Brownfields Reuse Planning for an Affordable Energy Future

August 13, 2026

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Rocky Mountain Institute (RMI) is an independent, non-partisan, nonprofit organization dedicated to accelerating a prosperous, clean energy future for all

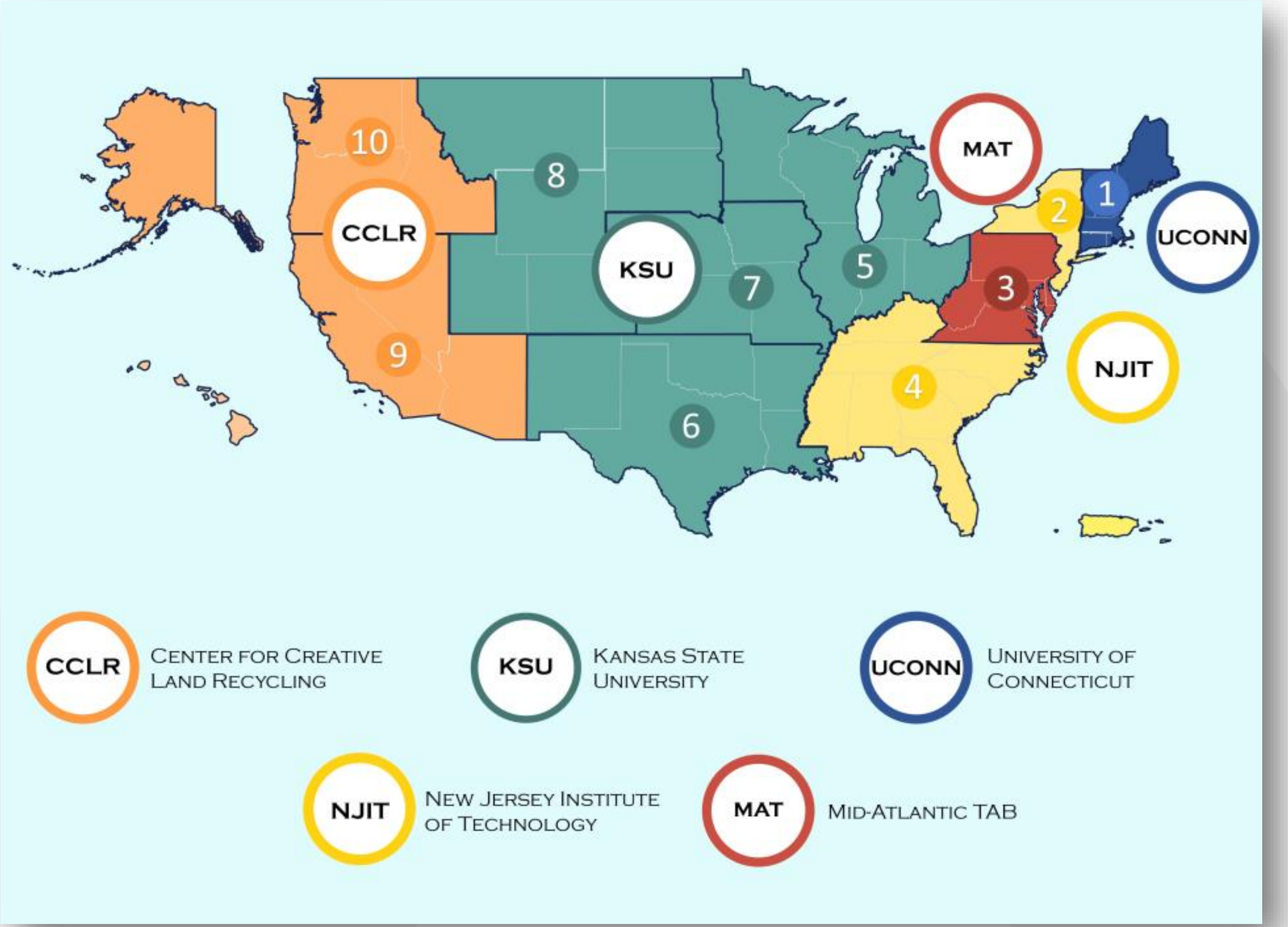
What We Do:

- *Founded in 1982, RMI now works across the United States and in 60 countries*
- *We combine research, whole-systems thinking, and unconventional partnerships to help communities advance sustainable, reliable, and affordable energy systems*

The Center for Creative Land Recycling (CCLR) is part of a broader network of technical assistance for brownfields (TAB) to help communities address brownfields challenges

TAB Guidance & Services:

- Inclusive community visioning
- Acquiring, assessing, cleaning up and redeveloping brownfield properties;
- Health impacts of brownfield sites
- How to comply with voluntary cleanup requirements
- Funding and financing strategies, including EPA brownfields grant application support
- And more…



RMI is partnered with CCLR TAB to provide **free and tailored technical assistance** to help communities across Regions 9 and 10 responsibly plan for and deploy clean energy on brownfields and closed landfills.

Our goals are…

To ***educate communities and site owners*** about brownfields reuse options that include clean energy

To ***provide pre-development site evaluation and analysis*** to communities considering “brightfields”

To ***provide other technical assistance and tools*** to help with reuse planning, funding, financing, and clean energy procurement

This series is intended to help site owners and municipalities more deeply understand how brightfield projects can contribute to a more affordable energy future and support long-term budget planning

Today's Objectives:

1. Unpack the basics of electricity market prices and regional trends that may inform brownfields reuse planning
2. Establish a foundation on clean energy project economics and how to quantify the costs and benefits over time

"Brightfields" reuse previously disturbed, often-contaminated land to reactivate sites and support a local energy transition

Photos courtesy of Matthew Popkin, RMI

Brownfield:

- A property where the expansion, redevelopment, or reuse may be complicated by the *presence or potential presence of a hazardous substance, pollutant, or contaminant*
- Common brownfields include former industrial sites, inactive landfills/dumps, old factories, abandoned mines, and closed power plants

Brightfield:

- A type of redevelopment where renewable energy (typically solar) is built on a former brownfield or Superfund site

Brightfields come in all shapes and sizes

Today's Agenda

1

Brightfields Economics

Dive into energy project economics, including energy markets and financial modeling strategies with state-specific examples

2

Panel/Q&A

Understand how the City of Cincinnati recently worked through its own landfill solar project by understanding its energy market (+ other Q&A)

3

Office Hours

Stick around to ask your site-specific question or discuss your site/needs in more detail

