DIGITAL TRANSFORMATION JOURNEY FOR GRID OPERATORS

AT A GLANCE

Power Grid: The energy transition backbone's challenges

While electric grids are aging significantly, the energy transition is disrupting traditional grid operations requiring electric grids to adapt to a new electricity paradigm: more and more intermittent and distributed renewables and new consumer patterns. In addition, the urge of electrification from all sectors to replace fossil energies creates a higher dependency on electric infrastructure and requires strengthening the grid physical robustness and cybersecurity layers to ensure security of supply.

As "energy transition backbone", electric grids have no choice but to adapt and evolve, leading to massive development and modernization investments to ensure that power stays reliable, affordable, and secure, especially on distribution side.

Digital is a "must have" in the grid transformation

Digital will play a key role to transform ways grids are managed and operated. Indeed, the new grid mandate relies on three pillars: i) a distributed architecture to match the new energy paradigm, ii) digital technologies to create business values and iii) a cybersecurity imperative.

Electric grid needs to accelerate their transformation from traditional to digital grid at scale, on the critical path on the energy transition. Yet there is no single route to achieve this complex journey that requires time (~10 to 15 years) and money (~billion $ budgets). Capgemini & Schneider Electric have defined a reference framework to guide grid operators building their iterative transformation journey and typicalsteps to go through.

Key functional considerations for successful digital grid transformation

The energy transition is making grid operations much more complex: DSO need to aggregate billions of data points to avoid local congestion, manage multi-directional power flow, provide reactive power support to TSOs, while ensuring grid sustainability, reliability, and resilience.

Bringing solutions together within a robust and interoperable architecture enable to integrate various data layers and better manage data across the overall grid lifecycle: from grid planning and design, to grid monitoring, operations and maintenance, and customer services. In this chapter we look at key functional considerations to address while defining grid transformation journey.

An end-to-end approach to accelerate & de-risk the transformation journey of Grid operators

Grid operators must adopt a holistic approach for their end-to-end transformation, to coherently develop new people skills, new business processes, new technology capabilities while orchestrating a new industrial ecosystem. Schneider Electric and Capgemini propose such an end-to-end combination of complementary capabilities, solutions, and services to assist utilities in driving their digital transformation journey. Our joint approach enables to secure, accelerate and de-risk grid operators digital journey thanks to an end-to-end delivery model, prepackaged solutions and use cases, as well as delivery accelerators.

1 POWER GRID: THE ENERGY TRANSITION BACKBONE'S CHALLENGES

Challenge 1

Adapting to the new electricity paradigm

Energy transition is disrupting traditional grid operations, especially as it relates to the increasing share of renewables, the rise of prosumers, and the emergence of storage at scale (including hydrogen and electric vehicles). The higher share of distributed and intermittent renewables in the electricity mix is endangering grid stability, which requires new grid connections and grid operations adaptation. Investments are necessary in both distribution and transmission networks to connect renewables, as well as enable local energy balance with storage and back-up generation plants to offset changes in load curves and avoid bottlenecks. This leads to an investment parity between renewables and grid development: Every $1 investment in renewables should be matched with a $1 investment in grids.

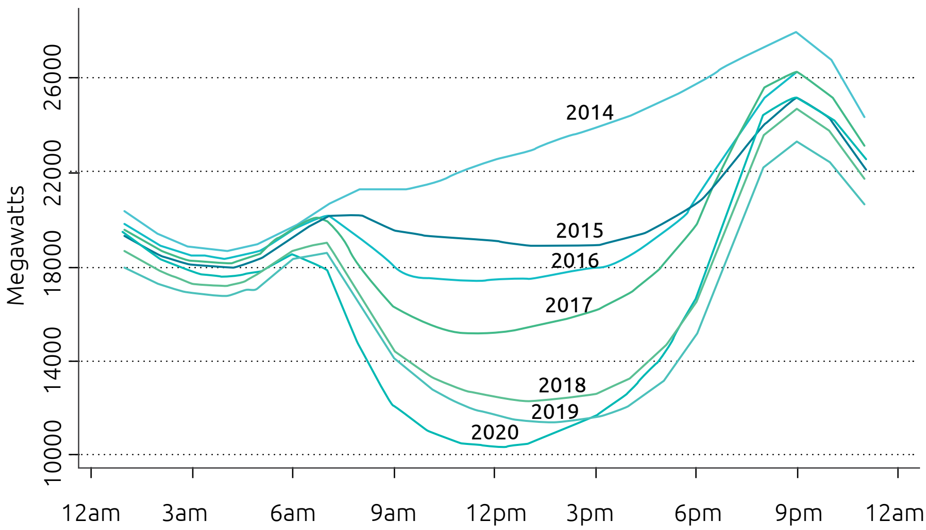
Challenge 2

Managing electricity usage acceleration

Electricity usage will increase due to the surge of electrification across all sectors to replace fossil energies. This includes electric mobility, electric heating and cooling, and other usages. Electricity usage is forecasted to grow over the coming years and surpass energy demand growth. In 2020, electricity covers only 19% of energy demand. However, to achieve carbon neutrality by 2050, this share must grow to 50%-60%. This requires at least doubling the volume of electricity by 2050 (1.5X in developed countries and 3-4X in developing countries). The recent rise of green hydrogen could raise these figures further.

Increasing electrification means higher dependency on grid infrastructure and appeals for grid development to support new electricity usages, as well as performance improvement to increase grid availability, flexibility, resilience, and operational efficiency. Therefore, growing electrification will require grid reinforcements and increased performance.

