

Advanced Renewable Energy Project Finance & Analysis

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11. Today's Project Finance Markets

Project Finance Debt Market Overview

Bank Market:

- A niche within the project finance bank market. Predominantly European and Japanese commercial banks
- Recent top lenders included MUFJ, Rabobank, Dexia, Credit Agricole, Santander, Natexis, WestLB, Mizuho, ING, SMBC, BayernLB, UniCredit
- Recent (re)entry - Deutsche Bank, Rabobank
- Equipment, construction and term loans; back leverage
- Historically 15-17 year fully amortizing term loans;
- Interest rates are floating and the loans are prepayable without penalty

Project Finance Debt Market Overview

Institutional Market:

- Insurance companies and pension funds; Lead institutions have long experience in wind financings
- Recent top lenders included Manulife/Hancock and Prudential
- Construction and term loans
- Longer term (20-25 years), fixed-rate, non-prepayable without penalty
- Fully amortized loans
- Better fit for refinancing operating assets

Renewable Energy Project Finance Bank Market – Current Status

	2009	2010
Volume (\$B)	\$ 5.12	\$ 7.95
# of Lenders	57	43
Lenders Committing > \$100 MM	17	23

- Bank market has recovered strongly in 2010 and continues to demonstrate growth in Q1 and Q2 2011
- Underwriting capacity, albeit with market flex, has improved tremendously in 2010-11. Thus, larger deals are financeable, compared to 2009
 - 18 transactions with >\$200 MM commitment in 2010 and 4 such transactions in H1 2011
 - Mega deals – Shepherd’s Flat; Alta Wind
- Historically, pricing increased dramatically from L+150/175 bps margin and 150/175 bps upfront fee in 2007 to L+300/350 bps margin and 300/350 upfront fees in 2009
- From Q4 2009, pricing has been declining slowly:
 - Current pricing is around L+225/250 bps margin and 200/225 bps upfront fee
 - Grant bridge loans, given the shorter tenor and higher credit, enjoy 25/50 bps discount
- Strictly mini perms till 2010, but tenors have been easing towards 15-17 years from Q1 2010, depending on credit

Data Source: Infrastructure Journal, Alyra analysis

Renewable Energy Project Equity Market Overview

Passive, Tax-Motivated Investors:

- Passive tax investment as limited partners in project companies or as lessors
- Generally, preferred distribution or lease structures ensure a minimum target return and low operating risk to investors
- Mostly, financial institutions only (banks, insurance companies) who are familiar with the energy space
- Fluctuating but small universe – technology and industry complexities are entry barriers

Strategic Investors:

- Utilities, energy companies and industrials
- Various JV and buy-out structures
- Asset driven – direct ownership and control of assets are important
- Longer-term focus

Renewable Energy Project Tax Equity Market - Current Status

- By 2007, there were about 20 active tax equity investors, up from fewer than 6 investors, 5 years prior. By late 2008, due to the market meltdown, the active investor market came down to 5-6 institutions
- Market recovered somewhat, starting in 2010 – currently there are about 14 tax equity investors actively looking at deals.
 - The active investors are GE, MetLife, CS, Citi, BofA, Wells Fargo, US Bank, UBOC, Morgan Stanley and JP Morgan
 - Google
- Cherry-picking: only high credit deals
- Investment sizes are smaller while the transactions are bigger – even the major investors are seeking co-investors in larger deals
- No commodity price exposure
- Mostly leveraged deals in 2010
- Yields have declined somewhat from 2009, but are still 200 – 250 bps higher from 2007
- Current unlevered yield 8-9% and levered yield 12-13%
 - Investor yields in shorter term levered partnership flips with grant need to be competitive with loan interest rates

