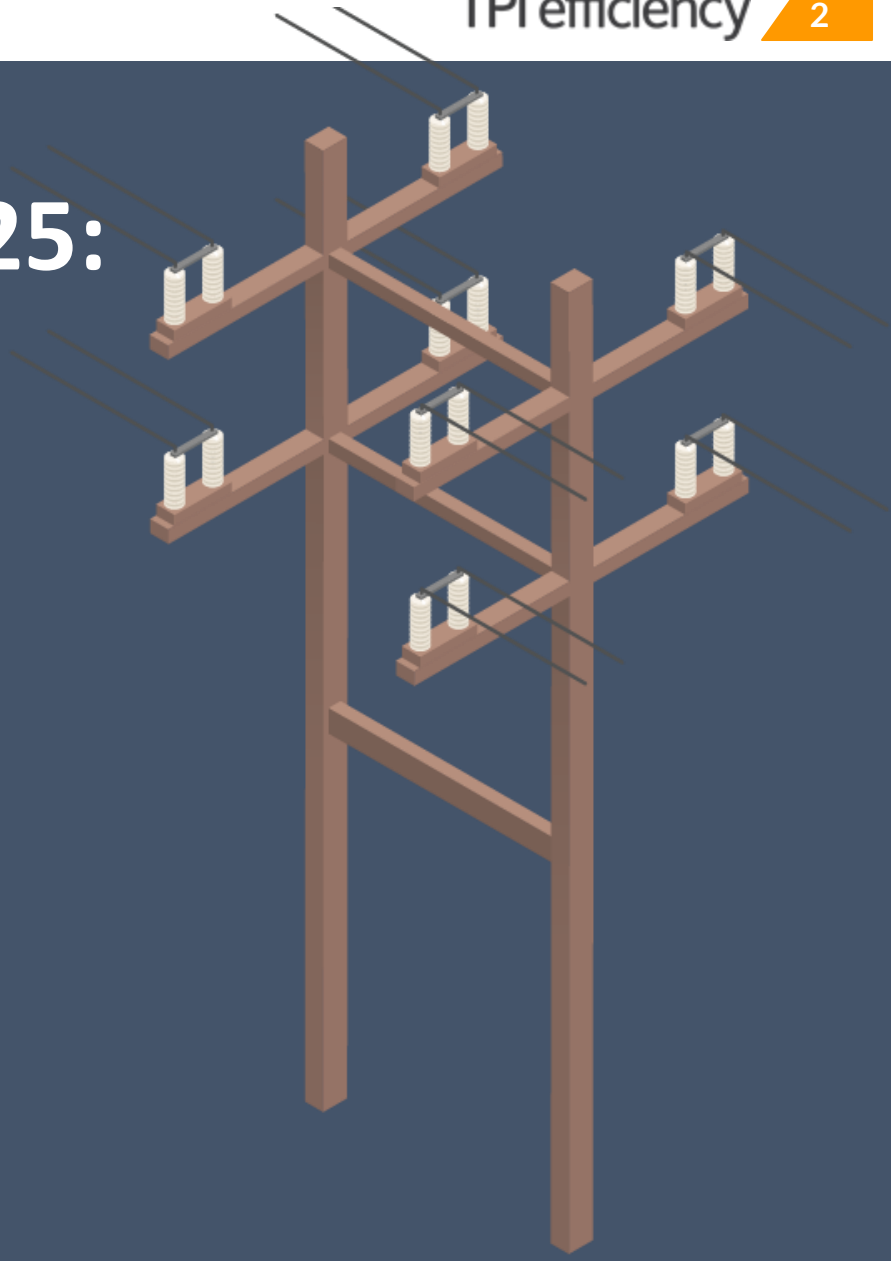
ENERGY • EFFICIENCY • SUSTAINABILITY • CONSULTING • FUNDING

SOLVING FUTURE CHALLENGES TODAY.

PJM Capacity Cost Increases for 2025: Impact and Mitigation Strategies



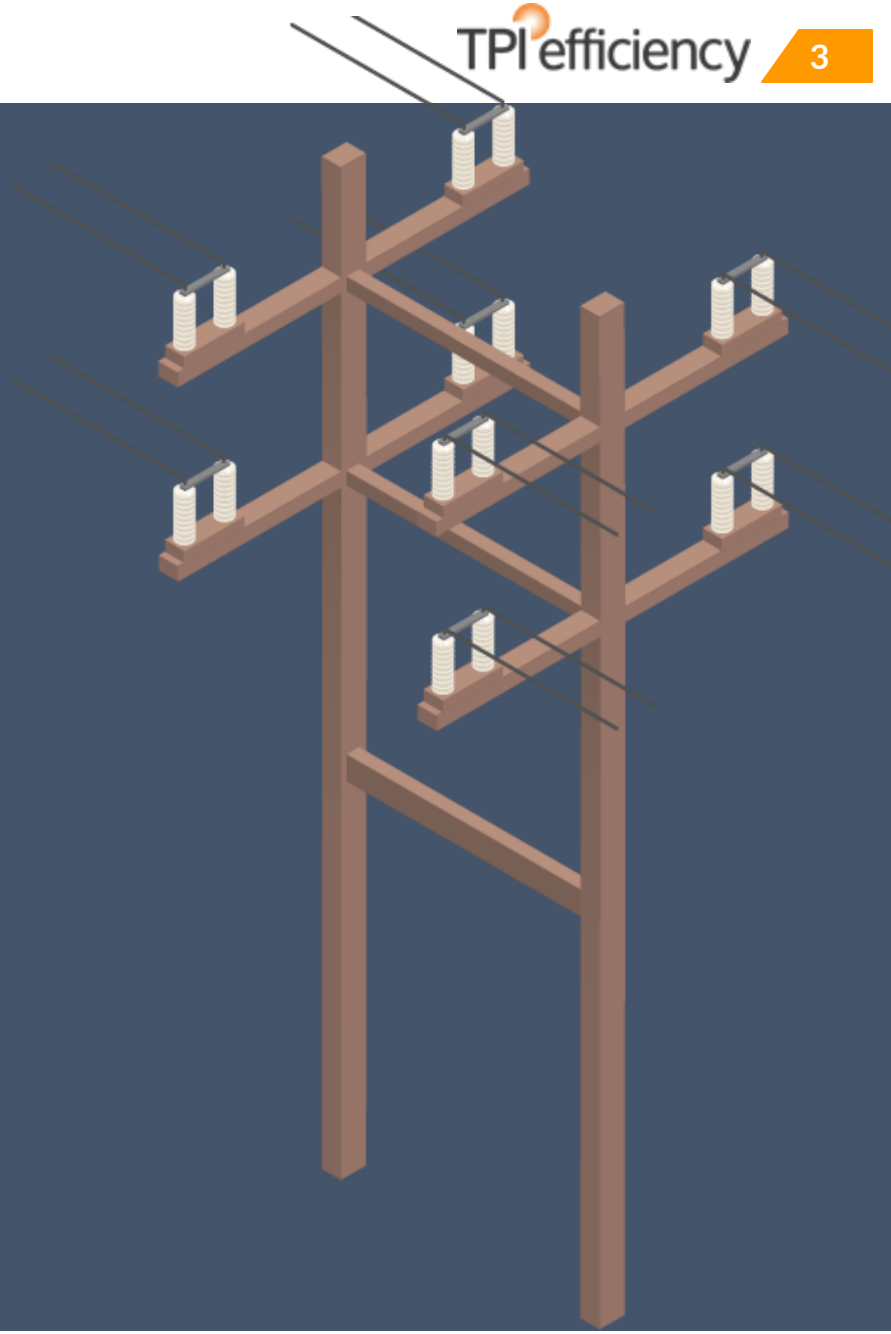
Presented by:

Karl Shaw, CEP
President & COO

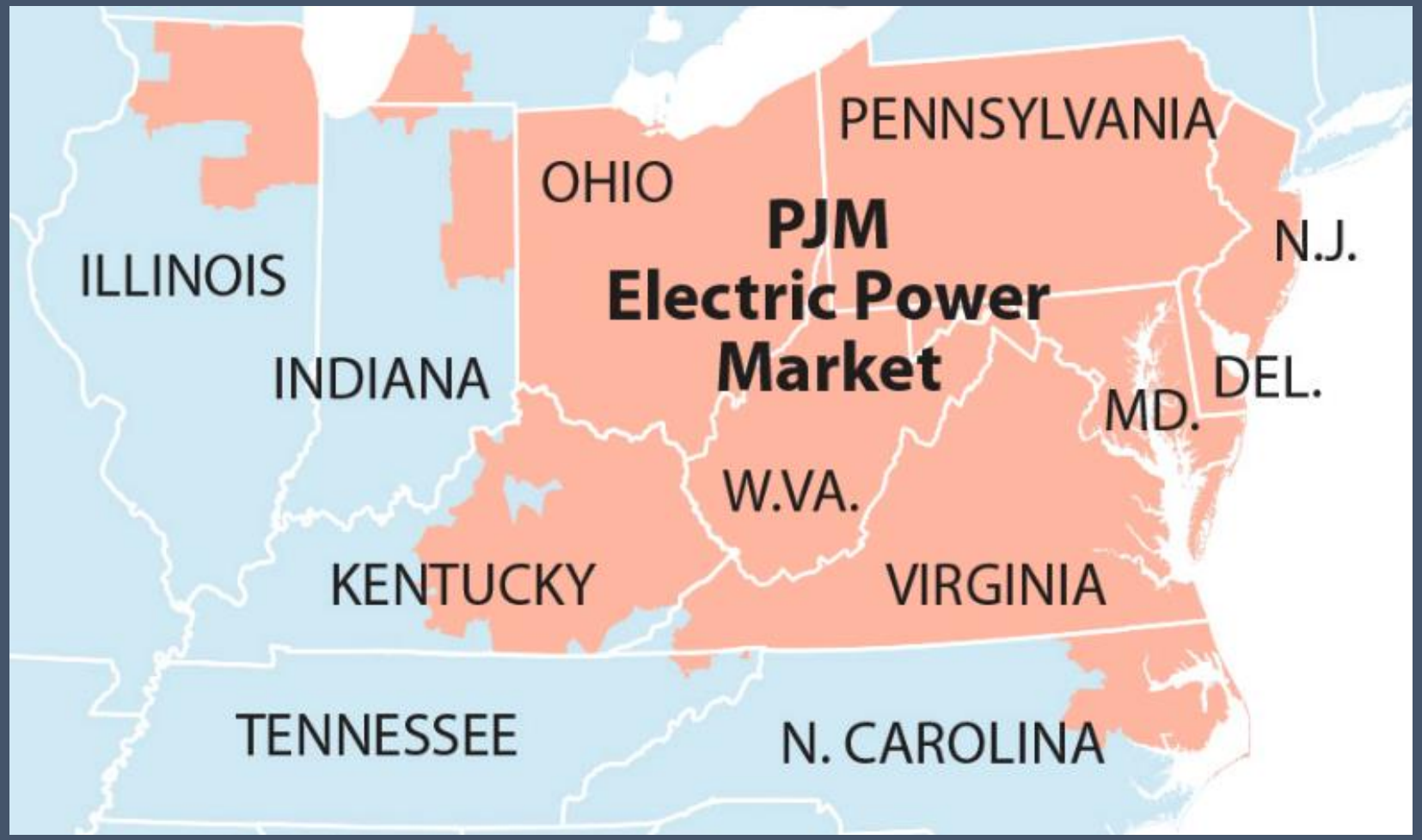
Jason Brown, PE, CEM, LC
Energy Engineer

