

# May 2024 ATWACC and Annual Automatic Update Methodology

— PRELIMINARY

PREPARED BY

BIN ZHOU

SAM NEWELL

HANNES PFEIFENBERGER

ROHAN JANAKIRAMAN

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PREPARED FOR

PJM



# Preliminary ATWACC Recommendation

Brattle's most recent ATWACC recommendation, as of August 31, 2022, is 8.85%

Based on our current analyses, as of May 22, 2024, we recommend 10.0%

Summary of ATWACC Analyses (May 22, 2024)

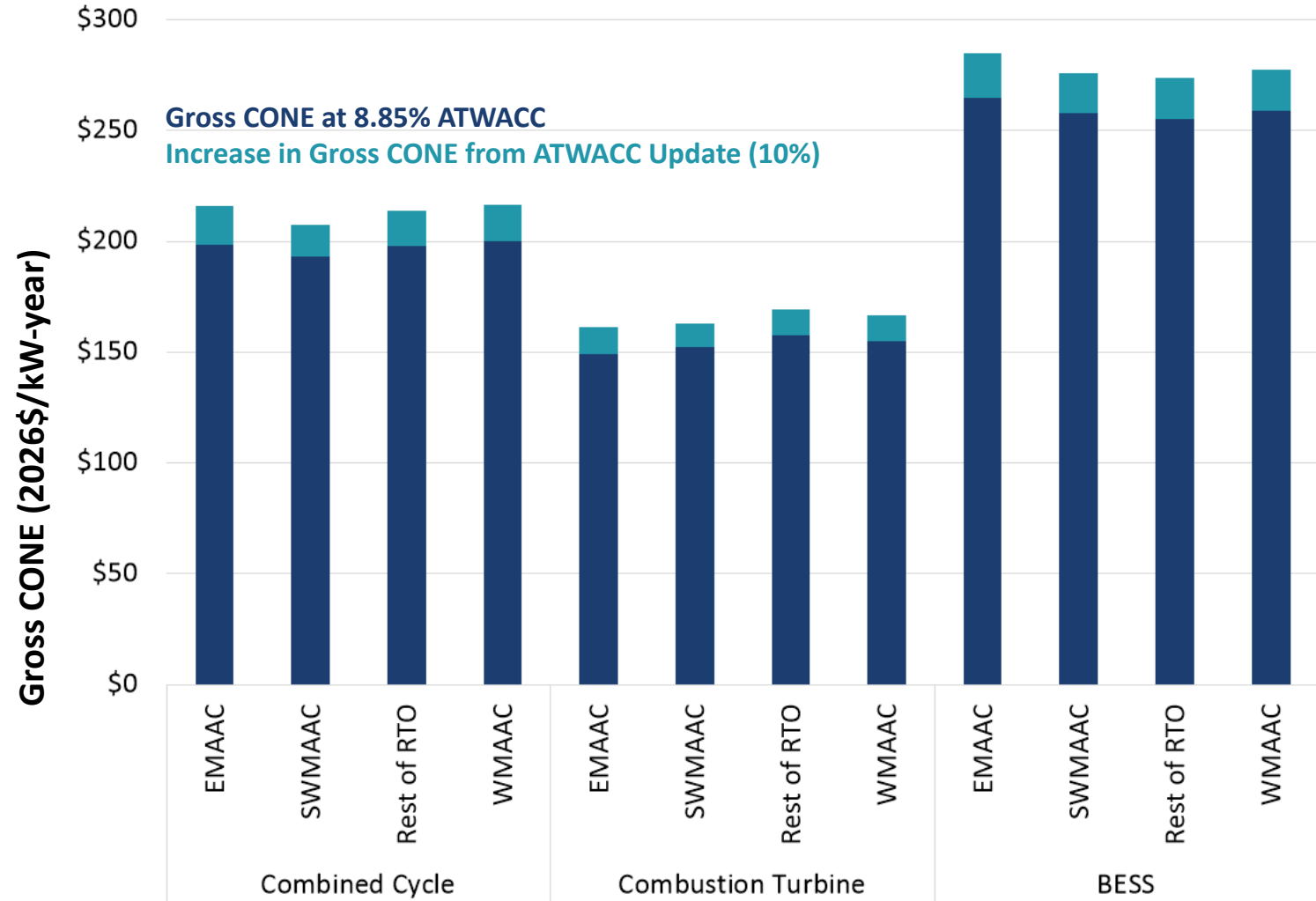


# Impact on Gross CONE

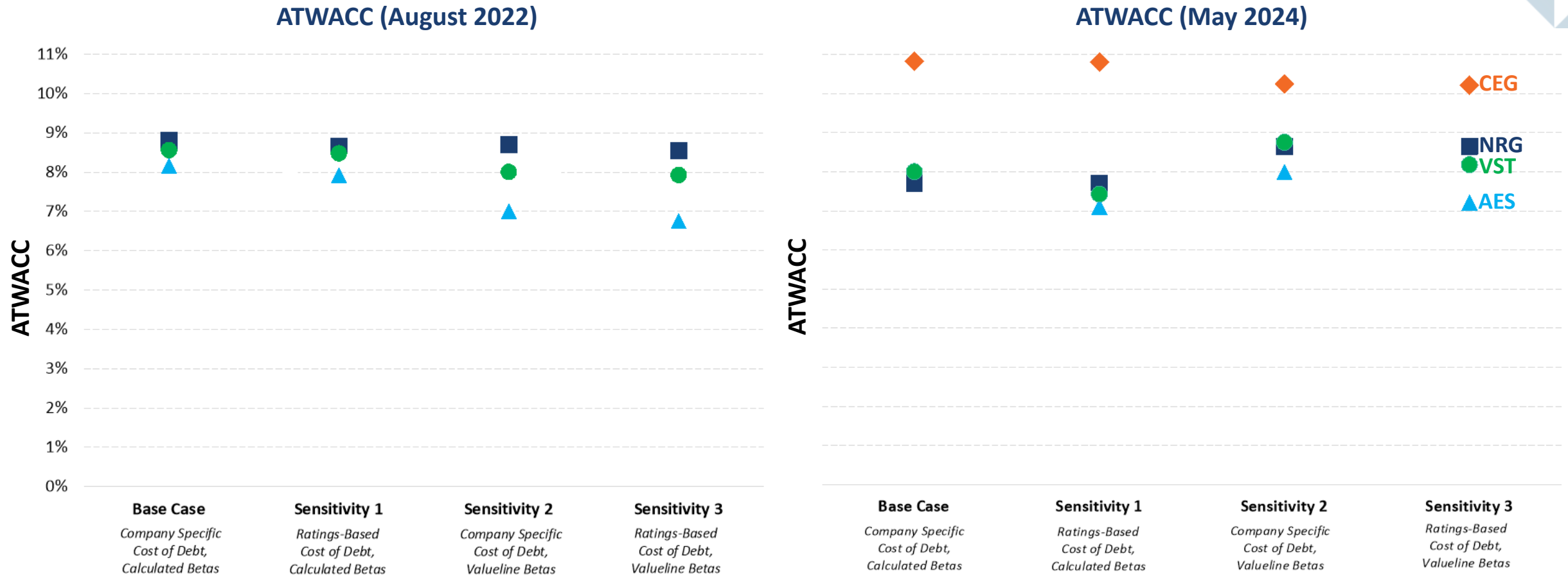
Gross CONE at 10% ATWACC  
(keeping all other inputs):

- ⌘ CC: increase by \$15-18/kW-year
- ⌘ CT: increase by \$10-12/kW-year
- ⌘ BESS: increase by \$18-20/kW-year