Data Source: Chadbourne & Parke, Alyra analysis

Factors Driving Demand and Supply of Capital in Renewables

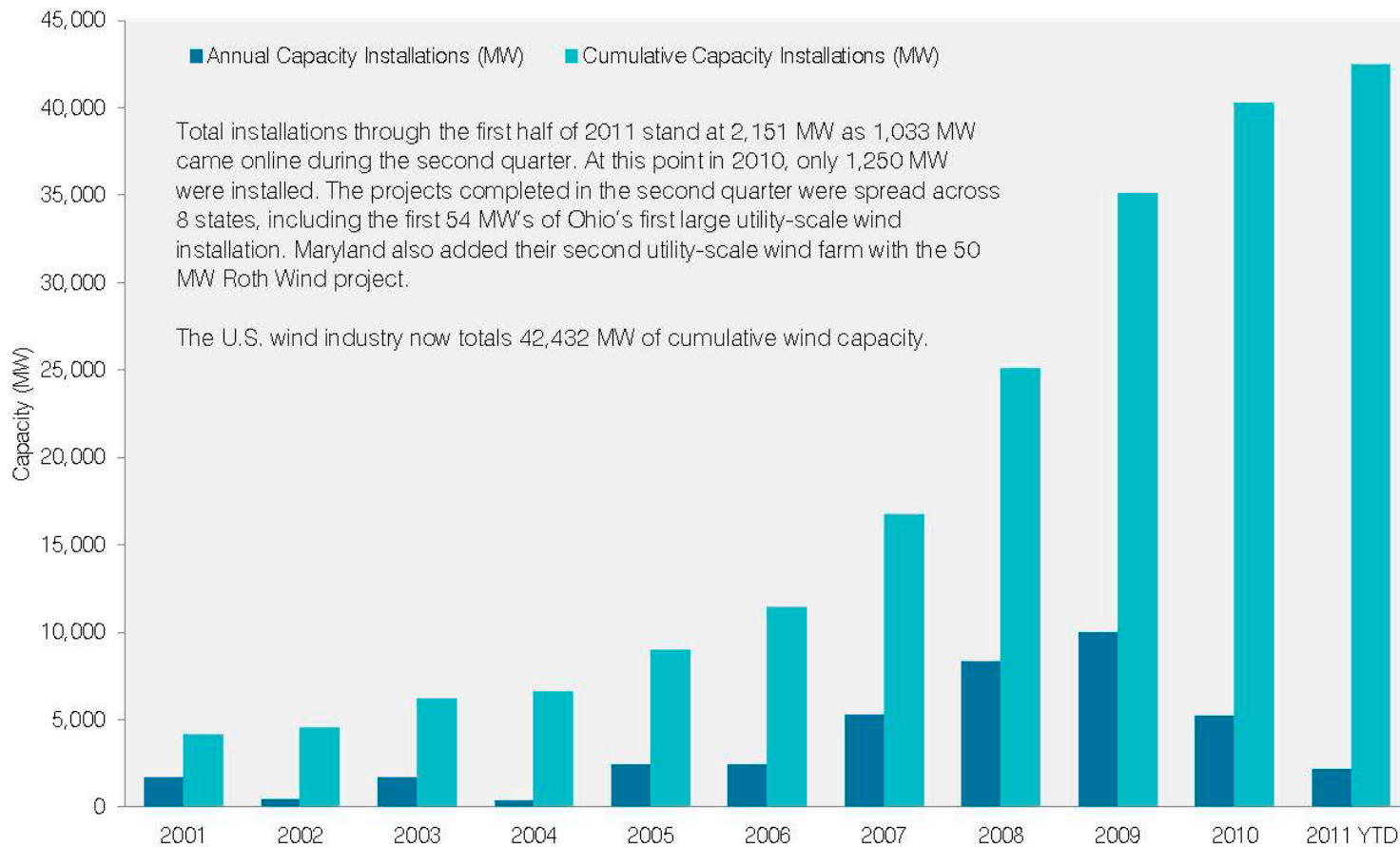
- **Supply of debt capital has been choppy; improving in 2010 and 2011**
 - Shrunk after Q4 2008 - capital rationing and market liquidity issues
 - Recovered in 2010 and expanding in 2011
 - More top-tier banks lending
 - Need more providers - three new banks vs. two exits
 - European financial markets

- **Supply of tax equity has been variable**
 - Investor base has historically been limited to about two dozen financial institutions (and GE Capital) – all with experience in energy sector
 - These institutions face similar sector volatility with their tax base
 - Various structural limitations in the Federal incentives
 - Force passive tax investors take risk unrelated to their core business
 - Deter entry of varied mix of investors (i.e., industrials, pharmaceuticals)
 - Unlike low income housing tax equity market

