

SUN DAY CAMPAIGN

(a campaign for a sustainable energy future)
6930 Carroll Avenue, Suite #340; Takoma Park, MD 20912
301-270-6477 x.11
sun-day-campaign@hotmail.com

RENEWABLE ENERGY COULD PROVIDE 16% OF U.S. ELECTRICITY WITHIN FIVE YEARS

SOME MODEST PROJECTIONS FOR NEAR-TERM GROWTH

(or why the EIA's forecast of renewables not reaching 16% until 2040
is almost certainly wrong)

by Ken Bossong, Executive Director
April 15, 2014

Contents:

Executive Summary	page. 1
Total Electrical Generation	page. 3
Hydropower	page. 3
Biomass	page. 5
Geothermal	page. 9
Wind	page. 12
Solar Thermal + Photovoltaics	page. 17
Renewables: 2017-2018	page. 27
Summary Chart	page. 32

EXECUTIVE SUMMARY

In its "early release overview" of the "Annual Energy Outlook 2014" (published December 16, 2013 with the final release of the full AEO2014 presently slated for April 30, 2014), the U.S. Energy Information Administration's (EIA) Reference Case foresaw renewable energy sources (i.e., biomass, geothermal, hydropower, solar, wind) accounting for just 16% of the nation's net electrical generation by the year 2040.

Given the current status of renewables (i.e., ~13% of the net electrical generation in 2013) and the growth trends of the past decade or longer, EIA's forecast seems highly conservative if not, in fact, simply wrong. Furthermore, the percentage of the nation's net electrical generation represented by renewable energy has expanded from less than 9% in 2004 to nearly 13% in 2013 - i.e., within a decade;

thus - particularly in light of the rapidly declining costs for most renewable energy sources - it seems improbable that it will require another 27 years to grow from 13% to 16%.

Inasmuch as policy makers in both the public and private sectors - as well as the media and others - rely heavily upon EIA data when making legislative, regulatory, investment, and other decisions, underestimation can have multiple adverse impacts on the renewable energy industry and, more broadly, on the nation's environmental and energy future.

Accordingly, the SUN DAY Campaign has reviewed EIA's published data for renewable energy sources and their contribution to the nation's net electrical generation for the 11-year period January 1, 2003 through December 31, 2013.

This has included a year-by-year assessment of growth rates for each of the major renewable energy technologies over the past decade as well as actual annual changes in net electrical generation (measured in MWh) for each technology.

The SUN DAY Campaign recognizes that future growth rates for the multiple renewable energy technologies can be impacted by numerous hard-to-assess variables and that the past is not necessarily prologue. Nonetheless, there has been such a remarkable consistency in the growth rates for renewables over the past decade that it seems that some near-term projections based on historical trends can be made with a reasonable degree of confidence.

Specifically, if past trends continue, renewable energy sources, which accounted for almost 13% of the nation's net electrical generation in 2013, could increase to about 13.5% in 2014, to 14.4% in 2015, to 15.3% in 2016, and reach or exceed 16.0% no later than 2018 -- i.e., within five years and not the 27 years forecast by EIA.

The assumptions and projections made, on a technology-by-technology basis, are explained below. Following the projections provided for each technology is a listing of recent studies and news reports that offer alternative or complementary scenarios - many of which are more aggressive than those provided by the SUN DAY Campaign based on EIA's numbers.

In addition, it should be noted that the SUN DAY Campaign does not believe that historical trends necessarily reflect the actual cost-effective, near-term deployment potential of renewable energy sources - particularly in light of the rapidly declining costs and technological advances associated with many of them. Moreover, while projections based on EIA data suggest that the percentage of electricity provided by hydropower, biomass, and geothermal sources over the next several years will remain largely unchanged, other studies indicate that significant growth is possible. Consequently, even SUN DAY's analysis may prove to be unduly conservative.

=====

The EIA data cited in this analysis can be found in the February 21, 2014 issue of the agency's "Electric Power Monthly," available at <http://www.eia.gov/electricity/monthly>. See, in particular, tables 1.1, 1.1A, ES1.A, and ES1.B. The early release version of the "Annual Energy Outlook 2014" can be found at <http://www.eia.gov/forecasts/aeo/er/index.cfm>; see the section titled "Electricity Generation." The most recent "Short-Term Energy Outlook" can be found at <http://www.eia.gov/forecasts/steo>.

TOTAL ELECTRICAL GENERATION

In its "Electric Power Monthly" report (issued on February 21, 2014 with data through December 31, 2013), EIA notes that net electrical generation in 2013 was 4,058,209 Thousand MWh. Further, in its early release overview for the "Annual Energy Outlook 2014," EIA forecasts electrical generation to grow at an annual rate of 0.9%. This analysis uses that data and assumption as a baseline.

Thus, net U.S. electrical generation in 2014 is projected to grow to 4,094,733 Thousand MWh; in 2015 it will be 4,131,586 Thousand MWh; and for 2016 it will be 4,168,770 Thousand MWh.

HYDROPOWER

For the past decade, output from conventional hydropower has been remarkably steady overall (notwithstanding slight ups and downs each year) and has averaged 272,870 Thousand MWh per year. It increased slightly to 276,240 Thousand MWh in 2012 but dipped back to 269,136 Thousand MWh in 2013. While some smaller hydro facilities and upgrades at existing plants are expected to come on-line in the next 2-5 years, they may be offset by decreased water flows elsewhere due to climate change or other factors. Therefore, this analysis assumes 273,000 Thousand MWh each year for the near term.

Hydropower provided about 6.63% of net electrical generation in 2013 and will probably contribute roughly the same percentage in 2014 (unless badly affected by the California drought) but as total net electrical generation slowly increases, its share might dip slightly to 6.61% in 2015, and 6.55% in 2016. (In its latest "Short-Term Energy Outlook" released on April 8, 2014, EIA projects virtually the same level of consumption from hydropower in 2015 as in 2012.)

Forecasts and Trends for Hydropower and Other Water Technologies Noted by Other Sources:

EPRI Calculates U.S. Riverine Hydrokinetic Potential at 3% of Annual Electricity Demand:

Electric Power Research Institute, February 12, 2013

<http://www.epri.com/Press-Releases/Pages/EPRI-Calculates-U-S--Riverine-Hydrokinetic-Potential-at-3-of-Annual-Electricity-Demand.aspx>

The Electric Power Research Institute recently completed a mapping and assessment of hydrokinetic resources in rivers of the continental United States and found that these undeveloped resources could provide 3 percent of the nation's annual use of electricity. The assessment analyzed 71,398 river segments across the 48 contiguous states and additional river segments in Alaska. It yielded a total theoretical resource estimate of 1,381 TWh/yr for the continental United States, which is equivalent to approximately 25 percent of annual U.S. electricity consumption. The technically recoverable resource estimate for the continental United States is 120 TWh/yr, which represents approximately 3 percent of annual U.S. electricity consumption. The results show that the Lower Mississippi region contributes almost half (47.9 percent) of the technically recoverable resource estimate; Alaska 17.1 percent, the Pacific Northwest region 9.2 percent, and, the Ohio region 5.7 percent. The assessment is part of an

effort by the U.S. Department of Energy to characterize U.S. hydrokinetic waterpower resources including river, wave, tidal, ocean thermal, and ocean current.

=====

Wave, Tidal Energy Could Grow in U.S.:

Electric Light & Power, by Timothy Mundon, June 13, 2013

<http://www.elp.com/articles/print/volume-91/issue-3/sections/wave-tida-energy-could-grow-in-us.html>

Marine renewable energy sources such as wave and tidal power are poised to become an important part of the U.S. future clean energy mix. Recent Electric Power Research Institute and Georgia Institute of Technology studies have measured the annual technically recoverable energy from U.S. wave and tidal resources at 1,170 terawatt-hours and 66 TWh respectively--a significant proportion of the 4,000 TWh of U.S. electricity demand. In practice, the realities of project development likely will result in a much smaller realized resource, but if 10 percent extraction can be reached, this would be equivalent to the output of 37 large fossil fuel plants.

=====

Water Power Energy Is Stirring:

EnergyBiz.com, by Paul Jacobson, June 16, 2013

<http://www.energybiz.com/article/13/06/water-power-energy-stirring>

The Electric Power Research Institute recently completed a mapping and assessment of hydrokinetic resources in rivers of the continental United States. The assessment, part of an effort by the U.S. Department of Energy to characterize U.S. hydrokinetic waterpower resources including river, wave, tidal, ocean thermal, and ocean current, found that these undeveloped river resources could provide 3 percent of the nation's annual use of electricity. The assessment analyzed 71,398 river segments across the 48 contiguous states and additional river segments in Alaska. It yielded a total theoretical resource estimate of nearly 1,400 terawatt-hours per year for the continental United States, which is equivalent to approximately 25 percent of annual U.S. electricity consumption. To date, six firms hold 55 Federal Energy Regulatory Commission preliminary permits for inland river hydrokinetic projects.

=====

Energy Department Invests \$16 Million to Harness Wave and Tidal Energy:

U.S. Department of Energy, August 29, 2013

http://apps1.eere.energy.gov/news/progress_alerts.cfm/pa_id=917

The U.S. Department of Energy has announced \$16 million for seventeen projects to help sustainably and efficiently capture energy from waves, tides, and currents. Together, these projects will increase the power production and reliability of wave and tidal devices and help gather valuable data on how deployed devices interact with the surrounding environment. The Department's latest nationwide wave and tidal energy resource assessments identify up to 1,400 terawatt hours of potential generation per year. One terawatt-hour of electricity is enough to power 85,000 homes, and developing a small fraction of the available wave and tidal energy resource could allow for millions of American homes to be powered with this form of renewable energy.

Global Hydropower Market Continuing to Grow, with Asia-Pacific Keeping the Lead:

Alternative Energy HQ, date - ??

<http://www.alternativeenergyhq.com/global-hydropower-market-continuing-to-grow-with-asia-pacific-keeping-the-lead.php>

The global cumulative hydropower installed capacity is expected to increase from 1,065 gigawatts in 2012 to 1,407 GW in 2020, at a compound annual growth rate of 3.5%, with investments reaching \$75 billion in the same period, forecasts research and consulting firm GlobalData. According to the company's latest report, "Hydropower (Large Hydro, Small Hydro and Pumped Storage), 2013 Update – Global Capacity, Market Size, Competitive Landscape, Regulations and Investment Analysis to 2020," the total for 2020 is expected to be comprised of 1,052 GW of large hydro capacity, 215 GW of pumped storage and 140 GW of small hydropower capacities. During the forecast period, Europe and North America, which have mature hydropower markets, will experience growth in installations with the addition of 271 GW and 197 GW, respectively.