### Impact of Updated ATWACC on Gross CONE



# Comparison of Genco Sample ATWACCs



# Sample Updates

New Genco comp: Constellation Energy (CEG) which was spun off from Exelon in Feb. 2022

(\$ Millions)	2022 Genco Sample			2024 Genco Sample		
	Rating	Market Cap	Net Debt	Rating	Market Cap	Net Debt
AES Corporation (AES)	BBB-	\$16,908	\$26,372	BBB-	\$14,290	\$36,324
NRG Energy, Inc. (NRG)	BB+	\$9,882	\$7,797	BB	\$16,699	\$11,701
Vistra (VST)	BB	\$10,500	\$13,675	BB	\$31,261	\$16,653
Constellation (CEG)				BBB+	\$66,385	\$9,782

Notes:

2024 market cap is as of May 22, 2024, and 2022 market cap is as of August 31, 2022.

2024 net debt is as of Q1 2024, and 2022 net debt is as of Q2 2022.

Net debt is calculated as total debt less cash.

There are several Genco M&As since 2021 but no publicly disclosed Fairness Opinions:\*

🌀 January 2021: NRG acquired Centrica's Direct Energy (retail, \$3.625 bn)

🌀 November 2023: CEG acquired NRG's 44% interest in South Texas Project (nuclear plants, \$1.75 bn)

🌀 March 2024: Vistra acquired Energy Harbor (nuclear fleet / retail, \$3.4 bn)

\* Fairness opinion for NRG's acquisition of Vivint Smart Home (\$2.8 bn) March 2023 was publicly disclosed. But Vivint's business is home security.

# Key Parameter Updates

🌀 Risk-free rate (RFR) increases by 1.27% (3.43% as of August 31, 2022 to 4.70% as of May 22, 2024)\*

(\$ Millions)	Aug-22		
	Value Line Beta	Calculated Beta	Equity / Value Ratio
AES Corporation (AES)	1.05	1.45	39%
NRG Energy, Inc. (NRG)	1.10	1.13	59%
Vistra (VST)	1.10	1.25	48%

(\$ Millions)	May-24		
	Value Line Beta	Calculated Beta	Equity / Value Ratio
AES Corporation (AES)	1.15	1.10	34%
NRG Energy, Inc. (NRG)	1.10	0.84	51%
Vistra (VST)	1.05	0.83	47%
Constellation (CEG)	0.95	1.05	83%

