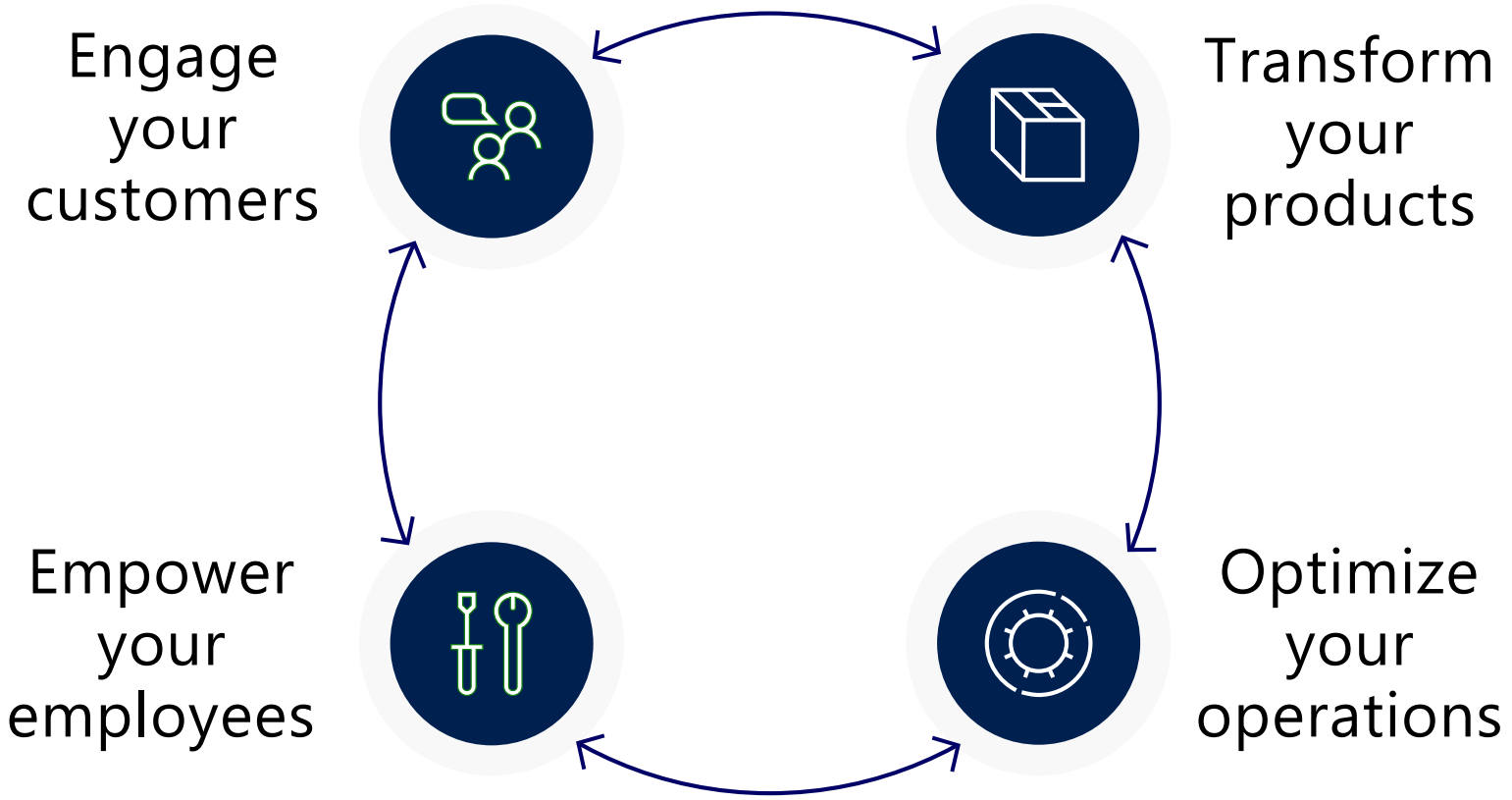
Digital in Power & Utility
Microsoft

Digital Transformation



Industry Digital Trends – Reinventing Power and Utilities

Improving operational efficiency, workforce productivity, energy conservation and asset performance are primary focus areas for energy and power providers.

