



# Fugitive Emissions at the Department of Energy: An Overview

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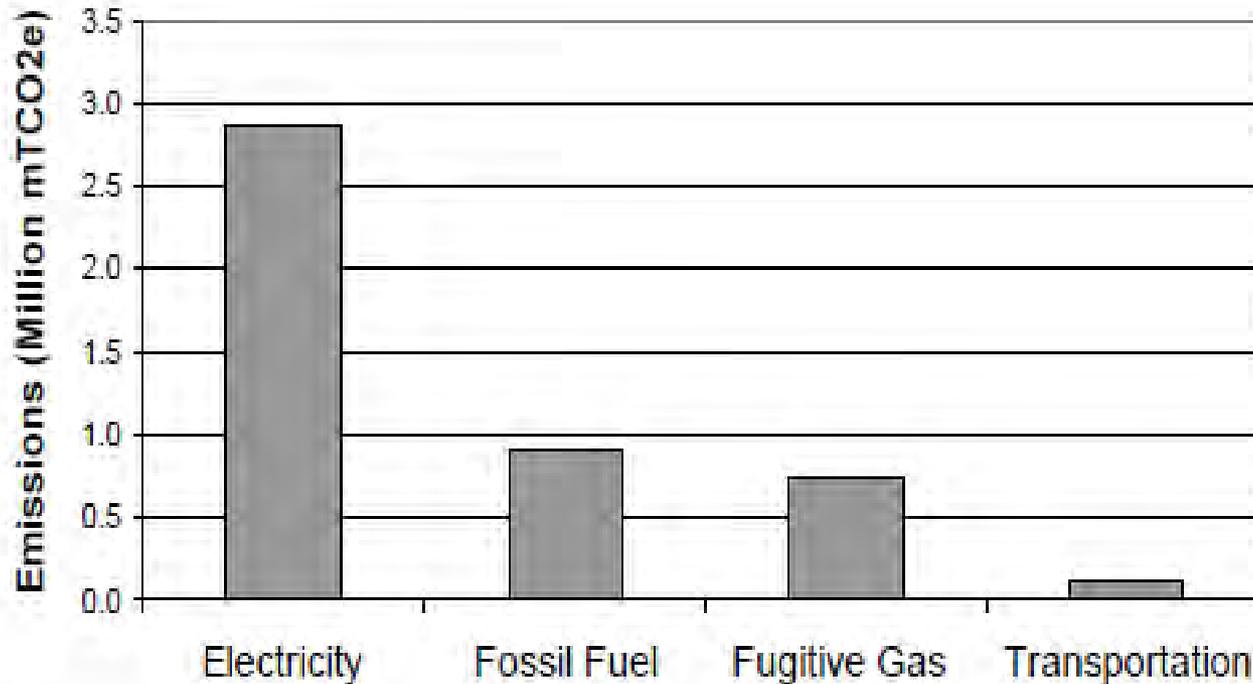
# What do we know about DOE fugitive emissions?



- Fugitive emissions comprise 14% of DOE's FY 2008 Scope 1 and 2 GHG inventory
  - Fugitive emissions reduction is highlighted in DOE's Strategic Sustainability Performance Plan (SSPP) as a key strategy for achieving DOE GHG reduction goals
- SF<sub>6</sub> emissions are the primary contributor
  - SF<sub>6</sub> is used as an electric insulator (dielectric medium) in high-voltage electrical equipment
  - Very potent GHG: global warming potential is 23,900 times greater than an equivalent amount of CO<sub>2</sub>
- Most SF<sub>6</sub> emissions result from intentional venting
  - 95% of reported SF<sub>6</sub> emissions come from nine sites
  - Over 80% come from four sites

