Duke Energy

May 2017

Business Brainz

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COMPANY INSIGHT

Duke Energy
Company Overview

Headquarters

Charlotte, North Carolina, US

Employees

28,798 (FY 2016)

Revenue

$22.7 billion (FY 2016)

Major competitors

- American Electric Power Company
- Constellation Energy Group
- Centerpoint Energy

- **Overview:**
  - Duke Energy Corporation (Duke Energy), incorporated in May 2005, is an energy company
  - The company operates through three segments: Electric Utilities and Infrastructure; Gas Utilities and Infrastructure, and Commercial Renewables
  - The company operates in US through its direct and indirect subsidiaries which include Duke Energy Carolinas, Progress Energy, Duke Energy Progress, Duke Energy Florida, Duke Energy Ohio, Duke Energy Indiana, and Piedmont Natural Gas Company

Source: Industry Reporting; Company website and reports

Duke Energy Business Segments

Electric Utilities and Infrastructure

- The Electric Utilities and Infrastructure segment conducts operations primarily through the regulated public utilities of Duke Energy Carolinas, Duke Energy Progress, Duke Energy Florida, Duke Energy Indiana and Duke Energy Ohio
- This segment provides retail electric service through the generation, transmission, distribution and sale of electricity to approximately 7.5 million customers within the Southeast and Midwest regions of US
- The operations include electricity sold wholesale to municipalities, electric cooperative utilities and other load-serving entities
- Electric Utilities and Infrastructure is also a joint owner in certain electric transmission projects
- As of December 31, 2016, Electric Utilities and Infrastructure owned approximately 49,300 megawatts (MW) of generation capacity

Gas Utilities and Infrastructures

- The Gas Utilities and Infrastructure segment conducts natural gas operations primarily through the regulated public utilities of Piedmont and Duke Energy Ohio
- This segment serves residential, commercial, industrial and power generation natural gas customers
- The segment had over 1.5 million customers, including over one million customers located in North Carolina, South Carolina and Tennessee, and an additional 529,000 customers located within southwestern Ohio and northern Kentucky
- The Gas Utilities and Infrastructure segment also owns, operates and has investments in various pipeline transmission and natural gas storage facilities.

Commercial Renewables

- The Commercial Renewables primarily acquires, builds, develops and operates wind and solar renewable generation throughout the continental US
- The portfolio includes non-regulated renewable energy and energy storage businesses
- This segment includes utility-scale wind and solar generation assets, which totaled 2,900 MW across 14 states from 21 wind farms and 63 commercial solar farms
- The Company is engaged in selling the power produced from renewable generation through long-term contracts to utilities, electric cooperatives, municipalities and commercial and industrial customers

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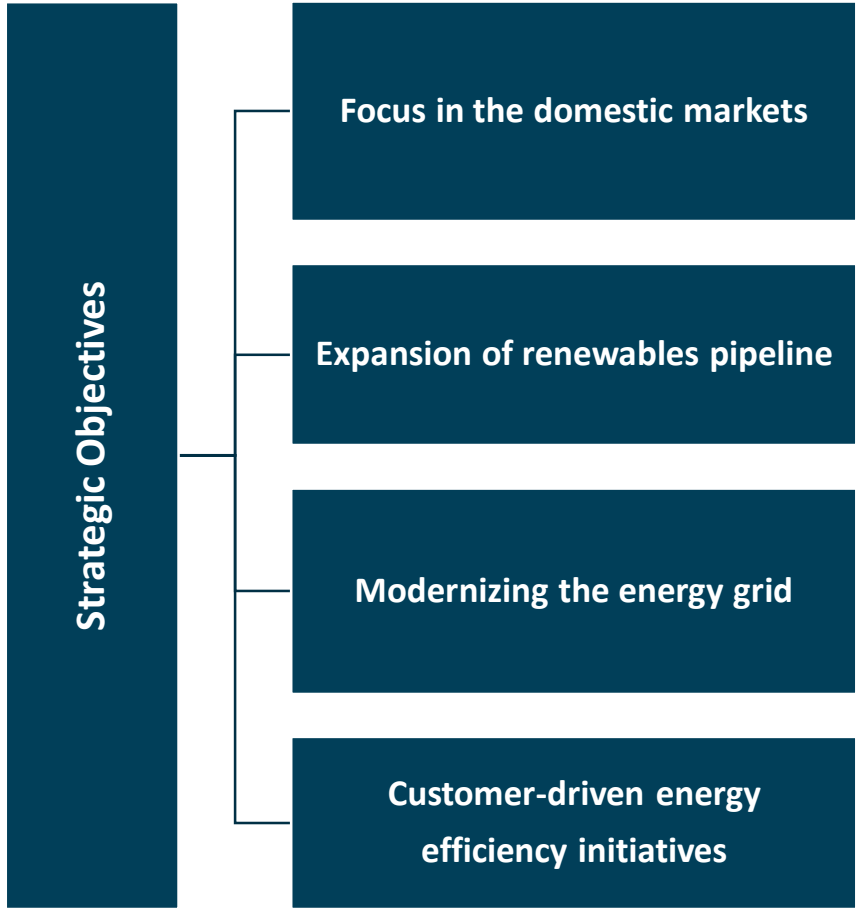
Strategy & Strategic Plan Targets

