REPORTED "REDUCTIONS," RISING EMISSIONS

The Failure of Voluntary Commitments and Reporting to Reduce U.S. Electric Industry CO_2 Emissions

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EXECUTIVE SUMMARY

Electric power plants generate more carbon dioxide (CO_2) than any other source in the United States, and are therefore the leading contributors to global warming. Despite the dangers associated with CO_2, power plants do not yet have mandatory limits on how much they can emit. Some members of the energy industry say that non-binding emissions reduction programs provide the best way to limit CO_2. In fact, voluntary programs, such as the Department of Energy's Climate Challenge, have failed to achieve their goals.

The Department of Energy launched the Climate Challenge program in 1993 in an effort to reduce electric sector CO_2 emissions to 1990 levels by the year 2000. Despite significant industry participation and reporting of emissions "reductions," actual electric industry CO_2 emissions increased by 20 percent between 1990 and 1999. Estimates based on Energy Information Administration (EIA) generation data indicate that the increase was 25 percent by 2000.

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The Climate Challenge program is one of many domestic and international voluntary efforts to reduce global warming pollution that the United States has adopted during the last decade.[1] Unfortunately, these programs have failed to reverse the trend of rising emissions. In fact, total U.S. carbon dioxide emissions from fossil fuel combustion increased by more than 15 percent during the last decade.[2]

By enabling companies to calculate and report emissions "reductions," while actual emissions were increasing, the Climate Challenge program stimulated artful emissions accounting procedures, but did little to alter electricity industry business practices or reduce emissions. Major shortcomings of the program include:

- Most commitments and "reductions" are calculated using theoretical reference cases that have no basis in reality.
- Emissions "reductions" reported under the program are paralleled by emissions increases from other activities that are not reported.
- The vast majority of reported emissions "reductions" are simply business-as-usual activities. In 1999:
  - Seventy percent of all emissions "reductions" reported were based on the standard operation of nuclear power plants. The entire output of at least three nuclear power plants—Browns Ferry (TVA), Watts Bar (TVA), and Comanche Peak (TXU)—were reported as CO_2 emissions reduction projects, accounting for about 45 million tons, or over 30 percent of reported "reductions."
  - Ten percent of reported "reductions" were attributed by the reporting companies to "routine maintenance" at fossil fuel power plants.[3]
  - Demand side management programs that were funded by ratepayers and initiated well before the Climate Challenge are reported as energy efficiency "reductions" under the program.
- Commitments for participation in a number of industry technology and research programs, as well as forestry and sequestration projects, look good on paper, but provide very little benefit compared to the emissions increases occurring in the electric industry.

The lesson from the Climate Challenge program is that enforceable emissions reduction requirements are needed to make real progress in reducing global warming pollution. Voluntary commitments are not sufficient because they do not significantly alter business planning or investment decisions. As a result, power plants continue to increase their contribution to global warming.

