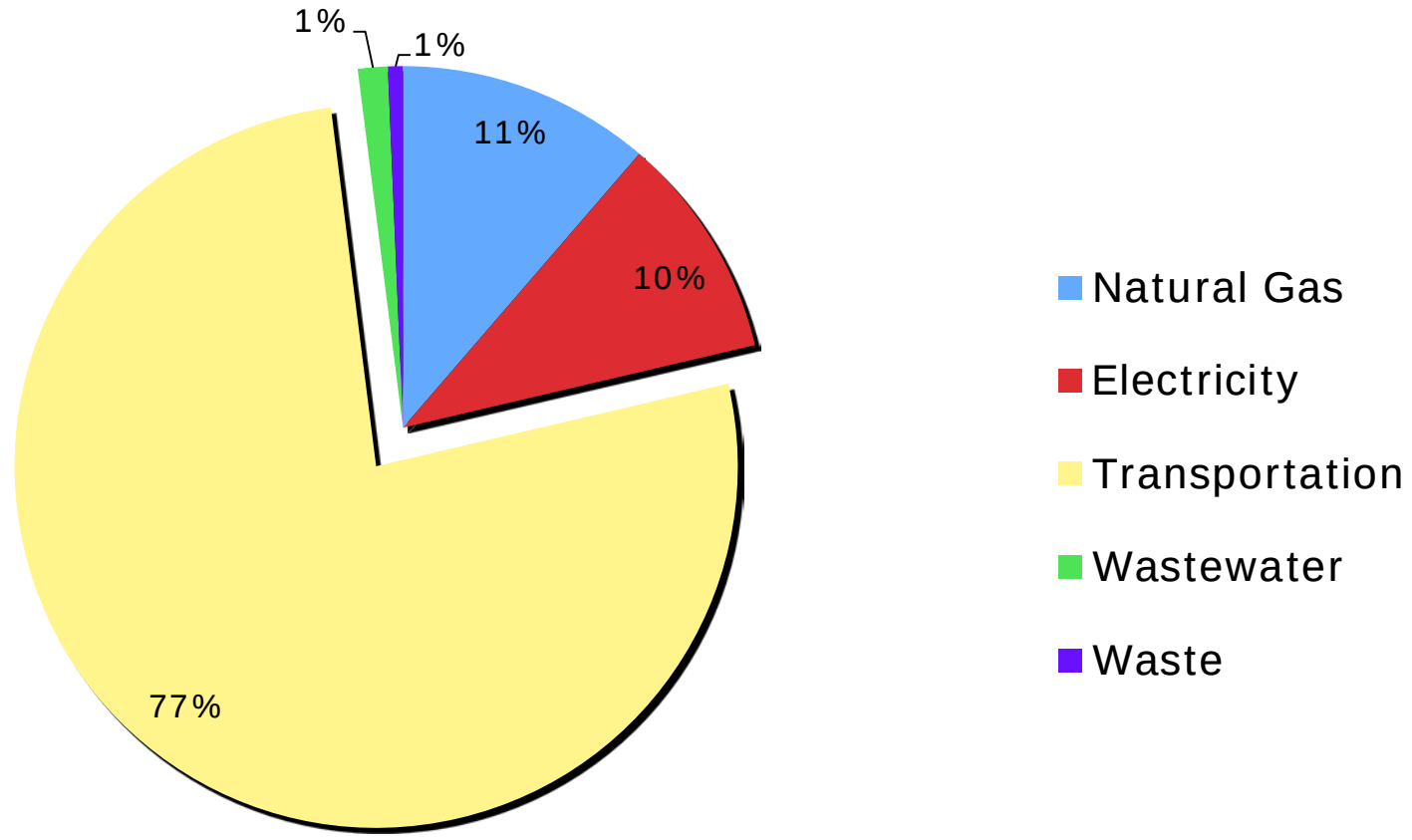
**We all have limited time and resources.**

