



In this year's World Energy Issues Monitor, US results were consistent with global result trends, but with some notably different – convey an **increased uncertainty** on many key issues, particularly:

- How quickly near-term policies will drive efforts toward carbon neutrality;
- How successful those efforts will be, and;
- How much technical progress will be made in developing and demonstrating essential technologies for achieving net-zero.

With many social systems stressed by the COVID-19 pandemic, issues such as equity, affordability, supply chain security, inflation and rising capital costs must be considered along with rising geopolitical tensions to drive effective strategies.

The emerging findings for the Action Priorities and Critical Uncertainties were tested during a workshop in February 2022. Three fundamental opportunities emerged: Rapidly scaling-up of commercial, clean-energy industries – efficiency, renewables, and electrification, and grid modernisation – that provide low-cost reduction options today and likely cost savings in the near-future. Dan Ford, US Power and Utilities Equity Analyst, also raised a key point that *“Supply chain disruptions (including geopolitics), inflation coupled with a rising cost of capital, and little public appetite for volatility in energy prices or lapses in reliability could hinder clean energy growth”*.

CRITICAL UNCERTAINTIES

Climate change management was the largest uncertainty identified in the survey. Dramatic federal policy shifts over the past year and 2022 gubernatorial elections that could lead to state-level energy policy changes are partially driving these uncertainties. The Biden Administration is pursuing regulatory approaches and promoting legislation with a considerable investment in clean energy targeting climate in both the recent Infrastructure Investment and Jobs Act (IIJA) and additional, proposed 2022 legislation. At the same time, extreme weather events are driving an increased focus and potential actions to increase climate adaptation and energy system resilience.

Market Design and regulation play a key role in climate management as states and regions grapple with rate structures to incentivise customer-sited solar and storage; expand the geographic regions for managing electric supply and demand and streamline interconnection processes, and; support existing low-carbon technologies, such as nuclear and hydroelectric plants, in the absence of a federal carbon price.

Regional integration is a critical uncertainty with the availability and cost of some clean-energy resources – renewables, natural gas, carbon storage – varying widely across the nation, higher-emitting plants being concentrated in a few regions, and a complex legal and regulatory system that parses governance of energy across numerous federal and state entities. The infrastructure bill (IIJA) attempts to improve regional integration by funding a national transmission planning function, but critical electric transmission siting approvals still occur at state and local levels.

Developing and demonstrating new **clean, firm capacity** technologies is a key opportunity and uncertainty. Likewise, maintaining and enhancing existing carbon-free resources, primarily existing nuclear and hydroelectric resources that provide over half of non-emitting generation today, is a related uncertainty. Many of these assets are under financial stress and have been supported by a patchwork of state policies. The infrastructure bill (IIJA) could help, providing \$6 billion (USD) to help keep existing nuclear generation viable.

ACTION PRIORITIES

Survey results emphasised deployment efforts for energy efficiency, rapid acceleration of clean electricity led by renewables and electrification, in parallel to development and demonstration of advanced low-carbon technologies needed to achieve net-zero. Carbon reduction strategies cannot be achieved without increased energy efficiency. More efficient cars and trucks, better insulated homes, improved **energy efficiency** in the manufacturing sector and intelligent operations minimise the amount of energy required and often increase comfort and resilience. The infrastructure bill (IIJA) also includes numerous investments in efficiency, including \$3.5 billion (USD) for a weatherisation assistance program targeting low-income households.

Solar and wind **renewable energy** are projected to expand from today's 12% to more than 30-50% of generation by 2030 to meet interim US emission targets. Grid expansion, modernisation, increased flexibility, energy storage, firm capacity and regulatory and market evolution underlie a successful transition. Increased regional