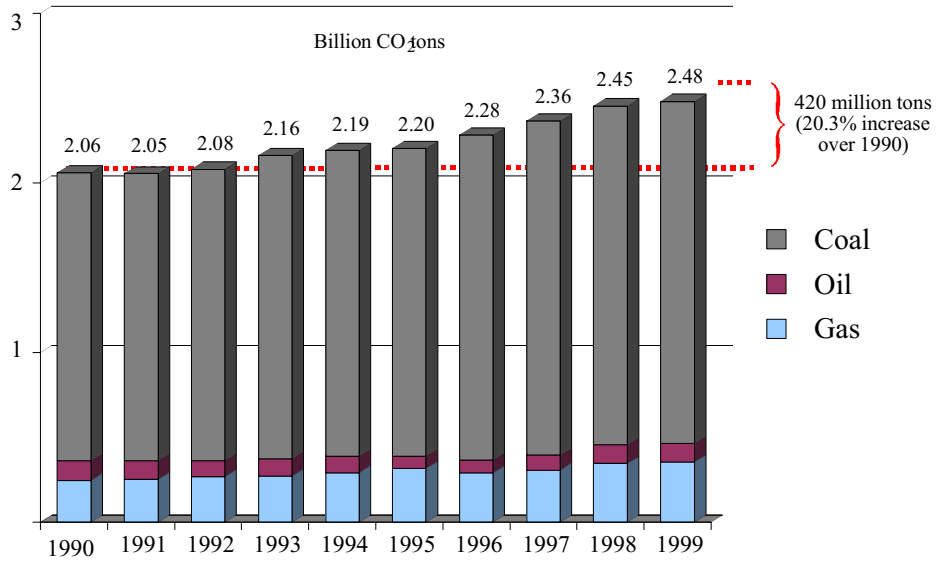
REPORTED "REDUCTIONS," RISING EMISSIONS

In 1992 the United States ratified the United Nations Framework Convention on Climate Change, committing to adopt national policies aimed at returning emissions of global warming pollution to 1990 levels. Acting on this commitment, President Clinton announced in 1993 the U.S. Climate Change Action Plan (CCAP), which established specific (mostly voluntary) steps the United States would take to stabilize emissions at 1990 levels by the year 2000. A cornerstone of the president's plan was the Climate Challenge program for the electric utility sector, which established voluntary commitments from electric utility companies to reduce carbon dioxide (CO_2) emissions to below 1990 emissions levels by 2000.

The program did not come close to meeting this objective. According to EIA, CO_2 emissions from electric power plants increased 20.3 percent between 1990 and 1999, outpacing the overall growth in U.S. greenhouse gas emissions and resulting in an annual emissions increase of over 400 million tons by 1999 (Figure 1).[4] Based on year 2000 EIA generation data, we estimate that CO_2 emissions increased to 2.57 billion tons in 2000, a 25 percent increase over 1990 levels.[5]

This emissions increase occurred despite significant participation by the industry in voluntary CO_2 emissions reduction programs. By 1999, 124 participation agreements had been signed with electric companies under the Climate Challenge program. Participating companies represented over 70 percent of 1990 CO_2 emissions in the industry. By 1999 one hundred electric power companies reported emissions "reductions" from over 450 voluntary projects under Section 1605(b) of the Energy Policy Act. The

Figure 1 Electric Industry CO_2 Emissions by Fuel Type



Source: Energy Information Administration, Emissions of Greenhouse Gas Emissions in the United States 1999, Table 10. http://www.eia.doe.gov/oiaf/1605/ggrpt/tbl10.html. Values converted from million metric tons carbon to billion short tons carbon dioxide.

"reductions" reported from these projects totaled over 136 million CO_2-equivalent tons.

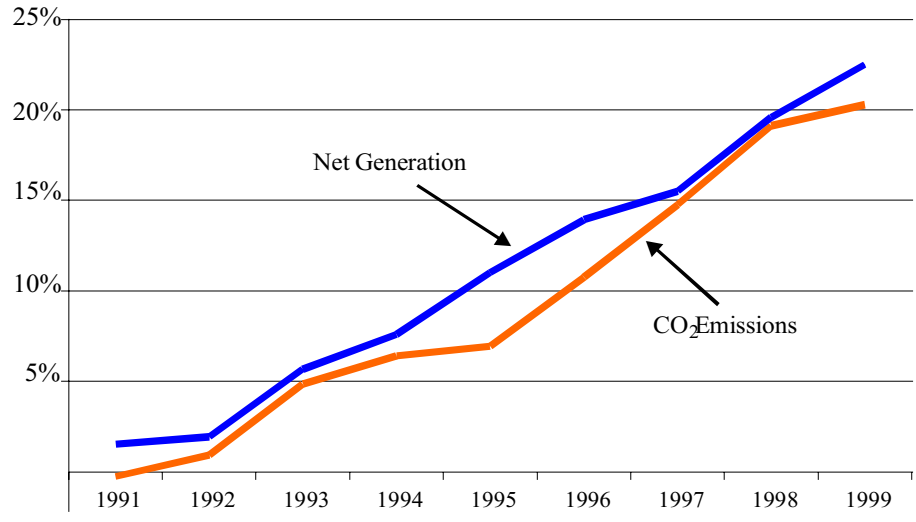
Why have electric industry emissions steadily risen despite voluntary reduction commitments and significant reporting of emissions reduction progress? This report examines this question by taking a closer look at the voluntary commitments made under the Climate Challenge program and by reviewing the "reductions" reported under the 1605(b) program.

INDUSTRY EMISSIONS TRENDS

Growth in electric industry CO_2 emissions in the last decade has closely paralleled the industry's growth in electricity production (Figure 2). As a result, the carbon intensity of electricity generation, expressed as CO_2 emissions per kilowatt-hour of generation, has remained virtually unchanged, decreasing less than 2 percent between 1990 and 1999. This modest change is a strong indication that no fundamental changes have taken place in the industry to improve CO_2 emissions performance as a result of the voluntary programs that have been in place.