Factors Driving Demand and Supply of Capital in Renewables, Continued

- **Demand for capital over the next 3-5 years will be driven by:**
 - Expiry of cash grant will increase demand for tax equity
 - Wind project installations – lower in 2010, question for 2011
 - Several very large-scale wind projects expected
 - Utility scale PV and CSP projects are on the rise
 - Federal RPS??
 - Financeable PPA price
 - Has become and will remain a major factor determining growth of the sector
 - Low natural gas prices, driven by shale gas and low overall power demand, forcing lower PPA prices
 - Natural gas prices vs. equipment prices

Installed Wind Capacity



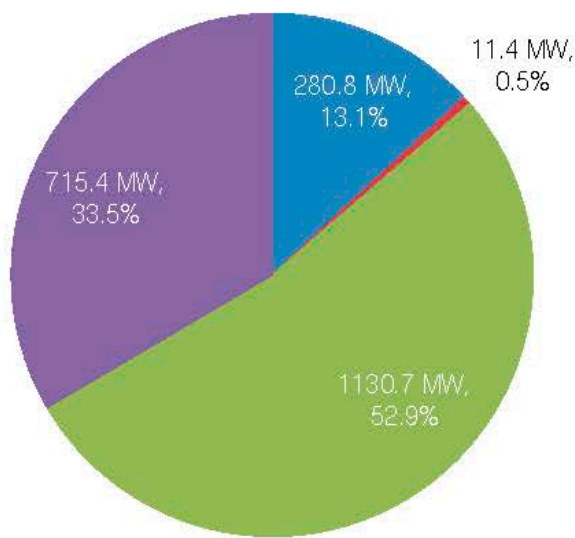
Source: American Wind Energy Association Q2 2011 Market Report

- 2010 was a traumatic year in the wind business
- Expected recovery in 2011? 7.3 GW in construction at the beginning of Q3-2011
- 78% of capacity completed in 2010 were by large strategic investors

