

Planning for the Future

Naperville Electric Utility



City Council | June 16, 2026¹

Tonight's Purpose:

- Continue the conversation of energy procurement options for the future
- **Review Option #2 – Market Participation with Asset Ownership**
- Summarize option #2 with our approved components of evaluation



Market Participation with Asset Ownership



What are the sources of power generation?

Generation Types:

- Fossil Fuels - Coal, Gas, Oil
- Nuclear - Traditional and Small Modular Reactor (SMR)
- Renewables - Solar, Wind, Hydropower, etc.
- Emerging - Fuel Cell

What are the goals of generation?

- The goal of electric energy generation is to provide safe, reliable, affordable, resilient electricity to meet society's energy needs.

Important Considerations for embarking on energy generation

- Technology choice
- Site selection
- Regulatory requirements and permitting
- Economics and Financing
- Grid interconnection
- Fuel Supply
- Environmental factors
- Operations and Risks

Natural Gas Generation

NG Reciprocating Engines

Lead Time - 18-36 months

Cost - \$900 – \$1,500/KW Capital + O&M + Fuel (gas prices)

Location Constraints

- Access to gas lines with sufficient capacity
- Zoning regulations
- Noise mitigation
- EPA regulations

Natural Gas Turbines

Lead Time - 2-5 years

Cost - \$2000-\$2400/kW + O&M +Fuel (gas prices)

Location Constraints

- Industrial sites adjacent to pipelines
- Zoning regulations
- Noise mitigation
- EPA regulations
- Air quality
- Water/Wastewater regulations

Wind Generation

Utility Ownership

- Naperville has very little open land for utility scale wind farm.
- No utility-scale wind farms exist in DuPage County or the immediate Chicago suburbs

Long-term Power Purchase Agreements (PPAs)

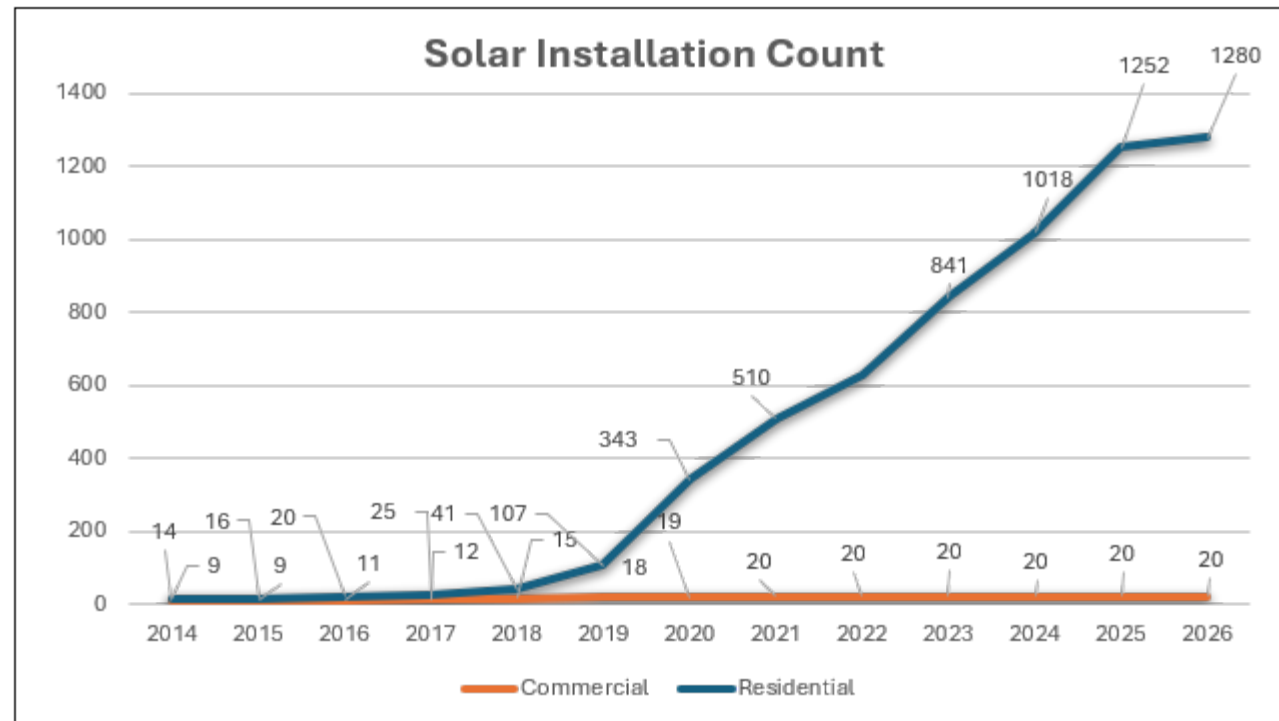
- Naperville will not own the assets but buy the energy output via long-term contracts
- Typically, the contracts are 15-25 years

