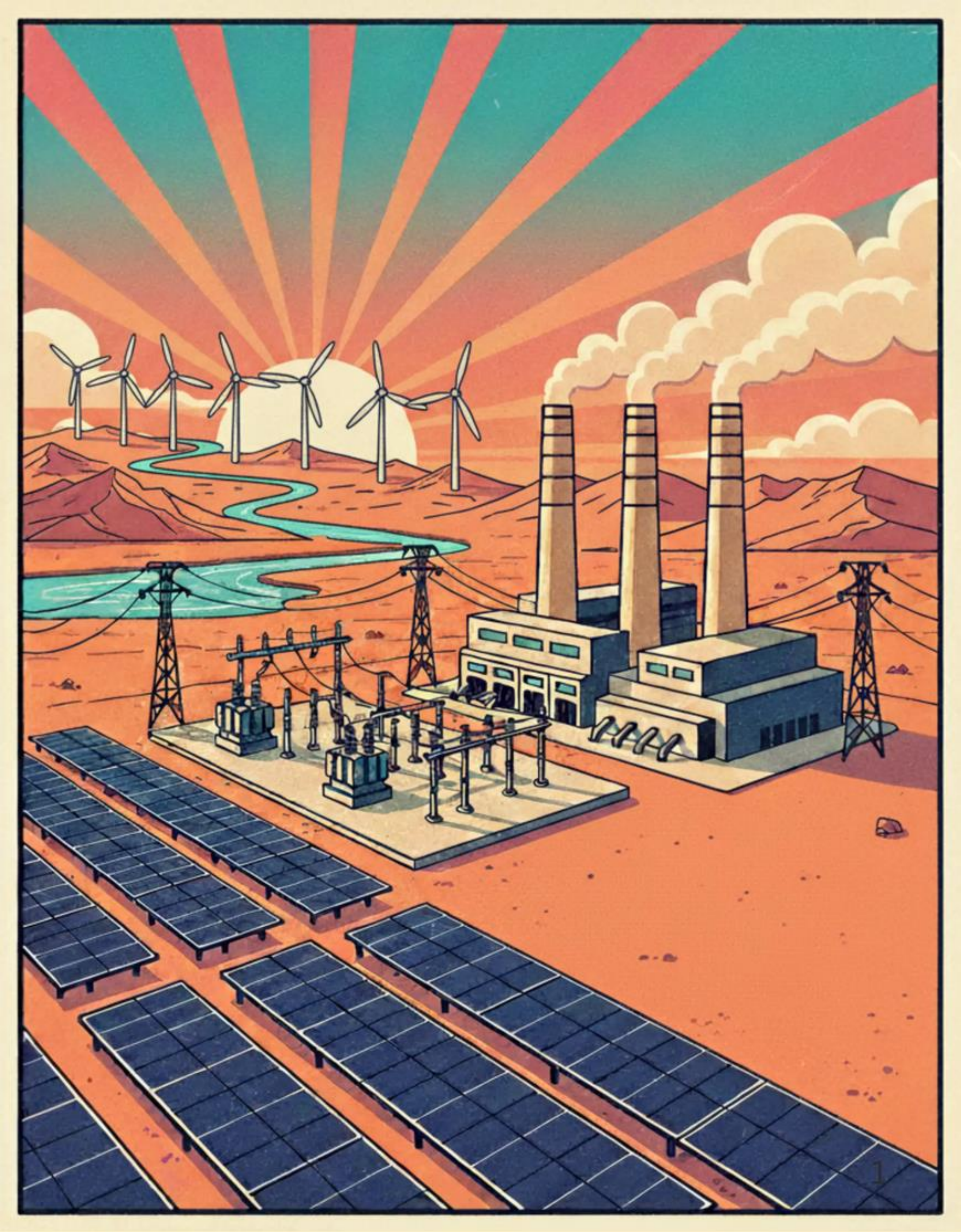

Existing Power Plants Sharing Grid Access with New Resources Can Lower Costs and Double Utah's Generation Capacity

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Working Paper 2025

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This working paper is circulated for discussion and comments. The paper has not been peer-reviewed or been subject to review by any editorial board.

Fast-tracking 13 GW of new capacity using existing grid with $1B+ savings

The Challenge

- Utah has 39 GW of active projects in interconnection queue (205 projects), with average connection timelines of 3-5 years—creating significant delays for new energy deployment.
- Utah's Operation Gigawatt initiative aims to double electricity capacity in 10 years to meet surging demand from data centers and industrial growth. Yet 67% of energy-generating plants will be offline in less than 20 years, with only 16% of those replaced with equivalent energy resources.
- New gas plants ordered today won't come online until 2030-2031 at earliest, creating a critical gap in meeting near-term capacity needs. Capital costs have surged: recent combined-cycle projects now cost $2,000/kW or more, up from $1,116-1,427/kW for 2026-2027 projects, making new gas generation increasingly expensive.
- U.S. electricity demand is projected to increase 25% by 2030 and 78% by 2050 (ICF, 2025). Power availability is now the primary site selection factor for data centers. Utah's plentiful land and high qaulity solar resources creates opportunities, but extended interconnection timelines limit competitiveness for these high-value investments.

The Solution

- Utah's 7.6 GW thermal fleet is severely underutilized—peaker gas plants operate at 24.3% capacity factor and oil/gas steamers at 15.5%. Similarly, existing renewables (solar 27.9%, wind 22%) use only a fraction of their interconnection capacity.
- Deployment of new generation at these existing underutilized plants can provide cost-effective energy and capacity without building new transmission infrastructure, bypassing lengthy interconnection queues.
- Utah can add up to 13 GW of capacity through surplus interconnection by 2030: including 7 GW at thermal plants, and 4 GW at renewable plants enabled by 2.5 GW of 6-hour storage.
- Adding battery storage to existing solar and wind plants enables the addition of more solar and wind capacity at the same interconnection point. This combination with 6-hour batteries can achieve approximately 75% effective capacity factor (64.8% solar, 76.8% wind), transforming variable output into reliable, firm capacity.
- Surplus interconnection can save $1.1 billion in interconnection costs, equivalent to $1,032 per Utah household. Projects can be completed in 12-18 months compared to 4-5 years for standard queue projects.

Policy Recommendations

- PacifiCorp and other utilities should transparently evaluate surplus interconnection potential at existing resources (thermal and renewable) and include cost-effective opportunities in their Near-Term Action Plans, demonstrating how SIS meets reliability, affordability, and sustainability goals.
- Issue RFPs for projects at utility-owned sites, modify existing offtake agreements with independent power producers to add surplus capacity (blend and extend), and procure SIS resources wherever cost-effective for ratepayers—following best practices from OG&E and Xcel Energy.
- Utah should streamline permitting and fast-track projects connecting via surplus interconnection, recognizing that these projects are built at existing power plant sites with known points of interconnection, reducing land use conflicts and transmission infrastructure needs.
- Utah Governor's Office of Energy Development and local economic development agencies should highlight surplus interconnection capacity in site selection and readiness programs, helping data centers and industries access power faster while saving approximately $1.1B in grid costs.

Thermal Plant constitute 75% of Utah’s installed capacity

Capacity Breakdown

Thermal technologies account for 75% of installed capacity, while renewables represent 25%

Total Capacity: 10,146 MW

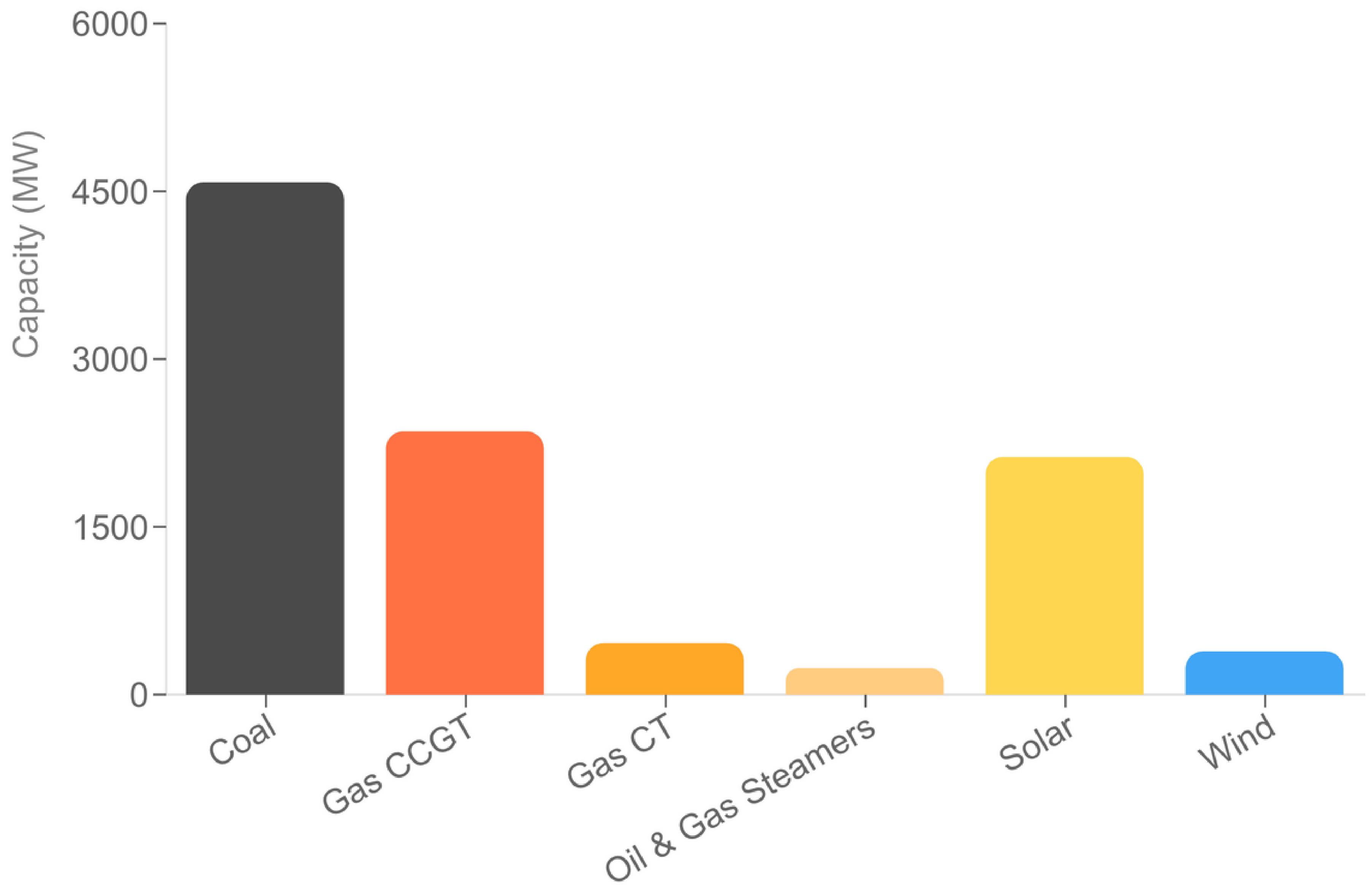
Thermal: 7,633 MW

- Coal: 4,581 MW (60%)
- Gas CCGT: 2,354 MW (31%)
- Gas CT: 461 MW (6%)
- Oil & Gas Steamers: 238 MW (3%)

Renewable: 2,513 MW

- Solar: 2,127 MW (85%)
- Wind: 387 MW (15%)

Installed Capacity by Technology (MW)



Thermal technologies account for 75% of installed capacity, while renewables represent 25%

Thermal plants are underutilizing their interconnection capacity

Interconnection Underutilization

Thermal plants like peaker gas plants and oil/gas steamers operate at extremely low capacity factors. In Utah, peaker gas plants operate at 24.3% capacity factor and oil/gas steamers operate at 15.5% capacity factor, meaning for 76% of the time and 85% of the time, respectively, the interconnection capacity sits idle.

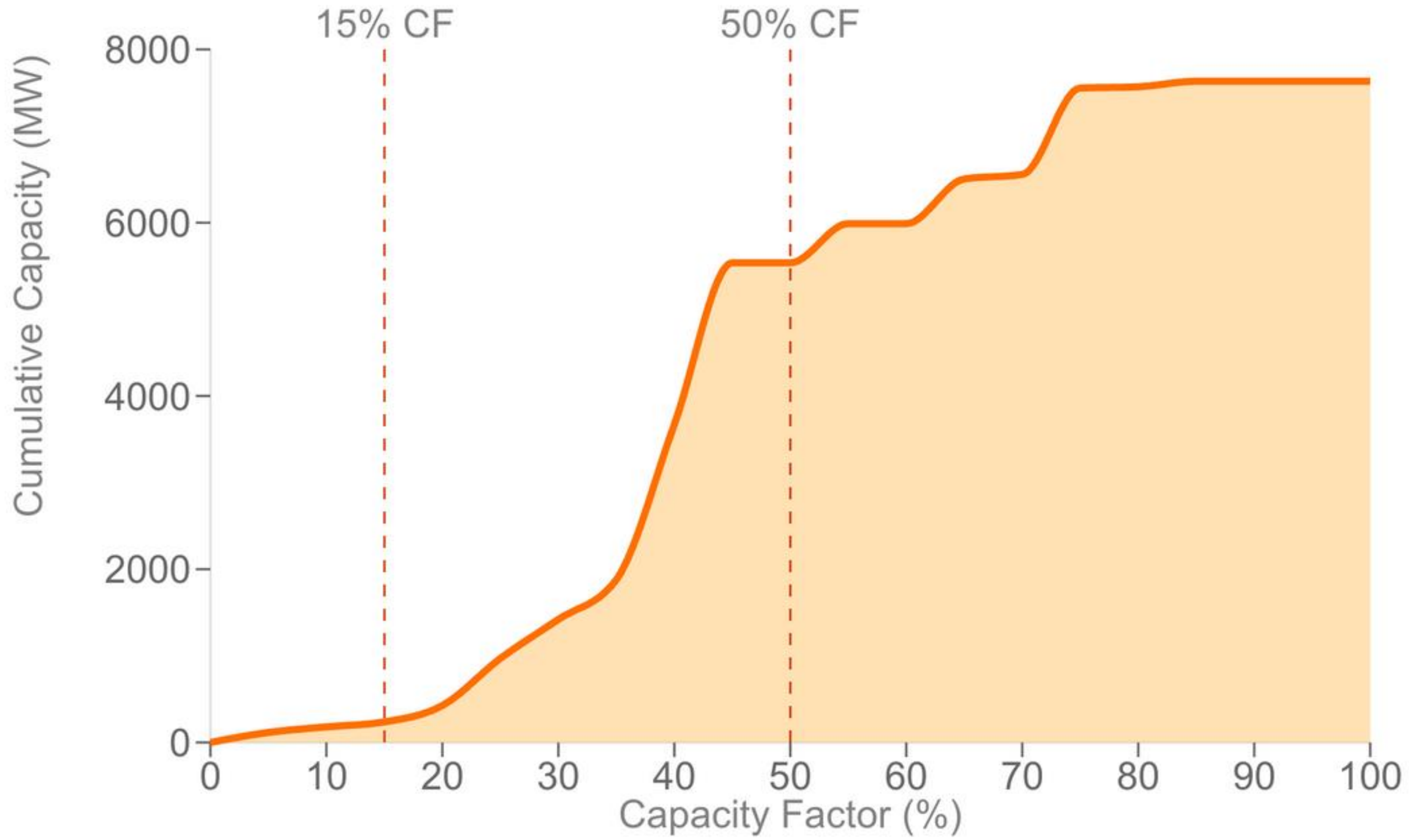
2024 Thermal Capacity Factors

- Gas CCGT: 57.1%
- Coal: 38.9%
- Gas CT: 24.3%
- Oil/Gas Steam: 15.5%

Underutilized Interconnection Capacity

- **1.4 GW** operates at <30% capacity factor
- Dominated by gas turbines (0.3 GW) and coal plants (0.9 GW)

