PRODUCT COUNCIL SESSION

Financing Market Transformation

A conversation with Jigar Shah

From SunEdison to the DOE Loan Programs Office to today's data-center demand surge — why financing, not technology, is usually the thing standing between a good idea and a scaled solution.

SPEAKER

Who Is Jigar Shah

Co-Managing Partner at Multiplier LLC with Jonathan Silver. Energy entrepreneur, investor, and policymaker who has spent two decades building the financing structures that turn promising energy technology into deployed infrastructure.

Founder, SunEdison

Pioneered “pay as you save” solar financing — the PPA model that let customers adopt solar with no upfront capital, reshaping how the industry sells power.

Founding CEO, Carbon War Room

Led the Branson/Virgin Unite-founded nonprofit helping entrepreneurs find market-based approaches to climate change.

Co-founder & President, Generate Capital

Built an infrastructure-as-a-service platform financing storage, microgrids, fuel cells, EVs, and waste-to-value projects at scale.

Director, DOE Loan Programs Office (2021–2025)

Grew the office's loan authority from $40B to $400B, largely via the Inflation Reduction Act; named to TIME's 100 Most Influential People (2024).

PERSONAL JOURNEY

How This Led to Market Transformation

Energy has lost its ability to innovate since the 1970s. Many in the industry believe that energy will now go up in cost. Market transformation, in this framing: finding a new way to deliver the same or better service at a lower net cost — then building the financing vehicle that makes adopting it the default choice.

The SunEdison insight

Solar didn't spread because panels got cheaper alone — it spread once a financing structure let customers pay from savings instead of fronting capital. The technology was ready long before the financing was.

Scaling it at DOE

The Loan Programs Office applied the same logic nationally: technologies that already worked but couldn't get commercial financing because they were “first of a kind” risk, not technology risk.

The pattern repeats

Storage, EVs, industrial decarbonization — in each case, the bottleneck was rarely the hardware. It was who would take the risk and get paid for it first.

Where it's headed next

Today's test case is data centers: massive, fast-moving demand meeting a slow-moving, capital-constrained utility model — the same financing problem, at a new scale.

THE CHALLENGE

What's Actually in the Way

Demand is growing faster than Business As Usual

Data centers, electrification, and EVs are adding load faster than new generation and transmission can be permitted and built.

Utilities are paid to build, not to Utilize

Cost-of-service ratemaking gives a return on capital investment — but nothing for choosing a cheaper alternative, even when one exists.

The cheap solutions often already pencil out

Efficiency, storage, and demand flexibility frequently beat new infrastructure on cost — they just don't have a financing path that gets them built at scale.

Financing is the actual bottleneck

As with early solar, the technology is usually ready before the capital markets are — the constraint is who takes the risk and how they get repaid.

THE OPPORTUNITY

What's Possible If We Get It Right

Demand growth without a bill shock

Data centers, EVs, and electrified buildings get absorbed by the grid without translating one-for-one into higher customer rates.

Every building becomes a grid resource

Homes and businesses stop being pure consumers and start acting as flexible, dispatchable capacity — at a fraction of new plant cost.

Capital follows the cheapest reliable option

Financing structures that reward avoided cost — not just capital deployed — let the lowest-cost solution win by default.

Financing innovation scales as fast as hardware

The next wave of climate and grid solutions gets built at the pace the technology allows, not the pace the balance sheet allows.

What Is a Virtual Power Plant?

A network of small, distributed energy resources — mostly batteries, some smart thermostats, EV chargers, water heaters — coordinated by software to act, collectively, like a single power plant.

How it's built

An aggregator deploys batteries across many homes and businesses — no single site is large enough to matter alone, but the pool is GWs.

How it's dispatched

Software coordinates the fleet in real time, discharging batteries or shifting HVAC and EV charging during peak demand or grid emergencies.

Who pays whom

The utility or grid operator pays for the capacity or energy delivered; participating customers get paid, or see a lower bill, in return.

Why it matters here

A VPP can add dispatchable capacity in months, not years — and turns equipment customers already own into grid infrastructure, at a fraction of a new plant's cost.

EXECUTIVE SUMMARY

Investment Thesis – Both States have Mandates

Two open dockets, one framework

NJ's Datacenter Tariff Act (A796/S731) and NY's Case 26-E-0045 are already live. The framework connects them into a single NARUC-commissioned rate design — no new legislation required in either state.

Affordability is the headline

Ratepayers realize at least a 20% rate reduction versus the business-as-usual trajectory from the 2026 base, enforced through a bounded rate cap and feeder-targeted CapEx.

The IOU carrot is quantified

Utility ownership ramps 0% → 50% over five years, adding owned capacity to rate base at the allowed return — earnings growth delivered inside a rate cap, not in spite of one.

Funders are the beneficiaries

VPP aggregators get open access to ~1/2 of feeder dispatch capacity; datacenters get a defined interconnection path instead of a permitting freeze. Those two constituencies fund the coalition.