Furthermore, if all of the "reductions" reported by the electric industry in 1999 were real and additional to what would have happened without the Climate Challenge program, then emissions would have increased by another 136 million tons in 1999 (above the 420-million-ton increase that did occur) if the program didn't exist. Had this theoretical scenario occurred, the industry's average CO_2 emissions rate would have actually increased 3.5 percent between 1990 and 1999, an unlikely outcome since it would suggest that the industry would have become more carbon-intensive during the decade absent the Climate Challenge program.

Figure 2 Percent Change in CO_2 Emissions and Net Generation from 1990



Sources: CO_2 Emissions, Energy Information Administration, Emissions of Greenhouse Gases in the United States 1999, October 2000. Generation: EIA, Annual Energy Review 2000, August 20001.

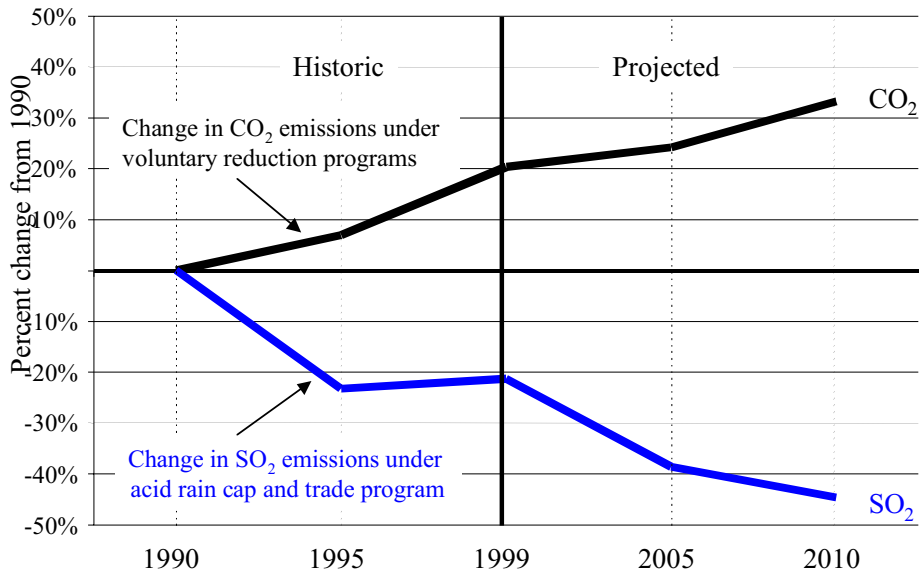
The CO_2 emissions trends shown in Figures 1 and 2 are in sharp contrast to the trend in sulfur dioxide (SO_2) emissions from the industry. Electric industry SO_2 emissions have been on a declining path and are projected to continue on this path as a result of the acid rain emissions trading program. The SO_2 program, which includes firm emissions caps and strong enforcement provisions, has resulted in a 36 percent reduction in average SO_2 emissions per kilowatt-hour of generation in the industry since 1990. Figure 3 provides a comparison of historic and projected changes in electric industry SO_2 and CO_2 emissions since 1990, illustrating the different results achieved by enforceable and voluntary emissions reduction programs.

CLIMATE CHALLENGE COMMITMENTS

By 1999, 124 participation agreements had been signed by electric companies under the Climate Challenge program. These agreements commit the companies to take specific actions to reduce emissions, or to make emissions reduction progress against a specific emissions baseline. Importantly, the commitments are non-binding and not enforceable, stating, "either party may withdraw…without penalty and without being subject to remedies at law or equity."

Many types of commitments have been made under the Climate Challenge, but most do not involve serious actions to reduce emissions beyond what would be achieved through ongoing business activities. Many of the commitments focus on operating power

Figure 3 Historic and Projected Change in CO_2 Emissions vs. SO_2 Emissions



Source: Historic CO_2, Energy Information Administration, Emissions of Greenhouse Gases in the United States 1999, October 2000. Historic SO_2, EIA Annual Energy Review 2000, August 2001. Projected CO_2 & SO_2, EIA Annual Energy Outlook 2001, December 2000.

plants the way the plants were designed to be operated. Many also involve commitments to a variety of industry initiatives and indirect emissions reduction programs, with very limited benefits compared to emissions from the industry. Only four of the agreements reviewed for this analysis include a commitment to reduce emissions back to or below 1990 levels. These companies have had mixed results.

Commitments to "Business-as-Usual" Activities

The vast majority of emissions "reductions" committed to under the Climate Challenge relate to ongoing operations of nuclear and fossil fuel power plants. The largest of these are commitments to continue standard operation of nuclear facilities.[6] For example:

- Texas Utilities (TXU) committed to continue to operate its Comanche Peak nuclear plant as a base load facility.
- Tennessee Valley Authority (TVA) committed to operate its Browns Ferry and Watts Bar nuclear plants.
- Duke Energy, Baltimore Gas and Electric, Entergy, and several others agreed to increase generation from their nuclear generating facilities by improving availability of their plants.