Figure 1 – The typical example of the "Duck curve," changes in load curve for a typical spring day in California



Source: Californian Electric System Operator, 2014-2020

Did you know?

With more than 40% of the renewable capacity mix, California bets on solar energy. The Californian Electric System Operator reported a transformation of the load curve called the "duck curve." It shows an increase in self-consumption with solar panels on buildings and houses decreasing mid-day electric demand, but an exponential ramp-up of back-up systems at sunset. It creates bottlenecks on the network, and the need for costly schedulable back-up generation.

Challenge 3

Strengthening resilience

The electricity grid is an instrumental component in our society. However, it remains vulnerable to natural disasters and malicious attacks:

- Climate change will very likely lead to intensifying the effects of climate events. This could wreak havoc on electricity distribution, leading to long lasting blackouts and other issues. In recent years, hurricanes in Louisiana, Texas, and in Florence, Italy, have had a significant impact on the grid and its ability to distribute electricity.
- Meanwhile, the overall utility sector, including the grid, is facing increasing threats from ransomware and other cyberattacks on operational technologies, which are made more accessible through the internet.

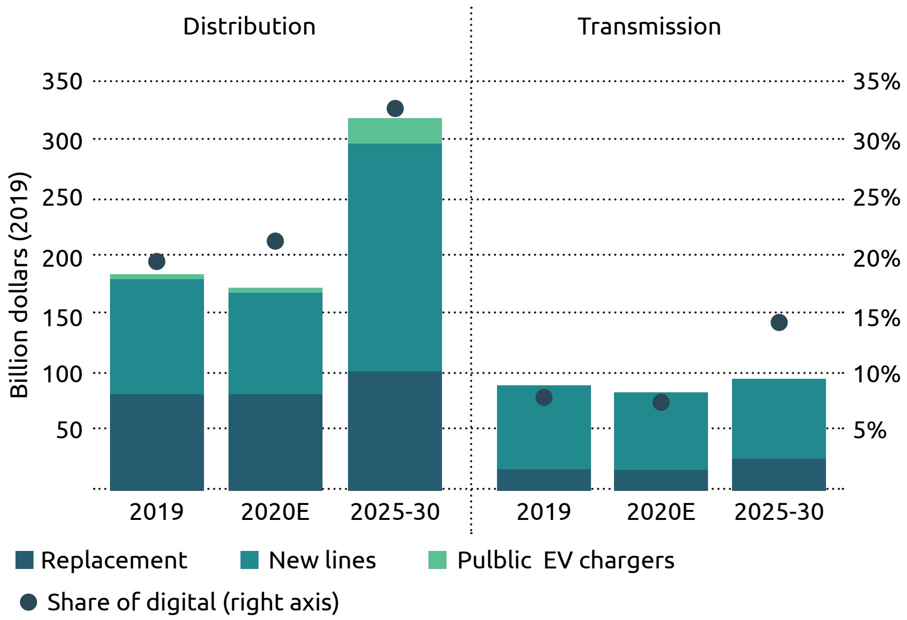
Strengthening the grid's physical robustness and cybersecurity layers is crucial to ensure security of supply to support the increasing electrification and higher dependency on grid infrastructure.

These three challenges have kicked off a wave of investments that are expected to continue through 2030. According to IEA, up to $400 billion in investments per year are forecasted from 2025 to ensure power stays reliable, affordable, and secure, especially on the distribution side. As of 2025, 30% of this investment will be related to grid digitalization of distribution networks, representing about $120 billion per year for smart grids.

Did you know?

In April 2021, the U.S. Department of Energy launched the 100-day plan to improve the cybersecurity of Electricity Control Systems and secure the energy supply in response to the "Colonial Pipeline" cyberattack. The Bill and Job Act Infrastructure plan has secured around $7 billion for cybersecurity.

Figure 2 – Annual investment in electricity networks 2019-2030



- **Replacing aging grids** offers an opportunity for modernization. Over the next ten years, about 20% of electricity grids worldwide need to be replaced.
- Cumulative investment by 2030 amounts to **$2.6 trillion for new lines** (~16 M km), an increase of 80% compared to last decade mainly due to twice as much **new wind and solar capacity being added.**
- Cumulative investments of about ~$40 billion are forecasted by 2030 to develop the charging infrastructure to support the growing demand for electric vehicles.

Source: Electricity security in tomorrow's power systems, IEA, 2020

2 | DIGITAL IS A "MUST HAVE" IN GRID TRANSFORMATION

Considering these challenges, achieving grid transformation at scale to optimize grid management and improve operations is an industrial imperative for grid operators on the critical path of energy transition.

2.1 The new grid mandate relies on three pillars

i Distributed architecture to match the new energy paradigm

The below graphic illustrates how grid operators must achieve a gradual shift from a centralized balancing model with one-way energy flow, to a decentralized balancing model with two-way energy flow, to a distributed model with production and storage assets moving on and off grid.

