Emerging from 2020: Energy Innovation and Infrastructure Developments

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The 2020 global pandemic created an increased awareness of several arenas, most notably the value of energy and technology. Not surprisingly, several key energy-related developments occurred, including the emergence of innovative technologies and a heightened recognition of the challenges of aging infrastructure. Policy and legislative responses to the COVID-19 pandemic produced a by-product: a medium to facilitate the development of new energy technologies and infrastructure investment, thereby driving both the clean energy transition and economic recovery.

New Innovative Technologies

Every year, Black & Veatch issues a *Strategic Directions: Electric Report* reflecting expert analyses of their annual survey of more than 600 power sector stakeholders and identifying emerging trends, challenges, and opportunities. This year's survey reveals that half of the respondents are committing more investment to local renewable energy over the next five years, followed closely by energy storage in the short term and eventually by microgrids and other DER in the longer term. 21% of *2020 Strategic Direction: Electric Report* respondents consider electric transportation highly promising – a 74% increase over 2019 -- while acknowledging infrastructure investment is needed to optimize the benefits.

National vehicle stock conversion requires over a decade, rather than a single model year. Ultimately, durability and functionality will be the most persuasive purchase attributes, particularly for electric buses, trucks, cars, airport service vehicles and freight-moving vehicles. To accelerate the pace of electrified transportation for passenger vehicles, greater battery range and increased deployment of charging stations are needed for both residential and public locations. GM's January

2021 announcement to phase out gasoline and diesel-fueled cars by 2035 and convert its production to electric vehicles will clearly impact that market. With Amazon leading a $700 million investment in the electric vehicle startup, Rivian, other companies are collaborating on user-friendly, high powered, next generation charging alternatives, including the deployment of fast Level 2 charging stations as part of an exclusive electric car-sharing service.

A survey of one thousand energy industry executives, released in November 2020 by Oilprice.com, predicts that hydrogen fuel cell technology will ultimately outperform battery powered EVs. Technological advances and substantial R&D investment are reviving hydrogen for a possible comeback, with a potential $11 trillion hydrogen marketplace by 2050. This year, Bloom Energy is slated to become the first fuel cell maker to become cash-flow positive, after experiencing a 521% gain for investors from October 2019 to October 2020.

Infrastructure Investment

The most challenging issue facing the electricity industry, according to one-third of the respondents in the *2020 Strategic Directions: Electric Report* is aging infrastructure, which was universally cited, although particularly noted as the top challenge among three in 10 respondents in the Northeast, South and West. The COVID-19 pandemic has, given increased reliance upon electronic communications, underscored the importance of electric service reliability and thus also, robust transmission and distribution infrastructure. Despite the high levels of concern, it is encouraging that this number is 13% lower than a year ago.

Federal government support for transmission infrastructure investment could emerge, as noted in DOE Secretary Nominee Granholm's Jan. 27, 2021 Senate Energy Committee hearing. *FERC's Order No. 2222: A New Day for Distributed Energy Resources,* could reveal new marketplace opportunities by helping to remove barriers for distributed energy resources (DERs) by allowing them to compete on a level playing field in the organized capacity, energy and ancillary services markets run by regional grid operators. The rule allows several sources of distributed electricity to aggregate to satisfy minimum size and performance requirements that each may not be able to meet individually.

DERs may include electric storage, intermittent generation, distributed generation, demand response, energy efficiency, thermal storage or electric vehicles and their charging equipment. Potential benefits include lower costs for consumers through enhanced competition, increased grid flexibility and resilience, and more innovation within the electric power industry.

Economic Stimulus Packages and Energy-related Tax Credit Extensions

The Congressionally-approved $900B stimulus package and $1.4T government funding bill passed in the final week of 2020 is estimated to contain over $35B designated for energy, including new technologies, such as advanced nuclear reactors, renewables, transportation, and energy efficiency.

The legislation includes several provisions to extend critical energy-related tax credits, specifically:

- Two-year extension of the investment tax credit (ITC) for solar projects at 26%, with a 22% ITC for solar projects beginning construction in 2023 and a subsequent drop to a 10 % ITC from 2024 onward.

- One-year extension of the 60% production tax credit for onshore wind.
- New 30% investment tax credit for offshore wind beginning construction prior to 2026. Considering the extensive development cycle and high construction costs for offshore wind, the new tax credit should be especially beneficial to developers seeking longer term stability, at a time when the US lags relative to other international developers.
- Two-year extension to start construction on carbon sequestration projects before January 1, 2026, rather than 2024.
- One-year PTC extension for other renewable energy projects: hydropower, marine kinetic, biomass, geothermal, landfill gas to power, trash to power, etc.
- Tax credit ($4K-$40K) for new qualified fuel cell motor vehicles.
- One-year extension of up to $2K credit for new energy efficient homes.
- Permanent deduction for energy efficient improvements to commercial buildings up to $1.80/square foot.

A stand-alone energy storage tax credit provision was omitted from the stimulus package.

Looking Forward into 2021

As we journey through 2021, energy stakeholders are reinventing a 130-year-old industry to meet the technology choices and customer expectations of the 21st Century, while continuing to navigate a worldwide public health crisis. President Biden's January 2021 Executive Orders signal new developments under a new Administration and 117th Congress:

Federal investment in clean energy technology: Expect federal support for carbon capture and storage technologies, hydrogen, advanced nuclear, electric transportation, building efficiency, renewable energy, and energy storage. Electric transportation supporters will advocate for a 2021 infrastructure package that will facilitate the installation of electric vehicle charging systems.

State/local authority: States and cities will continue to be major players in 2021, particularly given tight Congressional margins and overall national political divisiveness.

Environmental justice /regulation: Anticipate increasing air/land/water regulation.

"Build Back Better" Economic Recovery: Federal investment in clean energy infrastructure, resulting in jobs and the promise of greater innovation.

Conclusions

Despite the uncertainties created by a global pandemic, the US electric utility industry continued to provide reliable, affordable power in 2020, while simultaneously adapting to a changing marketplace. Although aging infrastructure remains a challenge, it is recognized by the new Administration as a significant pillar in the overall economic recovery and the stimulation of new clean energy jobs. Likewise, innovative technologies are a source of both new employment opportunities and potential environmental benefits. They will likely attract private sector investment, as well as federal government support. The synergistic consequences of "smarter" infrastructure and innovative technologies can yield considerable economic growth at a critical time. Meanwhile, continued support for renewable energy–as evidenced in the record 2020

installations and the Congressional tax credit renewals–will spur demand for greater transmission capabilities. The “chicken and egg” symbiotic relationship of infrastructure and innovation offer a recipe for a bright economic future.

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