STATE OF PLAY: Factors Shaping the Public Power Landscape

ElectriCities Annual Conference August 2021





Community Perspectives

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Wholesale Power

Kathy Moyer, Vice President, Operations

Technology Connell Price, *Vice President, Information Technology*

Legislative

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Competitive Analysis

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COMMUNITY PERSPECTIVES

Kelsey Lawhead Manager, Educational Programs



Where We Have Been...

In 2013, interviews were conducted with BOD and BOC members to obtain their views on the key issues facing NC Public Power

- The Value of ElectriCities: ElectriCities must clearly communicate the value that it delivers to its stakeholders.
- The Value of Public Power: ElectriCities must help members sell the value of public power to the general public.
- Better Planning: Lack of strategic planning/rate planning has historically hurt ElectriCities.
- Leadership: ElectriCities must establish a leadership position on emerging issues and new technologies.
- Rates: ElectriCities must be more proactive on rate planning and related communications to manage expectations.



What keeps our utility directors up at night?

- 1. Attracting & retaining qualified workers
- 2. Ability to keep up with technology (up from #5 in 2017)
- 3. Ability to compete with other utilities
- 4. External political issues
- 5. High Rates

Sources 2021 ElectriCities Utility Assessment

Value of Public Power

Members are looking to ElectriCities to help communicate & define the Value of Public Power

Good News

We know our members ARE providing value. Through ElectriCities "Economic Benefit Study" program, we have documented a research-based financial value for six members. Across those members:

The total estimated annual benefit: \$23,120,095

Less Good News

We are trailing our state-wide competition in the customer's perspective on Value for the cost of electricity. (8 points behind Co-ops & 1 point behind IOU)

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Customers are becoming more engaged with energy, expecting new services and more sustainable energy generation

- This year's customer survey again demonstrated, over half of customers want more engagement with their utility.
- Most sought-after programs:
 - Customer education
 - Solar programs
 - Rebates

Modern trends for electric customers

- Consumers are making the connection between smart energy and slowing climate change
- Consumers across all segments are interested in smart energy-enabled products
- Lower-income consumers are keenly interested in smart energy and the environment

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 Consumers need more education on how to assess a program or technology

Sources: 2021 State of the Consumer. Atlanta, GA; Smart Energy Consumer Collaborative, 2021

Consumer Engagement Trends

- Smart Home is no longer a distant future.
- Residential solar capacity has grown over 800% since 2013
- EV Adoption has grown over 300% since 2010



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The Employment Landscape

"I really am not being hyperbolic when I say that, as CEOs, this is the challenge of our time. Because for all the talk about the worries over digitization, transformation and disruption, the best-laid plans to address those issues can be derailed by failures in talent acquisition and talent retention."

--Johnny C. Taylor, Jr. President, Society for Human Resources Management



Workforce Skills Gap

Digitization is proceeding rapidly in the Energy industry, leading to demand for digital skills in both new and traditional jobs

Digital skill cluster increases over past decade² Automation 2.6% Share of job postings 5.3% 2010 2020 Cloud Cyber 8.4% 9.6% Data analysis 12.5% 23.7% Data management 14.0% 16.8% **Connected technologies** 0.6% Software development 3.7% 6.1%

Digital skill clusters for which demand has increased over the past decade

Power plant operators

(III) Data management

Workforce Skills Gap

Digitization is proceeding rapidly in the Energy industry, leading to demand for digital skills in both new and traditional jobs



Engineers (cp) Cloud **Connected technologies** () Automation Cyber 💷) Data management Software development (**)) (Data analysis New skills Cloud computing Augmented reality/virtual reality + 10T IT automation Identity management Data synchronization Image analysis Line workers 💷) Data management (Data analysis New skills Document management systems Big data. Data visualization Augmented reality/virtual reality

Skill shortage Skills with margin below 1% on supply Skills with margin above 1% on supply