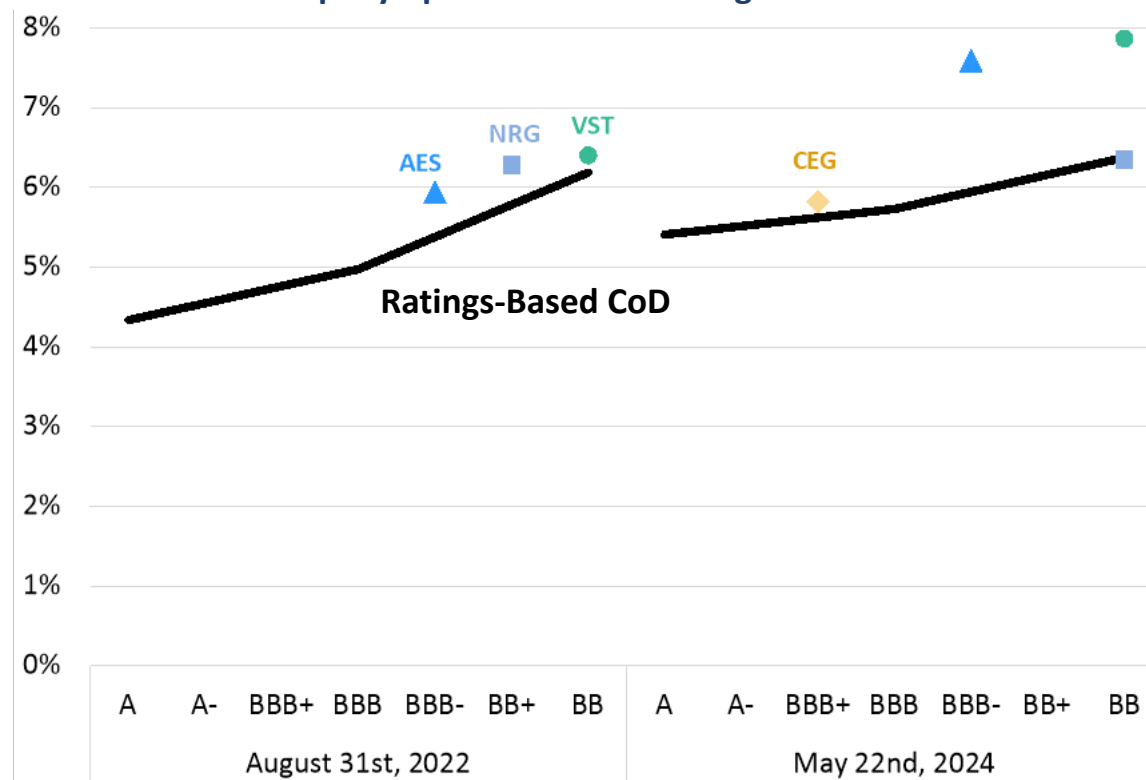
**Notes:**

Value Line betas are as of August 2022, and April, 2024, respectively.

Calculated betas are based on 3-year weekly returns for AES, NRG, and VST, and 2-year weekly returns for CEG.

Equity / value ratios are calculated as three-year (AES, NRG, and VST) and two-year (CEG) averages.

Company-Specific CoD vs. Ratings-Based CoD



\* The risk-free rate is calculated based on a 15-day moving average of the 20-year US treasury bond yields.



# Risk Assessments

## Revenues by Business Segment (2023)

Company	Total Revenue (\$M)	Share of Revenue (%)		
		Retail	Generation	Home Security
AES Corp	\$12,668	27.0%	73.0%	
Constellation Energy	\$24,918	100%		
NRG Energy Inc	\$28,823	89.9%	4.7%	5.4%
Vistra Corp	\$14,779	71.5%	28.5%	

Note: Constellation does not disclose revenues for Retail and Generation.

Carbon-free or clean energy is the focus of each company’s stated business strategies, although the asset mix and market exposure of NRG and Vistra are primarily fossil:

- ⌘ **AES Corp:** “partner with large corporations that are transitioning to carbon-free sources of electricity”
- ⌘ **Constellation Energy:** “the pairing of our majority carbon-free energy fleet with our customer-facing platform”
- ⌘ **NRG Energy Inc:** “a leader in the emerging convergence of energy and smart automation in the home and business”\*
- ⌘ **Vistra Corp:** “a leader in the clean power transition”

\* NRG’s entry into home security was under attack from Elliott as “troubling given NRG’s failure in attempting similar growth strategies in the past.”

## Generation Capacity Mix by Fuel Type (2023)

Company	Total Capacity (MW)	Capacity Mix (%)			
		Coal	Natural Gas & Fuel Oil	Nuclear	Renewable
AES Corp	34,596	18%	29%	0%	53%
Constellation Energy	33,094	0%	26%	67%	8%
NRG Energy Inc	13,112	51%	47%	0%	2%
Vistra Corp	36,702	23%	67%	7%	4%

## Generation Capacity Mix by Geography (2023)

Company	Total Capacity (MW)	Geographic Distribution (%)				
		Mid-Atlantic	Midwest	ERCOT	Other US	Non-US
AES Corp	34,596	4%	0%	2%	34%	60%
Constellation Energy	33,094	31%	35%	14%	19%	0%
NRG Energy Inc	13,112	5%	14%	65%	11%	5%
Vistra Corp	36,702	8%	23%	49%	19%	0%

