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Memorandum

TO: City Council President Sonner
City Council Members

FROM: Steve Dupee, Electric Director
Eric Norenberg, City Manager

RE : Base Load Power Supply Activities

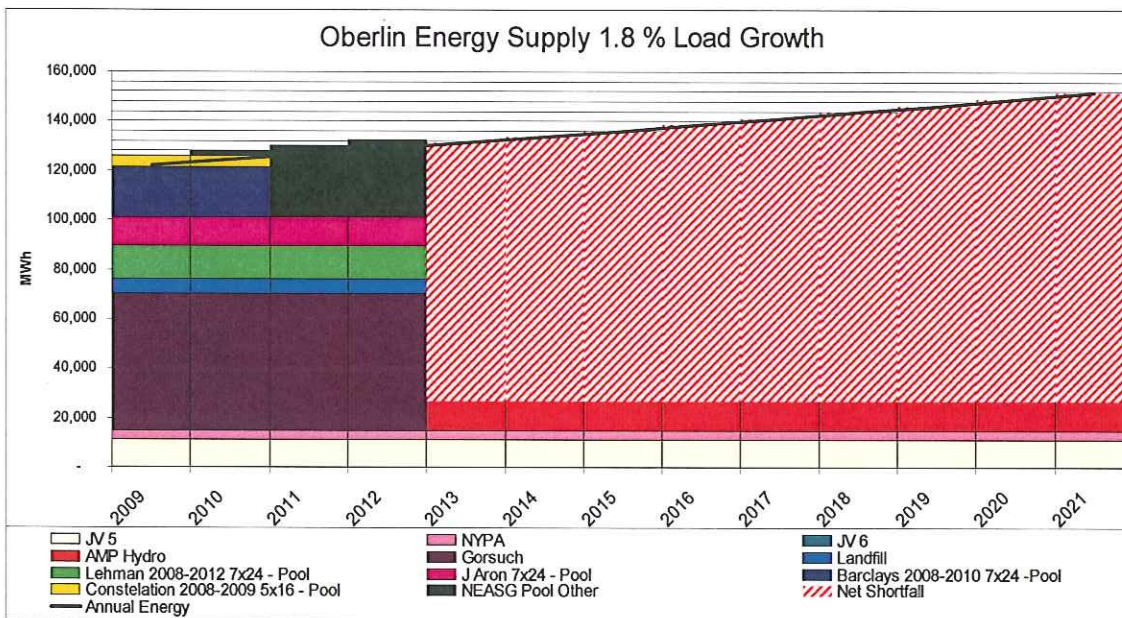
DATE: August 14, 2009

Purpose

The purpose of this memorandum is to provide City Council with an overview of activities over the past 18 months related to the City's base load power supply requirements beyond 2013.

Background

The City receives 6.7 megawatts of base load power supply from the Richard H. Gorsuch Power Station, a 213 megawatt coal-fired power plant located in Marietta, Ohio and another 4 megawatts of base load power supply from market power contracts with energy trading firms. With the retirement of the Richard H. Gorsuch Power Station and the expiration of market power contracts, the City will have an approximate base load power supply need of 11 to 13 megawatts beginning in 2013. Below is a bar graph illustrating the City's base load power supply shortfall beginning in 2013.



****Note – Power supply chart assumes that landfill gas generation will be available beyond 2011 and that new AMP hydro capacity is available in 2013.***

Future base load power resources will play a critical role in the City's ability to provide affordable, reliable and stable electric service to its customers. City staff, City Council, the Public Utilities Commission, Oberlin College representatives, consultants and others have been involved in numerous activities to address the City's base load power supply requirements. The purpose of this report is to provide City Council a summary and current status of various activities occurring over the past 6 to 18 months.

Power Supply Acquisition

- In December, 2007, Oberlin City Council authorized the City's participation in three (3) run-of-the-river hydro-electric projects under development by the City's wholesale power provider, AMP, Inc. The City will receive 2.6 megawatts from these projects on a pro-rata share basis as projects are completed. It is expected the Cannelton project will be completed first in the Fall of 2013 and Smithland and Willow Island will be completed in the Spring of 2014. With the addition of these generation resources, the City's renewable portfolio is expected to account for 25% of its total power supply requirements. *(See attached "AMP Generation Projects Fact Sheet" for overview and current status of hydro projects.)*
- Oberlin City Council authorized the purchase of 60 megawatts of base load "pool" power supply for a one year term beginning in 2011 for the Northeast Area Service Group (21 municipal electric systems including Oberlin).

