



# Economic Development

## Energy Market Outlook and Trends

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## AEP at a Glance



HEADQUARTERS: **Columbus, Ohio**

### AEP FINANCIALS

**\$88 BILLION** IN ASSETS

2021 REVENUES: **\$16.8 BILLION**



**2021**  
U.S. ELECTRICITY SALES  
OF APPROXIMATELY  
**188 MILLION**  
MEGAWATT HOURS

### STATES SERVED:

Arkansas, Indiana, Kentucky, Louisiana, Michigan, Ohio, Oklahoma, Tennessee, Texas, Virginia, West Virginia

APPROXIMATELY  
**40,000**  
MILES OF  
TRANSMISSION LINES  
64,000 kilometers



**2,110**  
MILES OF  
765-kV  
TRANSMISSION LINES  
3,400 kilometers



APPROXIMATELY  
**224,000 miles**  
of DISTRIBUTION LINES  
360,000 kilometers

APPROXIMATELY  
**31,000** MEGAWATTS  
of GENERATING CAPACITY

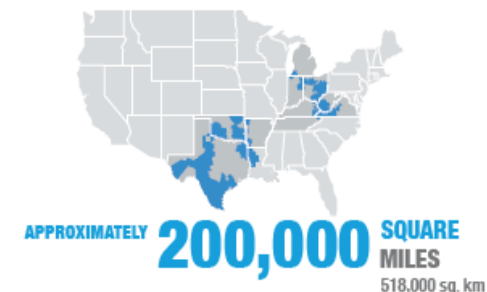


2021 OPERATING  
EARNINGS  
**\$2.373**  
BILLION

2021 OPERATING  
EARNINGS  
PER SHARE  
**\$4.74**

TRADED ON  
NASDAQ  
**NASDAQ:AEP**

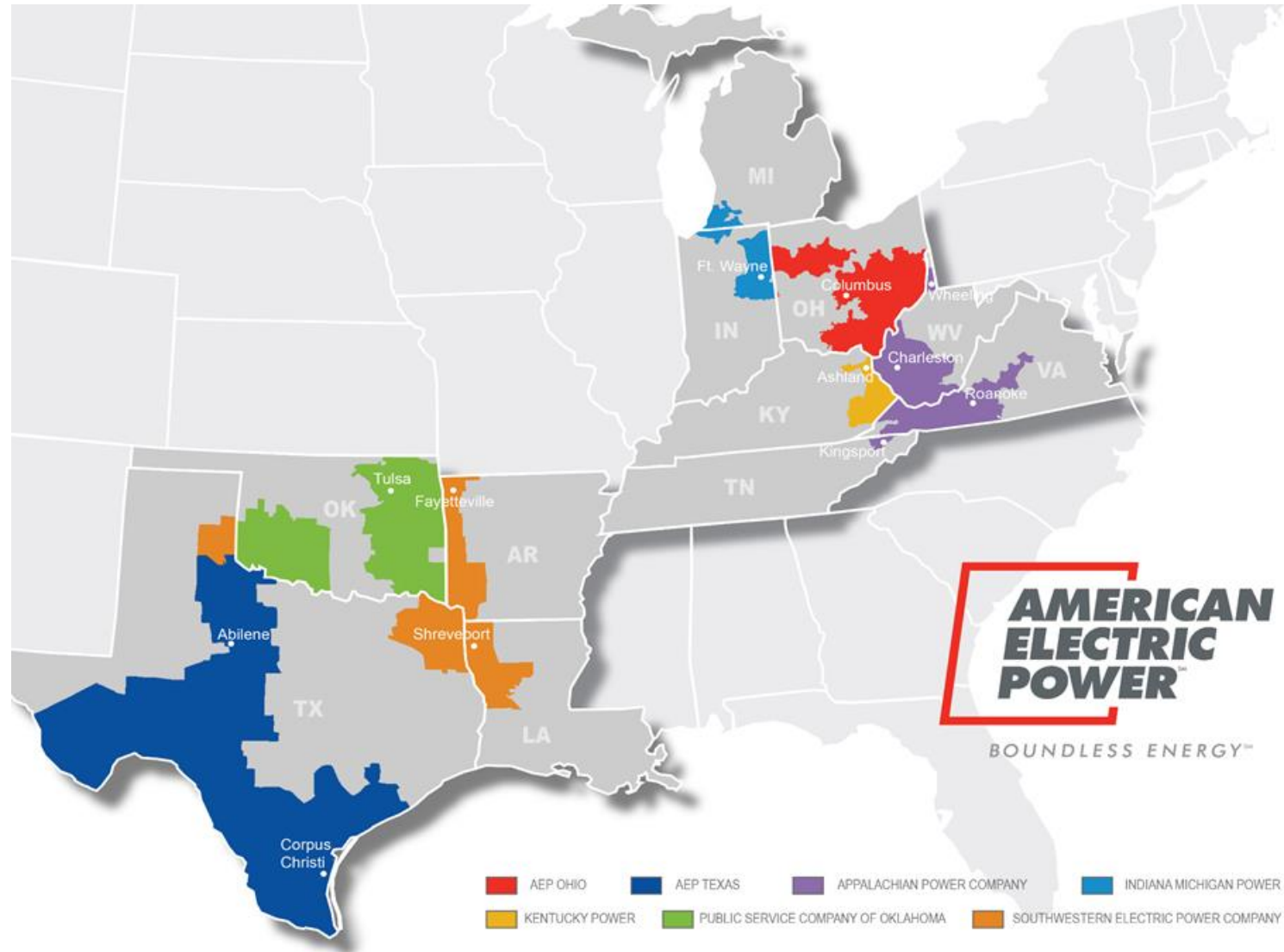
### SERVICE TERRITORY:



TOTAL  
RENEWABLES PORTFOLIO  
**7,100** MEGAWATTS  
As of May 2022



# AEP at a Glance



# Meet the Economic & Business Development Team



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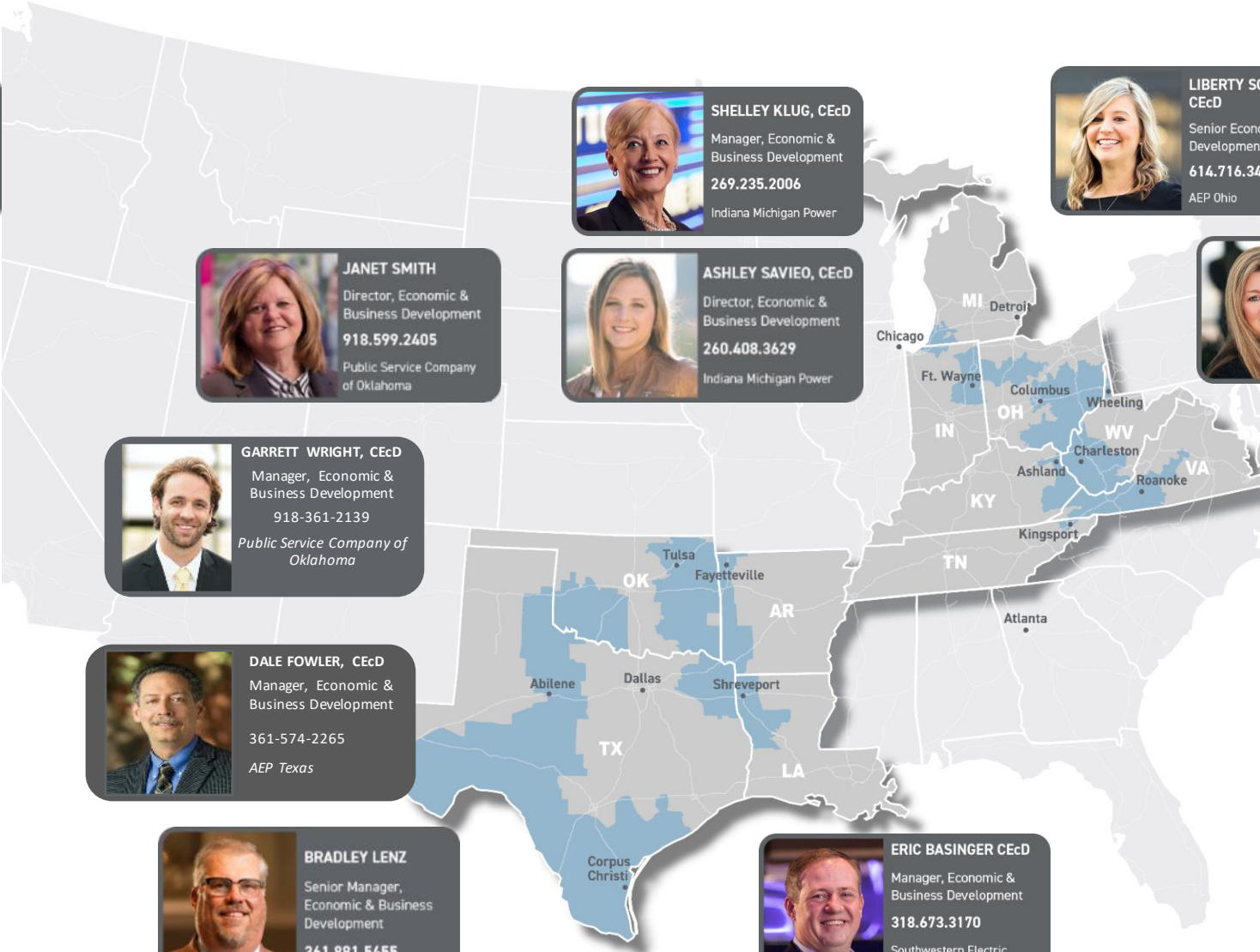
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# More than just a power company