**What should be the priorities?**

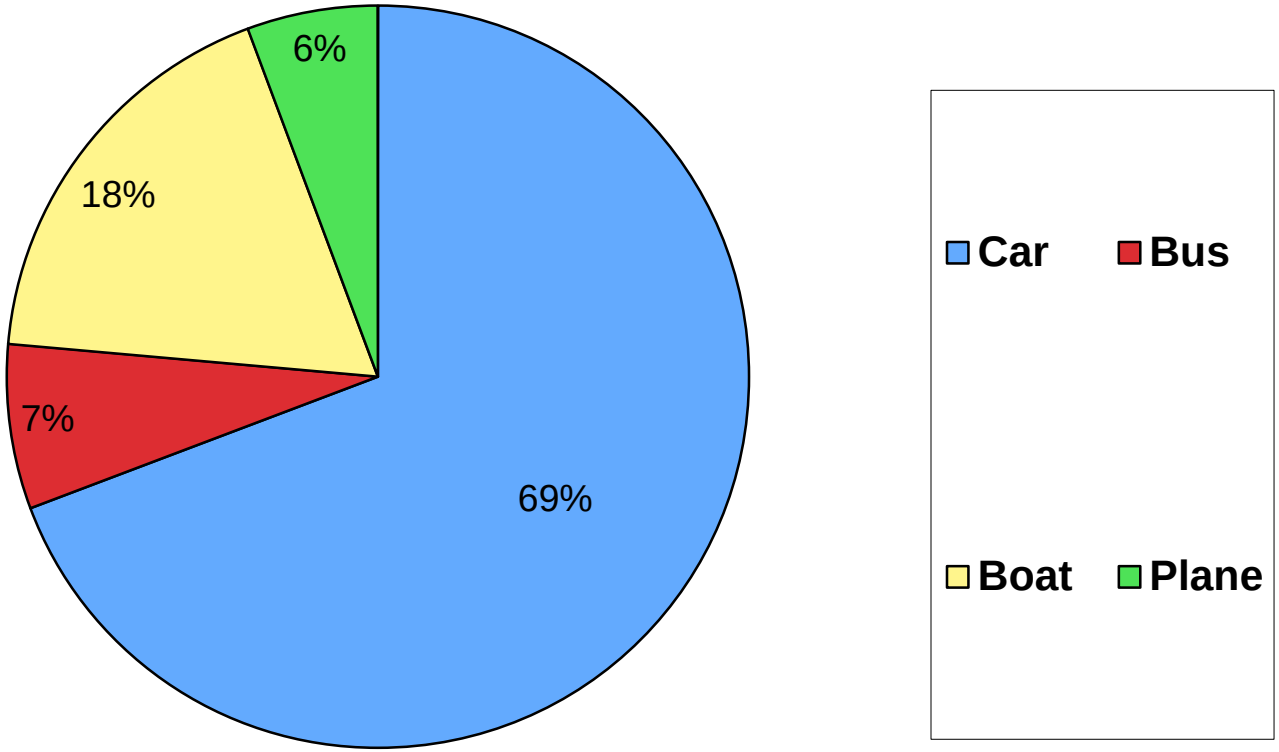
**Look more closely at the data…..**


2008-2015
Gross Emissions by Sector
Greater Farallones National Marine Sanctuary
MTCO2E
160
140
120
100
80
60
40
20
0
Natural Gas
Electricity
Transportation
Wastewater
Waste
2008
2009
2010
2011
2012
2013
2014
2015

