ELECTRICITY, AN INDUSTRY IN TRANSITION

WATERLOO INSTITUTE FOR SUSTAINABLE ENERGY

JANUARY 25, 2017

NAVIGANT

AGENDA

1. Introductions
2. Industry in Transition
3. Impacts

INTRODUCTIONS

NAVIGANT AT-A-GLANCE

2015 REVENUES:
$919 MILLION

WORKED IN
42
COUNTRIES IN 2015

CLIENTS
FOUR KEY BUSINESS SEGMENTS

DISPUTES, FORENSICS & LEGAL TECHNOLOGY
FINANCIAL SERVICES ADVISORY AND COMPLIANCE • HEALTHCARE • ENERGY

PEOPLE
5,000+ EMPLOYEES

1,700+ EXPERT CONSULTANTS

2,700+ BUSINESS PROCESS PROFESSIONALS

THOUGHT LEADERS: QUOTED
700x
IN 2015 IN NATIONAL, LOCAL & INDUSTRY PUBLICATIONS

AWARDS AND ACCOLADES

=7 CONSECUTIVE PERFECT SCORES ON THE HUMAN RIGHTS CAMPAIGN FOUNDATION'S CORPORATE EQUALITY INDEX (CEI)

IVY EXEC 2015
BEST FIRMS TO WORK FOR

2015 VAULT AWARDS
BEST CONSULTING FIRM FOR:

- #8 Energy Consulting
- #10 Healthcare Consulting
- #15 Economic Consulting
- #18 Public Sector Consulting

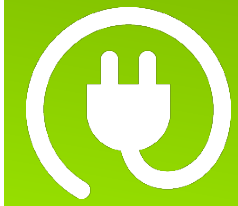
LOYALTY
100% OF OUR LARGEST **100** CLIENTS IN 2015
= REPEAT ENGAGEMENTS

SIGNIFICANT CLIENT RELATIONSHIPS*
5+ YEARS = 69%
10+ YEARS =44%

*Based on Navigant's largest revenue-generating clients in 2015

INTRODUCTIONS

GLOBAL ENERGY PRACTICE



CLIENTS

- ✓ 50 largest electricity and natural 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

- ✓ Industry's largest energy management consulting team
- ✓ Consultants average 15 years of experience
- ✓ 60% have an advanced degree
- ✓ More than half have an engineering degree

NAME

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

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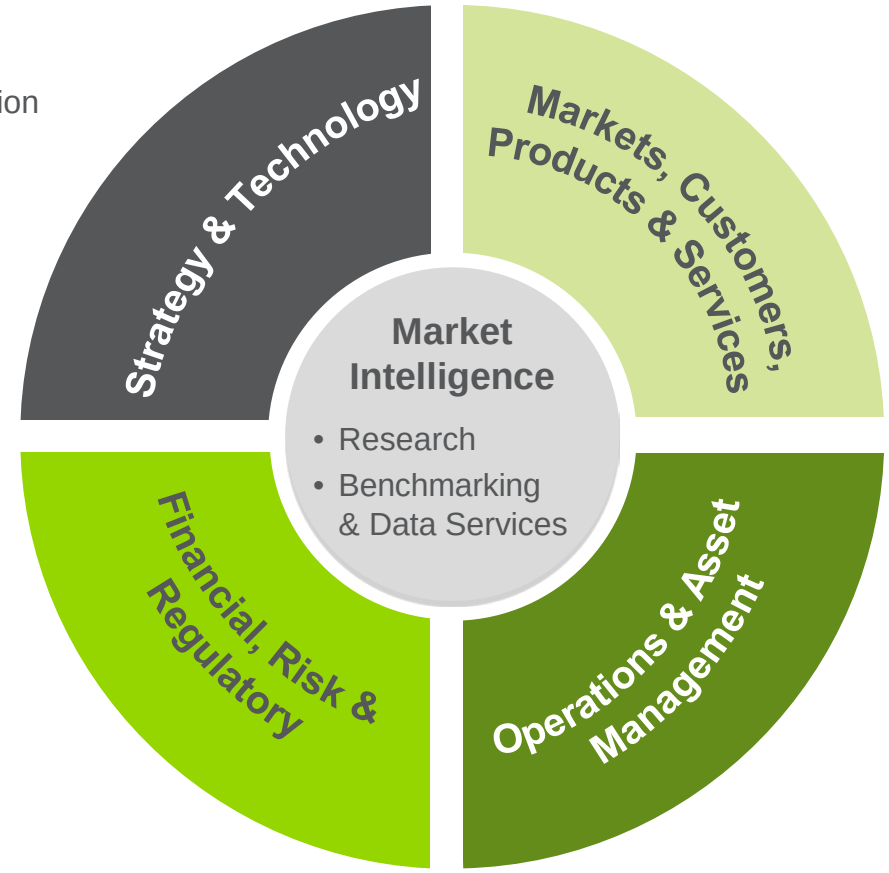
ENERGY SOLUTION OFFERINGS

