# THE SOL SOURCE

# **Navigating the Storm**

Assessing and Navigating Key Risks for the Solar Industry

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# WELCOME

THE SOL SOURCE is a journal that our team distributes to our network of clients and solar stakeholders. Our newsletter contains energy statistics from current reallife renewables projects, trends, and observations gained through interviews with our team, and it incorporates news from a variety of industry resources.



### State Markets

California District of Columbia Maine Florida Illinois

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### California

California has seen some changes to longplanned energy policy decisions this spring, including potentially

keeping its last nuclear plant open while shelving (for now) plans to recalculate net-energy metering ("NEM"). After industry objection, celebrity intervention, and Commissioner turnover, the highly-contested NEM 3.0 proposed decision ("PD") was suspended, likely until after the November election. On May 9, 2022, the California Public Utilities Commission ("CPUC") issued a ruling formally reopening the NEM 3.0 docket and requesting feedback on a transition approach in the form of a fixed electric bill credit adder on top of the hourly export credits. In addition, the Commission seeks feedback on whether the successor tariffs will be extended to include community solar as well as the viability of access for renters and low-income ratepayers. Comments are due June 10, 2022, and reply comments are due on June 24, 2022.

On April 21, 2022, the California Independent System Operator ("CAISO") and Western Energy Imbalance Market ("EIM") <u>announced</u> that cumulative benefits for entities participating in the rapidly growing real-time energy market have exceeded \$2 billion, suggesting neither entity intends to halt efforts to expand.



### District of Columbia

After considering a range of options, the

DC Public Service Commission will allow existing customer-sited solar projects to continue operating on estimated production. However, effective April 1, 2022, all new systems must have a revenue-grade production meter or inverter-based production measurement equipment. This is part of a broader (and likely good) move towards ensuring customer REC production can be tracked.

There remains no word yet on nominees for the DC Public Service Commission vacancy, which continues as the DC election heats up. June elections will see competition for Mayor, Attorney General, and several rarely-open Council seats.



### Florida

On April 27, 2022, Governor Ron DeSantis (R) shocked the solar industry by vetoing a bill backed by Florida Power

& Light that was widely expected to gut the rooftop solar industry in Florida (SB1024/ HB741). Gov. DeSantis, in several high-profile disputes with other Florida corporations, cited inflation and other cost concerns in his surprise veto. This adds Florida to states that have rescinded (or at least delayed) drastic changes to NEM in recent weeks.



### Illinois

Illinois continues working to implement myriad regulatory and other requirements stemming

from last year's landmark Clean Energy and Jobs Act ("CEJA"). After revising the Long-Term Renewable Resources Procurement Plan based on stakeholder feedback, the IPA submitted its <u>final plan</u> to the Illinois Commerce Commission ("ICC") on March 21, 2022. ICC is expected to issue a proposed order by June 8, 2022, which will provide guidance on future block operations and REC pricing. Per CEJA, the ICC must issue a final order by July 19, 2022. The Illinois Power Agency will be running its second Indexed-REC RFP for electric supply and renewable energy products this fall. The <u>program website</u> and <u>guidebook</u> are valuable resources.



#### Maine

Maine continues to attempt to develop a wider variety of clean electricity options in the state while wrestling with their role in

the national transmission system. The Governor's Energy Office is expected to reconvene the distributed generation stakeholder group now that Maine's legislative session has ended. We expect a straw proposal later this fall to contain more successor program design details in advance of a final report due January 2023. On May 10, 2022, developers of the New England Clean Energy Connect (NECEC) transmission project argued in court against the constitutionality of a ballot measure approved by state voters in November that sought to nullify the project. The NECEC project would carry electricity from Canadian hydropower to the New England grid.



### Indiana

Indiana saw the first, but likely not the last, delayed closure of a fossil fuel power plant due to the Commerce

investigation paralyzing the solar industry. On May 4, 2022, the Northern Indiana Public Service Company ("NIPSCO") announced delay of the planned shutdown of a coal-fired power plant to 2025, citing "uncertainty and delays" in the solar panel industry. NIPSCO representatives stated on an earnings call they expect the investigation to delay solar projects by six to 18 months and as a result the utility is expecting to delay the retirement of two coal-fired units by two years. NIPSCO previously calculated that replacing its coal with renewables could save customers billions of dollars over three decades.



### Maryland

While most observers expect next year to be a watershed year for climate and clean energy legislation if the

Governorship flips, Governor Larry Hogan (R) allowed the Climate Solutions Now Act of 2022 (<u>SB 528</u>) to become law without signature. The law requires the State to reduce statewide greenhouse gas emissions, establish a netzero statewide greenhouse gas emissions goal, and develop building energy efficiency and electrification requirements.



#### **Massachusetts**

The Baker Administration continues to push forward several energyrelated items in its last year. On April 15, 2022,

the Massachusetts Department of Environmental Protection ("MassDEP") published proposed amendments to the Clean Energy Standard ("CES"). The proposed amendments include setting the CES alternative compliance payment ("ACP") and Clean Energy Standard-Existing ("CES-E") ACP to \$35/MWh and \$10/MWh respectively for years 2022 through 2050. Comments are due on June 3, 2022, and we expect a final decision in the coming months. On May 20, 2022, the Massachusetts Department of Energy Resources ("DOER") issued an email notice to stakeholders identifying two errors affecting the minted supply of 2021 Clean Peak Energy Certificates (CPECs).

