Damas MMS:E

Electricity Market Management System

- Comprehensive support of business and technical processes of transmission system operators, HVDC interconnectors and market operators.
- Balancing markets for system balance control.
- Purchase of ancillary services in tenders.
- Integration of TERRE, MARI and PICASSO - European platforms for international exchange of balancing energy.
- Operation of day-ahead and intraday markets.
- Contract registration, evaluation and imbalance settlement.
- Cross-border transmissions and congestion management.
- Communication with market participants, authorities and the energy community.
- Working with plans, real-time operational data and evaluations, including advanced optimisation and analytical functions.
- Compliance with EU legislation, full support for ENTSO-E standards, compatibility with ENTSO-E operating rules and ACER regulations.
- Automated operation and process control.
- Exceptional flexibility and long-term product roadmap.
- Extensive customisation options to support client-specific processes and environments.
- Integration with Microsoft Office.
- State-of-the-art cloud technology.

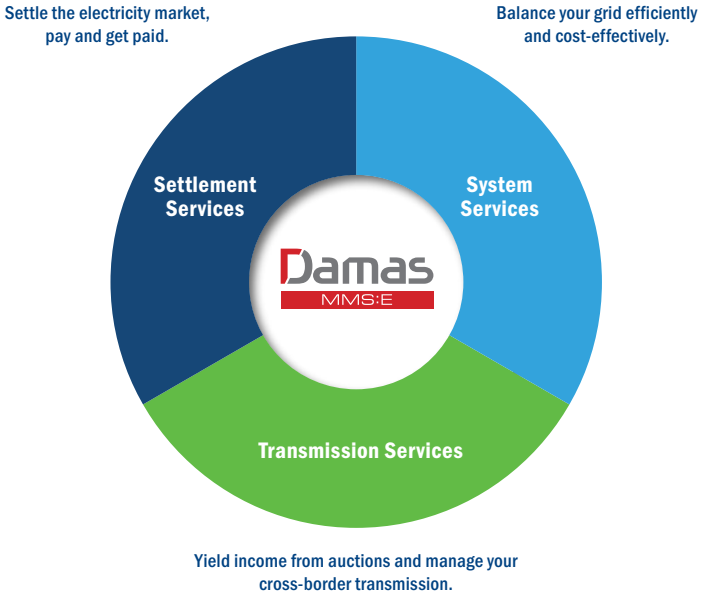

Fig. 1 – Basic Damas MMS:E Subsystems

Damas MMS:E is a comprehensive electricity market management system designed and developed for the needs of transmission system operators, HVDC interconnectors and market operators in an open market environment.

The main added value of Damas MMS:E is the comprehensive coverage of the commercial processes related to the operation of power markets, provision of system services using ancillary services and balancing markets, their evaluation and settlement, as well as the management of cross-border energy transmissions, congestion management and international cooperation (see Figure 1). In terms of time, Damas MMS:E supports all phases of TSO and market operator activities, from forecasting, long-term planning and procurement, through daily and intraday markets and preparation of operations, to evaluation, settlement and billing.

The design of Damas MMS:E is driven by the following requirements: unlimited scalability, open architecture with extensive configuration options, high flexibility to adapt quickly to changes, high performance, high reliability and availability, transparency and top security, standardised interfaces with the external environment and, last but not least, a great user experience.

Damas MMS:E fully supports the market processes of electricity transmission system operators in the following areas:

- **System Services** – Maintain system balance with balancing services efficiently and at minimal cost.
- **Transmission Services** – Earn revenue from capacity auctions and manage cross-border flows.

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- **Settlement Services** – Clear and settle energy market transactions, pay and receive payments.

System Services

Transmission system operators use the system and support services to ensure the quality and reliability of electricity supply in the national transmission system and to meet their international obligations and the conditions of international interconnection. Quality of supply is understood mainly in terms of frequency and voltage parameters defined by the Transmission System Codes in accordance with ENTSO-E RGCE standards (see Figure 2).

Ancillary Services

- Comprehensive support for the procurement of ancillary services: forecasting and planning, calculation of demands, purchasing in long-term and short-term tenders and on the day-ahead market, contract registration and management.
- Certification and administration of technical parameters of generation and consumption units providing balancing services, including virtual aggregation units.
- Transmission system operational planning at the level of grid elements, generation and consumptions units including load and production forecasting.
- Evaluation of the delivery of ancillary services in terms of quality parameters.

