Customized Energy Solutions

City of Naperville

Energy Procurement Options – Summary for the City Council

July 2025

Customized Energy Solutions

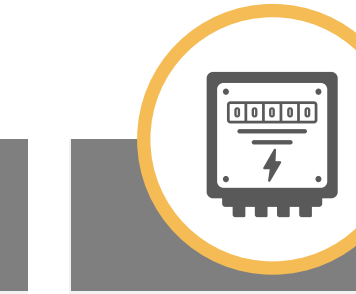
Established in 1998, Customized Energy Solutions (CES) is a global energy advisory, software and services company that works with clients to navigate the wholesale and retail electricity markets across the United States and globally. CES offers software solutions, back office operational support, advisory and consulting services focused on emerging technologies, asset optimization and wholesale energy market participation. CES is headquartered in Philadelphia, USA with other global offices in India, Japan, Vietnam.

Wholesale Services

Our 24-hour Market Operations Center provides full- service scheduling coordinator and asset monitoring services to over 25 GW of assets across wholesale markets

Market Intelligence

Our flagship informational product MarketIQ provides crucial analysis of wholesale market rules changes & stakeholder activities in a timely and cost- effective manner



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Our hosted platforms provide specialized services for market entry, registration, EDI data management, billing, forecasting and scheduling and reduce bill-to-cash cycle

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Our services support clients with demand response, peak load management, and bidding for energy and capacity in major ISOs/RTOs in North America

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CES Consulting

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CES Consulting is focused on providing industry leading advisory and services for the three pillars of energy transition
Energy Storage, E-Mobility and Green Hydrogen
We have an integrated ecosystem spanning market intelligence, policy expertise, modeling and optimization software platforms, technical capabilities and market operations to provide spectrum-wide consulting services to our clients

Energy Market Advisory	Price Curves & Revenue Forecasts	Financial Services & Valuation	Battery Manufacturing & Supply Chain	Technical Services
Market Overviews, Rules and detailed intelligence from across all North American ISO/RTO regions to help clients navigate through competitive markets	Power Market Fundamentals, Research, Production Cost Modeling, Market Price Forecasts, Asset Dispatch Optimization using CES CoMETS	Financial Modeling, Project Valuation, Technical and Commercial Due Diligence and Bid support services to help clients compete in solicitations	Market Research, Assessment, Value Chain Analysis, Business Planning, Strategy Consulting, Collaborations, Expert Advisory and Partnerships	Technical Due Diligence, Testing, Performance Validation, Expert Recommendations for battery cells, packs and associated systems

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To Be Part of a JAA, or Not to Be (Part of a JAA), That Is the Question.

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More autonomy, more risk

Outside of a Joint Action Agency

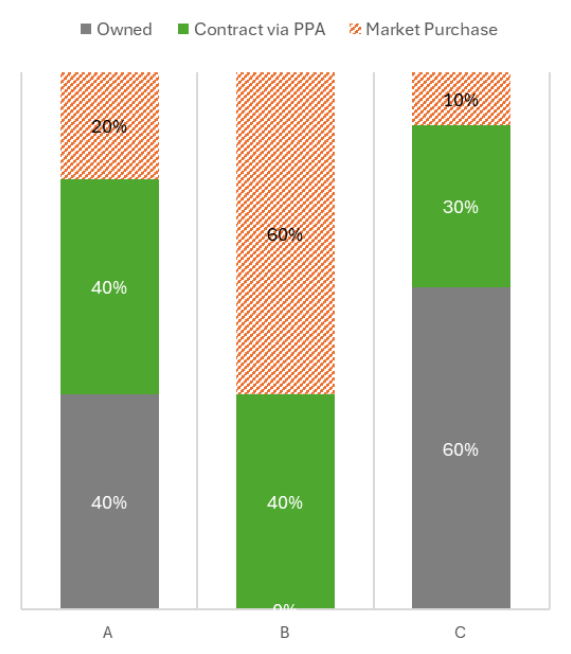
Naperville will determine its own energy supply from the following mix and **will need staff of different skillsets** to execute each.

Market Purchase with PJM
The wholesale market is flexible and the energy is ready when demanded. But the market price fluctuates, making rate unstable.

Contracted, e.g. Power Purchase Agreements
Prices are stable throughout the contracted years, but need to manage both contracting and execution of the projects.

Owned, e.g. city-owned generation
Prices are stable if fuel and operational risks are well managed, but the need to manage ownership and operation of the assets.

Supply contract with an energy marketer can be a combination of these options.



Less autonomy, less risk

Part of a Joint Action Agency

Naperville outsources energy procurement and participates in discussion of resource procurement but does not have sole autonomy.
The three options are mutually exclusive.

- Stay with IMEA
- Join a different JAA
- Start a new JAA

No autonomy, maybe more risk?

Sell the Utility to ComEd

The sale of the utility to an investor-owned or private entity was not exhaustively researched by CES and is not explicitly covered in this presentation. It is expected that costs would go up similar to the ComEd bill shown later in the presentation and Naperville would give up all control over future rates and service levels.

Market Purchase – Summary (1/2)

- One way for Naperville to supply its energy and capacity needs is through the **purchase of power through the PJM Wholesale Markets.**
- To become a market participant in the PJM Wholesale Markets, Naperville must:
  - Assume additional **personnel as well as a financial obligation**
  - Execute several agreements and forms required to participate in the market
- As a market participant, Naperville will be responsible for the functions currently being executed by IMEA, including:
  - Market scheduling functions
  - Long term planning
  - Regulatory compliance
  - Energy Efficiency program management
- As a market participant, Naperville will be responsible for several operational costs including **energy procurement, capacity costs, and ancillary services**
  - The pricing of these services will be dependent on the clearing prices in the market and will impact the rate that consumers will see on their bill. As an example, residential bill can vary from -11% to +22%, corresponding to 0.5x – 1.5x of current prevailing energy prices, in addition to the upfront cost to set up as a market participant.
  - PJM is currently seeing high volatility in the capacity market, which Naperville will be subject to as a market participant. As an example, residential bill can vary from -10% to +14%, corresponding to $30 - $300/MW-Day on capacity prices. There are some options to reduce this risk, but they are limited.
- If Naperville elects to procure energy and capacity from the PJM Wholesale Market, they will have **more visibility to the market but will be exposed to fluctuations in clearing price** which will lead to less stable rates for the consumer.

