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ENERGY INFORMATION SYSTEM OF THE CITY OF ZAGREB

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Intro

- The 2020 climate and energy package (20-20-20)
- 2030 framework for climate and energy policies
  - Reducing greenhouse gas emissions by 40%
  - Increasing the share of renewable energy to at least 27%
  - Continued improvements in energy efficiency etc.
- High consumption of energy in Croatia
- We need smart and affordable solutions:
  - To get the relevant data
  - To make clever investments
- Energy efficiency in building sector of Croatia
  - First ESCO model failed
  - New financing model (FZOEU, MGIPU, JLP(R)S)

Program for energy renovation of buildings in the public sector

Main goal::

Fulfill demands of the 2012/27/EU directive EU parliament and Council

- Member states obliged to renovating 3% of buildings owned and occupied by the central governments starting from 01 January 2014 and by including energy efficiency considerations in public procurement – insofar as certain conditions are met (e.g. cost-effectiveness, economic feasibility)

- If these goals are not met, EU commission can start an official appeal procedure for agreement repudiation

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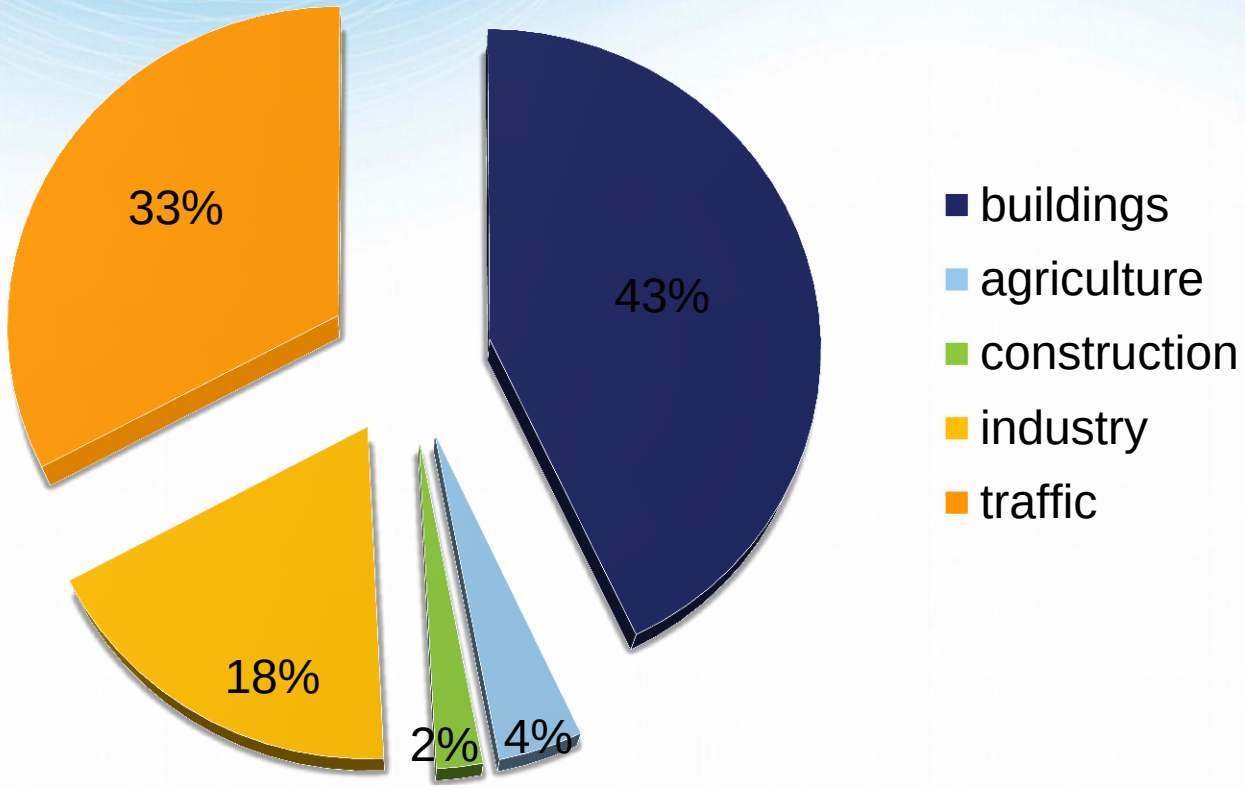
Total energy consumption in RH



