

# NAVIGATING THE ENERGY TRANSFORMATION

CREATING CUSTOMER AND SHAREHOLDER  
VALUE IN THE ENERGY CLOUD

NOVEMBER 20, 2017



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*Global Energy  
Practice Leader*



**APPRO**

ASSOCIATION OF  
POWER PRODUCERS  
OF ONTARIO

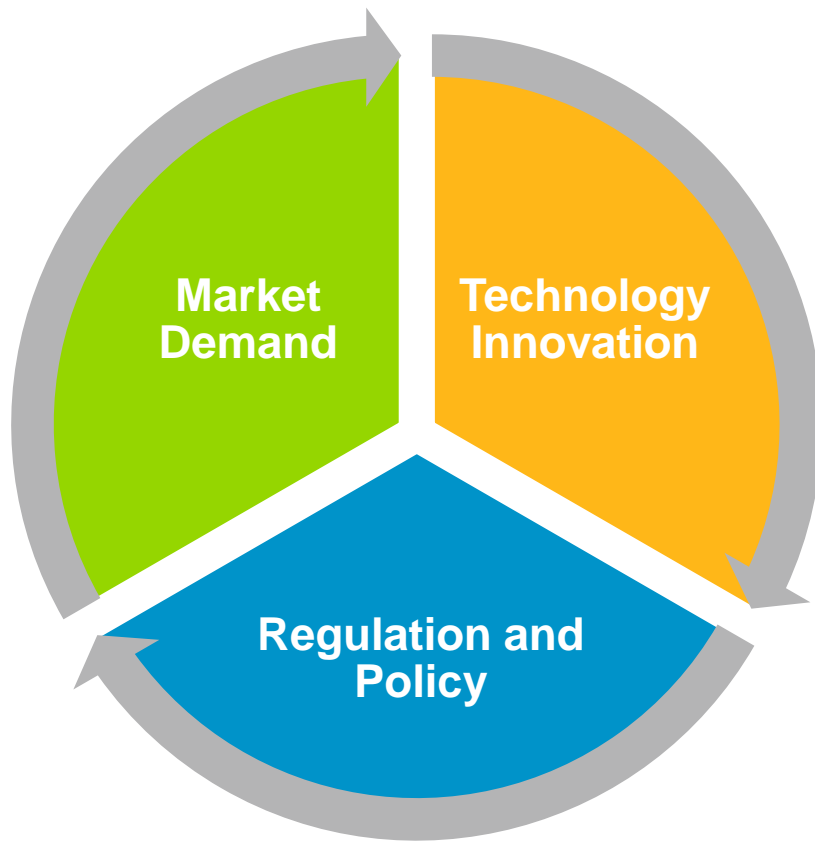
2017 CANADIAN  
POWER CONFERENCE

NAVIGANT

# THE ENERGY TRANSFORMATION IS ACCELERATING

## THREE FORCES UPENDING THE STATUS QUO

Disruption is a prevailing and uncompromising threat to our industry.



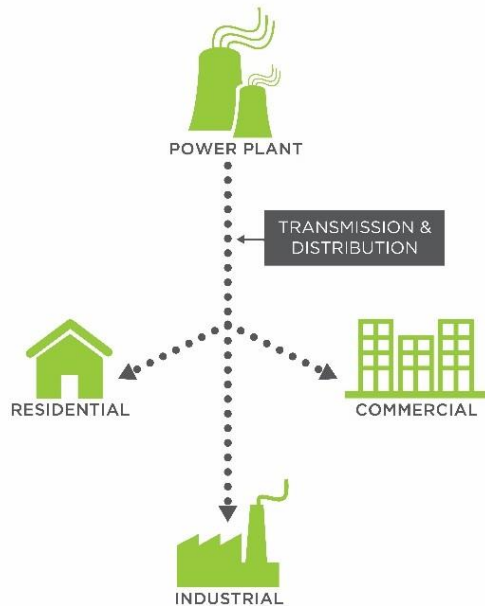
Five megatrends underpin the utility industry transformation in Canada.

1. Climate policies are subsuming energy policies
2. Energy customer expectations are changing
3. Well defined industry lines are blurring
4. Mega projects are more challenging
5. The **Energy Cloud** is emerging: Old energy infrastructure is being replaced with cleaner, more distributed, more intelligent systems

