



**KING COUNTY**

1200 King County Courthouse  
516 Third Avenue  
Seattle, WA 98104

**Signature Report**

**April 15, 2008**

**Motion 12735**

**Proposed No.** 2008-0129.2

**Sponsors** Hague and Phillips

1                   A MOTION approving a report on the efforts of the  
2                   wastewater treatment division in the department of natural  
3                   resources and parks to reduce its power consumption at  
4                   existing facilities, negotiate more favorable terms with its  
5                   current energy suppliers, and identify a work plan and  
6                   schedule to ensure cogeneration of power at the West Point  
7                   Treatment Plant as required in a 2008 adopted budget  
8                   proviso.

9  
10                WHEREAS, King County desires to reduce costs of operating its wastewater  
11                treatment plants as low as possible, to minimize costs to ratepayers, and

12                WHEREAS, King County desires to reduce its power consumption at existing  
13                facilities to minimize costs and environmental impacts, and

14                WHEREAS, King County wishes to maximize turning waste products into  
15                resources as much as practically and economically feasible, and

16                WHEREAS, a proviso in the 2008 adopted budget requires approval by motion of  
17                a report addressing the wastewater treatment division's efforts to reduce power

18 consumption, promote better terms with current energy suppliers, and identify a schedule  
19 to ensure cogeneration of power at the West Point Treatment Plant;

20 NOW, THEREFORE, BE IT MOVED by the Council of King County:

21 1. The report addressing the wastewater treatment division's efforts to reduce  
22 power consumption, promote better terms with current energy suppliers, and identify a  
23 schedule to ensure cogeneration of power at the West Point Treatment Plant, in the form  
24 of Attachment A to this motion, is hereby approved.

25 2. The executive is requested to provide a status report by September 15, 2008,  
26 on the Waste-to Energy Project 423474, replacing the co-generation facility at the West

27 Point Treatment Plant, including the status of grant funding and efforts to market green  
28 energy credits and other factors affecting the lifecycle costs of the project.  
29

Motion 12735 was introduced on 3/10/2008 and passed as amended by the Metropolitan King County Council on 4/14/2008, by the following vote:

Yes: 8 - Ms. Patterson, Mr. Dunn, Mr. Constantine, Ms. Lambert, Mr. von Reichbauer, Mr. Ferguson, Mr. Gossett and Ms. Hague

No: 0

Excused: 1 - Mr. Phillips

KING COUNTY COUNCIL  
KING COUNTY, WASHINGTON



Julia Patterson, Chair

ATTEST:



Anne Noris, Clerk of the Council

**Attachments** A. Report on Efforts to Reduce Power Consumption, Terms with Energy Suppliers, and Plans to Implement Co-Generation at the West Point Treatment Plant--February 2008

**Report on Efforts to Reduce Power Consumption, Terms with Energy Suppliers, and Plans to Implement Co-Generation at the West Point Treatment Plant**  
**Wastewater Treatment Division**  
**King County Department of Natural Resources and Parks**  
February 2008

Purpose

This document provides the Wastewater Treatment Division's (WTD) response to the Proviso on the division's operating budget, which reads as follows:

*“Of this appropriation, \$300,000 shall not be expended or encumbered unless by March 1, 2008 the wastewater treatment division of the department of natural resources and parks, transmits to the council for review and approval by motion a report on (1) strategies to reduce its power consumption at existing facilities; (2) strategies and proposals for negotiating more favorable terms with its current energy suppliers; and (3) a work plan and schedule to ensure the cogeneration of power at the West Point Treatment Plant has completed the design function by December, 2008 and the construction of new facilities is completed by June, 2009.”*

Background

Taking steps to minimize the amount of energy used and the costs paid for power is important both from a financial and environmental standpoint. As reflected in the table below, a significant amount of electricity is needed to operate the division's treatment plants and other facilities. The division annually expends about \$9 million on electrical power.