Izvor: Energija u Hrvatskoj 2011, EIHP

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EIS – The City of Zagreb

- Integral solution for energy management
  - Data collection
    - Allows integration with smart technologies (smart metering, demand response, smart grids …)
    - Wide range of date sources
      - Import of supplier or distributor data
      - Manual input, scanning support (QR)
  - Analysis
    - Business intelligence reporting
    - Advanced analysis based on different criteria and correlation
    - Analysis based alarming
  - Consumption planning
  - Investments planning

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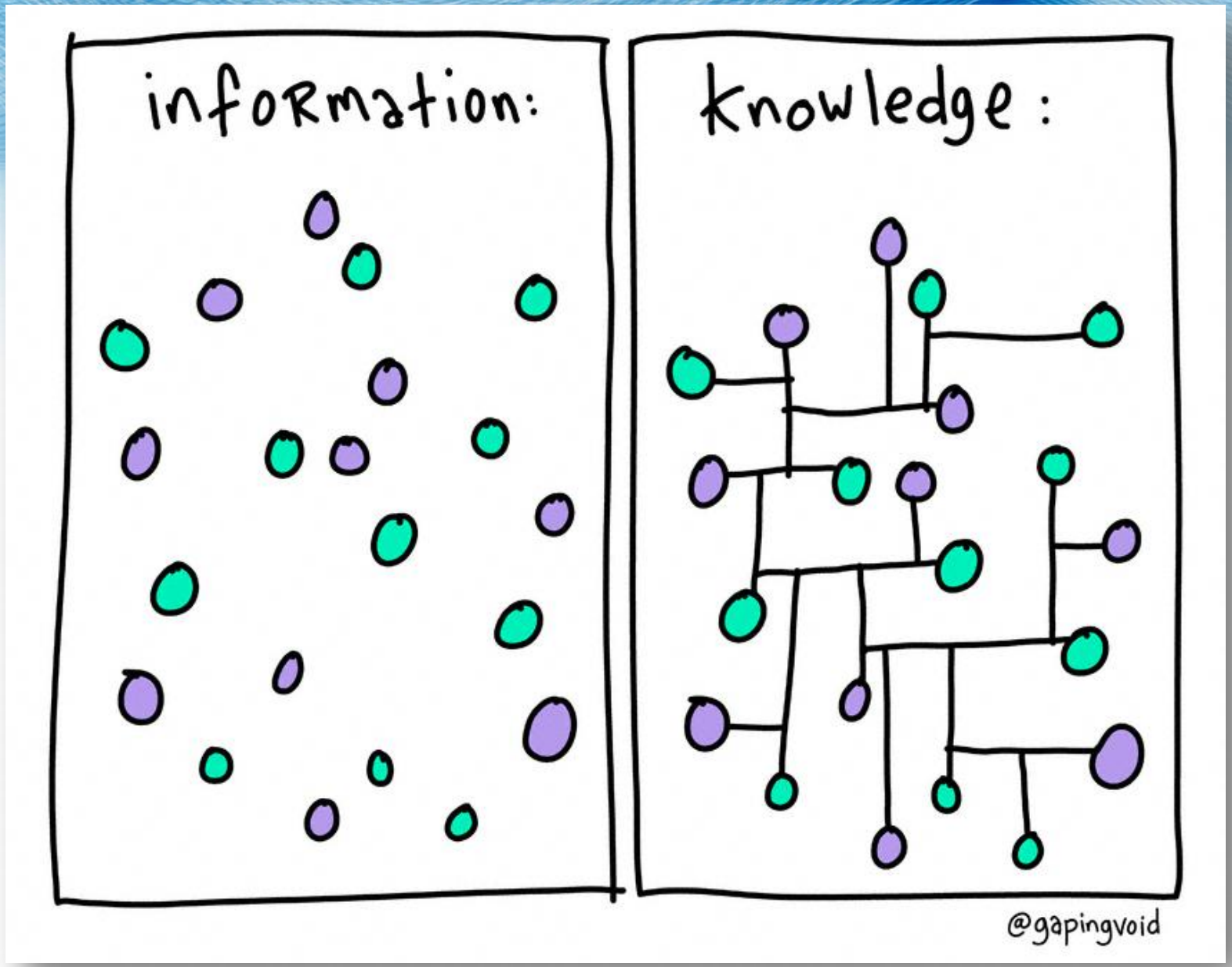

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EIS structure

Web browser HTML5

korisničko sučelje

- GUI podaci
- GUI očevidnik
- GUI pregled
- GUI praćenje
- GUI nadzor i upravljanje
- GUI planiranje

