

Special | September 2022

pV magazine special

Set for takeoff

Inflation busting legislation sets solar and storage on an unprecedented growth trajectory

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Landmark legislation readies solar for takeoff

By Anne Fischer, Senior Editor, pv magazine

After years of uncertainty in the clean energy industries, the passage of the Inflation Reduction Act (IRA) of 2022 offers myriad opportunities for the entire clean energy supply chain and brings a carbon-free future closer to reality.

We are delighted to again be partnering with the Solar Energy Industries Association (SEIA) and the Smart Electric Power Alliance (SEPA), to produce this special publication for RE+. We hope you find this guide a valuable resource to help you make the most of RE+ 2022 in Anaheim, California, this September.

The edition includes insights into the key developments in the U.S. solar and energy storage industries in 2022. This includes a look at the changing landscape in Ryan Kennedy's exploration of U.S. federal policies; John Fitzgerald Weaver's study of a microgrid that protects two water facilities in California; PV Intel's survey of the 25 largest solar installations in the United States. Abigail Ross Hopper provides insight into ways in which Solar Energy Industries Association (SEIA) and Smart Electric Power Alliance (SEPA) will work with industry players to make the most of recent policy changes. And Julia Hamm draws on her two-plus decades at the helm of the Smart Electric Power Association – and she also points out what not to miss at this week's event.

Anne Fischer is Senior Editor of **pv magazine USA**. Be sure to subscribe to our free daily pv magazine USA newsletter, visit our **pv magazine USA** website www.pv-magazine-usa.com, and stay up to date on the global solar industry through our multiple country-focused sites, as well as our monthly magazine (just use the QR code to access our shop and secure a 10% discount off our subscription rate).



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RE+ welcomes you back



Solar array on the roof of Anaheim Convention Center

Welcome to RE+ 2022, previously SPI, ESI, and Smart Energy Week! After three long years, we are excited to be back in person in Anaheim, California. RE+ 2022 prides itself on being the largest clean energy event in North America, bringing together 19,000+ professionals representing all segments of the industry to network and gain insight into the evolving clean energy landscape. Under the new brand RE+, this event is the hub that's bringing the industry together, providing an opportunity for American and international clean energy leaders to meet, network, and supercharge business growth.

Our multi-day event will grant attendees access to hands-on education sessions and workshops to learn about the fast-moving industry, gain knowledge on new trends and technological developments, and further their success. The full conference education schedule dives deep into major renewable energy sectors, including solar, energy storage, hydrogen, the integration of new electric vehicles into the grid, and microgrid use cases. The event also features

700+ exhibitors showcasing their expertise and innovative solutions on the sold-out show floor and international representatives from over 110 countries ready to make connections.

This year, RE+ 2022 spotlights a variety of new and improved features including co-located events like the Zero Emission Bus Conference (ZEB Con), a revamped RE+ Tech, and the PowerUp Media Zone, as well as the return of long-time favorite networking events. For our early risers, enjoy tee-time with your colleagues at our Golf Tournament on Monday, or 'Run with the Sun' at our 5K event on Tuesday morning. Batter up and share a beer with your peers at everyone's favorite networking event, The Annual Block Party, in Angel Stadium this year!

RE+ is developed by RE+ Events and powered by industry leaders SEIA (Solar Energy Industries Association) and SEPA (Smart Electric Power Alliance). All proceeds from the event go right back into the industry to fund year-round research and education provided by the two associations as well as SEIA's advocacy efforts.

“RE+ 2022 prides itself on being the largest clean energy event in North America.”



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Julia Hamm reflects on nearly two decades of change



*After announcing her intent to step down as President & CEO of the Smart Electric Power Alliance, Julia Hamm reminisces with **pv magazine** about the highs and lows, significant changes, and what not to miss at RE+.*

Q. You recently announced that you'll be leaving SEPA as soon as a replacement is found. What do you see as the most significant changes within the organization, and what were your greatest accomplishments?

It's incredible to me to reflect on how much the organization has evolved over the 2 ½ decades that I have been with SEPA. At the beginning, SEPA was the bridge between the solar and the utility industry. As the grid-connected solar market began to take hold in the U.S., SEPA was helping to accelerate adoption of solar at both utility and distributed energy scale. Until the 2013/2014 timeframe, the organization was focused just on solar. Then solar started to become mainstream, and we had to start thinking more holistically about how all of the resources need to work together. That is when we moved from what I call "SEPA 1.0", which stood for Solar Electric Power Association, to become what we are today—the Smart Electric Power Alliance. Now we're focused on accelerating decarbonization and doing it in a way in which we are essentially technology agnostic. Any technology that helps get us to a carbon free electricity sector is relevant. When we made that shift some people were scratching their heads, but it gets to one of the things that I'm really most proud of and that's that the organization has been so adept at seeing around corners, knowing what's coming and being a thought leader.

Q. Years ago, the solar industry was called the "solar coaster". Are we still on it, and what are the current highs and lows of the industry?

Anything that is not the predominant energy resource will always have its ups and downs. Traditional energy resources have a century plus of policy support, tax mechanisms that are under the surface that aren't necessarily highly visible to the average person. When you look at it through that lens, although solar has come a long way, it is still relatively new. It is getting much more mature,

much more mainstream, but we're still on the solar coaster—it's just that the ups and downs aren't as drastic as they used to be. I do believe we've reached a point where the downs are going to be less drastic as time goes on.

As far as some of the big ups and downs now... the supply chain has become an enormous challenge for the industry. From SEPA's perspective, many utilities have significant carbon-reduction targets with solar, wind and storage playing a huge role. But now they're having a very hard time getting projects built because of the supply chain issues. It's an interesting dilemma. We've finally crossed the point at which utilities are chomping at the bit to build as much renewables as they can, and yet here we are faced with a different challenge that is slowing that down. The result, however, is that utilities are now much more motivated to be more engaged with policy issues that are aligned with the solar industry. It's very exciting to see places where the solar industry and utility industry are on the same page and can work collaboratively and productively together for positive change.

Q. What are some of the changes and highlights at this year's RE+ and what are some not-to-miss opportunities?

This is the first time we're actually going to be gathering under the new RE+ brand. We announced the brand last year, but unfortunately the show was unable to happen. The tech conference itself is not new, but we are revamping it, and it's a fantastic opportunity focused on innovative research on both solar and storage. For people who are technologically focused, particularly when it comes to R&D, that's a not-to-be-missed element. Always not to be missed is the Block Party and this year it's at Angels Stadium, which will be a fun venue. And then there is the show floor, which was sold out in July with more than 750 exhibitors booked, so it is clear that the industry is eager to get back to business in person.



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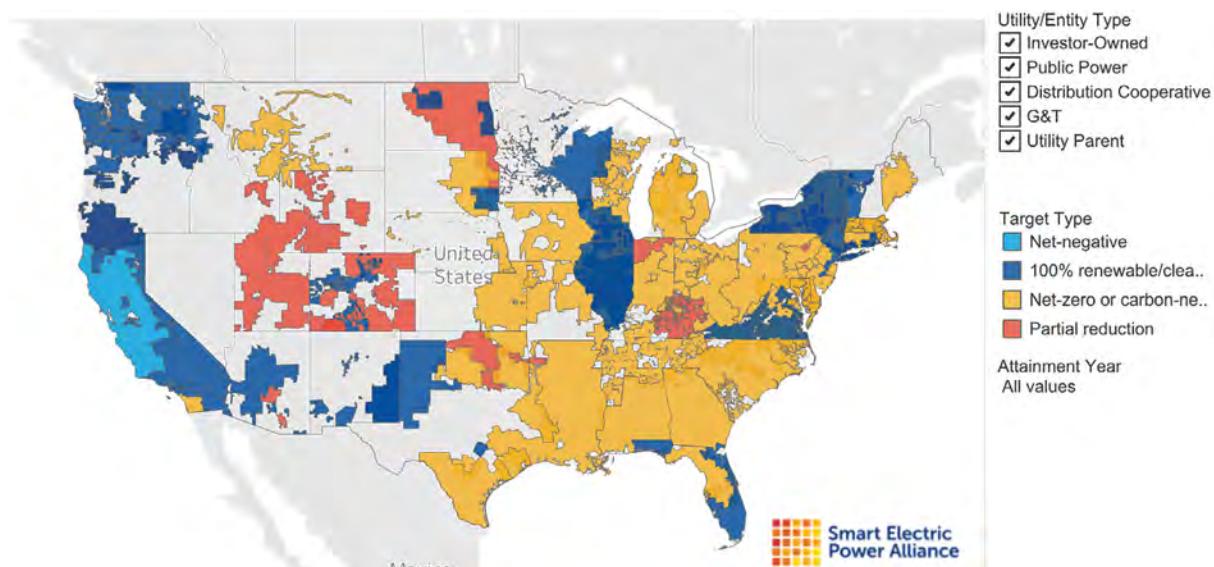


