BEST AMONG EQUALS?

Choice between Tax Incentives for Wind Projects

Steve R. Dean, ASA, P.E.
DAI Management Consultants, Inc.

The American Recovery and Reinvestment Act of 2009 ("ARRA") includes several provisions intended to stimulate the development of wind power projects. In particular, it extended the production tax credit ("PTC") but also allowed wind project developers to choose between taking the PTC, the 30% investment tax credit ("ITC") or the ITC as a cash grant. Project sponsors now face the complex choice of deciding which incentive to pursue. The purpose of this poster presentation is to examine this choice for individual projects, as well as the government's policy objective as a whole. By examining what can be done (under the policy), what should be done (optimally), and what will be done (in light of current constraints in the financial markets), we intend to offer insight into how new policy options and informed project development choices can work together to drive further development of wind capacity in the U.S.

The economic decision-making process for selecting a tax credit can be complex since the value of the PTC is driven by production while the value of the ITC depends on the installed cost. An economic analysis was used to quantify the value of each incentive as a function of generation and installed cost to enable developers to maximize returns given the specifics of any project. This analysis is then extended to determine tax credit preferences by region and the percentage of future projects that are likely to select one tax credit over the other.

Which tax credit maximizes investor returns?

In seeking to answer this question, Lawrence Berkeley National Laboratory ("LBNL") and National Renewable Energy Laboratory ("NREL") conducted an analysis to "quantitatively and qualitatively analyze, from the project developer/owner perspective, the choice between the PTC and the ITC." The results of their analysis are shown in the table below.

Present Value (in $/kW at a 10% discount rate) added by switching from PTC to ITC

Net Capacity Factor (%)	Total Installed Project Cost ($/kW)										
	$1,500	$1,600	$1,700	$1,800	$1,900	$2,000	$2,100	$2,200	$2,300	$2,400	$2,500
25%	$17	$38	$61	$83	$103	$126	$147	$167	$191	$211	$233
26%	$5	$27	$48	$70	$91	$112	$134	$156	$177	$199	$220
27%	-$8	$14	$36	$58	$80	$100	$122	$143	$166	$187	$208
28%	-$20	$2	$24	$45	$67	$88	$109	$132	$154	$175	$195
29%	-$32	-$10	$12	$32	$55	$76	$99	$119	$140	$163	$185
30%	-$44	-$22	-$2	$20	$42	$64	$86	$108	$129	$151	$173
31%	-$57	-$35	-$14	$9	$30	$52	$74	$95	$117	$137	$160
32%	-$69	-$46	-$26	-$4	$17	$40	$61	$81	$104	$125	$148
33%	-$81	-$59	-$37	-$16	$6	$28	$48	$70	$92	$113	$135
34%	-$93	-$72	-$49	-$29	-$8	$14	$36	$57	$81	$101	$123
35%	-$105	-$83	-$63	-$41	-$19	$2	$23	$46	$67	$89	$110
36%	-$117	-$96	-$75	-$52	-$30	-$10	$13	$33	$55	$77	$98
37%	-$131	-$109	-$87	-$65	-$44	-$22	$0	$22	$44	$65	$85
38%	-$143	-$120	-$99	-$77	-$55	-$34	-$13	$9	$30	$53	$73
39%	-$155	-$133	-$111	-$90	-$68	-$46	-$25	-$4	$18	$41	$63
40%	-$167	-$146	-$124	-$103	-$80	-$58	-$38	-$15	$7	$26	$50
41%	-$179	-$157	-$136	-$113	-$93	-$72	-$50	-$29	-$7	$14	$38
42%	-$191	-$170	-$148	-$126	-$105	-$84	-$61	-$40	-$18	$2	$25
43%	-$204	-$182	-$160	-$139	-$118	-$96	-$74	-$53	-$30	-$10	$13
44%	-$216	-$194	-$172	-$151	-$129	-$108	-$86	-$64	-$44	-$22	$0
45%	-$228	-$206	-$185	-$164	-$143	-$120	-$99	-$77	-$55	-$34	-$13

Postive	Postive means the ITC provides more value
Negative	Negative means the PTC provides more value

