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Natural hydrogen exploration in africa

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Stakeholder Forum
Pretoria, 3/10/2022

LEAP-RE

Long-Term Joint EU-AU Research
and Innovation Partnership on Renewable Energy

The LEAP-RE project has received funding from the European Union's Horizon 2020 Research and Innovation Program under Grant Agreement 963530.

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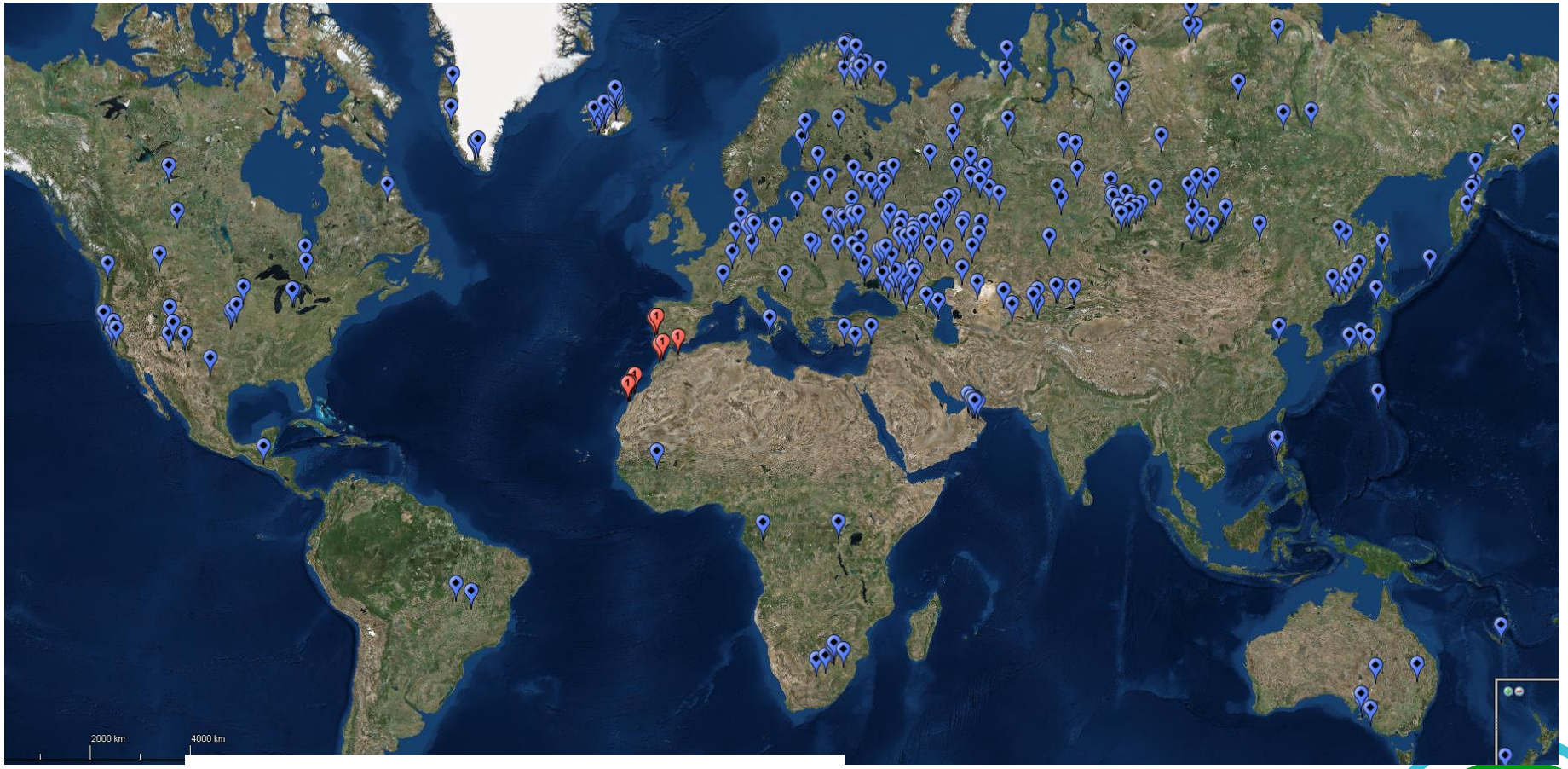
So, what about natural hydrogen?