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Accelerating the transformation

By Adam Wasserman, Vice President, Engagement, SEPA

Climate considerations, natural disasters, technology advancements and cost declines, evolving customer preferences and countless other trends are driving the U.S. electricity industry transformation to a carbon-free, modern grid. To meet this challenge, utilities around the country are taking actions to lead the transition to a carbon-free energy system.



Over the past two years, U.S. electric utilities have announced significant commitments to carbon reduction. To date, over eighty percent of U.S. customers are served by an individual utility with a carbon-reduction target, or a utility owned by a parent company with a carbon-reduction target. Notably, over seventy percent of customer accounts are under a 100% carbon-reduction target according to the SEPA Utility Carbon Reduction Tracker, which maintains an updated list of utility commitments, and provides valuable analysis and illustrations to stay up-to-date with the latest utility and state trends.

However, as the SEPA Utility Transformation Challenge has shown, the challenge facing our industry is evolving from one of motivating organizations and people to make commitments and take action on carbon reduction to one of going faster and accelerating the pace of change. SEPA recognizes

this evolution and has reoriented our goals around accelerating the transformation to a carbon-free energy system. We are focused on three areas that offer the greatest potential impact: Electrification, Regulatory and Business Innovation and Grid Integration. In each of these areas, or what we call pathways, SEPA delivers actionable solutions through education, collaboration and content creation.

But we won't achieve these goals alone. An important element of our success is RE+, where the clean energy industry convenes to explore the latest technologies, build relationships, discover new business opportunities and learn best practices. RE+ offers a deep reservoir of expertise, networking and sharing to help utilities, regulators, policy makers, energy users and solutions providers accelerate progress to a carbon-free, modern energy system.

A unique opportunity, new to RE+ this year, is the SEPA Working Groups Forum. The

Forum offers any RE+ attendee the opportunity to peek behind the curtain to see the important work underway in the SEPA Working Groups. For the first time, stakeholders outside of SEPA can learn and share with this typically member-only community. The topics addressed by the working groups will include: Community Solar, Cybersecurity, EVs, Energy Storage, Grid Architecture, Testing and Certification, Microgrids and Transactive Energy.

Our members come from across the clean energy spectrum, and look to SEPA for expertise and resources to help guide their energy transformation. From the C-suite to the front lines, SEPA helps our members achieve their business goals, cultivate a smarter and more informed workforce, and provide strategic leadership input.

We invite you to explore membership in SEPA, and join us to accelerate your journey to a carbon-free energy future.

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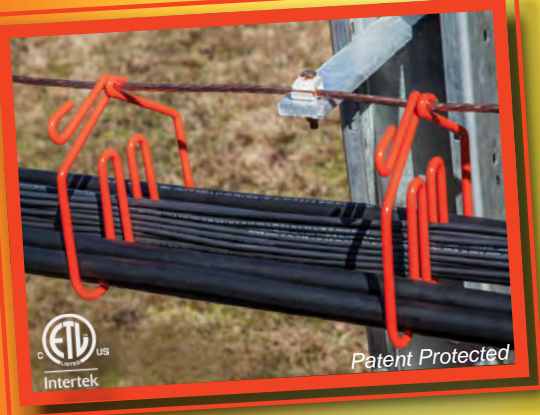
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About RE+

RE+ Events (formerly Solar Power Events) brings clean energy leaders together in marketplaces across the United States and internationally to expand business prospects and share best practices. These events examine solar, wind power, energy storage, green hydrogen, EVs, microgrids and more to foster business growth among participants and collectively identify ways to move the clean energy industry forward. Developed by the nation's leading solar energy organizations, the Solar Energy Industries Association (SEIA) and the Smart Electric Power Alliance (SEPA), RE+ Events represents an ongoing entrepreneurial approach to renewing best practices across the clean energy landscape as the marketplace evolves.

About SEIA

The Solar Energy Industries Association (SEIA) is leading the transformation to a clean energy economy, creating the framework for solar to achieve 30% of U.S. electricity generation by 2030. SEIA works with its 1,000 member companies and other strategic partners to fight for policies that create jobs in every community and shape fair market rules that promote competition and the growth of reliable, low-cost solar power. Founded in 1974, SEIA is the national trade association for the solar and solar + storage industries, building a comprehensive vision for the Solar+Decade through research, education and advocacy.

About SEPA

The Smart Electric Power Alliance (SEPA) is a nonprofit organization that envisions a carbon-free energy system that is safe, affordable, reliable, resilient and equitable. SEPA has a very specific role in the journey towards carbon-free. Our mission is to accelerate the electric power industry's transformation to a modern energy future through education, research, standards, and collaboration.



Building a strong solar industry to power America's transformation

To meet the challenge of transforming the U.S. electricity industry to a carbon-free, modern grid, the Solar Energy Industries Association is working with its member companies and partners to fight for the policies that will create the jobs and promote the competition that will drive the growth of solar power.

The Solar Energy Industries Association® (SEIA) is leading the transformation to a clean energy economy and building a strong solar industry to power America through research, advocacy, and education. We work with over 1,000 member companies and other strategic partners to fight for policies that create jobs in every community and shape fair market rules that promote competition and the growth of reliable, low-cost solar power.

Becoming a member ensures that your company connects with leading solar businesses and provides you with the insights and market intelligence you need to thrive.

Premium members receive access to basic benefits plus SEIA's advanced resources, a host of industry and event discounts, and enhanced opportunities to influence the direction of the solar industry. Memberships are cumulative – add benefits as you level up!

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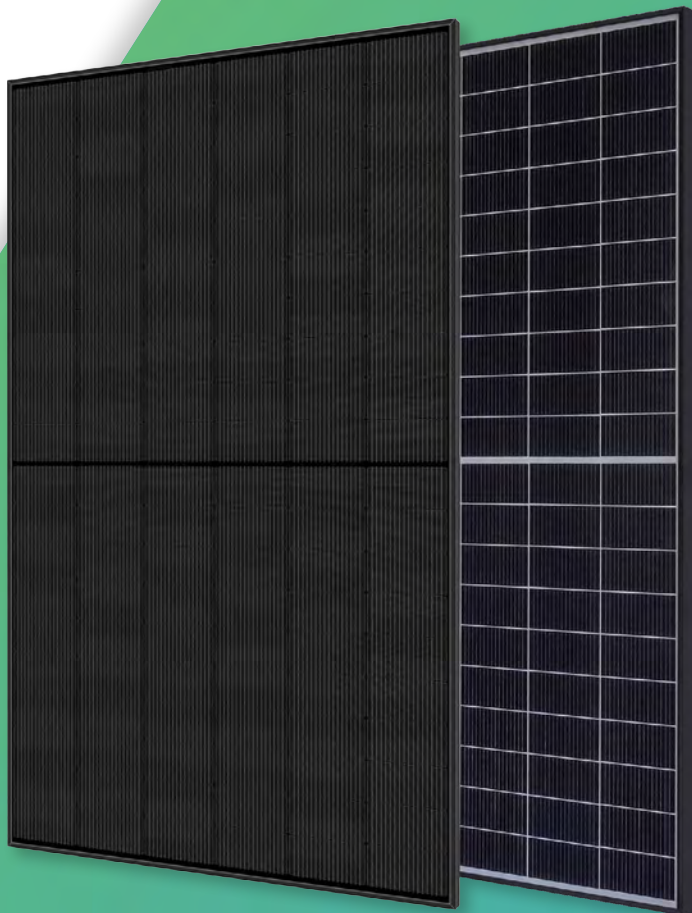


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Federal policy to usher in a new era of clean energy

By Ryan Kennedy, Editor,
pv magazine USA

Policy at the federal level continues to guide U.S. clean energy and solar markets, driving towards goals of reliability, affordability and sustainability.



