

Progress Report: EPA's Utility Partnership

Presented By

Jerome Blackman, EPA Program Manager
SF₆ Emissions Reduction Partnership for
Electric Power Systems

*International Conference on SF₆ and
the Environment: Emission Reduction
Strategies, November 2002*



Introduction

- 1900 - SF₆ discovered by Henry Moissan
- 1953 - SF₆ used as arc quenching medium
- 2000 - 81% of global SF₆ sales to EPS: OEMs (50%) and electric utilities (31%)
- 2000 - EPS emissions: 14.4 MMTCO₂ Eq.
- SF₆ emissions from EPS have fallen
- Modest long-term growth is projected due to increasing electricity demand

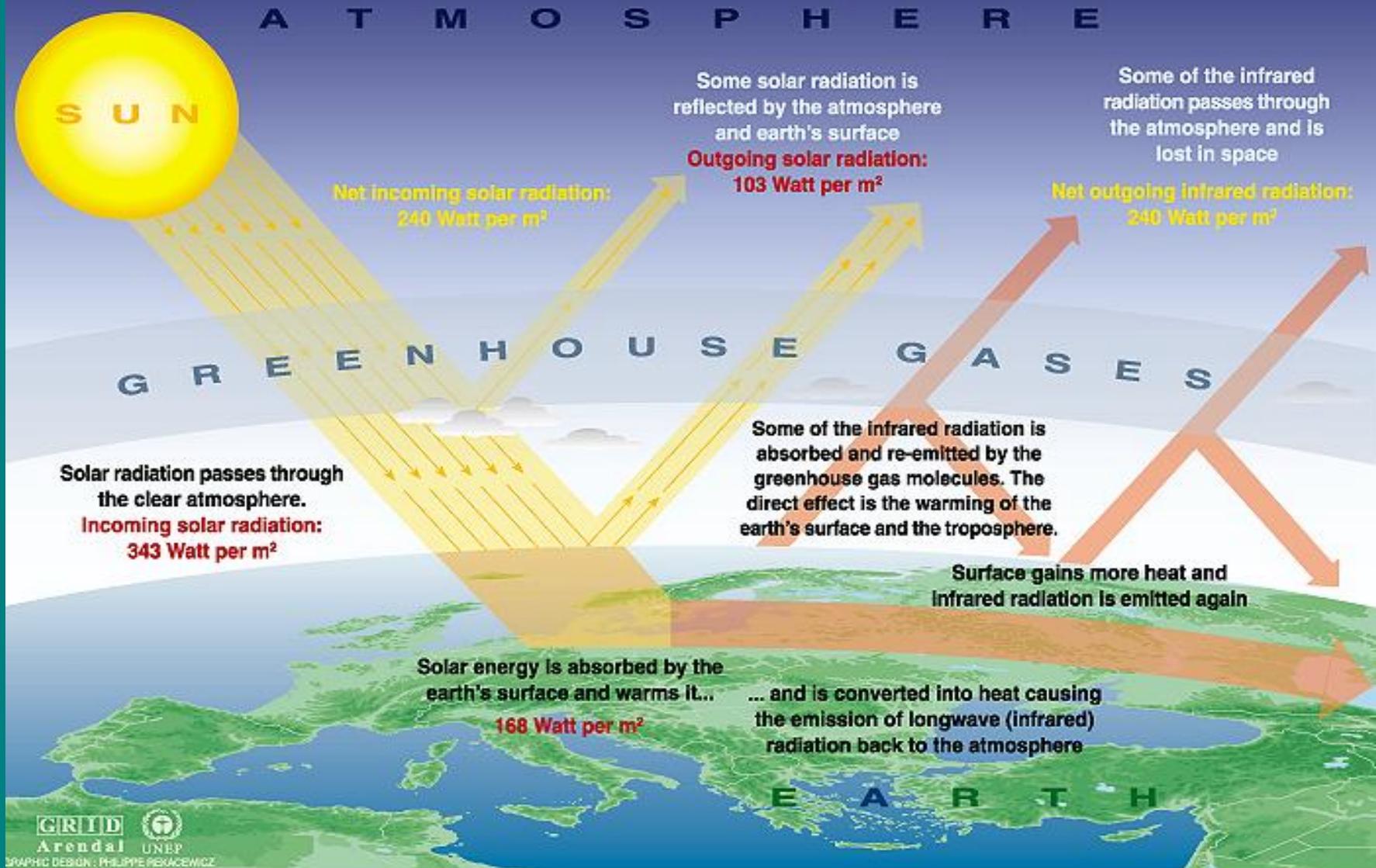


Impacts of SF₆ Emissions

- Released SF₆ becomes a Heat Absorbing Pollutant
 - GWP of 23,900
 - Atmospheric life of 3,200 years
- Wasted Money, Man-hours & Reduced System Reliability