Server HTTP

podaci
- unos statičkih podataka
- unos računa
- ručni unos meteo podataka

očevidnik
- unos podataka iz certifikata
- preuzimanje podataka iz cert sw
- pregled mjera ušteda

pregled
- pregledi podataka
- periodički izvještaji
- usporedba podataka o potrošnji

praćenje
- provjera podataka
- praćenje alarma
- elektronički posteri

nadzor i upravljanje
- vizualizacija podataka
- upravljanje

planiranje
- predviđanje potrošnje
- investicijski plan

Server services

servisi
- Alarmi
- GIS konektor
- CTMU konektor

db konektor
- MS SQL

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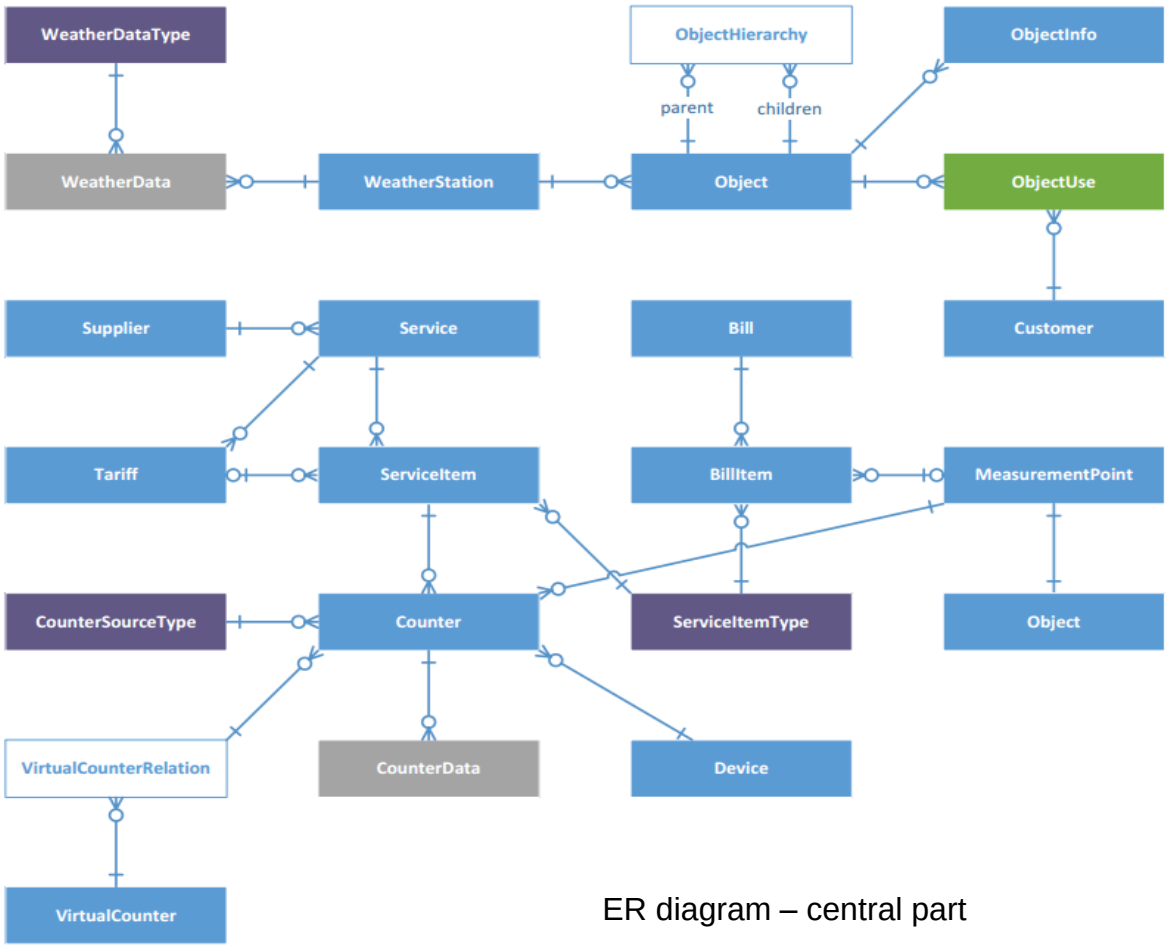
EIS data model



ER diagram – central part

- An object can have one or more users who change over time (they can use an object in different periods of the day)
- They can use one or more energy sources for different purposes
- All this changing over time and while being different for each energy source suppliers through time ...

