



RINGING IN THE NEW: Powering through to a clean energy future

By Bud Vos, President & CEO, Enbala

For most of 2020, uncertainty has defined almost every aspect of our lives — social, emotional, economic, political, business — we've been caught in what feels like a perpetual state of ambiguous limbo. Though we've officially welcomed 2021, we are still in the midst of an unprecedented pandemic that's left many of us feeling like a deer in the headlights, not sure if we should go right, veer left, duck, jump as high as we can, or standstill.

But there are points of light at the end of the tunnel — a clean energy-friendly administration in the U.S., a much-anticipated COVID vaccine, a renewed commitment to reducing carbon emissions and a strong focus on keeping the lights on, no matter what. A year from now, when we look back on 2021, what are we likely to see? How will the energy industry have changed forever, and what aspects of the old normal will revert to a pre-COVID world?

Rather than try to predict everything that's likely to occur as we sink deeper into 2021, let's focus on the top "most likely to happen" prognostications. Many, or perhaps most, of these predictions revolve around a higher-level truth that's becoming increasingly self-evident. As we ring out the old, coal is high on the "old" list, as are other carbon-based fuels.

The quest for carbon-free electricity is becoming more and more mainstream. In fact, over the past two years, the S&P Global Clean Energy index is up 37 percent. In the EU, the government's stimulus package set aside 25 percent of the funds for climate-friendly, clean-energy measures, and President Biden proposed 100 percent clean electricity by 2035. Power companies in the U.S. already announced retirement of 12+ coal plants in 2020, and as of December, 70 percent of the 30 largest electric and gas utilities had net-zero equivalent targets. Similarly, in Europe, renewables overcame fossil fuels on the European grid for the first time ever in 2020. In Australia residential solar smashed all previous records in 2020, and 2020 marked the lowest coal use in the [National Energy Market](#) this

century and the lowest gas usage since 2006. Globally, more than 110 countries have committed to becoming carbon neutral by mid-century, according to the United Nations

With that as a preface, here are our forecasts for where we're going in 2021 driven by these carbon reduction goals, along with interrelated factors associated with pandemic recovery, shifting energy customer priorities, changing regulatory and policy dynamics, and technology innovation.

1. Greater EV adoption

Electric vehicle growth will accelerate faster than previously planned, creating challenges for the grid and opportunities for optimization of the resulting increased demand flexibility. Achieving global carbon reduction goals will mandate electrification of most forms of over-the-road transport, a fact that's underscored by the fact that in the U.S. alone, road transportation accounted for almost 70 percent of oil consumption in 2019. Such zero-emission goals, combined with market forces, technological progress and more progressive, green-leaning government policies are sending strong signals that are already accelerating the shift from internal combustion engines to electric motors. France, the UK, Canada, and some dozen other countries have already said they are banning gasoline vehicles in the coming years, and just a few months ago, California became the first U.S. state to join the "no internal combustion engines" movement, committing to banning them by 2035.

A recent [Forbes article](#) noted, "The electrification of transport is now one of the major trends of the 21st century, and the markets are reacting." Forbes went on to say that although the COVID pandemic resulted in a decline in EV purchases in 2020, the EV demand that had been escalating dramatically prior to the pandemic is again expected to rise, citing data from Bloomberg New Energy Finance (BNEF),

“which sees improved batteries, more readily available charging infrastructure, new markets and price parity with internal combustion engine vehicles as major drivers.” BNEF projects that by 2040, EV sales will rise to nearly 60 percent of the global auto market, contrasting this to 2010, when sales were close to zero. As reliance on electrification increases, so will the need for energy storage systems and energy balancing technology to ensure grid stability.

2. Growth of solar

PV will continue to increase, comprising the largest installed capacity for all generation worldwide. Despite the pandemic, according to a [Power Magazine article](#), the IEA’s annual World Energy Outlook (WEO) projects that by 2025, renewables will overtake coal as the primary means of producing global electricity, noting that, “In particular, solar PV is now the cheapest source of electricity in most countries, and it has been the most-built power technology over the past three years.” Prices continue to fall steadily, with December 2020’s [Lawrence Berkeley National Laboratory distributed solar data update](#) confirming that from approximately \$12/watt in 2000, prices had fallen in 2019 to between \$2.30/watt and \$3.80/watt, depending on system size and market.

The quarterly [SEIA/Wood Mackenzie Power & Renewables U.S. Solar Marketing Insight](#) report includes numerous statistics supporting the continued growth of solar, noting that:

- In the third quarter of 2020 alone, the U.S. solar market installed 3.8 GWdc of solar PV, up 9 percent from the prior quarter.
- Residential installations were up 14 percent from Q2 to Q3, marking a recovery from the 2nd quarter’s large decline as a result of pandemic shelter-in-place orders.
- Non-residential solar installations were up 8 percent from Q2 to Q3, with the lifting of pandemic-related restrictions helping to accelerate project completions.
- Solar made up 43 percent of new electricity generating capacity in the U.S. through Q3 of 2020, overcoming all other generating technologies.