Agenda

- Where is this happening?
- Why is it happening?
- How will it affect you?
- How can you react?



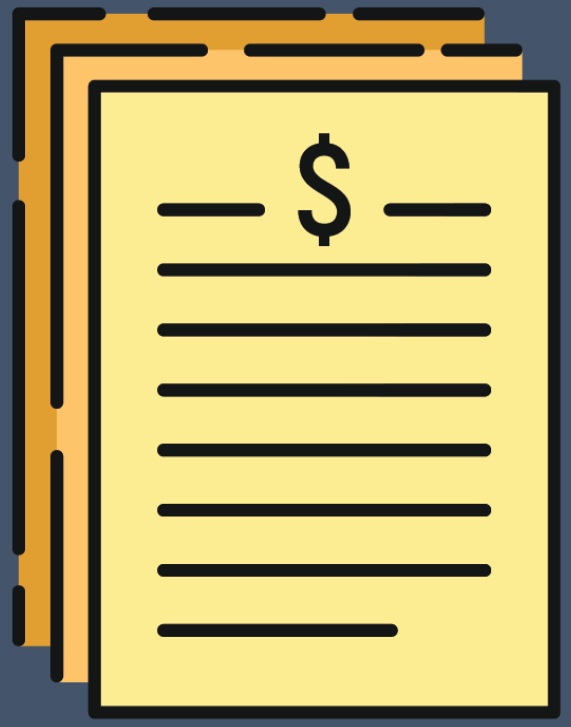
Where is this happening?



PJM is a regional transmission organization (RTO) that coordinates the movement of wholesale electricity in 13 states and the District of Columbia.

The footprint covers 65 million people.

Balances needs of customers and suppliers for grid reliability.



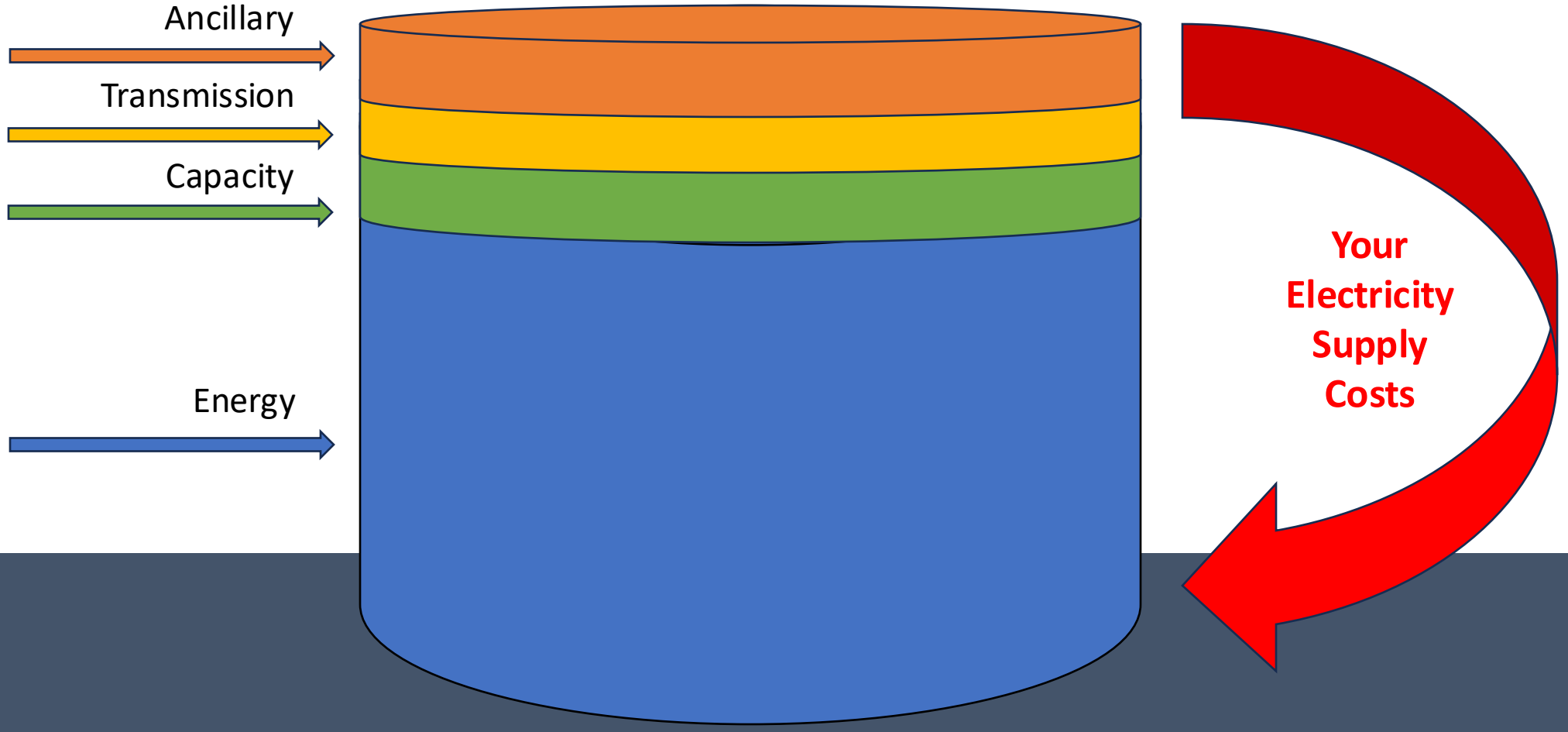
PJM's Capacity Cost Model

1. **Advance Procurement:** PJM secures capacity three years in advance through a competitive auction called the Reliability Pricing Model (RPM)

2. **Payment for Availability:** Participants are paid for committing to produce electricity when called upon by PJM, regardless of whether they are actually needed to generate power.

3. **Resource Types:** Capacity resources can include generators, demand response programs, energy efficiency measures, and transmission upgrades.

How Does Capacity Impact your Electricity Supply Costs?



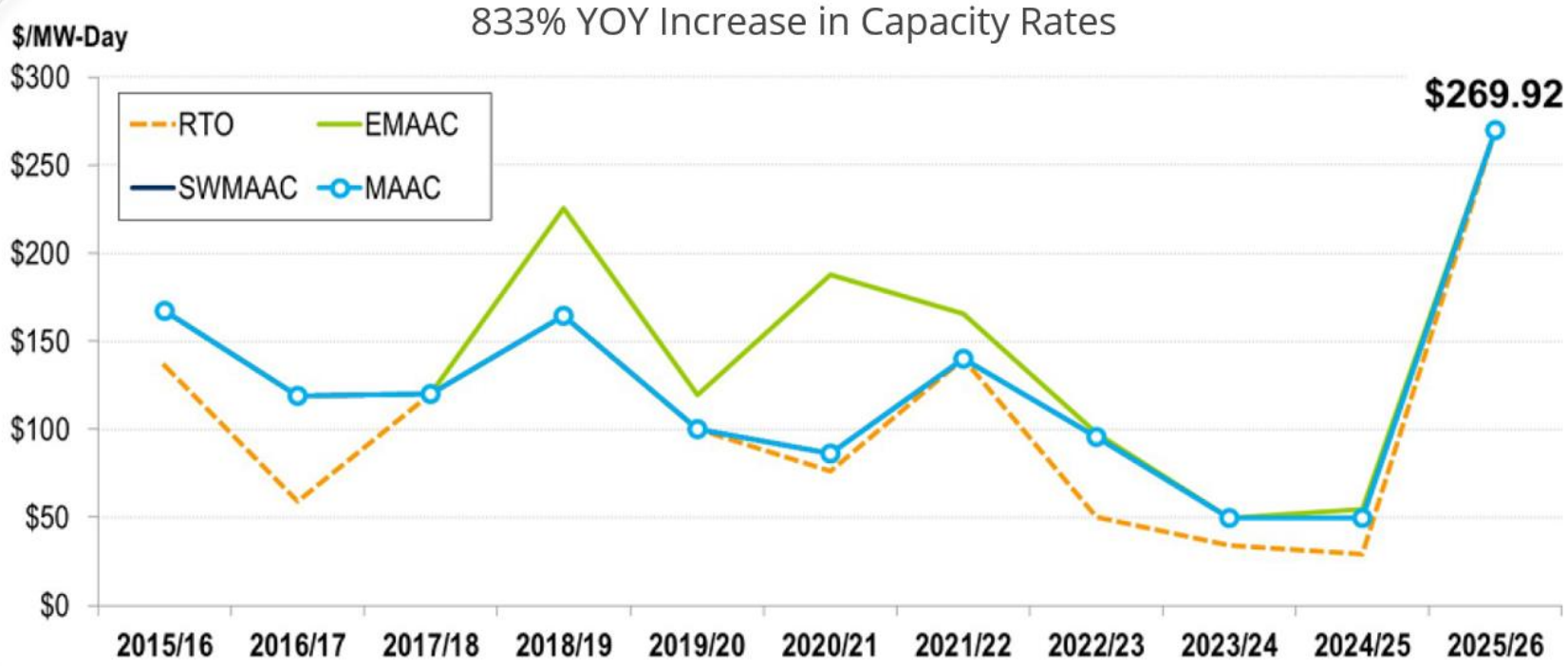
Buying energy from utility or competitive retail energy supplier

What happened at the last auction?

