

# SMART INFRASTRUCTURE

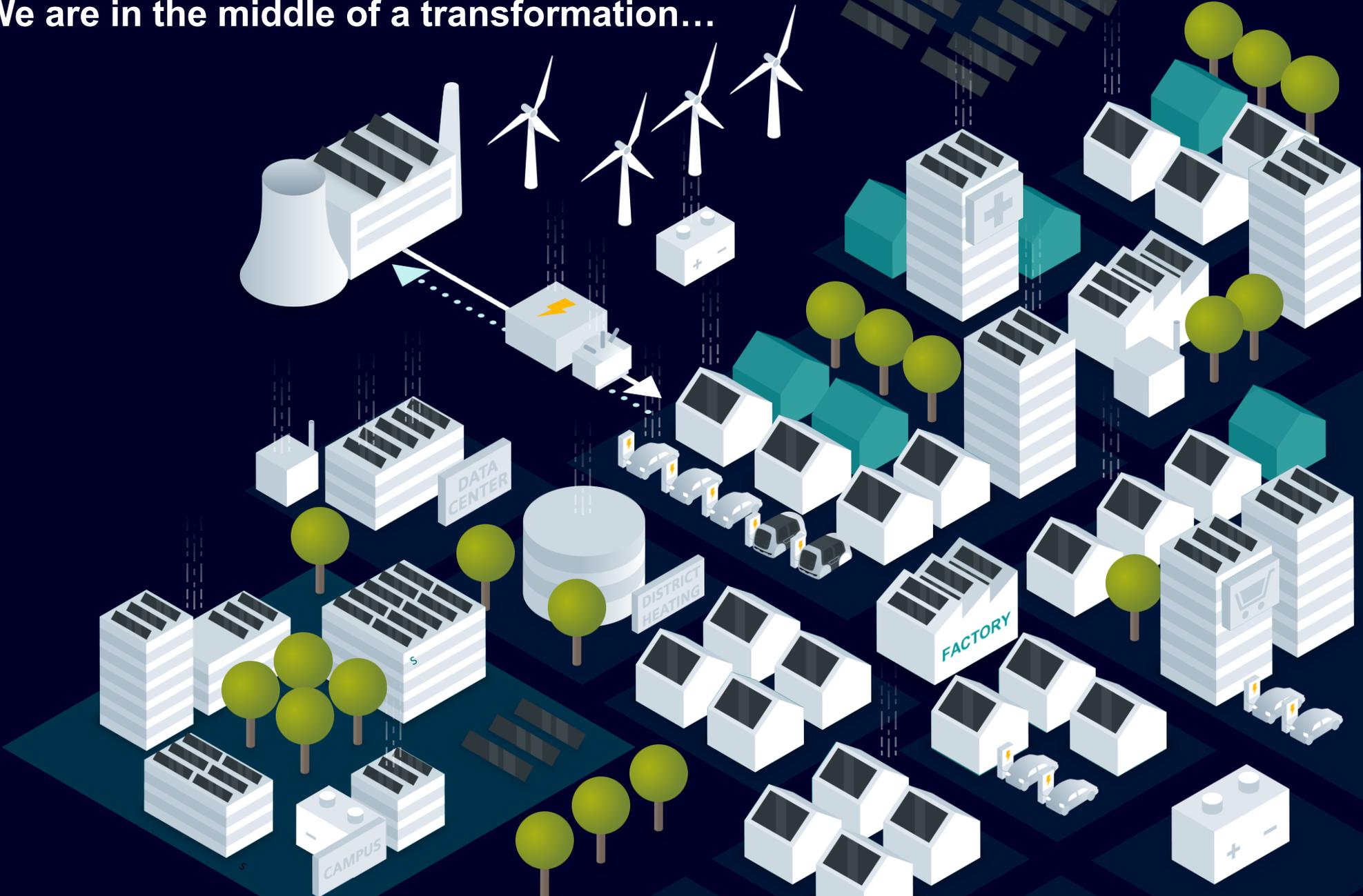
Technological improvements  
and electrical infrastructure development concepts

Levente Balasa

Head of Smart Infrastructure

**We are in the middle of a transformation...**

We are in the middle of a transformation...



We are in the middle of a transformation...



**2x**  
electricity  
consumption  
by 2050

**>50%**  
renewable  
annual energy  
by 2035

**82%**  
households have  
smart meters in  
2050

# Trends

- ✓ **Changing markets** effect municipalities' and TSOs' & DSOs' business and strategy
- ✓ **New business fields** appear in grid edge and prosumer environment
- ✓ **Innovative technologies** enhance new business models and revenue streams