Systems of Intelligence

Engage Customer

- Use of **analytics and BI for digital operations** and business insights such as demand forecasting
- **Customer Self Service App** for usage, billing and payments
- **Social Media and Listening** for customer communications and service
- **Smart Metering**
- **E-commerce Marketplace** for energy saving products and services with rebates
- Platforms for **integrating Distributed Energy Sources** (DER)

Empower Employees

- **Augmented reality** for hands-free maintenance assistance and video calling
- **Field Force Mobility** to enable planning ,scheduling and logistics optimization with real time alerts
- **Remote Expert Assistance** for maintenance engineers

Optimize Operations

- **Asset tracking**, monitoring health and performance
- **Predictive and condition based maintenance**
- **Intelligent Grid Operations** to Improve fault isolation and outage management, optimize voltage and power, and more effectively integrate distributed energy sources
- **Analytics based energy trading models**
- **Smart Grids** for demand response programs

Transform Products

- **Smart Homes** with IoT based energy management services
- **Smart Buildings** with large commercial and industrial energy efficiency programs and energy analytics services
- **Blockchain based microgrids** (peer to peer energy markets)

Digital Transformation

Industry Disruptors

Restructured Utility	enel Green Power	Global presence in 16 countries, focused on centralized renewable generation supported by strong CAPEX capability
Focus on renewables	SolarCity	Large, integrated solar player (retail manufacturer) with strong retail brand
IT	Google	Invested more than $ 2,5 bln in renewable energy, positioning as a central player for smart home solutions
Aggregator	NEXT KRAFTWERKE	Operator of virtual power plants, started in 2009 with 2.000 MW capacity
New entrant to the European market	CNNC CGN	Chinese nuclear players, looking for European investment opportunities
Technology	C3 Energy	Provides Big-data solutions based on weather forecast, customer segmentation and demand analysis
Oil industry	TOTAL	Planning to invest $ 500 mln into renewable energy sources, and established a new division for renewable electricity generation and retail

