Portugal is among the largest geothermal electricity users in the European Union thanks to 3 operational projects in the Acores islands representing 33 MWe. On the mainland, Portugal is not making use of deep geothermal resources. Moreover, the market remains moderate for shallow geothermal with an estimated installed stock of less than 1,000 units. Deep geothermal developments in Portugal are primarily enabled by the Acores energy company EDA Renovaveis.

### Policies and Regulations

#### Legislative framework

The National Energy Efficiency Action Plan (NEEAP) for the period 2013-16 and the National Renewable Energy Action Plan (NREAP) for the period 2013-20 form the basis of Portugal renewable energy policies, setting an overall target of 34.5% of energy generated from renewable sources in gross final energy consumption by 2020, with around 60% of the electricity generated from renewable sources.

Under the NREAP, Geothermal electricity is considered an important element for Portugal energy transition and future developments are expected particularly for deep geothermal installations.

#### Support schemes

Existing geothermal installations (i.e. plants up to 3 MW) can apply for a feed in tariff, while currently there is no direct support scheme for RES in the heating sector.

The Fund to Support Innovation (Fundo de Apoio à inovação - FAI), is the main funding instrument for research and projects of innovation and technological development in the field of renewable energy.

#### Key public institutions

- Ministério da Economia, da Inovação e do Desenvolvimento, Direcção Geral de Energia e Geologia (DGE/G) – Directorate General for Energy and Geology at the Ministry of Economy, Innovation and Development
- Agência para a Energia (ADENE) – Energy Agency
- Entidade Reguladora dos Serviços Energéticos (ERSE) – Energy Services Regulatory Authority
RESOURCES

Portugal has a high quality of resources available for geothermal electricity in the Acores, where more developments can be undertaken. The Country also has some identified resources in parts of the country, notably in the Lisbon area, where deep geothermal resources would be available for heating and cooling uses, and where some cogeneration projects may be developed in the medium terms. Altogether, the geothermal resources in mainland Portugal may require additional exploration.

Shallow geothermal can be developed across the whole country, and is notably a proven solution to provide renewable cooling.
PERSPECTIVE TO 2030, AND POTENTIAL DEVELOPMENTS

Geothermal energy can be a major prospect for the Portuguese heating and cooling sector, notably as shallow geothermal is a proven solution to provide renewable cooling at scale. Large scale deep geothermal projects may also be developed in some areas. However, this would require long term planning, involving the private sector and public authorities to ensure the availability of the heating and cooling infrastructure.

Portugal also has a large geothermal electricity potential in the Acores islands, as a solution for energy independence.

<table>
<thead>
<tr>
<th></th>
<th>Baseline (ongoing projects, commissioned by 2025)</th>
<th>Market slow down</th>
<th>Current trend</th>
<th>Moderate market acceleration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heating &amp; Cooling</td>
<td>-</td>
<td>-</td>
<td>+20MWh</td>
<td>+50MWh</td>
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<tr>
<td>Electricity</td>
<td>+5MWe</td>
<td>+10MWe</td>
<td>+30MWe</td>
<td>+60MWe</td>
</tr>
<tr>
<td>Shallow geothermal</td>
<td>-</td>
<td>+3000 units</td>
<td>+30000 units</td>
<td>+50000 units</td>
</tr>
</tbody>
</table>

KEY RECOMMENDATIONS

> Set ambitious objectives based resources not historical trends;

> For shallow geothermal, the policy, financial and regulatory framework should be not be a barrier to market uptake considering the technology’s benefits compared to other technologies (i.e. higher investment, lower operating costs, reduction of winter peaks in electricity consumption...)

> Set the regulatory and policy framework fit to attain these objectives, based on best practices that have proven able to deliver at the European level;

> Establish a long-term local planning of heating and cooling investments according to local resources.

> Continue and set financial support tools to increase geothermal development for electricity and heating and cooling, notably with a robust framework for geothermal risk mitigation scheme for attracting private investors and developers.