Cumulative Thermal Capacity by Capacity Factor



Steep rise shows majority of capacity concentrated in low-utilization plants

Renewable plants are underutilizing their interconnection capacity

Renewable Interconnection Underutilization

Because of the intermittency, renewables utilize their interconnection only when the sun is shining or wind is blowing. The average capacity factor in Utah for solar is 27.9%, for wind is 22%. This means solar plant interconnection is idle 72.1% of the time, and wind plant interconnection is idle 78% of the time.

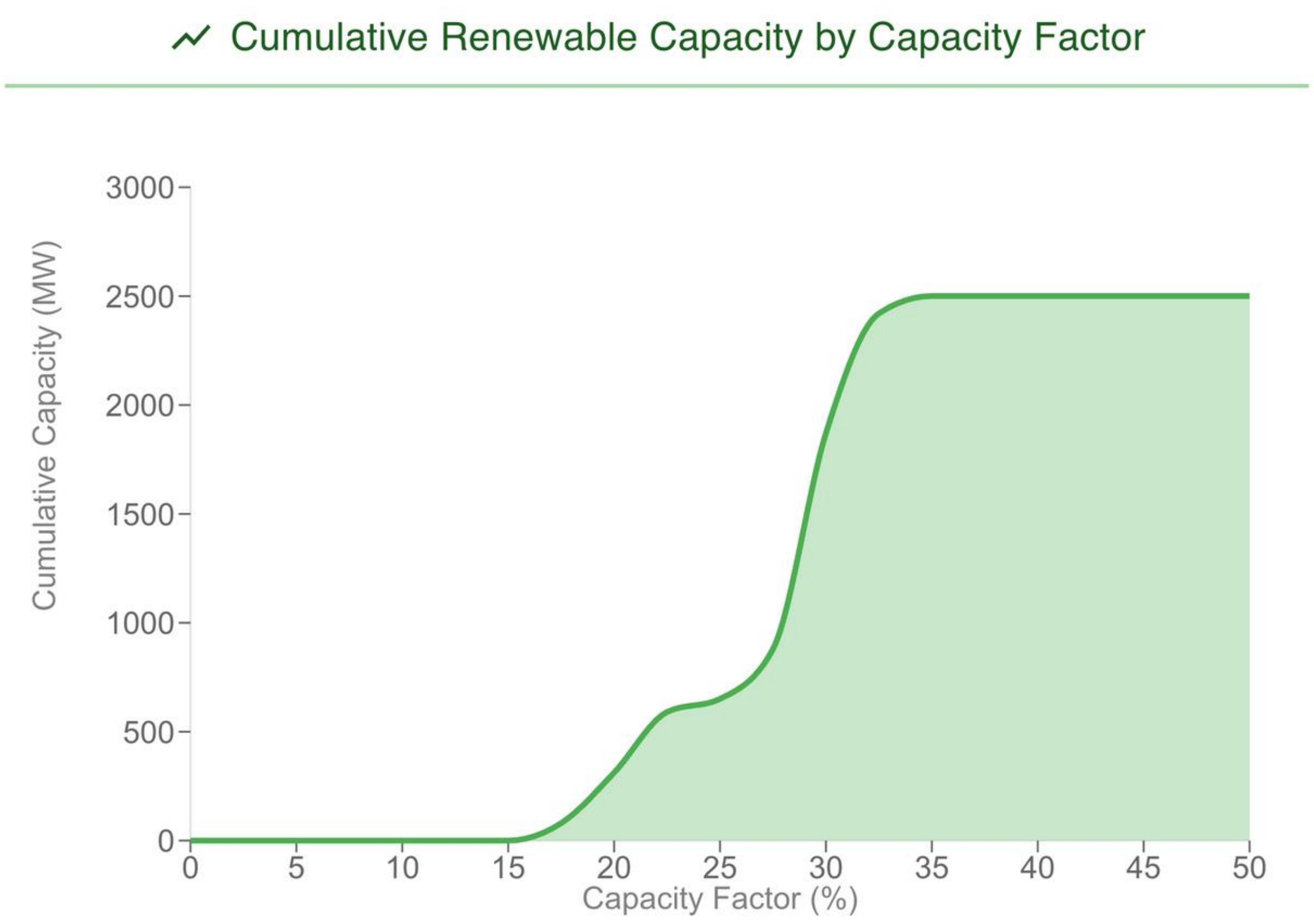
Technology Capacity Factors

- Solar: 27.9% (2126.5 MW)
- Wind: 22% (386.5 MW)

Aggregate Renewable Performance

- Total Capacity: 2,513 MW
- Weighted Average CF: 27.0%

The 2.5 GW renewable capacity utilizes their interconnection only 27.0% of the time



Marginal Cost of Thermal Generation

$ Thermal Plant Economics

Utah's 7.6 GW of installed thermal capacity shows clear cost separation by technology. Coal plants (4.6 GW) have the lowest variable costs below $35/MWh. Gas combined-cycle units (2.4 GW) operate in the $35-45/MWh range. Gas combustion turbines (460 MW) require $50-65/MWh to run. Oil and gas steamers (238 MW) have the highest costs above $70/MWh. This cost hierarchy drives plant dispatch—expensive units sit idle until electricity prices rise above their operating costs, leaving their interconnections underutilized.

Capacity-Weighted Average Variable Costs

Variable costs include fuel and variable O&M—the marginal cost to generate each MWh

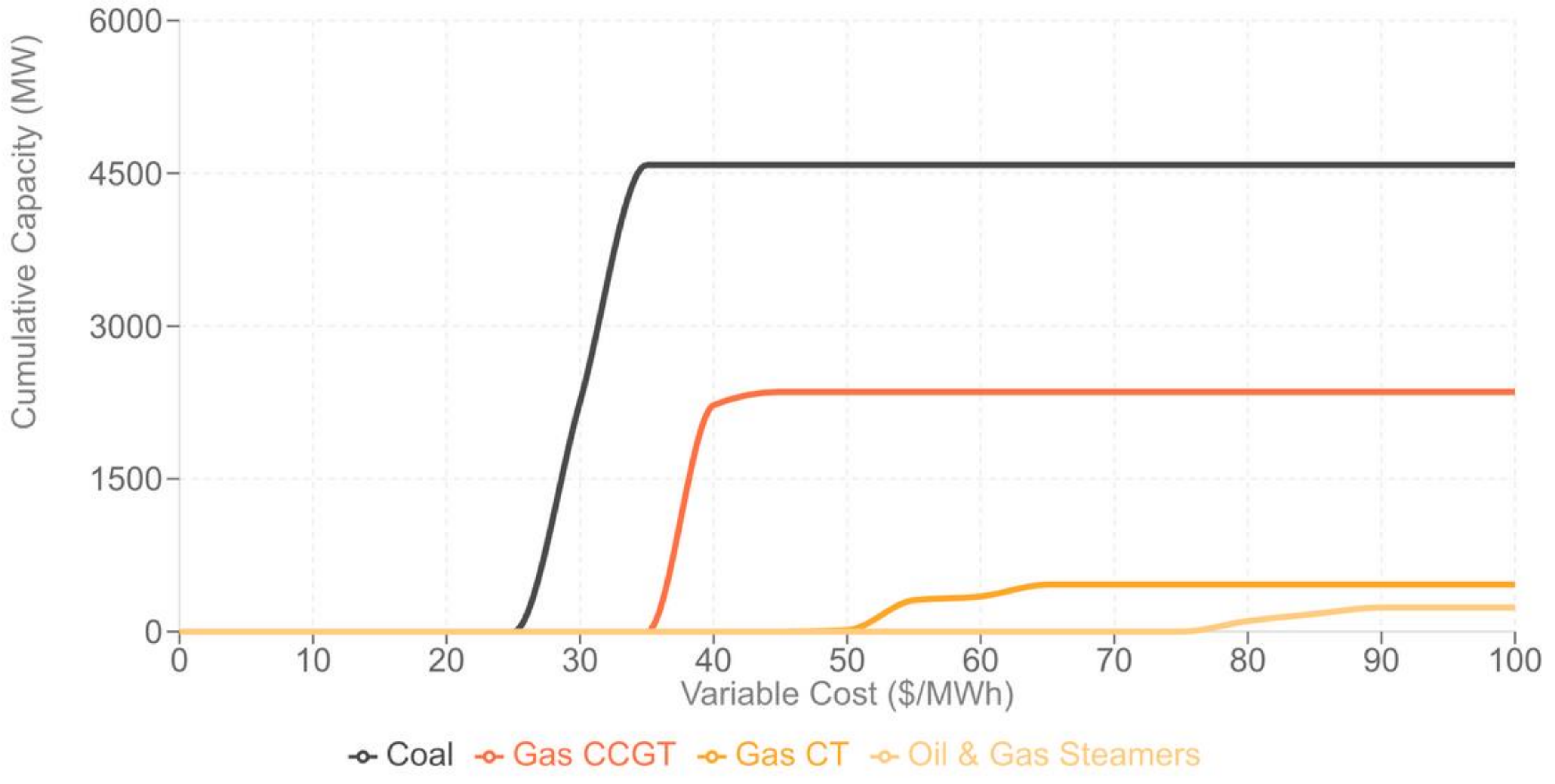
- Coal: $30.50/MWh (4.6 GW installed)
- Gas CCGT: $37.28/MWh (2.4 GW installed)
- Gas CT: $54.18/MWh (0.5 GW installed)
- Oil & Gas Steamers: $82.91/MWh (0.2 GW installed)

Economic Dispatch Impact

- Total Thermal Capacity: 7.6 GW
- Weighted Average VC: $35.08/MWh

29.6% of capacity competes economically at <$30/MWh

Thermal Capacity by Variable Cost & Technology



Coal and Gas CCGT dominate low-cost ranges while peakers (Gas CT) cluster in $50-70/MWh range

Project Pipeline

Project Pipeline

Pipeline Summary:

- Total Projects: 50
- Total Capacity: 6,001 MW
- 60% increase from current capacity

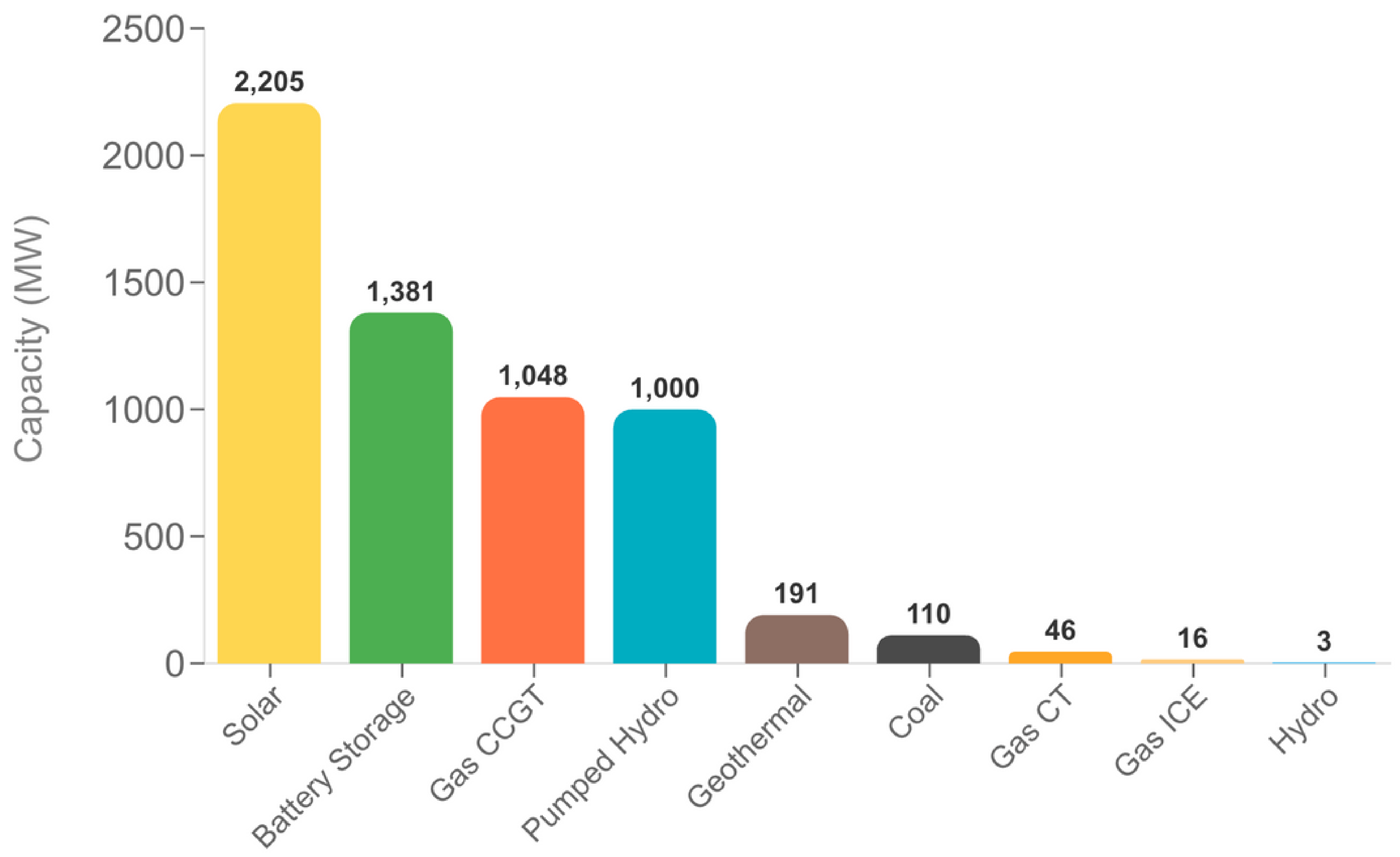
Capacity by Category:

Renewable: 2,400 MW (40%)
Solar and other renewables

Storage: 2,381 MW (40%)
Battery and pumped hydro storage

Natural Gas: 1,111 MW (19%)
CCGT and combustion turbines

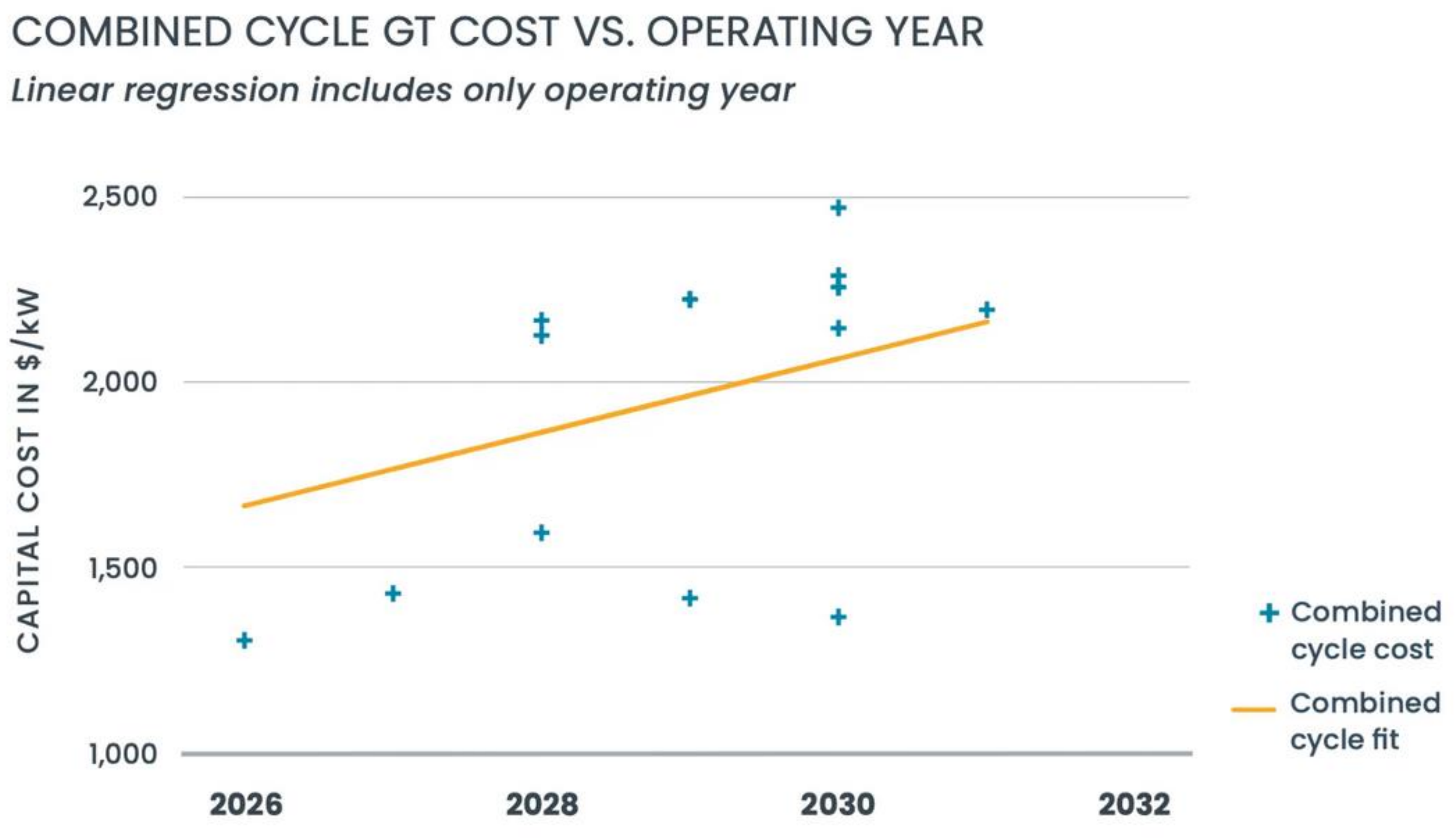
Proposed Capacity by Technology



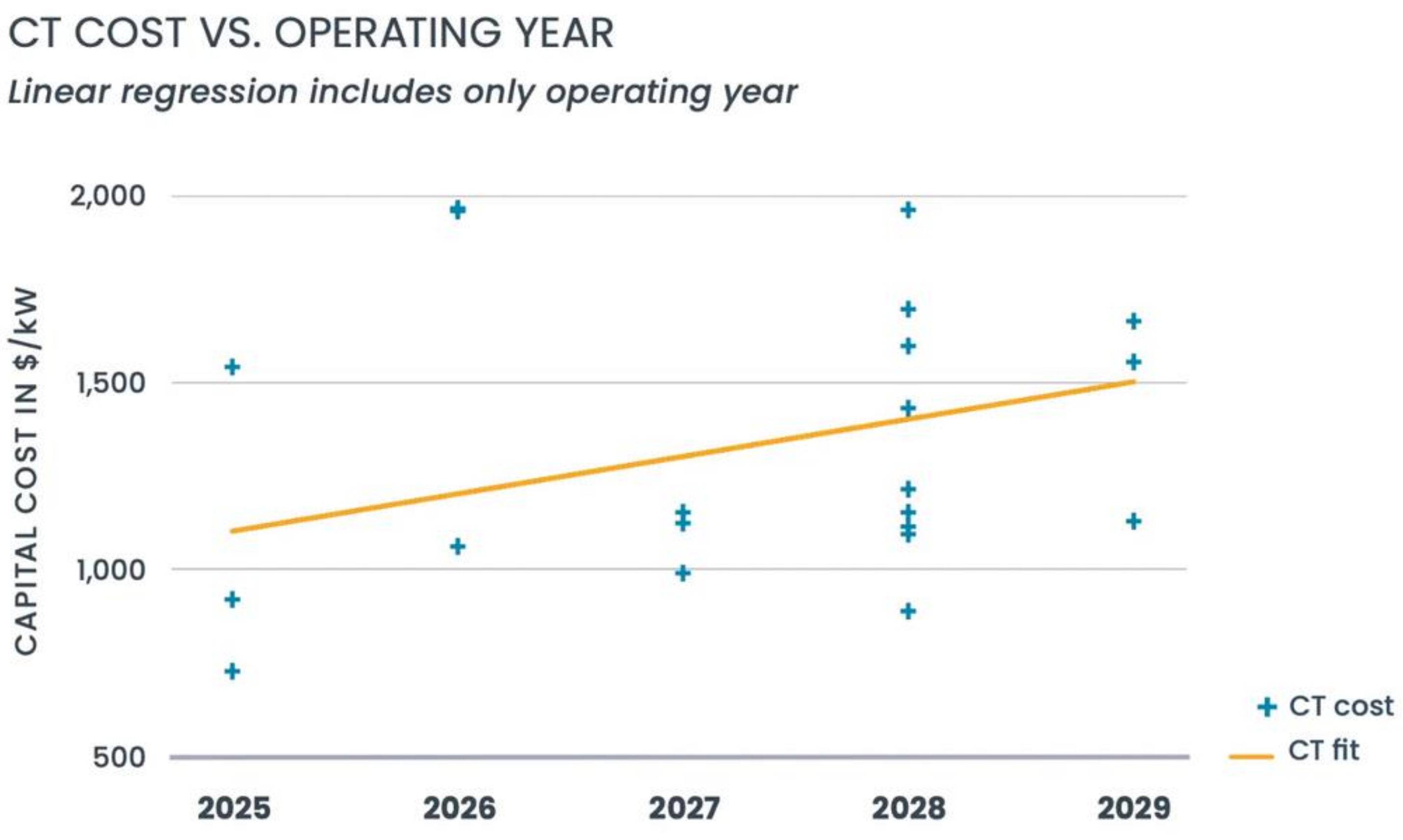
Solar and storage technologies dominate Utah's proposed generation pipeline

Gas Capital Costs and Timelines have increased significantly

Combined Cycle (CCGT) Capital Costs



Simple Cycle (CT) Capital Costs

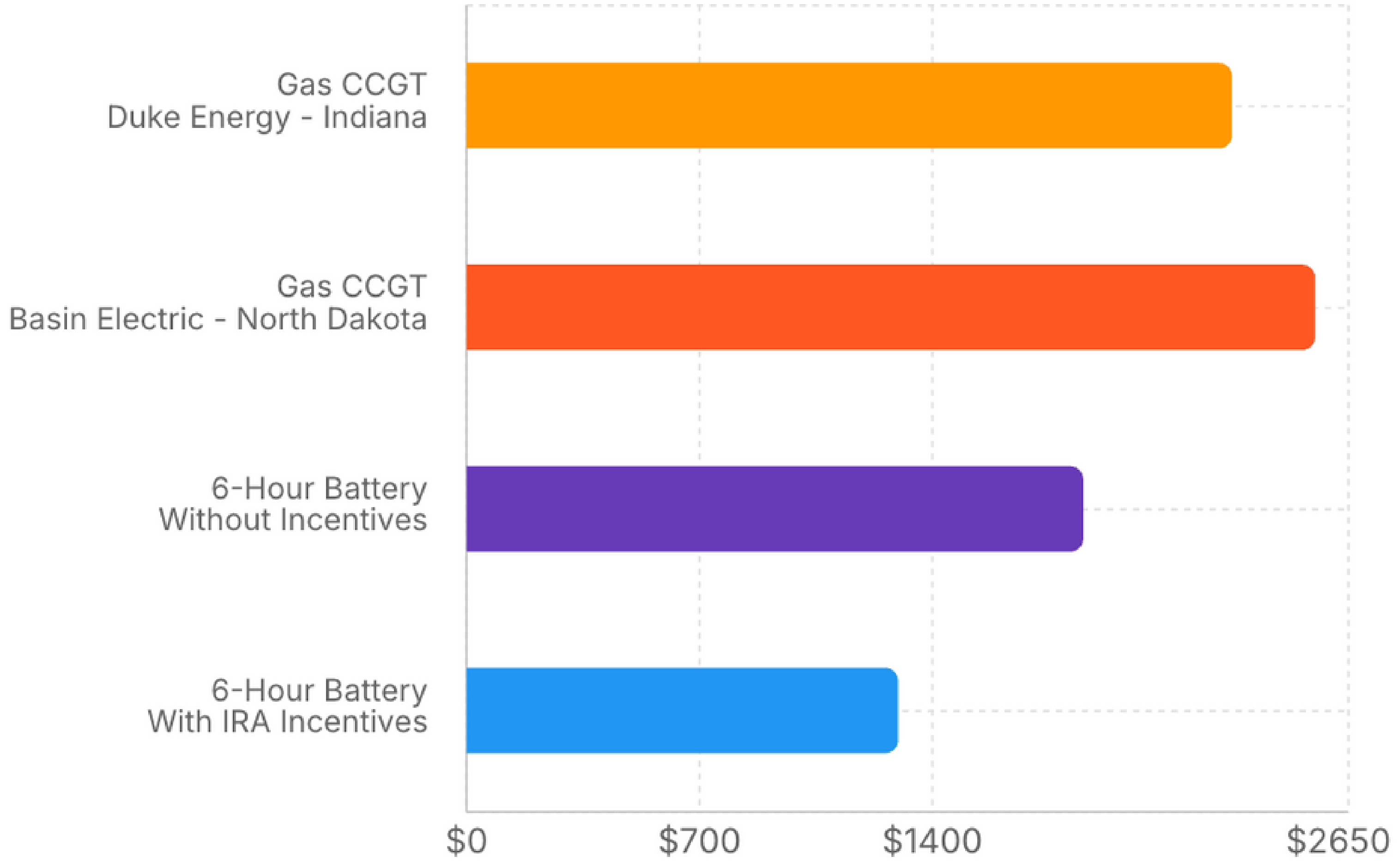


Source: GridLab "The New Reality of Power Generation" Report, September 2025

Storage capital costs are cheaper than gas

Capital Cost Comparison ($/kW)