Competition for Talent

Competition will increase across industries for skills in short supply



Competition for Talent

Demand for key talent will continue to drive wage competition

Historical Hourly Rate for Journey Lineworkers¹

\$45.00 \$40.00 \$35.00 \$30.00 \$25.00 \$20.00 \$15.00 2020 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 ——NC Public Power S.E. IOUs & Large PP S.E. APPA National APPA

Sources: [1] EAPDIS Energy Technical Craft & Clerical Survey, NCLM Municipal Salary Survey Report, APPA Public Power Utility Salary Survey. [2] Deloitte Consulting

Competition will increase across industries for skills in short supply

Employee Expectations

Gen Z and Young Millennials (1989-2001)

- Purpose-driven
- Seek organizations with values like their own
- Value authenticity
- Desire meaningful work
- Entrepreneurial
- Embrace and expect diversity and inclusivity

83% of employees identify a <u>hybrid</u> "Productive Anywhere" model as being most optimal – 64% when sampling utility employees specifically

39% of employees would consider <u>quitting</u> if their employer was not flexible about remote work

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Workplaces that support equity, transparency, flexibility and purpose take top marks among millennial employees, according to the 2021 Fortune Best Workplaces for Millennials™ survey. -Great Place to Work Institute

Sources: wespire.com; Great Place to Work Institute; Accenture Future of Work Study 2021; May 2021 Morning Consult Poll

Turnover Tsunami

- More than 50% of employees are projected to look for new employment in 2021
- Voluntary turnover is replacing retirement concerns in Energy organizations, especially in the first 5 years when many employees will leave:
 - 65% of lineworkers
 - 58% of engineers
 - 57% of employees ages 23-37



Sources: www.shrm.org; Center for Energy Workforce Development Gaps in Energy Surveys

Turnover Tsunami

- Unplanned turnover is expensive and time consuming
 - NC Public Power takes from 6-12 months to replace an experienced lineworker and up to 6 months to replace an engineer

National Energy Voluntary Turnover				
2015	10%			
2017	14%			
2019	13%			

NC Public Power Voluntary Turnover					
Entry & Apprentice Lineworkers	16%				
Total Lineworkers	21%				
Engineers	9%				

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Sources: ElectriCities 2020 Utility Assessment Survey per year average 2018-2020



WHOLESALE POWER SUPPLY Kathy Moyer Vice President, Operations



Traditional Wholesale Power Supply

On average wholesale power makes up 70% of your annual electric fund costs.



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*Transmission and Distribution voltage levels vary by Member.

Wholesale Power Supply Trends Towards Decarbonization

U.S. Electricity Generation From Selected Fuels



Wholesale Power Supply Transformation in North Carolina

- Since 2018 we have continued to see the shift to renewables and clean energy. In NC renewables increased by 8% in two years and 3% nationally.
- Nuclear has remained stable and in North Carolina has captured its top spot as the largest source of North Carolina's electricity generation.
- Coal has continued to decline with plant retirements and some natural gas plant build has stalled.

% of Electricity Generated



Source: NC and US EIA; NCEMPA and NCMPA1 based on 2020 Rating Agency Questionnaire

Wholesale Power Supply The Decentralized Interactive Grid

Where do Distributed Energy Resources (DERs) fit in?

Distributed Energy Resources (DERs) are shown in red.



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Wholesale Power Supply The Decentralized Interactive Grid

Past

Where do Distributed Energy Resources (DERs) fit in?



Emerging The Energy Cloud Market Demand Policy & Regulation

Central, One-Way Power System, focused on Safe, Reliable and Affordable power

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Distributed, Cleaner, Two-Way Power Flows, Mobile energy resources, new digital Energy Cloud platforms

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Wholesale Power Supply The Decentralized **Interactive Grid Taking it Further into the Future**

