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2023 power and utilities industry outlook

Contents

About the Deloitte survey

To understand the outlook and perspectives of organizations across the US power and utilities industry, Deloitte fielded a survey of more than 70 US executives and other senior leaders in September and October 2022. The survey captured insights from respondents in electricity generation, transmission, and distribution.

Electric power sector weighs promising trends amid cost and climate woes

2022 was a year of perils and promise for the electric power sector. US electricity sales continued to rise as the pandemic recovery progressed, increasing 3.6% in the first eight months compared to the prior year.[1] But costs also spiked, largely due to natural gas prices more than doubling on global shortages exacerbated by Russia's invasion of Ukraine. Coal prices also rose as demand surged for alternatives to gas,[2] while renewable energy prices followed suit due to supply chain disruption, inflation, and rising interest rates.[3] As a result, US retail electricity prices reached record highs in 2022, averaging 12.3 cents per kilowatt hour (cts/kWh) across all segments (commercial, industrial, residential) in the first eight months, up 11% year over year.[4] And they're expected to remain elevated into 2023.

Extreme climate events—from droughts to hurricanes, heat waves and wildfires—continued to test regional grid resilience.[5] In response, the industry and policymakers worked to bolster reserves, deploy energy storage and microgrids, harden infrastructure, and strengthen flexible load options.[6] The power sector also boosted efforts to thwart increasingly sophisticated cybersecurity threats.[7]

At the same time, 2022 brought several promising developments that will likely carry forward into 2023:

- US renewable generation and capacity rose, accounting for over 23% of electricity generated from January through August 2022, up from about 21% in the same period of 2021.[8] Solar and wind power accounted for 69% of new utility-scale capacity additions from January to August 2022.[9]
- The Inflation Reduction Act (IRA) extended and expanded tax credits for renewables, electric vehicles, stand-alone storage, green hydrogen, clean energy manufactured components, and more.[10]
- Funds began to flow from the $1.2 trillion Infrastructure Investment and Jobs Act (IIJA), also known as the Bipartisan Infrastructure Law, to support grid modernization and clean energy research and deployment.[11]
- Regional transmission organizations submitted initial plans for distributed energy resources (DER) to participate in wholesale markets under Federal Energy Regulatory Commission Order 2222.[12]
- US electric vehicle sales may have approached a tipping point, rising to 6.3% of light-duty vehicle sales in H1 2022.[13]

In 2023, these promising developments will likely evolve further. But providing secure, reliable, affordable, and clean electricity could become even more challenging. Inflation, high fuel costs, and supply chain snarls may keep electricity prices elevated, while extreme weather, cybersecurity threats, and the growth of variable renewables and DER may continue to require innovative management to ensure grid reliability. The 47 largest US electric and gas utilities plan to spend a record-breaking $169.4 billion in 2023 to enhance reliability, security, and renewable integration.[14] But as customers struggle with bill increases, affordability could become elusive.

Despite these challenges, new technologies and supportive policies could ripen opportunities in 2023 and help the industry achieve its goals. We explore several of these promising trends and their potential impact on the industry in this year's outlook, as well as what 2023 may hold for environmental, social, and governance (ESG) disclosures.

1

Grid modernization

Utilities increasingly plan to roll out the next wave of advanced metering infrastructure (AMI)

Many of the more than 115 million "smart" electricity meters deployed at US customer sites since 2000 are beginning to show their age, and utilities are increasingly developing replacement plans.[15] After a 15–20 year life span, batteries are wearing out and some need to be replaced. This first generation of digital electricity meters displaced mechanical meters and, for the first time, enabled utilities to remotely read their entire population of meters in daily, hourly, or even 15-minute intervals.[16] Utilities could remotely receive power quality information, switch power on and off, and detect power outages immediately.

