Positioning AEP for the Future

ACEC
American Council of Engineering Companies
of Ohio

Energy Forum
May 21, 2019

Matt Usher, P.E.
Generation Digital Portfolio Lead - CHARGE
American Electric Power

Agenda

- Overview of AEP
- Trends Impacting Our Industry
- Strategic Focus Areas
  - Business
  - Sustainability
- Generation Transformation & The Grid of the Future
- Innovation & The Future of Work
- Conclusion / Q&A

Overview of AEP

Regulated & Competitive Customers: **5.8 million**

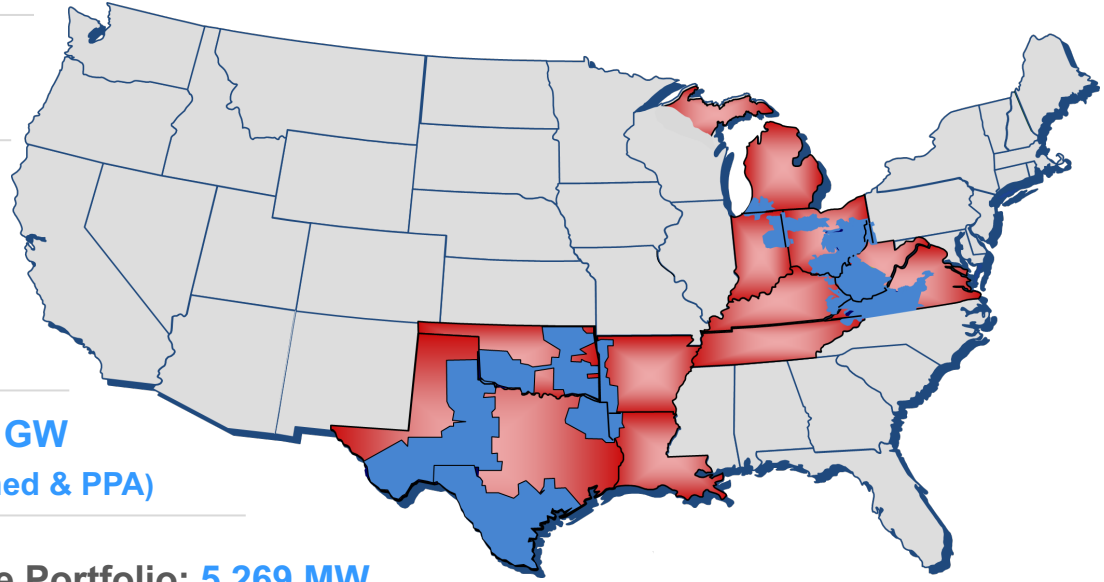
Territory: **200,000 sq. miles**

Transmission: **40,000 miles**

Distribution: **219,000 miles**

Total Generating Capacity: **32 GW**
(owned & PPA)

Total Renewable Portfolio: **5,269 MW**



RTOs Served: **PJM, SPP, ERCOT**

Data from AEP 2019 Corporate Accountability Report

Trends Impacting Our Industry

Global Mega-Trends

- Declining technology costs
- Integration of SMART elements/omni-directional flow of energy, information
- Digitization and data analytics
- Changing consumer preferences
- Changing demographics
- Environmental sustainability
- Security and cyber

Industry Specific Trends

Customers/Demand

- Decreasing electricity usage
- Electrification opportunities
- Customers value resiliency differently
- Continuing concerns regarding CO_2 and other emissions
- Customer headroom challenges

Competitors

- Non-traditional players without regulatory restrictions

Policy

- Conflicting state regulations
- Lowest cost doesn't necessarily drive policy

Technology

- Decreasing storage and distributed generation costs
- Increasing storage and distributed generation options
- EV growth

Markets

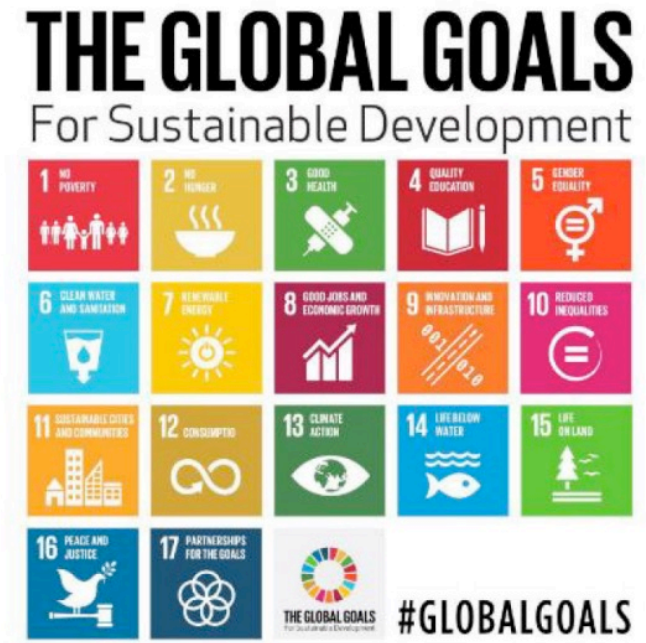
- Low cost natural gas
- Marginal cost of electricity approaching cost of renewables
- Challenges recovery capacity value