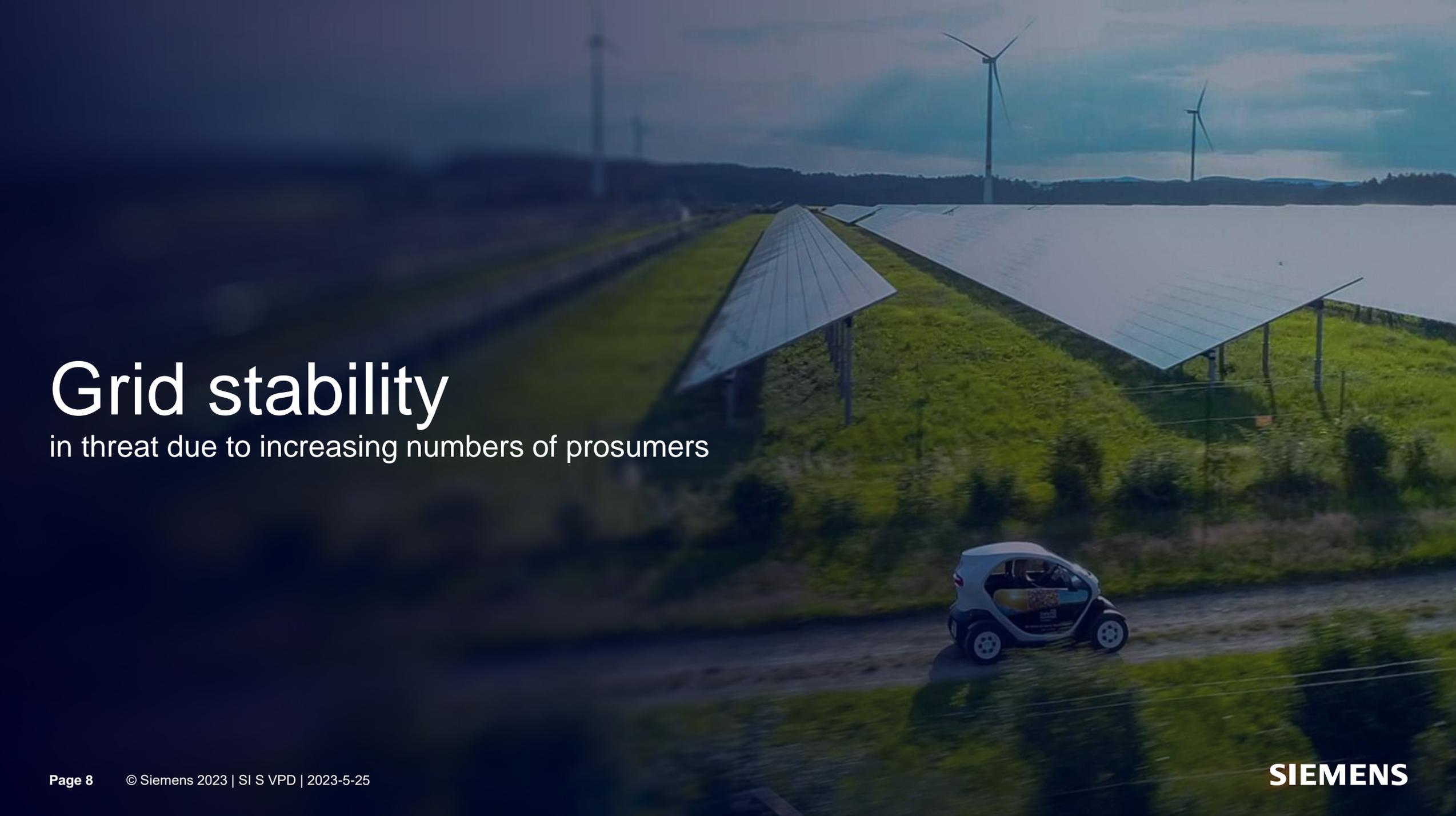
# Core drivers and objectives



A man and a woman, both wearing safety helmets (orange and blue respectively), are walking through a solar farm. The man is holding a tablet and pointing towards the background, while the woman is holding a rolled-up document and a smartphone. They are surrounded by rows of solar panels in the foreground and several wind turbines in the background under a clear sky.