Market Purchase – Summary (2/2)

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PROS

Flexible Procurement: Power can be purchased on an as-needed basis without long-term contracts. This "pay-as-you-go" model offers flexibility and avoids being locked into specific suppliers or prices.

CONS

- **Price Volatility**: Since power is bought from the market, the cost can fluctuate significantly. These swings in market prices lead to unstable electricity rates for consumers.
- **No Control Over Energy Mix**: Naperville cannot choose the type of energy it receives, as it depends entirely on what's available in the market at the time.

RISKS

- **Need for a Rate Stabilization Fund**: To protect consumers from market price spikes, a financial buffer (Rate Stabilization Fund) may be necessary, which adds upfront costs or financial planning burdens.
- **PJM Market Participation Costs**: Participating in the PJM wholesale electricity market comes with financial obligations, such as fees or collateral, that must be accounted for.

FEASIBILITY

High

Power Purchase Agreements – Summary (1/2)

- Power Purchase Agreements, or PPAs, are contractual mechanisms that allow a customer like Naperville to purchase electricity at a **pre-negotiated price** and is one way for Naperville to **reduce exposure** to the Wholesale Market.
- For example, Naperville could sign a PPA with a generator such as a gas turbine which would guarantee a certain quantity of energy and/or capacity at a rate that both parties agree.
  - PPAs allow cities like Naperville to benefit from **stable energy pricing without the resource burden** of owning and operating assets.
- To increase percentage of renewable energy, Naperville may choose to sign a PPA with a renewable source, such as solar. However, since solar will only contribute energy during certain portions of the day, Naperville will need to purchase additional energy supporting their remaining load.
  - To make economic sense, Naperville would need to contract a solar PPA for **less than the cost of current IMEA costs**. However, current solar PPA market pricing is consistently higher than the IMEA rate.
- To enter a PPA, Naperville will require **additional administrative and legal functions** to support the drafting and negotiation of the contracts.
- The primary benefits of a PPA is securing consistent, stable energy pricing. However, there are certain risks that Naperville will be exposed to:
  - Resource's failure to supply energy at the agreed upon price. Supply constraints or cost overrun may cause a project's developer to have to cancel or renegotiate the PPA at higher rates.
  - Project may not generate the volume of energy expected.
  - In both cases, Naperville would be forced to supplement the power shortfall at Wholesale Market prices.

Power Purchase Agreements– Summary (2/2)

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PROS

- **Control Over Resources**: Naperville can choose what types of energy resources to procure, aligning with policy or sustainability goals.
- **Price Stability**: PPAs provide long-term price certainty, reducing exposure to volatile wholesale market prices.

CONS

- **Potentially Higher Costs**: Because of Naperville's size and current market conditions—especially for zero-emission resources like solar—PPAs may come at a premium compared to existing IMEA rates.

RISKS

- **Underperformance or Non-Delivery**: If the developer fails to deliver energy at the agreed price or quantity (due to project delays, equipment failure, etc.), Naperville must make up the shortfall at market prices.
- **Less Energy Than Expected**: Especially with variable renewables like solar, actual output may be less than forecasted, requiring supplemental purchases.

FEASIBILITY

Medium: PPAs are a viable option but may not fully meet Naperville's load. A hybrid approach—pairing the PPA with market purchases—is likely needed to cover gaps between contracted generation and actual demand.

Asset Ownership – Summary (1/2)

- Naperville may elect to own and/or operate its own generation projects. In this scenario, Naperville would have **complete control over the operation of these resources**.
- There are several different technologies that can support Naperville's energy goals including gas turbines, solar farms, and wind projects. Each of these resources have varying operation and maintenance responsibilities as well as costs and development timelines.
  - Own and operating generation would **require building up a team of experienced operators and developers** (if new generation)
  - Wind and solar, as intermittent resources, would require substantial capacity procurement of capacity at market rates to support Naperville load.
- Gas turbines currently make up a near majority of the current installed capacity in PJM. If Naperville were to develop a gas project, it would be able to support a substantial portion of their energy load but would also require substantial development costs as well as a considerable timeline.
  - As an Illinois entity, **any gas project would be subject to CEJA mandates** which require all gas projects to reduce all emissions to zero by 2045.
  - Supply is tight given current market conditions; it will take at least 5-7 years to build a new gas project.
- Majority of utility-owned assets in Illinois are legacy coal-unit.
- While generation ownership allows for considerable autonomy and potentially stable pricing, Naperville would be exposed to potential risks such as:
  - Construction risks such as cost overrun or project delays
  - **Fuel risks** (exposed to volatility of Natural Gas pricing)
  - Performance risks

Asset Ownership– Summary (2/2)

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PROS

- **Price Stability & Control**: By owning its own power generation, Naperville can reduce its reliance on the wholesale market, resulting in more stable and predictable energy costs.
- **Operational Autonomy**: Naperville gains full control over how and when the generation resources are used, allowing more flexibility to align operations with local energy goals.