Duke Energy
Business Strategy (1/6)

- **Company's Mission Statement:** The power quality effort includes industry leaders. We offer a complete family of power quality services. We go beyond the energy meter to find power quality solutions. We can help prevent future problems. We have the equipment and expertise to analyze power quality problems outside and inside customer facilities
- Duke Energy appears to be focusing on its domestic markets regulated by its core businesses, expansion of the company's renewables pipeline, and modernizing the energy grid and emphasizing on customer-driven energy initiatives



Source: Industry Reporting; Company website and reports

Duke Energy
Business Strategy (2/6)

Focus in the domestic markets

- Duke Energy is marching on its strategy to focus on its domestic regulated, electric and gas business. The company appears to be fully focused on growing its regulated businesses in 2017 and beyond
- In October 2016, Duke Energy acquired Piedmont Natural Gas, an energy company which provides natural gas to residential, commercial and industrial customers, in portions of North Carolina, South Carolina and Tennessee, for $4.9 billion which is a bolster for the company's strategy to emphasize on home markets
- In February 2016, with an effort to turn its focus on domestic markets, the company began the process of exiting its International Energy business segment
  - In December 2016, Duke Energy sold its international businesses in Peru, Chile, Ecuador, Guatemala, El Salvador and Argentina to the infrastructure management company, I Squared Capital for approximately $1.2 billion enterprise value

  "Our strategic transformation is gathering more momentum as we exit the Latin American market to focus on our domestic regulated core business, which was bolstered by our recent Piedmont Natural Gas acquisition," - Lynn Good, President, CEO and Chairman, Duke Energy, May 2016
  - In December 2016, Duke Energy completed the sale of its international business in Brazil to China Three Gorges Corp. for approximately $1.2 billion
- In May 2015, Duke replaced a coal-fired power plant in western North Carolina with a $750 million gas-fired plant and announced plans of building $320 million worth of transmission projects hooked up to the new plant
  - The company paid $225 million for a 516-mile gas pipeline running from Alabama to Florida to help fuel its $1.5 billion, 1,640-MW plant in Citrus County, Florida

Source: Group website and reports; Industry reporting,

Duke Energy
Business Strategy (3/6)

Expansion of renewables pipeline (1/2)

- Duke Energy appears to leverage technology advancements to expand its renewable energy portfolio. In total, the company has more than 20 wind projects and 60 solar facilities in operation in over a dozen states, totaling about 3,000 megawatts (MW) of generating capacity
- In May 2017, Duke Energy announced that it will invest $11 billion to generate cleaner energy through renewables and natural gas as it moves to a low-carbon future
- The company plans to invest an additional $3 billion in renewable energy capacity and plans to reach 8000 MW by the year 2021. In addition to more renewable projects in North Carolina, the company is seeking to add renewable generation in South Carolina, Florida and Indiana
  - In 2017, the company is seeking about 400 MW of new capacity in its Duke Energy Carolinas territory in the Piedmont and western portions of the state. Also in 2017, Duke Energy is scheduled to begin operation at its 60-MW Monroe Solar Facility in Union County
  - In January 2017, Duke Energy added about 500 MW of solar capacity in North Carolina, expanding its status as a national solar energy leader. Also, in the same month, the company acquired three solar power plants totaling 55 MW
  - In early 2017, the company announced its 8.8-MW Suwannee Solar Facility in Florida and expects to break ground in the spring, with full operation by the end of 2017
  - In December 2016, Duke Energy Renewables completed its 20-MW solar project in San Bernardino County, California