The United States continues to push forward on its goals of increasing renewable energy buildout and retiring carbon-emitting energy sources. This past December, the White House set new ambitious goals for the nation as the Biden Administration signed an executive order to set targets for clean energy procurement and buildout. Solar is expected to play the central role in this transition as it is increasingly relied upon for its low-cost, high-bankability, and flexible nature of design.

The Biden order calls for 100% carbon-free electricity by 2030, at least half of which will be locally supplied, to meet 24/7 demand. It set targets for buildings and electric vehicles, and net-zero emissions from federal procurement by 2050. This electrification process will need to be supported by large amounts of carbon-free energy, and as such, many policies have been put in place at the federal level this year to support solar buildout.

The Inflation Reduction Act of 2022

The most recent and most significant federal policy development this year, and perhaps this decade, is the Inflation Reduction Act (IRA) of 2022. The Act passed in Congress on August 12. Inside the massive energy,

climate, and tax bill is \$600 billion in spending, \$370 billion of which is focused on supporting renewable energy buildout. The spending will be supported by closing tax loopholes on ultra-wealthy Americans and corporations.

The IRA mandates a reduction of carbon emissions by roughly 40% in 2030. The bill is “long overdue and a necessary step to ensure the United States takes decisive action on the climate crisis that helps our economy and provides leadership for the world by example,” said former Vice President Al Gore.

Tax credit

One of the most significant provisions in the IRA was something the industry had been calling for all year: a long-term extension of the Investment Tax Credit. The bill mandates a 10-year extension of the tax credit at 30% of the cost of the installed equipment, which will then step down to 26% in 2033 and 22% in 2034. The 30% credit will be retroactively applied to anyone who installed their system since the beginning of 2022.

The 30% credit also applies to energy storage whether it is co-located or installed as standalone energy storage. This enables the retrofit of a battery to a solar array while taking advantage of the credit.

The credit also includes the “direct pay” option, another provision the industry was calling for. This allows a developer with little or no tax liability to treat the amount of credit as an overpayment of tax, which would result in a cash payment refund in the amount of such overpayment being made to the developer.

Made-in-USA

The most significant challenge to the U.S. solar industry this year was a module supply shortage, as global supply chains faced semiconductor shortages, COVID-19 lockdowns, and the U.S. Department of Customs launched an investigation into antidumping violations that froze up the supply of nearly 80% of all polysilicon-based panels. The tariff and supply chain saga highlighted the fragility of a global supply chain backing up U.S. energy, so goals of bringing production back onshore were a major aspect of the IRA.

The bill includes over \$60 billion for domestic manufacturing across the clean energy supply chain. Included in this is \$30 billion in production tax credits to accelerate domestic manufacturing of solar panels, wind turbines, batteries, and critical minerals processing. About \$10 billion in investment tax credits is included to build new clean technology manufacturing facilities. National laboratories are granted \$2 billion to accelerate breakthrough energy research as part of the IRA.

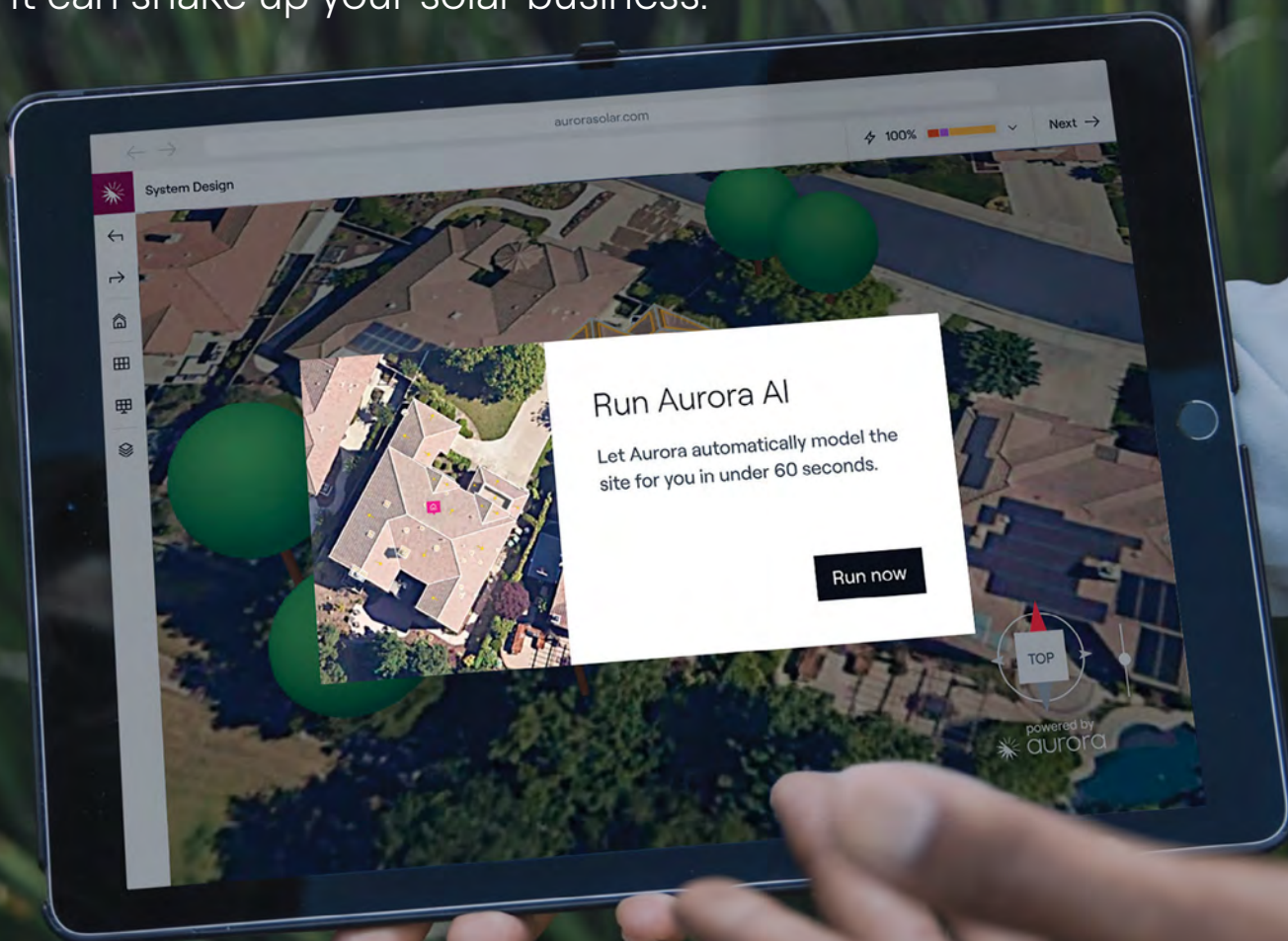
Numerous tax credits for each component are mandated, including:

- Manufacturing credit: 100% credit through 2029, 75% in 2030, 50% in 2031, 25% in 2032
- Thin film photovoltaic cell and crystalline photovoltaic cell: \$.04 per cell capacity in Wdc
- Photovoltaic wafer: \$12/sq. meter
- Solar grade polysilicon: \$3/kg
- Polymeric backsheets: \$0.40/sq. meter
- Solar module: \$.07 per module capacity in Wdc
- Torque tube: \$0.87/kg
- Structural fastener: \$2.28/kg
- Central/Utility inverter: \$0.0025 per capacity Wac
- Commercial inverter: \$0.02 per capacity Wac

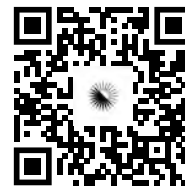


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- Battery module: \$10 per battery module capacity kWh
- Critical mineral: 10% of costs incurred
- Battery cell: \$35 per battery cell capacity kWh

“With long-term incentives for clean energy deployment and manufacturing, the solar and storage industry is ready to create hundreds of thousands of new jobs and get to work building out the next era of American energy leadership,” said Abigail Ross Hopper, president and cofounder of SEIA.

Urban and agricultural support

The IRA also contains several provisions and programs to accelerate federal goals of improved environmental justice and support for the energy transition in rural areas.

A \$27 billion clean energy technology accelerator program will support deployment of technologies to reduce emissions in disadvantaged communities. Funded at \$3 billion, Environmental and Climate Justice Block Grants are created by the bill to invest in community led projects and address disproportionate environmental and public health harms related to pollution and climate change.

More than \$20 billion will be dedicated to “climate-smart” agriculture practices. About \$5 billion in grants will be used to support healthy, fire-resilient forests, forest conservation, and urban tree planting. To support and conserve coastal habitats and the communities that depend on them, \$2.6 billion in grants will be available.

“Now, let me be clear: This bill would be the most significant legislation in history to tackle the climate crisis and improve our energy security right away. And it’ll give us a tool to meet the climate goals that are set — that we’ve agreed to — by cutting emissions and accelerating clean energy. A huge step forward,” said President Joe Biden.

“This bill requires the largest corporations to begin to — begin to pay toward their fair share of taxes by putting in place a 15 percent corporate minimum tax,” said Biden.

The Inflation Reduction Act of 2022, which is expected to be passed by the time this article

is read, will represent that largest climate and energy spending package in United States history.

Impact

The impact of this legislation is expected to be nothing short of staggering. In the Rapid Energy Policy Evaluation Analysis Toolkit (REPEAT), compiled by Princeton researchers, analysis showed that solar deployment may accelerate from 2020 rates of 10 GW of utility-scale capacity added per year to nearly five times as much by 2024, adding 49 GW of utility-scale solar each year. Solar deployment may be well over 100 GW per year by 2030, said Princeton.

Investment in solar could reach \$321 billion in 2030, nearly double the figure of \$177 billion expected under current policy. The Act would lead to nearly \$3.5 trillion in cumulative capital investment in new American energy supply through the next decade, said Princeton.

Annual U.S. energy expenditures are expected to fall by at least 4% in 2030 under the Act, a savings of nearly \$50 billion per year for households, businesses and industry. This translates into hundreds of dollars in annual energy cost savings for U.S. households. Tax credits, rebates, and federal investments in the Act would shift costs from energy bills to the progressive federal tax base.

The REPEAT report said the Inflation Reduction Act could cut annual emissions in 2030 by an additional 1 billion metric tons below current policy, including the impacts from the Bipartisan Infrastructure Law. This would represent closing two-thirds of the remaining emissions gap between current policy and the nation’s 2030 target of lowering emissions 50% below 2005 levels.

“It really makes me incredibly optimistic,” said Jesse Jenkins of Princeton University. “It doesn’t get us all the way there on its own, but it keeps us in the climate fight.”

Interconnection

Another hot-ticket item for federal policy is the reform of interconnection processes. Utility-scale, commercial, and industrial solar projects in the U.S. are often forced to wait more than three years on average to get

approval to connect to the utility grid. This creates uncertainty, increases costs, and slows solar development.

The wait is so long that three-quarters of projects in interconnection queues cancel before ever completing the process. The challenge of interconnection is considered so daunting, that developers and investors are often dissuaded from beginning a project in the first place.

Interconnection reform is being tackled in some areas at the state level, but the Federal Energy Regulatory Commission (FERC) has gotten involved, too. In June, FERC issued a notice of proposed rulemaking (NOPR) that detailed the agency’s proposed reforms to address interconnection queue backlogs. The reforms incorporate principles like transparency, standardization and accountability.

The NOPR calls for implementing a first-in, first-served cluster study process that prioritizes projects that are ready and have a greater chance of being built, thereby increasing the speed of the interconnection queue. It also creates a requirement for a standardized, transparent study process and establishes firm deadlines for interconnection studies, with penalties for transmission providers that do not meet the deadlines.

Joe Manchin and fellow Democrats said they will also work to reduce permit times and costs as another way to speed buildout. “President Biden, Leader Schumer and Speaker Pelosi have committed to advancing a suite of commonsense permitting reforms this fall that will ensure all energy infrastructure, from transmission to pipelines and export facilities, can be efficiently and responsibly built to deliver energy safely around the country and to our allies,” Manchin wrote. The Inflation Reduction Act of 2022 and reforms to interconnection are expected to usher in a new era for energy policy in the United States.

“This bill makes the largest investment ever in combatting the existential crisis of climate change, said President Biden after the Senate passed the IRA. “It addresses the climate crisis and strengthens our energy security, creating jobs manufacturing solar panels, wind turbines, and electric vehicles in America with American workers. It lowers families’ energy costs by hundreds of dollars each year.”

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Microgrid saves California water district \$73 million

By John Fitzgerald Weaver



Onsite existing diesel generator
Image: John F. Weaver

The Yucaipa Valley Water District (YVWD) of California has signed a solar energy plus battery backup power purchase agreement, to protect two facilities with French power major Engie. The agreement saves a potential \$73 million in electricity payments over 30 years, and guarantees three days of power backup for the district's two main water facilities.

Though the power purchase agreement was signed in April of 2021, the facilities are still moving through interconnection - something pv magazine will cover in more detail at a later date.

In 2018, a fire burning near the city of Yucaipa prompted the local electricity utility - Southern California Edison - to consider shutting down power lines in order to reduce the risk of fires spreading due to wind. To prevent the YVWD's County Line Water Treatment Facility from shutting down, YVWD sent a site manager to power up the onsite generators.

However, blocked roads prevented the manager from accessing the site. The fire had already taken lives, and local law enforcement wasn't taking further risks.

It was particularly important that the aeration pools at the County Line facility stay running. Breaking down waste requires a healthy, living culture of bacteria, fed by oxygen that is pumped into the water by large - electricity powered - fans. If these fans shut down for 24 hours or more, the bacterial colony collapses, and the water cannot be treated. It can take up to two weeks to reestablish the colony.

Following the fire event, the YVWD reached out to a solar power consultant to do a feasibility study in order to learn what levels of resilience the YVWD could obtain for its most important resources - the water treatment facility and water pumping station.

The initial outreach aimed to determine the amount of solar electricity that could be generated on the excess land at the Oak Glen Road Water Pumping Station.

At the Oak Glen facility it was determined that a solar power plus energy storage system could potentially offer the desired resilience, however, a full three-day backup would require more land - that wasn't available - to reach a 100% resilient backup. Though the onsite diesel generators technically can meet the energy backup needs of the facility, the requirement that they be activated locally, by a human, presented too much risk.



