November Student Initiative for Sustainable Energy Newsletter

Covered in this month’s newsletter:

What happened at the COP30 climate summit?

Sustainable energy financing

Innovation in wind and solar

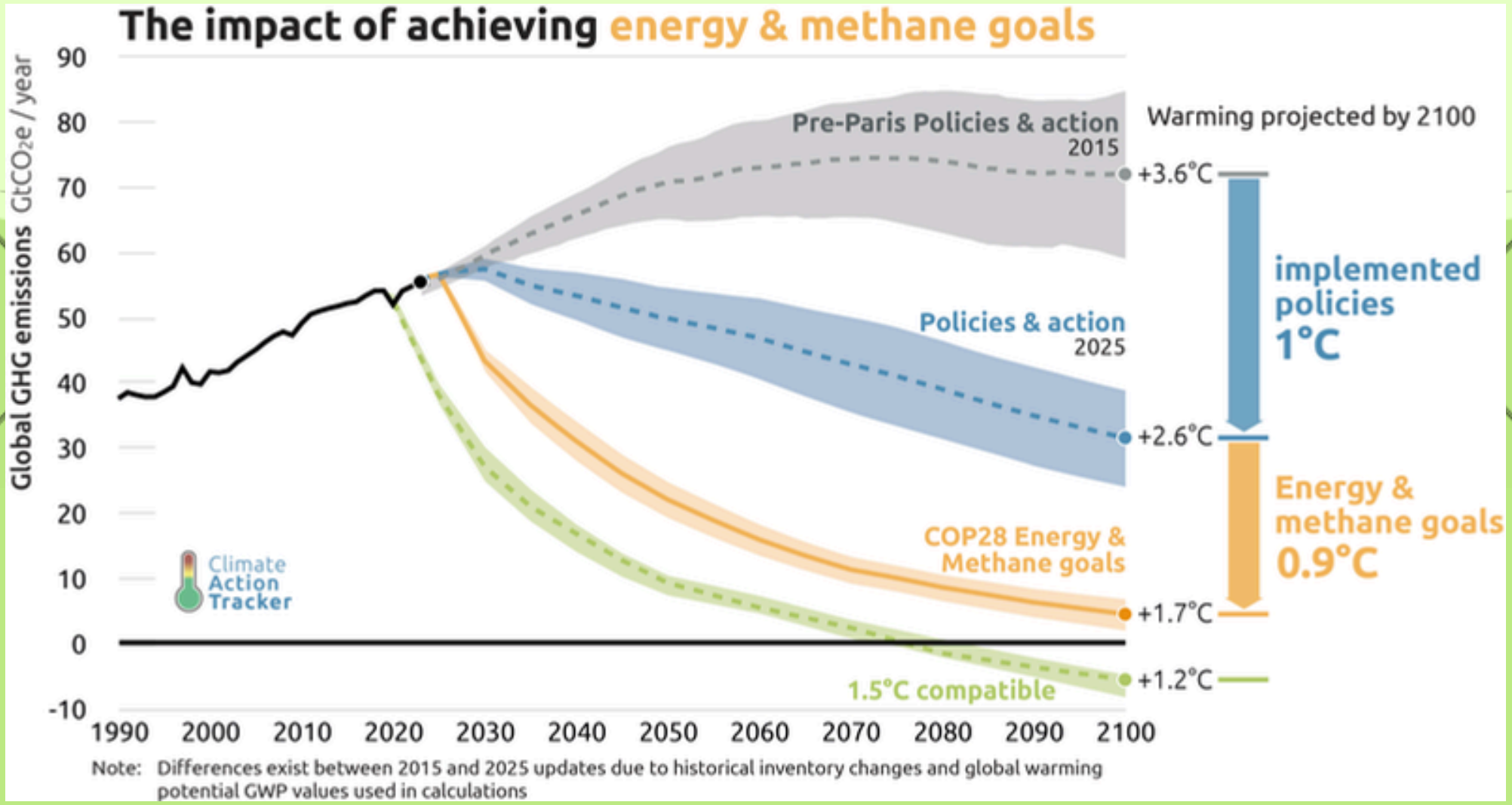
COP30 Conversations

The United Nations Climate Change Conference or the Conference of the Parties (COP) is the global gathering for climate discussion.