- Strategy, Planning & Implementation
- 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



- Customer Engagement
- Impact Evaluation
- Program Design & Implementation
- Process Evaluation
- Market Adoption & Potential Studies
- End-User Energy Management

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

- Integrated Resource Management
- Project Development & Transaction Support
- Electric Transmission, Planning & Operations
- Grid Modernization
- Performance Excellence
- Resource Procurement

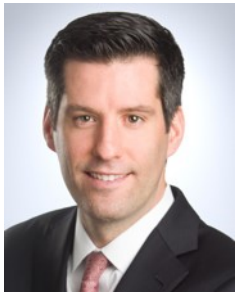
INTRODUCTIONS

ENERGY CANADA LEADERSHIP TEAM

Jan Vrins

Managing Director, Energy Practice Lead

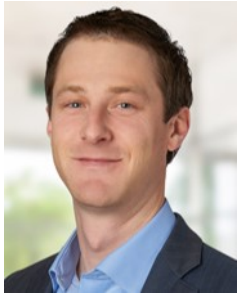
Jan advises executive leaders on developing and operationalising their strategies and achieving sustainable excellence, while increasing shareholder value.



Benjamin Grunfeld

Managing Director, Canadian Power and Utilities Sector Lead

An expert on the Ontario and Canadian power and utilities sector, Ben guides senior executives and boards to develop and implement long-term business and regulatory strategies, and supports senior operations executives to identify fact-based opportunities for performance improvement.



Craig Sabine

Director

As a seasoned expert in the analysis of Canadian energy markets and energy policy, Craig serves clients across the country, providing strategic advisory and risk management support to utilities, electricity generators, regulators and oil and gas companies.

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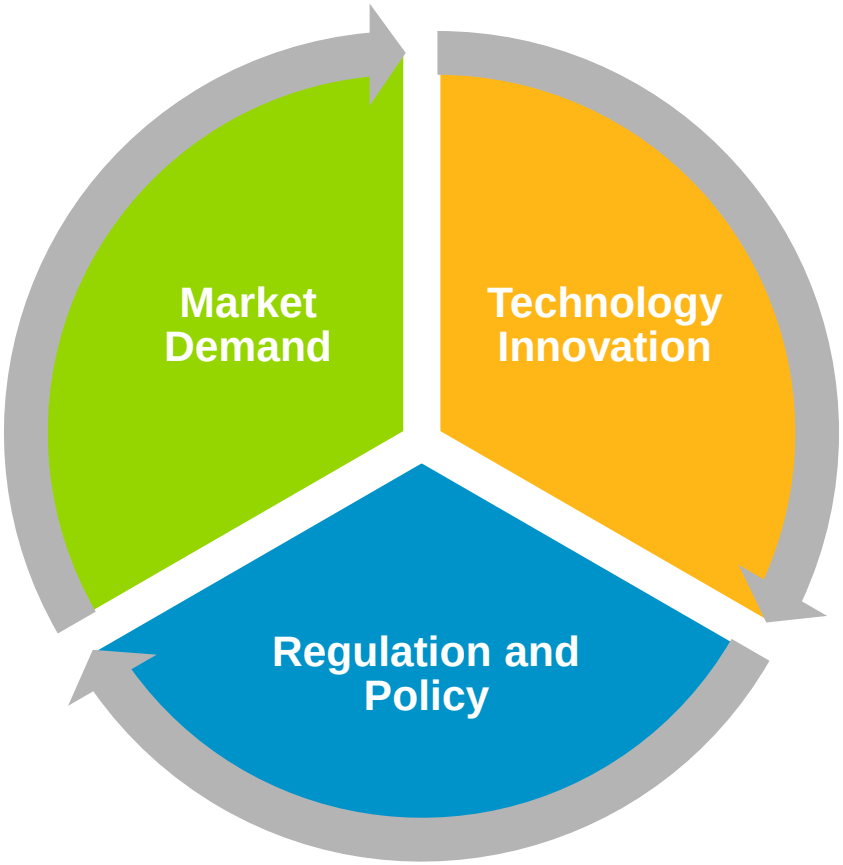
THREE FORCES UPENDING THE STATUS QUO

