

The



's of GHGs

Portsmouth Facility
June 19, 2012

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Support

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's of GHGs

- A. **Why** is the focus on GHGs?
- B. **What** are GHGs?
- C. **How** do you effectively reduce GHGs?



Fed'l Government Drivers for Sustainability

Goals of EO 13514



1. Reduce GHG emissions
2. Improve water use efficiency and management
3. Promote pollution prevention and eliminate waste
4. Advance regional and local integrated planning
5. Implement high-performance, sustainable building design, construction, O&M, and deconstruction
6. Advance sustainable acquisition
7. Promote electronics stewardship
8. Sustain environmental management systems

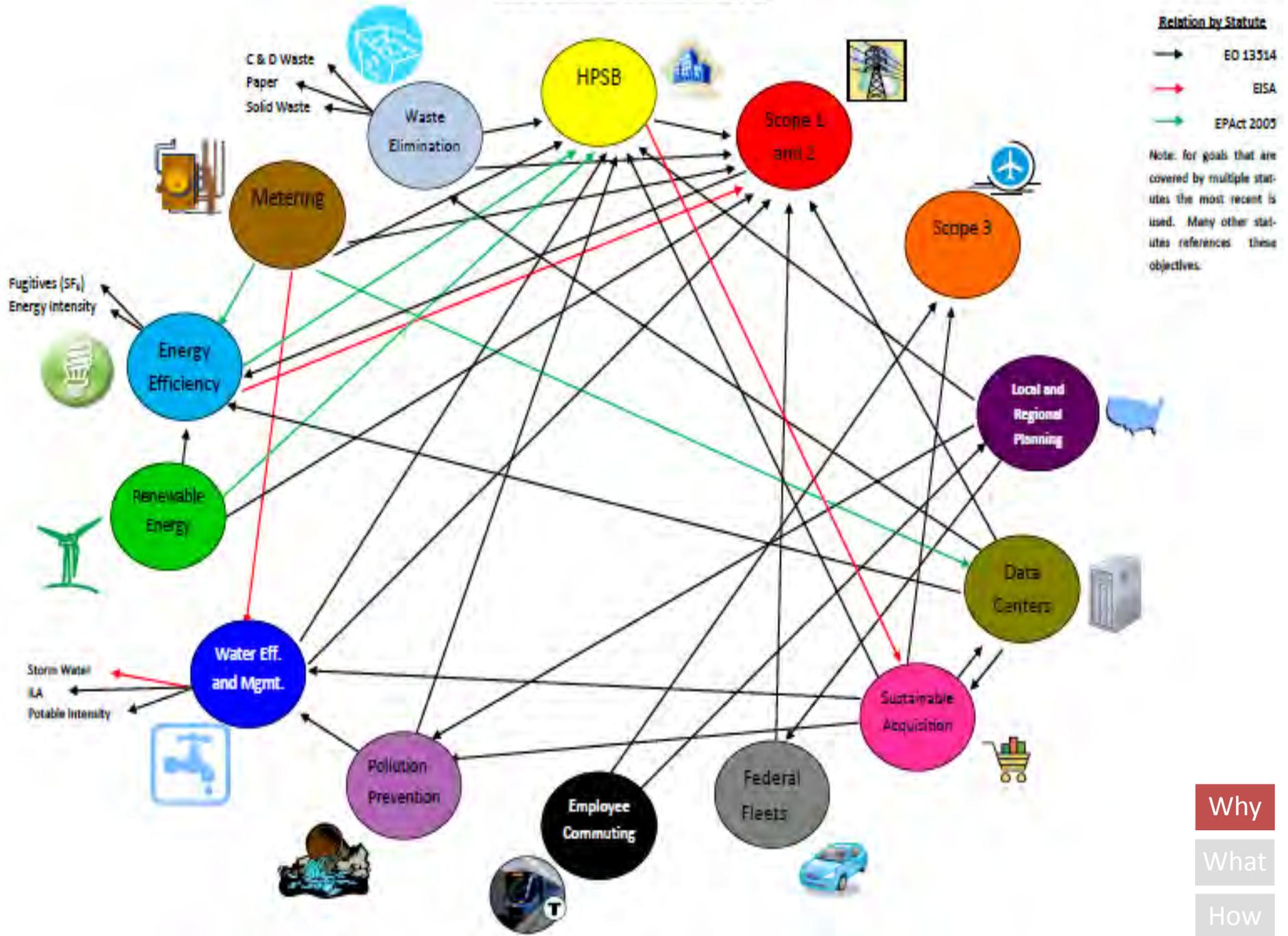
“To establish an integrated strategy towards sustainability in the Federal Government and make reduction of greenhouse gas emissions a priority for agencies.”