## We Help Businesses & Communities Thrive

Here are a few reasons you should partner with us on your next project:

One economic development resource across nearly 2,400 communities in 11 states

Electric service plan consulting & rate comparisons to expedite delivery

600+ available properties, including dozens of quality development-ready sites

Energy advisory services and decarbonization site assessments nationwide

A nationally recognized, experienced team

Access to best in class research and GIS mapping

## Today's Presenters and AEP Energy Overview

AEP Energy provides total energy management services nationwide providing superior insights and sustainable solutions for a brighter future.



**George Deljevic**  
VP, Products & Services

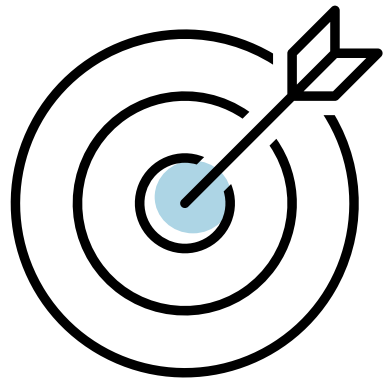


**Brandi Nye**  
Business Development



# Changing Energy Markets and Buyer Demands alter Decision-making

Increased corporate commitments to decarbonize, coupled with the increase in renewable energy demand and energy market volatility are making energy resources a key component of site-specific decisions.



Increased focus on renewable energy sourcing, energy-efficient buildings and meeting net-zero energy commitments



Market volatility in electric and gas rates may provide uncertainty for energy budgeting increasing pressure for accurate forecasts and data



Location-specific regulations, ordinances and policies related to energy will impact economic development decisions



Reliability and resiliency are bigger concerns with increased outages due to weather-related grid impacts

# Today's Renewable Energy Market: Shift from Linearity

Sustainability prioritization and externalities have changed accessibility and market dynamics.

## Historical Trends (Linear)

Increasingly accessible renewable energy resources with declining prices, low barriers to entry, stable energy market backdrop.

- ☑ Demand for resources readily met
- ☑ Market stability and predictability
- ☑ Increasing accessibility for renewable products
- ☑ Decreasing costs of assets due to increased suppliers, technology advancements and innovation

## Present Conditions (Non-Linear)

High demand, long interconnection timeframes and supply chain issues are creating uncertainty in the market and the ability to meet net-zero targets.

- ☑ Higher solar and wind raw material costs
- ☑ Supply chain, interconnection issues, tariff uncertainty
- ☑ Returns on capital increasing due to supply-demand rebalancing
- ☑ Energy market volatility challenges valuation and risk assessments