Source: Bolinger, Wiser, Cory, and James [2009], Lawrence Berkeley National Laboratory

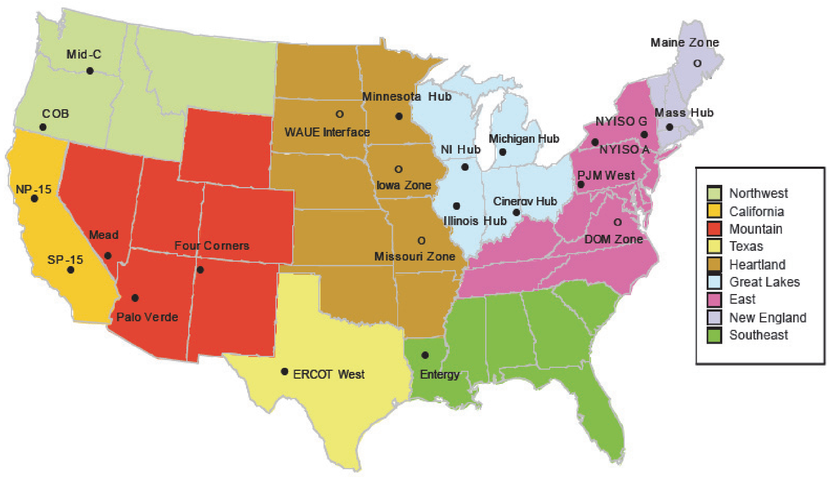
A negative value in represents value *lost* (or, more correctly, foregone) when selecting the ITC instead of the PTC. Therefore, it is evident that the PTC is preferred for projects with installed costs at the lower end of the spectrum, while the ITC is preferred for projects with installed costs at the higher end of the spectrum. Since the likelihood of tax incentive selection tends to be a function of location, historical data can be used to ascertain the average cost and capacity factor for a region and its corresponding tax credit preference. The tax credit preference of a region can then be considered in conjunction with regional capacity addition projections to formulate a conception of the tax credit profile of the country as a whole.

Which regions favor which tax credits?

Project conditions vary by location. Construction costs differ regionally due to variations in terrain, transportation costs, required permits, and labor costs. Capacity factors also depend on the specific wind resource of a location. The extent to which construction costs and capacity factors have varied across regions for installed projects has been documented by another LBNL report. The Wiser-Bolinger report divides the country into the nine regions illustrated in Figure 1, eight of which are considered here. The average capacity factor and installed cost for each region are listed in the table below. For illustrative purposes the map in Figure 2 was created using the average capacity factor and installed cost for each region in an effort to determine which tax credit is preferred given the location of a project.

Figure 1: Map of Regions Used in Analysis

Source: Wiser and Bolinger [2008], Lawrence Berkeley National Laboratory

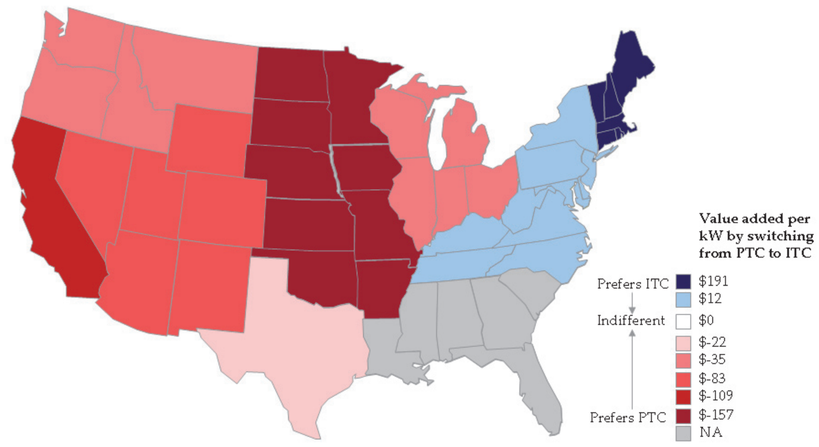


Average Capacity Factor and Project Cost by Region

Source: Wiser and Bolinger [2008], Lawrence Berkeley National Laboratory

Region	Capacity Factor	Installed Cost
Heartland	41%	$1,470
Texas	30%	$1,575
California	37%	$1,618
Northwest	31%	$1,575
Mountain	35%	$1,575
East	29%	$1,681
Great Lakes	31%	$1,575
New England	22%	$2,311

