

FINANCING RENEWABLE ENERGY PROJECTS



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How Much Does Energy Cost?

<u>Energy Type</u>	<u>Cost Range</u> (cents/kWh)	<u>Additional Considerations</u>
Coal	7.4-13.5	<ul style="list-style-type: none"> •Environmental concerns •Future carbon tax/regulation
Natural Gas	6.9-10.9	<ul style="list-style-type: none"> •Volatile fuel cost: range of \$1.80-\$15.38/million btu's
Wind	4.4-11.5	<ul style="list-style-type: none"> •Intermittent resource/low capacity factor •Incentive unreliability
Solar	14.1-18.9	<ul style="list-style-type: none"> •Price decreased by 1/4 since 2001, projected to continue to drop •Incentive unreliability

How Much Does Energy Cost?

Cost Conclusions:

- Very hard to predict cost
- Predictions have huge variation
- Other factors are also important
 - Reliability
 - Environmental
 - Political
 - Local economy

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Coal	7.4-13.5
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Wind	4.4-11.5
Solar	14.1-18.9

Renewable Energy Benefits

- Environmental Benefits
- Rural income opportunities
- Local tax revenue
- Construction/maintenance jobs
- Domestic, non-imported energy source
- Provides price stability if future carbon tax/regulations increase fossil fuel price
- Income for Native American communities on tribal lands
- National Security

Poll: Support for Wind Power, RES Strong

Voters from both political parties overwhelmingly support increasing the use of wind power in the U.S. and adopting a strong renewable electricity standard (RES), according to a national poll released by AWEA and conducted by two independent firms. According to the poll, 89% of American voters - including 84% of Republicans, 88% of Independents and 93% of Democrats – believe increasing the amount of energy the nation gets from wind is a good idea. Further, 77% are in favor of an RES, with that support extending across party lines: 65% of Republicans, 69% of Independents, 92% of Democrats.

The poll also found that 56% of Americans disapprove of the job Congress is doing on renewable energy and 67% believe Congress is not doing enough to increase renewable energy sources such as wind. A full 82% believe the economy would be stronger (52%) or remain the same (30%) if the U.S. used more renewable energy sources like wind.

Native American Tribal Lands Could Produce 17.5 Trillion Kilowatt Hours of Electricity from Wind and Solar Power

The 55 million acres of land across the nation controlled by Native American tribes can potentially produce an estimated 535 billion kilowatt-hours of electricity from wind power and more than 17 trillion kilowatt-hours from solar energy.

More than four times the total electricity generated in the United States.

Source: Taylor, Eleanor, *Native American Tribal Lands Could Produce 17.5 Trillion Kilowatt Hours of Electricity From Wind and Solar Power*, U.S. Dept. of Energy, available at: <http://www.ienearth.org/news/Native-American-Tribal-Lands-Could- Produce-17.5-Trillion-Kilowatt-Hours-of-Electricity-From-Wind-and-Solar-Power.html>⁶

Renewable Energy Drivers 2011

1. EXPIRATION OF ITC/CASH GRANTS /PTC
2. UTILITY REBATE PROGRAMS
3. MACRS
4. DOE GUARANTEES, PARTNERSHIPS
5. TRIBAL GUARANTEES, PARTNERSHIPS
6. SELLABLE RECS
7. SPLIT OWNERSHIP
8. ASIA DEMAND & CAPITAL
9. “INSERT COUNTRY HERE” (SUPPLY CONCERNS IN VENEZUELA, LIBYA, IRAQ, IRAN, SAUDI ARABIA, RUSSIA)
10. POLLUTION
11. STATE RPS’, STATE SOLAR INCENTIVES
12. MASSIVE RE GENERATING CAPACITY
13. GOOD SUPPLY OF SOME EQUIPMENT