Installed Wind Capacity

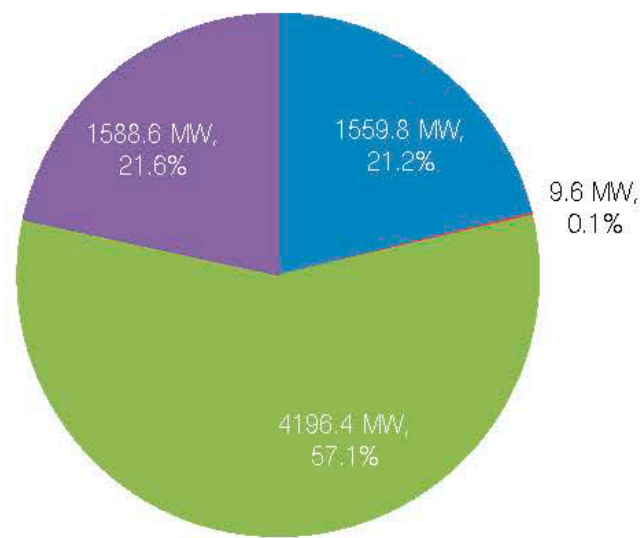
Online through Second Quarter 2011

■ Utility Owned ■ End User/Other ■ IPP - PPA ■ IPP - Merchant



Under Construction through Second Quarter 2011

■ Utility Owned ■ End User/Other ■ IPP - PPA ■ IPP - Merchant



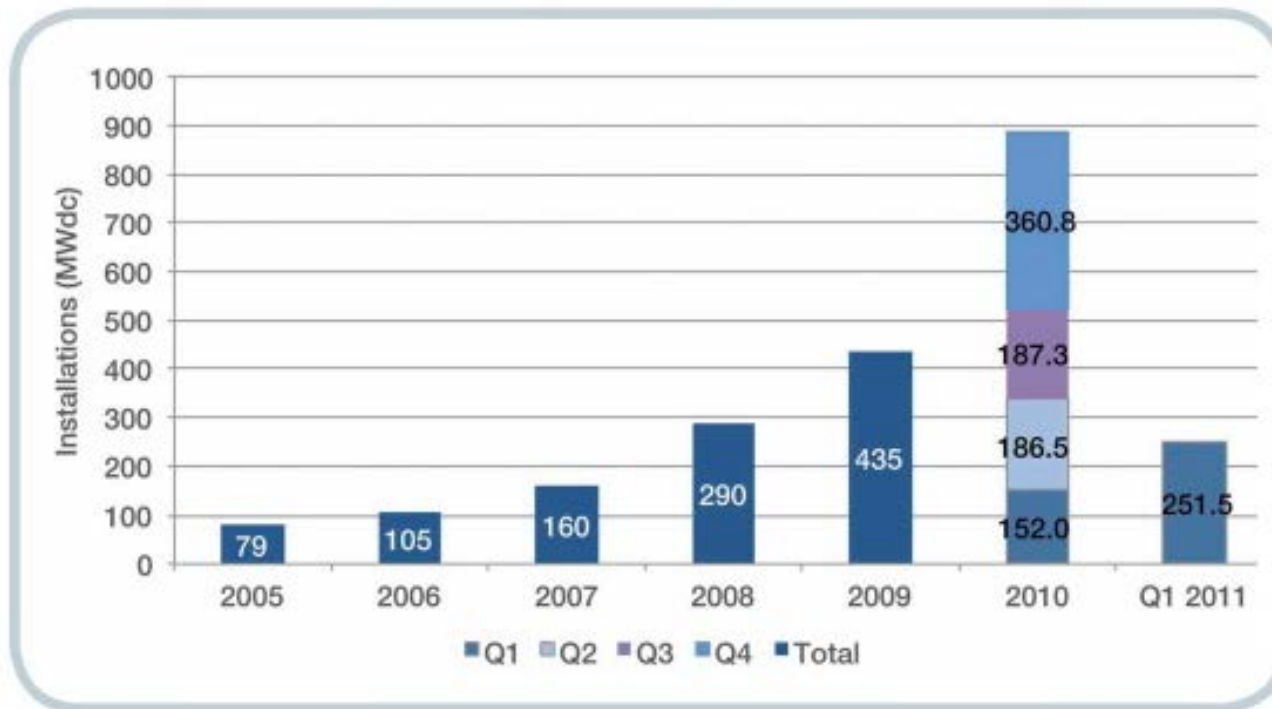
For projects online through the second quarter of 2011, approximately 86% of projects were owned by independent power producers (IPPs) and 13% were owned by utilities. This breaks down further to 53% under long-term power purchase agreements (PPAs), 34% merchant, 13% utility-owned and 1% owned by the end user or other arrangement. Among the IPP projects, 61% of the total project capacity had long term purchase agreements in place and 39% of total project capacity was merchant.

For projects under construction, approximately 79% of projects are owned by IPPs and 21% are utility owned. An impressive 78% of project capacity under construction is under PPAs (57%) or utility owned (21%), with only 22% currently merchant. Among the IPP projects, 73% of the capacity has PPAs in place, and 27% of total capacity is currently merchant.

Source: American Wind Energy Association Q2 2011 Market Report

Installed Solar PV Capacity

Figure 1-1: U.S. PV Installations, 2005-Q1 2011



Source: Solar Energy Industries Association / GTM Research

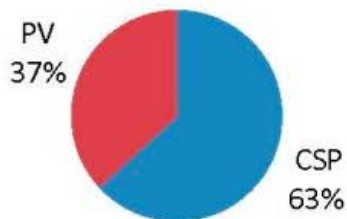
Utility Scale Solar PV and CSP Capacity Growth

Operating, Under Construction or Under Development

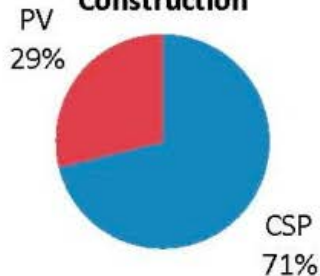
April 2011

Utility-Scale Project Capacity by Technology and Completion Status (MW)				
Technology	Operating	Under Construction	Under Development	Total
CSP	508	679	8,307	9,494
PV	296	274	16,688	17,258
Total	804	953	24,995	26,753