Smart meters have saved utilities significant time and money and enabled carbon emissions reduction through fewer truck rolls to read, activate, and deactivate meters. One analysis found that operational savings for deployments greater than 500,000 meters averaged $10 per meter per year, recovering 65% to 75% of the initial cost of the meter deployment program over 20 years.[17] Utility benefits came largely from reducing meter readers, deferring generation investment, detecting theft, and implementing conservation voltage reduction (CVR).[18] Some consumers benefitted from online move-in/move-out scheduling, outage restoration time notifications, dynamic pricing plans, and bill forecasting alerts.

The first wave of smart meters had a life expectancy of approximately 20 years, which appears roughly accurate based on interviews with AMI 1.0-enabled utilities.[19] As AMI systems approach that age, some utilities will start planning their replacement in 2023, as a large replacement project can take three to five years to plan and supply chain kinks could delay it further. Utility companies typically replace the entire meter rather than just the batteries because many meters are sealed or require disassembly, making battery-only replacement impractical.[20] And, just as first-wave AMI benefits helped pay for implementation, the benefits of next-gen AMI (or AMI 2.0) could also help justify the rollout expense.

AMI 2.0 features faster processors, more memory, modular communication capabilities, and longer-lasting batteries.[21] Residential meters are becoming edge computing devices that can better understand how electricity is being used or generated behind the meter. And that could be increasingly important as consumers add solar panels, electric vehicles, or battery storage and seek to interact with the grid. Fifty-three percent of our survey respondents said the most important capability AMI 2.0 could provide would be to support utility flexible load programs with real-time, device level usage analysis. Figure 1 highlights the wide variety of capabilities anticipated from AMI 2.0.

Figure 1. Anticipated capabilities from AMI 2.0-enabled meters

Source: Deloitte analysis. For a more in-depth analysis, see Enabling the clean energy transition: Planning for next-generation advanced metering infrastructure and grid technologies.

2

ESG reporting

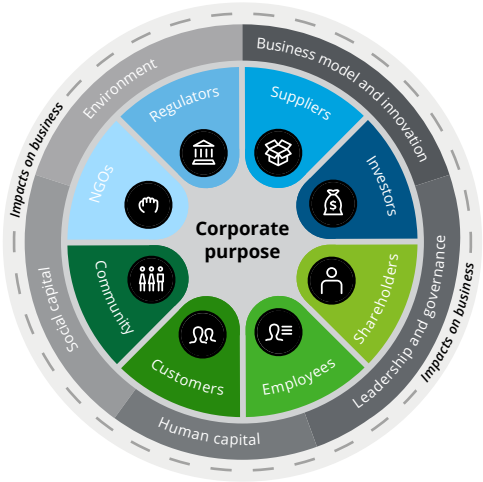
Environmental, social, and governance reporting continues to gain momentum

Many US power and utility companies have been disclosing elements of ESG topics for more than a decade and enhancing them as needs and advocacy evolve. Proposed rules by the US Securities and Exchange Commission (SEC) could provide further momentum in 2023.

Currently, most utilities post ESG reports and other sustainability activities on their websites. For many, it's their version of a comprehensive Sustainability Report or Corporate Responsibility Report, which includes all aspects of ESG, not just environmental and climate.[22] These reports tend to describe activities of the company, aspirational commitments made, and progress toward identified ESG metrics. Reporting often includes elements of the company's compliance with frameworks such as the Greenhouse Gas Protocol, the Task Force on Climate-related Financial Disclosures (TCFD), the Sustainability Accounting Standards Board (SASB), and the Global Reporting Initiative (GRI).[23] Nearly all utilities populate an ESG template developed by the Edison Electric Institute and the American Gas Association and their member companies specifically for power and gas utilities, and include it in reports or post it on their websites.[24] Many also submit disclosures through the Carbon Disclosure Project (CDP) portal.[25]

Enhanced ESG reporting and decarbonization commitments will likely progress further in 2023, as companies see a growing need to identify rapidly changing environmental and societal disrupters and address them. Mounting calls for more disclosures on how the companies are prepared to deal with disrupters are another driver. Figure 2 illustrates how ESG is an integral part of business planning.