Strategic Focus Areas

Strategy-Driven Sustainability Goals

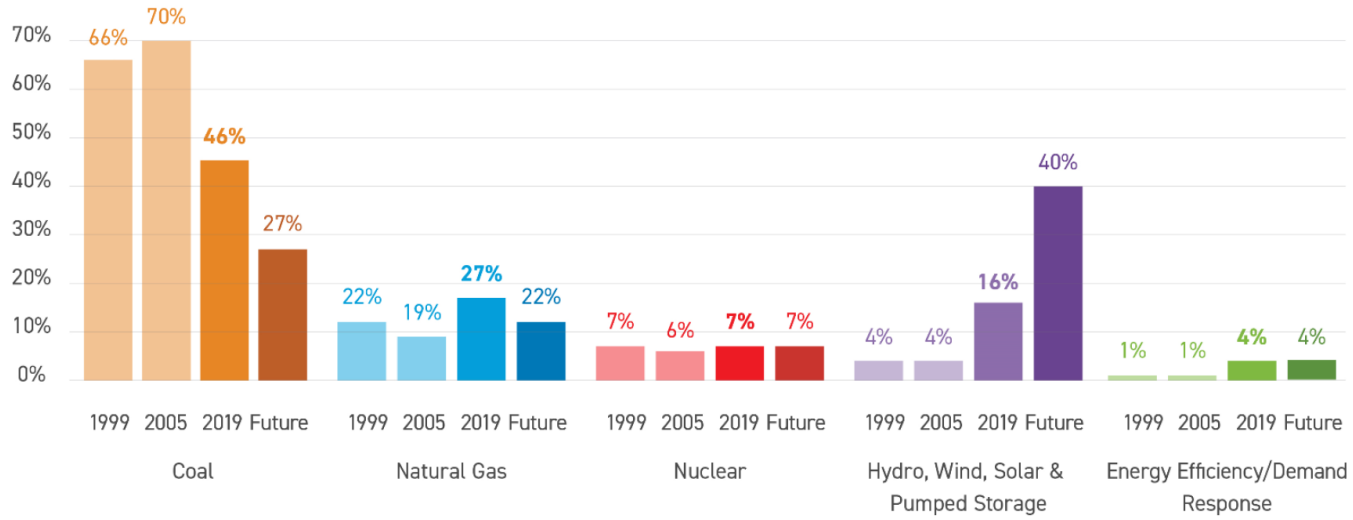
- **Energy & Environment**
  - Carbon Reduction Goals
  - Grid Modernization
  - Technology & Innovation
- **Social Responsibility**
  - Supplier Diversity
  - Safety & Health
  - Customer Focus
  - Diversity & Inclusion
- **Economic Impact**
  - Economic Development

AEP'S GOALS
MAPPED TO THE U.N. SDGs



Transforming Our Generating Fleet

TRANSFORMING OUR GENERATION FLEET— AEP'S GENERATING RESOURCE PORTFOLIO



2019 includes expected capacity as of year-end 2019. Future includes IRP forecasted additions and retirements through 2030. Energy Efficiency/Demand Response represents avoided capacity rather than physical assets.

