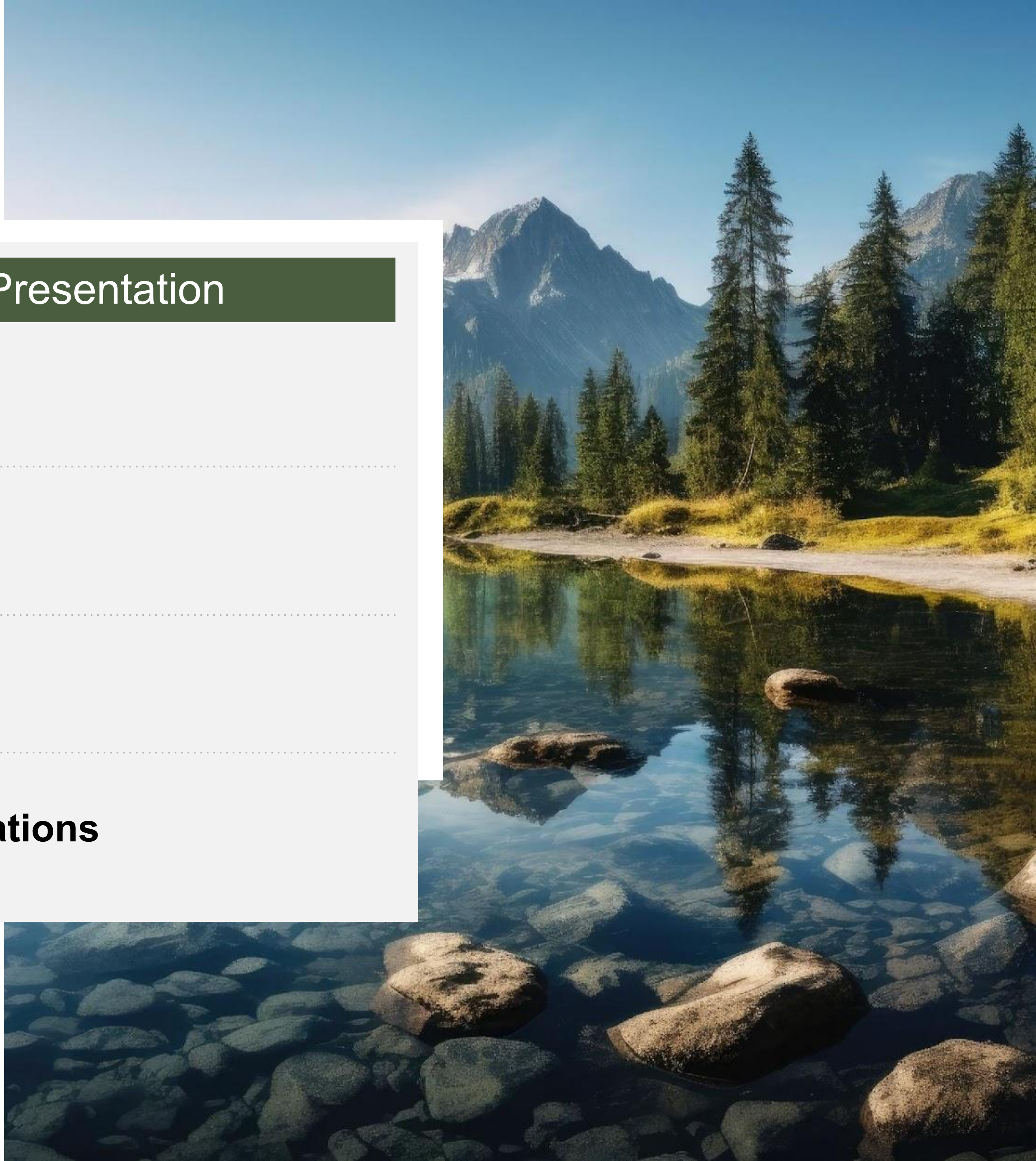
NextEra Renewables Project Final Report

February 2025

Agenda

NextGen | Student Impact Project Final Presentation



Introductions & Project Overview

NextGen Renewables & AI Team

Project Shepherds

David Pruner | Executive Director, TEX-E; Rice Business
Neil Fromer | Executive Director, Resnick Sustainability Institute, CalTech

