

SOLVERA LYNX

As part of R&D project "Demonstration of Integrated Energy Management" financed by:



REPUBLIKA SLOVENIJA
MINISTRSTVO ZA GOSPODARSKI
RAZVOJ IN TEHNOLOGIJO

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Flexible energy demand in steel industry (STEELFLEX)

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Flexible energy demand in steel industry (SteelFlex)

R&D project R&D project “Demonstration of Integrated Energy Management” to develop **solutions for the active participation of end users, advanced management of demand response and energy management.** Demonstration projects will be implemented in collaboration with large industrial consumers **in the steel, automotive and electrical industries.** The project is financed by Slovene Ministry of economic development and technology through European Regional Development Fund (ESRR).

The first part of the project is dealing with **PLATFORM FOR FLEXIBLE ENERGY MANAGEMENT IN STEEL INDUSTRY (STEELFLEX)** and refers to the development of the advanced platform for flexible consumption in steel industry. The second part combines the development and implementation of the energy management system adjusted for classic industrial production, the factory management system, and third part focuses on the energy optimisation of water systems, where two pilot installations will be made.

Solvera Lynx, as a leading Slovene provider of energy management software solutions is leading this part of R&D project, focusing on development of the platform together with Slovene Industry of Steel (SIJ), where two large steel plants (Acroni Jesenica and Metal Ravne) are participating in the pilots. Third partner Petrol (also leading R&D partner for whole project) is participating as potential aggregator and energy supplier.

R&D Project Targets

- Development of methods and concept proof of technical solutions for demand response
- Peak power control
- Reduce energy balancing costs
- Risk management of energy purchase
- Interoperability
- 3 years R&D project
- Simple final target: Provide 20MW of flexibility

Definition and analysis of energy consumers
Impact of energy consumers to energy system and production process



Integration of various information systems
Providing energy, process and production data



SteelFlex platform development
Platform for flexible energy demand



Testing and demonstration model
Testing of flexible demand management and new market products



STEEL INDUSTRY

- **High electricity consumption** with large and dynamic energy users
- Electricity costs **largest part of energy costs**, depend on steel quality and type of steel production
- **Active participation** for ancillary or market services
- Largest users **electric arc furnaces (EAF)** with peak loads of up to 40MW, >60% of total electricity costs
- **Peak loads** in steel company between **50 and 70 MW**

Key Issues:

- Relevant data
- Quality of data
- Production vs. energy consumption
- Process plan, control, changes
- Integrating flexibility into production process
- How to address process changes, planning, energy consumption, forecasts...
- Decisionmaking
- Platform to be used in other steel companies! Market potential!