Balancing Energy

- Purchase of balancing energy on day-ahead and intraday balancing markets.
- Integration with European balancing platforms (TERRE, MARI, PICASSO)
- Evaluation of the consumed balancing energy from the activation of ancillary services and from other sources (see Figure 3)
- Communication with SCADA, metering systems, datahubs, BI/DWH and other technical applications.

Network Losses

- Purchase of energy to cover transmission system losses.
- Evaluation and settlement of losses.

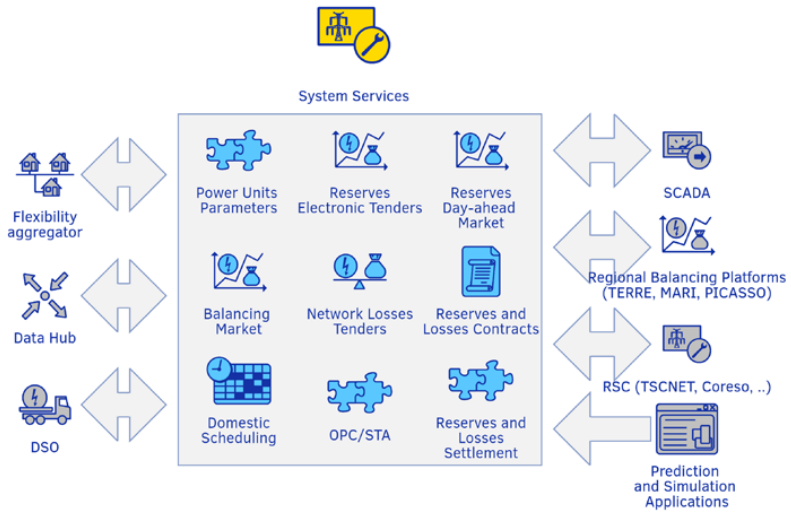

Fig. 2 – System Services Subsystem

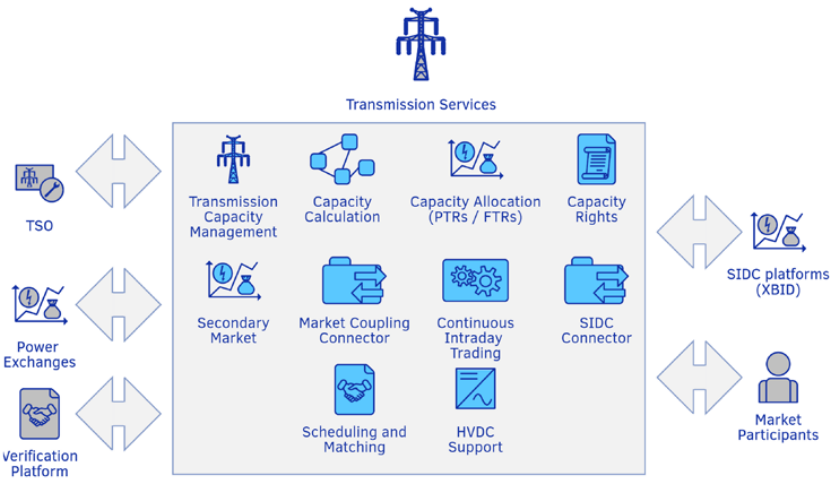

Fig. 4 – Transmission Services Subsystem

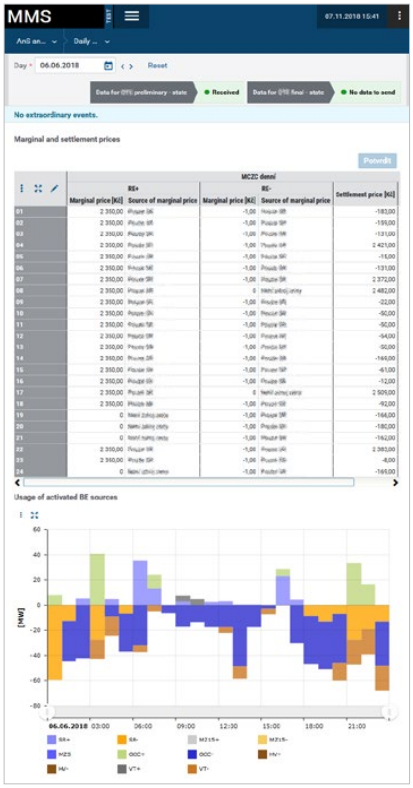

Fig. 3 – Control Dashboard of Imbalance Netting Process (GCC)

