RENEWABLE ENERGY MARKET ANALYSIS: SOUTHEAST EUROPE

Focus on District Energy
The “Renewable Energy market analysis” series

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Energy sector overview
Renewable energy landscape
Policy framework
Investment framework
In-focus discussion
The way forward
The energy sector reliance on fossil fuels

This is a pivotal moment for the energy sector in the SEE region

Total primary energy supply, 2017

Source: IRENA
Policies at the center of the energy transition

RE capacity additions, SEE, by technology [MW]

Source: IRENA
Investment in renewable energy, SEE, by jurisdiction [USD million]

Source: BNEF
Targets and their role

Sectorial comparison between 2020 targets and real 2016 RES shares in TFEC

Source: IRENA
New Regulatory framework

2020 targets and real 2016 renewable energy shares

Share of RES in gross final energy consumption, draft NCEP targets

Source: IRENA
Urban pollution

Top 15 cities by level of PM$_{2.5}$ levels, Europe, 2017

Source: IRENA
The role of cooking

Share of households without access to clean cooking solutions, 2010 and 2016

Source: World Bank
The biomass role in the region: heating households

### Contribution of biomass in the residential energy consumption

<table>
<thead>
<tr>
<th>Country</th>
<th>Bioenergy (PJ)</th>
<th>Non-Bioenergy (PJ)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Albania</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Bosnia and Herzegovina</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>Bulgaria</td>
<td>32</td>
<td>14</td>
</tr>
<tr>
<td>Croatia</td>
<td>46</td>
<td></td>
</tr>
<tr>
<td>Kosovo*</td>
<td>6</td>
<td>14</td>
</tr>
<tr>
<td>Montenegro</td>
<td>30</td>
<td></td>
</tr>
<tr>
<td>North Macedonia</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>Republic of Moldova</td>
<td>128</td>
<td></td>
</tr>
<tr>
<td>Romania</td>
<td>34</td>
<td></td>
</tr>
<tr>
<td>Serbia</td>
<td>19</td>
<td></td>
</tr>
</tbody>
</table>

Source: IRENA
A complete transition includes both the energy transition and the socio-economic system transition, and their interlinkages.
Socio-economic impact: employment

Energy transition footprint in terms of employment, SEE, 2020-50 [%]

~ 50,000 additional jobs

Source: IRENA
Socio-economic impact: GDP

Energy transition footprint in terms of GDP, SEE, 2020-50 [%]

Source: IRENA
## Contribution of bioenergy to district heating, SEE, 2017

<table>
<thead>
<tr>
<th>Country</th>
<th>Bioenergy (PJ)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bosnia and Herzegovina</td>
<td>0.67</td>
</tr>
<tr>
<td>Bulgaria</td>
<td>0.57</td>
</tr>
<tr>
<td>Croatia</td>
<td>1.82</td>
</tr>
<tr>
<td>Kosovo*</td>
<td></td>
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<tr>
<td>North Macedonia</td>
<td></td>
</tr>
<tr>
<td>Republic of Moldova</td>
<td>0.02</td>
</tr>
<tr>
<td>Romania</td>
<td>2.08</td>
</tr>
<tr>
<td>Serbia</td>
<td>0.14</td>
</tr>
<tr>
<td>Slovenia</td>
<td>1.58</td>
</tr>
</tbody>
</table>

Source: IRENA
Key barriers for low temperature district energy

• High upfront capital investment requirements

• Uncertainty around the use of the network - investment returns, “anchor load”

• Natural monopoly - risk of poor outcomes for consumers, negative consumer perception, reputational damage

• Fossil fuel costs do not account for their negative externalities artificial uncompetitive playing field for renewable sources.

• Technical suitability - distribution losses, space requirements, seasonality
The policies in a time of transition

Based on IRENA, IEA and REN21 (2018).
Deployment policies

- **Zoning mandates**
- **Financial incentives**
  - *Subsidies, grants, or tax credits* based on decarbonisation impact;
  - *Debt guarantees* to minimise risk for potential investors;
  - *Concessional finance* from an MDB if unable to secure financing locally

**Denmark**’s Heat Supply Act on District Heating (1979) designates separate urban zones for district heating and natural gas pipes. This not only ensures that economies of scale are achieved, but also prevents inefficient duplication of infrastructure investment. Similarly, **South Korea**’s mandate zones serve to minimise both life-cycle costs as well as total energy consumption by eliminating duplicate heat systems.
Integrating policies

- **Financing for refurbishment** of existing distribution networks
- **Financing for additional thermal storage**
- **Foster synergies** between renewable DHC and renewable electricity

Germany has made capital investments to refurbish its district heating systems and integrate renewables. It has refurbished its district heating pipes to use hot water instead of steam in multiple cities. The city of Munich, for example, is in the process of converting steam to hot water pipes to drastically increase the share of geothermal in the city’s district heating system in order to meet its ambitious goal of 100% renewable district heating by 2040. The project also leveraged synergies with existing infrastructure in that it made use of existing heat distribution pipes, which offset high upfront capital costs and ensured the economic viability of the district heating system.
Enabling policies

- **Consumer protection policies**
  - policies to regulate the natural monopoly
  - Tariffs on consumption
- **Demonstration projects** and R&D initiatives
- **Carbon pricing**

**Sweden's** Energy Markets Inspectorate (EMI) and the Swedish Competition Authority supervise the country's district heating market. The EMI ensures that private providers comply with the legislation, which stipulates pricing, customer rights and access to information, and third-party access. For example, customers have unconditional rights to access information regarding their tariffs and can legally leave the district heating system with no repercussions if their pricing terms change. Providers are also obligated to *negotiate with third parties*, which improves competition and customer outcomes.
## In conclusion

<table>
<thead>
<tr>
<th>Policy</th>
<th>Barrier tackled</th>
<th>Effectiveness</th>
<th>Feasibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heat mandate zones</td>
<td>Demand ‘anchor load’ concerns</td>
<td>Has led to economies of scale for DH providers in Denmark.</td>
<td>Consumers generally oppose uncompetitive markets</td>
</tr>
<tr>
<td>Financial incentives for infrastructure investment</td>
<td>High upfront capital costs</td>
<td>Must sufficiently offset longer payback and mitigate risk</td>
<td>Depends on fiscal status and budget priorities</td>
</tr>
<tr>
<td>Investment in improved system technology and flexibility</td>
<td>Technical suitability requirements</td>
<td>Has led to uptake of solar thermal and geothermal DH in Denmark and Germany</td>
<td>Very capital intensive and likely to face budget constraints</td>
</tr>
<tr>
<td>Monopoly and competition oversight</td>
<td>Natural monopoly</td>
<td>Necessary condition to drive growth</td>
<td>Ubiquity of competition oversight in countries with extensive DHC suggests feasibility</td>
</tr>
<tr>
<td>Demonstration projects</td>
<td>Risk and return uncertainty, demand-side informational</td>
<td></td>
<td>Demonstration projects entail uncertainty by nature</td>
</tr>
<tr>
<td>Carbon pricing/removal of subsidy</td>
<td>Artificial uncompetitive market</td>
<td>Necessary condition to leverage the playing field</td>
<td>Local players may not be able to tackle a national/international issue</td>
</tr>
</tbody>
</table>