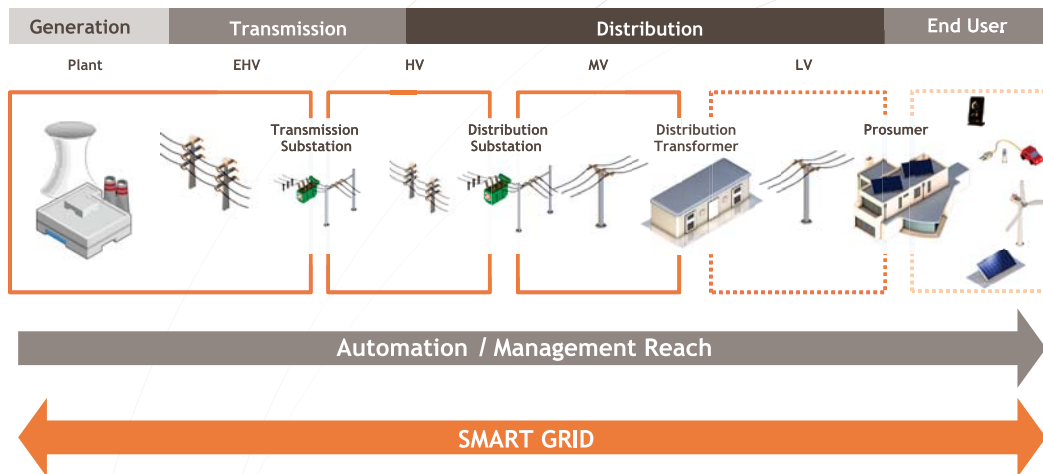


Smart Grid Solutions



Overview

Energy efficiency concerns, either from economical or environmental perspectives, are fostering continuous increase of renewable energy sources at all power levels of the grid. Optimal use of renewables requires storage and introduces stability issues that require new management schemes to maintain system operation within required technical operational limits. Endowing the network with intelligence as an answer to such concerns is at the foundation of the Smart Grid.

Energy efficiency also requires that consumers play an active role, where the smart use of electricity is fostered with demand side management initiatives that permit consumer energy use optimization. Such initiatives rely on use of smart meters and integrated communications in the whole grid.

Among the major actions taken for climate protection, the adoption of electric vehicles and corresponding charging infrastructure will push for increased flexibility of the grid, only possible with novel automation schemes and optimized management of charging stations.

These trends are changing the conventional grid, based on centralized generation and one-way power flow transmission and distribution, and are driving significant changes in the grid operation paradigms, such as:

- Real-time multi-way communications are deployed throughout the whole grid infrastructure up to the low voltage network.
- Power generation and storage is now decentralized, hence fostering multi-way power flows in the active grid up to the low voltage.
- Increased management of loads is feasible and consumers can also be power producers, becoming prosumers.

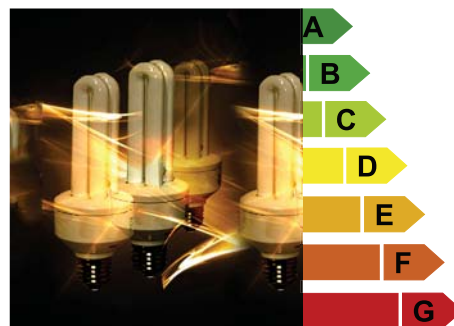
The utilities hence face the need to manage the network infrastructures in a more automated way and in real time, improving the corresponding asset and resource utilization. A higher automation and remote management capacity is needed for all the network components as well as a more dynamic and adaptive management system.

