

NAVIGATING THE ENERGY TRANSFORMATION

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Disruption is a prevailing and uncompromising threat to all industries. Today, the confluence of three disruptive forces—policy and regulatory shifts, changing market demand, and technological innovation—underscore the pervasiveness of the utility industry transformation currently underway. [Multiple megatrends across the energy landscape](#) are redefining traditional value exchanges across the grid.

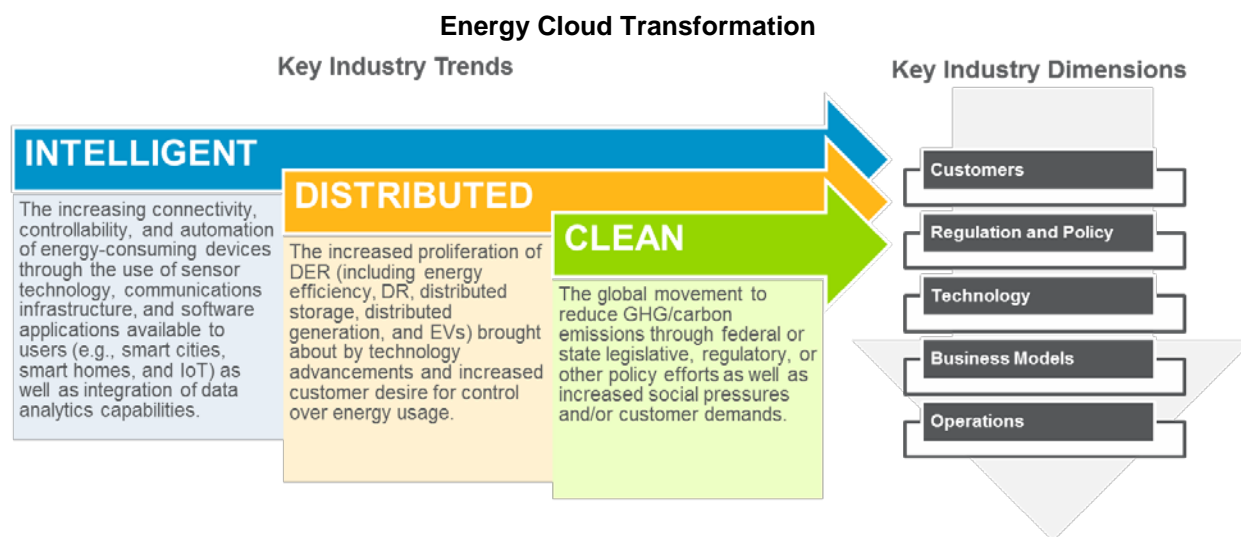
From this frothy landscape, two clear realities emerge:

1. Revenue opportunities are increasingly shifting downstream toward the edge of the grid
2. Digitally enabled products and services are on the rise

In [Navigating the Energy Transformation: Building a Competitive Advantage for Energy Cloud 2.0](#), Navigant describes how these forces are laying the foundation for a cleaner, more distributed, and increasingly intelligent grid. We call this the Energy Cloud.

A mature Energy Cloud has the potential to generate more than \$3 trillion in cumulative revenue growth globally through 2030 for the utility industry. More competition means that utilities will need to protect current revenue streams and infrastructure assets while transforming their business to compete with players and emerging third-party solutions. All of this must be accomplished without undermining current performance and societal expectations (safe, reliable, affordable power).

To build value in the Energy Cloud, utilities must adapt their strategy and business models. This involves facing difficult questions related to their operations and culture. As discussed in this article, the starting point is a holistic strategic planning process that embraces profound change across multiple industry dimensions:



(Source: Navigant)

Customers

Presented with more choice, control over their energy use and spend, and increased access to bundled energy and non-energy services, utility customers are an active instigator of innovation in the Energy Cloud. Targeting this demand, many of the most powerful and consumer-savvy companies in the world—GE, Google (and parent Alphabet), Apple, Amazon, Microsoft, and Tesla—are staking out positions to challenge the traditional utility fee-for-service model. In many cases, these companies are targeting

opportunities to source renewable energy as well as leverage strong relationships with consumers in, around, and behind the meter by offering innovative solutions for connected homes, the Internet of Things (IoT), and other digitally enabled opportunities.