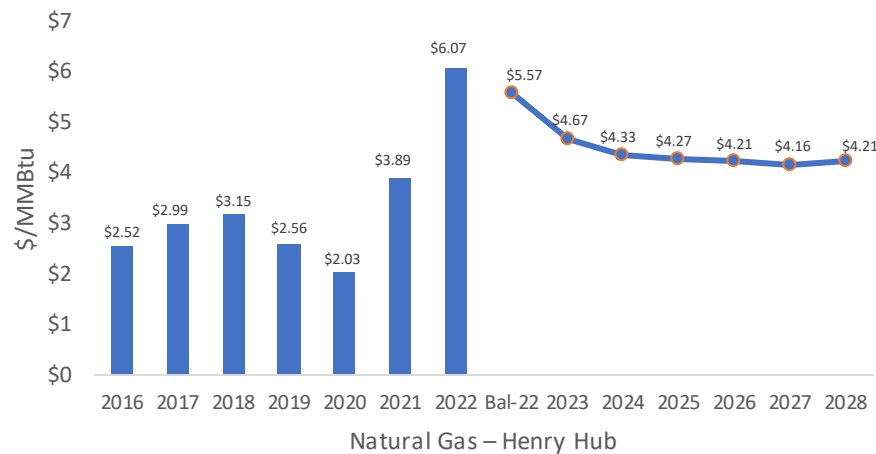


# Current Market Conditions: Commodity Markets

Gas and power markets have been creeping northward due to commodity and inflationary pressures

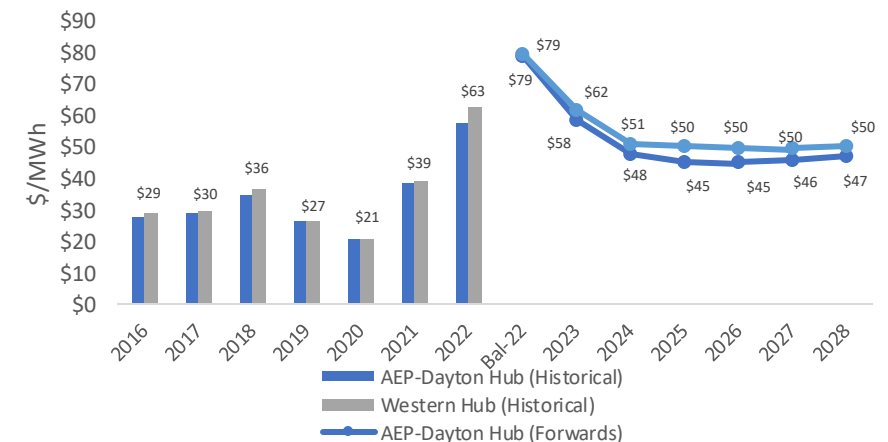
## Natural Gas Markets

- Natural gas prices collapsed with demand in 2020, but have since staged a nearly unprecedented rally
- The flagship index (NYMEX Henry Hub) reached record pricing not seen for over a decade, but is now slightly lower at under \$7/MMBtu
- Lagging production, general inflation, and robust global LNG demand driven substantially by the Ukraine-Russia conflict



## Power Markets

- Annual power prices dropped in 2020, came “roaring back” in 2021, and continued climbing into 2022
- In the US, since natural gas tends to be the marginal fuel for power generation, power prices follow gas movements
- Key trading hubs in PJM including AD Hub and PJM West Hub have seen record high prices in 2022, as expected
- The backwardated gas and power forwards point to higher short-term pricing in Q3 '22/Q1 '23, then normalizing somewhat thereafter