8,000 MW

Program deployment by Year 5 across both states

$10B

Program CapEx — 50/50 rate base vs. privately financed BOT/PPA

Illustrative program model outputs

CORE THESIS

Governors Actually Control the Distribution Grid

The jurisdictional insight: Governors and their utility commissions set distribution ratemaking, tariffs, and siting; transmission and interconnection queues sit with FERC and the RTOs — a separate authority, on a separate clock. Every lever this program pulls operates on the distribution side, inside power a Governor already has.

Distribution is a state matter

Governors and PUCs — not FERC — set distribution rates, tariffs, and siting. Track 1's rate cap and Track 2's datacenter tariff both operate entirely inside authority a Governor and BPU/PSC already hold.

Congestion relief cascades upstream

Relieving load at the most-congested feeders reduces the draw a substation pulls through the transmission corridor behind it — capacity freed system-wide without permitting a single new line.

The feeder list is the mechanism

The top-10 feeder ranking — hosting-capacity headroom × avoided cost (Slide 24) — is how state-level action gets targeted at the specific sites where it actually relieves the grid, not spread thin.

No new authority required

Because the program operates entirely on the distribution side, it needs no new legislation and carries only one disclosed federal dependency (FERC EL26-69) — a risk noted, not a precondition.

FERC PRECEDENT

Pure Batteries Are Already Transmission

FERC has affirmed — twice — that energy storage providing transmission functions may be classified as a transmission asset and recover costs through FERC-approved transmission rates. That precedent applies directly to the pure-battery program proposed here.

Western Grid (2010) — The Founding Order

- FERC approved Western Grid Development's sodium-sulfur battery project in CAISO as a transmission asset — the project's sole purpose was voltage support and thermal overload protection
- FERC held: storage may be classified as generation, transmission, or distribution depending on how it is used — and set the test: the asset must "mimic a wholesale transmission function"
- Eligibility for FERC transmission rate incentives confirmed — cost recovery through FERC-approved rates, not merchant market revenues
- **Docket: FERC ER10-1401**

MISO SATOA (2020) — The RTO Expansion

- FERC approved MISO's tariff to classify storage as "Storage As Transmission-Only Assets" (SATOAs) — the first time an RTO achieved program-level (not project-level) transmission classification for storage
- SATOAs earn cost recovery via transmission rates — same basis as any MISO transmission plan project — removing dependence on volatile capacity market revenues
- FERC found this "consistent with precedent recognizing the viability of classifying electric storage facilities as transmission assets" — and expressly invited other RTOs to follow
- **Docket: FERC ER20-588 (2020)**

Implication for this program: a PJM stakeholder process filing for SATOA-equivalent treatment could unlock FERC transmission rate recovery for the 8,000 MW BTM battery fleet — materially improving project economics and lender confidence.

THE PROBLEM

Why Now — Both States Are Out of Runway

1 Rates rising faster than household inflation

NJ and NY are among the fastest-growing electricity cost states. NJ declared a state of emergency on electricity costs on day one of the administration (EO1, Jan 2026).

2 Datacenter demand outrunning grid planning

12 GW / 48 projects already sit in NYISO's interconnection queue. NY answered with a statewide moratorium on new AI datacenter permits of 50MW+ — an admission the framework isn't fit for purpose.

3 A funded NJ vehicle already exists

BPU released $125MM in settlement funds for the Garden State Energy Storage Program, and A796/S731 requires every NJ utility to file a datacenter tariff within 180 days.

4 The ICAP/UCAP gap is the map

Every derated thermal unit carries an accreditation gap (ICAP − UCAP) the grid already interconnected but can no longer count on. The top 10 gap sites per state are the BESS siting list — nameplate-sized interconnection rights, ready to reuse.

POLICY CONTEXT

What Governor Sherrill Is Trying to Do

Day one: Sherrill signed EO1 and EO2 on her first day in office (Jan 20, 2026), declaring a state of emergency on electricity costs and directing BPU toward both near-term bill relief and longer-term structural reform — the same emergency authority and BPU mandate this program's tracks operate under.

EO1 — emergency declaration

Declared a state of emergency on electricity costs; directed BPU toward near-term relief (bill credits) and commissioned the utility business-model study that became the E3 Phase 1 report (July 2026).

EO2 — supply-side expansion

Expanded in-state solar and battery generation authority, aiming to add capacity New Jersey can control directly rather than relying solely on PJM markets.

The E3 finding: limited leverage

The state's own commissioned study found supply and transmission costs — set by PJM and FERC — drove most of the recent bill increase; distribution, the piece NJBPU regulates, is only about a quarter of the bill.

The politics: promise vs. limits

Sherrill's team frames the study as fixing "long-term structural issues"; critics argue the near-term relief falls short of the emergency framing used at launch.

SOLUTION SPOTLIGHT

Voltus — Virtual Power Plant Operator

What it does: Aggregates distributed energy resources — batteries, smart thermostats, EVs — into dispatchable capacity sold into wholesale and utility programs; manages roughly 8 GW of flexible load today.

