

Electric Power Daily

Monday, December 31, 2012

Developers seek new vehicles to finance renewables

The new year could see the debut of a new investment vehicle for renewable power projects, stakeholders say.

Developers and financiers have been looking for new financing structures that could help lower the cost of capital for renewable energy projects. In part they are being driven by the looming expiration of subsidies such as the production tax credit, which will end December 31, unless it is extended by Congress.

The financing vehicles encompass a range of options from securitization to master limited partnerships and real estate investment trusts, but each comes with its own set of challenges that would have to be overcome.

The closest to market could be a securitization in which a collection of assets are put into a company that is sold to investors. The income produced by the assets, such as a wind or solar farm, provides the cash flow to pay investors.

“Securitization may be the biggest hope of the renewable energy industry,” Ted

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Storage could add \$35/MWh to value of CSP: report

Saying they have known for some time that concentrating solar power with storage adds value, the Department of Energy’s National Renewable Energy Laboratory said in a recently released report that it now is able to quantify the value “in the language utilities understand.”

NREL said that a study it has done of the operation of CSP equipped with six-hour thermal energy storage capacity in a test system based on two balancing areas in Colorado and Wyoming lowered peak “net loads” when the sun was not shining by an amount that added \$35.80/MWh to the “capacity and operational value” of the utility. The added value of the storage compared to photovoltaic solar power, and was an “even higher extra value” when compared to CSP without storage.

NREL said the net load is the “normal load minus variable renewables such as photovoltaic and wind.”

NREL said there is additional value “because thermal storage allows CSP to

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Abengoa solar Nevada plant would feature CSP and PV

Abengoa Solar plans to build a 225-MW project in southwestern Nevada that will blend concentrating solar power and photovoltaic technologies, according to the company’s application filed last week with the Nevada Public Utilities Commission.

The Pahrump Valley Solar project would include a 135-MW CSP portion and a 90-MW PV section. The project would interconnect with a substation proposed by Valley Electric Association, a participating member of the California Independent System Operator starting January 1.

Renewable generators that interconnect directly with VEA will be treated in

North Carolina utilities rip through solar carve-out

North Carolina’s version of a renewable portfolio standard — which includes a small “carve-out” requirement for solar power — spurred the development of scores of small solar photovoltaic projects.

But plummeting prices for solar PV panels and other factors prompted something that was unexpected in 2007, when the RPS was enacted: a boom in solar development that already far exceeds the solar carve-out’s 2018 mandate.

“It was the RPS that got [the state] rolling” regarding solar development, Steve Kalland, executive director of the North Carolina Solar Center, said in an interview. The RPS — really a “renewable energy and energy efficiency portfolio standard” — requires investor-owned utilities, municipal utilities and electric cooperatives to secure increasing portions of their power from renewable sources and energy efficiency: rising from 3% in 2012 to 6% in 2015, 10% in 2018, and — for IOUs, but not munis or co-ops — 12.5%

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Go slow on geomagnetic standard, groups tell FERC

In proposing a reliability standard to protect the grid against geomagnetic disturbances, or GMDs, federal regulators must take into account a variety of perspectives and not assume that current modeling tools are sufficiently refined, said a coalition of the industry’s major trade associations.

Comments filed last week at the Federal Energy Regulatory Commission underline the public debate that has been ongoing over the threat represented to the electric grid by GMDs, and what steps should be taken to protect against outages that some say could last years in certain situations. GMDs result from geomagnetically induced currents from solar flares that can have negative effects on the power grid.

The American Public Power Association, the Edison Electric Institute, the Large Public Power Council and the National Rural Electric Cooperative Association filed joint comments saying that FERC’s October notice of proposed

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Holiday Notice

In observance of the New Year’s Day holiday, *Electric Power Daily* will not publish on Tuesday, January 1. The next issue will be dated January 2.

a preferred category under California's renewable portfolio standard rules. The substation is part of VEA's proposed 500-kV Hidden Hills transmission project, which will run to the Eldorado substation south of Las Vegas. Generators can access California from the Eldorado substation. The transmission project is being developed to accommodate BrightSource Energy's 500-MW Hidden Hills project in California.

The project will use "up-dated versions of proven technologies that reduce intermittent generation output while minimizing costs, maximization of renewable energy output from an optimal solar site, and meeting state and national objectives for the development and procurement of renewable energy," Abengoa's application said.