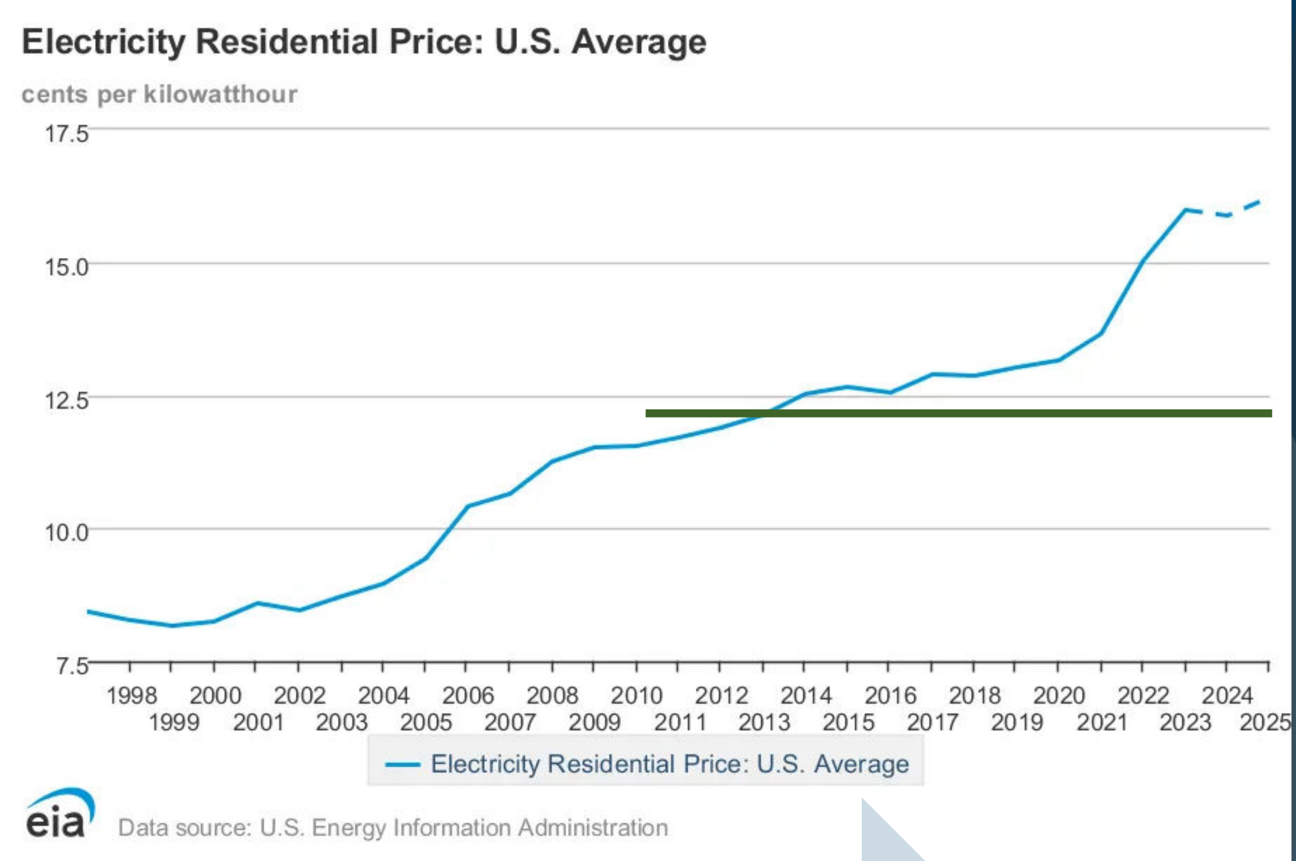
(optional)

Brightfields & Clean Energy Economics 101

Despite additional site preparation and design-related costs, key brightfield benefits can help reduce overall project costs

- Reactivating a site that lacks other viable reuse options can stimulate new tax revenue
- Co-locating with existing operational costs (ex. vegetation and wildlife management)
- When located near existing infrastructure, redevelopment costs can be lower compared to undeveloped land
- Siting on closed landfills, former mine lands, or brownfields prompts less community opposition
- These types of sites typically do not compete for the same market as other available land

Fixed-cost energy projects hedge against rising electricity and volatile fuel prices — this is what to examine when understanding the longer-term return on investment

