

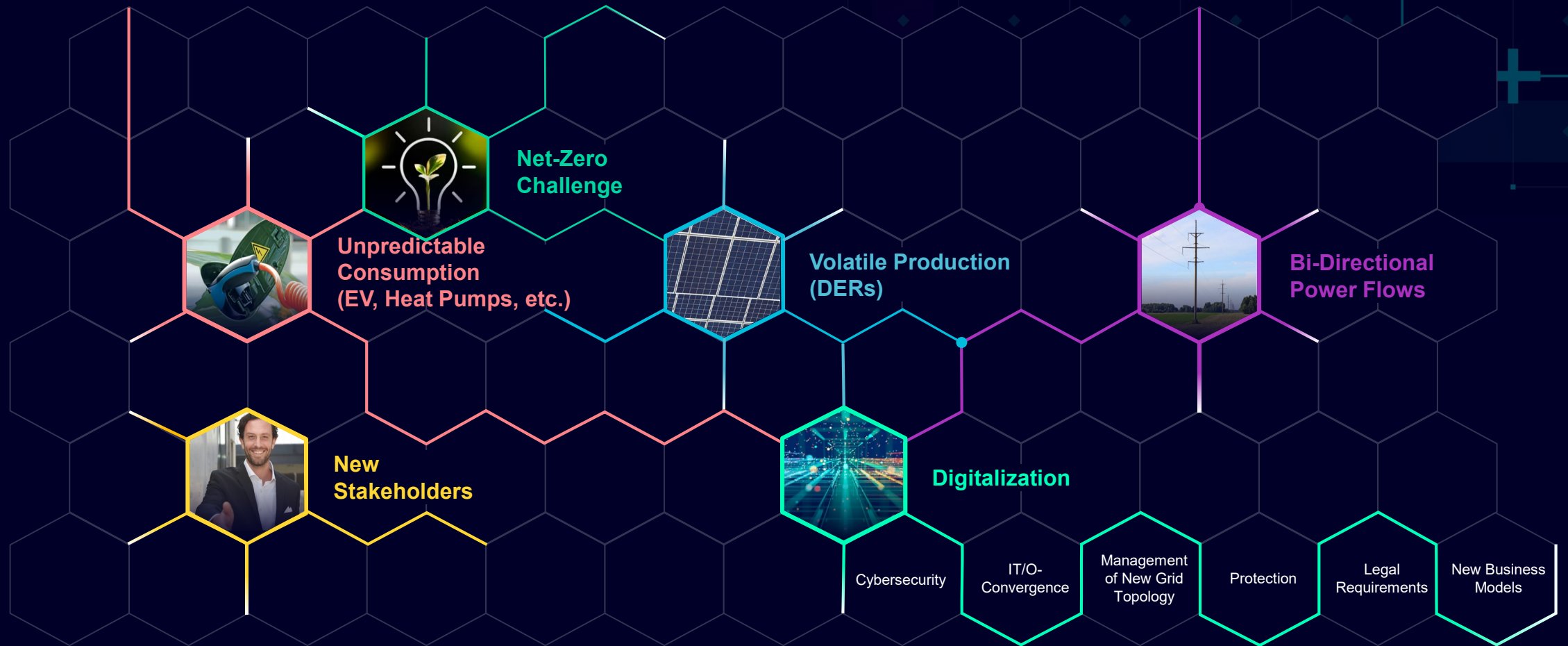
Energy Market Management Systems

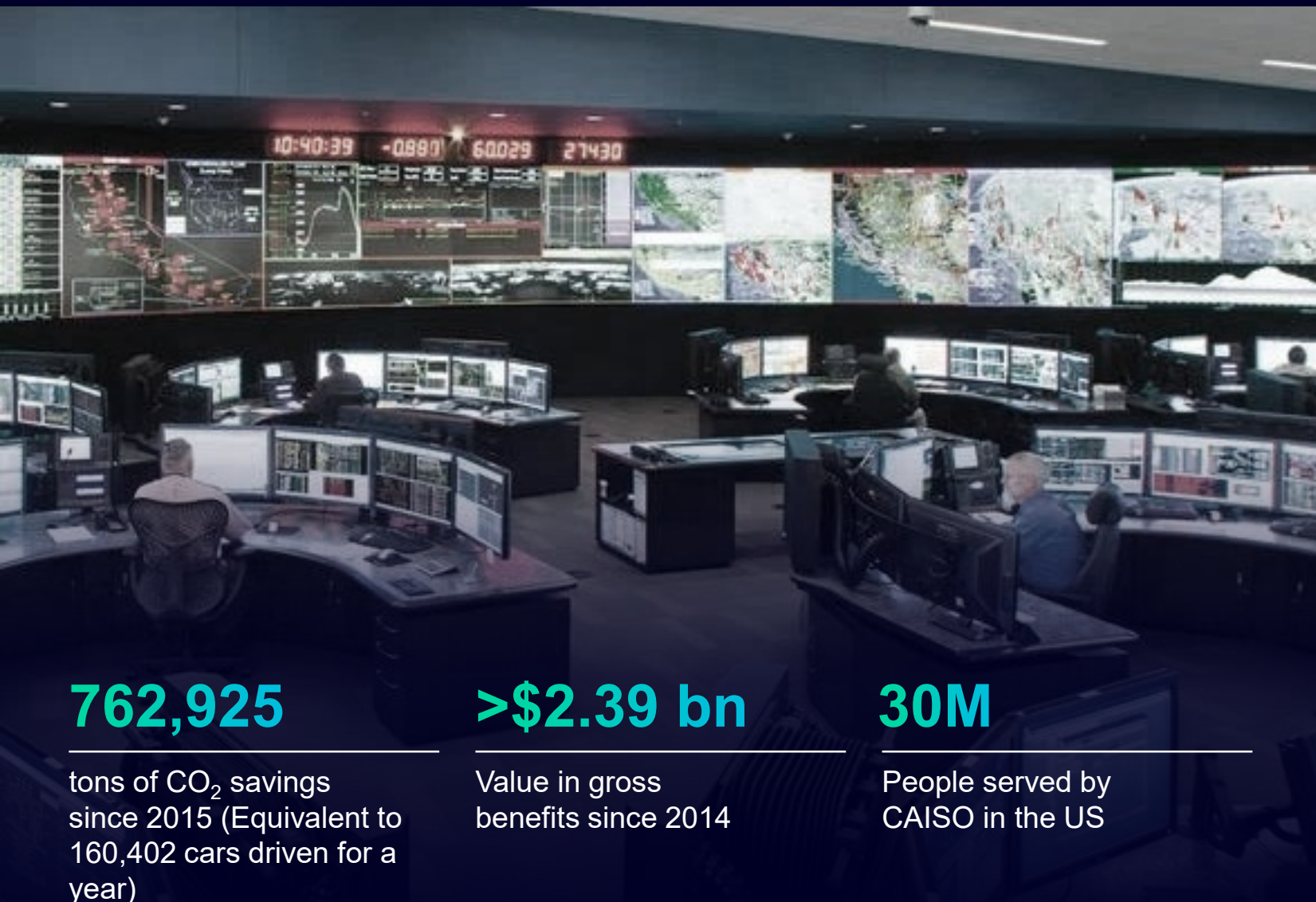
Siemens Grid Software US

SIEMENS

Our Mission

Accelerating and Securing the Energy Transition





762,925

tons of CO₂ savings since 2015 (Equivalent to 160,402 cars driven for a year)

>\$2.39 bn

Value in gross benefits since 2014

30M

People served by CAISO in the US

Transmission & Energy Market Management for California ISO

Transmission Management

Situational awareness and operational flexibility supporting market enhancements and renewable energy integration.

Energy Market Management