# We Recommend 10% ATWACC

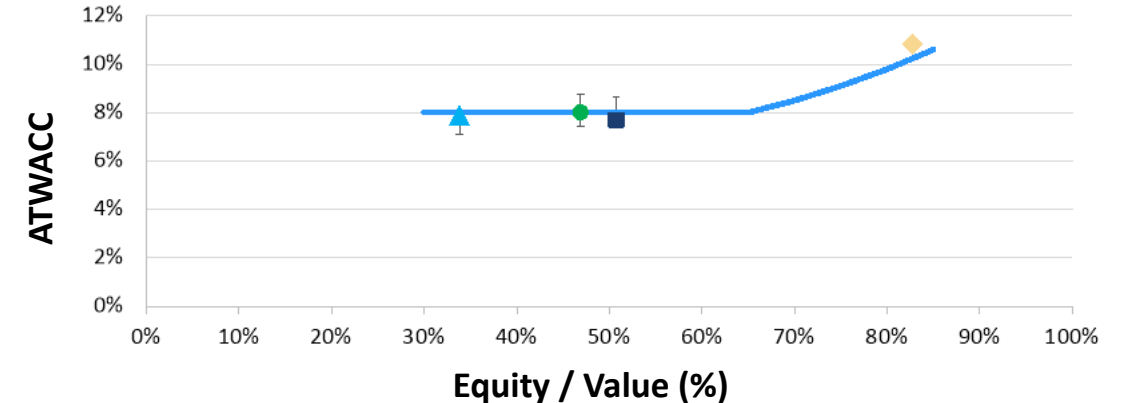
In our prior recommendations, we pick ATWACC at the top of our Genco sample ATWACCs:

- 10% is lower than CEG’s ATWACC range because they appear to be high for two reasons:
  - ④ Nuclear fleets tend to have higher non-diversifiable risks (higher fixed costs) than gas plants (somewhat correlated electricity and gas prices)
  - ④ As a newly independent company, CEG’s equity / value ratio also appears to be above the range of industry peers
- ATWACCs for the other three companies are lower than CEG’s due to higher degree of natural hedging by retail (NRG and Vistra), and utility and international operations (AES)

## Generation Capacity Mix by Fuel Type (2023)

Company	Total Capacity (MW)	Capacity Mix (%)			
		Coal	Natural Gas & Fuel Oil	Nuclear	Renewable
AES Corp	34,596	18%	29%	0%	53%
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## Genco Sample: ATWACC vs. Equity Ratio



Adjusted for the increase in the risk-free rate,

- Brattle’s recommended 8.85% ATWACC as of August 2022 would become approximately 10.15%
- The top range of fairness opinion discount rates would increase to about 10%



# Context of the Current Assignments

Prior ATWACC Recommendations	As of Date of the Analysis	Online Date
2011	July 2011	June 1, 2015
2014	Feb. 2014	June 1, 2018
2018	April 2018	June 1, 2022
2022	3/31/2022	June 1, 2026
2022 – Sept. Update	8/30/2022	June 1, 2026
2026 (Next QUAD Review)	TBD	June 1, 2030

Current Assignments	As of Date of the Analysis	Auction Date	Online Date
May 2024	May 22, 2024	June 2025	2027/2028
May 2025	May 31, 2025	December 2025	2028/2029
December 2025	December 31, 2025	May 2026	2029/2030