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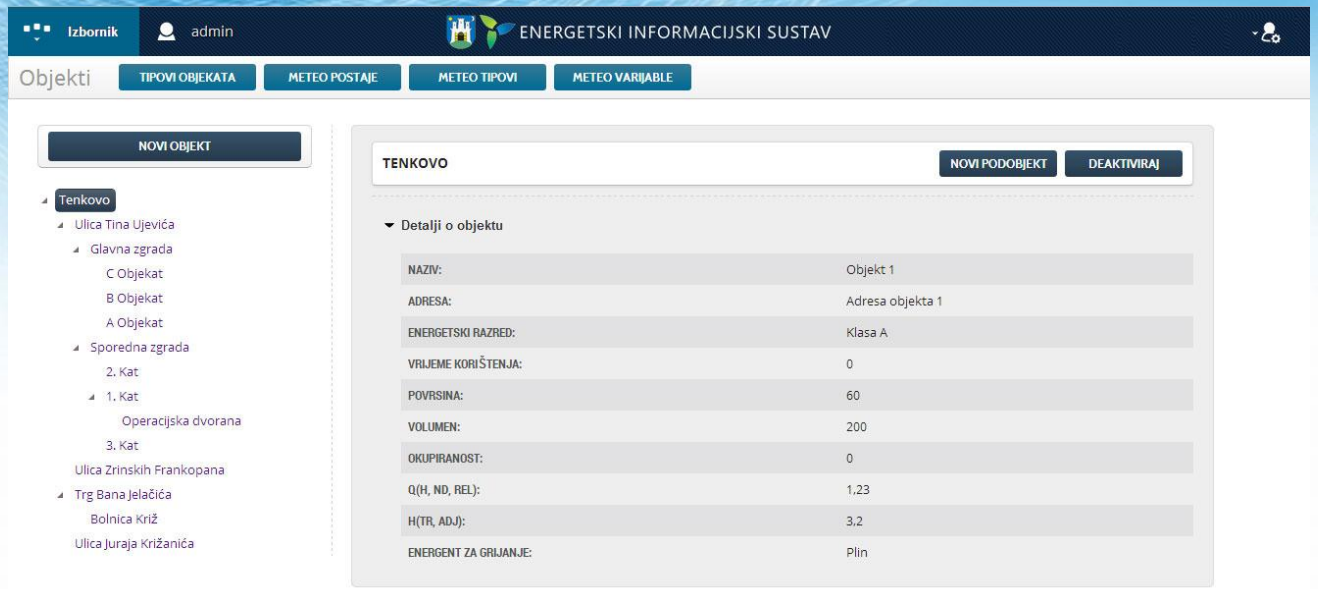
EIS functionalities



- Supports hierarchical relationships between **objects** and **subjects**
- Support relations many to many (subjects, objects, measurands)
- Supports analysis of the use of the building and all the changes **through time**

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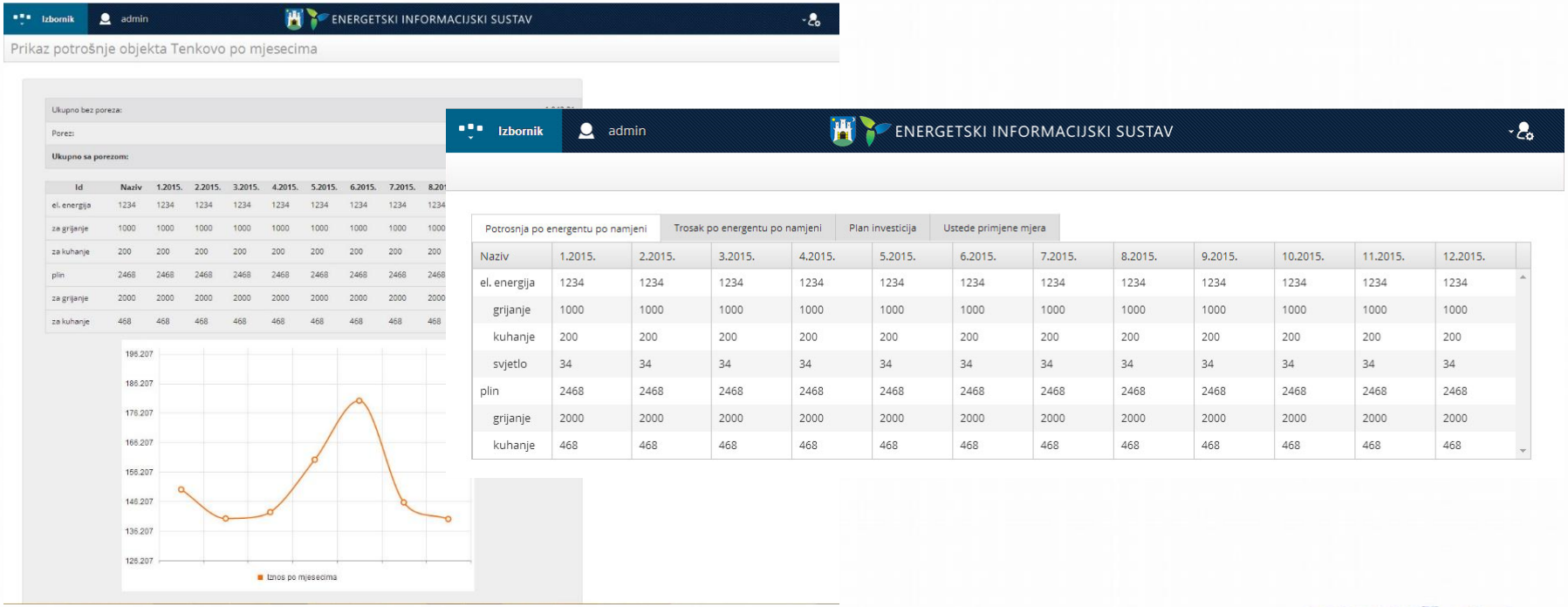
EIS functionalities