Omnibus energy legislation focused on advancing offshore wind is expected to make it through the legislature before the July 31, 2022, end of session. A conference committee has been appointed to merge HB <u>4524</u> (previously HB 4515) and SB <u>2842</u>. The House version contains specific offshore wind provisions, including tax incentives, grid modernization, and a target of 5,600 MW by June 2027. The Senate version is slightly broader and includes energy efficiency and transportation goals. We likely will not see much movement until July.

On May 24, 2022, the Commonwealth's highest court ruled Attorney General Maura Healey can pursue a lawsuit charging ExxonMobil with violating state consumer protection laws. Healey, a candidate for Governor, alleges ExxonMobil knew about the threat of climate change but downplayed it publicly while selling fossil fuels.



### **New Jersey**

The Board of Public Utilities ("BPU") continues to broadly deny extensions for projects unlikely to

meet Transition Renewable Energy Credit ("TREC") deadlines while smoothing the process of moving projects from the TREC to the Administratively Determined Incentive ("ADI") successor program. On April 26, 2022, BPU issued a Straw Proposal for the Competitive Solar Incentive ("CSI"). Staff will hold three virtual Stakeholder Meetings this summer to discuss the CSI Straw Proposal, with comments due June 20, 2022. On May 18, 2022, the BPU adopted a rule to implement the requirements of Section 38(d)(2) of the Clean Energy Act of 2018, as amended, which establishes a cost cap on certain Class I renewable energy incentives. Additionally, the BPU calculated the Cost Cap for Energy years 2021, 2022 and 2023 and noted that they are not forecasted to exceed the cost cap in 2022 or 2024. In the same order, the BPU also released the megawatt allocations in the ADI for Energy Year 2023 (as a reminder, the energy year, and capacity allocations close with new blocks opening on June 1, 2023).

Legislation related to interconnection (S431) and energy storage incentives (S2185) will be heard and voted upon at the next Senate Energy and Environment Committee meeting, which is scheduled for June 6.



### **New York**

New York's gubernatorial drama continued this spring, with Lt. Gov. Brian Benjamin resigning

over alleged campaign finance violations in his previous position. After last-minute legislation to allow him to replace Benjamin on this year's ballots, Antonio Delgado was sworn in as lieutenant governor on May 25, 2022. A special election to fill his congressional seat will be held at the same time as the August 23, 2022, primary.

On April 14, 2022, the New York Public Service Commission ("NYPSC") issued a final <u>order</u> approving a new framework for the state to achieve at least ten gigawatts of distributed solar by 2030 (often referred to as the "10GW Roadmap"). The adopted framework includes an investment of \$1.5 billion in ratepayer-funded incentives to extend the NY-SUN program. It also adds prevailing wage requirements for projects 1 MWac or greater. NYSERDA released an updated NY-SUN operating plan on May 31, 2022. Incentive programs will officially open on June 7, 2022.



### Ohio

Ohio energy policy continues its recent ambivalence toward clean energy. On March 8, 2022, the Public

Utilities Commission of Ohio argued to the Ohio Supreme Court that its approval of the Solar Generation Fund established by 2019's scandal-mired HB6 was proper. The Ohio Manufacturers' Association Energy Group has argued the Commission erred in designing the rate mechanism.

The Ohio Public Siting Board is expected to issue new rules this year to require solar setbacks of 100' from roads and 300' from residences. We also expect additional requirements around fencing and vegetative screening, as well as bills to require larger setbacks to be introduced.



### **North Carolina**

North Carolina has begun to implement HB 951. On May 16, 2022, Duke Energy <u>submitted</u> to its proposed plan

to the North Carolina Utilities Commission ("NCUC") as required by HB 951. This plan will be a key component <u>NCUC will use</u> to compose the overall Carbon Plan as required by December 31, 2022.



#### Pennsylvania

Pennsylvania's as-yet unresolved primary will see a dramatic gubernatorial contest between Attorney

General Josh Shapiro (D), a vocal proponent of solar and other clean electricity, and State Senator Doug Mastriano (R), an avowed supporter of Q-Anon and other fringe theories, including in protest of the 2020 presidential election. The Senate race for the seat currently held by retiring Senator Pat Toomey (R), which will help determine control of the U.S. Senate, will see Lt. Gov. John Fetterman (D) versus the winner of a recount between Dr. Mehmet Oz and David McCormick.

After several showdowns between Governor Wolf (D) and the Republican-controlled Legislature, including a last-minute stay on publication, regulations establishing Pennsylvania's participation in the Regional Greenhouse Gas Initiative ("RGGI") were published April 23, 2022, setting up a start date of July 1, 2022. Litigation continues.

#### The PUC's annual AEPS compliance report

includes discussion of the *Hommrich* lawsuit that invalidated regulations around virtual meter aggregation and contains a recommendation to reform net metering "to curb excessive wholesale generation from being compensated at retail rates..." In the report, the Commission recommends that "the General Assembly consider modifying the structure of net metering by placing reasonable bounds to curb excessive wholesale generation from being compensated at retail rates."



