



The Future of Renewable Power Production

A whitepaper in conjunction with:



CONTENTS

Future of Renewable Power Production..... 3

Foreword 4

Introduction 5

Soaring costs and congested supply chains 5

New technologies and the economics of hydrogen 6

Government policies to speed up the transition 7

FUTURE OF RENEWABLE POWER PRODUCTION

In partnership with:



An analysis of the key themes that emerged at the Reuters Events Future of Renewables – Energy Leaders Series live broadcast in January 2022.

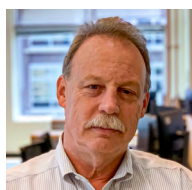
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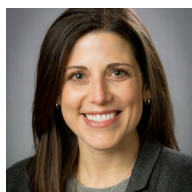
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*Thought leadership extracted from the Future of Renewable Power Production broadcast hosted by Reuters Events in January 2022

FOREWORD

Between climate change and Covid-19, recent years have weighed heavy on all market sectors, and the clean energy industry is no exception. Though general desire for renewable development is stronger than ever, the clean energy market struggles against growing challenges. Rising prices of shipping, materials and fuel coupled with global supply chain strains are slowing projects and fatiguing developers.

Against this backdrop, *The Future of Renewables: Insights from Industry Leaders* brings together a group of experts in the renewable energy field to discuss solutions and explore potential for the years ahead.

Though the challenges the industry battles currently are serving as barriers to the usual investment in research and development, emerging technologies and the embrace of local, sustainable options have the power to make projects more efficient and effective. Legacy systems are being modernized to better meet the unique needs of the 21st century, while green ammonia and hydrogen may offer support to systems for which electrification is not viable.

While these solutions progress to push the industry through this rough patch, government policies are poised to speed the overall transition to clean energy, with regulatory strategies emerging to facilitate the green energy revolution.

This webinar dives into these issues and their solutions, providing in-depth analysis and commentary by leading industry experts. More than ever, it seems the industry is at a crossroads of compounding challenges and enormous potential. As it navigates the path forward, creative solutions and a willingness to adapt will characterize the journey.

Introduction

Nearly two years into the Covid-19 pandemic, the renewable power projects on which the world relies to mitigate climate change face bigger challenges than when the coronavirus started to make headlines in 2020.

As the global economy started to recover, commodity prices rose sharply and logistic bottlenecks wreaked havoc on supply chains, causing delays and eroding the margins of power equipment providers and project developers. At this point, unappealing profitability or even financial losses jeopardize investments on research, innovation, and capacity expansion.

These were some of the problems discussed during the webinar *The Future of Renewables: Insights from Industry Leaders*, sponsored by Black & Veatch and held on January 12, 2022, as part of the *Energy Leaders Series*.

To address these issues, the participating experts highlighted the need for new models and incentives to put the renewable power industry back on a profitable course that would enable a stable transition to a greener global energy matrix.

Soaring costs and congested supply chains

At the onset of the pandemic, manufacturing plants and government agencies around the globe were shut down, halting component production and transportation, and delaying all sorts of permits needed for renewable power projects to move forward.

These problems were replaced by larger issues in 2021, notably escalating fuel and metal costs, as well as container and ship shortages that threw countless renewable projects behind schedule and over budget.

Sea freight rates from China to the West Coast of the United States climbed as much as five or six-fold in less than two years and delays became the norm. As profit margins to carry containers widened, maritime operators were less inclined to transport extremely large components, such as wind turbine blades.

In the United States, solar power projects face additional logistic hurdles due to low visibility of rules associated with Withhold Release Orders (WRO). Amid uncertainties about the proper information and documentation needed to overcome the review, many foreign suppliers prefer not to ship solar panels to American ports, and customers are forced to revise their plans and timelines. “We need to be planning for longer lead times,” says Paul Skurdahl, Senior Vice President and Renewables Solutions Leader at Black & Veatch.