Source: Group website and reports; Industry reporting,

Duke Energy
Business Strategy (4/6)

Expansion of renewables pipeline (2/2)

- In addition, the company acquired its first solar projects in Colorado and Georgia and began operating its first solar facility in New Mexico during 2016
- In November 2016, Duke Energy and Siemens Energy announced collaboration for joint execution on service contracts for wind developers, which is an effort to expand Duke Renewables' contract pipeline
- In October 2016, Duke Energy Carolinas issued a request for 750,000 megawatt-hours (MWh) of energy located in its territory, furthering efforts to provide renewable energy to customers. Proposed projects must be in operation by December 2018
- In September 2016, Duke Energy announced plans to expand its 1065-MW Bad Creek pumped storage project by 200 MW, with an anticipated completion date of 2023

Source: Group website and reports; Industry reporting,

Duke Energy
Business Strategy (5/6)

Modernizing the energy grid

- Duke Energy seems to put its focus on modernizing the energy grid since it plans to invest $25 billion in modernizing the company's energy delivery system
  - In April 2017, the company announced a $13 billion, 10-year project to modernize North Carolina's energy grid
  - In February 2017, Duke Energy announced a multibillion-dollar plan to modernize the utility's grid as it continues its transformation to a cleaner energy company
    - Duke will spend $25 billion over the next 10 years to create a more flexible and reliable system that can support new technologies
    - System upgrades are part of Duke's five-year capital investment plan. Additional pieces include a continued transition to a lower-carbon fleet and building more natural gas infrastructure
  - In November 2016, Duke Energy announced its plan to spend about $2.7 billion in the near term to modernize transmission and distribution infrastructure in Indiana and Ohio
- During 2016, the company enhanced its basic services to customers, including proactive outage notification options via voice, email and two-way text. In addition, the company provided customers with predictive high bill usage alerts, giving them greater control over their monthly bill. In 2015, Duke began testing a prepayment billing program in selected regions of South Carolina, giving customers greater choice in how they pay their bills

Source: Group website and reports; Industry reporting,

Duke Energy
Business Strategy (6/6)

Customer-driven energy efficiency initiatives

- Customer-driven energy efficiency initiatives continue to play a major role in Duke Energy's long term strategy
  - In April 2017, Duke Energy announced Power/Forward Carolinas -- a $13 billion, 10-year project to modernize North Carolina's electric system. These upgrades are believed to harden the system against storms and outages; make it safer and more resilient against cyber-attacks and physical threats; help expand renewable energy; generate jobs and stimulate economic growth
  - In February 2016, the company achieved a significant energy saving milestone through its "My Home Energy Report" program, which provides customers with customized energy usage reports. The customers saw 1 Terawattt-hour (Twh) of energy savings with home energy report

"Duke Energy is seeking to transform the customer experience by providing customers with more billing options, additional energy usage information and new tools to help manage and reduce energy costs," - Lynn Good, President, CEO and chairman, Duke Energy, May 2016

  - In December 2015, Duke Energy Renewables partnered with Green Charge to offer energy storage for commercial solar customers in markets of California and Hawaii. With this Agreement, the company has created a suite of onsite energy solutions for commercial customers
  - The company appears to be modernizing its electric power grid by installing flexible infrastructure, adding new technology to make power outages increasingly rare and deploying battery storage systems
  - In January 2014, Duke Energy launched a new shared-savings cost-recovery method for energy efficiency in North and South Carolina

Source: Group website and reports; Industry reporting,

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Business Challenges

Duke Energy
Business Challenges (1/2)

