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REPUBLIKA HRVATSKA  
Ministarstvo regionalnoga razvoja  
i fondova Europske unije

**EIHP**  
ENERGETSKI INSTITUT  
HRVOJE POŽAR

# ENERGY PRODUCTION FROM THE SEA

**Project Title:**

Seawater Heat Pump Systems

**Beneficiary:**

Brodogradilište Viktor Lenac d.d.

February 16, 2023, Presenting the project to the public



# Energy Efficiency



# Our successfully implemented energy efficiency projects

- ✓ Reduced impact on the environment
- ✓ Reduced cost of production

## Shore supply

- Annual energy savings of 4,210,000 kWh
- Emission reduction of 994 t CO<sub>2</sub>/year



Shore-to-ship power converters



# Our successfully implemented energy efficiency projects

## Lighting

- Outdoor, Temporary, Workshop and Office

→ Annual energy savings of 2,147,245 kWh

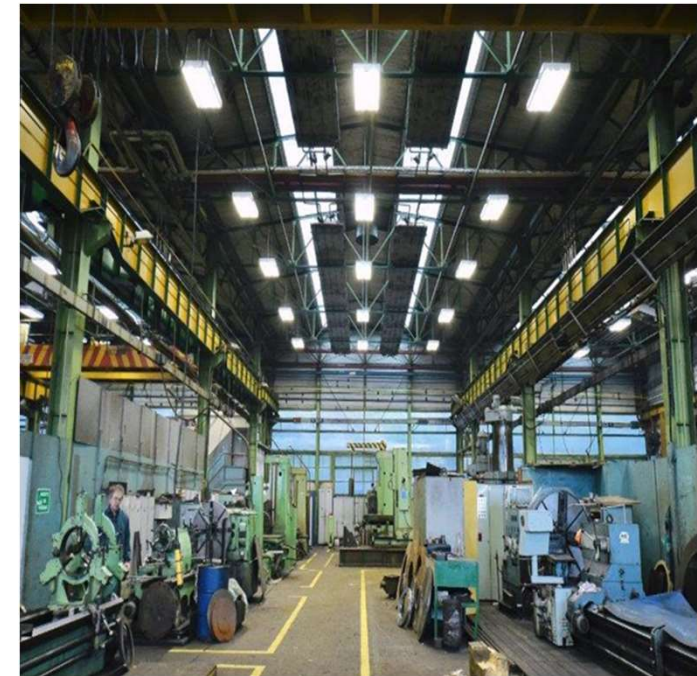
→ Emission reduction of 507 t CO<sub>2</sub>/year



Temporary lighting



Outdoor lighting



Workshop lighting



# Our successfully implemented energy efficiency projects

## UHPW technology

- Ultra High Pressure Anti-Corrosion Water Treatment operating at pressures up to 3000 bar
  - Annual energy savings of 335,300 kWh
  - Emission reduction of 78,700 kg CO<sub>2</sub>/year



*Spider*



# Our successfully implemented energy efficiency projects

Improved welding quality

REL and MIG-MAG

- Annual energy savings of 393,700 kWh
- Emission reduction of 92,900 kg CO<sub>2</sub>/year



REL welding



MIG-MAG welding



# Our successfully implemented energy efficiency projects

## Variable frequency drive

- pump stations, cranes

- Annual energy savings of 165,000 kWh
- Emission reduction of 38,900 kg CO<sub>2</sub>/year



Frequency regulation of PS2 pumps



# Our successfully implemented energy efficiency projects

## Water heating

- Annual energy savings of 1,315,000 kWh
- Emission reduction of 363 t CO<sub>2</sub>/year