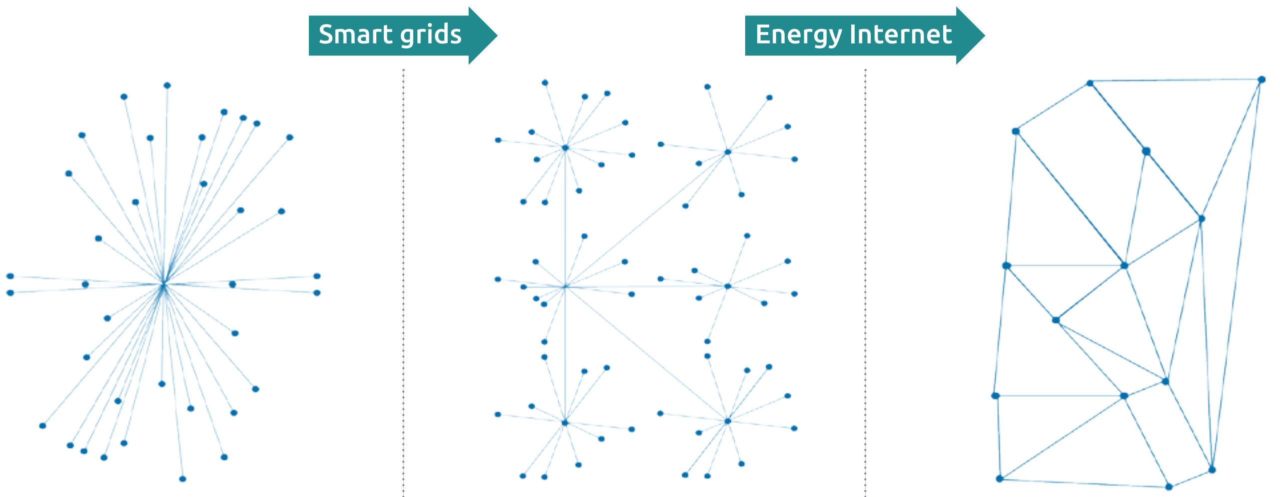
ii Digital transformation to create business value

The ability to generate data-powered insights through digital will enable grid operators to create business value through better management of infrastructure (e.g., maintenance, integrity management), more efficient grid operations (e.g., orchestrating the different parameters for grid balancing with real time data management), and improved services delivered to end customers (including new data-driven services to optimize electricity consumption).

iii Cybersecurity imperative to ensure continuity of service

The volume, diversity, and complexity of data is growing in orders of magnitude across the electricity value chain and has led to a proliferation of sensitive data

Figure 3 – New grid architecture: A gradual shift from a centralized balancing model to a distributed balancing model



Step 1 - Centralized

- Production is **centralized**
- Distribution network works **one-way**
- End-users are **consumers**
- Storage is **very limited**
- Producing and storage assets are **permanently** connected to the grid

Step 2 - Decentralized

- Production is **hybrid and scattered across the territory**
- Distribution network works **both ways**
- End-users are **prosumers**
- Storage takes a **bigger share**
- Producing and storage assets are **permanently** connected to the grid

Step 3 - Distributed

Decentralized model
+

- Storage is scaling (P2G and battery)
- Some producing and storage assets go **on/off** to the grid
- Off-grids systems can run independently from main T&D

managed in a decentralized way. This increases the risk of cyberattacks. Cybersecurity is a crucial component of any grid development, including both hardware and software applications, and must be integrated by design.

2.2 Capgemini and Schneider Electric's reference framework

Capgemini and Schneider Electric have defined a reference framework to guide grid operators on their transformation journey. Here we outline the four building blocks, which are iterative in nature, that should be addressed as part of the transformation process:

- **Network instrumentation:** Deploying IT/OT solutions, sensors, and computation capabilities at the core and the edge of the network, including decentralized calculation on the edge. This network instrumentation is done by design for a new line or by retrofitting an existing line.
- **Grid operations improvement:** Leveraging data to automate the supervision system; optimize grid maintenance and operations; improve grid performance and grid operations efficiency; ensure grid stability, resiliency and (cyber)security; and achieve higher customer service and performance.
- **Advanced asset management:** Improving lifetime of equipment, incorporating predictive maintenance, optimizing costs of assets ownership, and securing availability and sustainability.
- **Data-driven grid:** Setting the technical foundations and human capabilities to leverage data and artificial intelligence (AI) to optimize CAPEX and investments for intelligent grid modernization; derive value from existing grid operations and reduce OPEX; introduce new data-driven business models; and enable transition from consumer to prosumer.