On the cost side, not only fuel prices, but copper, aluminum and steel prices went up as well. Suppliers of cables, panels and other power generation components are passing on these price increases. Costs for solar projects rose 10% to 20% over the past 12 months, according to Skurdahl. In many cases, the energy prices established when these projects were approved no longer “support the project economically” and these companies will ultimately have to renegotiate terms with their own customers, he adds.

Bart Doyle, Chief Operating Officer at Mainstream Renewable Power, also believes that energy prices set on bidding rounds in the past are no longer economically advantageous. “We see projects at unreal prices,” he says.

While commodity prices are expected to come down from recent highs, “the level of fatigue in the system is palpable,” says Rael McNally, Director of Global Renewable Power at money manager BlackRock, stressing that developers should focus on keeping soft costs down.

On the other end of the supply chain, the largest providers of power generation equipment have been losing money because of rising costs. Margins slimmed to the point of jeopardizing capacity expansion and R&D capex. In an environment of thinning or negative margins, Doyle questions these providers' ability to deliver the equipment needed for the massive capacity expansion expected by the end of the decade.

"If there isn't more in the pie for developers and the supply chain, you're just not going to see capacity additions, not going to see the scale of new wind and PV that we need," he says. "We have to look past price, there has to be a sustainable business here."

At GE Renewable Energy, market dynamics have to be taken into account in deciding how to best invest in innovation and other strategies to support the future of renewable power production. "The market needs to support our ability to invest in new technologies, to try new things or create standardization that reduces costs across the industry," says Chief Technology Officer Danielle Merfeld.

"We have to have some faith that the market will evolve and put a value on capacity and flexibility, and we can start to bring more complex value rather than just raw energy that wins an auction," she adds.

New technologies and the economics of hydrogen

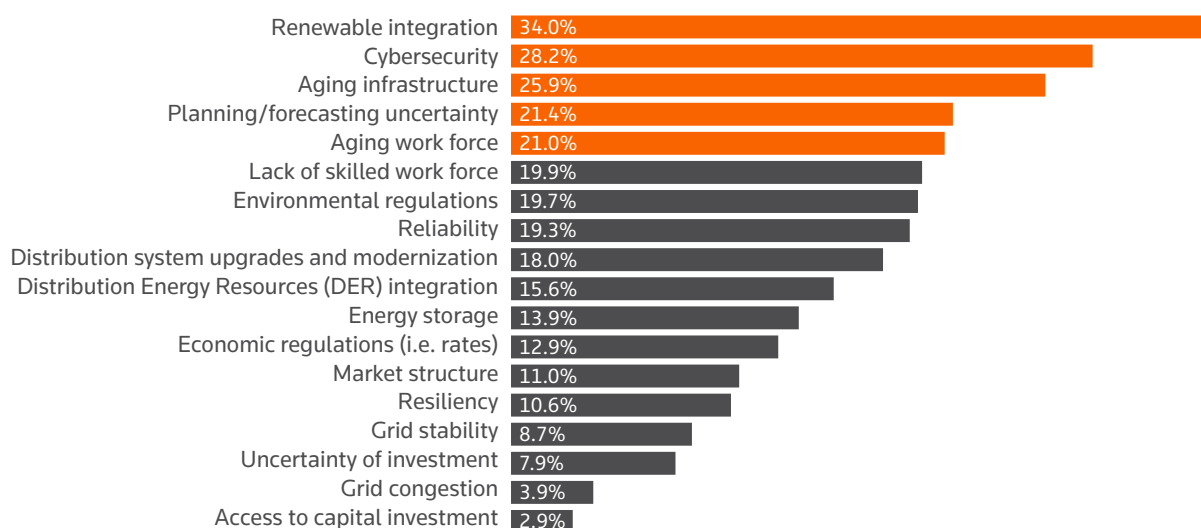
While cost pressures and logistic bottlenecks slow down even the best designed plans, new technologies and smarter deployment of existing technologies may help the renewables industry circumvent supply chain issues and rising costs.