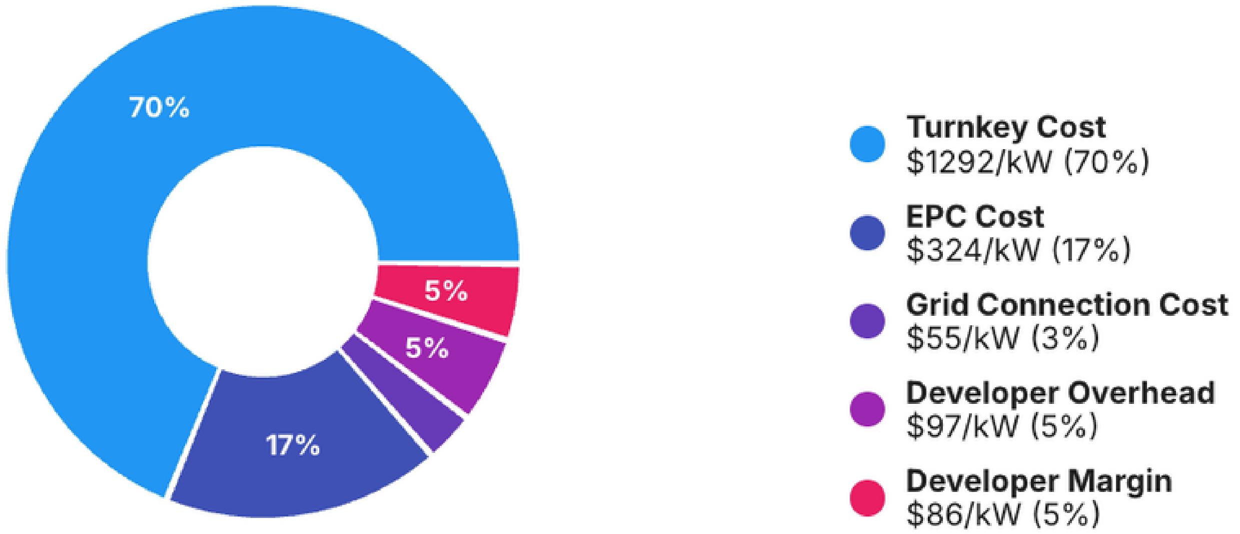
6H Battery with IRA: $1297/kW



Source: BNEF 2025 and PUC Filings

6H Battery Cost Components (wo Incentives)

Total: $1853/kW



Source: BNEF 2025

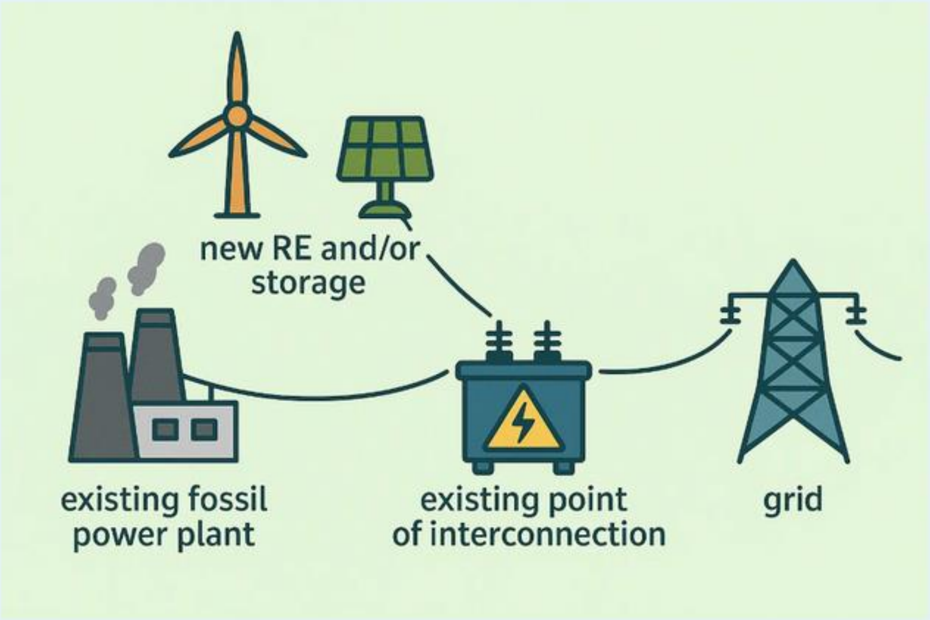
Battery Storage Outperforms Gas Plants

- Gas costs rising ($2,300-2,550/kW)
- Battery costs dropping every year
- Battery supply chain advantages over gas

- 2018: 2,000 cycles (6-year life)
- 2024: 10,000-15,000 cycles (20+ years)

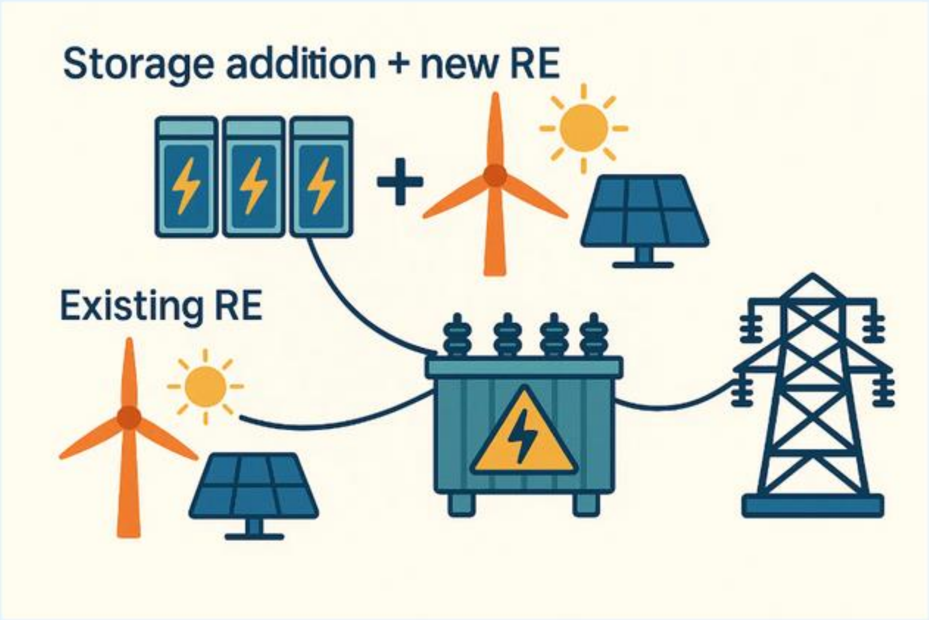
Maximizing efficiency of existing assets: Surplus Interconnection

Renewables at Thermal Plants



- Thermal plants (especially peakers) significantly underutilize their interconnection capacity
- Cheaper solar and wind resources can be added at the underutilized thermal plant
- FERC Order 845 provides regulatory pathway for surplus interconnection in WECC region
- Bypasses lengthy WECC interconnection queues for faster deployment
- Reduced costs through shared infrastructure and site development
- Creates transition pathway for Utah beyond coal and gas generation assets

Storage at Renewable Plants



- Battery storage can be added at existing renewable plants using surplus interconnection capacity
- Batteries absorb excess solar generation that would otherwise be curtailed
- Energy dispatched even when renewables aren't generating, smoothing output
- Batteries shift generation from low-value midday hours to high-value evening peaks
- With batteries managing generation profiles, more renewables can be added in Utah
- FERC Order 845 provides regulatory pathway for surplus interconnection

Surplus Interconnection Projects

🏭 Thermal

Crete Energy Venture

🏢 Earthrise Energy
📍 Will County, IL - PJM

🏭 Original Capacity	➕ Added Capacity
301MW Gas	**250MW Solar (2 projects)**
Online: Operating	Online: In Development

Source: Earthrise Portfolio

Gibson City

🏢 Earthrise Energy
📍 Ford County, IL - MISO

🏭 Original Capacity	➕ Added Capacity
237MW Gas	**270MW Solar (2 projects)**
Online: Operating	Online: In Development

Source: Earthrise Portfolio

Shelby County

🏢 Earthrise Energy
📍 Shelby County, IL - MISO

🏭 Original Capacity	➕ Added Capacity
352MW Gas	**360MW Solar (2 projects)**
Online: Operating	Online: In Development

Source: Earthrise Portfolio

☀️ RE

Polaris Solar

🏢 DTE Energy
📍 Michigan - MISO

Original Capacity	➕ Added Capacity
168MW Wind	**100MW Solar**
Online: Operating	Online: 2025

Source: DTE Solar

Pine River Solar

🏢 DTE Energy
📍 Michigan - MISO

Original Capacity	➕ Added Capacity
161.4MW Wind	**80MW Solar**
Online: Operating	Online: April 2025

Source: DTE Announcement

Scott Solar + Storage

🏢 Dominion Energy + RES
📍 Powhatan County, VA

🔆 Original Capacity	➕ Added Capacity
12MW Solar	**12MW/48MWh Storage**
Online: 2019	Online: May 2022

Source: Scott Solar

Maximizing efficiency of existing assets: Surplus Interconnection

Resource Assessment

- Assessed RE resource availability within a 6 mile buffer zone around each thermal and renewable plant
- Applied 50+ exclusion criteria including physical constraints (land cover, slope, etc.), environmental protections (protected areas, national parks, etc.), and local ordinances
- Estimated local solar and wind potential using suitable area and average solar and wind generation density

Economic Analysis

- Estimated local hourly solar and wind generation near each power plant using meteorological data from ERA5
- Estimated local solar and wind LCOE using capital cost data from BNEF and compared with the variable costs of thermal plants to identify economic crossover points
- Applied relevant IRA incentives including energy community bonus tax credits at power plant locations

Portfolio Optimization

- Estimated optimal mix of solar, wind and storage which maximizes interconnection use while limiting curtailment below 5%
- For thermal plants, estimated optimal solar and wind capacity that can be added, and for renewable plants, estimated additional solar and wind capacity that can be enabled by adding 6-hour storage.
- Selected high-quality resources with capacity factors above 30% for wind and 20% for solar to ensure economic viability

Load Growth Analysis

- Compared surplus interconnection potential with peak and energy load growth projections for 2030
- Estimated interconnection utilization increase for renewable plants through battery storage and renewable additions
- Quantified avoided interconnection and network upgrade costs based on historical cost data from the WECC region

Case Study: Milford Wind Corridor Stage II

Facility Information

LOCATION
Beaver, Utah

INSTALLED CAPACITY
102 MW

OWNER
Longroad Energy Holdings LLC

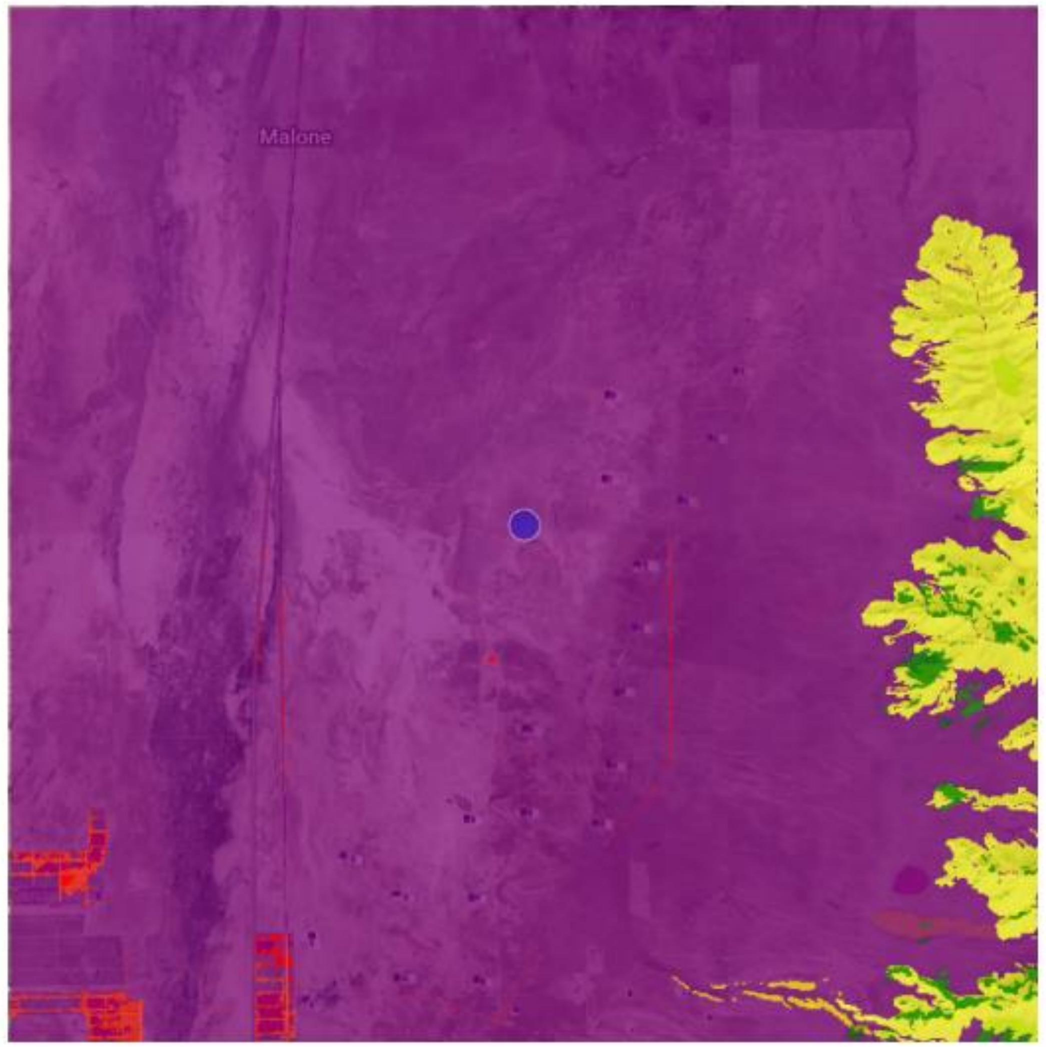
COD
2011

Satellite View of Wind Farm

6x6-Mile Buffer Zone

Milford Wind Corridor Stage II: Local Solar and Wind Potential

Classification Map



Sensitive Habitat · Water/Ice Covered · Urban Area · Unfavorable Topography · Buildable · Other

RE Potential within 6 miles of Milford Wind

- Assessed RE resource availability within a 6-mile buffer zone around the Milford Wind Corridor Stage II project
- Applied 50+ exclusion criteria including physical constraints, environmental protections, and local ordinances
- Estimated local solar and wind potential using suitable area and generation density analysis

