Chapter 1

Introduction

The way electricity is produced and sold in the United States is undergoing an historic change. For a century, electricity has been generated and sold by utilities granted monopolies to supply customers in a given territory. Now, electricity generators are allowed to compete to sell electricity on a wholesale level to any utility anywhere they can transmit their power. In a number of states, electric companies are allowed to compete to sell power to individual retail customers—households or businesses. Whether, how, and when to allow or to require retail competition for electricity customers is being debated in Congress and in every state in the country that has not yet made a decision.[1]

The changes now being debated and enacted across the country are primarily intended to lower electricity prices by increasing competition among electric companies. That is a laudable goal, but what are the implications of electricity deregulation for other things we value, such as the environment and public health?

The answer depends on what the rules governing the new electricity market will be. If they ignore threats to the environment and public health, then electricity prices may well go down in the short term—but the overall quality of American lives will be diminished by increased pollution, global warming, disappearing wildlife, and other looming dangers. Electricity generation is the source of 36% of the carbon dioxide contributing to global warming, to take just one example, and a significant shift toward coal as the main fuel in power plants (a likely result of some deregulation proposals) will only increase those emissions and electricity generation's share of responsibility.

And yet, if those new market rules are designed to promote cleaner, renewable energy sources such as wind, solar, biomass, and geothermal energy—all the while permitting robust competition and lower prices—then we may see significant improvements in all these areas. As several exhaustive studies have established, "renewables" offer a technically sound, economically feasible alternative to more polluting fossil fuels. The once-a-century restructuring of the electricity industry is an opportunity to ensure that the environmental performance of the industry is optimized along with the economic performance.

This primer describes seven simple, practical measures to switch America to clean, renewable electricity sources. They are

- Renewable portfolio standards—a way to use market mechanisms to meet minimum targets for the production of electricity from renewable resources
- Public benefits funds—a way to make sure that public benefits, such as environmental improvement and fuel diversity, provided by renewables and other programs, like energy efficiency and service to low-income customers, are not ignored; and to ensure the that new technologies can be commercialized
- Net metering—a way to avoid penalizing homeowners and small businesses that elect to generate their own power
- Fair transmission and distribution rules—a way to make sure that renewable electricity producers can get their power to markets at a fair price
- Fair pollution rules—a way to make sure that old, dirty power plants have to meet the same pollution rules as new power plants, and to allow renewables credit for cleaning up air pollution

What Is Renewable Energy?

Renewable energy comes from resources that are not depleted when used or that nature can replace when people use them at sustainable levels. Renewable energy sources have been used from ancient times to provide heat (burning wood), grind grains (windmills), and transport goods (sailing ships). New technologies use renewable resources to generate electricity.

Solar energy from the sun can provide direct heat. Or it can be converted to electricity by photovoltaic cells or by using mirrors to concentrate sunlight enough to heat water and drive a steam turbine or an engine.

Biomass energy comes from plants, like trees or crops, that store solar energy through photosynthesis. The stored energy can be released by burning the plant fuel directly in a power plant or by first converting it to a gas or liquid fuel. Sources of biomass include energy crops (plants grown just for fuel), organic wastes such as wood waste or agricultural wastes, and methane gas from landfills.

Wind energy can be converted to electricity by wind turbines, spun by propeller-like blades mounted on towers.

Geothermal energy taps into the heat under the earth's crust to create steam that drives turbines.

Hydroelectric power uses moving water to turn turbines that produce electricity.

For more information on renewable energy technologies, status, potential, costs, markets and environmental characteristics, see Appendix A.

- Consumer information—a way to give consumers the information they need to choose clean electricity sources, if they wish
- Putting green customer demand to work—a way to make sure that competition allows all customers to choose clean energy sources.

The primer also examines the rationale for encouraging renewable energy use, especially in deregulated electricity markets. Chapter 1 examines the public benefits of renewables and the risk that these benefits will be ignored in a restructured electricity industry. Chapter 2 summarizes several studies showing how practical and economical it would be to increase the use of renewables in producing electricity. Chapter 3 describes the barriers that inhibit the success of renewables in current, and perhaps future, electricity markets. Chapter 4 lays out, in depth, the seven ways to switch to renewable electricity. Appendices provide more detail on renewable energy technologies and their status and costs, detailed discussion of implementation issues with the renewables portfolio standards, and descriptions of how states have implemented renewables portfolio standards, public benefit funds, and net metering to date.

Because of the historic restructuring of the electricity industry underway, this primer focuses on changes that it is critical to consider during the restructuring process. However, most of the recommended solutions can also be implemented independently of the restructuring process. They need not wait for deregulation.

The primer does not consider all of the policies needed to deregulate the electricity industry successfully. Electricity deregulation is a very complex topic.[2] The primer focuses only on policies which have critical impacts on the development of renewable energy resources and technologies.

This primer also does not focus, therefore, on energy efficiency technologies, although the public benefits fund mechanism discussed here is a critical part of providing support for ongoing improvements to energy efficiency. Energy efficiency provides most of the same public benefits as renewables and faces most of the same market barriers.[3] Most importantly, energy efficiency improvements are usually the most cost-effective steps that can be taken to reduce the environmental impact of our energy system and to lower long-run costs. As the studies described in Chapter 2 demonstrate, increasing both energy efficiency and renewables is essential for meeting environmental objectives. Preserving the public benefits of utility funding of energy efficiency improvements is a vital part of any restructuring debate.[4]

Following the strategies we recommend will not guarantee that every new power plant will be renewable-based. However, it will set America on a course toward a renewable-based future, one in which the environment and public health, on the one hand, and free-market principles, on the other, are fostered and respected.

REFERENCES

[1] For up-to-date status on electricity restructuring, see US Department of Energy, *Status of State Electric Utility Deregulation Activity*, updated monthly on line at http://www.eia.doe.gov/cneaf/electricity/page/restructure.html.

[2] For an overview of restructuring see, Timothy Brennan, Karen Palmer, Raymond Kopp, Alan Krupnick, Vito Stagliano and Dallas Burtraw, *A Shock to the System: Restructuring Amerca's Electricity Industry*, Resources for the Future, Washington, DC, 1996; also, an important series of papers has been published as the Electric Industry Restructuring Series by the National Council on Competition and the Electric Industry on-line at http://www.ncsl.org/public/catalog/envicat.htm#electric. Web sites with comprehensive information include the National Council of State Legislatures, on line at http://www.ncsl.org/programs/esnr/restru.htm and the US Energy Information Administration, on line at http://www.eia.doe.gov/cneaf/electricity/page/restructure.html

[3] See W. Golove and J. Eto, *Market Barriers to Energy Efficiency: A Critical Reappraisal of the Rationale for Public Policies to Promote Energy Efficiency*, Lawrence Berkeley National Laboratory, LBL-38059, March 1996. Available on-line at http://eetd.lbl.gov/EA/EMP/emppubs.html.

[4] For more information on energy efficiency programs and public benefits funding, see Joseph Eto, Charles Goldman, and Steven Nadel (ACEEE), *Ratepayer-Funded Energy-Efficiency Programs in a Restructured Electricity Industry: Issues and Options for Regulators and Legislators*, Lawrence Berkeley National Laboratory, LBNL-41479, May 1998; J. Eto, *The Past, Present, and Future of U.S. Utility Demand-Side Management Programs*, LBNL-39931, December 1996. Available on-line at http://eetd.lbl.gov/EA/EMP/emppubs.html and the American Council for an Energy Efficient Economy web site at http://www.aceee.org/.