Energy meets Intelligence.
The Smart Grid – Constant Energy in a World of Constant Change.

Answers for infrastructure and cities.
Constant Change ...

Much of the world's existing energy infrastructure was built in the era of black-and-white TV, isolated markets, and low cost, centralized power plants. There were fewer consumers with fewer devices, smaller cities and smaller economies, less distribution and less variety in production — it was, as they say, a more simple time.

Since these "good old days" a constant and reliable energy supply has been central to the growth of industries, vital to economic stability and crucial to social well-being. This hasn’t changed, but as the complexity of our world continues to increase, our energy system must adapt to contend with these new and dynamic challenges. In a word, our energy infrastructure needs to be "smarter".

Siemens proudly invites you to experience the state of the art in energy systems.

... means a Constant Challenge

As energy consumption and generation increase worldwide, the percentage of electricity in the energy mix is automatically growing. The percentage of renewable energies is also increasing. The fluctuating and widely distributed output of these renewable sources adds complexity to the already pressured grids.

Changing infeed patterns, aging infrastructure, non-technical losses, and capacity problems pose a challenge we have no choice but to face. The questions of capacity and controlling, of distribution and decentralization, of integration, storage and high-end IT are ones we will have to find answers for.

The matter is complex – cooperation and custom solutions are in demand. Intelligence in information and communication will be central to the future of energy.

How can the energy industry provide a reliable, sustainable, and affordable supply of constant energy in a world of constant change? How can existing energy grids be modernized and combined with new approaches? This is the challenge of our times.

A thriving and ever-changing world poses great challenges to all of us in the energy industry. Smart energy grids are an essential part of the answer.
The bigger the change, the bigger the challenge

To stay successful, the energy industry will have to adapt and transform its aging business models and technologies, and develop new ways of thinking. Here are some of the greatest challenges the energy industry is facing.

Renewable & Distributed Generation
The integration of renewable and distributed generation and traction power networks within existing networks causes particular problems in the control of power flow, power quality and protection.

Limited Generation & Grid Capacity
The increase in outlay means an increase in potential dangers. Brownouts and blackouts affect the general economy, banking, communications, traffic and security.

Aging & Weak Infrastructure
Much of today’s energy infrastructure is more than 60 years old, posing a potential threat to security of supply. Fundamental modernization is necessary.

Cost & Emissions of Energy Supply
As both prices and emissions have a growing financial impact, efficiency in both generation and distribution is the key to a strong return on investment.

Revenue Losses, Non-Technical Losses
A significant volume of electricity is lost through technical inefficiencies or theft, posing real and sometimes existential threats to businesses and whole economies.

The trickier the problem, the smarter the solution

In an ever more decentralized and diversified energy system, there are no easy answers. Smart Grid partners need a modular set of flexible solutions and a great deal of experience to guarantee constant energy. Here are some Smart Grid solutions.

Balance of Generation & Demand
An optimized balance of generation and demand (e.g. demand response, microgrids, virtual power plants) helps reduce the overall consumption of electricity by directly regulating devices or influencing consumer behavior by offering peak tariffs. As a consequence, the need for costly peaker plants is also reduced. Decentralized, inter-connected generators allow for more control and precise planning of supply. Smart information technologies and the smart use of economic mechanisms lower operating costs, ensure reliability and help establish predictability.

Load Management & Peak Avoidance
Specialized load control and load management applications shave or shift peaks to ensure maximum grid stability – even at times of peak demand. Shedding loads through legacy systems, calculating baselines and automating customer billing and settlement are absolutely necessary for the system to run effectively.

Automatic Outage Prevention & Restoration
Smart Grids allow real-time monitoring and self-assessment in combination with automated interfaces. Protective relays, fuses and sensor systems automatically anticipate overloads and disconnect components before damage can occur. Components are restored, safety and supply is improved.

Efficient Generation, Transmission, Distribution & Consumption
Removing inefficiencies through advanced automation, sensing and measurement, and improved interfaces from the point of energy generation onwards. Energy storage systems and demand-side management improve the overall system efficiency at the point of consumption. Synergies are significantly increased, costs substantially cut – advanced grid technology equals a price advantage.

Full Transparency on Distribution Level & Automated Loss Prevention
Substation condition monitoring and automated interfaces provide utilities with a real-time status overview of their distribution grids and automatically anticipate disturbances in a self-healing manner. This increases overall network efficiency and saves on operational costs.
Siemens Smart Grid provides a complete end-to-end spectrum of technologies, products, services and solutions, designed for all partners in the energy industry. Siemens works closely with energy producers, grid operators, industrial companies, multutilities, cities and rail operators to help them meet the challenges of the new era.

Siemens Smart Grid incorporates the industry’s most innovative IT solutions to optimize information and communication. The more intelligent these systems are, the more useful and valuable the information generated from field data becomes. Incorporating digital sensing and automated analytics across the entire energy system will revolutionize the industry.

Siemens Smart Grid transforms cities into prosumers and private households into energy dealers in a new, bidirectional energy system – moving towards a more efficient, reliable, resilient and responsive grid. Rail operators become energy suppliers as excess (brake) energy is fed back into the grid. The megacities of the future bear a huge potential to become efficiency leaders in generating and storing electricity.