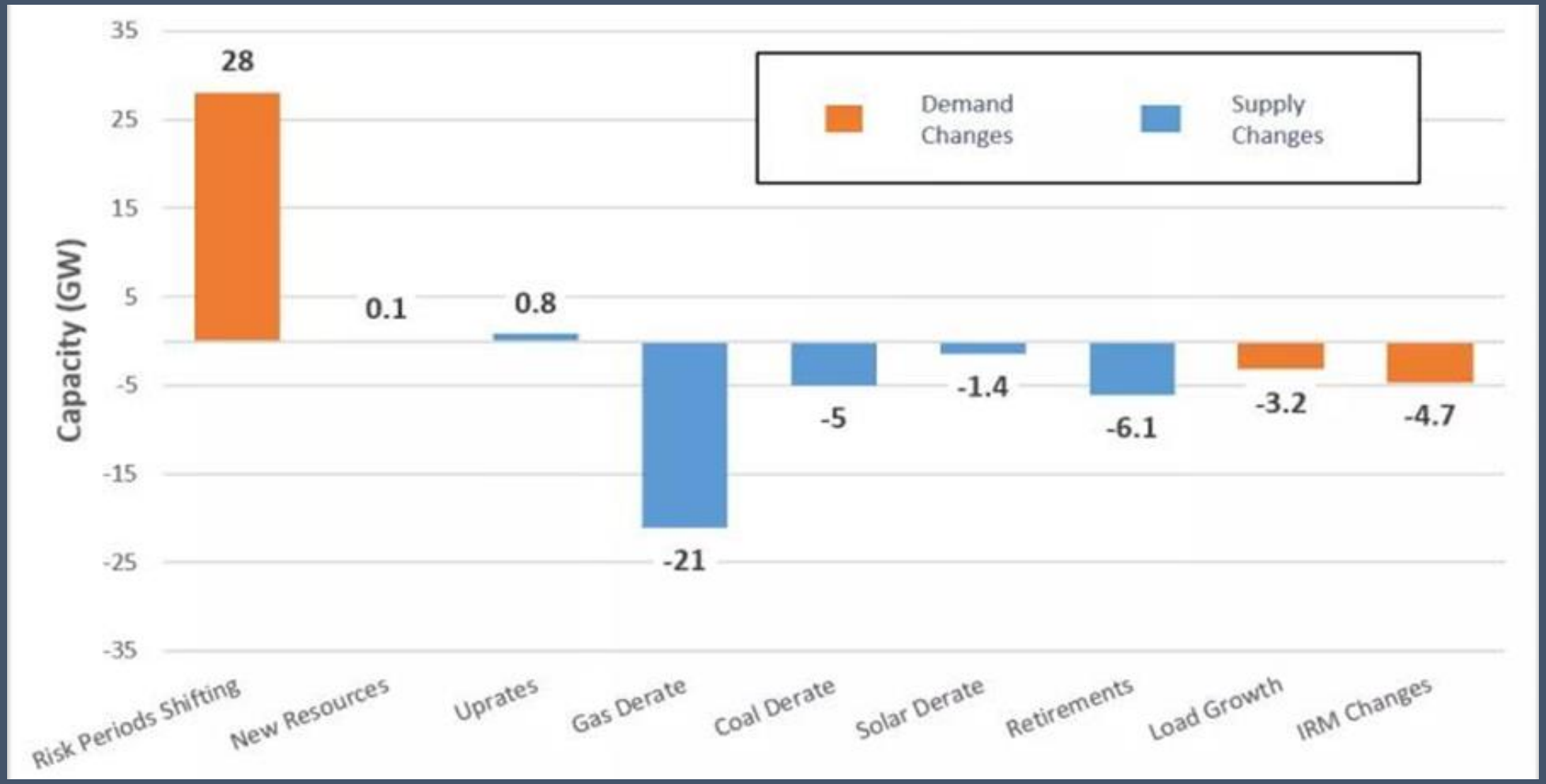
10X Price increase!

PJM Capacity Prices

- Significant increases between 2024/25 to 2025/26
- Larger increases reported in other areas
  - BGE ($466.35/MW-Day)
  - DOM ($444.26/MW-Day)



What Changed?



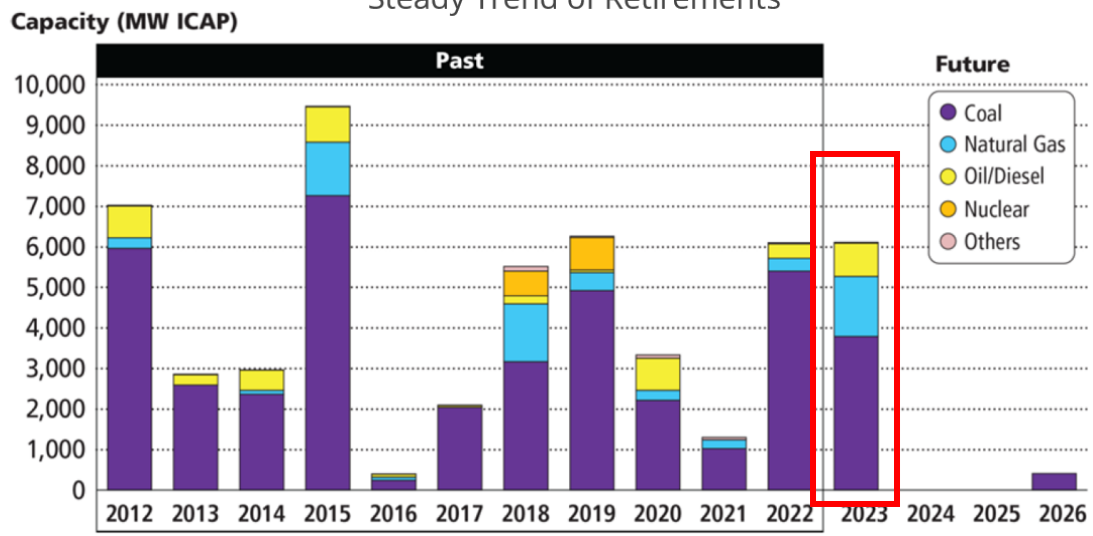
Extreme weather vs reliability

- PJM took the first step in remedying this problem by changing how all resources are evaluated for reliability, resulting in a more accurate process known as ***"marginal capacity accreditation."***
  - 26 GW of gas and coal resources now deemed to be unreliable and therefore not counted in its capacity market
  - 4.7 GW in changes to the Installed Reserve Margin (IRM)

