EU 2025: Envisioning the “Utility of the Future”

September 29, 2016

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Exelon Overview

Exelon Generation

**Power Generation**

- Largest merchant fleet in the nation ~33 GW of capacity, with unparalleled upside
- One of the largest and best managed nuclear fleets in the world (~19 GW)
- Significant gas generation capacity (~10 GW)
- Renewable portfolio (~1 GW), mostly contracted

**Constellation**

- Leading competitive energy provider in the U.S.
- Customer-facing business, with ~2.5 M customers and large wholesale business
- Top-notch portfolio and risk management capabilities
- Extensive suite of products including Load Response, RECs Distributed Solar

Exelon Utilities

**BGE, ComEd, PECO, & PEPCO**

- Largest electric and gas distribution company in the nation with ~10 M customers
- Diversified across multiple jurisdictions - Illinois, Maryland, Pennsylvania, Delaware, New Jersey, Wash DC
- Significant investments in Smart Grid technologies
- Transmission infrastructure improvement at utilities

Competitive Business

Exelon is the largest competitive integrated energy company in the U.S.
Exelon Utilities: Overview

17,400
Employees

$29.7B
2015 Rate Base

$15.8B
In Revenue

24.1M mi^2
Combined Service Territory

10 M
Customers

$25B
Being invested in utilities through 2020

12,042
Transmission line miles (circuit)

7.4 M
Smart Meters Installed
Evolution of Exelon Utilities’ strategy

Since 2012, EU leadership continues focusing on its strategy to ensure we are prepared for the future of the business.

Exelon Utilities Strategy (developed in 2012)

Focus on operational and financial excellence

**Vision**
- Be admired among the best electricity and gas delivery companies in the United States
- Perform to highest standards of safety, organizational effectiveness, operational excellence, and stakeholder satisfaction
- Attain best in class operating and financial performance for Exelon shareholders
- Refine regulatory models to optimize value creation opportunities, meet our regulatory/legislative commitments and key stakeholder requirements
- Leverage technology to maintain competitive advantage

**Strategy**
- Achieve 1st Quartile Operating Performance by 2015
- Achieve Financial Performance Targets by 2017
- Exploit standardization, common platforms, and the sharing of best practices across operating companies, a value creation platform for future scale

**Key initiatives:**
- Reliability improvement
- Customer satisfaction
- Rate of return (rate case) improvement

Exelon Utilities Strategy (developed in 2014)

Growth strategy added

**Vision**
- Be admired among the best electricity and gas delivery companies in the United States
- Perform to highest standards of safety, organizational effectiveness, operational excellence, and stakeholder satisfaction
- Attain best in class operating and financial performance for Exelon shareholders
- Shape regulatory models to optimize value creation opportunities, meet our regulatory/legislative commitments and key stakeholder requirements
- Leverage technology and innovate to maintain competitive advantage

**Strategy**
- Maintain 1st Quartile Operating Performance
- Achieve Financial Performance Targets
- Exploit standardization, common platforms, and the sharing of best practices across operating companies, a value creation platform for future scale

**Key initiatives added:**
- DER and microgrid pilots
- Electric and gas rate design proposals
- Smart home and grid services
Background for the 2016 strategy initiative

Communicating how the strategy will fundamentally transform the customer experience and our business has been challenging

- Impression of little near-term change as most investment continues in ‘traditional’ infrastructure
- Internal communication focused on earnings vs. broad functional change or description of desired “future state”
- Each jurisdiction presented permutations on the same theme highlighting its own initiatives, as the pace and type of innovation varies by jurisdiction

Objectives for Exelon Utilities’ 2016 Strategy Initiative

- Develop management alignment around a common, unifying vision of the 2025 “Utility of the Future”
- Revise and update the strategy to achieve that vision
- Communicate the vision and strategy in a compelling manner, highlighting significant changes occurring within Exelon Utilities
- Assess preparedness in moving toward that vision; and how current initiatives fuel the company’s path toward this future state (identify any gaps)

We commissioned an internal team, supported by consultants, to create the 2025 vision
Project overview

Objective: Develop and present a unifying and compelling vision for the future business, describing it as if we were already there today

Internal & External Inputs
Beyond what we know will happen

Internal perspectives
- Interviews with leadership
- Internal survey on level of anticipated change for each utility function

Focus groups/ working sessions
- Internal: Cross-sections of creative employees (e.g., millennials)
- External: MIT energy club, Oliver Wyman consultants, etc.

