



SMART GRID

Technologies
for the future



Today's power grid operators have a vital role to play in the successful transition to the clean and sustainable energy future that we all want, and our warming planet desperately needs.

Transmission System Operators (TSOs) and Distribution System Operators (DSOs) are racing against time to adapt to the most complex mix of challenges to face the energy industry in 100 years.

Today's realities have made our legacy, monolithic grids redundant. Consumers no longer simply use energy - they can produce and store it too. Wind, wave and solar power are replacing fossil fuels, but variable weather conditions impact generation, requiring sophisticated management to keep supply, demand and storage in balance.

Supporting the growing adoption of electric vehicles by citizens and businesses requires charging points to be available 24/7, adding to the complexity of demand management. But with these very real challenges comes a once-in-a-lifetime opportunity to completely reimagine our industry's fundamental building blocks, and to create a new, dynamic and flexible energy ecosystem, capable of meeting today's demands and those emerging in the decades to come.

The drive for renewable energy sources to slow down the impacts of climate change has brought with it an imperative to embrace new business models, characterised by Decentralization, Decarbonization and Digitalization.

In common with so many industries, the combination of new digital technologies and the ability to capture data and analyse, interpret and share it throughout the enterprise, is at the heart of the transformation of TSOs, DSOs and their supply chains.

But as with all business transformations, success comes from a combination of inspired strategic thinking, intelligent, informed decision making and expert execution. Around the world, leading energy businesses choose to partner with Capgemini for its holistic, end-to-end skills, experience and proven track record in multiple markets, leading the transition to the Smart Grids that are essential if we are to achieve our Net Zero targets and more.

Smart Grids, an integrated, end to end approach

Each year hundreds of billions of Euros are spent modernizing power grids. Ensuring that those investments are smart, and the grids they create are smart too, is critical to the success of our shared global mission. There is no time to lose and resources are finite.

With Capgemini's support throughout their change journey, today's leading power grid companies look very different to their predecessors, thanks to a strategically considered, integrated, end-to-end approach that supports client organizations through each stage of their transformation journey.

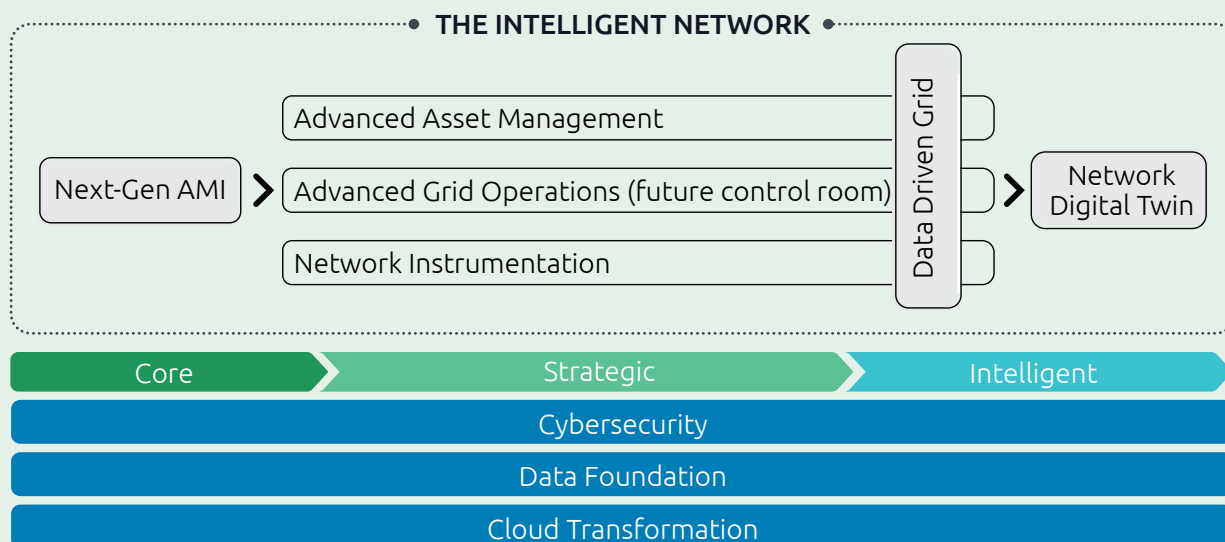
With digital technologies and data management at the core of our holistic approach, Capgemini helps grid companies achieve three key business objectives, to:

1. integrate intermittent renewable distributed energy sources, such as solar and wind
2. improve grid reliability, security and affordability
3. implement demand response management and energy storage optimization.