### Virginia

On April 11, 2022, Governor Youngkin signed multiple bills related to renewable energy. <u>SB 502</u> and <u>HB 1087</u> allow localities to assess projects

5 MW or less for either Machinery & Tools or Revenue Share tax (not both). The bill does not apply to projects 5 MW or less that were approved by a locality prior to July 1, 2022. <u>SB 537</u> and <u>HB 206</u> give localities the option to require developers to replace or preserve existing trees in a particular site. For example, a developer could be required to ensure that 10 to 20 percent of their site is covered by tree canopy, depending on how the site is zoned and how many units there are per acre. Trees that are planted have 20 years to grow into a canopy that exceeds 5 feet in height. Trees can be planted elsewhere if there is not enough space on-site, but they must be in the same locality.

In March 2022, the Virginia Department of Environmental Quality ("DEQ") announced that – effective immediately – it would define solar panels as impervious surface areas. On April 14, 2022, DEQ released additional <u>guidance</u> that pushed implementation out to January 1, 2025 for all projects that have not received interconnection approval.

Public comment for the draft Virginia Energy handbook for renewable energy and energy storage development on brownfields and previously coal mined lands were due on May 23, 2022. A draft copy of the report can be found <u>here</u>. The final report is scheduled to be released by July 1, 2022.

In April 2022, the Virginia Department of Energy and the Virginia Solar Initiative at the Weldon Cooper Center for Public Service at the University of Virginia released the <u>Virginia Solar Survey</u>. The first such survey in Virginia offers data regarding each county and city's experience with and readiness for solar development.

On April 14, 2022, the Virginia State Corporation Commission opened a <u>docket</u> to establish a selfcertification process for DG resources seeking to qualify as low-income projects and consider additional GATSrelated questions. Comments are due June 8, 2022.

### Navigating the Storm Assessing and Navigating Key Risks for the Solar Industry

#### By Yuri Horwitz

Every year, we put pen to paper to share our thoughts on the direction our industry is headed. In previous years we focused on opportunities: reduced module costs resulting from underlying shifts in manufacturing and commodity prices, the long-term promise of solar energy indicated by strong demand from corporate customers, and the need for the federal government to focus on pragmatic approaches to scaling American transmission infrastructure. This year we focus on current risks we think are critical for our industry to understand.

#### Background

There is overwhelming and increasing demand for renewable energy in the United States, and for solar energy in particular. A majority of Americans, independent of political affiliation, support renewable energy. Leading this demand are large corporations that are transitioning to renewable energy on behalf of their employees, their customers, and their shareholders. Solar is now the least expensive form of electricity in the world, and it is the single largest source of new electrical capacity installed in the United States.<sup>1</sup>

Today, the solar industry won a huge victory when the Biden administration announced a twoyear pause on new tariffs against solar modules imported from Southeast Asia. Details about the policy are still developing, but the move is viewed as a response to concerns about the Department of Commerce's ongoing anti-dumping



and countervailing duty (AD/CVD) investigation into the same products. The change is prophylactic-regardless of the outcome of the AD/CVD investigation, any resulting tariffs will not impact modules imported during the next 24 months. It is also narrow, leaving Section 201 and other existing tariffs and trade restrictions unaffected. In the same announcement, the administration also said it will invoke the Defense Production Act to support the long-term development of domestic solar manufacturing The administration's announcement signals exactly the long-term policy strategy that many of us have been advocating for years, and it's a massive win for the industry. But important challenges remain:

(1) supply-chain disruptions caused by COVID 19 and forced-labor concerns; (2) a suspension of new interconnection in PJM, one of the country's most important markets; and (3) an inflationary environment that increases the cost of capital for renewable energy infrastructure.

#### 1. Supply Chain Issues

Across almost every sector, COVID-19 has dramatically reduced available labor and industrial manufacturing capacity since 2020, especially in Southeast Asia and China. Production of solar modules, trackers, and other critical equipment was no exception.

<sup>1</sup> While solar accounted for 3 percent of U.S. electricity generation in 2020, the EIA (which has historically underestimated growth) projects this figure will be 20 percent by 2050. The Department of Energy, however, estimates that solar could account for upwards of 50 percent of all electricity by 2050

The price of polysilicon, the raw material used to produce solar modules, has tripled in the last 24 months. Shipping costs have increased by \$20,000 per container, or around 600 percent, during the same period. Shortages of semiconductor chips, which are critical for a wide variety of modern goods including for electrical inverters, have increased delivery lead times by six months. (Anyone looking to buy or sell a car has noticed this shortage.) And of course, the rising prices of steel, aluminum, and copper have hampered the entire global economy, increasing balance-of-system costs by 6 cents/watt, or 30 percent.

Another important, and complicating factor, is the Uyghur Forced Labor Prevention Act (UFLPA) which was signed into law on December 23, 2021. The UFLPA was designed to prevent the import of products made with forced labor in China by establishing a rebuttable presumption that any goods mined, produced, or manufactured, even in part, in the Xinjiang Region of China are prohibited from entering the United States.

The UFLPA could apply to many of the materials used to manufacture solar modules, including glass, aluminum frames, and other components. Because implementation guidance remains outstanding, uncertainty remains due to traceability risk exists, further driving up costs and limiting availability. This uncertainty, combined with the risk of new tariffs and the effects of COVID-related shutdowns, has frozen the supply of Chinese and Southeast Asian solar modules bound for the US market.