Water pumping station solar layout
Image: YVWD public documents



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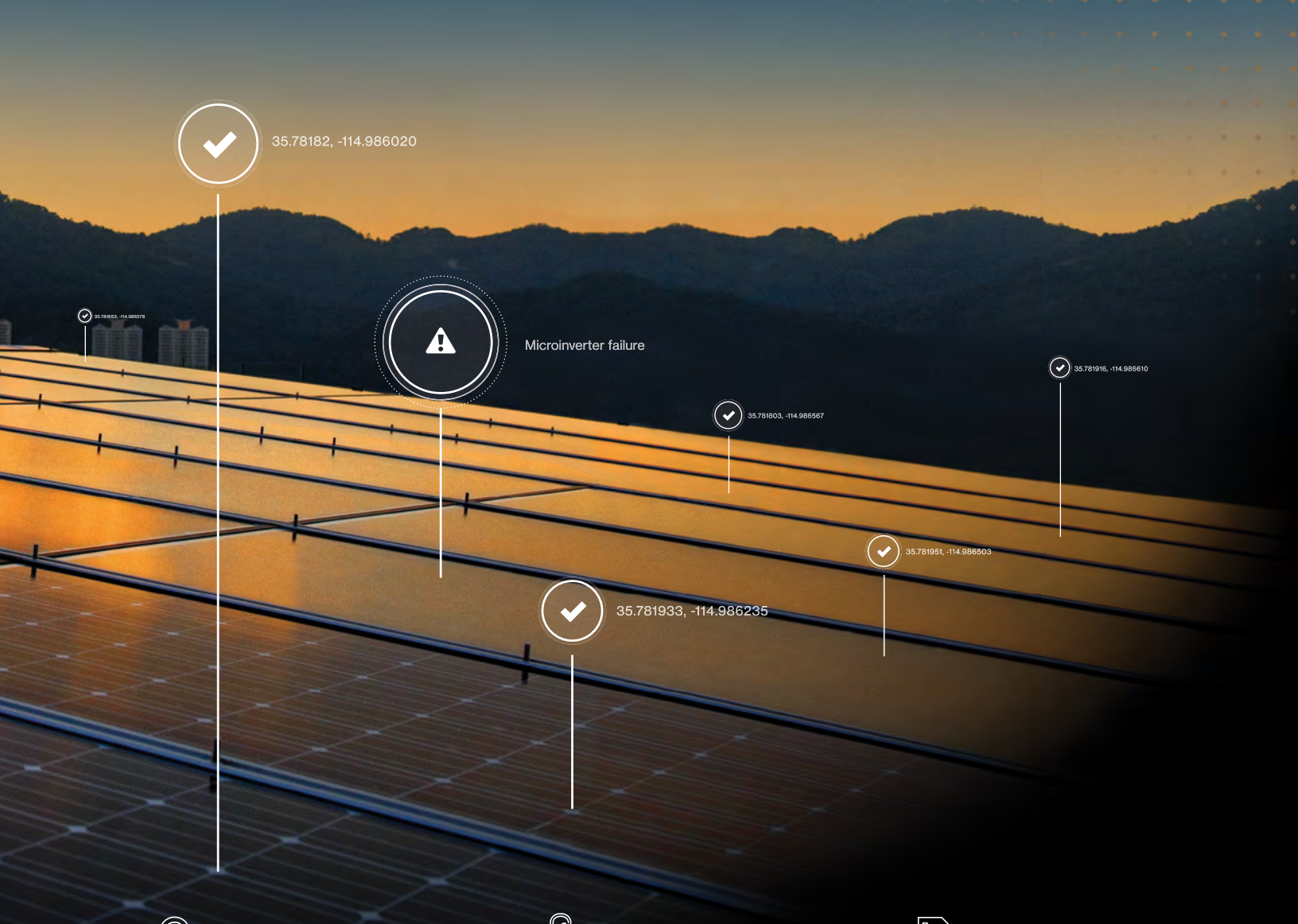
Futurology, 2021

2022 GLOBAL
CLEANTECH 100

Cleantech Group, 2022

TOP 10
SOLAR ENERGY TECH
SERVICE COMPANIES

Utilities Tech Outlook, 2021



35.78182, -114.986020



Microinverter failure



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Microgrid's cost savings



Burnt hillside next to YVWD treatment facility
Image: John F. Weaver

To power the pumping station, Engie modeled and submitted a solar power project of 3,453 kW, combined with a Tesla Megapack of 1,540 kW/6,161 kWh. This solar plus storage facility would also be complemented by a 1 MW fossil gas generator connected to the gas grid.

The second facility to be powered is the County Line water treatment facility. Located

in a valley with limited open space between two ridges, the treatment facility presented topographical challenges, both in how and where to install panels in order to generate the required electricity nearby.

While the feasibility study was ongoing, a second fire burned Yucaipa land. As the image above reveals, the fire burned right up to the fence line of the water treatment facility. The YVWD encouraged all parties involved with the project to work with a sense of urgency following the event.

Civil and electrical engineers brought in by the consultant suggested that building on the hills to the south of the YVWD's County Line facility could generate the amount of electricity needed to construct a financially viable solar power plant. The engineers determined that the land would not erode, and that the solar plant, as well as the connections between the ridge and facility, were viable.

At the water treatment plant, Engie will deploy three solar arrays, to be connected both to each other and to the facility at the bottom of the valley, via underground cables. The arrays are to be deployed in non-stan-

dard arrangements, in order to fit the challenging topography.

The total capacity of the solar power arrays at the County Line facility is to be 4,003 kW of solar power, coupled with 1,767 kW/7,067 kWh of Tesla megapacks. For the most extreme situations, there will be a 1.75 MW fossil gas backup generator. (1.0 MW at the pumping station, 1.75 MW at this location.)

The YVWD will spend no money, and will instead purchase the electricity from Engie at 7.95¢/kWh, with zero price inflation over 28 years.

Electricity savings in the first year alone should exceed \$804,000, a consequence of the 13.7 million kWh expected to be generated that year. When accounting for a (projected) electricity inflation rate of 5%, compounded over 30 years, the savings could easily reach \$73 million.

John Fitzgerald Weaver, Commercial Solar Guy, is a reporter for pv magazine USA.

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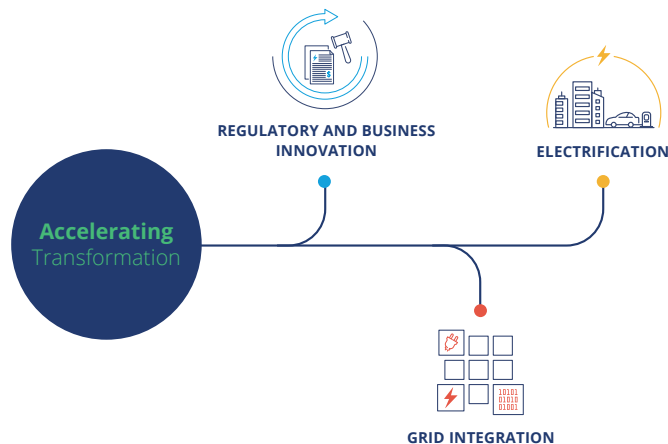
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RE+ 2022 conference session highlights

For times and speakers, please visit www.re-plus.com or download the app at re-plus.events/app/

Pathway to 1 Million Workers: Tools For Scaling Workforce Growth

The clean energy industry faces an incredible opportunity to change our approach to attracting and recruiting talent. Panelists will discuss the workforce development ecosystem, including organized labor, the value of apprenticeships and pre-apprenticeships, the role of community partners, and recruitment, placement and long-term mentorship from a diversity, equity, inclusion and justice-centered perspective.