Climate Challenge commitments based on nuclear power plant operations, which amount to companies committing to run these plants as profitably as they can, accounted for about 70 percent of the total voluntary emissions "reductions" reported in 1999, including virtually all of the largest "emissions reduction projects" (see detailed discussion on page 6).

Many companies made similar commitments regarding the operations of fossil generating stations. Primarily, the commitments related to heat rate maintenance and improvement programs. As an example of these activities, Figure 4 illustrates General Public Utilities' (GPU) commitment for capital improvement projects at the Shawville power plant. The list is comprised of typical activities that prevent an aging power plant from de-rating over time. Most of the largest fossil plant operators, such as American Electric Power, Southern Company, and Tennessee Valley Authority, made similar heat rate

Figure 4 Heat Rate Maintenance and Iimprovement Measures at General Public Utilities (GPU) Shawville Unit 3

- Flue Duct Expansion Joints, 1991
- Economizer Inlet Header Replacement, 1994
- High Temperature Re-heater, 1994
- Air Heater Cold End Replacement, 1994
- Boiler Control Replacement, 1997
- Condenser Cleaning System Replacement, 1997
- 10A & 10B FWH Replacement, 1999
- Feedwater Heater Replacement, 1999

Source: Energy Information Administration, 1605(b) Public Use Database

commitments. Like commitments to operate nuclear plants, commitments to invest in fossil plants so they continue to be profitable and operate as designed amount to no more than commitments to conduct business as usual.

In addition to commitments focused on energy supply, there are also many relating to demand side management (DSM) programs. These programs, which reduce consumer demand for electricity by helping facilitate the enhanced use of energy-efficient technologies, are an important means of reducing CO_2 emissions. However, it is doubtful many (if any) of them were made in response to the Climate Challenge program. Most of the demand side programs described, such as Wisconsin Electric Power Companies "Smart Money Energy Program" and Southern California Edison's energy-efficiency program, began years before the Climate Challenge and were built into regulated electricity rates. As described in Southern California Edison's 1999 1605(b) filing, "most of the savings responsible for the CO_2 reductions are due to ratepayer-funded survey and rebate programs." Far from increasing its investments in energy efficiency in response to the Climate Challenge program, industry-wide energy-efficiency program expenditures declined by about 50 percent between 1994 and 1999. [7]

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Industry and Forestry Programs

Commitments were also made to support industry programs designed to promote climate friendly technologies and research. The most popular were commitments to fund the Utility Forest Carbon Program (funding projects to reduce and sequester greenhouse gases), the National Earth Comfort Program (promoting use of geothermal heat pumps), and EV America (supporting development and use of electric vehicles). Most companies do not specifically report information on the carbon reduction benefits of these programs, but in some cases, companies estimate their proportionate share of "reductions," and these shares serve to illustrate the small scale of these projects. TVA, for example, estimated its share of "reductions" from the Utility Forest Carbon Management Program to be 50,000 tons of CO_2 annually by 2000. By comparison, TVA's fleet of power plants emitted an average of over 240,000 tons of CO_2 *per day* in 1999.

In addition, 43 electric companies sponsored forestry sequestration projects, which included both afforestation and reforestation initiatives. The average emissions "reductions" estimated for all sequestration projects reported under 1605(b) was about 25,000 tons of annual CO_2 sequestration per project. This is approximately equivalent to the CO_2 emissions from operating a single 500-megawatt coal plant for two days.

While industry technology programs, sequestration projects, and other similar initiatives agreed to under the Climate Challenge should not be completely discounted, they do not begin to offset emissions or emissions growth in the electric industry.

Commitments to Stabilize Emissions at or below 1990 Levels

Of the Climate Challenge agreements reviewed in this analysis, which included over 25 percent of the agreements and all agreements from companies reporting the largest emissions "reductions" under Section 1605(b), four companies were identified as having

made commitments to reduce overall corporate emissions back to or below 1990 levels. Of these, at least one company is clearly not on a path to achieve its commitment, one company has made real progress, one company's commitment is largely irrelevant because it has divested its generating assets, and the progress of one company cannot be determined from data reported. The four commitments identified include:

Cinergy Cinergy's participation agreement commits the company "to develop and implement a voluntary program of comprehensive and flexible least-cost activities to reduce, avoid, or sequester greenhouse gas emissions to return the Cinergy Companies' emissions to 1990 levels by the year 2000." Although Cinergy did not report emissions information under 1605(b) in 1999, by 1998 Cinergy reported total CO_2 emissions that were 40 percent above 1990 levels, suggesting the company would not meet its commitment.