CONS

Compliance Challenges: If the owned generation is based on natural gas (which is common in PJM), it will not meet the Clean Energy Jobs Act (CEJA) requirements for zero emissions by 2045, potentially leading to regulatory and financial penalties.

RISKS

- **Construction Risks**: New projects may face cost overruns or delays during development and construction phases.
- **Fuel Price Volatility**: If natural gas is the fuel source, Naperville will be exposed to fluctuations in gas prices, which could increase operating costs.
- **Performance Risks**: Unexpected operational issues may affect reliability or output, leading to additional expenses or market purchases

FEASIBILITY

Low: Developing and operating generation facilities is complex and resource-intensive. It will likely require hiring skilled staff and making significant financial investments. Additionally, market purchases will still be needed to cover gaps between generation and load.

Supply Contracts via Auctions Summary (1/2)

- At the last PUAB meeting, stakeholders asked to look into supply contracts via auctions. Instead of committing to a long-term contract, Naperville could consider a short-term supply agreement (1-3 years) with energy marketers.
  - These marketers may own generation assets, have existing PPAs with various energy resources, purchase energy from PJM wholesale markets, and hold hedge positions.
  - These contracts typically offer at a fixed price ($/MWh) that covers **energy, capacity, ancillary services, transmission costs, RECs, and PJM market participation responsibilities**. However, due to the mix of supply sources and associated financial risks, these contracts are priced at a premium compared to current market prices and **rarely available more than 3 years**, leading to rate uncertainty for Naperville.
  - The contract prices are likely to follow PJM wholesale market prices and PPA price trends plus a premium for hedging purposes.
- Many deregulated utility territories bid out 1/3 of their default service every year. See, for example, auction results from New Jersey Electric Distribution Companies.

Table 1: 2024 Winning RSCP Prices Compared to Previous Prices

EDC	2024 Winning Price ¢/kWh	2023 Winning Price ¢/kWh	% Change 2024 vs. 2023	2022 Winning Price ¢/kWh	% Change 2023 vs. 2022	2021 Winning Price ¢/kWh	% Change 2022 vs. 2021	% Change 2024 vs. 2021
Atlantic City Electric	8.142	9.217	-11.7%	7.557	22.0%	6.420	17.7%	26.8%
Jersey Central Power & Light	8.295	9.428	-12.0%	7.750	21.7%	6.477	19.7%	28.1%
Public Service Electric & Gas	8.088	9.311	-13.1%	7.630	22.0%	6.480	17.7%	24.8%
Rockland Electric Company	8.555	9.648	-11.3%	8.206	17.6%	6.692	22.6%	27.8%
Tranche Weighted Average	8.175	9.343	-12.5%	7.671	21.8%	6.475	18.5%	26.3%

Table 1. 2024 BGS-RSCP Auction Results

Statewide Load Cap: 21 tranches

	Peak Load re (MW)	Tranches Available (Load Cap)	Final Price (¢/kWh)	Winning Bidders by EDC	Number of Tranches Won
PSE&G	2,674.09	29 (14)	8.088	Axpo U.S. LLC	6
				BP Energy Company	2
				Calpine Energy Services, L.P.	1
				Constellation Energy Generation, LLC	1
				DTE Energy Trading, Inc.	3
				Five Elements Energy II LLC	1
				NextEra Energy Marketing, LLC	13
				Vitol Inc.	2

Source: ANNUAL FINAL REPORT ON THE 2024 BGS RSCP AND CIEP AUCTIONS

Supply Contracts via Auctions Summary (2/2)

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PROS

- **Flexibility in Resource Mix**: Naperville can choose the types of resources it wants—ranging from a standard PJM market mix to specific resource types located near Naperville.
- **Low Administrative Burden**: These short-term contracts require less long-term planning and legal/administrative effort compared to long-term PPAs or self-owned generation.

CONS

- **Price Uncertainty**: Contracts are usually limited to 1–3 years, with little visibility beyond that. This makes it hard to forecast rates in the long run.
- **Higher Cost for Renewable Options**: Contracts that include a greater share of renewable energy (RE) typically come at a higher price due to supply constraints and hedging premiums.

RISKS

- **Price Volatility**: Prices are tied to PJM market trends and influenced by risk premiums, making them subject to fluctuations.
- **Lack of Long-Term Price Transparency**: Because these contracts are short-term, Naperville won't know what prices will be like in 2035 or beyond, limiting long-term planning.

FEASIBILITY

High

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Stay with IMEA – Summary (1/2)

- Naperville may elect to remain an IMEA member and **continue to have all energy and capacity requirements supported by IMEA**.
- IMEA has outlined its current energy portfolio roadmap which includes **retiring all existing coal generation** and replacing with wind and solar resources by 2050.
  - Due to lower capacity accreditation values for resources like solar and wind, IMEA will need to procure large volumes of renewable generation and storage to maintain reliable service.
  - This may result in an overall higher revenue requirement for IMEA
- IMEA's current roadmap is similar to other public power entities, having to find replacement capacity and energy sources to gradually phase out natural gas and coal assets.
- As a member of IMEA, Naperville may have additional options to increase the renewables serving their load or reduce the cost to serve:
  - Through the Member-Directed Resource (MDR) clause of the contract extension which allows IMEA members to develop their own generation
  - By installing Behind-the-Meter (BTM) energy storage, Naperville can shave both its own peak as well as the overall IMEA's peaks and, as a result, reduce demand charges
  - Implement green tariffs which would allow resident to opt-in to an incremental charge that would purchase RECs or renewable energy from specific projects under the MDR clause
- If Naperville elects to remain an IMEA member, they will **continue to have reduced exposure to market risks and ownership risks but will have less autonomy of their generation portfolio**.