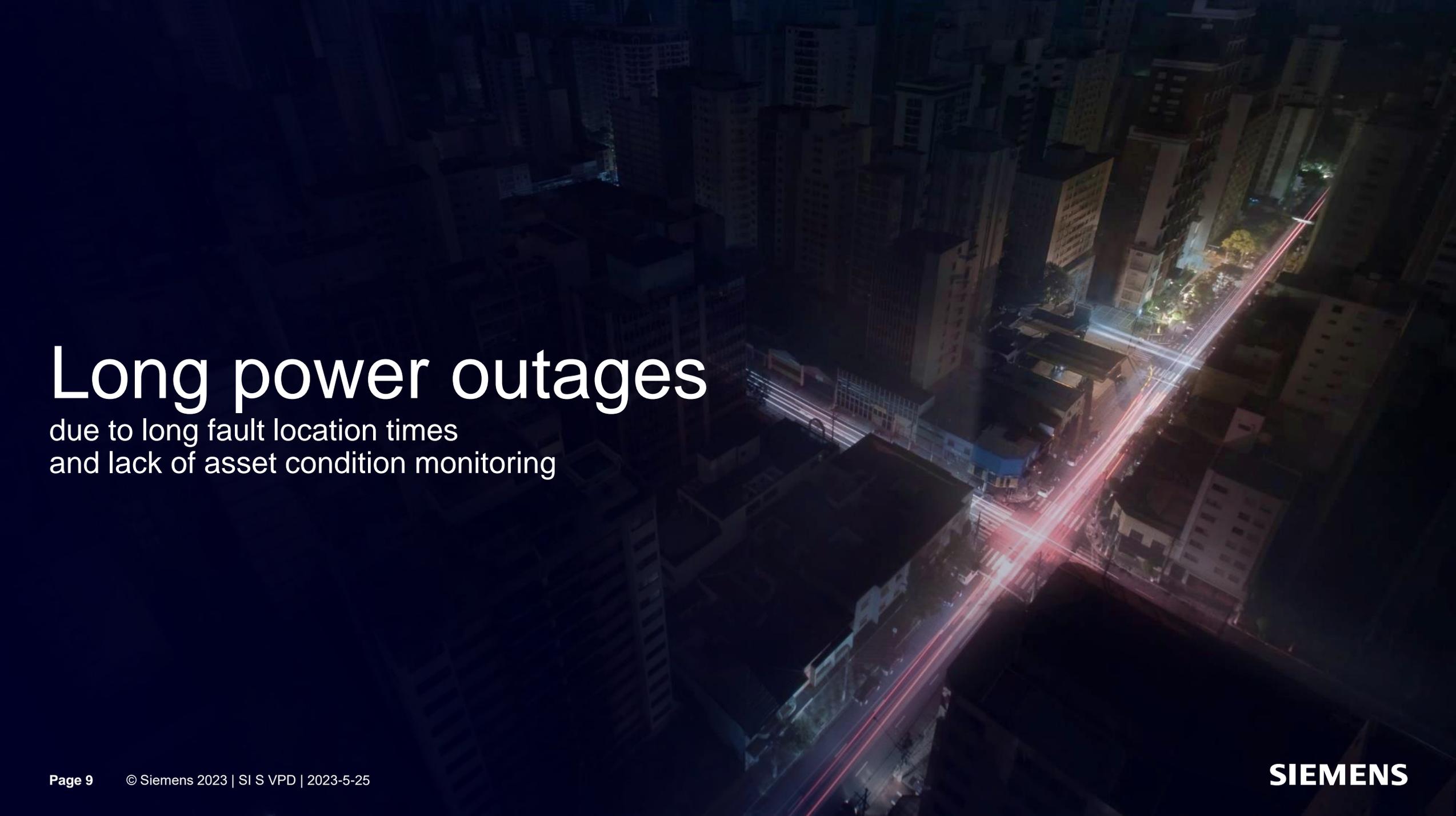
# Changing generation mix

increases stress factors for the power grid



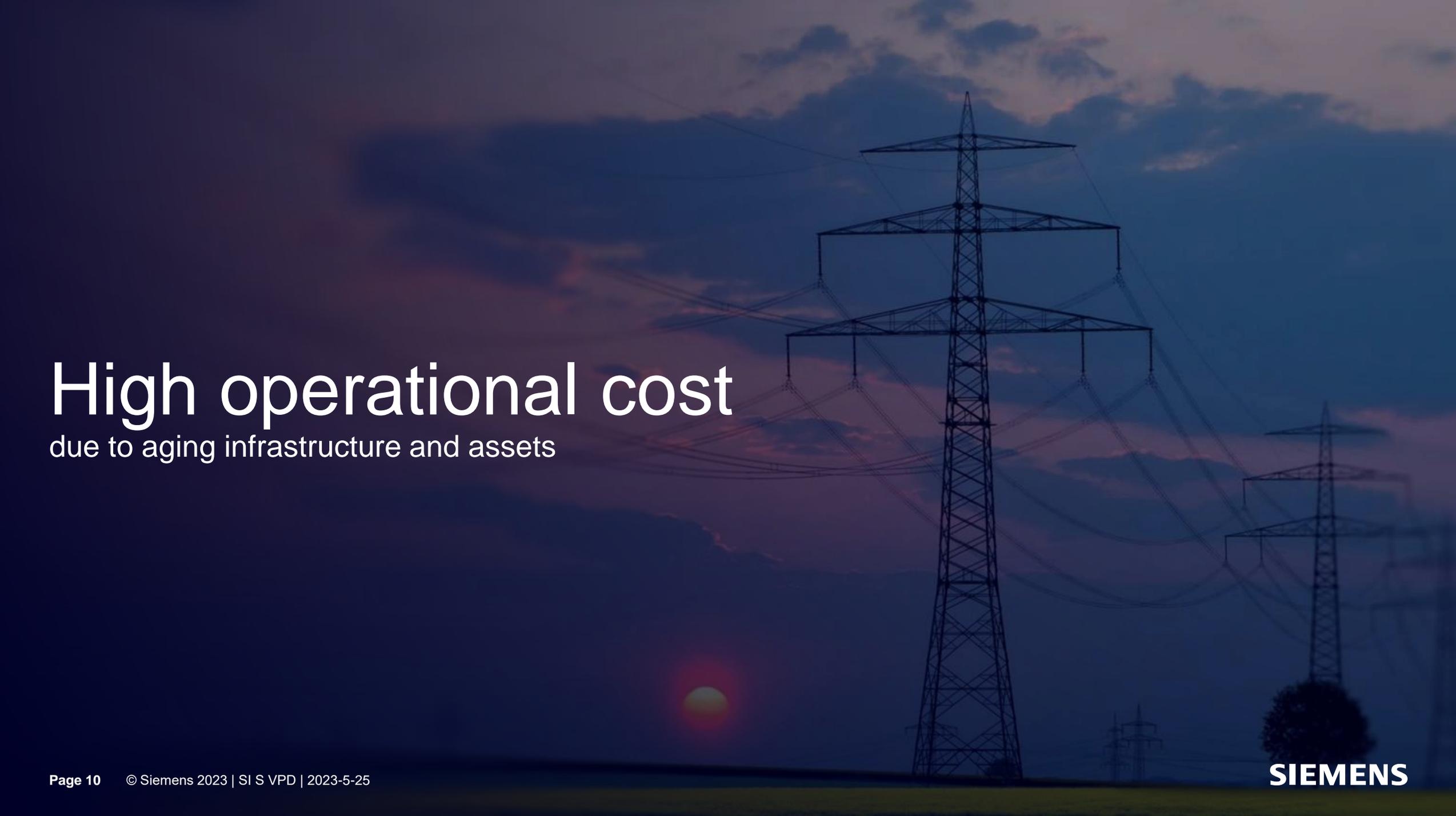
# Grid stability

in threat due to increasing numbers of prosumers

An aerial night view of a city with numerous high-rise buildings. The scene is dark, with some lights visible from the buildings and streets. A prominent feature is a series of bright red light trails that streak across the lower right portion of the image, suggesting long-exposure photography of light trails from traffic or perhaps a specific power line or cable. The overall mood is futuristic and urban.

# Long power outages

due to long fault location times  
and lack of asset condition monitoring

The background of the slide features a series of high-voltage power transmission towers (pylons) silhouetted against a dramatic sky at sunset or sunrise. The sun is a bright, glowing orb near the horizon, casting a warm glow. The sky transitions from a deep blue at the top to a reddish-orange near the horizon. The towers are arranged in a line, receding into the distance. The overall mood is one of industrial scale and the passage of time.

