EXHIBIT E

Advanced Steel Core Conductors

Daniel Berkowitz

Bekaert Corporation

Bekaert

Presenters

Dan Berkowitz currently leads the North American Energy marketing & strategy department for Bekaert, focused on driving the Power Transmissions ACSS/ACSR Conductor growth. Dan has a background in Mechanical Engineering and product management roles throughout his career related to the Energy Industry. His aspirations are to deliver the most efficient and economical solution that brings our electric grid into the future.


Bekaert Van Buren, AR

Arkansas

Current State of Grid

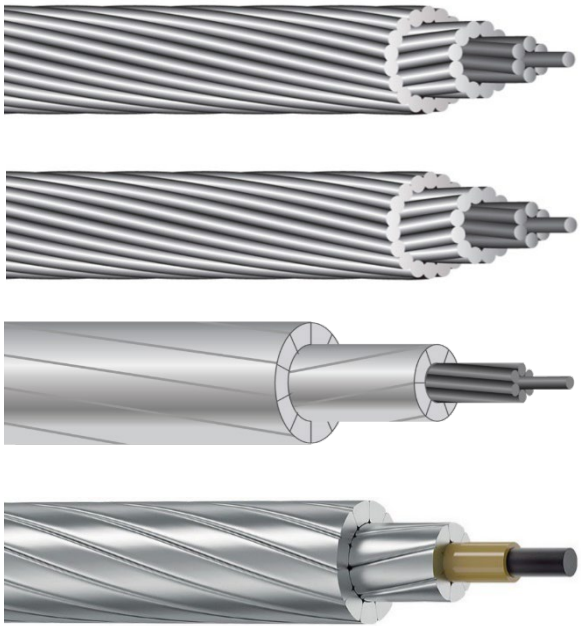
- DoE Grid Deployment Office 70% of the grid is 25 years or older.
- MISO's December 2024 Long-Term Demand Forecast estimates a growth of 53% increase.
- U.S. Energy Information Administration Arkansas loses ~3.5% energy in T&D in 2023. At 9.73 cents/kWh, this equates to ~$103.4M being passed on to the ratepayers.
- Line Loss = I^2R

Grid Opportunity

Scenario	Steel Structures	Foundation Work	Cost	Time	Capacity
New Build	New Towers	100% new foundations	High	5–10 years	Future Proof
Rebuild	Tower Modification or New	Remove & replace all foundations	Medium	3–4 years	Double or more
Reconductoring	Existing structures retained	Minimal reinforcement only	Low	1–2 years	Up to double

Conductor Technologies

Tools in line design



Type	Description
ACSR	As drawn aluminum around a zinc or mischmetal coated steel core
ACSS	Annealed aluminum around a mischmetal coated steel core
ACSS/TW	Trapezial shaped, annealed aluminum around a mischmetal coated steel core
ACCC/TW	Trapezial shaped, annealed aluminum around a composite

Technology Effects on Conductor Efficiency and Capacity

Some common technologies

Change	Effect	Efficiency Change	Capacity Change	Cost as % of conductor cost*
Trap wire, same conductor diameter	More aluminum**	20%	10%	20%
Higher Temperatures	Higher current	-0.4% per °C Up to -60%	80%	0%
Larger conductor	More aluminum	0.1% to 10%	0.05% to 5%	0.1% to 10%
Higher strength, smaller core	More aluminum	3%	1.5%	10% to 200%
Annealed aluminum	Higher Conductivity	1% to 1.5%	0%***	<1% to 10%