The level of competition keeps increasing

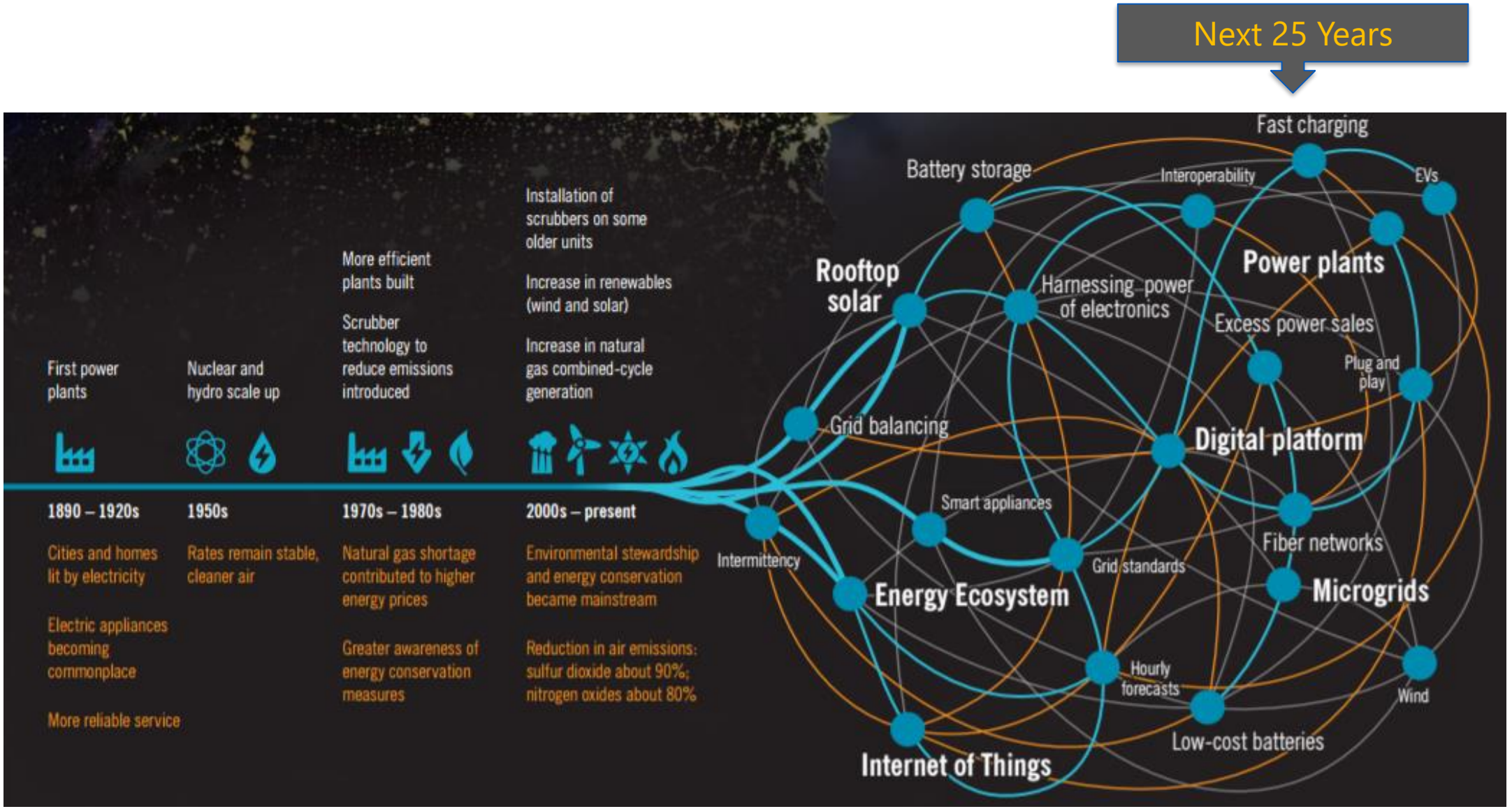
New, non-traditional players enter the energy market with new business solutions and stretch the boundaries of the sector

