NATIONAL COMMISSION ON ENERGY POLICY

April 27, 2010

The Honorable Sander M. Levin
Committee on Ways and Means
US House of Representatives
Washington, DC 20515

Ranking Member Dave Camp
Committee on Ways and Means
US House of Representatives
Washington, DC 20515

As energy and budgetary policies continue to be debated, the National Commission on Energy Policy has been examining the most effective incentive mechanisms for renewable energy. This analysis is not yet complete, and we look forward to sharing our results with the Committee when they are ready. However, in the interim, we submit this recent analysis that we commissioned from Bloomberg's New Energy Finance analyzing the effectiveness of the tax credits currently in place. We look forward to working more with the Committee as our efforts develop and would be happy to answer any questions related to the materials of this report.

Sincerely,

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NCEP is a project of the Bipartisan Policy Center

15 January 2009

Research Note: US policy

Cash is king: Shortcomings of US tax credits in subsidizing renewables

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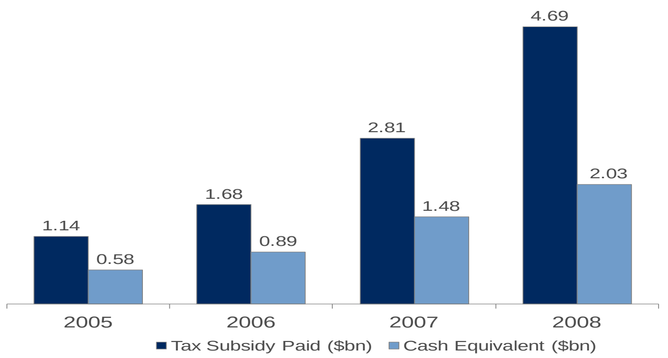
Executive Summary

For over a decade, US clean energy sector growth has relied heavily on federal tax subsidies with the Production Tax Credit and its sister Investment Tax Credit critical to developing wind, solar, and other renewables projects. On occasions when these policies have lapsed, the US market has suffered dearly. But just how efficiently do these subsidies put taxpayer resources to work? Could cash deployed in place of the credits have greater impact? At the request of the bi-partisan National Commission on Energy Policy in Washington, Bloomberg New Energy Finance recently examined these questions. Key findings:

- Deploying cash offers the federal government a substantially higher return on its "investment" in the sector. From 2005-2008, the US installed nearly 19GW of new wind capacity, incurring a liability to the federal government of approximately $10.3bn in tax credits (net present value).
- The government could have achieved approximately the same results in terms of new capacity additions by deploying $5bn in cash grants directly at the time of a project's commissioning. One dollar in cash has, on average, gone twice as far as one dollar of tax credits in subsidizing wind. This is partly due to the relatively small number of "tax equity investors" to exploit the credits.
- Whether the gap between cash and tax credit will remain as large going forward remains an open question dictated by a variety of factors. However, under most plausible short-term future scenarios, cash offers US taxpayers a better bang for their buck in spurring new clean energy development compared to the PTC. The one notable exception would be if wholesale electricity prices decline dramatically and remain low for a sustained period.

Figure 1: Total federal government cost of subsidizing US wind with tax credits vs. assumed substitute cost of using cash grants, $bn



Source: Bloomberg New Energy Finance Note: Contains numerous assumptions about capacity factors, power prices, debt/equity ratios, tax equity yields, and debt yields. See explanation below

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1. A brief history of tax credit financing for US renewables

1.1. The old PTC boom-bust cycle

Established by the 1992 Energy Policy Act, the Production Tax Credit offers owners of clean energy projects tax credits pegged directly to production. Today, for each MWh of electricity a wind project generates, the project's owner receives a $21 tax credit, which can be applied directly to his tax bill. The incentive is production-based – i.e. the more hours a project produces power, the more dollars in tax credits it generates. The tax credits pay out for the first 10 years of a project's existence and the $21/MWh benefit rises over time at the rate of inflation.