- Real-time data monitoring and historical analysis of the data **regardless of the source**
- Estimates impacts of different scenarios of energy efficiency
- Comparison of planned and actual consumption



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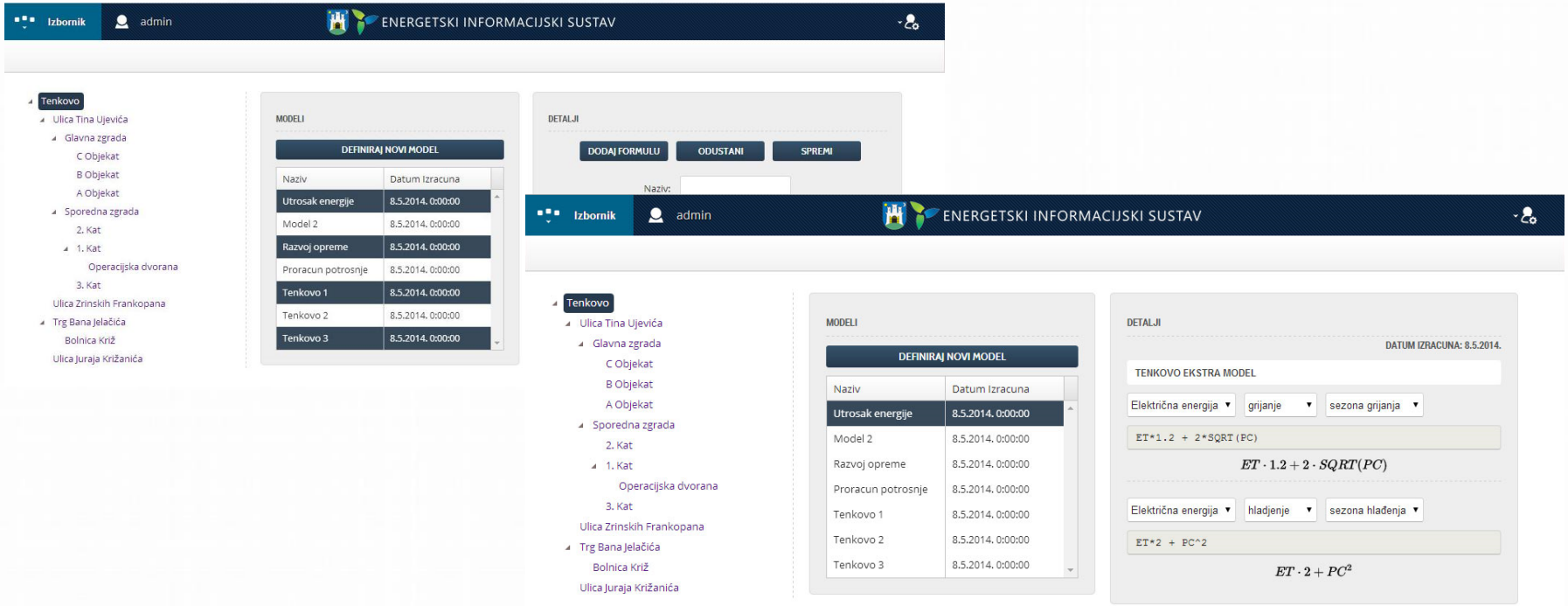
EIS functionalities

- EE measures management (from the review, the project, ...) and the combined measure
- Modeling estimates of consumption at the level of the building, period, energy ...