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INTEGRATED DER Integrated DER Platforms could support more than \$3-4 trillion in value within the next two to three decades.	TRASPORTATION By 2020, more than 6,000 GWh of electricity is expected to be consumed by plug-in EVs annually in the US, giving rise to Transportation 2Grid.	BUILDING2GRID means leveraging more than \$50 billion of anticipated investments in behind-the-meter integrated energy assets for residential and commercial customers within the next five years.	INTERNET OF ENERGY More than \$1 trillion in projected cumulative global revenue is at stake over the next decade across Internet of Energy platforms.	TRANSACTIVE ENERGY Transactive energy platforms are expected to see billions of dollars in software-related investments, technology integration and fees by 2030.	SMART CITIES More than \$250 billion in cumulative investments focused on smart cities energy projects alone are anticipated through 2030.	NEURAL GRID Investments in neural grid infrastructure and emerging technologies through 2030 are expected to exceed \$700 billion.		
ENERGY CLOUD ORCHESTRATOR								

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

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Wholesale Power Supply Future Grid is Sustainable and Resilient

Customers expect Wholesale Power Supply to adapt and recover to Weather Events and Man-made Threats

More customer education is needed to integrate customer technologies into Wholesale Power Supply as a resource.

- Reliable
- Renewable
- Clean
- Affordable

Sustainable

- Hardened
 Infrastructure
- Decentralized
- Adaptable
- Autonomous





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STATE OF PLAY: Technology

Connell Price VP, Information Technology



Technology Is Trending Forward...



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Technology Predictions Are Now Occurring...



ENERGY CLOUD ORCHESTRATOR

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

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Necessary Technologies

Emerging technologies lean heavily on cloud services and data analytics to define new customer preferences, segmentation and analysis.



The Smart City and the Smart Customer Where is Technology Taking Us...?



https://www.electronicsforu.com/electronics-projects/software-projects-ideas/home-automation-and-security-using-iot-devices https://www.smartcitiesworld.net/news/news/smart-cities-services-worth-225bn-by-2026-1618

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The Smart City and the Smart Customer Where is Technology Taking Us...?



https://www.electronicsforu.com/electronics-projects/software-projects-ideas/home-automation-and-security-using-iot-devices https://www.smartcitiesworld.net/news/news/smart-cities-services-worth-225bn-by-2026-1618

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The Smart City and the Smart Customer Where is Technology Taking Us...?

The Challenge: Can we create a digital (virtual) community experience like our original hometown model?



https://www.electronicsforu.com/electronics-projects/software-projects-ideas/home-automation-and-security-using-iot-devices https://www.smartcitiesworld.net/news/news/smart-cities-services-worth-225bn-by-2026-1618

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New Forms of Digital Customer Engagement Become Necessary

Internal Influences

- Skillsets are required to be more tech savvy
- Customer Service functions are expected to be more virtual



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The Virtual Influence

- Virtual local communities
- Virtual workplaces
- Higher degree of skilled (technology) workers
- More load for broadband

How have you branded your municipality's virtual community?



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https://wwd.com/business-news/business-features/outside-view-amber-atherton-covid-19-virtual-communities-crucial-1203701363/



New Forms of Digital Customer Engagement Become Necessary

External Influencers

- COVID Pandemic
- Malicious Cyber Threat Actors



The Municipality's Challenge: *Engaging Customers*

The COVID-19 crisis has accelerated the digitization of customer interactions by several years.



'Years ahead of the average rate of adoption from 2017 to 2019.

https://www.mckinsey.com/business-functions/strategy-and-corporate-finance/our-insights/how-covid-19-has-pushed-companies-over-the-technology-tipping-point-and-transformed-business-forever#

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CITIES

Malicious Cyber Threat Actors

February 2021: Florida water system attack





May 2021: Colonial Pipeline attack

Closer to home

North Carolina cyber attacks



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- Chatham County (October 2020 Ransomware)
- Rocky Mount (August 2020 Ransomware)
- Haywood County Schools (August 2020 Ransomware)
- Durham City & County (March 2020 Ransomware)
- Lincoln County (August 2019 Ransomware * 2nd attack in 1 year)
- Anson County (July 2019 Ransomware)
- Greenville, NC (April 2019 Ransomware)
- Orange County (March 2019 Ransomware *3rd attack in 6 years)
- Davidson County (February 2018 Ransomware)
- Mecklenburg County (December 2017 Ransomware)

1,644 North Carolina data breaches in 2020 - N.C. Attorney General


Malicious Cyber Threat Actors



Malicious Cyber Threat Actors

Types of Cybersecurity Threats

- Malware
- Phishing
- Spear Phishing
- Man in the Middle Attack
- Denial of Service Attack
- SQL Injection
- Zero-day Exploit
- Advanced Persistent Treats
- Ransomware
- DNS Attack



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Where Is The Municipality In All Of This?