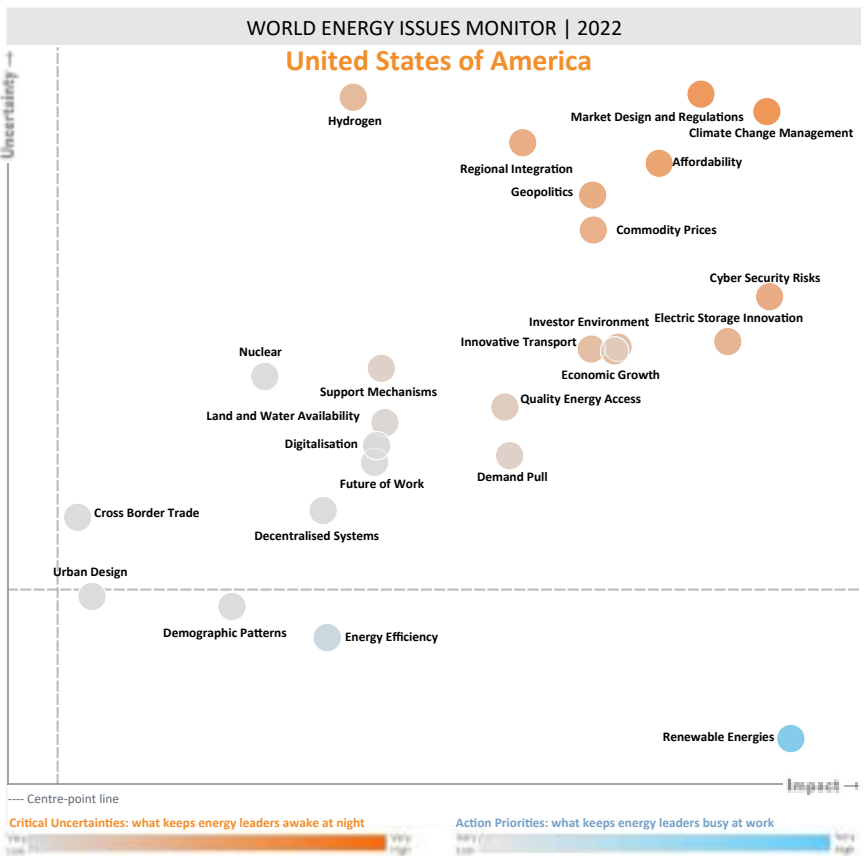
integration will be critical for controlling costs and maintaining reliability.

Increasing **innovative transport** solutions and lower emitting vehicles will also be key. Transportation represents the largest source of CO2 emissions in the country. The US electric vehicle (EV) market share grew from 2% of car sales in 2020 to 4% in 2021 and needs to reach around 50% of sales to meet the US interim climate target. While EV sales are expected to grow organically as battery costs decline and vehicle options expand, incentives can greatly accelerate the pace of adoption. Over \$30 billion (USD) of IIJA funding targets deployment of EVs and charging infrastructure. Much larger incentives for EV purchases are contained in proposed legislation. Ride sharing and development of rail and alternative modes of public transportation are other key opportunities.

The U.S. currently spends around \$1 trillion annually on energy and \$2 trillion on buying and maintaining energy-using equipment. To decarbonise, clean energy must be **affordable** and many of the nation's households and businesses need to have the technical and financial capacity to invest in efficiency and the low-carbon cars, trucks, and heating/cooling that will drive emission reductions. Working locally, the clean energy transition provides opportunities to improve the lives of disadvantages and underserved communities. In the U.S. as elsewhere around the globe, **humanising energy** is fundamental to societal understanding and acceptance of change that will drive the energy transition.

Maintaining and enhancing existing energy infrastructure from clean electricity sources, expanding and digitising the electric grid, and defining the role that different energy forms can play are all critical to an integrated and resilient low-carbon energy system. Specific to making investment decisions, EPRI Senior Vice President of Energy System Resources, Neil Wilmschurst said: *“By the early 2030s to 2035, we are going to be locking in what infrastructure we will have in 2050, so we have 10 years to get the uncertainties understood enough for markets to see what is investable. We do not need to know everything, but we need to know enough.”*

Developing and demonstrating technologies that are not commercial today, but that will provide the clean firm electric capacity critical to achieving net-zero goals for 2050. While this represents a daunting technology challenge, the unprecedented efforts to move COVID vaccines from lab to applications could provide lessons to explore and adopt. As highlighted by Mike Howard, EPRI Emeritus CEO: *“When I think about COVID and the world coming together to develop and advance those technologies so we could actually commercialise a vaccine in a very short period of time, it brings me hope that we can advance technologies to manage climate change.”*



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Acknowledgements
U.S. Member Committee