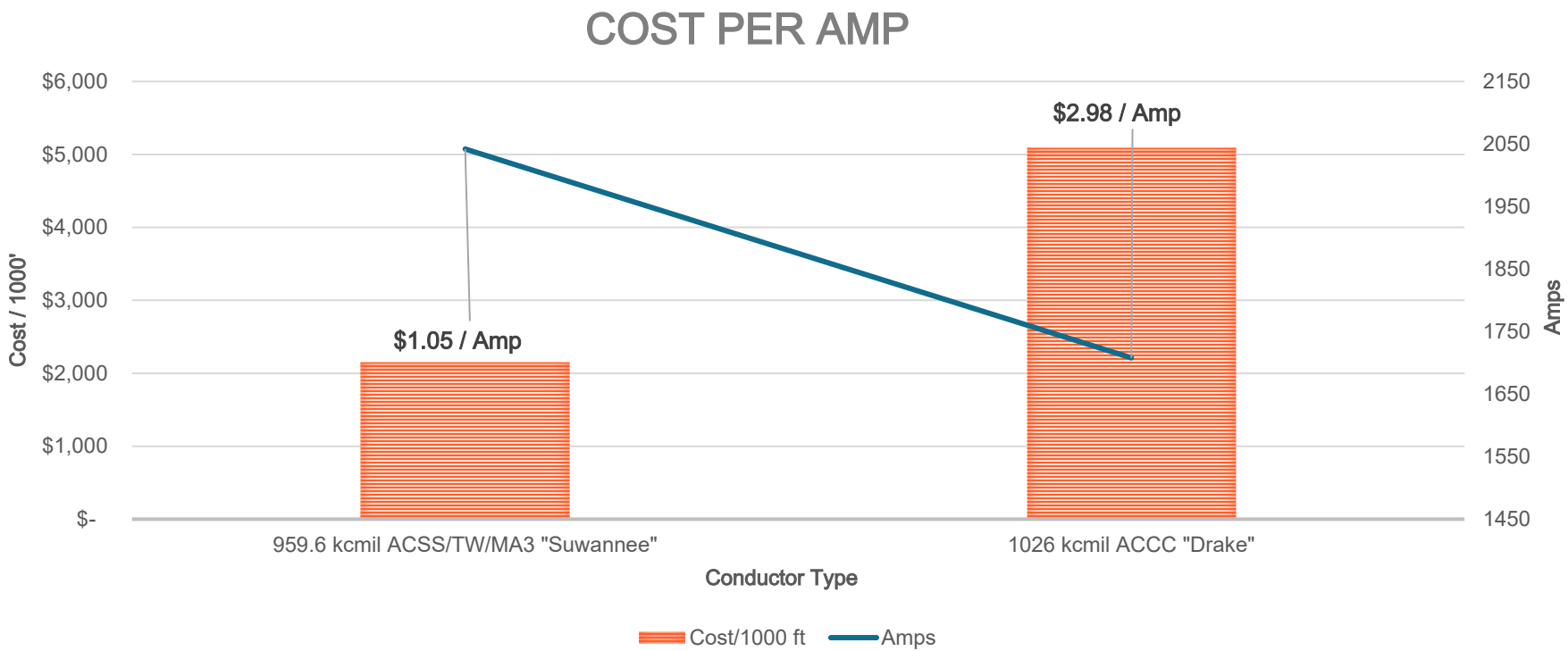
**Excludes costs differences of structures or tooling*
***1% more aluminum equals >1% more efficiency*
****Annealed aluminum is typically paired with a higher strength core that allow higher temperatures*

Idaho National Laboratory Advanced Conductor Scan Report

		History	Mechanical			Capacity	Efficiency/Line Losses		Unit Cost
Conductor Type	Conductor	Year Introduced	More Sag than ACSR	Rated breaking strength vs ACSR	Weight vs ACSR	Ampacity @ MOT Continuous vs ACSR	[‹ ¬,¬½ƴ ˝ ƒ ‹ ⅗ " ï ∫ °. ¹² ¬⅓# . ^ [	Resistance @ MOT Continuous vs ACSR	Cost vs ACSR
ACSR	795 Drake	1900s	No	100%	100%	100%	100%	100%	100%
3M ACCR	795 T16	2002	No	102%	85%	158%	94%	129%	Unknown
ACCC	1029 Drake	2003	No	129%	96%	165%	77%	99%	237%
ACSS/MA5	795 Drake	2007	Yes, @MOT	103%	100%	174%	97%	146%	108%
ACCS/TW/C7	973 Everglades	2014	No	124%	92%	153%	82%	106%	Unknown
ACCC/E3X	1029 Drake	2015	No	129%	97%	186%	77%	99%	237%
ACSS/TW/MA5	959 Suwanee	2015	Yes, @MOT	123%	121%	191%	80%	121%	139%
ACSS/MA5/E3X	795 Drake	2015	Yes, @MOT	103%	100%	199%	97%	146%	135%
ACSS/TW/MA5/E3X	959 Suwanee	2015	Yes, @MOT	123%	121%	218%	80%	121%	152%
TS Conductor	1051Sun M3	2021	No	129%	129%	129%	129%	129%	Unknown