# High operational cost

due to aging infrastructure and assets



# Digitalization of buildings

as a chance for flexibility and grid stability



# New innovative technologies

## Grid Edge - Monitoring

- ✓ Maintenance information and planning
- ✓ Capacity planning
- ✓ Infrastructure investment decisions



# Grid Edge - Monitoring

The screenshot shows the SCAM Navigator interface. On the left is a map of a city grid with various nodes and connections. On the right is a list of 'Latest Unacknowledged Alarms' with columns for 'Time', 'Timestamp', 'Description', and 'Status'. The list contains several entries, each with a red status indicator.

| Time       | Timestamp  | Description     | Status |
|------------|------------|-----------------|--------|
| 11:07:2022 | 11:07:2022 | MV_01 / Feuk_01 | Alarm  |
| 11:07:2022 | 11:07:2022 | MV_02 / Feuk_02 | Alarm  |
| 11:07:2022 | 11:07:2022 | MV_03 / Feuk_03 | Alarm  |
| 11:07:2022 | 11:07:2022 | MV_04 / Feuk_04 | Alarm  |
| 11:07:2022 | 11:07:2022 | MV_05 / Feuk_05 | Alarm  |
| 11:07:2022 | 11:07:2022 | MV_06 / Feuk_06 | Alarm  |
| 11:07:2022 | 11:07:2022 | MV_07 / Feuk_07 | Alarm  |
| 11:07:2022 | 11:07:2022 | MV_08 / Feuk_08 | Alarm  |
| 11:07:2022 | 11:07:2022 | MV_09 / Feuk_09 | Alarm  |
| 11:07:2022 | 11:07:2022 | MV_10 / Feuk_10 | Alarm  |
| 11:07:2022 | 11:07:2022 | MV_11 / Feuk_11 | Alarm  |
| 11:07:2022 | 11:07:2022 | MV_12 / Feuk_12 | Alarm  |
| 11:07:2022 | 11:07:2022 | MV_13 / Feuk_13 | Alarm  |
| 11:07:2022 | 11:07:2022 | MV_14 / Feuk_14 | Alarm  |
| 11:07:2022 | 11:07:2022 | MV_15 / Feuk_15 | Alarm  |
| 11:07:2022 | 11:07:2022 | MV_16 / Feuk_16 | Alarm  |
| 11:07:2022 | 11:07:2022 | MV_17 / Feuk_17 | Alarm  |
| 11:07:2022 | 11:07:2022 | MV_18 / Feuk_18 | Alarm  |
| 11:07:2022 | 11:07:2022 | MV_19 / Feuk_19 | Alarm  |
| 11:07:2022 | 11:07:2022 | MV_20 / Feuk_20 | Alarm  |



## E-House - plug and play power substation



✓ **One-stop solution**

✓ **Flexible modular design**

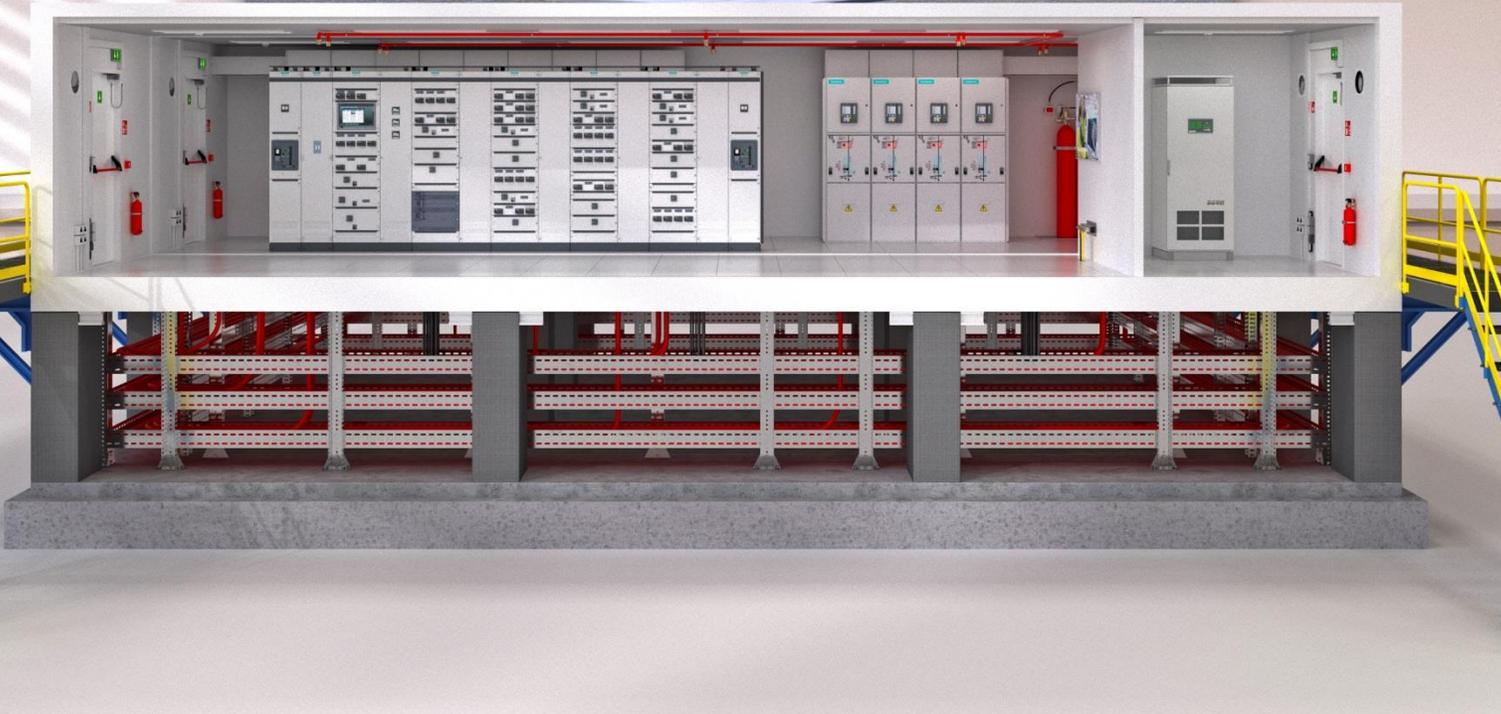
✓ **Cost-efficiency**  
reduction of planning and civil works



