

SF₆

Emission Reduction Partnership for Electric Power Systems

2008 Annual Report

December 2009

10 Years
1999-2009

SF₆ Emission Reduction
Partnership for Electric Power Systems



1999

Inception of the “Partnership” with 49 Charter Partners.

2000

1st International Conference on SF₆ and the Environment held in San Diego, CA.

2001–2003

Technical literature developed and made available on program Web site including, “Byproducts of SF₆ Use in the Electric Power Industry” and “Catalog of Guidelines and Standards for the Handling and Management of SF₆.”

2nd International Conference on SF₆ and the Environment held in San Diego, CA in 2002.

2004

3rd International Conference on SF₆ and the Environment held in Scottsdale, AZ (substation tour).

Partners start receiving customized benchmark reports on their progress in the program. Service Provider directory made available.

2005

Webcast tutorials on estimating and reporting SF₆ emissions offered. Field study on leak rates from circuit breakers manufactured between January 1998 and December 2002 is completed.

2006

4th International Conference on SF₆ and the Environment held in San Antonio, TX (substation tour). Partnership participation increases to 77 companies representing 42% of U.S. grid.

2007

The SF₆ emission rate dropped to 5.5 percent; Partners have reduced SF₆ emissions by more than half of baseline emissions.

2008

Partnership SF₆ emission rate drops again. Estimated at 4.7 percent, it is the lowest overall leak rate recorded by the Partnership. Cumulative SF₆ emission reductions since 1999 baseline year are nearly 2,000,000 lbs.

The SF₆ Emission Reduction Partnership for Electric Power Systems Celebrates 10 Years

In 1999, members of the U.S. electric power industry and the U.S. Environmental Protection Agency (EPA) collaborated to establish the SF₆ Emission Reduction Partnership for Electric Power Systems (the Partnership) as a mechanism for the EPA and industry to share information and encourage better management practices, all in effort to reduce emissions of SF₆ gas. This year marks the Partnership's 10 year anniversary. Partner utilities have made great progress in identifying and reducing emissions over this past decade. The Partnership continues to succeed in its purpose—to foster voluntary actions toward the overall nationwide effort to address global climate change. This report presents the significant reductions of sulfur hexafluoride (SF₆) emissions made by Partners to-date.

The Partnership is one of the many voluntary public-private partnerships managed by EPA that aim to reduce or slow the growth of greenhouse gas emissions. Greenhouse gases range in their potency; and sulfur hexafluoride (SF₆), which is the gas of concern under this Partnership, has a global warming potential (GWP) 23,900 times¹ that of carbon dioxide (CO₂), classifying it as the highest GWP gas. This means that SF₆ is 23,900 times more effective at trapping infrared radiation than an equivalent amount of carbon dioxide (CO₂) over a 100-year period. Although SF₆ is emitted in smaller quantities than many other greenhouse gases, its extremely long atmospheric lifetime of 3,200 years causes it to accumulate in the earth's atmosphere for centuries.

Because of its unique dielectric properties, electric utilities rely heavily on SF₆ in electric power system for voltage electrical insulation, current interruption and arc quenching in the transmission and distribution of electricity. SF₆ should remain contained within equipment; yet in reality, SF₆ is inadvertently emitted into the atmosphere as leaks develop during various stages of the equipment's lifecycle. SF₆ can also be released at the time of equipment manufacture installation, servicing, or de-commissioning. Because there is no clear alternative to SF₆, Partners reduce their greenhouse gas emissions through implementing emission reduction strategies such as detecting, repairing and/or replacing problem equipment, as well as educating gas handlers on proper handling techniques of SF₆ gas during equipment installation, servicing, and disposal.

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¹ 2001 IPCC Third Assessment Report.

Partnership Accomplishments

As part of their commitment to the Partnership, each year Partners voluntarily report their SF₆ emissions and nameplate capacity estimates to EPA. EPA collects and aggregates this information to determine the overall accomplishments of the Partnership. The results of the 2008 reporting year for the Partnership, including the cumulative emissions reduction for the program in comparison to the 1999 baseline year, are presented in the following section.