COP30, which happened in Brazil from November 10-21st, brought together delegates from nearly 200 countries to discuss the progress being made from previous COP climate commitments.

Sustainable Energy at COP30

The energy transition away from fossil fuel sources has previously been a major focus of preceding COP meetings. This year, the focus shifted with an emphasis on who should finance global climate action. Global greenhouse gas emission commitments and pledges were weakly addressed at the latest COP. 80 of the 194 attending countries did not resubmit a GHG emission pledge at the COP30.



https://newclimate.org/resources/publications/climate-action-tracker-briefing-three-key-near-term-actions-could-bring

COP30 Conversations: Key Outcomes

Day 2: Launch of the **Beat the Heat Implementation Drive**. Mobilizing over 185 cities at risk of extreme heat to implement local heat resiliency and energy-efficient cooling strategies.

https://cop30.br/en/news-about-cop30/cop30-evening-summary-november-11

Day 5: 14 developing countries announced plans to **develop national platforms for climate action through the Green Climate Fund (GCF)** readiness program.

https://www.greenclimate.fund/news/fourteen-new-country-platforms-announced-collaboration-gcf-drive-country-led-climate-solutions
https://cop30.br/en/news-about-cop30/cop30-evening-summary-november-15

COP30 Conversations: Key Outcomes

Day 8: Launch of the **Tropical Forest Forever Facility (TFFF), a global fund for forest conservation.** TFFF aims to blend public and private funding to equip local indigenous populations and communities with the necessary resources to progress forest conservation.

https://cop30.br/en/news-about-cop30/cop30-evening-summary-november-17

https://tfff.earth/

TROPICAL FOREST FOREVER FACILITY

COP30 Conversations: Key Outcomes

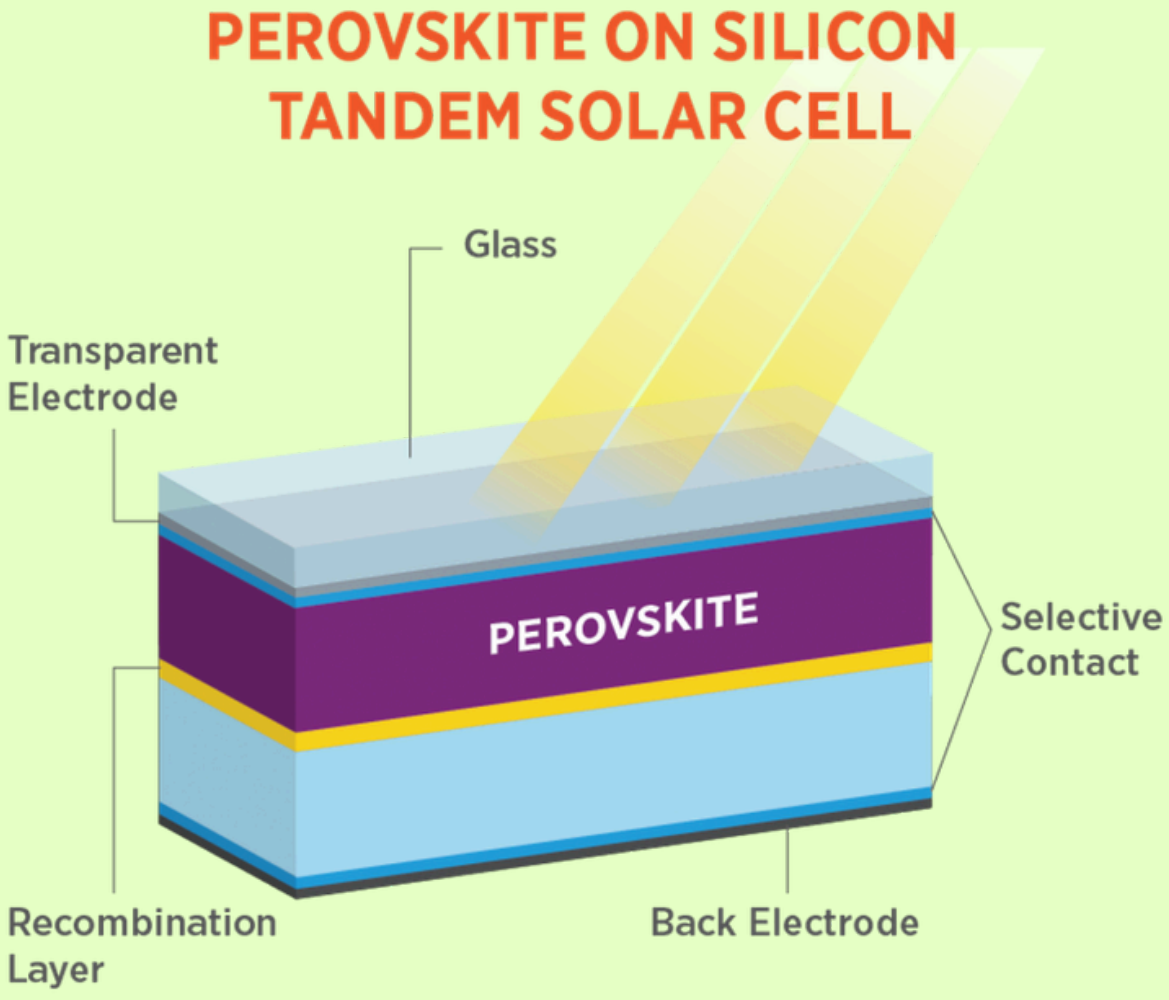
Day 9: Launch of the **One Ocean Partnership, with $20 billion of investment in a regenerative ocean action**. Particular emphasis was placed on recurring investments for mangrove and saltmarsh protection.