#### 2. Interconnection in PJM

In addition to significant tariff risks and price increases, the solar industry must also grapple with interconnection delays. PJM is the largest Regional Transmission Organization ("RTO") in the U.S., spanning from New Jersey to parts of Illinois and down through North Carolina. PJM also includes the largest concentration of data centers in the world. This makes PJM the single most important electricity market for corporate customers globally, which in turn drive demand for over 25 percent of the utility-scale solar projects in the country.

PJM is in charge of grid interconnection for the many electric generators located throughout its territory. Over the last five years, the number of applications for interconnection in PJM has grown exponentially, primarily driven by applications from new solar projects. During that time, PJM has failed to adopt procedures common in other regions capable of accommodating the increased demand. As a result, the RTO's interconnection process, originally designed to serve a relatively small number of new and very large coal and natural gas plants per year, has collapsed. In response, PJM has been forced to declare a moratorium on new interconnection applications for nearly two years while it transitions processes. This will affect over 1,000 projects, 95 percent of them solar, for years.

The impacts of these delays are significant. Every year, solar developers invest millions of dollars of at-risk capital with landowners, utilities, regulators, and other stakeholders with the expectation of eventually bringing their projects online. These developers must now wait until at least 2025 to find out whether their projects will be allowed to interconnect, and at what cost. Corporate customers working with these developers are similarly struggling to understand whether the projects they have contracted power from will be built, and whether these corporations will have access to the clean energy they had planned for.

Developers should ensure that they have appropriate liquidity to manage portfolios that may now take longer to develop. To adjust, some developers may have to sell portions of their portfolios or partner with those that have access to longer-dated capital.

The impact of these delays on customers will also be significant. Data centers consume

between three and four percent of the electricity generated in the United States, and over 90 percent of all internet traffic flows through data centers located in PJM. Corporate customers targeting 2025 to meet their renewable electricity goals, and those with 24/7 goals in particular, will have to collaborate with developers as to how to mitigate these delays.

#### 3. Inflation

For over a decade, the US has benefited from a combination of historically low interest rates and historic economic growth. In the last 24 months, governments have made significant capital injections into the global economy to incentivize growth and protect against a downturn during the COVID-19 pandemic. This has enabled corporations and investors to secure substantial amounts of low-cost debt to scale their businesses and investments, in turn enabling long-term growth in equity markets. There is no question that this environment has helped to power the development and construction of renewable energy assets, which have significant upfront costs but long-duration financial benefits.

Unfortunately, that same environment, together with pandemic-led disruptions and Russia's invasion of Ukraine, has triggered inflation not seen in the United States in 30 years. Gasoline prices are now floating above \$5 per gallon, and general staples have experienced price increases of up to 10 percent. In response, the Federal Reserve is doing what it's supposed to—raising interest rates to tamp down inflation. The Fed raised rates by 50 basis points (bps) (0.5 percent) in May, and it is poised to raise them again two or three times in the next 18 months.

As interest rates rise, so too will the blended cost of capital for infrastructure projects. We estimate that every 100-bps increase in interest rates equates to around a 10 cent/watt increase in capital costs, or a 125–150 bp reduction in returns. This estimate does not account for the increase we will very likely see in investors' expected returns on equity. This dynamic will put additional pressure on leveraged transactions as well as on long-dated infrastructure generally.

Projects with thin cash flows, significant leverage, or floating interest rates will be challenged, because their debt-to-service ratios will shrink. Sponsor equity, where return expectations may increase as well, will have to fill the gap. Solar developers and independent power producers ("IPPs") whose businesses are supported by corporate debt facilities will be challenged.

But while inflation certainly poses challenges for our industry, it also presents opportunities.

Operational solar projects with long-term contracts are relatively inflation-insulated, noncorrelated assets with limited ongoing operation and maintenance requirements. These projects are generally positioned to weather an economic downturn better than natural gas or wind generation facilities because of their low operational expenses and zero fuel costs. Most operational solar projects will actually increase in value because their "tail value" will increase in tandem with long-term natural gas and electricity price curves.

Operational assets that are merchant (like a number of wind and hydroelectric projects are) will benefit tremendously, because they can sell into high-priced markets immediately. To take one example, pricing in PJM now regularly averages \$60/MWh—that's not peak, that's currently average. Pricing that high is unheard of in recent history, but it will become increasingly common. If an IPP purchased a solar energy asset expecting \$30/MWh, its investors are doing well.

Developers may also benefit from an inflationary environment in certain respects. An increase in power prices will accelerate the ongoing increase in PPA rates. Developers on the right side of interconnection reform in PJM or with near-term assets in their portfolio will benefit from scarcity value.

#### Conclusion

It would be hard to overstate these changes. Most in our industry have not experienced a prolonged macro-economic downturn, and even fewer have experienced significant inflation. Over 99 percent of the solar assets built in the United States were built in the last decade or so – and when we started Sol in 2008, less than a percent of the current national capacity was in the ground. We have built billions of dollars of infrastructure and replaced some of the most polluting coal plants in our country along the way. Lots to be proud of. But our industry is changing, and we must be ready to adapt.

Supply-chain issues have raised module prices by 10–15 cents per watt and have raised balance-of-system costs by an additional 5 cents per watt. Put another way, costs have increased by around 30 to 40 percent, while Commerce's recent anti-circumvention investigation has reduced the availability of modules by 90 percent. In addition, assuming an increase in interest rates by an additional 100 bps, the rising cost of debt alone will increase project costs by the equivalent of 8-10 cents per watt. In sum, developers are facing an overall capex cost increase of around 25–30 cents per watt, or around 30-40%. Smaller projects will have higher capex increases, but are their economics are less sensitive to these costs generally.