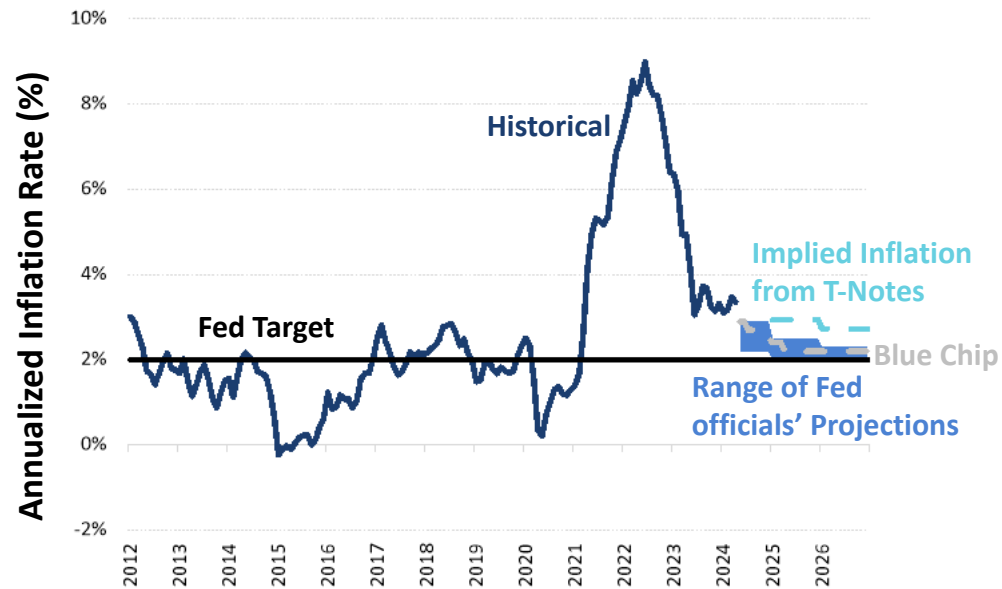
# Benefits of Automatic Updates

Relative to the status quo (one ATWACC per QUAD review cycle), annual automatic update

- ∞ ensures timely incorporation of then economic conditions for each auction
- ∞ offers greater administrative / regulatory certainty to stakeholders, and
- ∞ reduces administrative burden to stakeholders

The benefits are greater over the next two years as inflation remains a top risk for the economy:

**Inflation: Actual vs. Projections**



**Treasury Bond Yields (2012 – 2024)**



# PROPOSED Automatic Update Mechanics

## May 2025 ATWACC

As of date: May 31, 2024

- 🌀 April 2024: determine if the off-ramp conditions (see slide 12) are triggered
  - If not triggered, PJM would follow the automatic update mechanics to determine the ATWACC
  - If triggered, PJM would initiate a full ATWACC (and/or CONE) update

🌀 Automatic update (100% of the RFR adjustment):

$$\text{ATWACC (Auto)} = \text{ATWACC (5/24)} + (5/25 \text{ RFR} - 5/24 \text{ RFR})$$

🌀 May 2025 ATWACC is

- ATWACC (Auto): if off-ramp conditions are not triggered
- ATWACC (Full): if off-ramp conditions are triggered

## December 2025 ATWACC

As of date: December 31, 2025

- 🌀 November 2025: determine if the off-ramp conditions (see slide 12) are triggered
  - If not triggered, PJM would follow the automatic update mechanics to determine the ATWACC
  - If triggered, PJM would initiate a full ATWACC (and/or CONE) update

🌀 Automatic update (100% of the RFR adjustment):

$$\text{ATWACC (Auto)} = \text{ATWACC (5/25)} + (12/25 \text{ RFR} - 5/25 \text{ RFR})$$

🌀 December 2025 ATWACC is

- ATWACC (Auto): if off-ramp conditions are not triggered
- ATWACC (Full): if off-ramp conditions are triggered

Note: RFRs are calculated as the average yields of the Treasury 20-year notes over the 15 trading days immediately before and including the as of date.

