



Universidad del
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PAST, PRESENT AND FUTURE OF NUCLEAR ENERGY IN COLOMBIA FROM THE DEPLOYMENT OF SMALL MODULAR REACTOR

Diversifying Electricity Matrix to achieve Net Zero Emmissions

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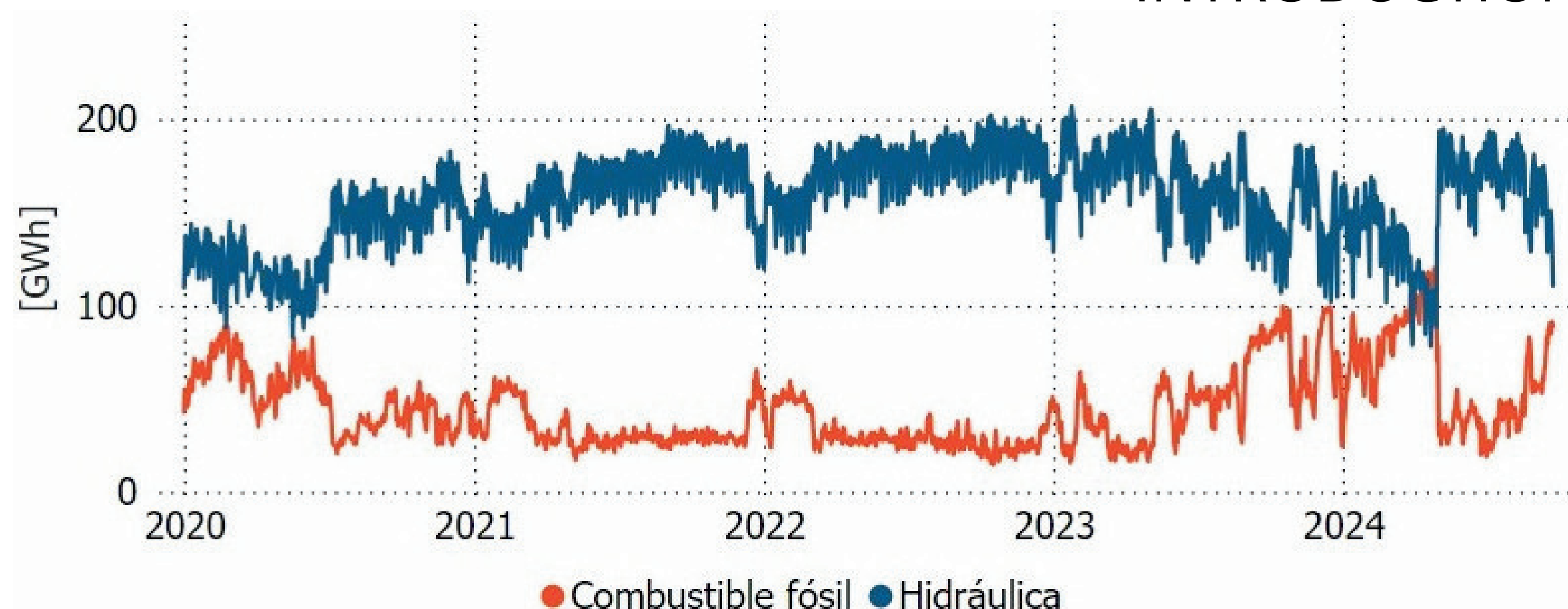
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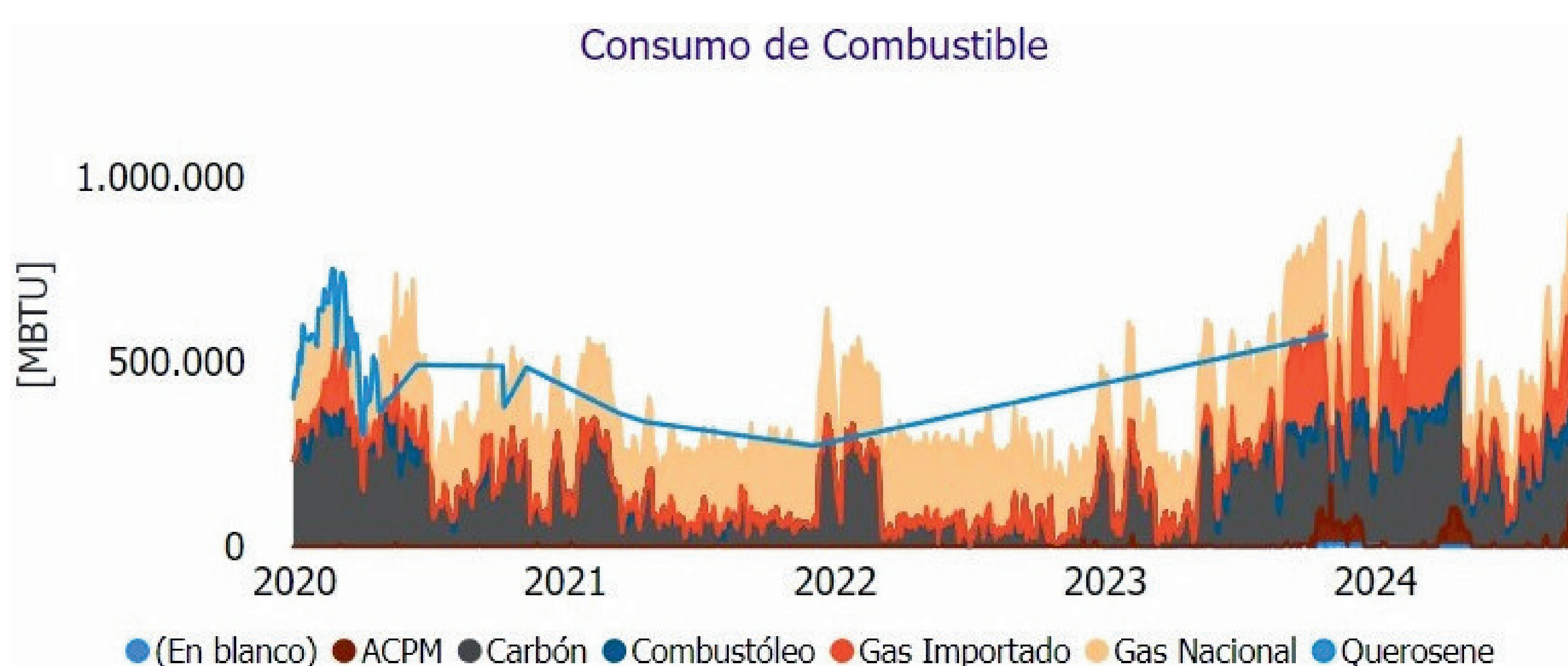