- **Regulations**
  - In May 2017, North Carolina regulators ordered Duke Energy to account for what it has spent on a South Carolina nuclear power plant facing new doubts after the company that was supposed to supply the reactors filed for bankruptcy
    - The North Carolina regulator wants to know why Duke Energy apparently blew past a $120 million cap the commission set in 2011 for the state's ratepayers
    - Duke Energy received a Nuclear Regulatory Commission license to build and operate the Lee plant near Gaffney, South Carolina, in December. The company hasn't made a final decision to proceed with the $11 billion project, the biggest construction project in the company's history
  - In May 2017, Duke Energy announced its plans to close coal ash ponds in Indiana because of new federal environmental regulations
    - Duke also plans to dispose coal ash into Terre Haute ponds, which they'll also close. Residents have expressed concerns about the ponds' proximity to the Wabash River

- **Blame for outage**
  - In May 2017, hundreds of Duke Energy customers were without power in Greenville County, reporting that the company's collision damaged equipment, causing an outage
  - The outage was traced to a blown fuse in one of the company's lines

Source: Group website and reports; Industry reporting,

Duke Energy
Business Challenges (2/2)

- **Penalty for Violation**
  - In January 2017, Duke Energy had to pay a $600,000 civil penalty to the US Department of Justice for violating federal antitrust laws in connection with the purchase of a power plant, Osprey Energy Centre, in Florida in 2015
  - The U.S. Department of Justice alleged that Duke Energy violated federal antitrust laws by not filing for approval – as required by the Hart-Scott-Rodino Act – at the time it signed the tolling agreement
  - Duke Energy Florida appears to have engaged in a scheme to manipulate the Federal Energy Regulatory Commission's review of the Osprey acquisition

- **Exclusion from wealth fund**
  - In September 2016, the $800 billion Government Pension Fund of Norway excluded Duke and three of its subsidiaries, citing "Risk of severe environmental damage"
  - The North Carolina Department of Environmental Quality said in a proposal that Duke must dig up and close coal-ash pits at eight sites by 2019 and at 25 locations by 2024

- **Delay for controversial Duke University Plant**
  - In December 2016, student and faculty protests over Duke University's plan to put a 21-megawatt Duke Energy combined heat-and-power plant on campus which appear to have raised doubts about the project's prospects
  - Duke Energy Carolinas has asked the N.C. Utilities Commission push back a hearing on the proposed $55 million plant from January to late spring

Source: Group website and reports; Industry reporting,

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Acquisitions & Divestitures

Duke Energy Acquisitions

Acquisitions

Acquirer	Target	Deal Period	Deal Value	Region	Deal Description
Duke Energy	Piedmont Natural Gas	October 2016	$4.9 billion	US	▪ Piedmont Natural Gas is an energy company which provides natural gas to residential, commercial and industrial customers ▪ The acquisition provides a foundation for Duke Energy to establish a broader, long-term strategic natural gas infrastructure platform to supplement and complement its existing natural gas pipeline investments and regulated natural gas business in the Midwest
Duke Energy	Phoenix Energy Technologies stake	October 2015	NA	US	▪ Phoenix Energy Technologies is a provider of enterprise energy management software and services ▪ The acquisition is part of Duke Energy's strategy to expand its offering of on-site, advanced energy solutions
Duke Energy	Progress Energy	July 2012	13.7 billion	US	▪ Progress Energy was an electricity utility company engaged in regulated electricity operations in the southeastern US ▪ The merger is a part of Duke Energy's strategy to build new power plants to meet future greenhouse-gas emissions limits

Source: Group website and reports; Industry reporting

Duke Energy Divestitures

Divestitures

Acquirer	Target	Deal Period	Deal Value	Region	Deal Description
China Three Gorges	Duke Energy's International Business	December 2016	$1.2 billion	Brazil	Duke Energy sold its international business in Brazil to China Three Gorges Corp The sale is a result of the company's exit from the Latin American market to focus on its domestic regulated business
I Squared Capital	Power operations	October 2016	$1.2 billion	Peru, Chile, Ecuador, Guatemala, EL Salvador, Argentina	Duke Energy sold its power operations in Peru, Chile, Ecuador, Guatemala, El Salvador and Argentina to New York based I Squared Capital for $1.2 billion This sale is a part of Duke Energy's strategy to focus on its domestic core business by exiting the Latin American market
Dynegy	Duke's Midwest Commercial Generation Business	August 2014	$2.8 billion	US	Duke Energy sold its non-regulated Midwest Commercial Generation Business, which includes ownership interests in 11 power plants and Duke Energy Retail Sales, the company's retail business in Ohio This transaction was a part of the company's strategy to exit the merchant generation business