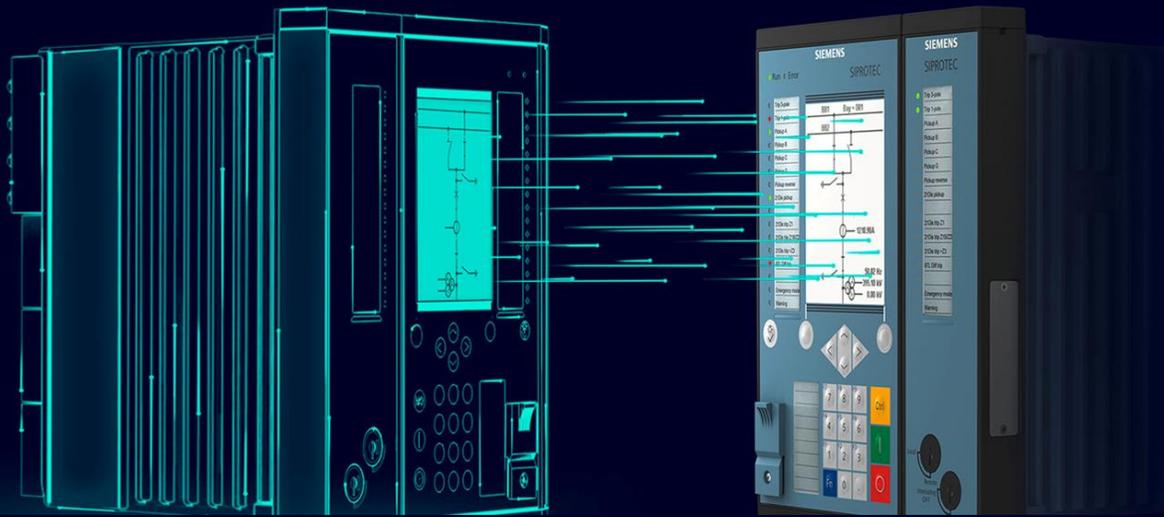
# Electrical House

What's an E-House?

- Proven alternative for conventional substations
- Fully equipped & pre-tested
- Suitable for remote locations and harsh condition



# Digital Twin





# NXpower MONITORING for Cloud solution

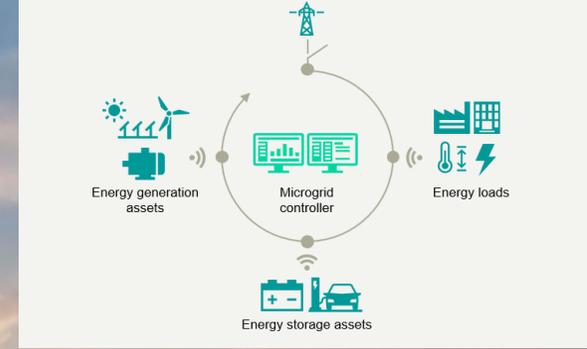
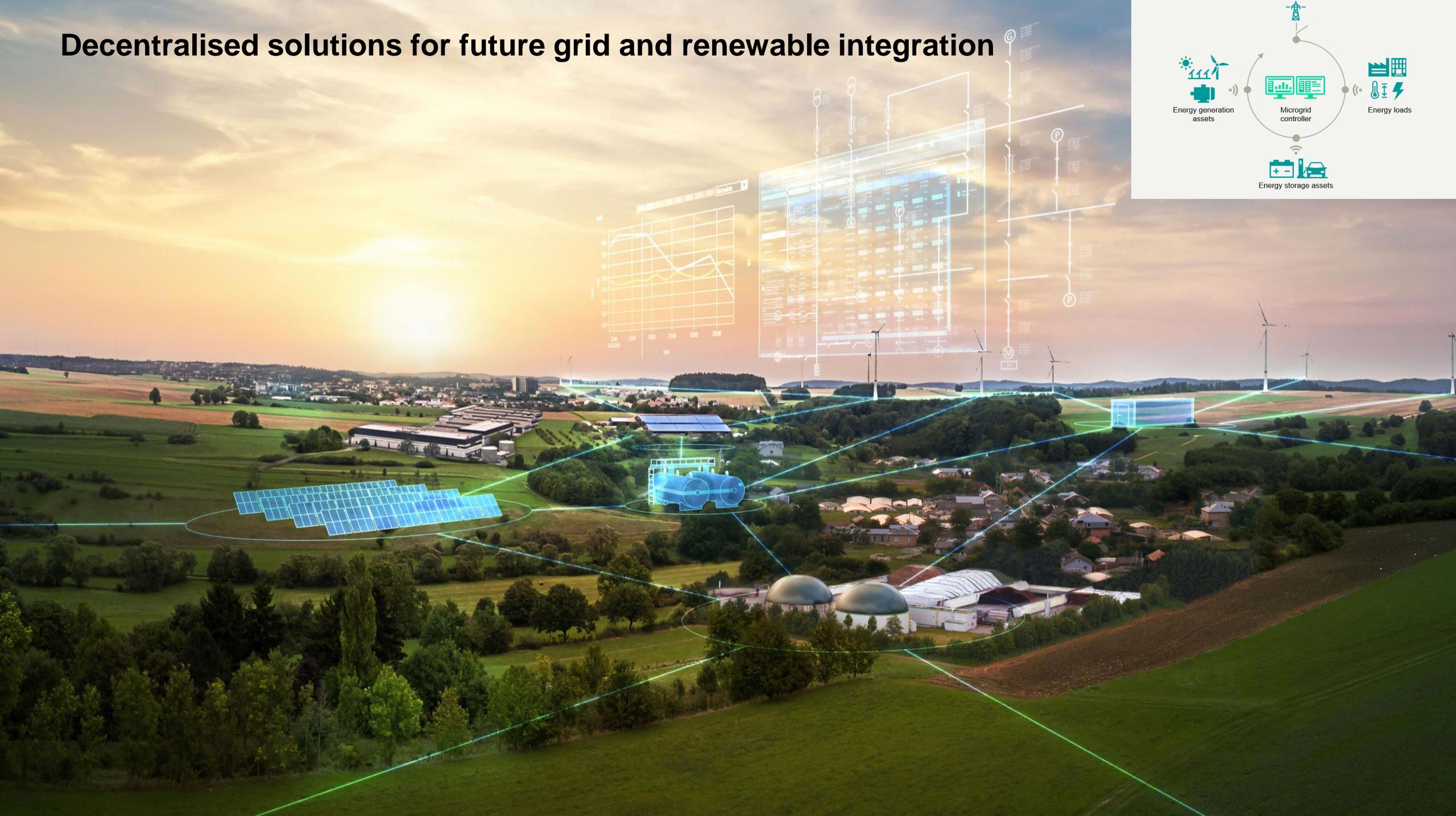
- Transparency of assets and operations
- Energy & Condition Monitoring
- Enhanced Maintenance during Operation



