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Modelling Decarbonization Pathways in the Power Sector in Developing Countries: The case of Bolivia

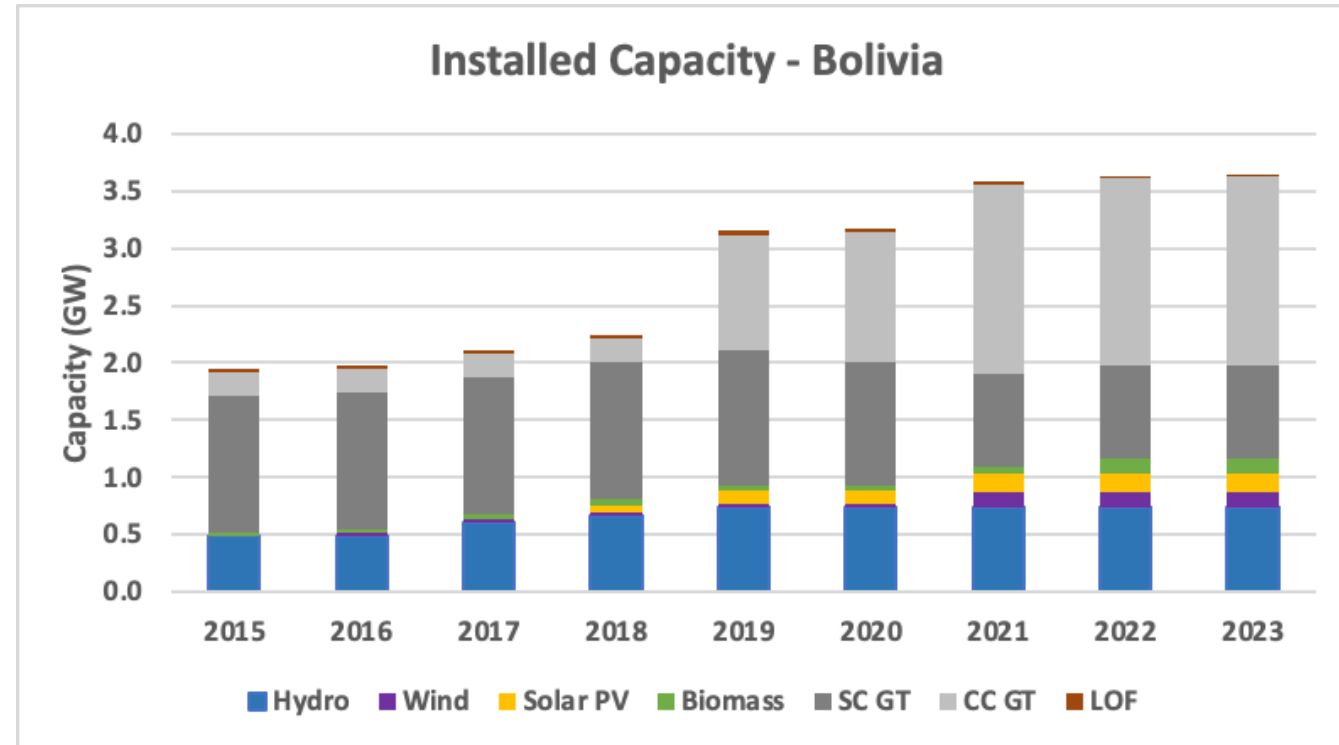


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Context (Bolivia)

- NDC of Bolivia: 79% of the energy from renewable energy sources (50% of installed capacity) by 2030.
- Bolivia has been vulnerable to climate change with repetition of prolonged dry periods. Decrease in planned hydroelectric generation (Memory CNDC 2022).