Source: Group website and reports; Industry reporting

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IT Strategy

Duke Energy
IT Strategy (1/4)

Internal IT Structure

- Christopher has been the Chief Information Officer and Vice President of Duke Energy Corporation since August 2014. Heck is responsible for supervising about 1500IT strategy, architecture, and the delivery and support of IT applications across the company
- Duke Energy is focusing on transforming this analog-focused company into a digital company. As of March 2017, the company appeared to be following a three year IT transformation program called LIFT, to fundamentally improve operations and deliver sustainable cost reductions

  LIFT isn't an acronym. It means elevating our game. The first aspect of this transformation is creating 'lean' IT to eliminate waste and non-value work. Another element is aggressively attacking outside spend in the supply chain. These two are really driving our costs down. The last two elements are investing in our capabilities in DevOps and in Agile"- Brian Savoy, Senior Vice President of Business Transformation & Technology at Duke Energy Corporation, March 2017
- The company appears to typically focus on price and the supplier-resource mix in supply chain. Also Duke puts its emphasis on demand management and process and stakeholder management to create lean IT and add efficiency to the supply chain

  "The company's goal is to be 100% Agile by 2020. It's a challenge."- Brian Savoy, Senior Vice President of Business Transformation & Technology at Duke Energy Corporation, March 2017

Source: Group website and reports; Industry reporting, Forbes

Duke Energy
IT Strategy (2/4)

Grid Computing Platform

- As of October 2013, Duke Energy initiated adding nodes into its smart grid communication to enable its grid computing platform. For this initiative, Duke worked with nodes from Cisco, Alcatel-Lucent and Ambient Corp. and used latter company's devices in its Charlotte project
- Duke expects the nodes to serve as the key exchange point for the distributed architecture

  "We're building out a tiered architecture of analytics and capabilities using a set of nodes that, while fairly unimpressive as individual computing machines, yield quite a bit of heft in aggregate."- Raiford Smith, Director of smart grid emerging technology, Duke Energy, October 2013
- The company created a coalition of six OEMs for the project which included Ambient, smart meter vendor Echelon, DMS provider Alstom, IT systems integrator Accenture, distribution automation and grid battery integration vendor S&C Electric and cellular provider Verizon
- Duke also worked with SK Telecom subsidiary GridMaven to implement the same networked computing infrastructure for distribution analytics
- Duke Energy intends to integrate these same concepts into its procurement process, requiring new equipment and systems to demonstrate interoperability through implementation of an adapter to a standards-based message bus such as MQTT

Source: Group website and reports; Industry reporting, Forbes

Duke Energy
IT Strategy (3/4)

Data Modelling and Analytics

- Duke Energy appears to be emphasizing big data analytics by putting focus on the value of integrating siloed datasets and streaming data from field devices used in managing its smart grid system
- Duke Energy has undertaken a series of data mining activities by mapping, monitoring, collecting, validating, storing, visualizing, discovering new relationships with the operational data from its smart grid test area
- In 2014, Duke Energy developed a Sandbox, a data model and dataset that combined data elements from various systems, to analyze and identify new value opportunities for managing the smart grid system
  - The data sources that Duke has integrated in a data warehouse include operational sensors and systems such as AMI, transformers, line sensors, capacitor banks and reclosers, outage management systems, billing systems, and smart grid communication nodes and data sources such as weather stations, socioeconomic databases and social network feeds
- In October 2012, Duke Energy announced its four-year $80 million project to deploy sensors for key power plant equipment
  - This allows Duke to use data analytics for everything from scheduling routine maintenance-learning how to read actual wear and tear on equipment instead of relying on rough operational hour estimates for needed work-to anticipating problems rather than reacting to them, which helps the company to save a lot of cost
- Duke Energy appears to be using a specialized Big Data system, Intelligent Process Insights Engine (IPIE), based on Genpact's Lean Digital approach, to manage data derived from geographically distributed assets