Niagara Mohawk Niagara Mohawk committed to limit company CO_2 emissions to its 1990 baseline level and to maintain that level through 2000. However, as noted in the 1605(b) filing by Niagara Mohawk, the "reduction" reported in 1999 "does not reflect new reduction projects and activities; it is rather a consequence of electric utility restructuring in New York state," which required the company to divest its generating assets. The sale of its power plants has made Niagara Mohawk's "reduction" commitment largely irrelevant.

The Sacramento Municipal Utility District (SMUD) SMUD committed to reduce CO_2 emissions to 30 percent below its 1990 baseline emissions of 3.9 million tons by 2000. As of 1999, SMUD reported emissions that were 21 percent below its reported 1990 CO_2 emissions level, signaling real progress toward meeting its commitment. The progress is based primarily on the purchase of less coal-fired electricity to meet its demand. SMUD points out that this progress represents a 33 percent "reduction" when adjusted for increased electricity sales. However, SMUD's commitment does not mention adjusting for increased electricity sales.

The Salt River Project (SRP) SRP agreed to stabilize its greenhouse gas emissions at 1990 levels by 2000. However, SRP has not been reporting corporate emissions information under the 1605(b) program, making it impossible to assess its progress from publicly reported data.

The commitments of these four companies are the types of commitments that would have been needed across the industry for the Climate Challenge to meet its objective of returning emissions to 1990 levels by 2000. However, as one might expect under a non-binding voluntary program, only a small minority of companies agreed to these types of commitments, and even for these self-selected companies the results were mixed.

1999 "REDUCTIONS" REPORTED UNDER 1605(B)

Section 1605(b) of the Energy Policy Act provides a mechanism for the voluntary reporting of annual reductions of greenhouse gas emissions. Electric companies that made emissions reduction commitments under the Climate Challenge program also agreed to report their emissions reduction progress under the 1605(b) reporting program. The program enables companies to report emissions reductions on a project-by-project

Table 1 Emissions and Emissions Reductions of 20 Companies Reporting over 20 Million Tons of CO_2 Equivalent Reductions over the Life of the 1605(b) Program

	Program Total CO_2 Equivalent Reductions Reported	Reporting Basis for Program Total	1999 Project Direct CO_2 Reductions	1999 Entity Direct CO_2 Reductions from Stationary Combustion	1990 to 1999 CO_2 Emissions Change
FPL Group	179,591,355	Entity	N/A	18,316,000	24,852,000
Tennessee Valley Authority	149,728,565	Entity	28,398,668	28,389,780	5,880,041
TXU	149,320,163	Project	20,908,112	N/A	N/A
Duke Energy	87,420,473	Entity	14,480,357	14,480,357	10,029,016
KeySpan Energy	53,374,582	Entity	N/A	4,063,200	-1,730,900
FirstEnergy	51,582,962	Entity	11,545,699	11,543,721	-8,674,000
AES	49,667,625	Entity	N/A	N/A	1,655,183
Niagara Mohawk	37,442,511	Entity	2,668,228	10,739,100	-10,739,000
Carolina Power & Light	36,994,932	Project	8,161,891	N/A	N/A
Pacific Gas & Electric	35,346,135	Entity	4,784,977	4,698,673	396,505
Southern Company	34,155,175	Entity	5,939,803	4,973,494	20,901,270
Baltimore Gas & Electric	31,797,949	Entity	5,568,779	5,571,504	6,800,000
Wisconsin Electric Power	30,953,598	Project	3,351,543	N/A	N/A
Reliant Energy	28,861,943	Entity	894,153	3,884,000	5,613,000
Entergy Services	28,161,439	Entity	4,151,247	4,144,288	27,484,683
Florida Power	27,694,761	Entity	N/A	5,555,831	680,448
Southern California Edison	24,953,373	Project	4,348,026	N/A	N/A
GPU, Inc.	24,541,630	Project	2,680,450	N/A	N/A
Central Hudson Gas & Electric	20,483,077	Entity	355,159	802,750	-802,750
Northeast Utilities	20,313,480	Entity	N/A	2,440,000	-940,000
Totals	1,102,385,728		118,237,091	119,602,698	81,405,496

Source: Energy Information Administration (EIA) 1605(b) Public Use Database. 1999 emissions values for Southern Company are reported incorrectly by EIA. Corrected values supplied by company are used to calculate 1990 to 1999 emissions change. Values for AES represent corporate total based on reporting of three separate entities.

