

## Decarbonisation and new energies

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(6 min read)

### Key takeaways:

- *Being a key contributor to global greenhouse gas emissions, the energy sector is expected to face challenges with massive transformation required by both producers and consumers of energy. This journey will be significantly aided by advancement in technologies such as batteries, hydrogen, carbon capture, modern bio-energy, along with rapidly falling renewable energy prices*
- *Now is the time for countries and corporates to plan their decarbonisation pathways by deploying multiple clean energy solutions with strong digital enablement to achieve and demonstrate results*

The latest report by an intergovernmental panel on climate change (IPCC), has been termed as a “code red for humanity”.<sup>1</sup> The report clearly warns of the unprecedented and irreversible change in climate, calling for the world to take significant and urgent mitigating steps to salvage the situation by reducing emissions of carbon dioxide and other greenhouse gases.

As per the International Energy Agency (IEA)<sup>2</sup>, the energy sector, which contributes more than 75 per cent of global emissions, holds the key to tackling climate change, thus, making decarbonisation of energy system the top-most priority for most countries and stakeholders.

Considering a net-zero energy system would require profound transformation in energy production and its usage across sectors. Critical levers for achieving this transformation include demand-side measures such as energy efficiency, resource efficiency/circularity and behavioural change, as well as supply-side solutions such as electrification, clean fuels like renewables, hydrogen, bio- fuels and technologies such as carbon capture utilisation and storage.

Amongst these, a few technologies are considered as game changers.

### Electrification

In the net zero pathway<sup>3</sup> analysed by IEA, electrification is slated to be one of the largest contributors to decarbonising the energy sector and needs to account for almost 50 per cent of the global energy consumption by 2050 vis a vis 20 per cent today, to achieve net zero. Transport, which contributes 24 per cent of direct global CO<sub>2</sub> emissions<sup>4</sup>, offers a huge opportunity for decarbonisation through electrification and fuel cells-based technology. Industrial and the building sectors are increasingly looking at solutions such as direct electrification or indirect use of electricity through solutions such as green hydrogen to decarbonise energy needs for heating, cooking and other processes.

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## **Renewable energy**

Renewable energy (RE) today, is one of the cheapest forms of energy globally and is the most rapidly advancing energy source in many parts of the world. In the last year alone, the capacity for RE put up globally far transcended what had been established in totality till date, recording a 45 per cent capacity addition increase. This segment is expected to garner 70 per cent of the total investment in power generation in 2021<sup>5</sup>. For corporates, RE procurement through corporate power purchase agreements (PPAs) has become a critical solution in driving the energy transformation and often results in bottom line improvement as well. Although not new to the market, it received traction from the increasing trend of global corporations committing to 100 per cent clean energy goals and integrating sustainability in their business philosophies. Advancement in technologies are enabling corporates to procure schedulable round-the-clock green power through hybridisation of technologies such as solar wind hybrids along with storage. In the last year alone, corporate procurement of RE has grown 18% in 2020 to reach –23.7 GW globally in a single year.<sup>6</sup> In fact, India had the second largest market with a global share of 7.4% in the year 2020.<sup>7</sup>

## **Hydrogen**

Clean hydrogen plays an important bridging role in this energy transition. While hydrogen is known by many colours depending upon the source of energy being used to produce it, green hydrogen, which is produced by electrolysis using RE is under increasing focus in renewable rich countries. From being a versatile fuel enabling greater penetration and integration of RE to decarbonising energy-intensive and hard-to-abate sectors like aviation, steel, shipping etc., it deeply cuts carbon emissions across various sectors. India has started pivoting towards creating a robust green hydrogen economy and is intensely focusing on hydrogen as the focal point of its clean energy strategy. The growth and adoption of this alternative fuel could fast track India's 2030 climate goals and globally reinforce our vision of being Atma Nirbhar. Although hydrogen production costs seem to be of a concern presently, declining prices of renewable energy and electrolyser would bring this cost to parity as compared to alternative fuels for several sectors by the end of the decade.

