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EPIC-HUB

Energy Positive Neighbourhoods Infrastructure Middleware based on Energy-Hub Concept

June 2016, Bari, Italy

EPIC-HUB Project

- **Full name:** Energy Positive Neighbourhoods Infrastructure Middleware based on Energy-Hub Concept
- Type of **funding scheme:** FP7 (Collaborative Project (CP) – Small or medium-scale focused research project (STREP))
- **Work programme topic** addressed EEB-ICT-2011.6.5 ICT for energy-positive neighbourhoods
- **Total budget:** 6.7 MEur/Total funding 4.2 MEur
- **Project lif** 42 months from 01/10/2012 until 30/03/2016

EPIC-HUB Project

- **Project Consortium:** 11 partners
  - 6 Industry / 2 SME / 3 Research from 6 countries
  - (Italy (4), Switzerland, Serbia, Spain, Czech Republic, Israel)

EPIC-HUB Objective

Objective

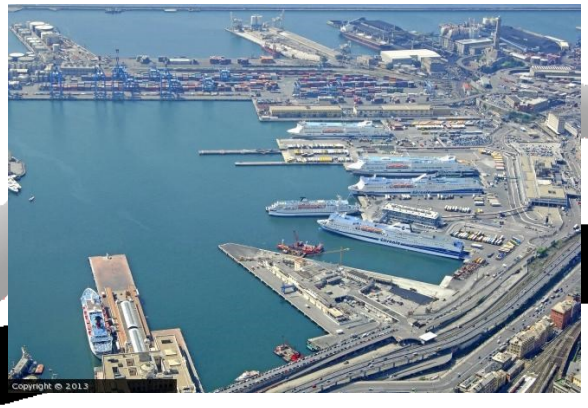
- To develop a new methodology, an extended architecture and services able to provide improved Energy Performances to Neighbourhoods (NBH).

How

- By combining powerful Energy-Hub (EH) based Energy Optimization capabilities with seamless integration of pre-existing and new ICT systems