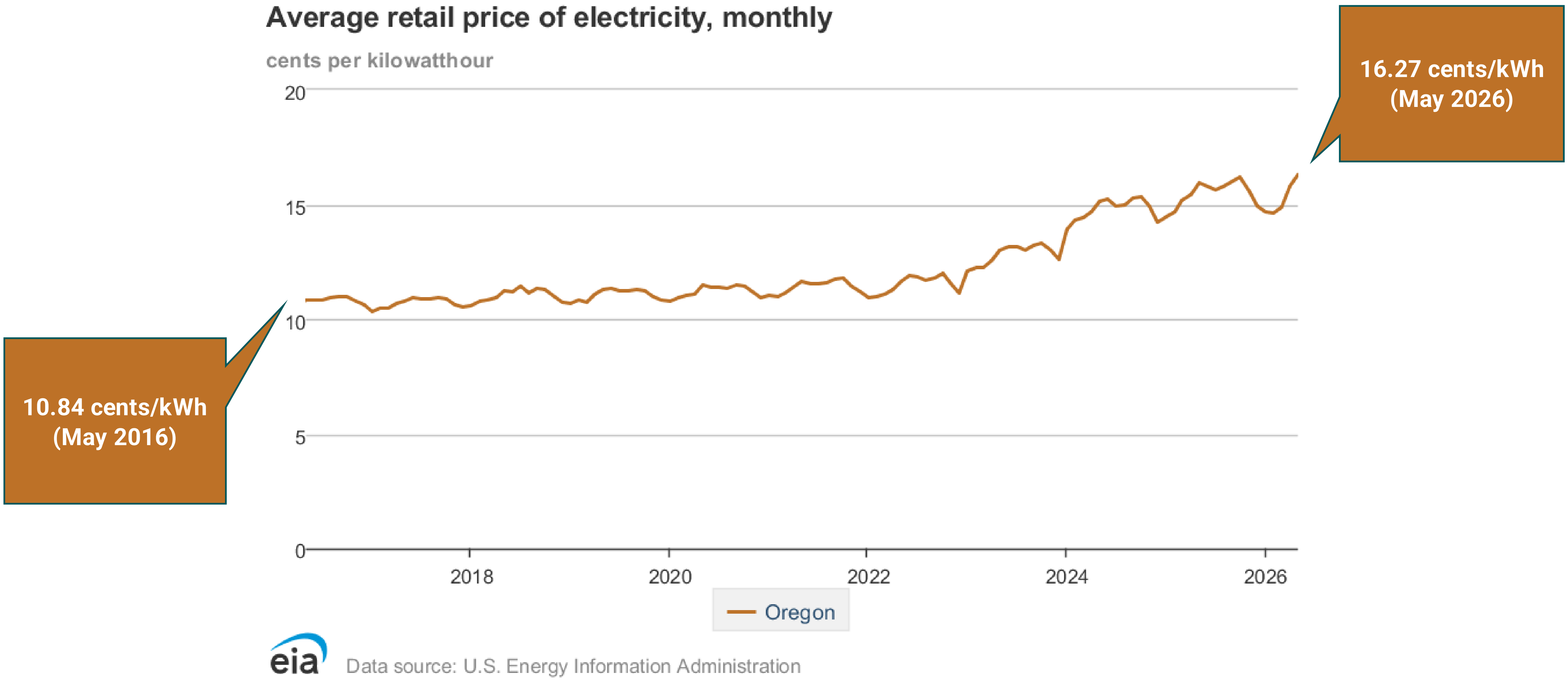


Electricity prices in the US increased by over 26% in last 5 years

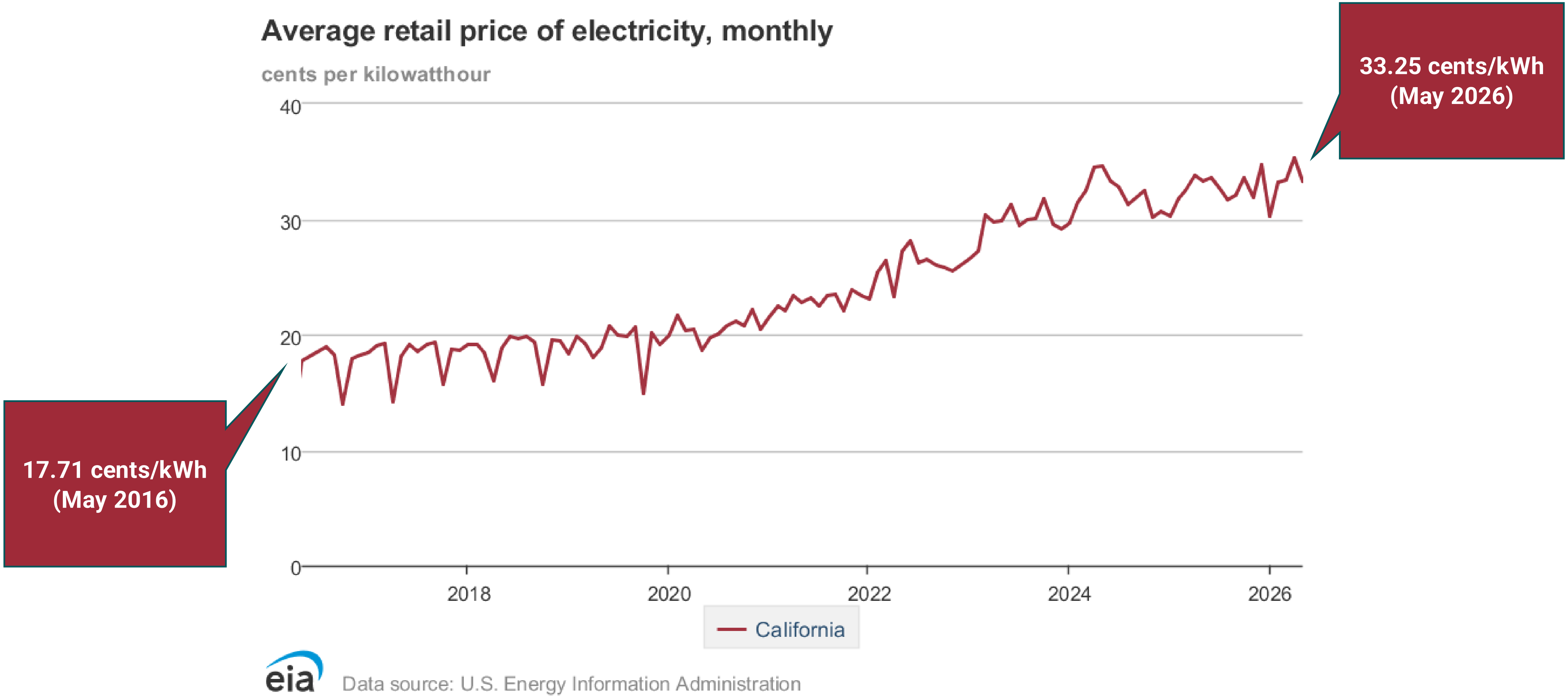
Because solar offers fixed-cost energy prices, savings *increase* as prices increase

Imagine if your community added solar in 2010 at a price of 12 cents per kWh. Where are you now?

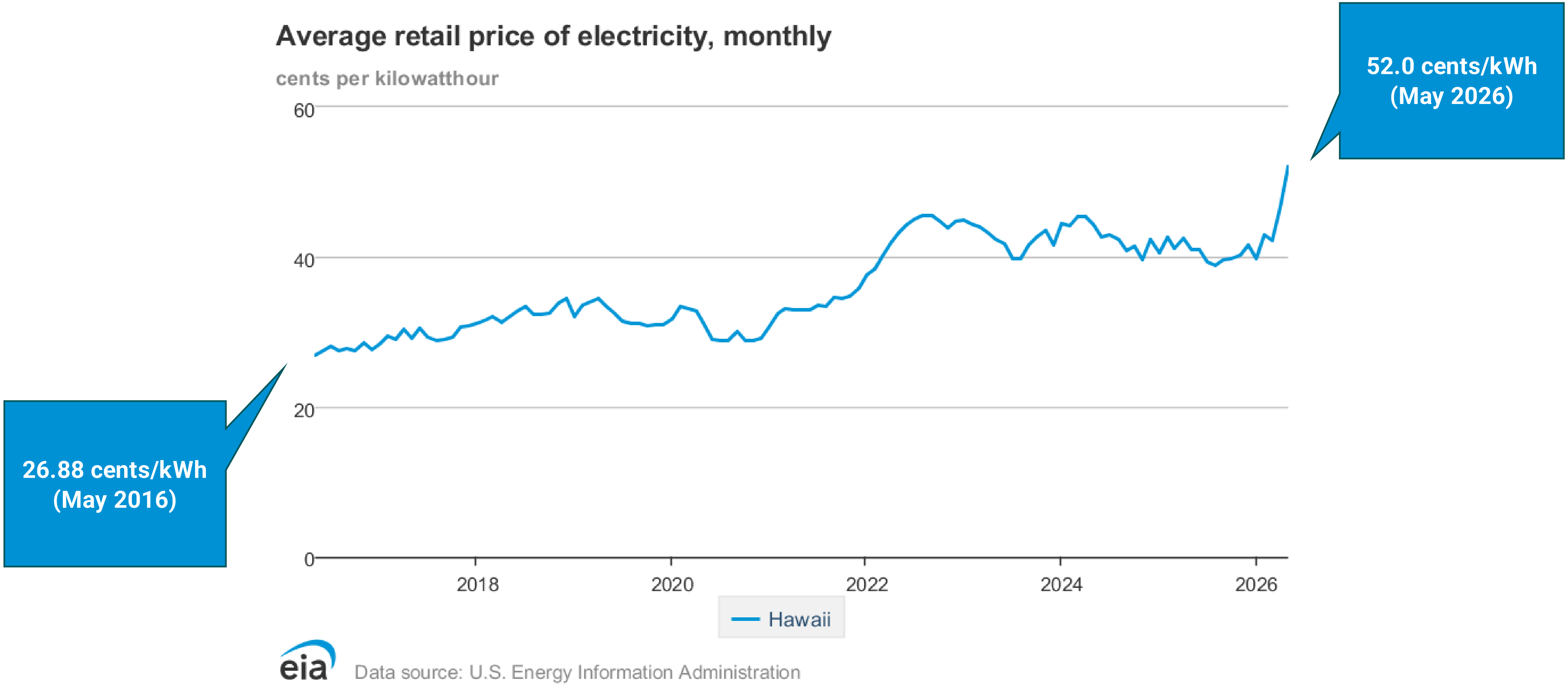
Oregon's electricity prices have increased steadily but gradually