Wind Capacity—Latest Numbers

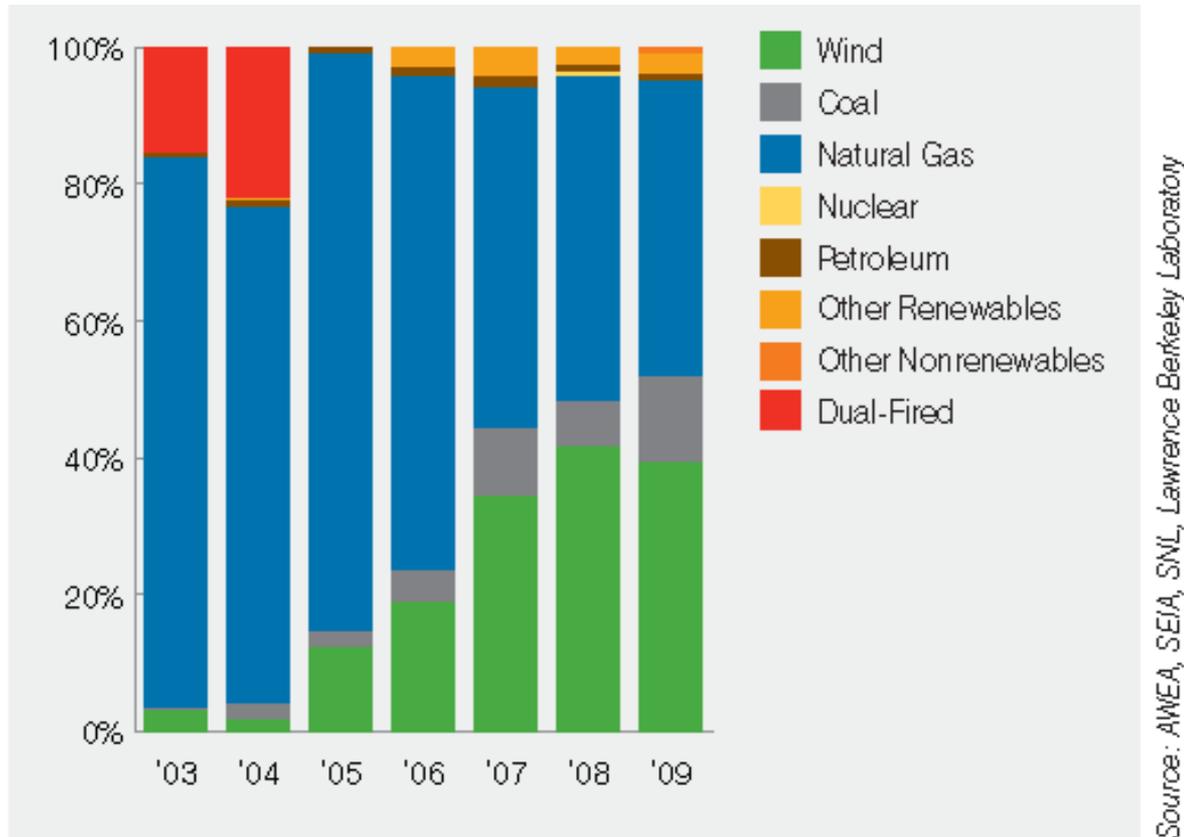
Highlights of the new analysis include:

- Potential U.S. Wind Capacity—37 million gWh/year
- Potential U.S. Wind Capacity for 60-meter turbine with 30% net capacity factor—10,458 gigawatts
- Improvements in turbine development have led to increased capacity potential

The top 10 windiest states are:

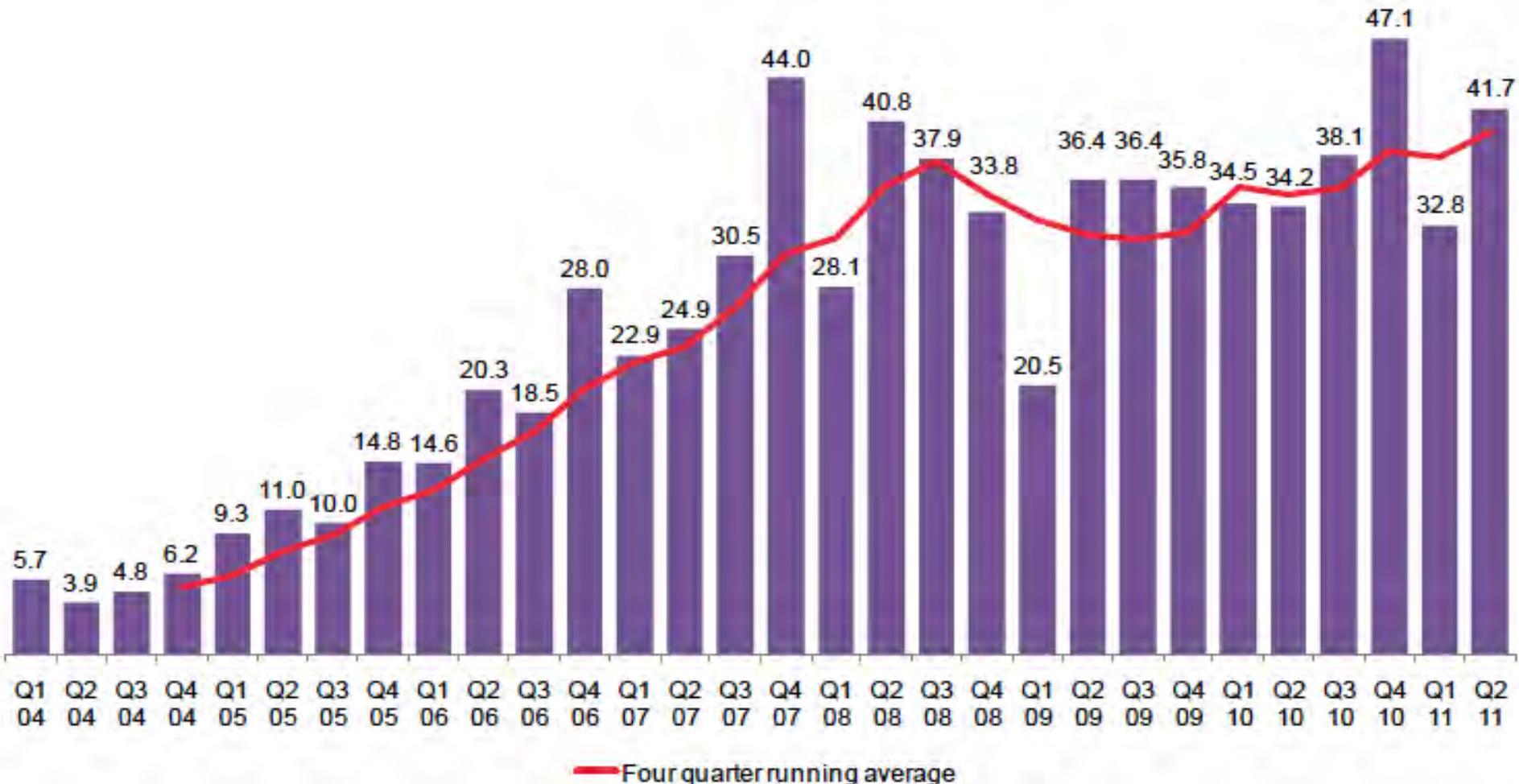
1. North Dakota
2. Texas
3. Kansas
4. South Dakota
5. Montana
6. Nebraska
7. Wyoming
8. Oklahoma
9. Minnesota
10. Iowa

New U.S. Generating Capacity by Energy Source



Source: Flowers, Larry. *Wind Energy Update*. National Renewable Energy Laboratory. 2010.