The Greenhouse effect



Sources: Okanagan university college in Canada, Department of geography, University of Oxford, school of geography; United States Environmental Protection Agency (EPA), Washington; Climate change 1995, The science of climate change, contribution of working group 1 to the second assessment report of the intergovernmental panel on climate change, UNEP and WMO, Cambridge university press, 1996.

Source: U.S. EPA

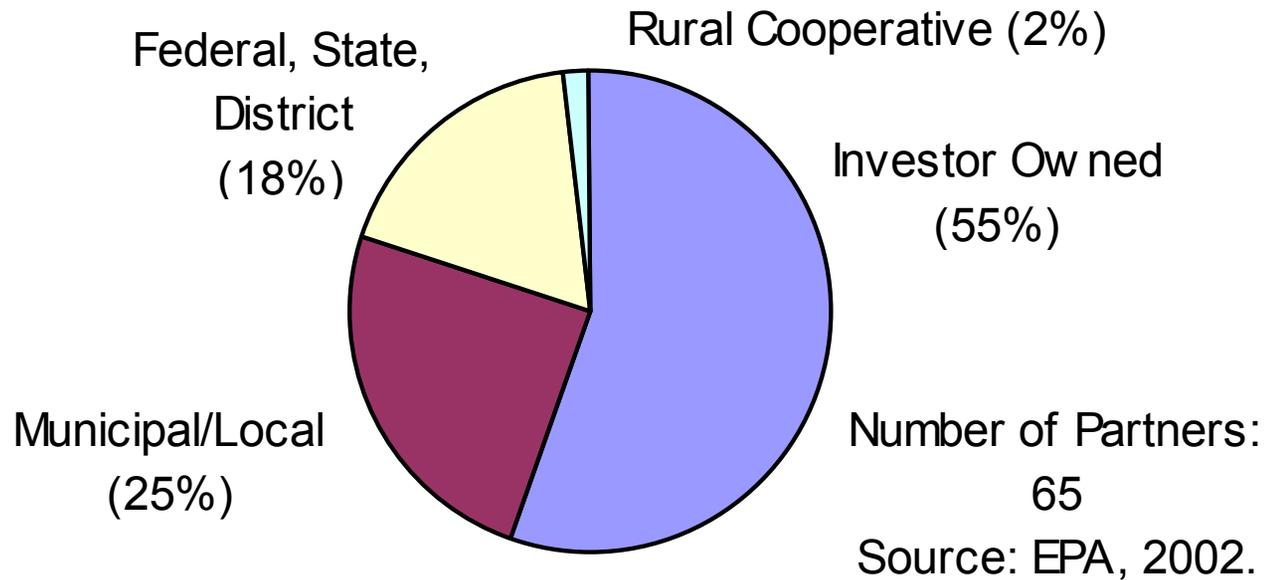
Progress Report

- 65 Companies have joined EPA's Partnership
- 38 Partners have established SF₆ emission reduction targets
- On average, from 1999 to 2001, partner leak rates have dropped from 11% to 10%
- Since 1999,
 - Total Emissions Reduction = 1.35 MMTCO₂E
 - Equivalent to the removal of approximately 264,000 cars



Who are the Partners?

Profile of Partner Utilities by Ownership



Where are the Partners?



Partners with Established Emission Reduction Goals

American Electric Power

Austin Energy

Bangor Hydro-Electric Company

Bonneville Power Administration

Central Maine Power Company

Central Vermont Public Service Corporation

Cinergy Power Generation Services Inc.,
(on behalf of The Cincinnati Gas & Electric Company and PSI Energy, Inc.)

Connecticut Light and Power Company
(Northeast Utilities)

Consolidated Edison Company of New York, Inc.