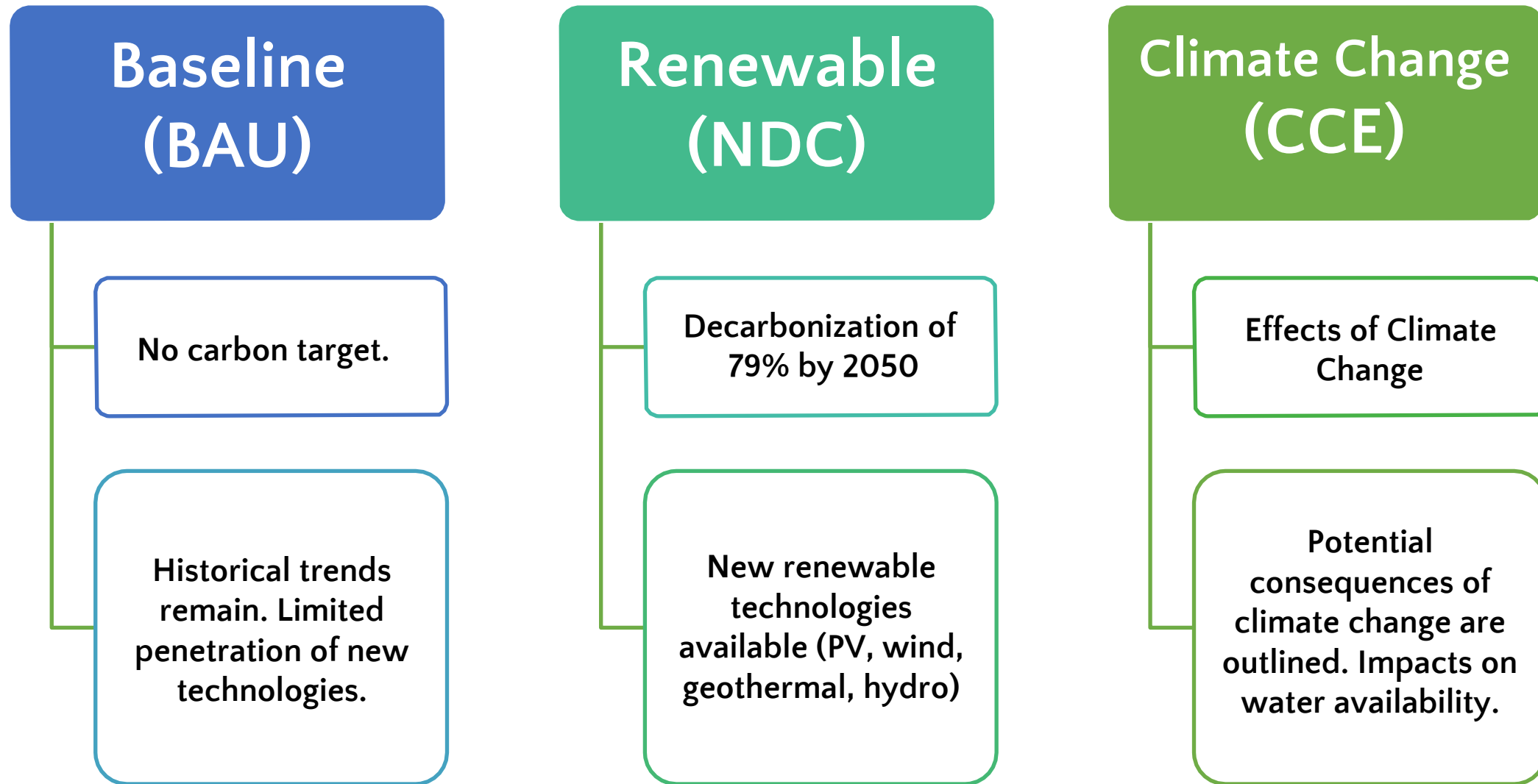


Source: CNDC 2023

Research questions:

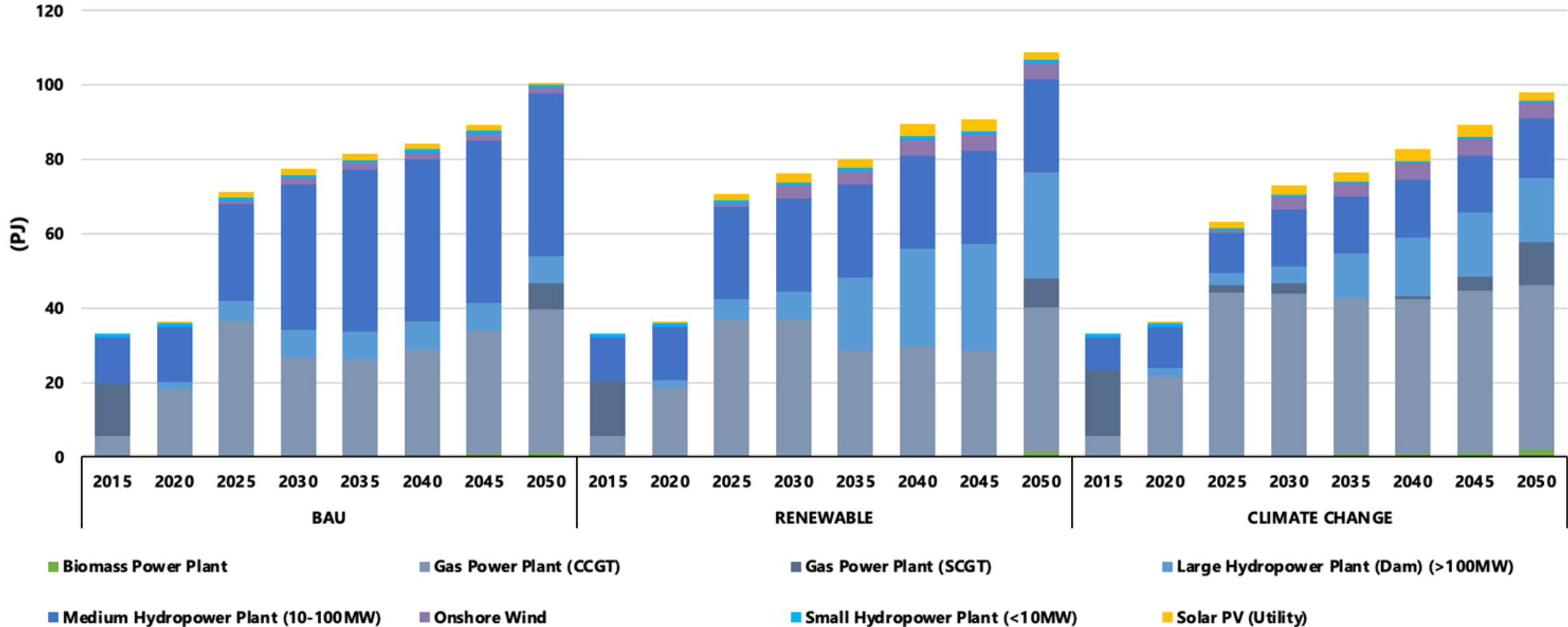
- How will the Bolivian energy mix BAU will evolve to reach total decarbonization by 2050?
- What will be the performance of generation with 79% renewable electricity system in Bolivia?
- How will climate change affect the electricity sector ?

Scenarios



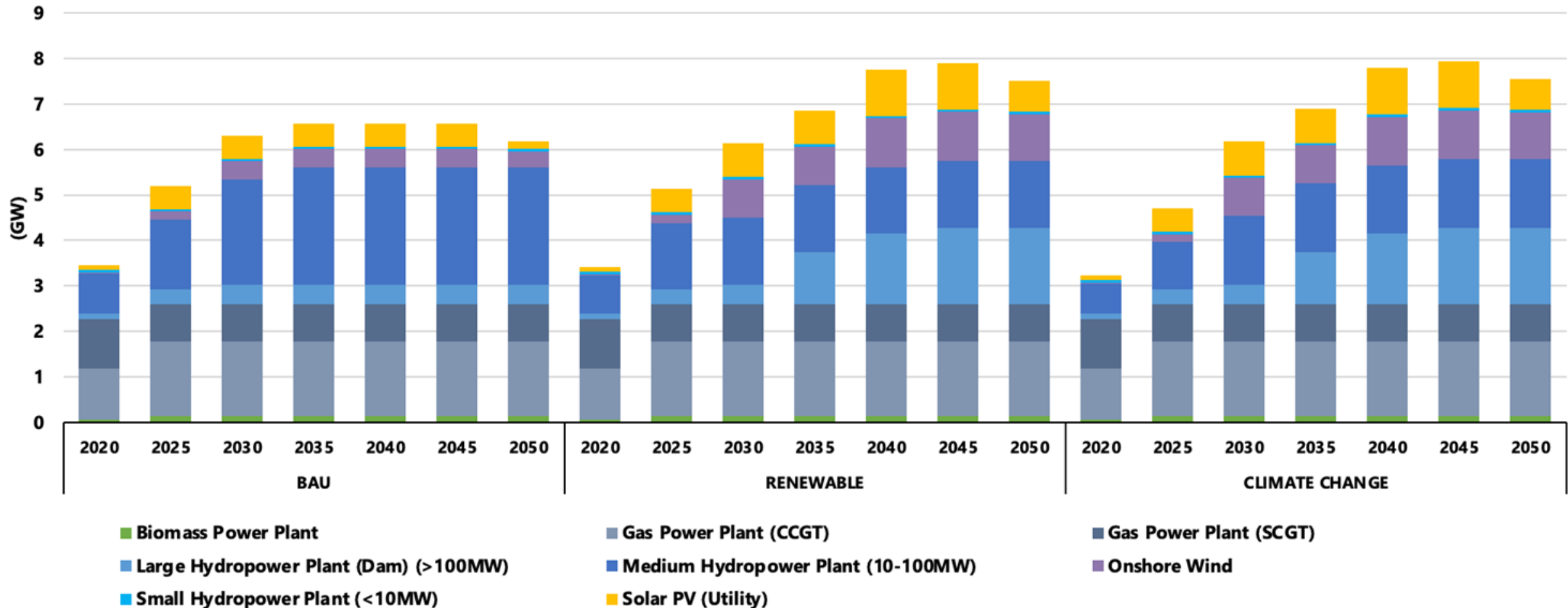
Scenarios Results (1/4)

