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

Vladimir Vidović, Nikola Matak, Goran Krajačić

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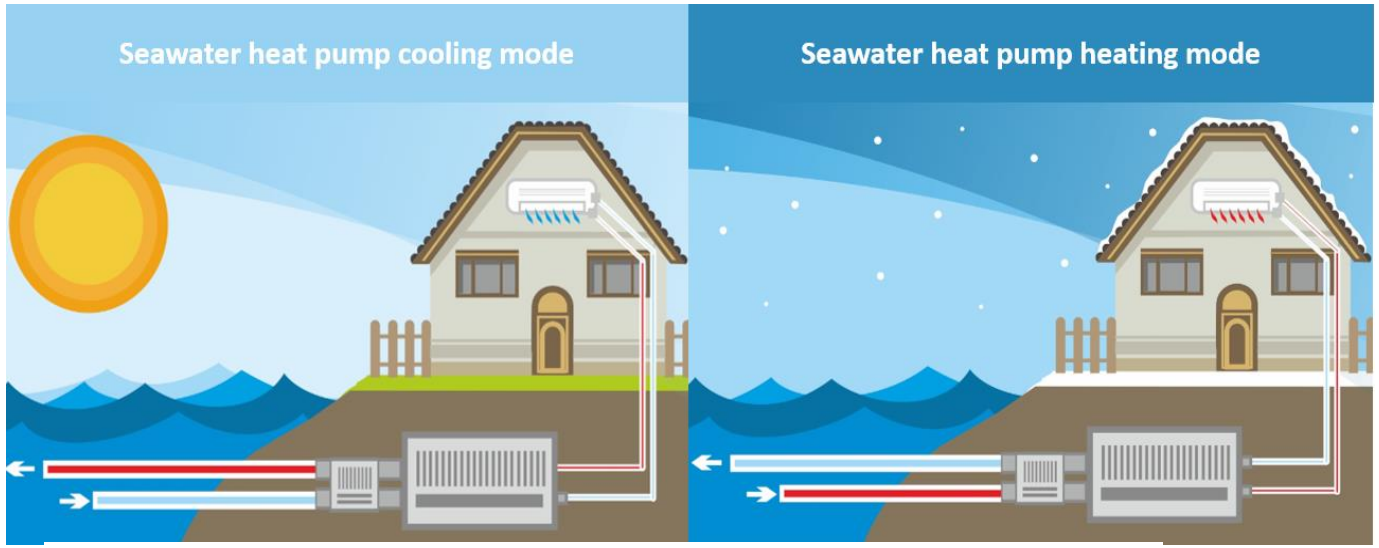
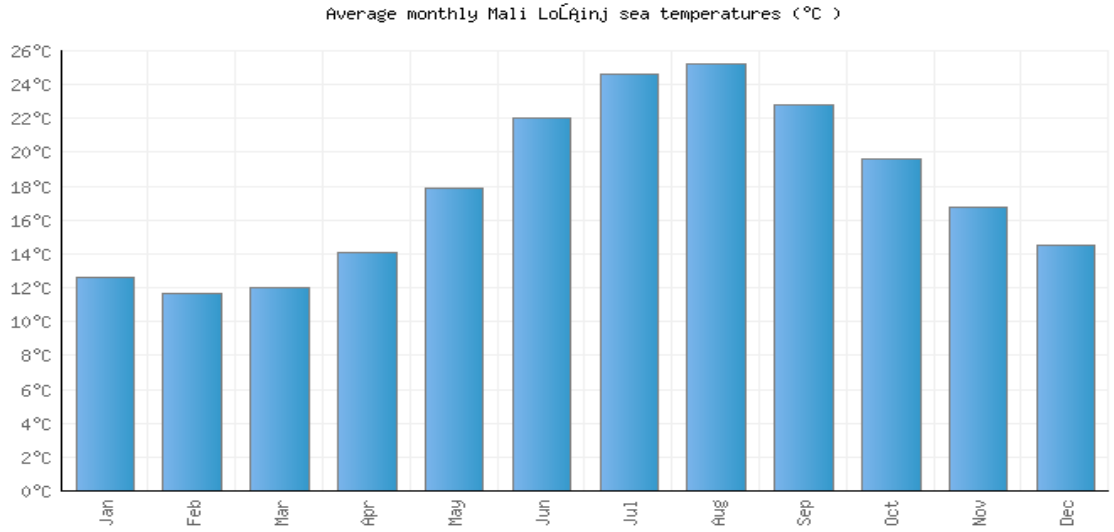
COASTENERGY project