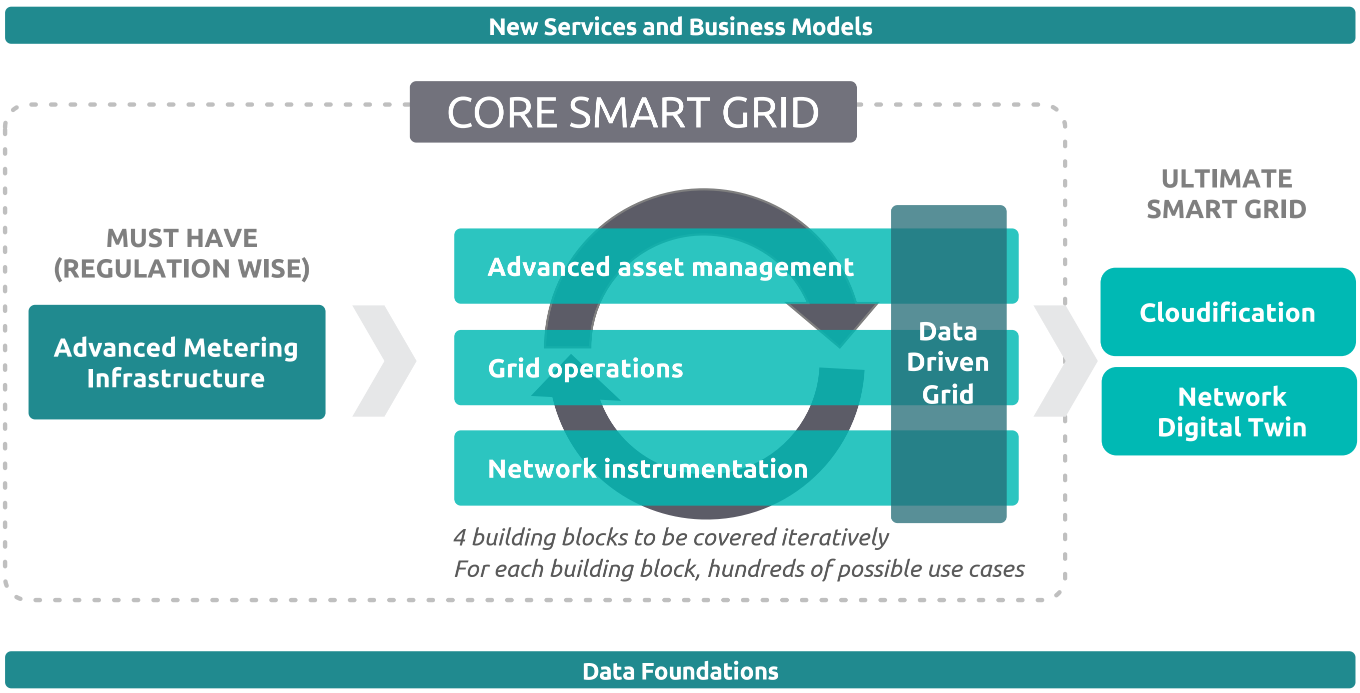
Usually, the smart grid roadmap starts with an advanced metering infrastructure rollout, which can sometimes be the result of regulation.

In an advanced state, the DSO can deploy cloudification and digital twin technology alongside these four building blocks to create the "Ultimate Smart Grid."

Did you know?

Along with smart grid projects, the volume of data in Europe is expected to increase from 33 zettabytes in 2018 to 175 in 2025, a 530% increase in seven years. While in 2018, 80% of data was stored in centralized computing facilities, in 2025 only 20% will be managed this way, with the remaining 80% being stored in smart connected objects.

Figure 4 – The building blocks of the smart grid transformation at scale



2.3 From traditional power grid to smart grid at scale: An iterative transformation journey

As the backbone of the energy transition journey, the industry needs to accelerate their transformation of the traditional power grid to a digital grid at scale. Yet there is no single route to achieve this complex journey that requires time (at least 10 to 15 years) and billions of dollars in investments. Here are some typical steps that will need to be addressed in this transformation journey:

i Setting the strategic vision: Establishing the expected business value from grid transformation

Grid transformation must be driven by a long-term vision, which sets the target benefits from both a technology and business perspective. These objectives will serve as a compass for the grid transformation journey, supporting rationalization of digitalization efforts, and accelerating business transformation.

ii Building the trajectory: A DSO-specific transformation journey

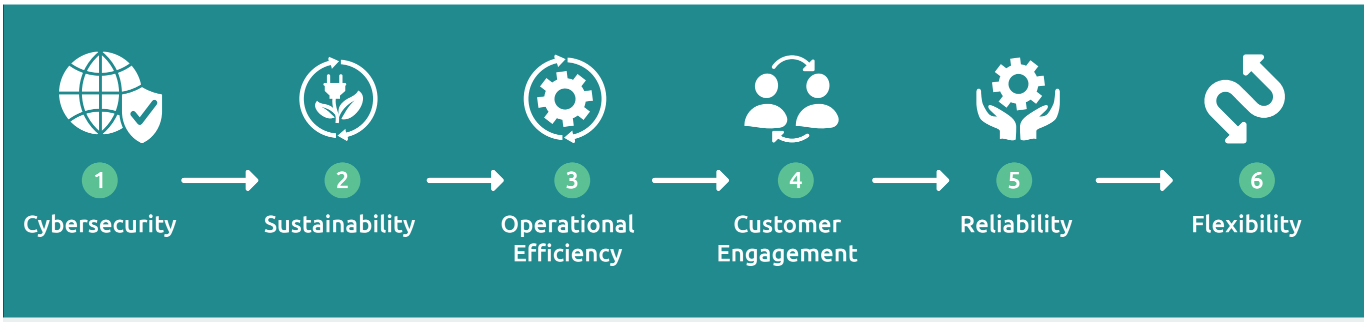
The digital grid transformation journey is DSO-specific and must consider the organization's digital maturity, market context, and technology evolutions. Its transformation roadmap must be built based on the specific grid situation (e.g., network age, smart meter rollout, generation mix, regulation) and business priorities (e.g., operational efficiency, customer engagement). The next table depicts the different priorities that can be set depending on the criteria and the situation of the DSO.