Electricity production



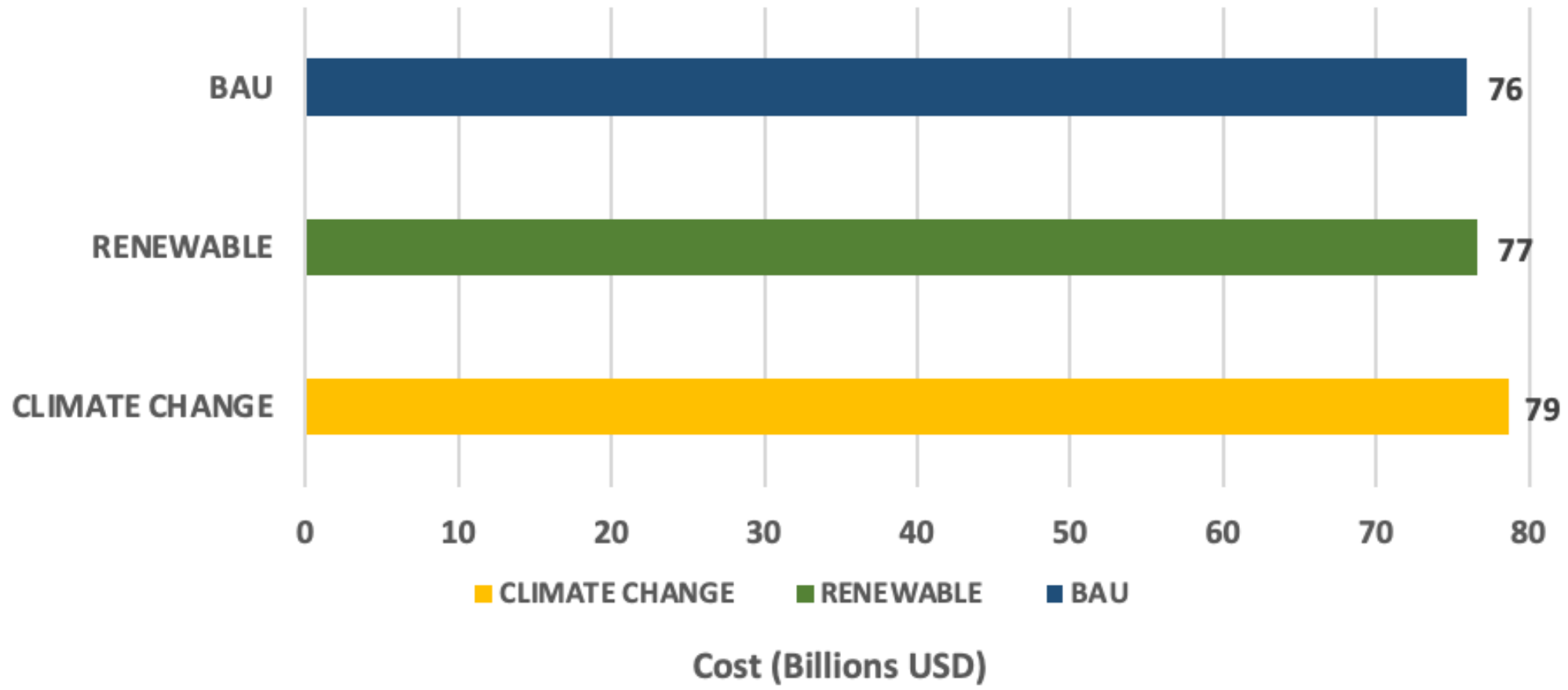
Scenarios Results (2/4)

