

City of Cleveland, Ohio



Strategic Resource Assessment & Wholesale Power Cost Forecast

Summary Report

Prepared by



GDS Associates, Inc.

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1.0 INTRODUCTION

The City of Cleveland, Ohio (“Cleveland”) requested that GDS Associates, Inc. (“GDS”) prepare a strategic resource assessment and wholesale power cost forecast for Cleveland Public Power (“CPP”) based on its existing power supply resources and power contracts. The purpose of the study was to review CPP’s existing power supply resources and confirm that these resources are a beneficial means to serve CPP’s current and future electric power requirements. The specific project objectives include (1) the development of a long-term forecast of CPP’s electric requirements, (2) an assessment of current power supply portfolio resources and market purchases and provide strategic considerations for future procurement that would assist CPP in developing and achieving future goals, (3) the completion of a detailed 10-year wholesale power cost projection to evaluate current resources, contracts and market cost impacts, and (4) the provision of key conclusions and recommendations for implementation of Cleveland’s strategic planning objectives for CPP and future power supply goals.

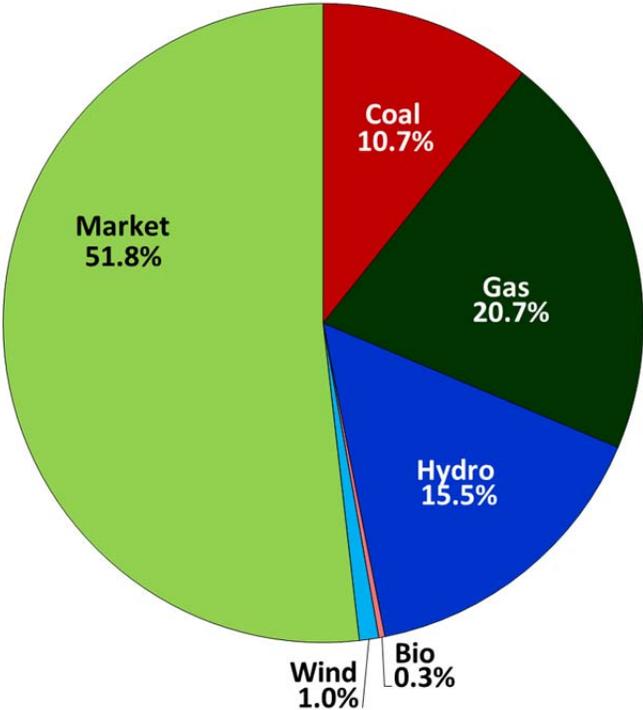
2.0 STRATEGIC RESOURCE ASSESSMENT

2.1 Overview

CPP is participating in a diverse mix of resources, as illustrated in Figure 1, including coal, gas, hydroelectric, bioenergy, and wind generation. CPP is participating in many of these resources through its membership in American Municipal Power (“AMP”) including: Prairie State Energy Campus coal project, AMP Hydro Phase 1 units (Cannelton/Smithland/Willow Island) and Phase 2 units (Meldahl/Greenup), AMP Fremont Energy Center (“AFEC”) combined cycle facility, and the Blue Creek Wind Project. Additionally, CPP participates in the NYPA Hydro projects and several behind-the-meter resources including Collinwood bioenergy generator, CPP owned-diesel generators, and the West 41st Street/Collinwood Combustion Turbines (“CT”s).

