



# Reality or Illusion? Is Peru replacing one energy dependency with another?

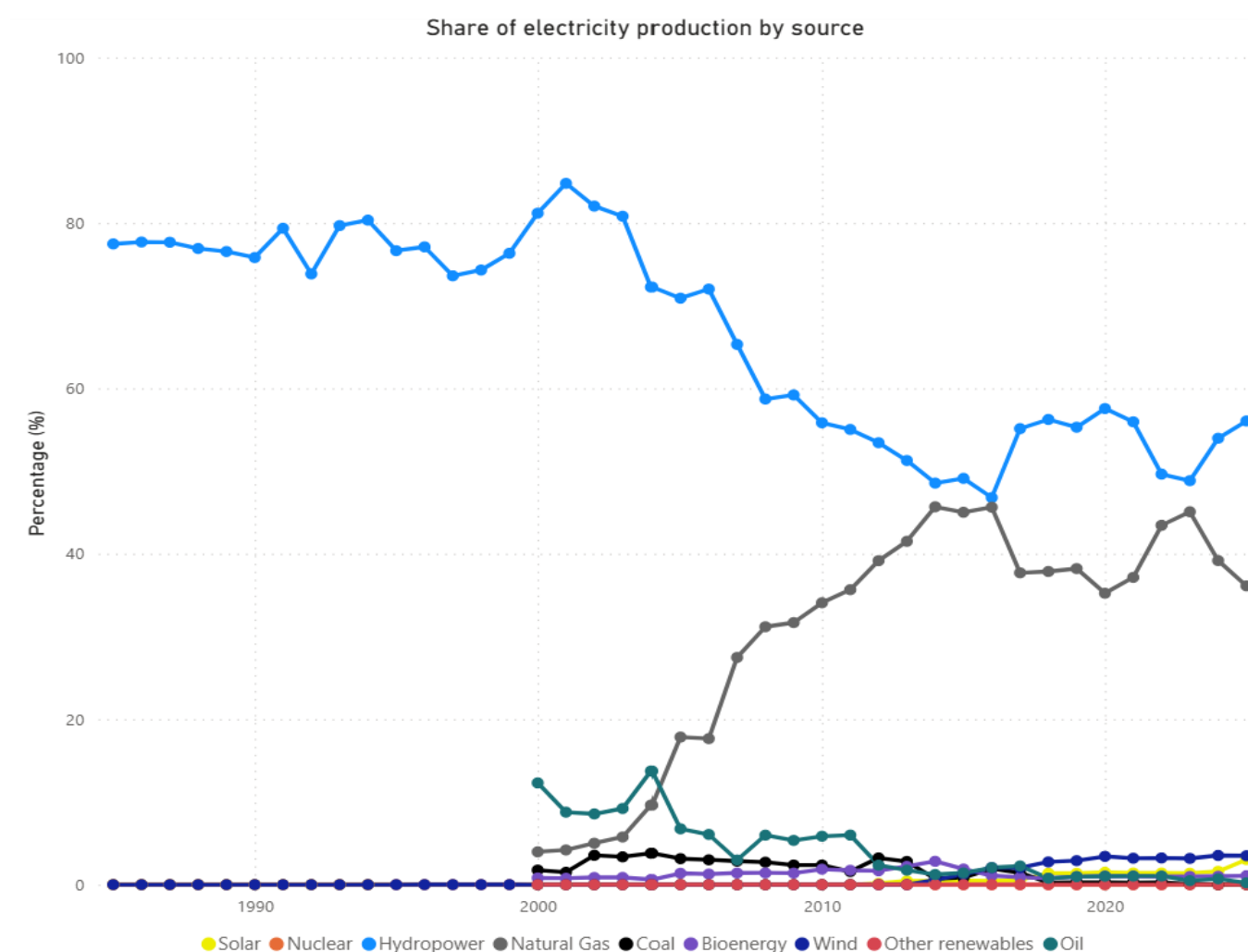
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## INTRODUCTION

**Context:** Hydropower historically dominated Peru's electricity system. Since the expansion of the Camisea gas system, natural gas has become a major source of electricity generation, while wind and solar have expanded rapidly in recent years.

