



# SmartMEDParks

ENERGY EFFICIENCY | RENEWABLE ENERGIES



## Poboljšanje energetske učinkovitosti u znanstveno-tehnološkim parkovima upotrebom inteligentnih modela i pristupa

6. Zagrebački energetska tjedan

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Projet cofinancé par le Fonds Européen de Développement Régional (FEDER)

Project cofinanced by the European Regional Development Fund (ERDF)

# O projektu

- MED Program
- Energetska učinkovitost u znanstveno-tehnološkim parkovima (ZTP)
- Model samodostatne proizvodnje i potrošnje energije  $\longleftrightarrow$  Smart Grid  
 $\longrightarrow$  konkurentnost i održivost u ZTP-ovima MED regije
- Projektni partneri:
  - Andalusian Institute of Technology – Španjolska
  - Regional Energy and Environment Agency from North Alentejo – Portugal
  - CSTB – Building scientific and technical centre – Francuska
  - Energy and Sustainable Development Agency of Modena – Italija
  - Energy Institute Hrvoje Požar – Hrvatska
  - Fondation Sophia Antipolis – Francuska
  - Local Energy Agency – LEA Spodnje Podravje – Slovenija
  - Province of Massa-Carrara – Italija
  - Technology Park of Andalusia – Španjolska

# Zašto Smart MED Parks?

## ZTP-ovi:

- U Europi preko 70
- IT, R&D, high-tech tvrtke
- Značajna potrošnja energije



## Visok stupanj energetske samodostatnosti:

- Localna proizvodnja zelene energije
- Smanjenje energetske gubitaka
- Smanjenje potrošnje energije
- Upotreba obnovljive i otpadne energije
- Smart Grid



Konkurentnost  
ZTP-ova



Europski ciljevi

# Rezultati Smart MED Parks projekta

- Energetski pregled zgrada, ind. postrojenja i infrastrukture u ZTP-ovima
- Katalog tehnologija za opskrbu energijom i upravljanjem sustavima
- SMP software
- Definiranje potrebnih tehnologija → samodostatnost i integracija različitih energetskih mreža
- Implementacija novog Energy Management modela → smanjenje energetskih potreba i potrošnje

# ZTP-ovi u Hrvatskoj

- Razvojna agencija Zagreb (RAZA) – Zagreb
- Znanstveno-tehnološki park Sveučilišta u Rijeci– Rijeka
- Tehnološki park Varaždin d.o.o. – Varaždin
- Poduzetnički inkubator BIOS d.o.o. – Osijek
- Tehnološko-inovacijski centar Međimurje d.o.o. – Čakovec
- Energetski pregledi i izvješća



# SMP software

- Kvantifikacija energetske potrebe u ZTP-ovima
- Predlaganje mehanizama za poboljšanje EE
- Vrednovanje EE mjera
- User friendly
- Opće preporuke i potencijalna rješenja
- Slobodno preuzimanje software na:

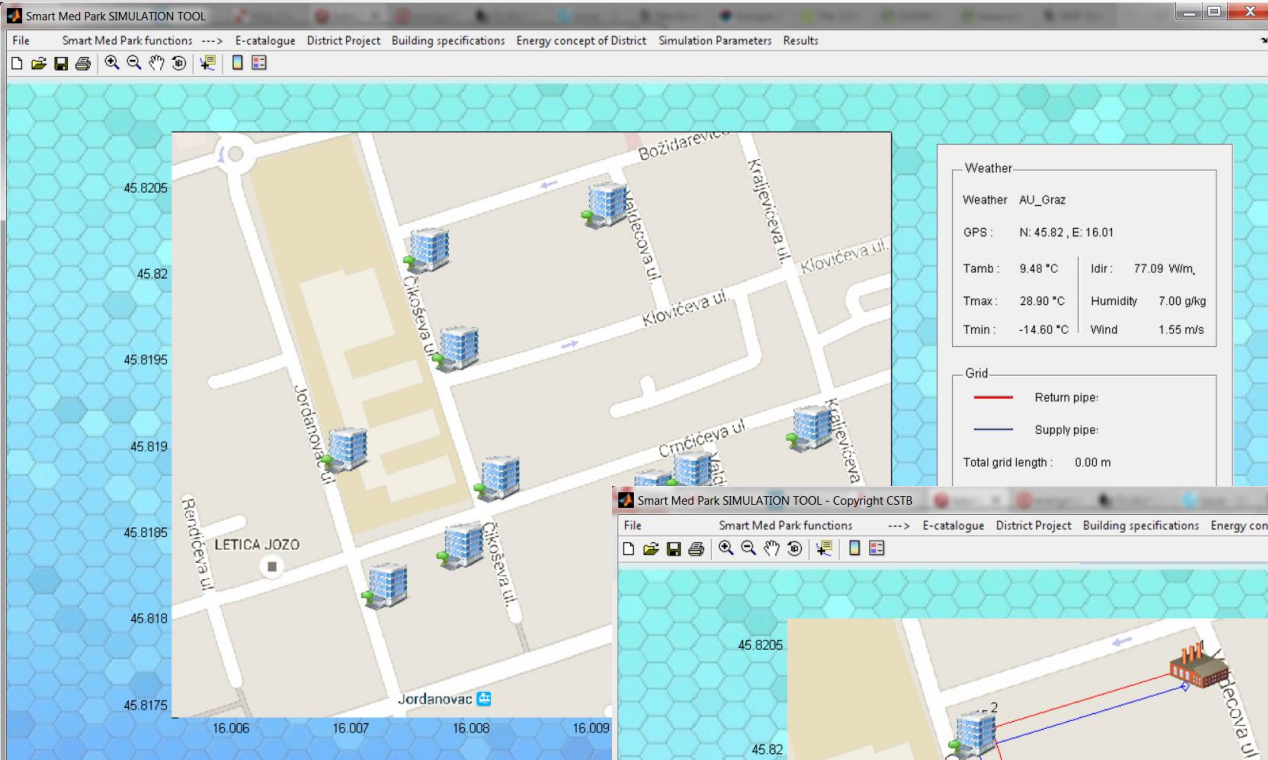
<http://www.smartmedparks.eu/hr/smart-med-parks-software-tool>



# SMP software

Smart Med Park SIMULATION TOOL

File Smart Med Park functions ---> E-catalogue District Project Building specifications Energy concept of District Simulation Parameters Results