Why

What

How

SUSTAINABILITY WEB



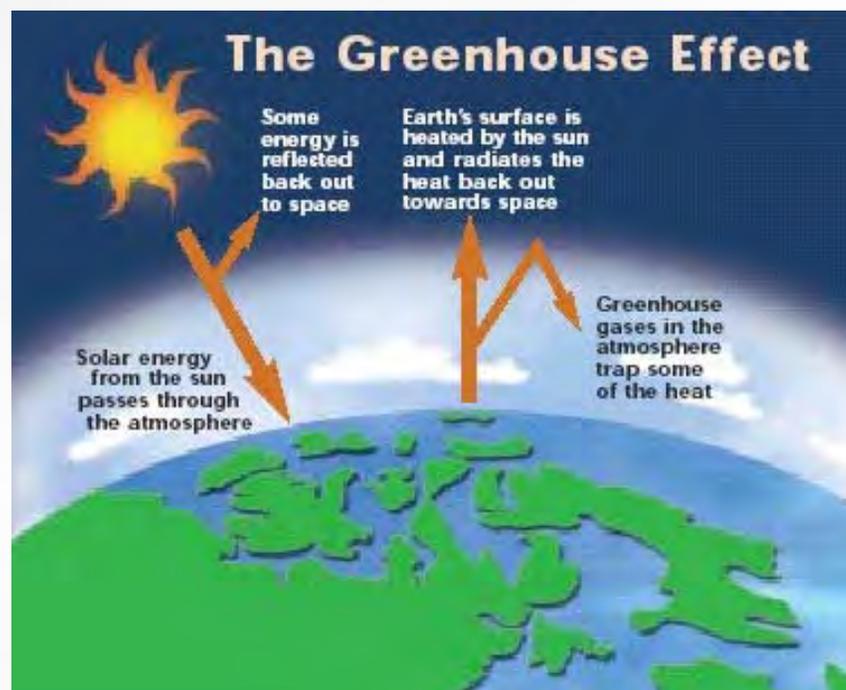
Why
What
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What are GHGs?

- ▶ Greenhouse Gases (GHGs) allow sunlight to enter the atmosphere freely. GHGs absorb and re-radiate some of the heat that would otherwise return to space. The primary GHGs include

- Carbon Dioxide (CO₂)
- Methane (CH₄)
- Nitrous Oxide (N₂O)
- Sulfur Hexafluoride (SF₆)
- Hydrofluorocarbons (HFCs)
- Perfluorocarbons (PFCs)
- Nitrogen Trifluoride (NF₃)