Global New Financial Investment in Clean Energy 2004-2011: \$BN

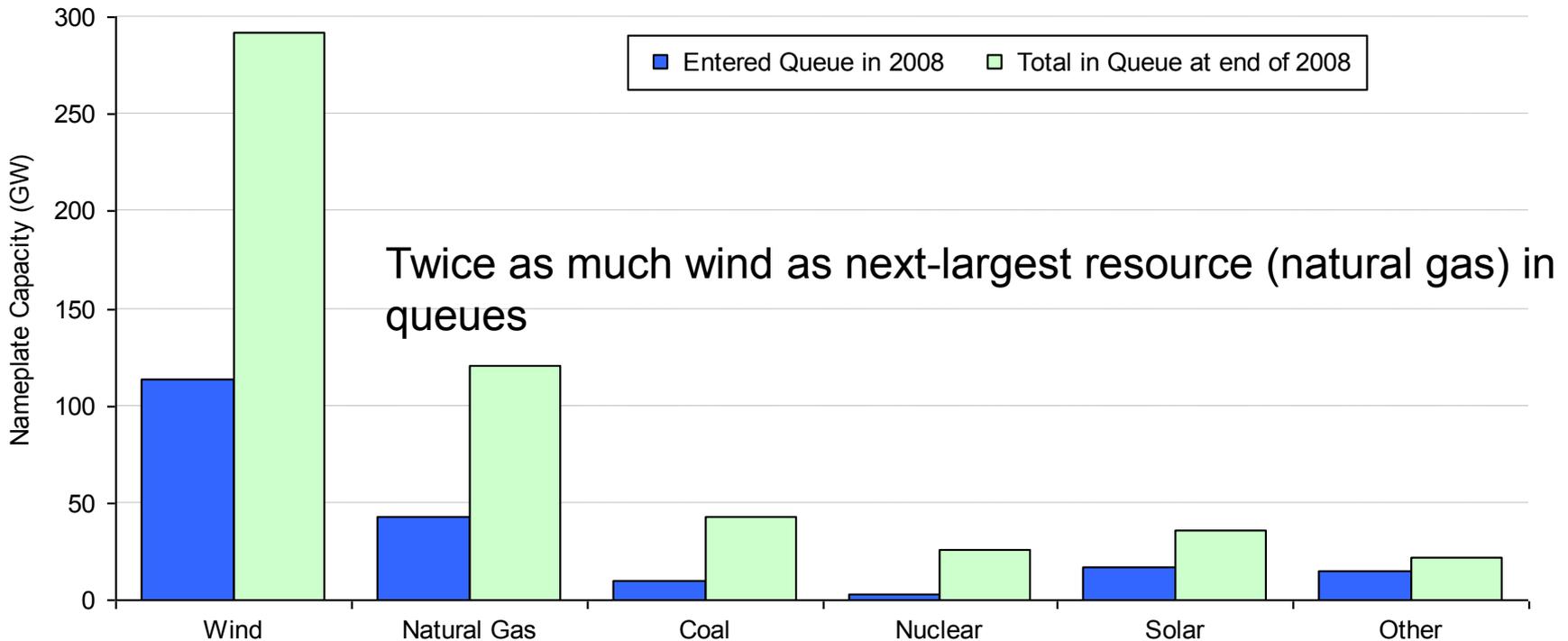


Source: Bloomberg Global Trends in Clean Energy Investment, 14 July 2011.

Clean-Energy Venture Capital Investments in U.S. Based Companies as Percent of Total 2001-2010

Year	Total Venture Investments (\$Millions)	Clean-Tech Venture Investments (\$Millions)	Clean-Tech Percentage of Venture Total
2001	\$37,624	\$458	1.2%
2002	\$20,737	\$651	3.1%
2003	\$18,789	\$807	4.3%
2004	\$21,699	\$760	3.5%
2005	\$22,535	\$1,158	5.1%
2006	\$26,010	\$2,685	10.3%
2007	\$29,901	\$3,761	12.6%
2008	\$28,105	\$6,120	21.8%
2009	\$18,276	\$3,553	19.4%
2010	\$21,823	\$5,055	23.2%

Nearly 300 GW of Wind in Transmission Interconnection Queues



- MISO (64 GW), ERCOT (52 GW), SPP (48), and PJM (43 GW) account for >70% of total wind in queues
- ***Not all of this capacity will be built....***

Source: Flowers, Larry. *Wind Energy Update*. National Renewable Energy Laboratory. 2010.

Recent IPOs on Major Global Markets

Company	IPO Date	IPO Raise	Stock Price Close of First Day Trading	Stock Price 2/1/11	Percent Change in Stock Price	Market Cap 2/1/11	Exchange	Sector
Amyris (AMRS)	9/29/2010	\$84.8M	\$16.50	\$32.20	95.15%	\$1.41B	NASDAQ	biofuels and biomaterials
China Ming Yang Wind Power Group (MY)	10/1/2010	\$350M	\$13.25	\$9.67	-27.02%	\$1.21B	NYSE	wind turbines
Elster Group (ELT)	9/30/2010	\$210.6M	\$13.80	\$15.91	15.29%	\$1.04B	NYSE	advanced meters
Enel Green Power (EGPW)	11/4/2010	\$3.6B	\$2.23	\$2.26	1.25%	\$11.3B	Milan	renewable energy development
Jinko Solar (JKS)	5/14/2010	\$64.2M	\$11.01	\$27.17	146.78%	\$590.43M	NYSE	silicon wafers, solar cells and solar modules
Sensata Technologies (ST)	3/11/2010	\$568.8M	\$18.50	\$32.00	72.97%	\$5.52B	NYSE	sensors and controls
Sinovel Wind Group (601558)	1/13/2011	\$1.43B	\$12.39	\$11.11	-10.34%	\$11.2B	Shanghai	wind turbines
Tesla Motors (TSLA)	6/29/2010	\$226.1M	\$23.89	\$23.91	0.08%	\$2.23B	NASDAQ	electric vehicles

Source: Clean Edge, Inc. Clean Energy Trends 2011.

