



Smart Grid Technology Supporting the Energy Transition

SIEMENS

PTI Consulting

Trusted partner for future energy business and infrastructure

**Energy
Business
Advisory**



**Power
System
Consulting**

Guiding organizations to maximize customer value in an evolving energy landscape.

Planning and optimizing the structure, performance and operation of energy systems.



Customer value

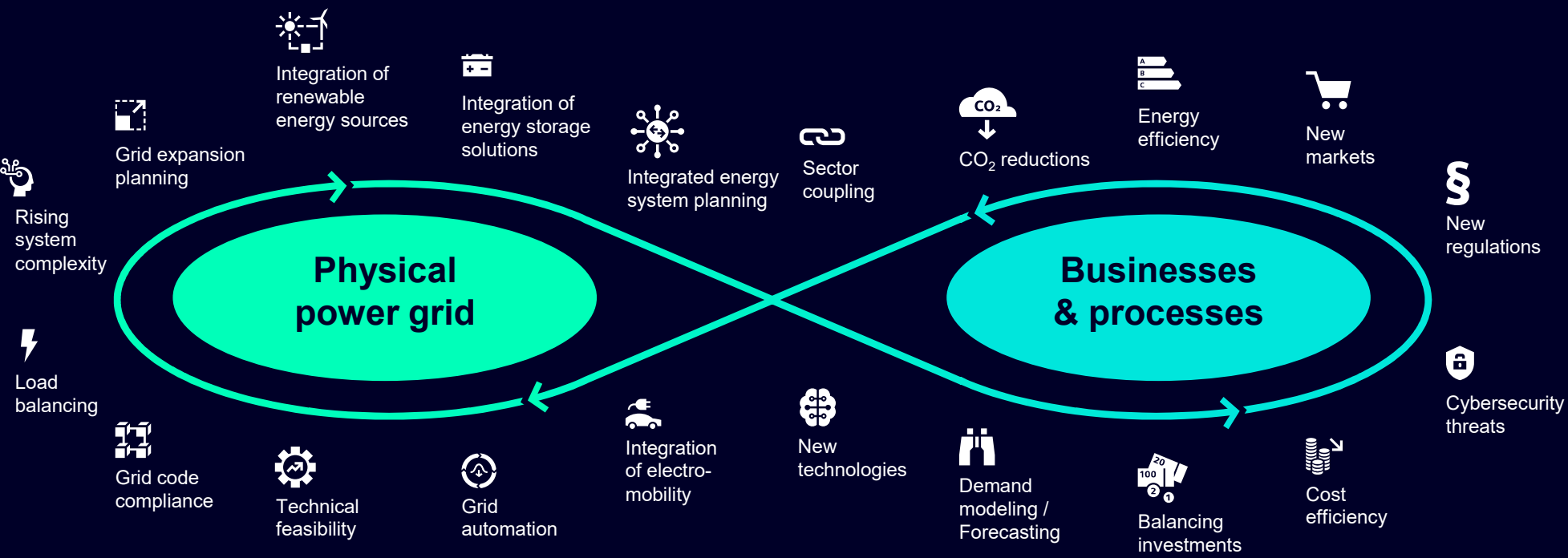
Technology expertise

Excellence and innovation

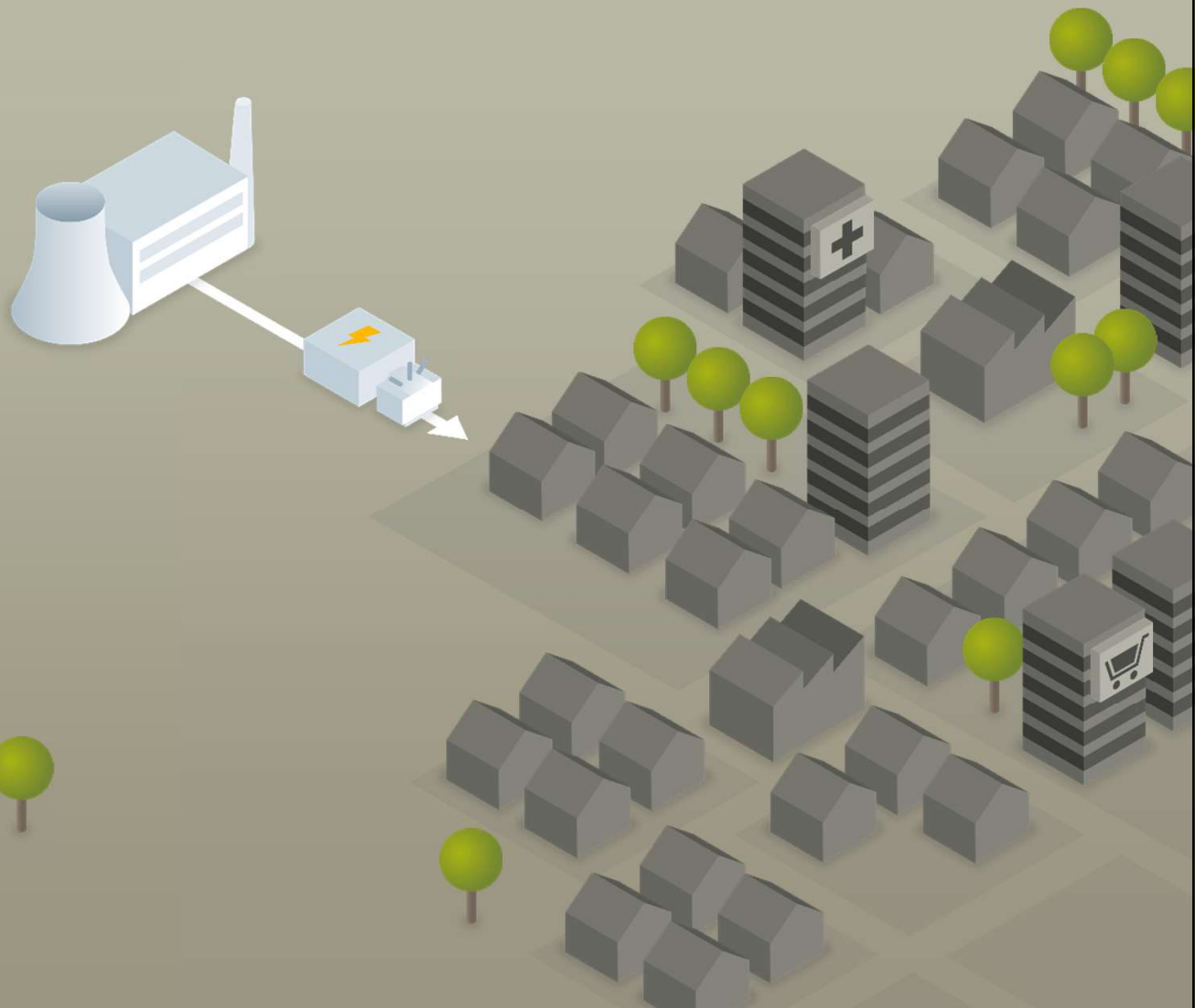
Independent consulting

SIEMENS

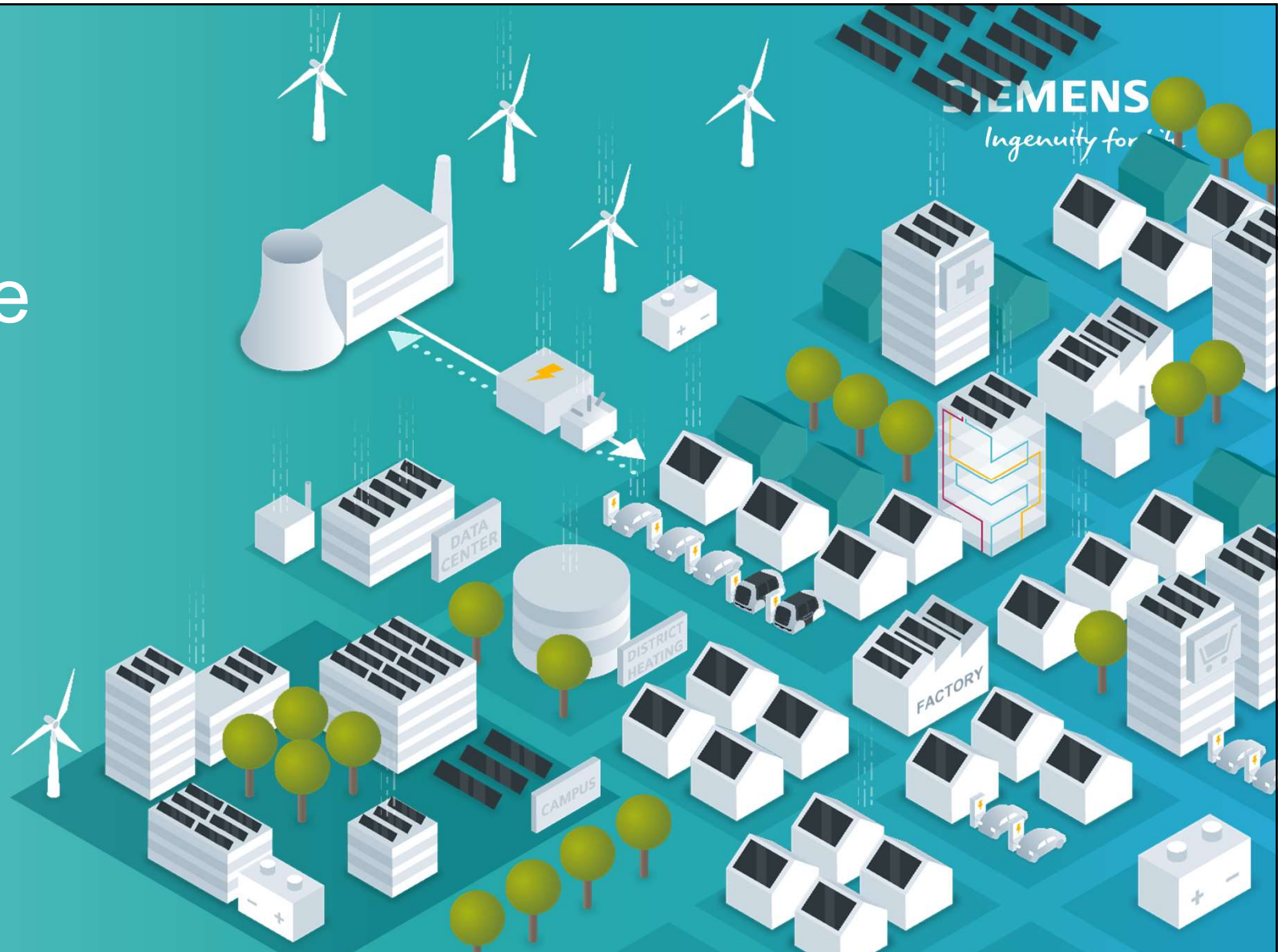
To achieve net zero targets, power systems, but also business models, processes, and grid planning practices will need to evolve.



The energy
system back
in the day



The future energy world is evolving rapidly



The energy world is changing towards an all-electric world

Decarbonization. Decentralization. Digitalization.