Section 3 of this whitepaper will present the key functional considerations that should be addressed when defining the trajectory.

iii Engaging a digital grid transformation at scale

Once the 'what' has been defined, the organization must consider 'how' it should be implemented. Here we share some recommendations:

Figure 5 – Business value domain brought by digital grid transformation at scale



- **Cybersecurity:** Establishing security standards to support the rise in connected devices and collaboration of all parties (e.g., regulators, prosumers)
- **Sustainability:** Extending asset life span and availability through smarter business decision-making enabled by predictive asset analytics; reducing maintenance costs and environmental impact
- **Operational efficiency:** Improving grid operations to better manage distributed energy resources and strengthen grid availability, stability, resiliency, and economic efficiency
- **Customer engagement:** Increase customer service and satisfaction via higher service quality and new offerings
- **Reliability:** Enhancing visibility into real-time and forecasted distributed energy source activity as well as optimizing dispatch to anticipate issues and prevent bottlenecks
- **Flexibility:** Increase coordination between TSOs and DSOs to leverage distributed energy sources flexibility for peak load management, load shifting, and other needs

Table 1 – Examples of grid characteristics and related transformation priorities

Criteria	DSO situation	Grid transformation priorities
Grid situation		
Smart metering status	i) No smart metering infrastructure in place, but regulation imperative ii) Aging smart metering infrastructure iii) Smart meters implemented at scale and infrastructure required to enable grid functions and communications	i) Smart meter wave 1 ii) Smart meter wave 2 iii) Network instrumentation
Bottlenecks to deliver more electricity	Networks could need reinforcement at peak hours or to deliver more energy (EV charging, heat pumps)	Grid planning (network reinforcement)
Share of Distributed Energy Resources in the mix	Beyond 30-40% renewables share in the generation mix; grid stability could be a challenge	Grid operations (incl. Distributed Energy Resources Management System)
Sensitivity to outages	Overhead grid not solid enough and multiplication of weather events Need for resiliency and robust risk management	Grid planning (network reinforcement) Grid operations (Outage Management System enhancement)
Digital Maturity		
Asset management data quality	Poor quality or pretty good quality	i) GIS implementation and data cleansing ii) Network instrumentation iii) Real Time Health Asset Management
Data management status	i) Data management foundations in place (or not) ii) First Data driven use cases deployed (or not) iii) Business processes and people skills in place (or not)	i) Smart grid data foundations ii) Use case rollout at scale iii) Data-driven grid process and skills
DSO characteristics		
Low / Medium / Large	Need off the shelf / prepackaged / customized solutions (IT/OT, processes)	

a. Federate around the vision

The long-term vision, shared with all stakeholders and regulation bodies, should create momentum within the DSO and across the industrial ecosystem. Expected and achieved business benefits should be clearly communicated. This should drive tangible results thanks to a dedicated proof of value.

b. Synchronize technology roadmap and business roadmap

The DSO must adopt a holistic approach for grid transformation from a people and process perspective. They should also fully leverage technology, rationalize digitalization efforts, and coherently develop new people skills, new business processes, and new technology capabilities.

c. Lead a step-by-step journey with ROI-driven approach and an agile methodology

This complex transformation journey needs to be driven with intermediate and ROI-secured milestones in order to track business benefits. An agile methodology is required to drive grid transformation as the path will be impacted by market evolution, new policies, and regulations.

d. Set up a scalable and interoperable architecture

IT/OT convergence, along with the cybersecurity imperative, require a robust architecture. This architecture should integrate both central and edge/field levels to connect the technologies between digital grid layers and secure resilience, reliability, and (cyber)security. The architecture should comply with industry standards to ensure interoperability and avoid vendor locking. It should also be scalable and replicable by design, as well as adaptable to future evolutions. The architecture should be data driven or even event-driven to support real-time reaction and adaptation of operations. As critical foundation of a vital infrastructure, cybersecurity authorities should be involved in the target architecture design, support and approval.

e. Build robust data foundations

To leverage data at scale, the DSO must build robust data foundations to address key data challenges, including:

- Insufficient, poor-quality, hard-to-find data
- Disparate legacy data landscape and lack of modern data platforms
- Lack of confidence in data
- Insufficient data experts and governance
- Challenges in use case prioritization
- Difficulties in transitioning from POC to AI in production, at scale

These robust data foundations will ensure high quality of data, scalability of AI solutions, self-service, and value realization from grid data.

f. Integrate next technology advancements and prepare for future innovation

The DSO should monitor business and technology trends and rely on industry standards and proofed solutions to ease future innovation. The roadmap should be flexible, allowing for the integration and deployment of new technologies and digital capabilities.

g. Ecosystem orchestration

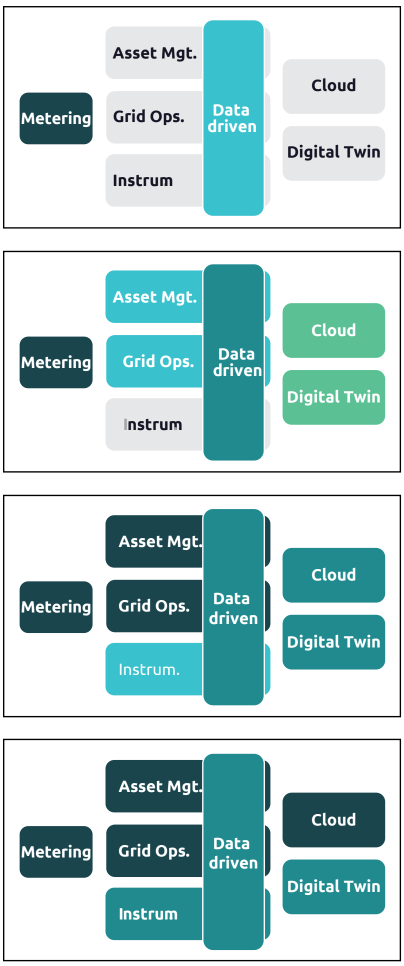
Considering the scale of the grid transformation, and the multiplicity of challenges to be addressed, it is not possible for one partner to deliver the entire transformation journey. Grid operators need to build and orchestrate an industrial ecosystem, ranging from large industrial players to start-ups.