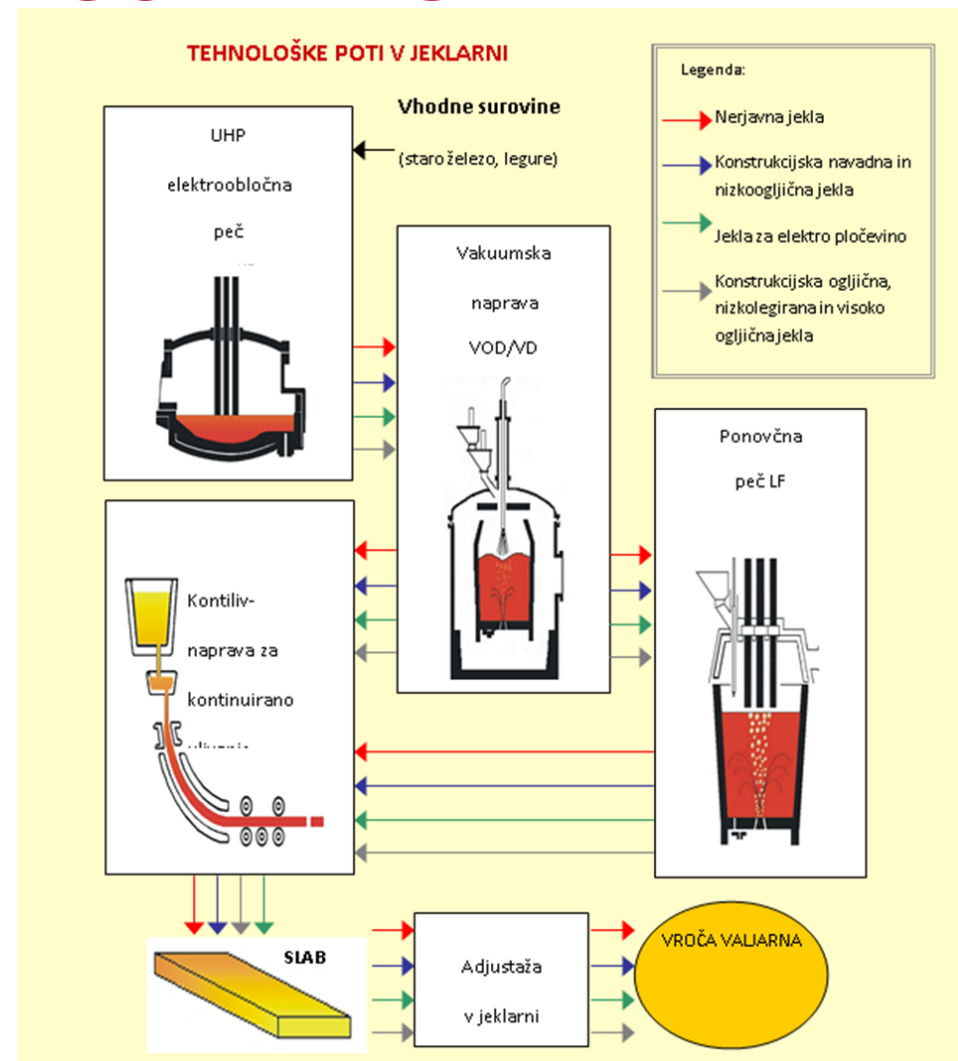


DEMAND FLEXIBILITY OF LARGE CONSUMERS

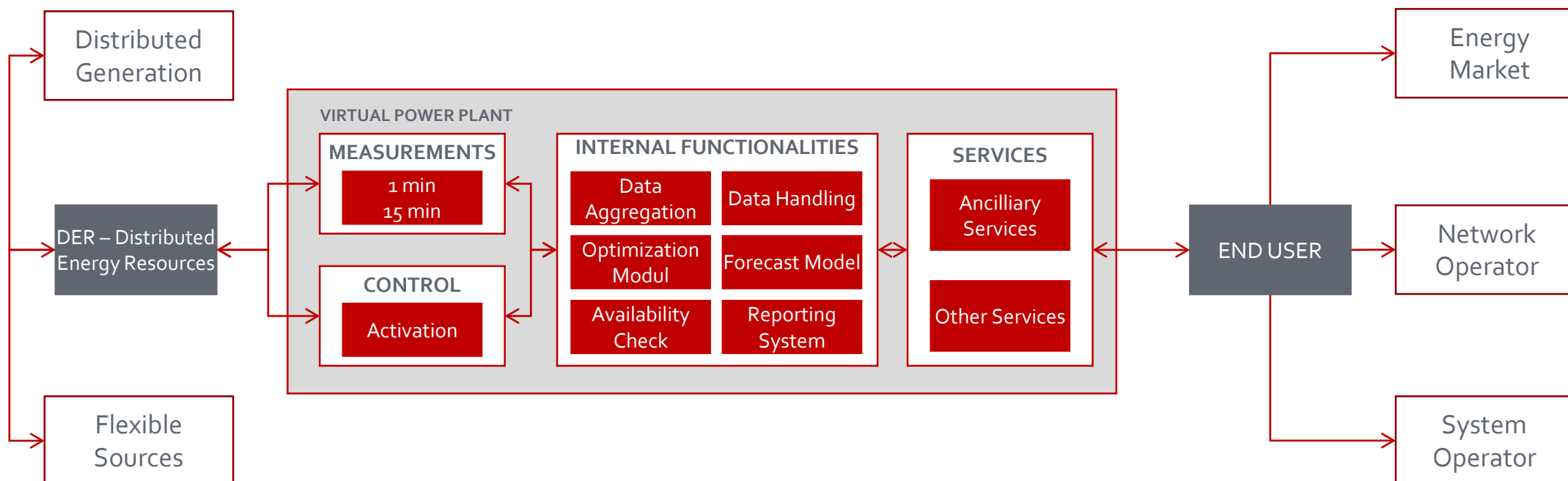
- Specific energy consumption, based on current steel production
- Yearly operation hours, process utilization
- Average consumption in operation and in shut down/standstill/off status
- Possibilities for reduced demand
- Response time (time to stop/reduce and time to return to normal operation) and technical/technological restrictions,
- Restriction factors (planned production, orders, production line capacity utilization)

