



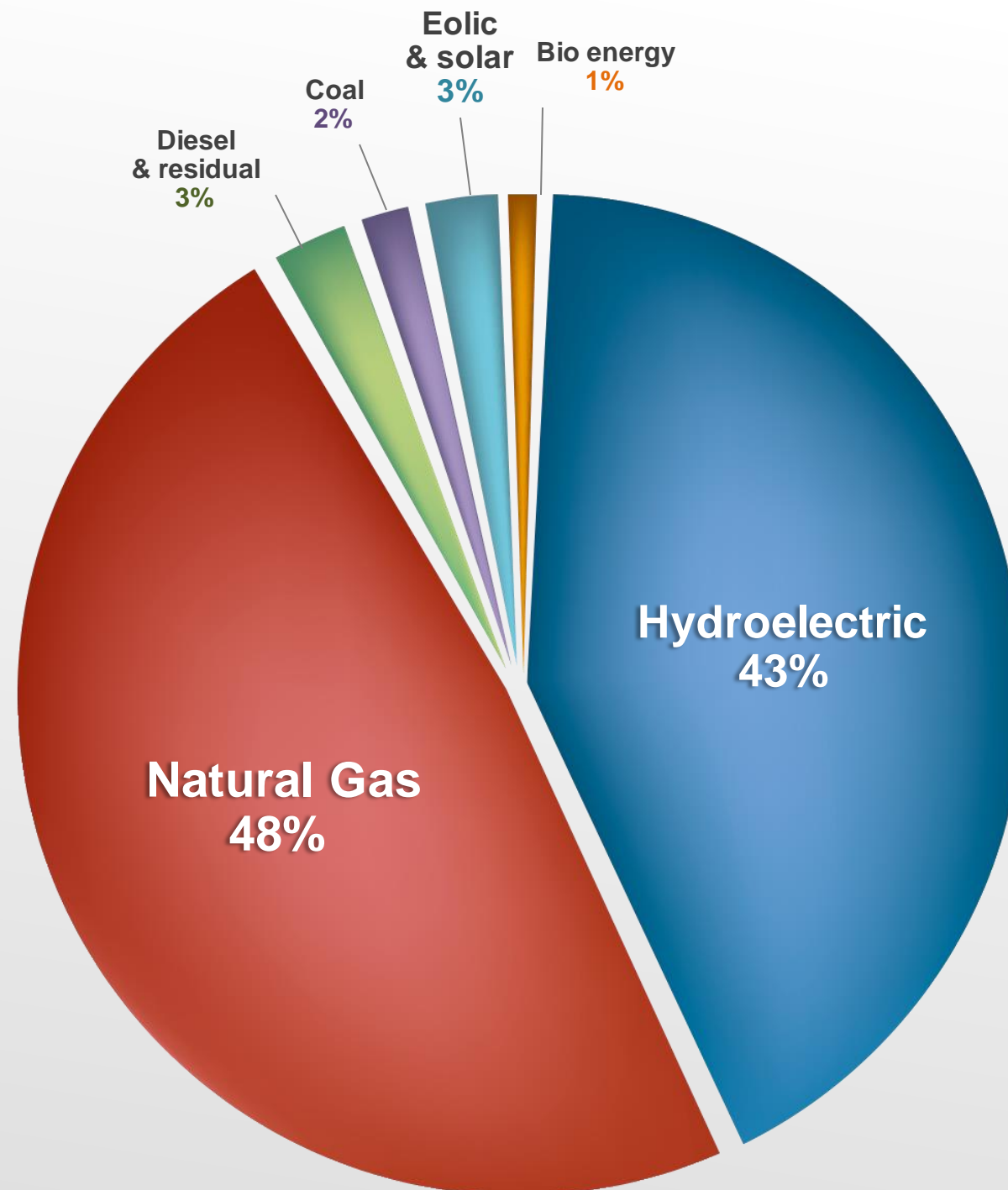
Geothermal: a competitive alternative to natural gas in Peru

FRANKLIN ACEVEDO
OIC
EDC PERU

Peruvian Electricity market

The Peruvian electrical matrix today

- Two sources of electric generation dominate
- Minimal development of renewable energies