https://cop30.br/en/news-about-cop30/cop30-evening-summary-november-18

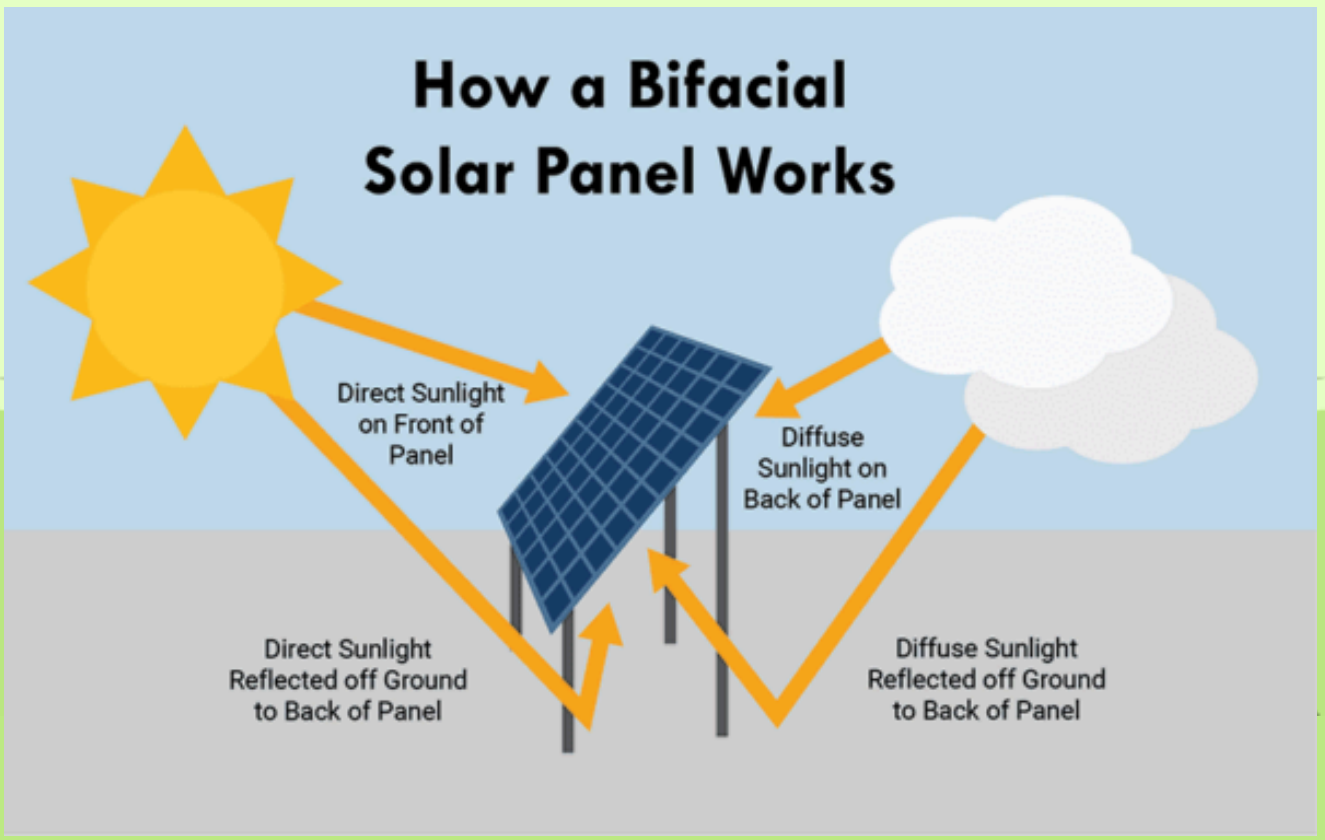
https://www.nature.scot/landscapes-and-habitats/habitat-types/coast-and-seas/coastal-habitats/saltmarsh