The U.S. Congress’ passage in December of a massive spending bill that includes an extension of the Investment Tax Credit for solar power will drive even greater investment, and the anticipated clean energy support from the Biden

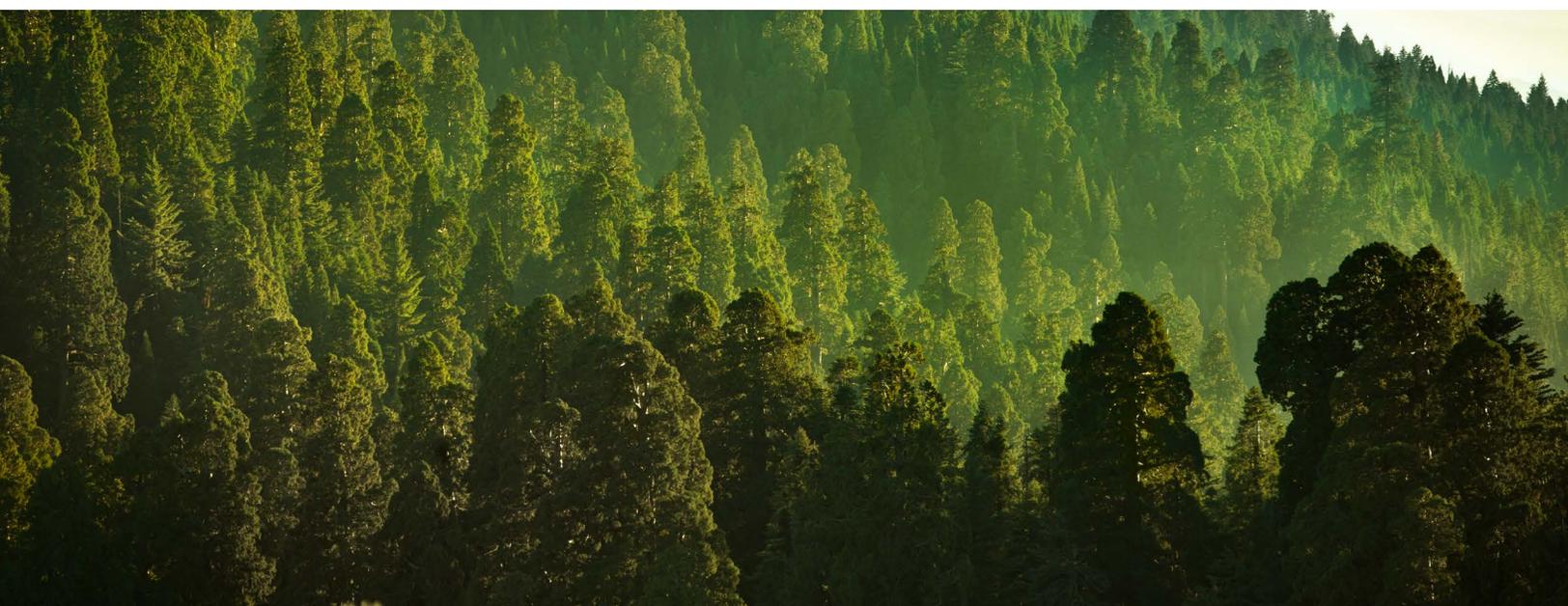
administration and a Democrat-controlled Congress should further accelerate the growth of distributed solar (and other clean energy technologies.) IEA analyst Yasmine Arsalane summed up the prospects for solar in saying, “We are definitely entering a new era, and solar PV is becoming the new king.”

3. From C&I demand response (DR) to residential distributed energy resources (DERs)

The DER mix is evolving quickly away from nonresidential load management, which made up two-thirds of all U.S. DR capacity in 2015 but will likely make up less than half of the total DER flexibility by 2025. This is because of several contributing factors. One, much of the low-hanging fruit for tapping C&I DR load flexibility has been picked, but there is considerable untapped flexibility from aggregated residential load — and the technology now exists to tap it. Furthermore, there’s a large growth in residential battery storage — a surge that not even the pandemic could stop. According to the U.S. Energy Storage Association’s and Wood Mackenzie’s [Energy Storage Monitor](#), the energy storage industry in the U.S. had its second-best quarter ever based on megawatts installed as customers added batteries to their homes to store solar power and provide the security of having self-generation backup options during outages caused by wildfires, weather and other factors.