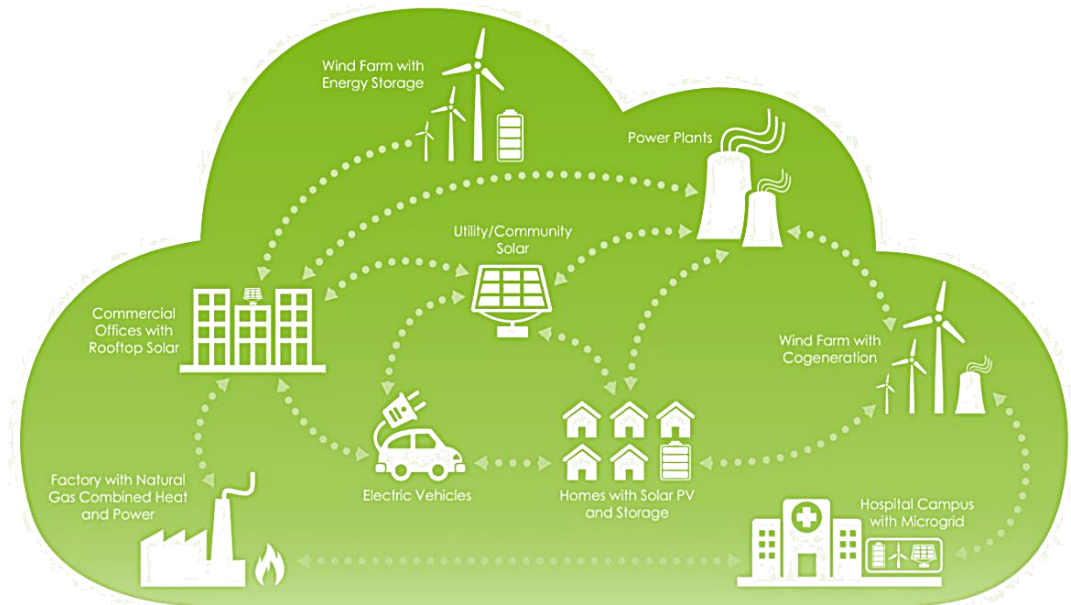
# THE ENERGY CLOUD

TOWARD A CLEAN, DECENTRALIZED, INTELLIGENT & MOBILE GRID

## PAST: Traditional Power Grid Central, One-Way Power System



## TODAY: The Energy Cloud Distributed, Cleaner, Two-Way Power Flows



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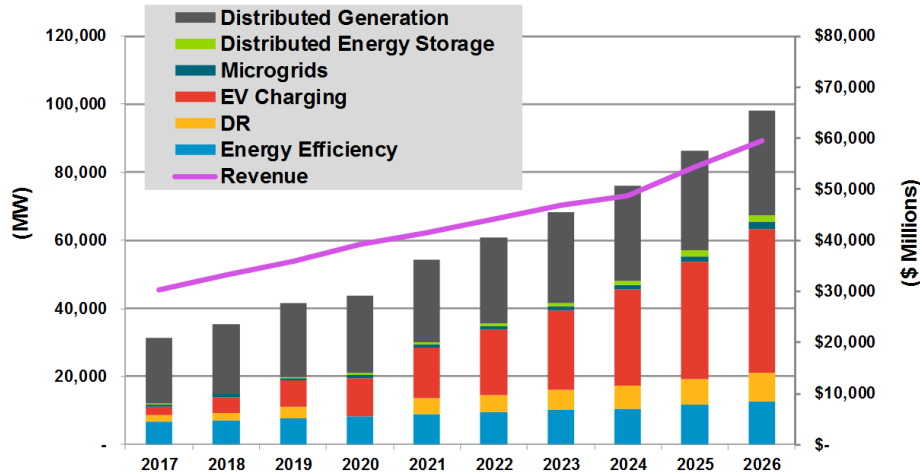
Source: Navigant

<sup>1</sup> Navigating the Energy Transformation: Building a Competitive Advantage for Energy Cloud 2.0 ([white paper](#))

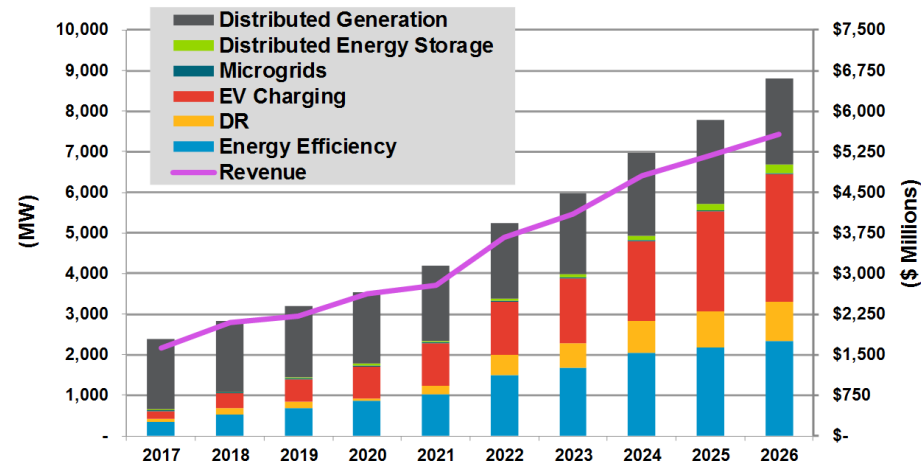
# ENERGY CLOUD SCENARIO'S

## DER GROWTH ACCELERATING IN NORTH AMERICA AND CANADA

Annual Installed DER Power Capacity Additions by DER Technology, North America: 2017-2026



Annual Installed DER Power Capacity Additions by DER Technology, Canada: 2017-2026

