Climate Change Presents the Greatest Opportunity to Leverage Technology to Eliminate Energy Poverty

BY GAUTAM SWAMI

Gautam Swami works in the renewables industry in Houston, Texas and can be reached at gautam.swami@nov.com.

All opinions expressed are his own.

Will finance and technology rise jointly to the emerging challenges and opportunities?

The giant leaps in society's standard of living, life expectancy, education, literacy, and global trade would not have been possible without the expertise and scale of our modern energy industry. Yet, the global energy industry will change more in the next fifty years, than in the past hundred and fifty years.

Environmental degradation, long-term changes in natural systems, and the increasing confidence among the global scientific community with regards to the attribution of increases in greenhouse gas emissions to the sustained use of fossil fuels over the past century, have compelled a serious discussion about the future of the energy industry.

Transportation, heating & cooling, metal refining, agriculture, industrial processes, and electricity generation are all facing significant headwinds and undergoing seismic changes simultaneously, as numerous countries prepare to achieve net-zero emissions between 2050 and 2070.

Scenarios and pathways created by global bodies like the Intergovernmental Panel on Climate Change (IPCC), the UK's Climate Change Committee (CCC), the US' Department of Energy (DOE), the International Energy Agency (IEA), and many others point to a clear acknowledgement that the energy industry needs to act with alacrity to stem further emissions attributable to its activities.

While the initial reaction could be that of denial, the sheer amount of financial capital at risk of being written off as stranded assets ought to be enough to make participants and financiers assess the consequences of not changing course. If governments, financial lenders, and operators conduct detailed stress tests across their portfolios, it would be hard to make a case for the status quo.

For technologists, a breakdown can often be the best time for a breakthrough. The amount of funding going into "climate-tech" ventures is an indication of the optimism and risk-taking prevalent in the Research & Development (R&D) and venture capital (VC) industries. Investments are flowing into Electric Vehicles (EVs), Artificial Intelligence (AI), Carbon management, material science, food technology, and renewable energy in record amounts. Both mitigation and adaption technologies are raising large sums of money. This rapid increase in momentum will drive down marginal costs, encourage widespread adoption, and increase affordability of modern technologies, processes, and devices.

Even more encouraging is the interest being shown by the Venture arms of traditional energy companies as they churn their upstream portfolios to reduce their absolute emissions and carbon intensities. Their interest also extends to innovations in their transportation, refining, chemicals, and petrochemicals divisions. This market will see an increase in Carbon Capture, Utilization, and Storage (CCUS) investments over the coming decade. Global Oil & Gas companies are also declaring net-zero targets themselves and are expanding their wind- and solar-power portfolios to achieve these targets.

The world's incumbent energy and utility companies ought to seize the opportunity to replicate their success in delivering affordable and accessible energy, while generating shareholder returns and achieving net-zero targets.

Energy companies' expertise in commodities trading, logistics, and offshore projects is enabling deep value-stacking too. For example, using electric equipment in drilling, production, heating, boiling, compressing, and pumping will lower oil companies' absolute emissions and operating expenses. Using surplus lease areas to develop solar energy projects will open another avenue of monetization. In offshore oil production operations, companies can lower their carbon footprint by powering production platforms from electricity generated by floating wind projects, instead of diesel or gas.

Over in the utilities business, the US is now racing towards generating a hundred percent of America's electricity from fossil-free sources by 2035. This target will only accelerate investments in wind and solar energy, away from coal and natural gas. The EU, China, Japan, South Korea, and India are also expanding their procurement of clean power using long-term power purchase agreements (PPAs). The UK's Crown Estate recently awarded 25 GW of offshore wind capacity in leases. To put that in context, the UK's current offshore wind capacity is 10 GW. India's solar tariffs are at all-time lows and barring inflationary pressures, the trend will continue downwards. Green hydrogen could leverage the success of offshore wind projects and emerge as a bigger than expected contributor to industrial decarbonization. The planned increase in the use of Microgrids could lead to potential revenue losses for integrated utilities, while increasing resiliency and independence of vulnerable communities. Automobile companies are committing ever-increasing amount of capital to designing and manufacturing electric vehicles (EVs), along with the associated charging infrastructure.

If we look at finance for energy projects, ESG funds have amassed large assets under management (AUM) and are taking an increasingly activist role in forcing

Boards and Management of investee companies to commit to decarbonization. These funds are joined by pension funds, university endowments, and sovereign wealth funds in aligning investors' values with the funds' asset allocations. Banks' portfolios could churn to reflect increasing investments in renewable energy in comparison to production, transportation, processing, and storage of fossil fuels. Corporate asset allocation and public budget planning processes could also change to promote technological solutions for adapting to ecological transformation.

Interestingly, the risk management and actuarial industries are facing an epistemological break in their models and are gradually reconciling the impact of climate risks on their portfolios. Some companies may seek to completely avoid those physical risks that are deeply intertwined with climate change. The impact of localized events like wildfires, storms, floods, etc. on tax revenues will force governments at all levels to act as a backstop for impacted citizens and communities. The Taskforce on Climate-Related Financial Disclosures (TCFD), Network of Central Banks and Supervisors for Greening the Financial System (NGFS), Science-based Targets Initiative (SBTI), and other supra-national bodies are already looking into potential impacts of revenue losses and potential contingent liabilities.

Another potential avenue of global regulation could be carbon-pricing and carbon-taxation. Grants, tax credits, tax offsets, and other fiscal instruments could become increasingly important to financing affordable real estate via sustainable finance programs, municipal bonds programs, and corporate investments. Second-order effects to changes in fiscal and financial behavior could increase unfunded liabilities, as well.

As an increasing number of economists model how climate risks translate into financial risks and eventually impact financial stability, the need to utilize carbon emissions data easily will increase. Societal demands for equity and environmental justice will also play an important role in policy-making and fiscal budgeting. Eradicating energy poverty, providing fair access, remediation of environmental losses, and avoiding climate-driven hazards could become key considerations of infrastructure financing.

In conclusion, governments, energy companies, investors, and end-users will have to work together to lower the carbon footprint of their operations while ensuring reliability and affordability. Investors will also need to brave commodity price volatility, temporary phases of supply chain disruptions, and inflation on the way to greener portfolios.

IAEE
International Association for
ENERGY ECONOMICS