Abengoa expects the project to take up about 2,000 acres on Bureau of Land Management land. The company has filed a right-of-way application with BLM, which will conduct an environmental impact statement on the project. Although the federal government has tried to speed up the EIS process, it typically takes well over a year to complete.

In 2010, Abengoa filed an application to build a 250-MW CSP project in southern Nevada, but withdrew the application because the Department of Defense was concerned it would interfere with the Nevada Test and Training Range.

Abengoa's latest project includes a 650 foot high tower surrounded by rows of heliostats. The mirrored heliostats will track the sun and concentrate light onto receivers at the top of the tower. Water will be turned to steam to generate power. The project will include natural gas or propane burners to quickly achieve superheat conditions during daily start-ups, the application said. The fossil fuel will provide up to 2% thermal input for the plant a year.

On the PV side, Abengoa intends to use a mix of traditional PV with high-concentrating PV, the application said. The exact mix will be determined later.

Abengoa estimates that the Pahrump Valley project would

use about 180 acre feet of water a year.

The project marks a shift for Abengoa, which is using solar trough technology at its two projects that are under construction in the US, not tower powers or PV. The Seville, Spain-based company has used tower technology in Spain. Abengoa declined to comment by press time.

Abengoa has nearly finished building its 280-MW Solana project near Gila Bend, Arizona. The project, with about six hours of storage capability, is under contract to Arizona Public Service. Abengoa received a \$1.45 billion federal loan guarantee for the roughly \$2 billion plant. Abengoa expects the plant to start operating in the summer of 2013.

Abengoa is also building the 280-MW Mojave project near Barstow, California. The project is under contract to Pacific Gas & Electric. It is slated to start operating in 2014. Abengoa received a \$1.2 billion federal loan guarantee for the project.

— Ethan Howland

E.ON brings Indiana wind farm online

E.ON Climate & Renewables has placed into commercial operation the first 200-MW phase of what eventually could become Indiana's largest wind farm, although additional development could hang on the fate of a federal production tax credit that remains up in the air.

All 125 General Electric turbines at the Wildcat 1 wind farm in Tipton and Madison counties, about 40 miles north of Indianapolis, are spinning away, company spokesman Matt Tulis said Friday. "I got notification on December 25" that the wind farm had been commissioned.

"We've commissioned all of the turbines, so it's in full operation."

Tulis said it was important for the wind farm to begin operating prior to the scheduled December 31 expiration of the PTC.

"We're interested in doing more phases out there, and a lot

platts *Electric Power Daily*

Monday, December 31, 2012

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Electric Power Daily is published daily by Platts, a division of The McGraw-Hill Companies. Registered office Two Penn Plaza, 25th Floor, New York, NY 10121-2298

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of that will depend on the production tax credit," he said. E.ON envisions at least one or two more 200-MW expansions of the wind farm. "We like the wind. We like the transmission there."

He described E.ON as "cautiously optimistic" Congress will continue the PTC, at least for another year or so. "We've seen good bipartisan support" for an extension, he added.

In the event the tax credit is allowed to expire, however, Tulis said E.ON is exploring other potential financing options for future wind farms. "We're looking at that and trying to see what we can do to make projects work," he said, declining to elaborate.

Electricity already is flowing from Wildcat Wind to Indiana Michigan Power, an American Electric Power subsidiary that signed a 20-year agreement to purchase 100 MW from the project. The remaining output has not been sold.

"We're still looking at the other 100 megawatts," Tulis said. "At the moment, we're still looking at our options there."

Wildcat marks the 18th wind farm developed by E.ON and first in Indiana.

Altogether, the company owns 2,700 MW of wind capacity in five states — Illinois, Texas, Pennsylvania and New York as well as Indiana. In the past four years, E.ON has invested more than \$4 billion in the US, creating more than 4,000 construction jobs and 200 permanent jobs to keep the wind farms up and running.

E.ON is eager to get started on the second phase at Wildcat, assuming the PTC is extended. "We would like to get going as soon as we can on the next phase, and ideally that would be next year, but it depends on the PTC and how that shakes out," Tulis said.

According to the American Wind Energy Association, Indiana had 1,343 MW of installed wind capacity before Wildcat went online. Only 3 MW of new wind capacity was added in Indiana in 2012 prior to Wildcat, the trade group said, following a flurry of activity in 2009 and 2010 when the state increased its installed wind capacity ten-fold.