In the past, the credits could not easily be put to use by developers themselves due to the developers small size, lack of profitability and, in turn, lack of tax exposure. Thus, third party "tax equity providers" invested in clean energy projects and took their pay outs in the form of the credits, rather than cash. Other investors, typically including the project developers themselves, received whatever cash flows were generated by the wind farm.

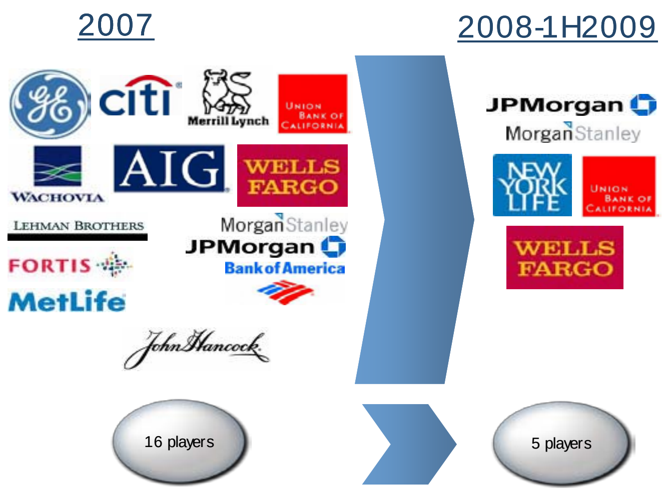
A small, specialized pool of tax equity investors developed, led by JP Morgan Chase and GE Capital. These institutions played a critical role in building the clean energy sector by taking advantage of the PTC's benefits and the benefit of a separate tax-related subsidy, the Modified Accelerated Cost Recovery System (MACRS), which allows developers to depreciate the value of their projects on a five-year timetable.

Since 1999, the PTC has been allowed to lapse by Congress on three separate occasions without being immediately extended. Each lapse resulted in a precipitous drop in wind installations. In 1999, 659MW of new wind went into the ground, according to American Wind Energy Association data. That fell to just 67MW in 2000. Similar drops occurred 2001/2002 and 2003/2004. The PTC is now on the books through 2012 (the ITC is in effect through 2016).

1.2. The new PTC boom-bust cycle

By summer 2008, a new and unprecedented PTC problem emerged, related not to Washington but to Wall Street. Financial institutions suddenly found themselves strapped for cash due to the dramatic downturn in the housing market. With most banks posting losses and future profitability in doubt, few were interested in an investment that would only pay out if they had significant tax liabilities for the next ten years. Tax equity capital became sparse and the so-called "tax equity yields" (returns on investment expected by providers and effectively the cost to the borrower) jumped from 6-6.5% to 9% or higher. The number of players providing capital shrank dramatically as well. As the financial crisis deepened in Fall 2008, tax equity capital dried up completely as financial institutions, in essence, lost confidence in their own profitability and, in turn, in their own use of tax credits to offset tax exposure.