2.4 Driving the journey: An example of digital transformation

The grid transformation roadmap must be built around each DSO's business challenges, expected benefits, and digital maturity. Intermediate milestones of the transformation roadmap should enable the DSO to achieve regulatory approval, improve business processes, and track benefits via an ROI-driven approach. Technology and digital solutions are enablers of grid transformation.

Here we present an example of a transformation roadmap which is designed to meet business objectives and synchronize new business processes and people skill development.

Figure 6 – Transformation journey example (Tier-1 player)



	DIGITAL ROADMAP STEPS (example)	**BUSINESS BENEFITS** (non exhaustive)
Starting point	• Advanced Metering Infrastructure deployed at scale • Proofs of concepts (PoC) on customer-oriented use case	• Real-time consumption • New possible services offering relying on data • Higher customer satisfaction with PoC • Consumption and emissions reduction
Milestone 1	• Improve the Advanced Distribution Management System (ADMS) • Implement a Distributed Energy Resources Management System • Deploy 1st data use case at scale (customer-oriented, asset performance management) • Launch a Digital Twin PoC • Test cloudification	• Improved grid operation performance • Ability to connect more renewables, real-time supervision of scattered resources • New offering and services development • Digital twin capabilities enabling simulations on limited scope (e.g. asset planning, extreme operations' conditions)
Milestone 2	• Launch Network Instrumentation Proof of Value • Implement ADMS & DERMS at scale • Implement first Digital Twin functions • Test and deploy more data use cases at scale • Start cloud implementation	• Standardization of data exchanges through network instrumentation • Real-time asset management • Automated supervision enhancement with real-time awareness, alerts and guided action leveraging AI • Predictive maintenance and various other data use cases • Digital Twin first benefits
Milestone 3	• Deploy Network Instrumentation at scale • Implement Wave 2 Digital Twin functions • Test and deploy more data use cases at scale • Deploy cloud at scale	• Real-time health asset management at scale (for global infrastructure) • Business flexibility • On the edge computing and automated, secured load supply balancing • Improved grid design, evolution and operations • Data and event-driven operations thanks to cloudification • Ability to deploy business best practices and related solutions to another network

To lead grid transformation at scale, the DSO needs to synchronize the technology roadmap and the business roadmap, as well as adopt a consistent, end-to-end approach across all transformation milestones.

3 KEY FUNCTIONAL CONSIDERATIONS FOR SUCCESSFUL DIGITAL GRID TRANSFORMATION

An influx of renewable energy, expansion of electric vehicles, and the rise of prosumers are driving energy transition. This, in turn, is disrupting the DSO mission and making grid operations much more complex. With millions of new connection points and devices integrating with the grid, the DSO needs to aggregate billions of data points to avoid local congestion, manage multi-directional power flow, and provide reactive power support to TSOs – all while ensuring grid sustainability, reliability, and resilience.

To manage these issues, the DSO must bring together different solutions within a robust and interoperable architecture to integrate various data layers and better manage data across the overall grid lifecycle. This includes grid planning and design, grid monitoring, operations and maintenance, and customer services.

> ***Did you know?***
>
> *One large grid operator estimates spending 90% of their time understanding the meaning of data, and only 10% of the time actually using the data.*

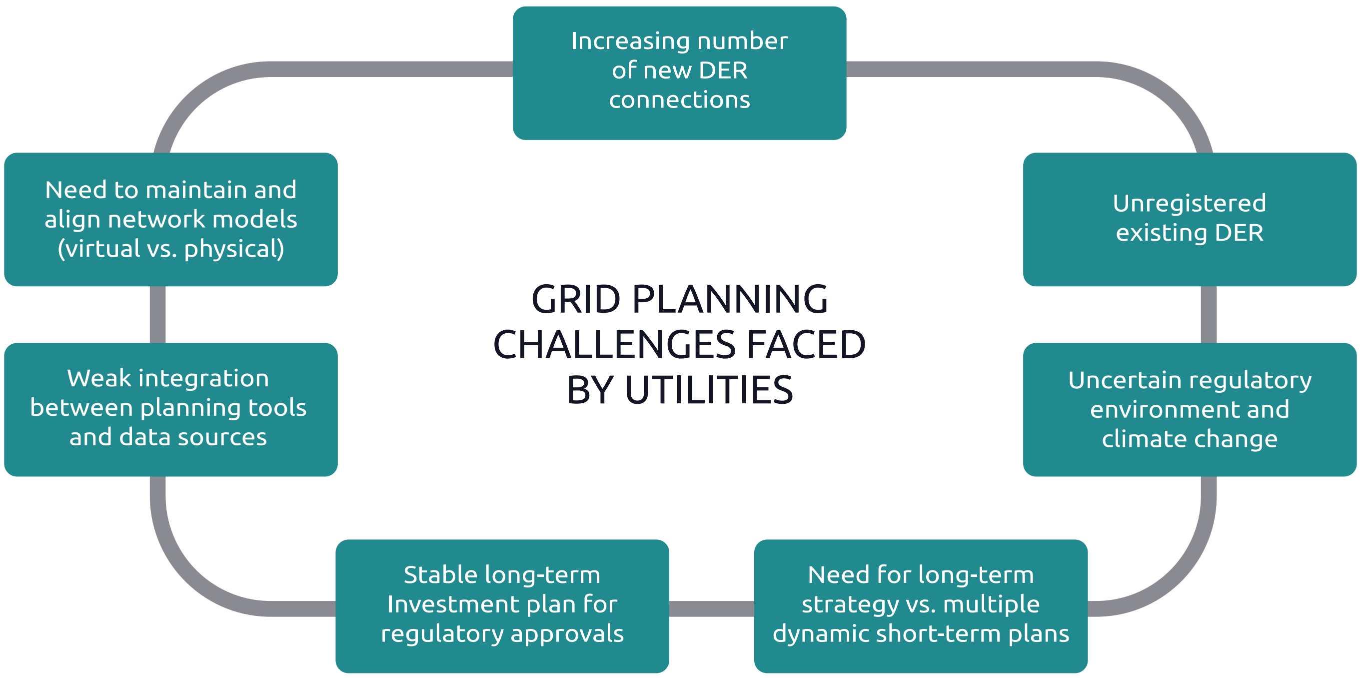
i Grid Planning: Requiring more complex simulations to integrate a myriad of data sources and variables