=====

More than 220 Non-Powered Sites Identified for Potential Hydroelectric Power Development:

Power Engineering, January 8, 2014

<http://www.power-eng.com/articles/2014/01/more-than-220-non-powered-sites-identified-for-potential-hydroelectric-power-development.html>

A new study "Hydropower Resource Assessment at Non-Powered USACE Sites," released by the U.S. Army Corps of Engineers, has identified 419 non-powered USACE sites that are potential locations for hydro development. The number was then pared to 223, based on the criteria that the site must be capable of producing 1 MW or more of hydroelectric power. The Corps also stipulated that the sites could not include a current Federal Energy Regulatory Commission license, and that there could be no obvious hindrances to project development. The sites combine for a cumulative output potential of 6,256 MW, though USACE said only 2,818 MW of those would likely be "feasible under economic assumptions made in the report".

=====

BIOMASS

EIA defines biomass for electrical generation to include "wood and wood-derived fuels," "landfill gas," "biogenic municipal solid waste," and "other waste biomass." Over the last decade, electrical generation from landfill gas has nearly doubled while there has been steady decline in that from municipal solid waste but very modest increases in wood and other waste biomass. Overall, the growth rate for biomass-generated electricity has been roughly 1.1% annually.

Based on that growth rate, [SUN DAY forecasts biomass - which accounted for about 1.48% of electrical generation in 2013, to hold steady at roughly 1.48% in 2014, 2015, and 2016.](#) (In its latest "Short-Term Energy Outlook" released on April 8, 2014, EIA projects a 1% increase in energy consumption from wood biomass and waste biomass in 2015 compared to 2013 levels.)

Forecasts and Trends for Biomass Noted by Other Sources:

Global Biogas Market to Hit a Value of \$33.1 Billion by 2022:

CompaniesAndMarkets.com, January 21, 2013

<http://reports.pr-inside.com/global-biogas-market-to-hit-a-r3559552.htm>

The global biogas market reached revenues of \$17.3 billion in 2011 and has been forecast to double over the next decade, hitting a market value of \$33.1 billion by 2022. Biogas is gaining traction as a versatile energy carrier with significant potential to meet growing demand within the power, heat, fuel, and chemical markets. Global installed production capacity is now more than 800 billion cubic feet per year, representing nearly 14.5 gigawatts of installed distributed and grid-scale renewable generation capacity. Germany continue to dominate global biogas energy generation for the foreseeable future. However, the US, the second most productive biogas power producer, is expected to increase generation from a more modest 2012 figure of 9,072 GWh to 20,936 GWh in 2025, at a CAGR of 6.6%.

=====

Report Addresses Midwest Biomass Thermal Potential:

Biomass Magazine, by Erin Voegelé, May 6, 2013

<http://www.biomassmagazine.com/articles/8957/report-addresses-midwest-biomass-thermal-potential>

FutureMetrics Inc. recently prepared a working report for the Heating the Midwest with Renewable Biomass steering committee. The report outlines a vision to achieve 15 percent renewable thermal energy in the Midwest by 2025, with 10 percent derived from sustainably produced biomass. In the Midwest, approximately 97 percent of thermal energy consumed in the residential sector is from non-renewable sources. The report stresses that biomass is the region's most abundant renewable resource for thermal applications. However, Michigan, which currently leads the Midwestern states with regard to biomass utilization for thermal energy, generates only 4.44 percent of its thermal energy from biomass sources. Minnesota, Ohio and Indiana generate a relative 2.66 percent, 2.51 percent and 2.32 percent of thermal energy from biomass. Illinois, Iowa, North Dakota, South Dakota and Wisconsin all generate less than 2 percent of their thermal energy from renewable biomass sources.

=====

Biomass Power Generation Installed Capacity to Reach At Least 82 Gigawatts Worldwide by 2020:

Navigant Research, May 30, 2013

<http://www.navigantresearch.com/newsroom/biomass-power-generation-installed-capacity-to-reach-at-least-82-gigawatts-worldwide-by-2020>

Currently accounting for 3 percent of global electricity generation capacity, biomass power generation is widely utilized by industrial facilities and distributed energy customers alike. Accelerated future growth depends on breakthroughs in densification processes and the commoditization of biomass resources for power production. According to a new report, "Market Data: Biomass Power Generation," global installed biopower capacity will grow gradually over the remainder of this decade, from 58.6 gigawatts in 2013 to 82 GW in 2020, under a conservative forecast scenario. Under a more aggressive scenario, installed capacity could reach 128.5 GW in 2020. Increasingly, the utilization of biomass is improving the efficiency and profitability of facilities as a fuel for combined heat and power installations, reducing

coal emissions through co-firing, and providing onsite generation for industrial facilities like biorefineries. According to the report, the growth outlook for these applications remains positive.

=====

U.S. Bioenergy Capacity to Reach 14.4 GW by 2018:

Biomass Magazine, by Erin Voegelé, July 1, 2013

<http://www.biomassmagazine.com/articles/9159/iea-us-bioenergy-capacity-to-reach-14-4-gw-by-2018>

In 2012, bioenergy production in the U.S. increased, reaching 12.1 GW and accounting for 1.5 percent of the power mix. However, the International Energy Agency's second annual "Medium-Term Renewable Energy Market Report" predicts that bioenergy capacity will reach 12.4 GW in 2013 and increase fairly steadily through 2018, when it will account for an estimated 14.4 GW of capacity. In addition, the report predicts that total U.S. renewable energy capacity will grow from 184 GW in 2012 to 247 GW in 2018, a growth rate of more than 5.1 percent per year.

=====

EPA's Expanded RE-Powering Tool Shows Vast Biomass Potential:

Biomass Magazine, by Erin Voegelé, August 7, 2013

<http://www.biomassmagazine.com/articles/9297/epas-expanded-re-powering-tool-shows-vast-biomass-potential>

The U.S. EPA's updated "RE-Powering Mapping and Screening Tool," which provides preliminary screening results for renewable energy potential at contaminated land, landfill and mine sites, has identified 9,591 sites as potential locations for a biorefinery facility. These locations feature cumulative biomass sources of at least 700,000 metric tons per year within 50 miles, are at least 50 acres in size and are close to roads and rail. In addition, 9,966 potential sites have been identified for biopower development. These sites have cumulative biomass resources of at least 280,000 metric tons per year within 50 miles, are at least 50 acres in size, are less than 10 miles from transmission lines, and are close to graded roads and rail. Finally, 1,947 sites are identified as potential locations for landfill gas energy projects. This includes sites that currently have landfill gas energy facilities, construction projects, or that have been identified by EPA's Landfill Methane Outreach Program as a candidate or potential site. Biomass potential at EPA's tracked sites is more than 190,000 MW on a technical level.

=====

Biomass Power Generation Will Reach \$11.5 Billion in Annual Revenue by 2020:

Navigant Research, August 28, 2013

<http://www.navigantresearch.com/newsroom/biomass-power-generation-will-reach-11-5-billion-in-annual-revenue-by-2020>

According to a recent report, "Market Data: Biomass Power Generation," worldwide revenue from biomass power generation will reach \$11.5 billion annually by 2020. Standalone biopower facilities have the potential to bring hundreds of megawatts online per installation. Biopower can also optimize existing industrial processes, such as combined heat and power installations, reducing coal emissions through co-firing, and onsite generation for industrial facilities like biorefineries. While biopower currently remains limited as a subsidy-dependent enterprise, technological breakthroughs and the expansion of international trade in biomass pellets are expected to lead to sustained growth in the sector.

The expansion of the biopower market will largely be determined by government mandates. These policies can be either aspirational or mandated, but if they remain in place through 2020, they could help the biomass market expand. If incentives and subsidies continue to be implemented on an ad hoc basis, growth in this sector is likely to remain constrained.

=====

Biogas Product Prospectus:

Biomass Magazine, by Anna Simet, November 27, 2013

<http://www.biomassmagazine.com/articles/9688/biogas-product-prospectus>

The potential of biogas is seemingly endless due to a number of factors, especially its versatility. According to BBC Research, the global market for biogas plant equipment was worth \$3 billion in 2010 and is estimated to reach nearly \$8.6 billion by 2016, a growth rate of nearly 20 percent. The North American market for biogas production equipment was valued at \$510 million in 2011 and is forecast to reach nearly \$1.2 billion by 2016. Such robust market growth means construction of many more plants—Research and Market analysts project worldwide installed capacity will increase by about 60 percent in only five years, with the number of plants increasing from 9,700 to 13,500 plants.

=====

U.S. EIA Predicts Increased Wood, Waste Biomass Consumption:

Biomass Magazine, by Erin Voegelé, January 10, 2014

<http://www.biomassmagazine.com/articles/9889/u-s-eia-predicts-increased-wood-waste-biomass-consumption>

The U.S. Energy Information Administration has published the January issue of its "Short-Term Energy Outlook," which provides its first 2015 forecasts for wood biomass and waste biomass energy production. Woody biomass is expected to be used to generate 120,000 megawatt hours per day of electricity across all sectors in 2014, increasing to 123,000 MWh per day in 2015. In 2013, woody biomass was used to generate an estimated 110,000 MWh per day of electricity. Waste biomass is expected to generate an average 56,000 MWh per day of electricity across all sectors in 2014 and 2015, up from 55,000 MWh per day in 2013.

=====

EIA Revises Wood, Waste Biomass Forecasts in Monthly Report:

Biomass Magazine, by Erin Voegelé, February 11, 2014

<http://www.biomassmagazine.com/articles/10005/eia-revises-wood-waste-biomass-forecasts-in-monthly-report>

The U.S. Energy Information Administration slightly revised its forecast for energy production from wood and waste biomass in the February issue of its "Short-Term Energy Outlook." The EIA predicts that across all sectors, wood biomass will be used to generate 119,000 megawatt hours of electricity per day in 2014, increasing to 122,000 MWh per day next year. These estimates are down slightly from the 120,000 MWh per day in 2014 and 123,000 MWh per day for 2015 forecast in the January STEO. The EIA has maintained its forecast that waste biomass will be used to generate 56,000 MWh per day of electricity across all sectors this year, and increased its forecast from 56,000 MWh per day to 57,000 MWh per day for 2015.

=====

Duke University Report Characterizes U.S. Biogas Potential:

Biomass Magazine, by Erin Voegelé, March 19, 2014

<http://www.biomassmagazine.com/articles/10154/duke-university-report-characterizes-u-s-biogas-potential>

A new report published by the Nicholas Institute for Environmental Policy Solutions at Duke University, "Biogas in the United States: An Assessment of Market Potential in a Carbon-Constrained Future," determined that biogas could supply as much as 5 percent of the total natural gas market in 2040, when U.S. consumption of natural gas is expected to reach nearly 30 trillion cubic feet. Enough biogas could be generated in 2040 to supply between 3 percent and 5 percent of the total natural gas market at prices of \$5-6 per MMBtu, with the largest source of biogas estimated to be thermal gasification of agriculture, forest residues and biomass. In the long run, the market share of biogas could reach as high as 30 percent.