Weather

Weather AU\_Graz

GPS : N: 45.82 , E: 16.01

Tamb : 9.48 °C Idir : 77.09 W/m<sub>2</sub>

Tmax : 28.90 °C Humidity : 7.00 g/kg

Tmin : -14.60 °C Wind : 1.55 m/s

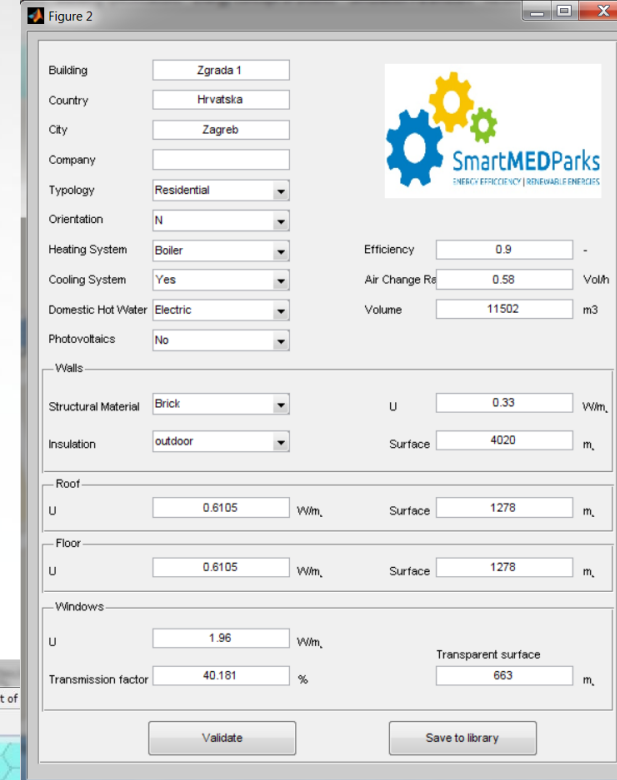
Grid

Return pipe: —

Supply pipe: —

Total grid length : 0.00 m

Figure 2



Building Zgrada 1

Country Hrvatska

City Zagreb

Company

Typology Residential

Orientation N

Heating System Boiler

Cooling System Yes

Domestic Hot Water Electric

Photovoltaics No

Efficiency 0.9

Air Change Rate 0.58 Vol/h

Volume 11502 m<sup>3</sup>

Walls

Structural Material Brick U 0.33 W/m<sup>2</sup>K

Insulation outdoor Surface 4020 m<sup>2</sup>

Roof

U 0.6105 W/m<sup>2</sup>K Surface 1278 m<sup>2</sup>

Floor

U 0.6105 W/m<sup>2</sup>K Surface 1278 m<sup>2</sup>

Windows

U 1.96 W/m<sup>2</sup>K

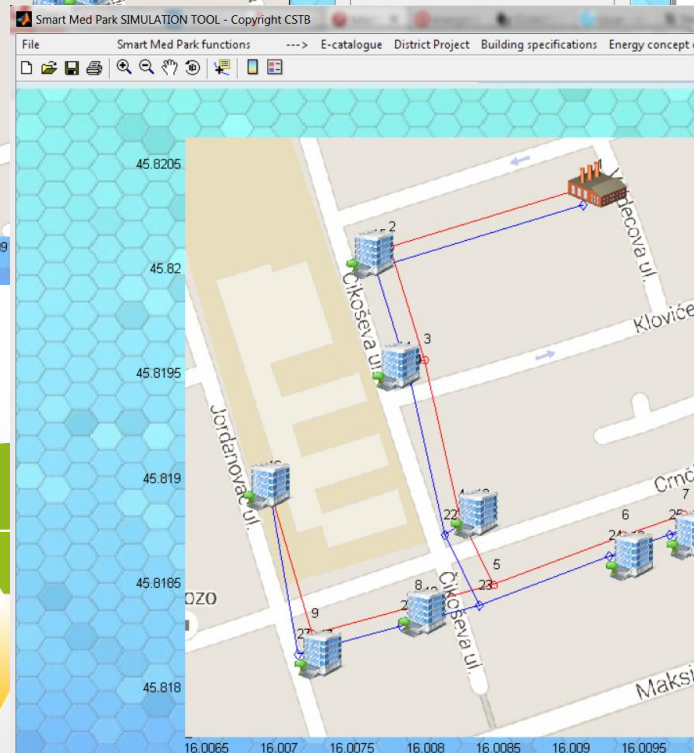
Transmission factor 40.181 %

Transparent surface 663 m<sup>2</sup>

Validate Save to library

Smart Med Park SIMULATION TOOL - Copyright CSTB

File Smart Med Park functions ---> E-catalogue District Project Building specifications Energy concept of District Simulation Parameters Results