# Justifications for the 100% RFR Change

Conceptually, ATWACC is the sum of RFR and Genco’s industry risk premium. The 100% RFR change is justified since, over the next two years (2025 – 2026),

- ☞ the RFR is most likely to change, and
- ☞ the industry risk premium or the industry risk is expected to stay constant

Some utility regulators allow “formulaic” return on equity (ROE) adjustment:

- ☞ **CA:** change in ROE = 0.5 × change in RFR
- ☞ **Alberta / Toronto:** change in ROE = 0.5 × change in RFR + 0.5 × change in bond yield

Assuming both RFR and the bond yield increase by a similar magnitude, the ATWACC adjustment would be about 75% of the RFR change

Empirically, Brattle’s prior recommended ATWACCs roughly support a 100% RFR adjustment

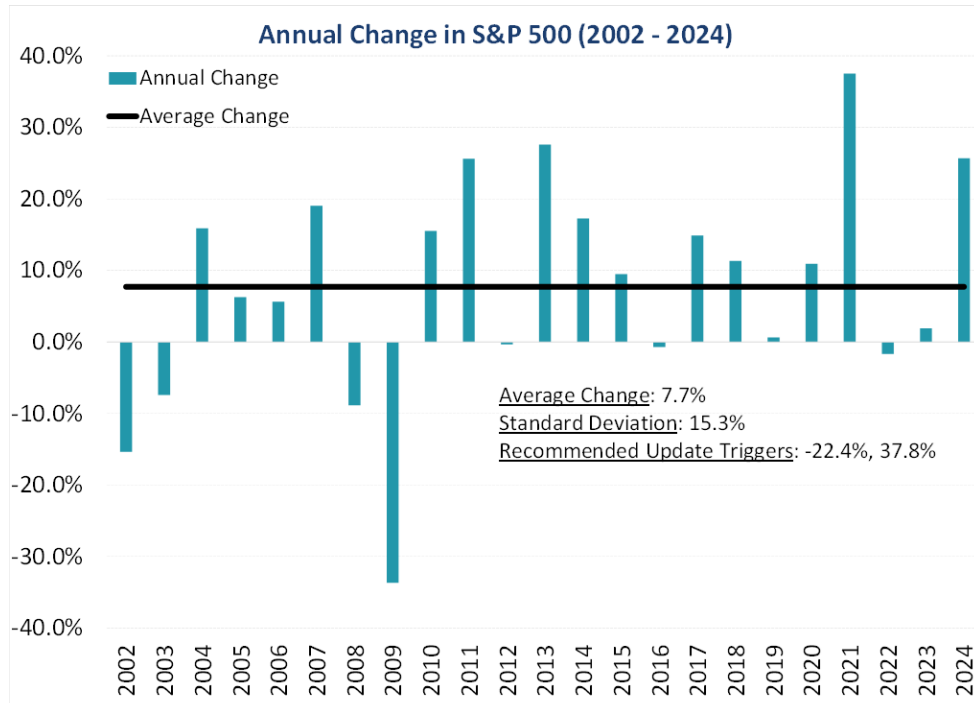
ATWACC and RFR

	RFR	ATWACC	Change in RFR	Change in ATWACC	Sensitivity
PJM 2011	4.30%	8.50%			
PJM 2014	3.40%	8.00%	-0.90%	-0.50%	0.56
PJM 2017 @ 35% Tax Rate	2.65%	7.00%	-0.75%	-1.00%	1.33
PJM 2017 @ 21% Tax Rate	2.65%	7.50%			
PJM 2018 @ 21% Tax Rate	2.96%	8.0%	0.31%	0.50%	1.61
PJM 2022 (1)	2.62%	8.0%	-0.34%	0.00%	-
PJM 2022 (2)	3.43%	8.85%	0.81%	0.85%	1.05
PJM 2024 (Preliminary)	4.70%	10.00%	1.27%	1.15%	0.91
<b>Average Sensitivity (Excl. 2024)</b>					<b>0.91</b>
<b>Average Sensitivity (Incl. 2024)</b>					<b>0.91</b>

Note Brattle’s ATWACCs in 2018 and 2022 were based partially on the 100% RFR adjustments to Genco M&A discount rates (from 2016 and 2017)