=====

World Market for Biomass Power Plants to Increase 50% in Eight Years:

PRNewswire, April 3, 2014

<http://www.prnewswire.com/news-releases/biomass-to-energy-analyst-version---the-world-market-for-biomass-power-plants-20132014-253705501.html>

A new report from Research and Markets, "Biomass to Energy - The World Market for Biomass Power Plants 2013/2014," projects the market for biomass power plants to grow throughout the world in the years to come: 3,500 biomass power plants will be operational in 2020. This is a growth of almost 50 per cent in 8 years. The situation is similar for the installed capacities: they will increase from 37.5 GWel today to almost 55 GWel in 2020. The internationally increasing subsidization of renewable energies is the main reason for this growth.

=====

GEOTHERMAL

Geothermal's share of U.S. net electrical generation has stayed largely unchanged over the past decade and was 0.41% in 2013. While geothermal grew by 6.1% in 2013 over 2012 levels, the average annual growth rate for each of the five previous years was 1.2%.

If that latter growth rate is maintained for the near-term, **geothermal's share of net electrical generation will hold steady at about 0.41% for 2014, 2015, and 2016.** (In its latest "Short-Term Energy Outlook" released on April 8, 2014, EIA projects an increase of 2.7% for geothermal in 2015 compared to its 2013 level.)

Forecasts and Trends for Geothermal Noted by Other Sources:

More Than 450 Geothermal Power Projects Are Now Under Active Development Worldwide:

Pike Research, February 21, 2013

<http://www.pikeresearch.com/newsroom/more-than-450-geothermal-power-projects-are-now-under-active-development-worldwide>

Although geothermal power projects typically take many years to develop, the geothermal power industry is rapidly expanding beyond its traditional markets. Promising resources in emerging markets and innovative technology demonstration projects are helping to exploit untapped geographic potential. According to a new report, "Geothermal Power Projects," a total of 454 geothermal power projects are now under active development worldwide, with surface exploration already underway. Sixty-four countries have geothermal projects slated for development, compared to fewer than 30 countries just a few years ago, the study concludes. As of the first quarter of 2013, an estimated 18.5 gigawatts of geothermal power capacity is in the pipeline. Conventional geothermal (hydrothermal) power, represents 90 percent of the projects identified in the report. However, 252 megawatts of enhanced geothermal system capacity is currently under development across North America, Asia Pacific, Western Europe, and Eastern Europe.

=====

U.S. Geothermal Industry Experiences Continued Steady Growth in 2012 and Could See Capacity Double over Next 10 Years:

Geothermal Energy Association, February 26, 2013

<http://www.geo-energy.org/pressReleases/2013/GEA2013UpdateRelease.aspx>

A new report, the "2013 Annual GEA Industry Update," found that installed geothermal capacity in the United States grew by 5%, or 147.05 MW, since the last annual survey in March 2012. This considerable increase in capacity is part of a larger trend of steady geothermal growth over the past decade, and can be attributed to seven geothermal projects that came online in 2012. GEA also revised its last year's estimate of total installed capacity upward by 128 MW, bringing current installed U.S. geothermal capacity to 3,386 MW. California, the U.S. and world leader in geothermal, increased its installed capacity to 2,732.2 MW over the past year, while the nation's second leading geothermal state, Nevada, reached 517.5 MW. There are also 175 geothermal projects currently in development, equal to 5,150-5,523 MW of known geothermal resource. Of this number, 2,511-2,606 MW are potential capacity additions in the next decade.

=====

Geothermal Energy Is Underutilized:

EnergyManagerToday.com, by Linda Hardesty, May 3, 2013

http://www.energymanagertoday.com/geothermal-energy-is-underutilized-says-gea-091560/?utm_source=el&utm_campaign=homefeed&utm_medium=link

The Geothermal Energy Association says that geothermal power is being underutilized because federal tax credits, which tend to be modified every few years, are reaching their end dates. For geothermal plants with long lead times, the legislative uncertainty means the effects of the incentive are diminished. Nonetheless, 27 plants came online between 2006 and 2012 in seven Western states, bringing the total installed capacity in the US to 3.38 GW. These new geothermal power facilities are attributed to the extension of the federal production tax credit in 2005 to geothermal facilities, the ITC cash grant program, and the American Recovery and Reinvestment Act, coupled with growing state-level

recognition of the value of renewable portfolio standards. Today, geothermal power plants are currently online in eight states: Alaska, California, Hawaii, Idaho, Nevada, Oregon, Utah, and Wyoming. Additionally, 175 geothermal projects are currently in development, which could add about 2,500 MW to U.S. installed capacity in the next decade or so.

=====

EIA Predicts Geothermal Generation to Double to 42 billion kWh by 2030:

Geothermal Energy Association, May 23, 2013

http://www.eia.gov/forecasts/aeo/IF_all.cfm#taxpayer_relief

In its latest renewable energy generation forecast, the U.S. Energy Information Administration projects geothermal power generation in the U.S. to double or more than double its kWh production by 2030. EIA provides both a base case and a tax credit added case. Geothermal energy's numbers are projected to reach output heights at about 25 billion kWh by 2020 and to nearly double to ~42 billion kWh by 2030 in its reference case forecast, which assumes the expiration of the production tax credit for geothermal. Additionally, EIA estimates that net summer capacity of geothermal will reach 5.7 GW by 2030 and 7.46 GW by 2040, a rate of growth at 4% per year.

=====

North America and Asia Pacific Lead the Market for Geothermal Power:

Navigant Research, June 7, 2013

<http://www.navigantresearch.com/newsroom/north-america-and-asia-pacific-lead-the-market-for-geothermal-power-with-a-combined-56-projects-in-final-stages-of-development>

According to a recent report, "Geothermal Power Projects," North America and Asia Pacific lead the world in terms of geothermal power projects in the final stages of development, with 56 reported projects in either active drilling or construction stages. Nearly all of these projects are in the United States, the Philippines, and Indonesia, the top three countries in installed geothermal power production capacity globally. More than 4 gigawatts of geothermal power capacity are expected to come online worldwide between 2013 and 2018. Although North America leads all regions with the largest number of projects in the pipeline, Asia Pacific has the most reported capacity under development.

=====

The Status of Global Geothermal Power Development:

GreenTechMedia.com, by Alexander Richter, September 27, 2013

<http://www.greentechmedia.com/articles/read/the-status-of-global-geothermal-power-development>

There are 806 geothermal power projects in development around the world with a combined capacity of 23,313 megawatts, with the majority located in Asia, North America and Africa. Looking at overall projects in development, Asia is by far the most active, with a combined planned capacity of around 10,100 megawatts. The majority of these projects can be found in Indonesia, followed by the Philippines and Japan. North America follows with around 6,340 megawatts in development, mostly in the U.S. Indonesia is the leading country, with more than 8,000 megawatts of projects in development. It is followed by the U.S. with around 6,100 MW in development. If all projects were to come on-line, America would still remain the top country, with Indonesia coming in a close second.

=====

Geothermal Industry Has Potential for Significant Increased Capacity in the U.S.:

Geothermal Energy Association, by Leslie Blodgett, January 29, 2014

<http://www.renewableenergyworld.com/rea/blog/post/2014/01/geothermal-visual-geothermal-has-potential-for-significant-increased-capacity-in-the-us>

A 2008 U.S. Geological Survey study that assessed the electric power generation potential of conventional geothermal resources (194°F and greater) and found potential for a much greater role for geothermal in the United States. With an average estimate of 5,404 MW, California has the highest identified resource, nearly double the state's current installed capacity of around 2,700 MW. In total, USGS found between 3,675 MW (95 percent likelihood) and 16,457 MW (5 percent) of identified moderate- to high-temperature geothermal resources. The number rose to between 7,917 MW and 73,286 MW when factoring in undiscovered resources. The current installed capacity of geothermal power in the U.S. is around 3,400 MW.

=====

WIND

Wind energy's share of net electrical generation was 4.13% in 2013. For the period 2007-2013, the amount of wind-generated electricity has grown each year by an average of 22,203 Thousand MWh. For the next several years, similar annual additions seem reasonable to assume (perhaps less in 2014 due to the temporary lapse in the wind production tax credit [PTC] but more in 2015 and 2016 - the American Wind Energy Association reports that 12,000 MW of new wind projects are presently in the pipeline: an amount equal to 20% of the current capacity).

If so, then wind's share of net electrical generation would increase to 4.64% in 2014, 5.13% in 2015, and 5.62% in 2016. However, to reflect the impact of the temporary lapse in the PTC last year, SUN DAY has moderately dropped its projections for [wind's share to 4.50% in 2014, 5.00% in 2015, and 5.50% in 2016](#). (In its most recent "Short-Term Energy Outlook" released on April 8, 2014, EIA projects electricity from wind to reach 4.5% by 2015.)

Forecasts and Trends for Wind Noted by Other Sources:

Texas Poised to Double Wind Energy Output:

KVUE News, by Angela Kocherga, February 15, 2013

<http://www.kvue.com/news/Wind-farms-in-Texas-191499131.html>

Giant wind turbines now dot the Texas horizon in a region known for oil and gas. In Pecos County alone, there are six massive wind farms. The big challenge: getting all the wind energy produced out here in far West Texas to the big cities that need the power. So the state is laying thousands of miles of transmission lines to get the job done. Construction is supposed to be completed by the end of the year. The \$6.8 billion the state is spending on new transmission lines will double the capacity to deliver wind power to Texas cities. That growth will also allow rural towns in West Texas to escape the boom and bust cycle of oil and gas.

=====

Iowa and South Dakota Approach 25 Percent Electricity from Wind in 2012:

Earth Policy Institute, by J. Matthew Roney, March 14, 2013

http://www.earth-policy.org/data_highlights/2013/highlights37

In 2012, both Iowa and South Dakota generated close to one quarter of their electricity from wind farms. Wind power accounted for at least 10 percent of electricity generation in seven other states. Texas, the U.S. leader in overall wind development, saw its wind power capacity grow to 12,200 megawatts in 2012, an increase of 18 percent over 2011. Only four countries outside the United States have more installed wind capacity than the state of Texas. The United States now has 60,000 megawatts of wind online, enough to meet the electricity needs of more than 14 million homes. A record 13,000 megawatts of wind generating capacity was added to the country's energy portfolio in 2012, more than any other electricity-generating technology. Wind developers installed close to two thirds of the new wind capacity in the final quarter of the year. Nearly 60 wind projects, totaling over 5,000 megawatts, came online in December alone.

