



**Minutes of the Oberlin City Council/PUC Joint Work Session**  
Held on Wednesday, February 10, 2010  
7:00 P.M.

Purpose to hear and discuss a report from Black and Veatch regarding the Oberlin Municipal Light and Power System's Power Supply Planning Study.

President Sloane called the Work Session to order at 7:00 PM.

Council members present: Ken Sloane, Sharon Soucy, Kate Pilacky, Bryan Burgess, Scott Broadwell, Elizabeth Meadows.

Public Utilities Commission members present: Tom Monroe, Floyd Ramp, John Scofield, Bob Coan

City staff present: Eric Norenberg, City Manager; Steve Dupee, OMLPS Director

Electric Director Steve Dupee provided introductory remarks and introduced Chris Klausner, Principal Consultant for Black and Veatch, Inc. Dupee explained that the purpose of the meeting was to present the preliminary findings of the power supply study plan prepared by Black and Veatch and to provide the City Council with an opportunity to ask questions and offer comments on the supply plan before finalizing the report. Dupee stated that the power supply study plan would assist the City with considering options to address its base load power supply requirements commencing in 2013 as a result of the Gorsuch Station retirement and expiration of multiple market-based base load power supply contracts.

(A copy of the power point presentation Mr. Klausner used to present preliminary findings is attached to this document.)

The agenda for the presentation included:

- Introduction to Black and Veatch
- Study Purpose and Scope
- Power Supply Study Approach
- Load Forecast
- Current and 2012 status
- Resources Considered
- Conclusions and Results
- Questions

Mr. Klausner began by providing an overview of the Black and Veatch firm. Following the overview, Mr. Klausner reiterated that the purpose of the supply plan was to analyze, evaluate and recommend power supply alternatives to meet the City's future energy requirements with a goal of reducing emissions

while maintaining a reasonable cost. In order to meet this objective, Mr. Klausner reviewed the scope of work including:

- the review and analysis of historical loads and previous load forecasts
- analysis of demand-side management savings projected by VEIC
- summarizing existing resources and identifying future capacity requirements
- analyzing and evaluating potential resources
- developing projected future costs of various resource plans
- forecasting future emissions from various plans
- offering recommendations

Black and Veatch's approach to the scope of work included:

- development and confirmation of a load forecast including the impacts from demand-side management measures
- documenting existing city resources including purchases through 2012
- creating a projected capacity balance beyond 2012
- identifying year by year projected needs
- assessing offers and opportunities that could meet the City's long term resource requirements including both generic resources as well as proposals received through the Request for Proposal process
- performing screening, optimal generation expansion and production cost modeling to compare various resource plans
- developing optimal resource plan over a 20 year period using Ventyx Strategist software which is an optimization tool used to develop a least cost plan

Mr. Klausner described the various inputs into the power supply study process including fuel prices and future CO<sub>2</sub> costs that were provided from the Energy Information Administration, financing rates, energy prices and various resource options.

Moving on to the load forecast, Mr. Klausner indicated that previous load forecasts appeared to be high and, of course, could not have foreseen the recent mild summers and the recession. He indicated that based on the City's historical load requirements over the past eight years as well as taking into account the mild summers and recession impacts, Black and Veatch is projecting a more conservative load growth value of 1.1% annually resulting in revised peak load and net energy requirements for the City. However, he indicated that it is important for the City to review and reassess load forecasts on an ongoing basis in particular if the economy rebounds.

Burgess asked if upcoming load additions such as SCA and the Jazz Center were included in the load forecast. Dupee responded that those load additions should fit within the projected load growth rates projected by Black and Veatch. Mr. Klausner continued that the revised load forecast was used to identify future capacity needs. Consideration was given to recent additions of hydro generation as well as the retirement of Gorsuch and termination of power purchases.

Mr. Klausner presented a summary of resources that were considered to fill the base load requirements including renewable resources such as hydro electricity, biomass, landfill gas and resources proposed by developers in the Request for Proposal. In addition, other non-base load resources were analyzed

including wind and solar. Conventional resources were analyzed as well including natural gas combined cycle, natural gas simple cycle and long-term market purchases.