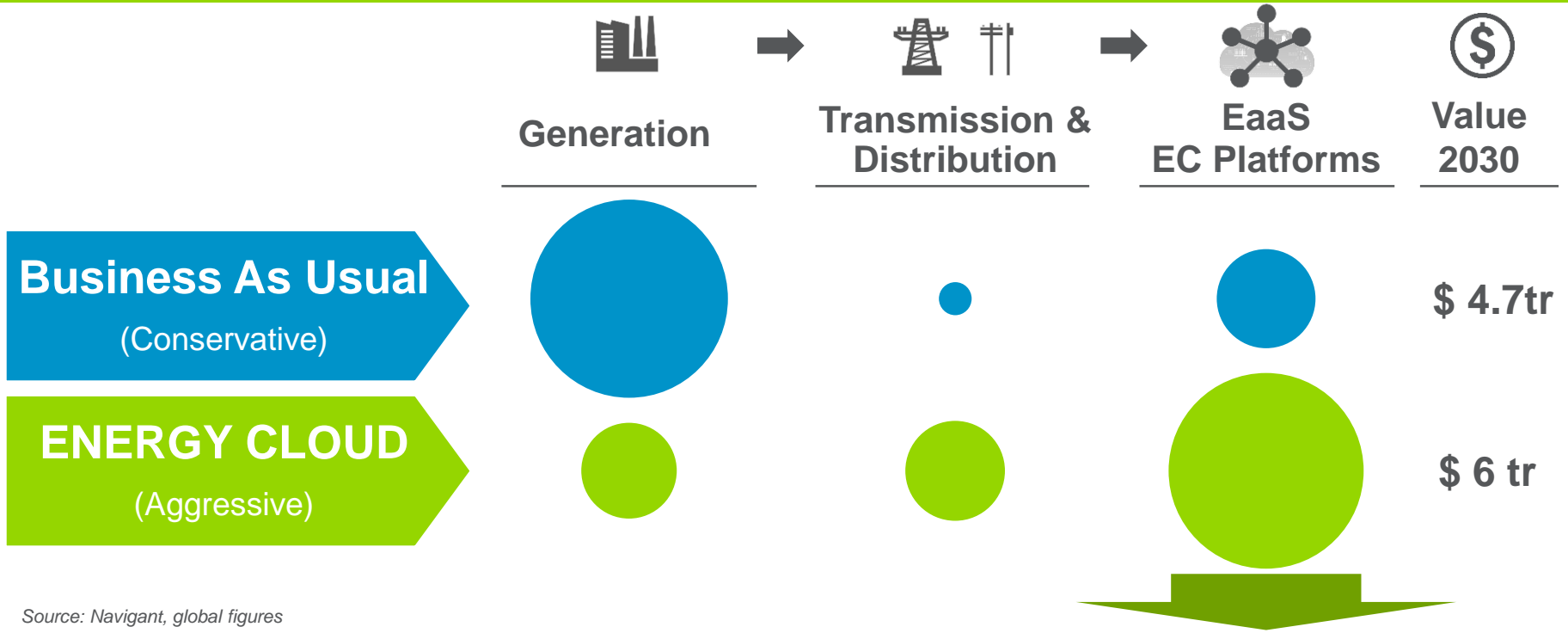


### Observations

- DER deployments will reach ~30 GW this year in the US, versus new central station generation (19.7GW)
- DER in North America is growing two-to-three times faster than centralized generation (incl. renewables)
- In Canada new DER will reach 15 GW in the next 5 year
- DER growth in Canada comes primarily from DG, DR, EV charging load, and energy efficiency

# ENERGY CLOUD SCENARIO'S

## VALUE SHIFTS TO T&D, EAAS AND EC PLATFORMS



Source: Navigant, global figures



**Disruptors are cash heavy, thriving in-house R&D engines, and often own customer relationship**

# BUSINESS MODELS ARE CHANGING

## 1. ENERGY-AS-A-SERVICE



**EaaS Applications**

### Supply Services

- Solar, Wind, Bioenergy
- CHP, Fuel cell, H2
- Backup generation
- Storage, Microgrids



### Demand Services

- Energy efficiency (lighting, HVAC etc.)
- Building optimization and commissioning
- Demand response



### Energy Optimization Services

- Energy monitoring & load management
- Waste/water/energy nexus
- Robotics / AI / ML



### Bold & Digital Moves



**Industry Evolution and Growth**

**Point Solutions**

**\$63B**

Today

**Integrated Deployments**



**\$221B**

2030

Source: Navigant, global figures

# BUSINESS MODELS ARE CHANGING

## 1. ENERGY-AS-A-SERVICE - RESIDENTIAL

**GMP is building the utility of the future ecosystem for their customers through its vertically integrated franchise.**

- Personal Energy Management
- Solar PV and storage
- Portable Power
- EV Charging, with several charging package options



Source: Green Mountain Power



Offering **NEW-AGE ENERGY PRODUCTS TO THEIR CUSTOMERS**, including heat pump water heaters, heating and cooling systems, Powerwall, EV charging, and home energy management.

# BUSINESS MODELS ARE CHANGING

## 1. ENERGY-AS-A-SERVICE – COMMERCIAL AND INDUSTRIAL

**Edison International created a subsidiary to help large energy users.** Edison Energy is a business that will help reduce energy costs, improve efficiency and offer more environmentally friendly **options for large energy users.** The company aims to serve commercial buildings, data centers, retail centers, healthcare operations and educational institutions **nationwide.**



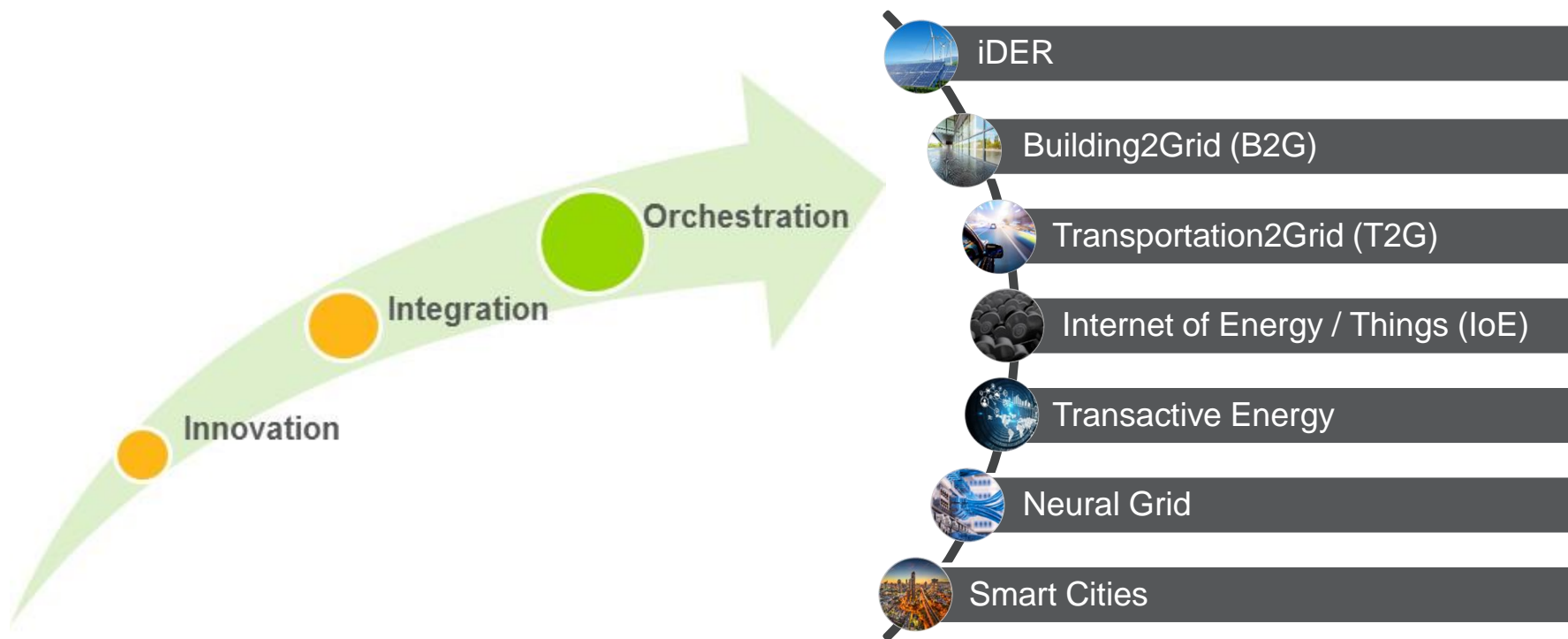
**ENGIE North America Inc. and Axiom Infrastructure have closed a 50-year concession valued at \$1.165 billion USD to address The Ohio State University's energy sustainability goals for its 485-building campus in Columbus, Ohio, one of the largest university campuses in the United States.**