=====

Firms to More Than Double Texas Region's Wind Power Capacity:

Amarillo Globe-News, by Kevin Welch, March 16, 2013

<http://amarillo.com/news/local-news/2013-03-16/wind-energy-takes>

Several wind power developers have started filing applications to invest a combined amount of at least \$3.3 billion in the Texas Panhandle in the next two years. Under agreements filed with the Public Utility Commission of Texas, developers have committed to add 1,644 megawatts of wind power capacity to the region's current capacity of about 1,500 MW. Cross Texas Transmission and Sharyland Utilities are approaching the end of construction of transmission lines that will take locally produced electricity to places like Dallas, Austin, San Antonio and Houston. That has lit the fuse, and wind farm developers and the transmission companies have begun filing agreements with the Public Utility Commission of Texas making some of their formerly closely guarded commitments public.

=====

Small Wind Power Annual Installations Will Double in Capacity by 2018:

Navigant Research, March 21, 2013

<http://www.navigantresearch.com/newsroom/small-wind-power-annual-installations-will-double-in-capacity-by-2018>

According to a new report, "Small Wind Power, annual global installations of SWTs will roughly double in the next five years, growing from 86 megawatts in 2012 to 172 MW in 2018 and representing \$3.3 billion in revenues. The small wind turbine (SWT) industry is maturing, signaled by the expanded role of SWT certification, the existence of hundreds of manufacturers located around the world, the expansion of dealer networks, and the growing number of national and regional industry associations. The number of applications is also growing, including applications in telecommunications, defense, and other sectors that involve producing power in remote locations. At the same time, small wind faces a strong challenge from the solar photovoltaic (PV) sector, which has seen dramatic price drops for solar PV modules over the past few years as well as the emergence of innovative business

models – including leasing programs and third party financing models – that have yet to be made available to the vast majority of small wind customers.

=====

Small Wind Power Systems Will Surpass \$700 Million in Annual Revenue by 2018:

Navigant Research, June 20, 2013

<http://www.navigantresearch.com/newsroom/small-wind-power-systems-will-surpass-700-million-in-annual-revenue-by-2018>

Although the market for small wind power systems has been in existence for 30 years, there are many signs that the industry is reaching a critical juncture. The past 18 months have seen a number of bankruptcies and acquisitions among small wind turbine manufacturers. Nevertheless, the overall opportunity for small wind power remains strong across a variety of applications in both developed and developing countries. According to a recent report, “Small Wind Power,” the worldwide market for small wind systems will reach \$723 million by 2018, with \$3.3 billion in cumulative sales from 2013 through 2018. Common in parts of Europe, community wind (i.e., wind generation assets that are owned by a group of local people) is now emerging in rural, windy areas of the United States – particularly Minnesota and Iowa – as a vehicle for economic development, the study concludes.

=====

4,000 MW of New Wind Capacity in the Pipeline... and Counting:

American Wind Energy Association, by Carl Levesque & Emily Williams, July 25, 2013

<http://aweablog.org/blog/post/4000-mw-and-counting-xcel-energy-punctuates-busy-first-half-of-2013-for-rfps-contracts>

Xcel Energy now has new power purchase agreements for wind energy projects that will bring approximately 1,850 MW online—likely the most wind megawatts ever inked by a utility in a single year. In addition, Austin Energy announced it had secured 570 MW of wind, after issuing an initial RFP that called for only 200 MW. Furthermore, after issuing an RFP for between 80 and 200 MW in February, AEP’s Indiana Michigan Power secured a 200-MW contract for the generation coming from EDP Renewables’ Headwater Wind Farm in the Hoosier State. And PacifiCorp’s Rocky Mountain Power has asked the Utah Public Service Commission to approve 300 MW of wind energy contracts. Meanwhile, RFPs are outstanding for other utilities. In total, utility plans for more wind, as announced just in the first six-plus months of the year, total almost 4,000 MW.

=====

IEA Says 18% of World's Electricity Could Come from Wind in 2050:

Bloomberg BusinessWeek, by Alex Morales, October 21, 2013

<http://www.businessweek.com/news/2013-10-21/wind-may-generate-18-percent-of-world-electricity-in-2050-iea-says>

Wind power may multiply more than six-fold to generate as much as 18 percent of the world’s electricity in 2050, the International Energy Agency said, raising an earlier estimate by half. Spending on new wind farms would need to ramp up to about \$150 billion a year from \$78 billion last year to achieve the necessary level of installed capacity. As much as 10 times the current capacity of almost 300 gigawatts is needed. The IEA estimated in 2009 that wind power may provide 12 percent of global

power in 2050. It cited improvements in wind technology and the “changing global energy context” for today’s upward revision. Wind turbines currently provide about 2.6 percent of global electricity.

=====

Small Wind Power Market to Reach \$3 Billion by 2020, with China in the Lead:

North America Clean Energy, November 25, 2013

<http://www.nacleanenergy.com/articles/17175/small-wind-power-market-to-reach-3-billion-by-2020-with-china-in-the-lead>

The small-wind power market is expected to increase massively, from \$609 million in 2012 to \$3 billion by 2020, at a Compound Annual Growth Rate of 22%, says research and consulting firm GlobalData. According to the company’s latest report, "Small Wind Turbines up to 100kW, 2013 Update," the global small-wind turbine cumulative installed capacity is also expected to witness a significant increase from 728.3 Megawatts in 2012 to 4,644.7 MW by 2020, at a CAGR of 26.1%. China, the US and UK contributed to more than 80% of the global small-wind power installed capacity in 2012, with 266 MW, 216 MW and 118 MW, respectively.

=====

PTC Deadline, Utility Solicitations Driving 2014 Wind-Sector Activity:

Platts/The Barrel blog, by Peter Maloney, December 26, 2013

<http://blogs.platts.com/2013/12/26/ptc-expire>

Activity in the wind-energy industry picked up in the third quarter of 2013, and the development pipeline is going to carry on into 2014 and likely even into 2015. As of September 30, 1,116 MW of wind projects had entered construction, bringing the total amount of wind capacity under construction to 2,316 MW. Looking a little further out, Platts data—current up to early December—shows 3,900 MW of wind projects under construction with 66,838 MW in development. If even only a fraction of those projects reach completion, it would be enough to beat the 2012 high water mark of 13,123 MW in both 2014 and 2015. The sector's production boost late in the year was prompted by the deadline for the wind-energy production tax credit as well as an increase in utility solicitations.

=====

American Wind Power Sees Unprecedented Growth Entering 2014:

American Wind Energy Association, January 30, 2014

<http://www.awea.org/MediaCenter/pressrelease.aspx?ItemNumber=6044>

At the end of 2013 there were more U.S. wind power megawatts under construction than ever in history: Over 12,000 MW of new generating capacity was under construction, with a record-breaking 10,900 MW starting construction activity during the fourth quarter. The wind projects under construction could power the equivalent of 3.5 million American homes, or all the households in Iowa, Oklahoma and Kansas. Further, there are now over 5,600 MW of turbine orders placed and a record number of long-term power purchase agreements were signed in 2013. At least 60 PPAs for nearly 8,000 MW were signed by utilities and corporate purchasers, of which 5,200 MW have not yet started construction.

Report Says Wind Industry Responded Strongly to Additional PTC Eligibility Guidance:

North American Windpower, by Luke Lewandowski & Dan Shreve, February 20, 2014

http://www.nawindpower.com/e107_plugins/content/content.php?content.12639

About 19 gigawatts of U.S. wind projects in active development can be attributed directly to the Internal Revenue Service's guidance for wind-energy Production Tax Credit eligibility, according to a report by MAKE Consulting. Developers in the U.S. have started construction on 13 GW of wind projects and have contracted 7 GW of firm turbine orders through the end of January 2014. However, only about 16.4 GW of the projects may be realized by 2014 to 2016 since over 7 GW of the projects are facing execution challenges after applying for PTC eligibility with no off-take agreements, MAKE Consulting noted.

=====

Global Wind Power Market Poised for a Comeback After 'Disappointing' 2013:

North American Wind Power, March 7, 2014

http://www.nawindpower.com/e107_plugins/content/content.php?content.12697

MAKE Consulting says 2013 was a challenging year, with a meager addition of 34.5GW of grid-connected wind capacity worldwide - a decline of 26% compared to 2012. However, the company projects that the global wind power market will add 51GW on average from 2014 to 2017 as many traditional markets fulfill expiring policy mechanisms. Furthermore, the company says the market will grow 5% on average annually from 2018 to 2023. The U.S. market - which was one of the primary influencers for low global demand last year - will recover and make 2014 a record year for wind power growth. The report notes that the U.S. accounted for 23% of firm turbine order volume in the fourth quarter of 2013 as developers complied with expiring incentives.

=====

MAKE Expects North American Wind Market to Grow 207% This Year:

North American Wind Power, April 9, 2014

http://www.nawindpower.com/e107_plugins/content/content.php?content.12832

The North American wind market grow 207% year-over-year, according to a new report from MAKE Consulting. Specifically, the region added 2.7 GW last year and is slated to install 8.3 GW this year. In addition, North America is expected to install 58.6 GW through 2023 - 30% of which is expected from 2014 to 2016 on account of an anticipated production tax credit extension in the U.S. this year and provincial feed-in tariffs and procurements in Canada. Beyond 2016, MAKE expects two more growth cycles from 2018 to 2020 and from 2021 to 2023, which will largely track state renewable energy standard targets and fossil fuel capacity retirements in the U.S. With an expected CAGR of 17.1% from 2013 to 2023, the U.S. will remain the dominant market in North America.

=====

Global Wind Power Market Poised to Rebound This Year, Install at Least 47 GW:

North American Wind Power, April 9, 2014

http://www.nawindpower.com/e107_plugins/content/content.php?content.12828

The Global Wind Energy Council says it expects new global wind installations to reach at least 47 GW this year, a dramatic increase over 2013 levels. According to a new report from the group, China will

lead the market, but there will also be a strong recovery in the U.S. sector, record installations in Canada and Brazil, and hundreds of megawatts in South Africa. However, GWEC cautions that without a strong global climate policy, the market is unlikely to return to the 20-25% or more average growth that has characterized most of the last two decades.

=====

SOLAR THERMAL + PHOTOVOLTAICS (PV)

Solar's share of net electrical generation in 2013 was small - about 0.23% - although this figure does not reflect electricity generated by distributed PV systems not connected to the grid. However, solar grew by 50% from 2010 to 2011 and then by 138% the following year, and by 114% this past year. A continued annual doubling of solar-electric generation for next couple of years appears to be possible (maybe even conservative in light of the number of solar photovoltaic and solar thermal projects slated to come on line in 2014 and 2015). Thereafter, a more conservative assumption is that solar continues to grow in increments comparable to that now being experienced by wind (i.e., ~20,000 Thousand MWh per year) beginning in 2016.