Solar Generation

Utility Scale

- Naperville hosts IMEA 1 MW solar plant at Springbrook Water Reclamation site.
- Limited open land for additional utility scale solar installation

Residential sector growing steadily



Traditional Nuclear and Small Modular Reactors (SMR)

Lead time - Traditional Nuclear – 20 years
SMR 7-10 years

Cost - Traditional - ~\$34B – 4.5GW
SMR - ~\$5.6B - 300MW

Location Constraints

- Nuclear is not scalable, smallest approach would exceed Naperville requirements
- Strict nuclear regulations
- Limits on proximity to large population
- Naperville has space constraints

NG Fuel Cells

Lead Time - 12-18 months (technology dependent)

Cost - \$2,500–7,000/kW

Location Constraints

- Proximity to gas lines
- Industrial zoning
- Large areas typically needed due to fire risks
- No SO_x, NO_x, or particulate, but still emits CO₂

Batteries Storage

Batteries store energy for later use. Up to 20% of the energy may be lost during transmission and storage.

Batteries are not an energy generation source.

Lead Time - 8-18 months, Interconnection study is required

Cost ~\$1.2M–\$2.8M per MW

Location Constraints

- Total site 10–40 acres, can be broken up into different locations
- Grid interconnection if demand is insufficient
- Substation nearby

Demand Response

Lead Time

Software deployment 6-9 months, customers outreach program 3-6 months

Cost

Software and administration - \$500,000 initial deployment and \$50,000 annual administration

Location Constraints

- No physical location required
- Administer from Electric Control Room through software and customer communication. The key constraint is customer participation rate.

How do these generation assets support our goals?

- **Assets for Cost Reduction**
- **Assets for Carbon Emission Reduction**
- **Assets to Improve Local Resiliency**

Assets for Cost Reduction

Demand Response

- Supports energy demand reduction during daily peaks

Generation

- Production is sold on the market and revenue used to offset market energy purchases

Batteries Storage Peak Shaving

- Support scheduled demand shaving to reduce monthly energy bills

Capacity Costs

- Reduced by local assets through Annual PJM Auction (much smaller for solar assets)

Assets for Carbon Emission Reduction

Demand Response

- Reduce demand on bulk electric grid during peak time generation

Renewable assets reduce carbon footprint

- Solar installations decrease the amount of electricity that must be purchased from the grid

Environmental emission arbitrage

- Charge batteries during low cost/low emission time and discharge during high cost/high emission time