Classification of energy consumers:

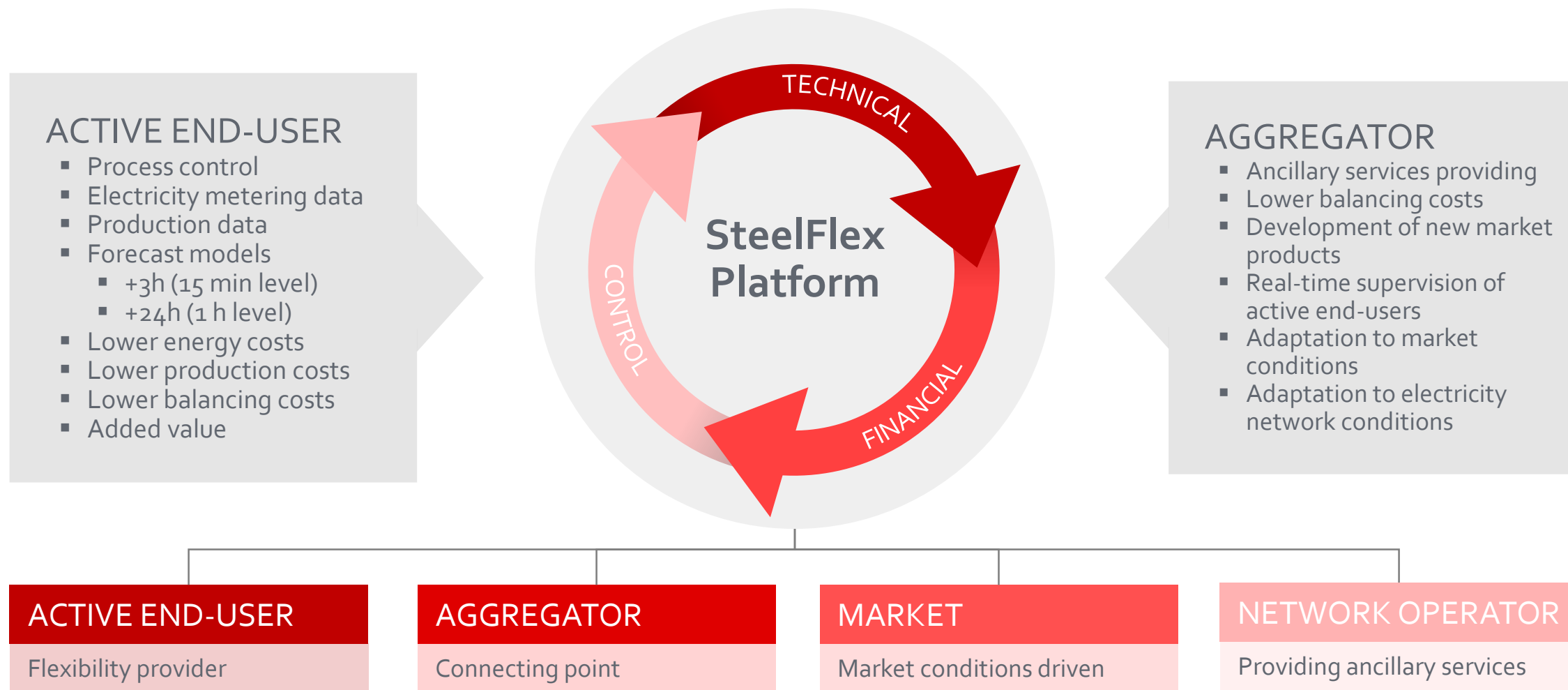
- Peak load, production on/off time, standstill, switching possibility, possible demand reduction for < 1 h/> 1 h period
- Forecast precision
- Availability
- Integration possibilities