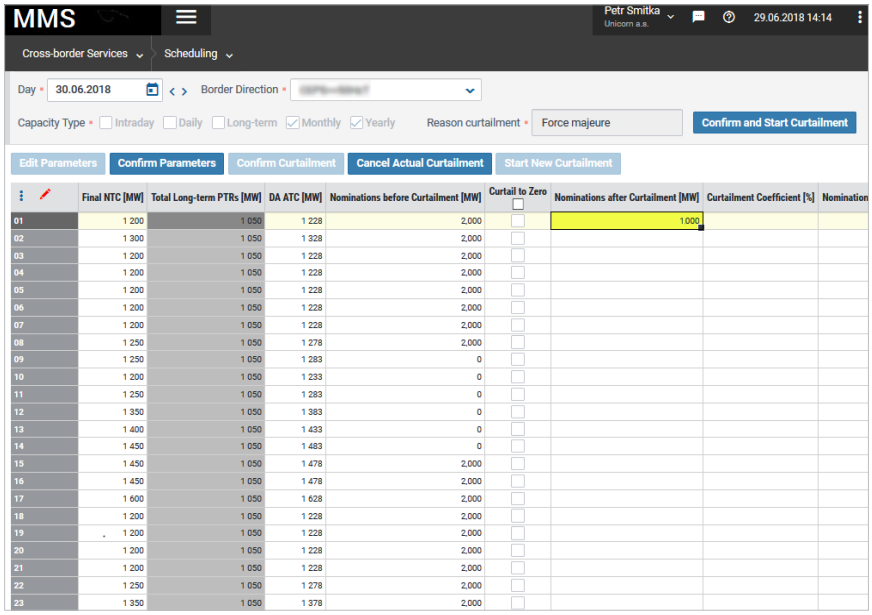

Fig. 5 – Transmission Services (Nomination Curtailment)

Transmission Services

This subsystem provides support for all activities related to cross-border energy transmissions and congestion management, including capacity allocations and nominations (see Figure 4).

The main functional areas of transmission services are:

- Capacity calculations based on grid models.
- Long-term, day-ahead, and intraday transmission capacities allocations in both explicit and implicit auctions.
- Management of physical transmission rights, including the integration with auction offices.
- Secondary market (capacity resales and transfers).
- Nomination management including international matching and integration with Verification Platform.
- Pre-coupling and post-coupling daily implicit auction processes.
- Special nominations (trades between two TSOs, compensations, etc.).
- Integration with XBID platform.
- Real-time transmission reduction and capacity curtailment.
- Risk management and financial security.
- Automatic data exchange with market participants and authorities.
- Support for HVDC – special features for DC interconnections including integration with protection and management systems via our Interconnector Network Control Application (INCA).

Damas MMS:E is fully compatible with established industry standards (ENTSO-E guidelines, ESS and ECAN data standards). Legal issues were also carefully studied during the development process to ensure that the system provides the highest possible level of security, meets the requirements of EU legislation and remains simple enough for users and third party integrators. Communication with neighbouring TSOs via the MADES (ECP) standard is supported, as well as integration with the ENTSO-E Transparency platform.

Settlement Services

This subsystem of the Damas MMS:E covers all processes and activities related to the responsibility of market operators to physically and financially evaluate and settle all types of market transactions (see Figure 6).

It covers the following main functional domains:

- Receiving and processing of bilateral trades between balance responsible parties (BRPs) using the ESS standard.
- Control of scheduled volumes against available financial collateral (risk management).
- Aggregation of metered values and balancing energy volumes.
- Calculation of the total system imbalance, imbalance volumes and prices for individual BRPs.

Furthermore, this subsystem provides settlement services for all other subsystems and their commodities (ancillary services, balancing energy, transmission