The Long Duration Elite 8: September Storage Madness

Recent developments in state policies and utility targets for energy storage are creating the market conditions for innovative long-duration storage applications to support a more resilient and cleaner energy system. In this interactive session, panelists will discuss applications of different long duration storage technologies in an elite 8 bracket-style competition. Play along and continue the debate after the event!

Ripped from the Headlines: Finance + Development Trends Illuminated by Sunion

Everyone's favorite enigmatic and incredibly niche satirical news site can always be relied upon for a laugh. But what can it teach us about the current market dynamics and financing trends of the clean energy industry? Join asset owners and investors in a lively and revealing conversation on capital markets, including tax equity and debt financing, development challenges and project risk management, and the latest legislative updates.

Winning the Race: The Electrification of Everything

While addressing lighting and HVAC loads has shown significant success, there are a number of industries where 100% electrification remains a challenge. This panel of utility and technology experts will discuss newly emerging trends that are helping to lead the way towards the electrification of everything.

The Grid of the Future: Moving Quickly Towards Fleet Electrification

As the adoption of EVs, from heavy to light duty vehicles, continues to accelerate, concerns are growing around existing grid capacity for vehicle charging and managing customer behaviors. This panel of transportation electrification professionals and the financial community will discuss the risks and rewards these new opportunities present.

Best Practices in Community Solar Program Design

A diverse range of community solar models are gaining traction in the U.S. today. Panelists will discuss a variety of projects that differ by state, service area and stakeholders involved, but have each demonstrated success in program design, implementation, and subscriber recruitment.

The Clean Energy Supply Chain: Ensuring Ethics, Resiliency and Sustainability

Solar supply chains face numerous challenges, including labor issues, shipping bottlenecks, and life-cycle sustainability, threatening the global transition to clean energy in the face of skyrocketing demand. This presents a challenge and an opportunity, giving solar purchasers influence over the approach and location of manufacturing growths. Panelists will discuss the effect of the pandemic on the global supply chain, and roles that policymakers, manufacturers and buyers can play to grow a reliable, ethical and sustainable supply chain that will allow us to meet our clean energy goals.

The Business Case for Hydrogen

Hydrogen will play a critical role in the energy system of the future, particularly by enabling higher penetration rates of renewables. This session will cover current policy and market factors that are driving, or will drive, opportunities in hydrogen as well as insights on current and future projects for green hydrogen production.

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Reduce, Reuse, Recycle: Best Practices for Sustainable Renewable Energy Development

With more Fortune 500 companies and utilities creating Environmental, Social and Governance (ESG) plans, the solar and storage industries will be expected to build projects that minimize waste and track the carbon footprint of their suppliers. Panelists will highlight best practices businesses can implement to reduce their carbon footprint, and the growing demand for recycling and reuse of PV equipment. They will also discuss challenges impeding the widespread adoption of second life batteries in stationary energy storage and present real world deployments that have overcome these challenges.

Rate Design Roundup: Lessons from Net Metering Developments in California & Across the Nation

Across the country, there is a vast spectrum of net metering policy structures and rate design arrangements. What can we learn from existing programs? What will future compensation programs look like, and how do we prepare for them? Panelists will discuss various approaches to rate design for solar and other DERs, including a deep dive into California, and how businesses can prepare for the compensation paradigms of the future.

Equity and Just Access For All: Highlighting Successful Low and Moderate Income Solar Programs

When justly implemented, solar programs are accessible, affordable, and beneficial to customers of all income brackets. This panel will explore successful strategies to serve low income households with solar power, and alternative methods for expanding customer education and pre-program participation in community solar and other types of solar installations. Panelists will discuss consumer education and protection and give real life examples of the benefit of solar development projects to underserved communities.

Valuing Resiliency for Critical Infrastructure: Lessons Learned from Microgrid Feasibility Studies

There is no industry standard for valuing resilience for energy customers, and while business or individual home owners can develop their own value for avoiding a prolonged outage, the calculation gets much more complicated for critical loads like emergency shelters, police operation centers, wastewater treatment plants, and schools that provide essential services. This session will investigate a recently developed cost-benefit analysis that provides insights into the value of avoiding prolonged outages for all types of energy customers, and provide valuable insights to anyone in the business of keeping the lights on.

Significant state policy changes in 2022

By Tim Sylvia, Associate Editor, pv magazine USA

A turbulent year with much policy action on the horizon; however, an important veto in Florida and two important wins for homeowners' rights have cast a positive light on state-level solar action so far in 2022.



Florida Governor Ron DeSantis
Image: Wikimedia Commons

Florida: An unexpected veto saved net metering

The biggest policy action taken at the state level this year has been Florida Gov. Ron DeSantis' veto of House Bill 741, which would have phased down the value of net metering and opened the door for utilities to add fixed charges to solar customer bills.

The bill initially passed the Florida Legislature on March 8, and, by 2023, payments to solar customers would have regressed from a retail rate to the "avoided cost" to the utility, a minute fraction of the retail rate, had DeSantis signed the bill. The phase out was set to slash payment rates to solar customers by 50% in four years and would drop further still to the avoided cost rate by 2029. The bill would have also allowed for fixed charges to grid connected solar customers starting in 2026, with no limit on the fixed charges outlined in the bill text.

DeSantis' veto received near-unanimous praise across the clean energy landscape, with Justin Vandenbroeck, president of Florida SEIA saying, "His decision to veto this bill will allow our industry to continue growing and give more homeowners in our state the chance to lower their electric bills with solar."

North Carolina: A win for the solar rights of homeowners

Most of North Carolina's news to start 2022 surrounded Duke Energy's Solar Choice Net Metering proposal, the successor program to its existing net metering offering, which was set to expire in 2022. Pending approval from the North Carolina Utilities Commission, the new net metering tariffs, known as the 'Proposed Bridge Rate' will go into effect for customers submitting applications through December 31, 2026.

More recently, the Supreme Court of North Carolina issued an order affirming homeowners' right to install rooftop solar, even if previously prohibited by a Homeowners association (HOA). The court also affirmed

that the HOA's architectural review committee could not limit the location of solar panels to the back of the home, in situations where installing panels in the back would prevent the reasonable use of the solar panels due to roof orientation.

Indiana: Homeowner association authority

Progress was also made in Indiana regarding the level of authority HOAs hold in limiting rooftop solar installations.

House Bill 1196, makes it considerably more difficult for HOAs to prohibit residents from adding solar installations to their homes. The law states that any homeowner who is a member of a HOA that has codified rules (adopted or amended after 2019) or previously ruled that solar installations may not be installed within the community, can petition other homeowners association members for approval to install a solar energy system on the homeowner's dwelling unit or property.

Once homeowners have collected signatures from 65% of HOA residents, the HOA



Solar on Florida home
Image: Morton Solar & Electric



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Solar across the states



California demonstration

Image: Sun Green Systems/Twitter

board of directors, an architectural review committee, or an architectural control committee of the HOA may not deny the homeowner's request to install the solar energy system. Projects may still be denied for legitimate siting and technical concerns, or if the HOA is responsible for the maintenance of the roof intended for installation, but the law still opens up solar development for many residences in Indiana.

California: Defining state-level policy

All eyes are on California, as the story of state-level solar policy in 2022 will be defined by the NEM 3.0 proceeding in California, and the changes that stem from it.

Under the original proposal, NEM 3.0 would have slashed the

payments made by utility companies to rooftop solar owners for exporting their excess solar back to the grid, leading to a 57% to 71% overall reduction in solar savings across the state, according to EQ Research.

In May a revised proposal packaged rooftop solar-slashing provisions as a "glide path" that would taper down payments for solar customers in increments over a four-year period, eventually reaching the "avoided cost" rate to the utility, a substantially lower rate than current net metering. The proposal also includes non-bypassable charges, which would add a proposed \$0.05/kWh fee to all customers, whether they have solar on their roof or not.