Andrew van Baal

Michigan | MS Energy Systems ‘26
Michigan | Corporate Sustainability & ESG ‘25

Work experience:
- **Michigan Athletics**
- **Environmental Defense Fund**
- **Consumers Energy**
- **General Motors**

Debjyoti Chatterjee

UT Austin | PhD, Electrical Engineering ‘26

Work experience:
- **National Renewable Energy Lab (NREL)**
- **Hitachi Energy**
- **KBH Energy Center**
- **Texas Exchange for Energy and Climate Entrepreneurship (TEX-E)**

Hillary McKenzie

Michigan | MBA/MS ‘25

Work experience:
- **NextEra**
- **Google**
- **Salesforce**
- **Hewlett Packard Enterprise**
- **Weatherford International**

Hannah Murdoch

Stanford | MS/MBA ‘25
UVA | Engineering ‘16

Work experience:
- **BlackRock (summer)**
- **US Department of Energy**
- **Union Square Ventures**
- **McKinsey**
- **GoogleX**

Yogi Nishanth

Harvard | ALM Sustainability’26
Rice | MBA’16

Work experience:
- **Founder, CBase AI**
- **Capital One**
- **JP Morgan Chase**
- **Oportun**
- **Credit Agricole**

Project Overview

Driving questions

What is the full potential in the US for **Solar, wind, and nuclear power to meet demand from AI** to address the Dual Challenge in the next 5-10 years?

What are the **levers to accelerate renewable power adoption** (e.g technological, software, economic, policy, and/or public opinion) for **project developers and hyperscalers?**

Approach

1 Energy Demand and Supply

- Projects data center electricity consumption through 2030
- Append renewable energy supply potential, price, and policy data.
- Develop in-house Renewable Compute Index (RCI) model to highlight states with relatively high renewable energy and low data center demand

2 Renewable Readiness Scorecard

Evaluates states across three weighted criteria:

- Business Attractiveness (50%): Economic and infrastructure factors
- Renewable Energy Potential (35%): Wind and solar resource quality
- Battery Storage Potential (15%): Market design and policy support

Key Findings

Leading states and markets continue to be attractive won't slow down - particularly TX, NV and AZ.

Fast followers - including Arizona and Nevada - **offer attractive renewable resources, business environments and permitting, and land availability** to scale quickly

Hyperscalers could look to expand into states with high RCI such as NM, MT, MN, CO, and SD.

Repeatable transaction structures that compensate for 24/7 clean electricity and capacity can help developers + offtakers go farther, faster (e.g., Clean Transition Tariff in NV)

Methods

Energy Demand & Renewable Compute Index (RCI)

Energy Demand Projection

Load & Projections: Uses 2023 data as a baseline and forecasts demand growth to 2030

Growth Assumptions: State and regional growth rates (10-14%), with higher increases for top RCI states

Efficiency Gains: Accounts for annual power usage effectiveness improvements

Renewable Energy Supply

Renewable Energy Potential: National Renewable Energy Laboratory data on solar and wind capacity

Energy Storage & Grid Capacity: Energy Info. Admin. data on existing and planned battery storage

Policy Impact: Renewable Portfolio Standards (RPS) and cost caps to evaluate incentives for clean energy adoption

Renewable Compute Index

Normalized Scores: Normalize demand, supply, and policy factors across states

RCI: 40%* Supply - 35%* Demand - 10%* Price + 10% * RPS + 5% * Cost Cap

Identify states with relatively higher renewable energy and lower data center demand

Renewables Readiness Scorecard

Analysis Framework

Approach: Evaluate state attractiveness for renewable energy deployment to meet data center power needs

Scope: Analysis of 14 key states selected based on anticipated data center activity(1)

Methodology: Composite score based on three weighted criteria, each evaluated using specific metrics and scored from 1 (low) - 5 (high) to determine final state rankings

Criterion 1 (50%)
Business Attractiveness

Metrics:
- Renewable Portfolio Standards
- Financial incentives
- Solar and wind markets
- Grid modernization
- Land availability and cost
- Innovation ecosystem
- Workforce

Criterion 2 (35%)
Renewable Resource Availability

Metrics:
- Wind Energy Potential *(80m hub height)*
- Solar Irradiance *(kWh/m²/day)*