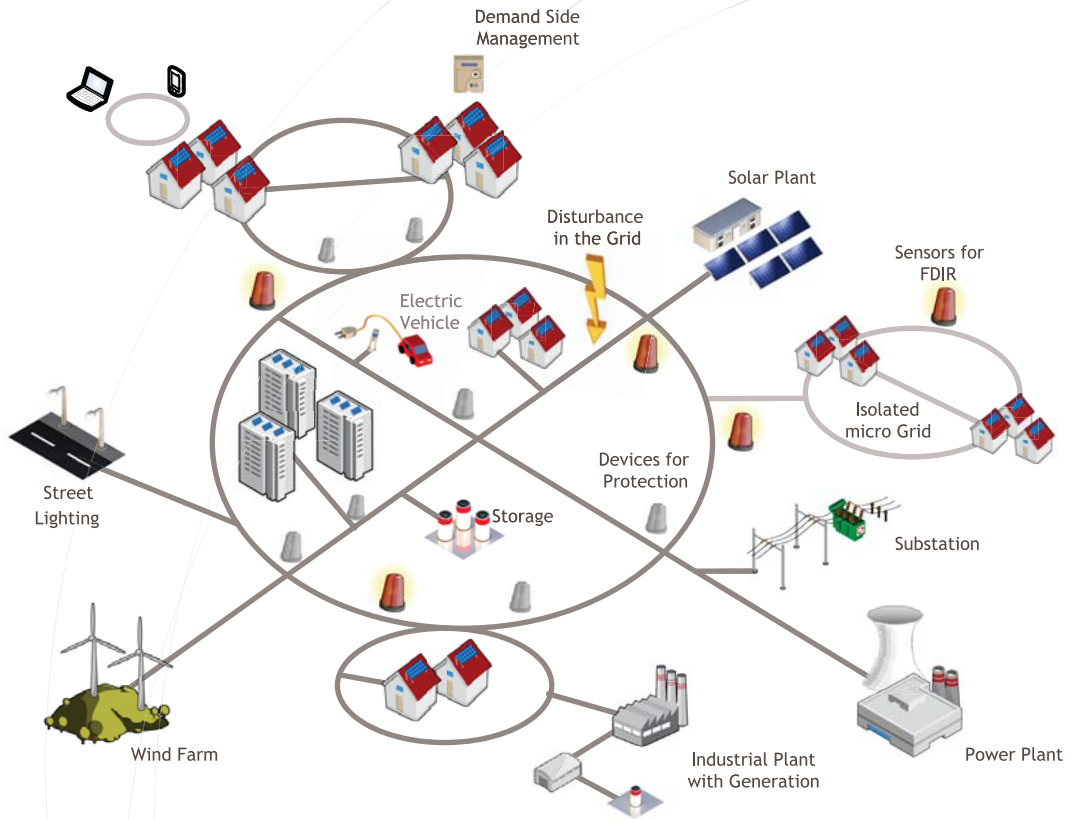
Management systems need improved adaptation capacity to face new requirements resulting from the new business processes. Communication between the various systems and interoperability between systems and products plays a fundamental role.

With this paradigm shift, some results are expected:

- Cost reduction reflected on the final user.
- Network loss reduction.
- Network investment optimization.
- Technological renovation inserting additional intelligence on the network.
- Availability of new tools for energy retailers.

Efacec, in line with its technological strategy that has been conducted since 2006, aiming to answer the new energy system challenges, developed a new range of solutions for Smart Grids, designated by: SmartPower.





**Distribution Management Solutions**

One of the major challenges of the new network paradigm is ensuring continuity of service, which entails fast network reconfiguration, corresponding to an operational added-value, expressed in terms of efficiency, savings and security of power distribution.

New enhanced SCADA/DMS/OMS features are required to handle increasing amounts of real-time or near real time information to provide global system overview and control. Such features include advanced visualization techniques, new approaches on messages and alarm processing, etc.

The new ScateX+ platform provides a field-proven, yet innovative solution to these concerns.



**Substation Automation**

The primary substation is a focal point for autonomous distribution area control, by accommodating typical DMS functions, condition monitoring and adaptative protection and control.

Designed with IEC 61850 and other open standards in mind, the Efacec CLP 500 products and solutions for Substation Automation are flexible, future-proof and can be seamless integrated in multivendor distributed protection, automation and control systems.



**Medium and Low Voltage Automation**

Advanced automation and management is now possible at the MV/LV transformer station with the G Smart controller. G Smart units can be applied as smart RTUs and automation units, providing built-in functions, such as fault detection, transformer monitoring and control, circuit breaker control, monitoring of LV circuits, as well as measurement and power quality analysis.

**Home Smart Metering**

With the introduction of smart grids it is now possible to take the full power of network automation and management down to the low voltage network. Efacec supports this trend with a new product in the Smart Grids solutions portfolio, the M Box smart meter.

With several LAN and HAN communication options, M Box enables the deployment of a real smart grid up to the consumer's premises.