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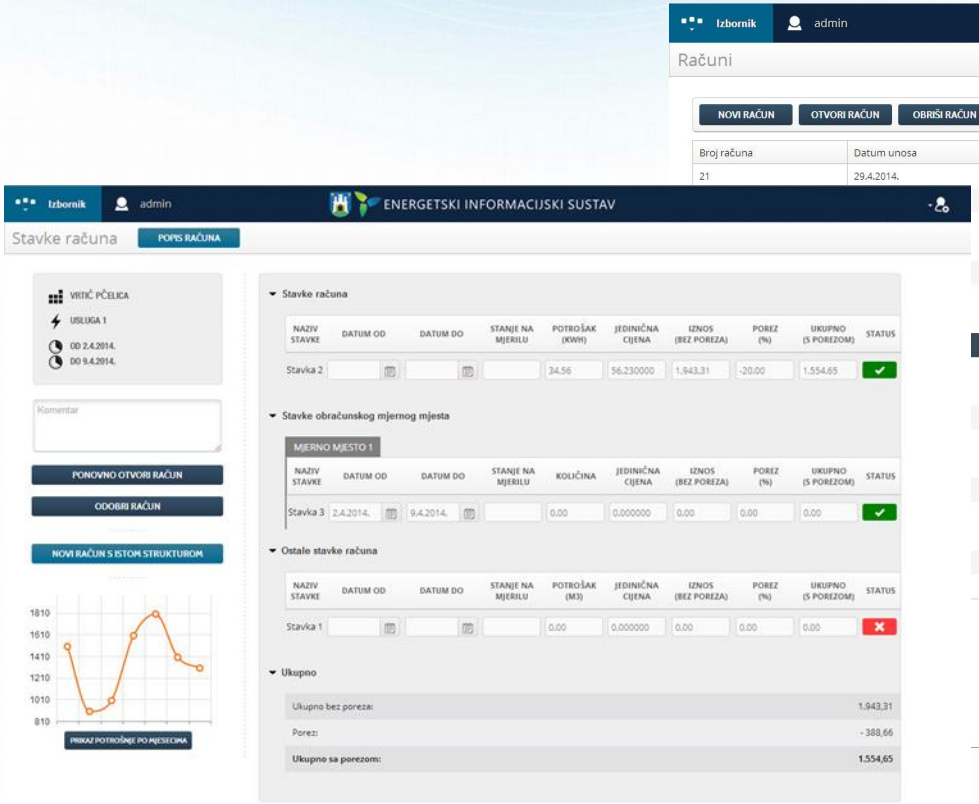
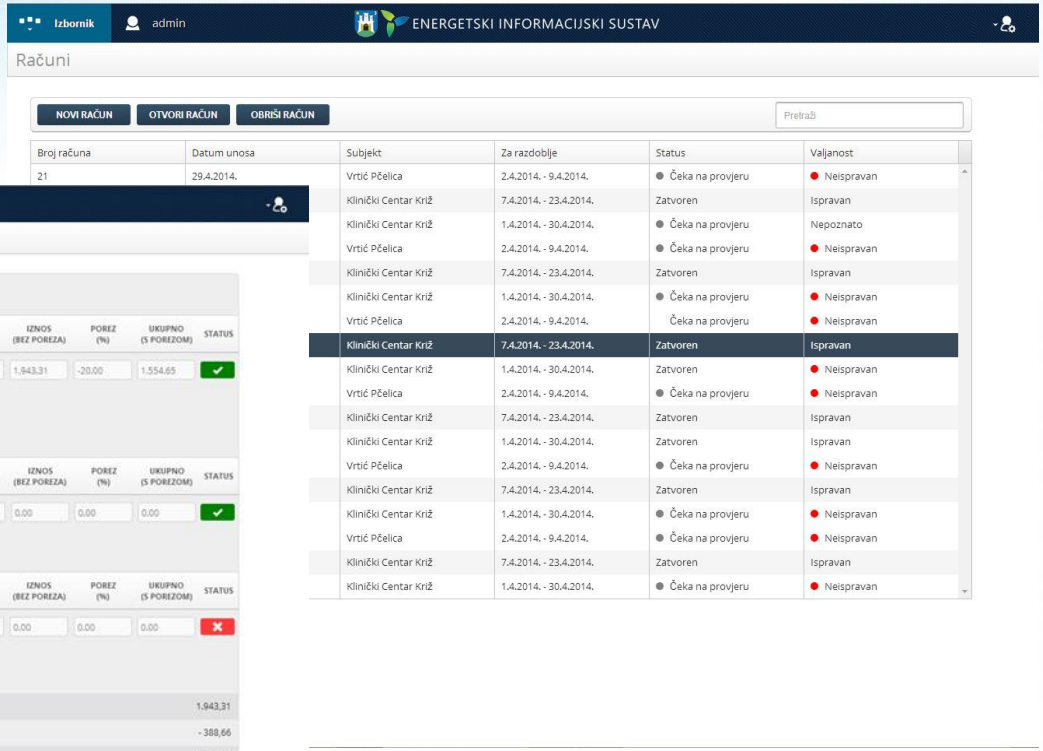
EIS functionalities