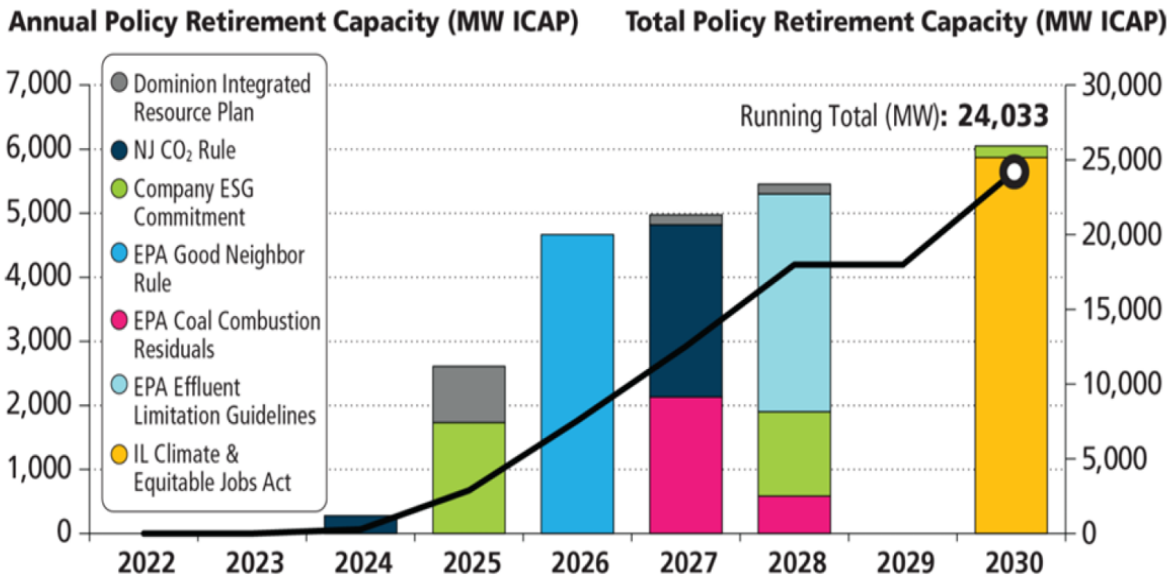
Retirements

Lost 6.1 GW

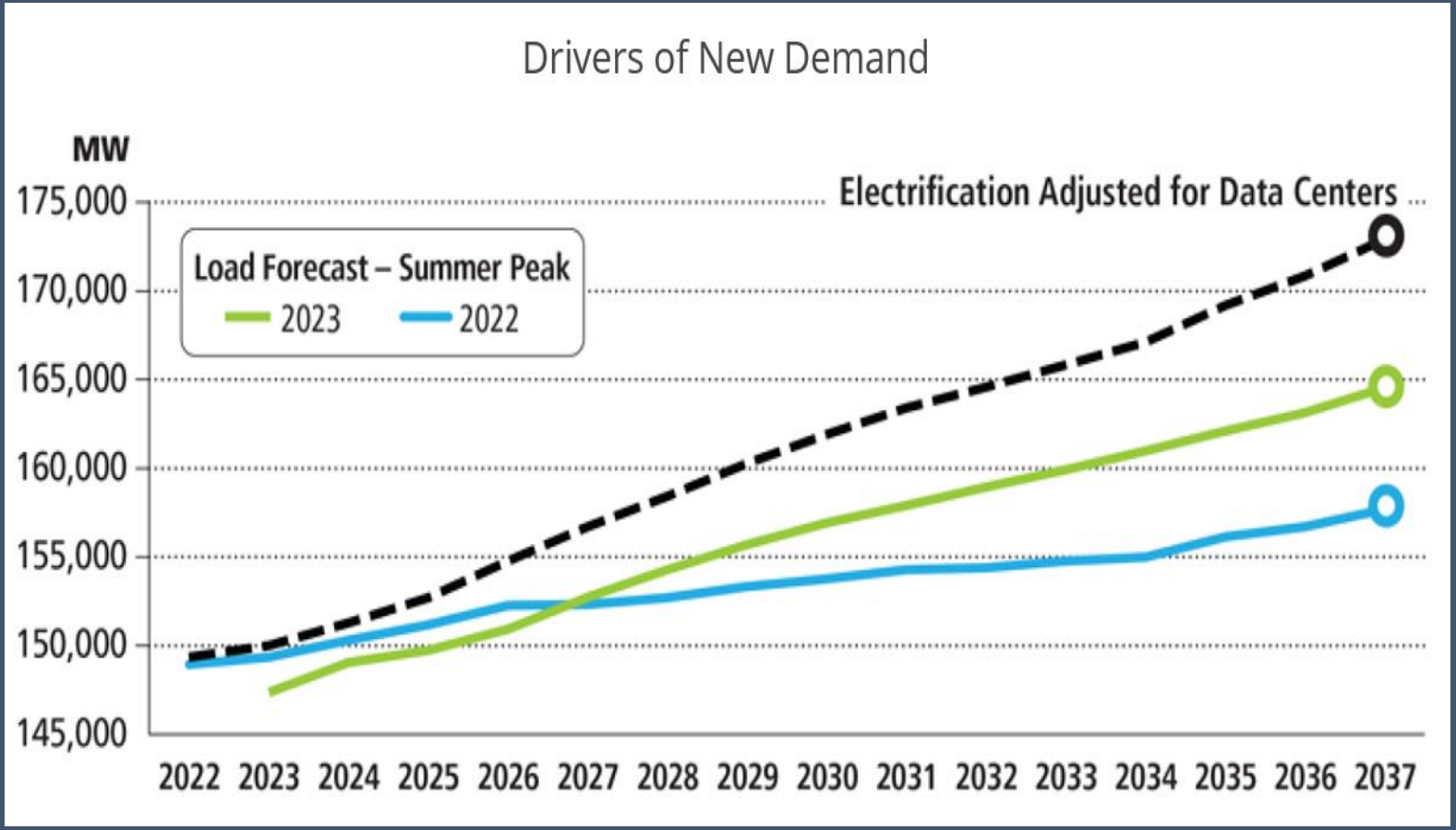
Steady Trend of Retirements



Retirement Numbers Expected to Rise



Load Growth

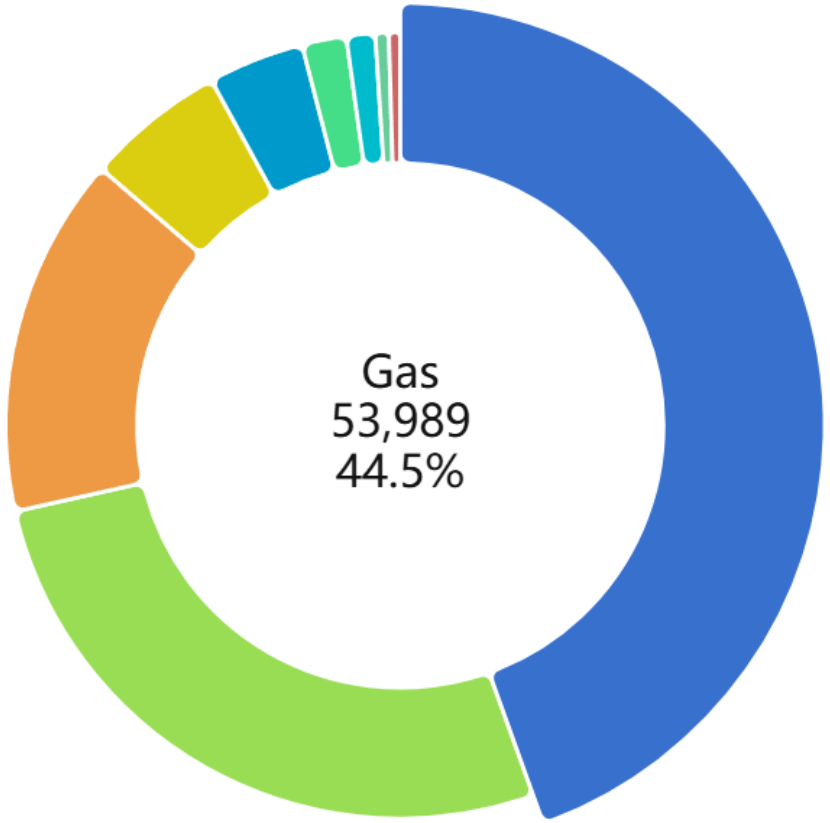


Data centers could account for 44% of U.S. electricity load growth from 2023 to 2028

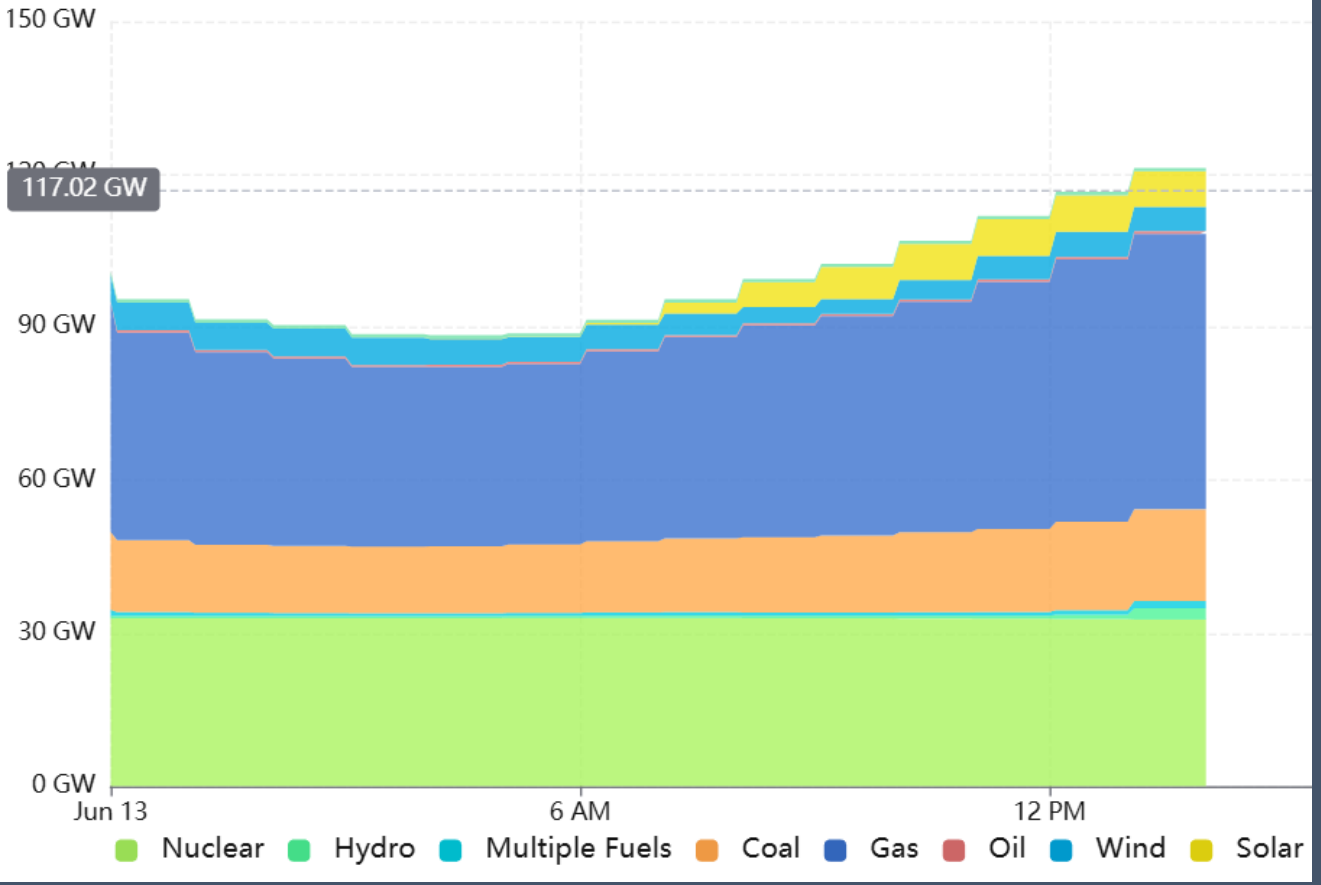
By 2028, U.S. utilities may need to increase annual energy generation by between 7% and 26% above 2023 levels in order to meet projected demand