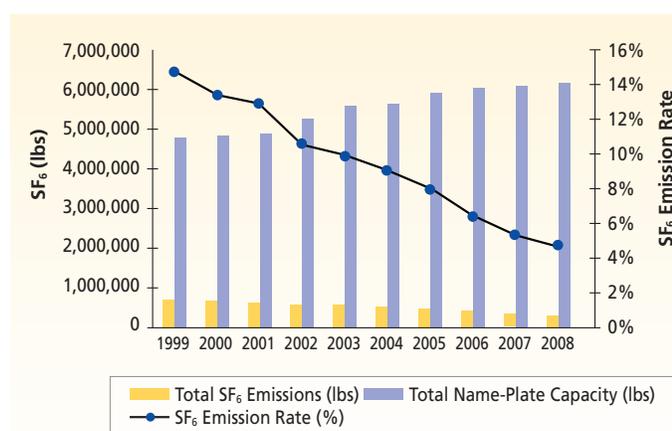
Partner-Reported Emissions Summary

The Partnership's annual average SF₆ emission rate, the ratio of SF₆ emissions relative to total SF₆ nameplate capacity (i.e., the total quantity of SF₆ contained in electrical equipment), is a benchmark metric by which achievements of the Partnership are tracked. Since 1999 the annual average SF₆ emission rate has decreased in every

reporting year, as illustrated in Figure 1. Between the 2007 and 2008 reporting years the SF₆ emission rate decreased from 5.3 percent to 4.7 percent. Overall the annual average SF₆ emission rate for the Partnership is down 68 percent from the 1999 baseline emission rate of 14.6 percent.

Table 1 summarizes the Partnership's aggregate SF₆ emissions, nameplate capacity and emission rate for the 1999 to 2008 reporting years.² From 2007 to 2008, total SF₆ emissions have decreased to 286,445 pounds, while the Partnership nameplate capacity increased to 6,116,188 pounds. Both of these changes led to an overall decrease in the annual average Partnership SF₆ emission rate. A summary of the Partnership's SF₆ emissions and reductions are presented in Table 2. The SF₆ emission reductions, presented in terms of pounds of SF₆ and million metric tons of carbon dioxide equivalent (MMT_{CO₂e}), were calculated using a baseline year of 1999.

Figure 1: SF₆ Emission Rate Trends



To date, Partners have decreased absolute emissions of SF₆ by 59 percent. In 2008, SF₆ Partners reduced emissions of SF₆ gas by 34,154 pounds, or the CO₂ equivalent of 0.37 million metric tons (MMT_{CO₂E}). From 1999 through 2008, Partnership emissions reductions totaled close to a cumulative of 2 million pounds of SF₆

² The SF₆ emission rate is a valuable indicator of Partnership trends because it allows for a normalized comparison of data. Partners vary significantly in total SF₆ nameplate capacity making comparisons of and conclusions about absolute emissions difficult. However, partners of all sizes can make comparisons using emission rates as a benchmark.

or 21.27 MMTCO₂E (i.e., based on the sum of “Reduction from Baseline” as provided in Row 3, Table 2).

Figure 2 displays the distribution of Partners according to their emission rate. As illustrated, over 75 percent Partners are below an emission rate of 5 percent, and half of all Partners have achieved an emission rate of 2.5 percent or less. Emission rates of Partners vary due to a number of factors such as total nameplate capacity within their system, transmission miles, age and geographic location of equipment, and the number of years participating in the Partnership.

Estimation Methods

Results in Table 1 are based on Partners in the program in 2008 as the representative population size for estimates for the entire time-series (1999-2008). To estimate emissions and nameplate capacity not reported by Partners; a set of assumptions was developed. For example, if a Partner provided a report for 2006 and 2008 but not for 2007, a 2007 estimate was determined through linear interpolation.