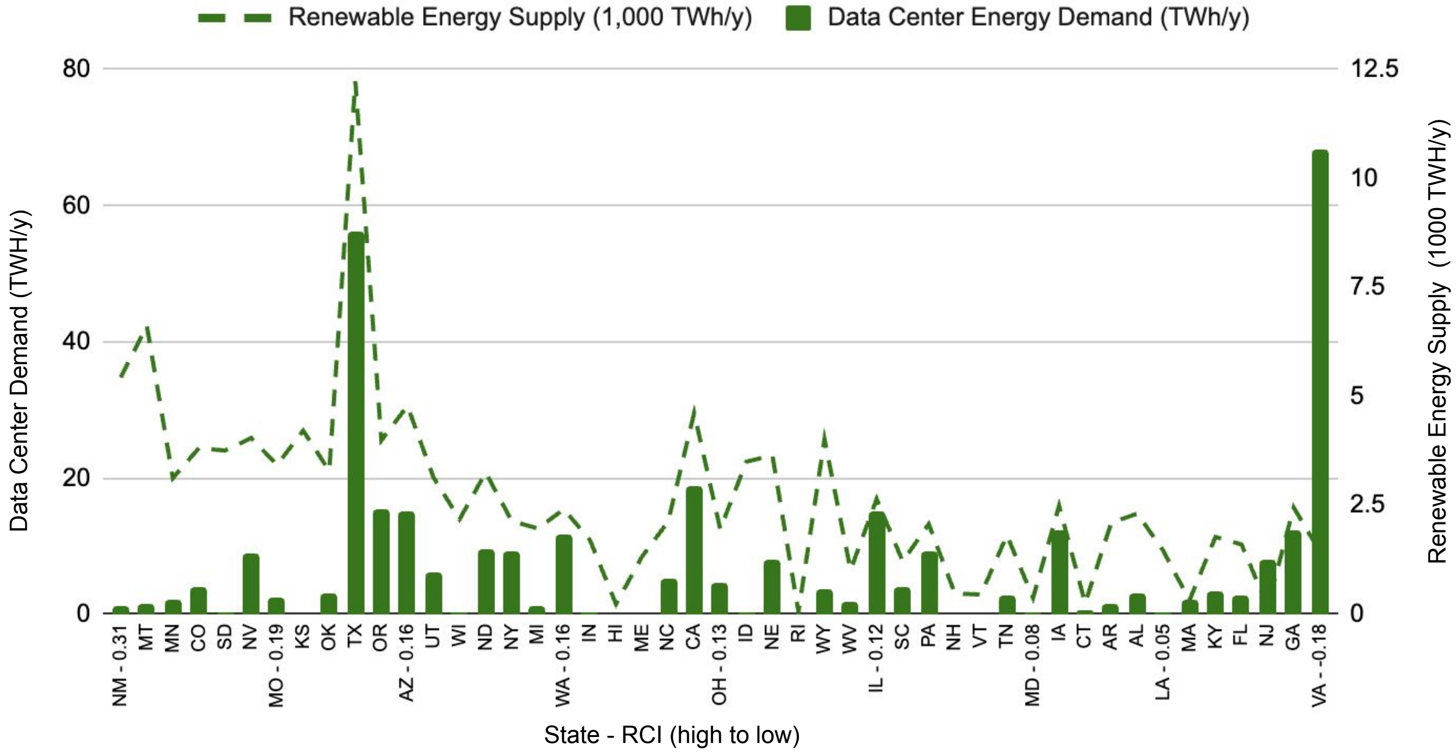
Criterion 3 (15%)
Energy Storage Potential

Metrics:
- Incentives
- Interconnection rules
- Market design
- Renewable penetration