GE Renewables sees more promise in technologies that make power projects more efficient, cheaper, sustainable, and local. CTO Merfeld mentions segmented wind blades that are easier to transport, and towers that are built locally and require less steel. Drone checks and artificial intelligence advancements allow remote system management and fewer visits to sites, keeping costs down and personnel safer.

"Power generation and consumption are getting more modular, more decentralized, and increasing in real time," says BlackRock's McNally. These trends are making the system more flexible and able to match generation and demand. Progress is also being made in the modernization of legacy systems, as existing infrastructure that was not designed for the needs of the 21st century must be complemented for flexibility and capacity.

According to Black & Veatch's [2021 Electric Report](#), aging infrastructure and the challenge of integrating a growing percentage of renewable energy across various networks were the top two industry concerns.

From your perspective, what are the most challenging issues facing the electric industry in your region today? (Select the TOP THREE most challenging issues)



Developments in that direction are needed to facilitate the expansion of sustainable power under a model that has been fundamentally unchanged in one hundred years and was not designed to work with renewables.

In another major innovation leap, green ammonia produced from hydrogen is advancing to support systems that can't be electrified. At this point, hydrogen projects are less mature and have higher costs than wind and solar enterprises, but the technology has been proven, according to Mainstream COO Doyle.

The dissemination of hydrogen projects in the future will depend on economics and usage. Only a few places now have a real advantage in terms of cost of input. Proximity to the coast to export the product and a supportive and stable political regime are also essential, he says. On the buy side, the markets for green hydrogen need proper conditions, such as infrastructure and pipelines to move ammonia around, and the possibility to convert existing gas grids.

However, hydrogen projects are plagued by some of the same economic issues faced by solar and wind enterprises and these new models may take longer to take off. Doyle fears "a much slower pace of innovation because the money isn't there."

Government policies to speed up the transition

Renewable energy capacity additions are an indispensable part of the plans to reduce emissions and mitigate climate change. However, market forces on their own will not allow these additions to come through fast enough.

Industry players support policies that help make renewable energy more efficient and less costly, counting on reliable transmission and distribution systems.

"We can't afford to wait, we need policy to support the speed of this transition because it won't happen at the right pace on its own," says Merfeld. "We need market evolution to support the right behaviors and sophistication to make the transition smoother."

In the United States, the \$1.2 trillion Infrastructure Investment and Jobs Act (IIJA), approved in late 2021, provides funding for energy related programs to support investment in electric grid resiliency, battery supply chain programs, carbon capture and utilization R&D, hydrogen R&D, nuclear subsidies, and related programs. Approximately \$30 billion is targeted for grid resiliency, largely focused on transmission and distribution project development and upgrades that will enable clean energy.

However, the IIJA provides broad policy directives and does not address specific state and local regulatory policies. According to Black & Veatch, successful implementation of infrastructure programs envisioned by IIJA necessitate a regulatory strategy that addresses the requirements of multiple regulatory authorities, including issues such as rate impacts, cybersecurity, safety, and market impacts, as well as financing conditions precedent.

"It's going to require really thoughtful, cohesive federal management and input to support the growth and transition, and also radical rethinking of how these businesses are run because the model is not that different from one hundred years ago," says McNally.

Around the world, carbon pricing tools could potentially work in that direction, helping to bring down coal and gas production and sharing value across the renewable supply chain. "The idea of global carbon pricing seems far away but it needs to get there", says Doyle.

CONCLUSION

The urgency to deliver infrastructure and technology to enable the energy transition met roadblocks during the pandemic. Soaring input prices and logistic bottlenecks are delaying several projects and putting their economic viability into question. Government policies and coordination efforts are coming short and not fast enough. Equipment manufacturers, technology companies and energy project developers need a clearer perspective of market dynamics in the coming years to make the investments required to speed up the energy transition.