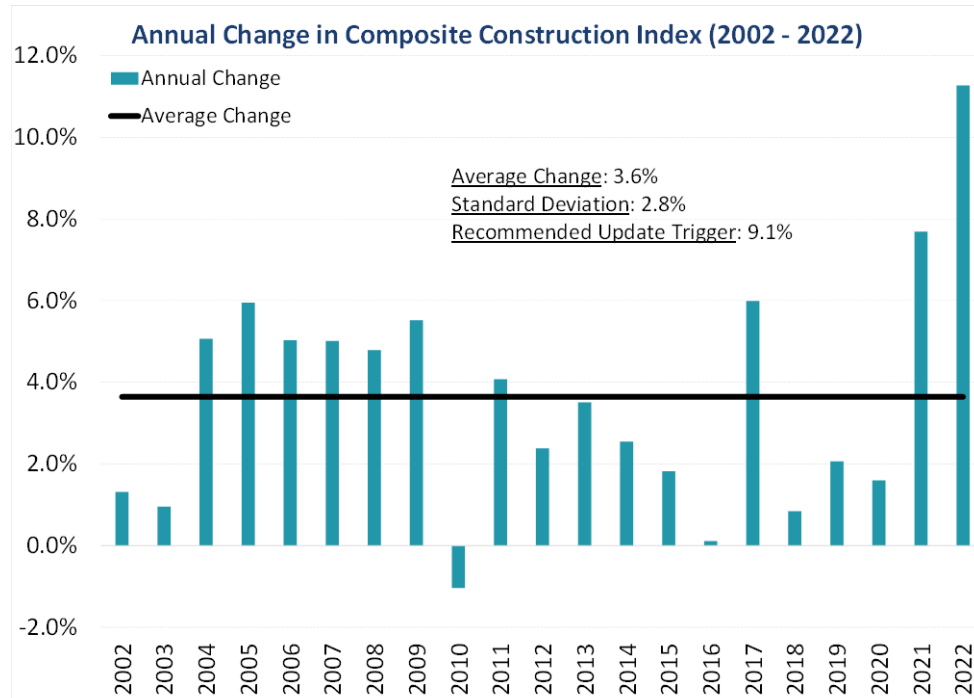
# Off-Ramp Conditions and Two Candidates

Are they desirable or necessary, given the automatic update is only for the next two years?



Triggers for the full update: annual return below -22.4% or over 37.8%

- Measurement periods:
  - May 2025 Update: June 2024 – May 2025
  - December 2025 Update: Jan. 2025 – Dec. 25



Trigger for the full update: annual increase over 9.1%

- Measurement periods:
  - May 2025 Update: April 2024 – Mar. 2025 for Materials and Turbines, and 2023 for Wages
  - December 2025 Update: Nov. 2024 – Oct. 2025 for Materials and Turbines, and 2023 for Wages

Note: Triggers are calculated statistically as average +/- 1.96 x standard deviation.

Notes: The composite construction index is based on material costs, turbine costs, and wages using the weights established in §5.10 of PJM’s OATT (45%, 15%, and 40%, respectively). Indices for materials and turbines are published monthly with a 1-month lag, and wage index is published annually with an approximately 18 months lag.

# Prepared By

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**Bin Zhou**

**PRINCIPAL  
BOSTON**

[Bin.Zhou@brattle.com](mailto:Bin.Zhou@brattle.com)

+1.617.234.5677



**Sam Newell**

**PRINCIPAL  
BOSTON**

[Sam.newell@brattle.com](mailto:Sam.newell@brattle.com)

+1.617.234.5725



**Hannes Pfeifenberger**

**PRINCIPAL  
BOSTON**

[Hannes.Pfeifenberger@brattle.com](mailto:Hannes.Pfeifenberger@brattle.com)

+1.617.234.5624



**Rohan Janakiraman**

**SENIOR ENERGY ANALYST  
WASHINGTON, DC**

[Rohan.Janakiraman@brattle.com](mailto:Rohan.Janakiraman@brattle.com)

+1.202.908.2644



# Clarity in the face of complexity

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