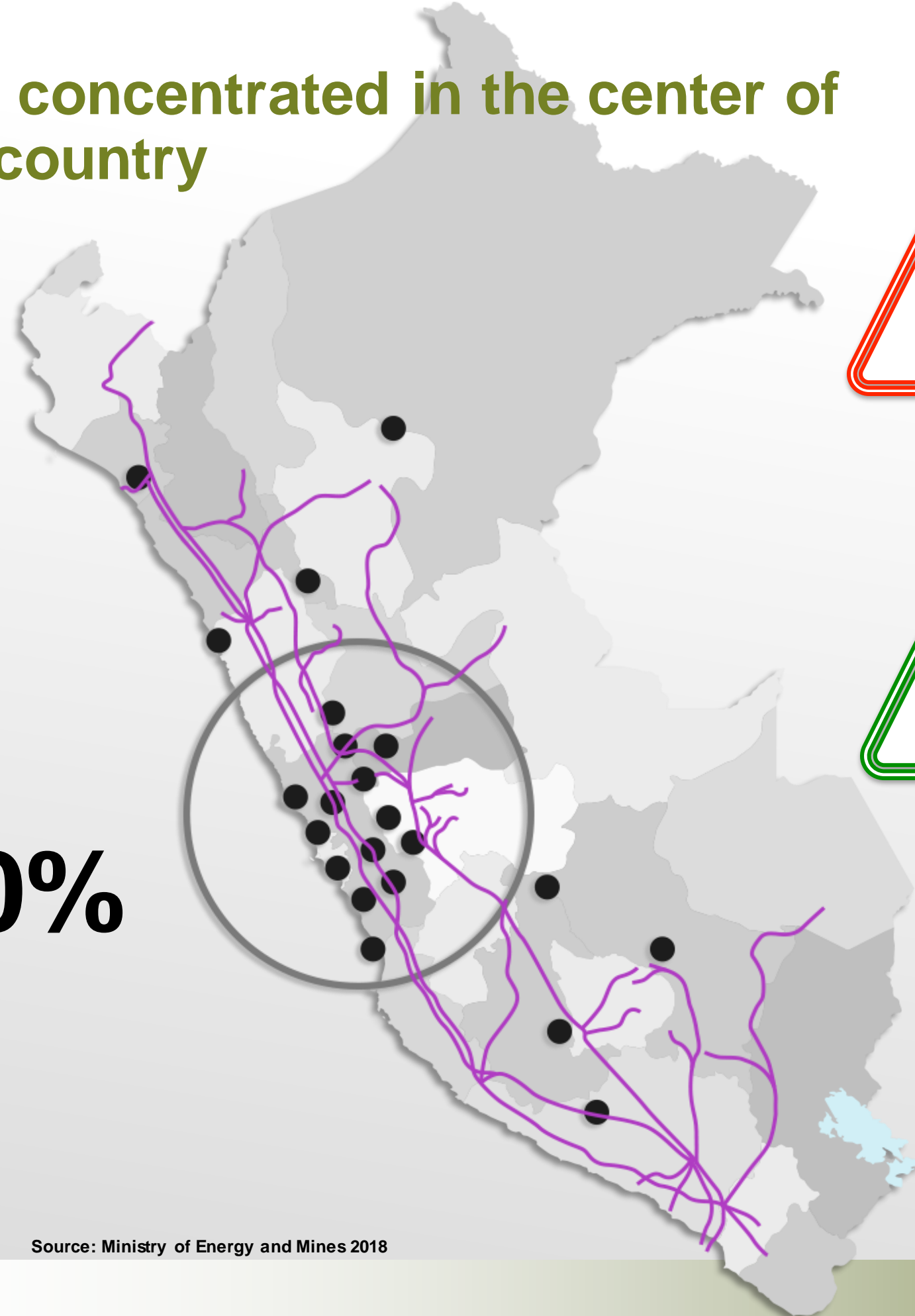


Source: Ministry of Energy and Mines 2018

And concentrated in the center of the country



80%



NORTH
342 MW deficit

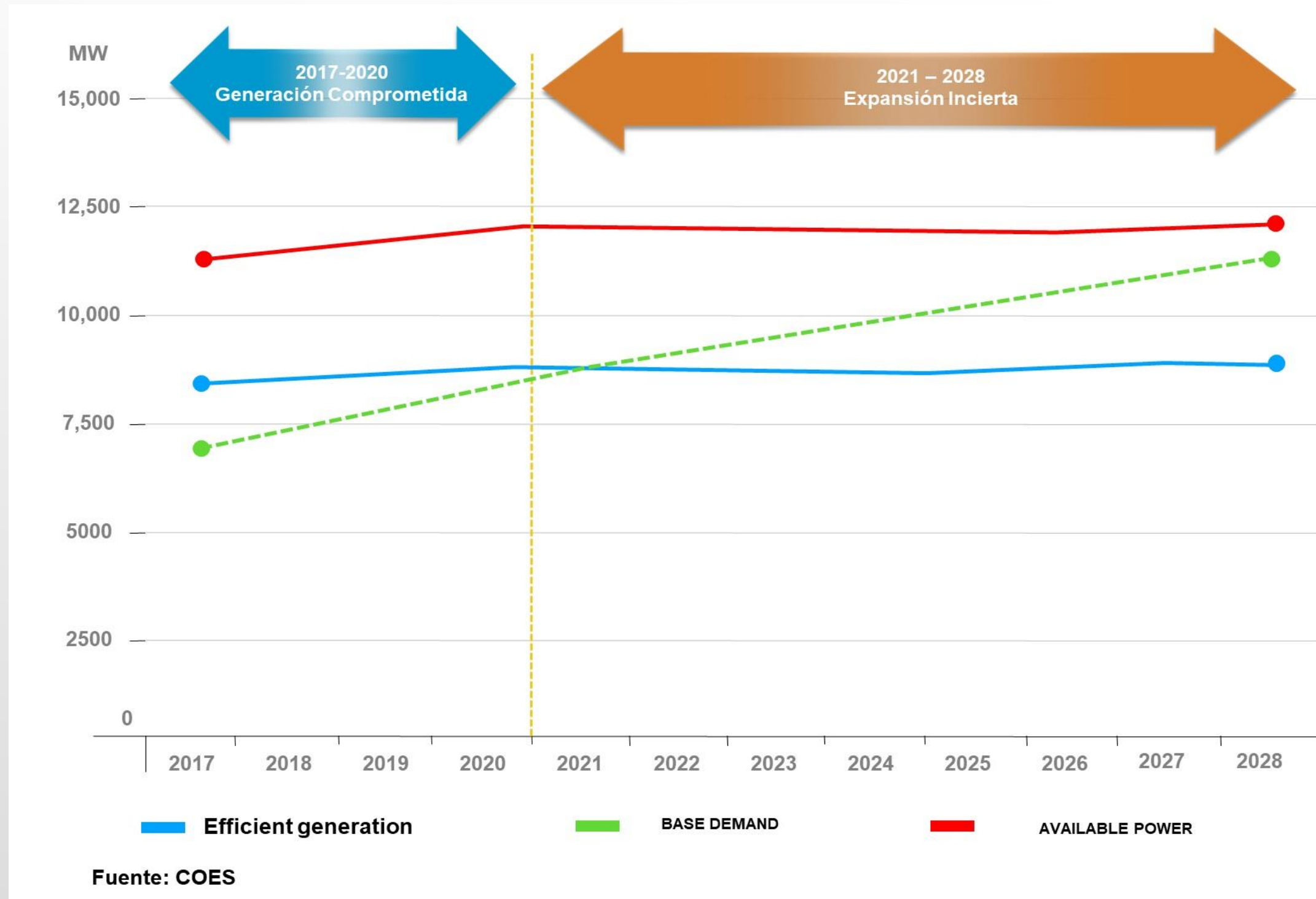


CENTER
3796 MW

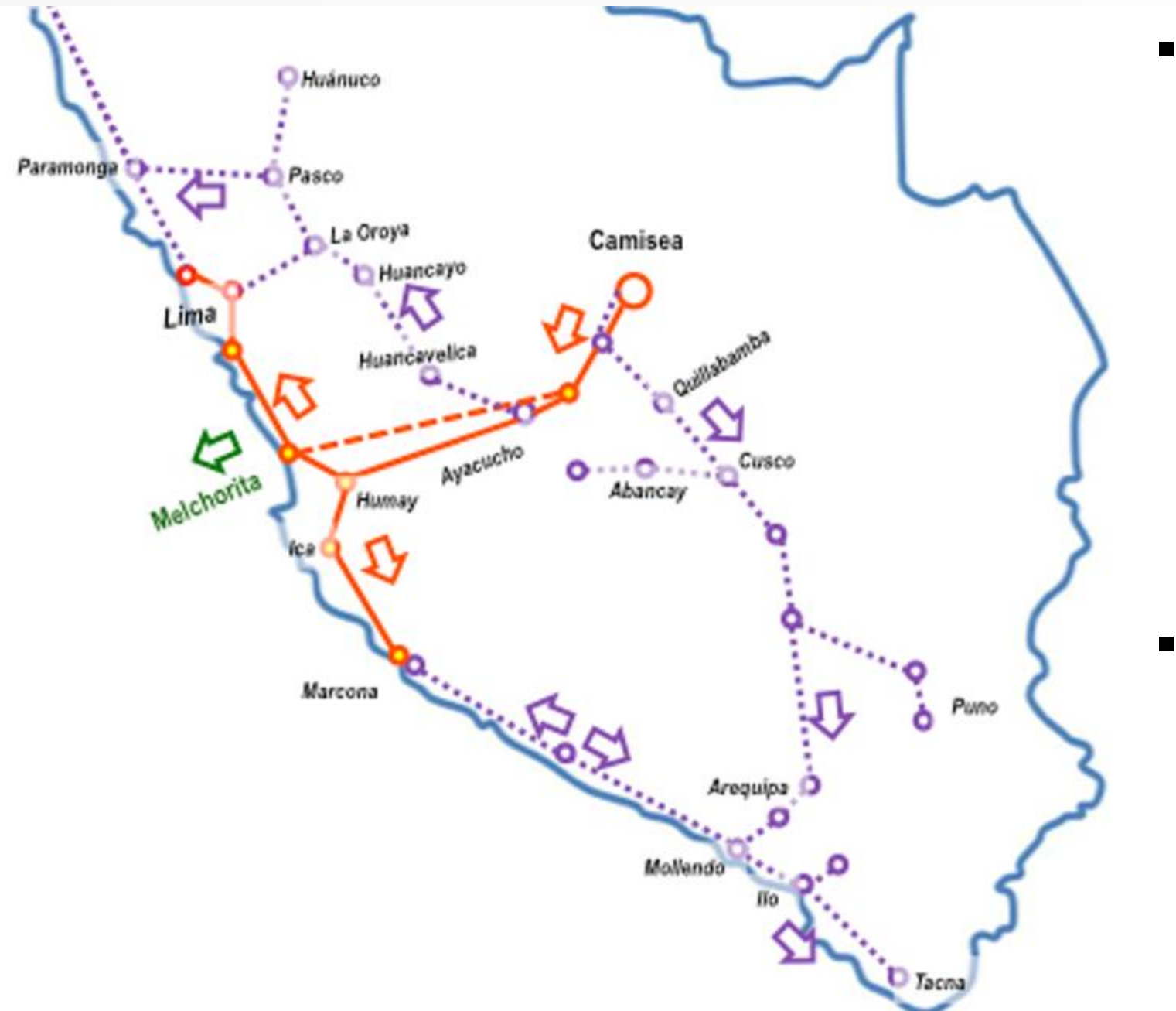


SOUTH
608 MW deficit

Requirement of efficient energy by 2022



Natural gas transportation



- Currently, Peru only has one natural gas pipeline that provides energy to the Thermoelectric Power Plants located in the Center (3600 MW), which due to the common failures in the Gas and Liquids Transport System makes it vulnerable.
- The Gaseoducto Sur Andino, main project will not be ready to provide natural gas to the southern power plants