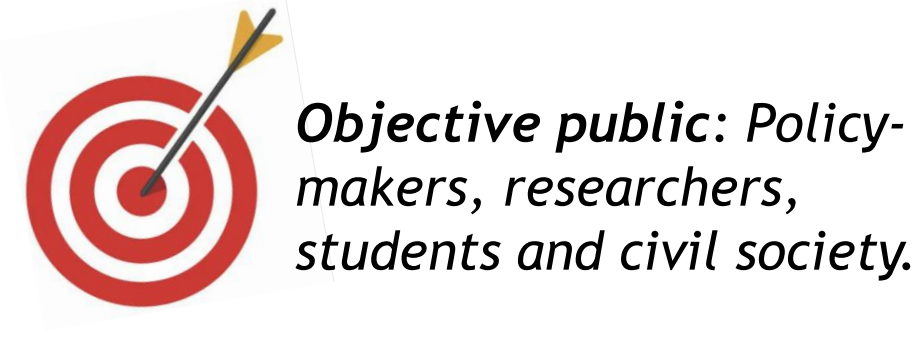
### Is Peru reducing energy dependency, or replacing one dependency with another?



**Relevance:** Future pathways must not only reduce emissions, but also diversify energy sources, reduce structural dependency and increase system flexibility under uncertainty.

## OBJECTIVES

1. Assess the evolution of Peru's electricity-source dependency and diversification.
2. Explore alternative 2050 energy transition pathways using the national energy transition calculator.
3. Examine how different energy dependencies may affect energy system resilience



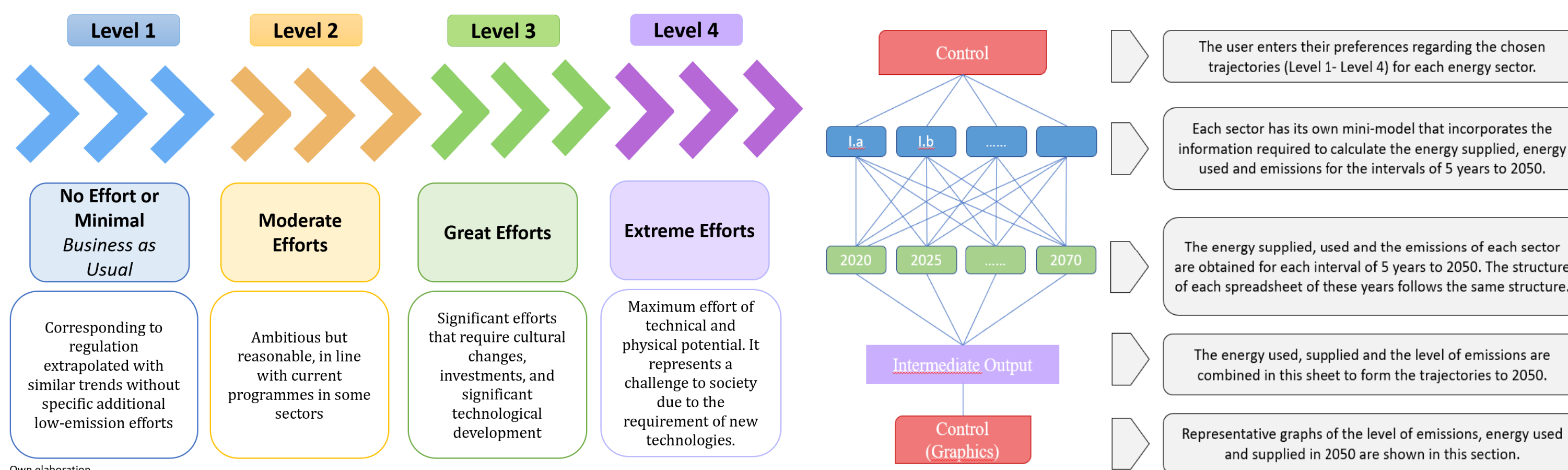
**Objective public:** Policy-makers, researchers, students and civil society.



