

Energy Management Optimization & Decision Support

CYBER SECURITY DIVISION

Energy Efficiency



ENERGY EFFICIENCY

Last years' worldwide policies are calling Public Administrations, Utilities and Industries to pursue a smart energy usage for emission and costs reduction. These actors are asked to identify and realize interventions in order to promote and increase energy performance of their infrastructures and to enhance energy efficiency.

In such a context, Governments and Critical National Infrastructures have an increasing need of solutions and services not only to achieve the targets established by national and international laws, but also to reach complementary advantages such as lower energy bills that can be obtained through custom energetic behavior analysis and consequent suggestion of best practices. An effective energetic management of plants, sites and even districts, cities or regions is based on the availability of related information, appropriate measures for corrective interventions, forecasting capacities, a deep knowledge of the available tariffs and of the energetic market, centralized procedures and invoicing controls. To achieve these goals, a complete platform for the improvement of energy efficiency has to offer:

- › the analysis of real time energy consumption and of energy performance trends, forecasting functionalities, deviation verification from Consumptions Typical Curve, evaluation of services' levels as a consequence of modified energy profiles and decision support.

THE ENERGY EFFICIENCY SOLUTION

Leveraging on modeling and simulation techniques and Big Data, Analytics and IoT technologies, Leonardo's energy efficiency solution is a platform addressing the management of energetic monitoring and data analysis to supply decision support facilities for energy efficiency and saving.

The cloud based energy monitoring and optimization solution acquires and correlates data from devices and high energy consumption equipment to offer analysis functions useful for the definition of immediate efficiency actions to reduce both current consumptions and those referred to high activity periods.

The **Energy Management Optimization & Decision Support (EMODS)** solution allows the development of an Energy Community in which every stakeholder is advised about the current situation, the achieved results and the future goals to be realized through the usage of summary reports, also generated in real time, and automatic alarms that can be shared through different channels like emails, social networks or others.

The dashboards and reports produced by the EMODS solution allow our customers to have a deep knowledge of their consumptions through a complete view on the energy usage for all the their processes and represent the basis for the production of the guidelines aiming at the reduction of consumptions and costs. EMODS helps the energy managers to identify the best practices deriving from the analysis of historical data of the

analyzed sites and allows the definition of the needed strategies for an optimal energy management. Data describing auto-production from both renewable and not-renewable sources are integrated into consumption analysis features to indicate the necessity to start or to stop auto-production in order to cope with unexpected consumption peaks.

CYBER SECURITY

As cyber threat related to energy and electricity sector is growing targeting both IT and OT sectors, Leonardo leverages its cyber security capabilities to build an integrated and specific approach addressing the issues of both energy management and cybernetic resilience. Network protection, security monitoring and analytics functionalities are introduced to support the safety of IT and industrial protocols, to identify anomalies or attacks, to detect known behaviors using rules based on Indicators of Compromise, to identify predictive models on methods or unknown vectors of attack and to signal security events to be analyzed.



THE ENERGY EFFICIENCY MODEL

Leonardo's approach to energy efficiency and optimization is based on a model in four steps that addresses consumptions' optimization and costs' reduction. At first, the model is applied to the buildings or sites more energy consuming and is subsequently employed on the most representative real estate assets of the Customer.

The proposed model aims at the identification of interventions addressing the realization of an energy saving project that, starting from introduction of devices for the acquisition of energy usage data, allows the analysis of historical data of both consumptions and costs.

- › **Assessment:** the knowledge of the customer's energy consumption profiles is at the basis of all the needed activities for the energy management process and allows the identification of the most suitable energy contracts for the customers and the detection of the higher consumptions in order to anticipate the remediation actions for energy savings purposes. The aggregation of similar consumption profiles or geographical zones into clusters allows the identification of the best contracts to be applied to the different groups of consumers. The knowledge of the consumption profiles is also at the basis for the choice of algorithms and models for the analysis and the selection of new energy contracts.
- › **Monitoring:** the system, through the processing of the acquired data – energy users, consumption profiles, clusters' definition – and the correlation with external variables – i.e. whether data, production processes, etc – is able to produce the information required for an integrated energy management that allows the implementation of:

 - an energy saving plan,
 - the support to negotiate more convenient energy contacts
 - the assistance for the management of the production process and of the energy storage.

Synoptic and reports are produced to monitor energy consumptions, to manage the data entry into analysis scenarios, to present the information related to defects, to define rules, thresholds and alarms and to present the costs related to energy supply and its historical trends.
- › **Energy Efficiency Interventions:** EMODS is able to build simplified models in order to analyze the functioning mode of the single sites as well as reference models that represent the consumptions trends. The usage of the EMORP platform and energetic consumption audits enables the analysis of the sites' load profile to identify non-optimal energy consumption practices, anomalies and wastes. This information allows the production of various types of proposed interventions arranged by different levels of costs to be sustained for their realization – reduced, low or high cost interventions. The optimization scheme managed by EMODS aims at achieving a reduction of consumptions and at the same time maintaining the same service levels trying to flatten the energetic load curve and allowing better negotiation in supply contracts.
- › **Management and decision support:** the synergic usage of the historical consumption data, the energetic model of the analyzed structure, a simulation engine, the synthesis and detailed reports and graphical views, the statistical analysis and a forecast model for consumption prediction make available to Decision Makers all the needed functionalities to solve complex issues and to have a prompt response following unexpected situations. The analytical functionalities of the decision support system take advantage of advanced algorithms that are applied to the consumptions of the whole infrastructure or of the logical or physical clusters defined by the user. A collection of user defined KPIs are generated to enhance the Decision Makers ability to make objective, data driven decisions.



Assessment

Analysis of consumption data and current energy contracts

Monitoring

Definition of the energy profiles

Energy Efficiency Interventions

Execution of energy efficiency interventions

Management and Decision Support

Optimization and management

BENEFITS

- › Intervention opportunities identification for energy behavior enhancement and costs optimization
- › Unnecessary, unexpected or unjustified consumption identification and removal
- › Consumptions continuous monitoring and real time anomaly detection
- › Gaps identification through different contracts application to consumptions curve
- › Critical events simulation and identification in order to provide the operator with possible solutions and remedies.

LEONARDO'S OFFER PORTFOLIO

Leonardo protects Governments, National Critical Infrastructures and National Strategic Industries against cyber threats and attacks using its technology and experience in cutting-edge cyber security and critical IT systems, all crucial for the operation and service continuity for citizens and countries.

Organized into two different lines Business-driven Cyber Security and Critical Information Systems, Leonardo's Portfolio leverages the main emerging technologies and the most up to date technological paradigms to offer solutions, platforms and services able to support customers' secure digital transformation.

The Energy Efficiency Solution (EMODS) is part of the Critical Information Systems offer, including:

- › Solutions and services for the secure digitisation of processes, infrastructures and applications and integrated digital transformation programs of strategic national customers.
- › Secure-by-design systems developed using analytics, big data & IoT technologies to support the operation/provision of core services of critical and government infrastructures also during their path to digital transformation.



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