Competitive prices in the energy market



Generate electricity
in the South Node
with **diesel**



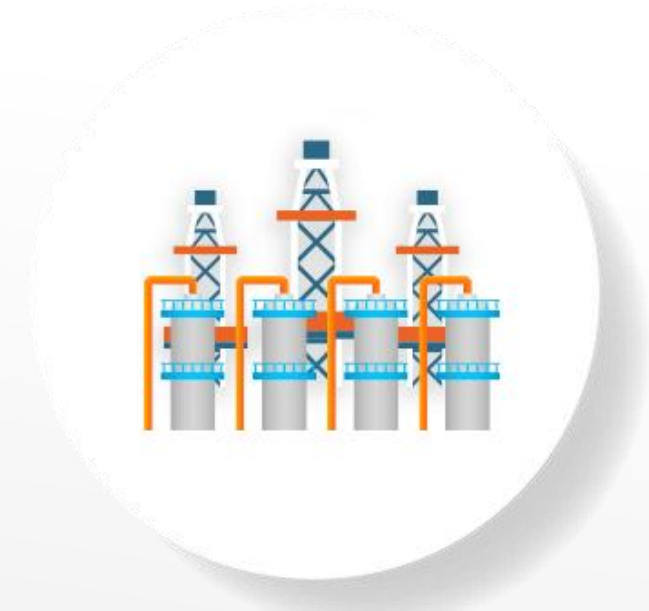
US\$ 175 MW/h



Generate with
Renewable Energies
**Wind, Solar and
Geothermal (base load)**



US\$ 90 MW/h



Import or transport by
vessel **Natural Gas** to
generate in the South
Node



