Navigating Structural Change: Evidence from Municipal Finances and Bond Market Pricing During the Coal Transition

Marcelo Ochoa and Andreas Rapp
Federal Reserve Board

Discussion by Melissa Winkler
Crosswalk Labs

14th Annual Municipal Finance Conference
July 22, 2025

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Location

USA

Emission Type

Direct Emissions | Emissions from Electricity Use

Timeframe

2024

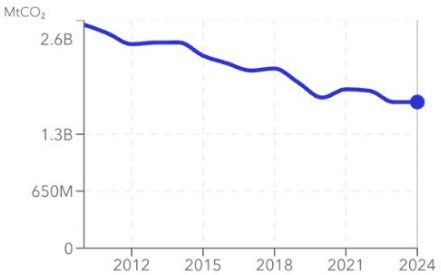
Sector

Power plants

Total Direct Emissions by Power plants in USA throughout 2024

1,670,000,000 $MtCO_2$

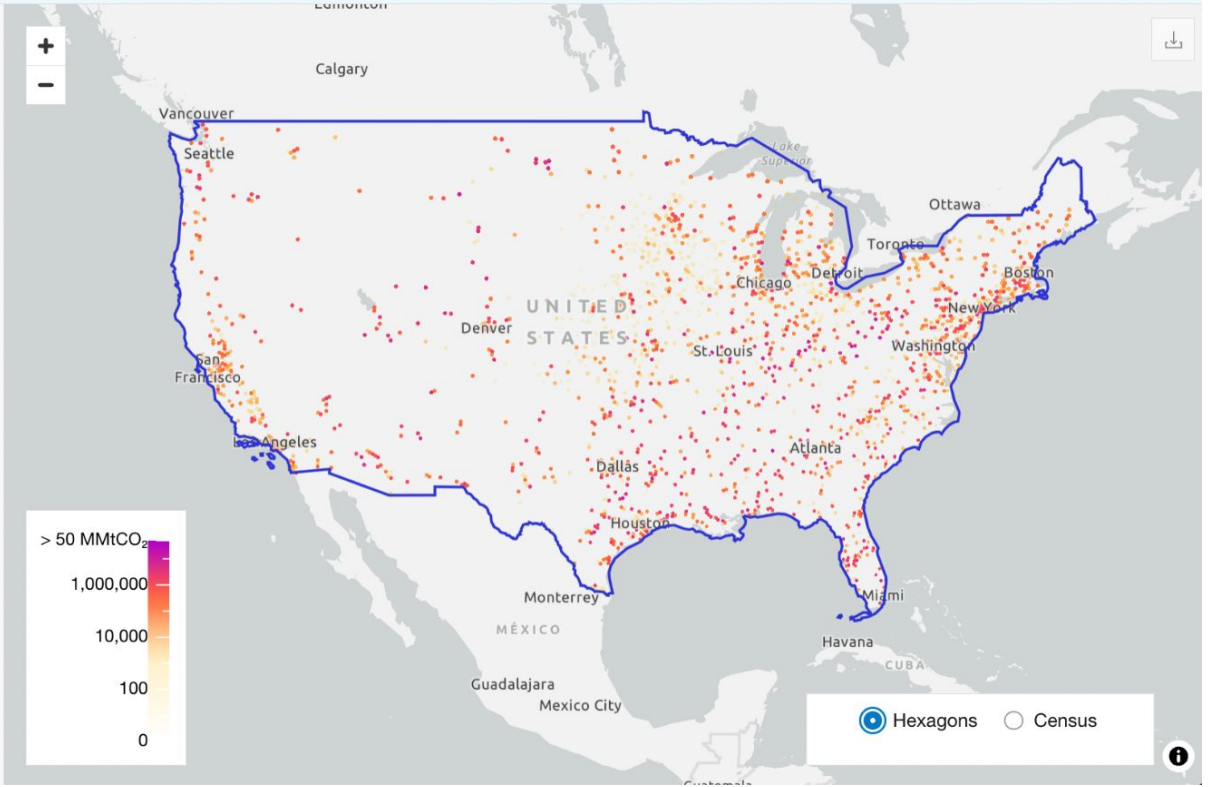
Emissions by year



Normalize by population

Power plants

31.64% 1,670,000,000 $MtCO_2$



Refinements and Considerations:

The paper documents wide variation in coal dependency and fiscal condition → *not all coal counties are equally affected.*

- Average: 450 miners/county; SD: 600 → large spread
- Suggest: Cluster counties by region and coal intensity
- Could reveal vulnerability thresholds or tipping points
- Adds clarity on which types of counties are most at risk

Refinements and Considerations:

The study controls for bond size → *a standard statistical approach, but market behavior for municipal bonds is nonlinear.*

- Larger deals often price tighter due to liquidity/institutional demand
- Suggest: Cluster by size (e.g., <$25M, $25–$100M, >$100M)
- Could surface hidden stress for smaller issuers
- Table A.6: Larger log size = higher yields (2.225 bps per unit)
- Avg issue size: $26M; SD: $79M → wide variation

Refinements and Considerations:

Refine controls for pricing nuances → control for sectors and essentiality.

36 different use of proceeds were included in the data sample, with 93% of the sample concentrated in the following 8 categories.

Use of Proceeds	Rank
Courts	1 (most essential)
Economic Development	2
Gen Purpose/Pub Improvement	run separately; too noisy
Higher Education	2
Hospitals	1 (most essential)
Primary/Secondary Education	2
Single Family Housing	2
Water and Sewer	1 (most essential)

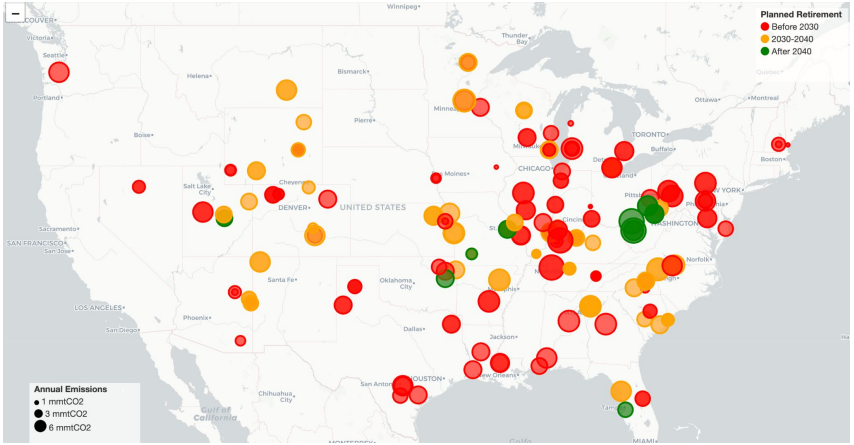
Implications Worth Highlighting:

The authors analysis indicates that rating agencies are not fully capturing transition risk.

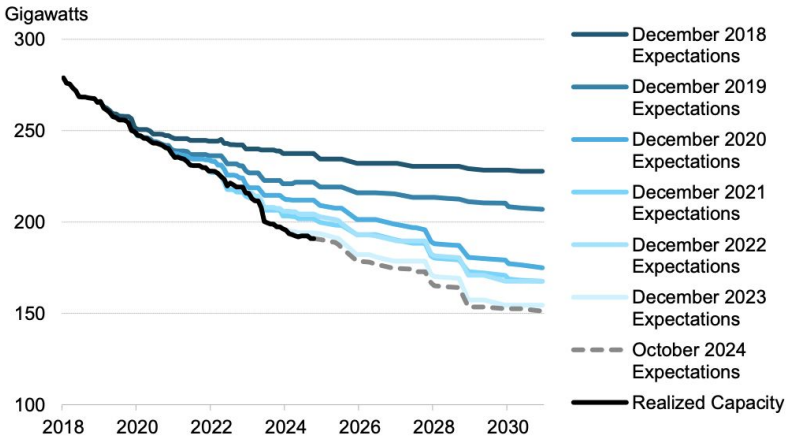
Are bond structures aligned to capture transition risk?

