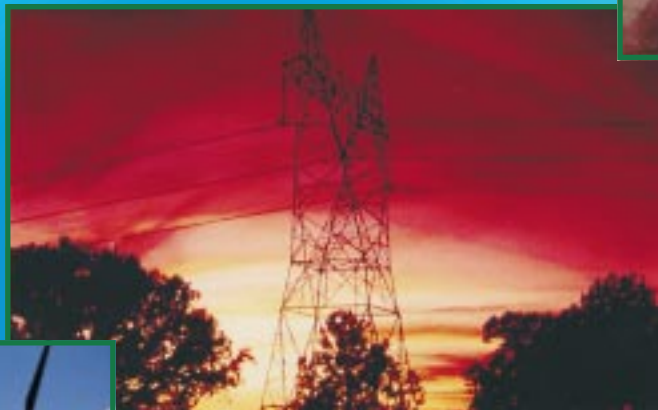


Supporting Analysis for the Comprehensive Electricity Competition Act



May 1999

**Office of Economic, Electricity and Natural Gas Analysis
Office of Policy
U.S. Department of Energy
Washington, DC 20585**



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Executive Summary

This report describes and quantifies the expected economic and environmental benefits of competition in retail electricity markets, taking into account the specific features of the Administration's Comprehensive Electricity Competition Act (CECA), which was submitted to the Congress on April 15, 1999. Potential economic impacts on electricity markets are estimated, including both regional and State-level detail, as well as environmental impacts. In addition to presenting an analysis of the current Administration proposal, this report highlights changes from the analysis issued in July 1998 in support of the legislative proposal submitted to the 105th Congress in June 1998. The changes reflect refinements in the Administration's proposal, updates in projections of energy market conditions by the Energy Information Administration (EIA), and improvements in the modeling framework.

The CECA was formulated to promote the economic benefits of competition in a manner that is fair to all Americans and improves the environmental performance of the electricity industry. The Act: (1) encourages States to implement retail competition; (2) protects consumers by promoting competitive markets, enhancing information flows, and outlawing various customer abuses, such as "slamming" and "cramming"; (3) assures access to and reliability of the transmission system; (4) promotes and preserves public benefits, including support for renewable energy and energy efficiency; (5) removes impediments to competition in areas served by Federal Power Marketing Administrations and the Tennessee Valley Authority; (6) protects the interests of rural and remote communities and Indian tribes; and (7) amends existing Federal statutes to clarify Federal and State authority.

Because this report focuses on economic rather than legal or institutional analysis, it does not address in detail every aspect of the Administration's proposed legislation. Readers interested in a complete

presentation and explanation of all aspects of the Administration proposal should read this analysis in conjunction with the proposed legislative language or the narrative description of the Act, both of which were issued on April 15, 1999.

Overview of Economic Benefits

The expected economic benefits of the Administration's legislative proposal fall into three major categories. First, competition will provide strong economic incentives to raise productivity through better use of resources. Second, increased competition will make it worthwhile for electricity sellers to pursue more efficient pricing practices, which in turn will enable power producers to make more intensive use of their substantial investments in generation capacity. Third, and perhaps most significantly, increased competition will call forth a wide range of innovative products and services that will add value and better meet customer needs. All three categories of benefits represent real efficiencies expected from competition, not a simple redistribution of existing financial flows that would benefit one set of interests at the expense of another. It is the real efficiencies from restructuring—increased productivity, better use of resources, and new products and services—that will provide sustained, long-run net benefits to U.S. electricity consumers and to the overall economy.

The Administration proposal takes special care to assure that all types of consumers will realize benefits from electricity restructuring. For example, it includes targeted provisions that address the concerns of low-income consumers, customers of rural electric systems, persons located in remote areas, and Indian tribes. The benefits to such groups, however, extend far beyond the impacts of specifically targeted provisions.

Consider, for example, the situation faced by rural customers. In addition to the greater efficiencies

and new products and services expected from competition, rural communities will benefit from the continuation of cost-based rates for Federal power, economic development resulting from the renewable portfolio standard because of the concentration of the Nation's wind and biomass resources in rural areas, and the authorization of new grants for rural and remote service in currently unserved or underserved areas.