Nationally, Indiana's wind resource ranks 15th, AWEA said.

On Friday, meanwhile, MidAmerican Wind, a subsidiary of MidAmerican Renewables, said it completed the 168-MW Pinyon Pines Wind 1 and 132-MW Pinyon Pines II projects, formerly known as Alta Wind VII and Alta Wind IX, near Tehachapi, California.

Completion of the projects brings MidAmerican Wind's renewable energy portfolio to 381 MW.

Southern California Edison will buy electricity from each of the projects under long-term power purchase agreements.

MidAmerican Renewables is a subsidiary of MidAmerican Energy Holdings, a global energy provider.

— Bob Matyi

ISO-NE MOPR plan faces criticism

The attorneys general for two New England states and renewable interest groups on Friday protested ISO New England's proposal to make all types of generation comply with a minimum bid rule to participate in the forward capacity market.

ISO-NE on December 3 proposed to eliminate its forward capacity auction price floor and replace it with a minimum bid requirement, commonly referred to as a minimum offer price rule.

Over the objection of states and renewable power developers, the ISO proposed to apply the MOPR to all types of capacity providers, including renewables, self-supply and gas-fired generation; and demand response and energy efficiency providers (Docket No. ER12-953).

Under the MOPR, ISO-NE would create a so-called benchmark "offer review trigger price" for each type of resource that would be updated at least every three years.

A new generator or other resource that wants to bid in at lower than the applicable trigger price would need to justify the lower bid based on such things as capital costs, expected non-capacity market revenues and operating costs.

However, revenue associated with a state's generation development programs could not be part of that justification unless the generator could show the state's revenue were not "expressly intended to reduce prices in the FCM," ISO-NE said.

The changes would apply beginning with the eighth forward capacity auction to be held in February 2014 for the June 2017-May 2018 delivery year.

As they did in stakeholder proceedings, states and renewable developers complained to FERC that the MOPR should not exclude revenue from state programs designed to address renewable policy mandates.

"The practical effect of ISO-NE's proposal is that such resources, which will be developed according to state policies, will not clear in the forward capacity market" and will not count toward meeting the region's installed capacity requirement, said joint comments by Massachusetts Attorney General Martha Coakley, the American Wind Energy Association, National Grid, the Conservation Law Foundation and others.

This will be the case "despite the undisputable capacity value that resources under such state-mandated wind and solar contracts contribute to system reliability," the joint comments said.

Therefore, FERC should make the ISO include revenue from state-mandated contracts in determining whether individual renewable generators can submit bids lower than the trigger price, the joint comments said.

Connecticut Attorney General George Jepsen said he supports the joint comments by Coakley, AWEA and the others. He also encouraged FERC to "go one step further" and make solar and wind renewable resources that are developed pursuant to state mandates exempt from the ISO-NE MOPR.

The New England Power Generators Association said it largely supports the ISO's proposal, although NEPGA would like the trigger prices to be updated as frequently as needed.

There is no need to give a blanket exemption to any class of resources, NEPGA said. "Buyer-side mitigation does not deter states and public power entities from carrying out their resource procurement objectives," NEPGA said.

States "have not and likely will not condition their renew-

able energy policies, and the associated procurement of renewable resources, based on the capacity market value (and wholesale power market value) of those resources.”

— *Esther Whieldon*

Utility output falls 0.1% on year in week: EEI

Utilities generated 76,060 GWh in the week that ended Saturday, down 0.1% from 76,170 GWh generated in the corresponding week of 2011, the Edison Electric Institute said Friday.

The weekly total was 704 GWh below the 76,764 GWh total posted in the week ended December 15, EEI said.

Output fell in five of the nine regions EEI assesses, with the largest percentage decrease coming in the Central Industrial region, where output fell 3% year on year to 12,970 GWh, followed by the South Central region, where output was down 1.5% from a year ago to 11,498 GWh.

The largest percentage gain came in the Pacific Northwest, where output rose 2.8% from last year to 3,844 GWh, followed by the Southeast, where generation increased 1.8% year on year to 19,121 GWh.

EEI said utility generation for 2012 to December 22 was about 3.9 million GWh, 1.9% below the 3.99 GWh generated in the comparable period of 2011.