1) *States evaluated: VA, TX, CA, IL, OR, AZ, IA, GA, WA, PA, IN, AR, LA and NV*

Findings

Energy Demand & Renewable Compute Index (RCI) Findings



Energy Demand

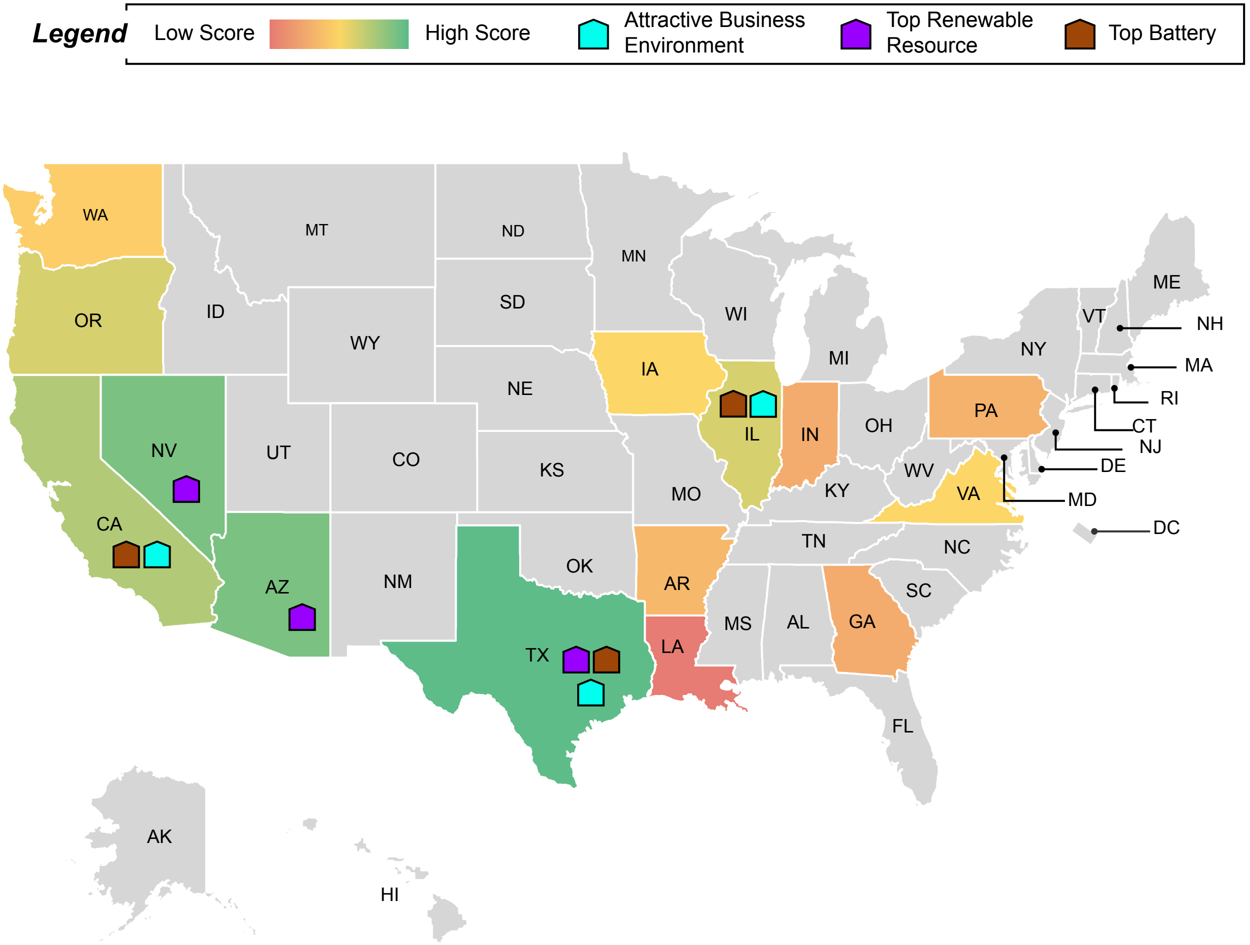
Data center energy demand is projected to be **306 - 391 TWh/y by 2030**, representing 6.45% - 8.10% of total energy demand

Model Advancement Impact

- Lower compute cost & energy per task
- Drives usage increase (Jevon's Paradox)
- Demand distributed to edge compute
- Total data center demand increases
- Growth limited by chip supply, not demand

High Renewable Energy Supply, Emerging Data Center Demand (Best for Expansion)	Low Renewable Supply, High Data Center Demand (Sustainability Concern)	Balanced States (Moderate Potential - Careful Planning)
New Mexico, Montana, Minnesota, Colorado, Nevada	**Virginia, Georgia, New Jersey**	**Texas, Oregon, Nevada, Missouri**