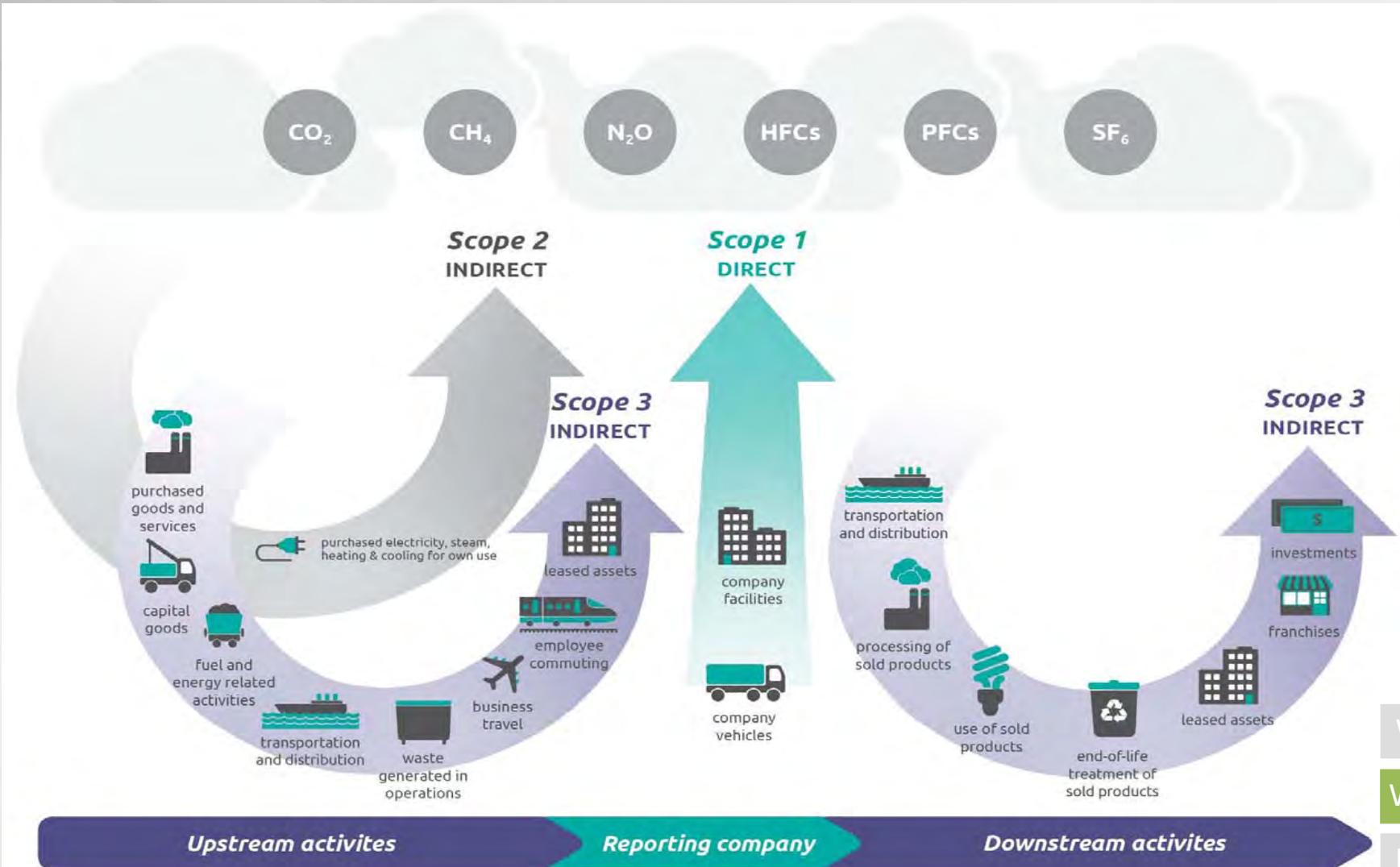


Why

What

How

GHG Emissions: Scope 1, 2, 3



Why
What
How

Modified from World Resources Institute (<http://www.ghgprotocol.org/node/178/>)

Kyoto GHGs + 1

Greenhouse Gas	Global Warming Potential ¹	Current Concentration	Common Sources
Carbon Dioxide (CO ₂)	1	384 ppm	Fossil fuel combustion, land use and land use changes
Methane (CH ₄)	21	1735-1857 ppb	Cattle, waste water treatment (WWT), landfills, rice fields, natural gas
Nitrous Oxide (N ₂ O)	310	320-321 ppb	Agriculture, mobile & stationary combustion, WWT, incineration
Sulfur Hexafluoride (SF ₆)	23,900	6.03-6.40 ppt	Magnesium casting, transformers, switches, electron microscopes, other research equipment
Hydrofluorocarbons (HFCs)	12-11,700	3.2-197 ppt	Refrigerant leaks, fire extinguishers, solvents
Perfluorocarbons (PFCs)	6,500-17,340	77-246 ppt	Aluminum production, semiconductors, health imaging
Nitrogen Trifluoride (NF ₃) ²	17,200	454 ppt	Semiconductor manufacturing

¹100 year time span

²Not a Kyoto GHG, but regulated in proposed American Clean Energy and Security Act of 2009 (aka Waxman/Markey)

Organic GHGs and some industrial gases: http://cdiac.ornl.gov/pns/current_ghg.html