Figure 2: Active players in US tax equity investing, 2008-1H2009

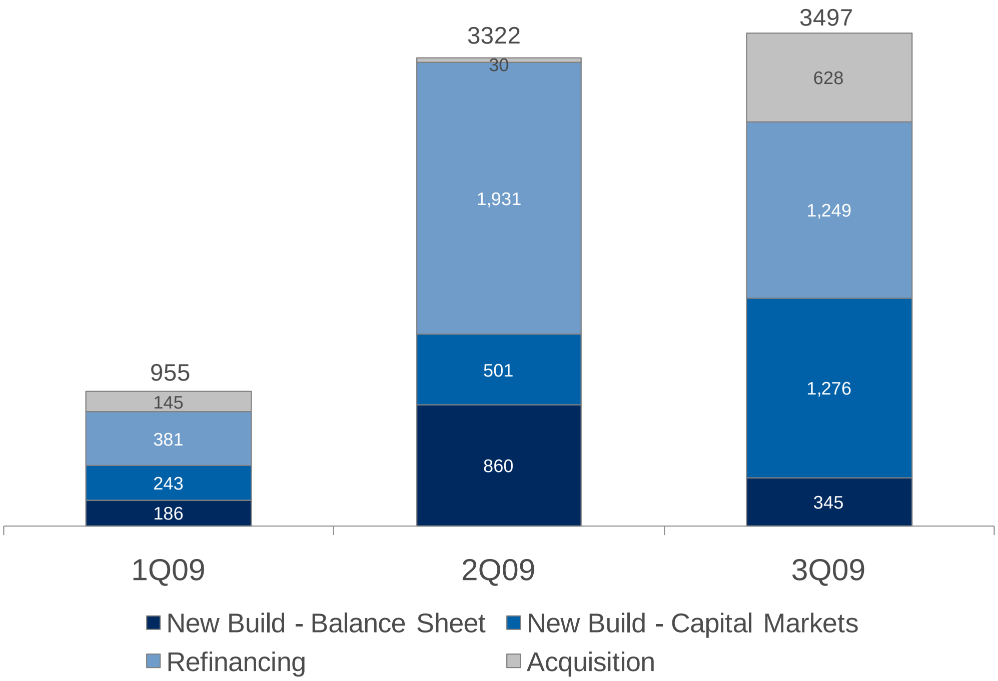


Source: Bloomberg New Energy Finance

The result of this sudden change was almost immediately apparent in the field, where new construction ground to a halt. Back in Washington, the same clean energy advocates that had pushed for extensions of the tax credits returned to Capitol Hill with a new goal of "fixing the PTC".

Those efforts paid dividends and in February 2009, President Obama signed into law the American Recovery and Reinvestment Act establishing a new grant programme to be administered by the Department of Treasury with assistance from the Department of Energy. In essence, the programme allows developers to receive cash grants from the federal government equal to 30% of their project's CAPEX, if they agree to forego the benefits of either the PTC or ITC. Rules regarding implementation were promulgated by Treasury in July and the first grants were issued in September. The new grant programme has breathed life into the US project finance market and helped revive asset finance activity, spurring over $1bn in capital markets activity in the wind sector alone.

Figure 3: 2009 Project financing for US wind, $m



Source: Bloomberg New Energy Finance Intelligence service

2. Cash or (tax) credit?

The sudden challenges confronting the tax credit subsidy system coupled with the new clean energy-friendly Obama administration has prompted some to ask if a new, superior federal policy can be crafted to support renewables in place of the PTC/ITC. Among those contemplating the alternatives is the National Commission on Energy Policy, a bipartisan group of 20 of the nation's leading energy experts, which regularly advises Congress and other key policymakers in Washington.

In November 2009, NCEP contacted Bloomberg New Energy Finance and asked that we examine a much narrower question: *how efficient is the PTC in leveraging private sector investment and spurring clean energy development? What would an equivalent subsidy cost the government if the aid was disbursed in cash, rather than via tax credits?*

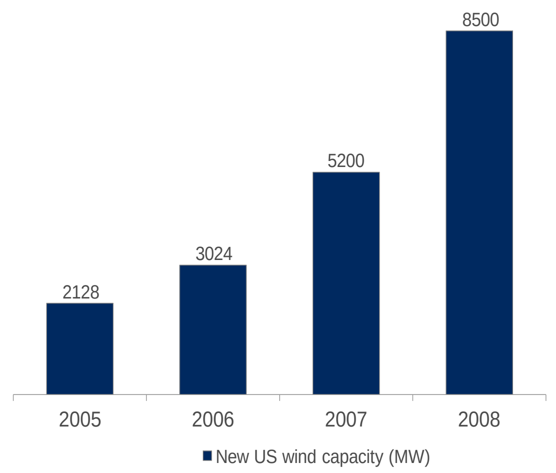
This latter question has become particularly relevant since the advent of the Treasury grant programme, which starts to sunset at the end 2010. Already, clean energy industry advocates are pushing for the grant's extension for a year or two longer. Bloomberg New Energy Finance offers no specific opinions here on that matter and the findings in this paper should not be construed as an endorsement or denouncement that policy.

