



# Grid modernization

Capability statement

# Grid modernization: overcoming the challenges

The impact of IT/OT convergence, cyber threats, climate change, electrification, and the rise of the prosumers are among the leading factors of uncertainty and risks driving the requirements of grid modernization and the grid digital transformation.

Navigate tomorrow's grid today: embrace the future of energy with innovation at your side. Discover how Hatch turns complex challenges into seamless opportunities.

Electric utilities are currently facing a multitude of challenges, including aging infrastructure, extreme weather events, the rise of distributed energy resources (DERs), penetration of behind the meter (BTM) technologies, accelerated load growth due to electrification and increasing customer expectations. Additionally, evolving regulations, markets, and technologies are driving a paradigm shift in utility's operations. These challenges become amplified when coupled with operational risks such as two-way power flow, lack of interoperability, and the speed at which smart technologies are emerging. What each of these scenarios present is a significant operational and financial risk to your business.

## Our approach

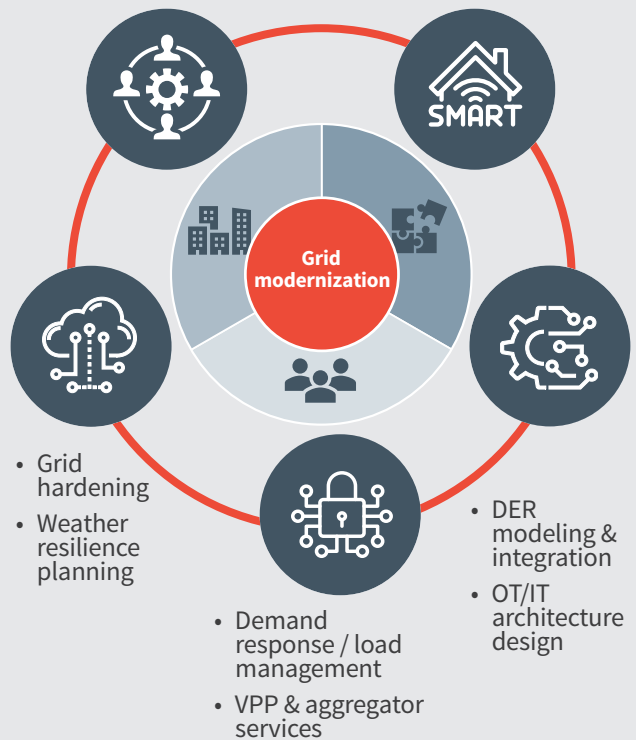
To thrive in this challenging environment, your business model, asset management approach, and technology adoption must be agile, integrated, and collaborative. This requires an in-depth understanding of your business processes, operational risks, and technology maturity level. Your vision, risk tolerance levels, and definition of what success means to you, can drive the development of a modernization road map that aligns your business objectives, assets conditions, and technologies status, helping you determine how to measure progress that encourages stakeholder alignment.

To achieve this, you need an innovative partner who understands utility operation, technology advancement, smart grid, advisory services, and digital transformations. Hatch has that expertise. We are your ideal partner.

## Value-added services at a glance

Our services encompass a range of solutions designed to enhance grid modernization efforts. These services are tailored to meet the evolving needs of power utilities and help optimize the performance of grid systems.

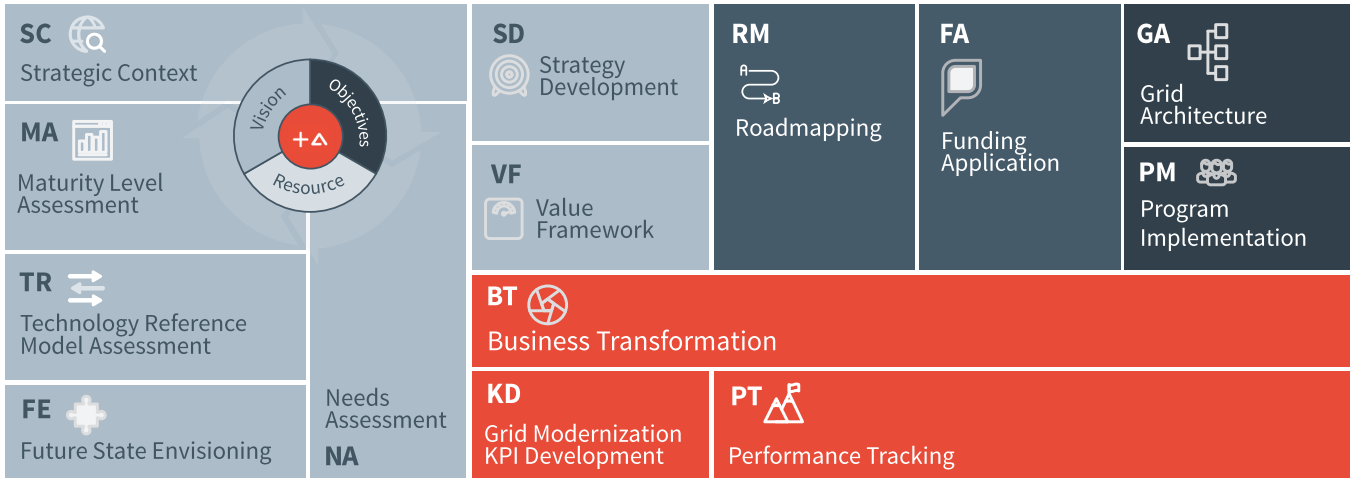
- Strategy and road map development
- Integrated distribution system planning
- AMI 2.0 implementation
- ADMS implementation
- DERMS implementation