For this reason, customer engagement is expected to be among the most hotly contested aspects of the Energy Cloud. More than 80% of survey respondents in Navigant's [State & Future of the Power Industry report](#) believe that residential and commercial customers' demand for choice and control will change moderately (50%) or substantially (33%). The challenge for utilities in particular will be to meet an exponentially growing set of customer choices and demands, while continuing to serve their core customer base.

Regulation & Policy

While the Trump Administration is expected to backpedal the Environmental Protection Agency's (EPA's) Clean Power Plan and challenge US support for the COP21 Paris Agreement, the overwhelming evidence points to broadening global, regional, and local support for clean, distributed, and intelligent energy. Sustainability objectives among industry stakeholders are more closely aligned than ever before.

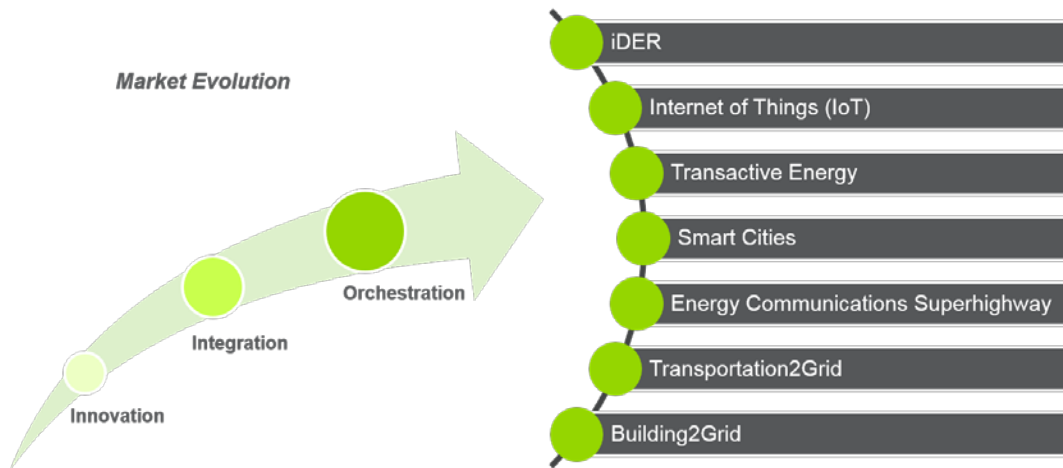
Innovation around regulation and policy will continue to be spearheaded at the state and local level. Utilities serving progressive population centers and commercial and industrial customers in emerging smart cities must keep pace with accelerating sustainability initiatives and adapt their business models, products, and services in spite of more restrictive regulatory regimes.

Half of respondents to Navigant's *State & Future of the Power Industry* survey already view the regulatory environment as lagging in innovation. Utilities will need to make the difficult choice between influencing the regulatory process to keep pace with customer demand and embracing regulatory change to capitalize on clean, distributed, and intelligent energy opportunities, or wait until a clearer (supported and more predictable) path can be identified. The risks of either strategy should be considered.

Technology

The volume of technological innovation and adoption across the utility industry today is simply staggering. Increasingly, one-off technologies are recombined into highly distributed and networked energy ecosystems. These are supported by rapidly evolving digitally enabled platforms, including: integrated distributed energy resources (iDER), smart cities, IoT, the energy communications superhighway, the transportation-grid nexus, and Building2Grid (B2G), for example. Navigant estimates that new products and services leveraging these emerging platforms could play a key role in driving \$53 trillion in cumulative revenue across the global utility industry between 2016 and 2030.

Emerging Energy Cloud 2.0 Platforms



(Source: Navigant)

If innovation tells us anything, it is that most initiatives are bound to fail, or worse yet, return just enough to sustain interest and occupy resources for several years before finally flaming out. Strategic planning must embrace the ability to fail fast, early, and often to keep pace with the rate of technology change. In turn, the regulatory environment will need to allow more flexibility and alternative risk-reward models. Given the highly modular nature of DER, portfolios of grid-edge assets will need to be continuously shaped and rebalanced in order to shed laggard components and embrace fast-emerging solutions delivering a rich array of grid services.