89.4% of area within this 6 mile square is buildable

25,393 MW Solar Potential

3,047 MW Wind Potential

300 GW of solar and wind potential near existing interconnection points

Thermal Plants

40
Facilities

7.6
GW Capacity

Plants in Urban Areas

14
Facilities
35% of Total

575
MW Capacity
7.5% of Total

RE Potential Near Thermal Plants

156.2
GW
Solar Potential

18.7
GW
Wind Potential

Total Potential: 174.9 GW

Renewable Plants

32
Facilities

2.5
GW Capacity

Plants in Urban Areas

1
Facilities
3.1% of Total

80
MW Capacity
3.2% of Total

Additional RE Potential Near Renewable Plants

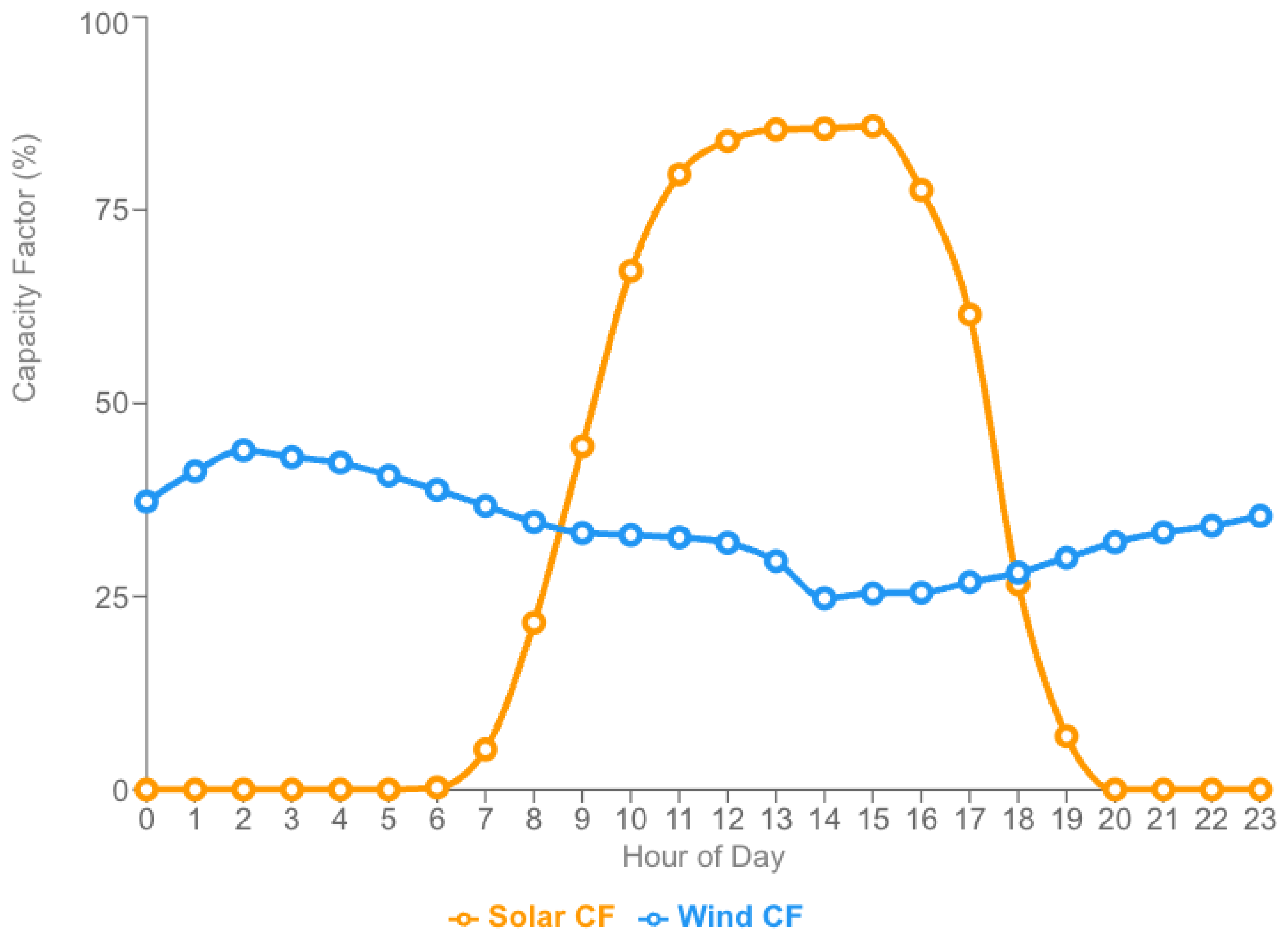
160.2
GW
Solar Potential

19.2
GW
Wind Potential

Total Potential: 179.4 GW

Milford Wind Corridor Stage II: Local Solar and Wind LCOE

Diurnal Capacity Factors at Milford Wind Corridor Stage II



Hourly average capacity factors showing solar peaks during midday and wind's more consistent generation pattern

Capacity Factors

Solar (AC)	Wind
33.9%	**39.9%**

Levelized Cost of Energy

Solar

$12/MWh 2025 (with IRA) → **$21/MWh** 2030 (without IRA)

Wind

$25/MWh 2025 (with IRA) → **$37/MWh** 2030 (without IRA)

By 2030 All of Thermal Capacity Expensive Compared to Local RE LCOE

Economic Crossover

Crossover occurs when renewable LCOE becomes lower than thermal plant variable costs. At this point, it becomes cheaper to build new renewables than to operate existing thermal plants.

☀️ Solar Crossover

GW of thermal capacity with variable costs higher than local solar LCOE

2024	2030
With IRA: **7.6 GW**	With IRA: **7.6 GW**
Without: **7.6 GW**	Without: **7.6 GW**

Wind Crossover

GW of thermal capacity with variable costs higher than local wind LCOE

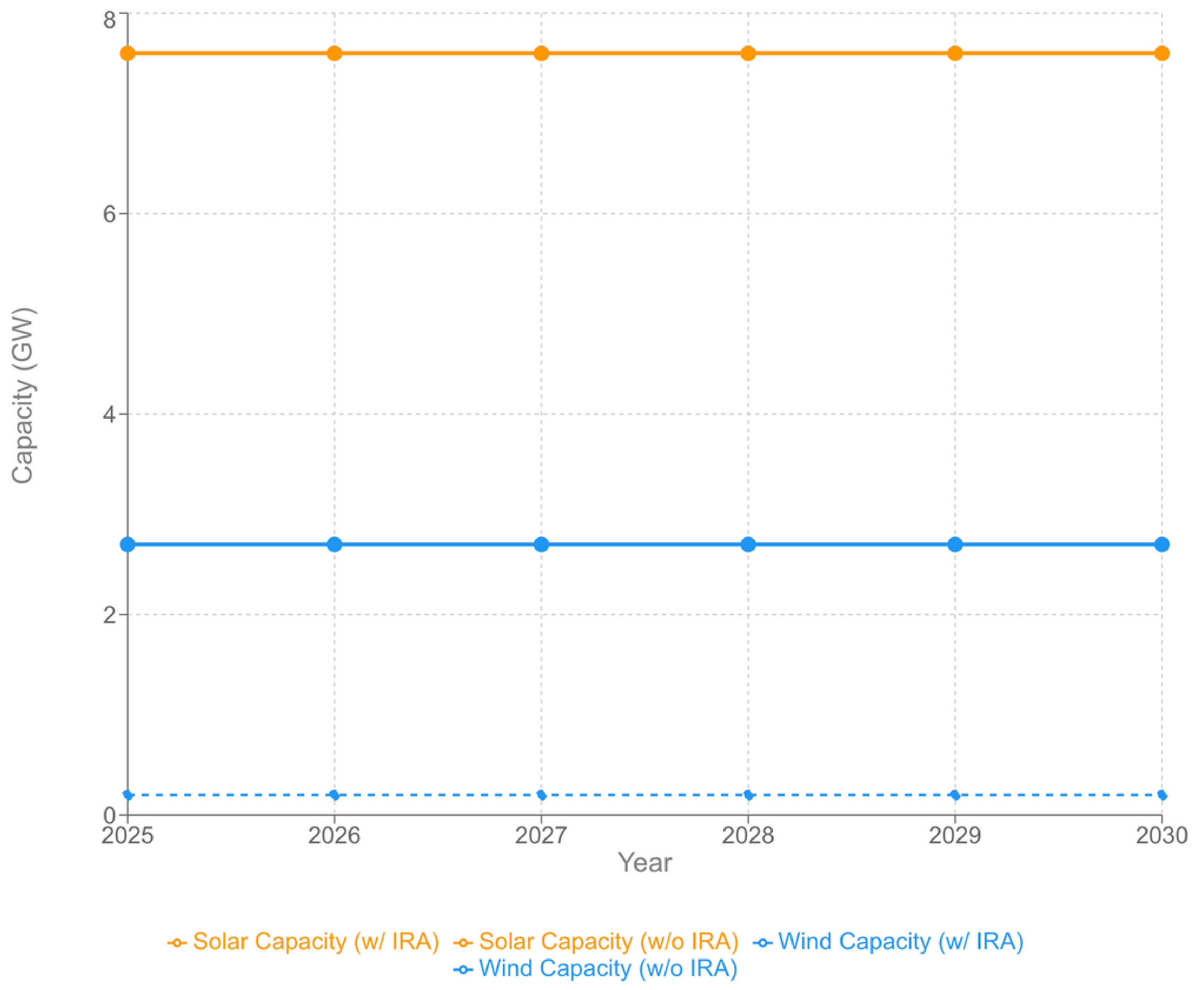
2024	2030
With IRA: **2.7 GW**	With IRA: **2.7 GW**
Without: **0.2 GW**	Without: **0.2 GW**

Impact of Losing IRA Tax Credits

With IRA tax credits being repealed under new 2025 legislation, renewable LCOE will increase significantly.

Solar LCOE already beats the entire 7.6 GW thermal fleet even without IRA credits, showing no impact from tax credit removal. However, wind shows dramatic vulnerability: with IRA credits, wind competes with 2.7 GW of thermal capacity, but without credits this plummets to only 0.2 GW—a loss of 2.5 GW of economic competitiveness.