High GWP gases: <http://www.epa.gov/highgwp/scientific.html>

Why

What

How



Fugitive Emissions: Main Sources of SF₆ Emissions

- ▶ Laboratories
 - Emissions from high-electricity equipment (accelerators, lasers, electron microscopes)
 - Point-source emissions from maintenance activities
 - Low-cost emissions reduction possibilities
- ▶ Power Administrations
 - Large quantities SF₆ needed to produce/transmit electricity
 - Emissions often from routine operations
- ▶ Plants/production facilities
 - SF₆ present in electrical distribution equipment, substations, transformers
 - May not be tracked in site chemical inventory

Why

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How



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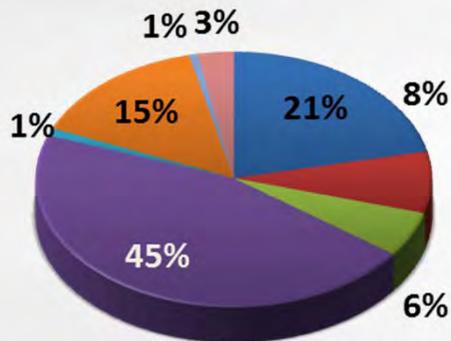
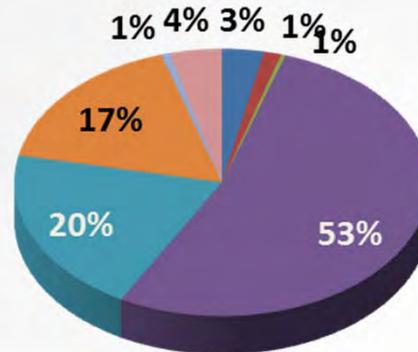
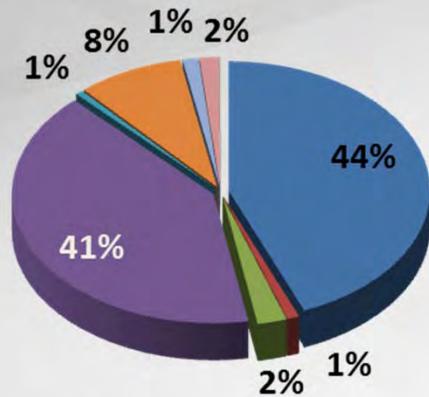
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Fugitive Emissions: DOE Fugitive Emissions Working Group

- ▶ DOE established Fugitive Emissions Working Group (FEWG) to share best practices and lessons learned
- ▶ FEWG partners reduced fugitive emissions by 40% since 2008 avoiding over 600,000 MTCO₂e
- ▶ FEWG awarded Secretary's Achievement Award in 2011



GHG Emissions at a Site Level



- Fossil Fuels
- Fleet
- Fugitives
- Electricity
- Business Travel
- Employee Commuting
- Contracted Waste & Water Mgmt
- T&D Losses

Why

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How

How do you reduce GHGs?