Notwithstanding the likely positive effects of competition, the plan also includes a rural safety net provision that could provide up to \$650 million per year to rural consumers by 2010.

Overview of Environmental Benefits

The expected environmental benefits of the Administration's legislative proposal result from environment-friendly aspects of competition augmented by specific provisions that directly benefit the environment. Increased competition spurred by the proposed legislation will itself strengthen incentives to use fuel more efficiently at both existing and new generating plants, thereby cutting emissions, costs, and fuel use. Additional emissions reductions will be provided to the extent that competitive sellers attract or retain customers by offering energy efficiency and management services and "green power" from renewable sources in order to add value and distinguish their products from those of other suppliers. The experience to date in nascent competitive markets suggests that efficiency and management services already are being used as a key strategy to attract commercial and industrial customers, while the prospects for green power appear to be strongest in residential markets.

CECA will produce significant environmental benefits through both market mechanisms and policies that promote investment in energy efficiency and renewable energy. Specific provisions of the Administration's proposed legislation that add to the environmental benefits of competition include: consumer information provisions to help consumers identify and choose environmentally friendly generators; a renewable portfolio standard (RPS) to ensure a minimum level of generation from non-hydroelectric renewable energy sources; a public

benefits fund to match State commitments for financing energy efficiency, renewable energy, and other public benefit programs; provisions that remove barriers to efficient combined heat and power systems; and a net metering provision to encourage the installation of small renewable energy systems, effectively turning consumers into part-time electricity producers using environmentally friendly technologies.

Quantifying the Economic and Environmental Benefits of Competition

This report presents modeling results that compare scenarios for electricity markets in the continental United States under cost-of-service regulation and competition. The scenarios were evaluated using the Policy Office Electricity Modeling System (POEMS), a system that integrates two existing models: EIA's National Energy Modeling System (NEMS) and TRADELEC™, an electricity model developed to evaluate competitive electricity markets in more detail than the standard NEMS electricity module (see Appendix C for an overview of the POEMS model).

The POEMS analysis examines the economic and environmental impacts of a transition to retail competition. It does not, however, attempt to explicitly account for State actions that are already beginning the transition to competition, nor to reflect the timing of future actions that States might take to implement competition consistent with the Administration's proposed "flexible mandate" for retail competition. From an analytical perspective, it is difficult to isolate the economic and environmental effects of the Administration's proposed legislation from the effects of State actions alone. Moreover, the Administration's proposal will benefit consumers even in States where the transition to competitive markets is already underway, by providing additional authority to help assure that potential gains from competition are realized:

- CECA strengthens the ability of the Federal Energy Regulatory Commission (FERC) to require the participation of utilities in independent regional system operators, enhances FERC's

authority to remedy market power abuses, requires consumer information disclosure, allows States to condition market access on reciprocal treatment, and clarifies the boundaries of State and Federal jurisdictions to promote competition.

- CECA significantly advances transmission access, which is critical to effective competition. Under its provisions, similar requirements for openness and transparency are applied to all transmission providers, and significant tax law impediments to the full participation of the existing assets of publicly owned systems in competitive transmission and generation markets are removed. In addition, customers served by the Tennessee Valley Authority gain potential access to the benefits of competitive power markets.
- Provisions such as the grant programs to extend electricity service to remote users and Indian tribes, as well as the rural safety net, apply on a national basis and help to assure that the benefits of electricity restructuring are shared by all Americans.
- Provisions that provide important environmental benefits, such as the renewable portfolio standard and the public benefit fund, apply to all States, including those where the transition to competitive markets is already underway.

The focus of the POEMS analysis is a quantitative assessment of the impacts of full national retail competition relative to a continuation of cost-of-service regulation that includes wholesale competition. The major results of the analysis are described below.