Renewables Readiness Scorecard: Results



Texas: Primary Strategic Focus

- Trump prioritizing for data center development
  - *First Stargate data center with co-located power gen at Lancium Clean Campus in Abilene*
- Deregulated market structure allows multiple revenue streams, driving strong project economics
- Abundant affordable land near major metro areas
- Fastest interconnection and streamlined permitting

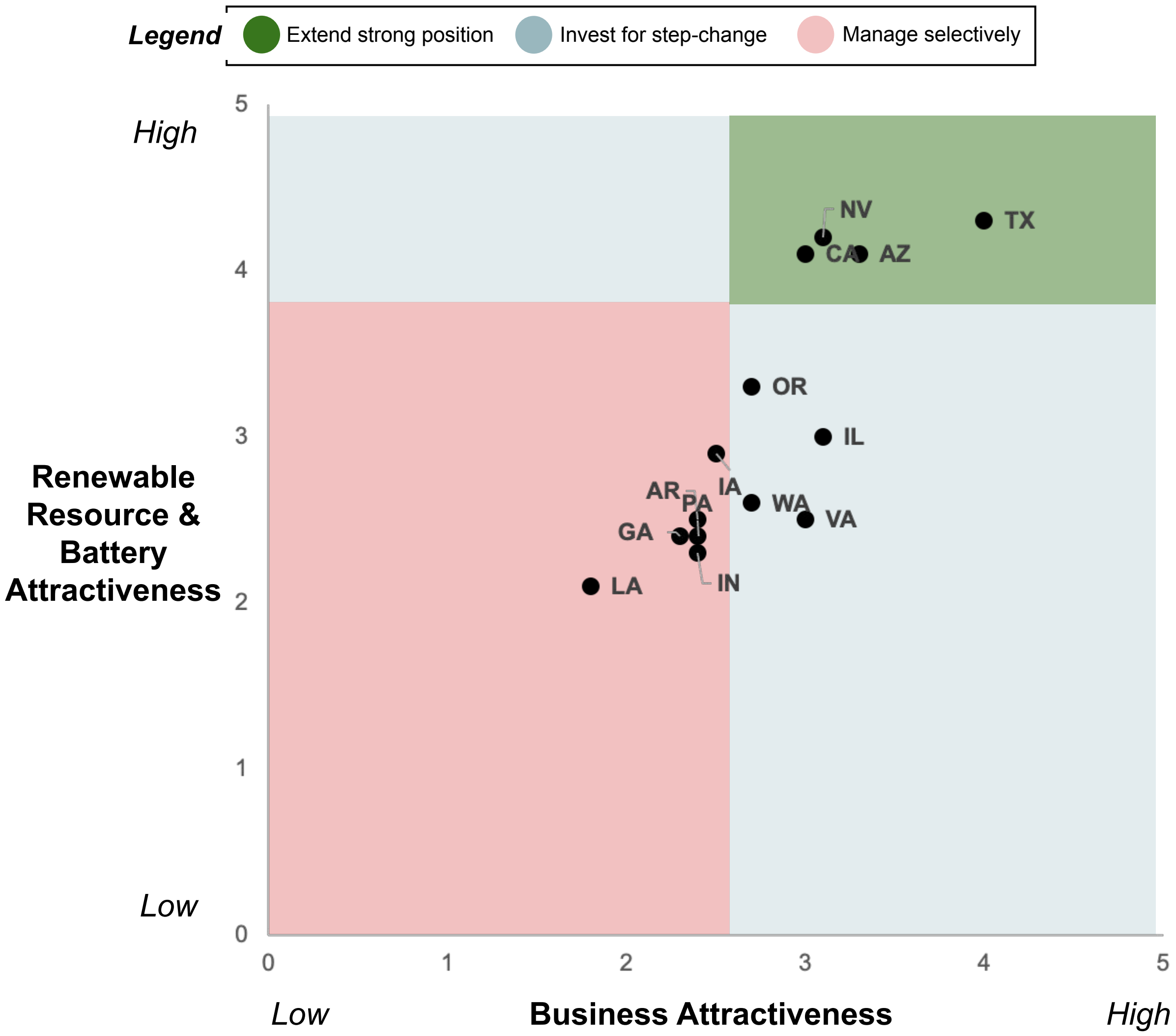
Nevada: High Growth Market

- 50% renewable requirement by 2030 driving demand
- Clean Transition Tariff structure with major Tech companies
- Strong state incentives for development
- Significant battery storage expansion planned