Recent Advancements In Solar

Perovskite Solar Cells Increase Panel Efficiency: Perovskite ($CaTiO_3$) is a material made of organic compounds that is paired in series with a silicon-based semiconductor, increasing the overall photon (sunlight) usable range and increasing the panel efficiency.



Bifacial Solar Panels:



An increasingly popular design with solar PV cells on both sides of the panel. These utilize direct solar irradiance as well as diffuse sunlight and reflections, increasing the energy production per panel.

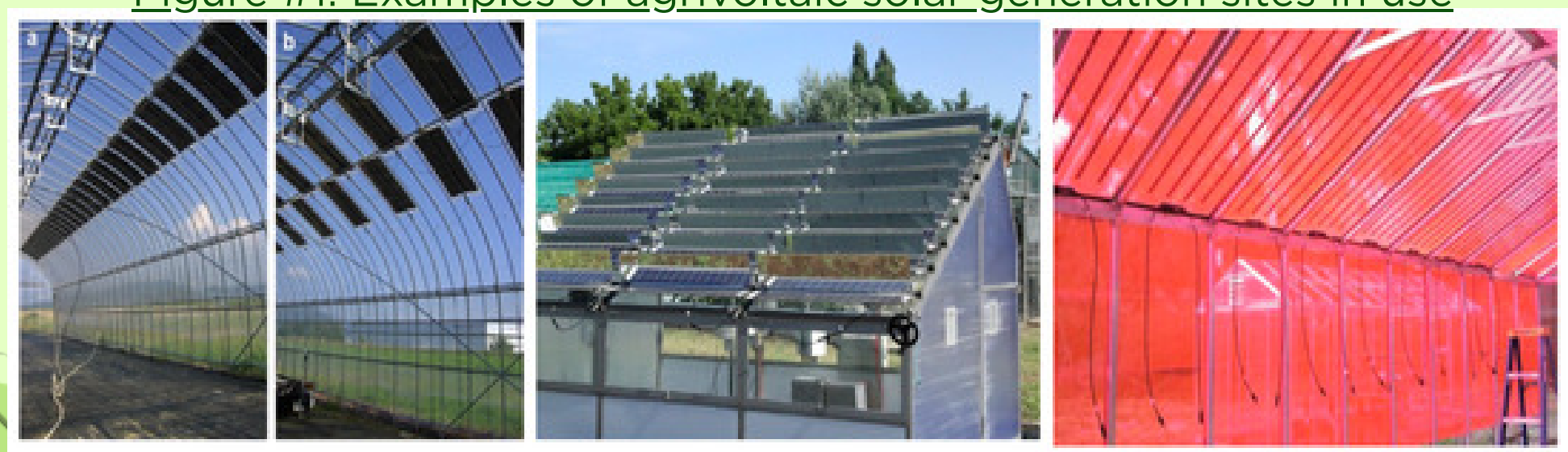
Addressing Solar Land Use Through Agrivoltaics

What is Agrivoltaics?