Economic Results

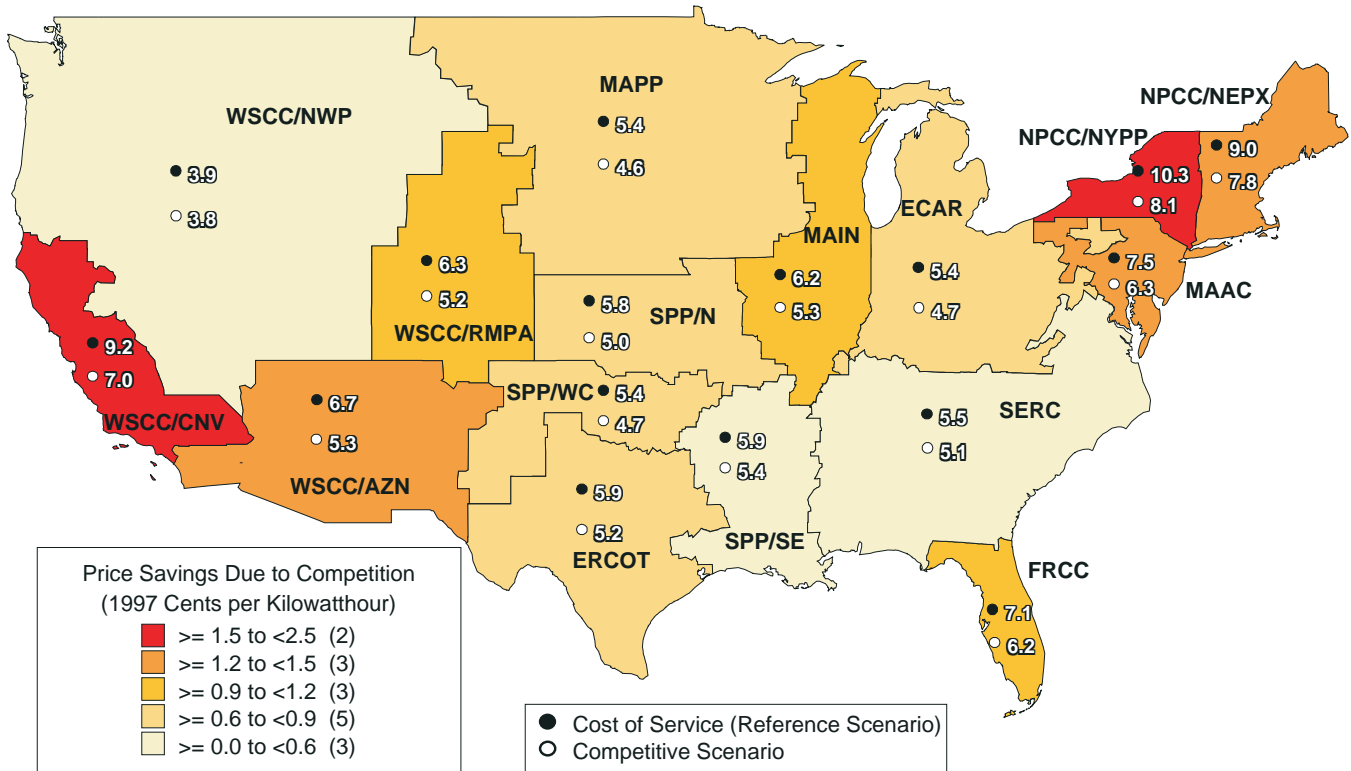
- The delivered cost of electricity to all consumers in 2010 in the Competitive Scenario is estimated to be \$32 billion lower than in the Reference (cost-of-service) Scenario.
- The average national price of electricity is estimated to be 14 percent lower under competition in 2010. The largest reductions are realized in

areas of the country with the highest cost-of-service rates. However, all regions of the country benefit from competition (Figure ES1).