- Supports series of activities (workflows)
- Forms based receipts administration (templates)





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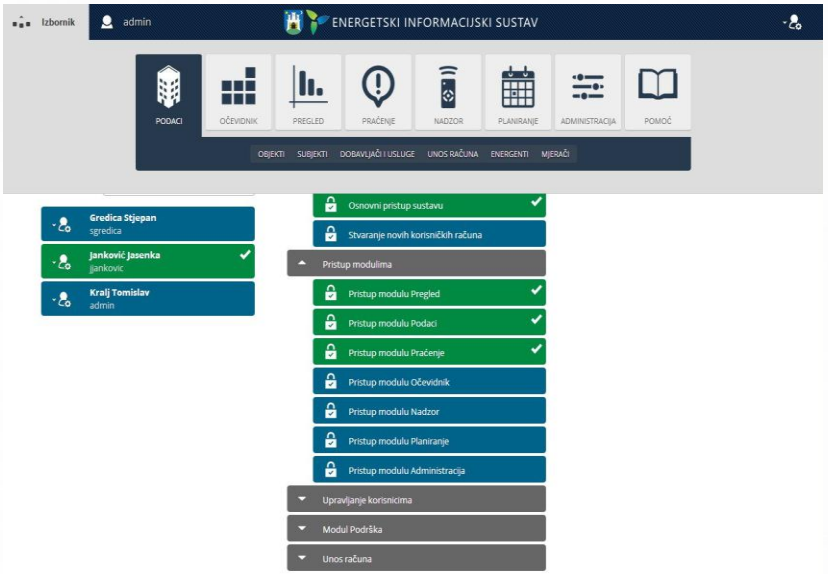
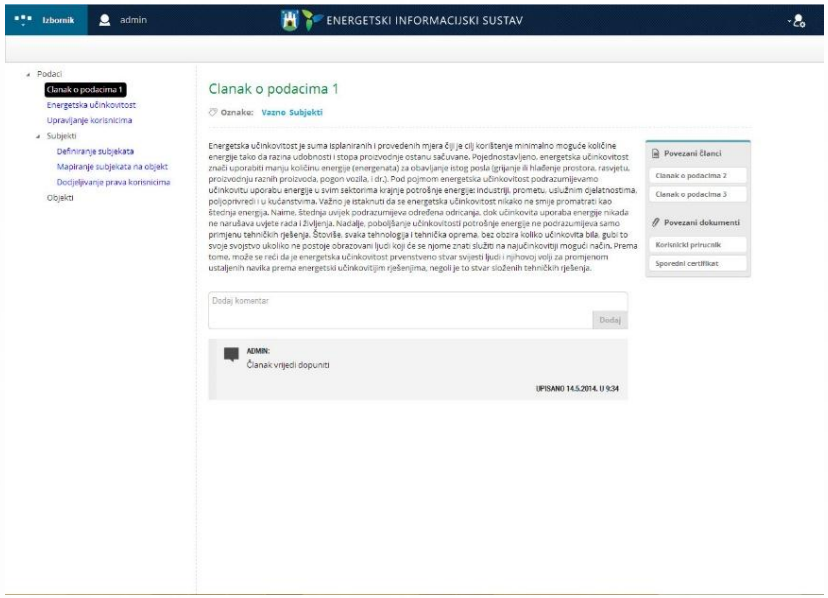
EIS functionalities

- Analysis and monitoring of user-defined elements (equipment at the facility, tags ...)
- Freedom to define indicators
- Advanced accounts management





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Example scenario

- What is the best way to invest 5 mil € in EE renewal?
  1. 25 Kindergartens
  2. 12 schools
- Analysis shows:
  - Kindergartens consumes 20 % more heat
  - Schools consume 30 % more electricity
- Modeling scenario:
  - Adding electrical equipment and public events as a parameters (lighting & time of use to object school)
  - Including temperature prediction model for next year (warmer year expected)
- **Savings will be bigger with schools renewed first!**

Conclusion

- EIS allows integrated management of energy
  - Monitoring
  - Planning
  - Investment optimization

- The flexibility of the system allows
  - analysis of the different user indicators
  - extension of the analysis to larger areas in the hierarchy (street, city district, city) depending only on the availability of the data
  - model adjustment to estimate actual future consumption
  - investment management budget to most effective way
  - support for a new generation Smart metering systems

About Končar – Electronic and Informatics Inc.