If so, **solar grows from 0.23% in 2013 to 0.45% in 2014, 0.90% in 2015, and 1.37% in 2016.** (In its most recent "Short-Term Energy Outlook" released on April 8, 2015, EIA projects solar to account for 0.5% of utility-scale generation in 2015.)

Forecasts and Trends for Solar Noted by Other Sources:

New Report Says Local Solar Could Power 10% of Country in 10 Years:

Institute for Local Self-Reliance, by John Farrell, January 2, 2013

<http://www.ilsr.org/utility-ready-report-local-solar-power-10-country-10-years>

According to a new report, "Commercial Rooftop Revolution," within a decade, more than 35 million buildings may be generating their own solar electricity (without subsidies) at prices lower than their utility offers, sufficient to power almost 10% of the country. A solar revolution that has been largely confined to states with generous sunshine (California) or high electricity prices (New Jersey) or both (Hawaii) will spread rapidly in the coming years. Utilities in unexpected states like Tennessee, Wisconsin, and Nebraska will face enormous competition from inexpensive rooftop solar power by 2022. In Minnesota, for example, the state's largest utility expects just 20 megawatts of new solar power in the next 13 years. But, according to the study, within 10 years, "unsubsidized solar electricity will be so inexpensive that 200 times more solar (over 4,000 megawatts) could be installed on the rooftops of Minnesota homes and businesses, providing lower cost electricity than from the utility."

=====

Frost & Sullivan Finds Affordability of Solar Photovoltaic Systems Accelerate their Uptake:

PRNewswire, January 15, 2013

<http://www.prnewswire.com/news-releases/affordability-of-solar-photovoltaic-systems-accelerate-their-uptake-finds-frost--sullivan-186922991.html>

Solar photovoltaics will hold its spot as the fastest growing technology in the U.S. energy industry for the next four years. The prices of solar modules have been in a free fall since 2008, accelerating PV systems' commercialization, while encouraging the development of new financing models for the residential sector. Prices decreased by almost 50.0 percent since 2008. Prices will continue to decline – albeit, at a lower rate – in the next four years, due to economies of scale and technological improvements, making solar energy more affordable to residential customers. New analysis from Frost & Sullivan's Analysis of the U.S. Residential Solar Power Market research finds that the market earned revenues of more than \$1.73 billion in 2011 and estimates this to reach \$3.04 billion in 2016. The cumulative PV solar installations in the United States reached 4,450, which generated 1,855 megawatts of solar power in 2011. The residential segment accounted for 15.2 percent, or 282 MW, of the annual installations during 2011, and is projected to grow at a compound annual growth rate of 11.9 percent from 2011 to 2016.

=====

Shell Sees Solar as Biggest Energy Source After Exiting It:

Bloomberg.com, by Eduard Gismatullin & Sally Bakewell, February 28, 2013

<http://www.bloomberg.com/news/2013-02-28/shell-sees-solar-as-biggest-energy-source-after-exiting-industry.html>

Royal Dutch Shell Plc says solar power, a business it abandoned four years ago, may expand into the world's biggest source of energy in the next half century. The proposition that photovoltaic panels will be the main power source by 2070 is one of the "New Lens Scenarios" Europe's largest oil company published in a report on energy demand this century. A second has natural gas as the main fuel by 2030. Both come with risks to energy producers and the climate. Shell's solar estimate, which assumes higher energy prices, follows an industry boom that saw capacity grow to about 102 gigawatts in 2012. That compares with a figure of 1 gigawatt in 2000. Lower costs and state support will boost solar to about 600 gigawatts in 2035, or more than 2 percent of power generation, according to the International Energy Agency.

=====

Cumulative PV Demand Could Double Again by 2015:

SolarBuzz.com, by Michael Barker, March 15, 2013

<http://www.solarbuzz.com/resources/blog/2013/03/reaching-new-heights-cumulative-pv-demand-to-double-again-by-2015>

Cumulative end-market PV demand in 2012 set a new record in terms of annual installed capacity. Moreover, demand levels in 2012 were high enough to continue the recent trend that has seen cumulative demand doubling every two years. It took more than 30 years for global cumulative demand to reach 2 GW but only four to surpass 4 GW in 2004. Since then, the industry has seen cumulative demand doubling every two years up to and including last year. Annual growth rates have been declining, however, and the next doubling of cumulative demand is anticipated to take slightly longer at three (rather than two) years, under current policy and installed pricing conditions. However, given the volatile nature of the PV industry, the market could double once again in both 2014 and in 2016, and exceed 450 GW of cumulative installed capacity by 2017.

=====

220 Gigawatts of New Distributed Solar Generation Will be Added by 2018:

Navigant Research, April 17, 2013

<http://www.navigantresearch.com/newsroom/220-gigawatts-of-new-distributed-solar-generation-will-be-added-by-2018>

The global electric power industry is evolving from a financial and engineering model that relies on large centralized power plants owned by utilities to one that is more diverse, in terms of both the sources of generation and the ownership of the generation assets. Distributed solar photovoltaic systems offer the benefit of producing electricity onsite, thereby reducing the need to build new transmission capacity and avoiding line losses. According to a new report, "Distributed Solar Energy Generation," 220 gigawatts of distributed solar PV capacity will be installed between 2013 and 2018, representing \$540 billion in revenue during this time. Even as distributed solar technologies have become more cost-effective, many governments are reining in popular feed-in tariffs in leading markets. The industry is fully aware that lucrative financial incentives will not be around forever. As a result, many companies are looking at 2017 (the year after solar PV investment tax credits expire in the United States) as the year that solar PV will be able to stand on its own, without government support.

=====

Solar's Great Recovery - Photovoltaics to Reach \$155 Billion Market in 2018:

Lux Research, May 21, 2013

<http://www.luxresearchinc.com/news-and-events/press-releases/171.html>

The solar crisis will become a boon, as record low prices boost demand, according to a new study, "Market Size Update 2013: Return to Equilibrium." The solar photovoltaic market is poised to rise from the ashes of its 2011 crisis to grow to \$155 billion in 2018, as market forces engineer a turnaround to a healthy 10.5% compound annual growth rate. In the most likely scenario, the PV market will grow at a modest clip to 35 GW in 2013 before rapidly ramping up to 61.7 GW in 2018 – with China emerging as the largest market. With an 18% CAGR to 10.8 GW of installations in 2018, the United States will emerge the world's second-largest market. Utility-scale solar, the smallest segment in 2012 at 8.6 GW, will grow the fastest to 19.9 GW in 2018 as developing markets turn to PV. Globally, commercial applications reign supreme as markets like the U.S. and Japan move to large rooftop installations.

=====

Worldwide Solar PV Market Will Surpass \$134 Billion in Annual Revenue by 2020:

Navigant Research, July 10, 2013

<http://www.navigantresearch.com/newsroom/worldwide-solar-pv-market-will-surpass-134-billion-in-annual-revenue-by-2020>

According to a new report, "Solar PV Market Forecasts," annual worldwide revenues from solar PV installations will surpass \$134 billion by 2020. Financial incentives, government renewable energy deployment targets, and technology cost reduction are still the most important drivers of the solar PV market. In most cases, these renewable energy deployment and cost reduction targets will be met or exceeded, with 438 GW of solar PV installed cumulatively between 2013 and 2020. Market activity is shifting from Europe to Asia Pacific and the United States, as these markets reach maturity and solar PV approaches grid parity in a growing number of regions. By the end of 2020, solar PV is expected to be cost-competitive with retail electricity prices, without subsidies, in a significant portion of the world.

=====

Distributed Solar Power Generation Will Reach \$112 Billion in Annual Revenue by 2018:

Navigant Research, July 25, 2013

<http://www.navigantresearch.com/newsroom/distributed-solar-power-generation-will-reach-112-billion-in-annual-revenue-by-2018>

Driven by feed-in tariffs and the commoditization of photovoltaic modules, along with innovative leasing programs for residential solar installations, distributed solar PV systems are expected to see double- and, in some countries, triple-digit growth over the next five years. Distributed solar power systems offer a number of advantages over large, centralized solar arrays: they reduce the need for new transmission capacity, they are scalable to meet the specific demand of the end user, they help reduce efficiency losses from transmission, and they are relatively quick to permit and install. According to a recent report, “Distributed Solar Energy Generation,” worldwide revenue from distributed solar power generation will reach \$112 billion annually by 2018.

=====

Solar Energy Could Supply One-Third of Power in U.S. West:

University of California-Berkeley, by Robert Sanders, August 1, 2013

<http://newscenter.berkeley.edu/2013/08/01/solar-energy-could-supply-one-third-of-power-in-u-s-west>

Researchers at the University of California, Berkeley have used a detailed computer model, called SWITCH, the West’s electric power grid to predict what will happen if the U.S. Department of Energy succeeds with its SunShot Initiative, which aims to make solar power more affordable and accessible to Americans. They found that achieving the SunShot target would allow solar photovoltaic technology to provide more than a third of electric power in the region by 2050, displacing natural gas, nuclear and carbon capture and sequestration technologies. SunShot is the DOE’s effort to work with industry, government and researchers to bring the price of solar power down to that of conventional power by 2020.

=====

Two-Thirds of All PV Capacity in Place Worldwide Has Been Installed since January 2011:

GTM Research, by Stephen Lacey, August 13, 2013

<http://www.greentechmedia.com/articles/read/chart-2-3rds-of-global-solar-pv-has-been-connected-in-the-last-2.5-years>

Two-thirds of all solar PV capacity in place worldwide has been installed since January 2011. To put that into perspective, it took nearly four decades to install 50 gigawatts of PV capacity worldwide. But in the last 2 1/2 years, the industry jumped from 50 gigawatts of PV capacity to just over 100 gigawatts. At the same time, global module prices have fallen 62 percent since January 2011. Even more amazingly, the solar industry is on track to install another 100 gigawatts worldwide by 2015 -- nearly doubling solar capacity in the next 2 1/2 years. The U.S. distributed solar market is on pretty much the same growth trajectory. More than two-thirds of America’s distributed PV (everything except for utility-scale projects) has been installed since January 2011. And by 2015, the country’s distributed PV market is expected to jump by more than 200 percent.