Next, Mr. Klausner presented a graphical representation of the levelized bus bar costs for resources capable of providing higher capacity factors including: biomass, landfill gas, new hydro and combined cycle. Mr. Klausner indicated that biomass is a good base load resource but typically comes at a higher levelized cost unless burned in existing equipment. Landfill gas typically offers a lower levelized cost with hydro costs in between biomass and landfill gas. In order to put the levelized expenditure on cost per mwh basis, in perspective, Dupee stated that the City's average power supply costs for all types of power resources (base load, intermediate, peaking) was in the mid \$50.00 range a few years ago. In 2009, the average cost was approximately \$69.00 due to higher coal costs for Gorsuch and recessionary impacts on power supply.

Broadwell asked if it were fair to say that landfill gas costs will mirror natural gas costs. Mr. Klausner stated that landfill gas developers might price their generation giving consideration to natural gas costs for short term or market-priced deals. However, if developers can secure a longer type arrangement then risk to the developer is minimized and should result in a lower cost for the power supply. Dupee indicated that some of the proposals received through the Request for Proposal were indicative of the longer term arrangements, lower costs of natural gas and recessionary pressures.

Burgess asked about the pricing received through the Request for Proposal process for direct-fired biomass vs. the generic pricing indicated in the Black and Veatch report in terms of prices offered through the RFP being lower. Mr. Klausner indicated that the proposal did not include a lot of information and he wasn't sure how they were able to offer generation output at those prices. Dupee indicated the proposal had a complex annual adjustment factor and that the minimum requirement for contracting for output was 10 megawatts according to the developer.

Next, Mr. Klausner presented levelized costs for intermittent resources such as wind, solar and simple cycle generation. While wind generation had the lowest levelized costs, Mr. Klausner indicated that wind generation does not correlate well with energy needs since it provides generating capacity at night during off-peak hours where solar generation does correlate well but has a very high cost.

Burgess asked why the study included a price for carbon but not a price for carbon credits producing a revenue stream. Mr. Klausner indicated that absent any regulatory clarity for emission allowance markets, it is difficult to determine what the value of carbon emission credits will be. Dupee indicated that one of the debates ongoing now is whether northwestern states heavy on hydro assets should receive any emission allowances at all. Dupee said that currently drafted climate legislation bases emission allowances on 50% historical load requirements and 50% historical emissions of the utility over a three-year period. However, that language could change in any final climate legislation enacted.

Mr. Klausner moved into a discussion of the RTO markets both MISO and PJM, regarding available reserve margins. Mr. Klausner indicated that reserve margins are forecasted to reduce over time, in particular in the PJM territory with a significant drop in 2019. Mr. Klausner indicated that capacity costs are expected to rise in the future. Dupee asked Mr. Klausner if the drop off is related to significant generation plant retirements in the future. Mr. Klausner stated that the drop off is related to both planned generation retirements and planned generation additions in the regional transmission areas.

Next, Mr. Klausner presented a comparison of the alternative power supply options. Mr. Klausner indicated that, in general, landfill gas appeared to be the most attractive from a pricing standpoint and carbon perspective. Mr. Klausner stated that the Strategist software chose natural gas combined cycle for the City's intermediate need which Black and Veatch estimated at between 4 to 5 megawatts. He indicated that the intermediate resource would be helpful in backing up hydro and wind.

Mr. Klausner stated that the market purchase power option was the lowest cost option without considering future CO<sub>2</sub> costs; however, with CO<sub>2</sub> costs included, the market purchase power option was the highest supply option. Mr. Klausner showed a graph of future CO<sub>2</sub> emissions based on the various alternative power supply options. The landfill gas alternative proved to have the lowest future CO<sub>2</sub> emission profile.

Scofield pointed out that the future CO<sub>2</sub> emission line for a market power purchase does not change much from historical emissions and he questioned whether the City could purchase only natural gas or only nuclear market power. Mr. Klausner indicated that the market power purchase for this area will be primarily comprised of coal and some nuclear.

Burgess pointed out that while the future CO<sub>2</sub> emission profile is the lowest for the landfill gas resources, the City would still have positive CO<sub>2</sub> emissions from its power portfolio. Burgess asked how the City could get emissions to zero. Mr. Klausner advised that getting to zero would be difficult because some of the City's load is intermediate and requires the power supply to be dispatchable. However, one way to get to zero would be to overbuy on renewable power and sell back when the City did not need it. Dupee indicated that the utility's main purpose is to meet the community's demand requirements and not to seek energy trading opportunities.