Projected Regulated Resource Additions 2020-2030

- up to 3,766
- up to 5,050
- up to 2,283

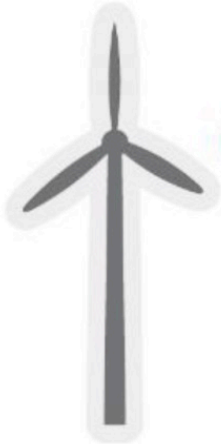
2019 Contracted Renewable Additions

1,302 MW

Delivering Clean Energy Resources

AEP's Expected Yearend 2019 Renewable Portfolio, in MW

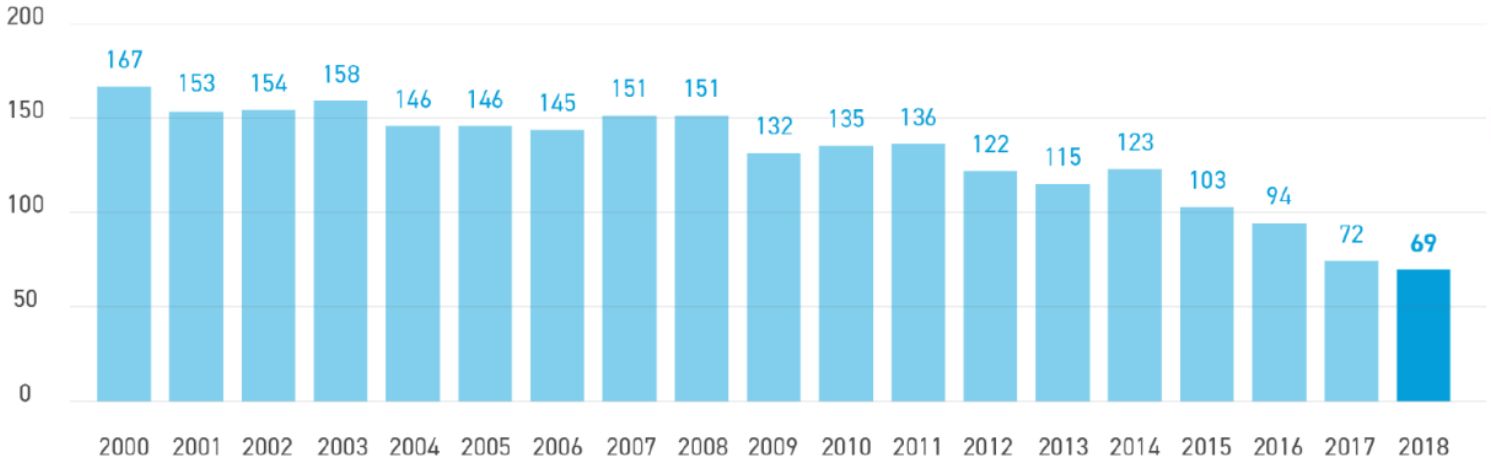
Hydro, Wind, Solar & Pumped Storage	Owned MW	PPA MW	**Total MW**
AEP Ohio		209	**209**
Appalachian Power Company	785	575	**1,360**
Indiana Michigan Power Company	36	450	**486**
Public Service Company of Oklahoma		1,137	**1,137**
Southwestern Electric Power Company		469	**469**
Competitive Wind, Solar & Hydro	1,433	175	**1,608**
Total	2,254	3,015	**5,269**



APPROXIMATELY
11,900MW
OF RENEWABLE GENERATION
INTERCONNECTED ACROSS THE U.S. VIA
AEP'S TRANSMISSION SYSTEM TODAY

Reducing Our Carbon Footprint

TOTAL AEP SYSTEM — ANNUAL CO_2 EMISSIONS in million metric tons



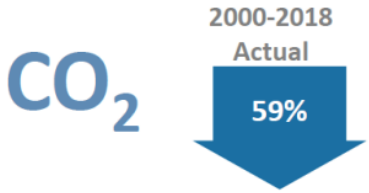
Direct CO_2 emissions from AEP's ownership share of generation as reported under Title IV of the 1990 Clean Air Act.

AEP'S CO_2 EMISSION REDUCTION GOALS

60% by 2030

80% by 2050

(both from a 2000 baseline)



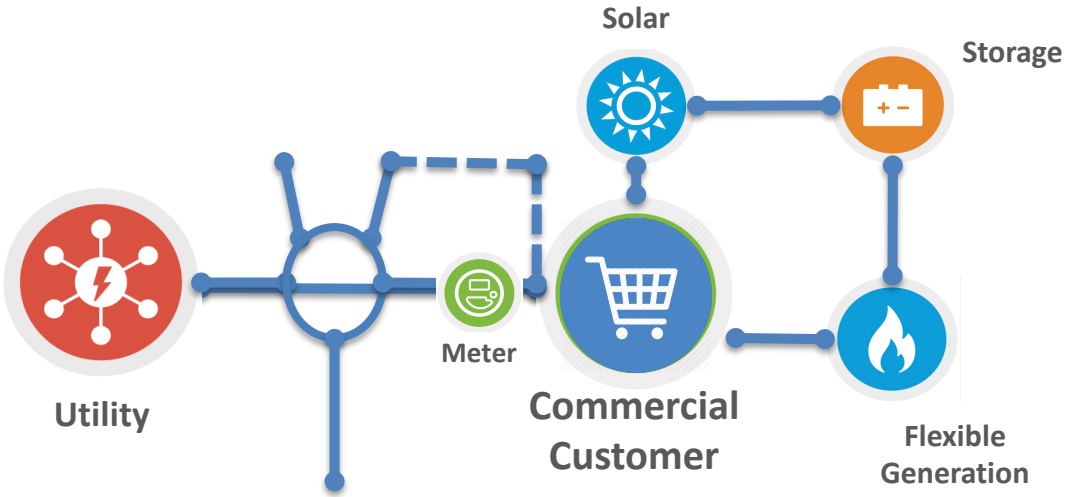
The Grid of the Future

Changing Role of Centralized Generation:

- **Optimization (flexibility, longevity, asset health)**
- **Innovation (analytics, technology, operations)**
- **"Glide Path" (extracting value over remaining life)**

Clean, Efficient, Sustainable & Flexible Energy

Future Resource Plan Options



At or near-meter solutions

Customer/Community Solutions

Innovation and the Future of Work

- Technology Innovation
  - Renewables
  - Microgrids
  - Energy Storage
- Future of Work
  - Building New Skills
  - Digital Transformation
  - Leveraging our Data
    - Analytics
    - Governance

Digital Transformation

To keep pace with rapid technology growth and industry change we created **CHARGE**

- **CHARGE** will *expand* our depth and ability to capitalize on new digital products and solutions for our employees and customers.
- **CHARGE** will *enable* us to improve efficiencies and manage costs through broader implementation of digital tools, increasing customer and shareholder value.
- **CHARGE** will *empower* our workforce to bring their innovative ideas to life, fueling AEP's sustainable growth through innovation.

Conclusion & Takeaways

- Our industry is changing and we ***MUST*** change with it
- Technology is the focus
  - State-of-the-Art, clean power generation technologies
  - Customer-focused solutions
  - Enhancing the Future of Work for our employees
- A culture of innovation will get us there

Planned Resource Additions

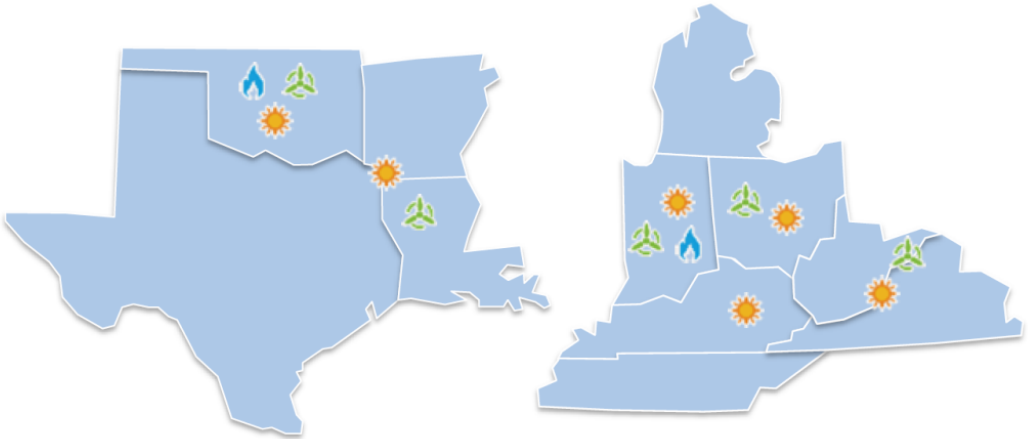
Solar Additions (MW)			
Operating Co:	2020-2023	2024-2027	2028-2030
AEP Ohio	Up to 400 *	-	-
APCo	15	300	450
I&M	-	150	150
KPCo	30 *	20	40
PSO	11	600	600
SWEPCO	-	450	550
Totals	**Up to 456**	**1,520**	**1,790**

Wind Additions (MW)			
Operating Co:	2020-2023	2024-2027	2028-2030
AEP Ohio	Up to 500*	-	-
APCo	-	300	-
I&M	-	600	450
KPCo	-	-	-
PSO	Up to 1,000 *	-	200
SWEPCO	Up to 1,200 *	200	600
Totals	**Up to 2,700**	**1,100**	**1,250**

Natural Gas Additions (MW)			
Operating Co:	2020-2023	2024-2027	2028-2030
I&M	-	-	1,500
PSO	410 [1]	373 [1]	-
Totals	**410**	**373**	**1,500**

[1] To replace expiring PPA

* Subject to regulatory filings currently underway



Total Projected Resource Additions (MW)	
Resource	2020-2030
Solar	Up to 3,766
Wind	Up to 5,050
Natural Gas	2,283
Totals	**Up to 11,099**

Updated 02/12/2019

Distributed Energy Resource Attributes

	Gas Turbine / Recip Engine	Solar PV	Wind	Fuel Cell	Batteries	Virtual Power Plant
Scalability	●	◕	◔	◕	◐	◕
Flexibility	●	◔	◐	○	●	●
Emissions	◔	●	●	◐	●	●
Cost	◐	◕	◔	○	◔	◐
Ancillary Service Capability	●	○	◔	◔	◕	◐
Resilience	●	◔	◔	◕	◐	◐

Strength ● ◕ ◐ ◔ ○ Weakness

How CHARGE fits into the Business