We estimate that each 5 cents/watt increase in capex equates to around \$2/MWh in increased PPA rates given an unlevered after-tax full-term IRR of 6 percent. The 25–30 cents/watt increase in costs noted above translates to a \$12–15/MWh increase in PPA prices, or an increase of 25 percent—which is exactly what is being reported in PJM, MISO, and other markets.

We urge customers and developers to work collaboratively to address these issues—most of which are not only beyond the control of developers, but beyond the control of the industry. It is a storm we all can – and must – navigate together.



### Battery Storage is the Way of the Future: Have You Accounted for the Right OpEx in Your Financial Model?

By Jill Rathke, Erin Hickok, and Eugene Rhee

Most solar developers around the world are rushing to add lithium-ion battery storage to as many projects as possible and to update financial models to account for the added development and OpEx challenges they present. Without many operating batteries on the market, many developers and owneroperators (Sol included) are continuing to update their **OpEx** assumptions. Public reports such as this 2020 NREL forecast for commercial scale battery storage, provide forecasts for how fixed operations and maintenance ("O&M") costs will decline over time, but these projections are difficult for developers to integrate into project economic models without



more operational data. Even the few public reports published in 2020 and 2021 include not only a range of published O&M costs—see the table below for a few examples—but also report **significant uncertainty on the scope of those examples.** 

While battery original equipment manufacturers (OEMs) and integrators can advise developers on what some of these costs might be, such as

preventative maintenance or a Long-Term Services Agreement ("LTSA") that includes an augmentation plan, many of these project costs are up to the developer to assess and to integrate into economic models. Battery energy storage systems ("BESS") present a huge opportunity for the clean energy industry as deployment grows and hardware costs decline.

2020 O&M Cost	BESS Size	Source
\$1.921/kWh	100 MW / 200 MWh	Lazard's 2020 Levelized Cost of Storage Analysis – Version 6.0,
\$1.04 - 1.26/kWh	1 MW/ 2 MWh - 100 MW / 200 MWh	Pacific Northwest National Laboratory 2020 Grid Energy Storage Technology Cost and Performance Assessment
\$12.5/kWh \$8.75/kWh	60 kW – 1.2 MW / 240 kWh – 7.2 MWh 60 MW / 240 MWh	NREL Storage Futures Study



• Auxiliary Loads: For technical and economic reasons, most often the thermal management systems and SCADA are served by a separate feeder, using retail power from the grid rather than the solar system. Auxiliary load profiles are hard to estimate and vary from project to project depending on precise cycling patterns and the applicable BESS product. Battery OEMs and integrators may not be able to provide these estimates early on, leaving developers struggling to include reasonable estimates in their models. Even Tesla Megapacks, known for their ability to use the battery's own charge to power its thermal management system, still require some additional auxiliary loads (e.g., additional SCADA for the entire BESS). For most utilityscale battery systems, these additional auxiliary loads are separately served by their own retail meters.

#### **24/7 Emergency Alarming with the Fire**

**Department:** Many BESS integrators offer a basic preventative maintenance package that includes valuable alarming and forecasting of specific equipment deficiencies that could eventually lead to fires. The responsibility of contacting the fire department in the event of an emergency fire alarm, however, is still often passed around like a hot potato. For smaller developers without a 24/7 network operations center, this all-hours fire alarm notification requirement is something that they must be ready to cover themselves.

- **O Climate-Controlled Spare Parts:** Capacity Maintenance Agreements (CMA)<sup>2</sup> typically require the asset owner to purchase a specific list of spare parts. Make sure to ask for this list and associated costs in advance-because they can add up! However, some (e.g., the battery modules) require specific climate conditions and appropriate documentation of said conditions to maintain any applicable warranties. Luckily, they are the same as the operating modules require, so the simplest solution is to leave several empty racks and simply store the spare modules in the same enclosure as the operating battery (with a battery management system ("BMS") to track conditions).
- **Install of Augmentation:** The installation of the augmented BESS modules can be a frequently forgotten scope item and uncounted cost in the initial pre-NTP<sup>5</sup> financial model. Most BESS integrators are not prime construction/engineering contracting firms and treat the install and balance of system of the augmented BESS modules the same way as they do the initially installed modules, assuming that developer/asset owner is responsible for install. Ensure that you don't undercount the future cost of mobilization and lifting equipment rental. While this gives developers the flexibility to shop around for price, it leaves some uncertainty on the table as to what the cost of installing additional BESS units will be in 7-15 years. There are ways to construct the initial build with everything in place to make that mid-term augmentation as efficient to install as possible, but we are all making calculated assumptions as to what the future install cost will be.

<sup>2</sup> What is Capacity Maintenance Agreement (CMA) exactly? When a BESS integrator commits to maintaining a certain capacity (e.g. 20 MWh) from beginning of life commissioning through a full contract term (e.g. 20 years) and does this through a combination of oversizing and augmentation.