At the same time, there are more and more opportunities for partnering

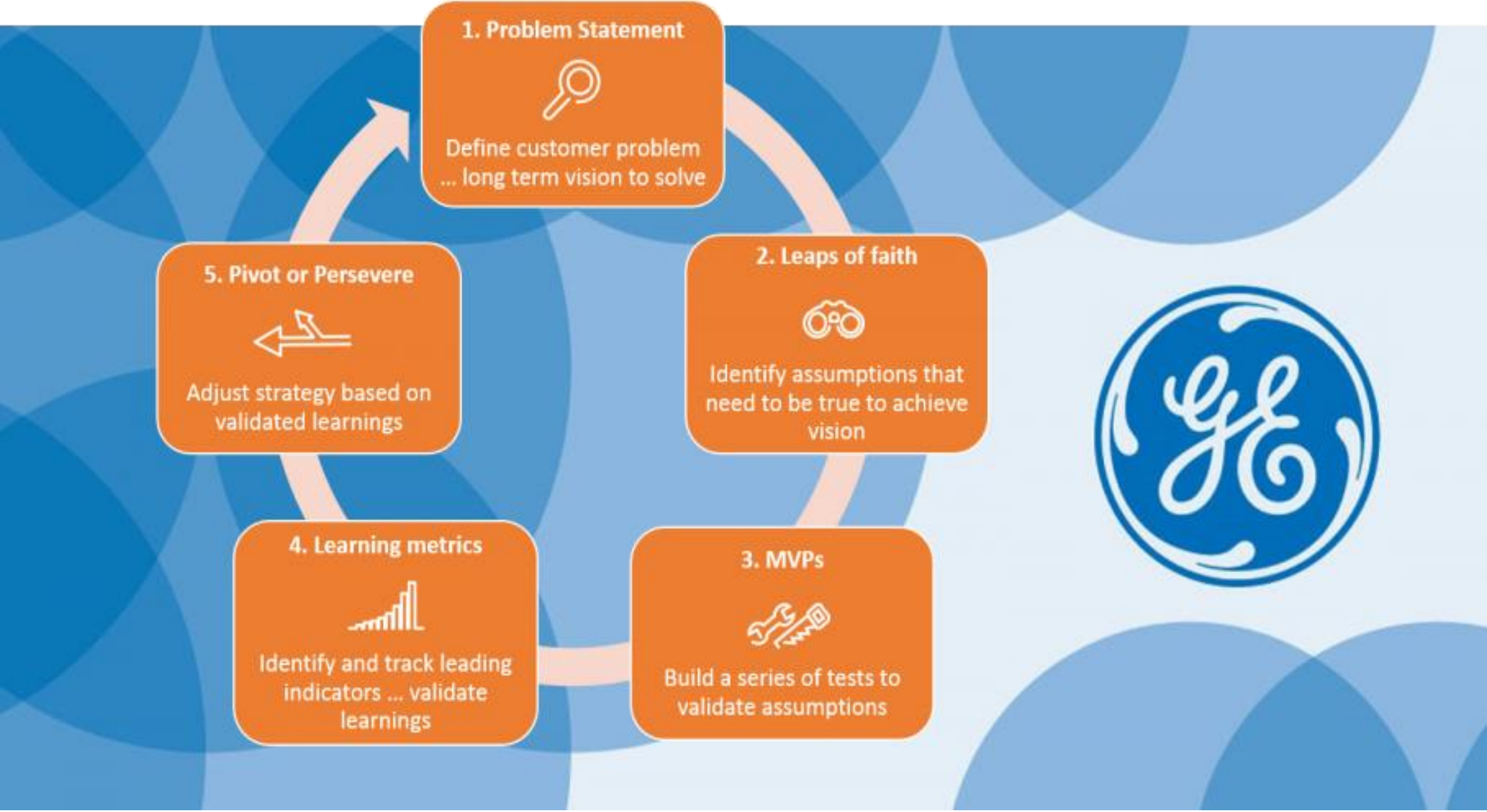
Competition is becoming more and more international, and new entrants are targetting all segments of the energy value chain

Utilities Industry – Evolution of Energy

From thermal powered stations to now distributed generation using Solar cells, Utility industry has come very far. Utilities of future are going to be self governed and automated leveraging digital wave which, from generation to distribution is impacting the entire value chain of this industry



Digital systems of intelligence can help you address the most pressing challenges of our time


1. Problem Statement
Define customer problem ... long term vision to solve
2. Leaps of faith
Identify assumptions that need to be true to achieve vision
3. MVPs
Build a series of tests to validate assumptions
4. Learning metrics
Identify and track leading indicators ... validate learnings
5. Pivot or Persevere
Adjust strategy based on validated learnings

The new **utility of the future** captures opportunities all along the value chain