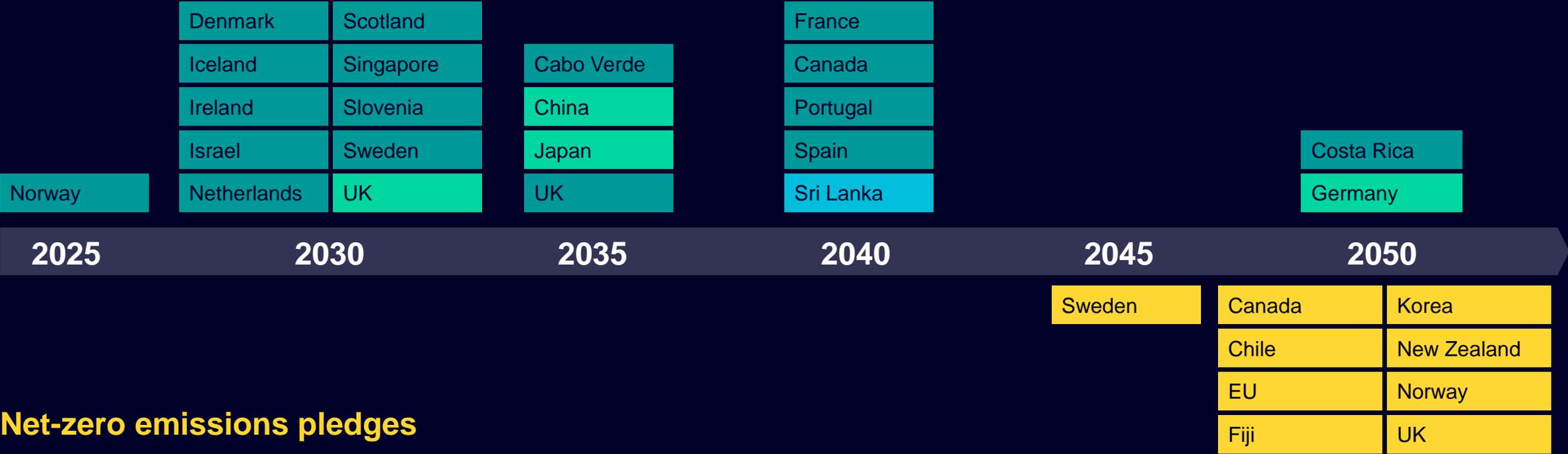
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# Decentralised solutions for future grid and renewable integration



# Internal combustion engine bans and electrification targets

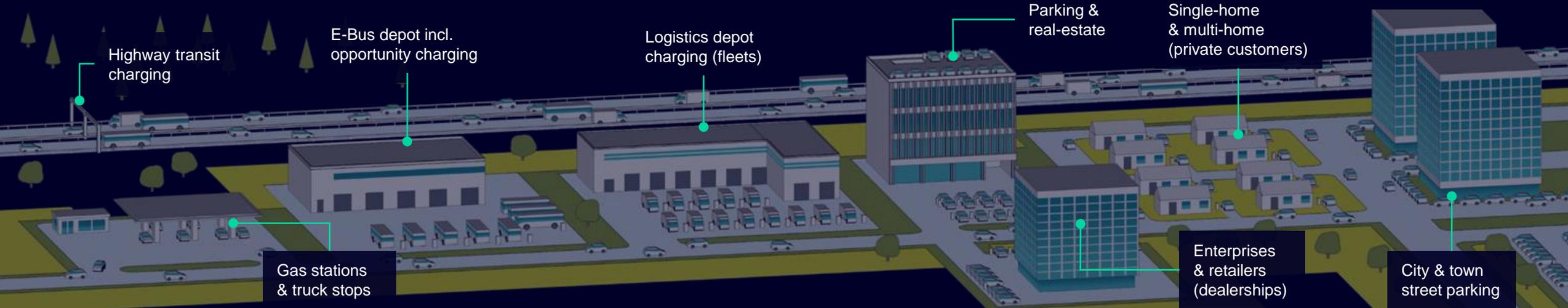


## Net-zero emissions pledges

■ 100% electrified sales
 ■ 100% ZEV sales
 ■ 100% ZEV stock
 ■ Net-zero pledge

Source: <https://www.iea.org/reports/global-ev-outlook-2021/policies-to-promote-electric-vehicle-deployment>