Siemens Smart Grid enables a paradigm shift away from a centralized, reactive and producer-controlled network. The future of efficient power generation and delivery will come from decentralized, interactive and demand-controlled systems. Fundamental modernization of current installations is necessary to master growing demands and to operate safely in the increasingly complex environment of the future.
Global Changes – Specific Requirements

Adequacy, efficiency, reliability and climate protection – the basic system requirements are the same all over the world. Whether power producers, grid operators, industrial companies, municipalities, and remote and rural operators in different countries and diverse markets face face unique and specific challenges.

Transmission Applications

Transmission grids are the backbone of any modern energy infrastructure. A high degree of automation, optimal maintenance and avoidance of outages can largely ensure a functioning transmission infrastructure. Help resources and plan in a way that avoids overloads and guarantees a long asset lifetime.

Industrial & Utility Grid Applications

When a power blackout paralyzes a steelworker’s melting furnace, the damage can quickly impact the whole enterprise. Intelligent control and automation technology ensure that emergency generators start working, guarantees critical asset lifetime, reduces overall operating costs. Smart meters and state-of-the-art IT infrastructure, helps maintain the balance, enable better storage, efficient load management and lowers the operating costs for individual solar and wind power plants.

Distribution Applications

Today’s distribution networks are not designed to handle growing power requirements in the increasing proportion of strongly fluctuating power generated from renewable resources. Intelligent hardware and software solutions help reestablish the balance of supply and demand to create new business models for small facilities. New modernization once was not sufficient – new and smarter distribution grids will have to be installed.

Microgrid

Microgrids are the backbone of a miniaturized smart grid. They are characterized by a high degree of automation, storage and consumption. They make the networks secure and cost-efficient operation of remote grids with a high share of fluctuating renewable energy grids.

Siemens Smart Grid Suite

Siemens is the only company able to provide a real end-to-end portfolio of end-to-end solutions on every single level.

End-to-End Intelligence

The Siemens Smart Grid Suite is designed to provide the energy industry’s movers and shakers with a complete portfolio of end-to-end solutions, flexible power plant systems, industrial applications, and remote and rural operators in different countries and diverse markets face face unique and specific challenges.

Field Equipment

Field Equipment is the first level of intelligence in electricity grids and the backbone of “all things energy”. It is always built on unrivaled domain knowledge and task-oriented IT solutions. Siemens is the perfect partner for “all things energy”.

Communication

Communication is key. All components of a smart grid are interconnected in a super-dense, communication layers. The Siemens Communication is designed to provide a real end-to-end portfolio of end-to-end solutions on every single level. Siemens is the only company able to provide a real end-to-end portfolio of end-to-end solutions on every single level.

The Smart Grid Suite by Siemens is designed to provide the energy industry’s movers and shakers with a complete portfolio of end-to-end solutions, flexible power plant systems, industrial applications, and remote and rural operators in different countries and diverse markets face face unique and specific challenges.

Local Challenges – Specific Solutions

The Operational IT level consists of intelligent platforms for grid control and grid applications. By playing a key role in the management, control and regulation of the entire grid and the power flow within the grid, Smart Metering is a pillar in the new layer and plays a major role in demand-side management. Scalable to existing and future standards, these technologies ensure the economic and secure operation of grids with notably lower emissions, and are key for the sustainable integration of intermittent, renewable energy sources.

The Smart Grid Suite by Siemens provides energy utility Enterprise IT access to or as part of a partner ecosystem. Always built on unrivaled domain knowledge and tailored to the individual needs of strongly fluctuating renewable energy grids, Siemens has the highest installation rate worldwide compared to competitors.
“There is nothing permanent except change.”

Heraclitus

From Buzzword to Business:

For utilities, industries, rail operators
Imagine a sharp climb in the cost of delivery infrastructure and the generation of operating energy. What if regulators demand market liberalization and an increased share of renewables. And consider that consumers are calling for more transparency and control of energy prices. Suddenly, utilities, industries and rail operators are under intense pressure to maintain profitable operations.

Siemens Smart Grid technologies help industrial partners transform from pure commodity to added-value service providers, positioning themselves as modern suppliers in the ever-changing world of energy services.

For the economy
So there’s a small disturbance, a minor variance in the electricity supply and what happens? Huge costs are incurred. Can you take it? Or do you pass those costs on to your customers? You don’t have much choice but to increase your prices, but in doing so, you automatically make your products and services less attractive.

Today’s digital economy requires a higher level of power quality than ever before. In order to provide the reliability business demands, a state-of-the-art electricity infrastructure is necessary.

Siemens Smart Grid technologies provide an environment that is attractive to new investment and new jobs, fosters production and growth, and is ultimately central to our economic well-being.

Constant Energy – Constant Success

For society
How do we move forward? Nuclear power is phasing out and fossil resources are diminishing. The universal expectations of the energy system are enormous and complex, amounting to nothing less than absolute stability and flexibility of supply while creating minimal environmental impact.

Siemens Smart Grid technologies help society maintain stability and security of energy supply while stabilizing the overall costs of energy generation and delivery, establishing transparency and meaningful dialog.