McKinsey&Company

Value Chain: Traditional vs. Digital

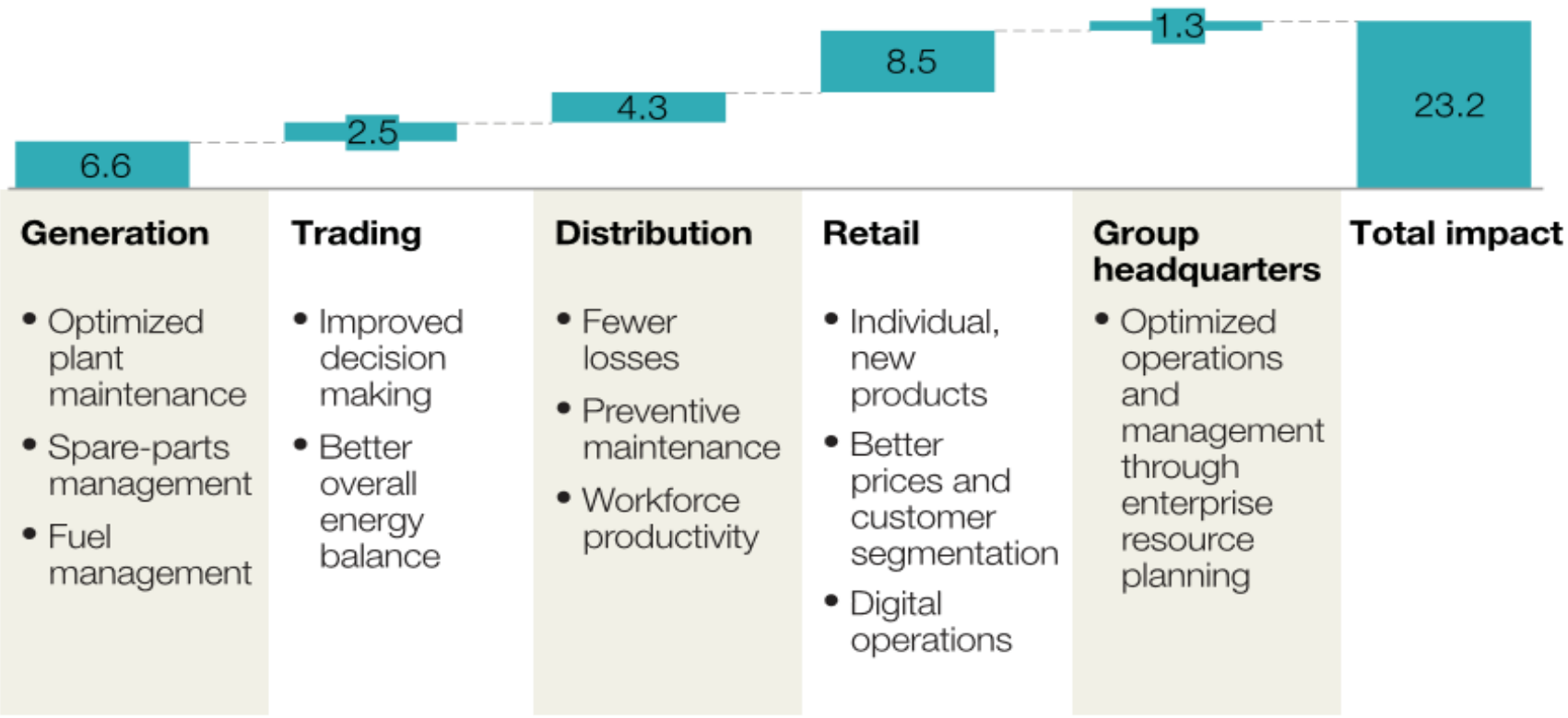
Pursuing digital transformation across the value chain can be the most effective and cost-efficient way to address business challenges and achieve sustainable growth.

Generation	Transmission	Distribution	Retail
Traditional Activities			
• Converting fuel energy in to electrical energy in power plants • Plant maintenance asset Management, asset monitoring, command control center • Capacity planning • Regulatory compliance and planning	• Transforming generated electricity into electricity that can be transmitted over power lines and matching end user requirements (demand) with energy availability - , i.e. maintaining the grid • Asset Management	• Stepdown of voltage and deliver electricity locally to commercial and residential customers • Fault and leakage restoration • Pipe and line replacement	• Rate management, • Metering, billing, payments, credit and collections • Customer relationship management – customer queries and grievance management, new customer enrolment
Digital Footprint			