## METHODOLOGY

PeCAL2050 follows the UK 2050 Pathways model philosophy. It is structured around modular sector models with four ambition levels (L1-L4). User-defined trajectories are processed every 5 years between 2020 and 2050, producing dynamic outputs for energy use and emissions.

*Demand -> Technologies -> Energy mix -> Emissions*

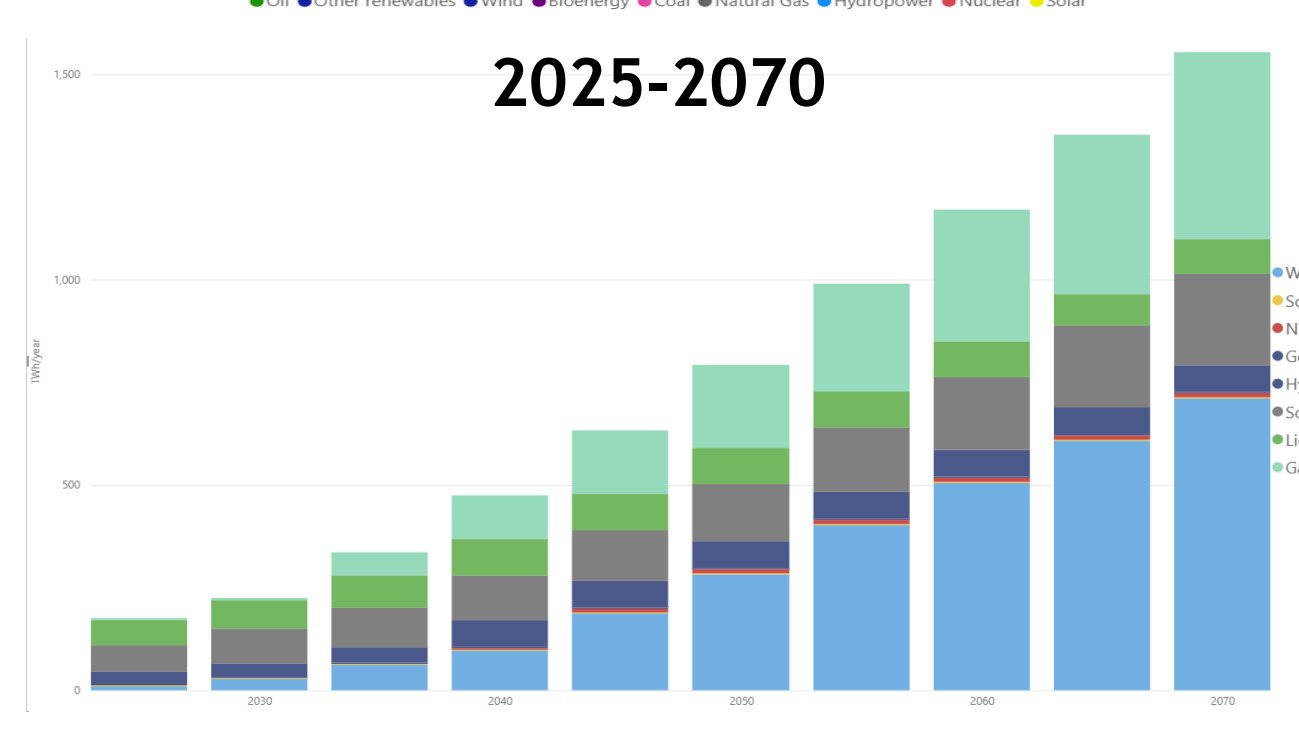
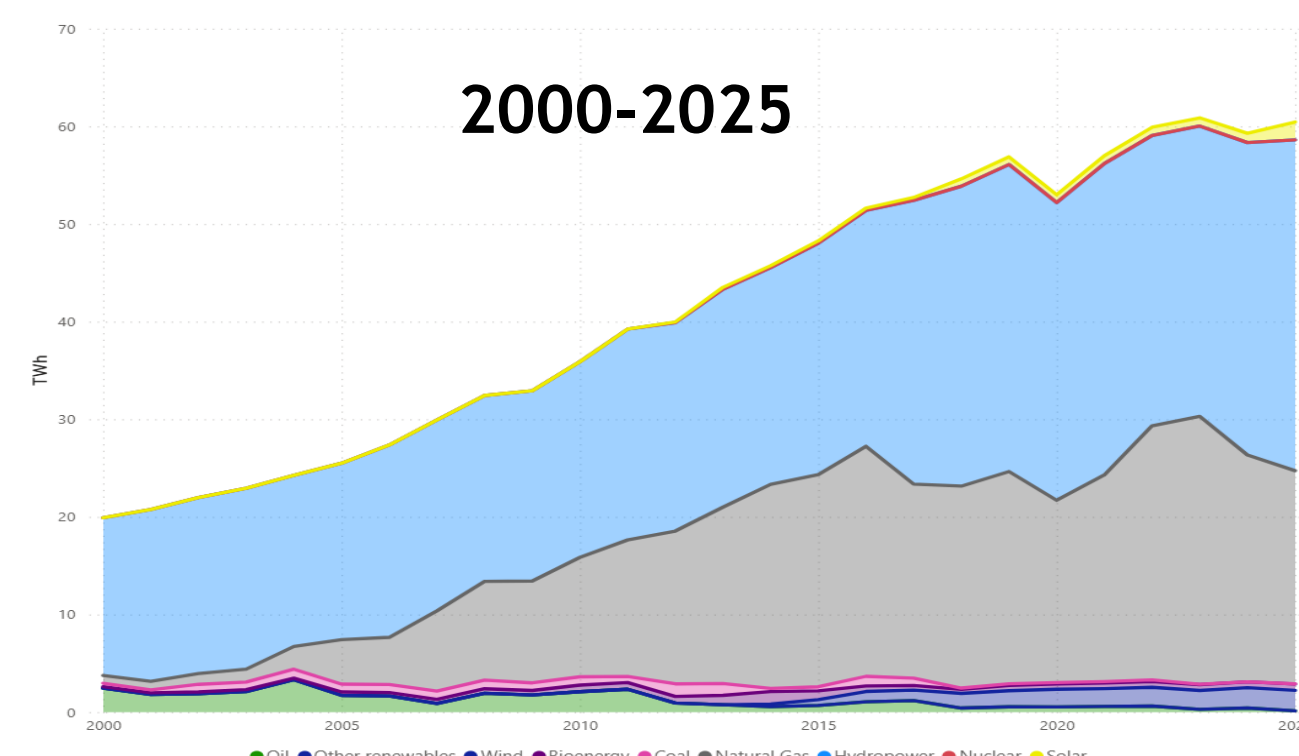