Future Paper Iterations:

Planned Coal Retirements



Realized and Planned Coal Capacity Expectations



U.S. Coal Outlook – Capacity in Decline

- **Coal capacity is falling fast: The U.S. has shed 88 GW since 2018, leaving 191 GW today (14.6% of total capacity). The lost capacity is equivalent to the power demand of 60–70 million homes – more than half of all U.S. households.**
- **More cuts ahead: 40 GW expected to retire by 2030 – and history suggests actual retirements outpace forecasts.**
- **Delays creeping in: Some system operators now eye coal for reliability amid rising demand (data centers, industry).**

Source: Crosswalk Labs retirement dates data; US Energy Information Administration and BNEF.

Looking Ahead:

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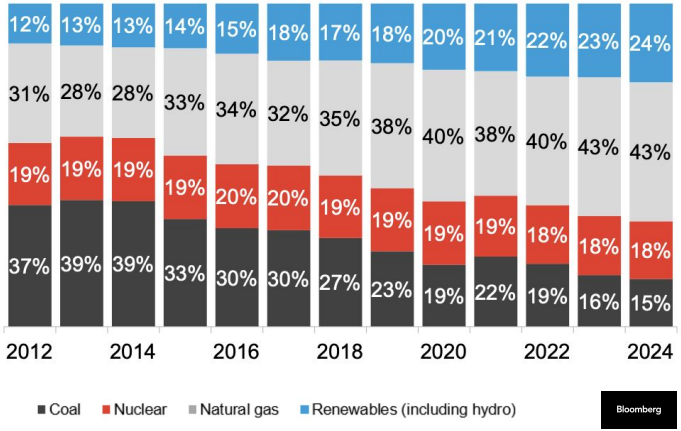
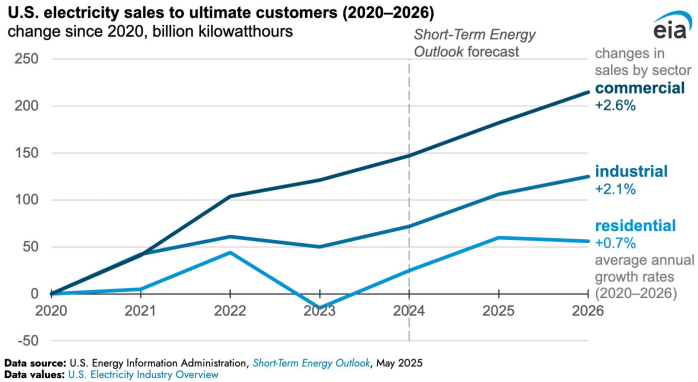
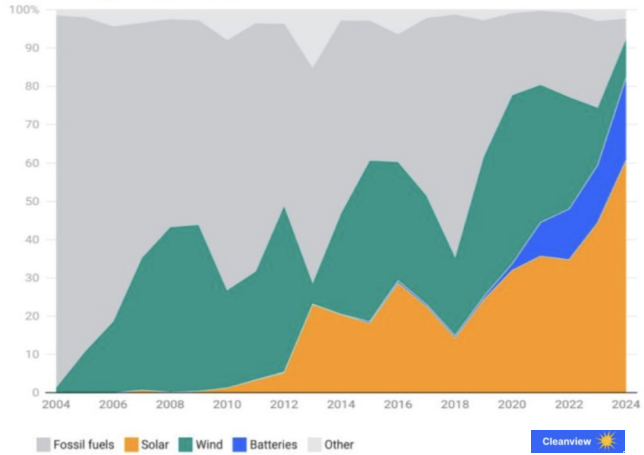
Share of Total US Electricity Generation, by Fuel Type





New Power Capacity, by Fuel Type



Key Trends in U.S. Electricity Generation

- Fuel mix shift: Renewables + nuclear = 42% of total electricity; gas leads at 43%.
- Fastest growth: Renewables rose 10% over past decade – now 24% of U.S. electricity.
- New capacity: In 2024, 95% of new power capacity was carbon-free.
- The U.S. Energy Information Administration is expecting electricity consumption to grow at an average rate of 1.7% per year.

Source: Bloomberg, 2025 Sustainable-Energy-in-America-Factbook; US Energy Information Administration and Cleanview.

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Crosswalk Labs is a science and technology company that tracks and visualizes emissions from every sector of the economy in every neighborhood of the United States, as well as building-specific data nationwide for energy use and cost.

Thank you
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