# BUSINESS MODELS ARE CHANGING

## 2. ENERGY CLOUD PLATFORMS



### Why Energy Cloud platforms?

- ✓ Margins on individual technologies will erode even faster going forward (e.g. rooftop solar, storage)
- ✓ Difficult to scale and build a sustainable business around individual (siloe) technologies
- ✓ Need for orchestration, to unlock **full value** out of these platforms and technology ecosystems

# BUSINESS MODELS ARE CHANGING

## 2. ENERGY CLOUD PLATFORMS

- DER will grow **3-5x** faster than central station generation giving rise to virtual power plants (VPP) and other aggregation networks

DER



- The smart city technology market will be worth more than **\$600 billion** over the next decade with annual revenues growing almost 2.5x

SMART CITIES



- Residential and commercial customers will invest more than **\$50 billion** in behind-the-meter integrated energy assets to take advantage of B2G opportunities

BUILDING2GRID



- Electric vehicles will be the single largest addition of energy demand to the grid globally, exceeding **200 TWh**

TRANSPORTATION 2GRID



- Annual global revenue from IoT devices will grow 4x generating nearly **\$750 billion** in cumulative revenue

INTERNET OF ENERGY



- Utilities will invest more than **\$700 billion** in information technology, communications networking and automation technologies over the next decade

NEURAL GRID



- More than **40 million** electricity customers expected to participate in transactive energy markets

TRANSACTIONAL ENERGY



- ...and **orchestrators** will be the fastest growing and most profitable business model category across the utility value chain by leveraging assets and customer networks

ENERGY CLOUD



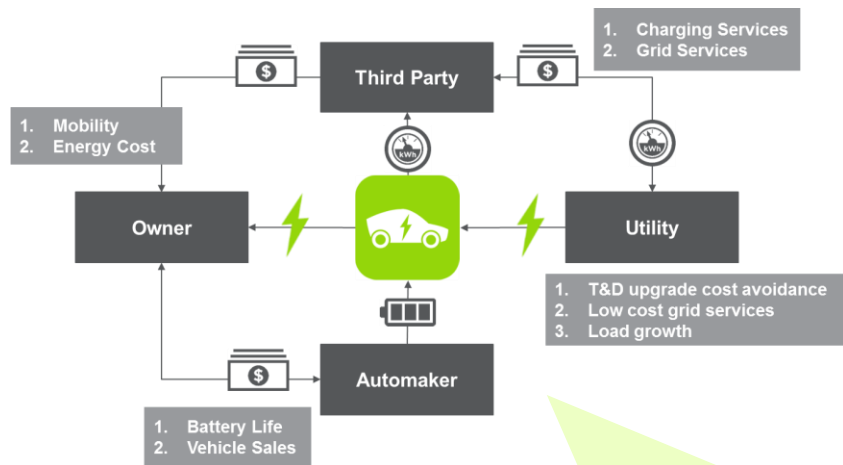
Source: Navigant Research

# BUSINESS MODELS ARE CHANGING

## 2. ENERGY CLOUD PLATFORMS - TRANSPORTATION EXAMPLE

Capture grid-related value streams on top of load growth and fleet management services.

### VALUE STREAMS



- Real-time energy balancing
- Peak-shaving load shift
- Distribution peak capacity support
- Time-of-use energy management
- Power quality, backup power, supply firming, and frequency regulation
- + Car sharing services, fleet management