PROS

- Proven at scale today — not a pilot; customers earned a record $240M in demand-response payments in 2025
- New “Bring Your Own Capacity” deals (e.g., Google, June 2026) show hyperscalers willing to directly finance capacity
- Asset-light model — no new hardware required to add capacity

CONS

- Footprint spans PJM, NYISO, MISO, and CAISO — value varies a lot market to market
- As an aggregator, growth depends entirely on the pace of underlying device enrollment
- Revenue is capacity-market-dependent — exposed to swings in auction clearing prices

SOLUTION SPOTLIGHT

WeaveGrid — Managed EV Charging Software

What it does: Software platform (DISCO) that schedules EV charging around distribution constraints and renewable output rather than raw price signals; supports utilities serving over 40% of U.S. EVs.

PROS

- Software-only — very low capex and fast to deploy
- Automaker partnerships (GM, Toyota, Hyundai/Kia, Rivian) give visibility into a large share of future EV load
- Bankable on its own — a 2026 raise led by Toyota's Woven Capital, plus HSBC debt financing

CONS

- Value depends on local EV adoption pace, which varies widely by region
- Addresses one load category only — doesn't touch HVAC, data centers, or other demand
- Needs both utility and automaker cooperation to actually reach the vehicles

SOLUTION SPOTLIGHT

LineVision — Dynamic Line Rating & Grid Monitoring

What it does: Non-contact sensors and software that measure real-time transmission line capacity (Dynamic Line Rating), unlocking headroom on existing lines without new construction.

PROS

- Unlocks existing transmission capacity fast, without new construction
- Proven at scale with National Grid in western New York — the largest operational DLR project in the U.S.
- UK deployment projects up to £50M in customer savings over five years

CONS

- Only addresses transmission headroom — not distribution or generation capacity
- Value is highly line-specific — some corridors have far more headroom than others
- Reveals existing capacity rather than creating new capacity

SOLUTION SPOTLIGHT

GridCare — AI-Modeled Hosting Capacity

What it does: AI platform (Energize) that models grid operating scenarios to find spare interconnection capacity on existing infrastructure, cutting large-load connection timelines from years to as little as six to 12 months.

PROS

- Software-only — fast and cheap relative to any physical build
- Found 650 MW of hidden capacity on National Grid's NY system — a real, publicized result
- Complements physical solutions by prioritizing where to deploy them

CONS

- A modeling result, not built capacity — the 650 MW still needs someone to build against it
- Accuracy depends on the quality of the utility's underlying grid data
- Newer company/product — less multi-year track record than others here

SOLUTION SPOTLIGHT

Sparkfund — Distributed Capacity Procurement

What it does: Utility-facing platform and financing partner that plans, deploys, and dispatches distributed energy resources — HVAC, lighting, storage — on an as-a-service basis, with no upfront capital from the host site.

PROS

- Removes the capital barrier entirely — the customer pays nothing upfront
- A decade of utility-partner delivery, not a pilot
- Over $49M raised across 9 rounds — a proven financing structure

CONS

- Return depends on long-term service contracts, requiring site retention over many years
- Best suited to larger commercial buildings — less natural fit for residential
- Financing cost is baked into the long-term fee, so it isn't the cheapest option in isolation

SOLUTION SPOTLIGHT

Carrier Energy — Battery-Enabled Heat Pumps

What it does: Field-testing next-generation variable-speed heat pumps with integrated battery storage, designed to store off-peak energy and power the HVAC system during peak grid demand — without sacrificing comfort.

PROS

- Backed by a 30M-unit installed base — 100+ GW of potential flexible demand if it scales
- Field trial run with utilities and EPRI lends real third-party credibility
- Turns HVAC — the single largest driver of grid peak load — into a grid asset instead of just a consumer

CONS

- Still a field trial, not a shipping product
- Requires a hardware swap (new heat pump + battery) — far more capital-intensive than a software fix
- Real-world performance and cost aren't yet proven at scale

SOLUTION SPOTLIGHT

Budderfly — Energy-as-a-Service, Zero Upfront Capital

What it does: Funds and installs HVAC, lighting, refrigeration, solar, and now battery storage upgrades for commercial customers at 100% of Budderfly's own capital cost, recouped through a fixed multi-year energy services fee.

PROS

- 100% of capital cost fronted by Budderfly — zero cash outlay or capital risk for the customer
- Backed by $550M in debt and $500M+ in equity — a well-capitalized, proven financing vehicle
- Already running a multi-region VPP across CAISO, ISO-NE, PJM, and SPP

CONS

- Customers commit to long (10+ year) contracts in exchange for no upfront cost
- Best fit for chain/multi-location businesses — less natural fit for a single homeowner
- Savings are shared with Budderfly — the customer doesn't capture the full benefit

SOLUTION SPOTLIGHT

Blue Box Air — Deep-Coil HVAC Restoration

What it does: Patented enzyme-foam process that deep-cleans fouled HVAC coils in place, restoring lost heat-transfer surface area — a no-downtime retrofit rather than an equipment replacement.