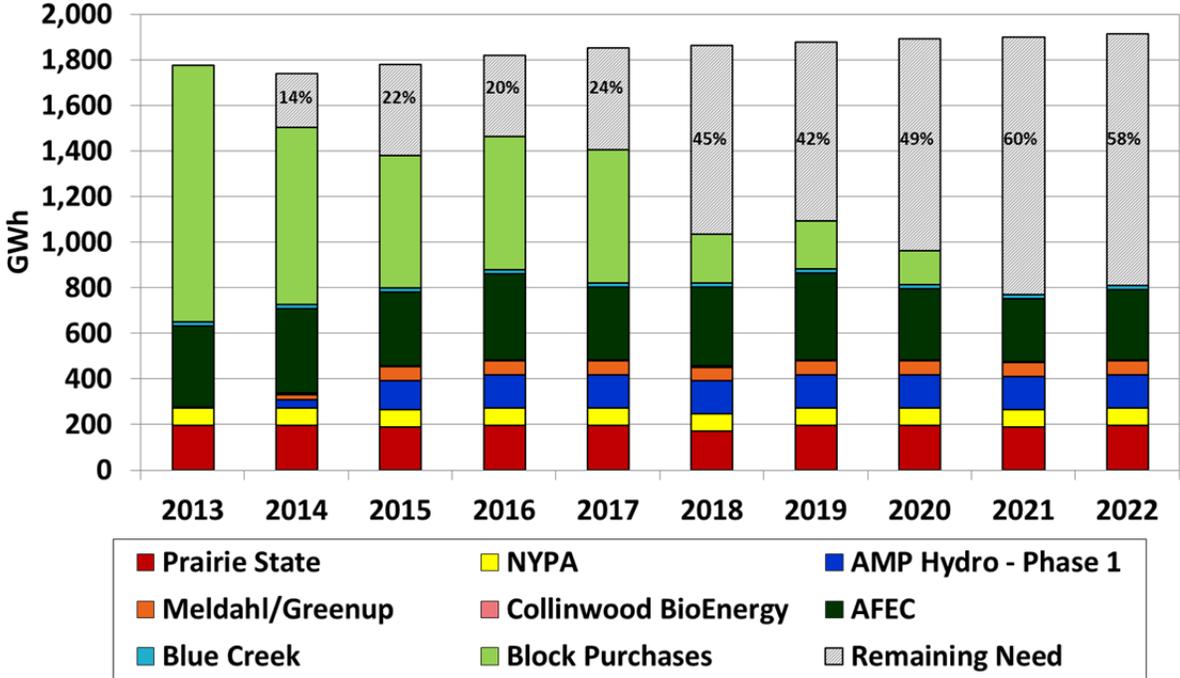
CPP’s power supply portfolio is also made up of a variety of market energy purchases of various sizes, terms, and delivery locations. These market purchases, often referred to as “block power” purchases because of their standard market types, are often procured as part of CPP’s current market purchases, including block power purchased around-the-clock (7x24), weekday peak periods (5x16), weekend peak periods (2x16) and off-peak periods at night (7x8).

Figure 1
Cleveland 2016 Resource Diversity



*Market includes block purchases and remaining energy requirements

**Figure 2
 Cleveland Energy Requirements**



GDS reviewed CPP’s power procurement history and outlined future procurement strategy and hedging considerations that could be used to achieve greater price certainty and/or mitigate market volatility, depending upon CPP’s desired price risk profile. CPP should consider the development of a Long-Term Integrated Resource Plan (IRP) that formalizes some of CPP’s long-term portfolio stability targets, fuel diversity ideals and Renewable Portfolio Standard (“RPS”) targets, while providing new energy procurement/hedging strategy and risk management procedures and policies to ensure CPP’s goals are clearly established and pursued. City council, city officials and Cleveland/CPP personnel should all provide key insights in establishing an IRP that all stakeholders agree represents the best future course of action to competitively and reliably serve CPP electric customers.

2.2 Power Supply Procurement Strategy

At present, CPP’s annual energy purchases from market represent over half of CPP’s annual energy requirements as evidenced in Figure 1. CPP’s annual energy requirements and purchases are illustrated in Figure 2, and CPP’s current power

procurement strategy for these market-based purchases seems to be primarily “opportunistic” or, for clarity, based on subjective decisions to enter into purchased power contracts from time to time. Although some quantity/percentage of opportunistic purchasing can offer the flexibility to transact on “good deals” in the marketplace as opportunities avail themselves, it is very difficult to avoid “emotional” purchases that are based on a current market view alone or the movement in market pricing at the time. For example, the summer of 2008 represented one of the fastest spikes in natural gas and, correspondingly, electric prices. Many entities relying on opportunistic purchasing alone were frightened into purchasing large portions of their needs all at once to avoid even higher prices. Only a couple months later, natural gas and electricity prices began a long decline, and entities procuring entirely on opportunistic strategies felt significant buyer’s remorse.