TABLE 1 Partnership SF₆ Emissions, Nameplate Capacity, and Emission Rate

| | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 |
|--|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Total SF ₆ Emissions (lbs) | 698,923 | 645,242 | 626,076 | 554,383 | 542,548 | 504,066 | 465,133 | 383,608 | 320,599 | 286,445 |
| Total Nameplate Capacity (lbs) | 4,785,355 | 4,820,335 | 4,862,004 | 5,237,981 | 5,544,657 | 5,619,007 | 5,864,673 | 6,005,624 | 6,069,311 | 6,116,188 |
| SF ₆ Emission Rate (%) ^a | 14.6% | 13.4% | 12.9% | 10.6% | 9.8% | 9.0% | 7.9% | 6.4% | 5.3% | 4.7% |

Note: Historical estimates have been updated based on the estimation methodology used by EPA and data made available by Partners.

^a Emission rate is defined as total emissions divided by total nameplate capacity (i.e., the total quantity of SF₆ contained in electrical equipment).

TABLE 2 Partnership SF₆ Emissions and Reductions

| | 1999 ^a | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 |
|---|-------------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| Total Partner-Reported SF ₆ Emissions (lbs) | 698,923 | 645,242 | 626,076 | 554,383 | 542,548 | 504,066 | 465,133 | 383,608 | 320,599 | 286,445 |
| Total Partner-Reported SF ₆ Emissions (MMTCo ₂ e) | 7.58 | 6.99 | 6.79 | 6.01 | 5.88 | 5.46 | 5.04 | 4.16 | 3.47 | 3.10 |
| Reduction from Baseline (lbs) | – | 53,682 | 72,848 | 144,540 | 156,376 | 194,857 | 233,790 | 315,316 | 378,325 | 412,478 |
| Reduction from Baseline (MMTCo ₂ e) | – | 0.58 | 0.79 | 1.57 | 1.69 | 2.11 | 2.53 | 3.42 | 4.10 | 4.47 |
| Percent Reduction from Baseline | – | 7.7% | 10.4% | 20.7% | 22.4% | 27.9% | 33.5% | 45.1% | 54.1% | 59.0% |

Note: Historical estimates have been updated based on the estimation methodology used by EPA and data made available by Partners.

^a Baseline year

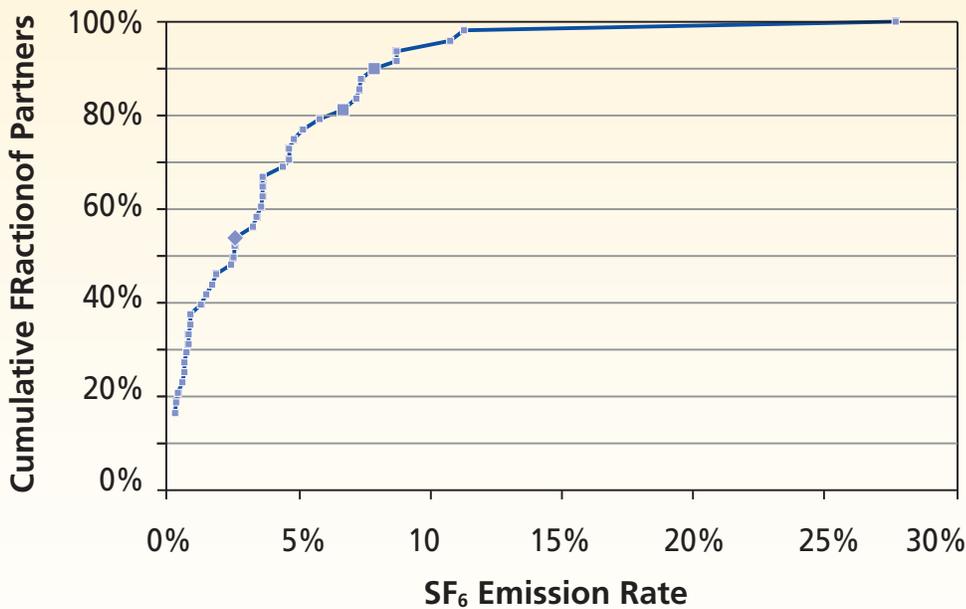
Cumulative SF₆ emissions reductions of 1,962,212 pounds relative to the 1999 baseline are equivalent to CO₂ emissions reductions from:

- **4.1 million** passenger cars not driven for one year
- **49.5 million** barrels of oil not used
- **5.5 million** households reducing electricity use by 50 percent for one year

Because SF₆ has an atmospheric lifetime of 3,200 years, the benefits of reducing emissions accrue for many generations.

Source: <http://www.epa.gov/cleanenergy/energy-resources/calculator.html>

Figure 2: 2008 Distribution of Partners by Emission Rates



Partnership Spotlights

Companies in the EPA SF₆ Partnership lead their industry in efforts to reduce SF₆ emissions. Partners are actively seeking opportunities to improve the management and tracking of their cylinder inventories, maximizing recycling, and continually training personnel on responsible handling of SF₆ in the field. Another key action is prioritizing equipment repair and replacing equipment with major leaks as they see the financial benefit in such an investment (i.e., improved system reliability and of the avoided cost to replace gas lost to the atmosphere), in addition to environmental benefits. Partners are also gathering at Partnership events to exchange information and learn from one another.

This past year, EPA recognized two Partners, Arizona Public Service Company and Consolidated Edison Company of New York Inc., that stood out as exemplary in achieving effective strategies for reductions of SF₆ and for sharing information on the environmental and economic benefits.

Arizona Public Service Company

Arizona Public Service Company (APS) joined the SF₆ Partnership in 2004, and has since achieved cumulative reductions of 126,542 pounds of SF₆ compared to their baseline year of 2001.³ They have achieved these reductions through adopting improved handling and

³ This quantity represents the sum of annual emission reductions relative to emissions in 2001.

maintenance practices and increasing SF₆ recycling. In recent years, APS has achieved substantial emissions reductions through an emissions reduction strategy focused on properly utilizing an SF₆ recycling gas cart to reclaim, purify, and reuse their SF₆ gas during equipment service or repair. These recycling efforts have significantly reduced the amount of SF₆ gas purchases required and have reduced SF₆ leakage associated with maintenance activities. APS has played an extremely valuable role in sharing knowledge about SF₆ emission reduction strategies by hosting site visits for a previous Partnership conference as well as for the 2009 Phoenix SF₆ Reduction Workshop. APS's aggressive efforts to reduce emissions and their commitment to sharing information have contributed to the overall success of the SF₆ Partnership. Thanks to their efforts, APS received a Partnership award at the 2009 SF₆ Emission Reduction Strategies Workshop.



Presentation of an award to Arizona Public Service for its commitment to reducing SF₆ emissions at the 2009 Partnership's Workshop in Phoenix, AZ. Left to right: Robert Mills (APS), Brian Clark (APS), Paul Atwell (APS), Scott Alford (APS), Sally Rand (EPA).

Consolidated Edison Company of New York, Inc.

Consolidated Edison Company of New York Inc. (Con Edison) became a Charter Partner of the EPA SF₆ Reduction Partnership when they joined the Partnership in its inception year, 1999. Con Edison, one of the larger Partners with a reported nameplate capacity in 2008 of 213,526 pounds, has achieved cumulative emissions reductions of 890,548 pounds of SF₆ compared to the baseline year of 1999.⁴ Con Edison embarked on an aggressive equipment repair and replacement program that resulted in the replacement of over 20 circuit breakers with high leak rates during the 2006 and 2007 reporting years. Additionally, Con Edison has been a leader in using innovative technologies to reduce SF₆ emissions, including a laser imaging camera developed in conjunction with the Electric Power Research Institute (EPRI) to identify leaky equipment and a new sealing method to seal leaks on flanges under pressure. The lessons that Con Edison has learned from implementing new technologies were used to provide guidance for EPRI's SF₆ Gas Handling Tutorial and to provide technical assistance to EPRI's SF₆ Task Force. Con Edison has also improved SF₆ gas handling practices by developing an on-the-job training course for handling SF₆ gas, which is distributed to all field employees who handle SF₆ gas. With a consistent focus and dedication to reducing emissions and improving management strategies, Con Edison has achieved large SF₆ emission reductions and has made significant contributions in terms of sharing knowledge of practical mitigation options.