Ohio Power Grid and Assets

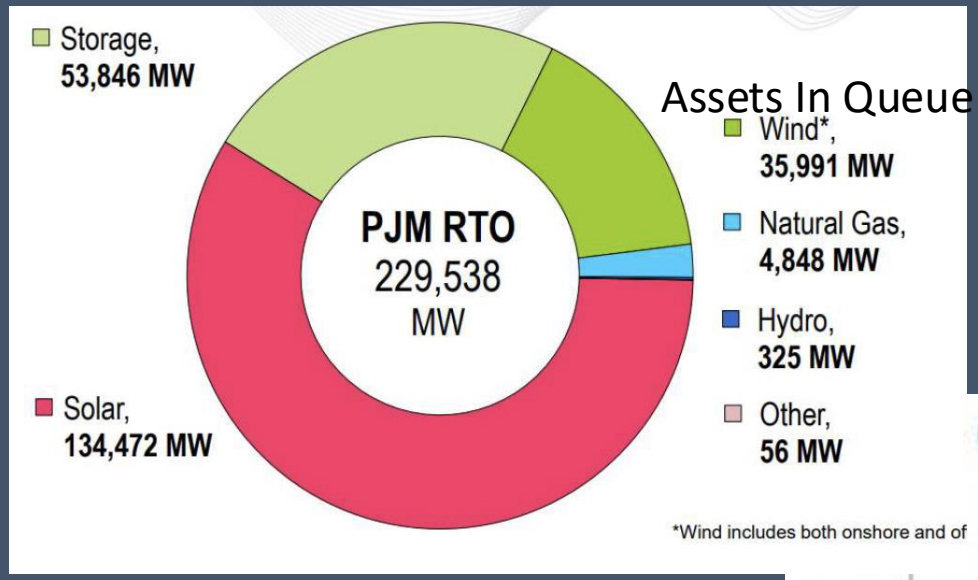
Current Fuel Mix

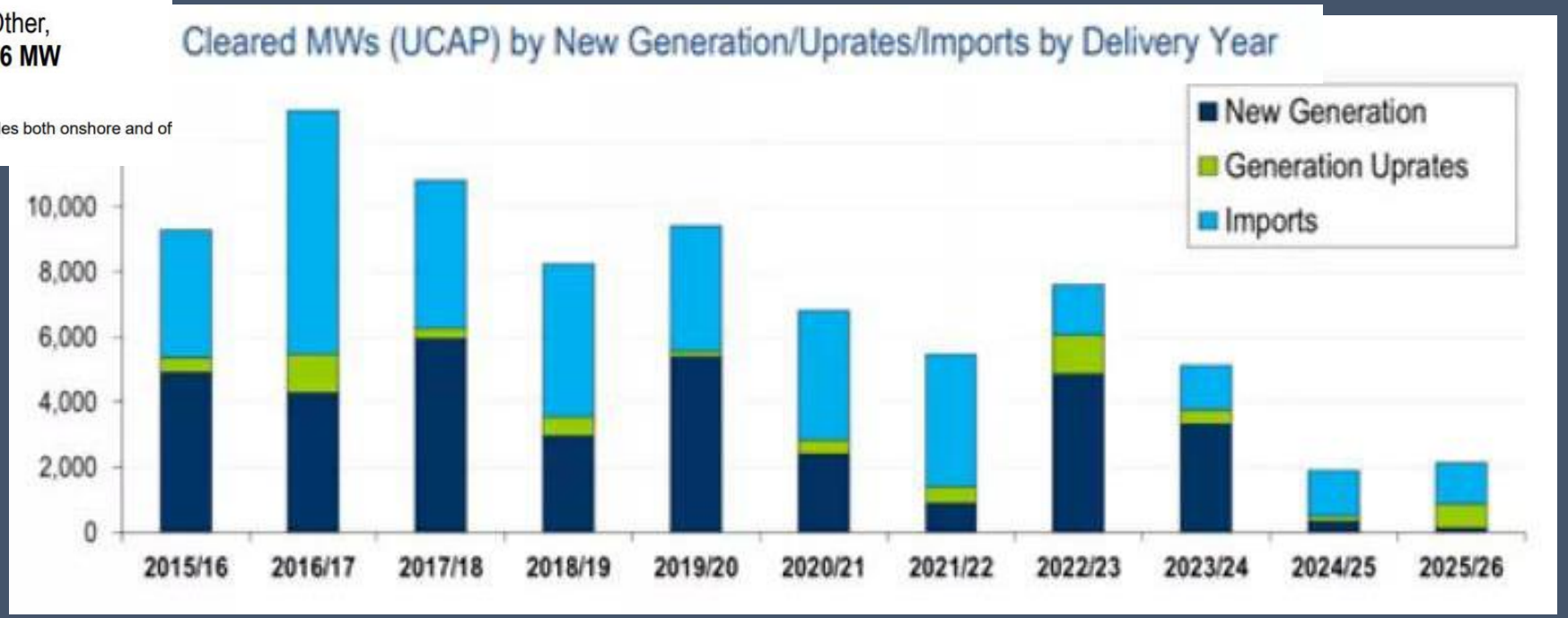


Fuel Mix - PJM



What Has PJM Been Doing?





Determining Your Capacity Cost

How is the total cost of capacity for every building calculated?

Peak Load Contribution (PLC) in kW - PLC is the average of your electricity demand in kW during the five coincidental summer peak hours.

Base Residual Auction (BRA) - this auction is typically held three years before the delivery year. It shapes the PJM's region 's electricity mix and ensures there is enough power supply to meet electricity demand.

2024 Peaks-to-date		
Date	**Hour Ending**	**Peak Demand**
07/16/2024	18	152,554
07/15/2024	18	151,588
08/01/2024	18	148,655
08/28/2024	18	147,594
06/21/2024	18	147,525

Example:

If you had a PLC of 1000 kW in 2024. This PLC will be adjusted by The Forecast Pool Requirement and Zonal Scaling Factors, which account for reserve margin and forecasted electric demand growth.

This will result in an adjusted PLC of 1213 kW, which is then multiplied by the BRA clearing price in $/kW – year, resulting in an estimated annual capacity cost of $12,844. Dividing this number by annual usage in kWh will give you the capacity costs in $/kWh for the year of $0.0021.

	PLC/MW	Price	FPR	ZSF	DAYS	Annual Cost	kWh	Cost per kWh
23-24	1	$34.00	1.0905	1.1127	365	$15,058	6,000,000	0.0025
24-25	1	$29.00	1.0905	1.1127	365	$12,844	6,000,000	0.0021
25-26	1	$269.92	1.0905	1.1127	365	$119,545	6,000,000	0.0199
26-27	1	$350.00*	1.0905	1.1127	365	$155,012	6,000,000	0.0258

This client will see an increase of $107,000 in annual electricity cost

Energy Contract Options for Capacity

- **Fixed — The supplier estimates the total cost for the term and averages it per kWh.** Suppliers add extra premiums to cover PLC deviations or small BRA changes.

- **Pass Through** – Annual PLC Values and BRA calculated and the cost per kWh billed. Adjusted annually if either changes up or down.

- **Bilateral—**The cost per kWh is calculated according to each supplier's own formula. It could be estimated future capacity cost or current PLC and BRA and adjusted annually if either changes up or down.

However….

Energy Contract Design: Fixed Capacity

Energy Costs	Passed Through
Ancillary Services And Other ISO Costs	Included in Price subject to Change in Law
Auction Revenue Rights Credits	Included in Price subject to Change in Law
Capacity Costs	Included in Price subject to Change in Law
Transmission Costs	Not Applicable
Transmission Loss Credits	Included in Price subject to Change in Law
Line Loss Costs	Passed Through
FERC Order 745 Costs	Included in Price subject to Change in Law
Balancing Congestion Costs	Included in Price subject to Change in Law
Transmission Reallocation Costs	Not Applicable

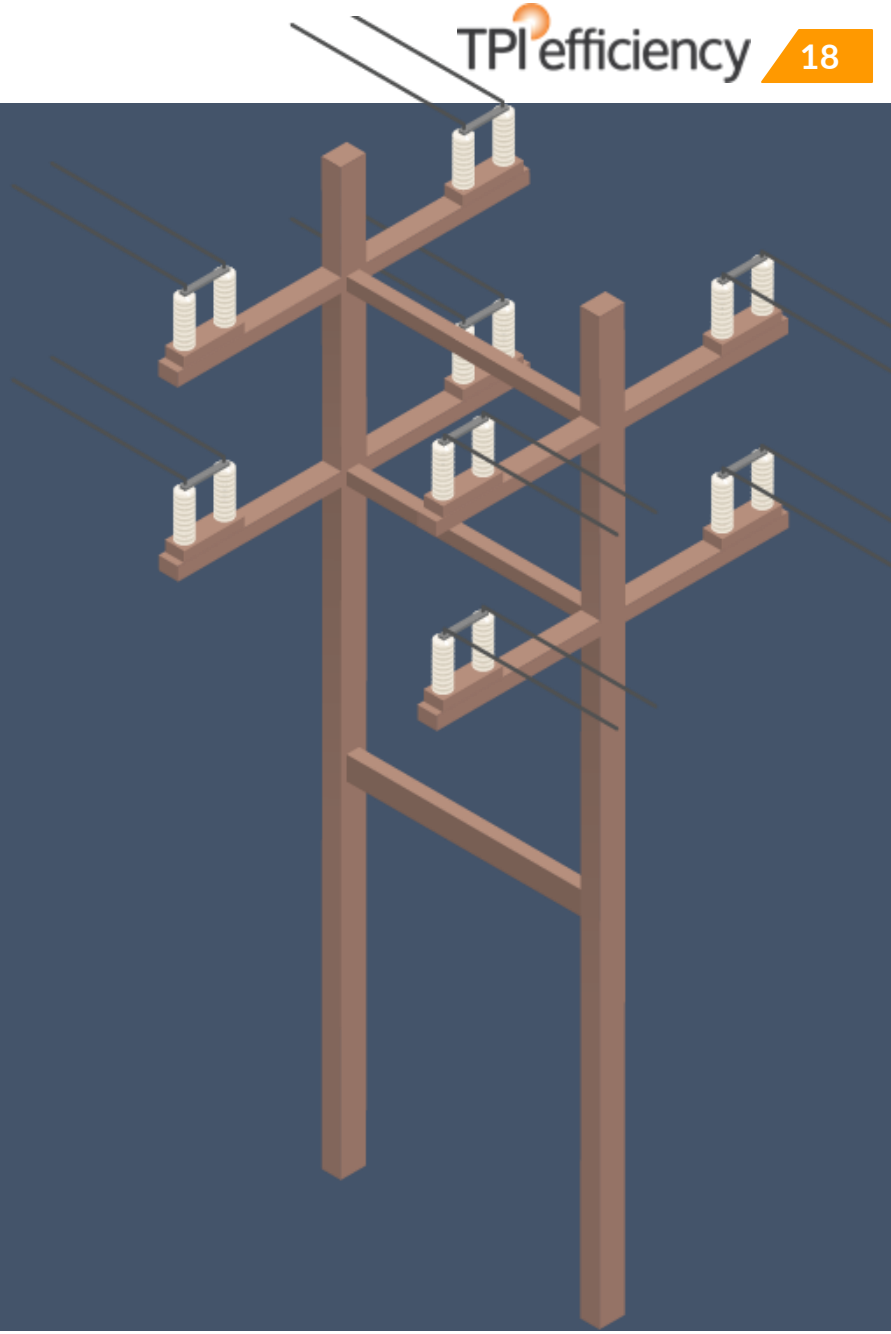
The contract prices contained in the Account Schedule include credit costs and margin as well as Renewable Portfolio Standards Costs. Any applicable RMR Costs are Not Applicable to this Agreement. Deration Credits are included in the contract price(s). All other costs listed above as "Included in Price subject to Change in Law" may be subject to change if there is a change in law, as described in Section 5 of the General Terms and Conditions below.