Soucy asked why nuclear power was not considered in the study. Dupee advised that only resources that would be reasonably available by 2013 were analyzed by Black and Veatch. Mr. Klausner indicated that we probably wouldn't see any new nuclear power before 2017.

Mr. Klausner concluded with findings and recommendations. Mr. Klausner reiterated the large base load need the City will have as a result of the Gorsuch retirement and power contracts expiring. Based on Black and Veatch's review of the AMP hydro opportunities, it would be recommended that the City continue to pursue those opportunities in the future. Mr. Klausner indicated that landfill gas is a fairly attractive way to meet the City's base load power supply needs and the recommendation would be to pursue options provided through the RFP process. Mr. Klausner suggested that in order to mitigate risks, the City should consider contracting with more than one landfill and more than one plant and to attempt to include availability penalty clauses if possible. Mr. Klausner recommended that the City should pursue natural gas combined cycle generation for the City's intermediate need. Mr. Klausner continued that load growth should be reviewed on an on-going basis and load forecasts revised as necessary.

Dupee added that Black and Veatch had recommended a base load need of 8 to 10 megawatts and an intermediate need of 4 to 5 megawatts. Burgess asked if the City needed to issue an RFP for the City's intermediate needs. Dupee indicated that intermediate needs would be served by the City's existing participation in the NEASG pool. In addition, the City will have an opportunity to participate in AMP's proposed natural gas combined cycle plant in the future.

Soucy asked why landfill gas appears to have more reliability issues. Mr. Klausner indicated that landfill gas generation generally has more frequent overhauls due to quality of the gas.

Scofield asked Mr. Klausner to put up the graph related to the future CO<sub>2</sub> emission costs. Scofield asked if the landfill gas opportunities specified in the RFPs' comes with the renewable energy attributes and therefore supports the CO<sub>2</sub> reductions shown in the graph. Dupee responded that yes, the RFP responses included renewable energy attributes.


Dupee summarized the next steps following the work session. Dupee indicated that any additional comments offered by City Council and PUC would be considered prior to finalization of report. With City Council support, the utility would commence implementing recommendations in the report. Dupee indicated that some progress has already been made with the Council's recent approval to participate in hydro projects as well as considering a purchase power agreement for landfill gas generation. In addition, Dupee indicated that it would be important to commence a dialogue with developers who responded to the RFP. Dupee also indicated that he would continue to work with AMP on the development of an intermediate asset to meet the City's future intermediate power needs.


Meeting adjourned at 9:45 p.m.

Submitted by,

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STEVE DUPEE  
OMLPS DIRECTOR

Attest:


  
\_\_\_\_\_  
BELINDA B. ANDERSON, CMC  
CLERK OF COUNCIL

  
\_\_\_\_\_  
KENNETH SLOANE  
PRESIDENT OF COUNCIL

Approved: 3/15/2010

Posted: 3/16/2010

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## Oberlin Municipal Light and Power Energy Plan

Chris Klausner, Principal

February 10, 2010

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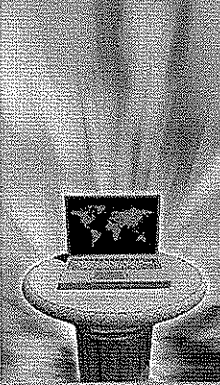
### Agenda

- Introduction to Black & Veatch
- Study Purpose and Scope
- Power Supply Study Approach
- Load Forecast
- Current and 2012 Status
- Resources Considered
- Conclusions and Results
- Questions

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### Black & Veatch

- Founded in 1915
- 9,000+ professionals worldwide
- More than 100 offices worldwide
- Projects in more than 70 countries on 6 continents
- \$3.2 billion in annual revenues in 2008
- Reputation of integrity and expertise
- Employee-owned corporation



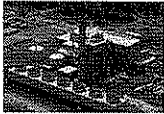



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<b>MANAGEMENT CONSULTING</b> 	<b>FEDERAL</b> 	<b>ENVIRONMENTAL</b> 

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### B&V Energy offers a broad range of solutions for a global client base