PROS

- Very low capex — a coil treatment, not equipment replacement
- No downtime — restores efficiency while systems keep running
- Fast payback with a proven case study: 44% reduction in coil pressure drop, 8.8M+ kWh saved annually

CONS

- A one-time efficiency fix, not an ongoing grid-flexibility resource like a battery or VPP
- Only helps buildings with fouled coils to begin with — not a universal solution
- Recovers lost efficiency rather than creating new capacity

SOLUTION SPOTLIGHT

Reservoir — Grid-Interactive Water Heating

What it does: Heat-pump water heater that manages multiple heating elements as a thermal battery, storing energy as hot water and shifting load away from system peaks without affecting hot-water availability.

PROS

- Turns an existing appliance category into a thermal battery — no new siting or interconnection needed
- Water heating is roughly 20% of home energy use — a large, largely untapped opportunity
- Backed by climate-focused venture capital (MCJ)

CONS

- Requires new hardware — not a retrofit of what's already installed
- Individually small — only matters at fleet/aggregator scale
- Needs a VPP/DERMS layer on top to actually dispatch it — hardware alone doesn't create grid value

NO NEW AUTHORITY REQUIRED

The Regulatory Landing Zone Is Already Open

Vehicle	Status	Why it matters to the program
NJ EO1 / EO2 (Jan 20, 2026)	Signed, in effect	Emergency authority on electricity costs; expands in-state solar + battery generation; >$1B/yr documented ratepayer savings (Synapse)
NJ A796/S731 — Datacenter Tariff Act	Signed into law, 2026	Requires every NJ utility to file a large-load tariff within 180 days — Track 2's BOT terms slot directly into BPU's mandate
NJ BPU Docket QO25040206	Order issued	$125MM released for the Garden State Energy Storage Program — a funded battery vehicle
NY PSC Case 26-E-0045 (Energize NY)	Opened Feb 2026	Actively soliciting comment on large-load cost allocation and tariff structure — the NY filing window
NY AI datacenter permitting freeze	Signed ~July 2026	Strengthens the case for a defined, state-blessed interconnection path — exactly what Track 2 provides
FERC Docket EL26-69 (NYISO)	Show-cause, resp. ~Aug 2026	The single federal dependency — disclosed, not assumed away; NJ side is fully insulated

Every vehicle above is live today. The program operationalizes existing proceedings rather than proposing new ones.

PROGRAM ARCHITECTURE

One Framework, Two Tracks

TRACK 1

Innovation Rate Design

- Bounded rate cap over a 20-year term — the affordability backstop
- Utility ownership ramps 0% → 50% of new capacity in 10-pt annual increments over 5 years
- Balance served through tolling PPAs at 15% unlevered WACC (no leverage)
- Premise: ≥20% ratepayer savings vs. BAU trajectory from the 2026 base