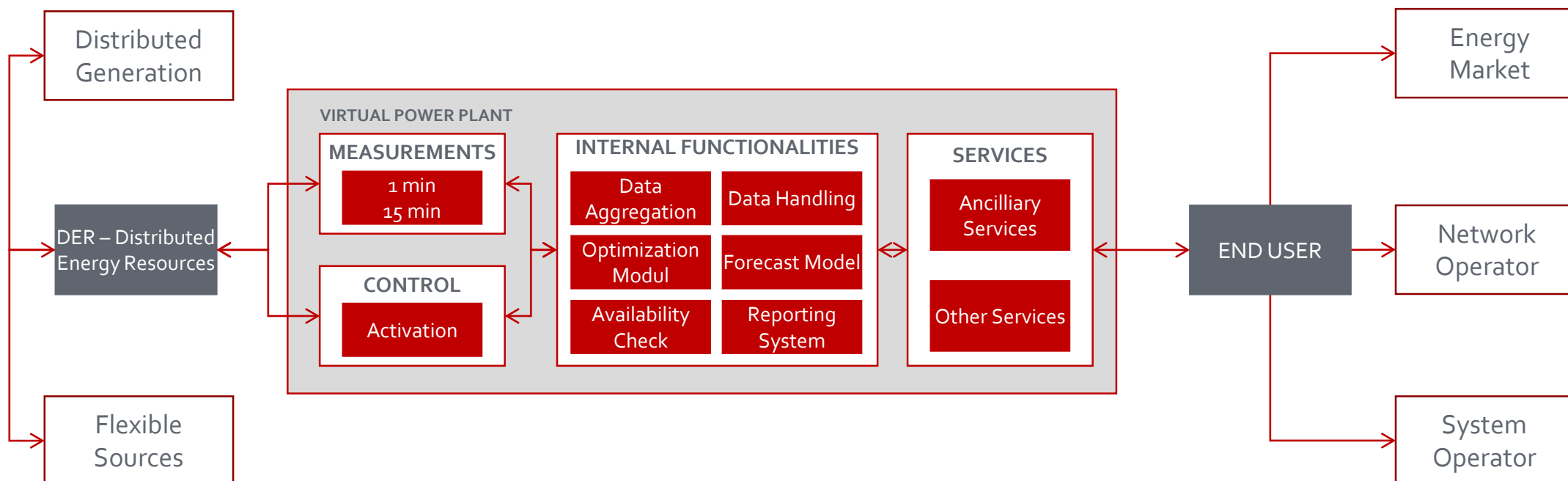
FUNCTIONALITIES OF VIRTUAL POWER PLANT



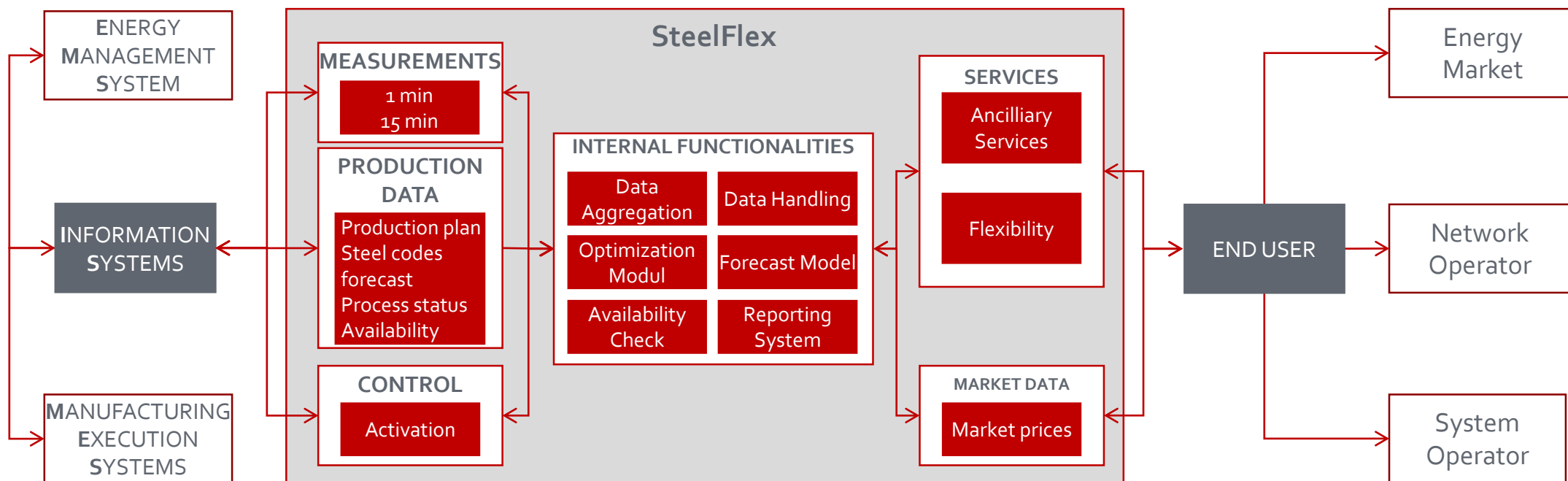
KEY FACTORS OF FLEXIBLE ENERGY MANAGEMENT