You have elected the "Included in Price subject to Change in Law" option for your "Capacity Costs" as noted in the table above. "Included in Price subject to Change in Law" means we have included Capacity Costs in your contract price (set forth in the Account Schedule) based on the current Capacity Costs associated with your Accounts as of the effective date of this Agreement. Your Capacity Costs will not be subject to change unless there has been a Change in Law pursuant to Section 5 of the General Terms and Conditions below. For avoidance of doubt, except as otherwise agreed to herein, your contract price will not be adjusted (either upward or downward) to pass through any changes in your Capacity Costs based on changes to the Capacity Obligation for the Account(s). "Capacity Obligation" means the Accounts' Peak Load Contribution provided by the UDC and adjusted to apply any applicable ISO adjustment factors.

Your supplier estimated capacity costs using the PLC available when the contract was signed.

Therefore, lowering your PLC **will NOT** result in savings until the contract expires.

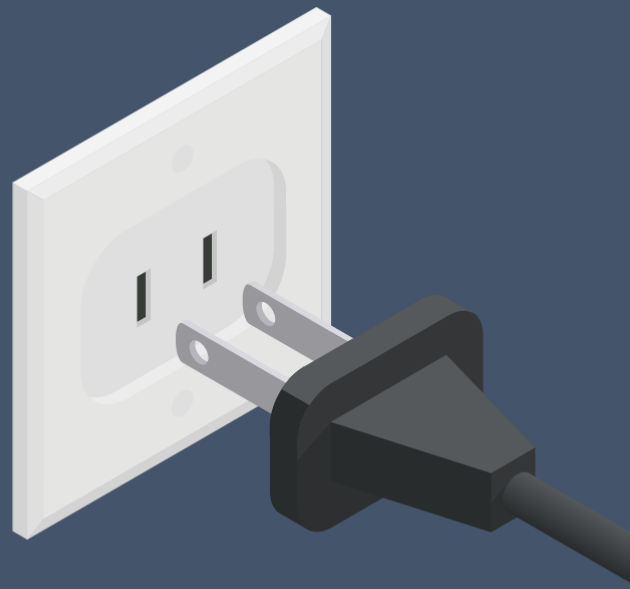
- How can you react to these market changes?



Energy Procurement Improvements

STOP Fixing Capacity
Consider Passing Through to save on premiums to cover future volatility

STOP Buying 100% of your usage at one time
Evaluate Managed Procurement Strategies



Buy at the right time

Personalized Advice And Portfolio Management In Action

The Takeaway: This client* has already saved $115,000 by paying the index rate instead of the fixed energy rate offered.

***13,000,000 kWh annual consumption**

Efficiency Projects

LED lighting upgrades: 40-60% kWh Reduction

Replace inefficient lighting systems with energy-efficient LED technology. Include Lighting Controls.

Fluorescent/HID - 1-5 Year Payback

5+ Year Old LED – 4+ Year Payback

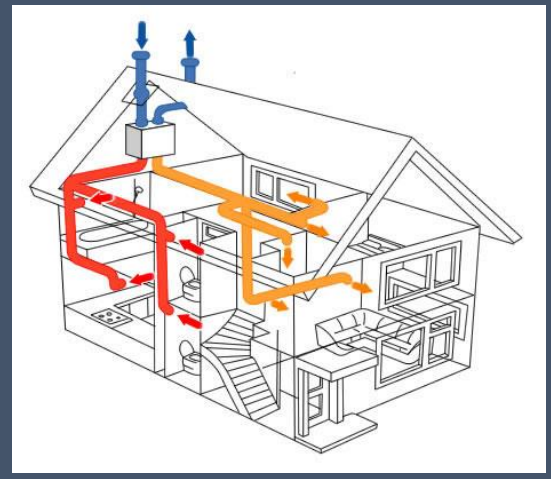
Exterior Only – HID – 3+ Year Payback

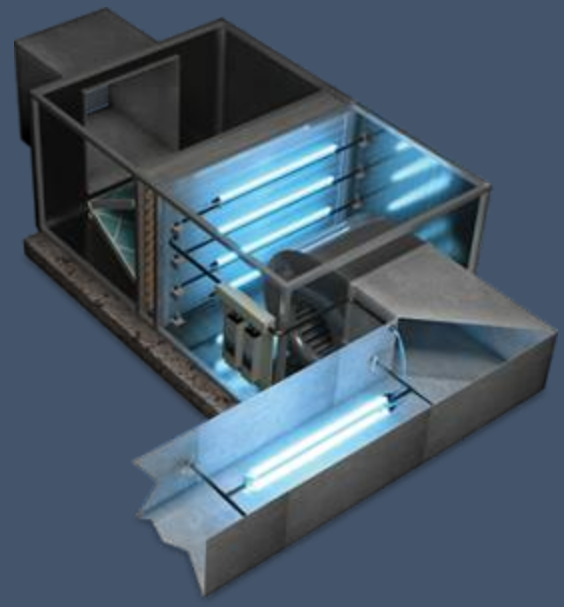
+Simple Lighting Controls – 2-4 Year Payback

Efficiency Projects

HVAC Upgrades:
Cut Break Fix Costs

- Upgrade Boilers, Chillers, Roof Top Units
- UV Filters – Outside Air Control
- Heat Recovery – Reuse Excess Heat
- Ventilation Improvement Study





Efficiency Projects

- Compressed Air Systems – 2-5 Year Payback

  Conduct a Leak Study

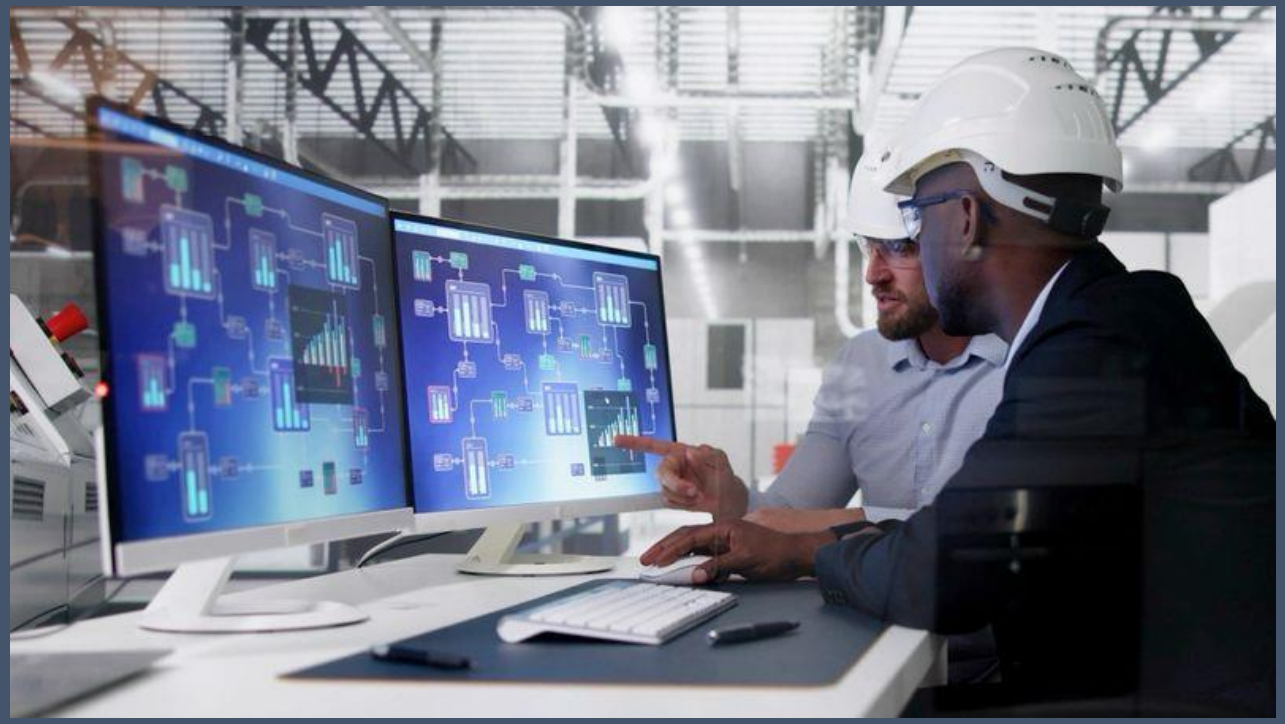
  Efficiency Improvement Study
    Rotary Screw

Efficiency Projects

Building automation and controls:

Implement advanced building management systems to optimize energy usage.