California's electricity prices have nearly doubled since 2016



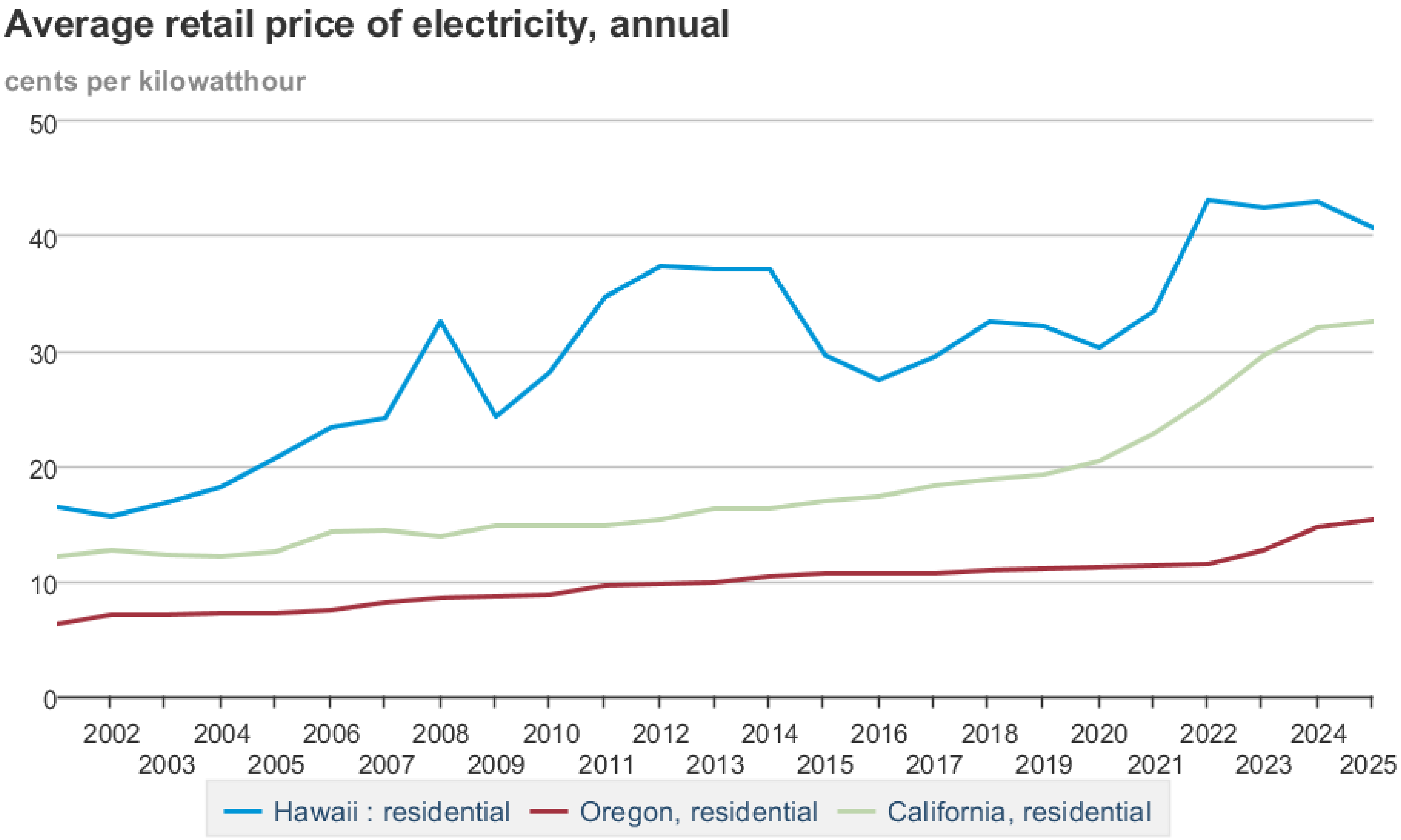
Hawai’i’s electricity prices reached a record high in the US this year, doubling from 2016



A Tale of 3 States

Most states are facing rising prices —some more steep and more volatile than others

