Smart Energy Management Systems
District Energy Optimisation
Brescia, 7th November 2019
OPTIT AT A GLANCE

Founded in 2007

Spinoff of the Operations Research (OR) team of the University of Bologna

We develop solutions and services based on advanced analytics, machine learning & mathematical optimisation

Young and highly skilled team: everyone holds a STEM Master Degree or PhD

We are Data scientists, Business consultants, Operations Research specialists, SW application dev. professionals

We work for medium and large enterprises in several industries: Energy, Waste, Logistics, Retail, etc.

We participate in the scientific community and active in fostering “Operations Research in Practice”

2 main Offices

Consultancy services and Commercial HQ in Bologna

SW Factory in Cesena

35+

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DECISION SUPPORT SYSTEMS FOR SMART ENERGY SYSTEMS

- Business Intelligence
- Data mining
- Simulation
- Forecasting
- Optimisation
- Artificial Intelligence
- Automatization
Initiate the DH upgrading process for 8 systems up to the investment stage (Generation, Distribution, Use)

Produce Best Practices and Tools Handbooks

Develop regional / national action plans for DHN retrofitting

Replicate the proposed solutions across Europe

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VALUE PROPOSITION FOR THE DISTRICT ENERGY INDUSTRY

**GENERATION**

- DSS for Energy production optimisation
  - H/P/C demand forecast
  - Operational scheduling of production assets to optimise operating margin
  - Budgeting and what-if yearly analyses
  - System integration for automatized process

**DISTRIBUTION**

- DSS for network development optimization
  - Investment (NPV) optimisation analysis
  - Technical and economic decision drivers integration
  - Advanced built-in thermal-hydraulic model for feasibility check

**DEMAND**

- Advanced analytics methodologies
  - Heat consumption patterns and profiling
  - Identification and qualification of user clusters
  - Valorisation of consumption patterns to improve overall operations
How to plan District Heating (& Cooling) Network Development roadmaps that maximise the Return on Invested Capital (i.e. Net Present Value), amongst countless possible options?

**The Business Objective**

**Challenges for Decision Making**

- **Geographic** dimension of the business issue (overcome Excel)
- Several possible potential **scenarios** (what-if)
- **Economic value assignments on costs and revenues** sides
- **Thermal-hydraulic** feasibility analysis of proposed solutions
OPTIT’S SOLUTION’S KEY FEATURES

- Tariffs & Capex/Opex
- Financial parameters
- Import + Puntual editing/drawing
- Tariffs & Capex/Opex
- Technical constraints
- Financial parameters
- Advanced Scenario Mgmt
- Existing & potential pipings & users
- Existing & potential plants
Development of new DHC networks
- Network extension to optimise NPV / ROI
- Optimal dimensioning of the potential piping to respect thermal-hydraulic constraints
- Economic KPIs of each scenario

Expansion of existing networks
- Optimal strategy for new customer connections
- Dimensioning of new connection piping
- Technical analysis of the new network set-up

Saturation of existing networks
- Strategic evaluation of recontractualization of existing customers after demand reduction
- Maximization of heat production capacity for further development
**Investment Analysis**

Validation and refinement of pre-set network expansion scenarios

Evaluation of Integration of new sources

Impact assessment of new economic frameworks

**Technical Analysis**

Thermal-hydraulic network physical model (pressure, velocity, heat balances)

Resizing of existing piping to be revamped

Analyses of fault & maintenance
FROM ANALYSIS TO CONSTRUCTION SITE

Via Martinetti - Milan

The tool allows for a smooth transition of the feasibility and commercial analysis from Marketing & Sales to Engineering department.
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