



## GE ENERGY FINANCIAL SERVICES STUDY: Impact of 2007 Wind Farms on US Treasury

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GE Energy Financial Services, a unit of GE (NYSE: GE), estimates that wind energy projects that began operating in 2007 have a positive net present value of \$250 million to the US Treasury (representing a 5 percent internal rate of return), after deducting the cost of the Section 45 Production Tax Credit (PTC).<sup>1</sup> These new wind projects that came online in 2007 added 5.2 gigawatts of annual electricity capacity.

The PTC has been key to the expansion of wind energy. The incentive provides an income tax credit of 1.5 cents per kilowatt-hour (kWh) (in 1993 dollars) for the first 10 years of a wind farm's production. This incentive is available to owners of wind farms and other renewable energy projects when the projects become operational, though it is reduced for some technologies.<sup>2</sup> The PTC is indexed to inflation; for 2008, the credit is 2.1 cents per kWh. Wind power assets are depreciated over five years for tax purposes. This accelerated depreciation further reduces project owners' income taxes in the early years of operation.

### The Production Tax Credit

The PTC is scheduled to expire Dec. 31, 2008. Since its establishment in 1992, the PTC has been allowed to lapse three

## Stable renewables policy creates the environment for sustained growth

U.S. wind annual capacity additions  
(Gigawatts)



Figure 1

times: 1999, 2001, and 2003. Each time, the annual increase of wind power capacity dropped dramatically (See Figure 1). Beginning in 2005, wind energy power capacity soared in part because of confidence in the PTC. Without confidence in the PTC, new wind power construction will slow significantly, and the uncertain future of the PTC is already creating a chilling effect on construction and investments. In early 2008, the House approved a one-year extension, but the bill failed a cloture motion by one vote in the Senate. The latest attempt to extend the PTC failed in the Senate in June 2008.

<sup>1</sup> Net Present Value (NPV) is a standard method for the financial appraisal of long-term projects. Future revenue is evaluated in present-day figures in relation to a discount rate, which is the cost of the present spending or borrowing.

<sup>2</sup> Currently, the PTC for wind, "closed-loop" biomass and geothermal is 2.1¢/kWh. Electricity from open-loop biomass, small irrigation hydroelectric, landfill gas, municipal solid waste resources, and hydropower receives 1.0¢/kWh.



## The Economic Benefits

Over the long-term, wind projects pump money into the US Treasury. Tax revenues flow mainly from the projects, which become significant taxpayers once the PTCs run out. Income taxes on corporate profits and individual workers' income associated with wind projects also help offset the US Treasury's cost of the PTC.

Calculations in this study are based on GE Energy Financial Services' extensive experience investing in real projects and the "Jobs and Economic Development Impact" (JEDI) Model from the National Renewable Energy Laboratory.<sup>3</sup> The JEDI model estimates the direct effects of investment as well as the multiplier effects throughout the US economy.

The JEDI model addresses three types of impacts:

- Direct – the effect of immediate expenditures to construct and operate projects
  - Examples: Construction: truck drivers, crane operators, linemen; Wind turbine manufacturing; Operations: field technicians, plant managers
- Indirect – the effect of increased economic activity
  - Example: Supply chain: component manufacturing, raw materials; Bankers, lawyers, accountants
- Induced – the effect of increased spending and investment by workers and businesses directly and indirectly involved in the wind industry
  - Example: Retail, real estate

Using this model, GE Energy Financial Services estimates that wind farms built in 2007 generates for the US Treasury:

- \$1.9 billion in NPV of taxes on project income<sup>4</sup>
- \$540 million in NPV of income tax on individuals' wages
- \$280 million in NPV of income tax on vendors' profits
- \$30 million in NPV of income tax on lease payments and royalties to landowners

## 2007 Wind Farms Add Estimated \$250M to US Treasury

NPV of estimated federal tax impacts from 5.2 GW of wind farms built in 2007 (Million US dollars)

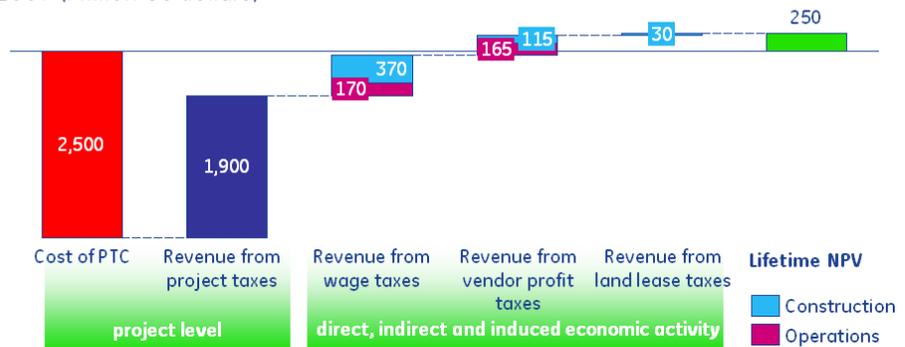


Figure 2

The total NPV to the US Treasury was an estimated \$2.75 billion, greater than the \$2.5 billion total cost of the PTCs – resulting in a net inflow to the Treasury of \$250 million (See Figure 2).