2.1. The cost of the PTC

To determine the relative effectiveness of the PTC, Bloomberg New Energy Finance focused on wind project capacity additions from 2005-2008 when the tax credits and the tax-related MACRS played key roles in spurring development. Exploited completely, these two subsidies eliminate well over half of a typical developer's CAPEX.

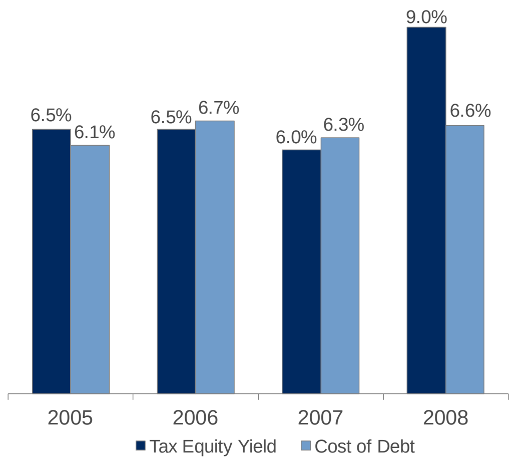
The wind sector enjoyed unprecedented growth over this period with installed capacity rising from 6.7GW at the end of 2004 to 26.4GW by end of 2008.

Figure 4: Wind capacity additions, 2004-08, MW



Source: Bloomberg New Energy Finance Intelligence service

Figure 5: Estimated tax and project finance yields



Source: Bloomberg New Energy Finance Wind Insight service. Note: Tax equity yields and cost of debt differ in that one represents a before-tax cost of capital while the other represents an after-tax cost.

To determine the cost to the federal government of the PTC in a given year, Bloomberg New Energy Finance took the total number of MW of new wind capacity installed then projected out total number of MWhs would be generated over a 10-year period, assuming an overall 33% capacity factor. This total was then multiplied by the value of the PTC to determine the government's tax credits liability. The year-on-year growth in the cost of the PTC to the government rose in near direct proportion to the rate at which new capacity was added. In 2005, the government incurred an approximate tax credit liability of $1.1bn as 2.1GW of new wind was added to the grid. In 2008, the liability rose to $4.7bn on 8.5GW of new installs. In all, over the four year period, the government incurred a total liability of approximately $10.3bn on 18.9GW of new wind capacity.

2.2. "PTC Ridge" vs. "Debt Valley"

Bloomberg New Energy Finance then sought to estimate how much it might have cost the federal government to subsidize the exact same number of new MW of wind with a simple cash grant subsidy that paid out at a project's commissioning, rather than over time.

This could not be a simplified calculation, for two reasons. First, the project finance structure for a typical wind farm changes dramatically when a cash subsidy is introduced and this has important implications for the project's overall cost of capital. Under a typical PTC finance structure, the tax credit equity investment effectively serves as a proxy for debt capital with the developer making fixed payments at certain yield rates each year to the tax equity provider through the first 10 years of the project's life. When a cash grant is part of the equation, the developer simply borrows from a lender and repays the debt in cash.

Second, the cost of capital for tax equity is different than the cost of capital for straight project debt. As shown in Figure 5, these costs can vary from year to year, sometimes substantially.

In an attempt to create the most relevant analysis, Bloomberg New Energy Finance created financial models for two typical but hypothetical 100MW nameplate capacity wind farms: "PTC Ridge" which exploits all available tax benefits (PTC and the MACRS five-year depreciation) and relies on a combination of tax equity and regular equity for funding; and "Debt Valley", which exploits no tax benefits whatsoever and relies on a combination of straight debt and regular equity.