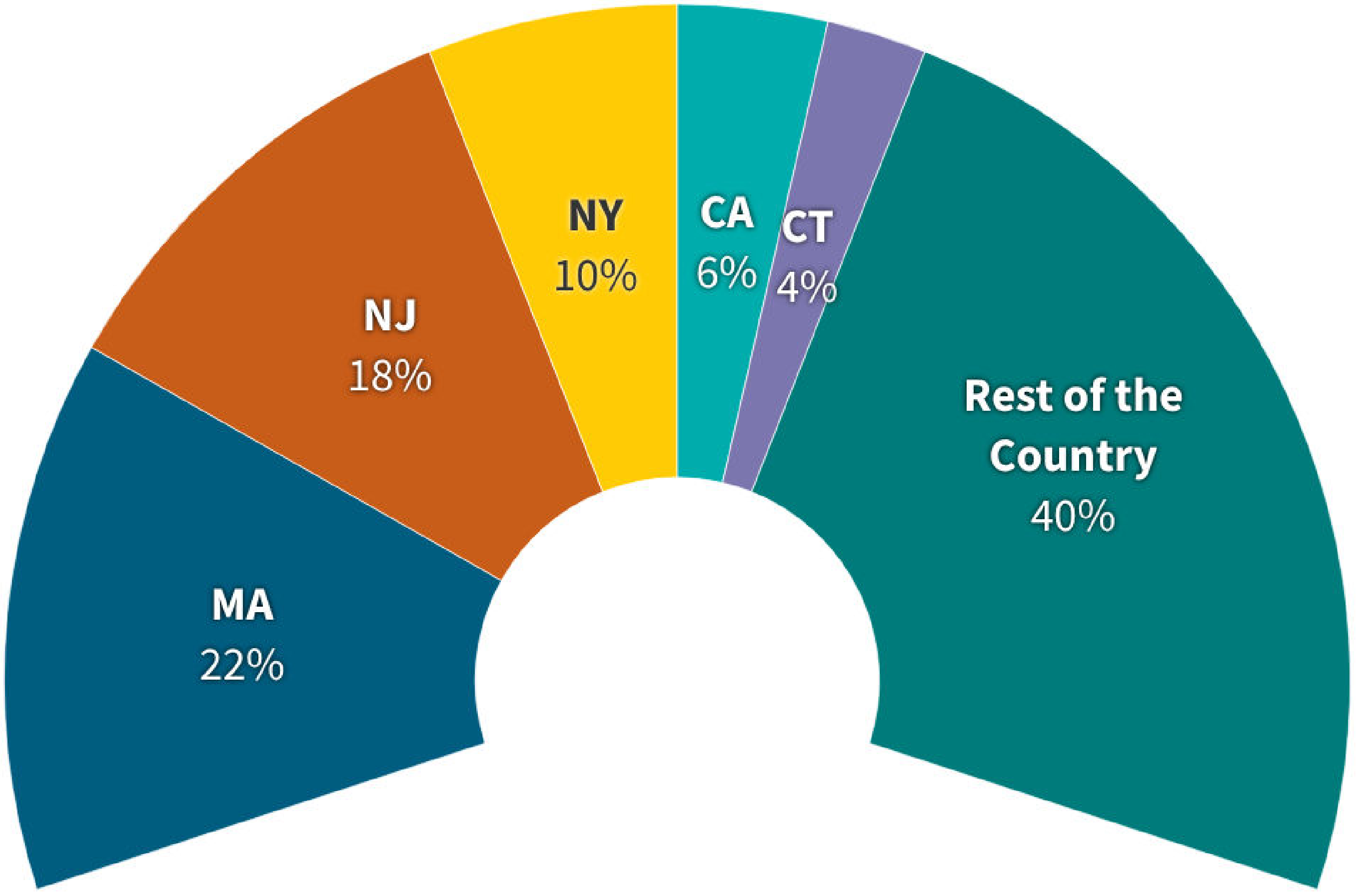
Examining the long-term energy prices trends for your state, region, or utility market can help highlight the risks and opportunities of future energy project investments



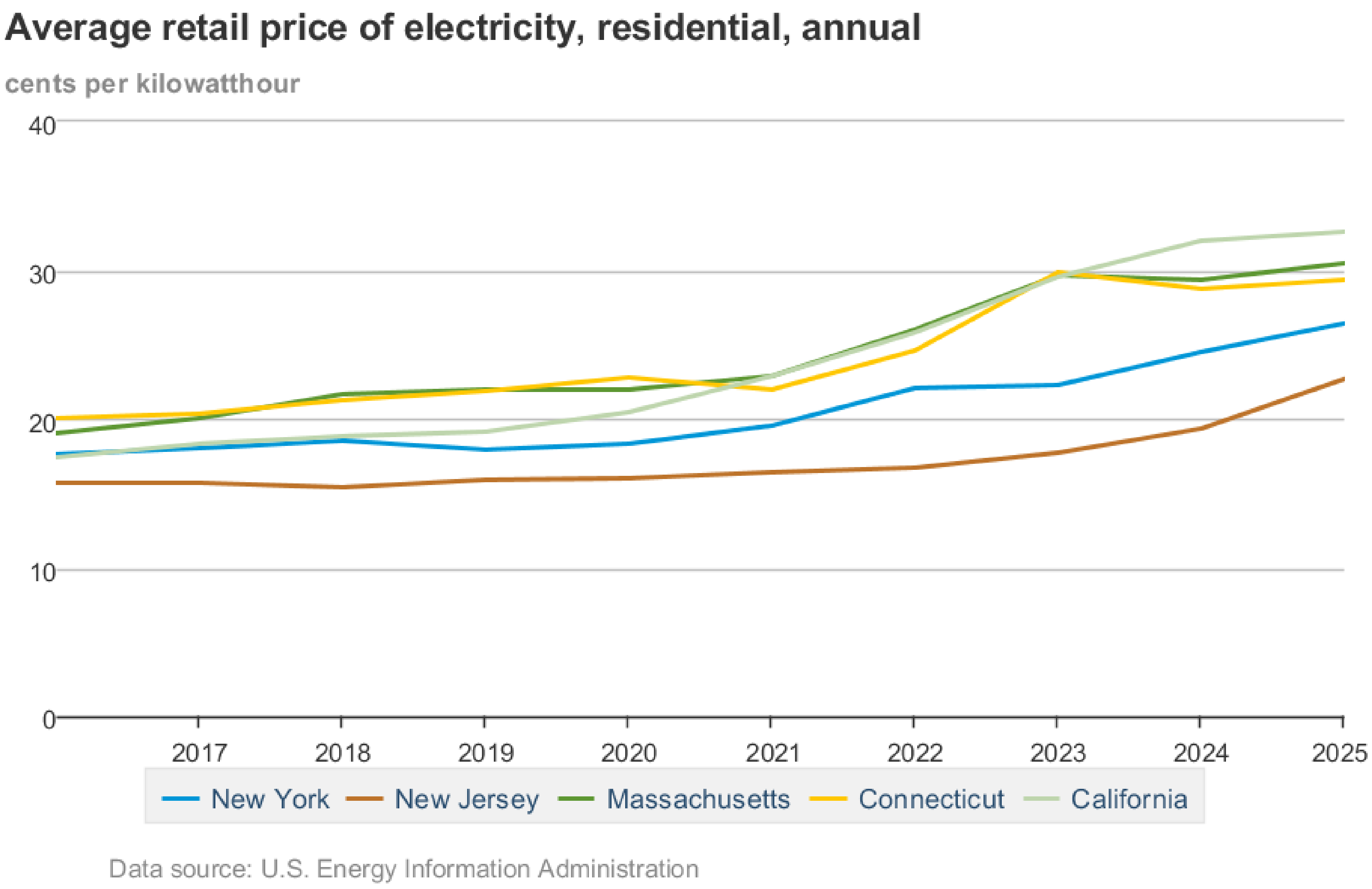
Data source: U.S. Energy Information Administration

Brightfields are growing across the country, yet 60% of the progress has been in just 5 states

Five states host 60% of US brightfields projects



Source: EPA Repowering Matrix, 2024; RMI, 2024-2026



And projects in these 5 states are more likely to serve as a financial hedge against these rising price trends

