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Impact of Climate Change on Energy System and Technology Choices (Keynote speech)

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Global climate change has shaken up our energy and economic systems. The fossil fuels, which helped us through the last century, starting with coal and followed by oil and gas have led to accumulation of 1500 billion tons of CO₂ in the atmosphere and disturbed the earth's ecosystem balance significantly. It includes hydro cycle, temperature rise, oceans warming and hence ocean currents, disturbances in forests, arctic and antarctic ecosystems, mountain systems and also human habitats. Thus, transition to renewable energy has become imperative. However, sun, wind, hydro power are relatively low energy density energy sources compared to fossil fuels and nuclear power which can give us high density source to reach 600 C degrees and beyond, needed for generating high voltage electricity in a continuous manner so as to ensure 24 hour reliability. It is also indispensable for manufacturing steel, aluminum, cement, chemicals, fertilisers etc Moreover, lightweight energy carriers such as liquid and gaseous fuels are needed to run cars, trains, ships and planes. The fossil fuels provided a high intensity energy source to produce electricity in a predictable manner and meet our fluctuating demand throughout the 24 hours. as needed.

On the other hand, solar, wind and hydro energy are low density, unpredictable and intermittent energy sources. Yet, through ingenious ways, it is possible to combine technologies such as solar, wind, hydro, batteries, nuclear, pumped hydro and hydrogen as carriers of energy and digital technologies to ensure the same services and functions.

This is the challenge that we have to meet as we chart out a new course, taking net zero emissions pathway. The lecture will cover the techno socio economic challenges associated with this transition.

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