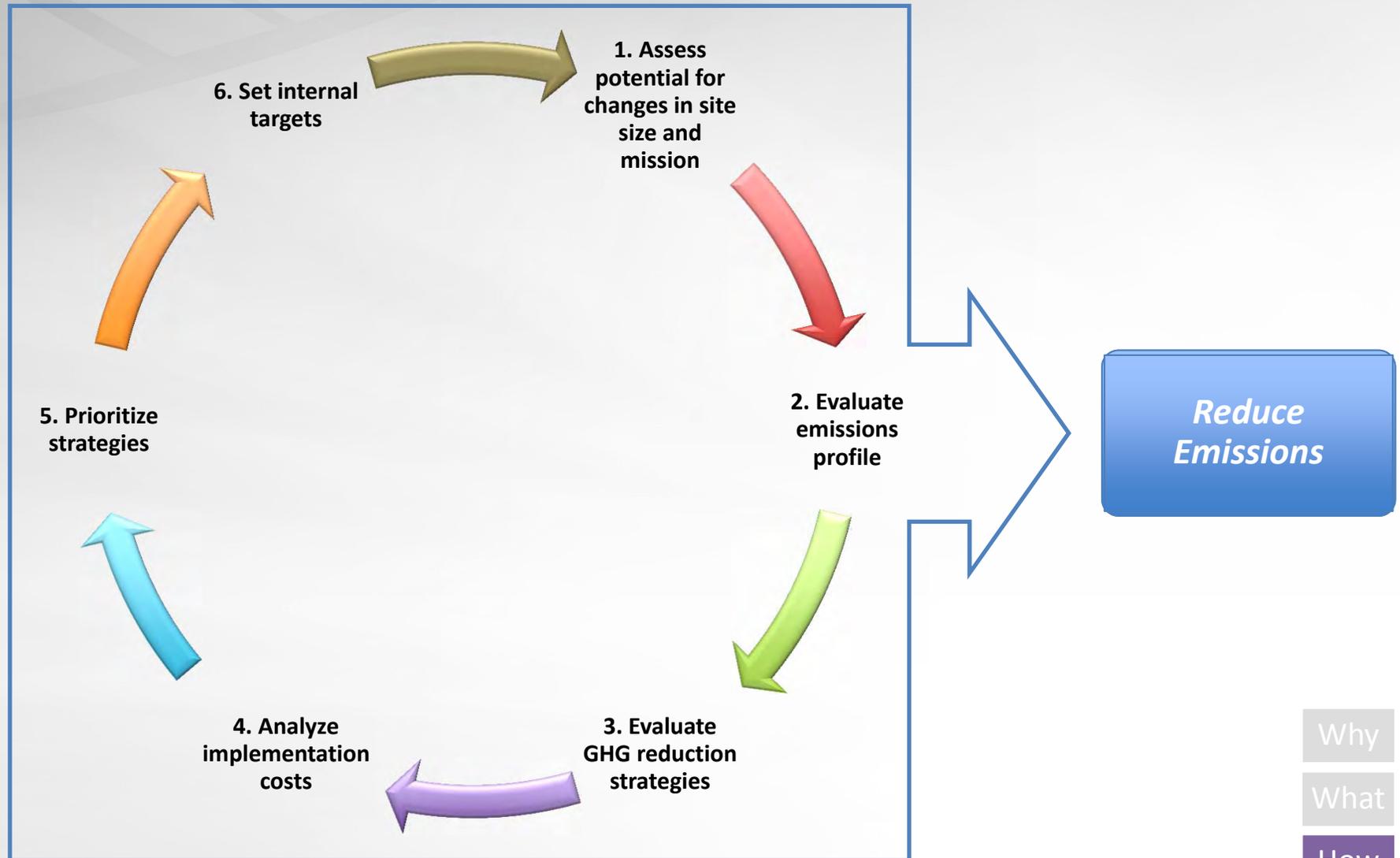
- ▶ Building energy use (scope 1 and 2)
 - Implement what has been identified during last week's assessments/what you've learned in today's Sustainable Building Operations and Building Assessments session
- ▶ Fleet energy use (scope 1)
 - Attend tomorrow's Fleet Management session
- ▶ Fugitive emissions (scope 1):
 - Focus on capturing SF₆ – *typically lowest cost opportunity*
 - Emphasize leak detection and repair
 - FEWG working to establish a marketplace for recovered SF₆
- ▶ Budgets are limited - how do you prioritize efforts??

Why

What

How

Planning for Emission Reductions



Why

What

How

What are your site's projected GHG emissions?

- ▶ Where will you be in 2020?
 - Number of employees?
 - Changes in work locations?
 - Quantity and type of D&D work?
 - Number of buildings?
 - Changes in electricity consumption profile?

- ▶ All else equal, how will that impact your:
 - Scope 1 and 2 emissions
 - Scope 3 emissions