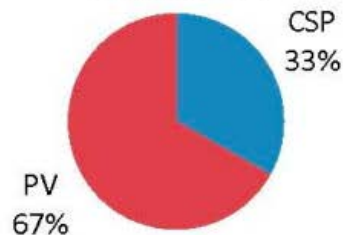
Operating Projects



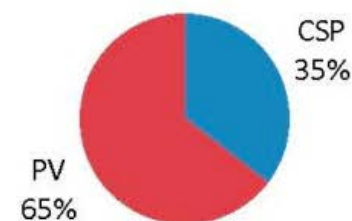
Projects Under Construction



Projects Under Development



Total Project Pipeline



Source: Solar Energy Industries Association

Natural Gas Price Trend

Monthly U.S. Natural Gas Wellhead Price



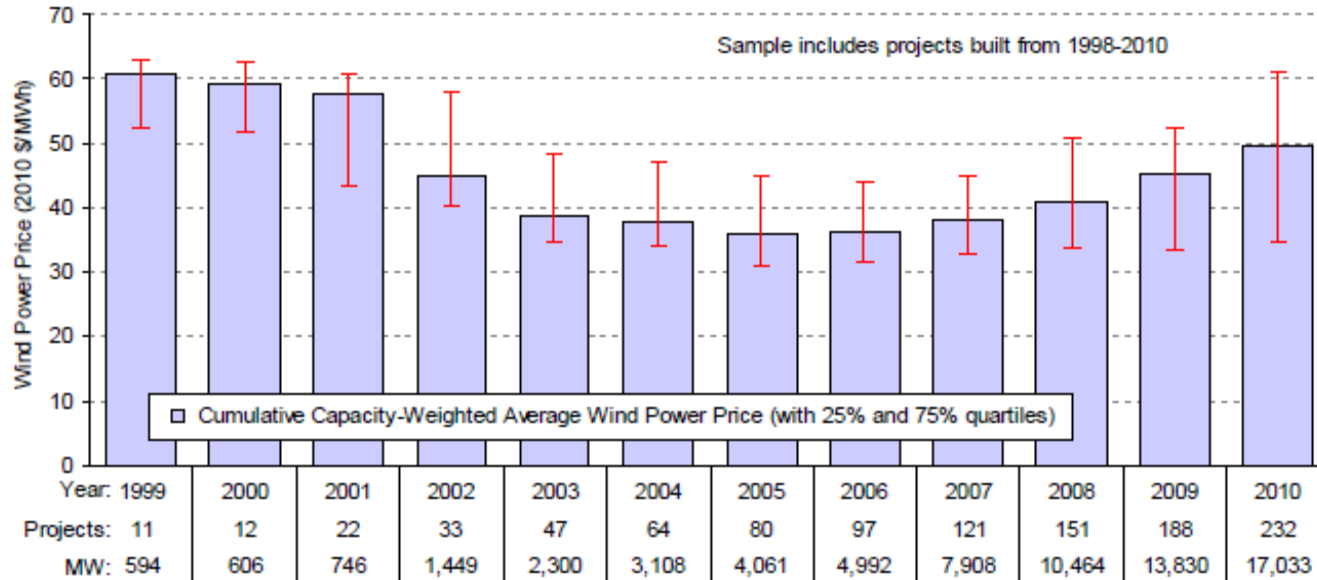
Source: U.S. Energy Information Administration