**2015**
**Emissions as Percent of Total**
**Greater Farallones National Marine Sanctuary**



# 2015
# Transportation Emissions as Percent of Total



# 2015
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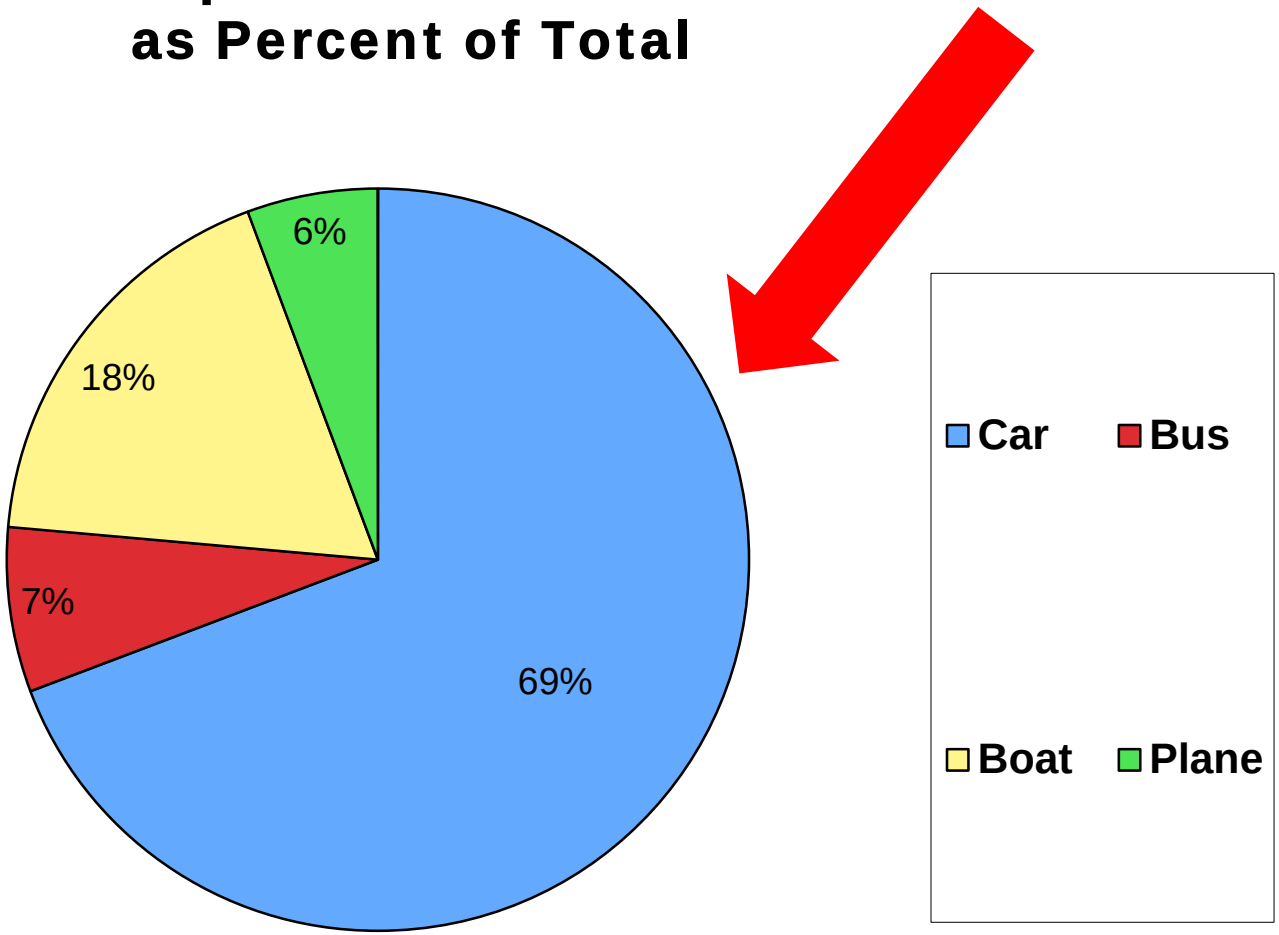

# Setting Priorities

**Use the CLIP Tool to generate target emission inputs**

**Use those target inputs to prioritize operational and budgeting decisions**

**To reach our 2020 targets, we are prioritizing the following actions….**

# Transportation

**TARGET:** **Reduce** 25% by 2015 and 50% by 2020

**REQUIRES:** **Reduce additional 40 MTCO2 by 2020**

**Action 1:** Increase telecommuting to 2 days/week

**Action 2:** Acquire biodiesel for research vessel

**Action 3:** More webinars; less auto & air travel (high speed internet)

**Action 4:** Pay for carbon offsets for all air travel

# Energy

**TARGET:** **Reduce** 15% by 2015 and 30% by 2020

**REQUIRES:** **Reduce additional 6 MTCO2 by 2020**

**Action 1:** Convert to LED lighting (SF Dept of Energy Audit-free)

**Action 2:** Install high-efficiency heater & Energy Star appliances

**Action 3:** Repair and weather-strip windows

**Action 4:** Purchase Green Power (Trust, when available)

**Action 5:** Smart power-strips

# Water

**TARGET: Reduce** 10% by 2015 and 20% by 2020
**REQUIRES: Reduce additional 1 MTCO2 by 2020**

**Action 1:** Improve or eliminate irrigation; use graywater when available

**Action 2:** Install low flush toilets and low water faucets

# Waste

**TARGET:** **Reduce** 95% by 2015 and 100% by 2020
**REQUIRES:** **Reduce additional 2 MTCO2 by 2020**

**Action 1:** Contingent on Recology meeting its 2020 WASTE ZERO goal

**Action 2:** Purchase green products and recyclable packaging

# Share Information

- Share emission data with our headquarters to change our telecommuting policy
- Train all marine sanctuary sites on this process
- Share information with Golden Gate Park partners
- Make everything available on the web
- Assist with capacity building and training
- Encourage NPS to update and web-enable CLIP Tool for parks and partners
- Encourage partners to monitor and change behaviors

# Observations

- If you don’t measure, you don’t know what to prioritize
- The measurement tool is not as important as your results (many available: NPS CLIP, EPA Portfolio Manager, etc.)
- Use trends & data to drive change in policies and behaviors
- Organizations are dynamic. Staff fluctuates, office space changes, you may grow or shrink (we tripled in size in 2015) or what you do may change over time
- Per capita or per square footage is good metric for dynamic organizations
- Transportation targets are the most challenging for us. We welcome any suggestions to address that.

# More Information

farallones.noaa.gov

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# Definition of Carbon Dioxide Equivalent

Carbon Dioxide Equivalent (CO2e):

The universal metric unit of measurement used to indicate the global warming potential of each of the six greenhouse gases. Carbon dioxide, a naturally occurring gas that is a byproduct of burning fossil fuels and biomass as well as land-use changes and other industrial processes, is the reference gas against which the other greenhouse gases are measured (Nitrous Oxide ($N_2O$), Methane ($CH_4$), Hydrofluorocarbons (HFC)).