# The eMobility Charging Ecosystem



# Charging of tomorrow

A glimpse into the future

## MEGAWATT CHARGING



## BI-DIRECTIONAL CHARGING



## AUTONOMOUS FAST CHARGING



## WIRELESS CHARGING



# Smart Buildings

Easier, faster and at scale



**Traditional building**



**Automated building**



**Smart building**



**Smart building Self-adaptive**

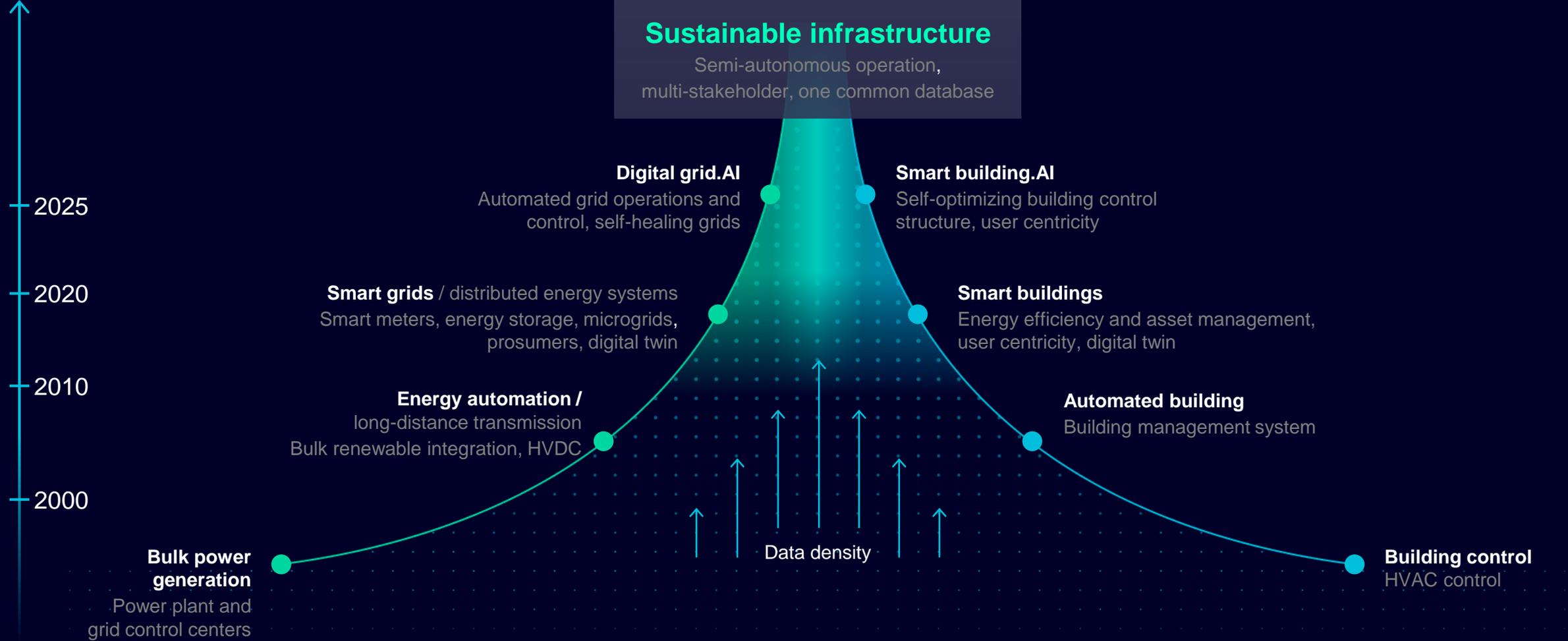


- Reactive on-site service & connected remote
- On-site solutions
- Complex integration process
- Siloed domain control

- Predictive & prescriptive
- AI-enabled remote operations
- Simple & easy integration
- as a Service

# Market drivers

## Evolution of smart grids and smart buildings





# The future of energy speaks “prosumer”

## Today

LV grid treated as a black box  
because of predictable behavior

Uncontrolled DER rise  
causes unpredictable  
problems

## Tomorrow

LV grid of tomorrow need to be fully  
transparent and controllable



Production Centric System

Prosumer Centric System

7

100

2x

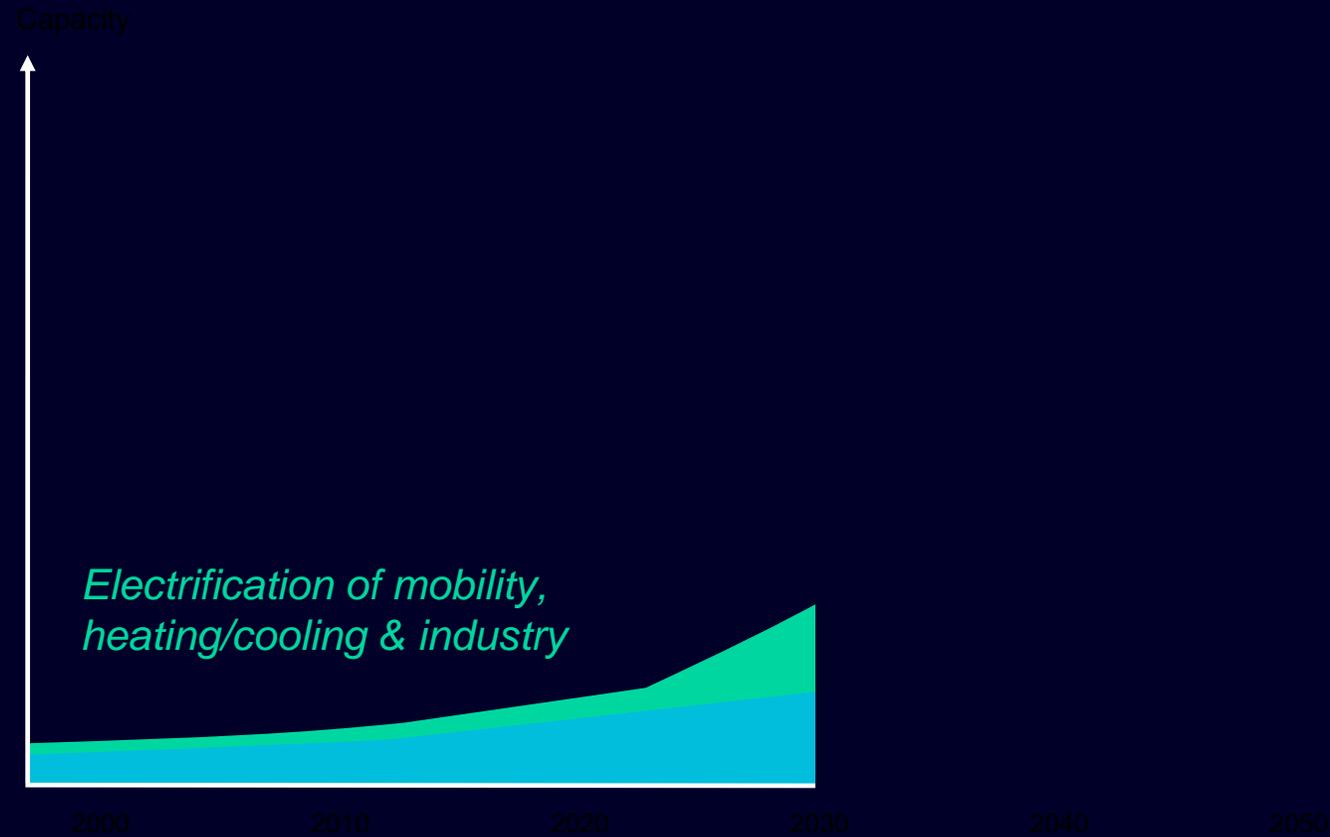
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Sources:

1. <https://www.spglobal.com/marketintelligence/en/news-insights/blog/insight-weekly-may-2-2023>
2. <https://about.brief.com/blog/a-power-grid-long-enough-to-reach-the-sun-is-key-to-the-climate-fight/>
3. <https://www2.deloitte.com/content/dam/Deloitte/eh/Documents/energy-resources/deloitte-eh-en-eurelectro-connecting-the-dots-study.pdf>

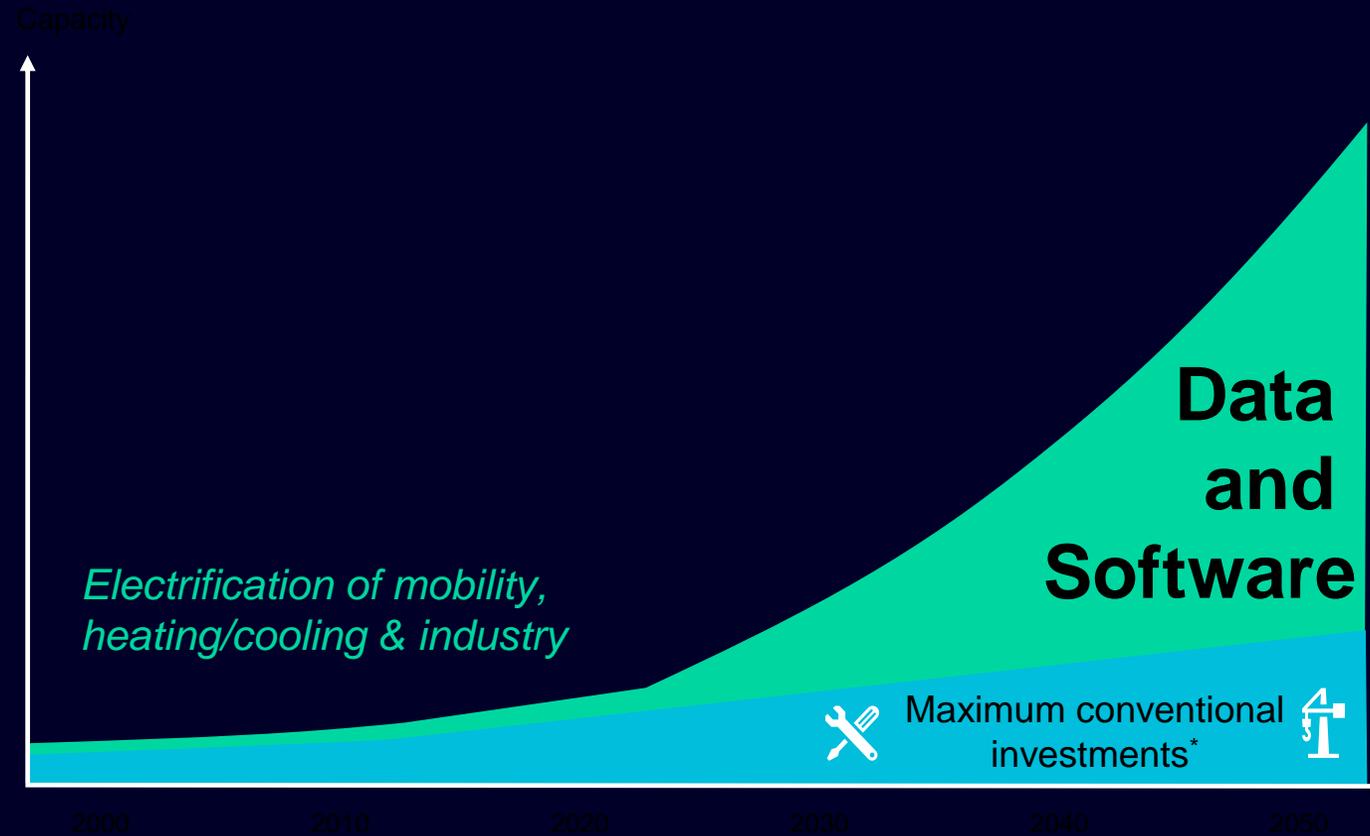


# How can we cope with this development?



- Limited by resource availability, coordination effort, space, acceptance etc.

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# Disclaimer

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