⁴ This quantity represents the sum of annual emission reductions relative to emissions in 1999.

Thanks to their efforts, Con Edison received a Partnership award at the 2009 SF₆ Emission Reduction Strategies Workshop.



Sally Rand, EPA (right) presenting an award to Theodorou Theophanis, Con Edison (left) and Anastasia O'Malley, Con Edison (center) for their company's significant SF₆ emission reductions at the 2009 Partnership's Workshop in Phoenix, AZ.

Partnership Updates

The end of 2008 and the beginning of 2009 was a very active time for the Partnership. The Partnership coordinated and executed three outreach events, including the SF₆ Emission Reduction Strategies Workshop in Phoenix, the Partner Webcast on the Proposed Mandatory Greenhouse Gas Reporting Rule and the Partner Meeting in Chicago focused on U.S. climate change policy and implications for SF₆ emissions. Since the beginning of 2008 the Partnership has welcomed two Partners, expanding our members count to 80 Partners.

Workshop on SF₆ Emission Reduction Strategies, Phoenix, Arizona

The SF₆ Emission Reduction Partnership for Electric Power Systems hosted a Workshop on February 4-5, 2009 in Phoenix, Arizona. The Workshop, which was held in conjunction with the EUEC Conference, brought together over 120 participants to discuss SF₆ emission reduction strategies and included representatives from Partner utilities, service providers, gas producers and distributors, and equipment manufacturers. The sessions conducted at the Workshop included:

- Domestic and International Climate Change Policy Update
- Training and Techniques for Field Personnel
- Best Management Practices and SF₆ Inventories
- Leak Detection, Repair, Replacement
- SF₆ Emissions Reductions through Recovery, Recycling, and Reuse



Thank you to our Workshop sponsors

- ▶ SF₆ Partner: APS
- ▶ National Electrical Manufacturers Association (NEMA)
- ▶ WIKA
- ▶ FLIR Systems Inc.

EPA is very appreciative for the participation of all speakers at the Workshop who contributed to its success. The event reinvigorated information sharing and led to a renewed interest in Partner forums. In addition to presentations and discussions, EPA presented all Charter Partners with certificates, recognizing their leading steps in efforts to reduce SF₆ emissions. To wrap up the event, APS graciously hosted a site tour at their Lone Peak substation. More information about the Workshop and its proceedings are available on the Partnership website.

EPA Regulatory Initiatives

EPA has begun to issue regulatory actions under the Clean Air Act and in some cases other statutory authorities to address issues related to climate change. For a list of these actions along with links to pages with more information see: <http://www.epa.gov/climatechange/initiatives/index.html>.

Partner Meeting: U.S. Climate Change Policy and Implications for Emissions of SF₆

On June 2-3, 2009, the Partnership conducted a Partners-only meeting held in Chicago, Illinois to discuss the status of climate policy and to review and discuss the enormous amount of activity within Congress and the Federal Government occurring on climate protection. The purpose of this meeting was to facilitate the exchange of information relevant to improving SF₆ emission estimates and reducing SF₆ emissions in the context of the recent developments in climate policy. Roundtable discussions were held allowing an open forum for Partners in attendance to discuss improving SF₆ emission

and nameplate capacity estimates, best management practices, and mitigation strategies for SF₆ emission reductions and the future of the SF₆ Partnership.

