



HOW BLACK SWAN EVENTS DRIVE STRATEGIC SHIFTS IN THE PATH TO NET ZERO ACROSS ENERGY, UTILITIES & RESOURCES SECTORS

There has been a sea change in the dynamics of the energy, utilities and resources industries since 2020. A series of black swan events have profoundly affected the way the world generates, distributes, stores, and consumes energy.

The shifts in business due to the Covid-19 pandemic reduced demand for energy significantly. Several oil and gas enterprises put investment in exploration and production projects on hold. For a brief period, it appeared to accelerate the transition to clean energy, especially in Europe.

The massive winter storm that caused days-long power outages in Texas in early 2021 raised questions about the reliability

of power generation resources. A majority of gas-powered plants were not weather-proof and critical equipment including wind turbines froze, posing questions about long-term grid stability.

The Ukraine crisis put energy security on the global agenda in early 2022. In fact, it may lead to a roll back in clean energy transition. Coal-fired power plants are being recommissioned in Germany to minimize reliance on Russian gas.

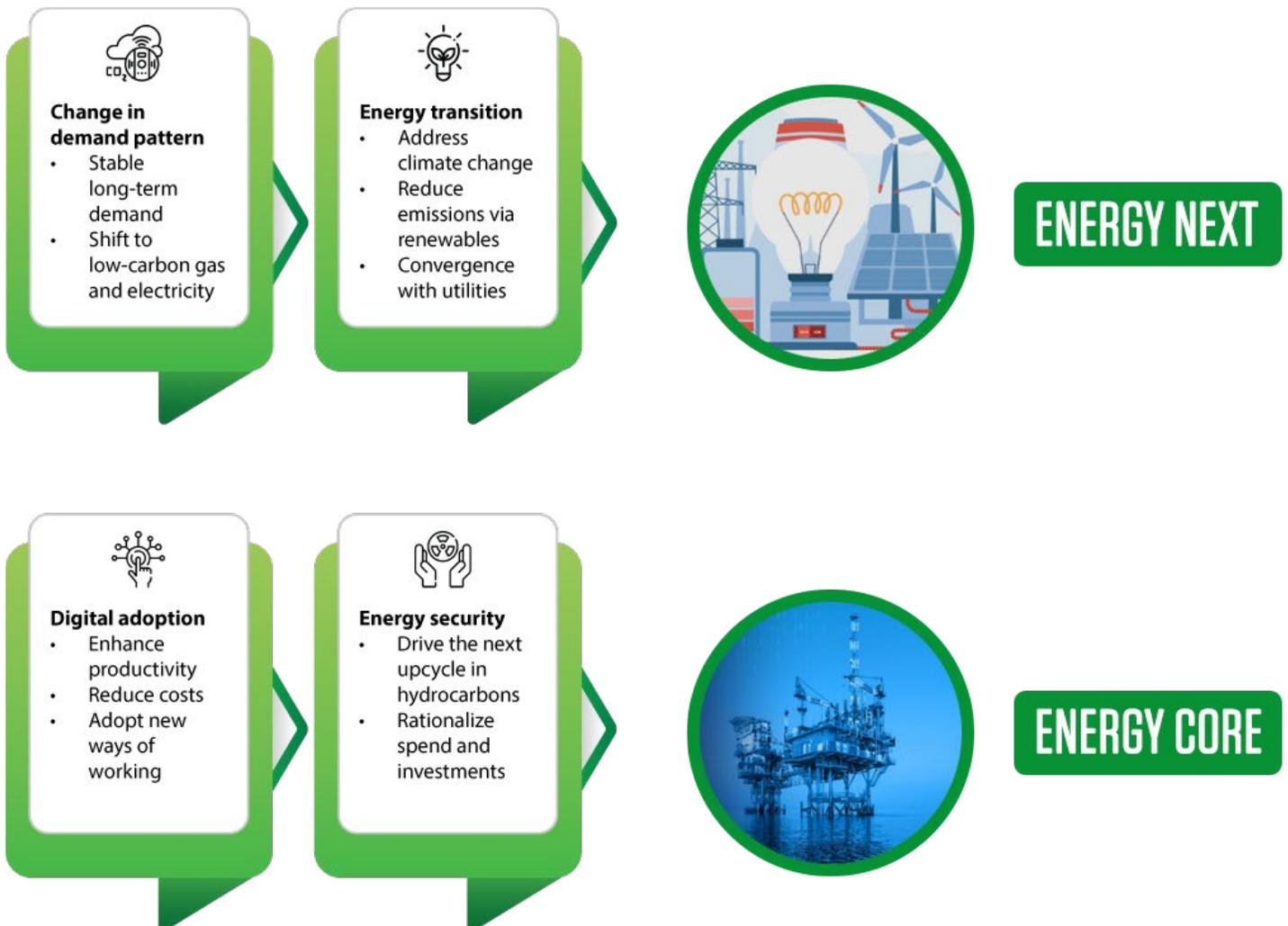
These events raise critical questions:

- Will the energy security concerns of nation states supersede the issue of climate change?