The traditional distribution planning process includes analysis of load variations to ensure power reliability and safety at least cost. This process relies on geographic information system (GIS) data, relatively predictable load growth and use patterns, and data from centralized generation sources.

But the multiplication of less predictable Distributed Energy Resources (DER) and increasing electrification use introduces many uncertainties on load variations and future grid capability requirements. More complex simulations are needed to merge a myriad of data sources and scenarios, and determine the impact of grid behavior, DER forecasts, and climatic and socioeconomic trends.

Performing advanced distribution planning with complex probabilistic modeling and simulation while also leveraging historical, real-time and forecast data from a multiple data

Figure 7 – Grid planning challenges faced by utilities



sources with effective data management practices will enable utilities to:

- Converge planning and operations through a common platform;
- Accelerate DER connection at a lower cost, while minimizing grid constraints;
- Maximize the benefit of equipment investments;
- Defer capital investment thanks to better optimization of generation, storage, demand-response, and energy efficiency; and
- Maintain compliance with regulatory and government targets.

ii Grid design: Maintaining aligned grid models "as-designed," "as-built," and "as-operated"

To optimize grid operations and maintenance, DSOs need accurate master data for their mission critical systems like work management, GIS, and Advanced Distribution Management System (ADMS). Yet most organizations are burdened with cumbersome design and construction processes, still paper based, with redundant tasks, leading to errors and discrepancies between "as-designed," "as-built," and "as-operated" grid states.

Breaking data silos is critical to enabling a single and aligned view of the grid network state to all stakeholders throughout the grid asset lifecycle. A single platform with digital processes and proper data ownership will ensure convergence between grid states while also improving access to information to design, analyze, plan, approve, schedule, and deploy changes in the network.

Many DSOs view GIS as the foundational or "master" data source of its geospatial asset information that will support the "as-built" state, and, increasingly, the "as-designed" state of the network. Engineering and design processes could be automated directly within the GIS as the ultimate system of record.

iii Grid monitoring: Integrating an increasing number of grid edge devices

Changing load structures due to DERs, EVs, and increasing electrification are causing utilities to rethink how they gather, validate an analyze data in real-time to reduce peak demand, optimize use of DERs, improve outage response, and enhance asset management to minimize capital expenditures.

This is quite a challenge, given the exponential data increase flowing into utilities' databases. For example, with smart meters, the number of data points per customer per year has increased a thousand-fold.

Did you know?

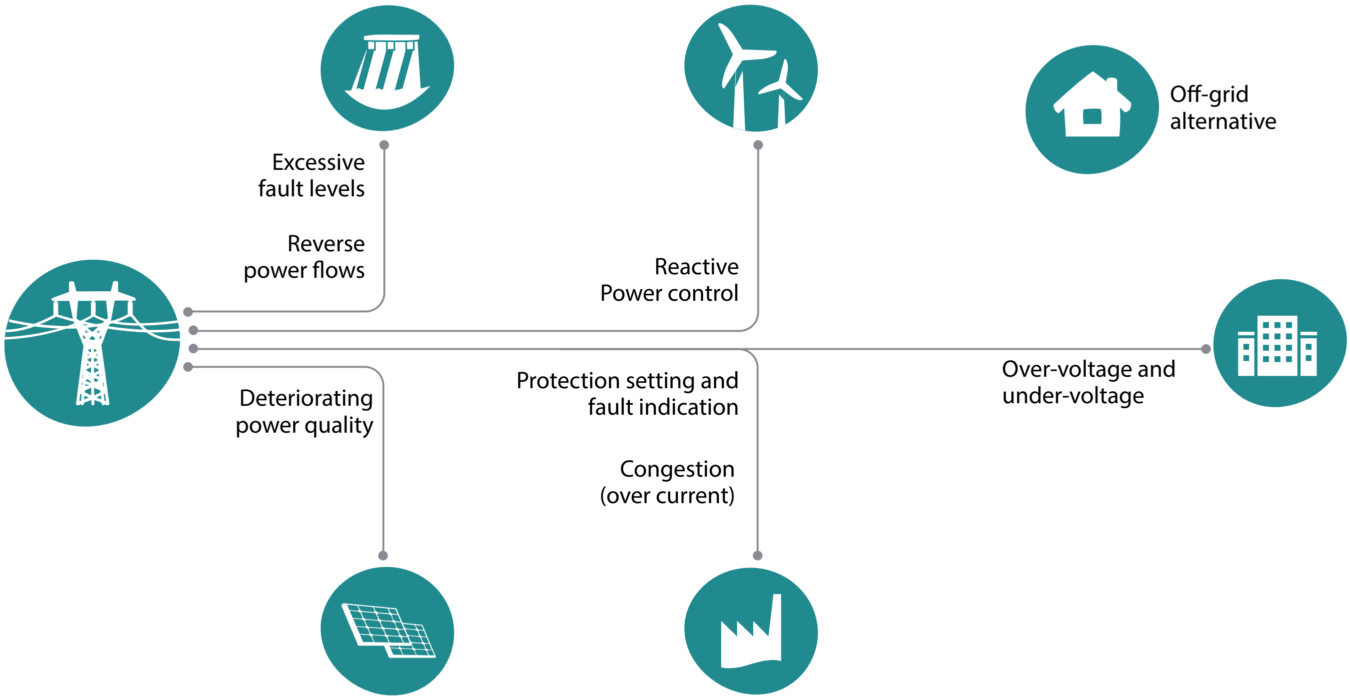
Many utility legacy systems cannot recognize, much less analyze, and predict bi-directional power flows from prosumers. In response, they are implementing an Advanced Distribution Management System (ADMS) to monitor and operate their network, as well as enhance planning, analysis, construction, operations, maintenance, and customer engagement processes.