## **Carbon capture, utilisation and storage**

Carbon capture, utilisation and storage (CCUS) plays a diverse role in meeting climate goals by capturing carbon from large point sources and facilities that use either fossil fuels or biomass for fuel. As rightly observed by the IEA, the momentum for CCUS is increasing. CCUS facilities, if successfully implemented, have the capacity to capture 130Mt of CO<sub>2</sub> per year.<sup>8</sup> CCUS adoption is increasing globally with applications being piloted in production of chemicals, fertilisers, hydrogen, natural gas processing, power generation, cement, steel making, etc. However, this technology is expensive, and costs can be wide ranging, depending upon application and availability of storage/utilisation opportunities. Carbon consciousness and effective carbon price, driven by carbon taxes, quota, public sentiment and other regulations, would be the key drivers for accelerating adoption.

## **Bioenergy**

Bio energy is an important 'drop-in' technology that can be used in various states, i.e., gas, solid or liquid, blended or stand alone, to reduce carbon intensity of existing fossil fuel use. Bioenergy today contributes to almost 75 per cent of the clean energies consumed globally.<sup>9</sup> While traditional bio mass usage dominates modern biomass use, i.e., use of bio-fuels, bio gas or biomass pellets is increasingly finding traction in end use, such as transportation, power generation and modern heating technologies, it is expected to continue to play a key role in future as well. Along with CCUS, bioenergy with carbon capture and storage, have the ability to become one of the most cost-effective negative carbon technologies, although there are constraints around cost and availability of biomass. The Indian Government is focusing strongly on the use

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of biofuel in transport as well as industry and has set a target to achieve 20% blending of ethanol in petrol and 5% blending of Biodiesel in diesel by 2030.<sup>10</sup>

**Following takeaways are important for stakeholders to focus on:**

- Addressing emissions from energy production and usage is absolutely critical as the world commits to moving towards net zero. Corporates are likely to face both internal and external pressures from investors, supply chain and governments to decarbonise
- Various levers are available both on the demand side as well as the supply side for reduction of greenhouse gas emissions
- Solutions in silos would be inadequate and countries as well as corporates would need to focus on multiple solutions to create holistic decarbonisation strategies
- While RE offers an economically compelling option for decarbonisation, it is not sufficient by itself. Other technologies such as electric vehicles (EVs), storage, hydrogen, CCUS have an important role to play. Government policies and incentives would have a strong role in accelerating the adoption of these technologies
- Focus also has to turn towards leveraging the opportunities that convergence of various technologies creates. Here digital solutions have an important role to play. Enabled by technologies IoT/ICT, AI/ML, blockchain, etc., diverse energy demand and supply sources such as RE, batteries, hydrogen, EVs, etc., need to be holistically connected, analysed and optimised for better efficiencies or incremental revenue opportunities
- Finally, digital technologies such as AI/ML and blockchain will also be key enablers for ensuring verifiability of the decarbonisation measures taken by stakeholders and will need to be weaved into the net zero strategies

For more on this, please read a KPMG in India publication: [Decarbonising growth](#)

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<sup>1</sup> IPCC report: 'Code red' for human driven global heating, warns UN chief, United Nations, 9 August 2021

<sup>2</sup> Net Zero by 2050, IEA, accessed on 21 September 2021

<sup>3</sup> Net Zero by 2050, IEA, accessed on 21 September 2021

<sup>4</sup> Transport Improving the sustainability of passenger and freight transport, IEA, accessed on 21 September 2021

<sup>5</sup> World Energy Investment, IEA, accessed on 21 September 2021

<sup>6</sup> Global corporate clean energy purchasing up 18% in 2020, Renewable Energy World, 27 January 2021

<sup>7</sup> India: Second Largest Market for Corporate Renewable Power, Amplus Blog, accessed on 21 September 2021

<sup>8</sup> Carbon capture, utilisation and storage, IEA, accessed on 21 September 2021

<sup>9</sup> Bioenergy, IRENA, accessed on 21 September 2021

<sup>10</sup> National Policy on Biofuel 2018, Ministry of New & Renewable Energy – GOI, accessed on 21 September 2021. Please note that Biofuel comprises of bioethanol and biodiesel

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