FUNCTIONALITIES OF VIRTUAL POWER PLANT

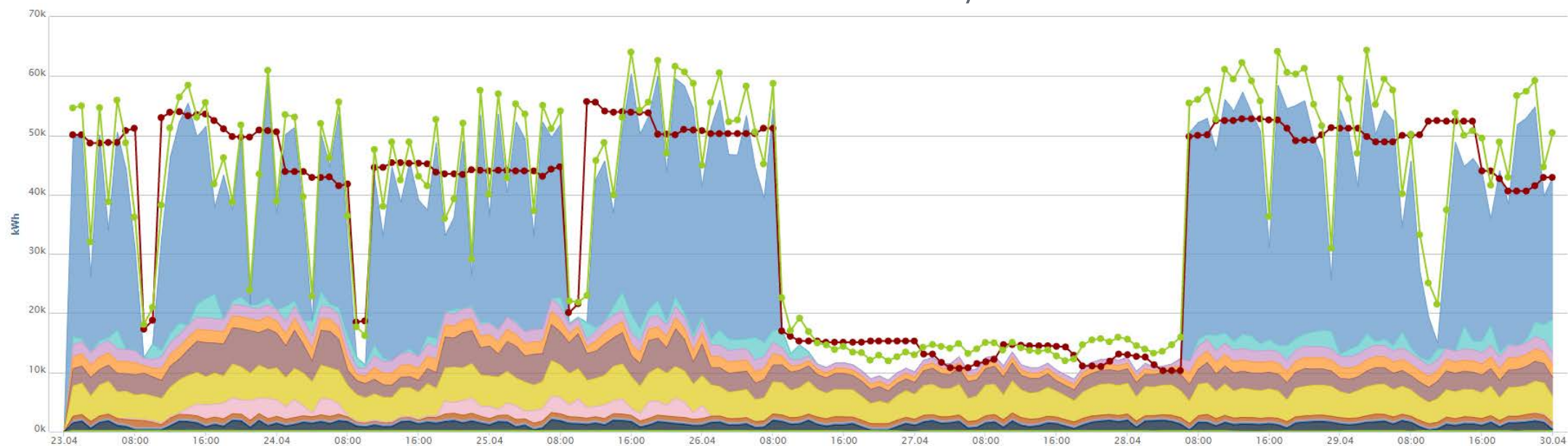


STEELFLEX PLATFORM



PROJECT CHALLENGES AND LESSONS LEARNED

1. **Integrated approach** due to various IT systems
2. Production/Process vs. energy **personnel**
3. **Higher energy prices** → high interest
4. Need for **detailed and exact** planning process
5. **Different level** of energy and process data quality and intensity
6. Flexibility depends on supply and demand **market flexibility** – adequate energy companies offers
7. **Artificial Intelligence** can improve definition of baselines and forecasts
8. Addressing **random** events
9. Search for additional **economic benefits** of flexibility



CONCLUSIONS ON R&D PROJECT RESULT

- Developed and tested **flexibility platform** for steel industry (SteelFlex)
- Development **methods** and **proof of concepts, technical solutions** and **business cases** of **20 MW** potential demand response sources in two steel companies
- Possible **adaptation** of the platform for various future aggregators both in steel industry and energy suppliers – **interoperability** is key
- **Key benefits:**
 - Reduced energy and operating costs
 - Increased level of process and energy flexibility
 - Balance group management
 - Demand flexibility for DayAhead and IntraDay trading
 - Optimization of forecast models with aim to reduce balancing costs
- Bilateral **data/service exchange** with aggregators' or trading platforms
- **Risk management**
- Development of **new** market and regulatory products (e.g. dynamic tariffs, demand response, distribution of risks between supplier and buyer...)
- Cooperation with steel production **equipment manufacturers** (processes, control)

THANK YOU!

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