The numbers are based on generation from investor-owned utilities, cooperatives and government-owned utilities.

— *Jeff Barber*

Developers seek new vehicles ... from page 1

Brandt, CEO and co-founder of Marathon Capital, said.

The first securitization deal to come to market could be an offering from Canada. J.P. Morgan has already formed a company, Threshold Power, that is preparing to offer a Canadian income trust that will hold a portfolio of US wind power farms with an aggregate capacity of 540 MW.

Another company, Pattern Energy, could even make a filing in the first quarter, Brandt said.

The problem is that the market wants growth, but not development assets; that was the lesson learned from First Wind, Brandt said.

In October 2010, First Wind pulled its \$300 million initial public offering. At the time, CEO Paul Gaynor said the market fairly valued its operating assets, but not the company's development portfolio.

First Wind went on to sell a 49% equity interest in its 385-MW portfolio of Northeast wind projects to Emera, a Canadian utility, for \$211 million. First Wind also retained a 51% stake in a joint venture that will own and operate the wind farms.

Another potential problem that would have to be resolved, at least for wind farms that receive production tax credits, is that cash flows are divided up between the holders of the original equity and the tax equity, a relationship that switches at the end of the deal. “Tax subsidies get in the way of smooth cash

flow streams,” Brandt said.

Nonetheless, the argument in favor of securitization could be compelling for developers.

A company with only operating assets is perceived as less risky and can command a higher multiple than one that includes development assets and, if it is publicly traded, it could also command a liquidity premium.

“A lot of large developers are looking to put operating assets into publicly traded vehicles,” Keith Martin, a partner at Chadbourne and Parke, said.

Securitization can take a variety of forms such as a security traded on the Toronto Exchange or a synthetic master limited trust, but bankers are exploring other options as well.

A straight master limited partnership would be attractive to investors and developers alike, but the use of an MLP for renewable energy assets could present the highest hurdle because it would require legislative action from Congress.

MLPs were set up under law for depletable assets such as oil and natural gas reserves. They have since been used for gas pipelines as well, but wind and solar power do not fit that definition.

There are efforts under way in Congress that would make MLPs available for renewables, but the law's prospects are unclear.

The bill, the Master Limited Partnerships Parity Act, was introduced by Senator Chris Coons, Democrat from Delaware, and has since picked up support from Senators Jerry Moran, Republican from Kansas, Jon Tester, Democrat from Montana, Al Franken, Democrat from Minnesota, Amy Klobuchar, Democrat from Minnesota, Sheldon Whitehouse, Democrat from Rhode Island, and Jeanne Shaheen, Democrat from New Hampshire, as well as from Representatives Ted Poe, Republican from Texas, and Mike Thompson, Democrat from California.

At the same time, however, Max Baucus, Democrat from Montana, head of the Senate Committee on Finance, favors taxing partnerships, which would negate many of the benefits MLPs hold for investors.

The Coons' bill could be taken up in 2013-2014, said Martin, and if passed would be useful for developers looking to raise money more cheaply. But if developers are also looking for another source of tax equity, even further changes would be needed to address issues such as passive loss rules, capital at risk and recapture rules that govern the treatment of short-term sales of MLPs, he noted.

Real estate investment trusts, or REITs, would require no statutory change to be used for renewables, but there are other complications. REITs are set up to be used with real property, not equipment. It is up to the Internal Revenue Service to rule on whether or not a renewable energy asset would qualify for treatment as a REIT.

One of the problems is that for the past four years the renewable energy industry has been saying that renewable energy wind projects are equipment so that they could meet the requirements of the now expired federal cash grant program

that was put in place as part of the stimulus bill.

There is a slightly different definition of real property for the purposes of the cash grant than for REITs, “so there could be enough daylight” to work out a deal, Martin said.

The Internal Revenue Service in January made a private ruling for a company looking to bundle renewable energy assets into a REIT, but that ruling has not been made public and it would have limited application, Martin said, adding that REITs still pose other hurdles for renewable energy developers.

Renewable projects that are paid production tax credits are also eligible for accelerated depreciation on a five-year schedule. In a REIT, assets are depreciated over 39 years. So a developer using a REIT would be giving up accelerated depreciation that is worth 26 cents on the dollar. “It is hard to see how to thread that needle,” Martin said.