Table 1: PTC Ridge and Debt Valley compared

	PTC Ridge	Debt Valley
Nameplate Capacity	100MW	100MW
Federal subsidy	Tax credits	Cash equivalent

	PTC Ridge	Debt Valley
Assumed capacity factor	33%	33%
Electricity price	$75/MWh	$75/MWh
Tax Equity or Debt as % of overall CAPEX	60% tax equity	75% debt
Back-leveraged?	Yes	No
Cost of Tax Equity / Debt	Variable -- See Figure 5	

Source: Bloomberg New Energy Finance. Note: Back-leverage indicates that developer takes out debt secured only against his claim to the cashflows to finance his cash equity investment in the project.

In a typical PTC-structured project, tax equity capital represents 60% of CAPEX with regular cash equity making up the balance. By contrast, a project such as Debt Valley receiving an up-front cash grant can lever up much further. For the sake of this analysis, New Energy Finance assumes a cash-funded project can cover 75% of its CAPEX with debt.

In addition, the cost of these two kinds of capital differs. As shown in Figure 5, tax equity yields demanded by providers ranged between 6-6.5% until 2008 when they spiked 9%, or even higher. It is important to note that the wind project finance market is quite opaque with actual terms of tax equity financings very rarely disclosed. Bloomberg New Energy Finance bases this estimate on its numerous conversations with players within the industry over the relevant years.

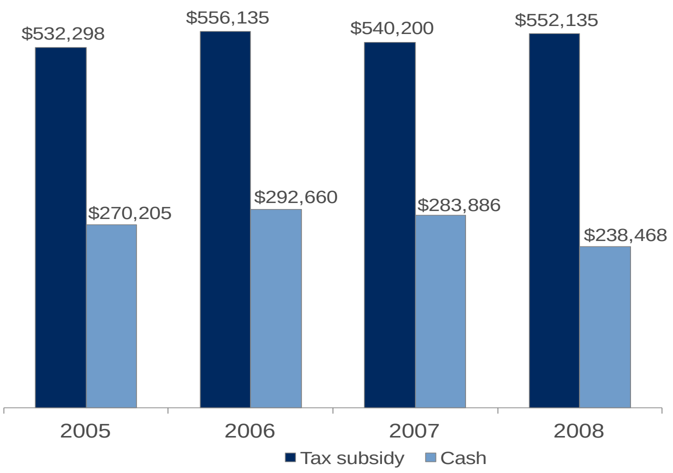
The cost of straight debt for wind projects also varied over those years, but somewhat less dramatically. Because there were few major wind projects financed with straight debt in the US during those years, Bloomberg New Energy Finance has used assumptions based on the cost of capital in the European Union where such financings are common.

2.3. Matching NPVs

We then examined the internal rate of return earned by a straight equity investor in PTC Ridge, given all of the assumptions outlined above. In real market conditions, that same investor would have to earn the same return on Debt Valley to consider backing that project. So we asked a simple question: *How much government cash would have to be provided to Debt Valley in lieu of the tax credits to allow that investor to earn the same return?*

While results varied from year to year somewhat, the basic finding remained the same: substantially less cash was needed than tax credits to provide the equivalent subsidy to the same 100MW wind farm. From those results, we were able to extrapolate the cost to the government of subsidizing 1MW of new capacity with tax credits vs. the theoretical cost of a cash subsidy in years 2004-2008.

Figure 6: Projected cost to the federal government of adding 1MW new wind capacity



Source: Bloomberg New Energy Finance PTC Ridge vs. Debt Valley financial model Note: Tax subsidy includes both PTC and MACRS. Cash figures are estimates.

PTC Ridge and Debt Valley were both intentionally structured to be as typical as possible of US wind farms. Thus, the results from these two projects can be used to generate an overall cost comparison analysis. As shown in Figure 1, the federal government could, theoretically at least, have saved between $560m (in 2004) and $2.66bn (in 2008) had a cash grant subsidy been in place rather than a tax subsidy.

One minor caveat: our PTC Ridge model assumes maximum efficiency in its use of tax credits. In reality, some percentage of the credits generated by projects over a 10-year span may not get put to use by the tax equity investor various reasons. However, even assuming 20% of all tax credits are left unused, a substantial gap still remains between the efficiency of the PTC and cash grants.