Other external perspectives
- Interviews: Rocky Mountain Institute, Silver Springs Networks, etc.
- Secondary research

Deliverables
Materials that bring to life the end state

Vision of the future
- Comprehensive vision of the future
  - Customers and communities
  - Technology
  - Products and services
  - Regulation

A day in the life...
- Perspectives on the utility from key stakeholders (e.g., employees, customers)

Brainstorming & evaluating
- Assess multiple perspectives and develop one cohesive view

In 2025+ the world will...
- Creative and compelling descriptions of the 2025 environment as if we were already living in it
The world in which we operate is changing

The team looked at societal, demographic and environmental trends, which will have significant implications for businesses and their customers

- **The Sharing Economy**
  - Growing rapidly (e.g., Uber, Netflix, Airbnb, Kickstarter)

- **Urbanization**
  - 27M more people will be living in cities in 2025, representing 83% of the population

- **Millennials**
  - Employment expectations and purchasing behaviors are different from previous generations

- **Rapid Innovation**
  - Organizations must be agile to adapt quickly to new innovations

- **Security**
  - Consumers increasingly demand transparency regarding use of sensitive data

- **Cashless Society**
  - Some Nordic countries will be cashless by 2030

- **Aging Population**
  - ~20% of population will be 65+ in 2025

- **Internet of Things**
  - More connected devices, and greater reliance on them

- **Climate Change**
  - May cause warmer temperatures and stronger storms

- **Social Responsibility**
  - Consumers will be loyal to brands that align with their values; Sustainability will become a competitive differentiator

- **Shrinking middle class**
  - The income gap between the upper and lower classes is growing. A smaller proportion of households are classified as “middle class”
“Reading the tea leaves” – Sample projections
Projections of emerging trends helped fuel discussions about potential futures:

**Advances in technology are setting the stage for automation to enter households**

- Smart services with greatest appeal to consumers are energy management, remote home control, and EV charging
- >60% of US households will have installed energy management technologies by 2022
- 50% of broadband households have privacy or security concerns about smart home devices

**Changes in buying preferences and the workforce will further affect our business**

- By 2025, **1 in 50 passenger vehicles** could be electric, representing **6%** of new vehicle purchases in 2025:

  **Millennials** will represent **44%** of the workforce
  - 3 out of 4 believe that work-life balances drives their career choices
  - >25% anticipate to have at least **6+ employers** during their career

Source(s): Cisco, U.S. Census Bureau, PwC, Frost and Sullivan, Parks Associates, Ernst and Young, GSM Association, U.S. Department of Energy, Tesla
## Customer and community energy expectations

Many of today’s customer expectations will continue to be important in 10+ years but will become more prevalent and dominant.

<table>
<thead>
<tr>
<th>Baseline expectations</th>
<th>Expectations that will accelerate</th>
<th>Emerging expectations</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SAFE AND AFFORDABLE</strong></td>
<td><strong>PERSONALIZED SERVICE AND DIGITAL CONVENIENCE</strong></td>
<td><strong>ACCESS TO ENERGY INNOVATION</strong></td>
</tr>
<tr>
<td>Safety remains a baseline expectation.</td>
<td>Customers want services that are easy to understand and use, and are tailored to their individual needs.</td>
<td>Customers will expect to quickly have access to upgrades and new releases for energy technology.</td>
</tr>
<tr>
<td>Emphasis on affordability for all (and low income) customers will persist.</td>
<td>Most, but not all, customers will gravitate towards self-service digital interactions.</td>
<td></td>
</tr>
<tr>
<td><strong>HIGH QUALITY ENERGY, ALWAYS AVAILABLE</strong></td>
<td><strong>ENVIRONMENTALLY AND SocialLY CONSCIOUS</strong></td>
<td><strong>INTERCONNECTEDNESS AND CONTROL</strong></td>
</tr>
<tr>
<td>Uninterrupted access to power seen as a necessity.</td>
<td>Energy efficiency and demand response become ubiquitous and institutionalized.</td>
<td>Customers will expect distributed energy resources and smart home devices to seamlessly connect with each other and the grid.</td>
</tr>
<tr>
<td>More customers may take resiliency into their own hands</td>
<td>For a more customers, environmental impacts will influence energy decisions.</td>
<td>Devices can be controlled from multiple sources, on demand.</td>
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</tbody>
</table>
In 2025 the electric grid will be more intelligent and interface with a growing number of distributed energy resources.