Stay with IMEA – Summary (2/2)

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PROS

- **Stable and Currently Low Prices**: IMEA rates are stable and lower than many market-based alternatives, offering budget predictability.
- **Access to MDR Flexibility**: Naperville can explore other procurement or renewable options through the Member-Directed Resource (MDR) clause, such as installing its own generation or contracting renewable energy.
- **Lower Administrative and Market Exposure**: IMEA manages energy procurement, reducing Naperville's exposure to market volatility and the burden of contract management.

CONS

Limited Control Over Energy Mix: Naperville has little influence over the type or source of energy IMEA supplies. This limits the city's ability to tailor its energy portfolio or sustainability goals.

RISKS

- **Uncertain Energy Transition Path**: Although IMEA has plans to shift from coal to renewables by 2050, there is a risk that it may not meet its targets or may rely longer on coal or natural gas.
- **Higher Future Costs**: IMEA plans for much higher renewables in the future years, increasing overall costs for members.

FEASIBILITY

High

Different JAA - Summary

- If Naperville does not want to stand up the functions to become a PJM market participant and/or to develop their own generation but would prefer to no longer be an IMEA member, they may elect to join a different Joint Action Agency (JAA).
- Considering the location and size of Naperville, there are **limited options for JAA's** for Naperville to join.
  - Northern Illinois Municipal Power Agency (NIMPA) is another JAA in the state but unlike IMEA, allows its members to retain local control of resource planning. Therefore, it would look and feel more similar to Naperville securing its own power through the means discussed in previous slides.
  - American Municipal Power (AMP) assists its members in developing and implementing power supply strategies to ensure reliable and cost-effective electricity.
  - Both JAA's have ownership in legacy coal assets so joining these agencies will likely not result in having a considerably larger amount of renewables in its generation portfolio.
- Naperville **may also elect to stand up its own JAA**. However, this would require all of the activities and functions including in "procure own energy" option.
  - As a smaller entity, the total size of this new JAA may not have the same leverage to negotiate PPA rates and capacity contracts.

Different JAA – Summary (2/2)

PROS

- **Stable Pricing**: Like IMEA, other JAAs typically offer stable and currently low energy prices.
- **More Local Control**: Agencies like NIMPA offer members more say in resource planning, allowing Naperville to better align energy procurement with its goals

CONS

- **Fossil-Fuel Dependency**: Most Illinois-based JAAs still rely heavily on fossil-fueled resources (e.g., coal), limiting renewable energy progress.

RISKS

- **Uncertain Availability**: It's unclear which, if any, existing JAAs are willing or able to absorb Naperville's large energy load.

FEASIBILITY

Medium: While operationally easier than starting a new JAA, Naperville would need to find a JAA willing to accept them and negotiate terms.

Staring a New JAA – Summary

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PROS

- **Full Autonomy**: Naperville would have full decision-making authority over energy procurement, resource types, and development priorities.

CONS

- **High Administrative Burden**: Forming and operating a JAA from scratch requires extensive setup, staffing, and regulatory coordination.

RISKS

- **Limited Scale and Buying Power**: As a smaller, standalone entity, Naperville may lack the scale to negotiate favorable long-term PPAs or capacity contracts.
- **Participation Uncertainty**: It's unknown whether other cities would be willing to join, impacting economies of scale.
- **Inherited Risks**: Naperville would take on all the risks already discussed for other options—market purchases, PPAs, and self-generation.

FEASIBILITY

Low: the complexity, costs, and uncertainty of starting a new JAA make this a challenging option without clear partners or scale

Cost and GHG Emissions Assumptions and Discussions

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Cost Projection Methods and Assumptions

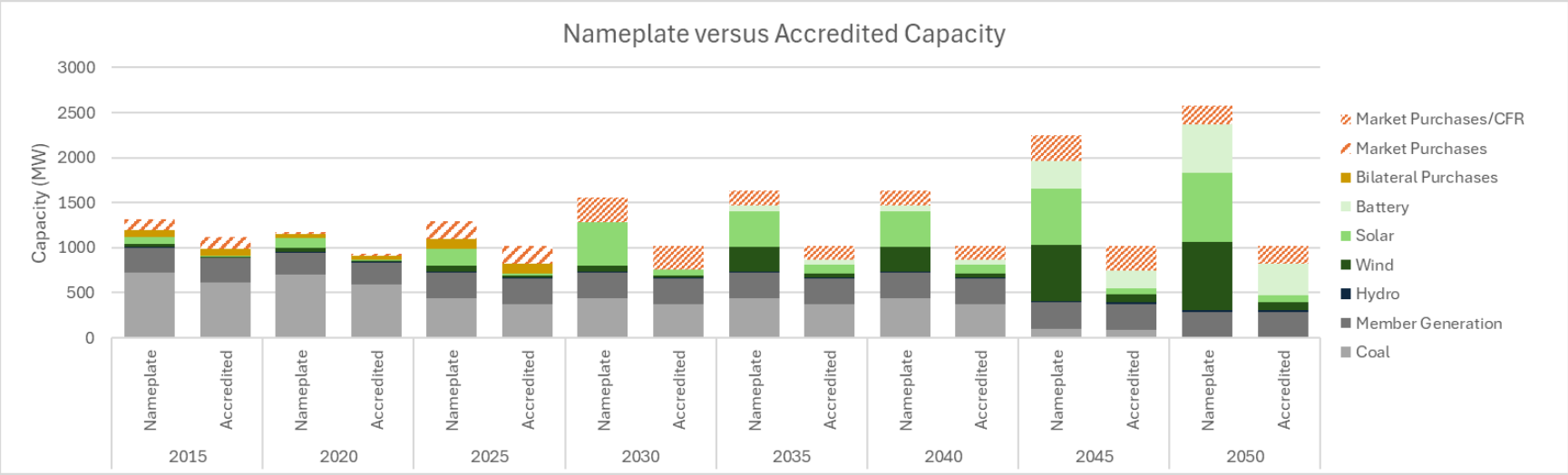
- To project future IMEA costs, CES utilized the following data:
  - IMEA's operating expenses from the Statement of Revenues, Expenses and Changes Net Position in its Annual Report served as the benchmark on its revenue requirements. The large-ticket items in the statement include:
    - Purchased power, projected based on IMEA's supply stack forecast, including both energy and capacity.
    - Transmission, assumed to be relatively stable.
    - Fuel and O&M for Prairie State and Trimble County Units No.1 and 2, assumed to decline in proportion with IMEA's supply stack forecast.
    - Depreciation, assumed to be relatively stable.
  - For purchased power, CES estimated annual cost using IMEA's projected supply stack and generation by resource type. For example, in 2030, the projected cost for market purchase was calculated using approximately 528,000 MWh from the market and CES's LMP forecast of ~$47.3/MWh. The cost for other resource types are as follows:
    - Market purchase of capacity @ $150/MW-day
    - Solar PPA @ $80+8/MWh, including energy, RECs and capacity (accounting for solar capacity factor and capacity accreditation) at 1% annual escalation.[1]
    - Wind PPA @ $85+10/MWh, including energy, RECs and capacity (accounting for solar capacity factor and capacity accreditation), at 1% annual escalation.[1]
    - Battery capacity contract @ $9/kW-month at 1% annual escalation;
  - Based on the supply stack changes, CES estimated how IMEA's revenue needs will grow and compare that growth to 2025 levels. The index shows how much future rights might increase compared to today's rates.
- To project costs for PJM market purchases, CES utilized the following data:
  - Energy: CES's LMP forecast based on fundamental supply and demand dynamics in the power markets.
  - Capacity: different scenarios were applied to capacity prices given the recent fluctuations in the capacity market.
  - Renewable Energy Credits (RECs): IPA's forecast on REC cost increases reflecting higher REC prices as state RPS goal increases.