### EXAMPLE: CUSTOMER-FOCUSED V2G SYSTEM

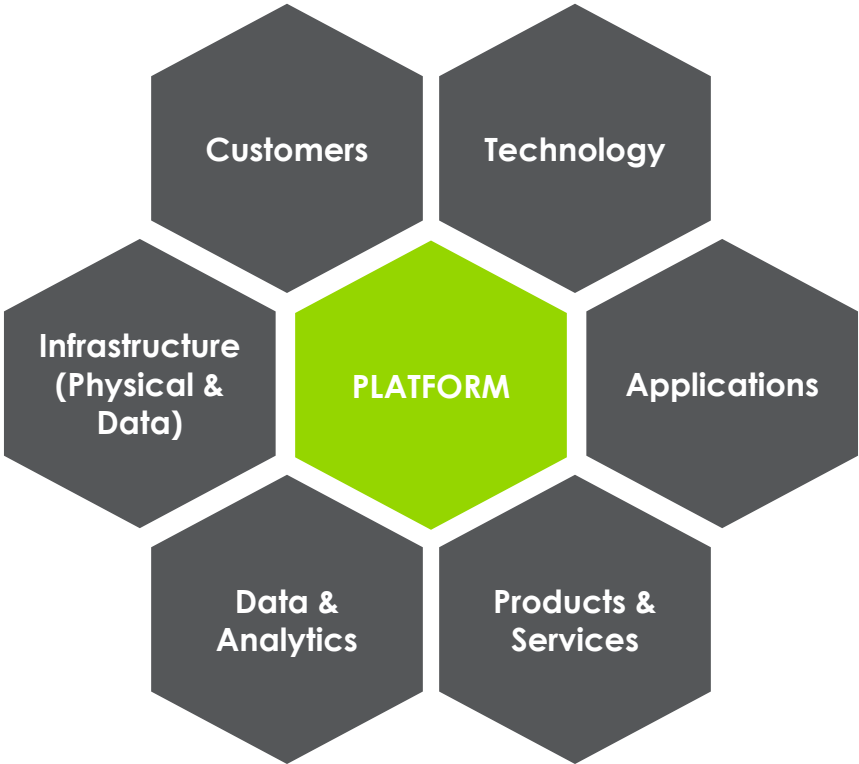


- Enables drivers to operate as individual energy hubs to use, store, and return excess energy to the grid
- EV owners paid up to €1,500/year for parking in dedicated locations
- If all UK vehicles were electric, the virtual storage capacity of 370 GW could power the UK, Germany, and France combined
- Enel acquired eMotorWorks to pursue the North American vehicle-to-grid (V2G) market