Renewable Capacity Below Thermal Variable Costs



Solid lines: With IRA incentives | Dashed lines: Without IRA incentives

172 MW of Solar enabled by 102 MW of 6H storage

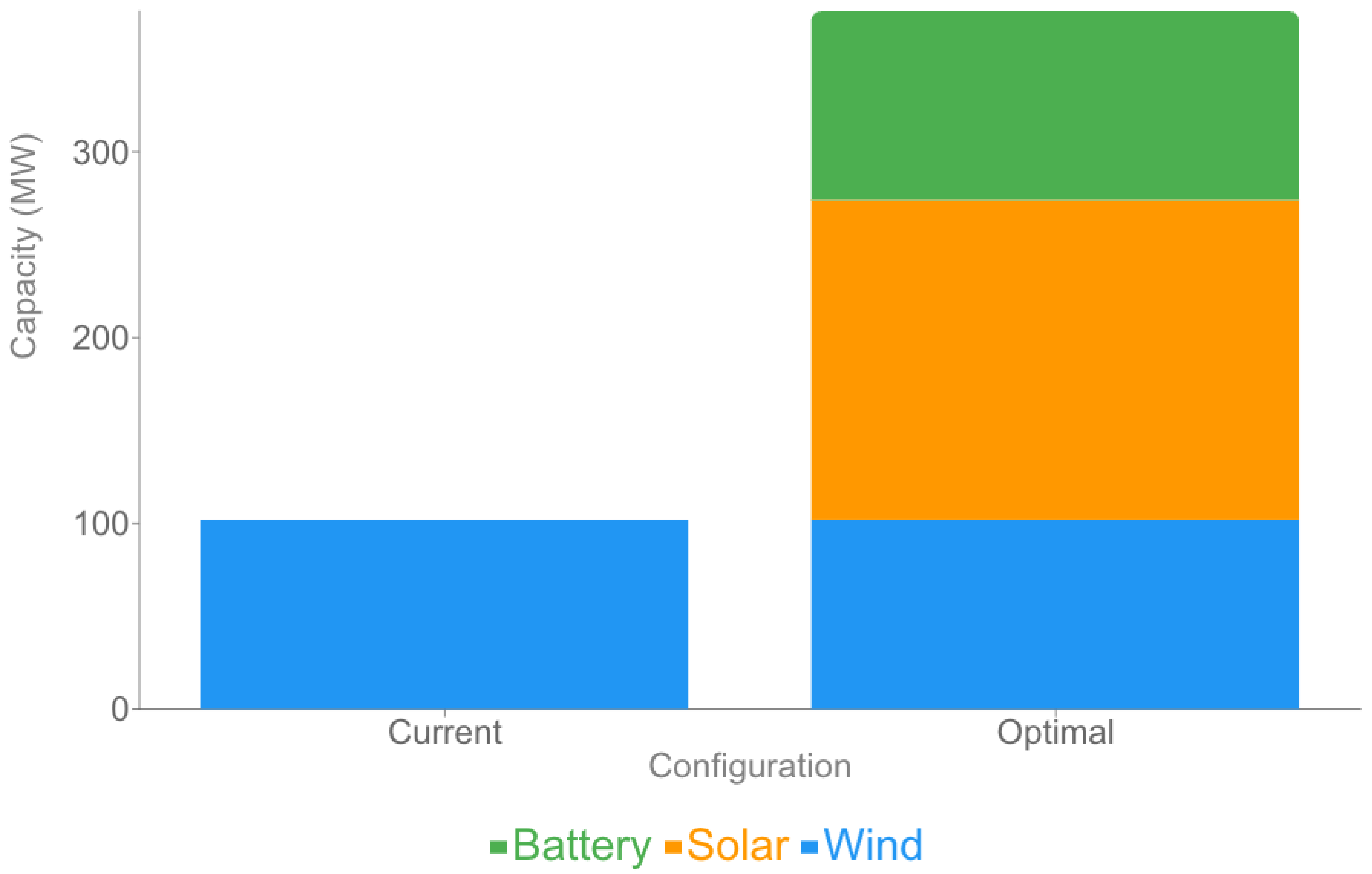
Optimal Capacity Configuration

2.7x Capacity Increase

38.7% CF Improvement

39.9% → 78.7% Capacity Factor

+346 GWh/year additional energy



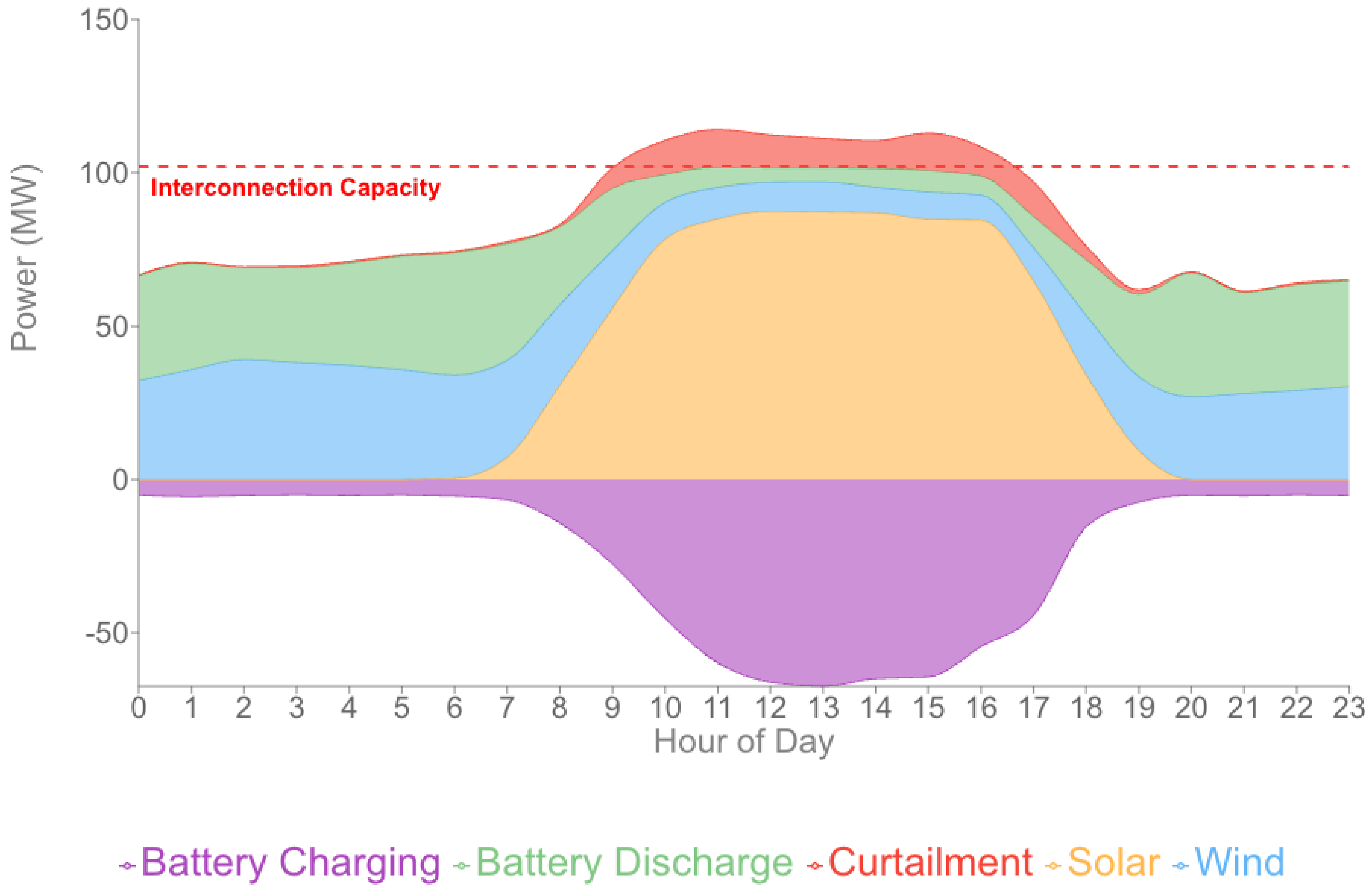
24-Hour Energy Flow Pattern (Annual Average)

System Performance Summary

80.2 MW Avg Output

6 Hour Battery

5% Curtailment



7 GW of RE can be added at Utah thermal plants

RE Integration Potential Results

7 GW of renewable energy capacity can be integrated near existing thermal plants in Utah by 2030

- Solar integration potential: 7 GW
- Wind integration potential: 0 GW

Sensitivity analysis:

We varied the cost of fuel by taking one standard deviation below and above the average fuel prices to test the economics of thermal versus local solar and wind:

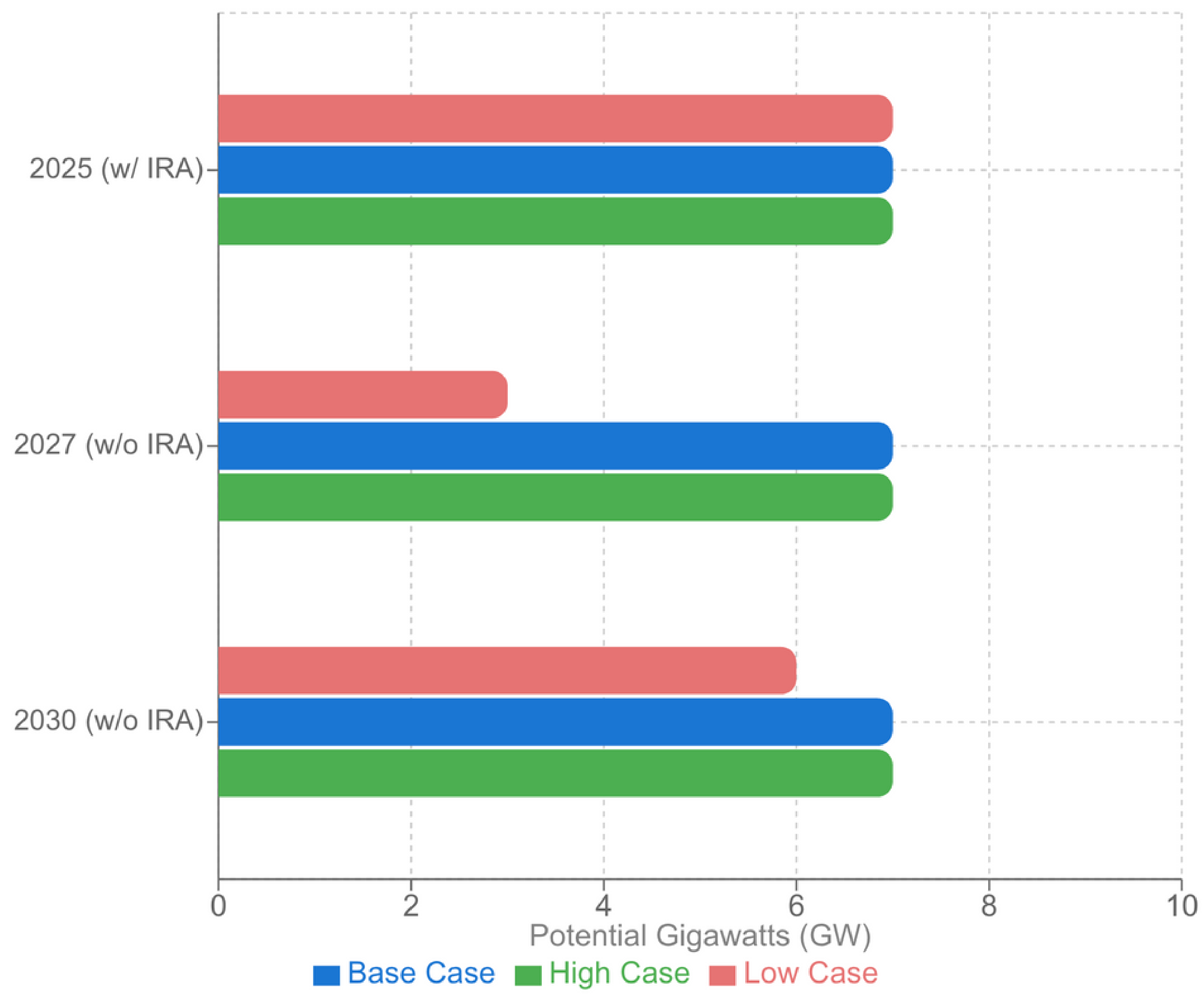
- ○ Low fuel prices (1σ below average): 7 GW (2025) → 6 GW (2030)
- ○ High fuel prices (1σ above average): 7 GW (2025) → 7 GW (2030)

Impact of IRA Removal: Despite losing IRA tax credits after 2025, the integration potential holds steady at 7.1 GW. This resilience demonstrates that ongoing technology cost reductions compensate for the tax credit loss. However, under low fuel price scenarios, potential drops significantly to 2.9 GW in 2027 before recovering to 5.8 GW by 2030 as renewable costs continue declining.

- **Even worst-case scenario shows 6 GW potential**

Total RE Integration Potential by Year

2025 with IRA tax credits | 2027 & 2030 without IRA



4 GW of RE enabled by 2.5 GW of storage can be added at existing RE plants

Enhancing Utah's Existing Renewable Fleet

We analyzed optimal solar and wind capacity additions at each renewable site when paired with 6-hour battery storage. Battery storage increases interconnection utilization by capturing excess generation during peak production, enabling significantly more renewable capacity without infrastructure upgrades.

The optimization algorithm estimates the solar and wind capacity that maximizes the interconnection utilization while limiting curtailment to below 5%. We analyzed 32 renewable plants in Utah.

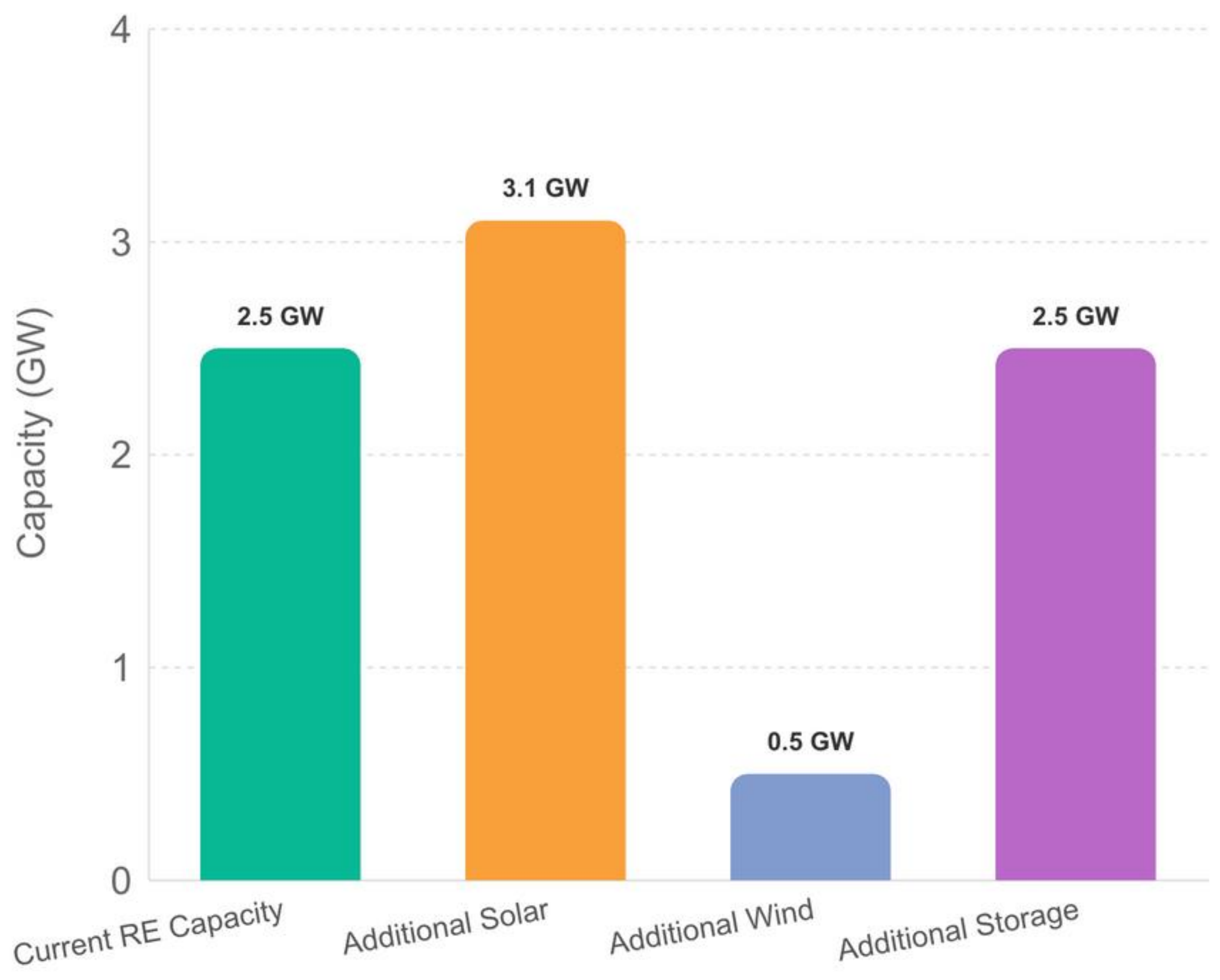
Solar Capacity	Wind Capacity	Storage Capacity
+3.1 GW	+0.5 GW	+2.5 GW

Current RE Capacity: 2.5 GW

Total After Enhancement: 2.5 + 3.6 = 6.1 GW

142% Overall Increase

Additional Capacity at Existing RE Sites (GW)



Additional capacity potential: 3.1 GW solar + 0.5 GW wind + 2.5 GW storage

Renewables can become firm capacity with capacity factor of 75%

Increasing Renewable Capacity Factors

Adding 6-hour battery storage to existing solar and wind plants enables an additional 3.6 GW of renewable capacity to be added at the same interconnection point—nearly 2.5 times the current renewable capacity. This, combined with the complementarity of solar and wind generation at these locations, significantly increases the utilization of the interconnection and the capacity factor of the newly hybridized plant.

Solar Assets

Battery capacity required: 2.1 GW (6-hour storage)

Solar assets in Utah can nearly double utilization from **33.7%** to **64.8%** capacity factor by adding 6-hour battery storage and more renewable generation.

Wind Assets

Battery capacity required: 0.4 GW (6-hour storage)

Wind assets show a 130% improvement in utilization with strategic 6-hour battery storage, increasing capacity factors from **33.4%** to **76.8%**.

Note: Capacity factors shown are simulated values based on the latest solar panels with fixed-axis tracking and latest wind turbines, which may be higher than typical values currently observed in the field.