For entities that have concluded through an IRP plan that they intend to diversify their resource portfolio and market purchases, GDS often recommends blending a programmatic, pre-defined plan or methodology for market-based energy procurement/hedging with opportunistic purchases to further diversify timing of purchases, suppliers and quantities of requirements sourced from the electric market.

However, there are more market products available to CPP other than standard block power purchases, and that is why a strategic IRP is an essential part of the planning process. An IRP can outline specific power procurement goals and methodologies and can be used as a tool to guide future plans. An IRP could consider other supply alternatives to block power purchases, including market products that accept less market price risk monthly or annually, if such a product better matches the city’s desired CPP power supply risk profile. Although GDS does not know exactly what procurement alternatives CPP considers regularly, it seems that only block power products are being utilized to fulfill remaining needs; however, there are a number of marketers/suppliers willing to offer other products to CPP that could serve a valuable purpose. The critical IRP analysis would attempt to identify CPP’s risk profile and appetite for price risk and consider these alternatives accordingly. To the extent that an IRP implementation

results in significant levels of purchasing, these purchase/hedging plans typically are governed by a Risk Management Policy that outlines specific procedures and controls so that it is clear to all interested stakeholders when purchases will take place, the competitive process for providing pricing and a standard process with appropriate delegation of authority for entering into such transactions. These public documents can be viewed by all departments of the organization and can be used to manage purchasing decisions, ensuring all individuals involved are working towards a common goal. Such a practice also compels varied types of suppliers, marketers and agencies to maintain a relationship with CPP and bring competitive and valuable products to them regularly. GDS does not want to imply that CPP has not pursued these types of alternative supplies historically, but it appears that they are not part of the current procurement plan.

Any CPP IRP, power supply plan, procurement or hedging strategy or risk management policy should be based, in large part or to the extent information is accessible, on CPP's competitive position with local competitor, The Cleveland Electric Illuminating Company, ("CEI") a FirstEnergy Company. GDS understands that CPP competes with CEI for local electric consumers, and, based on discussions with CPP staff, it appears that the expectation for customer growth in near-term years is substantial. However, with an existing risk of potential load loss to CEI, it seems that a critical missing piece in the electric planning process is an assessment of competitive position with FirstEnergy's portfolio resources. Although it is not always simple to ascertain from public documents what specific decisions and strategy a competitor contemplates, it is important to attempt to conduct that review and prepare as many key benchmarks to drive internal competitive planning ideals as possible. While GDS can support a supply sourcing approach founded on resource diversity, it is also essential to ground such decisions upon how they will differentiate CPP from the competition and, ultimately, how that could affect supply portfolio costs and risks. CPP should consider balancing diversification opportunities with FirstEnergy's resource portfolio decisions to better determine prudence of such a commitment. With significant commitments to long-term resources already existing in CPP's supply portfolio, a key metric for future long-term

resource considerations should be how such an investment would affect the competitive position with CEI. Resource diversification is generally a good risk mitigation tool to consider if it drives economic choices that continue to add competitive advantage to Cleveland's power portfolio as compared to FirstEnergy's power portfolio. Additionally, because the potential for competitive load loss does exist, GDS recommends that CPP carefully consider its procurement plan for the last 20-30% of annual energy requirements and largely base the purchase/hedging plan for those years on a 36-month outlook for retaining medium to large loads. Although load loss is not necessarily anticipated, the largest customers could be closely tracked, and a hedging plan could consider these loads before layering in additional purchases into the supply portfolio. Additionally, any future increases in cost that are anticipated should result in a conservative approach to future procurement given that customers could make a decision to change service to CEI for economic reasons. A greater sensitivity to competitive positioning and near-term load loss diminishes the risk of over-hedging due to load fluctuations in CPP's competitive environment. It also allows CPP to hedge more accurately as a delivery year approaches and account for loads lost and gained. If CPP reaches a point where load loss due to competition becomes a more significant risk, CPP could consider purchased power contracts with suppliers willing to assume some level of load loss risk and not penalize CPP in the supply arrangement. These kinds of supply arrangements do exist and are often referred to as "load following" or "full requirements" energy contracts.