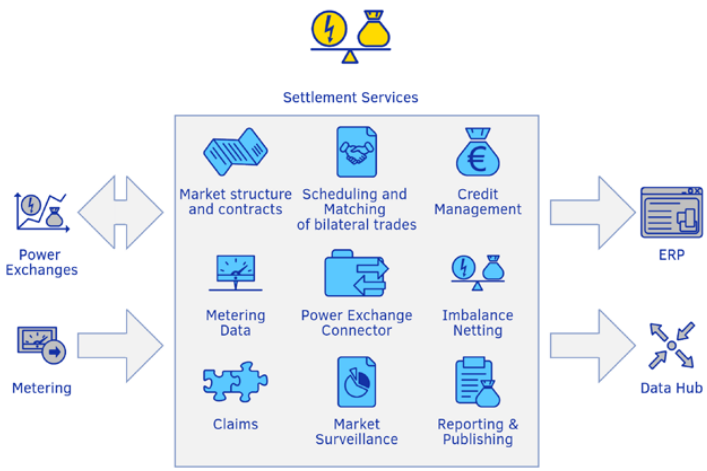

Fig. 6 – Settlement Services Subsystem

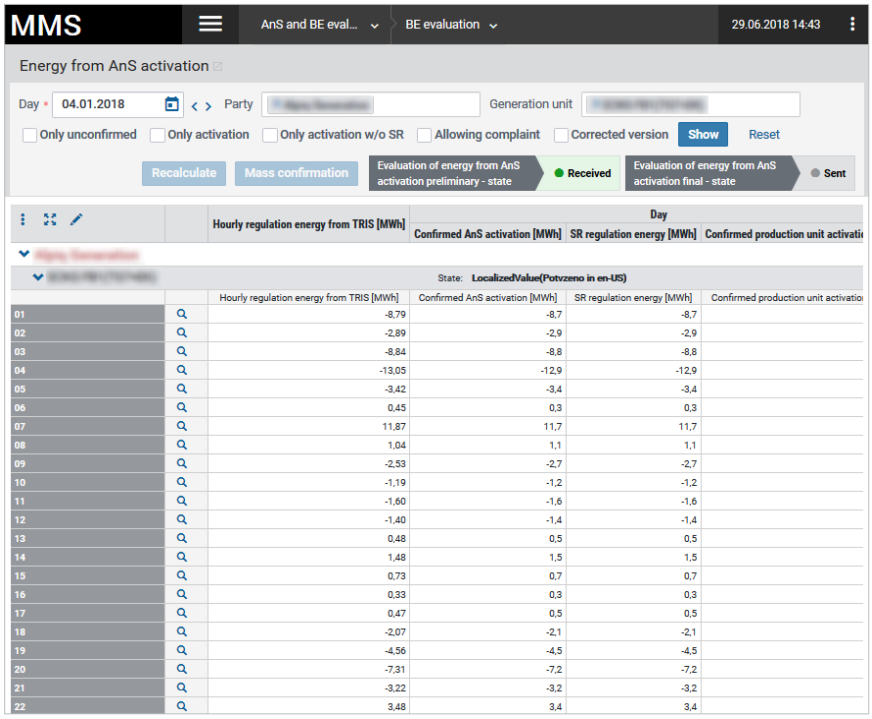

Fig. 7 – Evaluation and Settlement

rights, losses, fees, penalties, etc.) resulting in regular aggregated payments (daily, monthly, annual) transferred to accounting and billing systems. Automation of claims handling processes is a native part of this. All relevant data can be analyzed and user-defined reports can be generated based on them (see Figure 7).

Benefits of Damas MMS:E

- **Business and technical know-how** – Comprehensive support for business and technical processes based on in-depth knowledge of the energy industry gained since 1999 in hundreds of projects across Europe.
- **Fast delivery** – Solutions based on a balanced combination of configuration and customization of standard product and implementation of specific requirements.
- **Long-term perspective** – Long-term product development roadmap reflecting current challenges, perspectives and legislative changes.
- **Openness** – Extensive data and process integration options, compliant with industry standards.
- **Flexible licensing policy** – Corresponding with the modularity of the solution to provide an optimal licensing model for each client.
- **Web-based architecture** – No need for client station installations, multi-platform solution.
- **Modern, ergonomic user interface** – Rich information content and excellent response time.

References

- BritNed Development Ltd.
- ČEPS, a. s.
- EirGrid plc
- EMS Elektromreža Srbije
- eSett – Nordic Imbalance Settlement
- Fifty AS – Joint venture between Svenska kraftnät and Statnett
- Independent Power Transmission Operator S.A. (IPTO)
- National Grid plc
- OST (Operatori i Sistemit te Transmetimit)
- PTC SEE CAO LLC
- Réseau de Transport d'Electricité (RTE)
- Slovenská elektrizačná prenosová sústava, a. s.
- Swissgrid AG
- TenneT TSO GmbH
- Terna Rete Italia S.p.A.
- Transelectrica – Romanian National Power Grid Company
- UKRENERGO

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