TRACK 2

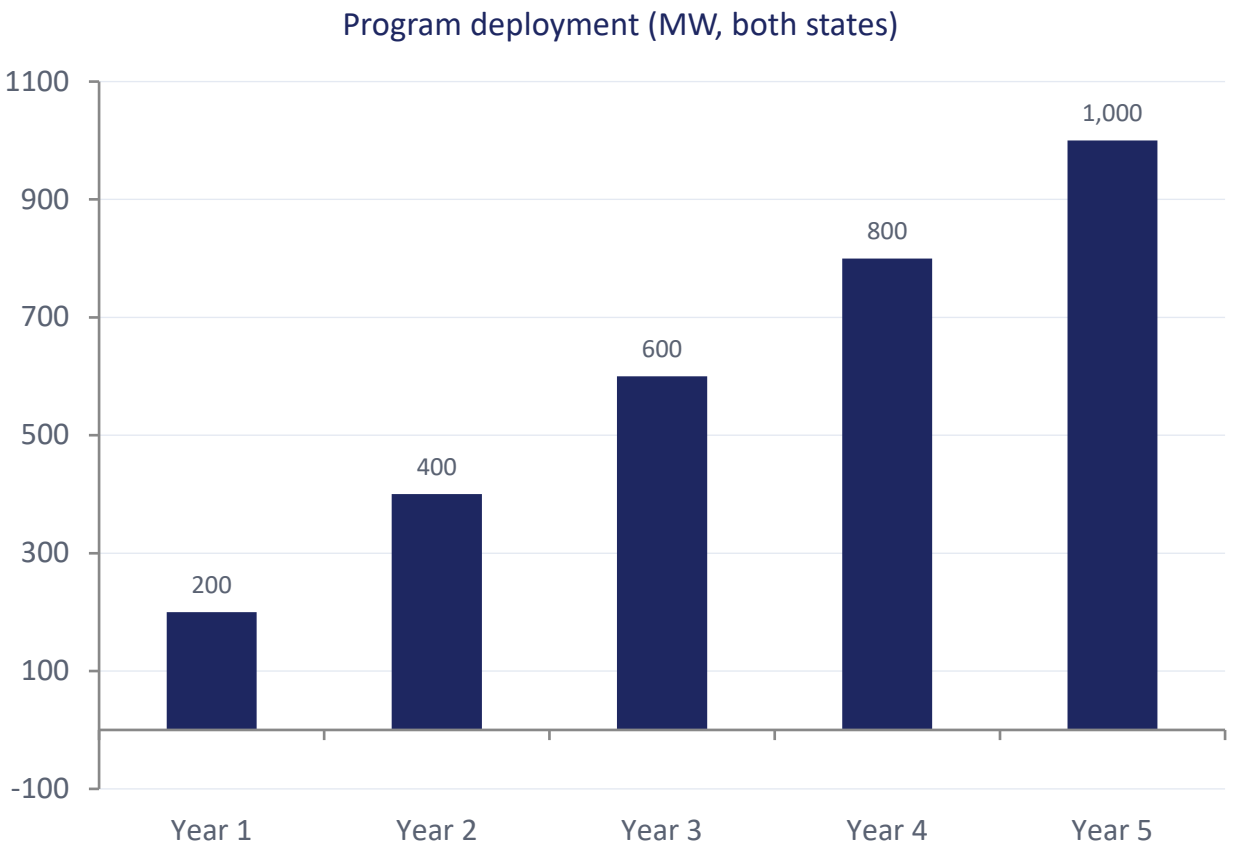
Datacenter Tariff + VPP Open Access

- Datacenters pay a capital cost-of-entry charge framed as a social-benefit surcharge
- Build-own-transfer (BOT): privately financed and built, transferred to utility ownership after 5 years
- Third-party VPPs (Voltus, CPower, comparable CSPs) receive guaranteed open access to ~1/2 of feeder dispatch capacity
- Modeled on FERC Order 636 — the unbundling that opened gas pipelines to third-party marketers

Deliberately narrow: CapEx and batteries go first to the feeders where avoided cost is highest — targeting over blanket buildout.

MECHANICS

Track 1 — Deployment and Ownership Ramp



Ownership ramp

10% → 50% utility ownership in equal annual steps; holds at 50% for the balance of the 20-yr rate-cap term

PPA tranche

Non-owned balance contracted as tolling PPAs at 15% unlevered WACC — ~$254/kW-yr all-in vs. ~$337/kW-yr merchant-equivalent