Business Models

The evolution of clean, distributed, and intelligent energy has intensified efforts to develop new business models better aligned with emerging market realities. Grappling with both revenue decline and increased competition from new market entrants, utilities are increasingly partnering with vendors to bundle products and services.

Emerging platforms like IoT offer exciting new channels that simultaneously deliver grid benefits like load control and improved customer satisfaction, while also unlocking new revenue streams. Many new business models in the Energy Cloud are expected to reflect the anything-as-a-service (XaaS) model gaining steam across the broader economy in which underused physical products and assets are transformed into services.

Every company uses one or more of four business models: asset builder, service provider, technology creator, and network orchestrator.¹ Of these, network orchestrator has proven to be the most profitable and scalable. Including high-growth ventures like Uber, Airbnb, and Spotify, network orchestrators leverage digital connectivity and deliver value through relationships or network capital. By creating a platform that participants use to interact or transact across the network, these companies may sell products, build relationships, share advice, give reviews, collaborate, and more.

¹ Barry Libert, Jerry Yoram, and Megan Beck Fenley from the University of Pennsylvania's Wharton School.

While there is no one-size-fits-all business model appropriate for all situations and markets, a wait-and-see approach creates the risk of missing the boat on major opportunities in a market that is becoming more open, innovative, and competitive.

Operations

The Energy Cloud represents a highly distributed and intelligent ecosystem where transactions involving the exchange of value will accelerate and move beyond a price-per-kilowatt-hour metric. Transactions will increasingly be digitized, new data will be generated and analyzed, and discrete objects, people, and activities will be more connected to the grid ecosystem than ever before.

In this emerging environment, the utility industry will need to optimize operations in the face of accelerating innovation, new technologies, and changing customer demands. Two-way power flows, large volumes of renewable generation, high penetration of DER, an increased number of sensors, smart devices, and data, and a broader set of energy management solutions to meet customer demands are some of the unique challenges facing conventional utility systems, processes, and organizations. As these issues are sorted out, the benchmarks for successful grid operations will increasingly move beyond safe, reliable, and affordable to embrace clean, distributed, and intelligent energy as well.

Recommendations

Demand for utility core services will remain in decline due to ongoing energy efficiency gains and expanding self-generation. Meanwhile, the number of physical things connected to the grid will proliferate, giving rise to well-orchestrated technology ecosystems such as iDER, IoT for networked buildings, transportation systems, communication, and smart cities.

Holistic strategic planning must anticipate and prepare for this transformation across all industry dimensions.

Utilities must:

- Anticipate an increasingly integrated, plug-and-play electricity system and plan to shift away from the traditional ratepayer model
- Develop and refine new services (e.g., integrate electric vehicle charging with demand response, offer bring your own device programs to customers, leverage technology and communication to offer bundled energy/non-energy behind-the-meter solutions, etc.)
- Embrace customer-centric flexibility and choice over energy use in order to maximize value across the network
- Proactively build collaborative partnerships with technology providers to broaden and augment core services
- Focus on integration platforms for technologies—iDER, IoT, smart cities—and the facilitation and coordination of customer networks rather than one-off technologies

To foster utility innovation, regulators should:

- Reform rate design and improve integration of DER by fairly compensating utilities and DER owners/operators for the value they provide to the grid
- Embrace more fluid, incentive-oriented frameworks needed to support innovation and modernization and operations investments

No two markets are alike. The Energy Cloud transformation will play out differently across various markets depending on specific on-the-ground realities. Electricity prices and tariff structures, existing policies and regulations, customer demands and choices, market structure (unbundled versus integrated; competitive versus monopoly market landscapes), and acceptance of new technologies will necessitate different levels of response.

Regardless of location, building value in the Energy Cloud will require utilities to foster a more agile-minded culture to maneuver their organizations and position for long-term success.

[Register for Navigant Research's upcoming webinar](#), December 5, featuring Richard Kauffman (Chairman of Energy and Finance for the State of New York), Ron Nichols (President of Southern California Edison), and Jan Vrins (Navigant's Global Practice Leader for Energy), for a panel discussion on how the Energy Cloud will impact utility customers, technology trends, business models, regulations, and operations.