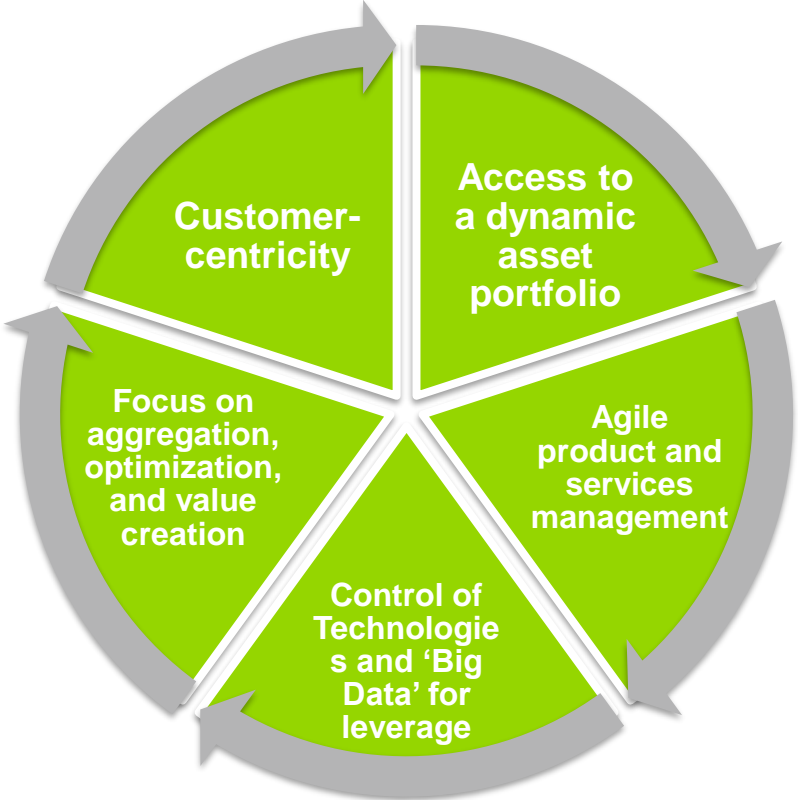
# BUSINESS MODELS ARE CHANGING

## 2. ENERGY CLOUD PLATFORMS – MOVE TO ORCHESTRATION

### Energy Cloud Platform

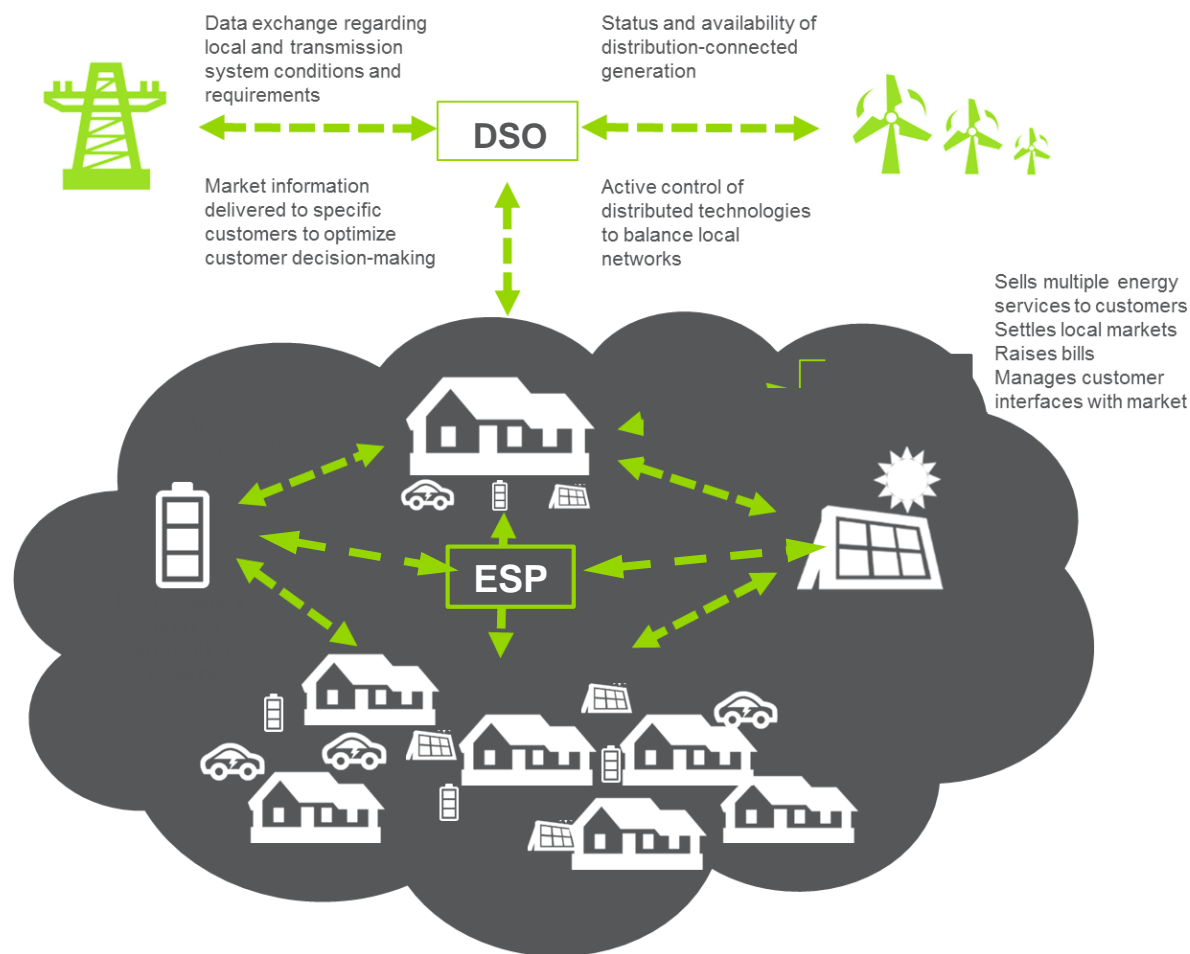


### Utility as Network Orchestrator



# STAY IN OR CHANGE THE GAME

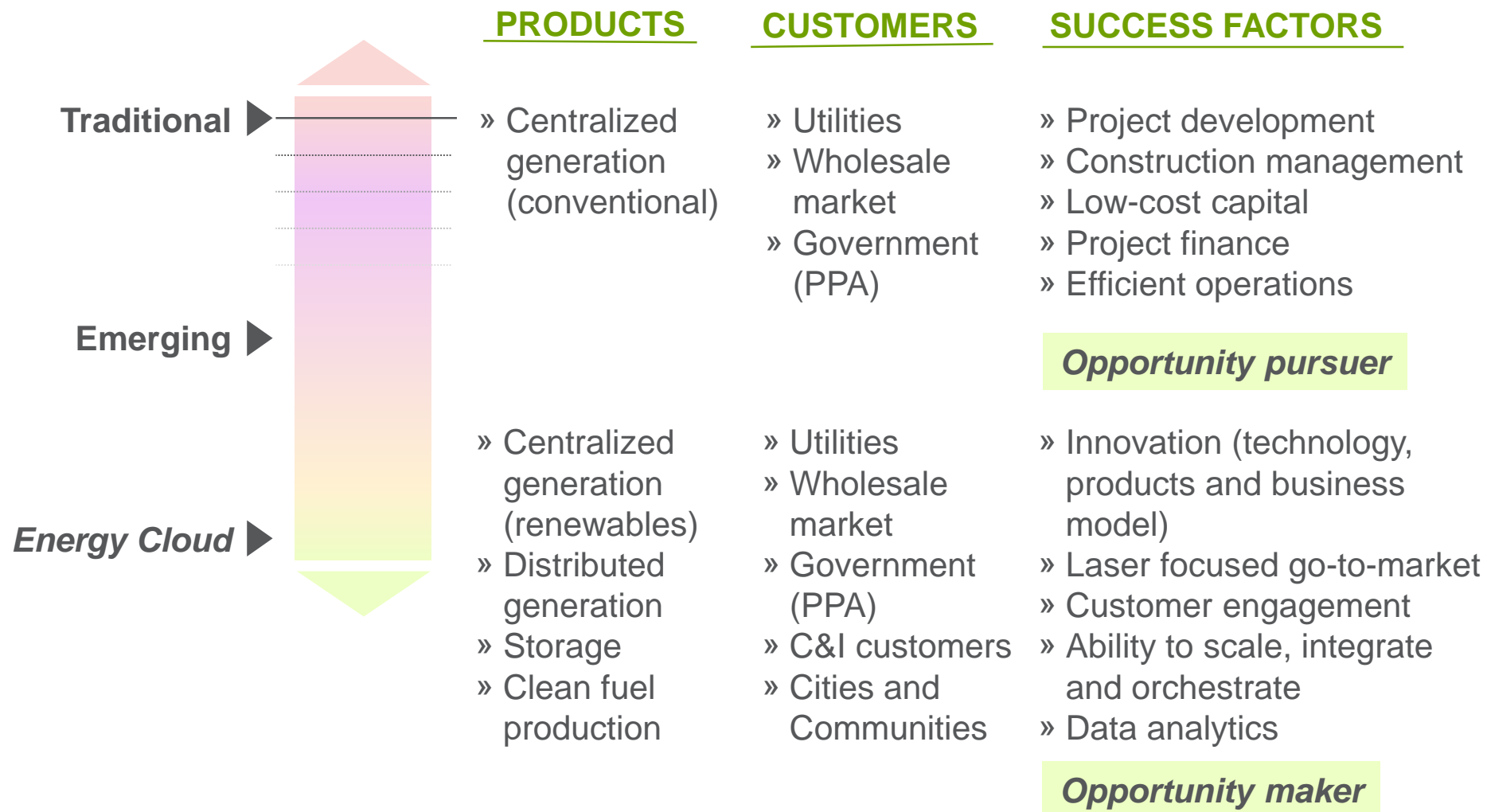
## EVOLVING ROLE OF THE UTILITY / LDC



- Utility business models transform from supply- to service- and platform based.
- Utilities evolve into energy cloud platform orchestrators to increase customer and shareholder value.
- Distributors evolve into **Distribution System Orchestrators (DSO)** to manage the intelligent, neural and mobile grid.
- Retail Operations evolve into **Energy as a Service Providers (ESP)**.
- Regulatory, Technology/ DER, Data analytics, AI capabilities are key.