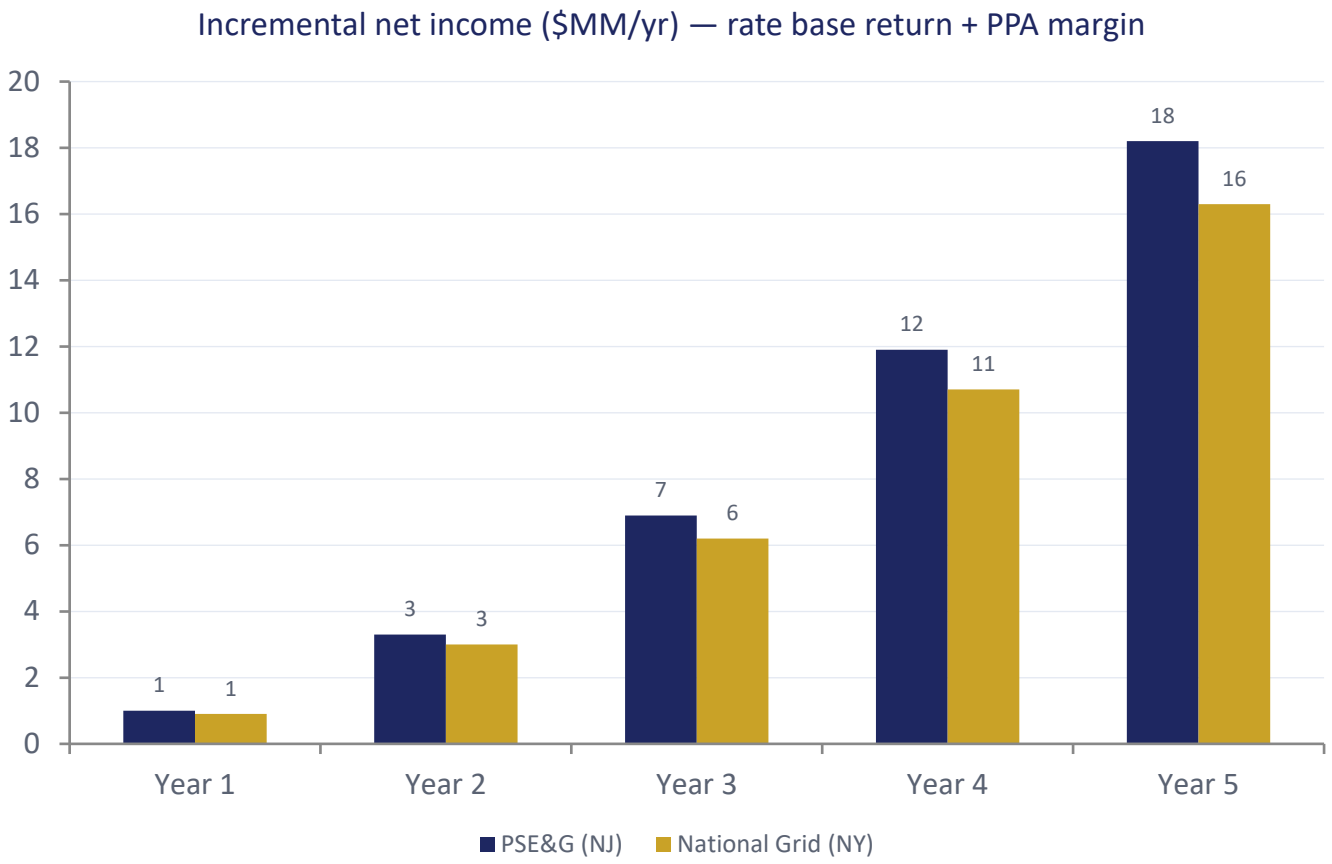
Rate cap

Rates rise at 50% of CPI off the 2026 base — partial recovery of cost growth; the program's avoided cost closes the gap

Load growth

~3% net load growth (EVs, electrification, edge inference) keeps the cap arithmetically achievable — supported by PJM's forecast; a disclosed gap on the NYISO side

The Carrot — What Deployment Means to Shareholders



~$3.5MM

Annual net income per 100 MW deployed, per utility (illustrative)

$700MM

New rate base per state pair at 50% ownership — earning the allowed ROE

Earnings growth delivered inside a rate-cap commitment — the value of filing first is a number, not a narrative. Full NJ/NY rate-case modeling in the companion program model.

OPEN ACCESS

Track 2 — The Order 636 Playbook, Applied to Feeders

Precedent: FERC Order 636 unbundled gas pipelines' merchant and transport functions, forcing open access for third-party marketers. The program applies the same logic at the distribution feeder: the utility keeps the wires; third-party VPPs get guaranteed, non-discriminatory dispatch access.

Datacenters fund the buildout

Capital cost-of-entry charge under A796/S731's statutory mandate; BOT transfer to utility after year 5

VPPs get half the feeder

~1/2 of feeder-level dispatch capacity allocated to third-party aggregators in exchange for the open-access commitment

Feeders designed at 10 MVA

VPPs take half that capacity and the addressable market numbers scale across every targeted feeder

Definition work remains

“Half” must be specified — dispatch rights vs. queue capacity vs. CapEx pool — before filing; the commissioned report resolves it

METHODOLOGY

Feeder Targeting — CapEx Goes Where Avoided Cost Is Highest

Targeting Score ($/yr) = Hosting Capacity Headroom (MW) × [Avoided Energy Value + Avoided Capacity Value] ($/kW-yr)