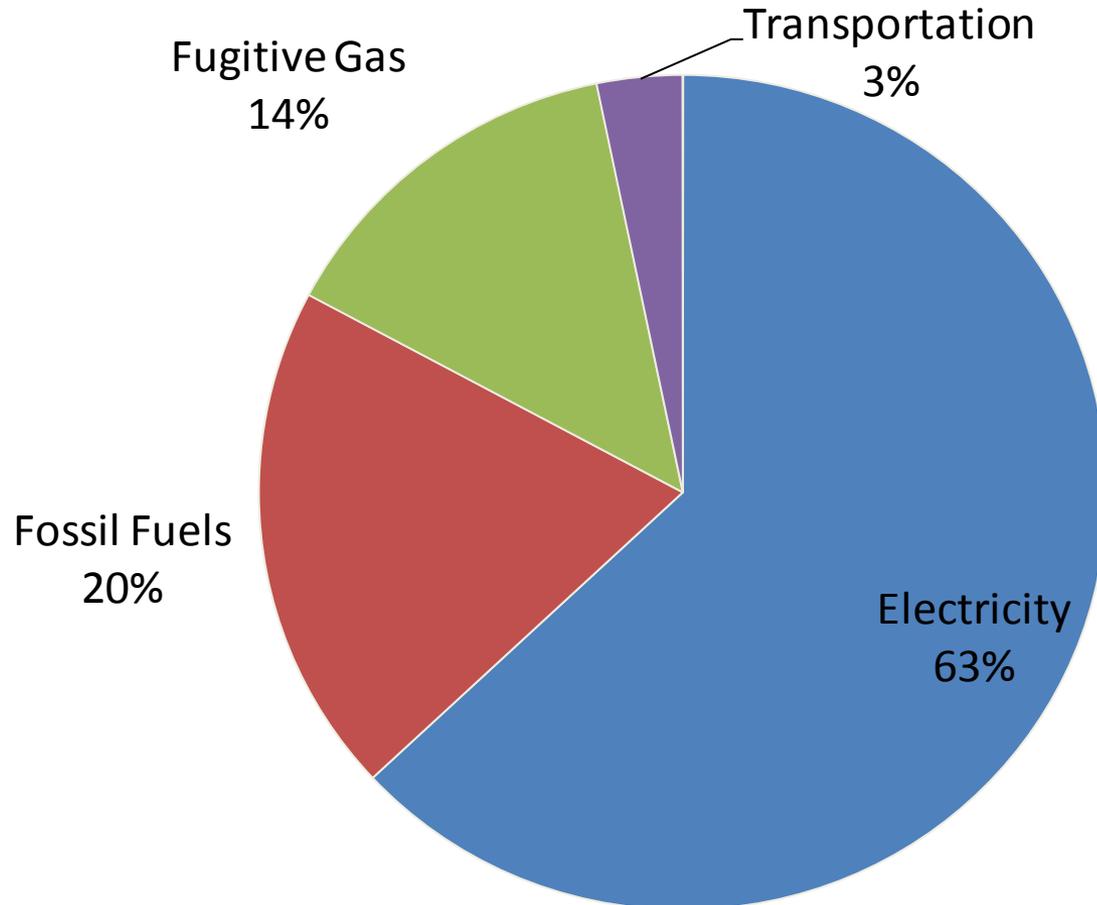


# FY08 DOE Scope 1 & 2 Emissions Inventory by Source



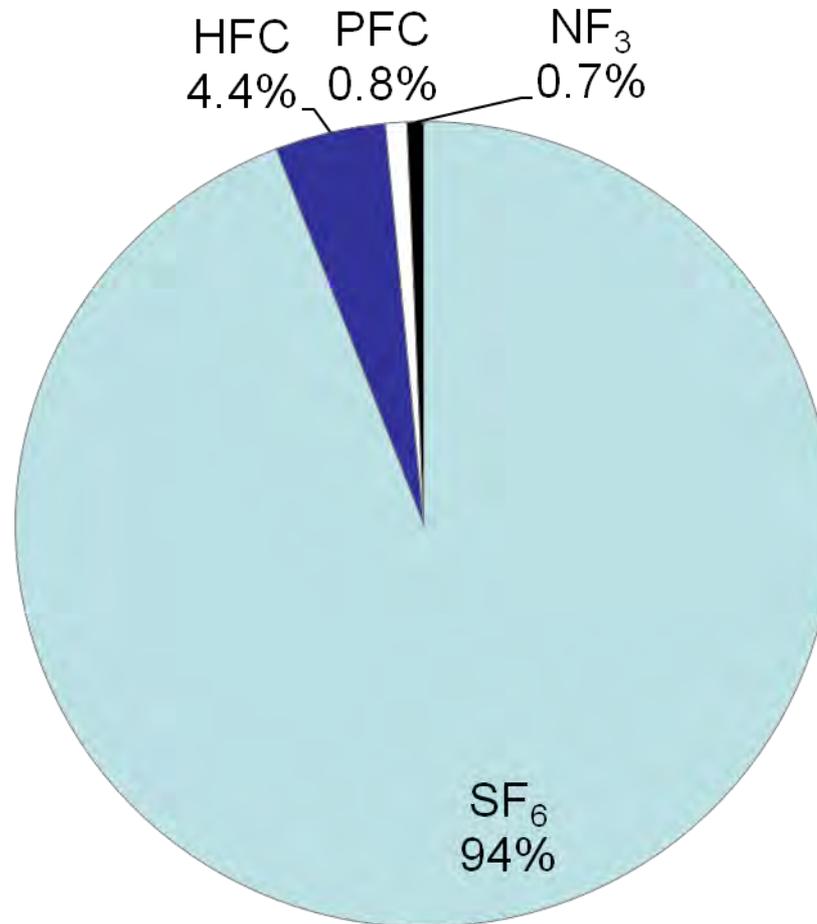


# FY08 Scope 1 & 2 Emissions by Source (4.6 MMTCO<sub>2</sub>e)