Alternative Generation Opportunities/Investigations

- ***Hydro Power***

AMP, Inc. is developing two (2) additional hydro projects at existing locks and dams (Meldahl and R.C. Byrd) on the Ohio River with a potential generation output of 111 megawatts and 48 megawatts, respectively. The City of Hamilton owns the FERC license to develop the Meldahl site and has agreed to sell AMP a 48.6% share of the project (51 megawatts). In addition, the City of Hamilton has also agreed to sell a portion of an existing hydro project (Green-up) that the municipality owns and operates (34 megawatts). It is expected that these resources will be available in the Spring of 2014. On behalf of AMP, the City of Wadsworth has filed an application for the FERC license to develop the R.C. Byrd Project. Output from these projects will be offered to AMP members towards the end of this year. *(See attached "AMP Generation Projects Fact Sheet" for overview and current status of Meldahl and R.C. Byrd projects).*

- ***Natural Gas Combined Heat and Power***

In March of 2008, utility staff, Council members and College representatives visited the Kent State University Combined Heat and Power Plant which provides both steam and electricity to the campus. The visit provided an opportunity to tour the facilities and determine if the project principles would apply to the City's need for base load power supply and the College's need for heat. We learned that the combined heat and power plant was not a base load power plant but rather a peaking plant with Kent State purchasing low-cost, off-peak power from Ohio Edison during the evenings and weekends. In addition, Kent State has year-around steam needs for

both cooling and heating while Oberlin College's needs are for heating only creating a mismatch between base load electricity needs and waste heat recovery requirements.

- *Plasma Gasification*

In June of 2008, utility staff participated in several discussion sessions on gasification of municipal solid waste to create electricity using plasma arc gasification technology. The plasma arc gasification technology has been around for approximately 30 years and is used to process waste streams. Japan uses the technology to gasify solid waste and wastewater sludge creating steam, hot water and electricity. Currently, there are no commercial plants operating in the U.S. that create electricity. Through discussions with technology developers (Cornal), the Ohio Department of Development and others, we learned that the plasma arc gasification technology for electric generation faces multiple hurdles in terms of economic viability, site location, emissions, gas clean-up issues, byproducts, waste stream sources, etc..

- *Landfill Gas*

Energy Developments, Inc. (EDI) owns and operates a methane to energy project at the Lorain landfill in New Russia Township. The City currently receives 645 kilowatts of capacity from EDI through a long-term power supply agreement with AMP. The power supply agreement expires in December, 2011. Over the past 6 to 18 months, the City and Oberlin College have investigated potential collaborative opportunities for combined heat and power and/or waste heat recovery. The College's recent "Climate Neutrality Options Study," prepared by Energy Ventures Inc., includes an analysis of alternative fuel sources for the College' central heating plant including methane. On several occasions, both the College and the City have met with EDI representatives to share information and discuss potential future opportunities.

One reason that exploring opportunities for using landfill gas for power and heat have taken many months is that over the past 18 months, EDI's parent corporation in Australia has undertaken a strategic review process to investigate shareholder value maximization opportunities including the potential sale of the EDI parent corporation and/or affiliated operations abroad including U.S. operations. It is our understanding that the strategic review process has been completed for the U.S. operations.

During the strategic review process, the City and Oberlin College prepared and submitted companion requests for American Recovery and Reinvestment Act (a.k.a. Stimulus) funds that would be used for different aspects of a landfill gas project to generate electricity and possibly heat for College buildings.

Current Status - At this time, EDI is looking to expand their U.S. methane to energy generation portfolio. The Lorain landfill continues to be a focus for expansion plans with the potential of an additional 10 to 20 megawatts. In May, City staff toured EDI's facilities including new gas treatment equipment which, according to EDI staff, is performing very well resulting in lower engine-generator maintenance requirements and increased reliability and availability of the generation station.

- *Wood Waste Combined Heat and Power*

In July, City staff met with representatives of Youngstown Energy to discuss district energy opportunities for the community. Youngstown Energy is developer of thermal energy district heating/cooling system in Youngstown and Akron as well as the wood waste thermal heating system for Green Circle Growers. Youngstown Energy is exploring opportunities for utilizing excess thermal capacity at Green Circle Growers to provide district heating/cooling to various industrial, institutional and retail customers in the City. In addition, Youngstown Energy has a 4 megawatt condensing steam turbine at the Green Circle Growers site. The steam turbine was part of a boiler package purchased for the Green Circle operation but was neither permitted nor installed. Youngstown Energy has been asked to provide additional background information on the company's history and project development experience including references. In the meantime, we plan to schedule a tour of the waste wood thermal energy facility in a couple of weeks.