Disruption is a prevailing and un-compromising threat to our industry.



Megatrends underpin utility industry transformation:

1. Greater customer choice and demand for more (sustainable) energy options
2. Increased policies and regulations to reduce carbon emissions
3. Shifting power-generating sources
4. Search for shareholder value: new ventures and increased M&A
5. Regionalization of energy
6. Merging of mega industries around growth opportunities
7. Replacement of old infrastructure and transition toward an increasingly clean, decentralized and intelligent grid architecture: the Energy Cloud

INDUSTRY IN TRANSITION

DISRUPTIVE TRIGGERS

Regulation and Policy

- **Carbon mitigation:** Carbon pricing mechanisms, policies, and investments (e.g., Cap and trade, Climate Change Action Plan, Clean Power Plan, EU Emissions Trading Scheme, COP21)
- **Shifting utility regulatory models:** Incentive-based regulation (e.g., RRFE, U.K. RIIO, NY REV)
- **Flexibility:** Promotion of distribution system operators, support for energy storage, support for intra- and international interconnection
- **Renewables promotion:** Purchase / production requirements (e.g. Renewable Portfolio Standards, Renewable Energy Directive), tax incentives (e.g., PTC, ITC, accelerated depreciation)
- **DER adoption:** Pricing mechanisms and policies (e.g., Net metering, feed-in tariffs, Solar Renewable Energy Credits)

Market Demand

- **Control:** More customers demanding control over their electricity usage and spend
- **Choice:** More customers want the ability to purchase green power or self-generate and sell that power back to the grid
- **Sustainability:** Marketplace differentiation and brand awareness
- **Accessibility:** More options available to greater share of end-use customers

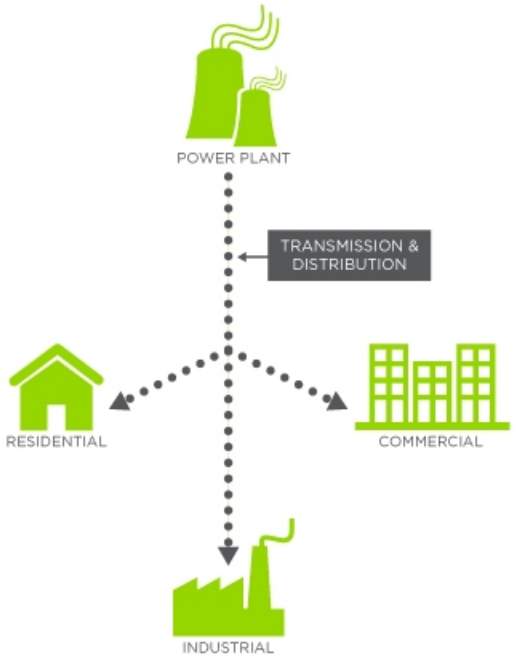
Technology Innovation

- **Affordability:** Declining cost of ownership for solar PV, energy storage, and other demand-side technologies
- **Digitalization:** Lowering the barrier for entry for innovative solutions
- **Networking and data analytics:** Harnessing distributed computing and data across the grid
- **Integration:** Pairing of complementary disruptive technologies (e.g., solar + storage)