<sup>3</sup> For more information:

[http://www.eere.energy.gov/windandhydro/windpoweringamerica/filter\\_detail.asp?itemid=707](http://www.eere.energy.gov/windandhydro/windpoweringamerica/filter_detail.asp?itemid=707)

<sup>4</sup> Includes effect of 5-year MACRS (Modified Accelerated Cost Recovery System) depreciation



The study does not analyze the wind industry's economic effects on other energy sectors.

### **Additional Benefits of the Wind Industry**

In addition to the revenue to the federal government, our analysis shows that the wind industry generates state and local tax revenues, creates jobs and avoids emissions of greenhouse gases and other pollutants:

- State and local tax revenue estimates:
  - Property taxes: \$6 million/year to meet local governments' needs<sup>5</sup>
  - State income taxes on wages and profits: \$15 million during construction and \$1.5 million/year during operations
  - Sales taxes<sup>6</sup>
- Job creation estimates:
  - Construction Period: 17,200 jobs for approximately one year of construction
  - Operating Period: 1,600 jobs for 20 or more years of operation
- Environmental benefits estimates:
  - 10 million metric tons per year of CO<sub>2</sub> emission avoided, equivalent to taking 1.8 million cars off the road
  - Avoided emissions (SO<sub>x</sub>, NO<sub>x</sub>, PM, Hg) from fossil fuel power generation
  - Less water used for power plant cooling

### **Model Details**

Project-level impacts (PTCs and project income taxes) were calculated using conservative estimates, with a generic wind project model similar to the one used by GE Energy Financial Services when it invests in real wind projects. Project inputs were calibrated to represent what GE Energy Financial Services believes to be the market's expectations of the costs and performance of an average US wind project in 2007: \$2000/kW project cost, 35 percent capacity factor, 7.5 c/kWh revenue, average O&M cost \$15/kW per year, and \$20,000/yr O&M cost per turbine.<sup>7</sup> Because the bulk of the tax payments come after the tenth year of operation, we assumed the US Treasury would borrow money to finance the tax credits, to be repaid from tax proceeds. As a result, the NPV calculations used a 4 percent discount rate based on 10-year US Treasury note yield. We assumed 2 percent annual inflation in operating costs, power and Renewable Energy Certificate sales prices. The estimated cash flow from a new 2007 wind project under current PTC legislation is shown in Figure 3, on next page.

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<sup>5</sup> Many states have laws reducing or eliminating property taxes on wind energy projects. GE Energy Financial Services estimates that these abatements reduced property taxes on the 2007 wind installations by about 80 percent from the \$30 million estimate calculated by the NREL JEDI model. This does not include the effect on non-wind property values.

<sup>6</sup> Sales taxes were not calculated in this study.

<sup>7</sup> A wind farm's capacity factor determines how much electricity it produces. With 8,760 hours in a year, a project with a 35 percent capacity factor would produce 3,066 kWh per year for every kW of capacity.



Wages and corporate revenues were translated into an estimate of federal income taxes using economy-wide average tax rates and operating margins. GE Energy Financial Services believes 2007 wind industry operating margins are above average but has not taken credit for these in the analysis. Economy-wide average tax rates are

## Cash flows to the Treasury from wind projects with 2007 startup (\$MM)



IRR of cash flows is 5%

NPV = \$247 M using 4% US government discount rate

Figure 3

Calculations assume 50 percent of wind turbines and blades (but not towers) are sourced outside the United States. US sourcing will grow as US demand for wind turbines supports the expansion of domestic manufacturing. The remainder of a wind project's materials, equipment and services are assumed to be sourced within the United States.

based on the most recent IRS statistics available: 12.9 percent average individual tax rate on wages; 34.5 percent average corporate tax rate on business profit; a taxable income of 3.4 percent of business revenues; and 3 percent state income tax on individuals and corporations. These calculations use average tax rates, rather than higher marginal tax rates, on the conservative assumption that wind projects provide the majority of the profits and wages for the firms and individuals involved in a wind farm's construction and operation.

Calculations assume 50 percent

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