

# 1 The Role and Context of Wind Energy

## 1.1 United States Wind Energy Development

The United States is the second largest global developer of wind energy. At the end of 2010, the U.S. had over 40,000 megawatts (MW) of cumulative wind capacity installed, or 21 percent of the world's installed wind capacity (Figure 1).<sup>1</sup> Wind energy has expanded rapidly in the United States, and:

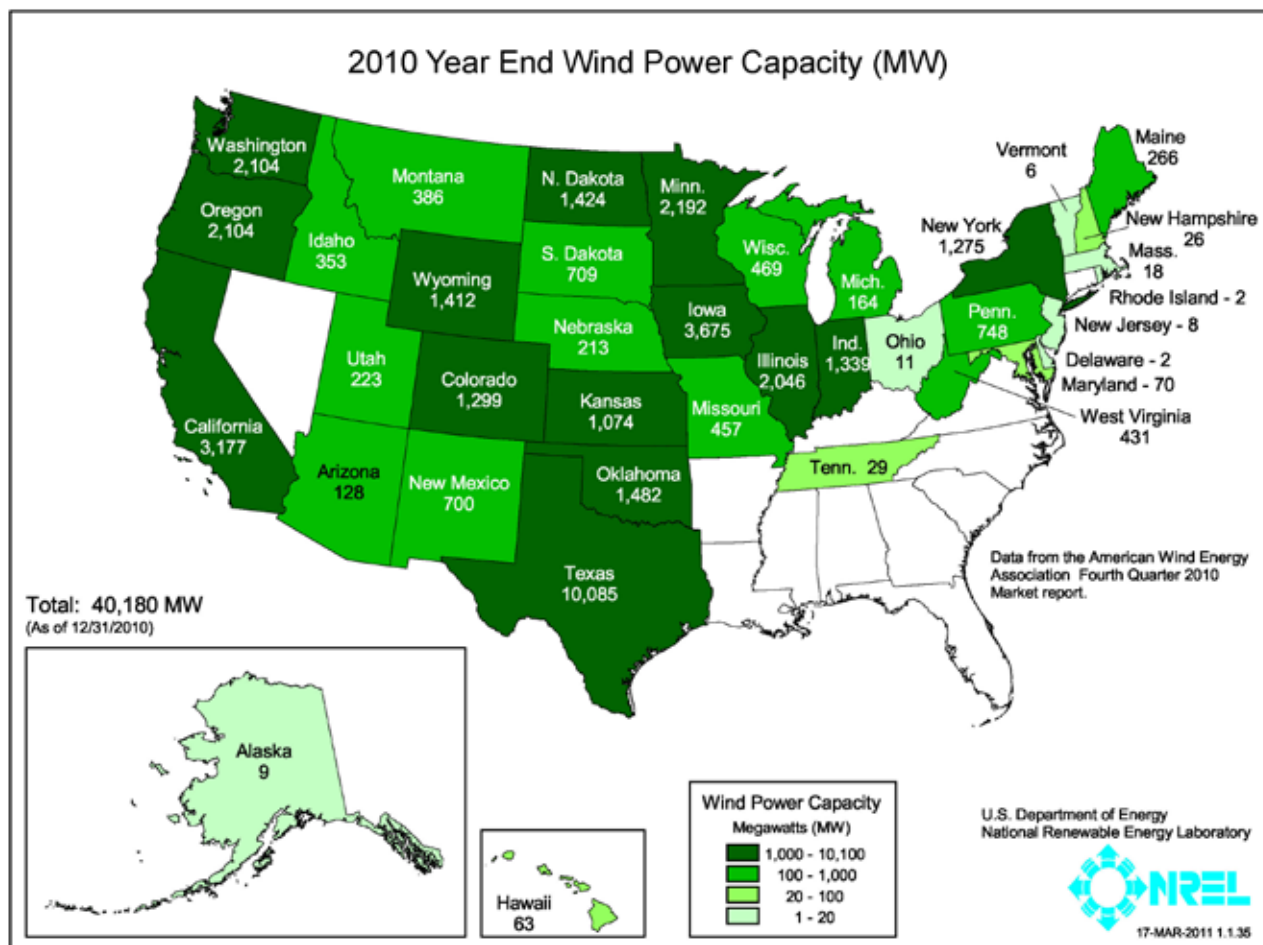
- From 2007 through 2010, wind represented 35 percent of new U.S. electricity-generating capacity installed, second only to natural gas; and
- From 2000 through 2010, the installed capacity of wind energy increased over 1,482 percent, from 2,539 MW in 2000 to 40,180 MW in 2010.<sup>2</sup>

