



What Is Cisco Smart Grid?

Cisco® Smart Grid is a holistic, cross-technology solution that enables utilities and other organizations in the energy industry to build secure, standards-based IP networks to efficiently meet the demands of energy generation, distribution, storage, and consumption. Cisco Smart Grid is a combination of products, technologies, services, and ecosystem partners that optimize communications, improve resilience, and reduce the operational cost and complexity of the energy grid.

The Energy Landscape Today

Most of the nation's electricity system was built when primary energy was relatively inexpensive. Grid reliability was mainly assured by having excess capacity in the system, with unidirectional electricity flow to consumers from centrally dispatched, coal-fired power plants. Investments in the electric system were made to meet

increasing demand—not to change fundamentally the way the system works. This lack of innovation, along with increased demand and green initiatives that are promoting the need for technology modernization, has resulted in:

- Inefficiency in the energy system
- Complex integration of alternate, distributed power sources
- No common management, visibility, and coordinated control
- Lack of reliability and resilience

With the trend of rising energy consumption and higher costs, utilities must be able to anticipate changing patterns to manage supply and demand. They need to be agile enough to explore alternate forms of energy generation such as wind and solar power and integrate these sources into their framework. Finally, they need to make sure that their

infrastructure is reliable, resilient, and secure to reduce the risk of costly outages and breakdowns.

Cisco Smart Grid Solution: Framework and Components

The Cisco strategy for enabling the transformation is to provide an end-to-end, secure communications fabric to help utility companies optimize power supply and demand. To effectively deliver this vision, the Cisco Smart Grid solution is built on a framework that covers the different aspects of the energy system.

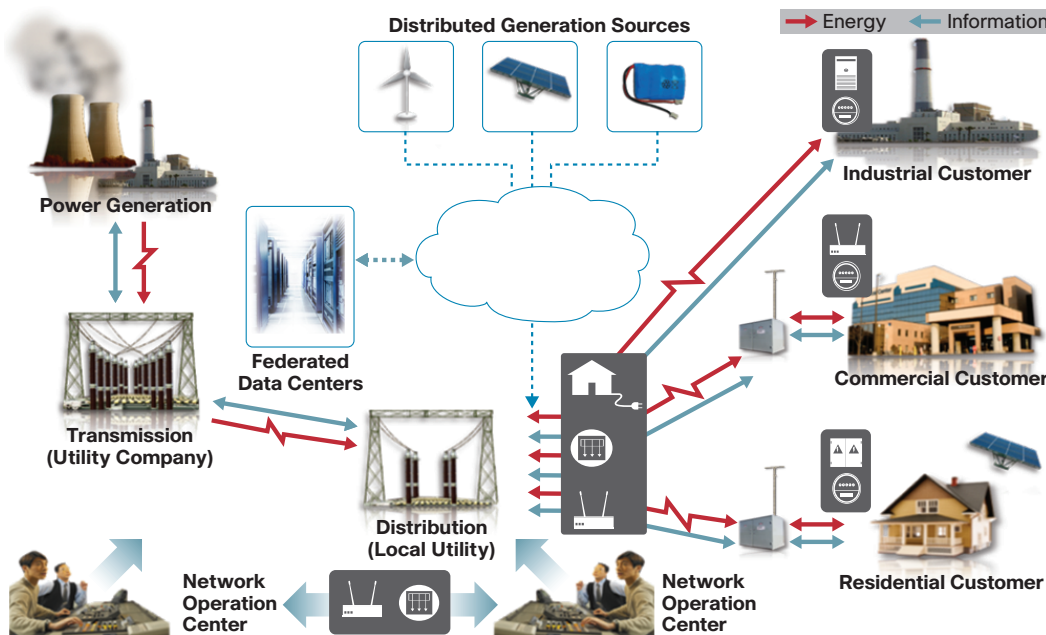
Energy Transmission and Distribution Infrastructure and the Communication Network

We start with the physical and logical components that interconnect the grid to enable the common communications fabric. Shared data sources are required to make the smart grid effective, and this holds true down to the individual electrical meter at a residential home. This information needs to be accessible and secure and communicated across the fabric. From a product and technology standpoint, this is delivered by ruggedized Integrated Services Routers, hardened Catalyst switches, and integrated security and software services that are used across the primary places in the network utility framework:

- Substation automation/integration (SA/I)
- Neighborhood area network (NAN)
- Business area network (BAN)
- Home area network (HAN)

Computing Platform

Data centers play an important role in sharing and segmenting the appropriate information across the fabric. Cisco's state of the art, standards-based data center portfolio provides the underlying computing platforms and infrastructure to enable sophisticated data collection techniques and storage solutions for power grid data analysis and optimization.