- The model results indicate that residential consumers in all States¹ will benefit from competition throughout the forecast horizon. In 2010, the price of electricity averaged across all consumer classes is expected to be higher with competition in three States. Authorities in States where prices to nonresidential consumers are higher in the Competitive Scenario could assure that their consumers reap benefits from competition by choosing different implementation approaches than were assumed for the modeling analysis. Although the State-level projections presented here for the effects of retail competition on electricity prices are of significant interest, it should be noted that their development requires the use of allocation methodologies that cause them to be inherently less reliable than the national or regional estimates.
- The POEMS analysis was informed by an independent effort to identify potential cost savings from restructuring. On the basis of information from reports filed by investor-owned and public utilities, the quantifiable potential cost reductions resulting from competition—in operations and maintenance costs, administrative and general costs, more efficient use of the transmission and distribution system, and capital cost savings at existing facilities—are estimated to exceed \$20 billion annually.
- Neither the POEMS analysis nor the benchmarking analysis includes the following: savings that would result from a reduction in the need for new capacity due to more efficient pricing; the benefit to consumers of avoiding the costs of any future mistakes with respect to capacity planning, technology choice, or project management that have in the past raised the cost of power to consumers; or the greater economic value to consumers of new products and services that will be created in a competitive environment.

¹The model analysis covers the continental United States.

Figure ES1. Projected Average Retail Electricity Prices in 2010
(1997 Cents per Kilowatthour)



Note: The Competitive Scenario reflects cost-of-service rates for Federal preference power customers.
Source: Policy Office, U.S. Department of Energy, POEMS model analysis (May 1999).

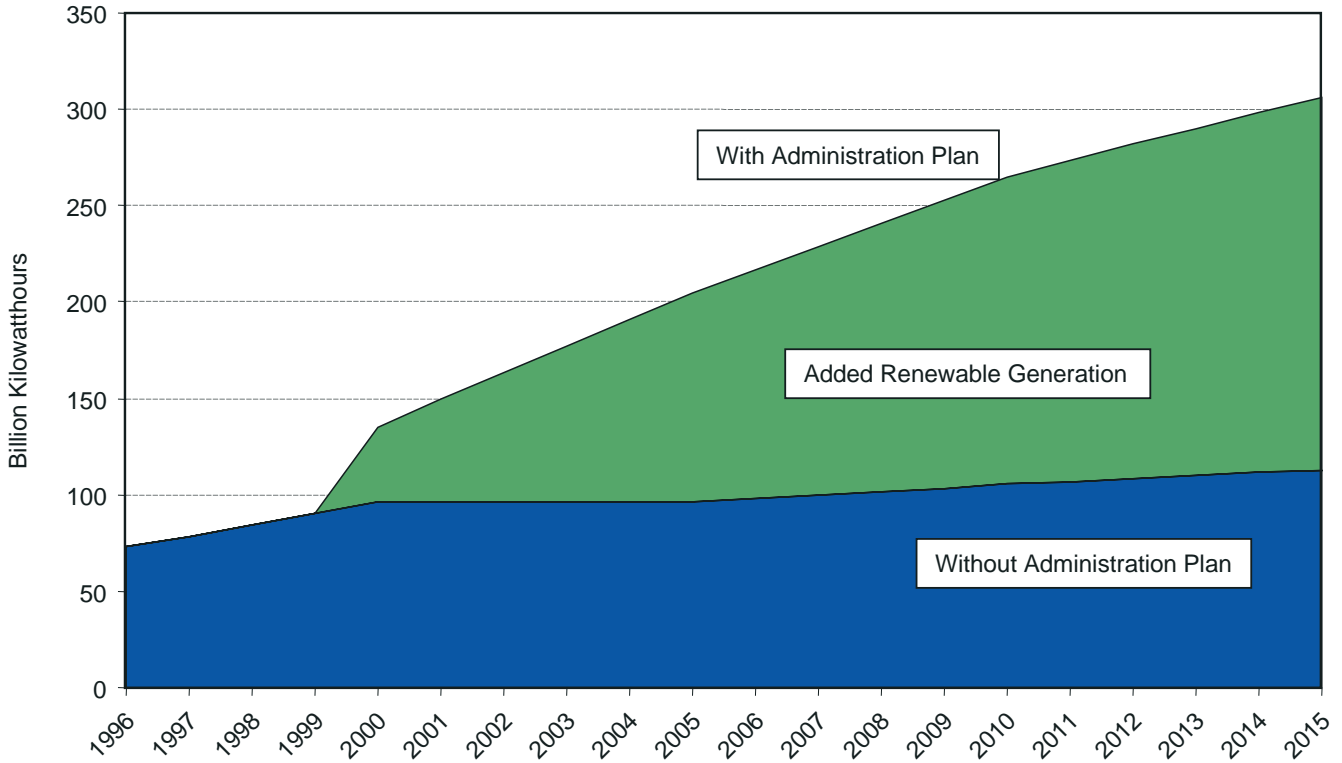
Generation Fuel Mix and Environmental Results