Pilots

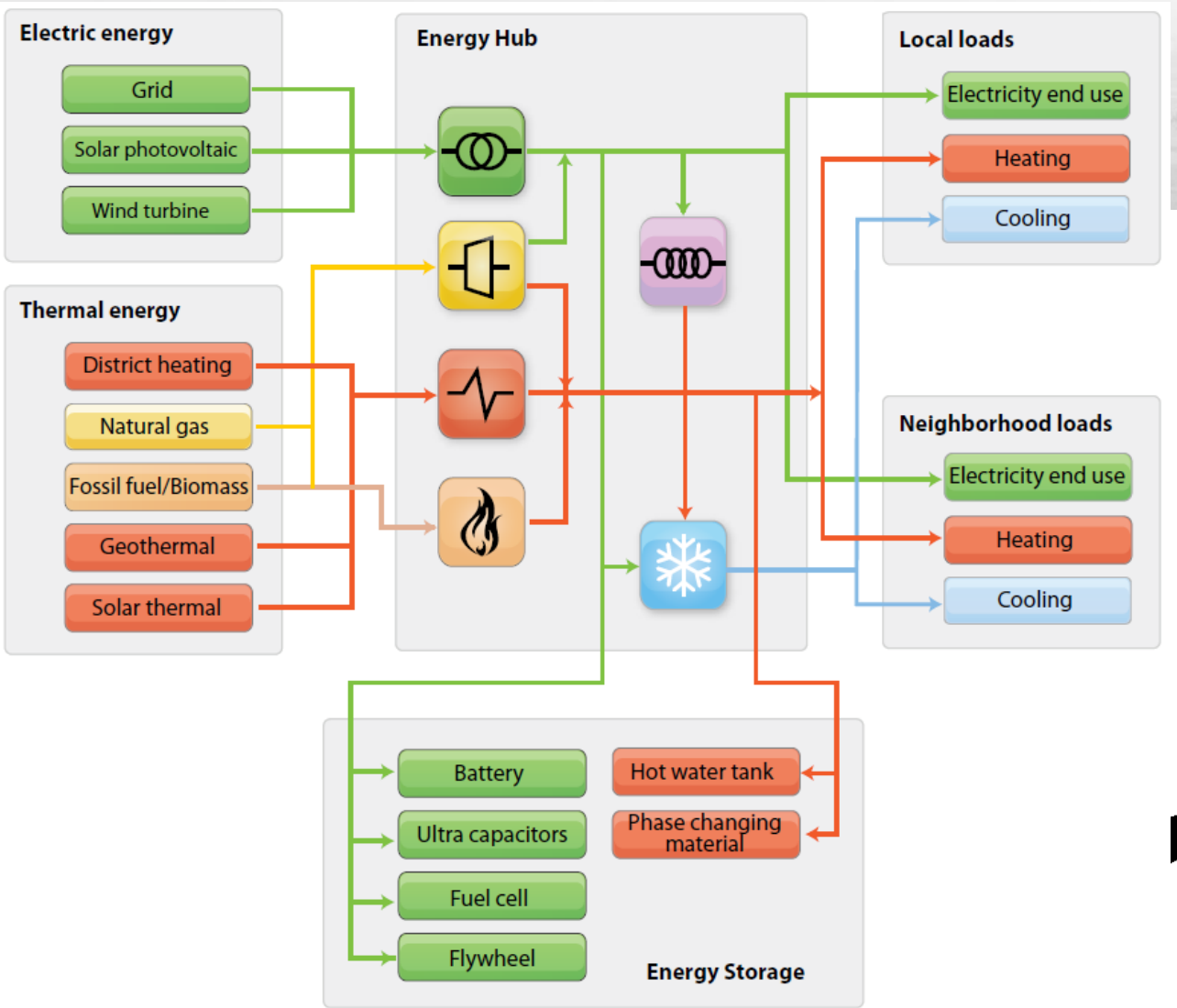
Genoa Port



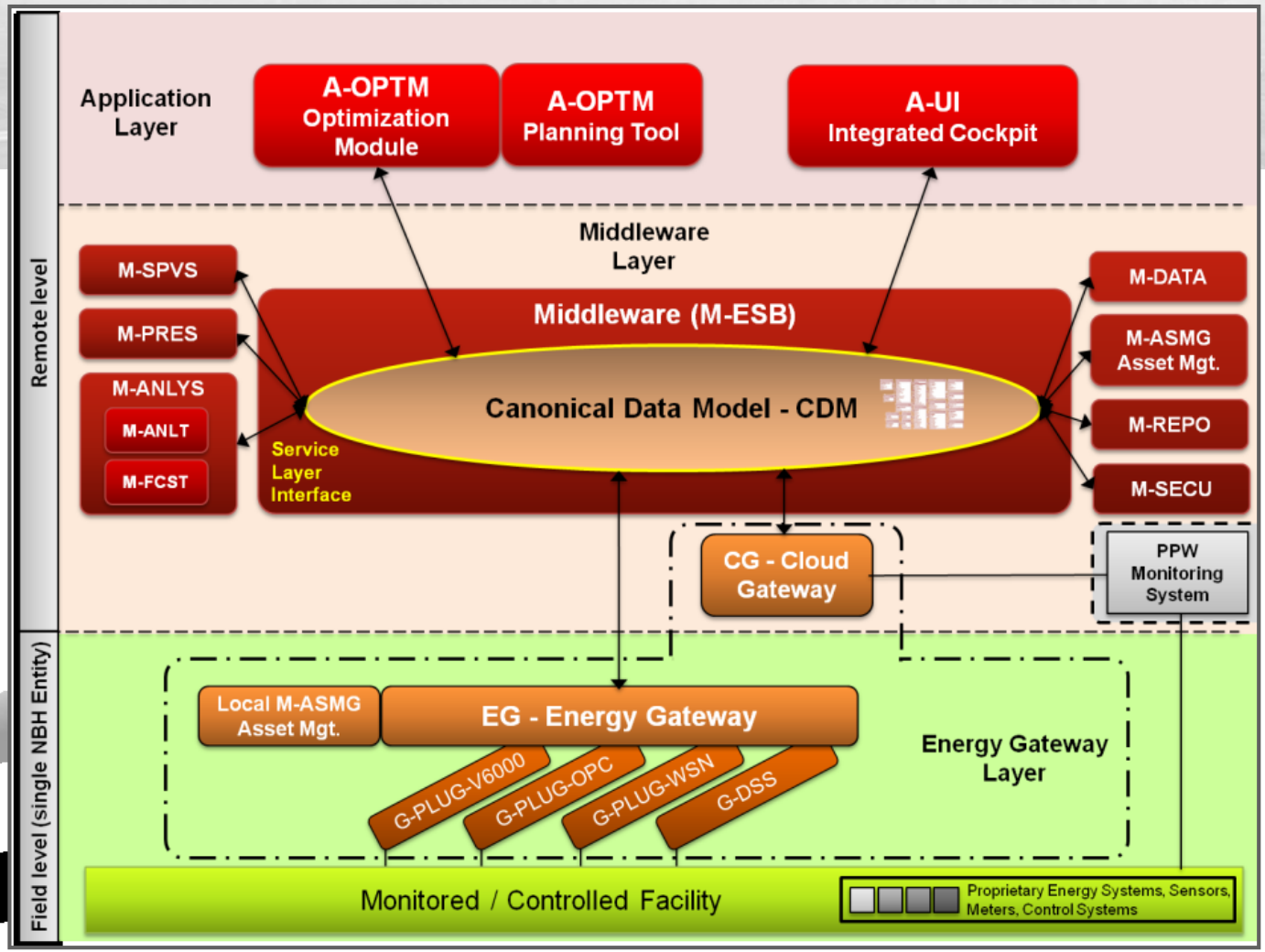
Nikola Tesla Airport

Bilbao Exhibition Centre

Energy Hub Concept



EPIC-HUB Solution



Nikola Tesla Airport

- Location: Serbia, Belgrade
- Key numbers: 4.8 million pax (2015)
- Responsible partner: *Institute Mihajlo Pupin*

NTA Pilot Site

Key figures (2015)

Aircraft Movements	No. passengers	Cargo (kg)	Mail (kg)
58,507	4,776,164	13,066,939	1,771,816

Total indoor area (T1, T2, Gates): 47,000 m2

Yearly energy consumption

- 33 GWh (both electrical and thermal energy)