****Source: Idaho National Laboratory. (December 2023). Advanced Conductor: Scan Report (Report No. INL/RPT -23-75873 R10). Department of Energy. 23 -50856_R10_AdvConductorszScanProjectReport -1.pdf (inl.gov)*

Cost Per Amp



* Calculation based on MISO Transmission cost estimate guide "Drake" Conductors
*Amps for Drake ACSS/TW/MA3 based on published Southwire technical specifications

Discussion

- Accelerating innovation that delivers more capacity, reliability, resiliency, and affordability to the US grid to support decarbonization.
- Bekaert would like to be involved with future discussions on grid enhancing technology and network upgrade challenges.

White papers:

Grid Efficiency - The Core Challenge

Comparing Advanced Cores - Achieving Maximum Grid Capacity

- Video: Comparing Advanced Cores: Achieving Maximum Grid Capacity
- CIGRE Version: 2024 CIGRE GOTF Paper

Connecting Renewable Energy with Giga-Strength Steel

- Video: Giga Strength Steel
- CIGRE Version: 2025 CIGRE International Paper

Cost Savings for Ratepayers - The role of Advanced Transmission Technologies and High-Performance Conductors

- Video: Cost Savings for Ratepayers


Bekaert

Appendix

Case Studies

Utility Scan Introduction

This document includes profiles of 44 major U.S. transmission utilities, including federal power marketing agencies.

Conductor Adoption: 95% of utilities have deployed or plan to deploy Aluminum Conductor Steel Supported (ACSS) conductors, with ultra-high-strength steel cores.

Deployment Trends: While advanced technologies are widely tested, many utilities only execute limited deployments (1-2 projects per conductor type).

Conductor Technology Adoption: Some utilities have standardized specific conductor technologies for certain applications (e.g., transmission voltage levels, reconductoring). However, many others have limited their use to one or two projects without broad adoption.

Cautious Approach: U.S. utilities are willing to experiment with new technologies but are hesitant to widely deploy them until proven with a strong performance record in both their own networks and others.

ACSS Adoption: The widespread use of ACSS is attributed to its 50+ year track record and continued advancements, such as trapezoidal aluminum wires and ultra-high-strength steel.

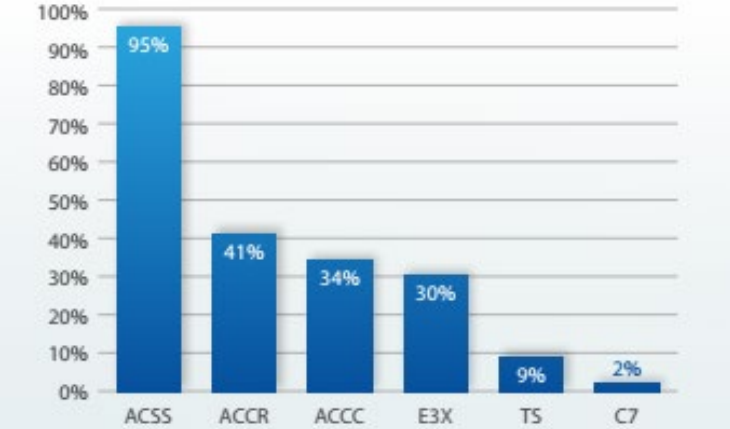


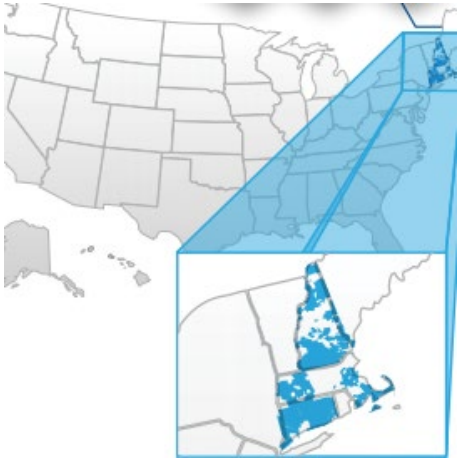
Figure A-1. Percentage of profiled utilities deploying transmission technology.