• Smart asset planning including preventative and conditioned based Maintenance
• Data analytics to the vast amounts of useful data utilities collect offers an opportunity to forecast demand better, to improve compliance with regulatory requests
	• **Predictive Outage** mapping
	• Intelligent grid devices
	• **Digital Asset Management**
	  • Asset information Mgmt.
	  • Asset condition monitoring
	  • Program performance Mgmt.
	• **Digital Field worker** with mobile access to maps, data, work-mgmt. tools, and real time expertise
		• Data Analytics for planning decisions about distribution networks
		• Substation automation, advanced tele-protection, dynamic line rating
		• Smart grid allow automated controls to improve network, safety and efficiency
		• Back office automation and data driven decision making
		• Fault and leakage , detection, isolation and restoration
			• Smart Meters – personalized services based on customer usage pattern
			• Energy/water usage notification - energy information services
			• Distributed generation support
			• Energy efficiency/conservation
			• Energy management
			• Digital channels for billing, payments

Is it worth it? New technologies have demonstrable impact on utility earnings

Improvement areas, case study, EBIT,[1] %



[1]Earnings before interest and taxes.

McKinsey&Company

Yesterday

Limited number of tools and vendors

One platform, few devices

Data is scarce but manageable

IT has major influence and control

People only work when they are at work

Today

Many tools and vendors to work with

Multiple platforms, many devices

Overabundance of data

IT has limited influence and control

People work wherever they want

Benefits of the cloud

Time

Confidence

Performance

Data is the new electricity powering organizations

DATA
163 zettabytes annually by 2025

DATA PLATFORMS & ANALYTICS
$138.5 billion market by 2021

CLOUD
Cloud shift will affect more than **$1 trillion** in IT spending by 2020

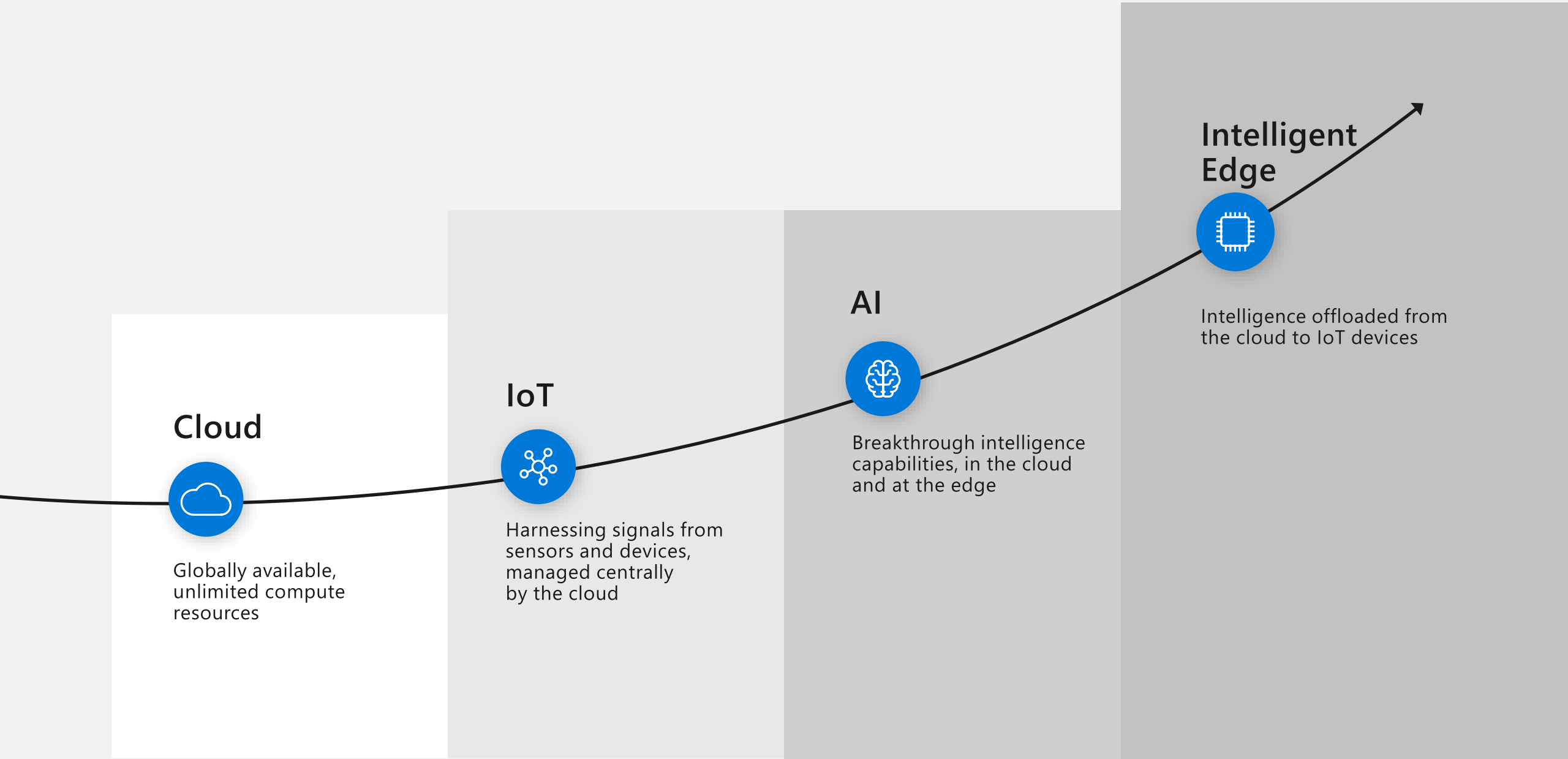
ENGAGE YOUR CUSTOMERS
to increase customer participation