US\$ 125 MW/h

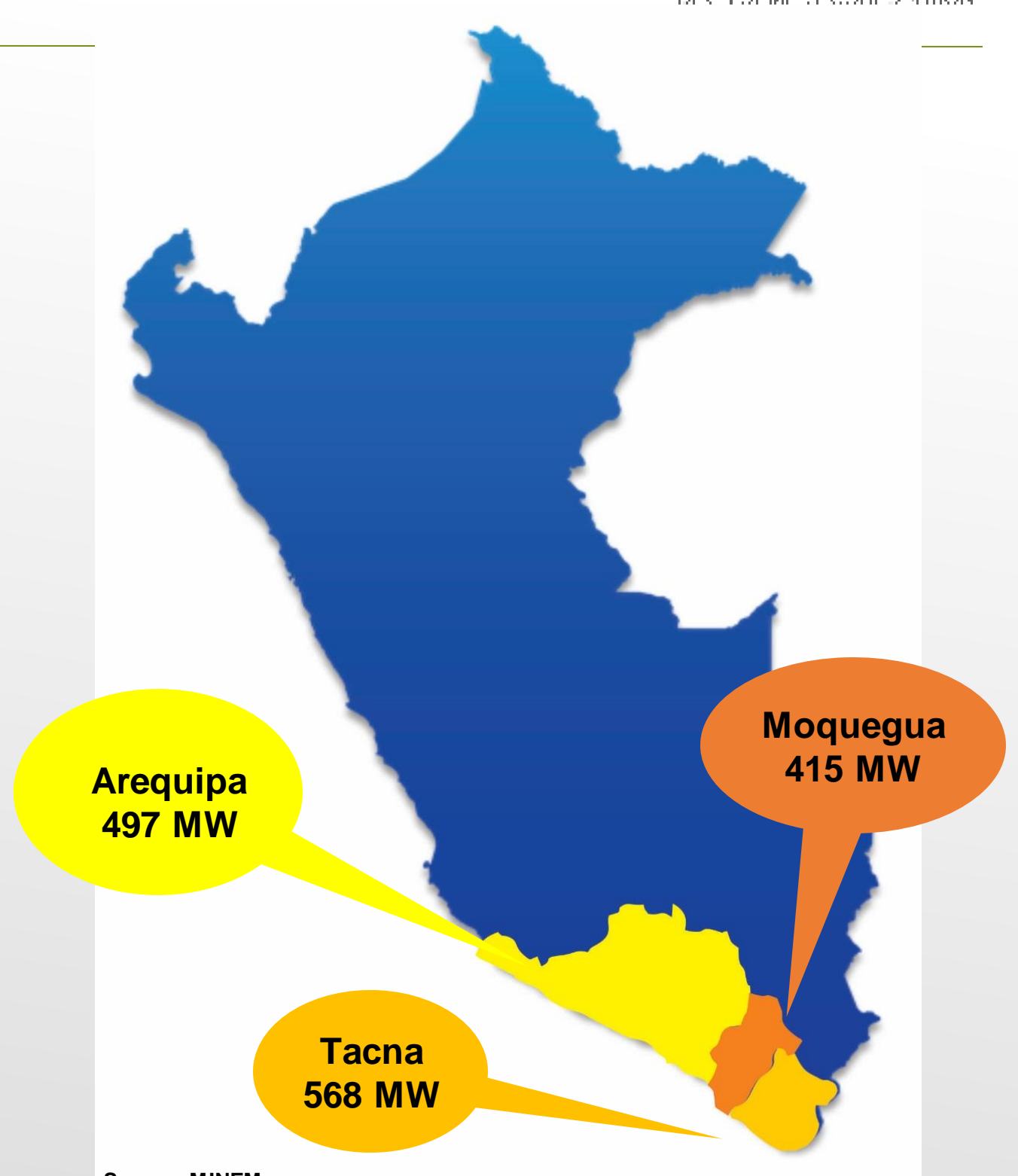


Cover new demand with Local Renewable Generation

Southern potential in Geothermal

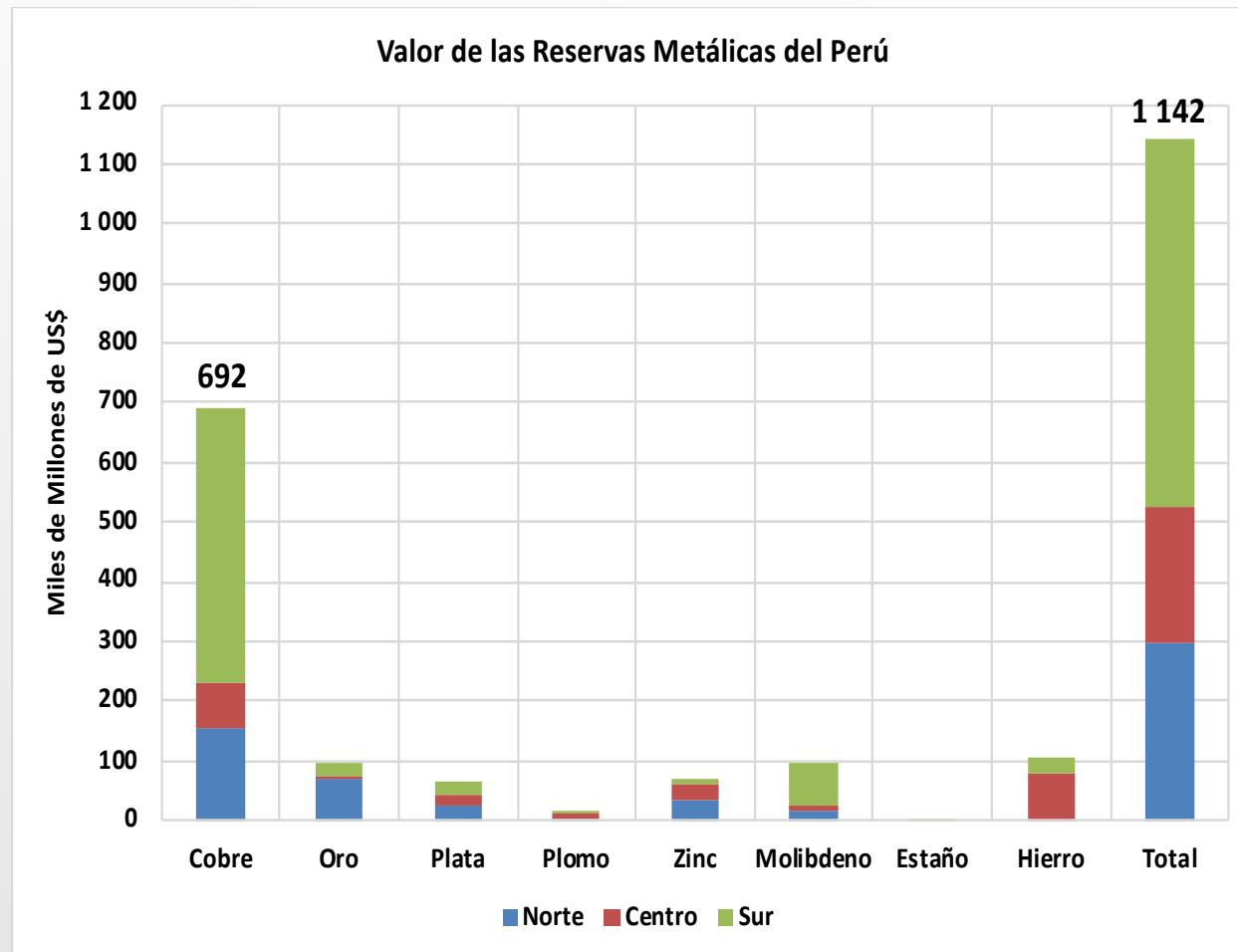
The heat energy of volcanoes

Being located in the Pacific Ring of Fire, Arequipa, Moquegua and Tacna have adequate resources to develop geothermal energy.