Eversource

(ACSS ACSS/E3X)

Service Area: Several states in the Northeast, serving approximately 4 million customers.

Services: Electricity and natural gas.



Conductor Application Successes:

- Eversource uses **ACSS** in transmission systems and prefers it over **ACSR** due to its higher current-carrying capacity.
- In 2023, Eversource partnered with **Prysmian** to use **ACSS with E3X** coating, enhancing efficiency.

Exemplary Projects

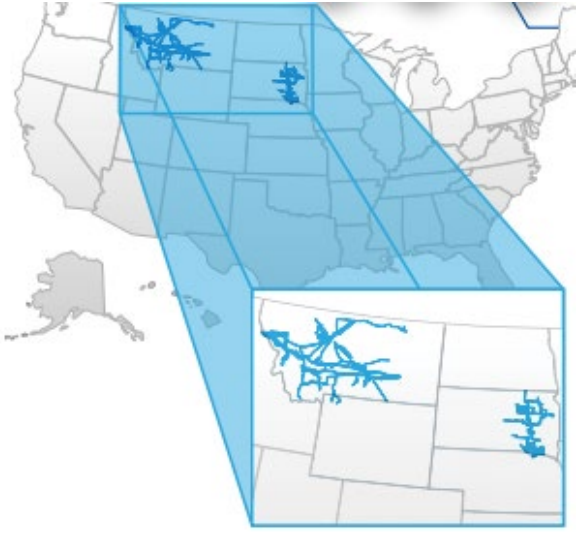
Year	Project Name	Project Type	Conductor Used	Voltage Level	Line Length	Project Purpose
Prior to 2022	Various	Rebuild and new construction	ACSS	115 kv 345 kv	Various	New capacity and wood pole replacement
2023	Various	Rebuild and new construction	ACSS/E3X	115 kv 345 kv	Various	New capacity and wood pole replacement

Figure A-48. ACSS conductor.

NorthWestern Energy

(ACSS/TW)

Service Area: 750,000 customers across western Montana and eastern South Dakota.



Conductor Application Successes:

One 20-mile section of a 100-kV line between the cities of Great Falls and Two Dot was constructed with an **ACSS/TW/MA5** conductor with ultra high-strength steel in a project, which has received national media attention as an example of a utility choosing a **lower loss conductor**. The annealed aluminum of the ACSS conductor increases conductivity compared to ACSR and the trapezoidal shaped wires allow more aluminum to be packed in the same diameter as a traditional ACSR. This project was undertaken in 2021.

One of the primary motivating factors for the project between Great Falls and Two Dot was **wildfire prevention**. The ~20-mile section was through a heavily wooded area so the reduced sag of the ACSS conductor, in addition to the use of modern steel structures, reduced the risk of fires in this historically wildfire prone region.

Additionally, the conductor has **increased efficiency**, which provides more value to the utility and ratepayers. It was estimated if the entire 105-mile line was replaced with this ACSS/TW conductor the total **savings could be as much as $440,000 per year**. This project was recently used as an example for state regulators to argue for increased incentives for utilities to adopt advanced conductors in the state of Montana.

Figure A-105. ACSS/TW conductor.

Exemplary Projects

Year	Project Name	Project Type	Conductor Used	Voltage Level	Line Length	Project Purpose
2021	Great Falls-Two Dot	Rebuild	ACSS/TW/MA5	100 kV	20 miles	Capacity and reliability

Evergy

(ACSS, ACSS/TW)

Service Area : Kansas and Missouri, formed by the 2019 merger of Kansas City Power and Light and Westar.
Customer Base : ~1.7 million residential, commercial, and industrial customers.
Capacity: 16,000 MW electricity generation, >10,100 miles of transmission, ~52,000 miles of distribution.

Conductor Application Successes:

- In 2003, KCP&L (predecessor to Evergy) performed a live line reconductoring using **ACSS** on a 32-mile line, replacing **ACSR** and **achieving cost savings within 14 months.**
- Maryville to Creston 161-kV Rebuild (62.4 miles) used ACSS Parakeet conductor, costing ~$14.9M.
- Evergy remains proactive in exploring new technologies, emphasizing the best design fit for their system and geography.