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https://techwireasia.com/2018/10/has-your-utilities-company-figured-out-the-new-age-consumer/

The Municipality Must Prepare To Answer The Challenge Understanding the changing age demographics and preferences.

What identifies each generation?



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https://wmkagency.com/blog/generation-marketing-how-to-reach-consumers-at-every-age

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Understanding the changing age demographics and preferences.



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https://wmkagency.com/blog/generation-marketing-how-to-reach-consumers-at-every-age

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Understanding the changing age demographics and preferences.



Data source: Pew Research Center (2019). This is a visualization from Our WorldinData,org, where you find data and research to make progress against the world's largest problems.

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Attracting the tech savvy next generation consumer



https://m.economictimes.com/topic/tech-savvy-consumers/4



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Digitizing your community presence...



LEGISLATIVE AND REGULATORY FACTORS:

How Industry and Technological Change is Enabling and Accelerating Regulatory and Legislative Trends (and Vice-versa)

Drew Elliot Manager, Government Relations



Overview

Setting the Stage 1: The Traditional Utility Model and its impact on Public Power

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- Setting the Stage 2: Technological Advancements
- Trends threatening the traditional model
- Trend Analysis: Decarbonization
- Trend Analysis: Distributed Energy Resources
- Trend Analysis: Cybersecurity

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The Opportunity for Public Power

Setting the Stage 1: The Traditional Utility Model



Setting the Stage 1: The Traditional Utility Model

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Less Than 1 Outage Per Year

Power On 99.98% Of The Time



Setting the Stage 1: The Traditional Model's Impact on Public Power



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Setting the Stage 2: Technological Advancements



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Trends Threatening The Traditional Model

Move away from fossil fuels

- Reasons to replace coal
- Anti-pipeline strategy
- Federalization

Customer Choice movements

- Mega-firms pressuring to access wholesale markets
- Green choice programs
- Waning political influence of investor-owned utilities
- Corporate sustainability goals



Trends Threatening The Traditional Model

Figure 7: Flow of Money into Sustainable Funds vs. Utility Adoption of Carbon-Reduction Targets



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Source: Smart Electric Power Alliance, 2021. With data adapted from Morningstar.¹⁵



Trend Analysis: Decarbonization

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- How fast can/should the U.S. decarbonize?
- Who will make the decisions?

Trend Analysis: Decarbonization

Proponent/Plan	Interim Goal	Final Goal
Gov. Cooper - E.O. 80	70% by 2030	Carbon-neutral by 2050
Duke Energy	50% by 2030	Net-zero by 2050
N.C. Electric Co-ops	50% by 2030	Net-zero by 2050
Clean Future bill (Congress/Biden)	80% by 2030	Net-zero by 2035



Trend Analysis: Distributed Energy Resources

DER Issues

- Penetration accelerating
- Ownership and control
- Cost allocation

Google

Data

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TESLA

Trend Analysis: Cybersecurity



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STATE OF PLAY: Competitive Positioning Andrew Fusco *VP, Member Services and Corporate Planning*



Overview

Dimensions of Competitiveness

- Retail rates
- Reliability
- Technology
- Workforce
- Sustainability
- Identify gaps
- SWOT Analysis



Dimensions of Competitiveness: Retail Rates *Reality*



Dimensions of Competitiveness: Retail Rates *Perception (residential customers)*

"Please rate your utility on providing good value for the cost of electricity."

"Would you say the prices you pay to your utility are higher, lower, or about the same as surrounding utilities?"