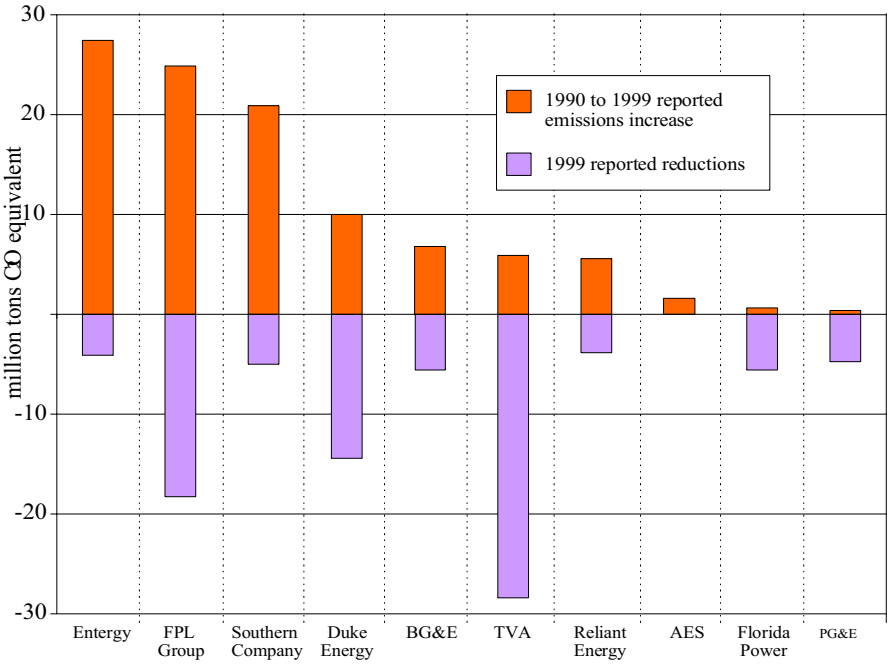
basis, as a single corporate entity, or both. Most, but not all, reporting companies provide information on both project and entity level "reductions," which largely overlap.

In 1999, 100 electric companies reported 453 projects, resulting in reported "reductions" of 136 million CO_2 tons. In addition, 42 electric companies reported entity level "reductions" from stationary combustion, totaling 137 million CO_2 tons.

Over the nine years of reporting under the 1605(b) program, 20 electric companies have individually reported "reductions" exceeding 20 million CO_2 equivalent tons, either on a project or entity basis. The emissions "reductions" reported by these 20 companies account for over 80 percent of electric industry emissions "reductions" reported over the life of the program and 87 percent of "reductions" reported in 1999. Table 1 illustrates the total emissions "reductions" reported by these companies from 1991 to 1999, the "reductions" reported by each in 1999, and their reported change in emissions between 1990 and 1999.

Table 1 indicates that 10 of the 15 companies reporting emissions information reported emissions increases between 1990 and 1999. Most of these 10 companies also reported significant emissions "reductions" in 1999 (Figure 5). Florida Power and Light (FPL) Group, for example, reported an emissions increase of 24.9 million tons between 1990 and 1999. At the same time, FPL Group reported 18.3 million tons of CO_2

Figure 5 Discrepancies between Reported Emissions and Emissions Reductions



Source: Energy Information Administration 1605(b) Public Use Database. Reductions shown are reported entity direct reductions from stationary combustion.

"reductions" from stationary combustion activities. The total discrepancy between the emissions increase and the reported "reductions" was 43.2 million tons. This circumstance highlights why the Climate Challenge and 1605(b) were ineffective at reducing actual emissions—companies have been able to report significant emissions "reductions" while emissions increased.

At least three related factors account for this seemingly inconsistent reporting: 1) the 1605(b) program allows companies to establish baselines for emission "reduction" calculations using hypothetical scenarios of "what would have happened" that have no basis in fact; 2) the programs allow companies to commit to and report "reductions" for what can only be described as business-as-usual activities; and 3) the programs allow companies to report "reductions," while ignoring emissions increases in other areas.