Managing complexity and simplifying end-customer interactions with day-ahead and real-time market operations (>30,000 transactions/day).

Energy Market Management System Components: Based on Market Segments

Market Segments

- ISO/RTO Market Segment
- Vertical System Operators
- Microgrid Management Systems
- Market Participants



EMM Capabilities

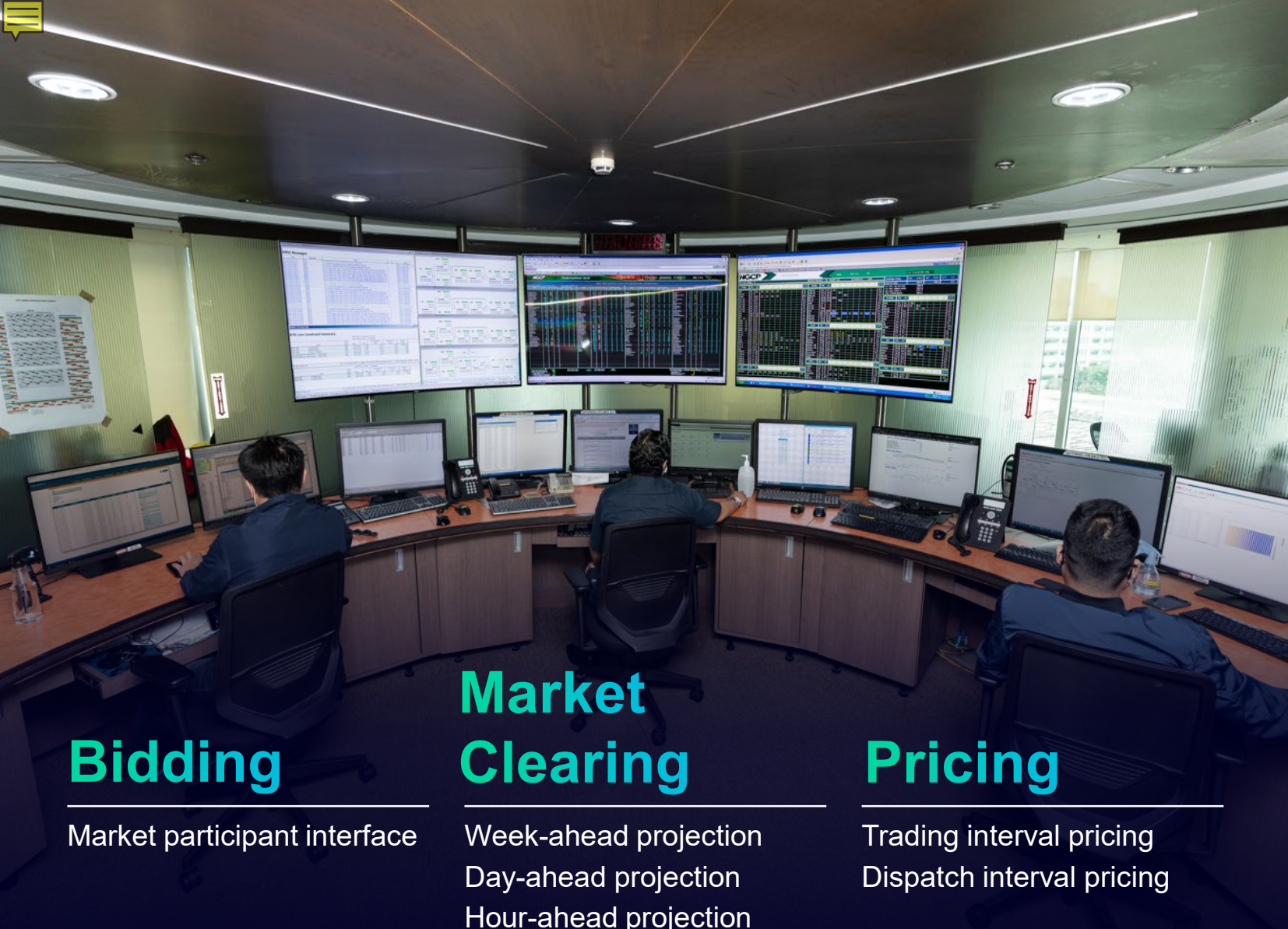
- + **ISO/RTO Liberalized Markets**
- + Market Participant Business Solutions
- + Microgrids of Communities
- + Hybrid (PV & Battery) Optimization
- + Vertical Utilities Fleet Optimization
- + **Imbalance Market for Renewables**