Celebrating 40 years as part of KONCAR group

Leading regional manufacturer and system integrator:

- **ICT systems** – Smart Metering, computers and servers, BI systems, electronic modules production
- **Energy sector** - excitation systems, ripple control systems, protection relays, electric measurements devices and systems, process informatics, devices and systems, DC and AC UPS, renewable energy sources
- **Transport** - converters and control systems for railway vehicles, EV chargers

- Main activities:

development, engineering and projecting, production, testing, commissioning and maintenance of ICT systems and devices

40 years of excellence 1974

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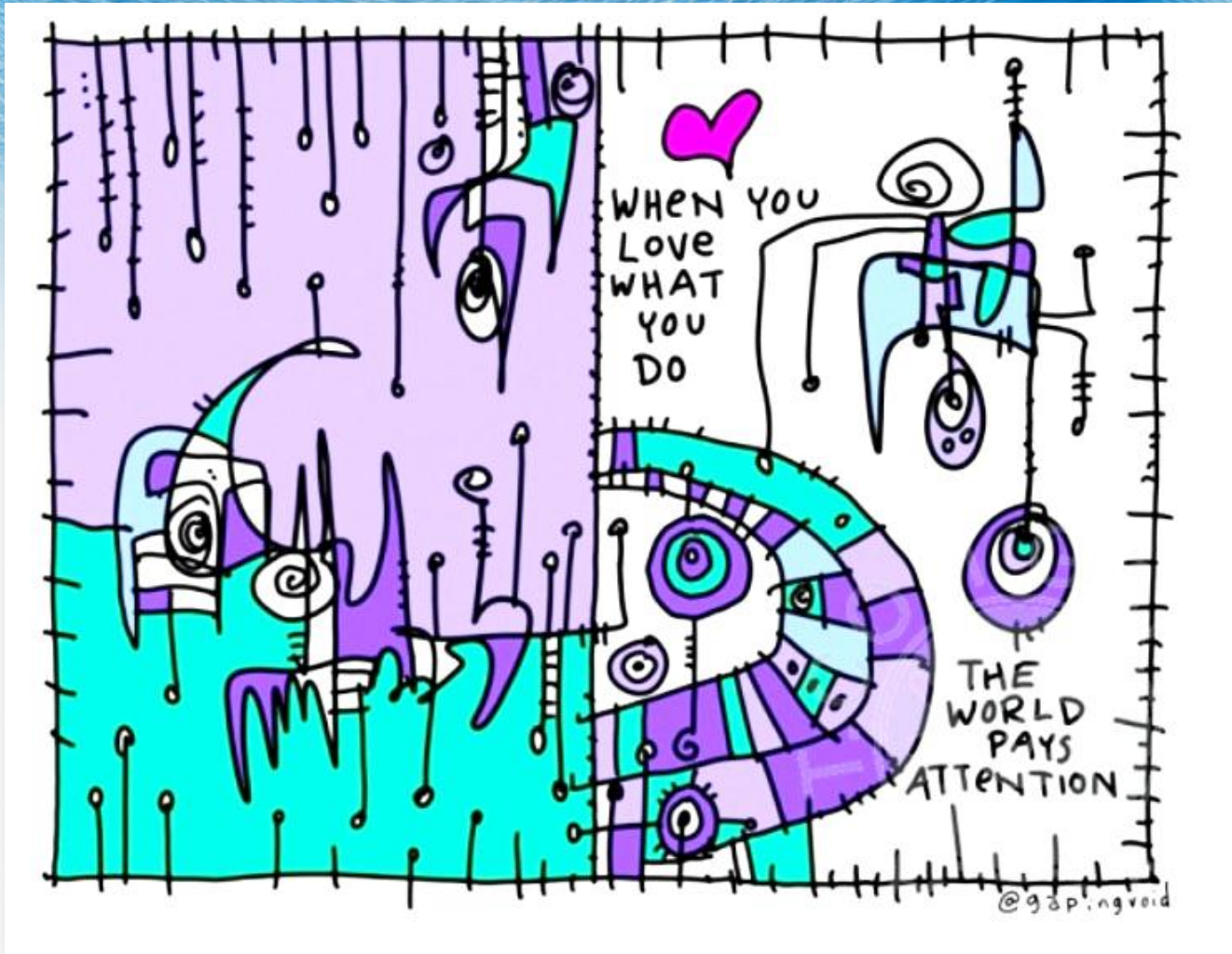

... thank you!

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