Source: Group website and reports; Industry reporting, Forbes

Duke Energy
IT Strategy (4/4)

IIoT and Predictive maintenance

- Duke Energy follows the “Duke Energy SmartGen Program” which includes the application of Industrial IoT (IIoT) for predictive maintenance
- The primary reason for the new SmartGen program is to avoid catastrophic failures at power plants. Duke Energy built an advanced monitoring, predictive analytics, and diagnostics infrastructure which provided a “force multiplier” to leverage the domain knowledge of a few specialists across the fleet of critical equipment
- Duke Energy expects the rate of cost avoidance to increase further as it continues to train the machine learning models in PRiSM and adds newer sensor technologies

Source: Group website and reports; Industry reporting, Forbes

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Technology Landscape

Duke Energy
Technology Landscape (1/9)

- Duke Energy upgraded to a new version of Oracle Utilities Billing Component, implemented and customized by IBM Global Business Services to ensure close alignment to the company's needs for operational control, supplier management and revenue tracking and reporting
- Duke Energy has partnered with IBM Global Business Services tin order to manage the implementation of the Oracle solution and manage the company's Gas Transportation Management system
- In 2011, Duke Energy selected IBM as the lead systems integrator for the approximately $520 million project, covering its two utilities in the Carolinas and Florida
  - The utility used IBM's software to integrate demand response, distribution and meter data management systems with legacy applications, including customer and outage management programs. The partnership also leveraged IBM's understanding of systems integration for Duke's large-scale smart grid projects
- Duke Energy appears to be using IBM DB2 as the company's data platform for transactional and analytical operations
- The company has implemented IBM Watson Campaign Automation to deliver experiences fpr customers across the buyer through customer data and analytical insights
- Duke is using IBM Tivoli which provides Integrated Service Management software to help manage company's IT's infrastructure
- The company seems to have deployed IBM Websphere to provide web-based access to the company's application software and IBM FileNet for its enterprise content platform

Source: Group website and reports; Industry reporting

Duke Energy
Technology Landscape (2/9)

- Duke Energy seems to have deployed basic Microsoft applications in the company
  - The company uses Microsoft SQL Server as a regional database management system for the firm and Microsoft Visual Studio to develop computer programs
  - Duke Energy uses IIS (Internet Information Services), as an extensible web server, for use with Windows NT family
  - The company appears to be deploying Microsoft Office 365, an office suite of desktop applications, servers, and services for the Microsoft Windows and OS X operating systems
  - Duke Energy seems to have deployed Microsoft Azure as its cloud computing platform and infrastructure for building, deploying, and managing applications and services
  - It uses applications like Microsoft Outlook for email service, and contact synchronization and Microsoft Visio as a professional flow chart and diagram making software
  - Duke uses Microsoft Project Online management tool to keep projects on track and manage projects effectively
- Duke Energy appears to be using some Oracle applications for some of its platforms for technological infrastructure
  - The company has deployed Oracle Database as its object-relational database management system. It also implements Oracle Hyperion Planning as its Microsoft Office and Web-based planning, budgeting and forecasting solution
  - It uses Oracle iPlanet Web Server which builds on the earlier Sun Java System Web Server, Sun ONE Web Server and Netscape Enterprise Server product lines
  - Duke Energy implements Oracle PeopleSoft and Oracle Taleo Cloud Service as the company's core human resource management systems

Source: Group website and reports; Industry reporting

Duke Energy
Technology Landscape (3/9)