Top 10 Disclosed Energy Tech Venture Deals

Company	Primary Sector	Total Invested (\$ Millions)
Better Place	EV Infrastructure	\$350.0
Solyndra	Thin-Film Solar	\$175.0
BrightSource Energy	Concentrated Solar Thermal	\$171.8
Fisker Automotive	Electric Vehicles	\$140.3
Amonix	Concentrated PV	\$129.4
Kior	Biomass	\$110.0
Abound Solar	Thin-Film Solar	\$110.0
Vulcan Power	Geothermal	\$108.0
MiaSolé	Thin-Film Solar	\$106.0
Elevance Renewable Sciences	Biochemicals	\$100.0

Source: Clean Edge, Inc. Clean Energy Trends 2011.

Financing Mechanisms

1. Venture Capital
2. Public Offerings
3. Tax Equity Finance
4. Self Funding (Partially)
5. Sale-Leaseback
6. Loan (With or Without Guarantees)
7. Co-ownership
8. Equipment Finance
9. Sponsorship by Federal & State, Regional & Local

Renewable Energy Speed Bumps and Road Blocks 2011

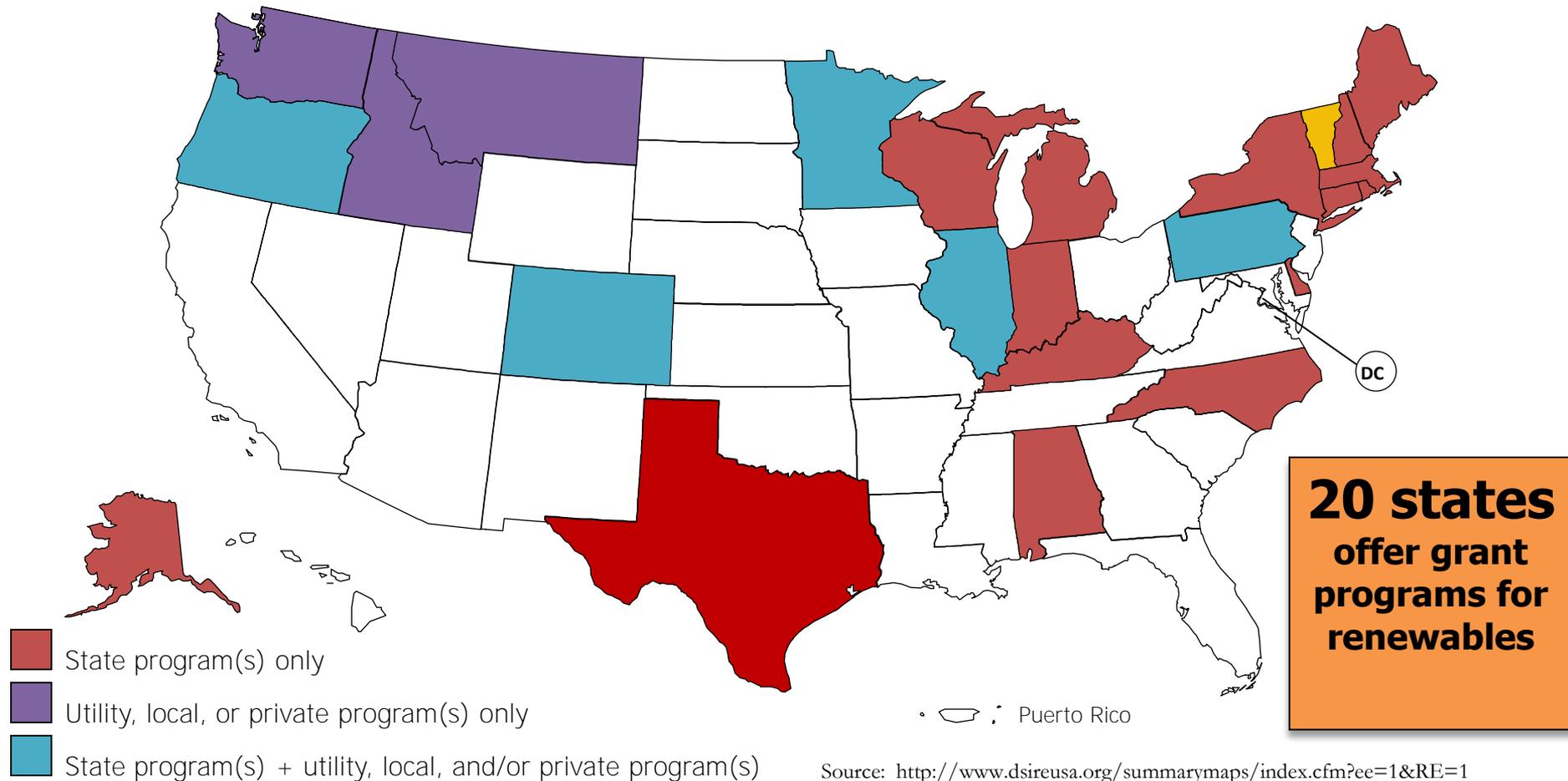
1. PPA's
2. Failure of Senate Carbon Legislation
3. Missing Lending Community due to Q4 2008 Shrinkage
4. Failure of Federal RPS
5. Transmission Inadequacies
6. Transmission Barriers
7. State Preferences for In-State Projects
8. In-State-Only RPS's
9. Bureaucracy/Approval Process (Tribes Especially)
10. Intermittency
11. The Missing Middle – Raising Money for Unproven Technologies
12. Recovery Act Deadlines
13. Tight Supply of Solar Equipment