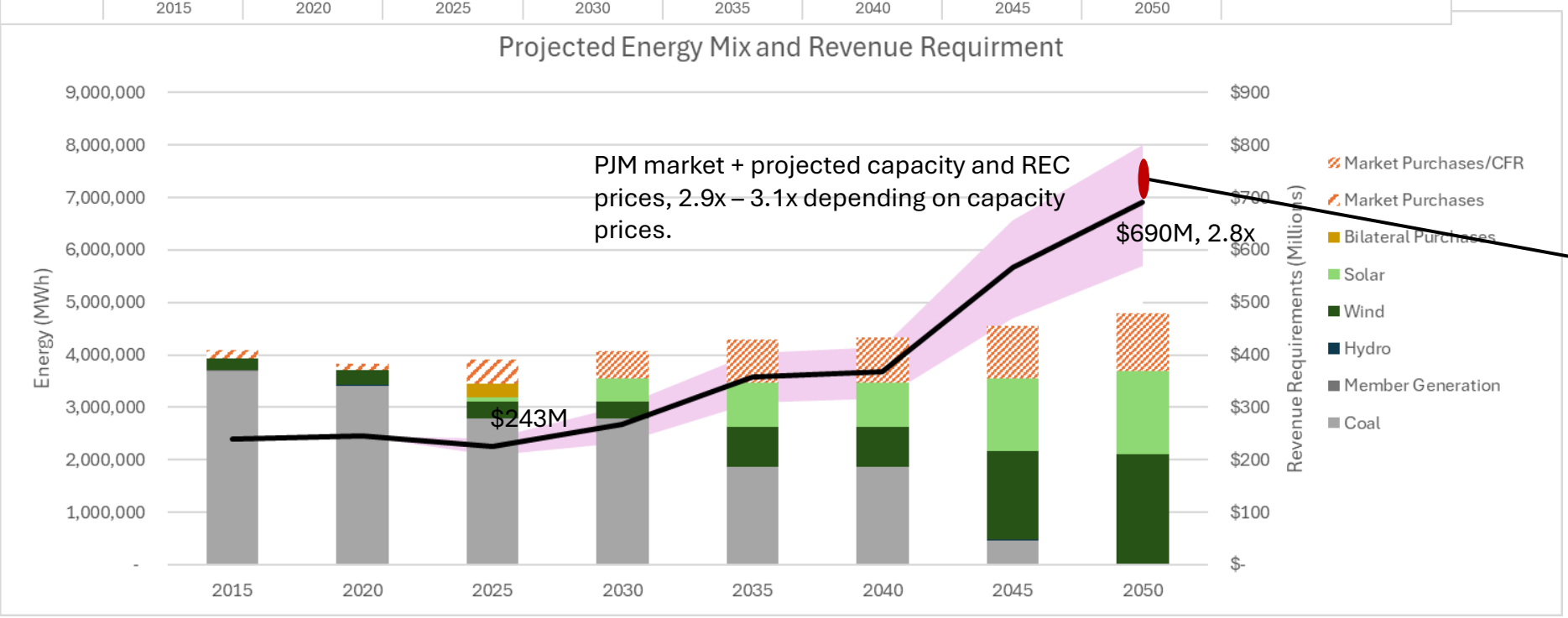
Source: IMEA presentation to Naperville, Oct. 2024, CES Analysis, IPA's estimate that RPS costs to increase at least 3x by 2043.

Notes:

1. The solar and wind PPA prices were based on industry knowledge prior to implementation of OBBB and tariff. The PPA prices are likely to increase from these two factors.

