



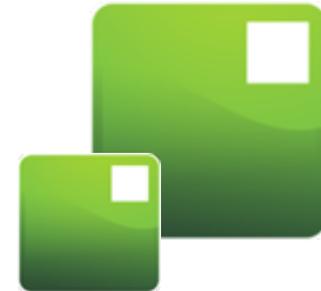
EMIS

Energy Management Information System

Content



1. How EMIS came to be – Legislative framework
2. EMIS
 1. In numbers
 2. Users
 3. Data we collect
 4. Functionalities
3. Results so far
4. What is next



Legislative framework



- 2005.-2013. **UNDP** – United Nations Development Programme „Removing barriers to energy efficiency in Croatia” (EE Project)
- **Goal** of the project was to build capacities for the implementation of systematic and continuous energy management in all Public Sector buildings in Croatia through development of human, organizational and procedural resources needed for energy management, their education and equipping them with necessary tools for a systematic approach to energy management.
- **EMIS** – first version of application became available to users in December 2008.



Legislative framework



- Continuation of the activities of the national components of the project was taken over by the national institutions – Croatian Government Real Estate Agency (APN) and the Environmental Protection and Energy Efficiency Fund (FZOEU)
- **Energy efficiency Act in 2014.** – implementation of Energy Performance of Buildings Directive and Energy Efficiency Directive
 - monitoring of energy and water consumption became mandatory for all buildings owned or used by Public Sector (all central and local government) - tool for that is EMIS
 - Appointed Person and Energy Efficiency team on institutional level
 - it became mandatory for energy and water vendors to send data on energy and water consumption of Public Sector buildings into EMIS system

EMIS



- Web-based software – requires username and password to access (www.isge.hr)
- Main tool for continuous data gathering, monitoring and analysis of energy and water consumption in buildings
- All data on energy and water consumption gathered in one centralized data base – easy access
- Allows easy analysis and interpretation of energy and water consumption from one centralized place
- Enables easier understanding of how and where we consume energy and water in a building, the comparison of individual buildings with other similar buildings, as well as identifying unwanted, excessive and irrational energy and water usage



EMIS – In numbers



- ECC – Energy Consumption Center (over 45 500 in total)
 - Over 21 000 buildings
 - Over 24 000 public lighting
- Over 14 million energy and water bills
- Around 87 million readings from metering points
- Over 7 100 users in total
 - EMIS interfaces with different functionalities: Guest, Energy Manager, User, Energy Administrator, System Administrator
 - EMIS users are educated by us (APN)
- Around 370 000 €/year for all activities of the department
 - installation of smart metering systems
 - energy studies
 - educations & promotions
 - promotional material (leaflets, guides, booklets, ...)
 - EMIS - maintenance, support, adaptations, development of new functionalities (around 100 000 €/year)

EMIS – Data

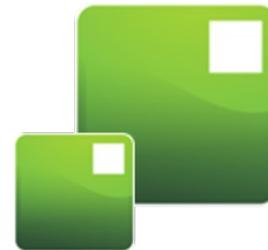


- Energy data:
 - energy and water vendor bills (monthly based consumption):
 - manually entered bills by EMIS users
 - remote bills – EMIS is connected to different vendor billing data bases
 - energy and water consumption from meter readings
 - manual readings by EMIS users (2/week, 1/week, ...)
 - remote/smart readings (hourly based) – EMIS is connected to automatic reading systems installed on metering points
 - sensor readings (interior temperature, CO₂, interior humidity, VOC)
- ECC's static data:
 - general (year of construction, area, etc.)
 - energy systems (heating, cooling, air-conditioning and ventilation systems, water supply system)
 - construction (orientation and structure of external walls, type of glazing, etc.)
 - energy certificates and audits module (energy efficiency measures)