*Each sector is represented by levers with four levels of ambition (L1-L4)*

*Structure of the Calculator's Internal Logic:*

## RESULTS

### What will Peru be dependent on by 2050 or beyond?



### From Dependency to Resilience

| Dependency/E xposure | Potential disruption                   | Resilience implication                 |
|----------------------|----------------------------------------|----------------------------------------|
| Hydropower           | Hydrological variability               | Reduced generation availability        |
| Natural Gas          | Fuel supply/ infrastructure disruption | Loss of firm generation                |
| Wind & Solar         | Resource variability                   | Greater flexibility requirements       |
| Transmission         | Infrastructure failure                 | Difficulty balancing supply and demand |

## CONCLUSIONS

- i. Peru's electricity transition is also a transition in energy dependency.
- ii. The expansion of natural gas reduced reliance on hydropower but did not eliminate structural dependency.
- iii. The 2050 pathways show that decarbonisation can lead to different energy-system configurations and exposure profiles.
- iv. Therefore, a low-carbon pathway should be assessed not only by emissions, but also by diversification, flexibility and exposure to disruption.

## NEXT STEPS

- Calibrate Peru-specific disruption scenarios for hydrological, fuel-supply and infrastructure risks.
- Quantify supply deficits, flexibility needs and backup requirements under different disruptions.
- Compare resilience across the 2050 pathways, identifying trade-offs between decarbonisation, diversification and system flexibility.
- Extend the analysis to regional energy systems to capture differences in exposure and vulnerability across Peru.

## REFERENCES

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