Digitalization across the energy value chain

Massimo Danieli
BU Managing Director Grid Automation
Hitachi Energy

Hitachi Energy – Advancing a sustainable energy future for all
Synergies between Hitachi Energy, GlobalLogic and Hitachi Digital Services give us an unparalleled competitive advantage

<table>
<thead>
<tr>
<th></th>
<th>GlobalLogic</th>
<th>METHOD</th>
<th>Hitachi Energy</th>
<th>Hitachi Digital Services</th>
</tr>
</thead>
</table>

**Accelerated development of products and better co-creation with customers as a strategic transformation partner**

**Global leader in digital solutions leveraging our experience and domain knowledge**

**Advanced data integration capabilities across multiple customer segments**

Hitachi’s leadership in software engineering, data integration and investments in GenAI gives Hitachi Energy expanded go-to-market capabilities and faster innovation
Hitachi Energy has leading digital capabilities to serve customers throughout the life cycle

Help customers **plan and optimize investments** and **schedule assets**

Reduce costs and risks when expanding infrastructure

Ensure reliable, safe and economic operation by automation

Optimize maintenance and increase system reliability with software and service solutions

Enable & **optimize market operations** and the **trading of electricity**

With digital solutions, we help our customers **Connect and Automate** their physical and business processes
Comprehensive digital portfolio

Leading digitalization solutions from edge to enterprise

01 Software systems

02 Connectivity

03 Digital in the field
Velocity Suite Power Prices powered by Google Cloud is an Energy Portfolio Management solution delivering sub-hourly, high-quality energy pricing data to allow developers to guide investment decisions.

Southwest Power Pool relies on the Energy Portfolio Management solution PROMOD® to evaluate transmission upgrades and their economic impact to assure reliable grid operation and competitive energy markets in the United States.

3,000+ GW of renewable projects globally await grid connection planning.
Digital substations are faster to deploy, have smaller footprint and reduce construction costs, while increasing safety.

Digital twins of assets are delivered via Hitachi Energy’s IdentiQ solution with HVDC installations to provide seamless workflow integration from design and construction to operations and maintenance.

30 km of copper wiring avoided with a digital substation.
EnBW, one of the largest suppliers of energy in Europe is modernizing its communications network linking grid assets with Hitachi Energy's utility-grade fiber optic communications solution featuring quantum-safe encryption.

Geneva public transport system (TPG Geneva) uses Hitachi Energy's e-bus charging solution Grid eMotion Flash. Supervision of bus operation and in-route charging from Hitachi Energy's Network Manager control system.

The use of grid automation technologies for digital substations allows greater visibility and understanding of connected power systems, while enabling safe and reliable grid operation and renewable interconnections.
Leading nuclear generation companies use Hitachi Energy’s enterprise asset management solutions to manage the full lifecycle of their fleet of generation stations.

75k+ managed assets in every nuclear unit

Ameren uses Lumada Asset Performance Management (APM) to increase reliability and reduce OpEx by prioritizing maintenance activities.

Lumada APM offers a secure, scalable analytics platform to enable fleet-wide visibility, predictive analytics, and clear, actionable information for asset lifecycle management.

Mainstream Renewable Power uses TXpert™ to monitor performance of transformers.

TXpert™ provides data-driven insights allowing to reduce costs, optimize operations, extend life expectancy, and enhance environmental performance.

Lumada APM offers a secure, scalable analytics platform to enable fleet-wide visibility, predictive analytics, and clear, actionable information for asset life cycle management.
Digitalization revolutionizes ability to support customers – Service

Hitachi Energy’s installed base of 200+ BUSD will grow additional 50+ BUSD by 2030

A connected asset strategy for service is key to delivering value to customers

The traditional way

- Troubleshooting
- Corrective actions
- Hands-on Support

New Digital Services enable:

<table>
<thead>
<tr>
<th>Insights &amp; Uptime</th>
<th>Resilience and Reliability</th>
<th>Sustainability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Real-time asset visibility</td>
<td>Enhanced control, optimal upgrade timing, Installed base analytics</td>
<td>Health, Safety and Environment coverage. Extended lifetime</td>
</tr>
<tr>
<td>Data-driven service planning</td>
<td>Faster reaction time</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Customer Value through digitally enabled offers

- Collaborative Operations Center
  Dedicated 24/7 expert team for instant support, troubleshooting and rectification through secure remote access to Hitachi Energy technologies
Digitally connected Collaborative Operation Centers make possible faster commissioning and better service for automation and communications systems on remote offshore stations.

GCCIA\(^1\) uses Hitachi Energy’s RelCare digital service application to manage and optimize service activities for their transmission substations in the Middle East.

---

\(^1\) The Gulf Cooperation Council Interconnection Authority
Market operators and participants in North America, Europe and Japan rely on Hitachi Energy software to manage electricity markets with economic efficiency while relieving congestion and ensuring grid security.

Energy Harbor, a producer and retail supplier of energy serving nearly 1M customers uses TRMTracker to manage wholesale trades, retail load forecasting and forecasts for the company’s carbon-free inventory.

Chemical products leader uses Hitachi Energy’s TRMTracker software to buy and sell electric energy and manage risks from energy price volatility.

75k+ managed assets in every nuclear unit.
Energy Harbor uses energy trading and risk management solutions to help its customers achieve sustainability goals.
Digital initiatives also help us to optimize our operations and delivering increased efficiency and quality while reducing costs.

**SELECTED EXAMPLES - NOT EXHAUSTIVE**

1. **Life cycle traceability**

2. **Service process automation**

3. **Factory digitalization**

---

The Digital Passport System is a core element of our quality management system, enabling the seamless end-to-end traceability and transparency across the global value chain.

Lumada EAM software establishing the digital capability foundation for own Hitachi Energy service operations leveraging own digital and service capabilities to deliver enhanced customer satisfaction and service growth.

Applying digitalization to optimize activities across engineering, supply chain, operations and quality in Hitachi Energy’s **factories**.
Operate and Trade – Hitachi combines strengths to unify grid and market operation for Japan

Challenge
10 T&D companies in Japan seek to improve reliability, flexibility, and economy for the whole nation, but operate with separate control systems

Solution
Comprehensive Network Manager SCADA/EMS¹ and Market Management software system integrated with Hitachi solution for operational grid planning

Impact
Makes possible Japan’s goal of accelerating market deregulation while assuring reliable, resilient, and cost-effective energy delivery for customers

First of its kind system integrating nationwide grid and market operations, enabled by combining Hitachi and Hitachi Energy IT/OT world-leading capabilities

¹ SCADA: Supervisory Control and Data Acquisition; EMS: Energy management system
Digitalization: Enhancing customer engagement and expanding opportunities across the energy value chain

Key takeaways

01 The uptake of renewable power and massive electrification creates a complex power "system of systems"

02 Digitalization is essential to enable efficiency, reliability, resilience and flexibility in this complex and interconnected power system

03 Hitachi Energy provides pioneering connected products, software-based solutions, and digitally-enabled services

04 Synergies between Hitachi Energy, GlobalLogic and Hitachi Digital Services give us an unparalleled competitive advantage

Energy expertise and technology leadership make Hitachi Energy the unique partner to manage the complexity of tomorrow’s energy systems