

Climate & Energy Security

Nanda Kumar Janardhanan

Deputy Director, Climate and Energy

Parallel Session 3 (PS-3)

Climate Security in Asia-Pacific: Key Issues and Challenges

19 December 2023 JST 13:30 - 15:00

ISAP 2023



Climate Change Impacts on Energy



Impact of extreme weather on production facilities: Currently, approximately **25% of refineries** are exposed, with over **10% facing the risk of severe tropical cyclones** above Category 3.

Impact on vulnerable infrastructure: Roughly **28% of installed capacity in coal power plants** and **29% of oil power plants** are susceptible to tropical cyclones.

Water: Global power sector currently consumes about **88 cubic kilometres** of water annually

Climate-induced outages: The average frequency of climate-induced outages (full and partial) has risen from 0.2 outages per nuclear reactor-year in the 1990s to 1.5 in the 2010s. Non-climate-driven outages have increased by only 50% over the same period.

[This Photo](#) by Unknown Author is licensed under [CC BY-NC-ND](#)

Impacts on Clean Energy Sector



Resilient designs are critical to withstand impact of cyclones: Over the past four decades, the global proportion of major tropical cyclone intensities (Category 3-5) has increased and is likely to continue to rise – by 10% with 1.5°C warming, 13% with 2°C and 20% with 4°C.

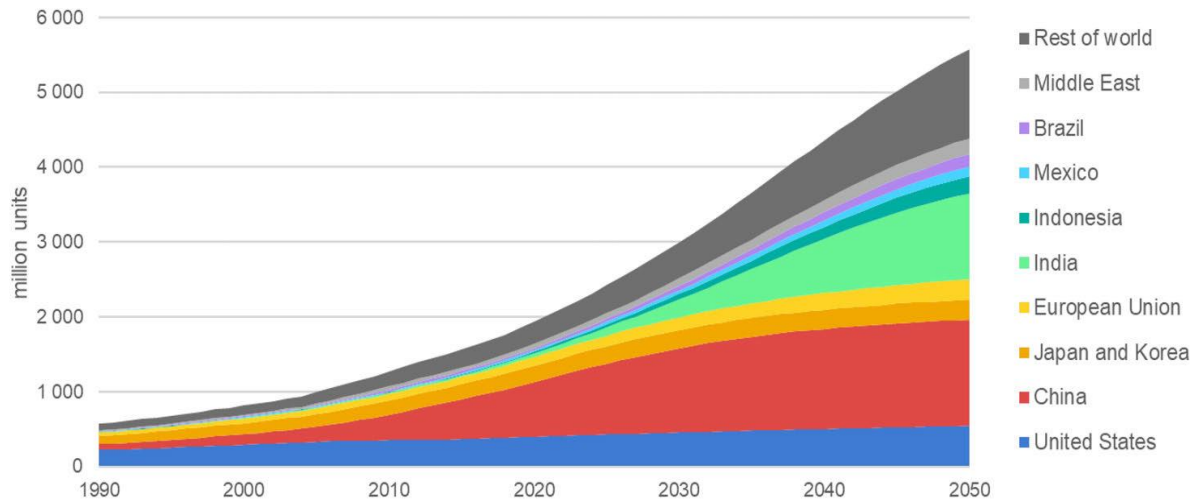
Rise in temperature affecting efficiency: If surface temperature goes above 35°C and solar PV efficiency can drop by 13.5-22.5%. Higher temperatures can reduce the life span of battery cells and other electronic components



Electricity transmission networks: Around a half of global electricity networks are currently vulnerable to wild fires

Image source: <https://www.pv-magazine.com/2021/11/08/storm-damages-shine-spotlight-on-ways-to-mitigate-impact-of-wind-on-pv-arrays/>, <https://www.saurenergy.com/solar-energy-news/researchers-develop-hurricane-resistant-wind-turbines-based-on-palm-tree-structure>

Impact on Energy Consumption



Global air conditioner stock, 1990-2050

Energy Consumption: The overall climate-induced effect is a global energy consumption increase, depending on overall temperature increase.

Cost: Exposure to climate impacts could lead to greater investment in energy infrastructure.

Source: Climate Resilience for Energy Security, [IEA](#), 2022

Impacts on Critical Mineral Sector

The Democratic Republic of the Congo (DRC) produces 70% of the global cobalt. China produces 60% of rare earth elements and graphite. South Africa produces 70% of platinum, while Australia and Chile provide three-quarters of lithium. China processes 50-70% for lithium and cobalt, and nearly 90% for rare earth elements.

	Copper	Cobalt	Nickel	Lithium	REEs	Aluminium
Solar PV	Red	Green	Green	Green	Green	Red
Wind	Red	Green	Yellow	Green	Red	Yellow
Hydro	Yellow	Green	Green	Green	Green	Yellow
CSP	Yellow	Green	Yellow	Green	Green	Red
Bioenergy	Red	Green	Green	Green	Green	Yellow
Geothermal	Green	Green	Red	Green	Green	Green
Nuclear	Yellow	Green	Yellow	Green	Green	Green
Electricity networks	Red	Green	Green	Green	Green	Red
EVs and battery storage	Red	Red	Red	Red	Red	Red
Hydrogen	Green	Green	Red	Green	Yellow	Yellow

- Climate change is likely to increase pressure on critical minerals extraction in regions where water availability is projected to decrease
- Increasing heavy precipitation and floods could impact mining activities

Source: Climate Resilience for Energy Security, [IEA](#), 2022

Colours indicate the relative importance of minerals for a particular clean energy technology (red = high; orange = moderate; green = low).

How to align energy policy in a world of climate crisis?

Strengthening energy sector Resilience

- Integrate climate resilience into national energy and climate plans, ensuring a dedicated focus.
- Develop high-level national resilience frameworks to identify risks, vulnerabilities, and needs at a systemic level.
- Integrate mechanisms for monitoring and evaluating within energy-sector resilience frameworks, covering climate hazards, impacts, adaptive capacity, and outcomes.

Accelerating clean energy Transition

- Prioritize investments in renewable energy sources to reduce reliance on fossil fuels.
- Update infrastructure standards to influence the design, operation, and maintenance of energy infrastructure.
- Promote energy efficiency to reduce overall energy consumption and enhance the sustainability of energy systems.

Fast-tracking Policy Adjustment

- Incentivize private investment in resilience.
- Incorporate climate risks into standard policy and project appraisal processes, such as environmental impact assessments.
- Implement performance-based regulation to remunerate industries based on their resilience performance. This encourages proactive investment in resilience

Resource Diplomacy

COP28 Outcomes

“transition away from fossil fuels in energy systems, in a just, orderly and equitable manner, accelerating action in this critical decade, so as to achieve net zero by 2050”.

“triple the world’s renewable energy capacity and double its energy efficiency by 2030”

Fossil fuel oriented initiatives

- Strengthening ties with Petroleum rich countries
- Strengthening cooperation on safety of sea lanes of communications
- Securing long-term energy supply contracts
- Engage in diplomatic efforts to encourage foreign investment in the country's energy sector

RE oriented initiatives

- Secure steady and safe supply of critical minerals
- Attract investment in domestic clean energy sector
- Foster collaboration on clean technology and innovation
- Alliances for trade in clean fuels/green hydrogen
- Contingency plans to address shift in global energy markets.

Thank you

Sources:

Climate Resilience for Energy Security, [IEA](#), 2022

Ministry of Defense Response [Strategy on Climate Change](#), Japan

The UN Security Council and [Climate Change](#), UNSC

The role of [critical minerals](#) in clean energy transition, IEA