Brightfields & Clean Energy Economics 201

- ✓ *Capital vs. Operating Costs*
- ✓ *Accounting for Cost/Savings Over Time*
- ✓ *Current Status of Federal Tax Credits*

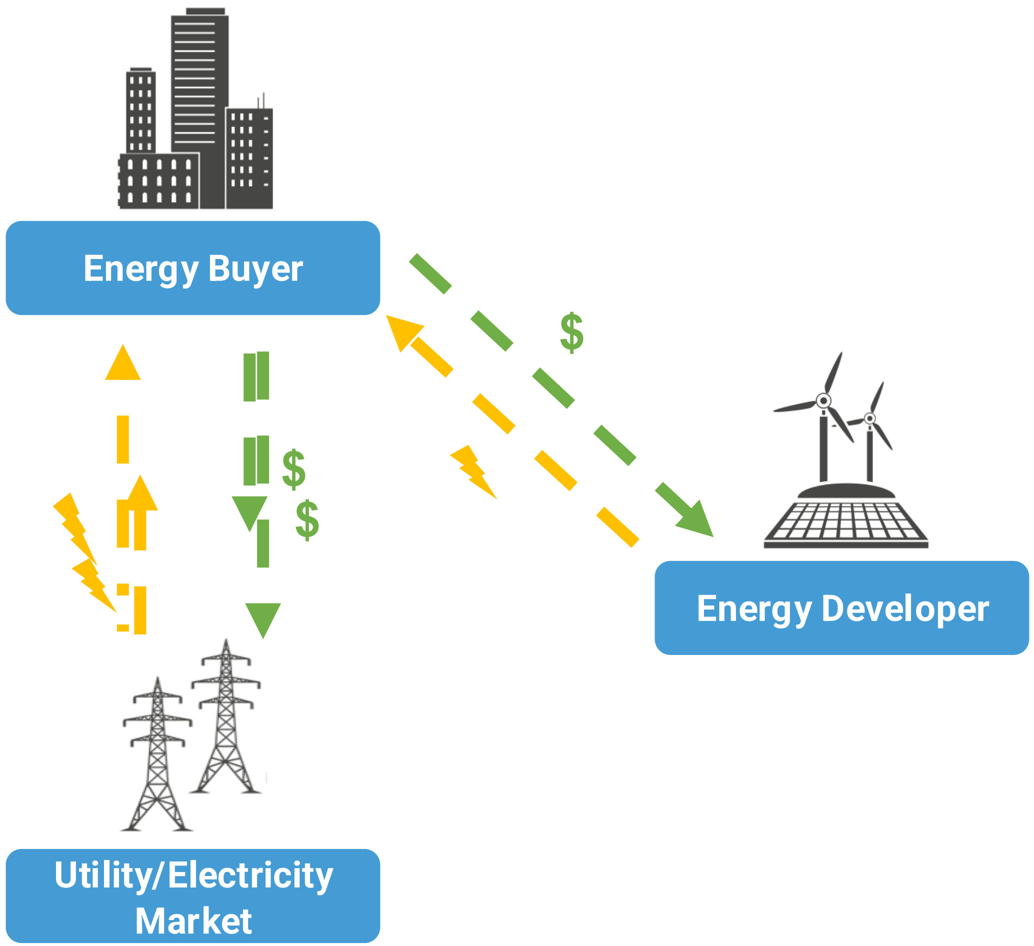
Understanding how clean energy infrastructure investments are typically set up can help you better plan for future projects

Fundamentally, clean energy projects are an upfront capital investment

But unlike other infrastructure projects, clean energy projects can displace operating expenses for electricity

When building and financing clean energy projects, a key goal is to achieve a reasonable market price for the energy buyer

Ultimately, your funding strategy does <u>not</u> have to cover 100% of project costs



Because clean energy projects have limited variable costs, they can hedge against long-term electricity price increases

Common Variable Costs:

- Fuel
- Transport Costs
- Operations & Maintenance

Energy projects without fuel / fewer variable costs are much more stable

- Enhances budget predictability and planning
- Enables more creative financing/ownership approaches

How do you calculate a project's financial outcome when…

- Infrastructure investment is upfront
- Electricity is generated and sold over time (typically 20-30 years)
- Electricity savings increase over time as electricity market prices increase

Net present value (NPV) is a financial metric that captures the current value of all future cash flows from a project.

When thinking about long-term investments, NPV accounts for the time value of money.

The overall NPV offers a comprehensive financial picture for a potential investment

- Accounts for the time value of money (a dollar today is more valuable than a dollar in a future year)
- Includes the estimated annual electricity savings from the project
- Includes incentives, rebates, and credits, where and when relevant
- Includes all upfront, monthly, and/or annual project costs

Option 1 NPV Calculator		
Year	Annual Cash Flow	Discounted Cash Flow
2026	$ 3,872,500.00	$ 3,872,500.00
2027	$ 899,171.61	$ 864,588.08
2028	$ (1,697,177.78)	$ (1,569,136.26)
2029	$ (1,689,216.90)	$ (1,501,707.67)
2030	$ (1,681,131.45)	$ (1,437,038.21)
2031	$ (1,672,919.62)	$ (1,375,017.98)
2032	$ 629,229.46	$ 497,289.18
2033	$ 637,699.67	$ 484,599.34
2034	$ 646,301.91	$ 472,246.48
2035	$ 655,038.13	$ 460,221.10
2036	$ 663,910.29	$ 448,514.01
2037	$ 672,920.39	$ 437,116.26
2038	$ 682,070.46	$ 426,019.20
2039	$ 691,362.55	$ 415,214.43
2040	$ 700,798.75	$ 404,693.81
2041	$ 710,381.17	$ 394,449.45
2042	$ 720,111.98	$ 384,473.67
2043	$ 729,993.34	$ 374,759.05
2044	$ 740,027.49	$ 365,298.38
2045	$ 750,216.66	$ 356,084.65
2046	$ 760,563.14	$ 347,111.09
2047	$ 771,069.24	$ 338,371.09
2048	$ 781,737.32	$ 329,858.27
2049	$ 792,569.77	$ 321,566.43
2050	$ 803,569.00	$ 313,489.52
2051	$ 814,737.47	$ 305,621.71

What Does Net Present Value Indicate?

Positive NPV

- The project will likely make a profit or result in savings and add value over the expected lifetime of the project

Negative NPV

- The project will likely lose money over the lifetime of the project

Zero NPV

- The project breaks even with no net gain or loss

Why use net present value?

- To **consistently compare** different proposed financial structures and differently-sized projects on an apples-to-apples basis

- Allows you to **assess the value of estimated project savings**, if any, *even if there are differences in project design, structure, capacity, or even number of sites*

- Helps you **identify the best value project over time** compared to business-as-usual (or other scenario) electricity expenses, not just the least cost project

Note: These crisp, mouthwatering apples will slightly distract you from less appetizing financial concepts.