Power Supply Studies

Concentric Energy Advisors - Alternative Base Load Generation Study

The City, in collaboration with Oberlin College, contracted for professional consulting services for the preparation of a power supply and conservation planning study. The purpose of this study was to evaluate **non coal-based** power supply and conservation alternatives to serve the City's future base-load power requirements vs. participation in the AMPGS project. The study was completed in February, 2008 and presented to Oberlin City Council in March of 2008. A couple key findings of the study included:

- An alternative base load power supply could be reasonably created using a combination of market power, renewable resources (i.e. wind, bio-gas, hydro) and demand side management activities.
- Implementation of aggressive demand side management programs could have a reasonable potential savings of approximately 12% in peak demand and 7% energy consumption by 2020.

Black and Veatch - Power Supply Study

The City recently hired Black and Veatch, the leading single source supplier of consulting, engineering, procurement and construction services in the electric power industry. Black and Veatch will prepare a 20 year power supply plan for the City considering cost, reliability, risk, feasibility and environmental impacts. The study will also include an analysis of low and no carbon generation resource portfolios with a goal of phasing out fossil-fuel generation from the City's power portfolio by 2032. A draft report of the power supply study will be completed within 3 months and a final report is expected to be complete by the end of the year. Study recommendations will be used to develop and implement plans for filling the City's future base load power supply requirements.

Demand Side Management

Efficiency Smart Program

The City is participating in the development of a State-wide municipal electric energy efficiency program in collaboration with AMP, Inc. and the Vermont Energy Investment Corporation (VEIC). VEIC, founded

in 1986, has extensive experience in energy efficiency program analysis, design and implementation with clients in 25 states. VEIC operates "Efficiency Vermont", the nation's first statewide provider of energy efficiency services. This efficiency effort would be designed to place AMP municipal member systems like Oberlin in the top-tier nationally in terms of energy savings. To be a national leader, AMP would seek to achieve a goal of 1 percent annual energy savings for members after a three-year start-up phase commencing in 2010. Achieving a goal of 1 percent annual energy savings would mean that the City would cut their current load growth rate in half on average. A menu of energy efficiency programs supported by AMP and VEIC staff would be offered to all customer classifications and would include a variety of financial incentives to customers who participate in the program. The ultimate goal of this program is to construct an "Efficiency Power Plant" resulting in low cost power supply, zero emissions, no environmental impacts or risk, no construction risk and no fuel risk.

Non-Base Load Power

While not specifically addressing our base load power supply need, it is important to mention that City staff, City officials, the PUC, the College, community volunteers and others have been engaged in several other activities to enhance the City's power portfolio through proliferation of renewable generation resources, development and implementation of efficiency/conservation measures and greenhouse gas reduction initiatives in the local community.

Below is a list of some of the most recent activities staff has been engaged in at the local level.

Solar

Green Glow Farm - An Oberlin College graduate and a small group of local representatives are planning to develop a network of solar power systems with a peak capacity of 50 megawatts to be constructed on 50 acres in New Russia Township. According to the developers, the project "Green Glow Solar Farm" would showcase New Russia Township and the City's leadership for renewable energy and capitalizing on economic opportunities for green jobs. City staff has assisted the developers by providing information on the City's power supply portfolio, transmission interconnection, distribution interconnection, etc. In addition, City staff arranged a meeting between GreenField Solar and the developer to explore opportunities for utilizing the Greenfield "Solar Concentrator" technology for their proposed development.

Sunwheel Energy Partners - Through College Professor, David Orr, City staff was introduced to Mr. Jonathan Goldstein of Sunwheel Energy Partners, an affiliate of McCormack, Baron, Salazar. Sunwheel is an energy service provider firm with the specific mission of expanding renewable energy into hard-to-reach communities, focusing on bringing solar to affordable housing, seeking out funding opportunities for renewable and developing a holistic approach to renewable energy including education, green jobs, and real economic impact. Sunwheel Energy Partners has offered to assist the City with the investigation into a large scale city-wide solar project. Mr. Goldstein has prepared a three stage development workplan to investigate, plan and implement a city-wide solar program. The first stage of this solar development project will be to assess the viability of a local project and determine whether solar electricity can provide meaningful contribution to the City's overall energy portfolio.