Source: Omar Maiga (2022)



Natural hydrogen in concentrations >10%

Natural hydrogen discoveries Converge!

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Consortium

One SME (coordinator), 2 research institutes, 5 universities and 1 governamental regulatory body.

Portugal — CONVERGE! I&D Geo-energia e Geofísica

Germany — IAG Leibniz Institute for Applied Geophysics; Fraunhofer IEE

Morocco — Université Mohammed Premier

Mozambique — Universidade Eduardo Mondlane; DNGM Moçambique

South Africa — University of Pretoria; University of Limpopo

Togo — Université de Lomé

Aim of the project

- Map **natural hydrogen resources** in target regions of Morocco, Mozambique South Africa, Togo.
- Socio-economic impact assessment and business models in standalone and off-grid systems.
- Regulatory and roadmap actions for target countries to engage on natural hydrogen exploration and utilisation.

Relevance vs MAR#3 and MAR#4

- Natural hydrogen is a constant energy source – reliability of power supply
- Local source of energy to isolated communities in stand-alone and off-grid systems
- Reduces energy costs and develops local economies by creating job opportunities.
- No GHG – water is the only by-product. Unlike green H_2, natural H_2 reduces energy-water competition.

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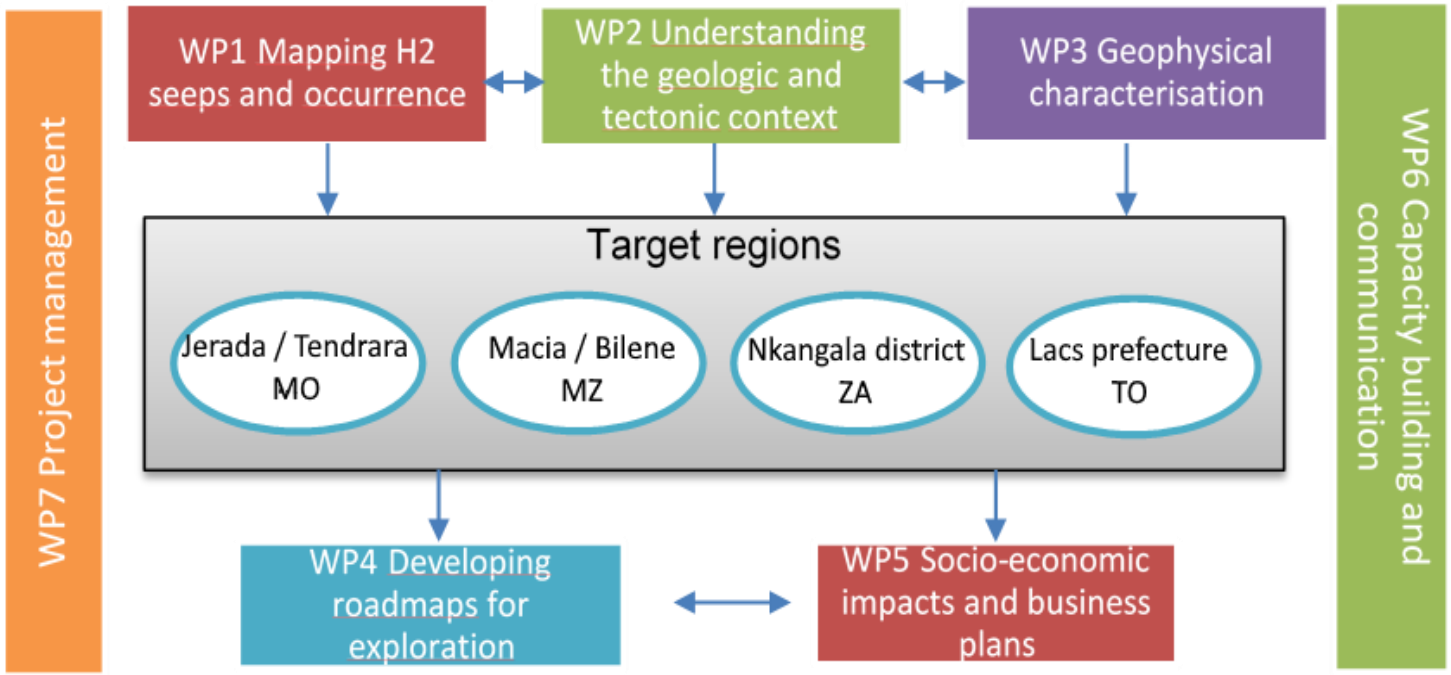