- In August 2013, Duke Energy contracted with Acronym, intent-based marketing solutions provider, for organic and paid search activity, redesigning their web presence
- In 2012, Duke Energy deployed BMC FootPrints to manage all its network assets and systems that run and support the company's public grid infrastructure
- In March 2011, Duke Energy selected Verizon Wireless as telecommunications partner for the company's project, Envision: Charlotte, public-private collaboration. As part of the pact, Verizon Wireless provided telecommunications network connecting the digital meters, signs and media players used in Envision: Charlotte
- In 2011, Duke Energy partnered with supply chain management solutions provider Enporion for an integration project for the transition from one ERP platform to another
- In June 2010, Duke Energy partnered with Cisco to pilot and further develop a smart grid-enabled home energy management solution to provide Duke Energy customers with secure and reliable energy information
  - Duke Energy standardizes on Cisco Connected Grid for migrating serial networks to a standards-based IP infrastructure. The company deployed Cisco 2010 Connected Grid Router and Cisco 2520 Connected Grid Switch as foundation of integrated power grid network as well as extended Cisco IP infrastructure in corporate environment to substations and implemented centralized security and management
- In September 2009, the company entered into an agreement with Convergys to provide an innovative next generation billing and customer management solution to support the rapid advance of smart grid technology

Source: Group website and reports; Industry reporting

Duke Energy
Technology Landscape (4/9)

- In 2009, Duke Energy selected Mirion Technologies to replace its existing personnel contamination monitors
- Duke Energy implemented Sphera Essential Suite as an enterprise level software platform-e-TRAC, the Electronic-Toolkit for Regulatory Assurance and Compliance and safety incident management
  - Duke Energy's implementation of the unified Sphera platform for eTRAC began in 2008 with Essential Air, Essential Compliance Manager and Essential Task Manager modules
- In 2008, Duke Energy implemented ARCOS Crew Callout Enterprise Edition (ARCOS) to automate and optimize its crew callout process and add efficiencies to the resource and real-time employee availability management
- In October 2006, Duke Energy licensed ODESTAR Meter Data Management on an enterprise-wide basis to manage all meter data across each of the Duke Energy service territories
- In 2005, Duke installed a platform of common software tools in Transmission and Distribution (T&D) and Substations for Work Management, Design, and GIS
  - Duke Energy made transition from 2D to 3D modeling environments by deploying software like Autodesk Inventor, AutoCAD Electrical, and Autodesk Vault Manufacturing software
- Duke Energy undertook what it called internally the Financial Reengineering (FREE) project. That meant upgrading PeopleSoft from 8.0 to 8.9, migrating the system from IBM's DB2 on a mainframe to an Oracle database platform, and upgrading Hyperion Enterprise to HFM System 9

Source: Group website and reports; Industry reporting

Duke Energy
Technology Landscape (5/9)

- In late 90's the company installed PeopleSoft HR 6.0. In 2000, the company implemented PeopleSoft Travel and Expense 7.5 upgrading to 8.0 and added PeopleSoft supply chain module in the year 2002
  - Duke Energy is currently running 14 instances of PeopleSoft -- three demo environments, three development, three testing, one quality assurance, one performance testing, one training, one production support and one production instance. It's running Oracle 10g on AIX and on Windows 2003 servers
- Duke has been using messaging protocols such as MQTT for lightweight, low-overhead applications and AMQP for more robust messaging traffic
- Duke Energy applied a specialized Big Data system, Intelligent Process Insights Engine (IPIE), based on Genpact's Lean Digital approach, to manage data derived from geographically distributed assets
- Duke Energy deployed Sensei Solutions for substation security review and design
- Duke Energy entered into a partnership with Accenture build a distributed intelligence application and demonstration to eliminate operational silos and improve grid performance
- Duke Energy has collaborated with Capgemini to provide support, research and testing resources for new technologies for the company's smart grid and energy efficiency technologies

Source: Group website and reports; Industry reporting

Duke Energy
Technology Landscape (6/9)