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Wind Power PPA Price Trend

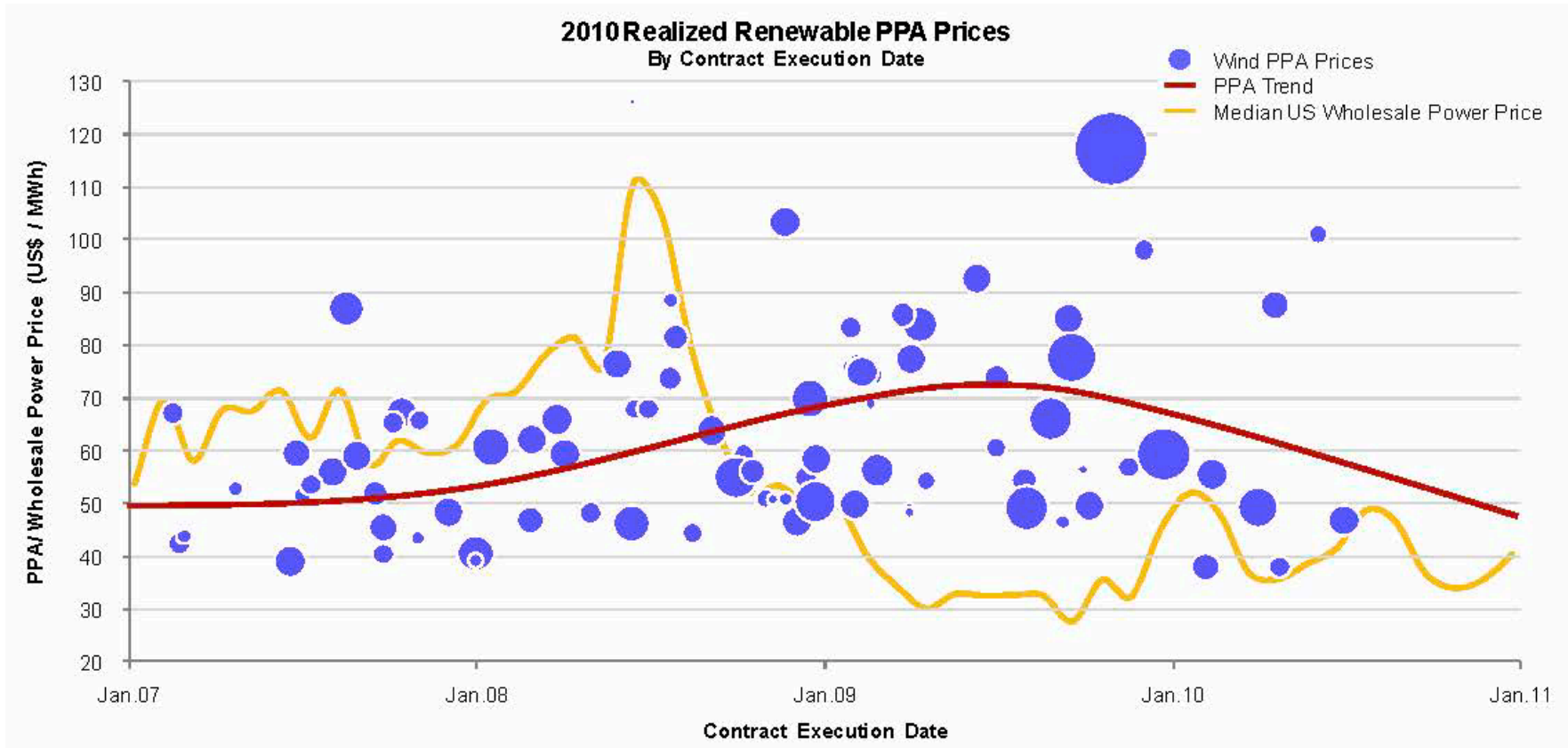


Source: Berkeley Lab

Figure 20. Cumulative Capacity-Weighted Average Wind Power Prices over Time