3.0 10-YEAR WHOLESALE POWER COST FORECAST

3.1 Overview

In order to quickly ascertain what supply resources or market costs result in anticipated future cost increases, Cleveland requested a 10-year wholesale power cost projection for CPP incorporating all existing block power purchases from market, cost estimates for long-term resource commitments, including all power projects that CPP participates in as part of its Purchased Power Agreement with American Municipal Power ("AMP"),

and all other projected PJM market costs. Cleveland will be able to utilize the 10-year forecast in order to make more informed short-term and long-term budgeting decisions, plan for future financial opportunities or cost, and better explain future potential cost increases and decreases to city officials and CPP customers.

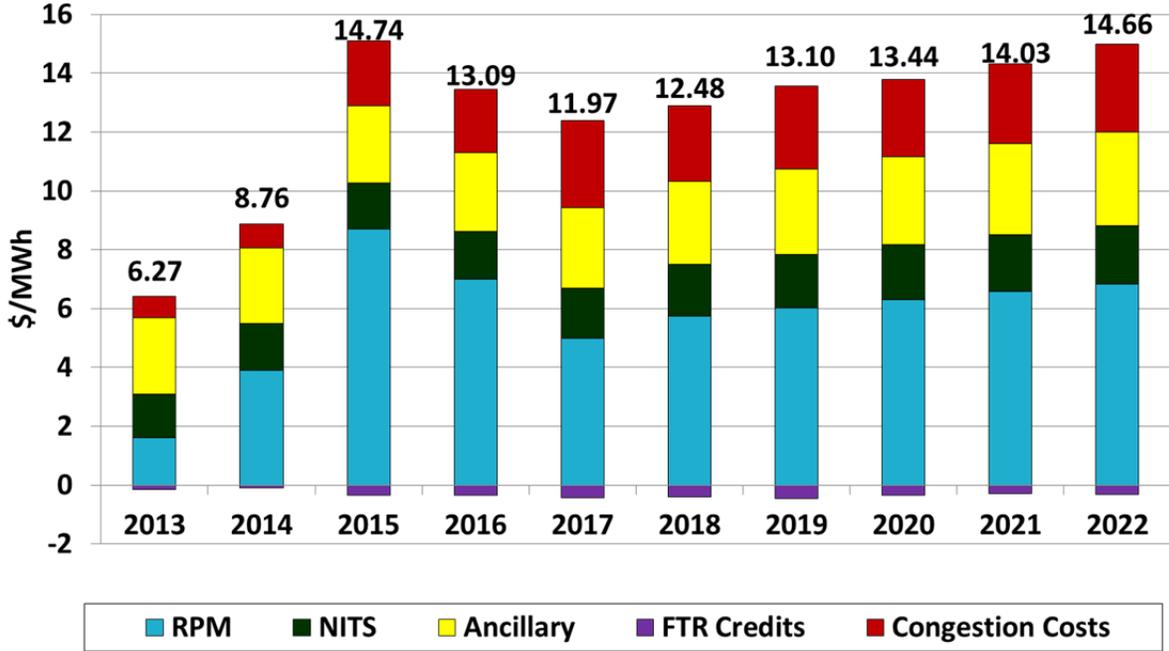
CPP's total wholesale power rates are projected to be \$62.26/MWh in 2013 and are projected to rise to \$80.11/MWh over the 10-year forecast horizon. GDS identified that the two primary drivers for this rise in cost are higher PJM Reliability Pricing Model ("RPM") capacity costs and the significant premium cost associated with CPP's participation in the AMP Hydro Phase 1 and Phase 2 resources, which are expected to come online in 2015.

3.2 Power Cost Mitigation

CPP's power costs are projected to increase 16% between 2014 and 2015 and continue to rise thereafter. This increase in cost is primarily due to two main drivers: RPM capacity costs and AMP Hydro Phase 1/Phase 2 costs.

As a new member to the PJM market, which is the prevailing market where CPP is situated, CPP has only recently been exposed to RPM capacity costs. RPM prices are determined through an auction process, conducted by PJM three years in advance of the planning year. RPM market prices are currently known through May 2016.