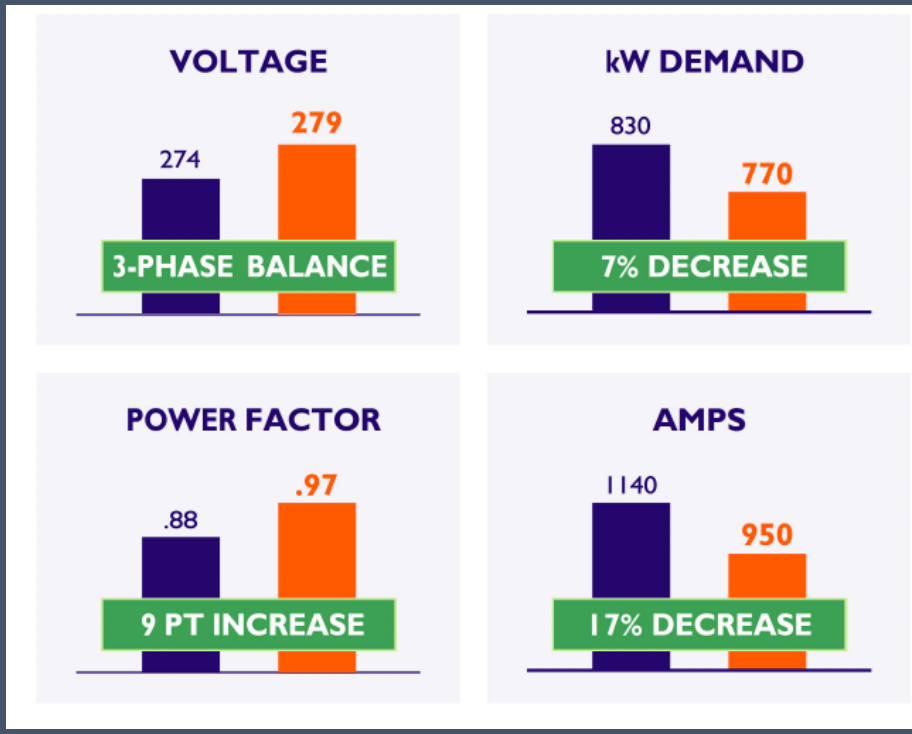
Add or Retro-Commission your existing automation Systems



Efficiency Projects

Power Quality Improvement:
Improve your power factor and protect from 3 second surges/blips

- ✔ **BALANCES** THREE-PHASE VOLTAGES
- ✔ **BOOSTS** SYSTEM VOLTAGE
- ✔ **REDUCES** HARMONIC DISTORTION
- ✔ **REDUCES** KW & KVA DEMAND
- ✔ **REDUCES** KWH CONSUMPTION
- ✔ **REDUCES** AMPERAGE
- ✔ **IMPROVES** POWER FACTOR
- ✔ **REDUCES** CARBON FOOTPRINT



Efficiency Projects Financial Benefits

Tax Benefits

- **Abandonment Tax Credit** – Fully Depreciate Existing Systems
- **Accelerated Depreciation**
  - 60% when completed in 2024 CY
  - 40% when completed in 2025 CY
  - 20% when completed in 2026 CY
- **179D Deduction**

Renewable Energy Credits values increased and able to cross state lines within PJM

Utility Incentives – utilitygenius.com

Business Specific Grants – DOE, DSIREUSA.org

USDA REAP Grant

Eligibility: Located in Rural Area, Classified as an SBA Small Business

or

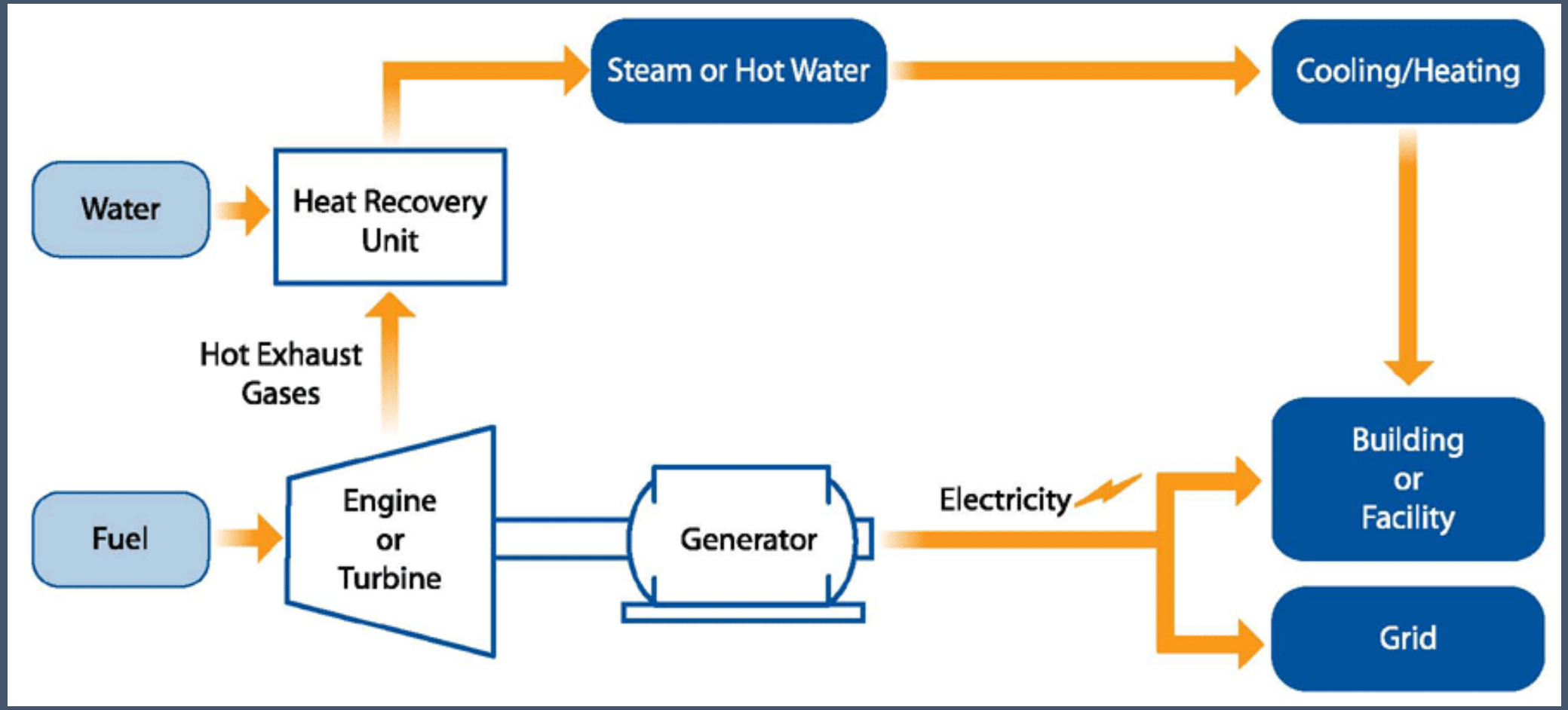
50% of gross income from direct production of agricultural products

- Solar Generation
- Wind Generation
- Biomass
- Biodiesel and Ethanol
- Anaerobic Digesters
- Solid Fuels
- Geothermal
- Hydropower (below 30 megawatts)
- Hydrogen
- Ocean (tidal, current, thermal) generation.

- High Efficiency HVAC Systems
- Insulation
- Lighting
- Cooling or refrigeration units
- Doors and windows
- Smart Thermostats and other EMS install
- Electric, solar or gravity pumps for sprinkler pivots
- Switching from a diesel to electric irrigation motor
- Replacement of energy-inefficient equipment

50% of project, Up to $1MM Grant
Recently extended through 2027

Combined Heat and Power



Example Solar Project

1,600,000kWh, 40% annual offset

CO2 Offset – ~2.1 Million lbs/year

Equivalent to planting almost 1 Million Trees

Equivalent to taking over 3000 ICE vehicles off the road

Solar Example Project - OHIO

Summary :			
Solar Price Per Watt	$1.86	System Payback-Years	5.4
Capital Purchase Price *(w/ Est.Taxes & Shipping Costs)*	$2,455,343.38	**Net Cost After Incentives**	$-24,449.13
Value of Energy Incentives	$2,479,792.50	Year 1 Energy Savings	$204,560.81
Lifetime ROI	**$4,352,252.82**	**Lifetime ROI %**	**177%**
IRR	15.53%	NPV	$943,617.73