- Can breakthrough technological innovations such as nuclear fusion, Small Modular Nuclear Reactors (SMRs), or hydrogen fuel cells mitigate climate change in the next five-ten years?

At the same time, there are strategic shifts across the energy, utilities and resources sectors. Technology can play a transformational role in developing a sustainable ecosystem.

Medium & Long-term Energy industry trends necessitates the need for organizations to pivot on a two prong strategy "Energy Core" & "Energy Next" to take advantage of the market opportunities (Figure 1).



Shift 1: Status quo in oil and gas – Hydrocarbon-centric energy sources

The human race realizes the need to transition from fossil fuels to limit the impact of climate change. Yet, the proliferation of hydrocarbon byproducts across our consumption lifestyle is ubiquitous, ranging from cosmetics and electronic goods to automobiles. Finding suitable alternatives for many of these products will take decades, if not longer.

Energy security is a key factor that will prolong the dominance of hydrocarbons. While the global demand for energy continues to increase significantly, supply from renewable sources faces challenges, leading to a cautious approach for clean energy transition. The consensus among policy makers and energy planners: LNG is the perfect transition hydrocarbon on the path to net zero. Low-cost natural gas coupled with Carbon Capture and Storage (CCS) technology can lead the way to a low-carbon future. Accordingly, coal plants are being retrofitted to process natural gas. LNG refineries being established along the Gulf coast of the United States will ensure energy security and also provide a source of export revenue.

How Infosys addresses the shift

Energy Core and Energy Next offerings of Infosys are aligned with industry needs. Our IIoT-based solutions ensure effective asset management in production plants and refineries. We implement digital solutions for methane emission detection as well as flaring monitoring and reduction. In addition, our data solutions hosted on the cloud aggregate and analyze real-time data from onshore production assets, refineries and the chemicals value chain to optimize operations. Further, our experts automate drilling and wireline operations and develop solutions for remote operations management. Significantly, our solutions

transcend post-facto reporting and compliance. Our digital solutions capture emissions data in real time, enabling enterprises to measure, monitor and control GHG emissions effectively.

Shift 2: Utilities - Accelerated investments in grid modernization and micro-grids

Learning from the Texas power grid failure in February 2021: significant investments are expected to weather-proof natural gas power plants and wind turbines globally. Power producers will expand their peak load capacity and plan for extreme weather events – heat and cold. The expansion may be in the form of more renewables in the energy mix or on-demand capacity for generation during weather-related disruptions. Grid connectivity and load sharing across multiple grids will be enhanced to improve resilience.

How Infosys addresses the shift

Infosys designs solutions that monitor weather and climate data and synchronize it with power production and grid performance in diverse stress / peak conditions. Our approach augments capacity planning and grid reliability management. Our machine learning-driven software learns from extreme weather events and finetunes predictive analytical engines. Our models simulate climatic conditions and provide predictive insights to avoid outages and increase reliability. Moreover, Infosys partners with utilities to boost capabilities in distributed energy resources systems, micro-grid management, plant control systems, and storage.

Shift 3: Metals and mining - Exponential growth in demand for minerals due to EVs and home battery storage

The battery and minerals supply chains need to expand by 10x in 2030 to address growing demand, according to the World Energy Outlook Special Report 2021 of the International Energy Agency. Mining enterprises and metal manufacturers pivoting to lithium, nickel, copper, graphite, cobalt, and rare earths should invest in new value chains. Supply chain visibility, transparency and assurance will be critical to capitalize on the predicted demand for electric vehicles and home battery storage solutions. In addition, sustainable sourcing, mining and extraction will be a priority for mining and metals companies.

How Infosys addresses the shift

Our artificial intelligence-based sustainability solutions digitize emerging value chains. We implement interoperable, open standards-driven supply chain solutions that provide end-to-end visibility into mining operations and boost reliability. We also develop bespoke analytical solutions, advanced cybersecurity systems, and IIoT-driven programs to facilitate secure remote operations and improve operational efficiency.

Infosys Energy Core and Energy Next strategy combines domain expertise, reliable service delivery, and human experience-oriented design to address the dynamics of the energy market. Notably, our Energy Transition Center of Excellence develops advanced solutions to decarbonize the oil and gas, resources and utilities value chains.



About the Author



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Sriram Sundar heads the Global Energy (Core) vertical at Infosys. He specializes in Digital Technology, Consulting & Digital Process Outsourcing(DPO), Sales and Delivery. As a strategic partner to his F500 clients, Sriram is helping these organizations digitize their core and accelerate their transformation to Digital & Cloud.



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