The story is similar in other geographies. Despite the pandemic-driven slowdown in growth this year, the deployment of home storage will accelerate again in 2021. According to [SolarPower Europe](#), the most-likely yearly growth rate is anticipated to be 14 percent in 2021, boosted by pandemic recovery packages. It will then slow down to an 11 percent growth in 2022 and then increase to 13 percent in 2023 and 16 percent in 2024. In total, Germany, Italy, the UK, Austria and Switzerland comprise over 90 percent of the European market. Similar stories are unfolding around the globe as prices drop and the desire for the security of a self-sufficient power source increases.

Another factor contributing to the growth in residential DERs is that more and more home devices are getting smarter and smarter, and as they get smarter, they can be orchestrated to participate in energy markets. From smart thermostats, to smart water heaters, to smart refrigerators and water faucets, as an increasing number of in-home devices are Wi-Fi connected, the opportunities continue to expand.





4. Increase in DER and clean energy technology spending

Given the projections outlined in the previous three sections, prediction number 4 is probably self-evident but should nevertheless be stated. Spending on solar, battery storage, EVs and smart devices will drive DER market spending to new highs. Wood Mackenzie says that cumulative distributed energy resource capacity in the U.S. will reach 387 gigawatts by 2025, according to a new **Wood Mackenzie report**. The report notes that U.S. DER investments will surpass \$110.4 billion between 2020 and 2026. Furthermore, **climate tech investment** – technologies focused on reducing GHG emissions and global warming – will continue to outperform the overall venture market, and this, in turn, will drive further innovation.

5. Growing reliance on flexibility

With the increased penetration of renewables and variable capacity DERs into the power grid comes the need for a greater reliance on the energy balancing capabilities of behind-the-meter flexibility. In fact, flexibility is becoming increasingly critical when it comes to maintaining energy security. The aforementioned **World Energy Outlook (WEO)** confirms that shifting power profiles, wavering demand and pandemic-related fuel supply disruptions have combined to substantiate the critical importance of flexibility when it comes to electricity security. “One point of consistency across all WEO2020 scenarios is that flexibility needs are set to rise,” said International Energy Agency analyst Tim Goodson. Global flexibility needs are projected to double by 2040, according to the IEA’s **“Stated Policies Scenario” (STEPS)**. As the needs increase, so will be need of non-polluting sources of flexibility, with aggregated DERs playing pivotal roles, given the right policies and regulations. The STEPS document cautions that the right market design environment must be in place for this to occur, and this brings us to prediction #6.

6. Removal of DER regulatory and policy barriers

The much-touted FERC order No. 2222 is a giant step in the right direction when it comes to creating a regulatory environment in the U.S. that enables greater participation of DER aggregations in organized wholesale markets as a means to improve grid flexibility and reliability and to improve capacity, energy and ancillary services markets. Regulators in U.S. states are also making progress in tackling DER regulatory hurdles, and we predict 2021 will be a year where we make giant strides when it comes to increasing reliance on aggregated DERs on both the distribution and transmission sides of the grid. Increased consumer demand for energy independence and a clean energy future, along with COVID recovery investments, increasing incentives for investing in green technologies, and the

need for a reliable, continually balanced grid have also resulted in ambitious GHG emission reduction policies in the EU that are DER friendly. The same applies to Japan, Australia and many other countries around the world, where customer demand, technological ability, market frameworks and a positive regulatory framework are converging.

7. A strong need for distributed energy control

With the number and types of DERs increasing at breakneck speeds, the need to predict, manage and control them in an aggregated and coordinated way is more important than ever. Our friends at Guidehouse Insights explain, “DER management solutions are foundational to enabling the digital transformation while simultaneously supporting energy industry transformation.” According to their research, the DER management technology market will grow from \$826.4 million in 2020 to nearly \$5.9 billion in 2029, at an annual compound growth rate of 24.3 percent. We have our own perspectives on the software technologies comprising the DER management technology market, as well as the roadmap for progressing from demand response, to virtual power plants and then to distribution resiliency. You can read more about this and the use cases provided at each step along this journey in our **thought leadership library**. But regardless of how you slice it or what you call it, the continued integration of distributed energy assets onto our power grids and energy markets cannot occur without these solutions, so select wisely, with today’s goals in mind and a vision towards the future to ensure you don’t hit a dead-end mid-way through your sustainable energy journey.

Wrapping it up

While the word of the year for 2020 was “uncertainty,” the word of the year for 2021 may well be “transformation.” The trend towards 100 percent clean or renewable energy will only accelerate in 2021, most certainly taking us down a path of increased reliance on distributed energy resources and rapid adoption of the distributed energy control systems that keep these resources balanced and our energy markets operating smoothly. Without a doubt, it is going to be a very interesting year and hopefully one that we will ring out on December 31, 2021, with smiles on our faces, our friends and family next to us and anticipation in our hearts.