**WTD Facilities, Electric Power Use and Co-Generation**

	Average Energy Demand, MWa (1)	Peak Energy Demand, MW (2)	Supplied through Co-Generation, MW (3,5)	Current Co-generation Capacity, MW (4,5)	Cost of Electrical Power (\$M)
East Section Off-Site Facilities	2.3	N/A	0	0	\$1.5
South Treatment Plant	6.8	16	0.5	2.2-2.7	\$3.6
West Section Off-Site Facilities	2.1	N/A	0	0	\$1.1
West Point Treatment Plant	6.0	13	0.1	0	\$2.4
Totals	17.2	N/A	0.6	2.2-2.7	\$8.6

- (1) Figures based on 2007 preliminary data. Energy use varies due to flow volumes and other factors.
- (2) Peak energy use reflects reduction from co-generated power.
- (3) South Plant power co-generation facilities mainly used to offset peak power and generate natural gas.
- (4) Maximum capacity at South Plant using available digester gas (varies summer-winter).
- (5) West Point co-generation facilities retired in April 2007

Several points must be noted at the outset of any discussion of the division's power consumption practices. First, the division's use of electrical power will be shaped by countywide energy policies and planning efforts in place or underway. This includes the 2006 Executive Order calling for 50 percent of King County's non-transit energy use to come from renewable sources by 2012, other policies and recommendations contained in the Public Review Draft of the King County Comprehensive Plan, and the ongoing development and implementation of the countywide energy plan. Overall, these call for improvements in energy efficiency and conservation, increased use of renewable energy sources, and conversion of waste to energy. The division will adhere to and coordinate with these efforts. Second, it is important to note that the division has undertaken many efforts in the past to reduce electrical power needs and secure low and stable rates for power purchased and will build on this experience in the future. As will be described below, the division is developing a WTD-specific energy plan, consistent with the overall county energy plan, and hiring staff to assist in the implementation of energy savings and waste to energy programs.

The remainder of this document addresses the three elements of the proviso in turn.

(1) Strategies to Reduce Power Consumption at Existing Facilities

Historically, the division has focused many efforts on reducing energy consumption at its wastewater treatment facilities because these facilities are very energy intensive. These include both efforts to promote efficiency as well as generating power on-site using methane digester gas produced from the wastewater treatment process. Conservation efforts have increased in recent years, motivated by the 2000 energy crisis and as part of ongoing efforts to implement cost saving measures associated with the division's Productivity Initiative. Examples of recent efforts to reduce energy at existing facilities include:

- Implementing a variety of electricity conservation projects at individual facilities, often in conjunction with energy suppliers (Seattle City Light (SCL) and Puget Sound Energy (PSE)). For example, since 2001 energy suppliers paid about half the costs of implementing measures that resulted in annual savings of over 16 million kilowatt-hours (kwh), representing approximately \$1 million dollars per year. Projects have included a variety of technical improvements such as lighting, compressors, and building climate control systems. The division will continue to seek opportunities to partner with suppliers in implementing conservation measures.
- Installation of facilities to allow for strategic use of digester gas at the South Treatment Plant. These have included a fuel cell demonstration project, an ongoing digester gas cleanup system, co-generation equipment including gas and steam-fired turbines and a boiler that helps meet the plant's heating needs. This range of equipment allows flexible options for application of the digester gas to minimize operating costs. Depending on current gas and electricity prices and usage needs, the division can choose to scrub digester gas and sell it back to PSE or use the scrubbed gas on-site to generate electricity, reducing plant electrical needs and peak power prices. Potentially, the division could even sell electricity back to PSE during periods of peak demand or emergency for the utility. The division will continue to manage these facilities in the most cost-effective way.

In addition, as will be described in part 3 of this proviso response, the division has been systematically pursuing a project to replace co-generation facilities at the West Point Treatment Plant. West Point continues to use digester gas to run boilers that provide heat to the plant and to run the raw sewage pumps, but the co-generation facilities at West Point were retired this past year as the equipment had ended its useful life of over 20 years. The division also is promoting energy efficiency in its design and construction of the Brightwater Treatment Plant, such as using digester gas boilers to generate heat for the plant.