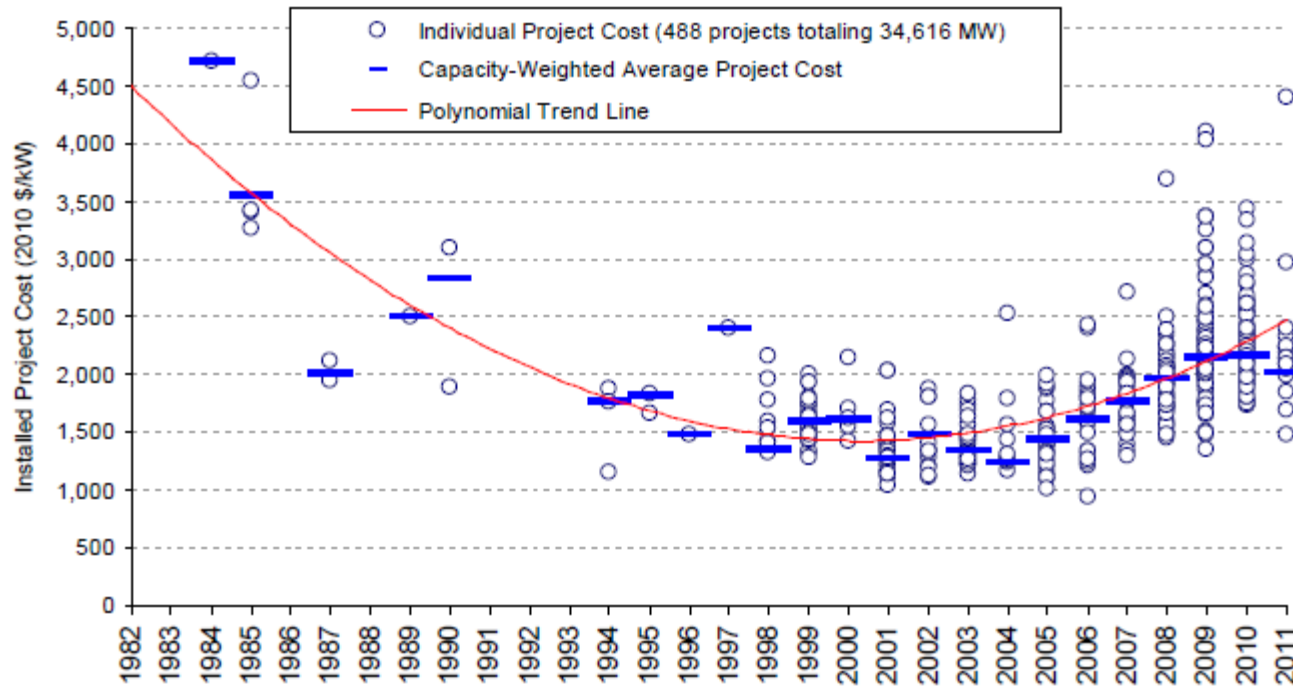
Source: 2010 WIND TECHNOLOGIES MARKET REPORT, Berkeley Lab

Wind Power PPA Price Trend



Source: "US Wind Power Markets and Strategies: 2011-2015", HIS Emerging Energy Research, *May 2011*