Figure 4
 PJM Costs



Each member of the PJM market is responsible for meeting its capacity obligation, which is determined based on its average contribution to the 5 highest summer peak hours in PJM. Cleveland is meeting its capacity obligation, in part, through resource participation in Prairie State, AMP Hydro Phase 1/Phase 2, natural gas-fired AMP Fremont Energy Center, Blue Creek Wind and NYPA Hydro. Any unmet capacity obligation is purchased on the RPM market at the established auction rates. Despite CPP’s participation in these resources, CPP still retains a significant capacity obligation exposed to the RPM market prices.

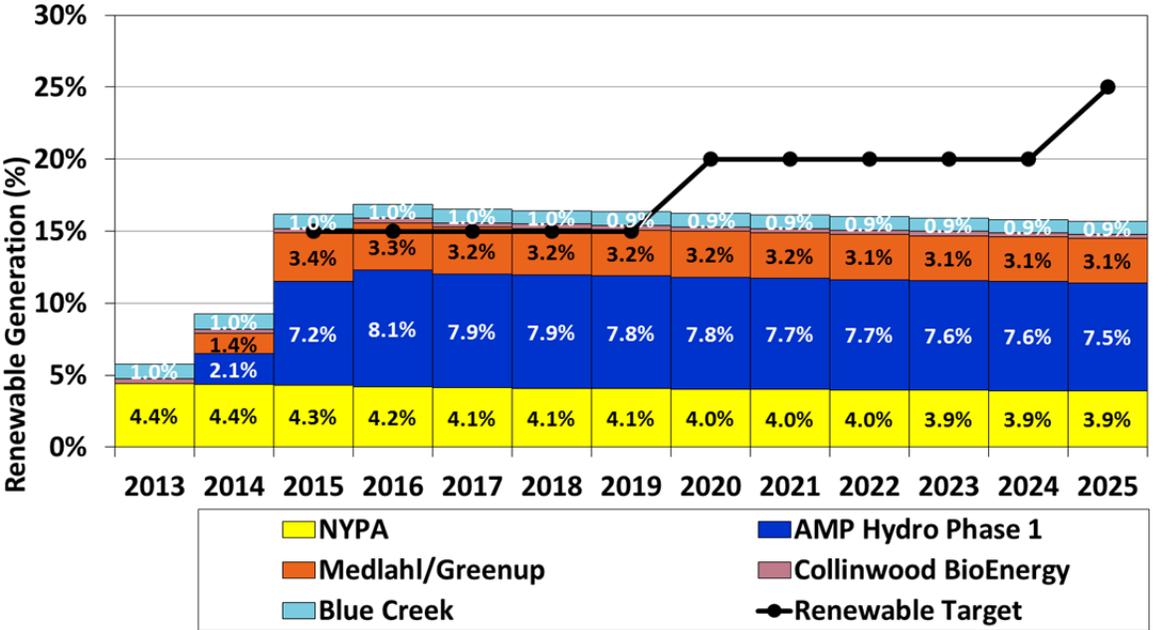
One strategy to mitigate RPM costs is through load management efforts. CPP should review all customer interruption opportunities, especially with any large/mid-sized load customers, and could contract with these customers to shed load for a shared financial compensation from the market savings.

Another strategy to mitigate RPM costs is through the use of behind-the-meter capacity resources. Currently, CPP is using its owned diesel generators and combustion turbines to attempt to generate during peak hours, which is commonly referred to as “peak

shaving”; however, it can be difficult to predict exactly which hours the peak usage will occur. Historically, the diesels and combustion turbines have not received their full capacity value through peak shaving. As an alternative, CPP could offer a significant portion of its behind-the-meter resources into the RPM auction to receive a direct offset of RPM costs and likely more value than what could be achieved through peak shaving. Additionally, new EPA regulations will soon impose more stringent rules regarding peak shaving, particularly for CPP’s diesel generation units.

In addition to RPM capacity costs, CPP’s wholesale power costs are expected to rise due to the premium costs associated with the AMP Hydro Phase 1/Phase 2 renewable projects. CPP is participating in 35 MW of AMP Hydro Phase 1 and 15 MW of AMP Hydro Phase 2 making up approximately 15% of CPP’s annual energy requirements. Although CPP’s participation in these allocations of the hydro resources fits safely within Cleveland’s around-the-clock energy requirements, the level of participation in these expensive renewable projects is certainly aggressive and represents a premium cost associated with the pursuit of renewable energy: 15% of energy requirements by 2015, 20% of energy requirements by 2020, and 25% of energy requirements by 2025.