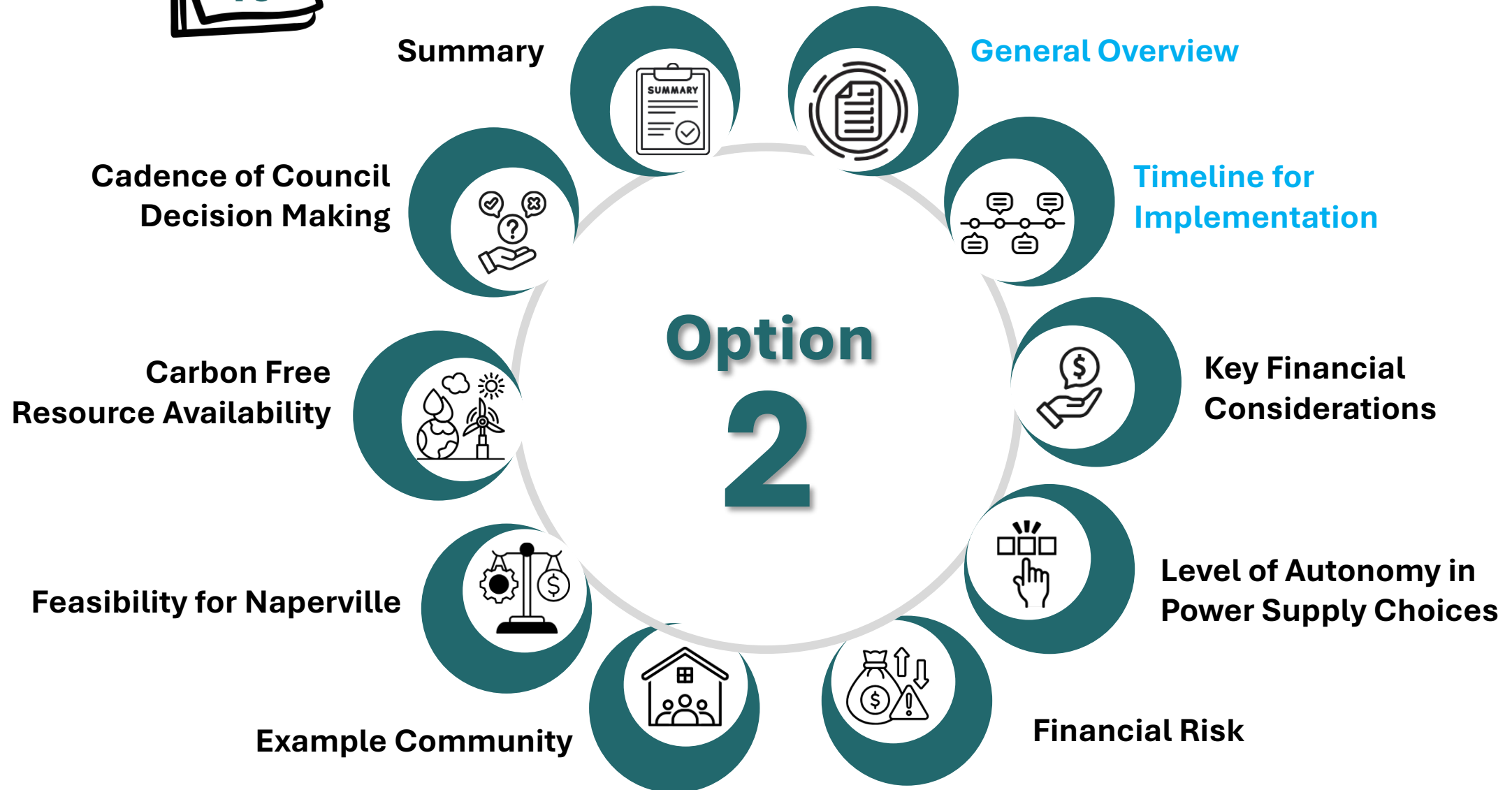
Assets to Improve Local Resiliency

- 80 MW of critical load across the city
- Local equipment failure
- Grid failure
- Hospitals, senior facilities, grocery stores

Questions?