## Distribution Automation

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Smart grid initiatives include the introduction of an increased number of breaker/recloser controllers, fault detectors and RTUs. The **G Remote** is the **SmartPower** product solution for smart remote control and distributed automation, a compact and cost effective solution that is flexible and integration friendly. Advanced distribution automation also allows users to vastly improve network quality of service through the implementation of self-healing or self-control solutions. Efacec **Centrix** provides an optimized model-based solution for automated fault detection, isolation and restoration which is easy to setup and manage.

## Technical Supervision of Infrastructures

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As more and more systems turn to condition monitoring for improved asset management, smart controllers like **G Smart** or systems like **CLP 500** become an invaluable help in performing local data acquisition and health assessment. Several operating conditions and alarms such as intrusion, fire, flood, transformer and the cabinet temperature, circuit status can be monitored, detected and reported upstream to infrastructure technical supervision platforms such as **M Converge** and **ScateX+**.

## Management of Street Lighting

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Managed either by municipalities, utilities or private entities, efficient management of lighting infrastructures can be supported by **G Smart** units, which includes a software module for local street light control, including not only manual control, status and lighting statistics, but also scheduling and management. Configurations options can be locally managed through the web-interface or through remote central street light management platforms such as **eLumen**, the Efacec solution for centralized street light management and control.

## Electrical Vehicle Load Management

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Efacec is a recognized leader in the manufacturing of electric vehicle chargers. With **G Smart** controllers and the **M Converge** management platform users can benefit from smart charging (dynamic charging, operational limits violation prevention, demand forecasts, etc.) integrated with infrastructure management.

The **M Converge** for EVs also includes a public portal for interaction with end users, including features such as charging station status, location or reservation.

## Smart Metering Management

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The **M Converge** is the Efacec head-end solution for smart grid infrastructure management. The solution provides a highly scalable management and monitoring platform for the smart grid infrastructure, including communications, smart meters, meter concentrators, EV charging stations or smart distribution controllers.

**M Converge** is modular, offering a set of configurable functions according to the requirements of each project, and providing standards-based interfaces to multiple attached systems.

## Integrated Solutions

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Efacec maintains an autonomous and continuous R&D activity to guarantee its competitiveness and long-term presence in a constantly evolving worldwide market. This enables us to deploy state-of-the-art high quality solutions, suitable to the needs and specifications of each client, and designed in accordance with open standards.

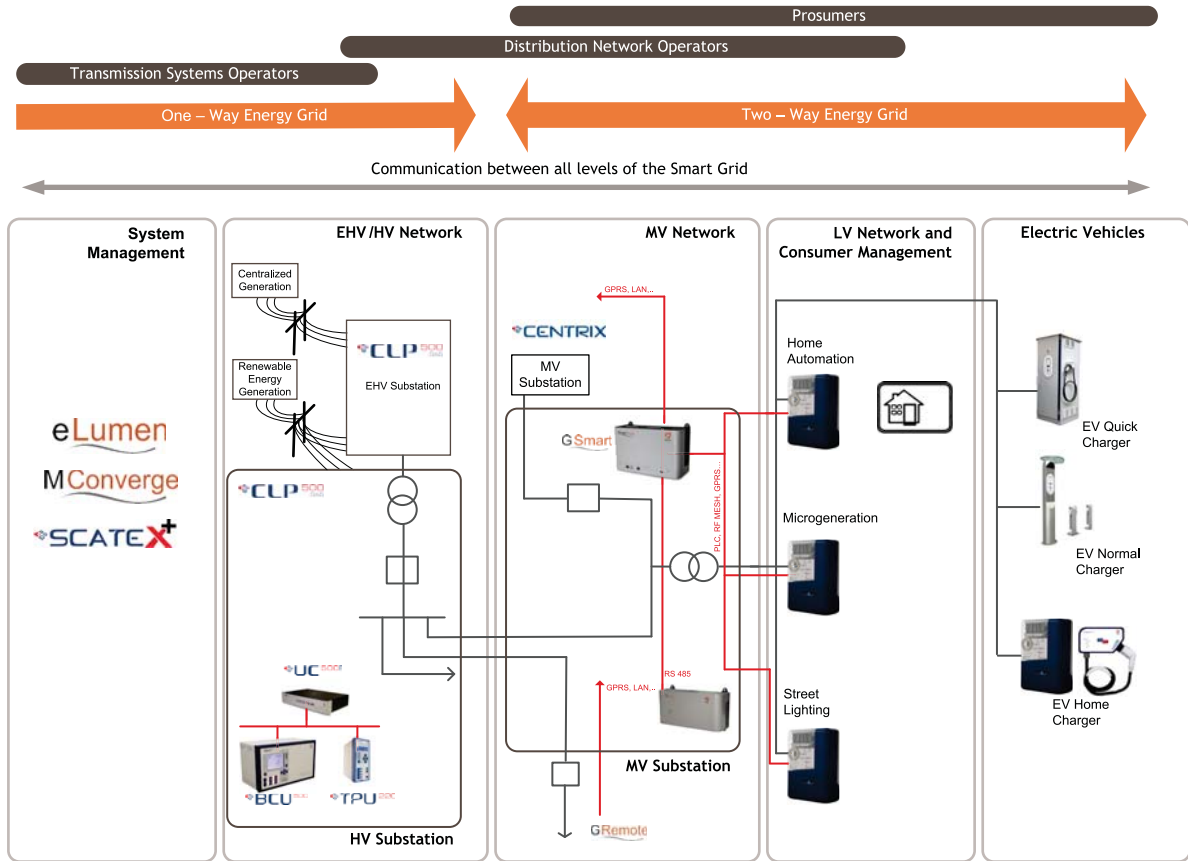
Efacec Smart Grid solutions include integration of own product portfolio with third party offer and value-added services to cost-effectively support the systems throughout out the life-cycle.