Figure 2. ESG is increasingly integral to business planning



Source: Deloitte analysis.

For most large power companies, the reports outline their carbon emissions reduction goals and plans to achieve them. As of October 2022, 43 of the 45 largest investor-owned utilities had committed to reducing carbon emissions.[26] Each year more companies announce targets or strengthen existing targets. Regulators, investors, customers, and other stakeholders continue to urge more comprehensive, consistent, and standardized ESG reporting. And reports suggest that favorable ESG ratings can boost a company's access to sustainability-linked financing, such as green bonds, and lower their cost of capital.[27]

Currently, US company disclosures and metrics are not uniform and third-party review or assurance is not widespread. But that could begin to change in 2023, as the SEC proposed a new rule in March 2022 that would require public companies to annually disclose certain climate-related financial statement metrics, information related to climate-related risks, and greenhouse gas (GHG) emissions in public disclosure filings.[28] This proposed SEC rule followed another that would require enhanced disclosures on cybersecurity incidents, risk, management, strategy, and governance.[29] Depending on whether and when the proposed climate rule is finalized, it could begin to be phased in as early as fiscal year 2023.[30]

3

Grid flexibility

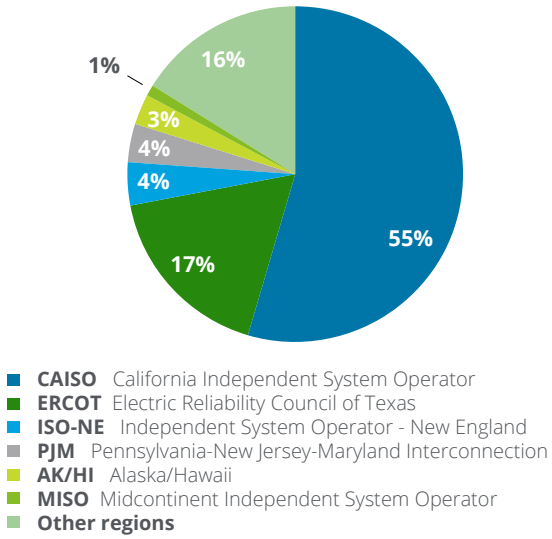
Battery storage deployments set to accelerate despite supply chain snags

US battery storage is poised for faster growth in 2023, as renewables' share of generation rises, extreme weather events become more frequent, and new legislation continues to improve its value proposition. At the end of 2021, the United States had a cumulative total of 4.6 gigawatts (GW) of utility-scale battery storage capacity.[31] In H1 2022, the industry added another 1.9 GW, or 5 gigawatt hours (GWh), of capacity, despite price increases and project delays amid ongoing supply chain struggles. Another 4 GW is expected to be operational by the end of 2022, bringing total 2022 additions to nearly 6 GW, almost double 2021 installations.[32] And forecasts indicate that could rise to nearly 10 GW of added capacity in 2023 and 12 GW in 2024.[33]

Battery storage costs are expected to continue rising in 2023, though that trend could reverse longer term and is unlikely to dampen demand. Average prices rose to about $200/kWh in H1 2022, largely due to supply chain challenges, after declining for more than a decade to approximately $175/kWh in 2020.[34] But demand is expected to remain robust as drivers and use cases expand, including:

- Growing renewables deployment means grid-scale storage is often tapped for frequency response or spinning reserves,[35] which are grid services that can mitigate wind and solar intermittency.
- Renewables are also sparking arbitrage opportunities: Battery storage can charge with low-marginal-cost wind or solar power and discharge when more expensive natural gas or coal-fired plants are setting electricity prices.[36]
- Increasingly extreme weather and climate events make storage more attractive as a hedge against outages.
- In the midcontinent and mid-Atlantic regions, storage is being installed to replace retiring coal-fired units and to prepare for rising renewable deployment.[37]
- Developers are integrating battery storage into more than 95% of new solar projects in California, while in other major regions that penetration is up to at least 20% and expected to increase.[38] Figure 3 provides a regional breakdown of US operating battery capacity.

