SOLVING BARRIERS FOR EFFECTIVE UTILIZATION OF SEAWATER HEAT PUMPS FOR HEATING AND COOLING IN THE ADRIATIC REGION

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COASTENERGY project

• Interreg Italy – Croatia
• Blue Innovation priority axis
• Bringing business investments in R&D, involving high education centers, promote technology transfers and encourage development of framework in the sector of utilization of **blue energy in coastal areas**.
• Vawe converters, tidal energy and **thermal energy of the sea**
Seawater heat pumps

- Heating and cooling
- High efficiency – COP
- Low temp. heating
  - Insulation is important
- Sea temperature (11-25°C)

**Viessman Vitocal 200-G PRO – 21 170 €**

<table>
<thead>
<tr>
<th>Power [kW]</th>
<th>COP</th>
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<tbody>
<tr>
<td>Heating / Cooling</td>
<td>4,7 – 5,9</td>
</tr>
<tr>
<td>75,4 / 59,2</td>
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Heating in Adriatic region

- Mediterranean climate – mild winters, but still there is a significant heating demand
- Current situation – low efficiency heating systems and low level of comfort
- Electrical heaters, air-air heat pumps, boilers using heating oil
- No DH systems, no CHP, poor gas connections
• Average heat demand density: 453,22 MWh/(Ha*year)

Source: https://www.hotmaps.eu/map
Cooling in Adriatic region

• Current situation – air-air heat pumps, no district cooling
• Mediterranean climate – warm summers, high cooling demand

Old city of Dubrovnik
Split, Croatia

- Average cooling demand density: 200.4 MWh/(Ha*year)

Source: [https://www.hotmaps.eu/map](https://www.hotmaps.eu/map)

Copenhagen, Denmark

- Average cooling demand density: 71.3 MWh/(Ha*year)
COASTENERGY – Cres-Lošinj Archipelago

- Identification of **pilot areas**
- Overview of **regulatory acts** and framework
  - International and EU level
  - National level
  - Local level
- Existing cases and references
- Feasibility analysis for Mali Lošinj townhall
Potentials for archipelago

• Most of the buildings use electric heaters and fossil fuels for heating
• Replacing heating systems using fossil fuels - **24.2% reduction** of all emissions
• Plenty of RES in Archipelago – Solar plants
Analysis for Mali Lošinj Townhall

- Under architectural conservation – 1890
- Heating oil – 400 kW boiler with heat storage
- Air-air heat pumps in the attic – 23 kW
  - Not meeting demand in the summer
- Indirect water intake
  - Drilling the well
  - Evading problems with concession
- Financing: - national fund for EE
  - EU funds
Examples of good practice

• Hotel Parentium, Poreč, Croatia
  – 1.59 MW heating, SCOP >5

• Hotel Le Meridien, Podstrana, Croatia
  – 3.4 MW, COP = 4

• Rector’s Palace, Dubrovnik, Croatia
  – 430 kW (6 smaller units)
  – SEADRION project
Examples of good practice - larger projects

• Îlot Allar eco-district, Marseille, France
  – 21 MW heat/cold production sufficient for 500 000 m² of heated area

• Copenhagen, Denmark
  – 5 MW amonia heat pump – seawater and wastewater used as a heat source
Barriers

• High investment costs – especially for refurbishment projects
• Low temperature heating – energy efficiency of the building is important
• **Framework** - unclear procedure for obtaining required permissions
Seawater heatpumps

+ • CO₂ reduction
   • Applying for national EE funds and other EU funding sources
   • Higher comfort in the building
   • Lower heating costs – higher efficiency
   • No imports of fuel
   • Security
   • Great for islands

- • High capital costs
  • Significant construction works
  • Lack of unique legal framework
Conclusions

- Seawater heatpumps are the best solution for **clean heating** and cooling systems in the coastal areas
- SWHP can be feasible, especially for **newly build buildings**
- Lack of existing heating systems in Adriatic region is an opportunity for the SWHP
- **Unique legal framework** would be the best driver for the implementation of this technology
THANK YOU FOR YOUR ATTENTION

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