Arizona: Emerging Opportunity

- Strong solar resources with competitive power costs
- $14 billion in expected capital investment
- State and local governments working to reduce NIMBYism

Renewable Readiness Scorecard: Strategic Recommendations



Speed to Market is Critical: Next Steps for Developers

- Accelerate development pipeline near planned AI facilities in TX
- Create hybrid PPA structures combining firm capacity with renewable generation
- Develop co-located power solutions that can meet demand quickly while awaiting grid connection
- Capitalize on Nevada's Clean Transition Tariff structure for immediate tech partnerships
- Establish early presence in Arizona's growing market before $14B capital investment wave

The Most Critical Areas to Monitor

- Federal policy shifts and changes to permitting and interconnection reform
- Competition for premium interconnection positions
- Clean Transition Tariff expansion to more states

Source: Wood Mackenzie, CapIQ, EIA

Trends, Recommendations, and Implications

Levers for Accelerating Renewables Adoption

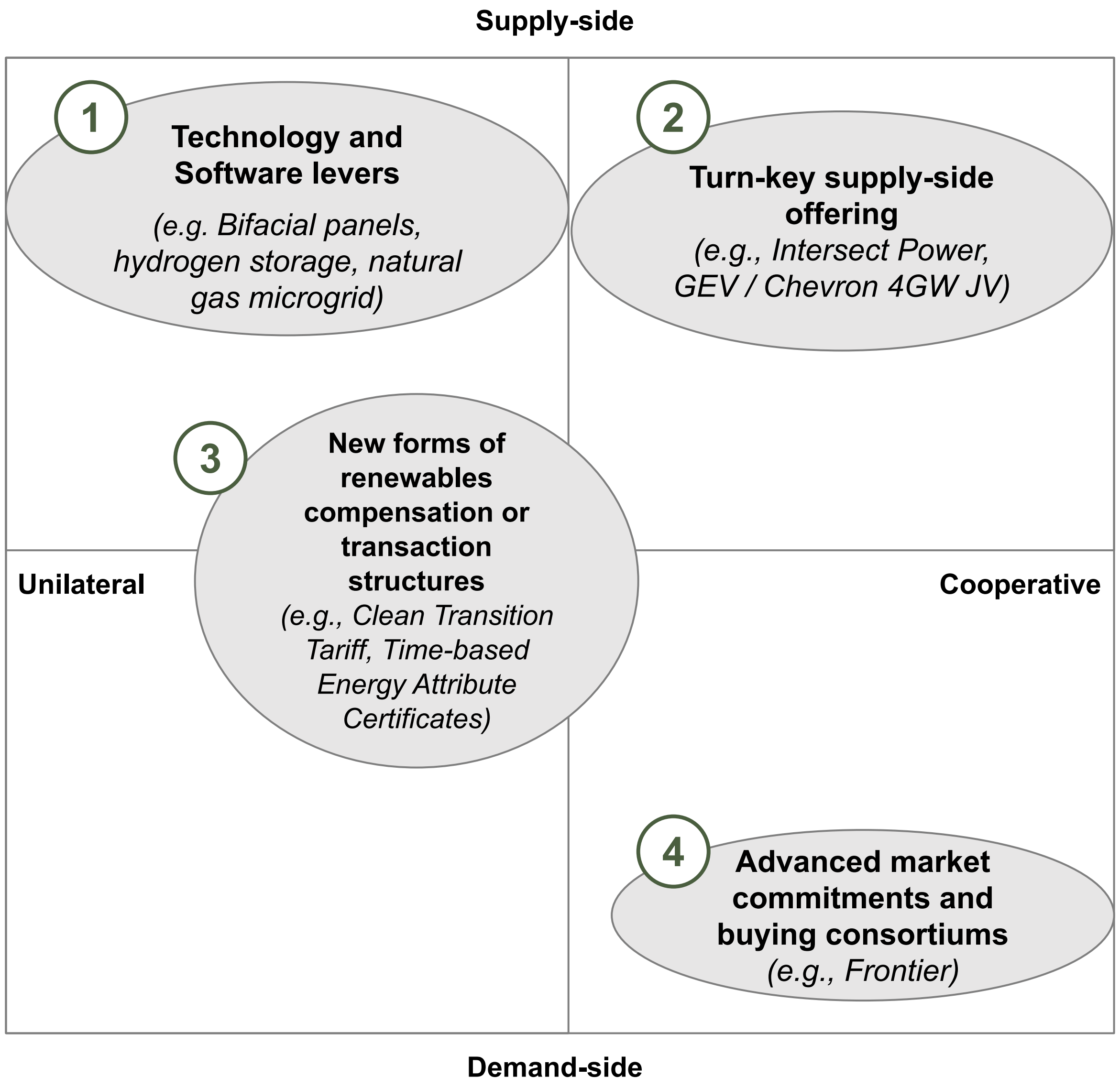


Figure adapted from Murdoch, Freeman, Johnson (2025) - Stanford University. Publication forthcoming.

Levers to accelerate adoption

Companies and policy-makers working to accelerate renewables adoption should take an 'all-of-the-above' approach across supply and demand:

1 **Option 1: Technology and Software levers**

- Virtual power plants, on-site renewables, battery storage, microgrids, AI & smart grid tools, etc.
- **Ex**: Bifacial panels, hydrogen storage, natural gas microgrid

2 **Option 2: Turn-key supply-side offering**

- Developers and manufacturers offer ready-to-deploy power solutions for data centers
- **Ex:** *Intersect Power x TPG, GE Vernova x Chevron*

3 **Option 3: New forms of compensation**

- Hyperscalers collaborate with energy providers to create 24/7 carbon-free power structures.
- **Ex:** *Clean Transition Tariff (Google, Fervo, NV Energy); Time-based Energy Attribute Certificates (Google)*

4 **Option 4: Pooled demand**

- Aggregating buyers reduces costs, accelerates deployment, and mitigates risk.
- **Ex:** *First Movers Coalition, Frontier, Symbiosis*

Implementation Roadmap/Strategy

Three-phased approach

1 | 2 | 3

1 — **Maximize existing assets** to serve immediate gaps in hyperscaler electricity demand