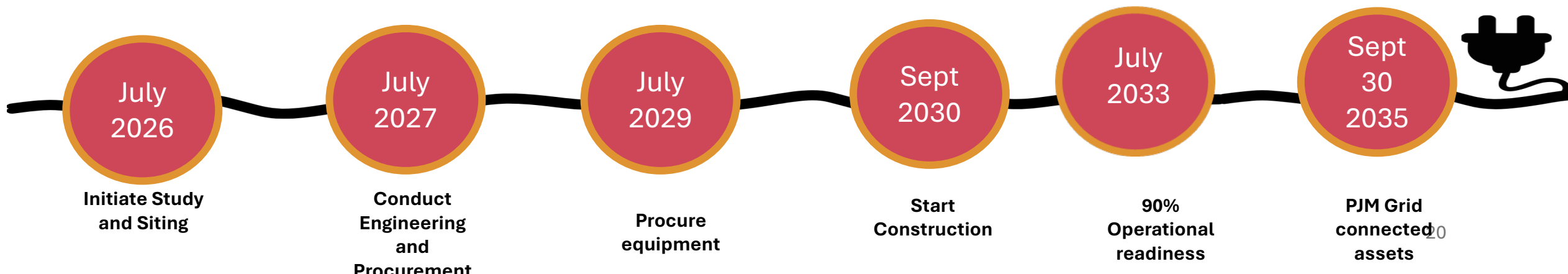
Market Participation with Asset Ownership



Option #2 Market Participation with Asset Ownership

General Overview and Timeline for Implementation

- Identify which Assets feasible to procure and install
- Secure capital funding
- Initiate interconnection study
- Initiate zoning and permitting
- Initiate EPA review if applicable





Market Participation with Asset Ownership



Option #2 Market Participation with Asset Ownership

Key Financial Considerations:

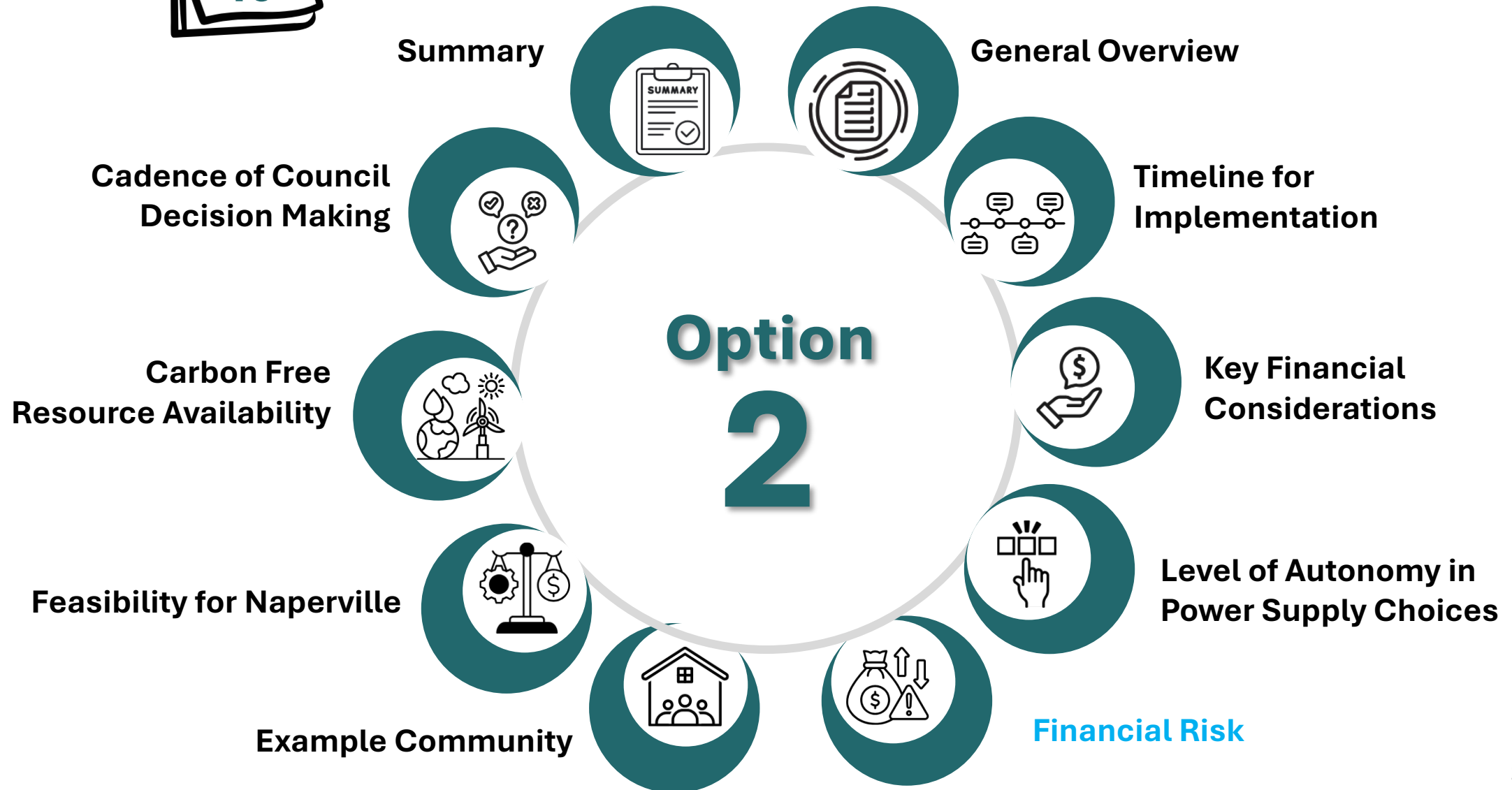
- Determine energy hedging strategy and ROI on assets
- Secure capital funding to procure assets
- Identify funding to increase city staff