Future Renewable Energy Accelerators

1. New Technology
2. Future Carbon Legislation
3. Increased Interest in Renewables by the Commercial Sector
4. Maturity of Federal Grants
5. FIT's
6. Public-Private Partnership Funds
7. Clean Energy Deployment Administration (Green Bank)
8. Consolidation
9. Good Supply Numbers (Wind Especially) (Price of Equipment Dropping)
10. Dropping Price Per Watt (Especially P.V.)
11. Political momentum in States
12. Extension of Cash grant Programs
13. Much More Financing From the Vendor
14. Expanded RPS
15. Commercial and Private Lenders
16. Ownership of Projects by Utilities, Governments
17. Massive Opportunities for Efficiency Improvements

Grant Programs for Renewables

Current through June 2011



Notes: This map only addresses grant programs for end-users. It does not address grants programs that support R&D, nor does it include grants for geothermal heat pumps or other efficiency technologies. The Virgin Islands also offers a grant program for certain renewable energy projects.

Tax Credit Uncertainty

- **Tax credits are significant driver of industry**
- **Production Tax Credit:** Per-kWh credit for wind, biomass, geothermal, landfill gas, solid waste, hydroelectric and tide-generated energy
 - Expiration for Wind: December 31, 2012
- **Investment Tax Credit:** Generally 30% of development expenditures
 - Expiration for Solar: December 31, 2016
 - Expiration for Wind: December 31, 2012
- **ARRA Addition:** Parties eligible for PTC or ITC may receive cash grant from treasury department in lieu of tax credit.

Source: *Renewable Electricity Production Tax Credit*. Database of State Incentives for Renewables & Efficiency. August 23, 2011. http://dsireusa.org/incentives/incentive.cfm?Incentive_Code=US13F&re=1&ee=1
Business Energy Investment Tax Credit. Database of State Incentives for Renewables & Efficiency. August 23, 2011. http://dsireusa.org/incentives/incentive.cfm?Incentive_Code=US02F&re=1&ee=1

Bloomberg: U.S. Debt Deal Kills Off Prospects of Renewable-Power Support

By Jim Efstathiou Jr. and Christopher Martin—August 5 2011

U.S. government support for renewable energy may plunge from record levels, setting back the use of wind and solar power before they can compete on their own with oil, gas and coal.

Direct spending, tax breaks and research funding pushed federal renewable-energy subsidies to \$14.7 billion in 2010, according to Alan Beamon, director of the Energy Information Administration's Office of Electric, Coal, Nuclear and Renewables Analysis. Project developers are lining up for subsidies approved in the 2009 stimulus bill as incentives expire and the deficit-reduction deal dims prospects for future backing of solar panels and wind farms.

"The debt agreement, which is focused on cuts only and not revenue increases, makes it more likely that this infant sector gets strangled before it matures," Daniel J. Weiss, a senior fellow at the Center for American Progress, a Washington policy group that advises Democrats, said in an interview with Bloomberg Government.

The deal on a debt-limit increase that Congress and President Barack Obama struck to avert a U.S. default would result in at least \$2.1 trillion in spending cuts, according to the Congressional Budget Office. Additional savings of at least \$1.2 trillion would come from enactment of a deficit-reduction bill or from automatic spending cuts if Congress fails to accept a package framed by a 12-member panel.

Direct Pressure

"The potential lapse of key subsidies at the end of 2011 puts the pressure all the more directly on the clean-energy sector to drive down costs and become more competitive between now and then," according to a Dec. 13 report by Bloomberg New Energy Finance.

The Treasury Department has paid out \$7.78 billion in grants to developers of wind, solar, biomass and geothermal energy under an incentive that was created in the stimulus bill and lapses at the end of the year. Tax credits for wind, solar and geothermal projects end in 2012 and 2016.