- Growing share of renewable energies
- Increasing electrification and sector coupling
- Improving energy efficiency



- Flexibilization of the energy market
- From consumer to prosumer
- New market players



- Connected systems and automated processes
- Smart data as a basis for decision-making
- New business models

Energy transition has reached a tipping point

Decarbonization

3x electricity consumption
by 2050

Decentralization

>50% renewable annual
energy by 2035

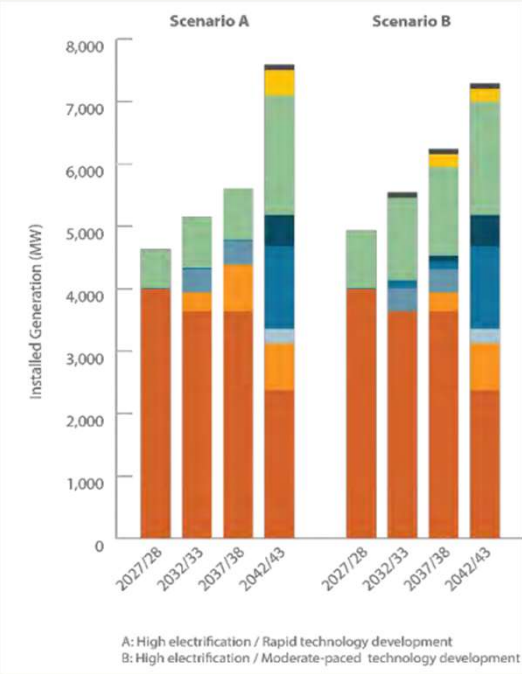
Digitalization

>80% of households have
smart meters in 2050

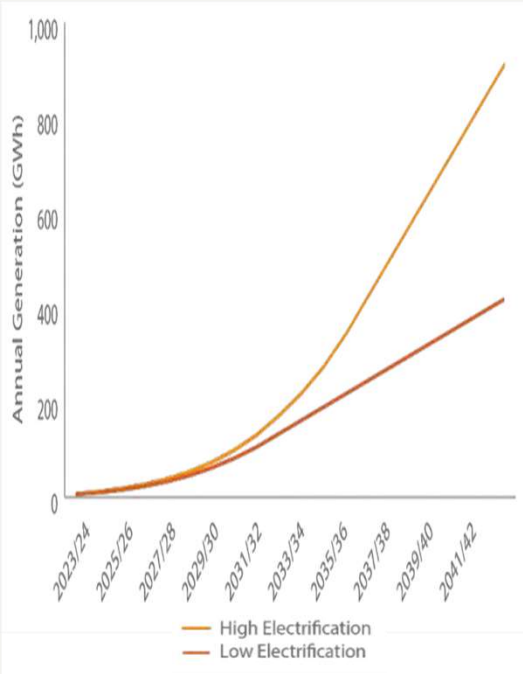


Impacts for NB

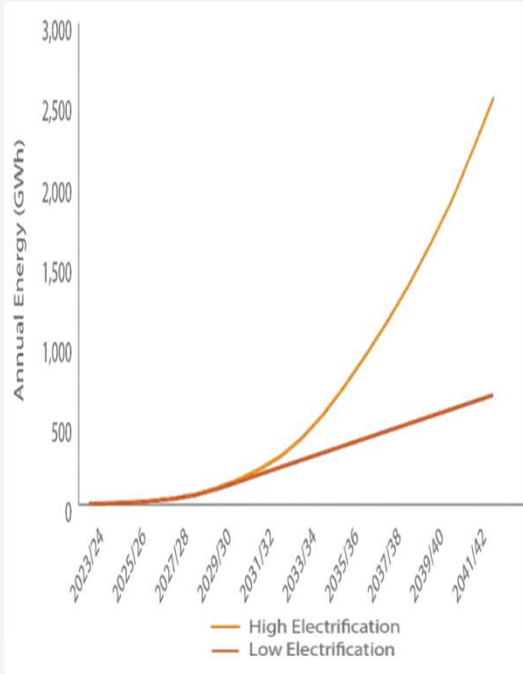
Generation Supply – High Electrification Scenarios