# FY08 Fugitive Gas Emissions by Type

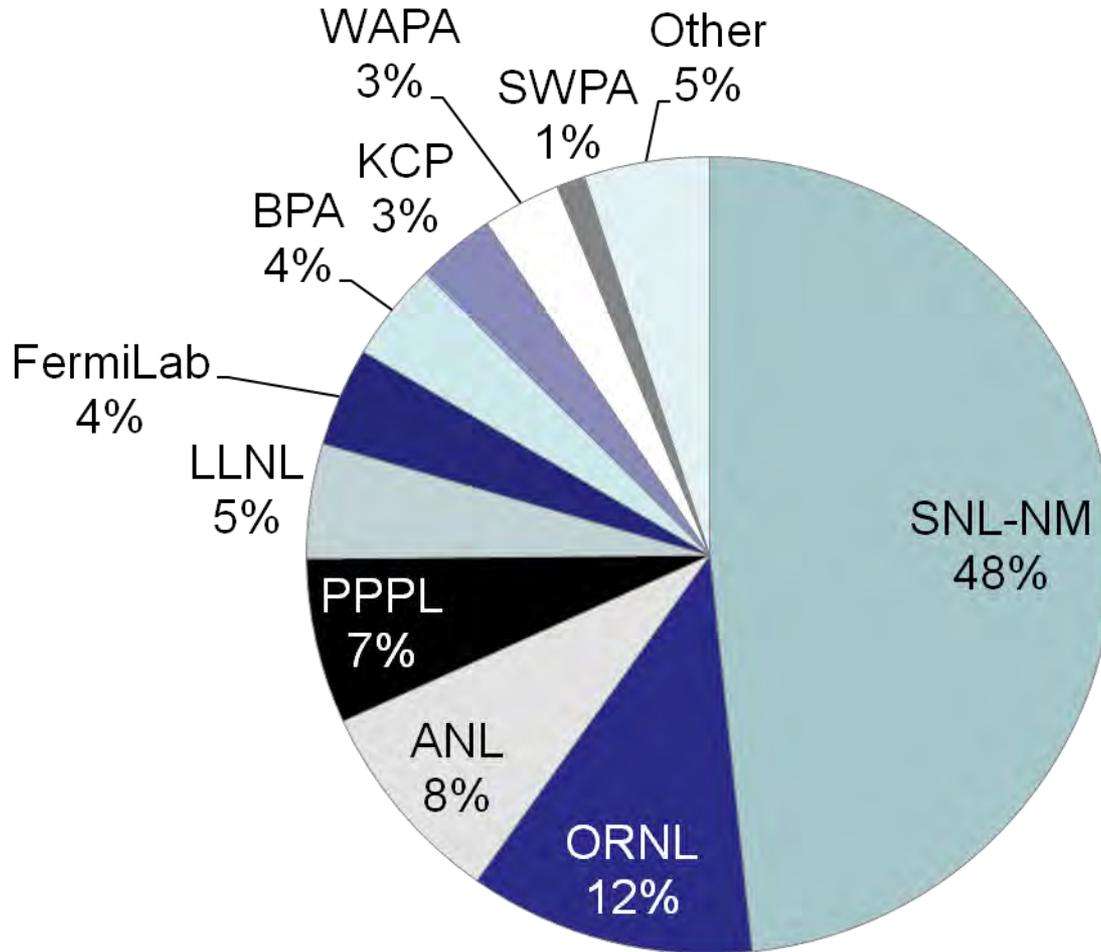


Key:  
SF<sub>6</sub>: Sulfur Hexafluoride  
HFC: Hydrofluorocarbons  
PFC: Perfluorocarbons  
NF<sub>3</sub>: Nitrogen Trifluoride