EMPOWER YOUR EMPLOYEES
to make informed decisions

OPTIMIZE YOUR OPERATIONS
to improve usage, capacity, forecasting and grid reliability

TRANSFORM YOUR PRODUCTS
to meet rising customer expectations

Source: Forbes, Gartner

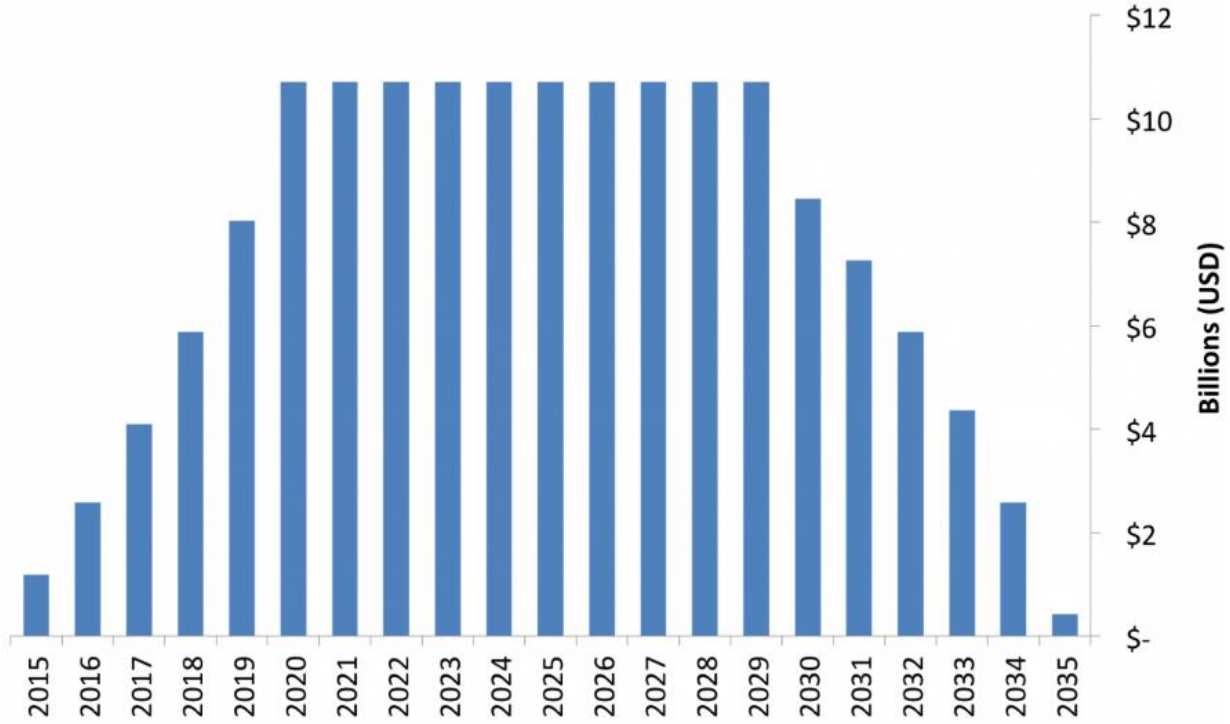

Cloud
Globally available, unlimited compute resources
IoT
Harnessing signals from sensors and devices, managed centrally by the cloud
AI
Breakthrough intelligence capabilities, in the cloud and at the edge
Intelligent Edge
Intelligence offloaded from the cloud to IoT devices

Internet of Things in Utilities

Utilities are currently among the largest IoT spenders. According to IDC's own estimates, they will be the third-largest industry by expenditure in IoT products and services, with over $69 billion worldwide. By 2018, this is expected to grow to nearly $87.5 billion.