#### **O Non-BESS Equipment O&M:** BESS

integrators provide the BESS modules/ enclosures, the inverters (PCS), and often the medium-voltage transformers. Beyond that, your EPC partner or in-house construction team will be procuring a much longer list of equipment, and the maintenance of this additional equipment is often a forgotten cost as well. If a BESS is paired with a solar project, the O&M provider for the solar project can typically offer this O&M for a reasonable additional cost. Alternatively, if the BESS is standalone, this additional O&M is both more expensive and can be harder to findtherefore, it is even more important to add these costs into the model early on.

#### **O** Corrective Maintenance for Smaller BESS:

For smaller BESS where a CMA doesn't make sense economically (e.g. < 15 MWh), integrators and BESS vendors provide a wide range of contract term services and it can be hard to parse through different defined terms from different vendors and evaluate if they are covering equivalent scope. Most offer preventative maintenance that is explicitly mentioned in the BESS proposals, but the corrective maintenance is frequently left out of many offerings for smaller projects (or the costs are 'TBD' depending on the future number of corrective maintenance events), and therefore, can easily be left out of an early-stage financial model if not careful. Extended Warranty: In addition to corrective maintenance, another sometimes hidden cost (and typically named different ways by different OEMs) is the warranty extension. Different vendors offer different warranty lengths included for free with the system purchase, but there is typically a cost to extend beyond 15 years and frequently a cost to extend beyond even just 3-5 years. Not purchasing this extended warranty for the full term of contracted revenue leaves an unthinkable scope gap that financiers won't accept, and therefore, these warranty extensions are a need-to-have.

As the industry grows and matures, the standard OpEx assumptions for BESS projects will be easier to forecast and calculate. For all of Sol Systems' utility-scale & Sol Customer Solutions' distributed generation solar projects, we are looking to add energy storage and working with several customers on standalone battery opportunities. What is clear is that energy storage will continue to be a key aspect of project development and energy management going forward and the Sol team is eager to work with our development partners and customers to create as many new opportunities as we can.



Sol's 5 MWh BESS + solar in Holliston, MA for the Town of Holliston – Under development

### Infrastructure + Impact Spotlight Series

By Adaora Ifebigh

At Sol Systems, we work with our customers to design tailored programs for a more impactful sustainable infrastructure solution. We do this because we believe in the work, it maps to our own culture and mission, and we can help lead our customers to make a transition they would not otherwise make. Our work connects our investments and projects to the community through educational programs focused on sustainability and clean energy, through job training programs, and through integrated economic activities around our projects. We focus on three aspects of the life cycle for the projects that we develop and/or finance: (1) site selection, (2) development, and (3) operations. In each phase, we attempt to maximize impact.

As part of our commitment to supporting underresourced communities through infrastructure investment and development, on May 17, 2022, Sol Systems and FedEx announced a unique charitable arrangement that will benefit So Others Might Eat (SOME), a local Washington DC non-profit. This effort builds off the 915Kw solar system Sol Systems developed on the roof of the FedEx Express Eckington Place facility in Northeast Washington, D.C. A portion of the energy credits generated from the project will be donated to SOME and help offset annual electricity costs at two of their facilities in Ward 5. At these facilities and through its overall mission, SOME provides programs to support DC residents who are impacted by mental health, homelessness, and poverty.

In addition, Sol has <u>partnered with Microsoft</u> to combine a 500MW framework power purchase agreement (one of the country's largest) with a groundbreaking strategy to invest in underresourced communities and communities



disproportionately impacted by climate change. As part of this initiative, Sol Systems will identify places where we can craft communitybased energy solutions, support local workforce development opportunities and partner with local organizations working to address challenges in their communities.

In this spotlight series, we will provide the opportunity for our staff, partners, and customers to get to know the community-based organizations we work with and to learn more about Sol's journey to help facilitate a more just and fair energy future.

The first five organizations are based in Philadelphia, Baltimore, and Washington DC, all focused on issues related to renewable energy, environmental justice, jobs creation and training, habitat restoration, and other community and societal impact challenges. In the coming months, you will hear more about these organizations and how Sol Systems works with them towards an equitable clean energy future.

PowerCorpsPHL based in Philadelphia, connects disconnected young adults and returning citizens to careers by using community service as a model to provide education and paid work experience. Sol's partnership will help PowerCorpsPHL to expand a skillsbuilding program focused on mathematics and construction and field tests for the utility

industry, increase career exposure opportunities for the students and address transportation logistics services for the program graduates.

#### Philadelphia Energy Authority's Bright Solar

Future (BSF) program provides access to solar careers for young people in Philadelphia, growing a diverse and more equitable workforce that will help make national climate priorities a reality. The students who are primarily from communities of color, train in solar and battery storage installation, sales, design, weatherization, construction basics, and job site safety. Sol's partnership will help curriculum development and equipment purchases for their new energy storage training model and adapt existing curriculum to create a permanent solar training program for various school districts.

Groundswell based in Washington DC, is a nonprofit organization that builds community power through equitable community solar projects and resilience centers, clean energy programs that reduce energy burdens, and pioneering research initiatives that help light the way to clean energy futures for all. Groundswell is working with various partners in the energy industry including the Baltimore Office of Sustainability, and the Maryland Energy Administration (MEA) to identify appropriate facilities for energy resiliency centers (solar + storage) serving low-income neighborhoods within Baltimore City. The non-profit City of Refuge will be among the first resiliency centers in the city with solar and battery storage.