**GENERATION**
Grid-scale renewable generation and DG will replace some conventional generation.

**TRANSMISSION & DISTRIBUTION**
A smarter electric grid will continue to deliver power to customers.

**MICROGRIDS**
Microgrids will be used mainly for security or safety; penetration will remain small overall due to high costs.

**ELECTRIC VEHICLES**
Growth in electric vehicles will be driven by policy. **EV penetration is expected to be >5% of annual U.S. vehicle sales.**

**RESIDENTIAL DER**
Rooftop solar will grow rapidly but remain relatively small overall within service territory. Storage at residential level will remain niche.

**COMMERCIAL DER**
Commercial solar DG in the northeast will grow. Some large C&I customers will also have other forms of DG installed (e.g., CHP).

**SMART METERS**
Virtually every home and business will have a smart meter installed.

**SMART HOME**
Consumer brands and technology companies well positioned to own Smart Home platform. Utilities have the opportunity to partner.

**SMART CITIES**
Growth in smart cities (intelligent networks of integrated infrastructure connecting energy, water, buildings, transportation, and governance).
Utility operations

Access to real-time data and technology-enabled automation will change how utility functions operate

**A. CUSTOMER-FACING OPERATIONS**

Digital channels are predominant, some customers tied to the “old world”

CSR role includes: advice, customer tech support, and diagnosis

Real-time data on usage, billing, and customer information

**B. NETWORK & GRID OPERATIONS**

Line of sight into asset health via smart devices and sensors

Growing importance of communication to enable automation via internet of things

More technologically proficient workforce

**C. SYSTEMS & TECHNOLOGY**

Streamlined systems with flexible backbone

Seamless sharing of data with customers and third parties

Rapid iterations of models and applications

Expanded focus on cybersecurity

**D. EMPLOYEES & CULTURE**

Cultural change to become nimble and innovative will be biggest challenge

More educated and technical workforce

Multiple career path designs to cater to changing workforce
### Regulatory & public policy – A key enabler

Regulatory change will continue to lag technology and business model innovation. Utilities will aim to bring more value to customers through new rate designs and programs.

<table>
<thead>
<tr>
<th>New rates designs</th>
<th>• More rate options to meet diverse customer base needs (e.g., demand-based rates, fixed monthly charges for delivery, and critical peak pricing)</th>
</tr>
</thead>
</table>
| Renewables at the forefront | • Focus on renewables and the environment will likely accelerate  
• Energy conservation and efficiency programs may evolve to a maintenance mode  
• Energy efficiency could evolve from a pass-through expense to be profit-making |
| Innovation incubator and vehicle for societal investments | • Leverage utilities as an investment vehicle to bring more value to customers:  
  – Incubate new energy innovations  
  – Act as a test bed for piloting innovative rate designs  
  – Socialize costs of some public purpose infrastructure investments |
| Setting standards around DER | • Net energy metering will likely be reformed to provide greater rate fairness for the use of the network  
• Standards for interoperability and interconnectedness of DER will be developed to support grid reliability and safety |
| New compensation mechanisms | • Alternative earning mechanisms (vs. rate base) will be explored to support new products, such as transaction fees for energy exchange  
• Uncertainty whether such fees are additive to or displace rate-based earnings |
Vignette overview

The team developed vignettes to describe what 2025 could look like if we were to bring the project team’s vision to life; for example:

<table>
<thead>
<tr>
<th>Title</th>
<th>Overview</th>
</tr>
</thead>
<tbody>
<tr>
<td>Suburban family</td>
<td>The Nenshis recently moved and are setting up a new account with BGE. After higher than expected bills, they go through a BGE Energy Audit. They also are interested in an EV home charging unit as they are considering purchasing an EV.</td>
</tr>
<tr>
<td>Small business owner</td>
<td>Farooq, the owner of a dry-cleaning business reads the story of a restaurant owner who used the BGE’s small business portal to enroll in tailored programs, and participate in the energy exchange. This motivates Farooq to contact BGE.</td>
</tr>
<tr>
<td>C&amp;I customer</td>
<td>Velix Inc., a biotechnology processing plant, works with a specialized PECO account representative to discuss tiered reliability packages.</td>
</tr>
<tr>
<td>Community planner</td>
<td>A community designer works with his ComEd energy advisor to develop a suburban community, and an urban downtown building that includes community solar, smart street lights, EV chargers, and is microgrid-ready.</td>
</tr>
<tr>
<td>Storm response</td>
<td>The Inquirer covers a story on PECO’s quick response to super storm Simon compared to hurricane Sandy. PECO’s approach to damage assessment and crew dispatch is discussed.</td>
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</tbody>
</table>

We will highlight several of the vignettes
The Nenshis recently had twins and purchased a larger house to accommodate the family. Alia Nenshi, the mother, loves the character of their pre-war house, but worries about how much their electricity bill will be due to the windows and old appliances.