Figure 3. Regional breakdown of US operating battery capacity (as of September 2022)



Sources: EIA Preliminary Monthly Electric Generator Inventory (based on Form EIA-860M as a supplement to Form EIA-860), September 2022; Deloitte analysis.

Supply chain kinks could continue into 2023, largely due to the paucity of battery and critical mineral suppliers and concern about unethical labor practices, especially in cobalt mining.[39] But alternate battery chemistries (such as lithium iron phosphate) could scale up for the electric vehicle (EV) market, helping reduce the demand for lithium-ion batteries.[40] In addition, the IIJA is injecting $7 billion into US battery and component manufacturing and recycling, as well as extraction and processing of critical materials such as lithium, cobalt, nickel, and graphite to develop a robust domestic battery supply chain for US EV and grid storage markets.[41]

Finally, the IRA is expected to boost battery storage development by 30 GW, or 111 GWh, from 2022 to 2030,[42] due to its 30% investment tax credit (ITC) for eligible storage projects, with 10% adders for meeting domestic content specifications or being located in a designated "energy community." Previously, energy storage tax credits were available only when the project was co-located with solar and part of the solar project.

4

Decarbonized fuels

Power and utility companies see opportunities to reap value from clean hydrogen

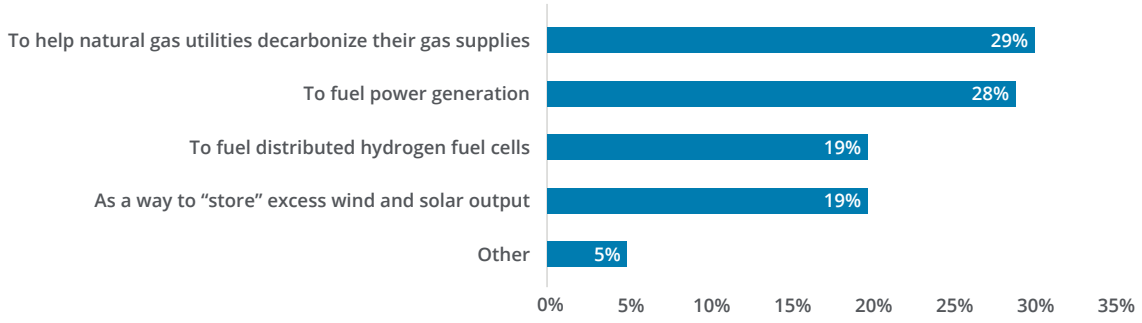
There has been a frenzy of activity in green hydrogen, and it's likely to accelerate in 2023 and beyond, partly due to new incentives in the IRA.[43] "Clean" hydrogen prices will likely become competitive with conventional hydrogen in many US regions,[44] though its use may still be infeasible for applications that require new transportation, storage, and other infrastructure. Power and utility companies are considering which options make the most economic sense in the near term.[45]

The IRA provides a new tax credit for qualified "clean hydrogen" facilities, where hydrogen is produced through a process that results in a lifecycle GHG emissions rate not exceeding 4 kilograms (kg) of carbon dioxide equivalent per kilogram of hydrogen.[46] The tax credit varies depending on the lifecycle GHG emissions rate, with the full $3/kg typically applying to hydrogen produced through renewable- or nuclear-powered electrolysis.[47]