Agrivoltaics is the process of simultaneously using land for both agricultural production and solar energy generation

(a) Heggeslbach (Germany) (b) Heggeslbach (Germany) (c) Curacaví (Chile)

Figure #1: Examples of agrivoltaic solar generation sites in use



(a) Fixed with different layouts (b) Dynamic (c) Innovative PV solution

Figure #2: Approaches to integrate PV into greenhouse's envelope

Five types of agrivoltaic sites currently exist: **elevated systems**, **inter-row** systems, **grazing systems**, **pollinator habitat**s, and **PV greenhouses**. Elevated and interrow differ in height (Figure #1), grazing and pollinator habitats adapt these layouts for livestock or native vegetation. PV greenhouse incorporates solar panels into the roofs or walls of greenhouses while creating a controlled environment for plant growth (Figure #2).

Wind Turbines & Corrosion-Resistant Coatings

Offshore turbines operate in harsh ocean environments that aggressively corrode the metal structural components.

Why we need coatings:

- Corrosion accounts for ~20–30% of offshore O&M costs in many regions
- Coatings extend component lifetimes from 10–15 years → 25+ years and reduce costs

Figure #3: Corroding Turbine Platform

How different types of coatings work:

Barrier coatings (epoxy, polyurethane): Create a physical layer blocking water, oxygen, and salts.

Cathodic protection coatings (zinc-rich primers): Allow the coating to corrode sacrificially instead of the steel

Advanced polymer films: Increase toughness, UV resistance, and abrasion resistance from waves and suspended sand

Figure #4: Ice on Turbine Blade

Ice-phobic coatings (emerging technology): Reduce ice buildup on blades and help deflect salt spray from surfaces

Current Wind News:

Offshore wind alleviates grid woes in winter,

Charles River Associates study says.

- The study finds East Coast offshore wind would deliver >90% reliability value in winter, rivaling gas plants during peak heating demand
- Offshore wind output aligns with winter evenings, when grid stress is highest and onshore renewables tend to underperform.
- Pausing or cancelling offshore wind projects could increase blackout risk and raise power costs, the analysis warns.

A turbine off the coast of Rhode Island, home of the first U.S. offshore wind farm (David L. Ryan/The Boston Globe via Getty Images)

https://www.canarymedia.com/articles/offshore-wind/grid-reliability-east-coast-trump-study?amp%3Butm_medium=email&%3Butm_campaign=canary&_hsenc=p2ANqtz-8utVU1UsaYUCXMGR-wymeMdA33CjtBxTknsWVT5ZDQWshE9lz0sSo7tOIP8J_lCbhZ2J6y4EQ_anMMJRMLtExaNttY0w&_hsmi=391380902&utm_source=newsletter

Renewable Energy Finance: Funding

Renewable energy projects are funded in a variety of ways, including:

Special Purpose Vehicles

Funding projects using non-recourse debt, meaning lenders are repaid exclusively from the project's cash flow, shielding the parent company from liability

Green Loans

A specific type of loan from investors where the money *must* be used for eco-friendly projects, like building a solar farm

Power Purchase Agreements

A long-term agreement to sell electricity at a set price, which guarantees income and makes banks willing to lend money for building the project

In addition to this funding, many renewable projects rely on public funding through investment tax credits or other government intervention

Renewable Energy Finance: Investing

Individuals can invest in renewable energy companies through a variety of ways

How to Invest

- Direct Project Investment
- Buying Publicly Traded Stock
- Clean Energy Funds and ETFs
- Green Bonds

