VIEW POINT

ORCHESTRATING A DIGITAL APPROACH TO ENERGY TRANSITION

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Human activity – from industrialization to urbanization – has precipitated climate change. Climate science confirms that burning of fossil fuels and carbon-centric industrial processes has released copious amounts of greenhouse gases (GHG), over the past two centuries. GHG emissions cause global warming, which has increased the frequency of extreme climate events such as heat waves, wildfires, drought, and floods.

In the words of Dr. Hoesung Lee, Chair of the United Nation's Intergovernmental Panel on Climate Change, and Dr. Fatih Birol, Executive Director of the International Energy Agency, "Our climate challenge is a shared global challenge – and it is largely an energy challenge. Energy accounts for over two-thirds of global greenhouse gas emissions. This means energy must be at the heart of any solution."

The energy transition journey

Enterprises, industries and governments are adopting multiple pathways in response to the UN's call to mitigate climate change with sustainable energy systems. The EU seeks to reduce carbon emissions by at least 55% through policy amendments across transportation, energy and taxation by 2030. Leading transportation service providers are combining a low-carbon fleet with smart route planning solutions to achieve clean energy goals. For instance, Posti, the parcel and logistics company in Finland, inducted electric vehicles (EVs) and implemented energy efficiency programs to reduce CO2 emissions by 60 percent between 2011 and 2022.

The Inflation Reduction Act (IRA) and The Infrastructure Investment and Jobs Act (IIJA) are set to drive substantial reduction in GHG emissions in USA, by 2030. The legislations for capital funding will sustain diverse programs for fair and equitable clean energy transition. Moreover, the IRA and IIJA will boost the transportation value chain. While grants for manufacturers accelerate domestic production of EVs, federal tax credits reduce the price of EVs for households and enterprises. Further, infrastructure funding will enable integrated utilities such as NextEra Energy to enhance transmission capacity and grow their renewables portfolio.

Pivoting to a digital model

Pivoting from carbon-intensive to net zero operations at scale and speed is far from easy. State and non-state actors need to make calibrated investment decisions and mitigate risks. A comprehensive solution demands decarbonization programs and energy transition strategies to be augmented with a diversified energy portfolio. Such an approach ensures that unwinding of fossil fuel investments is synchronized with decarbonization plans of carbon and energy-intensive industries such as shipping, aviation, fertilizers, steel, cement, and utilities.

Digital technology is a catalyst for holistic energy transition. It facilitates informed decision making to realize near-term enterprise / region-specific emissions reduction targets as well as long-term sustainability goals, while ensuring energy security. Artificial intelligence (AI)-driven solutions transform global energy systems by enabling carbon capture, reduction and removal.

AI and predictive analytics are reliable energy transition levers in the journey to net zero. Technology-based solutions empower stakeholders to evaluate options for an energy transition roadmap. For instance, automobile and transportation enterprises seeking to electrify their fleet should develop capabilities such as charging infrastructure. Analytical solutions guide strategies for EV charging enablement, infrastructure management and EV fleet operations. Similarly, AI-driven analytics empower utilities building EV charging networks with insights to boost grid resilience, an imperative for stability of energy production and distribution. Notably, AI-enabled distribution automation and smart metering programs transform grid operations. .

Hydrogen and biofuels are new sources in the emerging energy landscape. Digital platforms help oil and gas refineries and coal plants build capacity for alternative fuels and hydrogen production. Significantly, carbon capture, utilization and storage (CCUS) technology is set to become a game-changer in energy transition.

Accelerating decarbonization

Low-carbon fuels, renewable energy and public EV charging networks are not the only components of clean energy transition. Energy efficiency and sustainable business practices are equally important to reduce the emission of atmospheric CO2 and other greenhouse gases. Financial incentives for responsible power consumption by retail and commercial users, and voluntary or mandatory investment in energy saving devices will rationalize demand for electricity.

A digital ecosystem approach is a cost-effective pathway to a low-carbon industrial landscape. Access to clean energy as well as regional, national and global action plans for energy transition demand collaboration among stakeholders. In 1990, the state of California passed legislation mandating carmakers to roll out EVs. The policy was rolled back in 2002 due to conflict of interests. California has now banned new gasoline vehicles from 2035. Climate advocacy, favorable government policies, and advanced digital technologies can facilitate smooth implementation of the zero-emissions regulation.

Infosys, a digital energy orchestrator, develops bespoke tools for a seamless transition from non-renewable to renewable energy sources. Our AI solutions ensure a robust structure for diversified energy supply, while our data-driven approach helps prioritize clean energy investments. In addition, our energy transition team collaborates with utilities to develop capabilities for operating a modern grid and facilitating renewable sources of energy. Our grid modernization approach and energy management solutions enhance the efficiency of electric power systems.

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