#### GRID Alternatives Mid-Atlantic (GRID Mid-

<u>Atlantic</u>) based in Washington D.C., is nonprofit organization that provides no-cost solar installations and solar job training. It has a mission to build community-powered solutions to advance economic and environmental justice through renewable energy. With their Solar Works DC Training and Solar Futures Programs, GRID provides group-based job training and education in solar system installation to residents with low incomes. Sol's partnership will help GRID to provide its students with career support services (such as, career checkin sessions, case management support/checkins, resume techniques, professionalism in the workplace, etc.), financial and computer literacy programs, and other program support services.

Black Owners of Solar Services (BOSS) is a nationwide collaborative of entrepreneurs, financiers, veterans, attorneys, engineers, contractors, developers whose mission is to combine and leverage their collective power to lead actionable solutions for sustained access to equitable opportunities in clean energy production, distribution, and storage for Black owned businesses. BOSS and Sol will collaborate in the development and implementation of a business-to-business mentorship and sponsorship program that will help connect diverse business owners to opportunities and relationships across the renewable energy industry

Sol Systems is making it a priority to continuously work with its partners to meaningfully engage with communities through innovative solutions to tackle local challenges and build a sustainable pathway for future generations. Our commitment to working with under-resourced and communities of color is ongoing and built into the mission and vision of our company.

# SOLAR CHATTER



In a late-May study released by

released by RMI, detailed analysis projected \$5 billion in annual savings for electricity customers if the Investment Tax Credit ("ITC") and Production Tax Credit ("PTC") were extended and expanded. The study adjusted its model for both recent inflation and fossil fuel price volatility.

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After fits and starts, the Securities and Exchange Commission ("SEC") recently proposed how public companies should disclose risk from climate change and climate change regulation. Under the proposal, companies would be required to disclose information about climate-related risks that are reasonably likely to have a material impact on their business, results of operations, or financial condition, as well as to disclose certain climate-related financial statement metrics in a note to their audited financial statements. The goal is to require the disclosures necessary to properly evaluate investor risk, the core mission of the SEC. The risks of not doing so are highlighted in a number of fora, including the recent decision allowing Massachusetts's lawsuit against ExxonMobil under state consumer protection laws to move forward. Massachusetts alleges the company knew about the threat of climate change but downplayed it publicly while selling fossil fuels.

### <u>Renewables Forward</u> announced the <u>hiring of its first executive director</u>, Chris

**Nichols**, to champion the DEI initiative started by leading U.S. clean energy companies and partners, of which Sol Systems is a founding member. Nichols brings an impressive track record spearheading DEI work from within and outside the clean energy industry.



The solar business landscape is always changing, and May was no different with large-scale developer <u>Borrego announcing</u> the sale 8.4 GW of their solar portfolio along with 6.4 GWof their battery storage footprint. While Borrego moves on from developing, French energy company <u>TotalEnergies announced the purchase</u> of 50 percent of developer Clearway in TotalEnergies' latest move to scale its role in the U.S.

The "social cost" of a pollutant, such as carbon dioxide, quantifies the cost to all of us of adding one more ton of emissions – in other words, how much damage does a pollutant cause. All pollutants have these metrics, but the "<u>social cost</u> <u>of carbon</u>" has proved particularly contentious in the U.S. lately -after numerous attempts to block its use through the courts, the Supreme Court recently declined to take the case, allowing the White House to finalize (and likely significantly increase) the metric. New York State recently completed a similar analysis, and now uses\$121 per ton CO2, significantly increasing the calculable benefits of clean energy and climate programs.

Congress left town for the Memorial Day holiday weekend without meaningful progress on alleviating Senator Joe Manchin's opposition to passing a reconciliation bill that includes an ITC extension and expansion (all Republicans remain opposed). When Congress returns, the focus will be on the July 4th holiday as a soft deadline to reach an agreement to use reconciliation to pass a party-line climate, energy, and deficit reduction package. We do expect Democrats to use the reconciliation process before the August recess to extend Affordable Care Act ("ACA") subsidies; if not extended, notice of premium increases would go out just before the November election, hampering an already potentially dismal election for Democrats.

### **COMPANY NEWS**

### Illinois American Water and Sol Systems Celebrate Peoria Solar Field

May 13, 2021

PEORIA, III. – Yesterday, Sol Systems and Illinois American Water, the largest investorowned water utility in Illinois, cut the ribbon on their second solar project, located in Peoria, III. The 2.3-megawatt (MW) solar project includes bifacial panels and single-axis trackers and will generate the equivalent electricity each year of approximately 350 homes.

This is the second project collaboration of its kind for Sol Systems and Illinois American Water. They cut the ribbon on their first 2.3 MW array, located in Champaign County, in November 2021.

Justin Ladner, Illinois American Water President, said the Solar Fields support the company's "commitment to protect the environment, while supporting sustainability and affordability." He added, "The vast majority of energy consumed by water utilities is used to pump water. By reducing energy consumption and emissions we can use water more efficiently, protect the environment and reduce costs to our customers."

"This project demonstrates Illinois American Water's commitment to the communities it serves," said Andrew Grin, Vice President at Sol Systems. "Through onsite solar, Illinois American Water succeeds in reducing its reliance on fossil fuels, cutting its operating costs, and improving the sustainability of its operations."