Renewable Asset Capacity Factors with Storage

Solar Capacity Factor

Current Utilization 33.7%

Potential with 6h Storage 64.8%

Improvement 92%

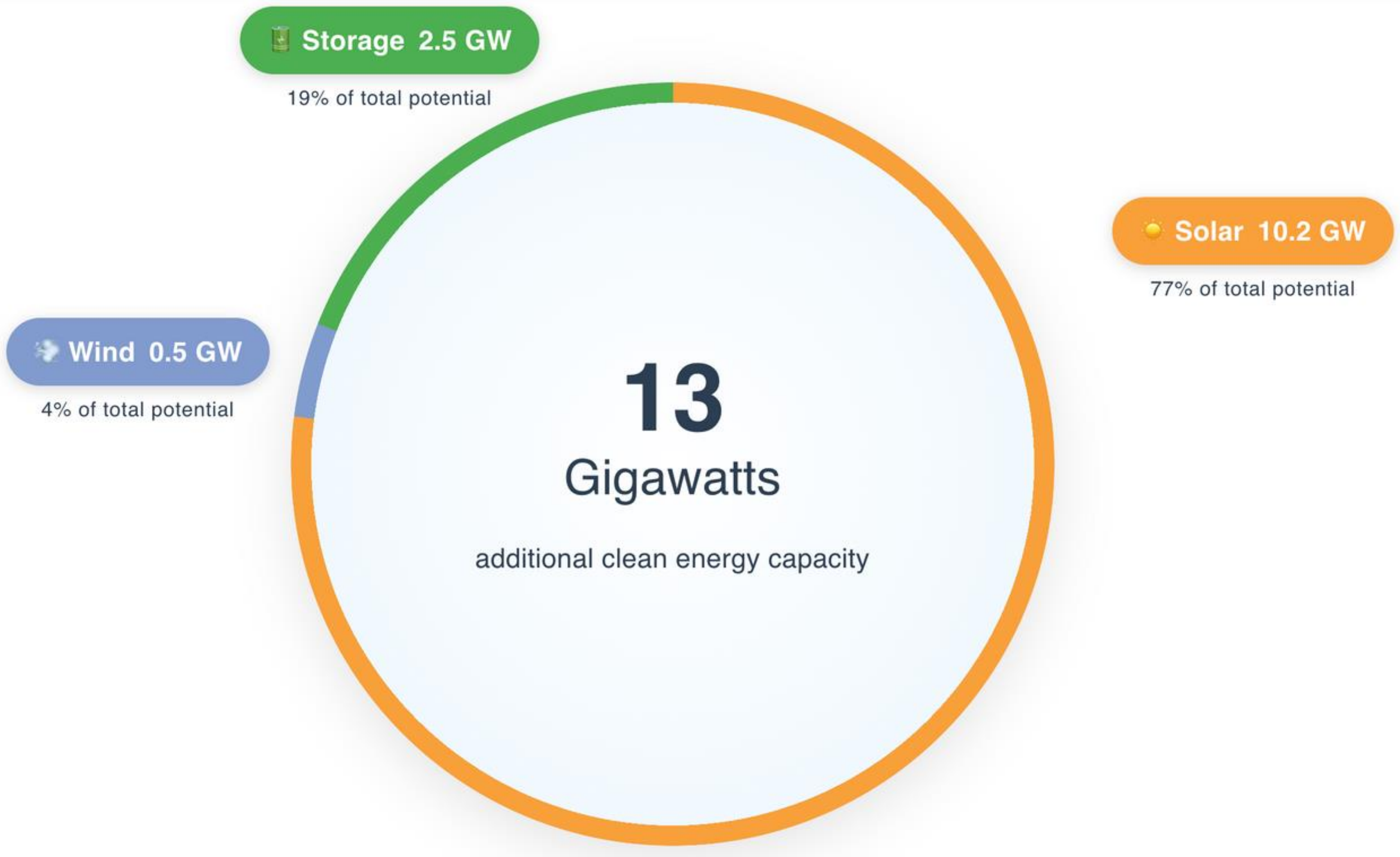
Wind Capacity Factor

Current Utilization 33.4%

Potential with 6h Storage 76.8%

Improvement 130%

13 GW of RE + Storage can be added at existing power plants in Utah



10.2 GW of additional solar capacity near existing renewable and thermal plants

0.5 GW of additional wind capacity through interconnection sharing

2.5 GW of storage enables higher penetration of renewables

$1B of savings in interconnection costs

$ Total Potential Savings

$1.1B

By leveraging existing infrastructure

$1032
Savings per Utah household

- Reduces interconnection costs
- Reduces new transmission infrastructure requirements
- Cost savings from faster deployment of cheaper clean energy and replacing generation from expensive thermal plants

This $1.1B is a conservative estimate that only accounts for interconnection cost savings for 13.2 GW of renewable capacity using an average cost of $86/kW. Additional benefits from co-location of solar, wind, and batteries, and increased utilization of bulk transmission would significantly increase the total value of savings, but are not included in this figure.

Shared Benefits Across Stakeholders

Surplus interconnection creates benefits for all stakeholders:

Stakeholder	Benefits
RE Developer	Tax Credit; Reduced Interconnection Costs; Faster Development
Existing Plant Owner	Additional Revenue Streams; Diverse Portfolio
Consumer	Low Cost Electricity; Tax Revenue; Less Pollution
Power System	Reliability; Higher Tx Utilization; Low Capacity Prices
Economy	Reliable Supply; Faster Supply; Low Cost Power

Finding best candidates for surplus interconnection

Thermal Plants Ranking

Weighted scoring to identify best thermal plants for surplus interconnection service

25% **Economic Arbitrage**
Differential between plant variable cost and renewable LCOE

30% **Renewable Resource Potential**
Combined solar and wind capacity within 6-mile radius

15% **Underutilization Factor**
Inverse of capacity factor (lower utilization = higher score)

15% **Technical Resource Quality**
Maximum renewable capacity factor achievable at site

10% **Plant Interconnection Capacity**
Existing thermal plant megawatt capacity

5% **Site Development Suitability**
Percentage of non-urbanized land area

Renewable Plants Ranking

Weighted scoring to identify best expansion candidates

30% **Resource Quality Performance**
Current operating capacity factor of renewable facility

30% **Expansion Potential**
Additional renewable capacity within 6-mile radius

20% **Economic Optimization**
Ratio of optimal to current capacity factor

10% **Site Development Viability**
Percentage of non-urbanized surrounding area

10% **Existing Plant Scale**
Current installed capacity demonstrating viability

Top thermal plants for surplus interconnection

Top Ranked Plants

#1 Millcreek Power Gene
Washington County • 74 MW • Gas CT
SIS RE Potential: 89 MW

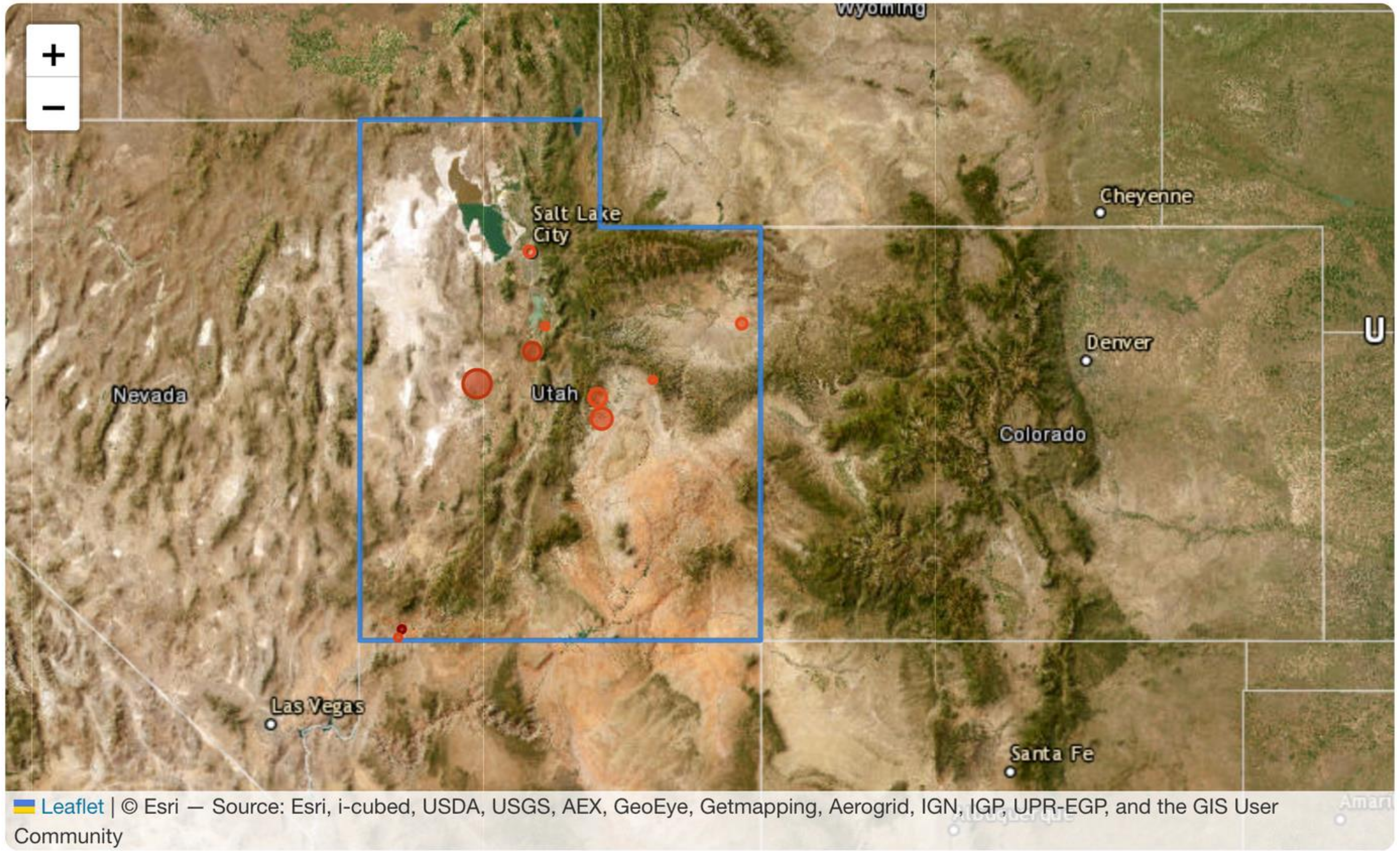
#2 Currant Creek
Juab County • 1048 MW • Gas CCGT
SIS RE Potential: 1264 MW

#3 Intermountain Power
Millard County • 1800 MW • Coal
SIS RE Potential: 2171 MW

#4 Hunter
Emery County • 1363 MW • Coal
SIS RE Potential: 1640 MW

#5 Fort Pierce Generati
Washington County • 15 MW • Gas CT
SIS RE Potential: 18 MW

Geographic Distribution



Rank #1 Top 3 Top 5 6-10 *Circle size = Plant capacity*

Top renewable plants for surplus interconnection

Top Ranked Plants

#1 **Milford Wind Corridor Stage II LLC**
Beaver County • 102 MW • Wind
SIS RE Potential: 172 MW

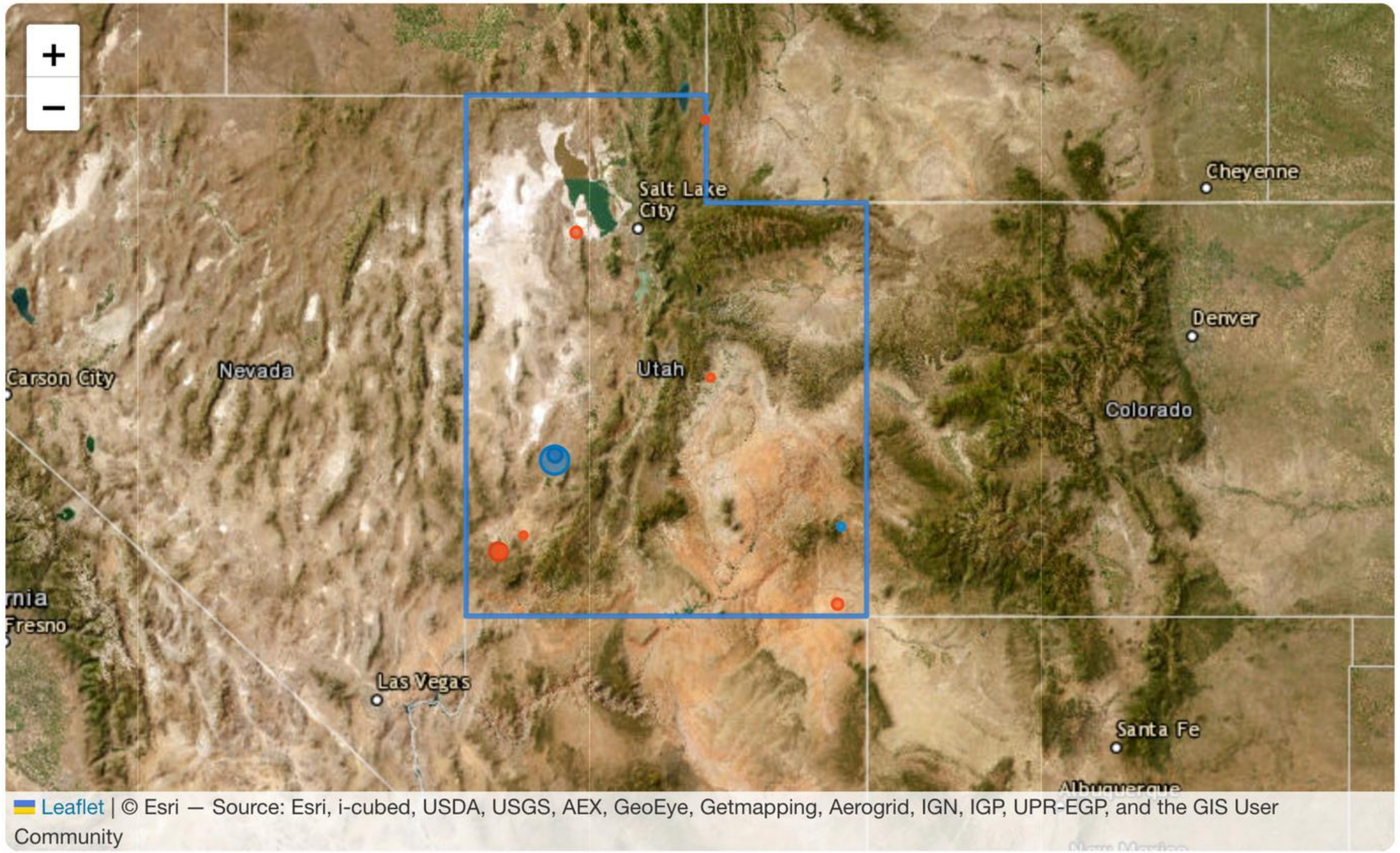
#2 **Milford Wind Corridor I LLC**
Beaver County • 204 MW • Wind
SIS RE Potential: 356 MW