Too often digitalization projects are tactical, to empower field forces or procurement teams for example. Helpful though these are, when carried out in isolation their benefits are limited.

By thinking and planning strategically, across the enterprise, Capgemini unlocks and maximizes value, with comprehensive and integrated digital transformation programs, with the goal of eliminating silos and capturing data from all sources on one central platform. This single source of truth can be shared and exploited by all, throughout the business and its extended supply chain.

OUR SMART APPROACH TO SMART GRID IS END TO END



Grid companies partnering with Capgemini typically enjoy:

- Advanced Asset Lifecycle Management capabilities, leveraging data analytics, IoT and AI to optimize the lifecycle of all grid assets, improving reliability and reducing maintenance costs.
- Advanced Dynamic Grid Operations, empowered by live, real-time data, predictive analytics and automation to manage and optimize the flow of electricity, enhancing reliability and ensuring efficient grid operations. The beating heart of today's dynamic grid operation is an integrated control centre, embracing IT, OT, automation and advanced analytics, informed by multiple data sources, both internal and external, such as live weather forecasting.

Important enablers are:

- Next generation Advanced Metering Infrastructure (AMI), an integrated system of the very latest smart meters in homes and businesses, communications applications and data management technologies. In combination they drive value for utilities and their stakeholders by enabling innovative new services, and unlocking enhanced performance, resilience, security and cost efficiency.
- Network instrumentation, primarily in the form of new, smart substations, acting as conversion hubs and enabling multi-directional flow to seamlessly manage supply and demand across the grid, including variable loads and large and small generation sources, such as nuclear, steam, solar, wind, EV, batteries and storage systems.
- Data-driven grids, with IoT data used to optimize CAPEX and investments in Intelligent Grid modernization.

Artificial Intelligence helps to derive value from existing grid data and reduce OPEX. Data and AI in combination fuel new data-driven business models to enable transition from consumer to prosumer. Data sharing supports collaboration in the ecosystem and adds transparency to ensure regulatory compliance.

Capgemini is pioneering the next generation of Smart Grid companies around the world, deploying vast, global energy experience and best practice, engineering excellence, collaborative innovation, cloud expertise and world class data management capabilities.

Through our extensive network of technology partners we design bespoke solutions with the best combination of components to meet the needs of each project.

This recognises that each organization's journey to Smart Grid is unique, with different start points, challenges and opportunities, success criteria and resources.

Capgemini has 75 smart energy clients worldwide and in the field of advanced metering infrastructure alone, Capgemini is responsible for seven out of ten of the world's largest implementations, is delivering smart energy projects involving 170 million smart meters and operates 1.5 million smart meters daily.

It's easy to forget how transformational energy is. Together we can light the way to clean, sustainable, available, affordable energy for all. We're working in partnership with energy companies around the world to transform our industry, improve lives and help protect our precious way of life and the natural world.



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About Capgemini

Capgemini is a global leader in partnering with companies to transform and manage their business by harnessing the power of technology. The Group is guided everyday by its purpose of unleashing human energy through technology for an inclusive and sustainable future. It is a responsible and diverse organization of over 360,000 team members in more than 50 countries. With its strong 55-year heritage and deep industry expertise, Capgemini is trusted by its clients to address the entire breadth of their business needs, from strategy and design to operations, fueled by the fast evolving and innovative world of cloud, data, AI, connectivity, software, digital engineering and platforms. The Group reported in 2022 global revenues of €22 billion.

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