Illinois American Water will purchase the electricity under a 15-year power purchase agreement (PPA) with Sol Customer Solutions, enabling the company to realize low, fixed electricity costs without upfront expenditure. Sol Customer Solutions is a joint venture between Sol Systems and Arevon Energy, Inc. Arevon will manage the asset and Sol Systems will operate and maintain the project.

Sol Systems partnered with construction firm Melink Solar to build the project. The project's features include bifacial panels, which take in additional reflected energy on both sides of each panel, and single-axis trackers that rotate the panels to face the sun throughout the day.

"Melink Solar is grateful for the partnership and forward thinking approaches of Illinois American Water and Sol Systems. These organizations are helping lead the clean energy revolution to help improve our global economy, security and environment – for ourselves, our children and future generations," said Seth Parker, Vice President and General Manager, Melink Solar.

### **COMPANY NEWS**

### Sol Systems Acquires 37 MW Illinois Solar Project from Lightrock Power

April 28, 2022

WASHINGTON, D.C. – April 28, 2022 – Today, Washington, DC.-based Sol Systems, LLC, announced the acquisition of a 37-megawatt (MWdc) solar development project in Morgan County, Illinois from Lightrock Power. Sol Systems acquired the project through an RFP process executed on LevelTen Energy's Asset Marketplace and it is part of Sol Systems' growth strategy to scale its Impact + InfrastructureTM platform across the US.

"This acquisition builds on Sol Systems' significant utility-scale footprint in Illinois," said Patty Rollin, Senior Vice President, Development at Sol Systems. "We are eager to kick-off the construction phase of the Prairie Creek project which will bring local clean energy and community opportunity to the region."

Sol Systems will develop, own, and operate the project. Once complete, the project will produce enough solar energy annually to power over 5,000 homes and offset the equivalent of over 9,000 passenger vehicles' emissions for one year. As long-term owner and operator, Sol Systems will work to enable local employment opportunities and additional community benefits.

"Over the last two years we have developed sites in the USA and UK totaling 1GW. Our team remain focused on creating further opportunities to accelerate the transition to renewable energy" said Benjamin Davies, Co-Founder of Lightrock Power.



"Through the Asset Marketplace, LevelTen Energy provides a centralized platform for renewable energy project developers and financiers to easily buy and sell their projects. We are happy that our platform enabled the connection between Sol Systems and Lightrock Power, both of whom are doing pioneering work to accelerate the clean energy transition and build local resiliency," said Patrick Worrall, Vice President of Asset Marketplace, LevelTen Energy.

To learn more about the project, visit <u>www.prairiecreeksolar.com</u>.

### **COMPANY NEWS**

### Sol Systems Acquires 540 MW Illinois Solar Portfolio From Arevon Energy

February 2, 2022

WASHINGTON, D.C. – February 01, 2022 – Today, Washington, DC.-based Sol Systems, LLC, announced the acquisition of a 540-megawatt (MW) solar development portfolio in southeast Illinois from Arevon Energy. The portfolio is one of a number of acquisitions Sol Systems is making to scale its Impact + InfrastructureTM platform across the US.

The portfolio consists of three 180 MWdc solar energy projects located across Hamilton, Randolph, Saline, and White counties. Sol Systems will own and operate the portfolio and will work with energy developer Tenaska to develop and construct the projects. In addition to delivering clean energy locally, Sol Systems will develop and operate the projects in a manner intended to enable local employment opportunities and additional community benefits. Once complete, the portfolio will produce enough solar energy per year to power nearly 77 thousand homes and offset the equivalent of nearly 140 thousand passenger vehicles' emissions.

"This acquisition begins Sol Systems' significant expansion into utility-scale solar development in Illinois," said Patty Rollin, Senior Vice President of Utility-Scale Solar Development at Sol Systems. "We are eager to work with Tenaska to construct and deliver clean solar energy to the grid and to create long-term community and ecological benefits at scale."



"This sale is a continuation of the partnership between Sol Systems and Arevon, which began with our joint venture, Sol Customer Solutions, providing distributed generation solutions to commercial customers. We are pleased to contribute to the growth of clean energy usage in Illinois," said Justin Johnson, Arevon's chief operating officer.

"The Tenaska team has been excited about solar development in southeast Illinois since the inception of these projects," said Steve Johnson, Tenaska senior vice president of development. "We are eager to continue moving forward in collaboration with Sol Systems and bringing the associated project benefits – jobs, tax revenue, landowner lease payments and other economic opportunities – to the region."

### **DEVELOPMENT PARTNERSHIPS**

Sol Systems is currently developing utility-scale projects across the U.S., and is working with developers to provide optimal financial solutions for their projects, leveraging our ability to structure unique financial vehicles for environmental commodities. See below a list of our projects under development, click the links on their name to learn more.

Project	Size	Location
Eldorado	150 MW	Saline County, IL
Tilden	150 MW	Randolph County, IL
Prairie Creek	37 MW	Morgan County, IL

Interested developers and financiers should reach out to finance@solsystems.com

### The Sol Standard June 2022 edition is out!

The Sol Standard, Sol Systems new LCFS and clean fuels newsletter provides up-to-date pricing data, market analysis, and policy trends to keep clients up to speed on the country's growing low carbon and clean fuels programs. **Download the newsletter** and <u>sign-up</u> to receive future editions.



### WHERE WE'LL BE



### CONTACT US

If you have any questions about this information, or wish to receive our newsletter via email, please contact our team. We would love to hear from you.

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