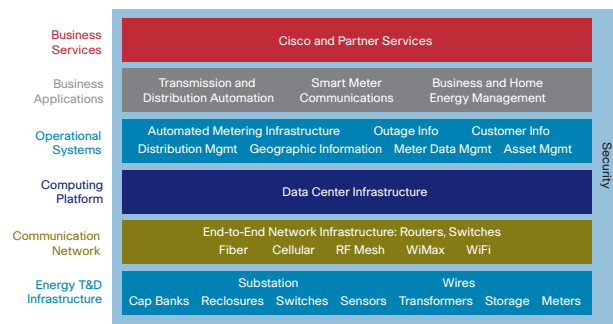


Operational Systems

Centralized management, control, and visibility of the smart grid are vital to achieve the benefits of efficiency and reliability. The challenge is bringing together disparate pieces of information in different formats for a cohesive and functional view. The Cisco Smart Grid framework uses network instrumentation and software services to contribute to operational efficiency. Examples of this include support for automated metering infrastructure, distribution management, outage information systems, geographic information systems, meter data management systems, asset management, and customer information systems.

Business Applications and Business Services

Cisco Lifecycle Services offer system-level support for creating and maintaining a resilient, converged network that meets the unique operational needs of smart grid solutions. Offered by Cisco and its partners, these services are based on industry best practices and Cisco's proven methodology for planning, designing, and implementing an end-to-end infrastructure that integrates Cisco and partners solutions.



These services are used to build the most complete and relevant business applications for utilities, including applications for grid management and control, customer service management, and demand and capacity management.

What Are the Benefits of Cisco Smart Grid?

The inherent efficiency of the Cisco Smart Grid solution provides combined benefits for both utility companies and end customers. For utilities, these are realized through simplified operations that help:

- Increase reliability of the energy system and enhance preventative maintenance through improved monitoring and diagnostic capabilities
- Reduce the cost of energy transmission and distribution through better demand management
- Reduce the cost of excess capacity and storage
- Integrate other distributed energy sources, minimizing the need to invest in additional generation and capacity extension projects
- Reduce risk by improving security and resiliency of the grid

For energy consumers and end customers, the benefits are:

- Lower energy bills
- Reduction in network outages and disruption
- Better control over energy consumption through better visibility into usage patterns
- More choices for energy sources along with options to supply energy to the grid
- Helping make green choices to increase environmental sustainability

Why Cisco?

Cisco is in a unique position to help lead energy organizations make the transformation to smart grids. From a technology standpoint, the Cisco portfolio includes industry-leading networking equipment, computing platforms, integrated software services, and professional services that cover the spectrum of functional requirements for a scalable, reliable, and secure smart grid. These products span the different segments of the grid from the generation facility infrastructure to the data center to the smart meters at a residence, creating a true end-to-end, converged, and interoperable solution.

Cisco also has a proven track record of success in using the network as the platform to roll out advanced services and applications. The lessons learned from public switched telephone network (PSTN) to IP migrations provide expertise that enables the deployment of time-tested networking techniques to make sure of resilience and self-healing. Similarly, Cisco has handled the migration of wired to wireless networks, providing consistent mobile services for a variety of applications in a secure manner across both LAN and WAN environments. This experience helps customers shorten the learning curve for smart grid projects.

Finally, Cisco is a committed partner. To support initiatives such as smart grid, Cisco created the Critical Infrastructure Assurance Group (CIAG). This group provides leadership to improve the security of global critical infrastructure. CIAG is committed to helping organizations worldwide implement security strategies by directly addressing research, training, education, sound practices, and standards needs.