Figure 2: Value Added by Switching from PTC to ITC

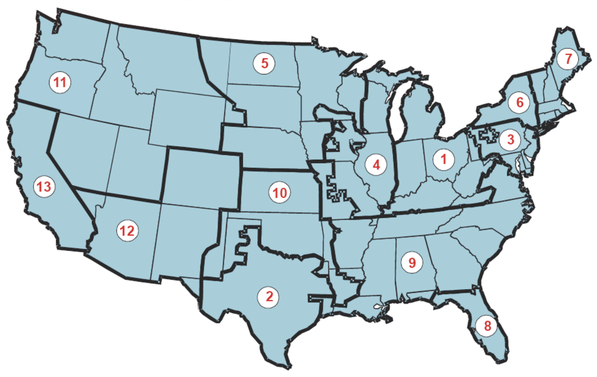


Which regions are likely to see the majority of development?

Knowing how tax credit preference varies according to geography, one question remains: which regions are projected to see the majority of wind installations? This question can be answered by turning to the U.S. Energy Information Administration's ("EIA") *Annual Energy Outlook* ("AEO"). The EIA projections regarding power installations are broken down according to the North American Electric Reliability Council regions that are illustrated to the right.

Electricity Market Module Regions

Source: Office of Integrated Analysis and Forecasting, Energy Information Administration



1 East Central Area Reliability Coordination Agreement (ECAR)
2 Electric Reliability Council of Texas (ERCOT)
3 Mid-Atlantic Area Council (MAAC)
4 Mid-America Interconnected Network (MAIN)
5 Mid-Continent Area Power Pool (MAPP)
6. New York (NY)
7. New England (NE)
8 Florida Reliability Coordinating Council (FL)
9 Southeastern Electric Reliability Council (SERC)
10 Southwest Power Pool (SPP)
11 Northwest Power Pool (NWP)
12. Rocky Mountain Power Area, Arizona, New Mexico, and Southern Nevada (RA)
13 California (CA)

Percent of 2009-2012 Total Installations per Region

LBNL Region (per **Figure 1**)	Equivalent EIA Regions	Percent of EIA projected additions per region	Tax Credit Preferred in Region
New England	7	22%	ITC
East	3&6	8%	ITC
Great Lakes	1&4	11%	PTC
Heartland	5&10	9%	PTC
Texas	2	3%	PTC
Northwest	11	24%	PTC
California	13	23%	PTC
Mountain	12	0%	PTC

New England, California, and the Northwest are projected to see a substantial increase in installations due to ARRA. According to the table to the left, 30% of the total wind capacity expected to be added through 2012 (in these regions) is expected to occur in regions that favor the ITC. The EIA estimates that approximately 36.3 GW of wind power will be installed in these regions between now and the end of 2012. Therefore, 10.9 GW will favor the ITC and 25.4 GW will favor the PTC.

CONCLUSIONS: Based on our analysis, approximately 70% of the wind installations projected to occur through 2012 *should* favor the existing PTC rather than the ITC. However, should need not imply will. In the current financially-constrained environment, the ITC – particularly in cash grant form – may be the only feasible alternative to developers even if it results in "money left on the table." In the event that external factors force the suboptimal selection of tax credits, the wind industry could be forfeiting as much as $2 billion in potential value by 2012. The analysis and results of these three questions are predicated on the assumption that the sole objective in selecting a tax credit is the *unconstrained* maximization of a project's value. Undoubtedly, other factors will influence a developer's decision: concerns over performance risk, project salability, subsidized energy financing, power sale requirements, and owner/operator requirements. For example, the continued absence of investors with a tax appetite could prompt some projects to select the ITC cash grant option regardless of whether it optimizes the project's return or not.

DAI