## How can Hatch do that?

Hatch has designed the **Performance-Based Grid Modernization Model** to assist our clients, their board of directors, and operational teams in comprehending the entire grid modernization process. The model presents a robust end-to-end framework, comprising of nine distinct workstreams, which provide a variety of tools, metrics, and methodologies for the development of an effective grid modernization strategy and road map.

### Performance-based grid modernization model



## Key expertise from your trusted strategic & technical advisor

Hatch stands as a technology-agnostic and vendor neutral advisor, proficient across a spectrum of major utility IT and OT systems including Distribution Management Systems, DER Management Systems, Asset Investment Planning and Asset Performance Management systems, ensuring unbiased solutions that best meet your unique needs.

### Strategy development and road mapping

Whether you are upgrading your operations to meet industry standards or updating your practices to be best-in-class, Hatch's experience with maturity assessments of distribution, transmission infrastructure, and grid modernization activities has you covered. From industry benchmark comparisons and recommendations to associated and/or review of grid modernization objectives and associated KPIs, Hatch has partnered with numerous utilities across North America to develop tailored grid modernization strategies, road maps, and regulatory filing narratives.

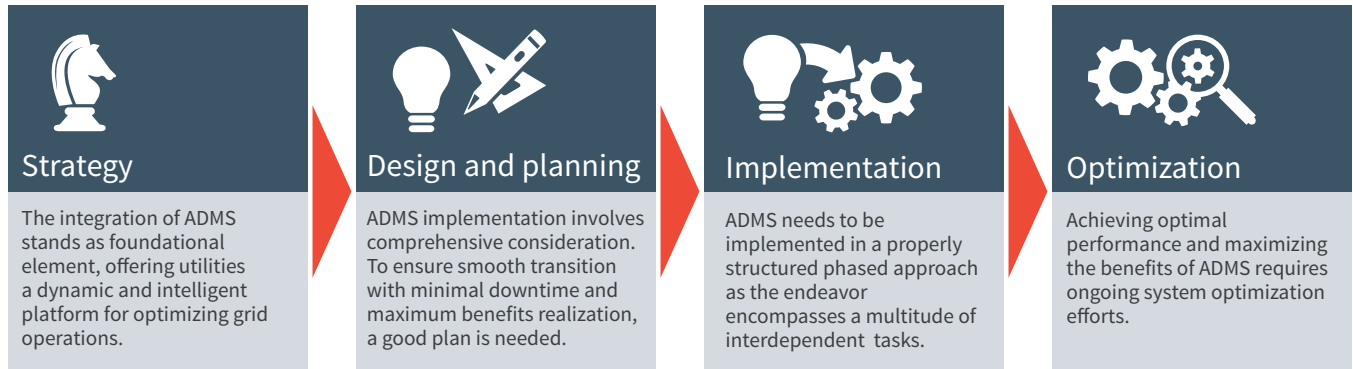




# Advanced grid and grid edge infrastructure experience

## Advanced distribution management system (ADMS)

Our experts will support your grid planning and operations so that you provide the best service to your customers. Hatch offers comprehensive services starting with strategy development and alignment through implementation and integration with other supporting systems such as GIS, AMI 2.0, and OMS. From system specification evaluation, digital road-mapping, data quality enhancement, and system integration, we guide you through the process to deploy and fully integrate your ADMS.



## Distributed energy resources management

DERs can transform the way power is generated and transmitted by deploying a combination of both physical and virtual assets across the electric grid to help you manage it adaptively. Whether you are looking to integrate DERs for resource planning, optimize grid configurations, or emergency restoration, let us help you navigate the integration of both the maturing and emerging DER technologies within your networks.

Screenshot of DER Hosting Capacity Online Map



## Advanced metering infrastructure (AMI)

AMI is a network of meters that provide visibility into how the system is operating, presenting significant benefits to customers and utility companies. Hatch is committed to aiding utilities in achieving the full benefits of AMI by helping throughout the entire AMI journey. Services include strategy development, technology and vendor selection, use case development, deployment and hypercare. We go beyond implementing AMI solutions by introducing value added approaches that strengthens a utilities ability to leverage the AMI data, optimizing the overall power grid operation and offering reliable service to customers.