NJ hosting capacity

PSE&G EV/DER Hosting Capacity Map — feeder-level, downloadable

NY hosting capacity

Joint Utilities of NY Storage Hosting Capacity Map — includes National Grid

NJ congestion / LMP

PJM Data Miner 2 — nodal congestion component, EMAAC zone

NY congestion / LMP

NYISO OASIS zonal LBMP — National Grid upstate zones, not NYC Zone J

NJ capacity price

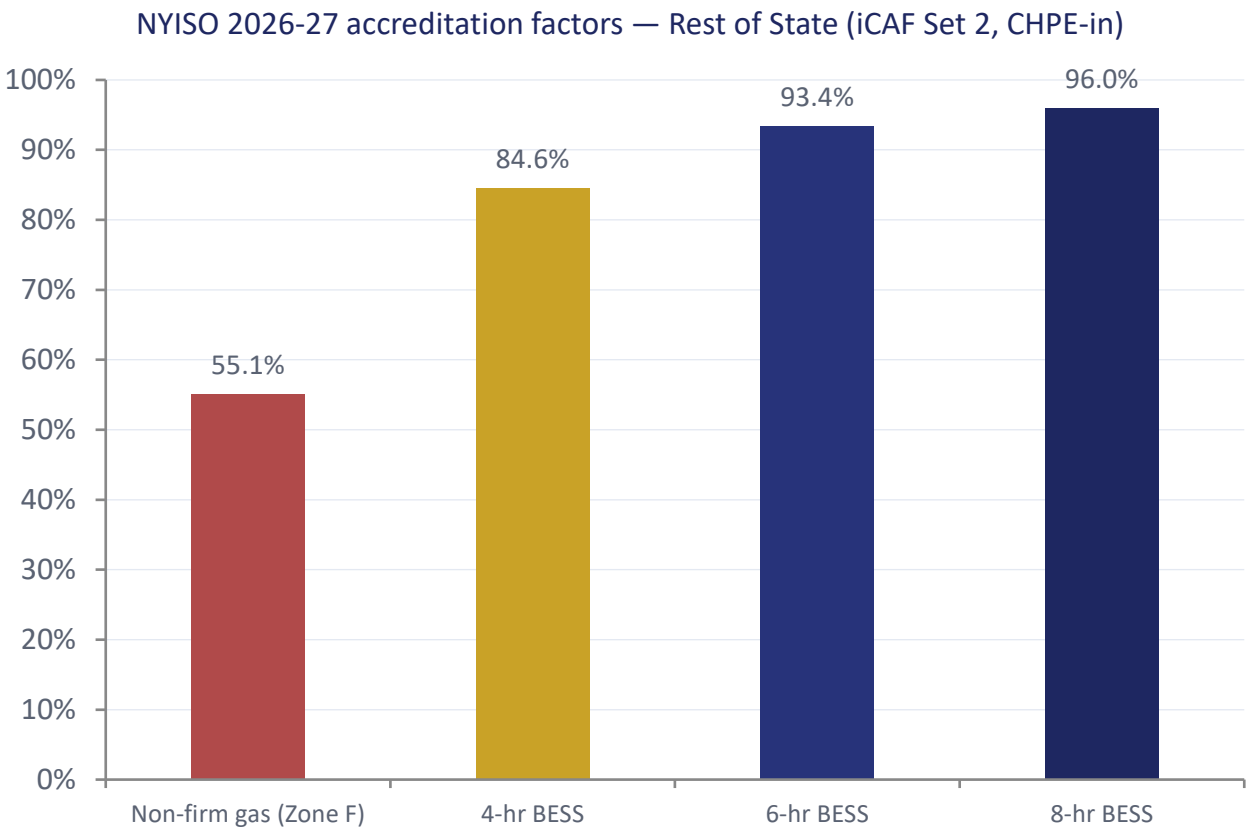
PJM 2026/27 BRA — EMAAC cleared at the FERC-mandated cap, $329.17/MW-day

NY capacity price

NYISO zone-specific ICAP — Zone J's record price excluded by design

Two screens, one list: top-10 feeders by headroom × avoided cost, cross-ranked with the top-10 ICAP/UCAP gap sites per state — BESS backfills the accreditation gap through existing interconnection rights (FERC Order 845 surplus service).

Zone F — The Battery Out-Accredits the Gas Plant Beside It



THE ALBANY GAP

Bethlehem Energy Center (AlphaGen) — ~900 MW	**404 MW gap**
Empire Generating, Rensselaer — 635 MW	**285 MW gap**
Selkirk Cogen (~2% recent CF) — 446 MW	**200 MW gap**