When Alia initiates the new account process at BGE.com, BGE shows the previous tenant’s average energy usage.

BGE’s algorithm suggests rate structure, products & services, and energy efficiency programs based on usage, age of the home, and answers to questions about her family’s lifestyle.

Using interactive tables, BGE provides Alia with an estimated monthly bill based on her selected rate structure, new products, and program enrollments.

She purchases a smart home solution, incl. thermostats and monitors that connect to her existing Apple HomeKit. Alia is notified of eligibility for two EE programs, and enrolls in both.

As part of account sign up, Alia is automatically enrolled in paperless billing with a monthly billing cycle, and a free annual energy consultation.

She has the option to opt-out or change these selections. Alia decides to adjust her billing cycle to begin on the 1st of every month.

Alia fills in her payment information (which accepts online wallets, credit cards, bank information, etc.) and changes the default notification settings.

Alia receives a confirmation email with her choices, instructions on how to manage her account, and an invitation to download the BGE mobile app.
Simon Nenshi, Alia’s husband, is looking for a new car and is interested in an electric vehicle. Simon is narrowing in on a particular model, but wants to learn more about installing an EV charger at home before making a purchase.

Simon visits the BGE EV showroom, a partnership with multiple EV dealers, for a test drive and to learn more about EV chargers. Helena, a saleswoman, gives him with a leaflet for BGE’s EV cost simulator.

Simon uses the cost simulator (the interactive tables, drag and drop tools, and calculators) to help weigh the factors to consider when deciding on an EV charger (e.g. amperage capacity, connectivity, cost).

Simon goes onto the BGE marketplace to live-chat with a CSR, Tazia. She informs him that an electrician will need to update his garage circuit for a fast charging system, and provides a list of certified electricians.

Tazia shows Simon estimated energy bills using different rate structures and an option to enroll in an EV-specific DR program (which provides BGE Rewards redeemable as bill credits or Smart Home devices on BGE’s marketplace).

Simon selects BGE’s financing offer and the cost of the charger and installation fees are both included on his monthly bill.

Once installed, Simon’s charger reacts to real-time energy prices and charges the EV throughout the night ensuring that it is 100% charged by 8 AM.

Simon selects to charge his EV energy usage directly onto his BGE bill.

1: Monthly bill estimates based off of the Department of Energy’s Alternative Fuel Data Centre
Community planner – Urban building

Chris is managing an urban project and is interested in seeing a development in downtown Chicago. Samara, his ComEd energy advisor, offered to show him an apartment building that required resiliency upgrades as many of the tenants were seniors, received home-based care and had critical medical equipment.

Solar panels could not be installed on the building’s roof, so building management joined a virtual community solar program through the utility, drawing from a facility in a Chicago suburb. By co-investing in the solar project, their share of solar energy produced each month is credited to their bill.

The building installed a large energy storage system in the basement which engages to cover momentary disruptions, and will provide 12 hours of back-up during prolonged outages.

Communal EV chargers are available in the parking lot. EV owners pay for service through their retail electric supplier or the utility.

A microgrid is being constructed nearby to provide additional resiliency to a trauma center and police station. The building asked to be connected to the microgrid due to the importance of resiliency to the tenants’ wellbeing.

The bus stop in front of the apartment building is part of the city’s green transit routes, serviced by a fleet of electric buses.
Just over 10 years ago, Superstorm Sandy ravaged the PECO service territory, interrupting 850,000 customers.

Last week, Pennsylvania was bracing for a storm of similar strength and on a similar path – storm Simon, but it caused significantly fewer outages and customer disruption. Storm Simon resulted in fewer than 700,000 customers experiencing a service interruption. The last customers impacted by Simon were restored in only 5 days, vs. 7 days for customers affected by Sandy.

PECO attributed the reduced impact to the significant infrastructure upgrades and storm hardening programs enacted following Sandy. PECO storm response team member Sam Cheung talked to the Inquirer.

“Your damage assessment tools allow us to be more efficient. Accelerometers tell us exactly which poles are down.”