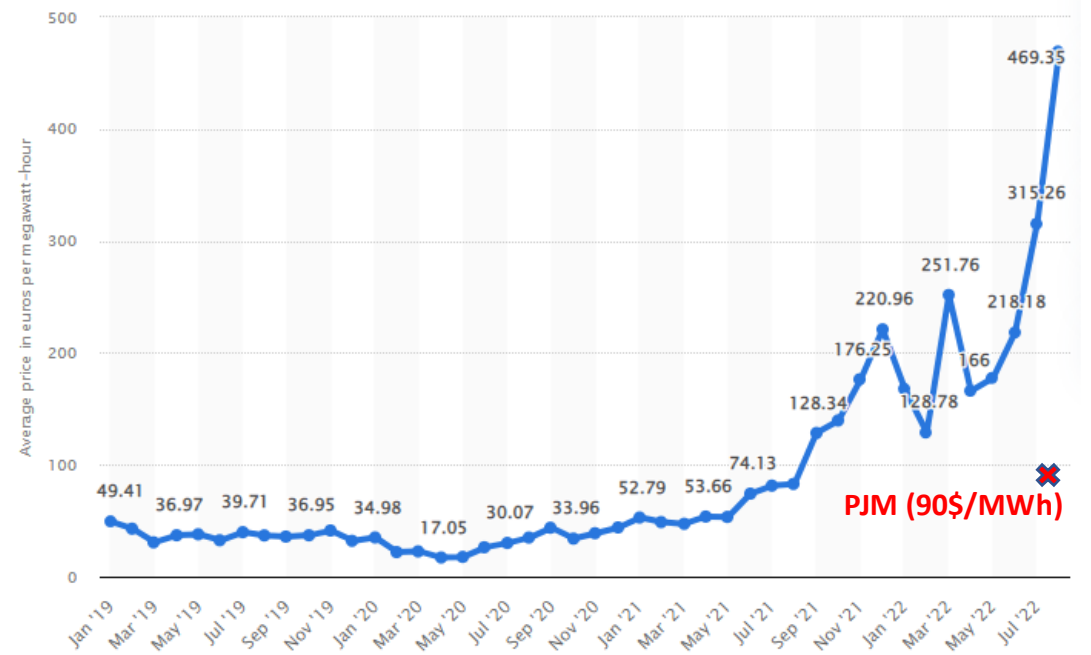
# Global Energy Prices and Index

The global price of energy index shows that since early 2021, Energy Prices around the world have increased sevenfold (7x). For example, Germany has experienced some of the highest increases in wholesale power – **reaching stratospheric levels of over 400€/MWh, on average in July '22 (cf. PJM averaged ~90\$/MWh the same month!)**

Global Price of Energy Index (Federal Reserve)



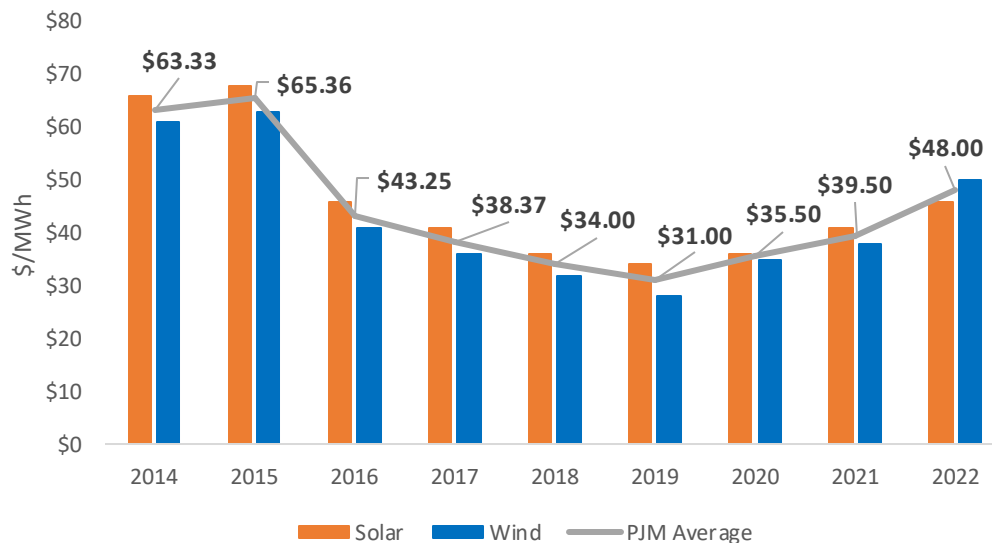
Average electricity wholesale price (euro/MWh) in Germany (Statista), exchange rate ~one-to-one



# Current Market Conditions: Renewable PPA Pricing

Renewable PPA Prices have been increasing alongside the power and natural gas markets, though not as precipitously, due to less liquidity and volatility vis-à-vis the “primary” gas and power markets