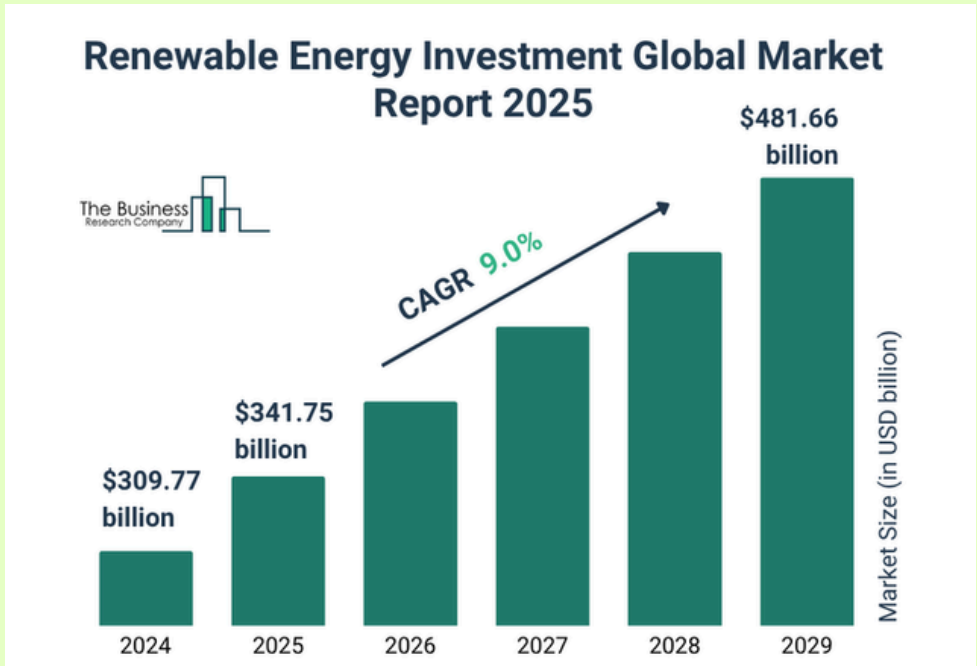
Why Invest

Stable long-term revenue: PPAs and tax credits create predictable cash flows.
Growing demand: More electrification means more need for clean power.
Policy support: Federal and state incentives lower risk and boost returns.
Energy security: Renewables reduce dependence on volatile fuel prices.

Renewable Energy Finance in Action

Trends

- Growth in battery storage investing.
- More investors buying transferable tax credits.
- Rising interest in community solar, virtual power plants, and grid upgrades.

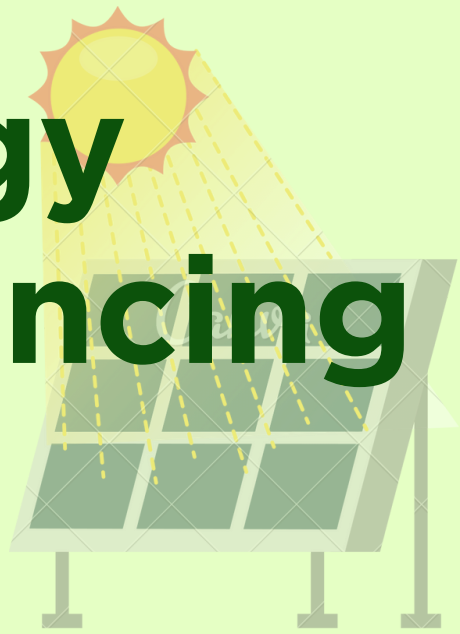


EXAMPLE: Generate Capital

Generate Capital is one of the leading sustainable-infrastructure investors in the U.S., specializing in distributed solar, battery storage, microgrids, EV fleets, and energy efficiency.

Generate has financed over $10 billion in sustainable infrastructure, enabling thousands of distributed clean-energy and decarbonization projects across North America.

Renewable Energy Finance: Private Financing



Types of Private Financing:

Traditional Cash Equity:

- Offering a percentage of ownership in the project company in return for cash investment.

Debt:

- Types of debt include construction loans, term loans, revolving credit facilities, and commercial bank loans.

Tax Equity/Credits:

- Tax equity occurs when an investing entity invests in a project to obtain a tax reduction.

Break Down of Funding Sources for Private Projects

Funding Source	Typical Percentage of Total
Tax Equity + Credits	40–50%
Debt	20–40%
Cash Equity	20–40%

Renewable Energy Finance: Outlook

Challenges:

- Reduced government incentives.
- Macroeconomic uncertainty (especially concerning the rare-earth metals supply chain).
- Persisting steep upfront costs.

By the Numbers:

- **Investment Decline:** Wind and solar investments in the first half of 2025 fell by 18%, totaling nearly US$35 billion
- **Capacity Growth:** Renewables accounted for 93% of US capacity additions (30.2 gigawatts) in 2025.
- **Storage Capacity:** US operating storage capacity reached 37.4 GW by October 2025, marking a 32% increase year to date.

Up Next for Companies:

- Secure Safe-Harbor Credits Fast: Developers must accelerate construction to lock in credit eligibility.
- Prioritize Resilience and Efficiency: Must also invest domestically to mitigate FEOC risks.