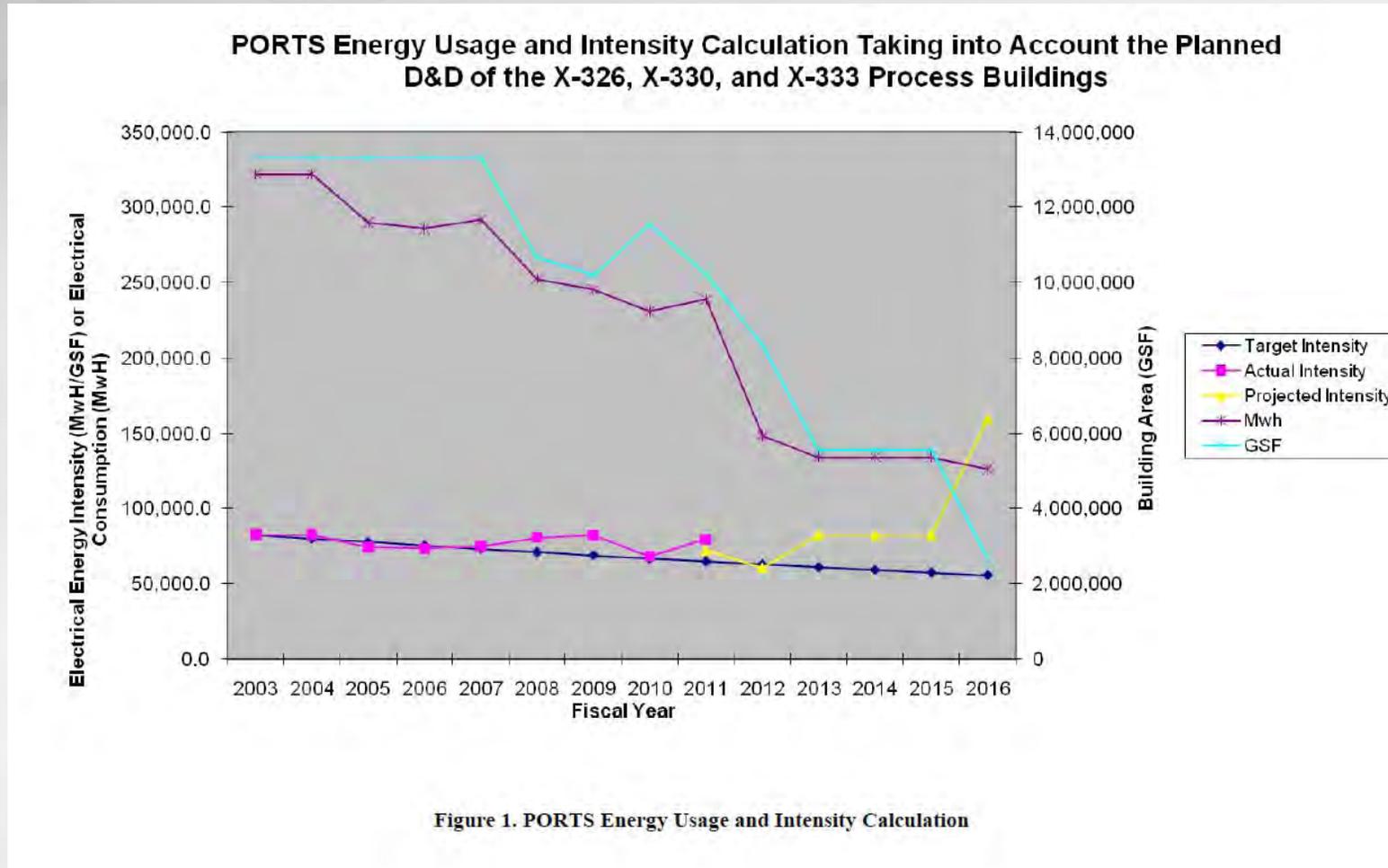
Why

What

How

PORTS' SSP: Projected Energy Usage and Intensity

Assess Potential
for Changes in
Site Size and
Mission



Why
What
How

What is your reduction potential?

Evaluate
Emissions Profile

- ▶ What is your detailed baseline performance?
- ▶ What are viable options?
- ▶ What is the GHG impact of implementing those options/alternatives?

Why

What

How

What are viable commute alternatives at PORTS?

Evaluate
Emissions Profile

- ▶ Eliminate commute
 - Telework
 - Alternative work schedules

- ▶ Travel more efficiently
 - Carpool
 - Vanpool
 - Public transit
 - Bike/walk



Why

What

How

What information can help estimate commute reduction potential?