Wind Power Installed Cost Trend



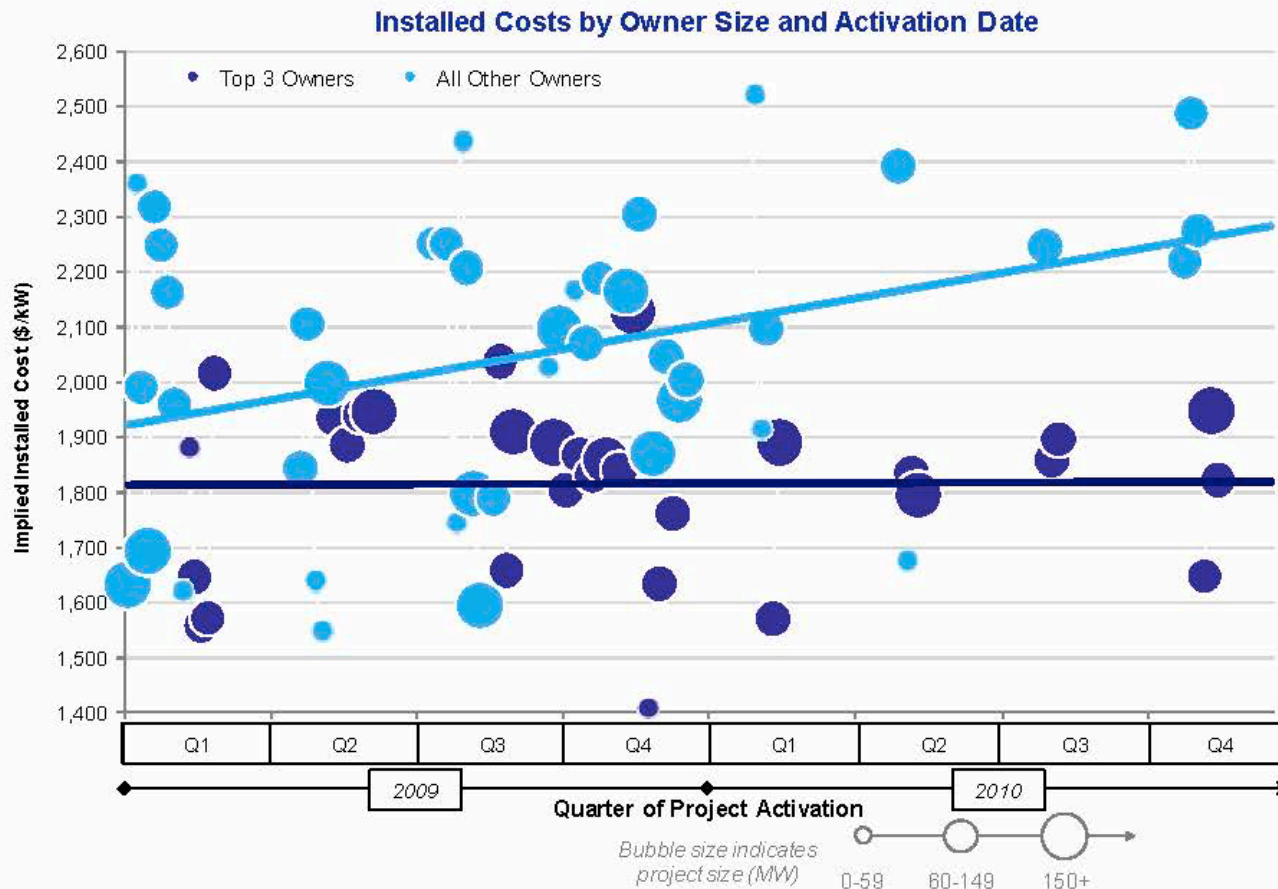
Note: 2011 data represent preliminary cost estimates for a sample of 17 projects totaling 1.1 GW that have either already been or will be built in 2011, and for which reliable cost estimates were available.

Source: Berkeley Lab (some data points suppressed to protect confidentiality)

Figure 28. Installed Wind Power Project Costs over Time (including preliminary sample of 2011 project costs)

Source: 2010 WIND TECHNOLOGIES MARKET REPORT, Berkeley Lab

Wind Power Installed Cost Trend



Top Three Owners



At the end of 2010, these three companies collectively owned over 15.5 GW of capacity in the United States—nearly 40% of total wind installations

Other Owners



Source: "US Wind Power Markets and Strategies: 2011-2015", HIS Emerging Energy Research, May 2011

Where Are We Headed? It Depends....

- **ITC Grant extension:** If the federal ITC Grant is not extended, need for tax equity capacity could double for the same number of MWs, under a ITC or PTC regime. There is not adequate capacity in the current tax equity market to support that.
 - More consolidation by strategics who have own tax capacity??
- **WTG Price:** Continued reduction in WTG prices, coupled with higher productivity of WTGs at lower speeds.
 - More PTC utilization -> more complex structures -> back to the future??
- **PPA prices:** Depressed PPA prices, influenced by low natural gas price levels (very likely), would stall projects in most markets. Future of the merchant buildout?
 - PPA prices in California could be an exception
- **Entry of foreign WTG vendors:** More than 2 dozen vendors including 4 new entrants with strong value proposition; 3 major suppliers, relatively new to the US, expanding capacity. 11 already have US manufacturing presence (vs. one vendor 5 years ago) and 6 more are planning.
 - Could bring down WTG prices further
 - May help attain lower PPA price points
 - May help relieve debt capital constraint somewhat, through development bank financing tied to their equipment
- **Foreign PV vendors:** suppliers exerting downward pressure on PV panel prices
- **Federal RPS:** A comprehensive, well crafted Federal RPS is the most efficient solution
 - Need to provide adequate, financeable price support
 - Establish a stable industry; industry participants need a reliable planning horizon
 - Will attract new capital from strategics, leading towards industry transformation
 - Has to happen – the question is when



Black Swan?



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