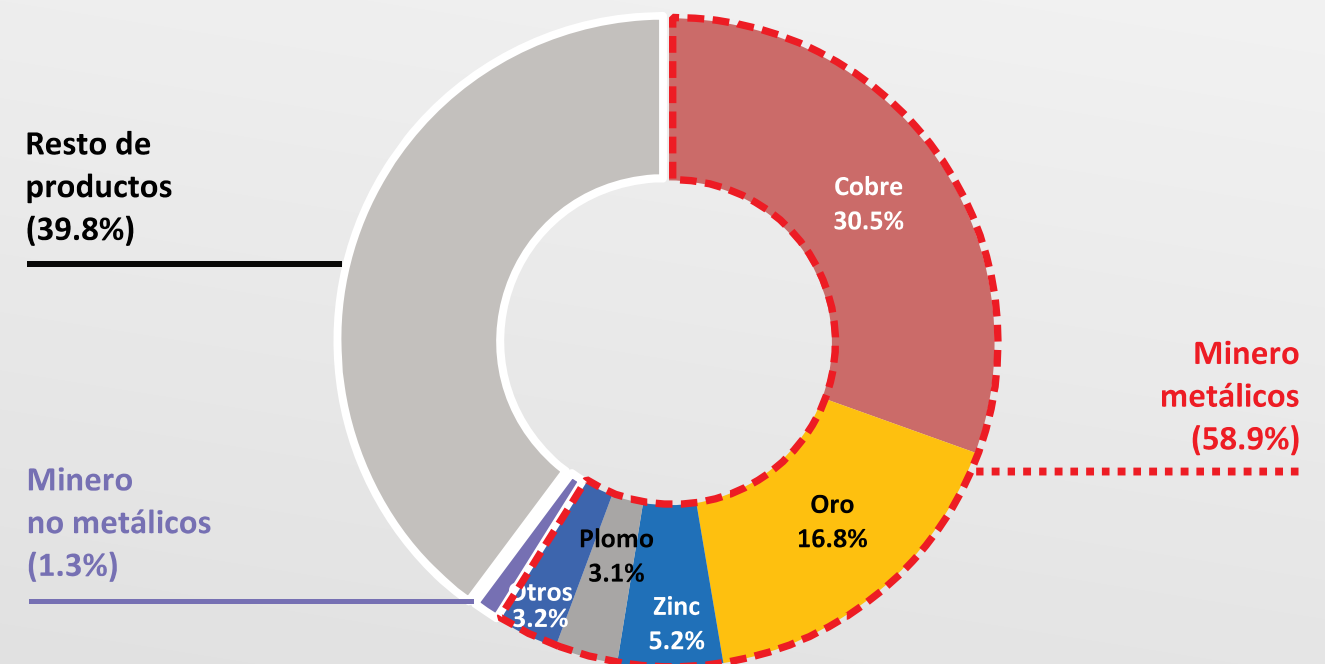
Source: MINEM

Growth of the energy demand in the South

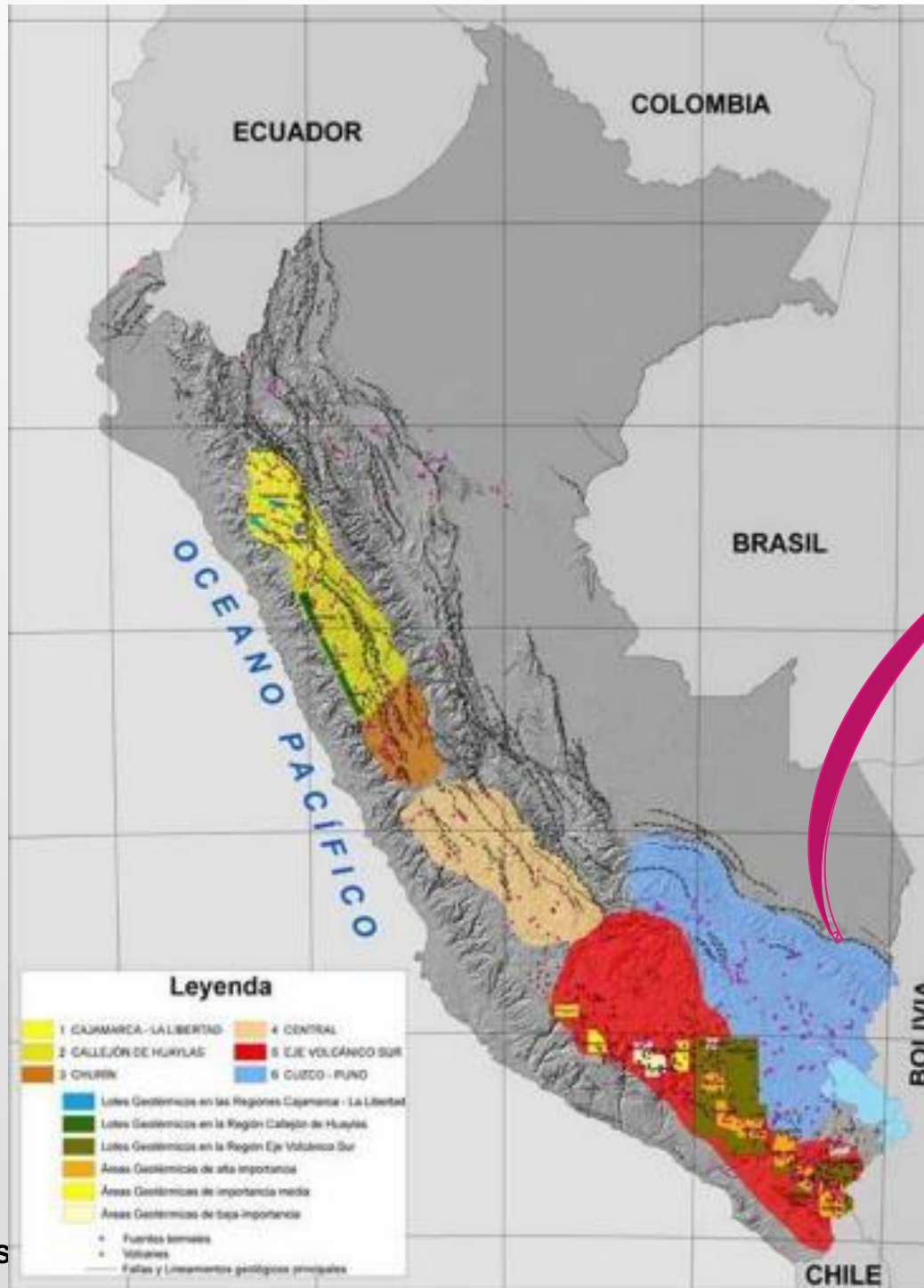


- Peru is a minning country. This activity contributes to the 13% of the PBI.
- The potential mining projects are mainly located in the South.