Hypothetical Baselines

The 1605(b) program enables companies to use so-called "modified baselines" to calculate emission "reductions." Modified baselines are a hypothetical construction of "what would have happened" without the so-called emissions "reduction" activity. All but two of the companies shown in Table 1 that report entity level "reductions" used modified baselines. Modified baselines are also used to calculate the vast majority of project "reductions." Prominent examples of the use of modified baselines include:

- Tennessee Valley Authority (TVA) uses a generation planning model to calculate a baseline of what emissions would have been had it continued to use the set of generating units operating in 1990 at their 1990 capacity factors and heat rates. Since neither the Browns Ferry, nor the Watts Bar nuclear facilities operated in 1990, TVA uses this baseline to calculate emissions "reductions" assuming the total output of these nuclear facilities offsets hypothetical emissions that would have been associated with the 1990 generating fleet. These reported "reductions" totaled 27.6 million CO_2 tons in 1999.
- Texas Utilities (TXU) uses a baseline of what would have taken place if the Comanche Peak nuclear facility had not operated. This baseline assumes additional construction and use of lignite coal plants. TXU calculates 19.4 million CO_2 tons of emissions "reductions" in 1999, assuming the entire 18 million MWh of generation from the Comanche Peak station offsets emissions from hypothetical lignite coal facilities.
- Florida Power and Light (FPL) Group uses a hypothetical baseline to claim "reductions" for building natural-gas-fired generating stations. FPL Group's baseline assumes incremental capacity additions would have been coal-fired, had they not built gas-fired plants. Therefore, when the company built gas-fired plants, emissions increased, but increased less than they would have if coal-fired plants had been built. The new plants lead to an emissions increase, but a reported "reduction."

Hypothetical baselines enable companies to commit to and report emissions "reductions" that don't exist in fact.

Hypothetical baselines enable companies to commit to and report emissions "reductions" that don't exist in fact. Virtually all companies reporting substantial emissions "reductions" under 1605(b) are using modified baselines.

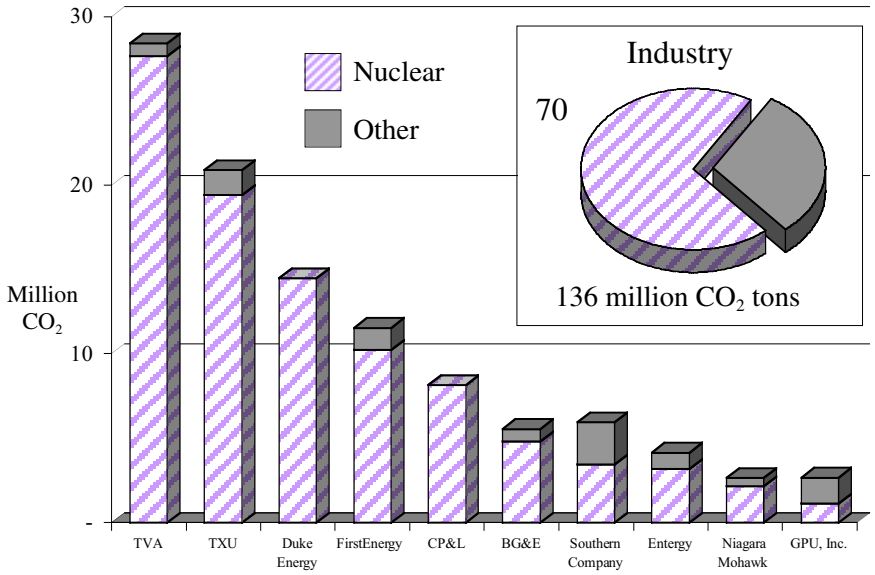
Business-as-Usual "Reductions"

With modified baselines, companies are able to report emissions "reductions" under 1605(b) for many "business-as-usual" activities. By far the largest of these involve reporting emissions "reduction" projects associated with availability improvements at existing nuclear power plants. Others involve regular maintenance or upgrades at existing fossil plants, shutting down plants, fuel switching, repowering, and other activities. It is not clear that any of these "reduction" activities resulted from changes in business behavior due to the Climate Challenge program.

Ten of the companies listed in Table 1 reported "reduction" projects associated with nuclear facilities. These projects accounted for 80 percent of the project direct "reductions" reported by companies in Table 1, and 70 percent of total project direct "reductions" reported by the electric industry under 1605(b) in 1999. Figure 6 illustrates the portion of "reductions" resulting from nuclear projects for the industry and for the companies included in Table 1 reporting nuclear projects.

Most of the nuclear "reductions" reported—aside from the examples of companies reporting "reductions" for a facilities entire output—were associated with availability improvements that increased generation at a facility.[8] Availability improvements are increases in the amount of time a plant operates during the year, which at base load nuclear plants is strictly a function of how well the plants are operated and maintained.

Figure 6 Reductions from Operation of Nuclear Plants



Source: Energy Information Administration 1605(b) Public Use Database.