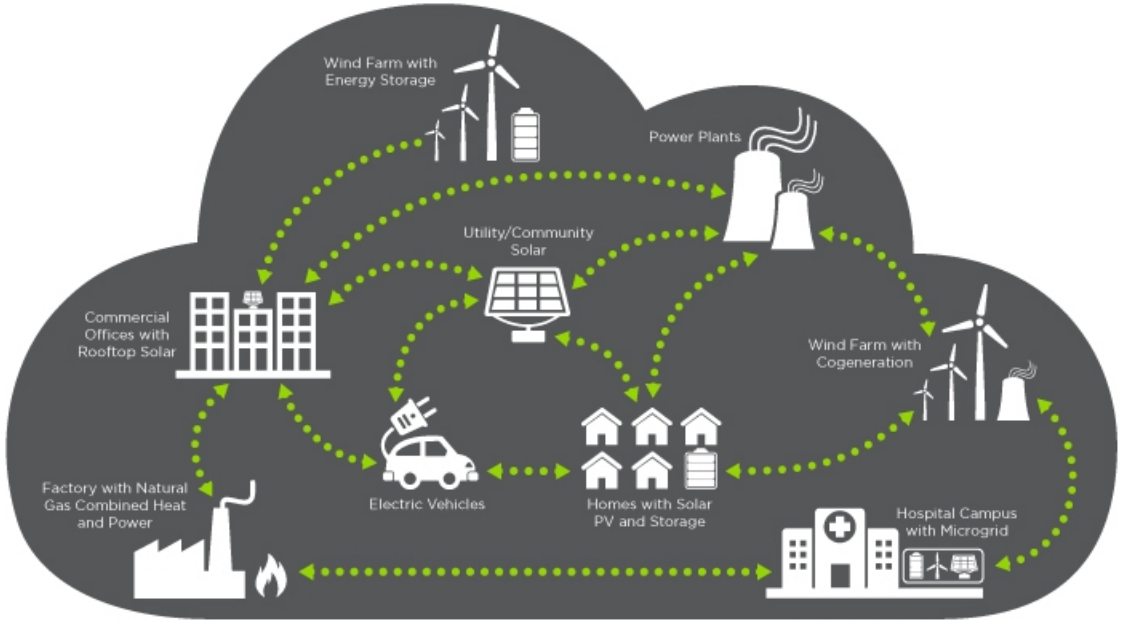
INDUSTRY IN TRANSITION

THE ENERGY CLOUD[1,2]

TODAY: TRADITIONAL POWER GRID
Central, One-Way Power System



EMERGING: THE ENERGY CLOUD
Distributed, Two-Way Power Flows



[1] The Energy Cloud: Emerging Opportunities on the Decentralized Grid (white paper)
[2] Navigating the Energy Transformation: Building a Competitive Advantage for Energy Cloud 2.0 (white paper)