NPV Methodology

Step 1: estimate all future cash inflows and outflows associated with an investment

Step 2: discount all those future cash flows to the present day*

Step 3: add up all discounted cash flows to create the investment's overall NPV

Discount Rate: An interest rate that adjusts future cash earnings down to today's dollar value.

Cash inflows and outflows should be as comprehensive as possible to best inform the NPV analysis

Inflows: (benefits)	Outflows: (costs)
• Solar generation proposed by respondent's design (provided by respondent) • Annual electricity savings (solar generation multiplied by projected electricity price if utility rate) • Federal, state, and utility incentives specific to proposed plan, if applicable	• Upfront project cost, if any (provided by respondent) • Monthly project cost, if any (provided by respondent) • Annual O&M cost, if any (provided by respondent) • Other fees/costs, if any (provided by respondent)

Ultimately, the inputs and assumptions impact multiple potential project scenarios — but net present value offers a direct comparison between different rate scenarios and project structures

Results Summary - Net Present Value & Project Payback			
Utility Rate Scenario	**Rate Increase - Low**	**Rate Increase - Medium**	**Rate Increase - High**
Option 1 NPV (Purchase)	$278,244	$1,352,617	$3,423,083
Option 1 Payback	2032	2043	2042
Option 2 NPV (PPA)	$2,619,867	$1,052,334	$937,732
Option 2 Payback	No Payback in Contract Term	No Payback in Contract Term	2043
Option 3 NPV (PPA Buyout)	$636,834	$2,204,367	$4,194,434
Option 3 Payback	2044	2043	2041

City-Determined Rate Parameters	Unit	Rate Inputs
Utility Electricity Rate (2027)	$/kWh	$0.060
Rate Increase - Low	%	1.5%
Rate Increase - Medium	%	3.0%
Rate Increase - High	%	4.5%

The tax credits include “adders” that add up to 70% of project costs and support multiple local benefits

Investment Tax Credit
w/ Prevailing Wages

+

Domestic Content
or US sourced material

+

Energy Communities

Includes brownfields, coal communities, and other communities that have relied economically on fossil fuels

+

Projects financially benefitting low-income communities

OR

Projects located in low-income or Tribal communities

Source: 26 U.S. Code § 48 - Energy credit. Note: While the production tax credit is calculated differently, the incentive ratios stack in a similar fashion.

So… where are “Energy Communities” exactly?

Brownfields

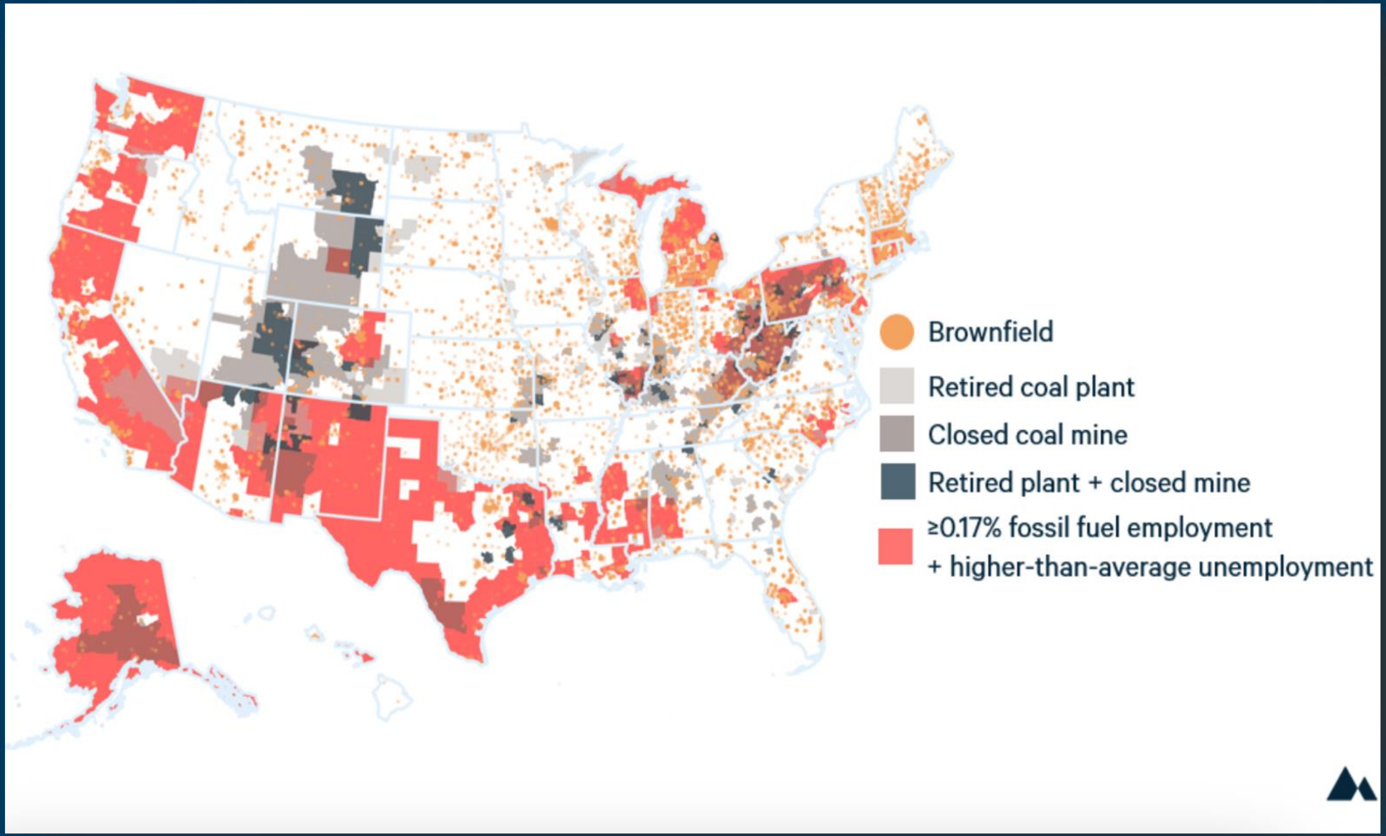
- Sites designated as “brownfields” that contribute to longer term community development legacies

Coal Communities

- Census tracts where a coal-fired power plant has closed since 2010 ***or*** a coal mine has closed since 2000, plus directly adjacent census tracts

Areas of Higher Fossil Fuel Economies

- Areas where direct employment or local tax revenues are substantially related to fossil fuels ***and*** where unemployment is at or above the national average in the previous year



Data Source: US EPA; Chart Source: Resources.org

The 2025 Budget Reconciliation Act accelerates the phaseout of *solar and wind* tax credits and introduces new Foreign Entity of Concern (FEOC) restrictions — other technologies, including battery storage, are still eligible through 2035

	Commence Construction*	Place in service	FEOC restrictions**
~~Type 1~~	~~Before 12/31/2025~~	~~Within a four-year window~~	~~No~~
~~Type 2~~	~~1/1/2026 – 7/4/2026~~	~~Within a four-year window~~	~~Yes~~
Type 3	**After 7/4/2026**	**No later than 12/31/2027**	**Yes**

* Commence Construction guidelines require "physical work of significant nature" for projects larger than 1.5 MW
** FEOC relates to equipment sourcing and related federal requirements

From now on, solar and wind projects that have not yet started construction must place project in service no later than December 31, 2027 to claim the federal tax credits.