- Duke Energy implemented Maximo, an enterprise asset management application for asset and work management and ArcGIS portal web services, web maps and web apps for solutions for analysis, planning and operations management
- Duke Energy appears to be using Informatica for enterprise data integration and management powering analytics for big data and cloud
- The company implements Tableau Software applications for fast analytics and visualization. It also uses Visual KPI, real-time mobile BI software, KPis, alerts, operations monitoring, and analytics
- Duke Energy has deployed ASP.NET as its open-source server-side web application framework for web development. It seems to be using AngularJS, an open-source web application framework mainly maintained by Google
- Duke Energy uses Underscore.js, a JavaScript library which provides utility functions for common programming tasks. Also, the company implements XL Release in order to manage, control and visualize continuous delivery pipelines and process optimization
- The company appears to be using AvidXchange for the company's end-to-end automated bill payment solutions. It also uses Bellwether Purchasing software to automate purchasing processes
- Duke seems to have deployed SMART by Gep which is a unified procurement software platform with comprehensive functionality, including spend analysis, sourcing, contract management

Source: Group website and reports; Industry reporting

Duke Energy
Technology Landscape (7/9)

- Duke Energy appears to be using OpenAir for Web services automation and to handle project management
- The company uses Salesforce Sales Cloud for managing accounts, contacts, and business opportunities, and collaboration. It has also implemented Drawloop for repeatable process for creating, managing and sending documents entirely in Salesforce
- For customer experience management, Duke has deployed Sitecore that provides web content management and multichannel marketing automation software
- Duke Energy seems to have deployed TRUSTe, a data privacy management solution enabling the company to collect and use customer data from web, mobile and advertising channels
- Also, the company is using EMC Enterprise Content Management platform. Duke has also implemented HP Quality Center which is a commercial test management tool by HP that supports various phases of software development life cycle
- Duke Energy uses DevonWay for cloud-hosted enterprise web applications for general business process management
- The company seems to have deployed Avetta as its supply chain management solution, which is compatible with SaaS software.

Source: Group website and reports; Industry reporting

Duke Energy
Technology Landscape (8/9)

- **Data Analytics/ Databases:**
  - Big Data/ No SQL: Ambari, Apache Hbase, CygNet, Hadoop, Hadoop HDFS, Hortonworks, MapR, NoSQL Database, Oozie
  - Business Intelligence: Actuate, HP Autonomy IDOL, Hyperion Performance Management, IBM Cognos, IBM Cognos Impromptu, IBM SPSS, Informatica, Microsoft Power BI, Microsoft Reporting Services, Microsoft SSAS
  - Data Modeling/Mining: Ab Initio, CA Erwin, Hyperion Essbase, Informatica PowerCenter, Informatica PowerExchange, Microsoft SSIS, Omniture Data Warehouse, Pentaho, SAS, SAS Visual Analytics

- **Data Infrastructure:**
  - Cloud Systems: Avocent, Citrix NetScaler, IBM HACMP, Oracle Enterprise Manager, Oracle Tuxedo, Symantec Veritas
  - Desktop Virtualization: AppSense, Bomgar, Citrix Receiver, Citrix XenApp, Citrix XenDesktop, EMCO Remote Desktop, VMware Thinstall/ThinApp, Workstation, WSUS
  - Email Hosting: SMTP Server (inhouse)

Source: Group website and reports; Industry reporting

Duke Energy
Technology Landscape (9/9)

- **Enterprise/ERP:**
  - CRM: Avaya Aura, Avaya Call Management System, CMS, Radian6, SalesForce, Salesforce Radian6, SAP CRM, Siebel CRM
  - Enterprise Resource Planning (ERP): Oracle EBS
  - Enterprise Systems Support: Altova MetaTeam, PeopleSoft Program Management, Primavera Enterprise Project Portfolio Management, Quest, SAP Applications, Software AG

- **Data Storage:**
  - Data Backup: CA ARCserve, EMC Avamar, EMC Legato, EMC Networker, EMC TimeFinder, Oracle RMAN, Oracle Secure Backup, Solix EDMS Database Archiving, Symantec Backup Exec, Symantec Enterprise Vault
  - Disaster Recovery: EMC RecoverPoint, Symantec Veritas Cluster Server, Vision Solutions MIMIX
  - Enterprise Storage: EMC Data Domain, EMC Replication Manager, HP StorageWorks, IBM Spectrum Protect, IBM Tape Systems, IBM Tivoli Storage Manager, NetApp, NetApp FAS Series Storage Systems, NetApp Storage Systems, Oracle Recovery Manager

Source: Group website and reports; Industry reporting

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