- ▶ Worksite characteristics that affect commute behavior
- ▶ Current employee commute behavior
- ▶ Employee commute characteristics and fit with alternatives
- ▶ Awareness of alternatives and supporting programs
- ▶ Preferences for commuting alternatives
- ▶ Barriers to adoption and incentives that best promote alternatives

All but the first are addressed through standard employee commute survey questionnaires

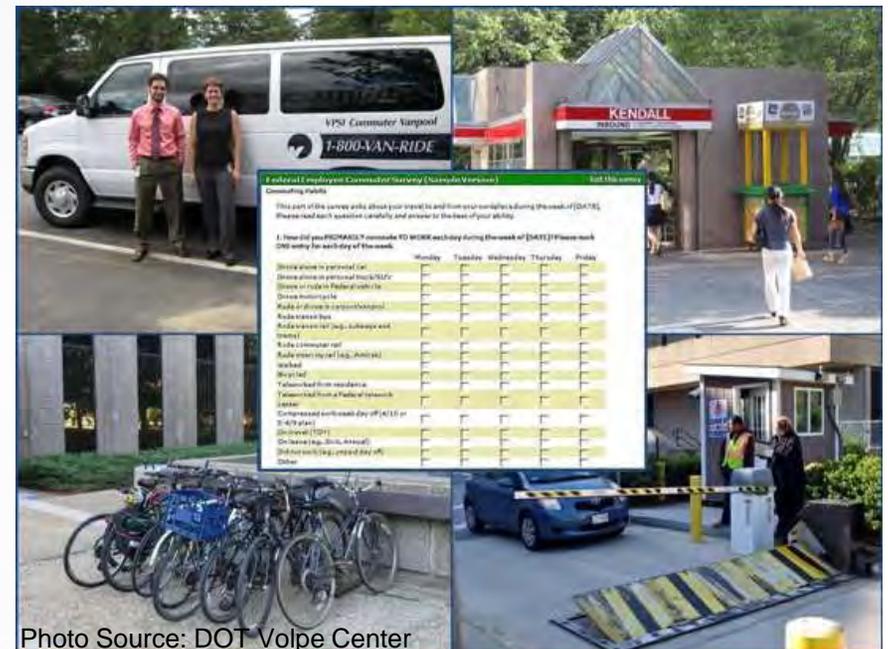


Photo Source: DOT Volpe Center

How many employees may switch modes?

Evaluate emissions profile

Example Adoption Rates

Modes	Near-term adoption rate	Long-term adoption rate
Telework	15%	40%
Alternative work schedule	20%	30%
Carpool/vanpool	10%	20%
Bus	0%	0%
Bike/walking	0%	1%

Note: Adoption rates should be based on an assumed average adoption level (e.g. 1 day/week, 5 days/week) that seems feasible for each mode.

Now, how do you get people to change??

Why

What

How

Evaluate strategies to build your program



Communications:

- Appoint teleworking advocate
- Establish centralized website to share information on alternatives
- Promote/provide ridesharing support



Policies:

- Establish formal telework policy and worker-manager agreements, provide training
- Establish guidelines for assessing employee suitability for telework
- Start a telework pilot and measure success