=====

A Solar System Is Installed in the U.S. Every Four Minutes:

Green Tech Media, by Stephen Lacey, August 19, 2013

<http://www.greentechmedia.com/articles/read/america-installs-a-solar-system-every-four-minutes>

According to figures from GTM Research, the U.S. is now installing one solar photovoltaic system every four minutes as well. If market growth continues at its current pace, the American solar industry could be installing a system every minute and twenty seconds by 2016. That's a dramatic difference from 2006, when installers were only putting up one system every 80 minutes. Two-thirds of all distributed solar in the U.S. has been installed over the last 2 1/2 years. And by 2016, cumulative installations of distributed PV will double. That means the U.S. will hit 1 million cumulative residential solar installations by then -- making the market in 2016 ten times larger than it was in 2010.

=====

Solar 'Is Going to Overtake Everything':

Green Tech Media, by Herman K. Trabish, August 21, 2013

<http://www.greentechmedia.com/articles/read/ferc-chair-wellinghoff-sees-a-solar-future-and-a-utility-of-the-future>

According to GTM Research, in the next 2 1/2 years the U.S. will double its entire cumulative capacity of distributed solar -- repeating in the span of a few short years what it originally took four decades to deploy. Thereafter, it could double every two years. Consequently, according to Jon Wellinghoff, chairman of the Federal Energy Regulatory Commission, "solar is growing so fast it is going to overtake everything. Geothermal, wind, and other resources will supplement solar; but at its present growth rate, solar will overtake wind in about ten years. It is going to be the dominant player." And those other resources have not seen declining prices like solar has. "Solar PV is \$0.70 or \$0.80 per watt to manufacture. Residential rooftop is \$4 to \$5 per watt. But they are going to drive that down to \$2 and then to \$1 per watt." Advanced storage technologies also promise lower costs, he said.

=====

How Soon Will the U.S. Surpass Germany in Solar Investments?

Energy Manager Today, by Kristina Ross, August 26, 2013

http://www.energymanagertoday.com/how-soon-will-the-us-surpass-germany-in-solar-investments-094845/?utm_source=el&utm_campaign=homefeed&utm_medium=link

The U.S. reported a record number of solar installations in 2012, which added 3,313 megawatts of energy to the grid. In total, the United States now has more than 8,500 MW of installed solar capacity, or enough to power 1.3 million homes. An additional 4,400 MW worth of solar panels is expected to come online in 2013. It's certainly short of Germany's 34,000 MW capacity, but with continued investments in solar in the U.S. and the decline of solar companies in Germany, it's possible that the country could surpass Germany's solar capacity in just six years, even if investments in solar energy remain the same in the U.S.

=====

Solar Panels Beginning to Become a Standard Amenity in New Homes:

Bloomberg, by Justin Doom, September 11, 2013

<http://mobile.bloomberg.com/news/2013-09-10/solar-panel-is-next-granite-countertop-for-homebuilders.html>

Solar panels are an amenity for new homes that's becoming a standard option for buyers in U.S. markets. At least six of 10 largest U.S. homebuilders led by KB Home include the photovoltaic devices in new construction. Two California towns are mandating installations, and demand for the systems that generate electricity at home will jump 56 percent nationwide this year. Lashing panels to roofs during construction is about 20 percent cheaper than after a house is built. A 3-kilowatt system, enough to power a typical mid-size home, costs less than \$15,000 and can be rolled into a mortgage. About 494 megawatts of panels were installed atop new and existing U.S. homes in 2012, according to the solar trade group. That figure is expected to swell to 770 megawatts this year as prices continue to slide and may reach 2,175 megawatts in 2016.

=====

Annual Worldwide Solar PV Installations Will Double by 2020:

Navigant Research, November 8, 2013

<http://www.navigantresearch.com/newsroom/annual-worldwide-solar-pv-installations-will-double-by-2020>

The solar photovoltaic market continues to grow as PV technology costs have steadily declined and pathways to further cost reduction are being pursued. By the end of this decade, solar PV is expected to be cost competitive – even without subsidies – with retail electricity prices in a significant portion of the world. According to a recent report, “Solar PV Market Forecasts,” annual installations of new solar PV capacity will more than double, in terms of capacity, by 2020, growing from 35.9 gigawatts in 2013 to 73.4 GW in 2020. Distributed systems will account for less than half of all installations in 2014, and non-distributed systems will represent more than half of the market through 2020.

=====

Photovoltaic Materials Market Will Grow 9% Annually Through 2018:

Lux Research, November 19, 2013

<http://www.luxresearchinc.com/news-and-events/press-releases/210.html>

Massive oversupply and downward price pressure have created the misconception that the solar industry suffered from industry-wide commoditization. Even though commoditization afflicts much of the solar industry, innovations can yield double-digit profit margins in high-performance encapsulants, backsheets and metallization according to the new report “Photovoltaic Materials Opportunities Beyond Commoditization.” But not all solar modules are created equal, and profit margins can rise to double-digits for select enabling materials – even as overall materials sales volumes grow at a compound annual growth rate (CAGR) of 9.2% through 2018.

=====

Megawatt-Scale Solar PV Operations and Maintenance Market to Reach 146 GW by 2017:

GLOBE NEWSWIRE, November 25, 2013

<http://www.energybiz.com/article/13/11/megawatt-scale-solar-pv-operations-and-maintenance-market-reach-146-gw->

2017?utm_source=2013_11_26&utm_medium=eNL&utm_campaign=EB_DAILY&utm_content=108834

According to GTM Research's new report, "Megawatt-Scale PV Plant Operations & Maintenance: Services, Markets and Competitors 2013-2017," O&M is a market that will triple its current size by 2017. Europe currently leads the space but Asia-Pacific markets will drive installations over the next four years bringing the worldwide total to 146 gigawatts. While the United States ranks sixth in terms of current megawatt-scale installations, the top three providers (First Solar, SunEdison, and SunPower) all primarily service the United States. Beyond the fast growth of the utility-scale PV industry in North America, the O&M market is more concentrated in the U.S., while it appears highly fragmented in European markets such as Germany and Italy.

=====

Concentrated PV Solar Set to Boom:

PV Magazine, December 10, 2013

http://www.pv-magazine.com/news/details/beitrag/concentrated-pv-solar-set-to-boom_100013699/#axzz2n5Trnrcv

The global market for concentrated photovoltaic (CPV) systems is entering a phase of explosive growth, with worldwide installations set to boom by 750 percent from 2013 to the end of 2020. CPV installations are projected to rise to 1,362 megawatts in 2020, up from 160 megawatts in 2013, according to the new report entitled "Concentrated PV (CPV) Report – 2013" from IHS Inc. Installations are forecast to expand at double-digit percentages every year through 2020. Average installed pricing for high-concentration PV systems are estimated to have decreased to \$2.62 per watt in 2013, down 25.8 percent from \$3.54 per watt in 2012. Prices will slide further at an annual compound rate of 15 percent from 2012 to 2017, IHS forecasts, falling to \$1.59 by the end of 2017.

=====

Global Solar Installations to Reach Approximately 43 GW in 2014:

North American Clean Energy, December 19, 2013

<http://www.nacleanenergy.com/articles/17267/global-solar-installations-to-reach-approximately-43-gw-in-2014>

Global solar installations are forecast to be in the 43 GW range in 2014, according to a new update by Mercom Capital Group, LLC. With China revising its solar installation goals to 12 GW in 2014 and 35 GW by 2015, Mercom expects installations to total roughly 10.5 GW in 2014. The U.S. is the other top solar market forecast to grow steadily over the long term with installations forecast to reach approximately 6 GW in 2014, as its solar market continues on a course of strong. Utility-scale projects and distributed generation through third party-financed residential installations have been the catalysts of growth. Third party-owned (solar lease) residential installations have been garnering most of the headlines over the last 12 months, raising over \$3 billion in solar lease funds so far this year to finance installations.

=====

Strong Growth Forecast for Solar PV Industry in 2014 with Demand Reaching 49 GW:

NPD Solarbuzz, December 23, 2013.

<http://www.solarbuzz.com/news/recent-findings/strong-growth-forecast-solar-pv-industry-2014-demand-reaching-49-gw>

Solar photovoltaic demand is poised for explosive growth in 2014, and is set to reach 49 gigawatts, up from 36 GW in 2013, according to findings in the latest "NPD Solarbuzz Quarterly." Q4'13 will be another record quarter for the solar PV industry, exceeding the 12 GW barrier for the first time ever. Furthermore, demand in Q1'14 will also achieve record-breaking status, as the strongest first-quarter ever seen by the PV industry. Over the six-month period from October 2013 to March 2014, the solar PV industry will install almost 22 GW, which is greater than all the solar PV installations that occurred between 2005 and 2009. This 22 GW of demand is equivalent to 120 megawatts (MW) of solar PV installed every day for six months, and equates to one new 5 MW solar farm being completed every hour of the day.

=====

Solar Farms Up to Five Megawatts in Size Drive 95 GW Project Pipeline in Leading PV Countries:

NPD Solarbuzz, February 18, 2014

<http://www.solarbuzz.com/news/recent-findings/solar-farms-five-megawatts-size-drive-95-gw-project-pipeline-leading-pv-countri>

Solar photovoltaic projects between 250 kilowatts and five megawatts now account for almost half of the yet-to-be-completed 4,300 commercial and utility projects within the leading PV countries, according to the new "Global Deal Tracker" report. The total project pipeline for the leading solar PV countries has reached almost 95 gigawatts, with the largest projects, in excess of 50 MW, making up 68% of the total capacity on offer, although there are currently less than 500 such projects in the pipeline. China, Japan, and the United States are expected to drive new solar PV capacity deployment over the next five years. Currently, these three leading countries offer a pipeline of more than 3,600 PV projects of greater than 250 kW, which is equivalent to a total capacity of 65 GW.

=====

Solar Installations Set to Hit Record 45 GW This Year:

BusinessGreen.com, February 27 2014

<http://www.businessgreen.com/bg/news/2331172/bloomberg-solar-installations-set-to-hit-record-45gw-this-year>

According to figures from a Bloomberg survey of nine analysts and companies, solar developers are expected to install a record 44.5GW of capacity this year, equating to an almost 21 per cent year-on-year increase. State support for solar PV projects in China has helped drive down installation costs and accelerate growth across the industry. Buoyant markets in Japan and the U.S., which are expected to install 10.5GW and 5.3GW of capacity respectively in 2014, have also helped offset lower installation numbers in Europe. The NYSE Bloomberg Global Solar Energy Index has jumped more than 70 per cent in the past year, with several stocks more than tripling in value.