- The generation of electricity from RPS-eligible renewable energy resources is projected to almost triple by 2010 as a result of the RPS included in the Administration’s proposal (Figure ES2). The model results suggest that the “cost cap” provision of the RPS proposal, which limits the price of renewable energy credits, would be activated. Under such circumstances, the full RPS target of 7.5 percent coverage of sales with renewable generation would not be achieved, because some retail sellers would meet the requirement through the purchase of “proxy credits” from the U.S. Department of Energy. The use of renewable energy could increase further if cost reductions for renewable energy technologies are more rapid than anticipated, or if fossil fuel prices are higher than projected.
- Projected emissions of carbon dioxide from the electricity sector are reduced by between 40 and

60 million metric tons carbon equivalent in 2010 (Figure ES3). This estimate reflects the net impact of the emissions-increasing and emissions-reducing effects of retail competition itself, as enhanced by specific environment-friendly provisions of the Administration’s plan, such as the RPS, the public benefits fund, and the consumer information provisions.

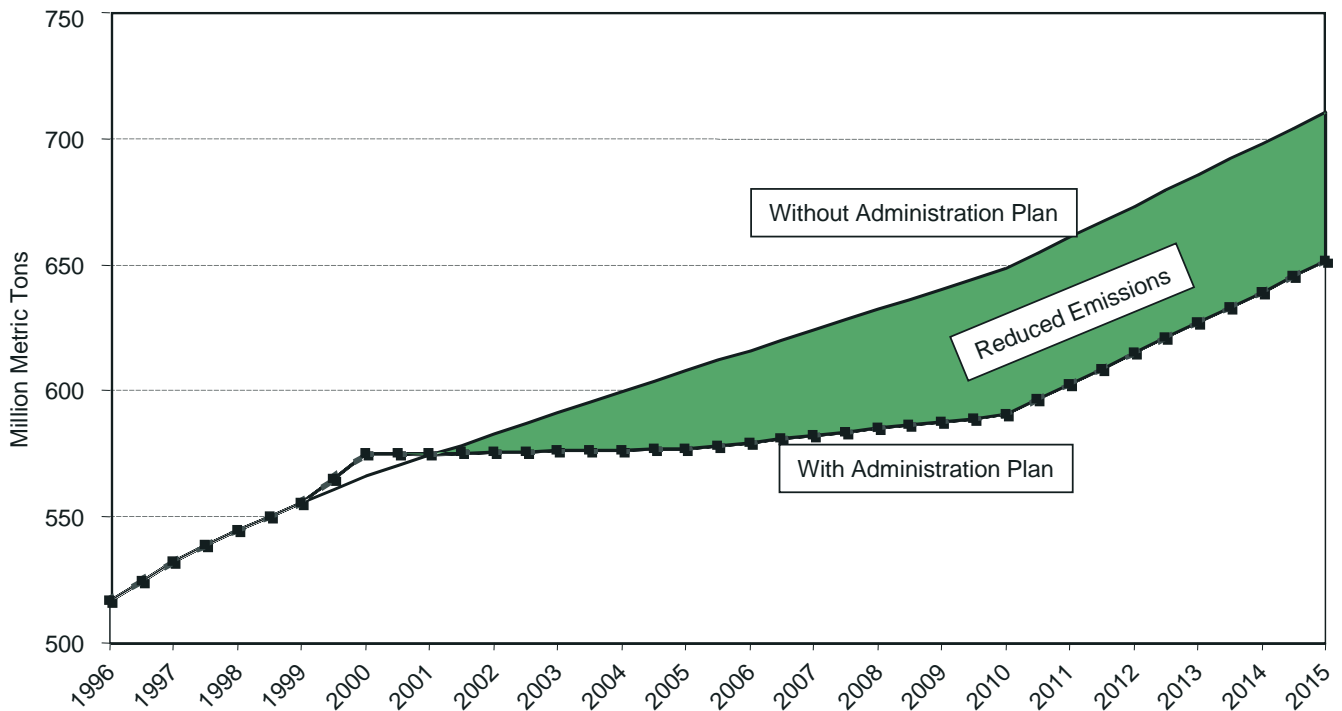
- The projected levels of nitrogen oxide (NO_x) and sulfur dioxide emissions are determined primarily by past, pending, and future actions taken by the U.S. Environmental Protection Agency (EPA) under its existing regulatory authorities. For example, annual emissions in 2000 and beyond are significantly below the 1995 level in both the Reference and Competitive scenarios due to the Phase 2 Clean Air Act NO_x standards and the September 1998 final rulemaking establishing caps on ozone-season emissions of NO_x in 22 Eastern States and the District of Columbia. Sulfur dioxide emissions from the electric utility sector already are subject to an annual nationwide