Dimensions of Competitiveness: Reliability Reality

	Avg. Length of Outage/ Customer (Min.)*	Avg. Number of Outages/ Customer*
NC Public Power	56.51	0.75
Coops	165.81	1.42
Duke Energy Progress	151.60	1.32
Duke Energy Carolinas	183.20	1.11
Dominion	128.20	1.09



* Averaged over the period from 2016 to 2020

Dimensions of Competitiveness: Reliability Perception 96%

Percent Perceiving High Reliability

"Please rate your utility on providing reliable electric service."



■ NC Public Power Customers ■ IOU Customers ■ Coop Customers

Dimensions of Competitiveness: Technology Reality



Dimensions of Competitiveness: Technology Perception

"Please rate your utility on providing services and products that I expect from a modern utility."



Dimensions of Competitiveness: Workforce

Perception



Dimensions of Competitiveness: Workforce *Reality*



Dimensions of Competitiveness: Environmental Sustainability

Reality

Percentage of Entities Offering Customer-Friendly Renewable Programs

CO2 Emissions Rate (lbs./kWh)		
NCMPA1	0.0035	
NCEMPA	0.5625	
Duke Energy	0.5635	

	NC Public Power		+ DUKE ENERGY.
Rebates for Solar Panels	None	None	Yes, up to\$6,000 per/install
Net Metering/ Billing	11%	23%	Yes
Time Varying Rate Plans	8%	69%	Yes
Community Solar	1%	46%	Yes

Dimensions of Competitiveness: Environmental Sustainability Perception

Q: How important is renewable energy to you?

Total Important	78.2%
Total Unimportant	14.8%
Don't Know	7.0%



Dimensions of Competitiveness: Environmental Sustainability Perception

"Please rate your utility on if you view them as a responsible steward of the environment."



Dimensions of Competitiveness: Environmental Sustainability Perception

30% of Fortune 500 Companies have set CO₂ emissions reduction targets*



Year action was taken / commitment announced

Source: 2020 Natural Capital Partners

Spend Money Wisely...But You Need To Spend It

Investing in the upkeep of your system is a good investment. Don't let it fall into disrepair.



Annual O&M/Retail kWh Sold
Spend Money Wisely...But You Need To Spend It

High system losses have a negative impact on your rate competitiveness. Minimize them.

Good 18% 16% 14% 12% 10% 8% 6% 4% 2% 0% 10th 20th 30th 40th 60th 70th 80th 90th 50th 100th Percentiles All Members -National Public Power ----National Utility Average

Distribution System Losses

Spend Money Wisely...But You Need To Spend It

Pay competitively. You get what you pay for.



Spend Money Wisely...But You Need To Spend It

Other must have investments:

- Technology your customers want it
- Cyber Security municipalities are targets
- Safety you can't afford not to



Customer Opinion Matters

"Please rate your overall satisfaction with your electric utility." *"If given a choice, what is the likelihood that you would continue purchasing from your current electric utility?"*



Customer Opinion Matters

Customer Awareness of Public Power

51.9% residential customers are aware their utility is municipally owned (Compared to 57.0% in 2020)

commercial customers are aware their utility is municipally owned (Compared to 66.0% in 2020)

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64.4%

Strengths

"Public Power" is a proven successful business model

General Resiliency

Trends provide opportunity for wholesale and retail rates Favorable customer perception in several areas NCMPA1 CO₂ emissions provide sustainability opportunities

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Weaknesses

Need succession of visionary leaders and long-term plan Competing objectives within a municipality Limited opportunities for economies of scale in small to mid-sized members

Lack of customer awareness of Public Power and its benefits

Under investment in electric utility

Lagging competitors in customer offerings

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Opportunities

Turn customers into advocates

Develop new customer programs related to clean energy

More collaboration among our members When surpluses exist, lower rates or invest appropriately

Mid-term flexibility with power supply options

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Threats

Low customer opinion results in regulatory risks

Risk of adverse legislation and regulations

Technology threats (obsolescence and cyber)

Lack of customer loyalty

Competitors on the move

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