EMIS – Data



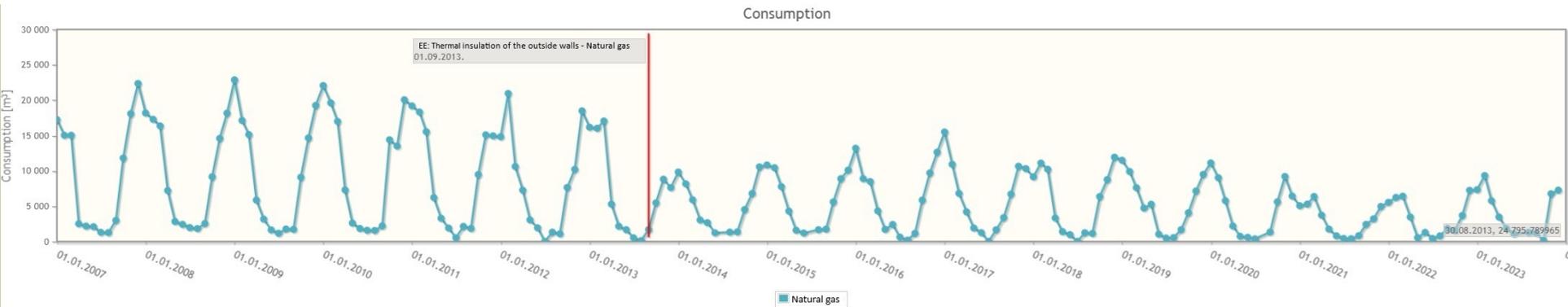
- Data on ECC's Institutional user:
 - which public institution uses which building
 - ECC type (Office, Elementary school, Hospital, etc.)
 - geographical data (county and city where ECC is located)
- This additional information about ECC makes it easier to generate targeted reports – introduces flexibility and scalability into reporting
- EMIS allows data export in other formats (.xlsx, .pdf, .csv)
- Huge amount and variety of data collected in EMIS makes it great tool for analyzing and planning future energy efficiency measures, for creating plans and strategies on local, regional and national level.



EMIS – Functionalities

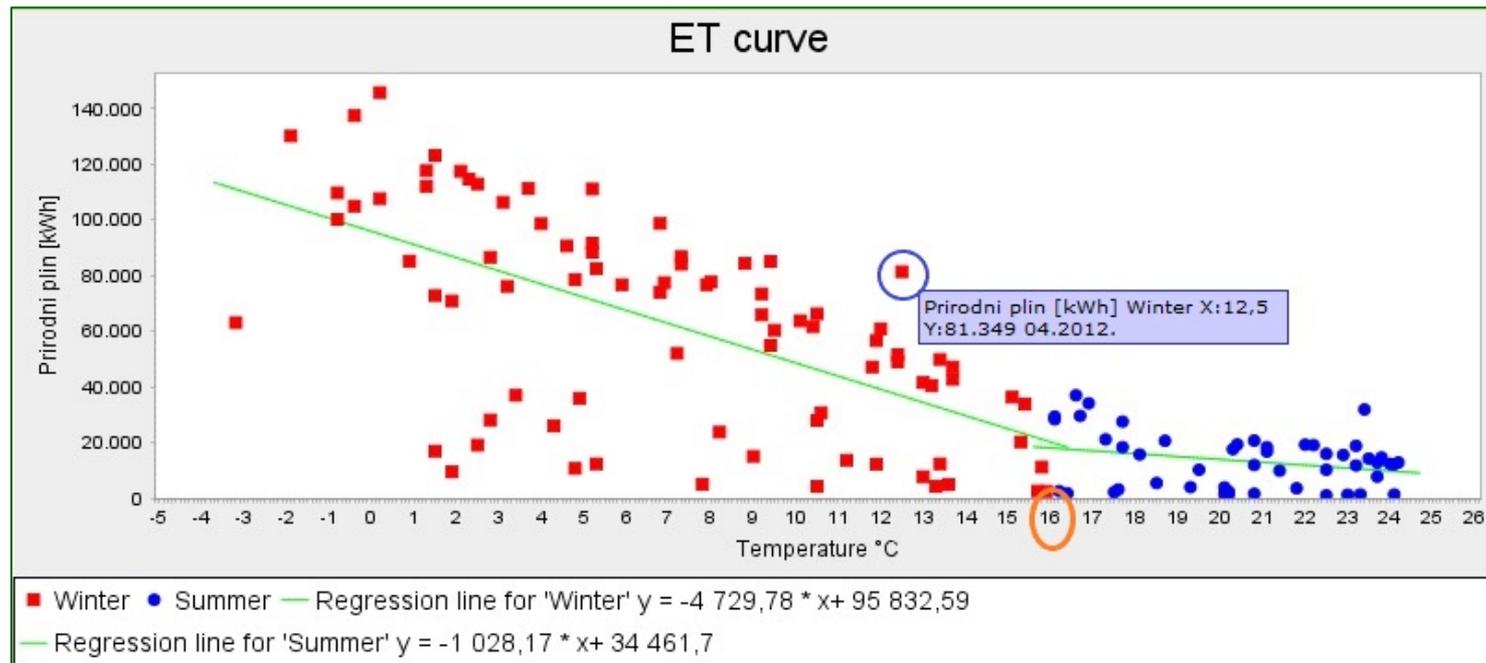


- Charts of the consumption
- EMIS has option to insert energy measures that were implemented
- Overview of the consumption of natural gas after an energy measure was implemented
 - outside walls were insulated in September of 2013.
 - decrease in natural gas consumption



EMIS – Functionalities

- E-T curve shows correlation between energy consumption and:
 - outdoor temperature
 - degree-day heating*
- If the dots are closer grouped around regression curve, energy management is better
- Croatian Meteorological and Hydrological Service sends data to EMIS