Duquesne Light Company

El Paso Electric Company

Eugene Water & Electric Board

Florida Power & Light Company

GPU Energy

Kings River Conservation District

Maine Public Service Company

Muscatine Power & Water

Nebraska Public Power District

Niagara Mohawk Power Corp

North Atlantic Energy Service Corporation

Northern Indiana Public Service Company (NIPSCO)

Oklahoma Gas and Electric Co (OG&E)

Pacific Gas and Electric Co

Public Utility District No. 1 of Douglas County

Public Utility District No. 1 of Pend Oreille County

Public Service Company of New Hampshire (Northeast Utilities)

Reliant Energy HL & P

Salt River Project Power District

Southern Company

Southwestern Electric Power Company

Tennessee Valley Authority

Texas Municipal Power Agency

TXU

Wallingford Electric Division

West Texas Utilities Co

Western Massachusetts Electric Company
(Northeast Utilities)

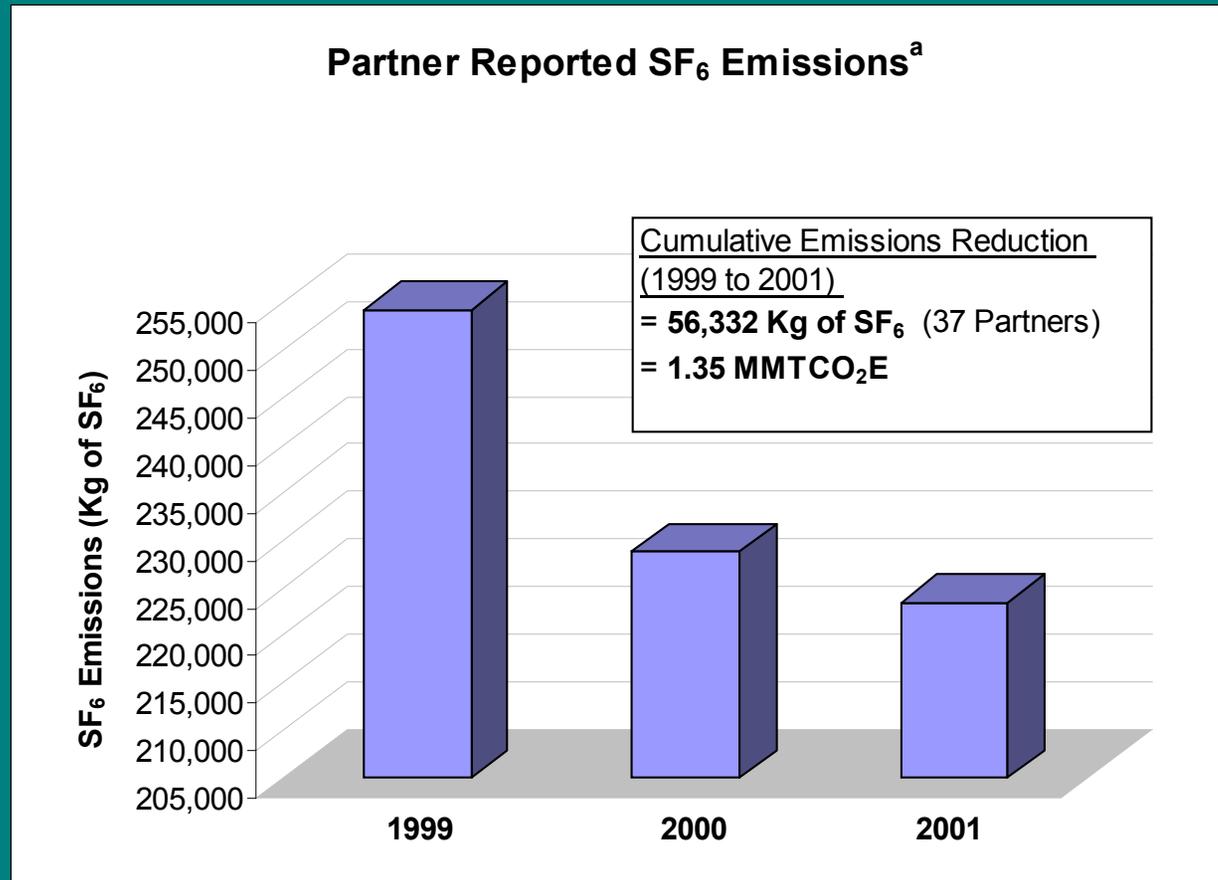
Wisconsin Electric Power Co

Aggregated Emissions Statistics for all Reporting Partners

	Reporting Year		
	1999	2000	2001
Number of Reporting Partners	49	50	49
Total Name-Plate Capacity (Kg)	1,572,120	1,750,390	1,686,922
Total SF ₆ Emissions (Kg)	269,848	264,686	249,898