"I will be working hard to preserve renewable energy incentives, but it will be more difficult to do so going forward, and that is one reason I opposed the deficit deal," Senator Robert Menendez, a New Jersey Democrat, said in an e-mail. "Oil company incentives do not sunset, but renewable incentives do."

Government aid for renewable energy is up from \$5.12 billion in 2007, according to the EIA. Subsidies are expected to decline beginning this year, and will fall 77 percent by 2016 from the record in 2010, according to the White House Office of Management and Budget.

Tax Credits

The expiring grants from the Treasury filled a void in project financing that followed the collapse of Lehman Brothers Holdings Inc. three years ago. The grants were offered after the recession sapped demand in the tax equity market, where tax credits earned by solar and wind project developers could be sold to companies seeking to reduce their tax burden. The tax credits also will expire unless Congress approves an extension. The production tax credit, used mainly by wind-farm developers, runs out at the end of 2012. The investment tax credit, which goes primarily to solar and geothermal projects, ends in 2016.

"The truth is that paying equity subsidies for green energy is expensive," Kevin Book, managing director at ClearView Energy Partners LLC, a Washington-based policy analysis firm, said in an interview. "Who will be the strong voice to defend credits, and which credits get defended?"

Other subsidies for energy, which go both to renewable sources and oil and gas, may also be targeted by the congressional debt-reduction panel.

Bloomberg: U.S. Debt Deal Kills Off Prospects of Renewable-Power Support

Tax Code

Written into the federal tax code are benefits valued at \$24.2 billion for renewable energy and efficiency incentives through 2014, compared with an estimated \$17.9 billion for the oil, gas, and coal industries, according to a December report by the congressional [Joint Committee on Taxation](#).

"We've only just started supporting renewable energy," Ellen Vancko, manager of the Nuclear Energy and Climate Change Project at the Cambridge, Massachusetts-based [Union of Concerned Scientists](#), said in an interview. "We need to allow these technologies to mature so they don't need subsidies."

Globally, [government spending](#) on renewable energy peaked last year at \$74.5 billion and will decline to \$68 billion this year before dropping to \$21.4 billion in 2013, according to New Energy Finance.

In the U.S., the 2009 stimulus bill provided \$65 billion for clean energy, including loan guarantees for solar and wind power, funding for state programs to help make homes more energy efficient, research into battery-powered cars and trucks and systems to capture carbon dioxide from power-plant emissions. The bill also created the Treasury grant program.

Spent by Mid-2012

By the end of last year, the U.S. had spent 36 percent of the \$65 billion, according to Stephen Munro, an analyst with New Energy Finance in Washington. By mid-2012, all the money should be spent.

About \$34 billion in stimulus funds will be spent on clean energy this year, up from \$13 billion in 2010, Munro said. The remainder, about \$18 billion, will be delivered by July 2012 as continued disbursements for Treasury grants and accelerated depreciation for renewable technologies, he said.

Projects that begin construction this year can qualify for a Treasury grant. Payments under the program, made when the renewable [power source](#) goes into service, are expected to reach a high of \$4.26 billion this year and end in 2016 with \$620 million in outlays, according to the White House Office of Management and Budget.

The grant program was extended through this year in a December 2010 tax deal.

'Political Football'

"The Treasury grants are very vulnerable in the current fiscal mood and the production tax credit has always been a political football," said Nathanael Greene, director of renewable [energy](#) policy at the [Natural Resources Defense Council](#) in [New York](#). "Wind energy has the most at stake right now. Expiry of the credits would put a lot of people on the street."

The stimulus bill also included \$6 billion for [Department of Energy](#) loan guarantees to back renewable projects, a figure later reduced to \$2.5 billion. The department said in May it stopped work on a loan guarantee for Cape Wind off of [Massachusetts](#) because there wasn't enough money for all applicants. The first U.S. offshore wind farm is projected to cost \$2.6 billion. Funding for the loan guarantee program fell to \$170 million in the current budget.

About 75,000 jobs in the U.S. are in the wind-power industry, according to [Denise Bode](#), chief executive officer of the [American Wind Energy Association](#), a trade group in [Washington](#).

Current wind "projects are safe, and prospects for extension of the program beyond 2012 are as good as ever," Bode said in an e-mail. "I had a front-row seat to [tax reform](#) in the mid-1980s, and I feel confident that wind incentives will survive this process."