INTRODUCTION



Colombia is predominantly powered by hydroelectricity (70% approx.) and makes grid vulnerable to climate variability.

Colombia's electricity matrix relies on more accessible resources like hydroelectric and hydrocarbons power (Graph 1. Generation by two main sources, source XM Sinergox 2024).



This paper explores the trajectory of nuclear energy in Colombia within the context of its development in Latin America, emphasizing the deployment of Small Modular Reactors.

During periods of drought, which can be exacerbated by El Niño phenomena, water scarcity directly impacts hydroelectric production, posing risks to energy security and economic stability increasing the consumption of fossil fuels (Graph 2. Fossil fuel consumption, source XM Sinergox 2024).

TIMELINE



- **1965.** IAN-R1 Nuclear research reactor.
- **1964 - 2016.** Armed conflict, costs estimated in 178 billion dollars.
- **2022.** CONPES 4075 energy transition policy, (studies for the deployment of nuclear technology).
- **2022 - 2052.** UPME issued National Energy Plan (PEN), progressive implementation of SMR.
- **2022 - 202X.** Starts draft of Nuclear and Radiation Protection Law.

ACADEMY AND UNIVERSITY EFFORTS

- In January **2024** starts the second cohort of the Diploma in Nuclear Energy at the University of Antioquia.
- Since **2023**, Javeriana University has been hosting forums dedicated to nuclear applications.
- Technological University of Pereira has implemented scholarship programs for its Master's degree in Safe and Reliable Nuclear Applications (SARENA).
- In **2025** National University of Medellin will open the specialization in Nuclear Reactors.



CONCLUSIONS



- Robust regulatory frameworks are essential for the safe operation of nuclear facilities.
- Continue development of Academic and Training Programs: Building a skilled workforce is crucial for the sustainable development of nuclear energy.
- Engaging in bilateral or multilateral agreements with countries that have advanced nuclear technology can facilitate the transfer of knowledge.
- Establishing clear and open communication channels to inform and educate the public about the benefits and risks associated with nuclear energy is essential.
- The integration of SMRs into Colombia's energy matrix could significantly enhance its ability to meet national greenhouse gas reduction goals.