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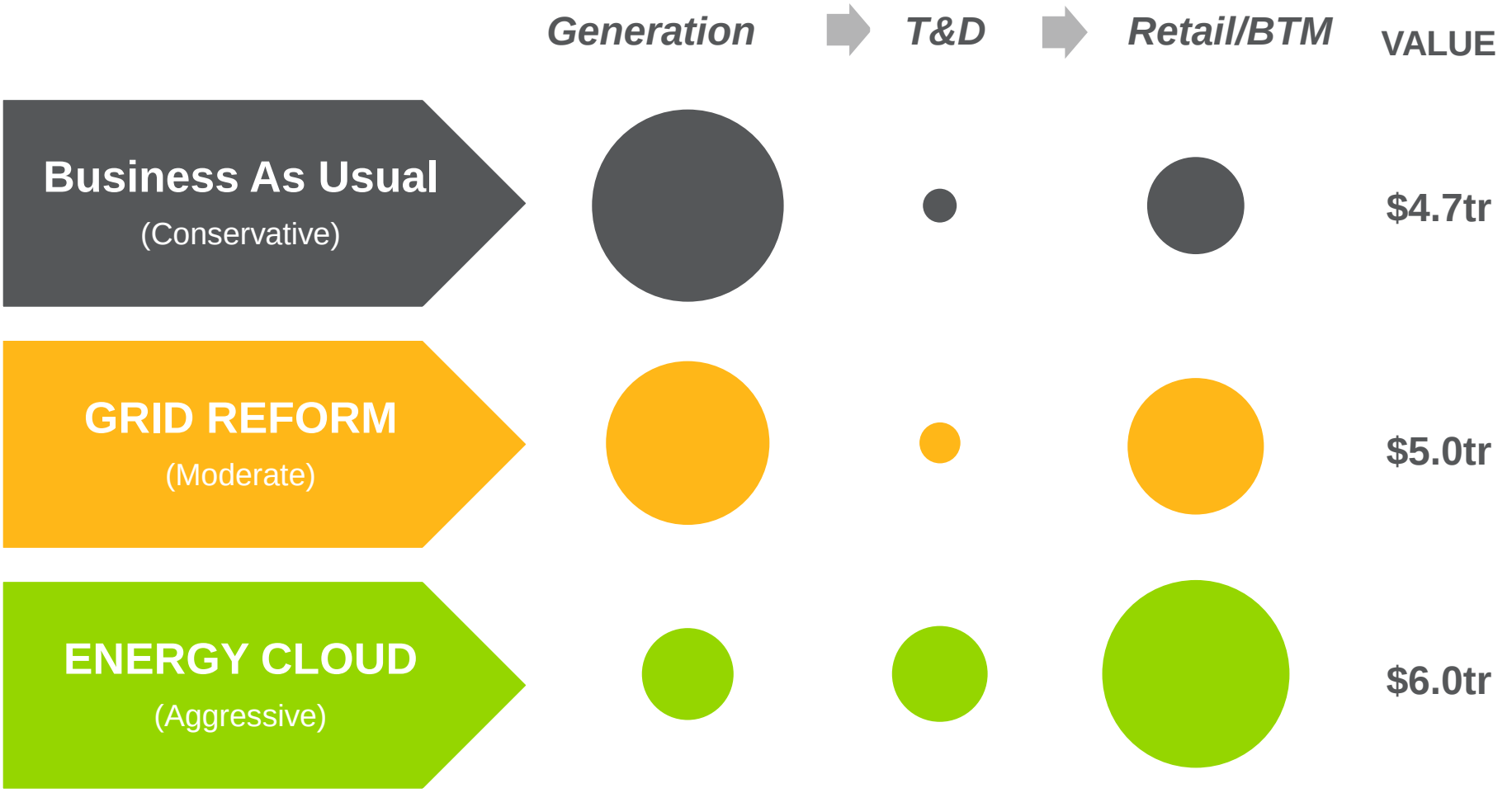
INDUSTRY IN TRANSITION