Projected IMEA Revenue Requirements





By 2050, IMEA expects 80% of its supply stack from solar, wind and storage

PJM market: CES projects that 45% of capacity from RE resources at 2.9x – 3.1x of today's average energy price plus capacity prices plus REC purchases. Capacity price based on historical fluctuation and recent price ceilings. REC prices estimated based on IPA budget forecast.

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Cost Projection Methods and Assumptions

Scenarios Analyzed	Assumptions
Extend IMEA Contract	• Cost shown in the previous page. • For CO2e emissions calculation, emissions factors were retrieved from Naperville Greenhouse Gas Inventory Report by Delta Institute (Appendix B). The CO2e/MWh were calculated using (percent of energy mix) multiply by (emissions factor).
IMEA contract with MDR (35MW nuclear)	• Assumed as much generation from coal is replaced by nuclear as possible. 35MW nuclear is 10% of Naperville's peak load, but 25% of its energy use. Cost of nuclear PPA is assumed at $190/MWh per Lazard's LCOE analysis. • CO2e emissions were calculated similarly as above. Note that nuclear has an emissions factor of 110 lbs CO2e/MWh, not 0.
IMEA through 2035, Power Marketer with market mix	• Cost of market purchase could be very volatile. Power Marketers usually purchase hedge against their load positions, pricing such cost in the offer price. Cost estimated here utilized CES's PJM LMP projections, coupled with ancillary services, capacity and RECs for a bundled price. REC prices were estimated to increase significantly as the PJM states' RPS goals increase and the REC market tightens. • CO2e emissions were calculated using CES's PJM supply stack and the emissions factor from the Delta Institute Report.
IMEA through 2035, Power Marketer with 100% renewable energy	• Cost of purchasing RE in 2035 is very difficult to estimate. Several drivers impact the cost including advances in manufacturing techniques (downward), OBBB and tariff impact prices (upward). Without better information at this time, we had used similar solar PPA prices at $88/MWh but assumed that the REC portion of the price will increase significantly as the state RPS goal increases and REC market tightens.

- Scenarios with BESS are not included as it is not clear how BESS would be utilized by Naperville. All following situations could be possible:
  - BESS is charged with IMEA portfolio or PJM Market Mix and used to reduce Naperville's peak load, reducing transmission charges from ComEd. The BESS can therefore reduce Naperville's bill but could increase CO2 emissions due to efficiency losses.
  - BESS is charged from on-site solar to offset Naperville's peak load. Need to discuss with IMEA whether such arrangement can be considered under MDR.
  - Note that IMEA portfolio also planned for 350MW of BESS by 2050 for capacity purposes.