Despite its rapid growth, wind energy still remains a small portion of total electricity generation in the United States. As of the end of 2010, wind energy composed 2.3 percent of total U.S. electricity generation.<sup>3</sup>

## Federal Drivers of Wind Energy Development

The two primary policy drivers of wind energy development in the United States are: 1) financial incentives, including tax credits and deductions; and 2) renewable portfolio standards.

Financial Incentives. Federal incentives for wind energy development include a production or investment tax credit (PTC or ITC) and accelerated depreciation. The PTC provides wind developers who have their projects in service before December 31, 2012, with \$0.022 per kilowatt-hour (kWh) of electricity generated for the first 10 years of operation.<sup>4</sup> The 2009 American Reinvestment and Recovery Act provided an alternative incentive for commercial renewable energy developers, who, if construction begins prior to December 31, 2011, can take an ITC of 30 percent of capital costs



**Figure 1.** U.S. wind energy installed capacity at the end of 2010. (Source: U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy.)

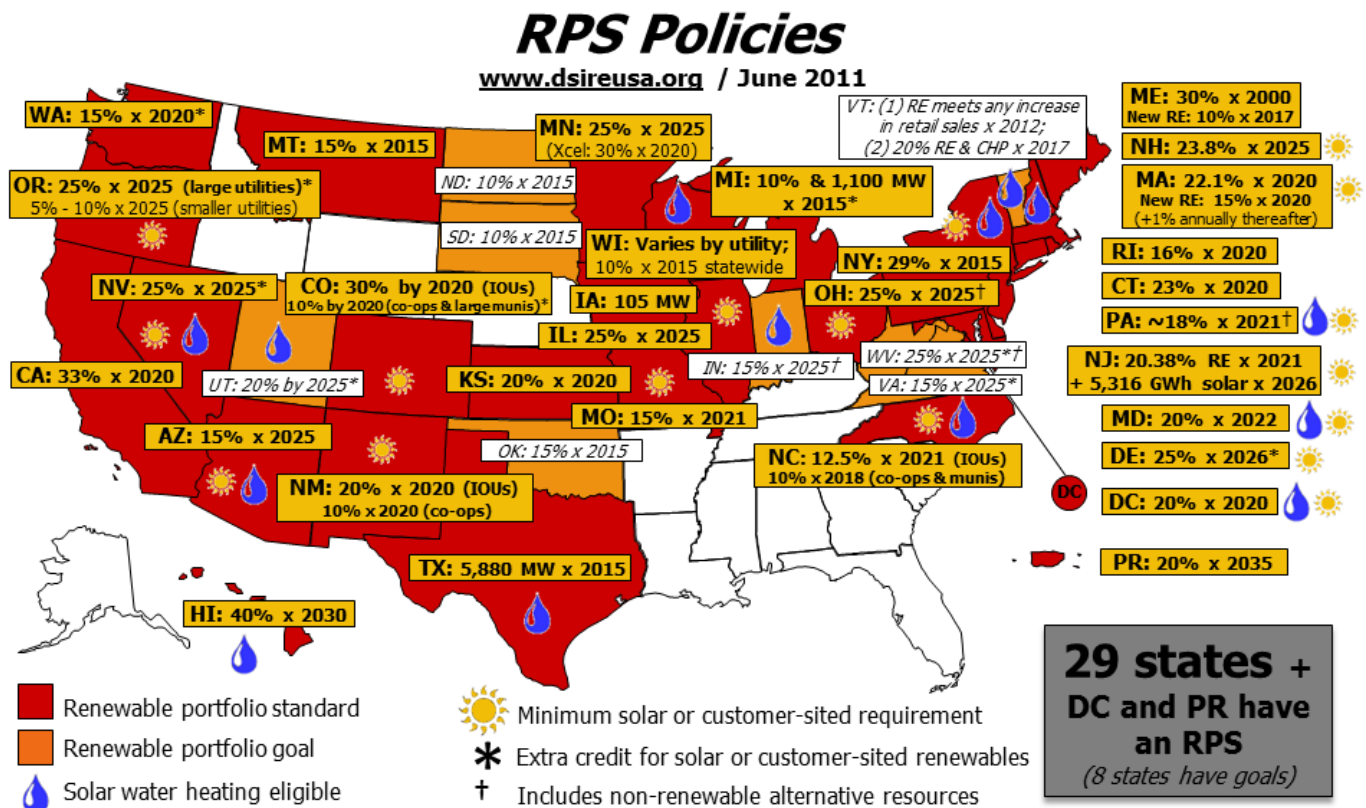
in lieu of the PTC.<sup>5</sup> The status of these tax credits beyond their expiration dates is uncertain, although the PTC has been renewed continuously over the last decade. In addition, through the Modified Accelerated Cost-Recovery System (MARCS) wind developers can depreciate the cost of the wind facility over five years (other non-renewable electricity generating facilities generally depreciate capital costs over 20 years), and they may also be eligible for an additional bonus depreciation.<sup>6</sup>