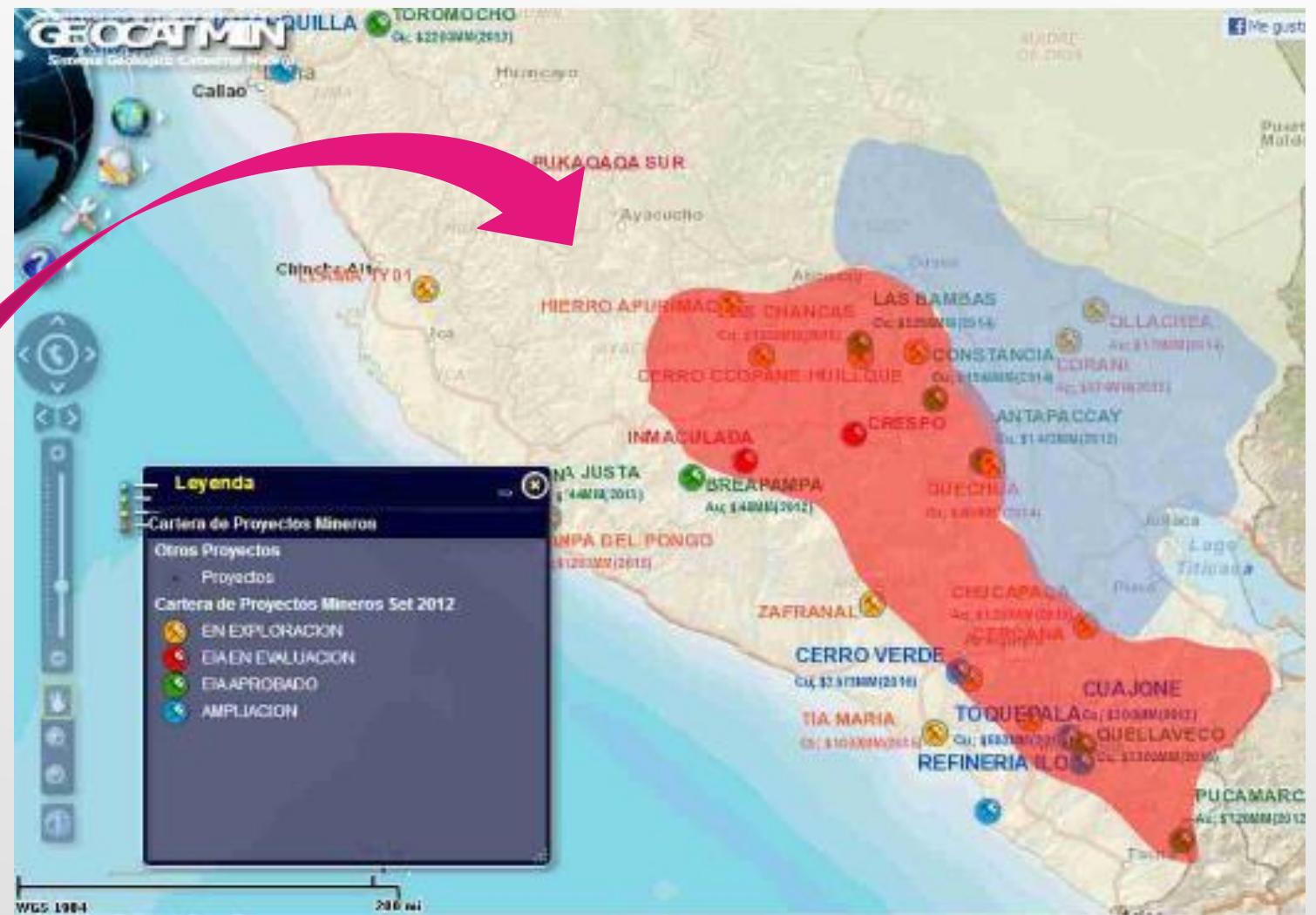
2018: ESTRUCTURA DEL VALOR DE LAS EXPORTACIONES NACIONALES



Demand of the main mining projects

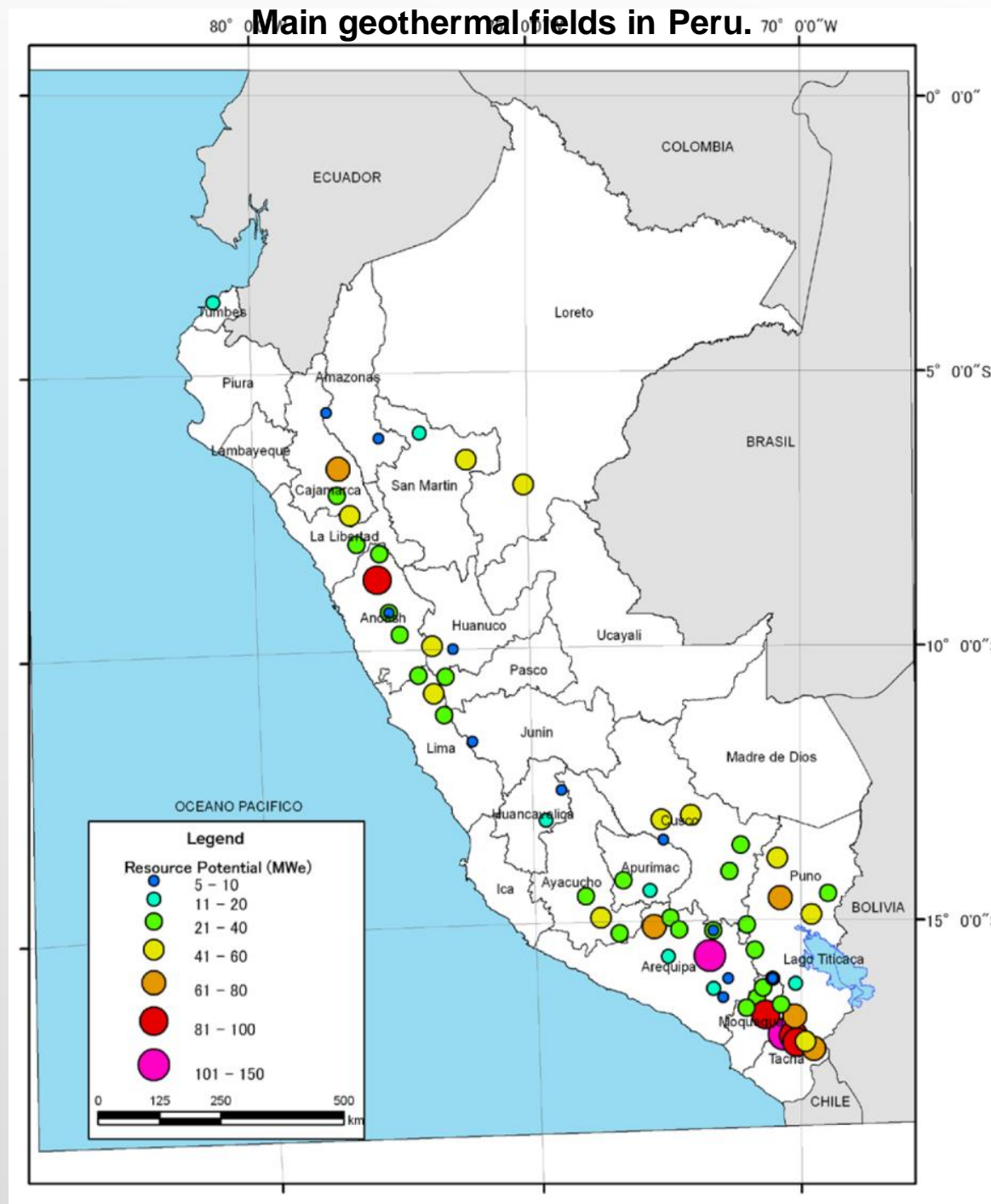


1500 MW to produce stable energy using geothermal resources



Source: GEOCATMIN - INGEMMET

Energy Development Corporation in Peru



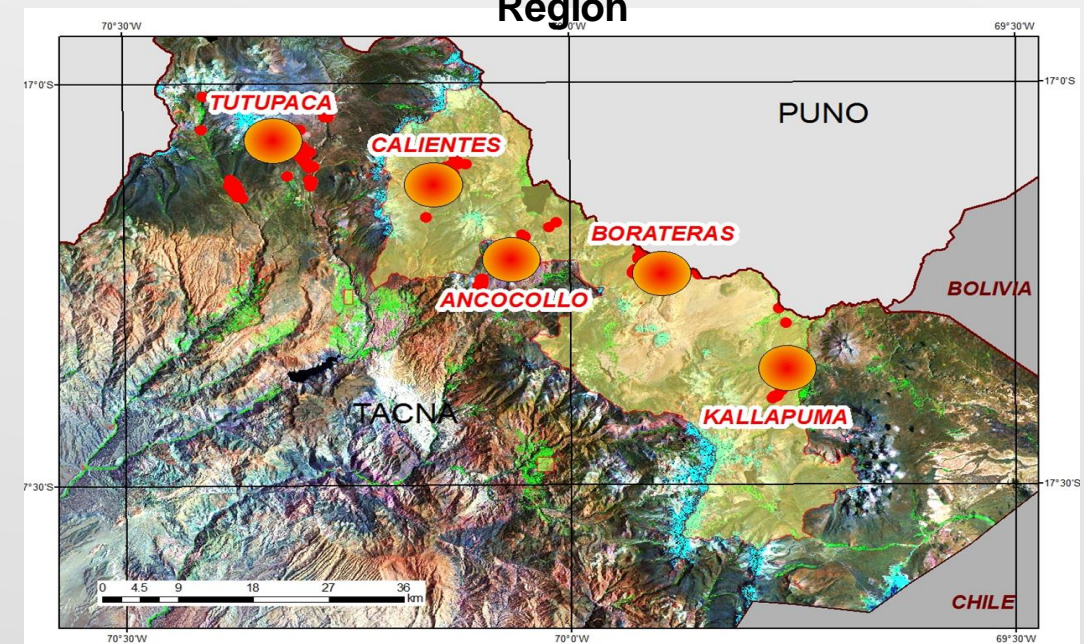
The Master Plan for Geothermal Energy, developed by JICA in 2012, indicates that Peru has a potential of about 3,000 MW.

Since 2012, EDC has explored several promissory areas in southern country, such as Arequipa, Moquegua and Tacna.

As a result of the explorations, EDC owns two projects: Achumani and Quello Apacheta.

Also, EDC has submitted several applications in Tacna region to increase the geothermal portfolio in Peru.

Most important geothermal fields in Tacna Region



Achumani (Energía Verde) project



- Located in Arequipa region, with authorization of exploration awarded by Ministry of Energy and Mines.
- Surface exploration was completed in 2015 and determined an average potential of 350 MW.
- EDC Energía Verde (EEVP) has already invested more than US \$ 2 million in the project.
- The construction of the geothermal plant will attract an investment of more than US \$ 500 million.
- The relationship with the stakeholders has already begun: the regional government of Arequipa declared geothermal energy as a public necessity in 2017 and there are good relations with the peasant communities in the area of influence.

 **GEOLAC2019**



Muchas gracias