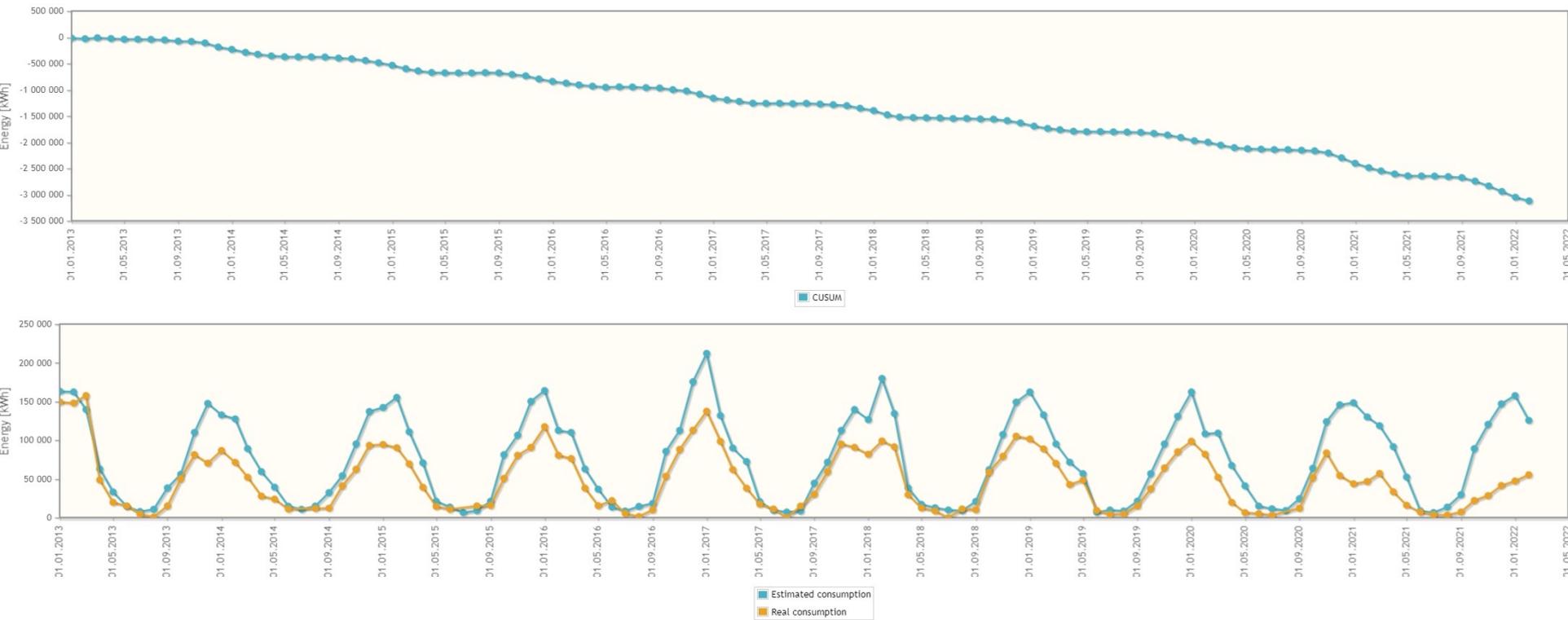


- *Degree-day is a measure of heating or cooling. It represents sum of temperature differences between the indoor air temperature (by convention 20 °C) and the mean daily outdoor temperature. Only days with outdoor temperature lower than 12 °C enter calculation.

EMIS – Functionalities



- CUSUM Analysis shows the total savings achieved by certain energy efficiency improvement measure
- If graph drops toward negative values, then savings are achieved



Results so far



- Yearly up to 5% reduction in energy in water consumption achieved by using EMIS (monitoring) – this does not include period from 2020. - 2022. because of COVID-19 and work from home
- We have covered all Public Sector institutions in EMIS (16 Ministries, 21 Counties, 128 Cities, 428 Municipalities)
- EMIS has been transferred to Bosnia and Herzegovina, Serbia, Malaysia, Hungary, Russia and Turkey
- Indispensable tool for planning strategies on national and local level (e.g., SECAP)



What we plan to do next



- Connect EMIS with SMIV (System for measuring and verification of energy savings)
- Connect EMIS with Energy certificates database
- Increase energy efficiency in neglected areas such as public lighting
- Develop methodology for measuring the reduction of energy consumption in buildings after energy renovation and verifying additional savings through EMIS
- Develop module for monitoring fuel consumption of vehicles
- Introduce sustainable energy management into residential buildings (National Recovery and Resilience Plan)





Thank you!

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APN (Croatian Government Real-estate
Agency)