***Thank You to our June 2009
Partner Meeting Host, SF₆
Partner ComEd!***

Representatives from thirteen Partner companies attended the meeting representing approximately 50 percent of the Partnership's total SF₆ nameplate capacity. The meeting proved to reinvigorate the collaborative spirit of the Partnership with productive Partner discussions on SF₆ best management practices and SF₆ emission reductions.

The host of the event, SF₆ Partner ComEd, shared their headquarters at Chase Tower, which offered a fabulous view of the city. In addition, ComEd also provided meeting participants a site tour of their new West Loop GIS Substation. The site tour enabled participants to explore the design and specifications of one of ComEd's largest ever expansion projects. Four participants also had the opportunity to speak with the engineers of the project to learn—among other things—how state-of-the-art GIS technology can minimize SF₆ emissions while increasing system reliability. The meeting would not have been possible without the hard work and hospitality of the ComEd staff.

New Partners

In 2009, the Partnership welcomed two new Partners, the State of California Department of Water Resources based in Sacramento, CA, as well as Salt River Project from Phoenix, AZ. The

Partnership has nearly doubled from the initial count of 48 members in 1999 to 80 Partners as of August 2009. Charter members are specially recognized in the complete Partner list, which can be referenced at the end of this report.

A Decade of Success and Tomorrow's Challenges



When EPA and the electric power industry launched the Partnership in 1999, the challenge to reduce SF₆ emissions in technically and economically feasible ways was at hand. Partners met this challenge making significant reductions primarily by identifying and replacing or repairing old, leaking breakers. Over the years, Partners advanced their strategies to reduce SF₆ emissions, examining their system for all possible sources of potential emissions; purchasing new laser leak detection cameras; working with their vendors to receive SF₆ inventory related reports; tightening their gas cylinder inventories; purchasing more recycling carts; and improving on their overall management and training procedures. Ten years of learning and voluntary action has yielded impressive results. In the reporting year 2008, SF₆ Partners collectively reduced the average SF₆ emission rate to 4.7 percent compared to 5.3 percent in 2007 and 14.6 percent in 1999. SF₆ emissions in the 2008 reporting year are 68 percent lower than in the 1999 baseline year.

Know your System— Take the Partner Challenge to Improve SF₆ Nameplate Capacity Estimates

Over the next year, Partners are encouraged and challenged to reevaluate and develop thorough and accurate estimates of SF₆ nameplate capacity. Total nameplate capacity is recognized as difficult for Partners to determine given the various ages and types of SF₆-containing equipment and its varied distribution across numerous substations; but having a reliable estimate is imperative to understanding system-wide SF₆ usage and accurately determining an SF₆ emission rate.

Cumulatively, over the course of the Partnership, SF₆ Partners have prevented the escape of approximately 2 million pounds of SF₆ or 21.27 MMTCO_{2e}. Preventing the loss of this much gas into the atmosphere translates into an equivalent of \$15.7 million to \$23.5 million of avoided SF₆ purchases to replace such losses.⁵

EPA applauds all Partners for the program's success and celebrates reaching a 10-year milestone. The lessons learned in the last ten years are invaluable. They position Partners to target more challenging SF₆ emission sources and to manage more accurately and thoroughly all SF₆ gas activities across their systems toward the goal of more robust SF₆ emission estimates. It is the demonstrated leadership of SF₆ Partners over the last ten years that has resulted in a thriving program today and will lead it to future successes in SF₆ emission reductions.

For Additional Information, Please Contact:

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For additional Partnership information see:
[http://www.epa.gov/highgwp/electricpower-sf6/
index.html](http://www.epa.gov/highgwp/electricpower-sf6/index.html)

⁵ Based on an SF₆ gas cost range of \$8 to \$12 per pound. Estimated cost savings does not consider other potential cost savings that might be realized indirectly, such as savings from reduced labor and maintenance expenditure or potential annual SF₆ cylinder rental fees.