*Renewable Portfolio Standards.* Renewable portfolio standards (RPSs) dictate a certain percentage of total electricity production that will come from renewable sources by a designated year. Although no federal RPS exists, 29 states, the District of Columbia, and Puerto Rico currently have binding standards, while another eight states have non-binding goals (Figure 2). Wyoming does not have an RPS, although wind energy

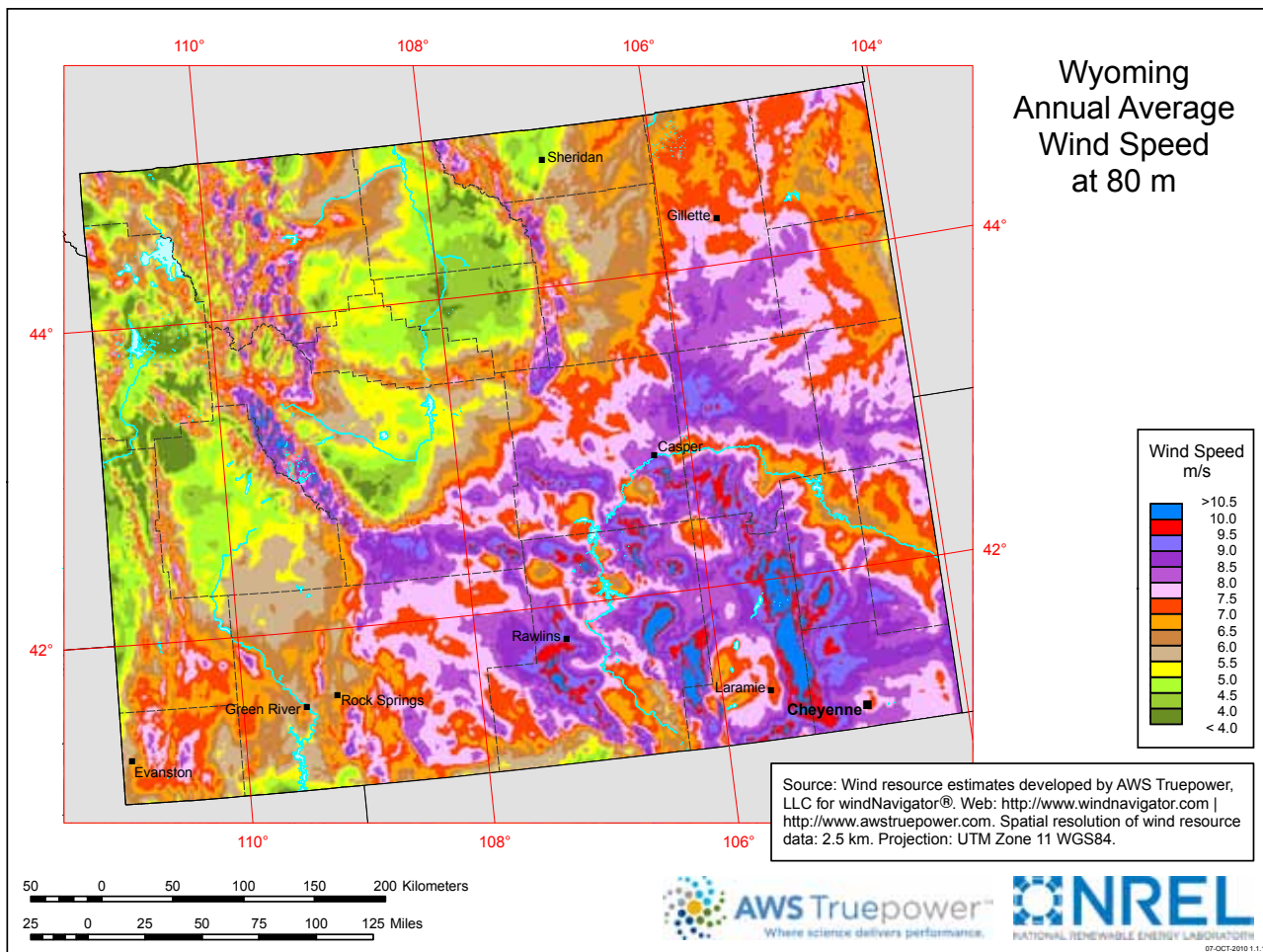
developers hope to supply Wyoming's wind-generated electricity to buyers in states that have adopted RPSs.