Wind

Lorain Landfill Wind Monitoring Project - As City Council may recall one of the first projects to be funded by the Sustainable Reserve Fund was the purchase of a 50-meter wind monitoring tower and associated equipment to determine the viability of a local wind project. The project team consisted of Oberlin College Professor John Scofield, an Environmental Studies Student, OMLPS staff and New Russia

Township Trustees. Ultimately, the wind monitoring data did not support an economically viable project. Undeterred by the results, the project team reformed with some additional team members about six (6) months ago to determine the viability of a local wind project; however, this time at Lorain landfill in New Russia Township. The Lorain Landfill is one of the highest points in Lorain County.

OMLPS staff, Professor Scofield and new team members Leo Evans, Trevor Rhodes (an environmental studies student) and Chris Jacquet (Allied Waste Environmental Manager) have led the effort to develop, engineer, permit and install the City's 50 meter wind monitoring tower as well as 5 to 6 small portable wind speed monitoring stands at various perimeter points on the western edge of the landfill. Republic Waste, the owner/operator of the Lorain landfill, has been extremely supportive of the project. The 50 meter tower and the small wind monitoring stands will enable the project team to obtain a profile for wind over the landfill both horizontally with the small wind devices and vertically with the tower to determine the places with the highest potential for electric generation. The wind-monitoring systems will remain in place for no less than one year (preferably 14-16 months), after which time the tower and stands will be disassembled and removed.

Monitoring wind at the Lorain landfill presents a unique set of anchoring and guying challenges since the 50 meter tower will sit on top of a soil cap and bladder system. With the guidance of Mr. Jacquet, Mr. Stuart Saylor, an engineer working for the project team, has design an anchoring and guying system using strategically-located concrete blocks, sunk one foot into the ground so as to not compromise the landfill's cap. The base of the anchors has been designed large enough to insure that the regulated maximum pressure on the landfill cap is not exceeded. The main tower will house a number of weather sensors attached to a logging system at the base of the tower and the data will then be wirelessly transmitted to a server, off-site, for analysis and display. The small portable wind monitoring stands will hold one or two sensors each along with a data logger and battery.

The wind monitoring project will require approvals by the Federal Aviation Administration, New Russia Township and the EPA. Permit applications have been prepared and submitted. In June, the project team received good news that the Federal Aviation Administration had approved the tower installation at the landfill site. Once all approvals have been received, the project team expects to commence work at the site during the fourth quarter of 2009.

St. Georges Renewables - At the request of Council President Sonner and PUC Chair Burgess, OMLPS staff met with a Mr. John Sekulic, President and a Mr. Christopher Viscomi, Executive Vice President, of St. Georges Renewables. St. Georges is an independent power producer located in Wakeman, Ohio whose business model is to bring renewable energies at competitive rates using wind as the primary source of fuel. Based on preliminary discussions with St. Georges, we learn that the company was just at the beginning stages of renewable generation development. Mr. Sekulic gave a presentation to the PUC in April, 2009 with the PUC taking no action on further discussions.

Efficiency/Conservation

Power - OMLPS has partnered with a community organization called POWER (Providing Oberlin With Efficiency Responsibly), a grassroots organization whose mission is to increase energy efficiency in the community. POWER has a wide range of participants including citizens, college students, city leaders, city staff and community organizations. As City Council is aware POWER requested \$12,750 to support a one-year pilot program to insulate 10 low-income homes in the community. These funds, in conjunction with other funding sources, would support offering ten (10) grants in the amount of \$2,250 each to low-income qualified residents. OMLPS supports the effort through its heat-loss inspection program performing infrared inspections and blower door tests before and after the weatherization/insulation

services are completed. In addition, OMLPS staff developed and prepared the Request for Proposals for insulation contractors, arranged for tours of homes, and provided contractor oversight services. To date, insulations services have been completed on eight (8) homes. Four more applications for services are now under consideration by POWER.

Great Lakes Protection Fund Grant - The City and Oberlin College have partnered on a “smart grid” initiative funded through a grant from the Great Lakes Protection Fund to develop a real-time monitoring display system of city-wide energy and water consumption in order to affect and influence energy consumption and conservation decisions by community residents, businesses and institutions. OMLPS and Public Works staff are actively involved in the initiative related to metering devices, meter-reading capabilities, data acquisition, SCADA monitoring, etc..