# STAY IN OR CHANGE THE GAME

## EVOLVING ROLE OF THE POWER PRODUCER



# PATH FORWARD IN THE ENERGY CLOUD

Need to pursue two parallel tracks:

**Business model evolution will be key to success.**

**Network orchestrator business model emerges in energy and beyond.**

**Competitors are proactive, bold, and digital.**



## FIRST TRACK: PLAY DEFENSE

- More scalable, integrated, and cost-effective services to optimize the current business
- Ensure core business remains resilient while freeing up resources (human and financial) to invest



## SECOND TRACK: PLAY OFFENSE

- Departure from well-worn norms of strategic planning
- Focus on lucrative, high growth opportunities around Energy Cloud platforms and orchestration
- Cultural change plus regulatory and market change

# CONTACT

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#FutureUtility

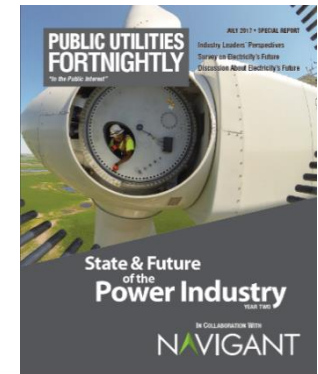
*RELEVANT  
THOUGHT  
LEADERSHIP*

## Navigating the Energy Transformation



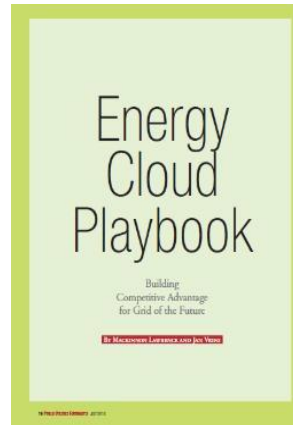
August 2016

## State & Future of the Power Industry



July 5, 2017

## Energy Cloud Playbook



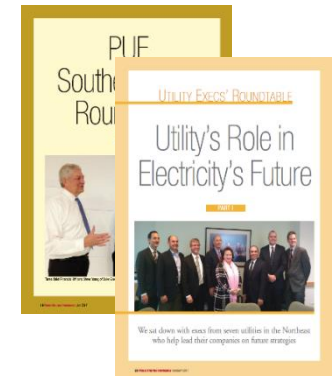
July 2016

## Defining the Digital Future of Utilities



April 2017

## Utility's Role in Electricity's Future

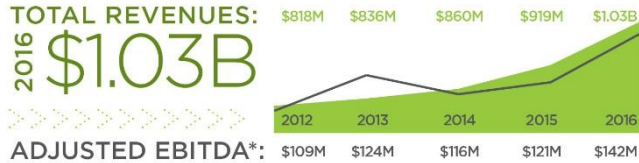


Q1 & Q2 2017



# NAVIGANT CONSULTING

## GLOBAL SPECIALIZED PROFESSIONAL SERVICES FIRM



WORKED IN **43** COUNTRIES (2016)

### CLIENTS FOUR KEY BUSINESS SEGMENTS



- HEALTHCARE **38%**
- DISPUTES, FORENSICS & LEGAL TECHNOLOGY **33%**
- FINANCIAL SERVICES ADVISORY AND COMPLIANCE **17%**
- ENERGY **12%**

### LOYALTY

**97%**  
OF OUR LARGEST  
**100**  
CLIENTS IN 2016  
= REPEAT  
ENGAGEMENTS

SIGNIFICANT  
CLIENT  
RELATIONSHIPS\*\*

**5+** YEARS **10+** YEARS  
= **68%** = **50%**

\* EBITDA is earnings from continuing operations before interest, taxes, depreciation, and amortization. Adjusted EBITDA excludes the impact of severance expense and other operating costs (benefit).  
\*\*Based on Navigant's largest revenue-generating clients in 2016.

### AWARDS AND ACCOLADES

**= 8** CONSECUTIVE  
PERFECT  
SCORES  
ON THE

HUMAN RIGHTS CAMPAIGN  
FOUNDATION'S CORPORATE  
EQUALITY INDEX (CEI)

2016 VAULT AWARDS  
**BEST**  
CONSULTING  
FIRM FOR:



- #8** Energy Consulting
- #12** Healthcare Consulting
- #16** Public Sector Consulting
- #18** Economic Consulting

AMERICA'S BEST EMPLOYERS 2016  
TOP 250 MID-SIZE FIRMS - FORBES

### MEDIA COVERAGE:

**2,400**  
CITATIONS  
IN 2016 IN NATIONAL,  
LOCAL & INDUSTRY  
PUBLICATIONS

### PEOPLE

**5,500+**  
EMPLOYEES  
**1,900+**  
EXPERT  
CONSULTANTS  
**2,700+**  
BUSINESS PROCESS  
PROFESSIONALS

# NAVIGANT'S GLOBAL ENERGY PRACTICE

We collaborate with clients to help them thrive in a rapidly changing environment.