Central boiler room – Water heater boiler



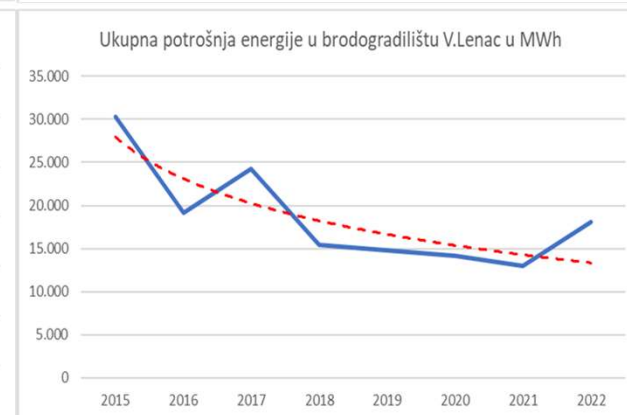
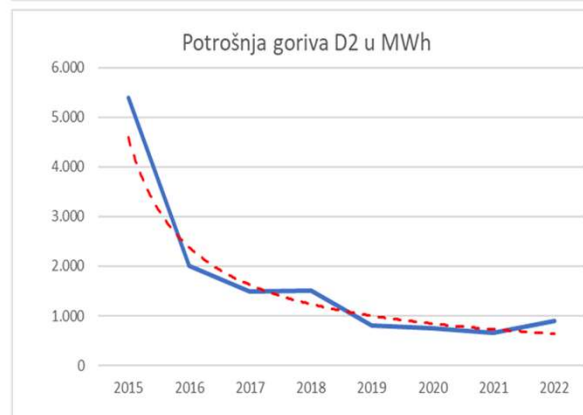
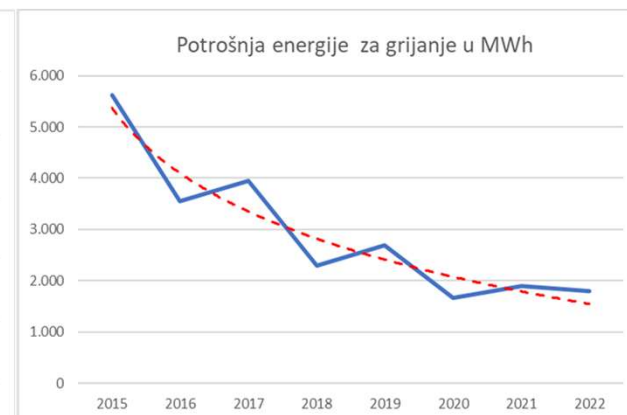
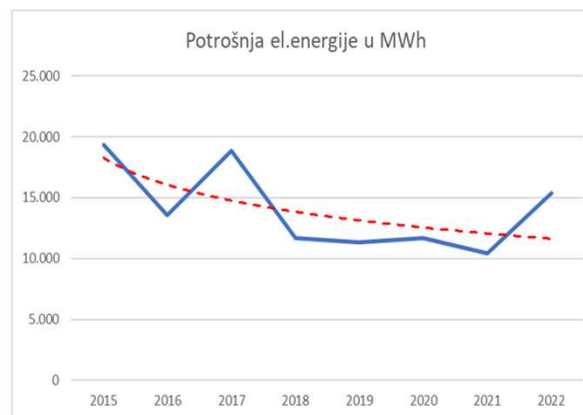
Waste heat from compressor





# 2015-2022 Annual Energy Savings

Electricity, Extra light fuel oil  
and Diesel D2 in MWh



# Heating System



# Existing conditions

- 2016 → Renovation and upgrading of the heating system and central preparation of hot sanitary water by using waste heat produced by the compressor and introducing an automatic central monitoring, regulation and control system
- By installing the water heating system, the steam pipeline that led from the central boiler room to the TOST 2 thermal station in Stara Martinščica zone was eliminated, where heat is produced by:
  - 30 kW water-to-water heat pump system achieving a thermal effect of 108 kW
  - 208 kW electric boilers (4 x 52 kW)
- 100 kW of the required 280 kW of thermal energy is obtained from the heat pump, and the rest from electric resistance boilers
- Due to short periods of process water consumption on Berth 8, and high costs of process water concession fee
  - it was not profitable for the Shipyard to use the water-to-water heat pump.