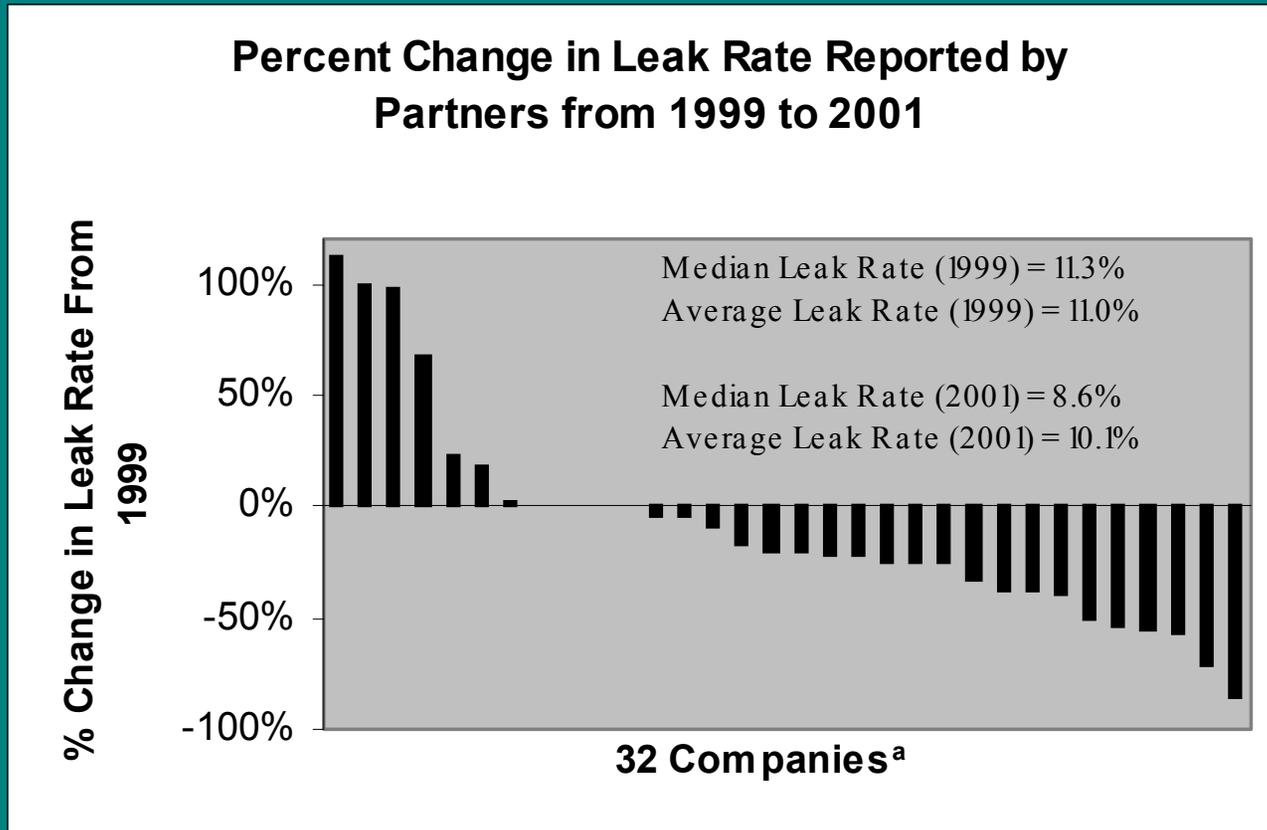
How successful is the Partnership?



^a Only for the 37 partners that reported in each of the reporting years, 1999, 2000, and 2001.



Percentage Leak Rate Reduction



^a Companies that have not reported a leak rate (i.e., no nameplate capacity provided) are not included.



Case Study: El Paso Electric Co.

- **SF₆ Management** - hired a contractor to assist in the development of a management plan and to evaluate processes to enhance proper SF₆ handling procedures. Initiated training programs for crews, implemented use of leak detection activities.
- **Cost Savings** – by meeting their emissions reduction goal, approximately U.S.\$27,000 in 2000 and U.S.\$22,000 in 2001 were saved through improved SF₆ management.