Also available for NP

40% in 2025

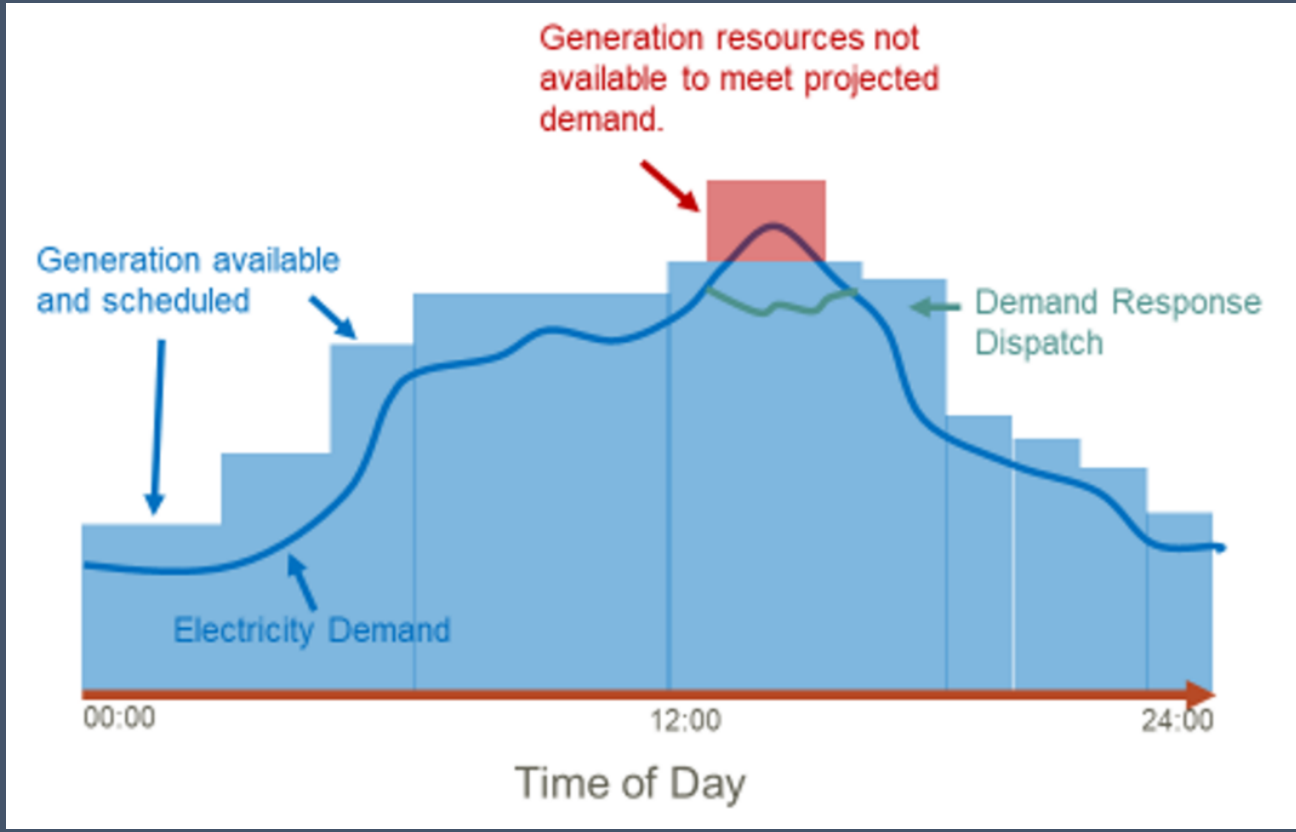
OH -> PA RECS

Incentive	Type	Receipt	Amount
Federal Tax Credit - 30% (Includes 10% Adder)	Tax Credit	Year 1	$982,137.35
Bonus Depreciation/MACRS	Accelerated Asset Depreciation	Year 1-6	$417,604.80
PA Tier-1 REC	Renewable Energy Credits	Year 1-25	$1,080,050.35

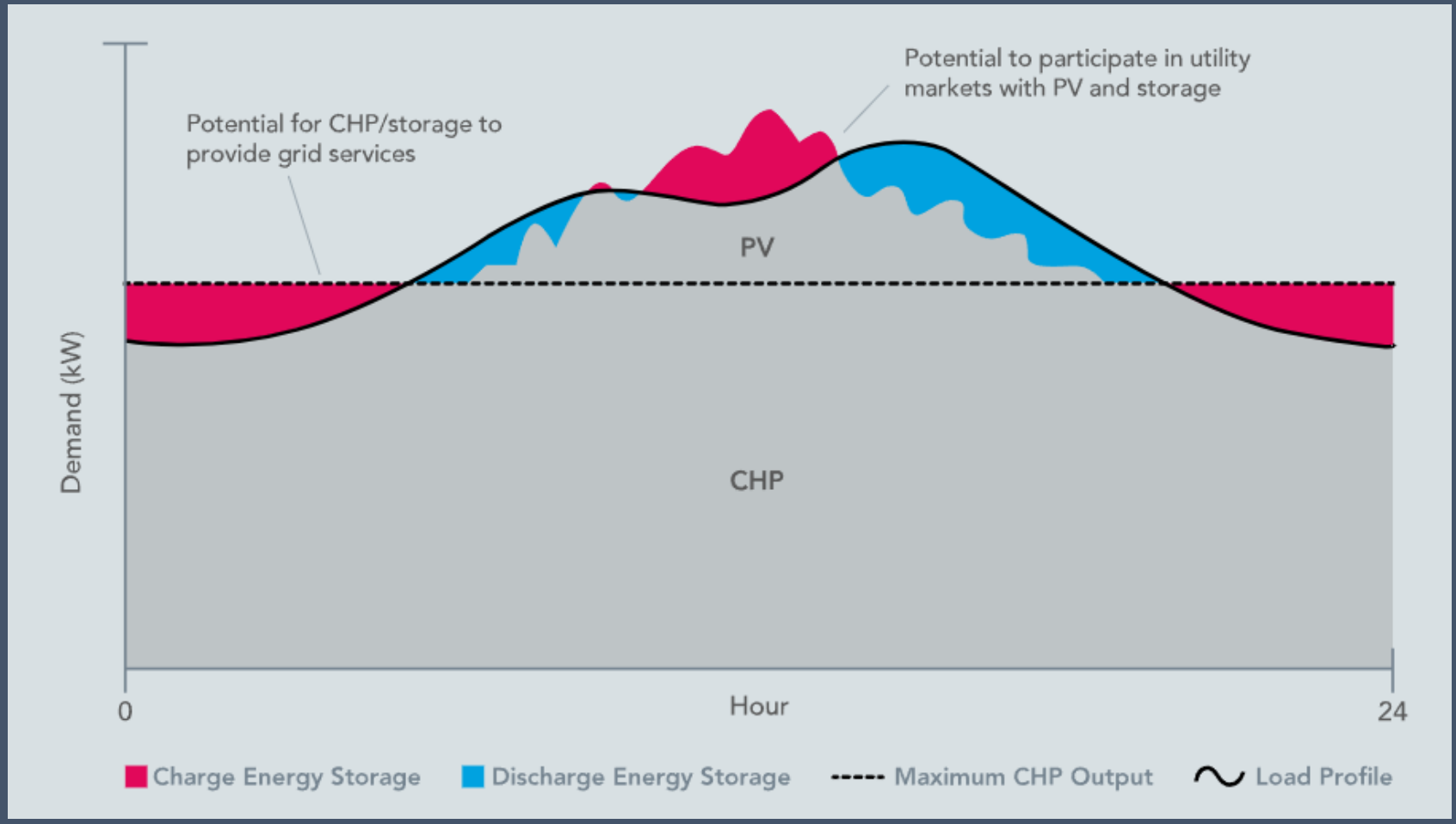
Demand Response and Cap Tag Reductions

Demand response programs:
Participate in programs that incentivize the reduction of electricity consumption during peak demand periods.
Utilize Tier 4 Generators

Capacity Tag Reductions:
5 Days each year are used to define your capacity rate, curtail during those dates to keep your rates low



Onsite Production more viable



Energy Project Funding Options

Cash (Cap-Ex)

Requires a large upfront expense. While you have full ownership of the equipment, your service, support, and future upgrade options are limited

Accounting Treatment:
Capital Expense
Ownership: Full Ownership
Services/Support:
Material warranty
Future Upgrade Options: None

Lease/Loan

Reduces upfront expense but is still a capital expense with funding fees over the term of the agreement. Still offers limited warranty service, maintenance support, and future upgrade options.

Accounting Treatment:
Capital Expense
Ownership: 3rd Party until term of agreement is over.
Services/Support:
Material warranty
Future Upgrade Options: None

PACE/On-Bill

No upfront expense and utilizes operational budgets to avoid being a capital expense. Offers limited warranty service, maintenance support, and future upgrade options.

Accounting Treatment:
Operational Expense
Ownership: 3rd Party until term of agreement is over.
Services/Support:
Material warranty
Future Upgrade Options:
None

EaaS

Pay one monthly fee for new equipment over 5–10-year time period, Includes performance guarantees. Provides warranty service, maintenance support and future upgrade options.

Accounting Treatment:
Operational Expense/Off Balance Sheet in Aggregate
Ownership: 3rd Party until term of agreement is over.
Services/Support:
Maintenance and Full Warranty coverage
Future Upgrade Options: New Service Plan

Energy Project Funding Options

	Expense	Incentives	Annual Savings
LED	$100,000	NA	$40,000
Water	$20,000	NA	$10,000
Solar	$200,000	$90,000	$40,000
HVAC	$200,000	$10,000	$20,000
	$520,000	**$100,000**	**$120,000**

Cash (Cap-Ex)

3.1 Year Payback
Owner takes all credits

No REAP Loan

Loan

5 Year Loan
Owner takes all credits

Pay $9,000/Month
Keep $1,000/Month

O&M on client

On-Bill

5 Year On Bill
Owner takes all credits

Pay $9,000/Month
Keep $1,000/Month

O&M on client

EaaS

7 Year agreement

Pay $8,800/Month
Keep $1,200/Month

No Maintenance
Off Balance Sheet

One More Thing
Water Savings

Vanderbilt University Medical Center
1161 21st Ave S, Nashville, TN

Annualized Savings

$90,000

Gallons

551,276

23% Reduction

"Through 7 months we have experienced a savings of about 23%, equaling more than $67,000. If this trend continues, we should see a savings of $90,000/year"

- Mike Gable, PE, CEM, CHFM

Key Takeaways

Investigate all opportunities with certified Energy Professionals

- Have TPI Conduct a Free Energy Audit by a Certified Energy Procurement Professional and a Certified Energy Manager
- **Smarter Energy Procurement** , ~15% potential decrease compared to Fixed – Even for new!
- **Improve Energy Efficiency – LED, Compressed Air, HVAC, Controls**
- **Onsite Generation – Solar, Storage, CHP**
- **Operational Improvements – Demand Response, Cap Tag Control**
- Investigate all Incentives, Grants and Lease/As-A-Service Off balance sheet options

Scope 2:

INDIRECT-SOURCES

The emissions caused when generating the electricity used in our buildings would fall into this category.

Leverage Cash Positive, Off-Balance Sheet for efficiency and renewables

Utilize those shared savings to fund Green Energy/Rec procurement for remaining Scope 2

OFFSET ALL SCOPE 2 BY 2025!!!!

TPI Efficiency is focused on delivering carbon and GHG emissions offsetting products to our customers nationwide.

Scope 1:

COMPANY-OWNED

Emissions from building operations and from owned assets.

Scope 3:

COMPANY-INFLUENCED

Indirect greenhouse emissions occur due to an organization's activities but are outside of its direct control or ownership.

Further Questions?

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Ready for your free energy audit?

https://bit.ly/TPI_AuditForm