Like the earlier proposal, this attempt with reconciliation has been met with near-unanimous scorn, with Mayor Sam Liccardo of San Jose saying it "threatens to kill rooftop solar in CA with cost-prohibitive fees."



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Booth 2614

RE+ 2022 networking

Monday, September 19

Golf Tournament 8:00 am – 1:00 pm

Network with your colleagues and embark in a little friendly competition by attending our annual golf tournament. This year's tournament is located at the Tustin Ranch Golf Club! Ticket required.



Welcome Reception 6:30 pm – 8:00 pm

Kick-off RE+ 2022 with an evening of networking with colleagues, friends, and clients. Ticket required. Tickets for this event are also included with Full Conference passes.



Tuesday, September 20

Run with the Sun 5K 6:00 am

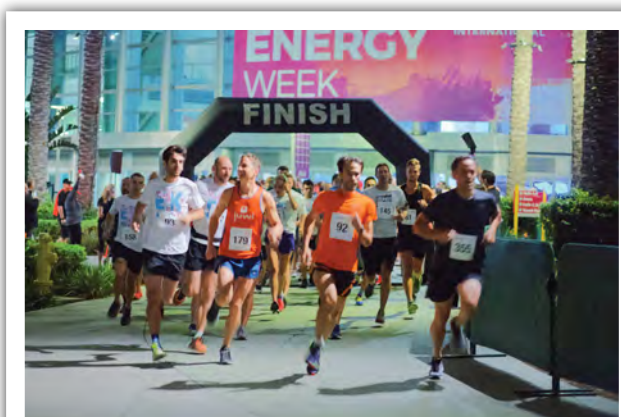
Lace up your running shoes and energize your day with a morning run with other attendees. Ticket required.

Poster Reception 4:30 pm – 5:30 pm

Join us on the expo floor to hear from leaders in the industry, grab a drink, and get one-on-one insight from a comprehensive selection of poster presenters sharing latest technologies. Badge required for attendance.

Women in Renewable Energy Reception 4:30 pm – 6:00 pm

Attendees will be able to connect with energy professionals from across the globe in an interactive experience during our speed mentoring roundtable. Get a chance to hear from several senior-level women in a male-dominated industry and gain insights in a short, focused conversation format. Ticket required.



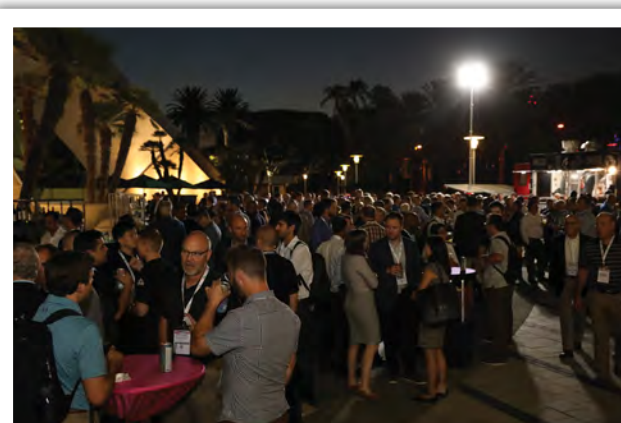
Annual Block Party 7:00 pm – 10:00 pm

Get ready to feel the festival vibes at our annual Block Party! Join your colleagues for a night of music, dancing, and locally sourced food, beer, wine, and whiskey under the stars at Anaheim's Angels Stadium. Ticket required. Tickets for this event are also included with Full Conference passes.

Wednesday, September 21

Exhibit Hall Happy Hour 5:00 pm – 6:00 pm

Close out a full day of learning and business dealing with libations and laughter on the expo floor. Attendees with access to the expo floor can attend the happy hour.



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25 largest solar PV projects

All projects listed on EIA 860 Monthly, and have at least achieved regulatory approval.

NA = Not available

T = Regulatory approvals received.
Not under construction

TS = Construction complete, not yet in commercial operation

Plant Name	Owner	Developer	State	County	Capacity (MW)	Storage (MW)	
Gemini Solar	Gemini Solar	Primergy Solar	NV	Clark	690	380	
Renegade Solar Project (Dawn)	Blue Planet Funding	Blue Planet Funding	TX	Deaf Smith	515		
Roseland Solar Project, LLC	Enel Green Power	NA	TX	Falls	500	59	
Aktina Solar	Rosendin	Rosendin/Tokyo Gas America	TX	Wharton	500		
Hornet Solar (TX)	Vesper Energy	Vesper Energy	TX	Swisher	500		
Desert Quartzite	First Solar	EDF Renewables	CA	Riverside	480	600MWh	
Old 300 Solar Center, LLC	Orsted	Orsted	TX	Fort Bend	430		
Big Creek Solar LLC	Big Creek Solar LLC	NA	AR	Lee	400		
Fighting Jays Solar Project	AP Solar 2, LLC	Avondale Solar, Plus Renewable Technologies	TX	Fort Bend	350		
Hot Pot Solar	Primergy Solar	Primergy	NV	Humboldt	350	280/4 hour	
Notch Peak Solar LLC	BayWa r.e.	BayWa r.e.	UT	Millard	324		
Delilah Solar Energy II LLC	Invenergy Services LLC	Invenergy	TX	Red River	310		
Delilah Solar Energy LLC	Invenergy Services LLC	Invenergy	TX	Red River	300		
Eagle Shadow Mountain Solar Farm	8minute Energy	NA	NV	Clark	300		
Highland Solar Farm	Hecate Energy Highland LLC	NA	OH	Highland	300		
IP Radian, LLC	IP Radian, LLC	NA	TX	Brown	300		
Arroyo Solar Energy Storage Hybrid	Enel Green Power	Enel Green Power	NM	McKinley	300	150/4 hour	
Daggett 3	Global Infrastructure Partners	Clearway Energy Group	CA	San Bernardino	300	387/4 hour	
Noble Solar	National Grid Renewables	Signal Energy	TX	Denton	275	125	
Samson Solar Energy	Invenergy Services LLC	Invenergy	TX	Franklin	250		
Athos Solar Project	SoftBank Energy	Intersect Power	CA	Riverside	250		
Samson Solar Energy III LLC	Invenergy Services LLC	Invenergy	TX	Lamar	250		
Neptune Energy Center Hybrid	NextEra Energy Resources	NextEra Energy	CO	Pueblo	250	125	
Chaparral Springs	Leeward Asset Management	McCarthy Building Companies	CA	Kern	250	52/4 hour	
Sun Valley Solar Project	Sun Valley Solar LLC	Alpin Sun	TX	Hill	250		

**By Ryan Kennedy, Editor, pv magazine USA,
Jason O'Leary, Principal Analyst, PV Intel**



U = Under construction, less than 50% complete **V** = Under construction, more than 50% complete