Figure A-46. ACSS/TW conductor.

Exemplary Projects

Year	Project Name	Project Type	Conductor Used	Voltage Level	Line Length	Project Purpose
2003	LaCygne to Stillwell	Live reconductor	ACSS/TW	345 kV	32 miles	Capacity

Bonneville Power Administration

(ACSS)

Service Area: Delivers hydropower from the Columbia River Basin to communities across the Northwest.

Figure A-20. BPA region.

Conductor Application Successes:

- Installed **ACSS** and for testing and new construction, recognizing the significant benefits of these technologies.
- Reconductored ACSR line that ran at 2,300 amps when at 100 degrees C. With materials about a quarter-of-an-inch smaller in diameter, the ACSS/TW Plover can run up to 200 degrees Celsius, or 392 degrees Fahrenheit, and has a capacity of over 4,300 amps – about an 87% increase in capacity comparison to the ASCR 2.5-inch expanded conductor.

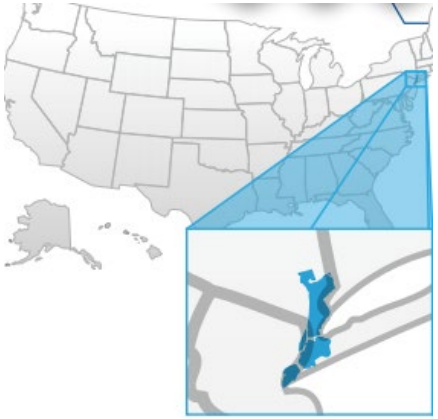
Exemplary Projects

Year	Project Name	Project Type	Conductor Used	Voltage Level	Line Length	Project Purpose
2004	Pascal, Washington	Reconductor	ACCR	115 kV	Unknown	Test line

Figure A-21. ACSS conductor.

Consolidated Edison

(ACSS, ACSS/E3X)



Service Area: Provides electricity and natural gas to New York City and Westchester County, serving approximately 3.6 million customers.
Transmission: Primarily underground cables; owns 45.7% of New York Transco, LLC, a transmission developer.

Conductor Application Successes:

- Partnered in a 17.5-mile transmission project connecting Cricket Valley Energy Center to a substation, using **ACSS** for the **New York Energy Solution project** .
- Selected **ACSS** for **cost, line losses, and performance** considerations.
- Completed a 54-mile 345-kV rebuild along 115-kV corridors using **ACSS**, with **ACSS/E3X** chosen for a section to enable reconductoring of existing 345-kV structures.

Exemplary Projects

Year	Project Name	Project Type	Conductor Used	Voltage Level	Line Length	Project Purpose
2017	Cricket Valley	New build	ACSS	345 kV	17.5 miles	New generation interconnection
2020-2023	New York Energy Solution	Rebuild and reconductor	ACSS for rebuild ACSS/E3X for reconductor	345 kV	54.5 miles	Capacity to connect to upstate

Western Area Power Administration

(ACSS/TW MA5)

Service Area: Federal Power Marketing Agency providing wholesale power across 15 western and central states

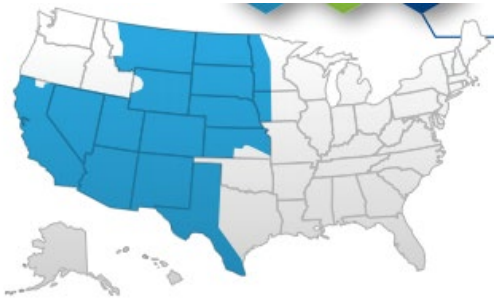


Figure A-104. WAPA region.

Conductor Application Successes:

- In 2008, WAPA installed 1.5 thousand miles of **ACSS** conductor to replace an aged **ACSR** line, achieving **minimal tower modifications** . WAPA has since continued using ACSS for reconductoring projects. In 2006, ACCR was applied to boost capacity, including replacing a line from Boulder Dam with minimal tower rebuilding. WAPA also tested ACCC in Arizona for wind performance. After a cost-benefit study, WAPA opted **for ACSS/TW to increase capacity at lower costs, a strategy they continue to use**

Exemplary Projects

Year	Project Name	Project Type	Conductor Used	Voltage Level	Line Length	Project Purpose
2007	Davis Mead	Reconductor	ACSS/HS285	230 kV	61 miles	Capacity

Figure A-105. ACSS/TW conductor.