Weather

Weather AU\_Graz

GPS : N: 45.82 , E: 16.01

Tamb : 9.48 °C Idir : 77.09 W/m<sup>2</sup>

Tmax : 28.90 °C Humidity : 7.00 g/kg

Tmin : -14.60 °C Wind : 1.55 m/s

Grid

Return pipe: —

Supply pipe: —

Total grid length : 1899.14 m

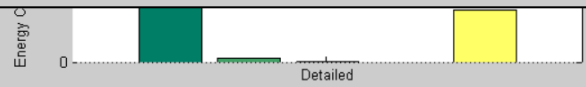
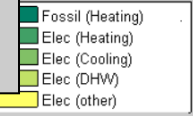
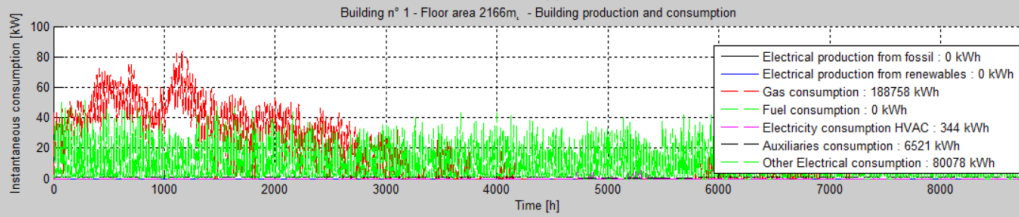
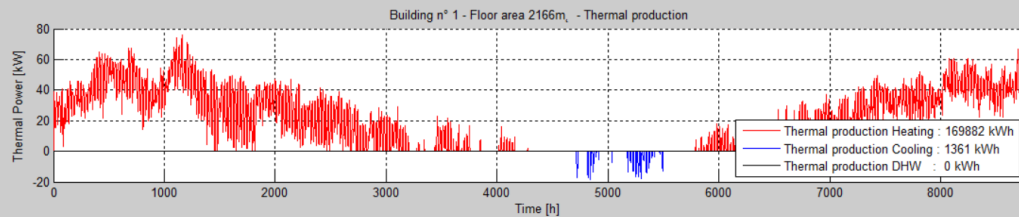
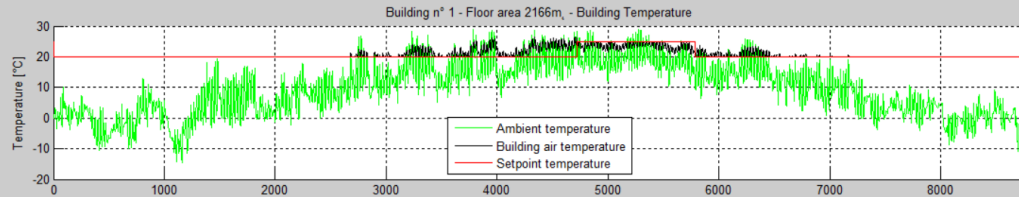
Number of pipes 36

Number of nodes 27

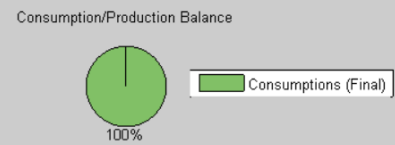
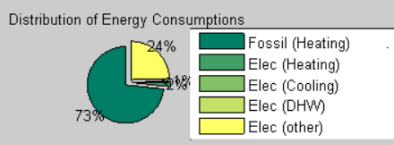
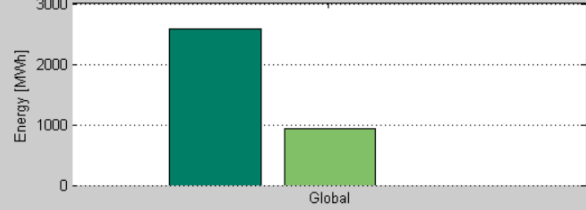
Number of 9

Run Simulation

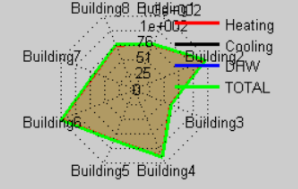
# SMP software



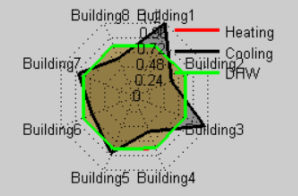
Annual Consumptions - Fossil : 2566 MWh, Elec : 935 MWh ; Annual Elec Production : 0 MWh