Municipal Facilities Energy Audit/Performance Contract Services - The City recently engaged the services of a performance contracting firm, Johnson Controls Inc., to perform a preliminary audit of municipal facilities and operations to determine if significant energy efficiency and cost saving opportunities exist to warrant capital improvements related to HVAC systems, lighting, energy automation, etc. Johnson Controls is the global leader in energy efficiency and manages the largest performance contracting portfolio in the U.S. of \$3.8 billion. Simply stated, performance contracting is a financial vehicle used to leverage savings from the implementation of efficiency improvements identified through an auditing process to pay for various capital improvements. As a first step, Johnson Controls will perform a no-cost preliminary analysis. The purpose of the analysis is to determine if there are significant efficiency improvement opportunities that would warrant a more detailed evaluation study of the City’s facilities and operations. If significant opportunities are identified, the second step will be to issue a Request for Qualifications for energy performance contracting services. The City would proceed with evaluating and selecting the most qualified firm and seek City Council approval to enter into a performance contract agreement. In June, energy engineers from Johnson Controls performed the preliminary audit including a tour of municipal facilities and a Q & A with City staff. Electric consumption and gas consumption data has been assembled and forwarded to Johnson Controls. We are now awaiting the preliminary audit report.

Environmental

ICLEI - The City is a member of ICLEI – Local Governments for Sustainability, an international association of local governments and regional and national governmental organizations that have made a commitment to sustainable development. Recently, the City conducted a CO2 emissions inventory of city-wide and college emissions. The inventory will be used as a base line for measuring future reductions in CO2 emissions. The City is in the early stages of developing a community climate action plan including targets for carbon reductions. It is expected that an Oberlin College Intern will be hired in the next few weeks to assist in the process of continuing to track the greenhouse gas inventory and in researching/developing the Climate Action Plan.

Grant and Stimulus Requests

EPA Climate Showcase Grant Program – City and Oberlin College staff recently completed and submitted an EPA Climate Showcase Grant Program application. The grant program will assist local and tribal governments in developing plans, conducting demonstrations and implementing projects that reduce greenhouse gas emissions while achieving additional environmental, economic, public health and/or community benefits. The EPA expects to award between 20 to 30 cooperative agreements totaling \$10 million. The City’s application seeks to develop a unified energy plan that will join the City, Oberlin College, Oberlin Public Schools and other civic and business organizations in an effort to create a prosperous post carbon economy. The plan will build on and integrate several previously engineering

studies that focused on demand-side management, advancement of local renewable generation projects, utilization of landfill gas generation and Oberlin College energy use. The energy plan will study efficiency improvements, scope and cost of energy alternatives that eliminate the use of coal by both the City and the College, smart grid technology and so on. For Council's information, we have attached a copy of the grant application.

American Recovery and Reinvestment Act – In addition to the “Stimulus” request noted above, City staff submitted several other items to the State Energy Office for possible funding through the ARRA. During the summer, the State Energy Office developed and submitted application procedures and processes for awarding “stimulus” funding for weatherization, alternative energy, conservation and other similar projects. We expect to receive further instructions on how to apply for funds during August.

Conclusion

As the City Council is aware, planning and developing energy resources is a complex, time-consuming process that involves many different issues such as development, permitting, siting, transmission, financing and construction. Such an endeavor is even more challenging when a community sets a goal of carbon neutrality and sustainability. Meeting the City's future base load power supply needs beyond 2013 will present several challenges as a result of:

- The detrimental impacts of a failed deregulation policy in Ohio leading to a lack of investment in base load generation resources for well over a decade;
- Dysfunctional wholesale power markets resulting in the loss of long-term, cost-based bilateral contracts and market power pricing closely tied to the natural gas markets;
- Mandated Renewable Portfolio Standard (Senate Bill 221) which requires Ohio investor-owned utilities to meet 25% of their power supply requirements with renewable/advanced energy power supply resources creating competition and driving up costs for renewable power;
- Regional Transmission Organization Structure in Ohio including capacity markets which have driven up costs associated with market-based power supplies; and
- Regulatory uncertainty related to traditional base load generation fuel resources.

Staff is pleased to have made progress towards identifying base load resources to meet our future need, while engaging and exploring a number of projects that could meet our energy needs in other ways. More work is ahead of us and the Black and Veatch study will provide critical data to enable staff to make recommendations to the PUC and City Council.