<b>PORT WESTWARD</b> 	<ul style="list-style-type: none"> <li>• Power Delivery</li> <li>• Coal</li> <li>• Combustion Turbine</li> <li>• Nuclear</li> <li>• Gasification / IGCC</li> <li>• Renewables</li> <li>• Air Quality Control</li> <li>• Gas, Oil &amp; Chemicals</li> <li>• Consulting Engineering Services</li> </ul>	<b>TRUMBULL</b> 
<b>MOUNTAIN VIEW</b> 	<b>Black &amp; Veatch has expert knowledge in every facet of the energy industry</b>	<b>COSTA AZUL</b> 

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Enterprise Management Solutions (EMS) blends traditional engineering with forward-thinking management consulting services

- Strategy Development
- Process Improvement
- Technology Application

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## Study Purpose and Approach

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### Study Purpose and Work Scope

Objective: Analyze, evaluate, and recommend power supply alternatives to meet the City's future energy requirements with a goal of reducing emissions while maintaining a reasonable cost

To meet this objective, Black & Veatch:

- Reviewed and analyzed historical loads and modified previous load forecast.
- Incorporated DSM savings projected by VEIC.
- Summarized existing resources and developed a capacity balance for future needs.
- Analyzed and evaluated potential resources available including renewables.
- Developed projected future costs of various resource plans
- Forecast future expected emissions for selected plans
- Provided recommendations in a power supply report

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### Black & Veatch's Approach to Power Supply Studies

1. Develop/Confirm a load forecast for the utility (includes demand-side programs and load management programs).
2. Document existing resources including purchases.
3. Create a projected capacity balance.
4. Identify year-by-year projected needs for additional capacity and energy resources.
5. Assess offers and opportunities that can meet the utility's long-term resource requirements.
6. Perform screening, optimal generation expansion, and production cost modeling to compare various resource plans.
7. Develop an optimal resource plan addressing utility's specific needs. Optimization using Venlyx Strategist™.
8. Reporting.

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### Key Inputs to the Power Supply Study Process

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    graph TD
      FuelPrices[Fuel Prices] --> OptimizationModeling((Optimization Modeling))
      EnergyPrices[Energy Prices] --> OptimizationModeling
      EmissionPrices[Emission Prices] --> OptimizationModeling
      LoadForecast[Load Forecast And DSM] --> OptimizationModeling
      Economic[Economic] --> OptimizationModeling
      RegulatoryRequirements[Regulatory Requirements] --> OptimizationModeling
      PotentialResources[Potential Resources] --> OptimizationModeling
  
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## Load Forecast

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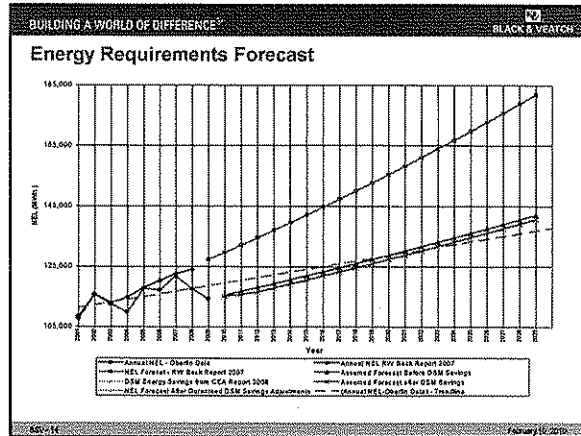
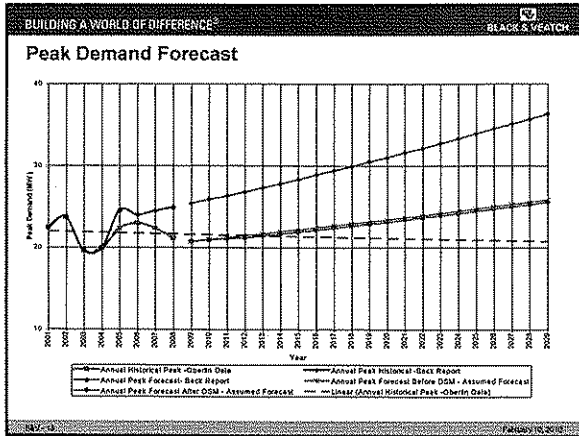
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### Load Forecast Evaluation and Update

- Evaluated the previous load forecast by RW Beck completed in 2006
- Prior forecast did not foresee recent mild summers and recession
- Evaluated historical demand and energy usage 2001 to 2008
- Adjusted starting point and growth rates in demand and energy forecasts
- Incorporated energy and peak savings from VEIC
- Developed new demand (MW) and energy (MWh) forecasts for the City
  - Resulting forecasts are much lower, with ~ 1.1% annual growth