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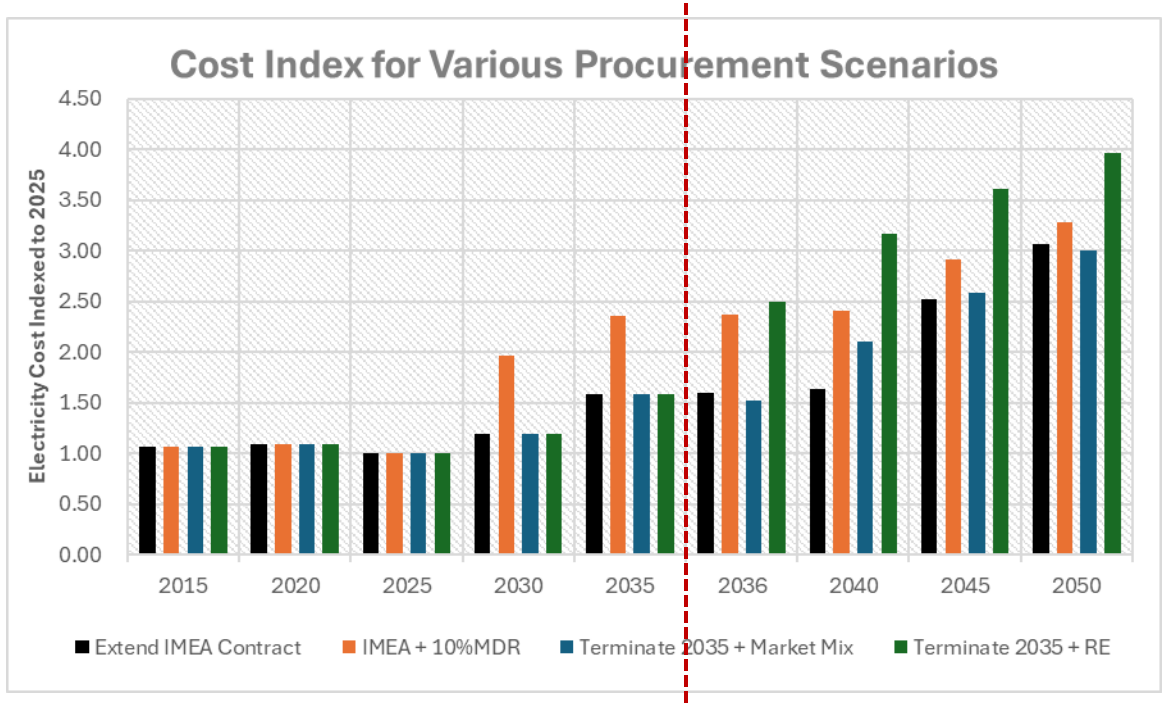
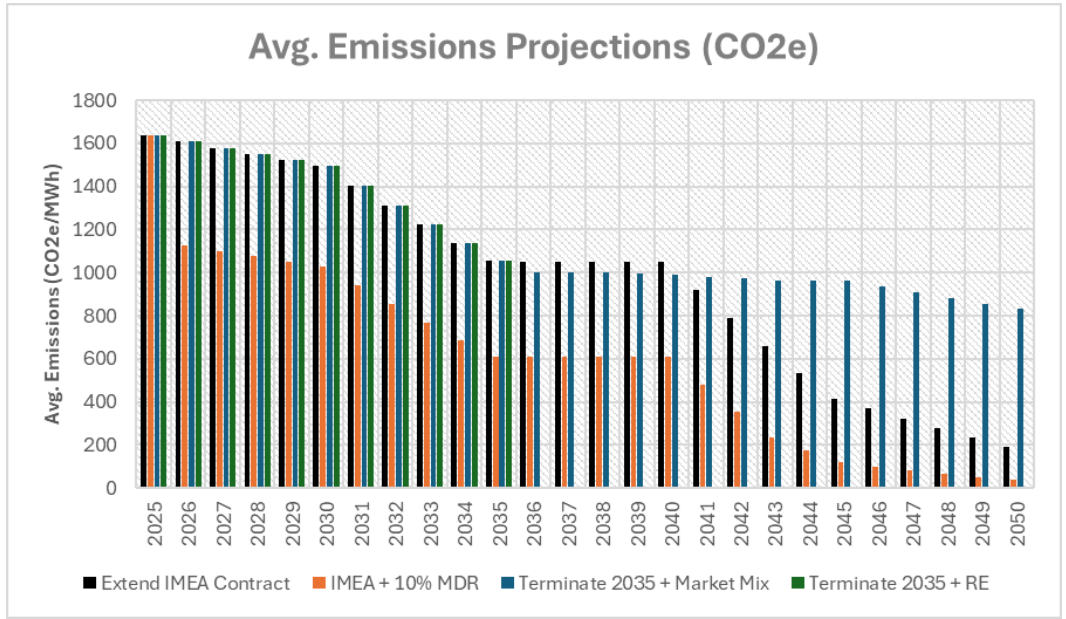
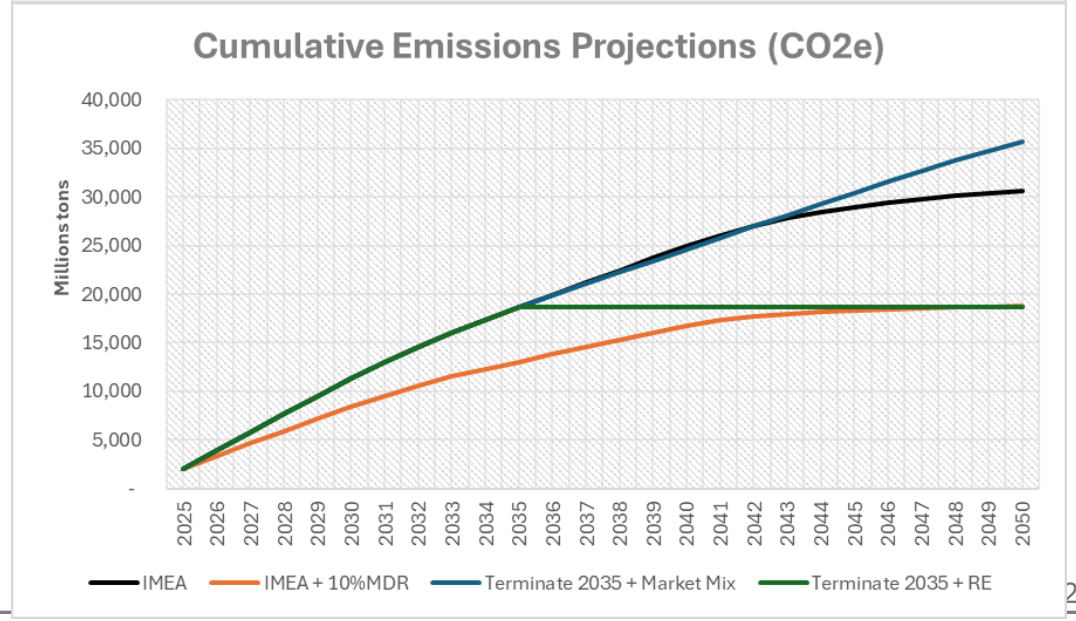
Projected Cost and CO2 Emissions for Various Procurement Scenarios



End of current contract period. Costs for 2036 were interpolated to show the immediate difference





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Summary of Options, post 2035

	Outside of a JAA				Part of a JAA		
	Market purchase	**PPA**	**Owning resources**	**Power Marketer**	**Staying with IMEA**	**Joining a different JAA**	**Starting a new JAA**
Renewable Energy as part of energy consumed	Medium	High	Low	High [1]	Low in 2035 High in 2050	Low [2]	Can be High [3]
Cost	Medium	High	Medium	High [1]	Low in 2035 High in 2050	Low	Can be High [3]
Volatility, or cost uncertainty	High	Low to Medium	Low to Medium	Medium to High	Low	Low	Low to Medium
Administrative Burden	Medium	Low to Medium	High	Low	Low	Low	High

CES rated the above based on current market conditions. These ratings could change over time, especially after 2035, due to outside factors.
Notes:

1. If Naperville asks power marketers to supply more RE than IMEA currently provides—or requests specific types or locations of resources—costs are likely to increase. Contracts (bids) with power marketers typically last 1–3 years. However, they cannot provide pricing estimates as far ahead as 2035.
2. Other JAAs have not yet developed a plan to meet the State's CEJA mandate.
3. If Naperville forms a new JAA, it would have more control over the types of resources it buys. This could include a large share of renewable energy through PPAs, but that would likely come with higher costs.