## PJM P25/lower PPA Renewable Offer Price Trends (Level10 Energy, LBNL)

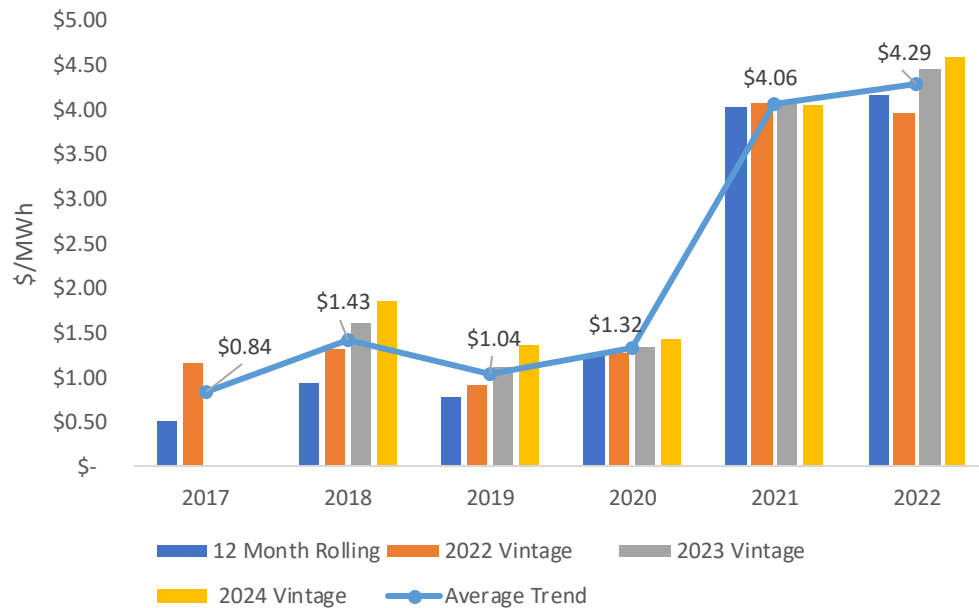


- Since 2019, 25<sup>th</sup>-percentile average renewable PPA prices have steadily increased by nearly 33%, with executed pricing typically higher (in P50 ballpark)
- The prices quoted reference flat (no escalation that corrects for inflation), as-generated (no volumetric constraints), unit-contingent (must come from that same resource), **hub-settled prices**
- **Supply chain woes, along with cyclical commodity price increases** have had a cascading, upward effect on developers’ offers
- Corporate demand for virtual PPAs is increasing, further exacerbating the apparent price squeeze on virtual PPA price quotes, even further, **erasing levelized cost of energy (LCOE) gains from technological and scale improvements made since 2014, from 2019 onwards**

# Current Market Conditions: Voluntary (Green-e) REC Market

From December 2020 to August 2021, REC prices (nationally sourced, Green-e Eligible) increased from \$1.50/MWh to \$6.60/MWh, and are now hovering in the \$2-4/MWh range. – Previously, these RECs were <\$1/MWh since 2015

## National Green-e REC Market Pricing



- From 2017 to 2022, the nationally sourced, **Green-e Eligible REC 12-month rolling average price increased from \$0.51/MWh to \$4.17/MWh**
- Increases due to the “2021 explosion” reflects the recent supply-chain challenges of solar modules against the backdrop of sustained demand from large corporate customers **creating knock-on effects in the national, voluntary REC market**
- Unless these constraints are alleviated in due course, prices may remain “high” for the foreseeable future, **with voluntary RECs as higher-costs decarbonization option for C&I Customers**
- **Example: Customer portfolio of 55,000 MWh/yr x \$4.29 = \$235,950 / yr for 100% 12-month decarbonization**

# Conditions for Renewables by Region

	CAISO	WECC	SPP	ERCOT	MISO	PJM	SERC	NYISO	ISO-NE
High Rates	●	◐	○	○	◐	◐	◐	◐	●
Energy Volatility	◐	○	◐	●	◐	◐	○	◐	○
Utility Programs	◐	◐	◐	○	◐	◐	◐	◐	◐
Regulatory Support/RPS REC Markets	◐	◐	○	○	◐	◐	○	●	●
Irradiance	●	◐	◐	●	◐	◐	◐	○	◐
Interconnection Queue – Active Solar	●	◐	◐	◐	●	●	◐	◐	○
Overall	◐	◐	○	◐	◐	◐	◐	◐	◐

● Very Strong    ◐ Strong    ◐ Neutral    ◐ Weak    ○ Very Weak

# Meeting Energy-specific Site Selection Expectations



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## Market Rate Analytics

More accurate electricity and gas rates across the US to input into site selection models in the beginning phases based on historical and forecasting pricing.

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## Site Opportunity Assessments

Detailed energy analysis to make informed site-selection decisions between narrowed sites that include renewable energy options and economic impacts.

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## Execution Services

Execution support post-site-selection through assisting with connectivity with utilities, enrollment in programs, procuring renewable energy and installation of assets, etc.

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# Overview of Markets & Rates

Energy market intelligence on national energy rates and renewables market trends with insights on evolving energy policies are critical in early-stage site-selection phases.



**Energy Market Intelligence** that provides insights and analytics on power and gas market trends; access to AEP Energy exports and curated insight reports.




**National Utility Rates** exposition to help identify cost-effective markets, utility-specific rate trends and insights to help narrow site selection options.





**Renewable Energy Market** updates including evolving developer landscape and regulatory trends with further refinement based on customer needs related to renewable energy integration


# Enhance Confidence through Site Opportunity Assessments


Detailed site-specific energy opportunity assessments for top three to five sites will increase client confidence and provide transparency for sound energy decision-making.