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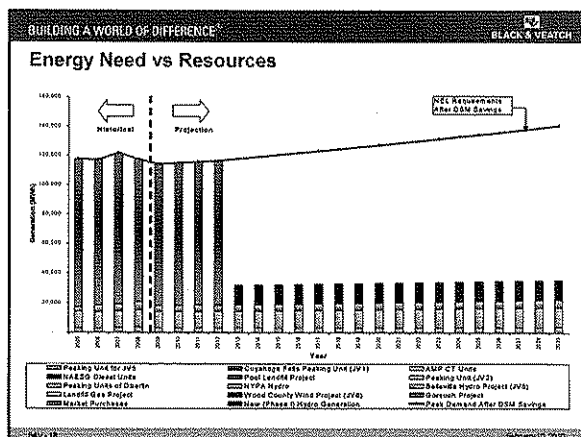
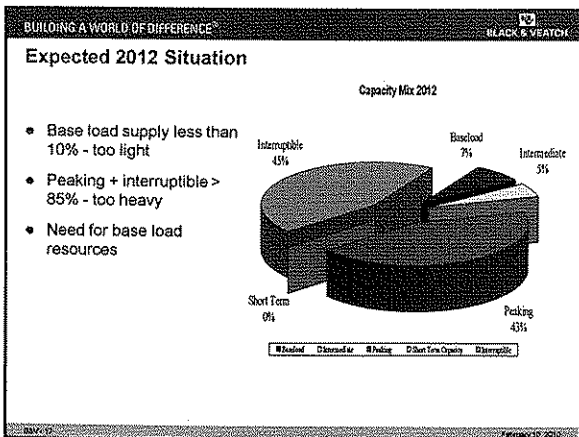
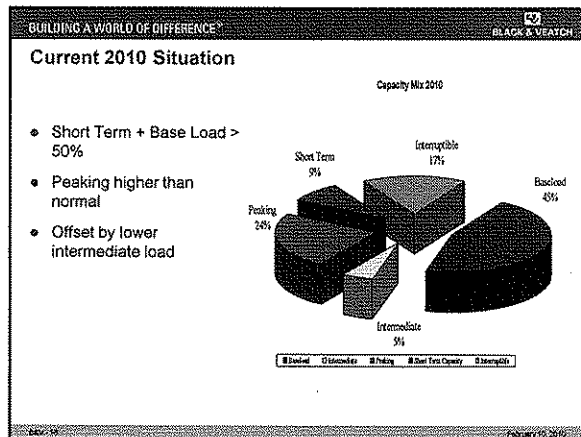


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### Next Step – Compare expected needs with current resources

- Developing the load forecast establishes the need now and in the future
- Necessary to evaluate current resources available
- Include planned future resources – hydro additions
- Document changes over time
- Keys for Oberlin – Planned retirement of Gorsuch capacity in 2012 and expiration of future purchases

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## Evaluation of Alternatives Available

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## Resources Available to Oberlin

- **Renewable Energy Alternatives**
  - Participation in New Hydroelectric
  - Direct Fired Biomass
  - Landfill Gas
  - Wind
  - Solar Photovoltaic
- **Conventional Alternatives**
  - Participation in natural gas 2x1 combined cycle
  - Participation in natural gas LM6000 simple cycle
  - Long term market purchases
- **Several Responses to Renewable Base Load Request for Proposal Process**

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## Screening Levelized Busbar Cost of Base Load Resources

Resource	Levelized \$/MWh
Biomass direct	~200
landfill gas	~100
hydro	~80
LFG	~50
combined cycle	~40

- Biomass typically higher cost unless burned in existing equipment
- Hydro has reasonable costs
- LFG has low cost
- Combined cycle have low cost but can be more volatile
- Also, combined cycle most dispatchable of these options

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## Screening Levelized Busbar Cost of Intermittent Resources

Resource	Levelized \$/MWh
wind	~10
solar PV residential	~40
solar PV commercial	~60
simple cycle	~80

- Wind lowest cost, but highly intermittent
- Wind also inversely correlated with energy needs
- Solar very high cost, but good correlation with peak energy needs
- Simple cycle most dispatchable of these options

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## Optimization Modeling - Strategist™