Behind-The-Meter (BTM) Generation Scenarios

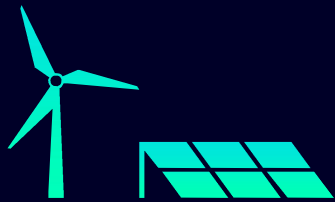


Projections of Electric Vehicle Annual Energy Requirements



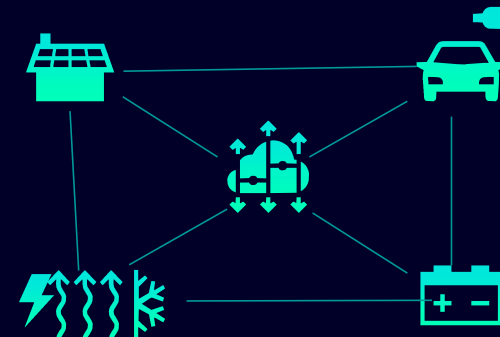
How do we cost effectively integrate more renewable supply and ensure beneficial electrification?

Variable Supply



- Intermittent availability
- Forecasting errors
- Ramping up and down

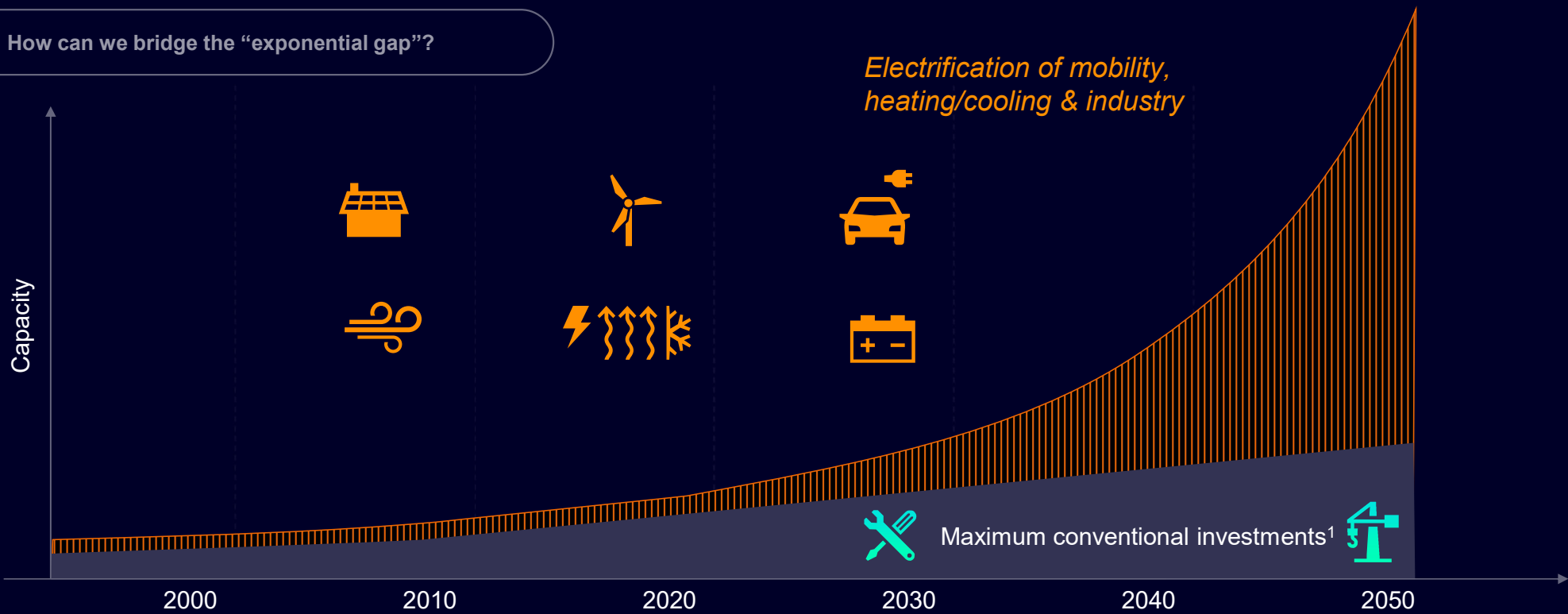
Flexible Demand



- Peak demand reduction
- Load following/ balancing
- Energy shifting

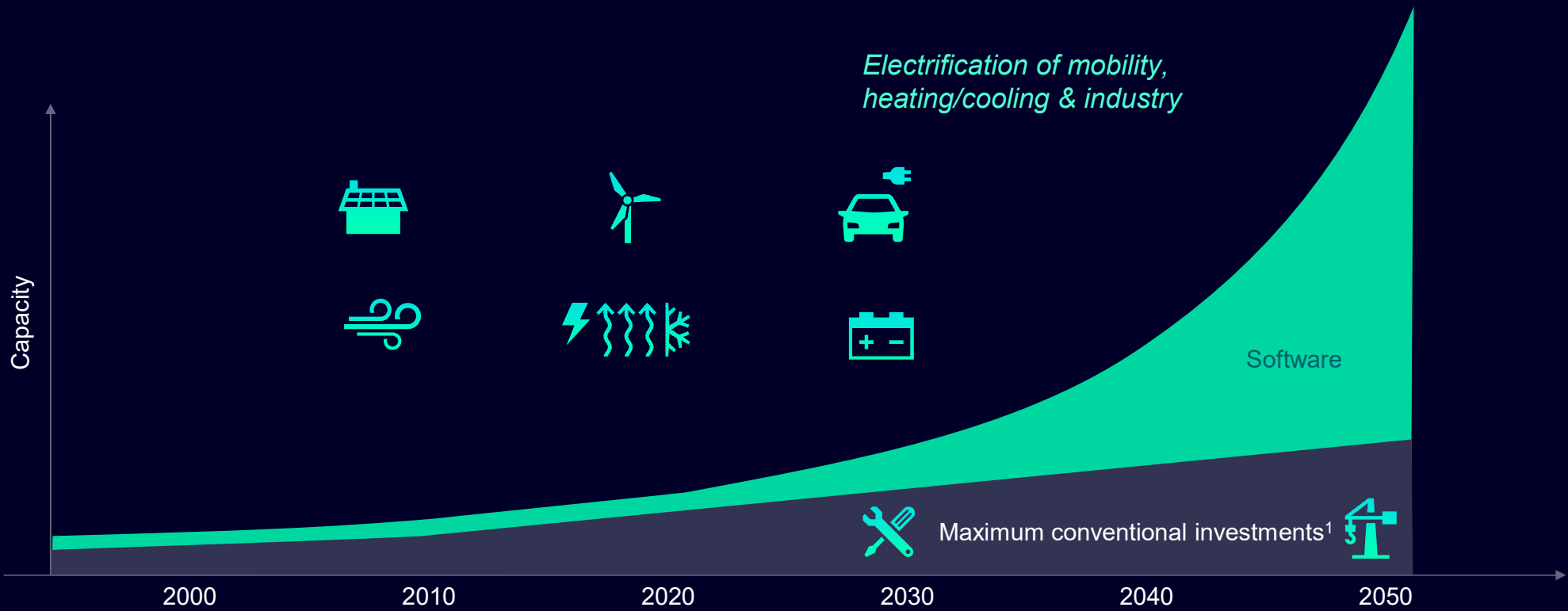
Conventional investments will not provide the needed speed to keep up with the increasing complexity

- How can we bridge the “exponential gap”?



¹ limited by resource availability, coordination effort, space, acceptance, etc.