 **Energy Rate Analysis** to survey rate structures across locations to identify optimal tariff and supply options to navigate the complexity of gas, electric and renewable rates across markets.

 **Renewable Energy Feasibility** study to identify on and offsite renewable project and product options, including costs and availability including payback, ROI and technical feasibility.

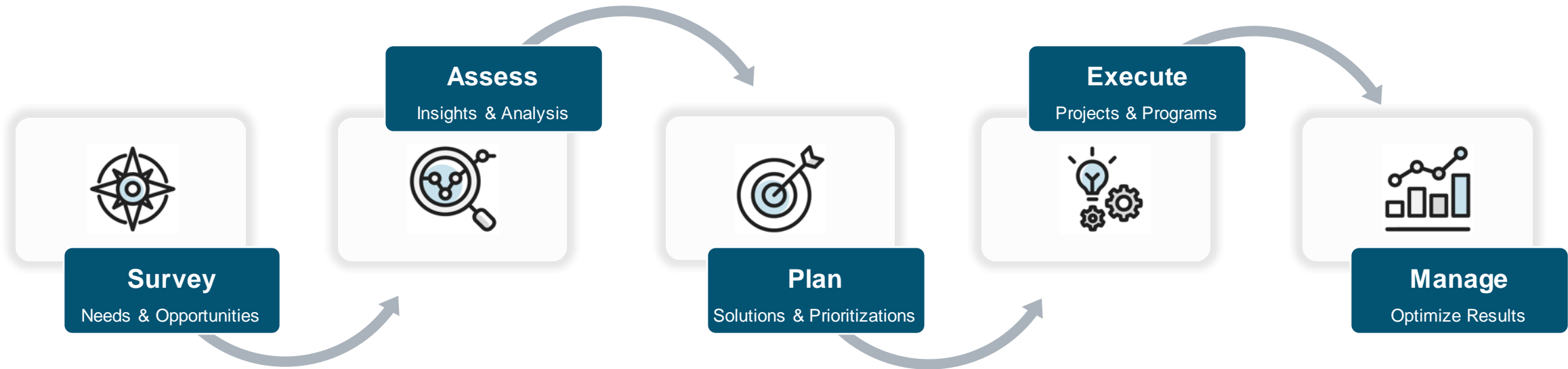
 **Energy Incentives & Rebate Potential** exposition across the utilities under consideration that can guide the prioritization of energy efficiency measures during retrofit or design.

 **Demand Response Program Potential** survey of available options for incremental revenue and development of a load management program.

 **Interconnection analysis** to assess in the identification of utility upgrade and connection costs with utilities and associated timeline for energization.



# Energy Sustainability Planning Frameworks and Approaches



**Energy Conservation Measures**

**Onsite Renewables**

**Offsite Renewables**

**Renewable Energy Credits & Offsets**

**Electrification**

# Implementation Execution & Management

When site selection is over, clients are responsible for energizing sites, procuring renewable resources and overseeing execution and program management of energy needs.



**Power & Gas Connectivity** support with utilities and pipelines, including rate modeling and selection through step-by-step guidance.



**Product Selection & Structuring** assistance in choice markets, including exposition of prospective suppliers to drive an optimum strategy for long-cost savings, forecasting and tracking.



**Renewables Strategy Development & Procurement** support in setting a strategy for achieving, and executing on, decarbonization objectives.



**Energy Efficiency Program** to facilitate incentives and enrollment into rebate initiatives and filing assistance with utilities.



**Load Management Services** to enable participation in Demand Response and Peak Shaving programs with Comprehensive support in design, execution and management of high-value revenue-generating programs

# AEP Energy can Support Energy Site-selection Services



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## Market Rate Analytics

Structure to provide ongoing support and updates on electric, gas and renewable energy pricing and trends

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## Site Opportunity Assessments

Detailed assessments for location specific energy needs, including renewable energy assessments and accurate cost forecasting.

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## Execution Services

End-to-end support for site energization, renewable energy procurement and any energy management service need

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**Thank You!**

Please contact Emily Smith at [ejsmith1@aep.com](mailto:ejsmith1@aep.com) or  
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The recording of today's presentation will be available tomorrow at  
[AEPenergy.com/energymarketwebinar](https://AEPenergy.com/energymarketwebinar)