List of Partners (as of December 2009)

* Charter Partner

Subsidiaries are bulleted under parent companies

Allegheny Power
Greensburg, PA

American Electric Power (AEP)*
Columbus, OH

Arizona Public Service Company (APS)
Phoenix, AZ

Athens Electric Department*
Athens, AL

Austin Energy
Austin, TX

Bangor Hydro-Electric Company*
Bangor, ME

Big Rivers Electric Corporation*
Henderson, KY

Bonneville Power Administration*
Portland, OR

CenterPoint Energy*
Houston, TX

Central Maine Power Company*
Augusta, ME

Central Vermont Public Service Corporation*
Rutland, VT

City of Palo Alto
Palo Alto, CA

Columbia River People's Utility District*
St. Helens, OR

Consolidated Edison Company of New York, Inc.
New York, NY

CPS Energy (formerly San Antonio City Public Service Board)*
San Antonio, TX

Duquesne Light Company*
Pittsburg, PA

E.ON U.S. LCC
Louisville, KY

Edison International
Rosemead, CA

El Paso Electric Company*
El Paso, TX

Eugene Water and Electric Board*
Eugene, OR

Exelon Energy Delivery (EED)

ComEd Energy Delivery*
Chicago, IL

PECO Energy Delivery
Philadelphia, PA

FirstEnergy Corporation*
Akron, OH

Florida Power and Light Company (FPL)*
Juno Beach, FL

FPL Energy New England Division
Seabrook, NH

Fort Pierce Utilities Authority*
Fort Pierce, FL

Grand Island Utilities Department*
Grand Island, NE

Great River Energy
Elk River, MN

Hastings Utilities*
Hastings, NE

ITC Transmission
Novi, MI

Kings River Conservation District*
Fresno, CA

Lower Colorado River Authority (LCRA)
Austin, TX

Maine Public Service Company*
Presque Isle, ME

Manitowoc Public Utilities*
Manitowoc, WI

Memphis Light, Gas & Water Division
Memphis, TN

Menasha Utilities*
Menasha, WI

MidAmerican Energy
Des Moines, IA

Montana-Dakota Utilities
Bismarck, ND

Muscatine Power & Water*
Muscatine, IA

NSTAR Electric and Gas
Westwood, MA

Boston Edison Company
Boston, MA

Cambridge Electric Light Company
Boston, MA

Commonwealth Electric Company
Boston, MA

Nashville Electric Service (NES)
Nashville, TN

National Grid

Granite State Electric
Northborough, MA