VALUE SHIFT



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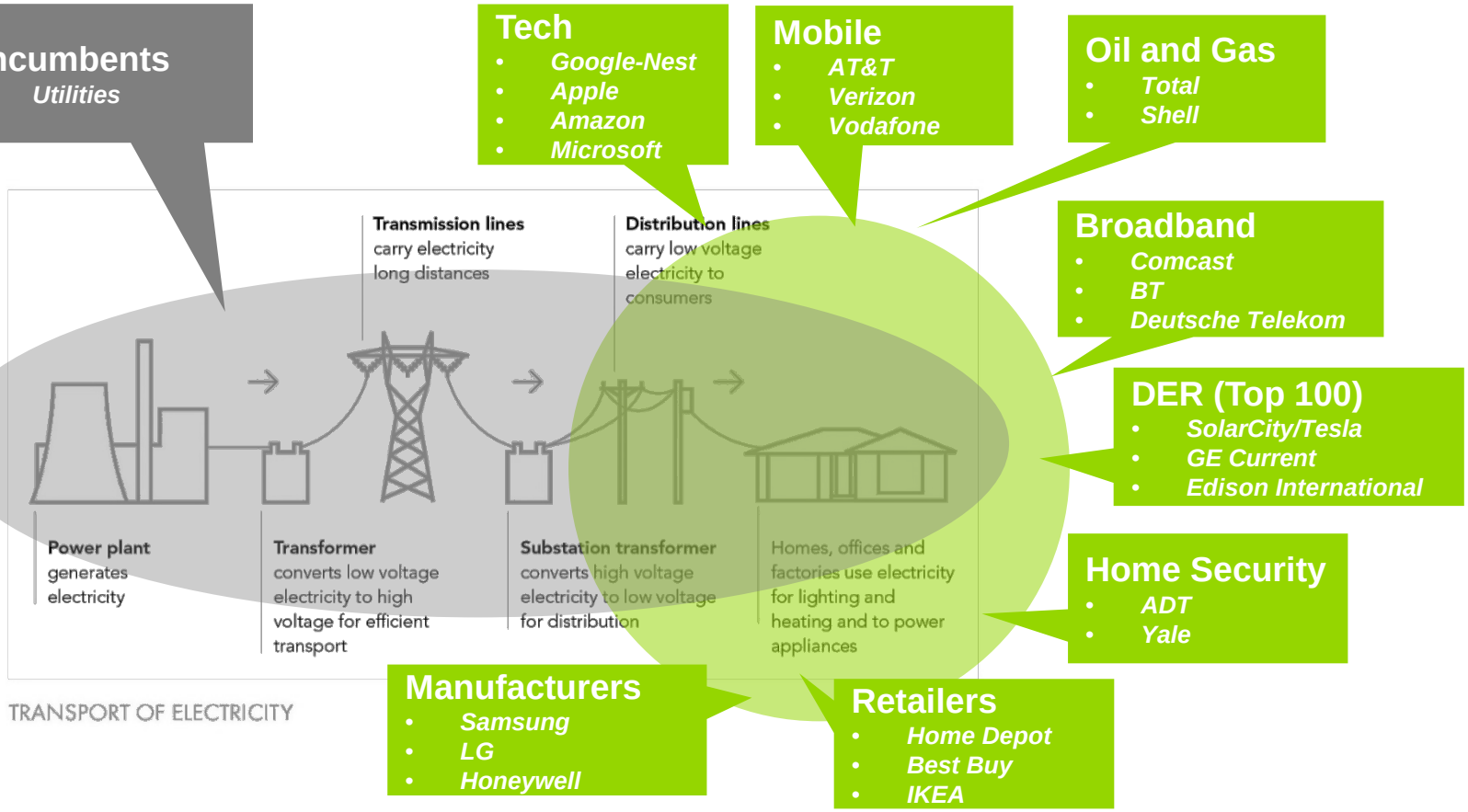
COMPETITION AT THE EDGE OF THE GRID