Figure ES2. RPS-Eligible Generation in the Competitive Scenario, 1996-2015



Source: Policy Office, U.S. Department of Energy, POEMS model analysis (May 1999).

Figure ES3. Carbon Dioxide Emissions from Electricity Generation, 1996-2015
(Million Metric Tons Carbon Equivalent)



Note: Emissions from electricity generators are net of changes in emissions from other sectors, which result from increases in distributed generation or price responses.

Source: Policy Office, U.S. Department of Energy, POEMS model analysis (May 1999).

cap under provisions of the 1990 Clean Air Act Amendments. Therefore, emissions of both these pollutants are projected to be similar in the two scenarios.

These estimates, presented as an Appendix in the July 1998 report, are supported by recent independent analyses by nongovernment organizations.

Changes Since the July 1998 Supporting Analysis

Changes in the projected competitive market prices are significantly influenced by the use of updated energy market assumptions drawn from the EIA's 1999 *Annual Energy Outlook*. Notably, there are significant changes in the projected evolution of fuel markets relative to the characterization in the 1997 *Annual Energy Outlook* that was used in developing the July 1998 analysis. There are also some moderate changes in the projected baseline growth rate for electricity demand, reflecting a higher projected rate of economic growth and other changes in macroeconomic assumptions. The model has also been updated to reflect the impact of the final Ozone Transport Rule in the fall of 1998, which limits ozone-season (May through September) emissions of nitrous oxides in 22 Eastern States and the District of Columbia. Projected competitive market prices are also affected by improvements in the electricity component of POEMS implemented since July 1998. Two key changes include a more accurate characterization of transmission constraints and an improved representation of the flow-through of stranded generation costs into consumer prices.

The increase in the estimated reduction in carbon dioxide emissions (40 to 60 million metric tons

carbon equivalent rather than the 25 to 40 million metric tons reported in July 1998) results primarily from two changes in the Administration proposal. First, the current proposal raises the level of the RPS target in 2010 from last year's 5.5 percent to 7.5 percent. Second, the Act adds new provisions that will remove barriers to the use of combined heat and power technologies where they are economical. Changes in the underlying energy market and economic assumptions due to the use of baseline information from the 1999 *Annual Energy Outlook* in the current modeling work also impacts the carbon dioxide estimates through a variety of mechanisms, but those changes are largely offsetting in nature.

Organization of This Report

The body of this report summarizes the economic analysis of the Administration's proposal for Federal restructuring legislation. Chapter 1 provides a short overview of recent electric industry data, drawing on standard sources that are in turn based on information filed with the EIA and FERC. Chapter 2 presents the major results of the POEMS modeling analysis and also includes a discussion of planned enhancements to the modeling framework for future work. Chapter 3 presents key assumptions used in the analysis and the rationale for the scenario formulation. It also discusses changes between the economic and energy baseline assumptions used for the July 1998 analysis and those drawn from the 1999 *Annual Energy Outlook* for the current report. Appendix A provides summary tables of results for the Reference and Competitive scenarios. Appendix B provides a table of State laws that pose a barrier to uncompensated physical bypass. Appendix C provides documentation for the POEMS.