

# Policies and market factors driving wind power development in the United States

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## Abstract

In the United States, there has been substantial recent growth in wind energy generating capacity, with growth averaging 24 percent annually during the past five years. About 1700 MW of wind energy capacity was installed in 2001, while another 410 MW became operational in 2002. During 2003, development activity has remained strong, with an estimated 1600 MW of capacity installed. With this growth, an increasing number of States are experiencing investment in wind energy projects: currently about half of all States host at least one wind power project. This paper explores the key factors at play in the 12 States in which a substantial amount of wind energy capacity has been developed or planned. Some of the factors that are examined include policy drivers, such as Renewable Portfolio Standards (RPS), Federal and State financial incentives; as well as market drivers, such as consumer demand for green power, natural gas price volatility, and wholesale market rules.

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*Keywords:* Renewable energy policy; Wind energy development; Wind energy markets

## 1. Introduction

Installed wind power capacity in the United States has accelerated in recent times, with an average annual growth rate of 24 percent during the past five years.<sup>1</sup> By the end of 2002, total installations reached 4685 MW (see Fig. 1), which placed the United States third in wind power capacity globally, following Germany and Spain (which reported 12,000 MW and 4830 MW, respectively). Growth in the US wind industry continued during 2003, with an estimated 1600 MW installed (AWEA, 2003). With this growth, an increasing number

of States are experiencing investment in wind energy projects. Current installations are spread among more than 25 States, although the vast majority of capacity is concentrated in fewer than half of those States.

This paper explores the policies and market factors that have been driving wind energy development in the United States, particularly in the States that have achieved a substantial amount of wind energy investment in recent years. Although there are Federal policies and overarching market issues that are encouraging investment nationally, recent activity has also been spurred by State-level policies or localized market drivers.

Some of the policy drivers of wind development in the United States that are discussed in this paper also exist in other countries, particularly those in Europe, while others do not. For example, the so-called “feed-in tariffs” that have provided a stable profitable market for wind generators in Denmark and Sweden historically, and Germany and Spain currently, no longer exist in the United States (Haas, 2000). Other forms of support, such as the Renewables Obligation in the UK, as well as similar quotas in Austria, Belgium, and Italy (and

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<sup>1</sup>For comparison purposes, between 1997 and 2002, natural gas-fired generating capacity in the United States increased at an average annual rate of 18 percent, while coal-fired, hydroelectric, and nuclear capacity showed no growth over this period, and oil-fired generation capacity declined by an average annual rate of 2 percent (EIA, 2003).

## Nomenclature

### Integrated Resource Planning (IRP)

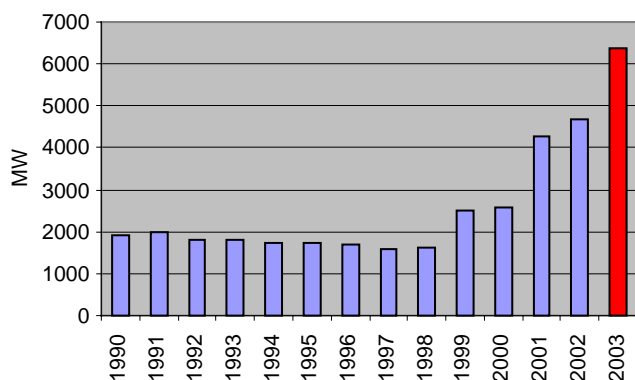
IRP is an electric-system planning process that requires utilities to forecast demand for power and examine alternative resource scenarios to meet that demand. The least expensive combination of resources is then chosen to meet the utilities' needs, considering environmental constraints, risks, and other factors.

### Renewable Portfolio Standard (RPS)

Similar to the Renewables Obligation in the United Kingdom, an RPS is a policy that requires electricity providers to include in their resource portfolios a specified amount of electricity generated from renewable sources.

### System Benefits Fund

A system benefits fund is a policy that has been adopted primarily in restructured electricity markets, whereby a small surcharge is imposed on electricity customers and placed into a fund used to support renewable energy, energy efficiency, and other system benefits that might not otherwise be funded in a competitive electricity market.



Sources: 1990–1996 data from EIA Renewable Energy Annual; 1998–2003 data from American Wind Energy Association. 2003 data is estimated.

Fig. 1. Cumulative US wind energy capacity.

planned for Denmark and Sweden) closely resemble the renewables portfolio standard (RPS) that has taken hold at the State level in the United States (Reiche and Bechberger, 2004). Finally, Europe's aggressive targets for renewables deployment are driven in large part by its strong stance on carbon abatement and adoption of the Kyoto protocol, whereas the United States, which at the Federal level has opted to encourage voluntary emissions reductions rather than to ratify the Kyoto protocol, has so far not explicitly linked policy support for renewables with carbon policy (though some State governments are beginning to move in this direction, and consumers who voluntarily purchase renewable energy often do so out of concern for carbon emissions).

This paper proceeds as follows. We first look briefly at Federal policies and broad market issues driving wind development in the United States, and then focus more narrowly on State-specific experience. We provide brief discussions of the drivers for wind development in a

dozen leading States—California, Colorado, Iowa, Kansas, Minnesota, New York, Oregon, Pennsylvania, Texas, Washington, West Virginia, and Wyoming. Finally, we conclude with a discussion of the key lessons that may be transferable to other States, regions, or countries.

## 2. Federal policies

Federal tax and financial incentives have played an important role in encouraging wind power development. The most notable and effective of these incentives has been the Federal Production Tax Credit, which is an inflation-adjusted per-kWh credit applied to the output of a qualifying facility during the first 10 years of its operation. During calendar year 2002, qualifying wind generators earned an inflation-adjusted production tax credit of 1.8¢/kWh. Originally created under the 1992 Energy Policy Act, the Federal Production Tax Credit was initially available for projects installed between 1994 and June 30, 1999 (Gielecki et al., 2001). The credit was subsequently extended to December 2001 and then again to December 2003. As of the time of writing, Congress has failed to adopt new energy legislation to extend the credit. The impact of the tax credit on the wind energy industry is evident in the boom-bust cycle of development in recent years. Wind energy installations have peaked in years when the credit was scheduled to expire (i.e., 1999, 2001, and 2003) as developers rushed to complete projects in time to take advantage of the credit. In the off years, development has lagged because of the uncertainty surrounding the Production Tax Credit extension and the lead-time necessary to plan and complete projects (see Fig. 2).

The Renewable Energy Production Incentive, also created under the 1992 Energy Policy Act, provides an

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