TOST 2 Stara Martinscica



# Developing an Effective Solution



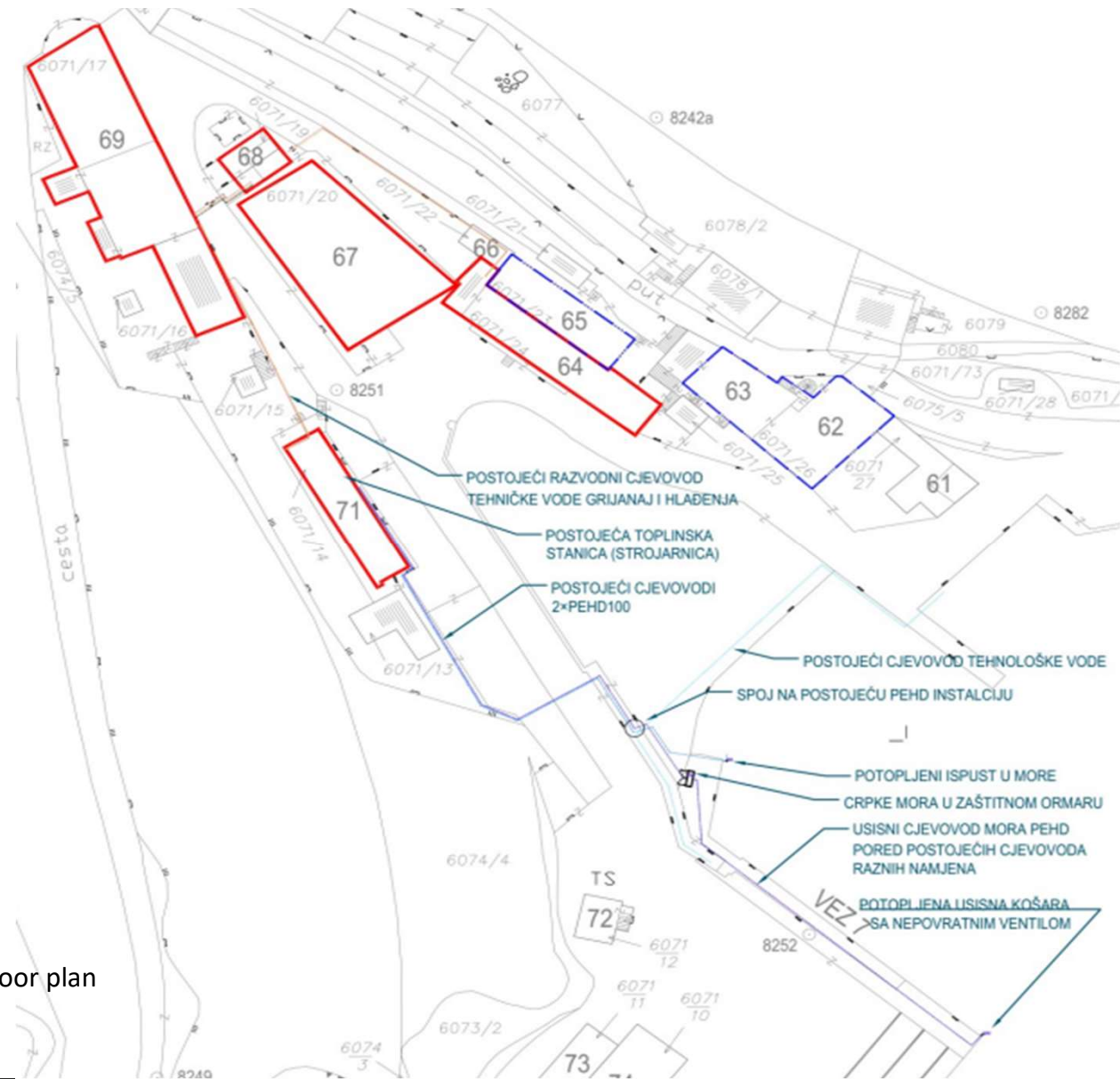
# Seawater Heat Pump

## ENERGY PRODUCTION FROM THE SEA

### Goal

- Increasing the scope of use of renewable thermal energy sources
- Reduction of heating costs (electricity)
- Cooling energy use in buildings