“Trees fell on power lines outside Philadelphia, submitted to #PECOS StormPic

“We restored 75% of customers within 24 hours due to automation on our network”

“Our damage assessment tools allow us to be more efficient compared to Sandy” Cheung was referring to data from smart meters and sensors deployed on the electric grid. “Accelerometers tell us exactly where we have downed poles, resulting in faster response times,” said Cheung.

PECO drones survey damage in difficult to access areas

Today, PECO has access to a more images for damage assessment. PECO taps into city cameras and has drones that survey difficult to access areas. Crowd-sourcing also allows the utility to obtain images from customers posting to social media.
Our view of the operating environment in 2025

Our view of the future was organized around five areas. Customer expectations and technological advancements will shape the operating environment and what utilities must offer to be successful.

**NEW TECHNOLOGY**
- Smart, flexible network to enable DER interconnectivity
- Rapid DER & EV growth
- Seamless digital connection to the customer

**UTILITY OPERATIONS**
- Customized and proactive customer service
- Intelligent, self-optimizing network
- Nimble and adaptable organization

**ENERGY PRODUCTS & SERVICES**
- Customized and proactive services
- Platform facilitating access to:
  - Energy products & services
  - Energy exchange
- Tiered service and reliability

**CUSTOMER EXPECTATIONS**
- Personalized
- Secure
- Seamless
- Affordable
- Sustainable
- Reliable
- Innovative

**REGULATION & PUBLIC POLICY**
- Rate fairness for use and value of the network
- Returns encouraging investment
- Mechanisms supporting innovation
Desired business model

Our desired business model is to go beyond being a Network Service Provider / Integrator to also provide value-added products and services

1. Enhanced Status Quo (ESQ)
   - Continue providing energy services, managing the network, and piloting new emerging technologies
   - Invest in making the system more intelligent and resilient
   - Pursue a rate mechanism that compensates the utility fairly for the value of being connected to the energy system

2. Network Service Provider / Integrator (NSPI)
   - In addition to ESQ, take on the role of distribution system operator
     - Manage two-way power flows and intermittent and dispatchable resources
     - Influence new DER-siting through price signals
   - Expand network role (e.g., communications, EV, etc.)
   - Pursue a compensation mechanism for DSO role (e.g., premium reliability services)

3. Customer Full Service (CFS)
   - In addition to ESQ and NSPI, offer an array of customized, value-added products and services including:
     - A full array of generation and related services, including DG
     - Financing options
     - Creative price structures
   - Pursue recovery mechanisms for ownership of DG, beyond special purpose DG
   - Offer some products competitively
Customer and Energy Services model

CUSTOMER VALUE PROPOSITION

• An affordable, reliable, resilient, and clean **energy delivery service**

• Access to an **energy platform** that connects users, simplifying access to distributed energy resources, enabling energy transactions, and facilitating participation in ancillary services

• A **broad array of energy information, products, and services** that enable customers to manage and control their energy use

CUSTOMER EXPERIENCE

• **Service will be tailored to meet individual customers’ needs** with specific product, service and rate recommendations

• **Systems and processes will be more flexible** to enable differentiated and customized services for our diverse customer base

ENERGY DELIVERY

• The energy provider will act as the **distribution system operator**, dynamically managing two-way power flows

• **Networks will be optimized and reliably operated** with direct line of sight to all assets and workforce

REGULATORY MODEL

• The energy provider will be an **innovation incubator and vehicle for societal investments**

• **Alternative rate structures and earning mechanisms** will support new services and customer needs

• **Fair compensation** for investments and practices that benefit the power grid, gas network and customers
Strategy to become a Customer and Energy Services provider

Drive customer centricity and growth while maintaining operational and financial excellence

Exelon Utilities

Transform into a Customer and Energy Services Provider

- Premium experience
- Rapid innovator
- Energy platform
- Partner of choice
- Regulatory shaper

A nimble, adaptable and customer-centric culture and organization

Operational and Financial Excellence Foundation

- Maintain 1st quartile operating performance
- Achieve growth and financial performance targets
- Apply best practice sharing, common platforms, and standardization for value

Increase Value to Customers, Employees, and Shareholders
Where is Exelon Utilities going from here?

• Vision of the future and strategy endorsed at Board of Directors retreat

• Communication to employees commencing regarding the updated strategy and 2025 vision

• Updated strategy (and its pillars) being used as foundation and structure for business plan and resource allocation to strategic initiatives

• Plan and initiatives to stimulate cultural change being designed