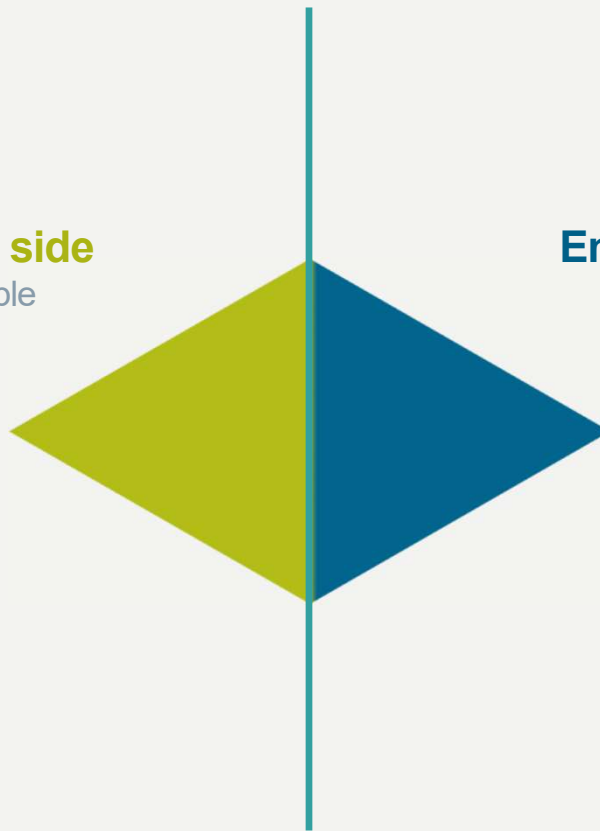
Only investments in software provide the necessary speed, flexibility, and scalability



¹ limited by resource availability, coordination effort, space, acceptance, etc.