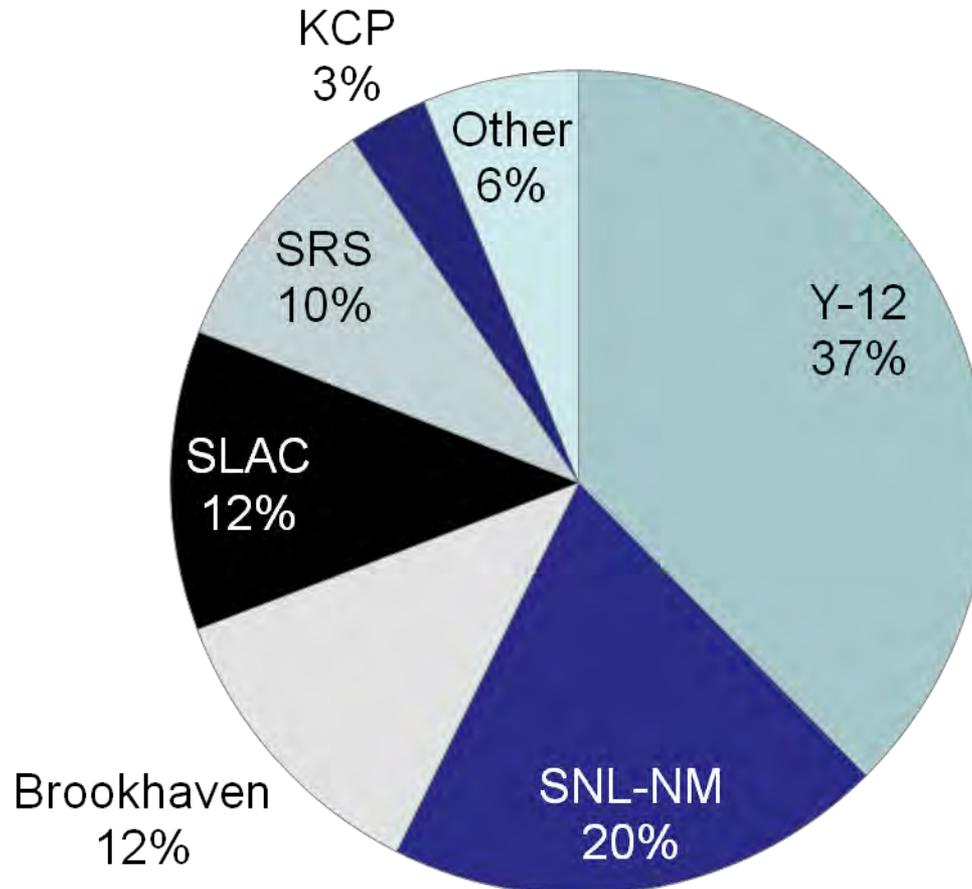
# FY08 SF<sub>6</sub> Emissions by Site

94% of DOE Fugitive Emissions





# FY08 Non-SF<sub>6</sub> Emissions by Site





# SSPP Direction for the FEWG



- DOE commits to creating a Fugitive Gas Working Group “...to share information and monitoring/control technology among sites that use non-CO<sub>2</sub> GHGs”
- Key Goals of the FEWG:
  - Identify measures to reduce leakage and recapture gases at risk of leakage when routine maintenance is performed
  - Identify environmentally preferable alternatives
- SSPP expectations for sites:
  - Modify procedures, redesign existing equipment, and/or purchase new equipment to minimize or eliminate the release of non-CO<sub>2</sub> GHGs
  - Seek out substitute gases that have lower global warming potentials



# DOE Fugitive Emissions Success Stories



- **Bonneville Power Administration:**
  - Leak rate = 0.46% (28,577 MTCO<sub>2</sub>e SF<sub>6</sub> in FY 2008)
  - Reduced leak rate from 0.89% in 1999 to 0.12-0.5% in recent years
  - Success through aggressive leak detection and repair
  - Leak rate decreasing despite increasing capacity
- **Western Area Power Association**
  - Leak rate = 1.5% (22,262 MTCO<sub>2</sub>e SF<sub>6</sub> in FY 2008)
  - Reduced leak rate from 4-5% to 1.5% in 8-9 years
  - Success through aggressive leak detection and repair, training of maintenance personnel



# DOE Fugitive Emissions Success Stories



- **SLAC National Accelerator Laboratory**
  - Reported 976 MTCO<sub>2</sub>e SF<sub>6</sub> emissions in FY 2008
  - 2 Capture systems motivated by cost savings
  - Hand-cart mounted system for laboratory-scale capture and reuse; Brand new, potential to save 22-108 MTCO<sub>2</sub>e per experimental chamber