Massachusetts Electric
Northborough, MA

Nantucket Electric
Nantucket, MA

Narragansett Electric
Providence, RI

**New England Power
Company**
Westborough, MA

**New England Electric
Transmission Corporation**
Westborough, MA

**New England Hydro-
Transmissions Company Inc.**
Westborough, MA

**Niagara Mohawk Power
Corporation**
Syracuse, NY

Nebraska Public Power District
Doniphan, NE

New York Power Authority
New York, NY

New York State Electric and Gas
Ithaca, NY

**Northeast Utilities Services
Company***

**Connecticut Light and Power
Company**
Berlin, CT

**Public Service Company of
New Hampshire**
Manchester, CT

**Western Massachusetts
Electric Company**
West Springfield, MA

**Northern Indiana Public Service
Company (NIPSCO)**
Merriville, IN

Oglethorpe Power
Tucker, GA

**Oklahoma Gas and Electric
Corporation* (OG&E)**
Oklahoma City, OK

Oncor (formerly TXU)*
Dallas, TX

Otter Tail Power Company
Fergus Falls, MN

PNM Resources
Albuquerque, NM

Pacificorp
Portland, OR

Pacific Power
Portland, OR

Rocky Mountain Power
Salt Lake City, UT

**Pacific Gas and Electric
Corporation (PG&E)***
San Francisco, CA

**Public Utility District No. 1 of
Douglas County**
East Wenatchee, WA

**Public Utility District No. 1 of
Pend Oreille County***
Newport, WA

**Rochester Gas and Electric
Corporation**
Rochester, NY

Salt River Project**
Phoenix, AZ

Seattle City Light
Seattle, WA

Silicon Valley Power*
Santa Clara, CA

**South Carolina Electric & Gas
Company**
Columbia, SC

Southern Company*
Atlanta, GA

**State of California – Department
of Water Resources**
Sacramento, CA

Tennessee Valley Authority (TVA)
Knoxville, TN

Texas Municipal Power Agency*
Bryan, TX

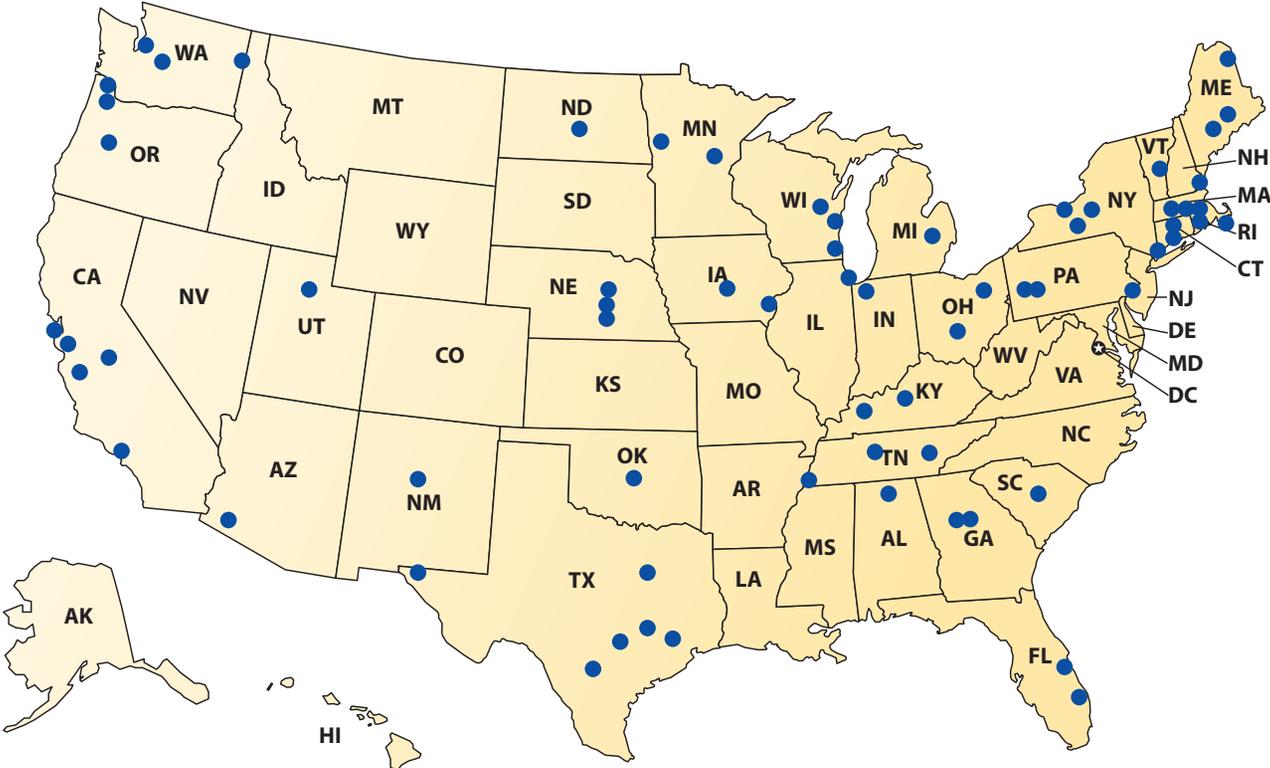
VT Transco LLC
Rutland, VT

Wallingford Electric Division*
Wallingford, CT

We Energies*
Milwaukee, WI

** Salt River Project is a Charter Partner that left the Partnership, but recently rejoined in 2009.

Distribution of Partners





EPA

United States
Environmental Protection
Agency

Climate Change Division (6207J)

www.epa.gov

December 2009