Level of Autonomy:

- High level of autonomy in city's decisions



Market Participation with Asset Ownership



Option #2 Market Participation with Asset Ownership

Financial Risk

- Risk of market exposure with insufficient hedge against market swings
- Not achieving market return on investment
- Maintenance risk (unplanned financial outlay)
- Commodity price swings (gas)
- Capacity performance penalties (PJM)
- Increase in city staff (energy trading work team)
- Risk of frequent rate fluctuations for customers
- Risk for utility annual budget (uncertain energy cost)



Market Participation with Asset Ownership



Option #2 Market Participation with Asset Ownership

Example Community

- Denton Municipal Utility, TX
- Pasadena Power and Water, CA

Feasibility for Naperville

- Market participation will require creating a new section within Electric Department - Energy Management Office
- EMO will **conduct energy trading**

Option #2 Market Participation with Asset Ownership

Data from Example community - Denton Municipal Electric

- Denton Municipal Electric EMO has a formal three-office structure for segregation of duties - a best practice for risk control in energy trading
 - Front Office — Identifies and executes transactions (trading/bidding)
 - Middle Office — Monitors compliance with the Energy Risk Management Policy and Hedge Plan
 - Back Office — Handles settlement, recording, and accounting
- Setup is all handled by EMO staff, with quarterly Risk Management Committee oversight and annual policy reviews by City Council, requiring 14 additional staff members.



Market Participation with Asset Ownership



Option #2 Market Participation with Asset Ownership

Carbon Free Resource Availability

- Amount of carbon free resources will be determined during the asset's feasibility study and/or bidding process.