Efacec Smart Grid solutions cover all levels of the energy network and are provided by experienced, highly qualified and certified engineering teams around the world to deliver and maintain high performing, secure and economical systems on schedule and on budget. Solutions are designed to be highly adaptable to specific customer requirements whether new systems, expansions or upgrades are considered.

Efacec engineering services, delivered in accordance with certified quality, environmental and other management systems, include:

- Supply of turn-key solutions.
- Project management and execution.
- Integration of multi-vendor solutions.
- System design, configuration, testing, integration and commissioning.





Innovative Products

Efacec delivers a full range of new automation products in the **SmartPower** platform, developed in-house by combining state-of-art technology with innovation in accordance with industry standards.

The new **SmartPower** platform products overview

|  |  |   |
|--|--|---|
|  | <p><b>GSmart</b><br/>Smart Controller<br/>Meter Concentrator</p> | <p>Smart controller, with built-in Web server, I/O, data storage, fault detection, communications, condition monitoring, metering and power quality analysis. By integrating multiple automation functions with LV smart meter concentration through multiple standard communication interfaces, <b>G Smart</b> units enable true smart grid solutions from MV network automation through street lighting, EV charging and microgeneration control up to LV network automation.</p> |
|  | <p><b>GFault</b><br/>Fault Detector</p>                          | <p>Standalone fault detector device or small RTU for distribution networks. <b>G Fault</b> units can also be deployed as I/O and fault detector extenders for other <b>SmartPower</b> products.</p>   |
|  | <p><b>GRemote</b><br/>Smart RTU</p>                              | <p>Smart distribution RTU and automation controller including support for open automation based on IEC 61850, IEC 60870-5, DNP, IEC 61131-3 and other standards. Targeted for transformer stations, distribution switches, reclosers and self-healing distributed applications, <b>G Remote</b> units provide a future-ready platform for distribution automation.</p>  |
|  | <p><b>MBox</b><br/>Smart Meter</p>                               | <p>Featuring sealed metering module, tamper detection, flexible control module and multiple communication media through detachable modules, <b>M Box</b> LV smart meters support advanced metering, demand side management and smart energy management.</p>   |
|  | <p><b>MConverge</b><br/>Head End Software</p>                    | <p>A highly scalable and standards-based Head End software platform for technical infrastructure management of smart metering systems, electric vehicle charging systems and supporting communication network infrastructures.</p>  |
|  | <p><b>eLumen</b><br/>Street Light Manager</p>                    | <p>Web-based street light management platform enabling straightforward operation of multiple lighting infrastructures.</p>  |



Automation Business Unit

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