Croatia's geothermal sector emerged as a heritage of oil exploration. However, in the past decade, it slowly consolidated, and as of 2018, Croatia is among the few European countries that produce both heating and cooling and electricity from geothermal energy. Recent development of geothermal energy in Croatia have been allowed in part by the role of RD&I funding, notably from European Funds, and by the emergence of private investors and developers pursuing new geothermal projects in country. In the case of Croatia, the lack of an appropriate regulatory and reporting framework prevents the collection of statistical data for shallow geothermal installations. The operators in Croatia's geothermal sector are quite diverse, ranging from public district heating operator, to private geothermal electricity developers, including private sector sourcing of geothermal heat for the agricultural sector. This diversity reflects the potential of geothermal deployment in Croatia as being attractive to different types of actors.

### POLICIES AND REGULATIONS

**Legislative framework**

Croatia National Energy Strategy 2009 – 2020 set the main targets to increase the share of renewable energy to 20% in the annual gross energy consumption of the country by 2020, which are implemented according to the National Renewable Energy Action Plan's (NREAP).

The strategy sets up a goal to maintain the level of 35% of a share of electricity generation from renewable energy sources in overall electricity consumption until 2020, while in Heating and cooling RES is expected to cover at least 20% of the demand.

In this context, geothermal is expected to cover 1.3% of RES total energy consumption by 2020, mainly for tourist-recreational facilities, as well as for space heating, hot water, agricultural production, industrial manufacturing, fish farms, etc.

Specific goals for the future exploitation of geothermal energy are also mentioned regarding economically justified exploitation of existing geothermal bores, economically acceptable utilization of bores in order to use the geothermal energy, and exploitation of medium temperature basins for development.
Support schemes

The 2016 Act on Renewable Energy Sources and High-efficiency Cogeneration provides the comprehensive codification of provisions concerning the planning and the promotion of renewable energy sources and introduce support scheme for RES-electricity producers, covering all technologies, in the form of a premium tariff and a guaranteed feed-in tariff (for installations smaller than 30 kW).

Specific loans and incentives are also provided by the Croatian Bank for Reconstruction and Development (HBOR), in cooperation with commercial banks, and through the Environmental Protection and Energy Efficiency Fund (FZOEU) (interest-free loans, subsidies, financial assistance, donations). Geothermal energy is eligible for all measures.

There are no supporting measures at national level for Heating and Cooling.

> Key public institutions

Key P Hrvatski operator tržišta energije (HROTE) – Croatian Energy Market Operator
Hrvatska Energetska Regulatorna Agencija (HERA) – Croatian Energy Regulation Agency
Hrvatska banka za obnovu i razvitak – Croatian Bank for Reconstruction and Development
Ministarstvo zaštiće okoliša i energetike – Ministry of Environment and Energy
Ministarstvo Gospodarstva – Ministry of Economy
Croatia’s geothermal resources are well identified, and primarily located in the North of the Country, within the Panonian Basin (which is the source of many Eastern European countries’ geothermal resources). These resources are suitable for heating and cooling, and for electricity production through cogeneration. Further exploration may be required for mitigating geological risk, or to identify different types of resources in other parts of the country.

Maps based on available geological data (GeoELEC, GeoDH)
PERSPECTIVE TO 2030, AND POTENTIAL DEVELOPMENTS

The Croatian deep geothermal energy sector is dynamic and diverse and has proven attractive to private developers. These characteristics are an asset allowing to foresee a rapid scale up of the use of geothermal energy in Croatia. The country’s use of deep geothermal energy can increase rapidly both for electricity and for heating and cooling production, owing to a significant pool of ongoing projects. The objectives to 2030 should build on this trend in order to promote the consolidation of the industry.

One of the key area of interest for Croatia to tap more widely into geothermal energy also is to set the right framework to allow the development of shallow geothermal projects in the country. In particular, large scale shallow geothermal, or projects for single family houses to replace fossil boilers have quite a high potential in the country. Experience from comparable countries show that it is a valuable solution that should not be overlooked.

<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>+97MWh</td>
<td>+60MWh</td>
<td>+130MWh</td>
<td>+200MWh</td>
</tr>
<tr>
<td>Electricity</td>
<td>+30MWe</td>
<td>+35MWe</td>
<td>+60MWe</td>
<td>+150MWe</td>
</tr>
<tr>
<td>Shallow geothermal</td>
<td>N.A</td>
<td>+5000 units</td>
<td>+10000 units</td>
<td>+20000 units</td>
</tr>
</tbody>
</table>

KEY RECOMMENDATIONS

- Set ambitious objectives based resources not historical trends;
- 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 heating and cooling and CHP, notably by the establishment of a geothermal risk mitigation scheme for attracting private investors and developers.
- Introduce measures that encourage users/consumers to use geothermal heat and electricity, reflecting the lower emissions in the market price (e.g. reduction of VAT for geothermal district heat...)
- 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...)