	Outside of a JAA				Part of a JAA		
	Market purchase	**PPA**	**Owning resources**	**Power Marketer**	**Staying with IMEA**	**Joining a different JAA**	**Starting a new JAA**
Renewable Energy Today	6.2% (PJM, 2024)	N/A	N/A	N/A	11% (20% by 2026)	21% (AMP, 2023)	N/A
Exposure to financial risk today	Full exposure to market volatility	- Some exposure to market volatility, depending on how much requirement is under PPA - Exposure to PPA performance	- Some exposure to market volatility, depending on how much requirement is from owned generation - Exposure to asset CapEx, performance and fuel risks.	N/A	Limited financial exposure, 10% purchased form PJM	Medium exposure, 35% purchased from PJM (AMP, 2023)	Depending on the mix of resources; mostly similar to being outside of a JAA
Renewable Energy Target by 2050	45% (PJM, 2050 projection)	Can be as high as IMEA's or 100%	Less likely to be as high as IMEA's	Can be as high as IMEA's or 100%	87.4% (including expected PJM market purchases)	Less likely to be as high as IMEA's: AMP has many members outside of IL without CEJA compliance.	Depending on the mix of resources; mostly similar to being outside of a JAA
Exposure to financial risks through 2050, can be mitigated by rate stabilization funds	Full exposure to market volatility	- Some exposure to market volatility, depending on how much requirement is under PPA - Exposure to PPA performance	- Some exposure to market volatility, depending on how much requirement is from owned generation - Exposure to asset CapEx, performance and fuel risks.	- Some exposure to market volatility depending on well the power marketer is hedged. Well-hedged positions usually means higher costs.	Limited to medium financial exposure to energy market (23%) and capacity market	Likely medium exposure, as it is today	Depending on the mix of resources; mostly similar to being outside of a JAA
Additional overhead to perform administrative and legal work	Yes (3-5 FTE)	Yes (7-12 FTE)	Yes (7-15+ FTE, depending on the asset owned)	Yes (1-2 FTE)	No	No	Yes (10-20+, depending on who else join)

Conclusion (1/2)

Customized Energy Solutions

More autonomy, more risk

Outside of a Joint Action Agency

Naperville has **more autonomy** to choose the resource mix, including Naperville-owned generation, contracting and market purchases. Naperville will also need to **staff up in each of the three functions**. There is a **significant risk** of rate uncertainty given the small size of Naperville load.

Market Purchase with PJM

Contracted, e.g. Power Purchase Agreements

Owned, e.g. city-owned generation

Supply contract with an energy marketer can be a combination of these options. While the energy marketer can be responsible for PJM administration, the City still needs to choose the resource mix and pay for the administrative services. There is still significant risk on rate uncertainty because these contracts are usually 1-3 years out.

DTE Energy

NEXTera ENERGY MARKETING

bp

Constellation.

Less autonomy, less risk

Part of a Joint Action Agency

Naperville outsources energy procurement and participates in discussion of resource procurement but does not have sole autonomy.
The three options are mutually exclusive.

Stay with IMEA	Join a different JAA	Start a new JAA
Predictable but increasing rates to comply with CEJA, proven track record, return on 30 years pay for capacity investment	Predictable rates with new upfront cost. Potential option to customize portfolio just for Naperville with cost risk born by the city. Loss of 30-year capacity investment in IMEA resources.	Similar autonomy, costs and risks to being outside of a JAA.

DRAFT

Conclusion (2/2)

- At the March 6th PUAB meeting to discuss the above options, CES witnessed firsthand the PUAB's challenge in balancing reliability, affordability and sustainability. To address these priorities, **CES recommends that Naperville continues to procure energy and capacity through IMEA while leveraging the MDR clause in its contract to explore renewable energy procurement via PPAs.**
  - This approach allows Naperville to take meaningful steps toward increasing renewable energy utilization over the next decade beyond IMEA's existing plans.
  - This approach also ensures rate stability in the foreseeable future.
  - By starting with 10% of its peak load, Naperville can gain valuable market experiences in contracting non-fossil resources and managing associated risks, such as project delays and underperformance while maintaining rate stability through IMEA's supply stack.

Glossary

- Capacity procurement: this refers to securing enough megawatts (MW) of generation to meet the highest expected electricity demand on any given day. Utilities must ensure they can meet the peak load hour—usually the hottest hour in the summer—by having access to enough generation. Each resource is assessed for how much power it can produce during that peak hour.
- Effective Load Carrying Capability (ELCC): ELCC measures how much a resource contributes to meeting demand during the peak load hour. For example, if the peak hour is 6 PM on July 15, and a 100 MW solar plant only generates 6 MW at that time, its ELCC is 6%. That means only 6 MW of its capacity counts toward capacity requirements.
- Energy procurement: this involves securing megawatt-hours (MWh) of electricity to meet total energy needs over time (e.g., hourly, daily, annually). Unlike capacity procurement, energy procurement accounts for all energy produced, not just what's available during peak hours. For instance, a 100 MW solar plant might produce 131,400 MWh annually, and every MWh can be used to meet energy demand.
- PJM: the administrator to manage supply and demand of wholesale electricity for 13 states and DC, including Illinois. To access the wholesale electricity market, the Market Participant (IMEA, energy marketer such as Constellation, or the City of Naperville) needs to register with PJM, be certified, and post credit to buy wholesale energy to serve its load.
- Power Purchase Agreement (PPA): A PPA is a long-term contract between a generator and a buyer (load) to either physically deliver electricity or financially settle the price difference between market and contract prices. The generator maintains the facility and ensures performance. PPAs are common for renewables and can include terms for: Energy (MWh), Capacity (MW), and/or Renewable Energy Credits (RECs).
- Renewable Energy Credits (RECs): RECs are certificates issued for every MWh of electricity produced by eligible renewable energy sources. They serve as proof of renewable generation and are used to meet Renewable Portfolio Standards (RPS). Utilities and companies can buy RECs to meet clean energy targets, and renewable generators earn revenue by selling them.

Thank You

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