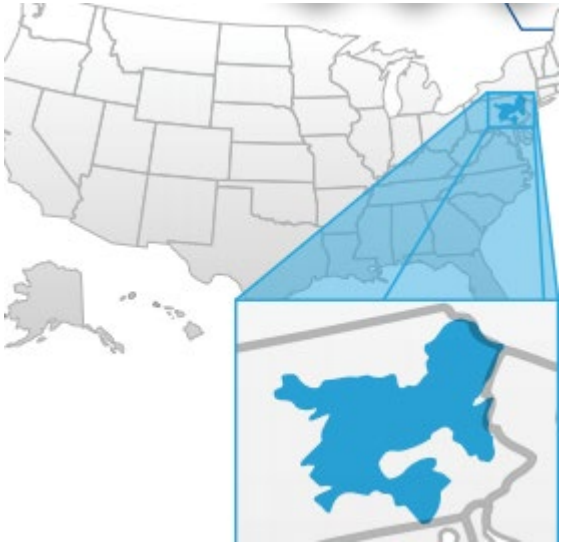
PPL Electric Corporation

(ACSS/TW)

Service Area: serves customers in 29 Pennsylvania counties.

Conductor Application Successes:

- PPL plans to use **ACSS** for a reconductoring project in the PJM Interconnection, replacing porcelain insulators with glass strings. Only **one out of 75 structures** requires replacement, with others needing reinforcement. The ACSS will incorporate HS285 steel, allowing **tighter tensioning and reduced sag** .



Exemplary Projects

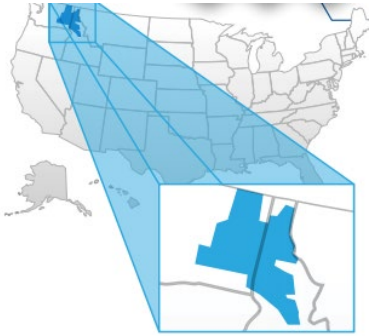
Year	Project Name	Project Type	Conductor Used	Voltage Level	Line Length	Project Purpose
2023	Juniata - Cumberland	Reconductor	ACSS/TW	230 kV	14.2 miles	Unknown

Figure A-89. ACSR/ACSS.

Avista Utilities

(ACSS, ACSS/E3X)

Service Area: Over 30,000 mi^2 in Washington, Oregon, Idaho, and Alaska.
Energy Mix: 59% renewable energy (mainly hydro, also wind, biomass, natural gas, and coal).



Conductor Application Successes:

- Uses **ACSS** for projects involving new towers, redundancy, and additional capacity in narrow corridors.
- **E3X Coating:** Improves heat transfer and allows conductors to support up to 25% more capacity. For example, **ACSS** with **E3X** can double capacity compared to traditional ACSR.
- **Benton -Othello Line Upgrade:** Enhanced to handle increased peak loads, preventing potential system failures.
- **Ninth and Central Project:** Replaced 1940s wood poles, increased line capacity with **ACSS + E3X**, improving capacity by 15% and reducing visual impact for residents.

Figure A-17. ACSS cable with (top) and without (bottom) E3X emissivity coating.

Exemplary Projects

Year	Project Name	Project Type	Conductor Used	Voltage Level	Line Length	Project Purpose
2020	Benton-Othello	Rebuild	ACSS	115 kV	26 miles	Capacity
Ongoing	Ninth & Central-Sunset	Rebuild	ACSS/E3X	115 kV	7 miles	Capacity

El Paso Electric Company

(ACSS)

Location: Texas, serving customers in El Paso, Texas, and Las Cruces, New Mexico.

Generation Portfolio : Diverse, including nuclear, natural gas, solar, and wind.

Transmission and Distribution: Serves ~437,000 customers, with 2,010 MW of base load generation from six facilities.