## Loading and hosting capacity mapping

In response to the introduction of flexible hosting capacity arrangements proposed by the Ontario Energy Board, Hatch can help you develop a loading and DER hosting capacity map, both internally for system planning purpose and externally to help inform customers and the public. With the map, system planners can leverage the map to identify constrained areas and better allocate resources to improve them and ensure optimal service. In addition, if such map is published externally, customers, developers, and/or DER owners will have access to a preliminary view of system availability and restrictions. Before making a siting decision, this will help interconnection applicants understand the potential impact of their proposed connection.



## Selected utility project experience

### Loading and DER hosting capacity market research

**Project objective:** Establish an in-depth understanding of the practices, technologies, and experiences of loading and DER hosting capacity mapping across various jurisdictions. Aid in creating a comprehensive online map tool for system planning and DER adoption.

**Deliverables:** A comprehensive report that includes a jurisdiction scan of utilities, comparative technology evaluation, with hands-on testing performed to provide feedback on experiences of various technology solution, experience and lessons learned review, future state envisioning for the desired functionalities for loading and DER hosting capacity map. A fully functioning hosting capacity demo map is also created.

**Benefits:** Informed implementation process based on suitable methodologies, technologies, and practices, including but not limited to integrating existing initiatives, utilizing existing simulation tools, refining current network models, performing necessary data cleaning, and creating automation scripts.

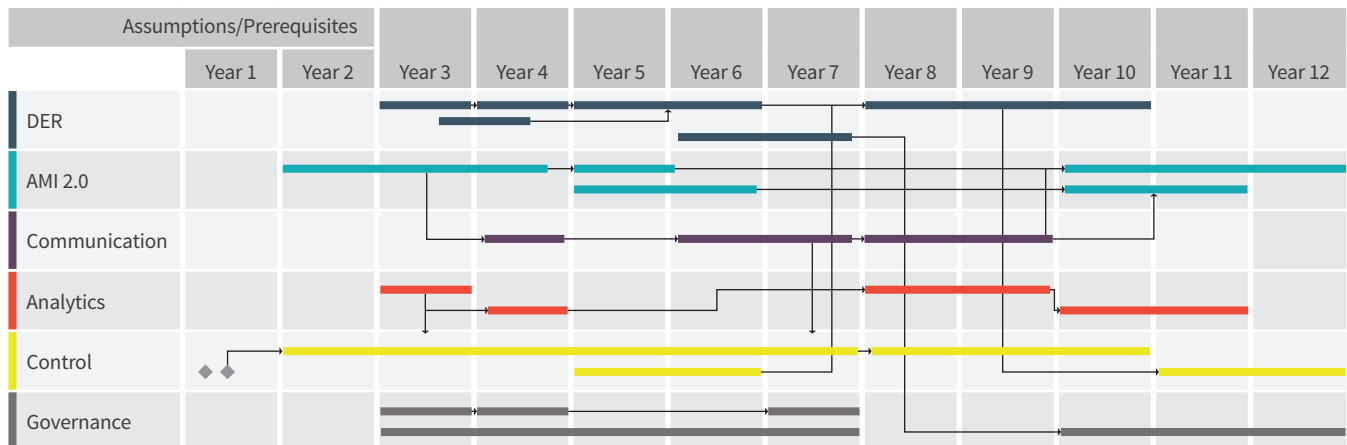
### Grid modernization strategy and road map

**Project objective:** Develop a comprehensive strategy and roadmap for grid modernization.

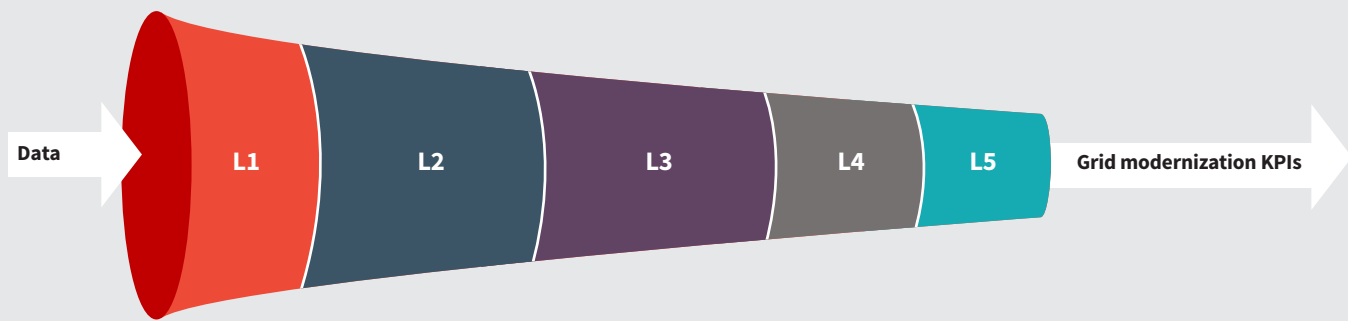
**Deliverables:** Grid modernization strategy aligned with the utility's vision for the next ten years, detailed grid modernization road map featuring initiative descriptions, timelines, interdependencies, and benefit assessments estimates for each initiative.