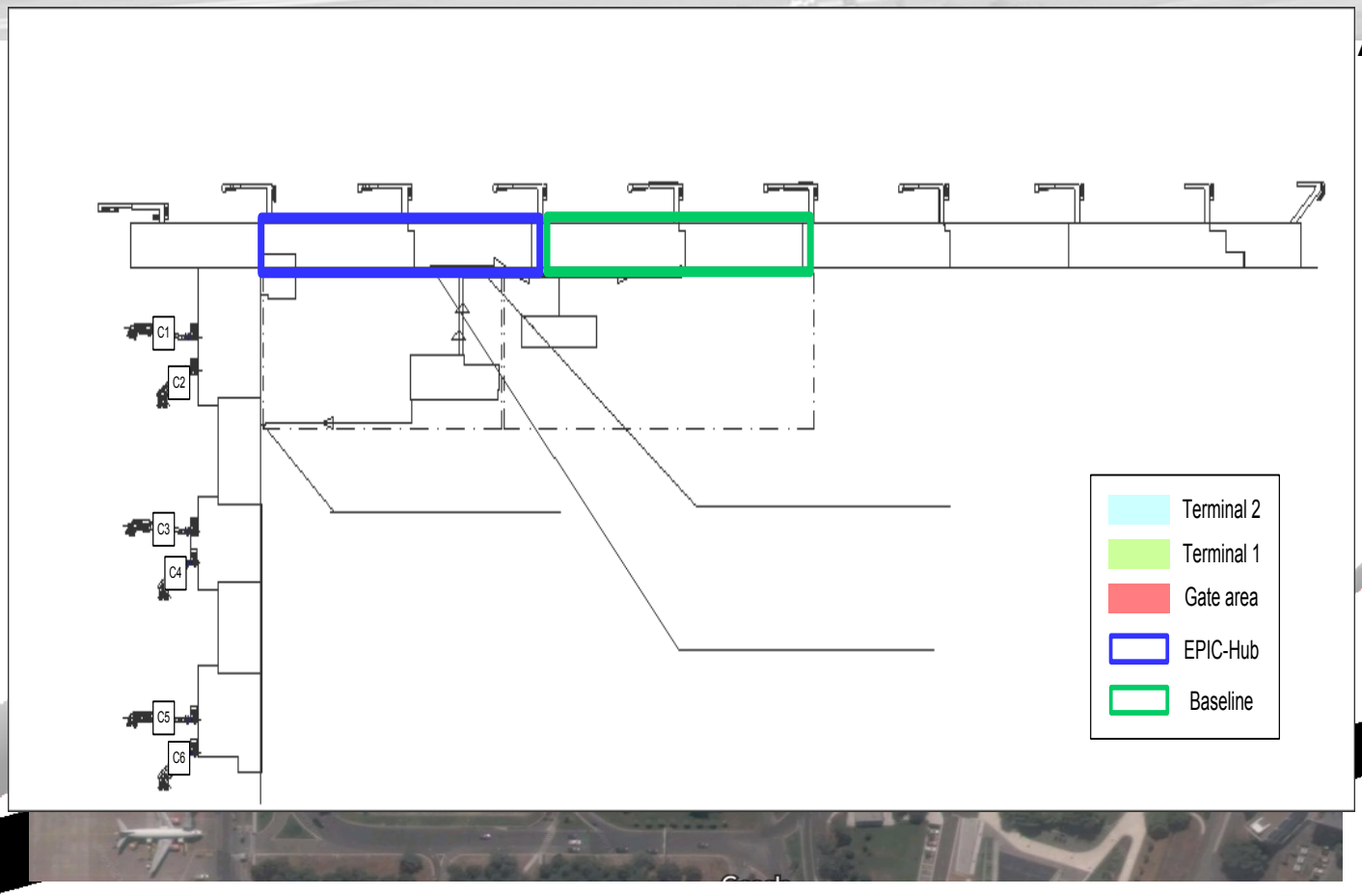
Energy assets

- 4 boilers - heating capacity 47.9 MW (18MW NTA demand -> NBH)
- 7 chillers - cooling capacity 2.3 MW
- 20 rooftop units – Qc 222 kW/ Qh 255 kW (auxiliary system!)

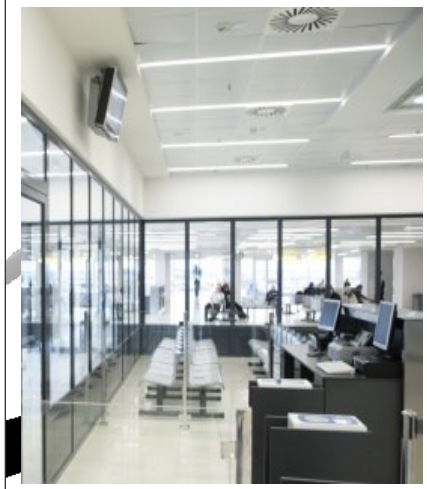
NTA Demonstration Plan

Specific target area

- Multiple energy supply options -> allowing EH optimization

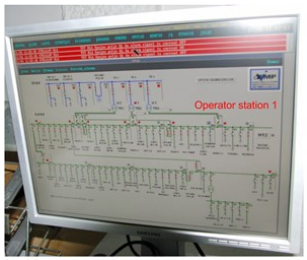


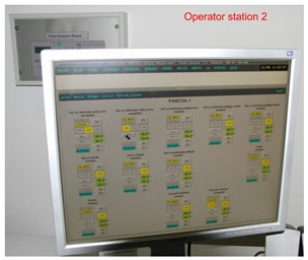
A4-A5 (B)

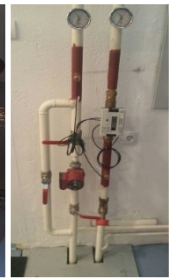


NTA Deployment Plan

- Data acquisition and integration with EPIC-HUB Middleware
  - Main BMS - SCADA View6000
  - Existing and missing energy monitoring
    - Electrical energy
    - Thermal energy







NBH Level Optimization

- Entities considered for the multi-Epic-Hub demonstration scenario:

  1) Aviation Museum,

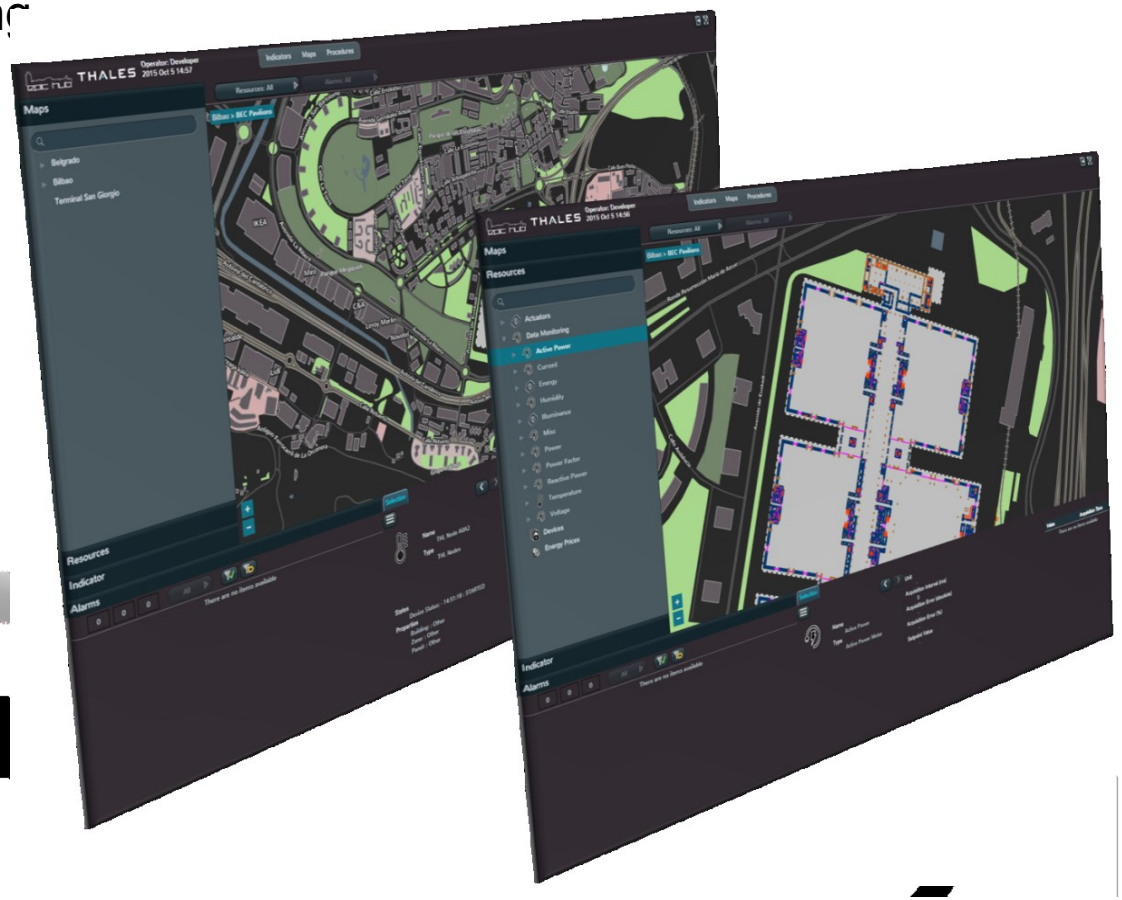
  2) SMATSA,

  3) "JAT Tehnika".

EPIC-HUB Cockpit

EPIC-HUB Integrated user interface

- Centralized, holistic monitoring of the energy data
- Detailed information about deployed monitoring points and energy assets
- Overview of the current, past and forecasted energy profiles



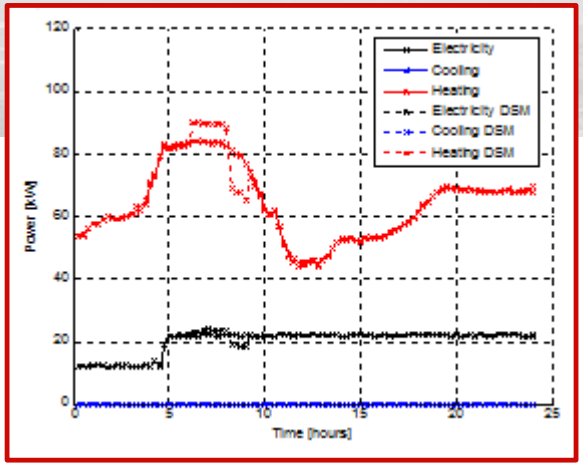
EPIC-HUB Output

- **Operation optimization**
  - Controlling the type of supplied energy carrier (electricity or hot water via roof-top supply carrier switch)
- **DSM measure**
  - Optimal load profile suggested to the airport energy manager (energy carrier tariffs and contracted power peaks)
- **Planning optimization**
  - Optimal solution for introducing new energy assets based on EH approach (e.g. a CHP plant or PVPP)
- **Optimization at NBH level**
  - Optimization of the energy flows among NTA and its NBH entities

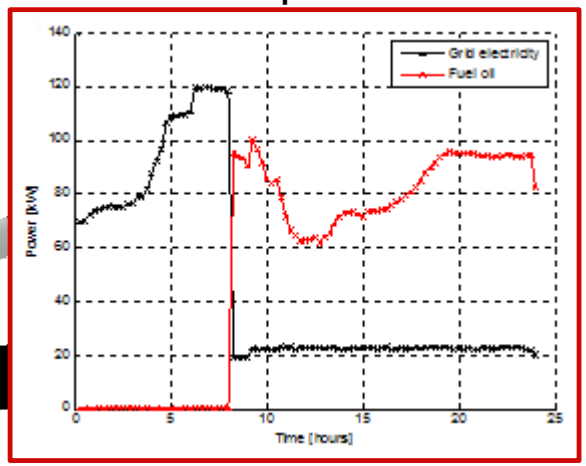
EPIC-HUB Results

- Dynamic selection of thermal energy source
  - **Estimated savings**: 16.5% (only HVAC at NTA target area)
- High replication potential
  - **Estimated savings** for **all T1+T2 gates**:
  - 20 kEur/year (for heating only)
- Optimization leveraging on NBH energy assets
  - "High" capacity CHP reduce energy
    about 16%

Load



Import



Thank you!

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