REITs also face a challenge from a federal law that exempts foreign investors from capital gain taxes, except on real estate. Many big renewable energy projects are owned by foreign companies that would not be happy if their renewable REITs had to pay capital gains taxes, Martin said.

A fourth possible vehicle for renewables is the Property Assessed Clean Energy program. Initially PACE was viewed as a natural fit for rooftop solar projects.

In areas that have passed PACE legislation, a government agency, a municipality for instance, issues bonds to fund the installation of solar panels or efficiency upgrades. The bond is paid back through a special property tax assessment.

The program took off quickly after it was introduced in Berkeley, California, in 2008, spreading to 28 states and the District of Columbia. But most residential PACE programs were put on hold in 2010 after the Federal Housing Finance Agency issued guidance that limited federal backing for mortgages in areas with PACE programs. FFHA’s concern is that a tax lien would take priority over a mortgage obligation.

But the FFHA’s concerns are an attraction to investors, who see security in the senior status of a tax lien, so bankers are still enthusiastic about using PACE to finance renewable energy projects but they are looking at using it with commercial rather than residential properties.

For a commercial building, a relatively modest tax lien can buy relatively large increases in energy efficiency, Edwin Feo, managing director and co-managing partner at USRG Renewable Finance, said.

Feo pointed to a deal announced in November in which Clean Fund joined with Johnson Controls and Prologis in floating a \$1.4 million bond under San Francisco’s PACE program that will be used for energy efficiency upgrades and to add solar panels to Prologis’ San Francisco headquarters building.

Feo is an external strategic adviser to Clean Fund, which facilitates clean energy projects using the PACE structure.

In September, California launched the largest PACE program in the nation. The CaliforniaFIRST program encompasses 14 counties and 126 cities, virtually the entire state, and is designed to help commercial property owners finance energy

efficiency upgrades.

So far most of the capital raised for PACE programs has targeted high net worth individuals, but as it scales up it will be rolled out to institutional investors who could be attracted because PACE is essentially a pass-through to the bonds, Feo said.

But even if the legislative and regulatory hurdles to REITs and MLPs are cleared, there are challenges that could hamper all forms of renewable energy securitizations.

Securitization requires a lot of data, bankers say, and most renewable energy technologies, especially solar panels, have not been around long enough to provide a sufficient track record of payments.

A short track record can cause a ratings agency to deduct points from a potential rating, leaving a gap between the agency’s and the developer’s view of the project’s viability. Bridging that gap could be one of the biggest challenges to the securitization of a renewable energy project, bankers say.

“There has been more talk than action because securitization is hard, but we are working on several initiatives, and I would be surprised if at least one deal didn’t come to market” in 2013, Marshal Salant, managing director and head of alternative energy finance at Citigroup, said.

— Peter Maloney

Storage could add \$35/MWh ... from page 1

displace more expensive gas-fired generation during peak loads rather than displacing lower-priced coal.” It said that storage can “flatten” the peak load in the evenings when PV is not contributing to the mix because the sun has set.

The authors of the report, which was released December 20, said the \$35.80/MWh extra value “would come in a scenario in which there is relatively high penetration of renewables into the utility’s mix.” They put that penetration at “about 34%.”

They said that if the penetration was lower, the extra value would be lessened.

The authors, NREL’s Paul Denholm and Marissa Hummon, said they used Energy Exemplar’s PLEXOS simulation model that they said allowed them to isolate the relative value of thermal energy storage both with and without storage.

The authors said NREL is using the same methodology it developed for the Colorado scenario for the more complex California system controlled by the California Independent System Operator. A report on the value that CSP with thermal storage adds to the California system is expected early next year, NREL said.

CSP using molten salt for thermal energy storage, can be dispatched to displace natural gas rather than coal. “This is important because electricity produced from natural gas fired generators is typically more costly than that produced from coal,” NREL’s Denholm noted.

“With CSP with thermal storage, you aren’t diving as deep into the generation stack, displacing cheaper and cheaper fuel. You’re always displacing the highest-cost fuel.”

Also, CSP with thermal storage can lower peak net loads in

the evenings when electricity use can still be high, but PV is not available.

“So, it helps utilities offset the need to build new gas-fired generators in order to meet the electricity demand when the sun goes down.”