Capacity Generation



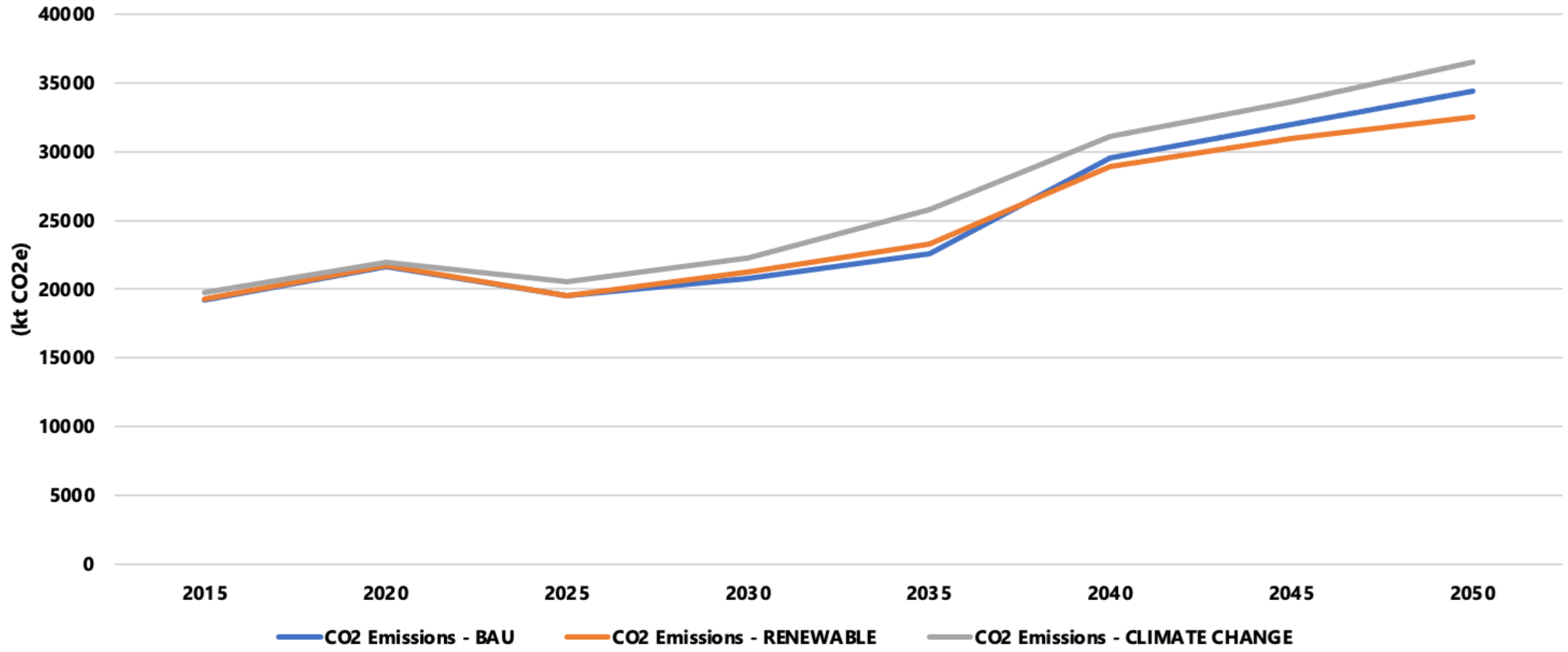
Scenarios Results (3/4)

Capital Investment



Scenarios Results (4/4)

Annual Emissions



Conclusions and Policy Insights



NDC scenario reduces (GHG) emissions in relation to the BAU and Climate Change scenarios. However, emissions still increase over time due to prevalence of thermal generation and growing demand.



In CCE scenario, effects of extreme climate change decrease water availability. Increase in thermal generation from NGS.



Policy design to promote large-scale investments in Hydro, Solar, PV and Wind technologies in the coming years (e.g. renewable energy auctions, annual capacity targets and system flexibility studies).

Establish regulatory framework for renewables, especially for remuneration of these energies.

Future work

- Update data and information;
- Review of scenarios with public policies;
- Investigate energy matrix flexibility in scenarios;
- Storage systems modelling;

Acknowledgments

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