**Figure 5
 Renewable Energy Targets**



In order to achieve these aggressive RPS requirements, CPP would have had to select capital-intensive renewable resources, such as these hydro units, that produce a large amount of annual energy in order to achieve the first 15% annual energy requirement in 2015. When choosing renewable resources to fulfill RPS targets, it is important to consider the most economic renewable resources for fulfilling that need. The AMP Blue Creek Wind project is an example of a renewable resource that helps satisfy CPP’s RPS requirement at much more economic levels. Nevertheless, many types of renewable resources would be required to achieve the levels of Cleveland’s adopted RPS requirements.

It is important to note that CEI is required to establish RPS requirements for its supply portfolio, and Cleveland established its RPS requirements voluntarily based on a council-adopted policy. Cleveland does have the flexibility to revisit and modify its RPS requirements now that the cost impacts of adding renewable resources have become more clear. If Cleveland officials desire to maintain the RPS requirements and corresponding cost implications, Cleveland will likely see additional increases in future cost as there are additional resources that must be secured to achieve renewable requirements

in 2020 and 2025. GDS recommends that, as part of the proposed IRP development, CPP's renewable resource participation should be compared to similar CEI resources with significant attention given to the competitive cost impacts of future renewable resource participation. This information will be a necessity for Cleveland officials to consider future renewable resource policy and resource participation.

Although the current RPS requirements adopted by Cleveland likely require resources like the AMP Hydro projects for compliance, CPP could consider marketing the resources to other interested parties if RPS requirements are relaxed. While it would be challenging and, unfortunately, unlikely that CPP would recover all project participation costs from selling a share of these resources, other regional utilities have need for RPS-qualifying resources that could be met with these projects. Marketing options could be developed in greater detail in the context of an IRP. With the option to sell all or a portion of these resources as an ongoing option, strategically, Cleveland must develop a long-term plan to serve the annual RPS requirements and begin determining how CPP would intend to achieve these requirements. If, after further review, Cleveland takes steps to relax the RPS requirements downward, some level of negotiated sale of CPP's share of the AMP Hydro project could be realistic due to the high costs of these renewable resources.

Having noted the two key drivers for cost increases in the 10-year wholesale cost projection in RPM capacity costs and AMP Hydro project participation costs, it is important to contrast CPP's participation in other AMP resources, including the AMP Fremont Energy Center combined cycle, natural gas resource. CPP's participation in this resource is effectively mitigating near-term capacity costs and also avoiding a significant amount of higher-priced market energy. Additionally, CPP's participation in the Prairie State Energy Campus coal project represents just over 10% of CPP's annual energy requirements and is anticipated to be a cost-stable resource alternative to gas-fired resources for CPP's supply portfolio. Despite being at a higher cost than market today, the participation level and costs seem reasonable for a long-term asset that offers price stability and cost mitigation against the potential for future market price increases.

4.0 KEY STUDY RECOMMENDATIONS (BULLETED-LIST SUMMARY)

Overall, CPP's current resources and market purchases fit within its load profile. CPP should develop a strategic document, such as an IRP, that outlines a definitive plan for future resource considerations and energy procurement that all Cleveland stakeholders agree is appropriate in guiding the future of the CPP electric utility, especially in light of CPP's expectations of more significant future load growth. This public plan would contain the following:

1. Competitive benchmark of CPP versus CEI/FirstEnergy
 - a. Determine what ideals or planning goals CEI/FirstEnergy utilize to develop procurement plans, if available, and utilize this information to consider how CPP could gain competitive advantage.
 - b. Compare long-term resource commitments to CEI/FirstEnergy to determine if CPP has competitive advantage when considering resource costs, RPS requirements, potential carbon emission requirements and other risks.
2. Existence of competitive choice and potential load loss
 - a. Current procurement process doesn't seem to account for the potential of load loss due to retail choice.
 - b. Consider more conservative approach to serving load growth with larger load growth potential served from market
 - c. Consider more detailed tracking of near-term load impacts on hedging/procurement and, if continuing a portfolio procurement strategy with block power, consider shortening the length of time before 20-30% of hedges are conducted (inside of 36 months from delivery month).
 - d. By comparison, CPP risk profile with retail competition should include more near-term market reliance as compared to other municipals without retail competition.
3. Determine desired future resource goals such as renewable or diversity goals
 - a. Consider whether Cleveland will actively seek other renewable resources to achieve RPS requirements

- b. Whenever evaluating power projects for potential long-term participation, GDS recommends considering other market alternatives before performing an independent feasibility review of single plants. Other cost-effective and reliable alternatives may exist.
4. Determine procurement/hedging plan
- a. Refresh Cleveland's risk profile and appetite for price risk versus possible reward associated with available market products.
 - b. If CPP continues to manage market purchases from block power procurement only:
 - i. Consider the pros/cons of mixing purchases via AMP and from independent transactions with counterparties.
 - ii. Develop procurement/hedge plan that governs annual goal percentages.
 - iii. Adopt appropriate risk management and rate stabilization ideals.
 - iv. Consider newer contract management, including the use of the EEI and ISDA, and cultivate marketer relationships.
 - c. If CPP manages market purchases from other power supply products:
 - i. Consider utilizing "load following" contract as a means to manage highly variable load growth expectations without penalty for potential load loss (such a product is more valuable in periods of major load growth and can be incorporated with other long-term diversification ideals).
 - ii. Develop rate stabilization ideals.
5. Consider separate treatment of large economic development accounts for supply planning purposes as may already be a standard practice.
6. Evaluate retail rate structures for best practices that appropriately manage CPP price risks adopted by the procurement/hedging plan. If competitive pricing becomes a concern in the future, increased economic development and incentive rates could improve load growth and help avoid higher system average costs.

GDS also recommends that CPP more actively manage its supply planning in PJM and utilize its existing relationships with AMP and other marketers to develop more competitive opportunities to implement its own independent IRP goals. Cleveland must continue to pursue an active knowledge of the following:

1. Federal, state and PJM regulatory issues
2. Market opportunities and resource alternatives
 - a. AMP, other utilities and other marketers provide key resources but shouldn't be relied upon as sole entity for supply alternatives
 - b. Integrated Resource Planning process
 - i. Recommended update and review with council every several years to ensure streamlined implementation of the goals established by city officials.
 - ii. Recommended as a tool that city council can adopt and expect future implementation to closely track the plan.

Additionally, key stakeholders must have a collaborative planning process that incorporates necessary industry expertise:

1. CPP staff has critical historical hands-on experience.
2. City personnel must weigh in at critical planning junctures.

CPP's power costs are expected to increase by 16% between 2014 and 2015 primarily due to increases in RPM costs and the significant costs of the AMP Hydro Projects. CPP should focus on opportunities to mitigate these costs.

RPM costs can be mitigated by:

1. Implementing load management efforts.
 - a. CPP should discuss interruptible opportunities with any medium/large load customers.
 - b. CPP could contract with these customers to shed load for shared financial compensation from market savings.

- i. GDS has negotiated previous shared savings contracts for load management.
2. Reviewing any new generation opportunities that provide capacity.
3. Bidding CPP behind-the-meter generation (including diesel and combustion turbine units) into the RPM auctions instead of peak shaving in order to realize more capacity value.

Although CPP's allocation of the AMP Hydro projects fits within its projected load requirements, the overall participation share is aggressive; however, such an aggressive renewable participation is necessitated by the RPS requirements currently adopted by the city.

If the premium cost associated with participating in renewable resources is too much for Cleveland to bear, the city can reevaluate its current RPS requirements. Benchmarking CPP's renewable resources against similar CEI resources may reveal competitive considerations that Cleveland should consider.



APPENDIX A – LOAD FORECAST REPORT



APPENDIX B – 2013 WHOLESALE POWER COST FORECAST



***APPENDIX C – 10-YEAR WHOLESAL
POWER COST FORECAST
(2013-2022)***