- Interreg Italy – Croatia
- Blue Innovation priority axis
- Bringing business investments in R&D, involving high eduacation 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 heatpumps

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



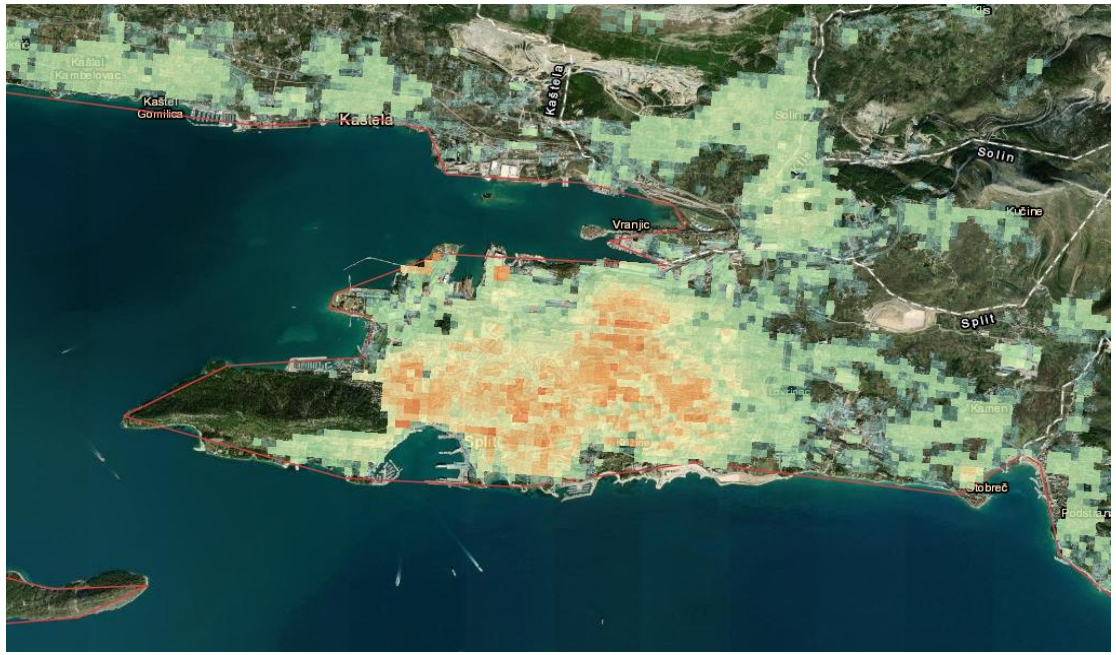


Viessman Vitocal 200-G PRO – 21 170 €	
Power [kW]	COP
Heating / Cooling 75,4 / 59,2	4,7 – 5,9

Heating in Adriatic region

- Mediterranean climte – 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

Split, Croatia



- Average heat demand density:

  453,22 MWh/(Ha*year)

Copenhagen, Denmark

- Average heat demand density:

  565,29 MWh/(Ha*year)