=====

North and South America Solar Photovoltaic Market Set to Increase Ten-Fold by 2030:

AlternativeEnergyNewswire.com, March 3, 2014

<http://www.alternativeenergynewswire.com>

and

http://store.globaldata.com/market-reports/alternative-energy/north-and-south-america-solar-photovoltaic-market-outlook-to-2030-installed-capacity-market-size-risk-analysis-market-saturat?utm_source=email&utm_medium=pr&utm_campaign=gdenprq1&utm_nooverride=1

The North and South American solar photovoltaic installed capacity will increase more than tenfold over the coming years, climbing from 13.1 Gigawatts in 2013 to 138.8 GW by 2030, at a massive Compound Annual Growth Rate of 15%, says a new report from research and consulting firm GlobalData.

According to the report, the Americas' power generation from solar PV installations will also increase at an impressive rate, jumping from 21 Terawatt-hours in 2013 to 234 TWh by 2030.

=====

Morgan Stanley Says U.S. Could Have 129 GW of Commercial Solar by 2018:

CleanTechnica.com, March 7, 2014

http://cleantechnica.com/2014/03/07/morgan-stanley-us-129-gw-commercial-solar-2018/?utm_source=Cleantechnica+News&utm_campaign=37121805c5-

[RSS_EMAIL_CAMPAIGN&utm_medium=email&utm_term=0_b9b83ee7eb-37121805c5-331986949](http://cleantechnica.com/2014/03/07/morgan-stanley-us-129-gw-commercial-solar-2018/?utm_source=Cleantechnica+News&utm_campaign=37121805c5-)

The installed capacity of solar PV in North and South America will increase more than tenfold over the coming years, jumping from 13.1 Gigawatts in 2013 to 138.8-GW by 2030 – according to a new report from consulting firm GlobalData. However, according to Morgan Stanley analyst Timothy Radcliff, the U.S. commercial-scale solar market could be as large as 129-GW in 2018, assuming that the investment tax credit goes to 0% and utilities nationwide implement fixed charges on solar customers.

=====

Concentrated Photovoltaics Market to Triple by 2020:

GlobalData, March xx, 2014

http://store.globaldata.com/market-reports/alternative-energy/concentrated-photovoltaics-cpv-2014-update-global-market-size-competitive-landscape-and-key-country-analysis-to-2020?utm_source=email&utm_medium=pr&utm_campaign=gdenprq1&utm_nooverride=1

According to a new report, the global concentrated photovoltaic market is expected to undergo a major growth spurt in the next five years, with its cumulative installed capacity forecast to jump from 357.9 Megawatts in 2014 to 1,043.96 MW by 2020. According to the report, China and the U.S. dominated the global CPV market in 2013, with their cumulative installed capacity reaching shares of 35.4% and 33.3%, respectively. Spain stood third after the U.S. with 12.2%, followed by Portugal and Italy, with respected shares of 5.1% and 4.3%.

=====

Mercom Capital Forecasts 46-GW of Solar for 2014:

Solar Industry Magazine, March 20, 2014

http://www.solarindustrymagazine.com/e107_plugins/content/content.php?content.13929

Demand outlook for the solar industry remains strong, and global solar installations are forecast to be around 46 GW this year, according to the latest quarterly update from Mercom Capital Group LLC. Global installations for 2013 are estimated to come in at about 37 GW, in line with Mercom's forecast.

The U.S. solar market is expected to install 6.4 GW this year, spurred by utility-scale projects and an energetic residential sector. Solar leasing has been the big driver of residential installations with third-party finance companies raising \$3.3 billion in residential and commercial tax equity funds in 2013. System costs in the U.S. are still high compared to Germany, but innovative financial instruments, including asset-backed securities, third-party finance and yieldcos, are helping bring the cost of capital down. Trade disputes, however, continue to be an issue.

=====

Solar PV Industry Targets 100 GW Annual Deployment in 2018:

NPD Solarbuzz, March 20, 2014

<http://www.solarbuzz.com/news/recent-findings/solar-pv-industry-targets-100-gw-annual-deployment-2018-according-npd-solarbuzz>

The solar photovoltaic industry is set for rapid growth over the next five years, with up to 100 gigawatts annual deployment being targeted in 2018, according to the latest edition of "Marketbuzz." This end-market growth is projected to increase annual PV module revenues, which are forecast to reach \$50 billion in 2018. About 300 GW of new solar PV will be installed in the next five years, as solar increases to 3% of total global power supply.

=====

Global Concentrated Photovoltaic Cumulative Installations to Achieve More than 1 Gigawatt Capacity by 2020:

BUSINESS WIRE, March 25, 2014

<http://www.businesswire.com/news/home/20140325005716/en>

According to a new study by Research and Markets, the global Concentrated Photovoltaic market is expected to undergo a major growth spurt in the next five years, with its cumulative installed capacity forecast to jump from 357.9 Megawatts in 2014 to 1,043.96 MW by 2020. China and the U.S. dominated the global CPV market in 2013, with their cumulative installed capacity reaching shares of 35.4% and 33.3%, respectively. Spain stood third after the US with 12.2%, followed by Portugal and Italy, with respected shares of 5.1% and 4.3%.

=====

Record-Breaking Demand for Global Solar PV Industry in Q1'14:

NPD Solarbuzz, April 2, 2014

<http://www.solarbuzz.com/news/recent-findings/record-breaking-demand-global-solar-pv-industry-according-npd-solarbuzz>

Globally, new solar photovoltaic demand added during Q1'14 exceeded 9 GW, which was 35% more than the previous first-quarter record, set last year. In fact, every quarter in 2014 is forecast to reach new highs, with trailing 12-month demand at the end of Q1'15 forecast to exceed 50 GW for the first time, according to findings in the latest "NPD Solarbuzz Quarterly" report. With Q1'14 now closed, the trailing 12-month demand suggests that the true size of the industry today is almost 40 GW. By the end of Q1'15, the PV industry will likely break through the pivotal 50 GW barrier within a 12-month period for the first time.

=====

RENEWABLES: 2017-2018

The preceding technology-by-technology analysis suggests that renewables could grow from 12.87% of net electrical generation in 2013 to 13.47% in 2014, 14.40% in 2015, and 15.31% in 2016.

While no assumptions on a technology-by-technology basis have been made for the period after 2016, it should be noted that the percentage of the nation's net electrical generation represented by renewable energy has expanded from 8.85% in 2004 to 12.87% in 2013-- that is, the percentage has widened, on average, by roughly 0.4% each year over the past decade (e.g., from 10.0% to 10.4% over a year's time). Given the mix of dropping costs, continued pressure by state RPSs, and the political desire to displace coal (as well as other fossil fuels and nuclear power) - particularly in light of climate change concerns, it seems reasonable to expect this past decade's pace of growth to at least continue for the near term.

Assuming a continued increase of 0.4% per year in renewable energy's share of net electrical generation, that would mean that the contribution from those sources would grow from 15.31% in 2016 to 15.71% in 2017 and 16.11% by 2018.

Forecasts and Trends for Renewable Energy Noted by Other Sources:

NREL Says Renewables Can Meet 80% of U.S. Generation in 2050:

Power Engineering, June 19, 2012

<http://www.power-eng.com/articles/2012/06/nrel-renewables-can-meet-80-percent-of-us-generation-in-2050.html>

A new report published by the National Renewable Energy Laboratory seeks to find the extent to which renewable energy supply can meet the electricity demands of the U.S. over the next several decades. The study explores the implications and challenges of very high renewable electricity generation levels—from 30 percent up to 90 percent, focusing on 80 percent, of all U.S. electricity generation from renewable technologies — in 2050. Amongst the findings, the report reveals that renewable electricity generation from technologies that are commercially available today, in combination with a more flexible electric system, are more than adequate to supply 80 percent of total U.S. electricity generation in 2050 while meeting electricity demand on an hourly basis in every region of the country.

=====

Hawaii Expected to Hit 15% Clean-Energy Goal by 2015:

American City Business Journals/Honolulu, by Duane Shimogawa, January 10, 2013

<http://www.bizjournals.com/pacific/news/2013/01/10/alm-hawaii-will-exceed-15-clean.html>

Hawaii is on track to meet -- and maybe surpass -- its target of obtaining 15% of its power from low-carbon sources by 2015, according to Hawaiian Electric Company. The Hawaii Clean Energy Initiative aims to achieve 70 percent clean energy by 2030, which includes 40 percent coming from locally-generated renewable sources and the other 30 percent from energy efficiency and conservation measures. But although the state is well on its way to reaching its renewable energy goal, there may not

be much left in the pipeline for projects, other than planned biofuels projects from Aina Koa Pono and Hawaii BioEnergy, as well as the proposed 200 megawatts of wind energy from Lanai and OTEC International's 100-megawatt ocean thermal energy conversion planned project.

=====

BP Forecasts Renewables to Be the Fastest Growing Energy Class Through 2030:

Biomass Magazine, by Erin Voegelé, January 16, 2013

<http://www.biomassmagazine.com/articles/8529/bp-renewables-to-be-the-fastest-growing-energy-class-though-2030>

BP expects renewables to continue to be the fastest growing class of energy over the next several years. According to the "BP Energy Outlook 2030," renewables will gain market share from a small base as they increase at an average of 7.6 percent a year through 2030. Overall, BP estimates that renewable energy production will grow from 4 percent to 11 percent by 2030. "Including biofuels, renewables are expected to have a higher share of primary energy than nuclear by 2030," said BP. Renewables are expected to contribute to 27 percent of the sector's growth through 2030. In the transportation sector alone, there is expected to be some diversification away from oil, with 13 percent of the fuel mix coming from biofuels, 16 percent from natural gas, and 2 percent from electricity.

=====

Oklahoma Is Ahead of Schedule in Renewable Energy Goal:

Oklahoman, by Paul Monies, March 8, 2013

http://www.energybiz.com/article/13/03/oklahoma-ahead-schedule-renewable-energy-goal-officials-say&utm_medium=eNL&utm_campaign=EB_DAILY&utm_term=Original-Member

Helped by a year-end surge of completed wind projects, Oklahoma is well ahead of schedule for a state goal for renewable energy capacity. The state's renewable energy goal, passed in 2010, called for 15 percent renewable energy by 2015. Oklahoma came close to meeting that mark in 2011, with 14.5 percent. More than 1,100 megawatts of wind power capacity came online last year in the state. Oklahoma now ranks sixth in the nation for wind energy capacity. The state was in eighth place in 2011.