**Benefits:** Enhanced investment planning, clear road map to future investments, informed decision-making, regulatory compliance.

### Grid modernization outcome – road map



## KPI design procedure



Data	Reporting setup and configuration	Metrics design and considerations	Metrics	Goal categories
<p>Data input</p> <ul style="list-style-type: none"> <li>• Project progress</li> <li>• Systems behaviors</li> <li>• Utility and client benefits</li> </ul> <p>Data management</p> <ul style="list-style-type: none"> <li>• Availability</li> <li>• Reliability</li> <li>• Accuracy</li> <li>• etc.</li> </ul>	<p>Reporting setup</p> <ul style="list-style-type: none"> <li>• Frequency</li> <li>• Ownership</li> <li>• Reporting procedure</li> </ul> <p>Configuration</p> <ul style="list-style-type: none"> <li>• Min</li> <li>• Max</li> <li>• Threshold</li> <li>• etc.</li> </ul>	<ul style="list-style-type: none"> <li>• Metrics calculation</li> <li>• Weight assignment</li> <li>• Categories</li> <li>• Types of metrics</li> <li>• Applicability and scope of metrics</li> <li>• etc.</li> </ul>	<ul style="list-style-type: none"> <li>• System observability</li> <li>• System controllability</li> <li>• Active management</li> <li>• Grid planning</li> <li>• DER hosting capacity</li> <li>• Asset utilization</li> <li>• etc.</li> </ul>	<ul style="list-style-type: none"> <li>• Reliability</li> <li>• Environment</li> <li>• Public policy</li> </ul>

### Grid modernization KPI development

**Project objective:** Develop KPIs to measure the progress towards grid modernization and its intended objectives and benefits.

**Deliverables:** Excel prototype models for four KPIs on both feeder and bus level. Historical system information and data were applied to validate the KPI calculation methodologies. System planning criteria and capital investment plans were leveraged to develop KPI targets and three future scenarios including business-as-usual, best cases, and worst cases.

**Benefits:** Establish a performance matrix to help in performance management, and enhance the trust between utility, regulator and ratepayers. Regulatory compliance, increased reliability, improved monitoring capabilities, increased operational efficiency.

### Utility rate application support

**Project objective:** Craft the grid modernization narrative for the rate application submission to energy regulator.

**Deliverables:** Narratives for various grid modernization endeavors that not only align with the grid modernization vision but also fit seamlessly within the regulators framework. These projects required a nuanced approach in regulatory narrative composition.

**Benefits:** While the business-as-usual narratives focus on system enhancement and renewal under the Custom Incentive Rate framework, the narrative we drafted emphasizes the phased-approach to achieve holistic grid modernization benefits and innovation.

## Substation modernization - digital relay design and implementation

**Project objective:** Support the utility's modernization program that aims to manage station level failure risks through the replacement of end-of-life electromechanical relays with digital ones.

**Deliverables:** A detailed report that covers the review of the technical capabilities of the preferred digital relay products, future state envisioning, digital relay replacement feasibility analysis, assessment of the utility's current state of communication and cyber security architecture design. Three different system architecture options were provided, each offering a different level of robustness, availability, cost, setup, and associated maintenance efforts.

**Benefits:** Streamlined project implementation plan that ensures efficient and productive digital relay deployment.

## Climate change vulnerability assessment

**Project objective:** Develop a Climate Change Vulnerability Assessment based on the Global Climate Modeling data obtained from the Intergovernmental Panel on Climate Change's AR5 Report.

**Deliverables:** Assessment of the materiality of the differences in impact on utility asset risk assessment using historical outage incident, climate data, and IPCC forecasting data.

**Benefits:** Risk-based assessment that resulted in a high-level mitigation strategy categorized under engineering actions, management actions, and further studies.

## Select north american & global power sector clients







# About Hatch

Hatch is a global engineering, project management and construction, and professional services firm. Whatever our clients envision, our professionals can design and build. With over six decades of business and technical experience in the energy, infrastructure, and mining sectors, we know your business and understand that your challenges are changing rapidly. We respond quickly with solutions that are smarter, more efficient and innovative. We rely upon our 10,000 staff with experience in over 150 countries to challenge the status quo and create positive change for our clients, our employees, and the communities we serve.

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