Source: https://www.hotmaps.eu/map

Cooling in Adriatic region

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

Old city of Dubrovnik

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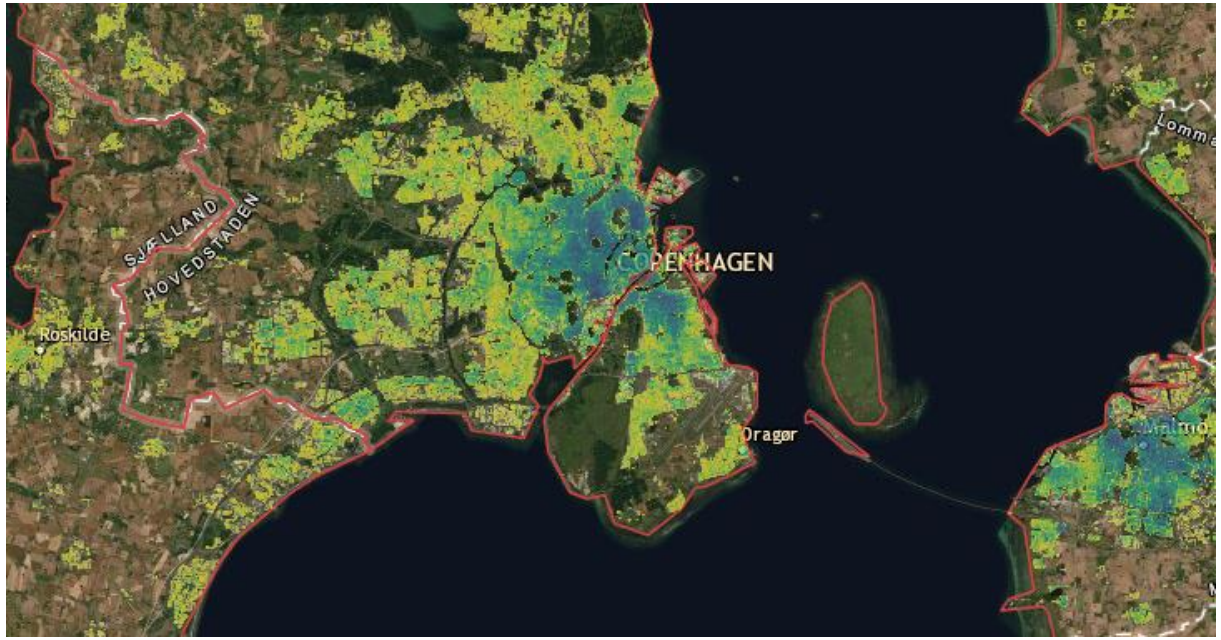
Split, Croatia

- Average cooling demand density:

  200,4 MWh/(Ha*year)

Copenhagen, Denmark



- Average cooling demand density:

  71,3 MWh/(Ha*year)

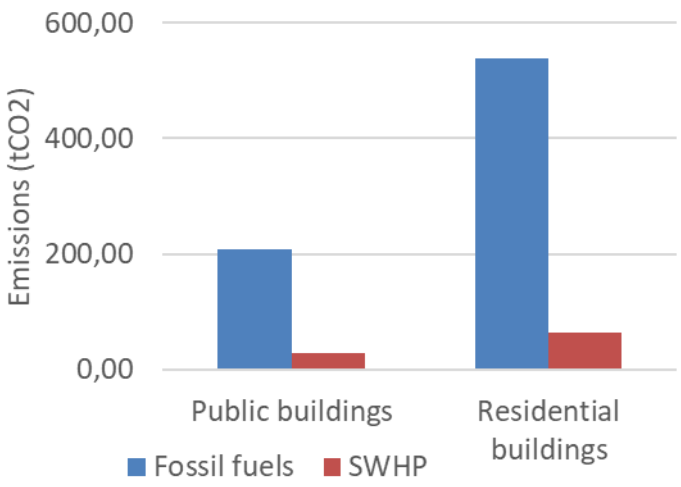
Source: https://www.hotmaps.eu/map

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 architectual 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 – especialy for refurbishment projects
- Low temperature heating – energy efficiency of thebuilding is important
- **Framework** - unclear procedure for obtaining requiered permissions

Seawater heatpumps

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- CO2 reduction
- Applying for natoinal 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

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THANK YOU FOR YOUR ATTENTION

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