Seawater heat pump systems installation floor plan



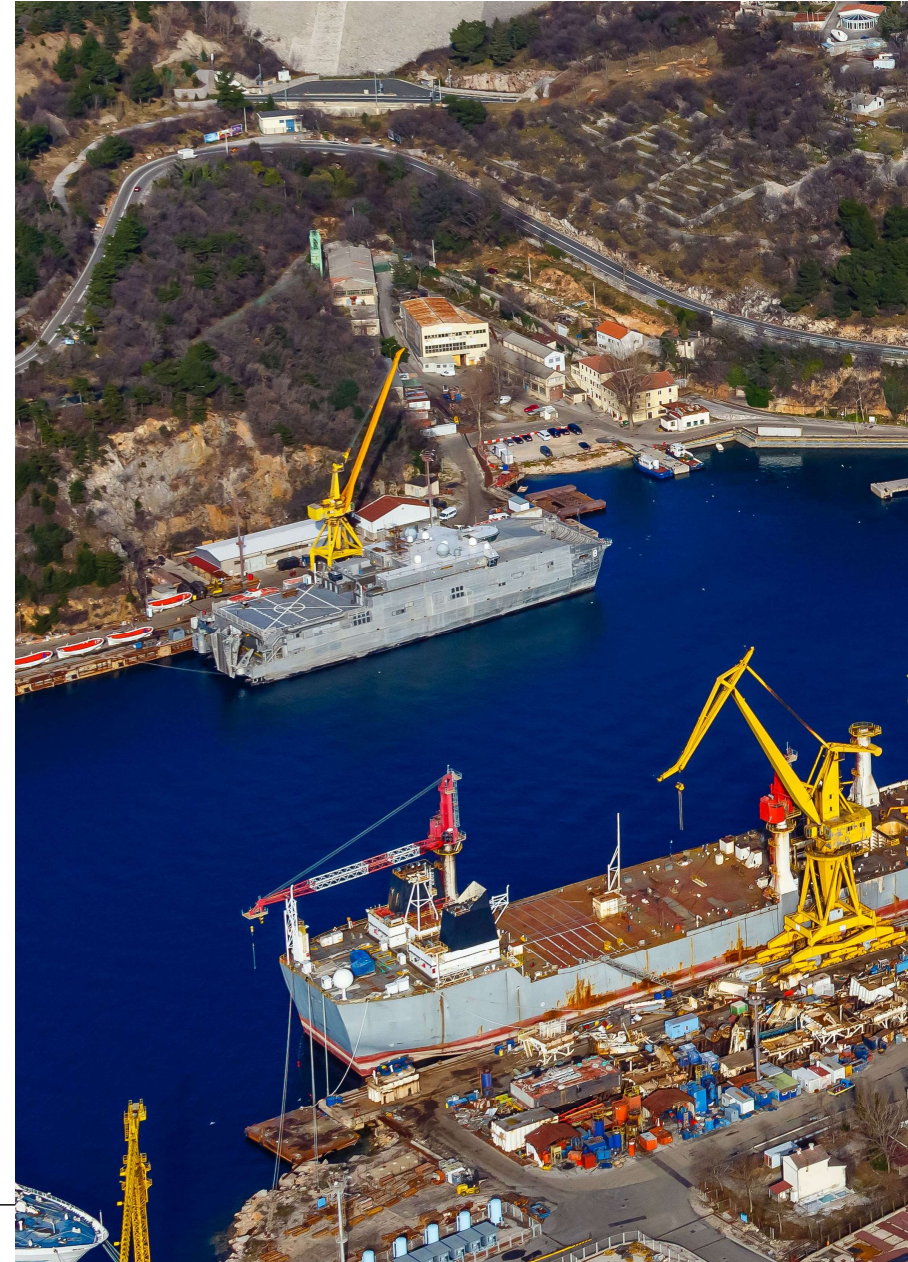
# Seawater Heat Pump Systems



# Project preparation

## Seawater Heat Pump Systems

- **Goal** → Increasing efficiency of the TOST 2 thermal station engine room heating system in the Stara Martinscica zone by using renewable sources of electricity
- December, 2021 → → **Applying for a grant** pursuant to the public tender launched by the Ministry of Regional Development and EU Funds under the Energy and Climate Change Program - Energy production from the sea
- Seawater Heat Pump Systems Project is funded by Iceland, Liechtenstein and Norway through the European Economic Area (EEA) Financial Mechanism 2014-2021, under the Energy and Climate Change Program, co-financed by national funding



# Grant Agreement

- ✓ Concluded in May, 2022
- ✓ Programme Operator: Ministry of Regional Development and EU Funds
- ✓ **Project Implementation Period:** 1 June 2022 – 31 March 2024
- ✓ **Total Project Amount:** EUR 480,312.54
- ✓ **Grant:** EUR 232,583.52



Electricity consumption will decrease by

**155.872** kWh/year



Emission reduction CO<sub>2</sub> by

**36.600** kg/year







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# Thank you for your attention!

**Brodogradilište Viktor Lenac d.d.**

**[www.lenac.hr](http://www.lenac.hr)**

Project Consultant: SENSUM d.o.o.

Donor Programme Partners

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**Iceland, Liechtenstein and Norway**

**Working together for a Green, Competitive and  
Inclusive Europe**