Utilities face competition from non-utilities for customer engagement



Customers used to rely on the utility, now they have more choices

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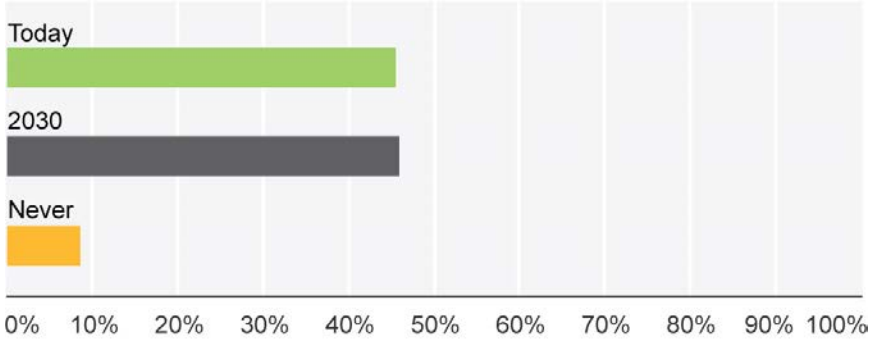
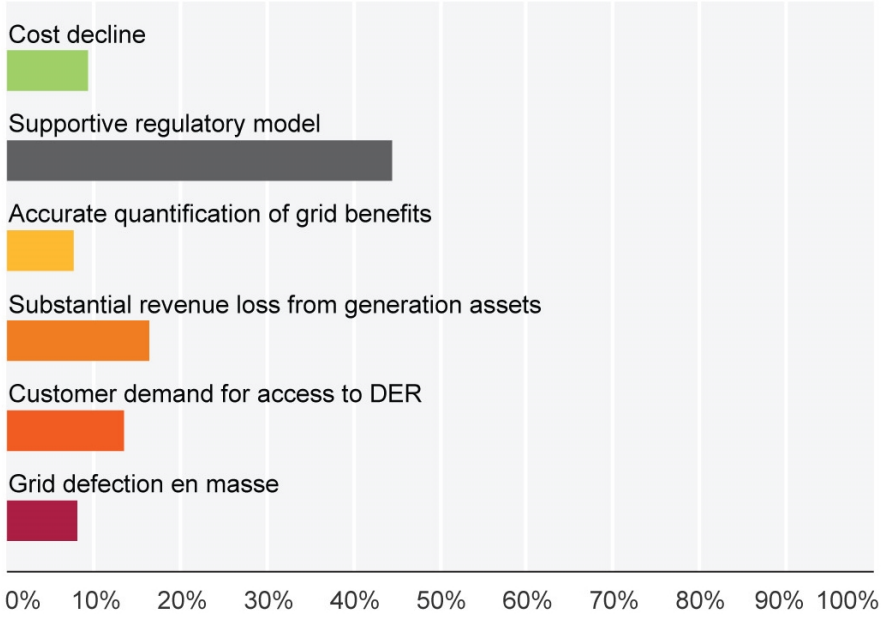
PACE OF CHANGE[1]

When will the **growth of DER force a major shift** in the utility business models?



What is the **most important tipping point** for utilities to aggressively pursue owning and operating DER?



[1] State and Future of the Power Industry (special report)

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IMPACTS

UTILITY BUSINESS MODELS

Utility's role in managing distributed energy resources:

- What services can they provide to the grid? (energy, ancillary services?)
- Who should own them? (utility, customer, both?)
- How should owners of DER be compensated?
- How should the utility rate design and cost recovery model change? (e.g., decoupling, net metering, lost revenue adjustment mechanisms, etc.)
- Who determines what investments are made and where? (in the distribution grid, in DER?)
- Who should plan and operate the (physical) distribution grid to ensure optimal adoption and integration of DER? (utility, distribution system operator (DSO)?)
- Who should operate the market for DERs and the services they provide?

Utility's ability to provide potential new utility products and services:

- Behind-the-meter energy services (e.g., home energy management)
- Premium (i.e., higher reliability/quality) power supply
- Warranties, financing for DER
- Ownership/operation of electric vehicle (EV) charging stations
- Operations and maintenance of third-party owned DER