Energy supply side

Increasing Renewable
Generation



Energy demand side

Electrification and Smart
Devices

Energy supply side

Increasing Renewable
Generation

Energy demand side

Electrification and Smart
Devices

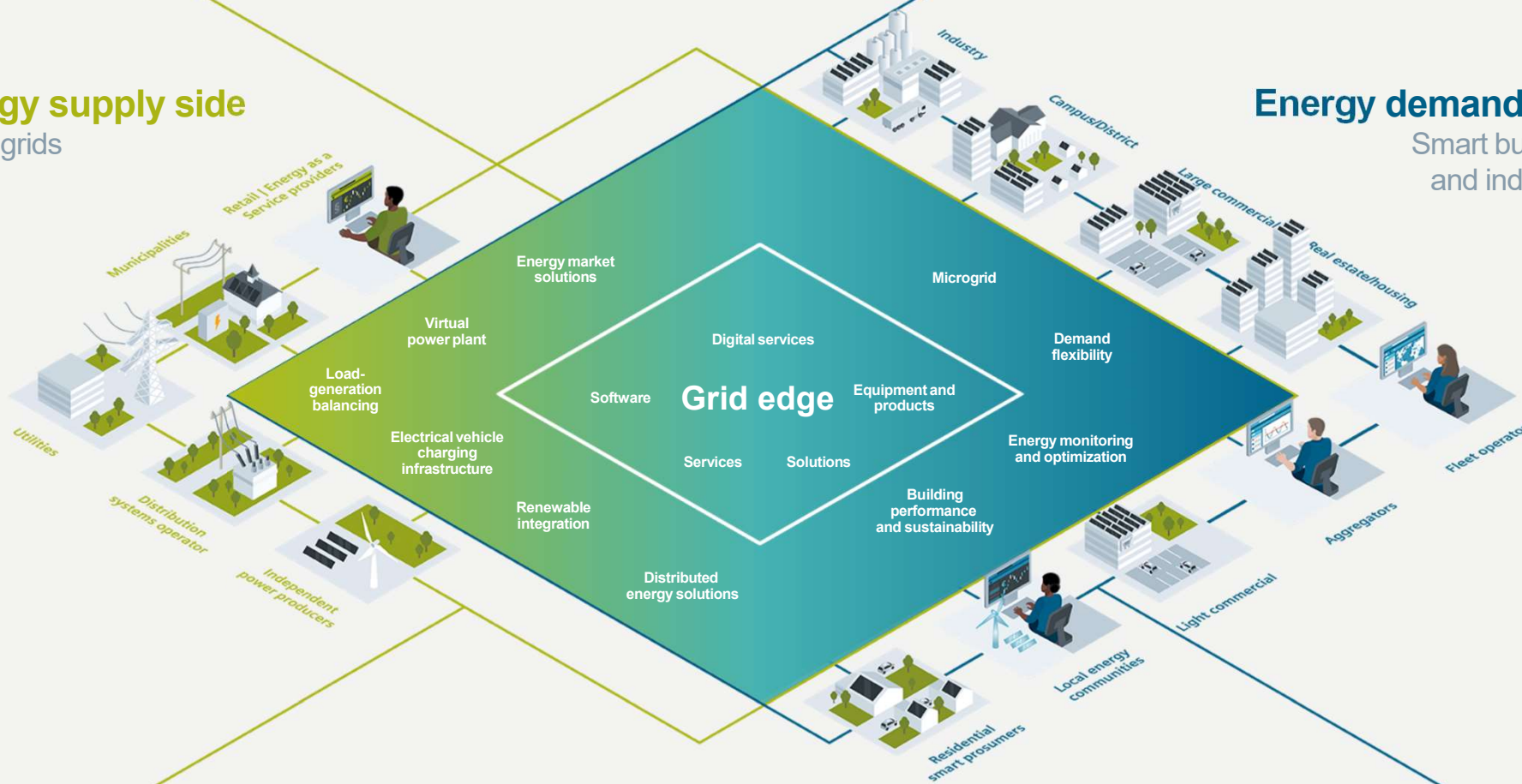


Energy supply side

Smart grids

Energy demand side

Smart buildings and industries



Enablement of Grid Edge Opportunities - Shared Benefits



Utility/ Grid

Renewable Integration
New sources of flexible load and generation



Defer Upgrades

Deferred Investment in Grid Infrastructure



Customer Satisfaction

Enable customer's energy choices



Shared Benefits

Lower Costs

Shared cost of ownership



Climate Resilience

Reduce outage duration
Reduce customers impacted



New Business Models

Opportunities to participate in smart grid and energy transition



Customer/ Prosumers

Energy Choices

Energy savings or climate goals



Energy Savings

Energy savings or climate goals



Energy Security

Backup and self generation



SIEMENS

Siemens, NB Power, Nova Scotia Power have partnered to shape the future of energy with support by the federal government

Smart Grid Atlantic
Developing a cloud-based platform to maximize the benefit, for utilities and customers, of distributed energy resources (DERs) and microgrids through a series of smart energy community projects

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NEW BRUNSWICK
Microgrid Lab
Shediac Smart Energy Community
Fredericton Project Management Office and R&D

PEI
Energy System Platform

NOVA SCOTIA
Smart Grid Nova Scotia
Halifax Project Management Office

Partners:
Énergie NB Power
Nova Scotia POWER
An Emera Company

Funding Partners:
Innovation, Science and Economic Development Canada
Innovation, Sciences et Développement économique Canada
Natural Resources Canada
Ressources naturelles Canada

CANADA

Residential Smart Community

400 Homes

Smart Meters (400)

Smart Thermostats (350)

Controllable Water Heater (340)

Heat Pumps (40)

Solar & Storage (75)



Resiliency through Fiona

52 Homes Installed

- Seamless pickup when power went out
- No noisy generators
- Solar arrays withstood winds
- No one fully drained battery



Commercial Smart Energy Study

Rooftop Solar &
Battery Storage



Commercial Smart Energy Study

Net-Zero Energy
&
Net-Zero Emissions



< 15% from
Rooftop PV



DER Control

Residential Storage (75)

Controllable Water Heater (270)

Demand Response (1)

C&I Storage (2)

Utility Storage (1)



Thank You

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