While solar and wind energy projects will no longer qualify for the federal clean electricity investment tax credits, other energy technologies still do through 2035.

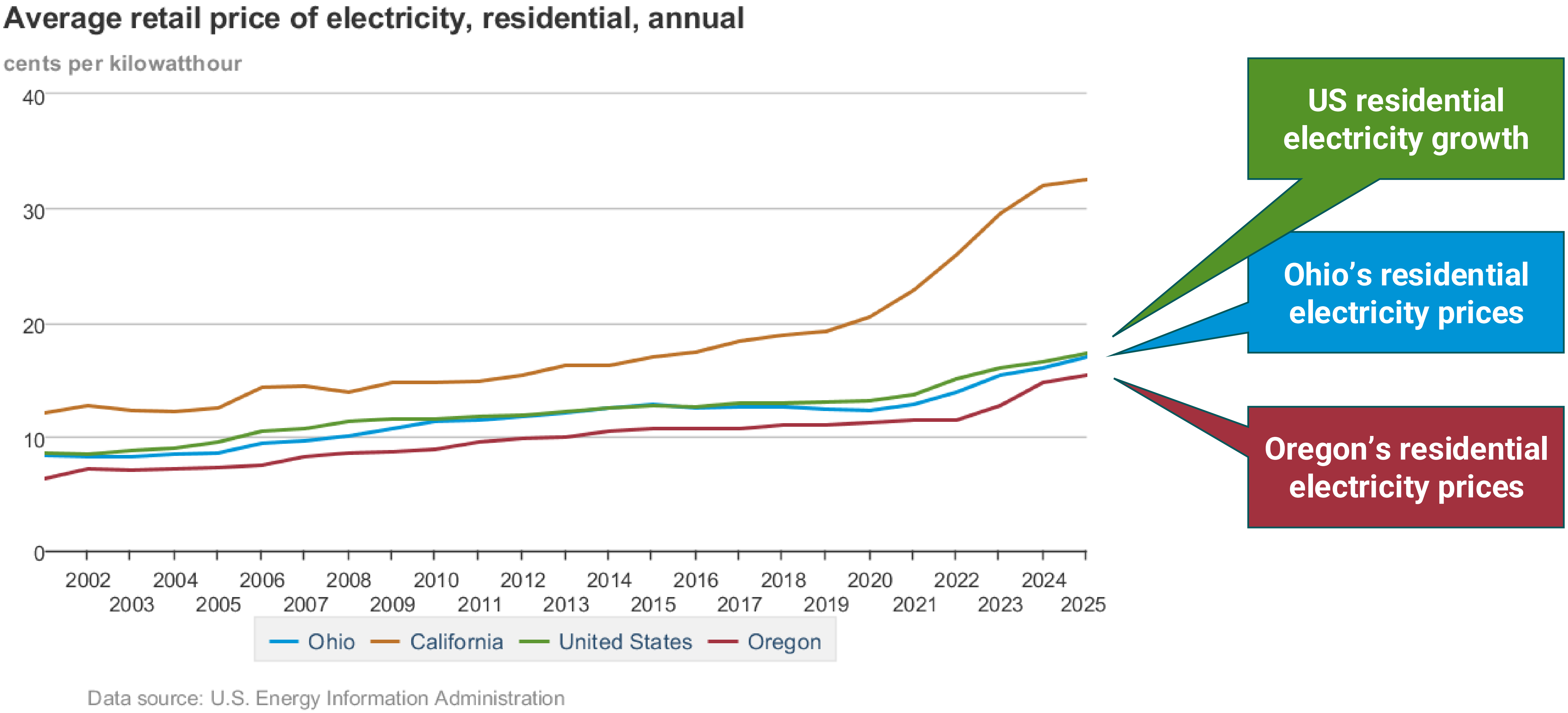
Battery storage may be the most logical technology after (or paired with) solar for brightfields.

Pulse Check

- ✓ *Capital vs. Operating Costs*
- ✓ *Accounting for Cost Savings Over Time*
- ✓ *Current Status of Federal Tax Credits*

A Conversation with Cincinnati’s Energy Manager

Ohio’s electricity prices have increased steadily over 25 years and trended very similarly to the US residential average



Our Panel

Claire Weston
Program Director
Center for Creative
Land Recycling

Rob McCracken
Energy Manager
City of Cincinnati

Matthew Popkin
Manager
RMI Brightfields
Accelerator

In December 2025, Cincinnati approved a solar project to reactivate a closed landfill and advance the City's clean energy, sustainability, and operational goals

Overview

- Center Hill Landfill closed in 1976
- The site will soon host 9.8 MW solar installation on its surface – equal to powering ~1,700 homes
- This project will deliver electricity for municipal operations
- Once built, this will be the 2nd largest landfill solar project in Ohio and 13th largest in the country

The City pursued a hybrid ownership model to balance risk and financial return despite the loss of a sizable federal grant

Key Financial Details:

- The $25.3M project is expected to generate more than $3.54 million in savings over the 25-year life of the project
- Expected to achieve a 15–17 year payback period
- Notably, the City *lost* $10M in previously awarded US EPA Solar for All funding in summer 2025 and had to pivot its approach

Key Ownership Structure Details:

- Half the project will be owned by the City and paid for using municipal bonds; the other half will be owned by the developer, UPower Energy, and structured as a power purchase agreement (PPA) with the option for the City to buy out the project in year 6
- Ultimately, the hybrid approach enabled the City to balance risk and estimated financial return

Moving Forward

What technical assistance is available?

Identifying Your Most Promising Brightfields Opportunities

- Site pre-screening
- Strategic reuse planning
- Utility engagement

Funding & Financing Guidance

- Unpacking brightfields-related incentives and funding strategy
- Financial modeling support
- Assistance with brownfields grant applications

Accelerating Brightfields Procurement

- Procurement support
- Insights from the brightfields market

Reflections & Feedback

Next Steps

Slides, recording, and resources referenced will be shared by next week

Stick around for the next 30 minutes for office hours to ask site/community specific questions

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Thanks for joining us!

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