The power and utilities sector has typically produced and consumed a negligible share of hydrogen, but that could begin to change in 2023.[48] Power companies are evaluating hydrogen options with an eye to those most immediately economically feasible. Producing clean hydrogen using renewable or nuclear generation is often an attractive option. And it could potentially qualify for at least two IRA tax credits: an ITC or a PTC for the renewable or nuclear generation, and a credit for the hydrogen production.[49] Below are five ways some power companies are considering monetizing clean hydrogen's value, and figure 4 provides perspectives from our industry survey:

- **Sell it to industrial or transportation sector consumers.** Site electrolyzers near consumers (such as oil refiners and ammonia producers) that already use conventional hydrogen and don't require new infrastructure.[50] Proceeds can help power companies expand renewables and support nuclear plants.
- **Store and use it as long-duration energy storage.** Hydrogen could be a way to "store" excess wind and solar output longer than the typical four- or eight-hour battery system allows.[51] Stored hydrogen could fuel power plants when wind and solar are offline. However, this could require new storage facilities and gas turbines that can run on 100% hydrogen or hydrogen blends.
- **Provide flexible distributed generation through hydrogen fuel cells,** which could power industrial and commercial end users, help balance load, provide resiliency, and mitigate renewable variability. Fuel cells could also qualify for an ITC.
- **Use it to help decarbonize their own natural gas distribution systems,** or sell it to other gas utilities. Levels above a 5 to 15% blend with natural gas could require significant upgrades to distribution infrastructure and end-user appliances.[52]
- **Use it for baseload power generation.** Economics are currently challenging at the scale needed, though new gas-fired generation will likely be built with the capacity to use increasing amounts of hydrogen in the future.[53]

Figure 4. What should be green hydrogen's most important role in the power and utilities sector as it becomes cost-competitive with conventional fuels?



Source: Deloitte 2022 power and utilities industry survey.

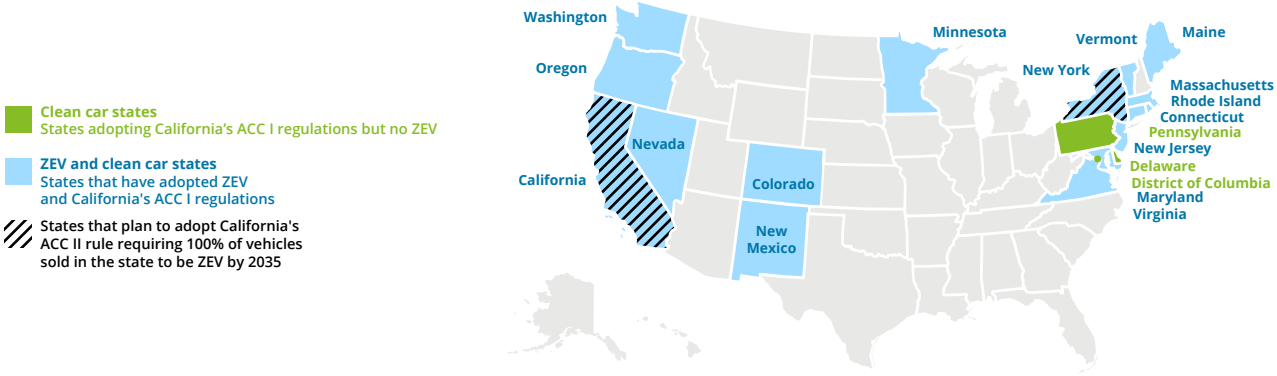
5

Transportation electrification

Utilities likely to sharpen focus on preparing for electric vehicle growth

Utilities will likely accelerate their EV planning and programs in 2023, as US EV market share exceeded 6% of new car sales in H1 2022, the IRA offered new EV tax credits, and federal and state governments set ambitious goals for EV penetration.[54] The Biden administration set a US goal of 50% EV market share by 2030.[55] In addition, California's new Advanced Clean Cars II (ACC II) regulations require 100% of cars sold in the state to be zero emission vehicles (ZEV) by 2035.[56] New York has followed suit,[57] and at least four of the other 17 states that had adopted California's original Advanced Clean Cars I (ACC I) regulations are considering adopting this new, stricter standard.[58] Figure 5 maps these 17 states.