iv Grid Operations: Managing grid instabilities caused by an influx of new consumption and power generation patterns

The higher share of renewables and distributed resources calls for more flexibility for network balancing and congestion management, and, by extension, closer coordination between DSOs and TSOs.

Orchestrating these scattered resources requires consolidating large amounts of data and leveraging strong analytical and artificial intelligence capabilities in real-time to find the optimum scenario as an answer to the operational constraints imposed by these resources.

Figure 8 – Operational constraints imposed by Distributed Energy Resources (DER) on distribution systems



Leading DSO are using ADMS coupled with a Distributed Energy Resources Management System (DERMS). The DERMS solution enables the DSO to coordinate directly with behind-the-meter (BTM) assets, such as solar PV, batteries and EVs, including demand-response.

Virtual power plant (VPP) platforms are also gaining traction and play a significant role in enabling grid flexibility. Microgrid controllers are another solution that enhance flexibility for both customers and DSOs by enabling local DER optimization and DER coordination as a single resource for the grid.

v Grid maintenance: Overcoming structural challenges and maximizing asset lifecycle

As utilities transform into more digital organizations and incorporate more distributed energy sources, they face structural challenges that impact operations and revenue streams. For example, updating infrastructure to address changing reliability of assets will create operations and maintenance decisions that may limit asset optimization and return on investment.

An Asset Performance Management (APM) solution helps DSOs gather and analyze asset data from operational, technical, financial, and geospatial sources in order to better understand the state of health and risk of failure. It enables the business to maximize the grid lifecycle by predicting when and where maintenance activities are needed to avoid outages, save costs, and maximize crew resources.

vi Customer services: Ensuring customer satisfaction while facing growing expectations

Reducing outages is still one of the most critical issues for consumers, especially when intermittent and distributed renewables are endangering grid stability. Moreover, DSOs are expected to achieve integration of distributed renewable and prosumer generation, as well as provide energy efficiency services. Ensuring customer satisfaction is more difficult as these expectations grow, and many DSOs are not adequately equipped or staffed to address these challenges.

DSOs require solutions designed to provide meaningful data analytics on energy use, improved efficiency, energy-saving programs, and demand-response management.

4 AN END-TO-END APPROACH TO ACCELERATE AND DE-RISK THE TRANSFORMATION JOURNEY OF GRID OPERATORS

The transformation imperative outlined in this paper demonstrates how and why DSOs must adapt and evolve. This includes rethinking their technology investment strategies and engaging **ambitious, holistic transformation strategy and roadmap to coherently develop new people skills, new business processes, and new technology capabilities, while also orchestrating a new industrial ecosystem.** Such transformation journeys typically take billions in investment and up to a decade for end-to-end transformation, especially for large utilities.

It will be difficult for utilities to engage this deep transformation journey alone. **Further, no single partner will be able to deliver this transformation on its own.** Utilities will need to build a trusted ecosystem of partners to help them on the end-to-end transformation journey, from developing the transformation strategy, including business transformation, to implementation of the technology roadmap.

Utilities can reap greater benefits by working with industrial partners who, with their combined capabilities, can address the full range of capabilities needed. **Schneider Electric and Capgemini propose such an end-to-end combination of complementary capabilities, solutions, and services** to assist utilities in driving their digital transformation journey.

Schneider Electric is the world leader in energy management and grid automation solutions, bringing software and hardware expertise in:

- **Enterprise solutions:** ADMS, DERMS, GIS, Grid Metering, Asset Management, and Energy Management
- **Operational solutions:** Scada and microgrid operations
- **Connected products:** Sensors, Remote Terminal Units, transformers, power management solutions, etc.

Capgemini is a world-class leader in Intelligent Industry, bringing together business transformation, systems integration, data science, and engineering services:

- **Strategy & transformation:** Digital innovation, business transformation and data science to deliver transformational outcomes at scale
- **Applications & technologies:** Technology development, implementation, IT/OT system integration, and data engineering
- **Operations & engineering:** Grid expertise and in-depth understanding of business processes and operational technologies

With our combination of skills and extensive grid experience, we can support all phases of the digital journey, **from strategy to execution.**

Our joint approach enables DSOs to **secure, accelerate and de-risk the digital journey** thanks to our embedded delivery model, prepackaged solutions and use cases, and delivery accelerators.

Want to find out more? Contact us.

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