Duke Energy reports significant emissions "reductions" associated with increased generation at three of its nuclear power plants, but the company recorded an overall emission increase from its fossil generation fleet of over 26 percent between 1990 and 1999.

Availability improvements at base load nuclear facilities directly and substantially improve plant profitability, making them a top priority for all nuclear plant operators. Over the past decade, nuclear operators have been successful at improving availability, as the average capacity factor of nuclear power plants (the amount of annual generation as a percent of the plant's total generation capability), increased from 66 percent in 1990, to over 85 percent in 1999.[9] This industry-wide phenomenon is not limited to plants associated with the Climate Challenge commitments or 1605(b) reporting.

Fossil-fuel power plant operation provides another set of reported "reductions." These range from maintaining and upgrading equipment to fuel switching, re-powering, or shutting down outdated generating plants. Projects that companies claimed were routine repair and maintenance accounted for by far the largest "reductions" in this category, with 159 projects reported for a total emissions "reduction" of 16 million tons of CO_2 in 1999, or 10 percent of total reported "reductions."[10] As noted above, these "reductions" amount to nothing more than reporting of business-as-usual activities to service aging power plants.

Selective Reporting

Under 1605(b), companies are able to report emissions "reductions" from one set of activities, while ignoring other activities that increase emissions. For example, Duke Energy reports significant emissions "reductions" associated with increased generation at three of its nuclear power plants, but the company recorded an overall emission increase from its fossil generation fleet of over 26 percent between 1990 and 1999. None of the emissions increases were reported as projects or counted against claimed "reductions." Similarly, Baltimore Gas & Electric reported "reductions" associated with heat rate

improvements at three fossil fuel power plants in 1999, but emissions from its fleet increased 50 percent between 1990 and 1999. Allowing for reporting of "reductions" from one set of operations, and simultaneously ignoring emissions increases from other activities is a significant accounting loophole in the 1605(b) program. To achieve real emissions reductions, programs must clearly account for all emissions activities.

CONCLUSION

The failure of the Climate Challenge program to reduce emissions was arguably predictable. Without binding commitments or enforcement provisions, electric power producers had no incentive to pursue real changes in business practices to reduce CO_2 emissions. Furthermore, by enabling companies to claim "reductions" using hypothetical baselines, report "reductions" from business-as-usual activities, and ignore emissions increases that parallel reported "reductions," the Climate Challenge and 1605(b) allowed companies to essentially print their own emissions "reductions." Real progress in improving electric industry environmental performance must involve enforceable requirements that make global warming pollution reduction an integral factor in business planning and investment decisions.

ENDNOTES

[i] For examples of other voluntary programs that have not been effective at reducing emissions see: NRDC, Voluntary Greenhouse Gas Reduction Programs Are Not Enough, June 2001. http://www.nrdc.org/globalWarming/avoluntary.asp .

2 Energy Information Administration, U.S. Carbon Dioxide Emissions from Energy Sources: 2000 Flash Estimate. June 2001. http://www.eia.doe.gov/oiaf/1605/flash/sld001.htm.

3 In an effort to circumvent air pollution control requirements, many power companies have classified a variety of projects as "routine maintenance," when in fact these projects represented "major modifications" to existing power plants under the Clean Air Act. Regardless of their legal status, these projects often represent business-as-usual investments to maintain or expand capacity at aging units.

4 Energy Information Administration (EIA) data indicate that between 1990 and 1999 overall U.S. greenhouse gas emissions increased 10.7 percent and U.S. CO_2 emissions increased 13.1 percent. During the same period, electric industry CO_2 emissions increased 20.3 percent. See http://www.eia.doe.gov/oiaf/1605/ggrpt/index.html.

5 Based on 2000 net electricity generation data from Energy Information Administration (EIA), Annual Energy Review 2000, August 2001, Table 8.2; and average 1999 lbs/MWh emissions rates for coal (2,095), oil (1,969) and natural gas (1,321) from DOE, Carbon Dioxide Emissions from the Generation of Electric Power in U.S., July 2000, Table 1.

6 Climate Challenge Agreements are available for review at: http://www.eren.doe.gov/climatechallenge /cc_accords.htm.

7 Richard Cowart, "Efficient Reliability: The Critical Role of Demand-Side Resources in Power Systems and Markets," (National Association of Regulatory Utility Commissioners, June 2001) at 12-13.

8 Of companies in Table 1, CP&L, Duke Energy, Entergy, FirstEnergy, Niagara Mohawk, and Southern Company reported emissions "reductions" from nuclear plant availability improvements.

9 Energy Information Administration (EIA), Annual Energy Review 2000, Table 9.2.

10 See Note 3.