  - Trailer-cart mounted system capture and reuse of circuit breaker SF<sub>6</sub>; Estimated emissions avoided = 4,336 MTCO<sub>2</sub>e per maintenance activity
- **Thomas Jefferson National Accelerator Facility**
  - Reported 1,821 MTCO<sub>2</sub>e SF<sub>6</sub> emissions in FY 2008
  - Capture system designed in-house to reduce emissions associated with maintenance of injector high voltage power supply – motivated by cost and time savings
  - Estimated annual emissions avoided = ~20,000 MTCO<sub>2</sub>e



# Fugitive Emissions Working Group Next Steps



## 1. Build Up the Working Group

- Expand and diversify membership as needed
- Establish regular meeting schedule (2<sup>nd</sup> Thurs-next mtg 10/14)

## 2. Implement Communications Plan

- Identify and document best practices
- Create web-based resource and information center

## 3. Develop Near Term Action Plan

- Assess and improve data quality (inform and learn from FY10 GHG inventory process)
- Propose reduction targets (based on FY10 reported data and field input)
- Identify substitution path forward (as appropriate for site needs)



# Fugitive Emissions Working Group Near Term Action Plan



- Support Fugitive Emissions Data Call
  - Technical support on data quality and inventory process
  - Continue discussions with DOE programs and sites on their strategies and paths forward
- Establish Near and Medium Term Objectives
  - Identify annual reduction goals to be achieved through 2020
  - Objective: eliminate intentional atmospheric venting of SF<sub>6</sub>
- Conduct cost benefit analysis of engineering solutions
  - Rooted in operational requirements at key DOE sites
  - Support HQ fugitive emissions funding distribution (if available)
- Identify substitution path forward
  - Recognize upward price pressure on SF<sub>6</sub>



## Contact Information



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