3. Implications for future costs

As discussed above, the two financial models built by Bloomberg New Energy Finance to compare the efficiency of the PTC vs. straight cash support from the federal government contain numerous realistic inputs and assumptions based on real world conditions from 2004 to 2008. Looking ahead, virtually all of these are subject to change making predicting the future efficiency of credits a challenge. While cash would have been roughly twice as efficient as tax credits in subsidizing wind over the past four years, on average, there is no certainty that that gap will remain as large in coming years. That said, Bloomberg New Energy Finance believes there is only one somewhat realistically possible short-term future scenario under which the PTC becomes a better deal for taxpayers.

3.1. Sensitivities

While any number of inputs are critical to determining the cost of capital of a given wind project, adjusting most in the Bloomberg New Energy Finance PTC Ridge vs. Debt Valley model have surprisingly little impact on our overall findings about the efficiency of the PTC vs. cash.

Inputs almost certain to change on a look-ahead basis include the costs of tax equity capital vs. debt. As discussed above, estimated tax equity yields demanded by project financiers ranged from 6% to 9% from 2004-2008 while the projected potential cost of debt ranged from 6.1% to 6.7%. The comparative efficiency of the PTC vs. cash widened and narrowed year to year (Figure 6). The gap was narrowest in 2006 and 2007 when cash would have been 1.9 times as efficient for the federal government as the PTC. It was widest in 2008 when cash would have been 2.3 as effective as tax credits.

It should be noted that 2008 was clearly an exceptional year in which capital did not merely become constrained but the very viability of the entire financial system came into question. This created an unusually large 9% to 6.6% gap between the cost of tax equity and the projected cost of debt for US wind projects. Even under these extreme conditions, however, the underlying difference in the efficiency of the PTC vs. cash was not dramatically larger than in more the more “normal” years of 2005-2007.

Similarly, adjusting projected demanded yields for tax credits and debt in future years makes only a relatively minor impact on the amount of federal cash that would be needed to replace the PTC effectively. Bloomberg New Energy Finance projects the US will install roughly 8-10GW of new wind capacity in 2010 resulting in an overall CAPEX of $15-$19bn (assuming roughly $1.9m/MW). Assuming tax equity and debt costs that are roughly equivalent and a power price of $75/MWh, the federal government would assume a tax credit liability on these projects of $4.3-$5.4bn, on a net present value basis, if all were to be financed with the PTC and MACRS. The equivalent subsidy could be disbursed in cash for $2.3-$2.8bn in cash.

(It should be noted that in reality nearly all new wind projects installed in 2010 will not be financed with the PTC. Instead, they will benefit from the Treasury Department’s grant-in-lieu-of-credits program, which for wind projects alone will cost the federal government $4.5-$5.6bn in 2010. The government will incur a further liability on these projects due to the MACRS accelerated depreciation which these projects will exploit as well.)

3.2. Natural gas, power prices, and implications for federal subsidies

The one factor that could have a major impact on the cost of a properly priced PTC replacement relates to the price at which electricity can be sold from US wind projects. In our base case scenarios for both PTC Ridge and Debt Valley, we assumed all power from either project would be sold for a flat $75/MWh over 10 years of either project’s life. This was a relatively reasonable assumption, given long-term power purchase agreements wind projects have signed with utilities in recent years.

Looking ahead, there is considerable uncertainty about the price at which wind power can be sold, however. The recent economic downturn, coupled with a glut of domestic natural gas is putting downward pressure on wholesale electricity prices overall. The trend has the potential to depress wind power prices in particular and would mean the federal government would have to provide more generous cash supports to match the PTC.

As illustrated in Figure 7 below, electricity sold from Debt Valley at $90 requires a federal cash subsidy of $240,000 per installed MW to match the benefit of the higher cost PTC. If the electricity price drops to $75, the required cash subsidy rises to $280,000 per MW. If the price falls to $60, the projected cost rises to $440,000.