Cadence of Council Decision Making

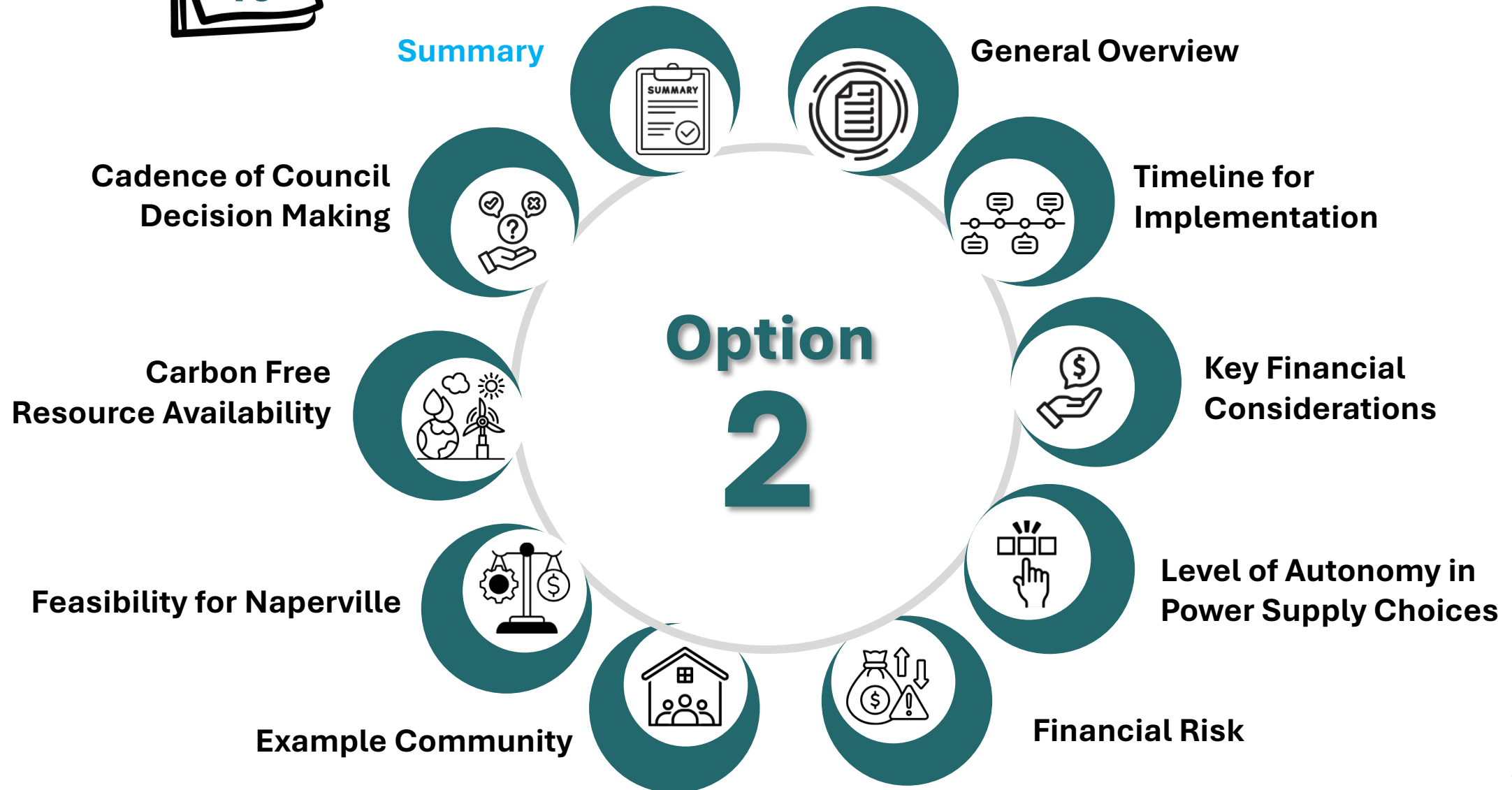
- Customer rates will include fixed component and flexible component. Flexible component will fluctuate based on energy market prices.

Flexible Cost adjustments require Council approval several times per year.

Example Community - Denton Municipal Utility - Council approves the Electrical Cost Adjustment **every three months.**



Market Participation with Asset Ownership



Option 2 Market Participation with Asset Ownership

Summary

- Market Participation with Asset Ownership will require immediate action to start evaluating the feasibility, cost, funding, ROI, and market hedging level.
- Market participation will require creating a new section within Electric Department - Energy Management Office. EMO will conduct energy trading.

Option 2 – Market Participation with Asset Ownership

Next Steps

- **Discussion**
 - Formal battery study required to determine ROI, siting, and 5-year plan
 - Formal generation study required to determine net costs to rate payer – including capacity incentives
 - Procurement of forward cost curves for renewable resources

-  High Performance/
Low Risk
-  Moderate
Performance/Manageable
Risk
-  Poor Performance/
High Risk

GENERATION SUPPLY SUMMARY CHART

 Naperville	Amount of Power	Cost	C02 Production	Requires Customer Acceptance	Space Required	Rapid Deployment
NG Reciprocating						
NG Turbine						
Fuel Cell						
Wind						
Solar						
Traditional Nuclear						
SMR						
Fuel Cell						
Batteries						
Demand Response						



Market Participation without Asset Ownership



Questions?

Naperville Electric Utility