Conductor Application Successes:

- For the **2020 -2029 System Expansion Plan** , the company plans to use **ACSR** for most projects, with a single 2-mile span using **ACSS** .
- Focus on leveraging technologies like smart meters and improved EV infrastructure to enhance efficiency and reduce emissions.
- Significant investment in developing solar generation capacity.

Figure A-41. ACSS conductor.

Exemplary Projects

Year	Project Name	Project Type	Conductor Used	Voltage Level	Line Length	Project Purpose
2019 planned	Newman East	New construction	ACSS	115 kV	2 miles	Capacity

NextEra Energy Florida Power & Light

(ACSS)

Service Area: Florida Power and Light (FPL) provides electricity to approximately 5.8 million accounts, serving over 12 million people in Florida. NextEra also operates LoneStar Transmission in Texas.\

Conductor Application Successes:

- **Grid Reliability:** FPL has been recognized multiple times with industry awards for power system reliability. In **2021,** it won the **ReliabilityOne ® National Reliability Award** for the **sixth time in seven years.** Their ongoing grid upgrades and rebuilds have resulted in a **45% improvement in reliability.**
- **Transmission Lines:** While FPL has not needed advanced conductors for uprating existing lines in Florida due to low congestion, **LoneStar Transmission** constructed **330 miles of 345 -kV Texas CREZ lines** using **ACSS.**

Exemplary Projects

Year	Project Name	Project Type	Conductor Used	Voltage Level	Line Length	Project Purpose
2013	CREZ	New build	ACSS	345 kV	330 miles	Renewable energy

Duke Energy

(ACSS, ACSS/TW, ACCR, ACCC)

Headquarters: Charlotte, North Carolina.
Service Area: Covers 104,000 mi² across IN, OH, KY, WV, VA, NC, and SC, supporting 7.2 million customers.
Generation: Owns 58,200 MW of generation, with a mix of coal, natural gas, oil, and nuclear power (especially in the Carolinas). Committed to increasing renewable energy and improving efficiency while reducing emissions.

Conductor Application Successes:

- Duke commonly uses **ACSS** (Figure A-33) and **ACSS/TW** . Duke has experience with **ACCC** (Figure A-34) and **ACCR** (Figure A-35) composite core conductors and in 2022, testified to the North Carolina Utilities Commission that Duke no longer considers composite core conductors due to recent **installation concerns** .

Exemplary Projects

Year	Project Name	Project Type	Conductor Used	Voltage Level	Line Length	Project Purpose
2013	Pisgah Tie to Shiloh Station	Reconductor	ACSS	230 kV	22 miles	Capacity

Figure A-33. ACSS conductor.

Avangrid

(ACSS)

Operations:

Avangrid Renewables: Operates renewable energy plants in 24 states (east to west coast).

Avangrid Networks : Owns 8 electric utilities serving over 3.3 million customers in New York and New England.

Renewables: Third-largest renewable energy company with both onshore and offshore assets.

Conductor Application Successes:

- Used **ACSS** for a long span over the Housatonic River.
- **Derby Junction -Ansonia Project:** Upgraded from 13.8 kV in 1924 to 115 kV in the 1960s, with plans to increase capacity.
- Initially considered **ACSR** with **E3X** for further upgrades, but after assessing the condition of structures, chose to rebuild the line.
- **Rebuild Decision:** Chose **ACSR** to meet future needs; future demand could lead to increased capacity with advanced conductors.

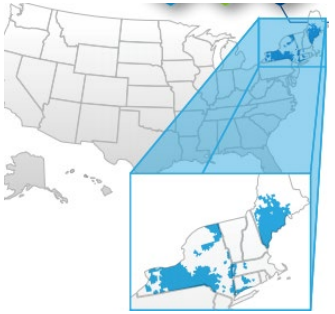


Figure A-15. ACSS conductor.

Exemplary Projects

Year	Project Name	Project Type	Conductor Used	Voltage Level	Line Length	Project Purpose
1930's and 1960s	Derby Junction-Ansonia	Voltage uprate	Copper	13.8 to 69 to 115 kV	8.2 miles	Capacity increase
Planned	Derby Junction-Ansonia	Rebuild	ACSR	115 kV	8.2 miles	Capacity increase and reliability