Still, under all three such scenarios, the price of the cash subsidy is less than the approximately $0.55m/MW cost of the PTC. It is not until electricity prices fall to $54/MWh that the cash subsidy becomes equivalent to the cost of the PTC. In short, only if the US faces a period of substantially lower wholesale power prices does the PTC offer a better a return on investment for the federal government.

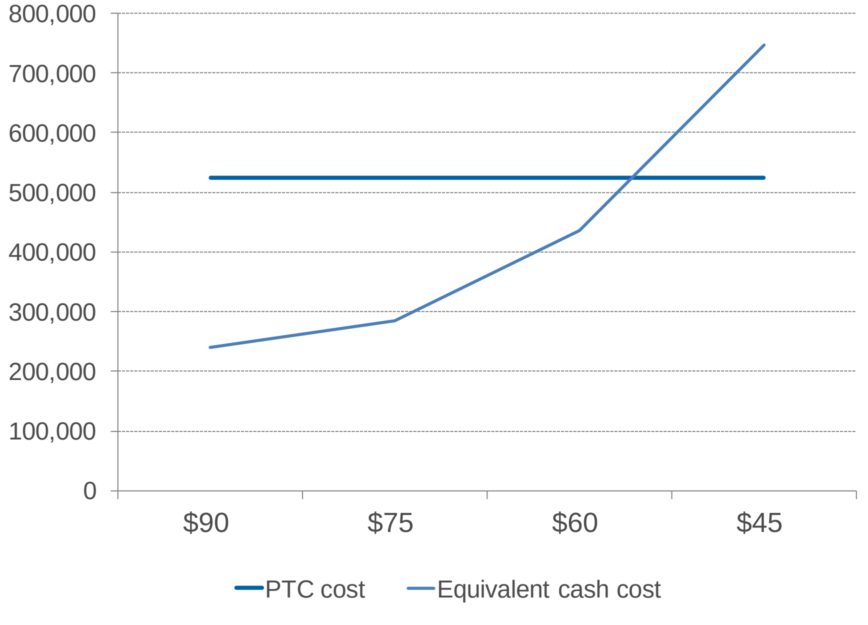
It is worth recalling here that the point of the PTC Ridge vs. Debt Valley model comparison discussed was solely to evaluate how much cash would be needed to replicate the value of the PTC under real world conditions where investors expect certain rates of return. It was not to assess the current grant programme which offers a pay-out equal to 30% of a project's CAPEX.

Given that, there is a relatively straightforward reason why more government cash would be needed to match the value of the PTC if natural gas and, in turn, electricity prices were to fall. The PTC (and the other tax benefit, MACRS) essentially represents the fixed part of a project's value since the tax credits are pegged at $21/MWh and rise with inflation. Cash from electricity sales represents the variable part of a project's value. As a result, if those cash flows diminish, the tax benefits become a larger percentage of the project's overall value.

From the investor's perspective, a project has to offer a justifiable rate of return. Thus, if the cash flows from electricity sales are lower, the benefit offered by the government has to be higher to compensate and offer the same attractive return the project would have had in a higher priced environment.

Figure 7: Federal cash subsidy required to match PTC impact at various wholesale electricity prices

$/MW



Source: Bloomberg New Energy Finance. Note: The above reflects the amount of federal cash subsidy required to replicate the impact of the PTC for a typical wind project selling its power at $90, $75, $60, or $45 per MWh. Assumes power sales contracts are long-term with consistent pricing over a 10-year period. Assumes PTC costs, tax equity yield, and debt yields from 2007.

One last important caveat: The sensitivity analysis above does not take into account the potential impact state level renewable portfolio standards can have on the economics of specific wind projects. These RPS generally allow clean energy projects to sell not just the power they generate but also the associated clean energy attributes, typically monetized in the form of renewable energy credits (RECs). Bloomberg New Energy Finance believes that if electricity prices drop dramatically in coming months and years, operators of wind farms will be able to make up for some significant portion of that shortfall via higher priced REC sales agreements.

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