Methodological approach

Geological and geophysical research - WP1, WP2, WP3

Policy and regulatory analysis – WP4

Research on local energy systems and their economics - WP5

Capacity-building strategy - WP6

Local Teams characterise each region

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Key challenges addressed by the project

1. High level of uncertainty on natural hydrogen resources required for local / regional energy systems;
2. Exploration methodologies for natural hydrogen are poorly defined;
3. No regulatory measures are in place;
4. Lack of studies on social-economic impact or business model;
5. Technical capacity and awareness about natural hydrogen is very low, even among the geosciences community.

Expected results :

- ***Mid-term expected results (end 2023)***
  - Identification of natural H_2 resources in 4 regions;
  - Methodology for exploration of natural hydrogen;
  - Capacity building and raising awareness among stakeholders of target countries.
- ***End of project expected results (2025)***
  - Roadmaps for exploration and exploitation in target countries;
  - Techno-economic analysis of natural H_2 in energy system of two most promising regions;
  - Business models for natural H_2 utilization at local and regional level for 4 regions;
  - Complementarity of natural H_2 and green H_2 and other RES for 2 promising regions.

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Expected outcomes in case of success of the project (2030)

Regional scale

1. At least 2 regions implement natural H_2 exploration and utilisation programmes;
2. At least 2 regions increase the share of RES and promote sustainability by using natural H_2;
3. Business models for standalone systems with H_2 (natural or green) are validated in the target regions;
4. Communication at local and regional level increase local populations engagements.

Country scale

1. At least 2 countries include natural H_2 in the national mining and energy laws;
2. At least 2 countries implement programs for characterisation of national resources in natural H_2.

Which main risks of failure during project implementation ?

1. Insufficiency of geological or geophysical data.
2. Limited commercial viability of the use cases (not enough H_2 resources, cost of infrastructure, …);
3. Difficulty to engage regional / national policy makers and stakeholders to develop regulatory frameworks;
4. Difficulties in collecting data about local energy systems and for socio-economic analysis;

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Contribution of the project to AU – EU R&D cooperation

1. African and Europe researchers involved in new industrial branch on an hydrogen base economy,
2. Europe's competitive edge in an innovative technology, and Africa a competitive advantage on the availability of H_2 resources.
3. Reinforced joint African and European scientific basis and export potential for a new primary energy source.
4. Europe and Africa as frontrunners in the natural hydrogen industry and provide EU and African companies the opportunity to lead its exploration, exploitation and purification.

Interest of Consortium members in participating in LEAP-RE clustering activities

1. Connection to MAR#1, MAR#3 and MAR#4.
2. Capacity building for public officers and institutional representatives
3. Acquisition of data on socio-economic conditions, energy semand and energy supply
4. Socio-economic modelling
5. Resource availability and energy supply chain.

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Casablanca 15 and 16 September
Workshop on Natural Hydrogen and field trip

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THANK YOU

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