- **Consider brownfield expansions** in top-ranked states, including uprates and capacity additions within existing portfolio
- **Deploy grid-enhancing technologies** alongside customers and partners
- **Implement virtual power plants** for demand optimization

2 — **Innovate in both technologies and transaction structures** to prepare for 2030s load growth

- **Consider 'turnkey' offerings or joint ventures tailored to hyperscaler customers** in high-growth markets including Arizona, Texas, Nevada
- **Explore a range of cost-effective storage options** beyond Li-ion, including pilots with 8-10 hour storage durations

3 — **Scale for 2030 load growth and beyond**

- **Develop scaled, hybrid renewable systems combining multiple technologies** to satisfy data center reliability requirements
- **Partner with hyperscalers to expand transaction structures** (Clean Transition Tariffs, T-EACs) **that better compensate renewable energy solutions**

Wrap-Up

Takeaways for NextEra

- **Developing in states with federal support should prove a winning strategy:** *Move quickly in states that Trump administration is positioning for energy and data center hubs*
- **Lean-in to creative transaction structures:** *The opportunities and case studies emerging are promising for developers, particularly of NextEra's size and scale*
- **Monitor the changing policy landscape:** *Stay ahead of the game by placing contingency terms in contracts/structures*

OpenMinds Implications

- **Jevons paradox will hold with DeepSeek:** Improved efficiency gains will be offset by larger investment amounts in training and expanding models, not diminishing AI's energy consumption and subsequent opportunities for developers.
- **First mover advantage is imperative:** Hyperscalers need to build fast in high renewables supply states like NV and NM before land availability concerns mount, as developers will have ample time and natural resources to meet demand.
- **Methane and Carbon Capture Systems (CCS) will have increasingly important roles to play:** As hyperscalers face commercial pressure, renewables will develop alongside combined cycle. Data centers offer a strong demonstration case for stricter methane mitigation and CCS systems

Key Takeaways

OpenMinds

Solving for the
Dual Challenge.