In a separate report also released December 20, the Concentrating Solar Power Alliance, a public policy advocacy group, said that at low renewable penetration levels thermal storage adds energy and ancillary service value to a CSP facility in the range of \$5/MWh to \$10/MWh, “depending on the plant size and the region studied.”

The CSPA report said that at higher penetration levels “the comparative economic value of incremental CSP with storage diverges dramatically from incremental solar PV additions, possibly increasing to \$30/MWh or higher as penetrations increase.”

— Jeffrey Ryser

North Carolina utilities rip through ... from page 1 in 2021.

To help spur development of particular types of renewables, the RPS law includes carve-outs for solar, poultry-waste and swine-waste projects; the solar carve-out calls for at least 0.07% of a utility's power to come from solar sources by 2013, rising to 0.14% in 2015 and 0.2% in 2018.

Kalland, whose NCSC is a state-funded entity based at North Carolina State University's College of Engineering, said that IOUs like Duke Energy Carolinas and Progress Energy Carolinas blew through the modest solar carve-outs early on, and now are turning to low-cost solar power purchases to meet substantial portions of their general RPS requirements.

“We've seen a big uptick in solar projects in 2012,” Kalland said, noting that the biggest increase has been in larger projects, ranging from 5 MW to 20 MW each. “The total number [of MW] in operation is hard to track,” he said, in part because of the sheer number of projects, and in part because of the lag between project approval from the North Carolina Utilities Commission and project construction and start-up.

“I still remember coming to North Carolina in 2001; the biggest [solar] project then was 30 kW,” Kalland said. “To be looking now at large numbers of projects in the 10-to-20-MW range is very gratifying.”

One of the larger solar developers active in the state is Chapel Hill-based Strata Solar. It said in a statement that it built more than 60 MW of solar PV capacity in North Carolina in 2012 — more than the total amount of solar capacity installed statewide in 2011.

Strata now has a total of more than 75 MW of solar capacity in operation in North Carolina, with much of the recently installed capacity in solar-farm “clusters” of 6.4 MW, initially in the southern and northern parts of the state.

“By building its solar farms in clusters, Strata Solar has been able to effectively hire, train and maintain a strong workforce

and, in turn, contribute to North Carolina's growing economy — hiring over 400 staff this year,” the company said. Strata said that in early 2013, it will begin work on an “eastern cluster” of solar farms, with 6.4-MW projects planned in Pitt, Nash, Craven, Edgecombe, Lenoir, Wilson and Wayne counties.

Strata said that it has 800 MW of solar projects in its development pipeline, most of them in North Carolina, and that the NCUC recently approved a 20-MW project in Mount Olive that would be among the state's largest. Strata is awaiting NCUC approval for a second 20-MW project, this one in Robeson County.

Meanwhile, computer giant Apple is building two 20-MW solar farms in Catawba County to offset the electricity usage at a large data center there, and several solar developers — including SunEnergy1, O2Energies, and Sustainable Energy Development Corp. — are building or planning multi-MW solar projects totaling dozens or scores of MW per company.

“Initially we thought that biomass would be the primary renewable resource” DEC and PEC would rely on to comply with North Carolina's RPS, “and that still may turn out to be the case,” Mike Hughes, spokesman for Duke Energy — corporate parent of DEC and PEC — said Friday. He added, however, that “solar is certainly developing at a faster rate,” and almost all of the renewable projects proposed in recent months have been solar.

With the boom in solar development, prices for solar renewable energy certificates have been plummeting, said Andy Fusco, director of planning for Electricities of North Carolina, the state's muni group. When North Carolina munis first started buying solar RECs a few years ago, he said, “we were paying over \$100/solar REC. Now, over the past two or three years, the market price has dropped to below \$10/solar REC ... There's a lot of solar capacity being built and the market [for solar RECs] is being flooded.”

Fusco noted that in addition to declining prices for solar PV panels, solar developers are benefiting from federal and state tax incentives that total “about 55%” of the current cost of solar projects.

Jay Nemeth, director of business operations at GreenCo Solutions, an entity established by North Carolina's co-ops to help them comply with the state's RPS, confirmed Fusco's view of how much solar REC prices have fallen, and said that solar developers also have driven down the cost of building solar farms by increasing the efficiency of their installation work.