=====

Strong Growth for Renewables Expected Through to 2030:

Bloomberg New Energy Finance, April 22, 2013

<http://about.bnef.com/press-releases/strong-growth-for-renewables-expected-through-to-2030>

Annual investment in new renewable power capacity is set to rise by anywhere from two and a half times to more than four and a half times between now and 2030. The likeliest scenario implies a jump of 230%, to \$630 billion per year by 2030, driven by further improvements in the cost-competitiveness of wind and solar technologies relative to fossil fuel alternatives, as well as an increase in the roll-out of non-intermittent clean energy sources like hydro, geothermal and biomass. Bloomberg's "Global Energy and Emissions Model" shows the investment requirement for new clean energy assets in the year 2030 at \$630 billion (in nominal terms), more than three times the investment in the renewable energy capacity that was built in 2012. This 2030 investment figure is 35% higher than that produced in Bloomberg New Energy Finance's last global forecast a year ago, and the projection for total installed renewable energy capacity by that date is 25% higher than in that previous forecast, at 3,500GW. In the power sector, the

research company's latest forecasts project that 70% of new power generation capacity added between 2012 and 2030 will be from renewable technologies (including large hydro). Only 25% will be in the form of coal, gas or oil, the remaining being nuclear.

=====

IEA Says Renewables to Become World's Second-Largest Power Source by 2016:

FirstEnercastFinancial.com, by Sarah Kent, June 26, 2013

<http://www.firstenercastfinancial.com/news/story/53896-renewables-become-worlds-secondlargest-power-source-2016-iaa>

and

Agence France-Presse, June 26, 2013

[http://www.industryweek.com/environment/renewable-energy-use-gaining-worldwide?NL=IW-07&Issue=IW-07_20130627_IW-](http://www.industryweek.com/environment/renewable-energy-use-gaining-worldwide?NL=IW-07&Issue=IW-07_20130627_IW-07_102&YM_RID=kbossong614@yahoo.com&YM_MID=1405290&sfvc4enews=42)

[07_102&YM_RID=kbossong614@yahoo.com&YM_MID=1405290&sfvc4enews=42](http://www.industryweek.com/environment/renewable-energy-use-gaining-worldwide?NL=IW-07&Issue=IW-07_20130627_IW-07_102&YM_RID=kbossong614@yahoo.com&YM_MID=1405290&sfvc4enews=42)

According to the International Energy Agency, renewable energy is set to surpass natural gas to become the world's second-largest power source by 2016. In its annual report on the medium-term outlook for renewables, IEA said that by 2016 renewables will be second only to coal as a global electricity source and by 2018 will account for a quarter of gross power generation, that is an increase of 40% from 2012. Non-hydro renewable power, mainly wind and solar photovoltaics, is projected to grow from 4% of all power generation in 2011 to 8% in 2018. The role of biofuels for transport and renewable heat is also set to increase, though at a slower rate than renewable electricity. Global biofuels production is expected to rise by more than 25% from 2012 to 2018 to reach 2.4 million barrels a day.

=====

Hawaii to Aim Higher Than 40% Renewable Energy:

American City Business Journals/Honolulu, September 9, 2013

<http://www.bizjournals.com/pacific/news/2013/09/09/hawaii-looks-to-exceed-40-renewable.html>

Hawaii, which is currently generating nearly 14 percent of its electricity from renewable sources and well on its way to achieving 40 percent clean energy by 2030, is projecting to eclipse 40 percent and is looking to set a new goal. The State Energy Office plans to work with stakeholders and come up with a strategy to do that. The Hawaii Clean Energy Initiative in 2008 set the goals for the state to get to 70 percent of its electricity from renewable energy by 2030 — 40 percent from locally generated sources and 30 percent from energy conservation. In terms of the efficiency side, Hawaii is currently at 16.4 percent.

=====

Distributed Generation Is Poised to Soar Over Next Five Years:

American Council on Renewable Energy, September 9, 2013

<http://www.energyfactcheck.org/slideshow/renewables-work-best-from-a-central-utility-owned-distribution-point-just-like-fossil-fuels-distributed-generation-dg-is-a-niche-market-for-rich-off-the-grid-enthusias>

Distributed generation – electricity produced and consumed onsite – is growing quickly. In many places, rooftop solar, geothermal and other technologies are providing power to property owners and lowering

costs while increasing the resilience of the electric grid. From 2013 to 2018, 220 GW of distributed solar PV will be installed worldwide. The U.S. is on pace to see one new solar installation every 83 seconds by 2016. California has set a goal of developing 12,000 megawatts of distributed renewable energy by 2020. The total capacity of distributed generation installed in New England is likely to triple by 2021. Distributed wind currently tops over 800 MW, from more than 69,000 turbines across all 50 states plus Puerto Rico and the U.S. Virgin Islands.

=====

IEA Says Renewables on Track to Overtake Gas in a Few Years:

MarketWatch/Energy Ticker, October 7, 2013

<http://blogs.marketwatch.com/energy-ticker/2013/10/07/coal-remains-power-generator-king-through-2035-iea>

Renewable energy will overtake natural gas as an electricity source worldwide in the next few years, according to projections by the International Energy Agency. Coal will remain the top fuel for generating electricity for the next 20 years, with growth in coal-fired power in emerging markets outweighing its decline in rich countries. Coal will continue to trend upward unless governments take steps to promote cleaner sources of power. However, renewables will be almost level with coal by 2035.

=====

Renewable Energy to Be Half of Global Generation Increase to 2035:

U.S. Department of Energy, November 20, 2013

http://apps1.eere.energy.gov/news/news_detail.cfm/news_id=21070

and

International Energy Agency, November 12, 2013

<http://www.iea.org/newsroomandevents/pressreleases/2013/november/name%2c44368%2cen.html>

Renewable energy sources could account for nearly half of the increase in global power generation through 2035, according to the International Energy Agency's 2013 edition of the "World Energy Outlook." Wind energy and solar energy could make up 45% of that expansion in renewables. The report also found that a renewed global focus on energy efficiency is taking hold and is set to deliver multiple benefits. China is expected to see the biggest absolute increase in generation from renewable sources, more than the increase in the European Union, the United States, and Japan combined. In terms of trends in energy efficiency, the IEA found that potential for energy efficiency is still far from exhausted: two-thirds of the economic potential of energy efficiency remains untapped. In addition, North America's demand for crude oil imports all but disappears by 2035 and the region becomes a larger exporter of oil products.

=====

NERC Says California Set to Double Solar, Wind Capacity by 2020:

Electric Light & Power Magazine, December 6, 2013

<http://www.elp.com/articles/2013/12/nerc-sees-california-set-to-double-solar-wind-capacity-by-2020.html>

The state of California is preparing to double the power generation it derives from wind power and solar energy in the next seven years as electric power companies work to meet the thresholds set by

California's 33 percent by 2020 renewable portfolio standard. The North American Electric Reliability Corp. and the California Independent System Operator are scrutinizing the renewable energy resources of California. According to their assessment, the power grid run by the California ISO now has 10.7 GW of wind and solar power. The state is about to bring online another 8 GW of renewable energy by the end of the RPS deadline in 2020.

=====

International Renewable Energy Agency Maps Out Path to Double the Global Share of Renewable Energy:

International Renewable Energy Agency, January 20, 2014

http://www.irena.org/News/Description.aspx?NType=A&mnu=cat&PriMenuID=16&CatID=84&News_ID=349

The global renewable energy share can reach and exceed 30% by 2030 at no extra cost, according to a new study "REmap 2030" which maps out a pathway for doubling the share of renewable energy in the global energy mix based on technologies that are available today. Energy efficiency and improved availability of cost-effective renewable energy technologies can advance the share of renewables in the global energy mix by up to 36%. The deployment of modern renewable energy (renewable energy sources that exclude traditional burning of biomass such as wood) needs to grow more than threefold. "REmap 2030" builds on the analysis of the energy supply and demand of 26 countries, which account for 74% of projected global energy consumption in 2030.

=====

Renewables Can Safely Reach 30% Penetration:

EnvironmentalLeader.com, February 28, 2014

<http://www.environmentalleader.com/2014/02/28/renewables-can-safely-reach-30-penetration-ia>

Carbon-free wind power and solar photovoltaics can be fully integrated into power systems in large volumes without compromising grid stability and at a reasonable cost, according to a new study released by the International Energy Agency, "The Power of Transformation – Wind, Sun and the Economics of Flexible Power Systems." It says that integrating high percentages, up to 30 percent, of variable generation can come at little additional cost in the long term. Currently, wind and solar PV account for just about 3 percent of world electricity generation although a few countries already feature a much high percentage.

=====

Energy Secretary Predicts 30-40 Percent Renewable Energy by 2030:

Here And Now, March 4, 2014

<http://hereandnow.wbur.org/2014/03/04/ernest-moniz-energy>

Asked during a recent interview when solar and wind will represent a significant part of energy production, U.S. Energy Secretary Ernest Moniz responded: "The growth has been very dramatic, really. In the last four or five years, we have seen a doubling of wind and solar. We expect another doubling over the next several years. Last year we had 2,300 megawatts of large-scale solar alone put in place. What we are seeing with wind - in particular on-shore wind - and solar, is that costs have come down pretty dramatically, and with that cost reduction is coming rapidly-increased deployment. Now

obviously, in both cases, we're talking with relatively small market share today - a few percent for wind and still less than 1 percent, I believe, for solar. But the rate of growth is very dramatic. I mean, we are looking by 2030 to having a very, very large fraction of our capacity in wind, solar and other renewables ... 30 percent, 40 percent."

=====

CalWEA Says 50% Renewables Target in California Is Possible and Affordable:

North American Wind Power, April 11, 2014

http://www.nawindpower.com/e107_plugins/content/content.php?content.12844

A recent study performed for California's five major utilities by the research firm Energy and Environmental Economics provides a roadmap for achieving 50% renewable energy by 2030 in the state according to an analysis of the report by the California Wind Energy Association. The E3 report estimated the system average rate impact of a 50% solar-heavy renewables scenario at 14% in 2030. A more diverse E3 renewables scenario dropped that figure to 9%. However, CalWEA claims it is possible to dramatically reduce total overall costs by applying the low-cost mitigation measures identified by E3 to a renewable resource mix with lower total costs (including both procurement and integration costs). The result was a 2%, or less, rate impact in 2030.

=====

	<u>SUMMARY CHART</u>					
	(share of net U.S. electrical generation)					
	<u>2013</u>	<u>2014</u>	<u>2015</u>	<u>2016</u>	<u>2017</u>	<u>2018</u>
Hydropower	6.63%	6.63%	6.61%	6.55%		
Biomass	1.48%	1.48%	1.48%	1.48%		
Geothermal	0.41%	0.41%	0.41%	0.41%		
Wind	4.13%	4.50%	5.00%	5.50%		
Solar	0.23%	0.45%	0.90%	1.37%		
Total	12.87%	13.47%	14.40%	15.31%	15.71%	16.11%
	#####					
	#####					

The SUN DAY Campaign is a non-profit research and educational organization founded in 1992 to promote sustainable energy technologies as cost-effective alternatives to nuclear power and fossil fuels.

=====

=====