Case Study: Con Edison

- **SF₆ Management** – inventory system to identify, monitor, and weigh gas cylinders, “on the job” training on proper handling and safety precautions of SF₆, utilization of GasVue camera for detection of leaks.
- **Cost Savings** – a reduction in SF₆ usage by 500 cylinders (or approx. 26,080 kg of SF₆), which at \$20/kg (\$9/lb) is equivalent to an estimated savings of U.S.\$517,500 per year.



Case Study:

Bonneville Power Administration

- **SF₆ Management** – gas usage monitoring, regularly scheduled maintenance and inspection protocol, sophisticated SF₆ laser leak detection methods, upgrades on gas handling carts. Maintenance and repair operations reduced leaks by 265 kg (585 lbs).
- **SF₆ Training** - utilization of SF₆-specific Standards, Procedures, Instructions, and Information documents.
- **Technology** – installation of 36 new circuit breakers and 39 new current transformers in 2000. Replacing old equipment has accounted for more than 989 kg (2,180 lbs) of SF₆ lost through leakage.



Bonneville Power Administration

- Implementation Costs –

Contracting Laser Leak Detection Services in 2001	\$6,000
Purchase of heavy duty weighing scales	\$5,000
Installation of data tracking system of SF ₆ usage	<u>\$10,000</u>
<i>Estimated Total</i>	<i>\$21,000</i>

- Cost Savings –

Savings in man-hours (at least)	\$10,000
SF ₆ gas savings in 2001 (\$20/kg SF ₆)	<u>\$25,000</u>
<i>Estimated Total</i>	<i>\$35,000</i>

Net Value Savings in 2001 Estimated at \$14,000.



Lessons Learned

Common themes from successful Partners:

1. Employee Training: for increased diligence of field personnel (gas carts)
2. SF₆ Tracking Program
3. Leak Detection, Repair, & Refurbishment
4. Equipment Replacement Investments



Goals for SF₆ Partnership

- Expand Partnership: Seeking at least 20 new partners (Utilities, OEMs, Gas Distributors) in 2003
- Continue to Reduce SF₆ Emissions: SF₆ Management, Training and Handling Practices
- Benchmark SF₆ Performance
- Increase Partner Reporting: Complete Data, Consistent Reporting, Data Quality



Annual Electronic Reporting Form

**SF₆ Emissions Reduction Partnership for Electric Power Systems
Annual Reporting Form**

Name:		Company Name:	
Title:		Report Year:	
Phone:		Date Completed:	

Change in Inventory (SF₆ contained in cylinders, not electrical equipment)

Inventory (in cylinders, not equipment)	AMOUNT (lbs.)	Comments
1. Beginning of Year		
2. End of Year		
A. Change in Inventory (1 - 2)		

Purchases/Acquisitions of SF₆

Inventory (in cylinders, not equipment)	AMOUNT (lbs.)	Comments
3. SF ₆ purchased from producers or distributors in cylinders		
4. SF ₆ provided by equipment manufacturers with/inside equipment		
5. SF ₆ returned to the site after off-site recycling		
B. Total Purchases/Acquisitions (3+4+5)		

Sales/Disbursements of SF₆

Inventory (in cylinders, not equipment)	AMOUNT (lbs.)	Comments
6. Sales of SF ₆ to other entities, including gas left in equipment that is sold		
7. Returns of SF ₆ to supplier		
8. SF ₆ sent to destruction facilities		
9. SF ₆ sent off-site for recycling		
C. Total Sales/Disbursements (6+7+8+9)		

Change in Nameplate Capacity

Inventory (in cylinders, not equipment)	AMOUNT (lbs.)	Comments
10. Total nameplate capacity (proper full charge) of <u>new</u> equipment		
11. Total nameplate capacity (proper full charge) of <u>retired or sold</u> equipment		
D. Change in Capacity (10 - 11)		

Total Annual Emissions

E. Total Emissions (A+B-C-D)	lbs. SF ₆	Tonnes CO ₂ equiv. (lbs.SF ₆ x23,900/2205)
-------------------------------------	----------------------	--

Emission Rate (optional)

Inventory (in cylinders, not equipment)	AMOUNT (lbs.)	Comments
Total Nameplate Capacity at End of Year		
F. Emission Rate (Emissions/Capacity)	PERCENT (%)	

- User-friendly, an automated process
- Simplified approach to submitting emissions data to EPA
- Accessible from the Partnership website



For More Information about the Partnership:

Visit: <http://www.epa.gov/highgwp1/sf6/>

Contact:

Jerome Blackman

Program Manager

blackman.jerome@epa.gov

(202) 564-8995