“North Carolina is an attractive place” for solar developers, not only because of the state's RPS and tax incentives, but because of the availability of land, Nemeth said. “A lot of farmers are anxious to lease their land” for solar facilities.

— Housley Carr

Go slow on geomagnetic standard ... from page 1

rulemaking gave too little weight to certain viewpoints, including those of the North American Electric Reliability Corp.-driven geomagnetic disturbance task force. The associations said they fear that the cure for GMDs will be worse than the threat.

“Many aspects of the science surrounding GMDs are still

immature, the methods of grid impact analysis remain crude and unrefined, and necessary assessments of the impact of methods of remediation are unproven," the associations said. They noted that various studies "suggest far different opinions of the risk and urgency related to GMDs with respect to the [bulk power system]." The associations said that blocking devices for geomagnetically-induced currents have not been sufficiently analyzed regarding their impacts to the grid, and could introduce negative reliability impacts if not managed correctly.

FERC proposed to direct NERC to develop standards to guard against geomagnetic disturbances in a two-part process. FERC's October action followed a sweeping assessment of the threat by NERC and scientific experts who did not always agree on the likely duration of outages caused by geomagnetic disturbance events.

FERC's notice of proposed rulemaking (Docket No. RM12-22) said that within 90 days of a final rule, NERC would first submit one or more standards requiring owners and operators of the bulk grid to develop operational procedures to mitigate against the effects of geomagnetic disturbances, which can result from solar storms or hostile attacks. FERC member Cheryl LaFleur at the time said the new proposal is consistent with a NERC assessment of such events issued earlier this year that said the greatest risk is loss of reactive power support, which could lead to voltage instability and power system collapse.

In the second part of the process, FERC proposed that NERC file within six months of a final rule standards that require grid owners and operators to conduct ongoing assessments of the potential impacts of geomagnetic events and implement strategies to protect the bulk power system. These would include "automatic blocking of geomagnetically induced currents, instituting specification requirements for new equipment, inventory management, or isolating certain equipment that is not cost effective to retrofit," FERC said in a news release.

NERC, which would be charged with developing the standard, in filed comments said that the science around understanding GMDs is still being developed, and much remains to be learned about the threat. GMDs vary in intensity depending on factors like location, which makes a "one size fits all" approach inadvisable, NERC said.

NERC also said that human-generated electromagnetic pulses from hostile actors, which are also seen by some as a threat to the grid, should be distinguished from GMDs. FERC should specify that EMP events are outside the scope of the rulemaking,

NERC said.

"The NOPR explicitly does not propose to require NERC or owners or operators of the bulk power system to adopt any particular operational procedures or a particular solution in the second stage reliability standards to address GMDs," NERC said.

The Electric Power Supply Association filed comments similar to the other trade associations, saying without strong understanding or consensus on the technical specification of a GMD event, and in the absence of effective modeling tools, "there is an insufficient basis to conclude that new or modified NERC reliability standards on GMDs should be developed on the proposed time frame specified in the NOPR." If FERC determines that a standard is necessary, the costs of assessment and mitigation should be recoverable, EPSA said.

The Foundation for Resilient Societies, made up of GMD experts, argued in favor of a new standard without any delays, saying the electric industry has known of the problem for years. Members of the group have sometimes clashed with the NERC task force over the level of threat from GMDs.

"Unnecessary delays allow for coordination of nonpublic discussions to forestall a GMD reliability standard," the group said. "It should be noted that many of the comments filed on Docket RM12-22 indicate explicit coordination among individual utilities, regional entities and trade groups; not surprisingly, these same comments oppose a reliability standard. The FERC commissioners should not facilitate coordinated delay tactics at the expense of the public safety; the original time lines in the NOPR should be adhered to."

The National Association of Regulatory Utility Commissioners said the NOPR does not provide sufficient cost-benefit analysis or technical evidence to justify a directive to NERC to set a GMD reliability standard. The group, which represents state regulators, cautioned against moving ahead without more understanding.

"The direction to NERC to propose reliability standards that ensure that the listed vulnerabilities will not occur is problematic in the absence of a thorough understanding of the costs and benefits," NARUC said. "For instance, as proposed, infrastructure investment would be required even though there does not appear to be evidence cited in the NOPR demonstrating that the suggested mitigation measures will actually deliver the expected reliability benefits nor that these reliability benefits outweigh the costs."

— Jason Fordney

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