Figure 5. States with ZEV and clean car standards



Source: California Air Resources Board,"States that have Adopted California's Vehicle Standards under Section 177 of the Federal Clean Air Act," May 13, 2022.

Some of the thorniest challenges to meeting these goals could be for the auto and battery industries to produce enough EVs and batteries, given supply chain constraints and IRA tax credit eligibility requirements for EVs.[59] Surveyed power and utilities executives perceive their sector's key priorities as supporting charging infrastructure buildout (43%); upgrading distribution assets to prepare for increased load (36%); and preparing to manage new load with EV rates to encourage off-peak charging (18%).[60] Below are some important focus areas for 2023 and beyond:

- **Vehicle-grid integration:** While US electricity generation is generally deemed sufficient to handle the roughly 2% annual demand growth expected from EVs,[61] spreading out demand over time and upgrading distribution system equipment in high-adoption areas is a priority. Utilities are increasingly setting rates that encourage off-peak charging—and new submetering technology enables them to charge separate rates without installing additional meters.[62] Some utilities will use accumulated data to fine-tune managed charging programs. And while widespread adoption of bidirectional vehicle-to-grid (V2G) technologies may still be several years off, pilot activity is largely focusing on fleet V2G programs and vehicle-to-home charging.[63]

- **Charging infrastructure buildout:** All 50 states have submitted EV infrastructure deployment plans to access the IIJA's $5 billion allocation for 500,000 fast-charging stations across 53,000 miles over five years.[64] And many utilities will be providing the additional equipment upgrades, or "make readies," to prepare sites for charger installation. Since fast chargers require a significant amount of power, utilities are gearing up to provide extra infrastructure such as conduit, trenching, cabling, and switchgear, including new transformers and meters (much of which still faces supply chain constraints). Many utilities are also coordinating with fleet operators to support charging infrastructure for trucks and other heavy-duty vehicles.

- **Medium- and heavy-duty vehicle uptake**: Nearly 20 states and jurisdictions are aiming for 30% of new medium- and heavy-duty (MDHD) vehicle sales to be electric by 2030, and 100% by 2050.[65] 2021–2022 saw unprecedented MDHD growth in investment, policy support, and deployment,[66] and utilities are increasingly offering programs to promote and enable MDHD vehicle uptake. This includes piloting several electric school bus V2G programs. Adoption is likely to accelerate further in 2023 with IIJA investments, such as $5 billion for electric school buses and $5.6 billion for electric transit buses. School districts from all 50 states applied for $500 million in EPA 2022 Clean School Bus Rebates, prompting an increase to $965 million.[67]

Innovation, investment, and industry convergence could counter headwinds

In 2023, supply chain snags, rising costs, and extreme weather are likely to continue plaguing the power sector. But promising trends in innovation and investment, buoyed by recent legislation, can help the sector fulfill its mission to provide increasingly secure, reliable, clean, and affordable electricity. Power and utility companies will likely lean further into evolving technologies and new business models. Integrating technologies such as AMI 2.0, battery storage, clean hydrogen, and EVs can boost system flexibility and agility to help offset rising costs and increase resilience to extreme weather events.

In the new year, power and utility companies will likely continue to seek guidance from federal and state governments on how to access the considerable clean energy support and incentives provided by the IRA and IIJA legislation. Utility decarbonization plans often contain caveats stating that government research, development, and deployment support, funding, and incentives for new technologies will be needed to reach net-zero goals. The cavalry may have arrived.

The sector can also continue to seek opportunities for partnerships to access capabilities, technologies, and assets in adjacent sectors such as oil and gas and manufacturing, as well as automotive, technology, mining, real estate, and government to advance the energy transition. As the clean energy transition progresses, opportunities will likely continue to expand across the entire economy.

Let’s talk

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