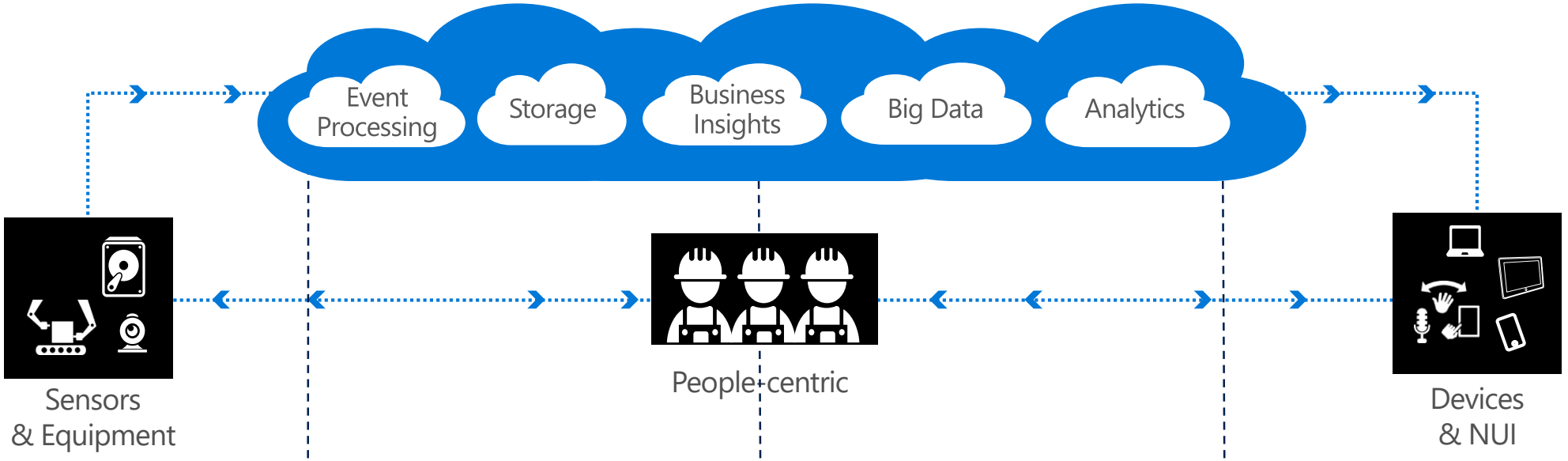
Estimated Savings per Year realized from Smart meters Installed between 2015-2020

Not Including meters Installed after 2020



Source: European Commision 2014, BI Intelligence Estimates 2015

Internet of Things, People and Services



Device Connectivity & Management	Data management & Insights	Advanced Analytics	Business Productivity & Process Optimization
Gain visibility, access and control to machinery and processes	Manage KPIs to improve operational performance and decision making	Anticipate problems and deliver new value added services	Enable Business Process Automation, Operators and Service Engineers

Microsoft can help optimize while enabling new business models