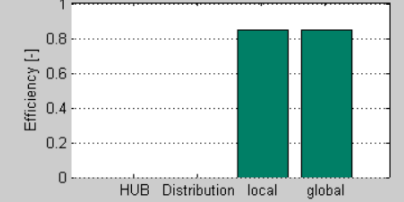
## Building Thermal Loads [kWh/m<sup>2</sup>]



## Local Efficiencies



## District Efficiencies





# eKatalog tehnologija

- Pregled i opći opis na tržištu dostupnih tehnologija

The screenshot shows a user interface for an e-catalog. At the top, there are navigation icons (home, user, list, star) and a page indicator '2-3/66'. The main content area features a 3D isometric illustration of a city with various buildings, including a tall skyscraper, a modern office building, a residential block, and a cylindrical storage tank. To the left of the city model is a vertical list of circular icons, each representing a different technology: Distributed energy generation source (industrial pipes), Energy distribution network (power lines), Local energy generation systems (solar panels), Cooling (industrial cooling tower), Heating and DHW (boiler), Storage (battery packs), Support infrastructure (streetlights), and Control and management systems (control panels). To the right of the city model is a vertical list of colored boxes, each representing a technology category: Distributed energy generation source (yellow), Energy distribution network (yellow), Local energy generation systems (green), Cooling (green), Heating and DHW (green), Storage (green), Support infrastructure (yellow), and Control and management systems (green).

Coordinating Partner: Partners:



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# eKatalog tehnologija

- Dostupan detaljniji opis svake tehnologije
- Preuzimanje eKataloga na: <http://www.smartmedparks.eu/hr/node/113>

The screenshot shows a detailed page for 'Microturbine' technology. It includes a navigation bar at the top with icons for home, user, menu, and star, and a page indicator '6-7/66'. The main content is organized into several sections:

- Microturbine**: A title section with a description of the technology and concept, stating that microturbines are a type of internal combustion engine designed for small-scale power generation.
- Description of the technology & concept**: A detailed text block explaining the advantages of microturbines, such as compact size, high efficiency, and lower emissions.
- Fields of application**: A section listing three main applications: CHP (Combined Heat and Power), CCHP (Combined Cooling, Heat and Power), and SP (Secure Power).
- Energy performances**: A section with two line graphs. The first graph shows 'Efficiency (%)' vs 'Ambient Temperature (°C)', and the second graph shows 'Efficiency (%)' vs 'Recuperator Effectiveness (percent)'. Both graphs compare 'From 100% (ICE) Output' and 'Efficiency (%) CHP'.
- Success Stories**: A text block detailing the experience of CEM Ambiente SpA in Milan, which switched to microturbines to power its headquarters.
- SWOT analysis**: A central section with four colored boxes:
  - STRENGTHS**: Low cost energy, lowest emissions, and suitability for waste fuels.
  - WEAKNESSES**: Loss of power and efficiency at high altitudes, constant humming, and high capital costs.
  - OPPORTUNITIES**: Ability to produce electricity from local fuels, use for combined heat and power, and waste heat recovery for air conditioning.
  - THREATS**: Scarcity of gas and the impact of renewable energy technologies on the price of microturbines.
- Energy performances**: A section explaining that microturbines generate between 25kW to 1000kW and can achieve up to 85% efficiency in recuperated configurations.
- Navigation and Sidebar**: On the right, there is a vertical sidebar with buttons for 'Distributed energy generation source', 'Energy distribution network', 'Local energy generation systems', 'Cooling', 'Heating and DHW', 'Storage', 'Support infrastructure', and 'Control and management systems'. At the bottom of the page, there is a yellow button that says 'For more information, click here...'

# Zaključak

- Tvrke partneri ZTP-ova – najveći korisnici projekta
  - Smanjenje potrošnje energije
  - Smanjenje ovisnosti o vanjskim izvorima energije
  - Smanjenje energetske gubitaka
  - Povećanje konkurentnosti ZTP-ova na tržištu
- Širi benefiti:
  - STP software
  - eKatalog tehnologija



# HVALA NA PAŽNJI



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