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Status (see notes)	Planned Operation Date	Balancing Authority	Mount	Module	Offtaker
U	Nov 2023	NEVP	Single-axis	Maxeon, bifacial	NV Energy
T	Dec 2023	ERCO	Single-axis	NA	NA
U	Q4 2022	ERCO	NA	NA	NA
V	Dec 2022	ERCO	Genius Tracker, single-axis; GameChange, speed clamps	JinkoSolar	ERCOT Wholesale
T	Dec 2023	ERCO	Single-axis	NA	Pfizer
T	Mar 2023	CISO	Single-axis and fixed	CdTe	Clean Power Alliance
V	July 2022	ERCO	Single-axis	Longi, bifacial	CenterPoint Energy
T	June 2024	MISO	NA	NA	NA
V	June 2022	ERCO	NA	NA	Shell Power
T	Dec 2024	NEVP	Single-axis	NA	NV Energy
T	Jan 2025	LDWP	NA	NA	LADWP
U	June 2023	ERCO	NA	NA	NA
TS	June 2022	ERCO	NA	NA	NA
V	Oct 2022	NEVP	Single-axis	Bifacial, crystalline silicon	NA
U	Nov 2022	PJM	Single-axis	Tier 1, crystalline silicon	City of Cincinnati
U	Nov 2022	ERCO	Nextracker, NX Horizon, and TrueCapture	NA	Apple
U	Jan 2023	PNM	Nextracker, single-axis	NA	PNM
U	Sept 2023	CISO	NA	NA	CPA, EBCE, Constellation, MCE, PG&E
V	June 2022	ERCO	NA	First Solar	The Home Depot, NRG, The Hershey Company
V	May 2022	ERCO	Single-axis	NA	Honda, AT&T, Google, and others
U	June 2022	CISO	Nextracker, single-axis	First Solar	Direct Energy Business
U	July 2022	ERCO	Single-axis	NA	Honda, AT&T, Google, and others
U	Dec 2022	PSCO	NA	NA	NA
U	Dec 2022	CISO	NA	First Solar	Central Coast Community Energy, Silicon Valley Energy
V	Dec 2022	ERCO	NA	NA	NA

RE+ partners in profile



To give RE+ attendees additional networking and learning opportunities, RE+ 22 is co-locating with the **Zero Emission Bus Conference (ZEB Con)** at the Anaheim Convention Center, September 19-21. Hosted by the **Center for Transportation and the Environment (CTE)** since 2011, ZEB Con is the premiere event for professionals who are leading the charge to electrification – equipping school, transit, and shuttle bus managers with the necessary tools to electrify their fleets. Together, ZEB Con and RE+ help fleets and technology providers navigate the carbon-free paradigm from zero-emission vehicles to a renewable energy-powered grid. **Register here:** re-plus.com/zero-emission-bus-conference.

About ZEB Con: zebconference.com **About CTE:** cte.tv



In partnership with **EMerge Alliance**, RE+ conducts a live demonstration of microgrids on its show floor. This year's demonstration will feature a fully operating "hybrid" bi-directional residential microgrid, complete with appliances, HVAC, lighting, EV charging and various plug load distributions including line AC and DC, USB-C, PoE and FMP. It will also provide the excess power it generates to the adjacent Grid Edge presentation theater and other exhibitor loads on the convention center floor. Power resources for the microgrid will be a combination of solar, battery and utility energy. www.emergealliance.org



Solar Energy International (SEI) will be on site for RE+ delivering both paid and free industry-leading solar training to attendees, as well as a booth party. Paid training on September 19th includes: PV System Operations and Maintenance (O&M), Megawatt-Scale PV: Design Considerations and Case Studies. Both courses are approved for 6.5 contact training hours. Each free show-floor training is an hour long and approved for 1 NABCEP CEU. SEI's purpose is to empower students, alumni, and partners to expand a diverse, inclusive, well-trained and educated solar workforce and spread the knowledge of how to safely deploy industry-leading technology. www.solarenergy.org



Center for Hydrogen Safety (CHS) is a global oriented non-profit dedicated to promoting hydrogen safety and best practices worldwide. The CHS identifies and addresses concerns regarding the safe use of hydrogen during the energy transition. CHS is co-locating its 3rd **Hydrogen Safety Conference** with RE+ in Anaheim, covering the Americas. This conference will bring together representatives from industry, government, and academia to highlight the safe use of hydrogen in commercial and industrial applications. This year's conference is being held in partnership with WHA International. www.aiche.org/chsus



California Fuel Cell Partnership is an industry/government collaboration aimed at expanding the market for fuel cell electric vehicles powered by hydrogen to help create a cleaner, more energy-diverse future with no-compromises zero emission vehicles. Staff from member organizations participate on standing committees and project teams that help ensure that vehicles, stations, regulations and people are in step with each other as the market grows. CaFCP's success is directly linked to the commitment and involvement of our member organizations. cafc.org



Idaho National Laboratory is a world leader in solving major energy challenges by creating reliable, sustainable and secure energy solutions. Those solutions include developing ways to reduce carbon emissions to stave off the major impacts of climate change. INL researchers are studying ways to provide practical carbon-free energy options for people and industries, including microgrid systems, water treatment capabilities and investment in solar and wind. Their work combines world-class technologies to bring more renewable and sustainable solutions into today's industrial landscape. Visit inl.gov

Abigail Ross Hopper looks at the new frontier of clean energy policy

As president and CEO, Solar Energy Industries Association (SEIA), Abigail Ross Hopper, shares insights with pv magazine USA on how SEIA will help member companies effectively navigate the new Inflation Reduction Act.



Q. 2022 has been another year of ups and downs in the solar industry, but then in late July the Inflation Reduction Act was introduced. What will SEIA do to work with the industry to implement the policy effectively?

The Inflation Reduction Act is the most significant development for the U.S. solar industry in its history, but this did not happen in a vacuum. It is a result of years of tireless advocacy to finally secure policy certainty for our industry and drive clean energy growth. The linchpin of the legislation's clean energy measures is a long-term extension of the solar Investment Tax Credit (ITC), which has been the most effective policy tool for deploying solar and will be a boon to reaching SEIA's goal for solar to account for 30% of U.S. electricity generation by 2030. The bill includes other transformative policies including a new energy storage tax credit, historic incentives for domestic manufacturing, and critical environmental justice programs.

SEIA is already working with our members and partners to ensure that this legislation is implemented swiftly and effectively. This includes helping companies understand how new workforce development, domestic content and environmental justice adds in the ITC can be met to maximize their credit and support sustainable growth of the solar and storage industry. SEIA is also offering guidance for domestic

manufacturers to ensure the most efficient timeline for bringing manufacturing facilities at various stages of the solar supply chain online. In addition, SEIA is updating its Solar Tax Manual to account for this new frontier of American clean energy policy and ensure member companies have everything they need to effectively navigate this law.

Q. Concurrent with the two-year halt of solar tariffs on major Southeast Asian panel suppliers, the Inflation Reduction Act offers incentives to boost domestic manufacturing. What are the most critical parts of the supply chain that will benefit from this support?

The manufacturing incentives in the Inflation Reduction Act (IRA), based on Senator Jon Ossoff's Solar Energy Manufacturing for America Act, will boost every sector of the U.S. solar supply chain. Currently, the United States has limited module manufacturing

and dormant polysilicon production, but no existing cell, ingot or wafer manufacturing. Filling in these gaps is crucial for U.S. energy security — as the Auxin Solar tariff investigation this spring made clear, we cannot leave our supply chain open to trade vulnerabilities. The manufacturing provisions in the IRA can help immediately reopen shuttered polysilicon facilities and boost module production, and we expect cell, ingot, and wafer manufacturing to not be far behind.

However, the manufacturing incentives do not remedy the harmful impacts of tariffs, which have consistently proven to depress the U.S. manufacturing workforce while driving up prices for consumers. The IRA is a model for the correct approach to securing our supply chain by offering incentives that make domestic manufacturing competitive with imports.

Q. FERC implemented new rules to speed interconnection. What kind of impact can we expect from this? How much time in the project development cycle will be trimmed due to these reforms, and will this lead to a reduction in cancelled projects?

It's great to see FERC taking serious action on interconnection. It will simply be impossible to reach our clean energy goals and capitalize on the Inflation Reduction Act without clearing up our nation's enormous interconnection backlog, where currently more than a terawatt of clean energy capacity is awaiting connection to the grid.

The reforms proposed by FERC in June closely align with recommendations from SEIA and our partners, including demanding greater accountability from utilities and reforms to streamline interconnection study processes. If adopted, these reforms will speed timelines and reduce application withdrawals. Importantly, the Inflation Reduction Act allows for interconnection costs on projects under 5 MW to be eligible for the Investment Tax Credit.



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