Source: Jim Efstathiou Jr. and Christopher Martin, *U.S. Debt Deal Kills Off Prospects of Renewable-Power Support*. Bloomberg. August 5, 2011. <http://www.bloomberg.com/news/2011-08-05/u-s-debt-deal-kills-off-prospects-of-renewable-power-support.html>

ReCharge: US budget cuts will ‘have little impact’ on bid to extend wind tax credit

By Benjamin Romano—August 11, 2011

The US wind industry expects little immediate impact from the government’s plan to cut trillions of dollars from the budget and increase the national debt ceiling, and is looking instead to autumn legislative action to win an extension of important incentives.

“We don’t view the debt ceiling or Budget Control Act (BCA) process as much of a threat or opportunity, the reason being they (Congress’ deficit Supercommittee, tasked with identifying up to \$1.5trn in additional cuts) have a specific assignment to use the Congressional Budget Office 2013 budget baseline, and that baseline includes no wind tax credits,” American Wind Energy Association (AWEA) public policy head Rob Gramlich tells *Recharge*.

The wind industry’s most important federal support is the production tax credit (PTC), which provides a credit of \$0.022/kWh of production for projects brought online by 31 December 2012. AWEA’s top priority is to win an extension of the PTC.

Gramlich says PTC extension, like the extension of other tax provisions such as the Bush tax cuts, is “really in a different process” from the BCA. The industry will be looking for a legislative vehicle this autumn to attach a PTC extension to.

Asked for his level of optimism on a PTC extension, Gramlich says, “It’s the same as it’s been the last seven times we extended the tax credit, which is that we can’t give anybody any guarantees”.

Since the PTC was first enacted in 1992, the wind industry has fought repeated battles to extend it a couple more years at a time. The uncertainty and on-and-off nature of this incentive is largely to blame for the US wind industry’s boom-and-bust cycles during the last decade.

“We can say we’ve done it before,” Gramlich says. “We as an industry are very good at making the case.”

A focus on energy jobs

Senate Majority Leader Harry Reid, a strong backer of renewable energy, has a list of priorities when Congress returns from its August recess on 6 September that sounds promising for renewables broadly.

“When we come back, we’re focusing on jobs,” Reid, a Nevada Democrat, told reporters this week ahead of his National Clean Energy Summit in Las Vegas at the end of the month. “...One of the things at the top of the list is energy jobs and we’re going to try to see if we can get a little bit of cooperation from the Republicans so we can make that one of our signature issues during the next couple of months.”

Reid blamed Republicans in the House of Representatives for blocking or attempting to reverse energy efficiency measures. He was asked what the Democrats’ response would be if members of the Supercommittee, such as Michigan Republican Fred Upton, chairman of the House Energy and Commerce Committee, try to cut support for renewable energy or Environmental Protection Agency greenhouse gas emissions rules.

“I don’t think that there’ll be much appetite to do a lot of that stuff in November,” Reid said. “I really don’t. I think that we’re going to have to focus on jobs and I would hope that the Republicans will get off their kick of trying to do things that are message pieces of legislation and get to things that are very substantive.”

AWEA’s Gramlich says there are also “a good number of supporters of wind energy on the committee. “If energy taxes for some reason do come up, we think we will have some helpful friends on both sides of the aisle.”

Windy Iowa in the spotlight

AWEA is making a major push this week in Iowa, where Republican presidential hopefuls are debating ahead of the influential Iowa Straw Poll, to be held on Saturday.

“They’ve all been exposed to wind supporters there pretty extensively and we hope to see them all sign the blade [provided by TPI Composites] that will be at the Ames Straw Poll event,” Gramlich says. Iowa, an important early political state, is also the national wind leader, accounting for 20% of its electricity generation this year. The industry enjoys strong popular and political support in the state. “You can’t go to Iowa and miss wind energy,” Gramlich says. “It’s good that candidates are forced to get out and see the real world and they’re seeing the future when they go to Iowa.”

Source: Benjamin Romano, *U.S. budget cuts ‘have little impact’ on bid to extend wind tax credit*, ReCharge News.com. August 11, 2011.
http://www.rechargenews.com/business_area/politics/article271696.ece

Summary

1. Focus on Smaller Projects: Focus on Distributed Generation
2. Focus on Stability: It is Not the Strongest Gust, It is the Duration
3. Focus on Expansion of Existing Projects
4. Don't Bet Solely on Long Distance Transmission
5. Seek to Attract Innovative Technologies
6. It is Not "Plastics," it is "Efficiency"
7. Watch Developments with Tax Credit Extension

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THE WIND SPILL
FROM THE OFFSHORE
TURBINE ACCIDENT
HAS REACHED
THE SHORE.

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