## 1.2 Wyoming Wind Energy Development

Wyoming currently ranks tenth in the nation for overall installed wind capacity, and the state has the eighth highest potential wind energy resources.<sup>7</sup> From 2000 to 2010, the amount of wind energy installed in Wyoming increased from 90 MW to 1,412 MW,<sup>8</sup> and wind energy now comprises over 5 percent of electricity generated in the state.<sup>9</sup> Consistent, strong wind continues to attract wind energy developers to Wyoming (Figure 3).



**Figure 2.** State renewable portfolio standards (RPSs), as of June 2011. (Source: Database of State Incentives for Renewables and Efficiency (DSIRE). DSIRE is a comprehensive source of information on state, local, utility, and federal incentives and policies that promote renewable energy and energy efficiency. Established in 1995 and funded by the U.S. Department of Energy, DSIRE is an ongoing project of the North Carolina Solar Center and the Interstate Renewable Energy Council.)



**Figure 3.** Distribution of wind resources in Wyoming. Areas suitable for commercial wind energy development have an average of 6.5 meters per second (m/s) wind speed and above and are represented by the areas shaded from orange to blue. (Source: National Renewable Energy Laboratory.)

## 2 Stages of Wind Energy Development

### 2.1 Overview of the Development Processes

There are several discrete stages of commercial wind energy development (Figure 4), some of which the landowner is directly involved in. These stages include:

***Pre-Feasibility Assessment*** (Section 2.2): The establishment of a viable and profitable wind resource is an essential first step to wind energy development. In this stage, landowners often sign a short-term agreement with a wind developer.

***Development Option Selection and Compensation*** (Sections 2.3 and 2.4): Landowners have multiple choices for developing and receiving compensation for their wind resource, including direct development, assignment of easements, or entering into a lease. Landowners primarily

pursue leasing through either an individual lease or an agreement among a collection of landowners (i.e., a landowner wind association).

***Full Feasibility Assessment:*** This important planning step is completed by the developer. A full feasibility assessment will include a site-specific evaluation of resources, an assessment of permitting constraints, examination of transmission access, identification of power markets, exploration of potential environmental issues, and estimation of costs for project development. Landowners will likely receive payments during this stage of development but will want to be informed about how long this process will take, as the most significant opportunity for revenue comes from actual development, not simply lease payments.