Appendices

Criterion 1: Business Attractiveness Rubric (weight: 50%)

Metrics	Weight	Score: 1	2	3	4	5	Rationale
RPS	**10%**	*No RPS*	*Minimal RPS, weak targets*	*Moderate RPS, clear targets*	*Strong RPS, ambitious targets*	*100% RPS, robust benchmarks*	• Aggressive RPS targets provide long-term market signals and drive deployment.
Financial Incentives	**15%**	*No incentives, minimal impact*	*Few incentives, modest impact*	*Moderate incentives, noticeable impact*	*Broad incentives, significant impact*	*Comprehensive incentives, wide support*	• Financial incentives can significantly impact project economics and accelerate adoption.
Solar and Wind Markets	**20%**	*Very limited progress, poor infra*	*Limited progress, infra gaps*	*Good progress, some infra development*	*Substantial progress, strong infra*	*Leading progress, robust infra*	• An understanding of trends in the markets for utility-scale solar and wind power is essential for developers making future business decisions.
Grid Modernization	**15%**	*No actions in Q3 2024*	*1-2 actions in Q3 2024*	*3-5 actions in Q3 2024*	*6-9 actions in Q3 2024*	*10+ actions in Q3 2024*	• An updated grid infrastructure is crucial to accommodating the growing influx of renewable energy sources and advanced technologies.
Land Availability & Cost	**20%**	*Very high costs, limited land*	*High costs, limited/moderate land*	*Moderate costs, adequate land*	*Lower costs, significant agricultural land*	*Low costs, extensive agricultural land*	• Access to large swaths of land for renewables deployment is essential to accelerate the transition. Agricultural land usually fits the desired criteria.
Innovation Ecosystem	**5%**	*Avg score 1.0-1.49, bottom 10*	*Avg score 1.5-2.49, top 40*	*Avg score 2.5-3.49, top 30*	*Avg score 3.5-4.49, top 20*	*Avg score 4.5-5.0, top 10*	• States that have strong innovation ecosystems are better positioned to enhance the overall effectiveness and economic feasibility of renewable energy projects.
Workforce Availability	**15%**	*Limited availability, low jobs*	*Low/moderate availability, below-average*	*Adequate availability, average growth*	*Strong availability, above-average growth*	*Excellent availability, exceptional growth*	• A well-trained workforce will be essential in a green economy and in the management of large-scale assets.

Criterion 2: Renewable Energy Resource Rubric (weight: 35%)

Metrics	Weight	Score: 1	2	3	4	5	Rationale
Wind Energy Potential (80 meter hub height)	**50%**	*<100,000*	*100,000 - 199,999*	*20,000 - 299,999*	*300,000 – 499,999*	*>500,000*	• States with a high number of net new solar installations are more attractive for BESS market entry because batteries are typically attached to solar installations; states are scored accordingly
Solar Irradiance (kWh/m²/day)	**50%**	*<3*	*3-3.99*	*4-4.99*	*5-5.99*	*6-6.99*	• States with prices less than $0.20 are unlikely to seek alternative power options; prices are scored accordingly.

Criterion 3: Battery Storage Potential Rubric (weight: 15%)

		Score					
Metrics	**Weight**	**1**	**2**	**3**	**4**	**5**	**Rationale**
Incentives	**25%**	*No/minimal state-level storage incentives*	*Utility-only programs <$200/kWh*	*State programs $200-500/kWh*	*Multiple programs $500-800/kWh*	*Comprehensive programs >$800/kWh + permitting support*	• Financial incentives can significantly impact project economics and accelerate adoption.
Interconnection Rules	**10%**	*>55 month process, multiple studies*	*40-55 month process, unclear requirements, case-by-case basis*	*25-40 month basic standardized process*	*15-25 month mostly standardized process*	*<15 months fully standardized process/fast-track available*	• *Easy interconnection reduces barriers and costs associated with connecting batteries to the grid.*
Market Design	**35%**	*No wholesale participation*	*Single service (capacity only)*	*Dual services (capacity + ancillary)*	*Triple services (energy, capacity, ancillary)*	*Full market participation + retail services*	• *Well-designed markets with diverse value streams are essential for battery storage revenue.*
Renewable Penetration	**30%**	*<10% renewable penetration*	*10-20% penetration*	*20-30% penetration*	*30-40% penetration*	*>40% penetration*	• *High penetration creates need for grid flexibility*