Market Trends

- Utilize flexibility
- Empower hybrid energy resources
- Enable the best ROI for flexibility and renewables
- Time for big climate change initiatives
- Net-zero initiatives





Bidding

Market participant interface

Market Clearing

Week-ahead projection
Day-ahead projection
Hour-ahead projection
Real-time dispatch

Pricing

Trading interval pricing
Dispatch interval pricing

IEMO of the Philippines Operates the Wholesale Electricity Spot Market

June 2021

Since the new market is in commercial operation.

3 Main Islands
Market footprint.

5-min Based

Electric spot market along with long-term projections.

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Smart Grid Engineering Manager: Model Management for Midcontinent ISO



Model Consistency

- Planning vs. Operations
- Multiple systems

Model Exchange

- Multiple vendors
- Multiple organizations

Model Formats

- Multiple versions

Cloud Access

For graphical model editing or model upload provided for MISO members.

Coordinates MISO Model Management

For submission, validation, approval, and activation of models.

Common Model

For use by EMS, Market Management System, Congestion Revenue Rights & Outage Management System.

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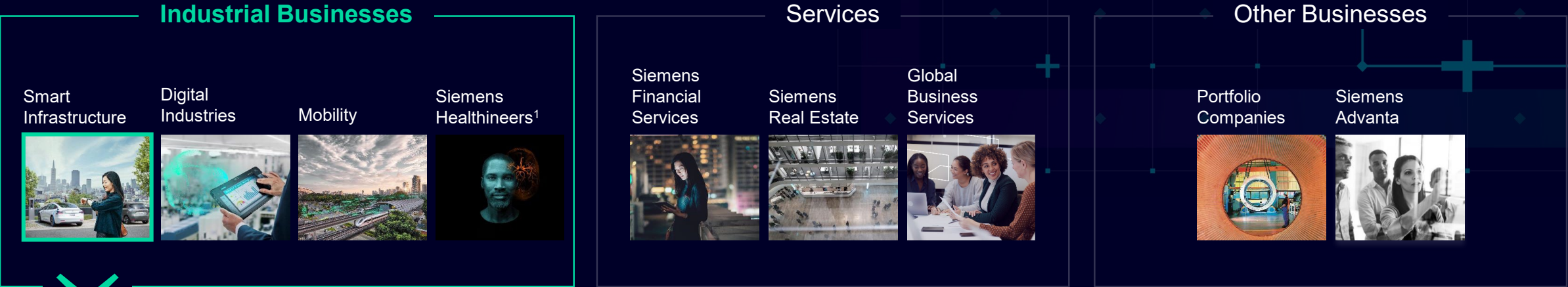


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Siemens Grid Software is Part of Siemens AG



Siemens Grid Software

Grid Operators (plan, operate, maintain)
Infrastructure & Industry (Grid Edge)

2,550

Team members around the world

Installed Base

200+

EnergyIP® installations

>100 m

Meters contracted

1,300

Control centers

70%

of the world's electricity consumption flows through infrastructure planned or analyzed by Siemens Grid Software

¹ Publicly listed subsidiary of Siemens; Siemens' share in Siemens Healthineers: 75%