Infrastructure/Technology

- Implement desktop collaboration tools with video
- Remote office locations



1&2

1&2

= Scope 1 and 2 reduction benefit



= Supports business travel strategy

Why

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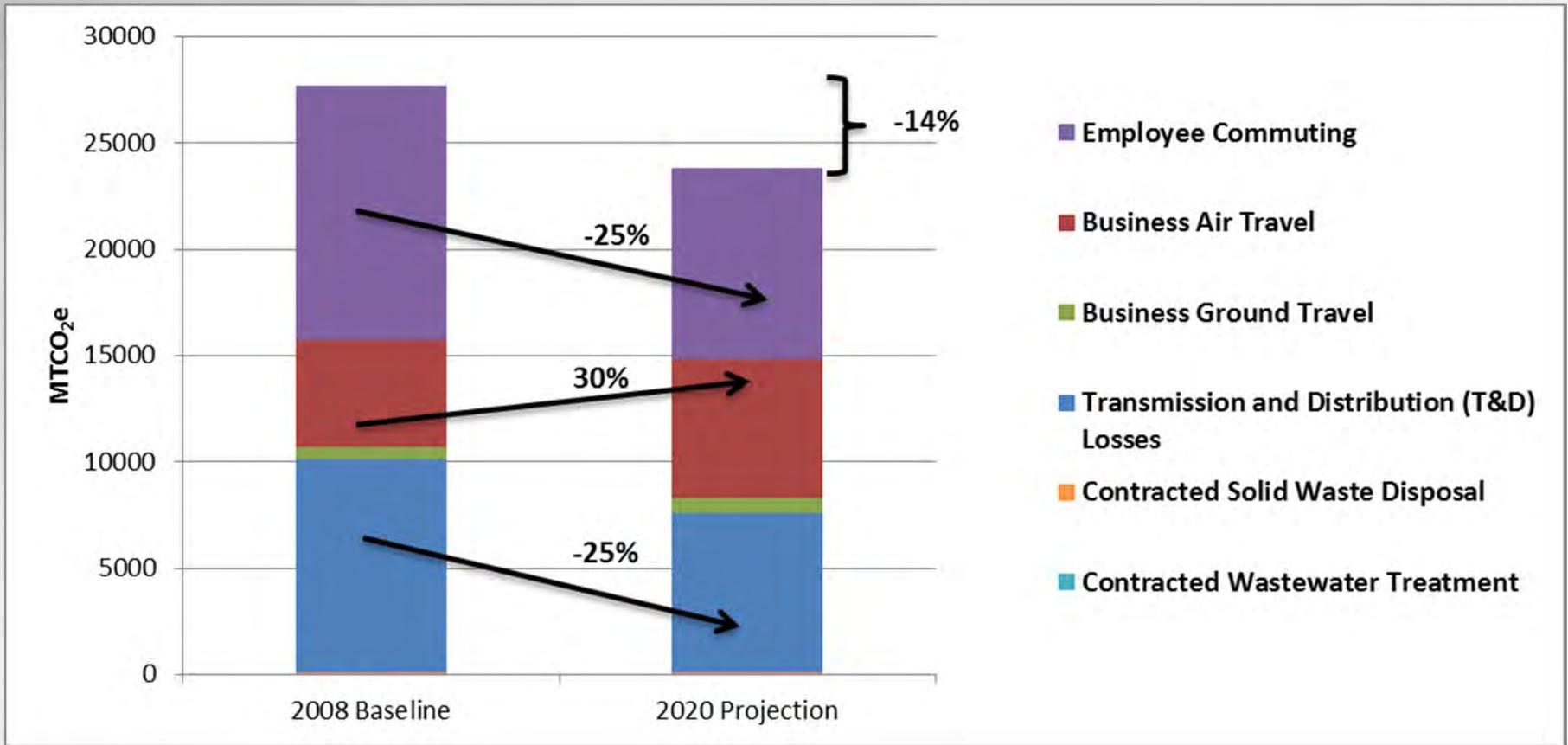
What's the most cost-effective way to reduce all Scope 3 emissions?

- ▶ Prioritize across all scope 3 reduction actions based on resources available

Scope 3 Reduction Activity	GHG Reduction	Total Cost/Savings	Cost Effectiveness (\$/MTCO ₂ e)	Overall Rank
Telework program				
Alternative work schedule program				
Carpool/Vanpool program				
Business travel				
Contracted Solid Waste reduction				
T&D losses (resulting from planned scope 2 actions)				

What percent reduction from our baseline can we achieve?

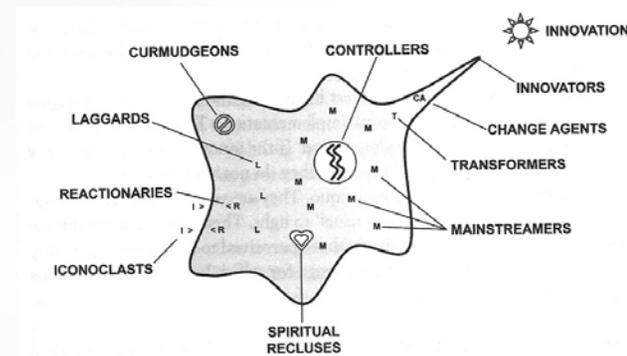
Set Targets



From Planning to Action

Reduce Emissions

- ▶ Develop a timeline based on prioritized strategies
 - ▶ Identify responsible parties for implementing strategy
 - ▶ Identify metrics to track progress against target
 - ▶ Engage leadership to encourage behavior change across all levels of the site
 - ▶ Re-evaluate strategies periodically and adjust plans based on actual progress
-
- ▶ Remember the AMOEBA
 - ▶ Report success stories!



Why

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