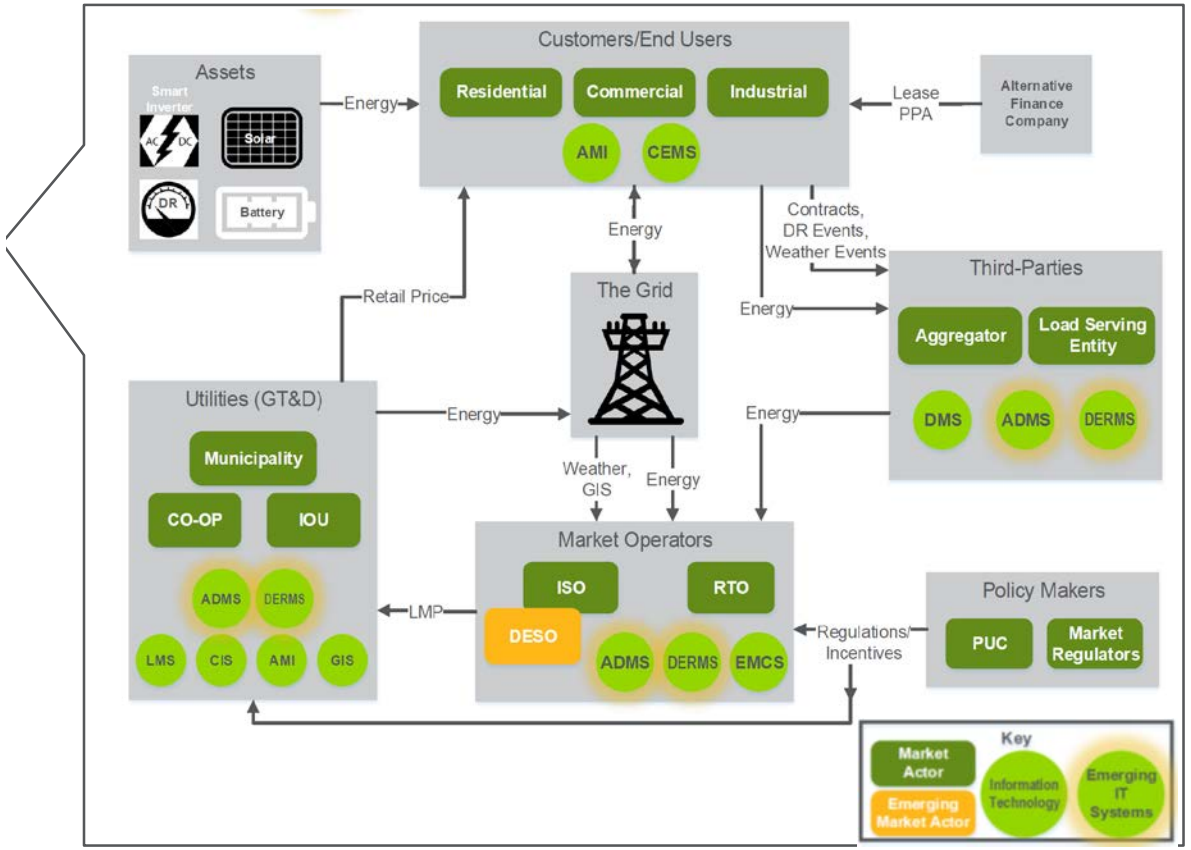
IMPACTS

US STATE PROCEEDINGS

State/Proceeding	Utility Business Model Issues
New York REV Proceeding	• Integrating DERs from third party providers • Incentivizing utilities to consider DER as alternative to traditional grid investments • Utility revenue model for “market-facing platform activities” (Distribution System Platform) • Role of traditional utility ratemaking
California AB327 – DRP filing	• Incorporation of DERs to support CA statewide low-carbon policy goals • Optimal locations and appropriate value for DER through integration of DER into distribution system planning (including demonstration projects) • Role of DER in optimizing markets, grid operations, and distribution investment • Grid investments needed to enable DERs
Hawaii Policy and Regulatory Reforms	• Integration of growing amounts of distributed generation, demand response, and storage • Regulatory incentives and rate structures (unbundling, time-of-use, dynamic pricing) to increase renewables and DERs • Allowing customer-owned generation resources at all points in a timely manner and at reasonable cost
Illinois (ComEd proposed legislation)	• Rate structures, net metering policy changes, and solar rebates to equitably enable solar PV • Community solar and microgrids
Massachusetts Grid Modernization	• Grid design that maximizes integration of intermittent renewable power, much of which is distributed

MATURITY MODEL FOR DER

MATURITY LEVEL	DESCRIPTION
Level 5	**Fully mature iDER business** Full set of value-added DER products and services, significant revenue, fully integrated into IRP, markets, and operations
Level 4	**Managed iDER at scale** Full implementation, DER at scale, fully integrated into IRP, markets, and operations, limited value-added DER products and services
Level 3	**Integrated pilot DER** Piloting, DER at scale, initial integration of some DER into IRP, markets, and operations
Level 2	**Fragmented DER at scale** Planning, DER at scale, not integrated
Level 1	**Inactive DER** Inactive, no significant DER at scale, not integrated



Have you started benchmarking your DER efforts?

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