#3 **Cove Mountain Solar 2**
Iron County • 122 MW • Solar
SIS RE Potential: 149 MW

#4 **Latigo Wind Park**
San Juan County • 62 MW • Wind
SIS RE Potential: 111 MW

#5 **Sage Solar I-III**
Rich County • 58 MW • Solar
SIS RE Potential: 112 MW

Geographic Distribution



Solar: #1 Top 3 Others   Wind: #1 Top 3 Others   *Circle size = Plant capacity*

Quick deployment and incremental scaling reduce stranded asset risk

Uncertain Demand Growth Drivers

AI & Data Centers
Explosive growth with unpredictable timing - some facilities need 1GW+

Manufacturing Reshoring
Policy-driven industrial expansion with uncertain location and scale

Transportation Electrification
EV adoption varies 10x between forecasts - massive grid impact uncertainty

Grid planners face unprecedented uncertainty in timing, location, and magnitude of new loads - traditional planning breaks down

Deployment Strategy Comparison

Traditional New Generation

- 5-7 year development timeline
- Large upfront commitment (500MW+)
- High stranded asset risk
- Requires accurate long-term forecasts

SIS + Battery Storage

- 12-18 month deployment
- Modular additions (50-200MW blocks)
- Deploy capacity as demand materializes
- Leverages existing interconnection

The "Build As You Need" Advantage with SIS

Surplus Interconnection Service transforms how utilities can respond to uncertain demand growth by enabling incremental, just-in-time capacity additions:

Risk Mitigation Benefits:

- Match CAPEX deployment to actual load growth
- Avoid overbuilding in uncertain markets
- Preserve optionality as forecasts evolve
- Minimize stranded asset exposure

Operational Flexibility:

- Start with 100MW, scale to 500MW+ over time
- Respond to surprise data center announcements
- Adjust to actual EV adoption rates
- Redeploy assets if local demand shifts

SIS enables utilities to transform stranded asset risk into strategic flexibility - critical for navigating the unprecedented uncertainty of the energy transition

Behind-the-Meter Data Centers: Leveraging Surplus Interconnection

Innovative Behind-the-Meter Solution

Configuration Setup

Data center is located behind-the-meter of an existing gas peaker plant, with new oversized solar arrays + 16-hour battery storage added on-site

How It Works

95% of the time: Data center receives power from solar + battery storage.
5% of the time: When solar/battery unavailable, gas plant provides backup power

Gas Plant Dual Role

1) Provides electricity to grid during peak demand when needed
2) Acts as backup power source for data center (5% of time)

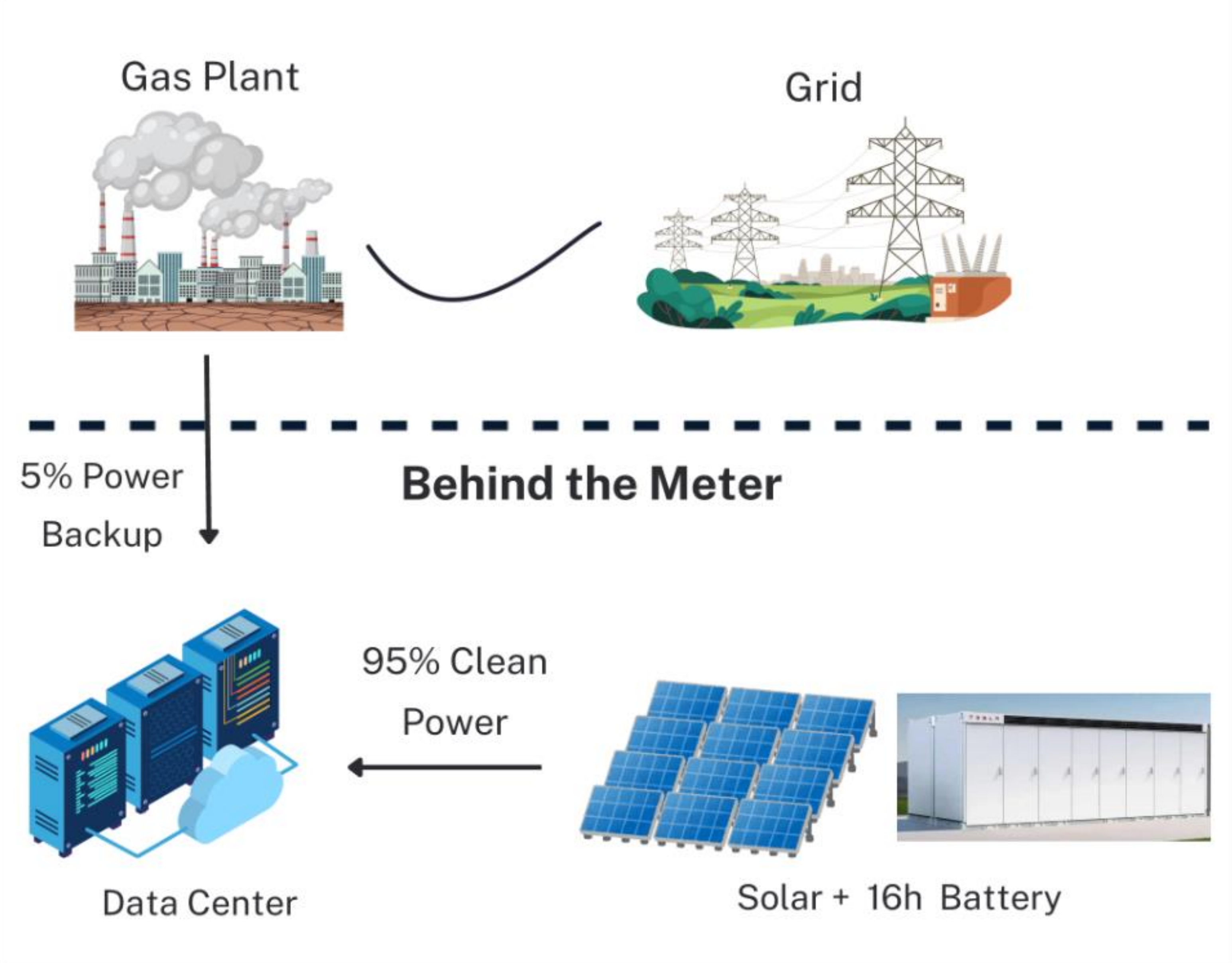
Fast Implementation

Complete build in 1-2 years (vs 5-6 years for new gas plant or grid connection)

Key Benefits

- Uses existing gas plant interconnection (no new transmission)
- 95% carbon-free operation with solar + battery
- Gas plant remains available for grid emergencies

Surplus Interconnection to Power Data Centers



Thank you!

Cost of Renewable generation

Renewable Economics vs Thermal

Utah's 2.5 GW renewable capacity shows costs comparable to thermal generation seen in the previous slide. Solar (2.1 GW) averages $27.52/MWh. Wind (386.5 MW) averages $54.78/MWh. These costs are competitive with the $30-40/MWh variable costs of coal and gas CCGT plants shown previously.

Technology Cost (Unsubsidized)

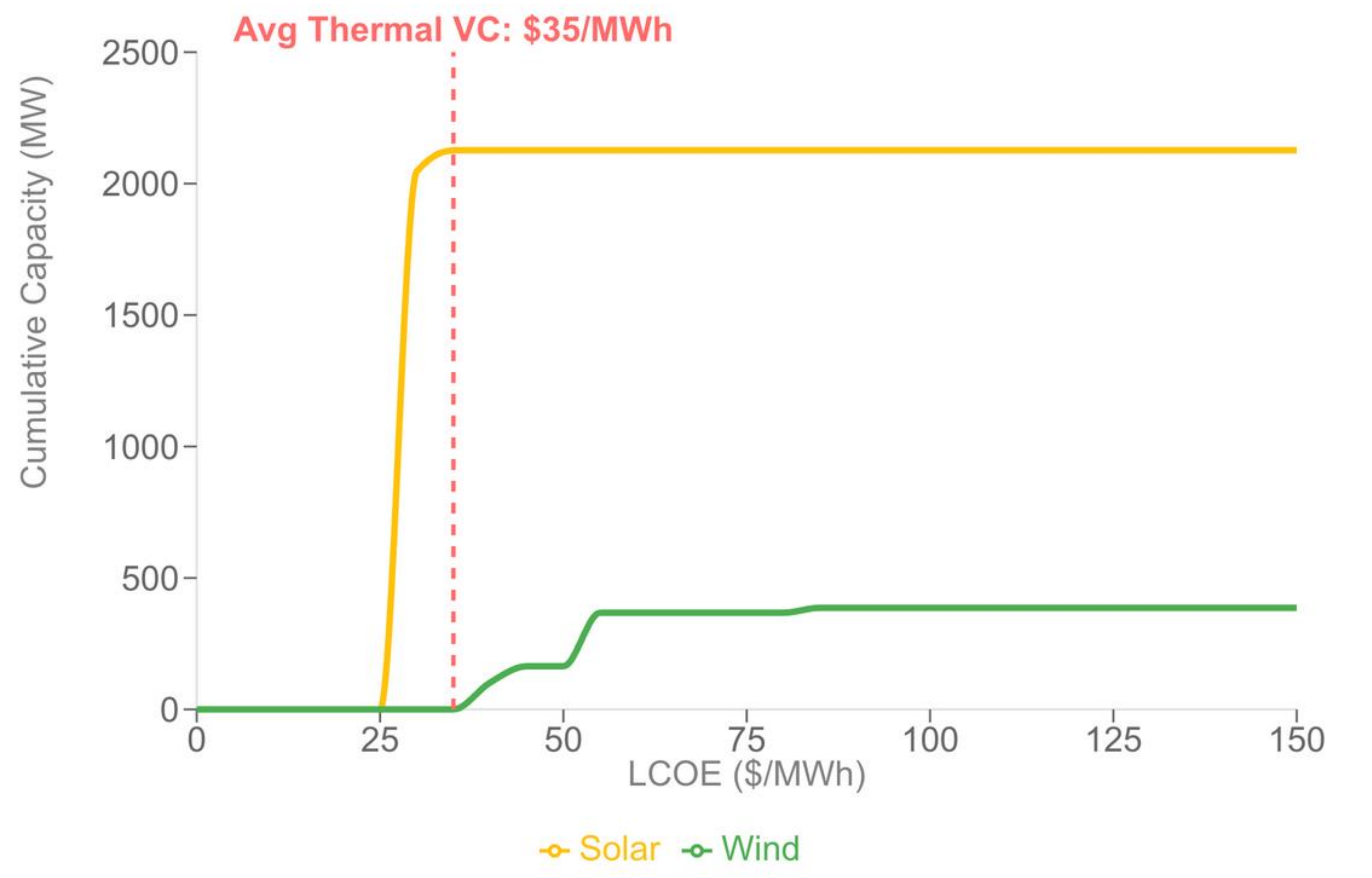
**All costs shown are unsubsidized, without IRA tax credits*

- **Solar:** 2.1 GW @ $27.52/MWh
- **Wind:** 386.5 MW @ $54.78/MWh

Market Competition Range

- Thermal VC Range: $30-45/MWh (Coal/CCGT)
- Solar LCOE: $27.52/MWh

Cumulative Renewable Capacity by LCOE



New gas is unlikely come online before 2030

Gas Plant Development Timeline

For a gas plant ordered February 2025, the projected online date is 2030-2032

1

Phase 1

Turbine Delivery

4-5 Years

- GE Vernova: 48-60 month lead times
  Limited to manufacturing 20 GW annually by 2027
- Siemens: Backlogged to 2029
  Limited expansion plans despite high demand
- Mitsubishi: J-series queued to 2029
  Plans only 'very planned expansion with discipline'

2

Phase 2

Interconnection

3-5 Years

- PJM's queue now takes 4-5+ years, 286 GW backlogged as of 2024
- Grid upgrades add another 1-2 years, Additional time if significant transmission upgrades required

3

Phase 3

Construction

2-3 Years

- Combined-cycle plants: 24-36 months
- Simple-cycle (peaking): 18-24 months

Best Case	Likely Case	Worst Case
5 years	**6-7 years**	**8+ years**
Online by Feb 2030	Online by Feb 2031-2032	Online after 2033

Industry Dynamics: Long Lead Times and Turbine Shortages

Gas turbine shortages and capacity constraints create extended timelines

Industry Leaders Confirm Long Lead Times

> *"New gas projects won't be available at scale until 2030, and then only in certain pockets of the U.S. This is an industry that really hasn't seen any active development or construction in years... all of that puts pressure on cost."*
>
> — John Ketchum, NextEra Energy CEO (2024)

> *"We have to be very thoughtful to make sure that we don't add too much capacity, even though we are starting to sell slots into 2029. We're going to continue to be very sequential on how we invest."*
>
> — Scott Strazik, GE Vernova CEO (2024)

Turbine Shortage: Market Impacts

- Engie withdrew Texas gas plant applications due to "equipment procurement constraints"
- GE Vernova limiting $300M investment to improving existing plants, not expansion
- Industry analysts project turbine shortage will continue through 2030 due to manufacturing constraints

Conclusion

Existing gas plants already in development can only meet approximately 25% of projected peak capacity needs by 2030. New gas plants ordered today would not come online until after 2030.

Source - HeatMap News 2025