## CLIENTS

- ✓ 50 largest electric and gas utilities
- ✓ 20 largest independent power generators
- ✓ 20 largest gas distribution and pipeline companies
- ✓ Leading oil & gas companies
- ✓ International, federal, and state government organizations
- ✓ Multiple new energy market entrants and investors



## TEAM

- ✓ With over 600 consultants globally we are one of the largest energy management consulting teams
- ✓ Consultants average 15 years of experience
- ✓ 60% have an advanced degree
- ✓ Over 50% have an engineering degree



## NAME

- ✓ Among Top 10 in Vault's 2016 Best Consulting Firms for Energy
- ✓ Named "Best Advisory – Renewable Energy" in 9th and 10th Annual Environmental Finance and Carbon Finance Market Surveys

# NAVIGANT'S GLOBAL ENERGY PRACTICE

## OUR CLIENTS



US DOE

- Analyzed global and domestic fuel cell market growth by shipment and manufacturers, including end-use application, technology, and fuel cell size



- Analysis used to set competitive positioning against other countries



SOUTHERN CALIFORNIA EDISON

- Assessed more than 140 distribution technologies in order to prepare for major regulatory filing with CPUC, including classification by opportunity type



- Results and recommendations were included in SCE's Distribution Resource Plan file at CPUC



HAWAIIAN ELECTRIC COMPANY

- Assessed potential for fast-responding demand response system for power distribution across five islands and 450,000 customers



- Operational flexibility of the demand response system will enable HECO to meet its goals of 100% clean energy by 2045



ENGIE

- Explored smart city market growth potential, specifically analyzing markets by geography and key segment



- Analysis enabled 5-year business unit plans to prepare for capital and operational investments



DTE ENERGY

- Measured and validated savings of \$100 million energy efficiency portfolio
- Supported energy efficiency program planning



- Navigant named Supplier of the Year for Innovation

# NAVIGANT'S GLOBAL ENERGY PRACTICE

## OUR PROJECTS

### Strategy

- M&A / Growth / Go-to-market
- New energy products and services
- Customer Engagement
- DER / Renewables
- R&D / Innovation
- Grid Modernization/Technology
- Sustainability and Climate Risk (SBT)

### Implementation

- Strategy Implementation
- Renewable procurement and auctioning
- DER products / services implementation
- Grid Modernization
- Compliance and Security

### Technologies

- Distributed generation
- Demand Side Management
- Energy Storage
- Electrification of Transportation
- Building Automation (residential/C&I)
- Information & communication technologies
- Flexibility / demand response

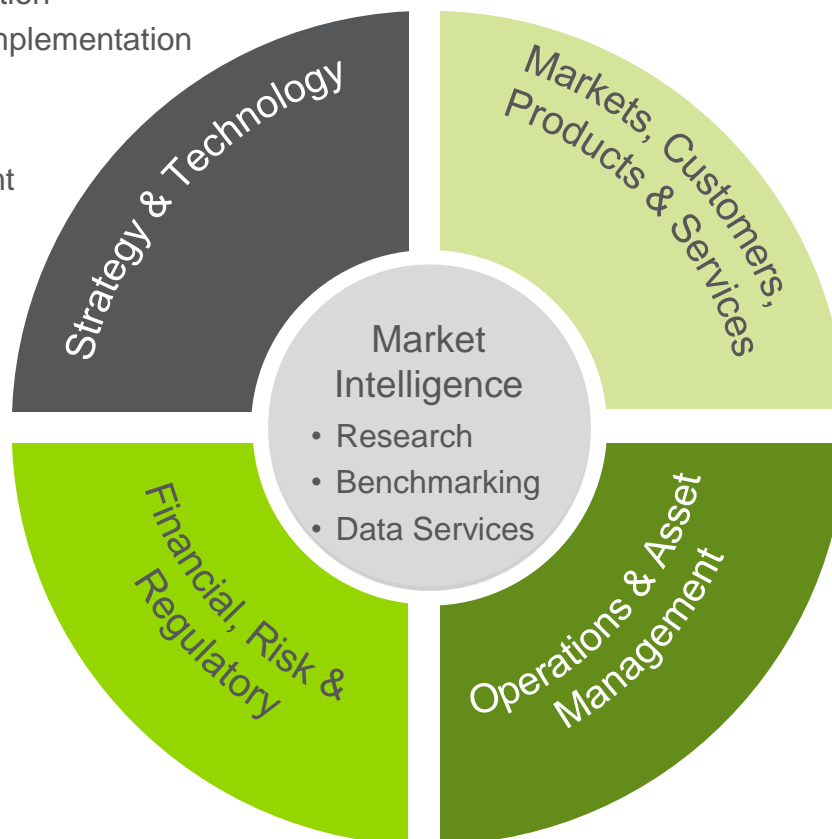
Client	Recent Projects
Global Energy Company	Smart Cities strategy and roadmap
US Vertically-integrated Utility	DER market assessment and strategy
UK DNO	DSO strategy
Canadian Electricity Distributor	Strategic merger and due diligence support
European Energy Company	Transactive Energy Market Assessment
US Utility	New Energy Products and Services
European Energy Company	DER Acquisition Support North-America
Middle East Utility	R&D Centre strategy/implementation roadmap
US Utility	Technology innovation Roadmap and Implementation
US Vertically-integrated Utility	DER Architecture Design
Global Manufacturer	Connected Home Strategy
US Vertically-integrated Utility	Micro-grid Strategy and Roadmap
US Vertically-integrated Utility	EV Integration Architecture and Design
US NY Utilities	Renewable Strategy

# NAVIGANT'S GLOBAL ENERGY PRACTICE

## OUR SOLUTION OFFERINGS

- Strategy, Planning & Implementation
- Low Carbon Strategy, Policy & Implementation
- Financing the Energy Transition
- DER Strategy & Implementation
- Innovation and R&D Management
- Technology Advisory
- Due Diligence and M&A Support
- Technology/Appliance Standards, Codes & Testing
- Data Management and Analytics

- Regulatory Support
- Risk Management, Compliance & Security
- Litigation Support



- Customer Engagement
- Impact Evaluation
- Program Design & Implementation
- Process Evaluation
- Market Adoption & Potential Studies
- Corporate Climate & Sustainability Services
- End-User Energy Management
- Integrated Resource Management
- Project Development & Transaction Support
- Electric Transmission, Planning & Operations
- Grid Modernization
- Performance Excellence
- Resource Procurement