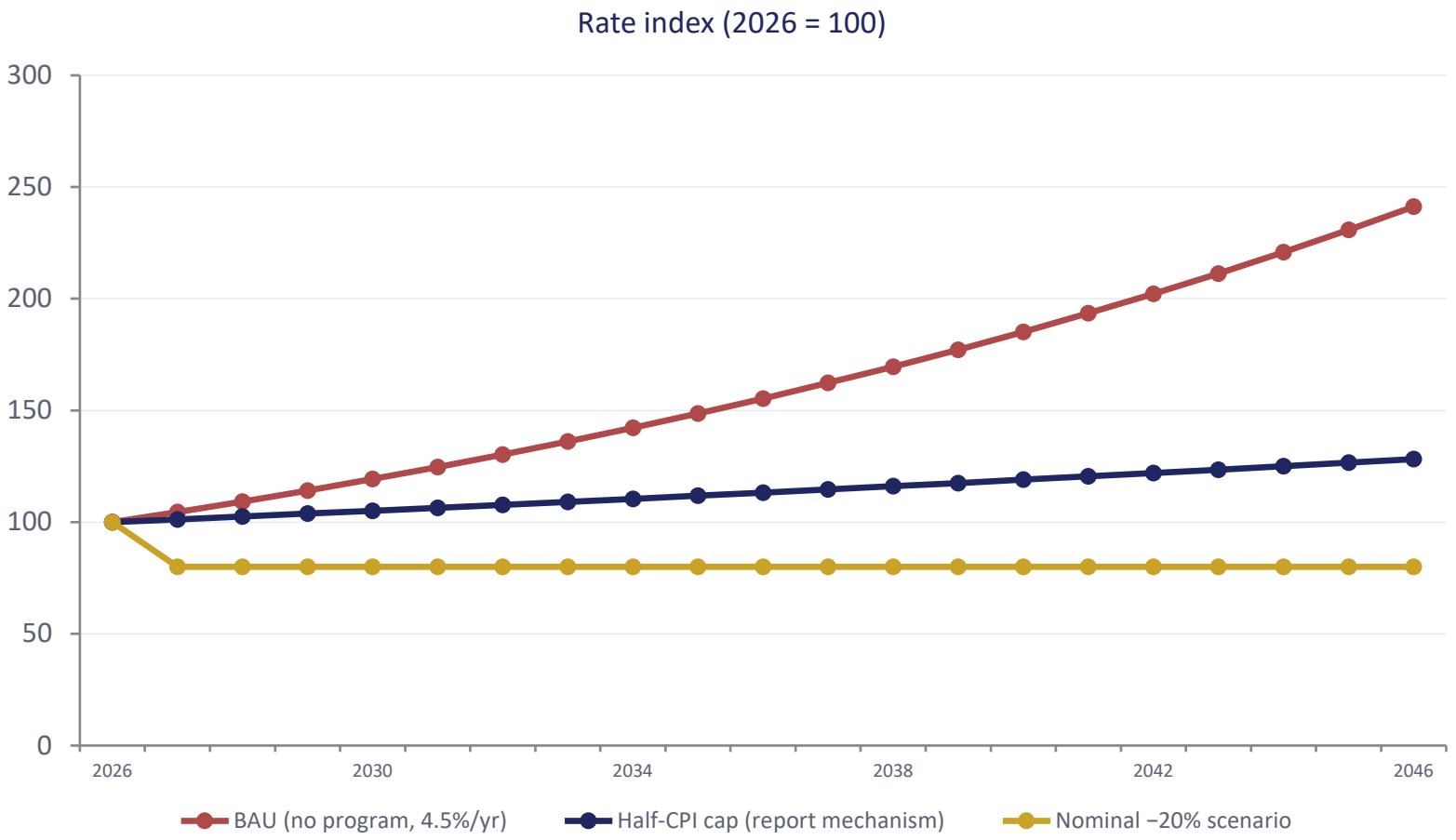
~890 MW

Zone F accreditation gap in the non-firm case — nearly 2,000 MW of installed gas capability derated to 55%

Zone F is the only Rest-of-State zone carrying the winter-fuel Non-Firm CARC (55.1% CHPE-in / 84.7% CHPE-out) on MW without a firm-fuel election. Storage co-located at these POIs converts the winter-fuel penalty into accredited capacity — with zero fuel-security exposure. Linden, NJ mirror: ~767 MW of class-ELCC gap, ~$106MM/yr at the EMAAC cap. Informational CAFs (Jan 2026); replace with finals and confirm fuel elections.

RATEPAYER OUTCOME

The Affordability Case — Three Rate Paths from the 2026 Base



2034

Year the capped path crosses 20% savings vs. BAU

47%

Cumulative savings vs. BAU by 2046 under the cap

Both paths shown so the coalition can commit to either; the filed report selects one.

WHAT GETS DEPLOYED

Technology Portfolio — Hardware Exists; Software Unlocks It

Behind-the-meter batteries

Tesla Powerwall, FranklinWH, Base Power, C&I BESS — enrollment is the gap, not hardware

HVAC & thermal flexibility

Smart thermostats (largest DOE VPP category, ~8% enrolled), Carrier Abound, Budderfly

Water heaters & thermal storage

CTA-2045 fleets, Rheem EcoNet / Aquanta, commercial ice storage

Managed EV charging & V2G

WeaveGrid DISCO, ChargePoint, Fermata, Nuvve — the growth engine of the DOE VPP target

Sub-5-yr payback efficiency

PCM, GridPoint, Blue Box Air coil cleaning — shrinks the load the tranche must serve

Enabling software layer

DERMS, telemetry & settlement, OpenADR / CTA-2045, aggregator market access — the binding constraint

Without the software layer, none of the installed hardware becomes usable grid capacity — it is the operational basis for Track 2's open feeder access.

RISK MITIGATION

De-Risking the Standard Objections

Battery fire & disposal	448 facility fires and $2.5B+ damage in 2025 (Fire Rover) — a real risk IOUs will raise. The program preempts it: compliance is a stated precondition of program participation in every filing.	*Preemptive filing language + CDRA/NWRA/SWANA industry programs*
Stewardship funding	RGGI-style, market-participant-funded state fund: whoever deploys the battery — IOU or VPP — pays into disposal/safety mitigation. Real precedent: CA SB 1215, Nebraska LB36, Vermont EPR.	*Attaches to NY's live producer-responsibility vehicle; NJ Clean Energy Fund is the administrative home*
Safer chemistry, in-territory	Viridi Parente (Buffalo, NY) — anti-propagation lithium in National Grid's territory. Eos Energy (Edison, NJ) — non-flammable zinc in PSE&G's territory. Local jobs framing built in.	*UL 9540/9540A listed options geographically aligned to both pilots*
Forecast risk	PJM load forecasts already revised for phantom load; NYISO's baseline doesn't yet support 3% growth. The commissioned report stress-tests the cap at 1.5–2% growth rather than one point estimate.	*Disclosed dependencies, not papered-over assumptions*