- Further analysis required to address limitations of screening analysis
- Capacity expansion optimization program to develop least cost expansion plans
- Evaluates an hourly profile over a typical week for every month during planning period
- After optimization, production costs determined
- Evaluation period of 2010 to 2030 to ensure long term solutions
- Resources selected to provide least cumulative present worth cost (CPWC)
- Included Fuel and CO2 price forecasts from EIA
- Multiple resource plans developed

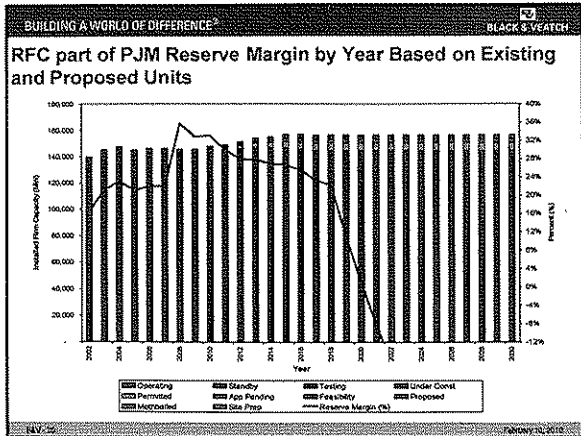
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## RFC part of MISO Reserve Margin by Year Based on Existing and Proposed Units

Year	Reserve Margin (%)
2005	~35
2006	~35
2007	~35
2008	~35
2009	~35
2010	~35
2011	~35
2012	~35
2013	~35
2014	~35
2015	~35
2016	~35
2017	~35
2018	~35
2019	~35
2020	~35
2021	~35
2022	~35
2023	~35
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2025	~35
2026	~35
2027	~35
2028	~35
2029	~35
2030	~35

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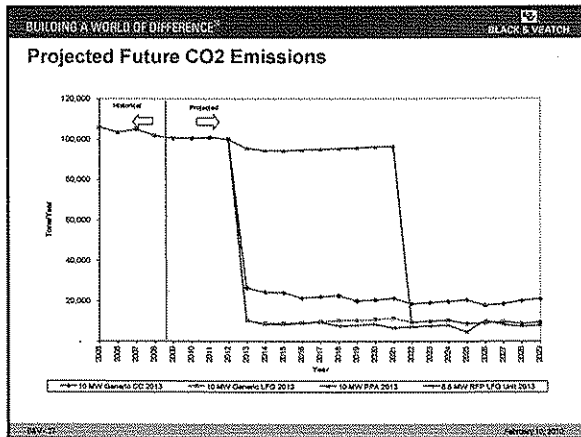
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### Comparison of Selected Plans

- LFG attractive for base load, CO2 neutral, competitive even with no CO2, included in many plans, but not dispatchable
- CC capacity attractive for intermediate, several MW included in all plans, and moderate CO2 profile, high dispatchability
- 10 MW PPA higher cost with CO2 taxes included (lowest cost without CO2), but high CO2 and not dispatchable (7x24 profile)
- 0.79 MW hydro less than 0.5% cost increase

Selected Case Results	CPWC Millions 2010\$	Levelized \$/MWh
8.8 MW LFG PPA response in 2012 with CO2 taxes	144.1	91.06
10 MW block of CC with CO2 taxes	154.5	97.44
10 MW PPA with CO2 taxes	156.6	98.87
10 MW PPA without CO2 taxes	135.3	85.37
8.8 MW LFG PPA response without CO2	140.3	88.70

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- ### Findings and Recommendations
- With retirement of Gorsuch, the City will have a large base load and intermediate load need in 2013
  - OMLPS should continue to pursue participation in new hydroelectric capacity
  - OMLPS should pursue negotiations and contracting with economically attractive land fill gas generators to fill in its base load need
  - To mitigate availability risk, OMLPS should consider diversifying LFG resources if possible, include penalties in contracts for availability and procure dispatchable resources (such as CC) to provide backup energy
  - OMLPS also has a need for dispatchable intermediate resources. OMLPS should consider and evaluate participation or purchase from combined cycle developments in the future
  - VEIC EE savings and load growth should be monitored (low forecast growth could require larger need if higher future growth rates occur)
  - Intermediate term market purchases should be considered if the above resources can not be obtained to provide reliable service
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## Questions

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