While much has been done to reduce power needs, the division recognizes that more reductions are needed to meet county goals and further reduce costs. But additional reductions will require deliberate, concentrated attention. The specific steps the division is taking to do this include:

- Developing and implementing a *division-wide energy plan*, consistent with the countywide energy plan. The division's management team has identified this as a priority for 2008. At a minimum, the division-wide plan will include:
  - The clarification of division energy policies;
  - The development of standards to monitor and measure energy use and evaluate green energy alternatives;
  - The charter, roles and responsibilities for an energy advisory group;
  - The review and documentation of existing system energy requirements and re-use opportunities;
  - An assessment of current and future energy demand and production capability, including benchmarks by which to measure progress;
  - The development of options for energy production and acquisition; and
  - The outline of a long range implementation plan, schedule, and budget.
- Hiring a *full time energy program manager*. The lack of staff fully dedicated to energy conservation and management has consistently been identified as a barrier to identifying and implementing additional energy reductions. This FTE will lead the development of a division energy plan; analyze data and operational processes to identify efficiency improvements; evaluate, recommend, prioritize, and otherwise assist in implementing energy efficiency projects; and work with staff to motivate them to incorporate energy efficiency improvements into everyday business practices.
- Creating a single *division-wide energy team*, charged with developing and implementing the energy plan over time. The team, led by the energy program manager, will ensure that energy reduction efforts are identified, thoroughly evaluated, and carried out.

Together with other DNRP divisions, the wastewater treatment division will be participating in the development and implementation of the countywide energy plan, which will help identify strategies to achieve effective county energy policies.

## (2) Strategies for Negotiating More Favorable Terms with Current Energy Suppliers

The two utilities that currently supply power to the division's facilities are Puget Sound Energy (primarily South Plant and offsite facilities outside of Seattle) and Seattle City Light (West Point

and offsite facilities in Seattle). In general, there are limited opportunities for the division to negotiate rates with current energy suppliers. The division is on fixed public rate schedules (tariffs) with each of these suppliers and rates for a facility are typically set based on a customer's size and peak power demand. Rates paid to PSE are set by the Washington Utilities and Transportation Commission (WUTC), while rates paid to SCL are set by the Seattle City Council. These tariffs are periodically adjusted through ordinances by the Seattle City Council (for SCL) or petitions by the WUTC (for PSE).

The decision to be on fixed, regulated rate schedules provides the division with electricity price stability, as opposed to market-based or special unilateral contracted rates. The importance of protecting ratepayers from dramatic price fluctuations became apparent during the 2001 energy crisis. At that time, the division was on a wholesale market-based rate schedule for electricity and incurred substantial unanticipated costs due to extreme price spikes that occurred in the wholesale energy markets. Energy rates have stabilized since then, and it does not appear that the division could secure substantially lower rates from any available alternate arrangement without taking on increased risks. Because it is such a large user, the rates the division pays for electricity are relatively low. It is also not feasible for the division to seek an alternate energy supplier, given that the electricity market is still highly regulated in the state, and that the division would still need to negotiate transmission of electricity through SCL or PSE.

However, in the future it is possible that the division may be able to work with its suppliers to reduce its expenditures on electrical power. For example, the division will investigate additional opportunities to employ its co-generation capabilities that exist at South Plant and those that are planned for West Point. The flexibility provided by co-generation facilities may provide some room to negotiate better terms with power suppliers – for example, there may be financial benefits from using cogeneration facilities to maximize generation of electric power when the utilities are experiencing high demand. These benefits may accrue to both King County and its power suppliers, providing some incentive to negotiate. The division may also be able to derive financial benefits by generating renewable energy credits (REC) for greenhouse gas offsets derived from co-generated power in the future, depending on how the REC market develops. While this proviso focuses on existing facilities, the division is actively negotiating with the Snohomish County Public Utility District to secure favorable terms for the Brightwater Treatment Plant.

In sum, given the current state of the market and the desire for price stability, the division does not anticipate seeking dramatic changes in the terms it has with current energy suppliers. In general, before pursuing strategies to negotiate changes in its rate schedules, the division will focus on developing and implementing its energy plan to reduce consumption. It will thoroughly review the opportunities from participating in any market for green credits and proceed with its co-generation project at West Point. It will continue to manage its existing facilities in a manner that takes advantage of market conditions to meet its power needs in the most cost effective way.

### (3) Plan and Schedule to Ensure Energy Co-generation at West Point Treatment Plant

The co-generation facility at West Point was taken off-line in the spring of 2007, as the equipment had reached the end of its useful life. In addition, the equipment needed to be

removed in order to install updated digester heating systems and to install new engines for cogeneration. The division is implementing a capital project (Waste-to-Energy Project 423474) to replace the co-generation facility so that digester gas can again be used to generate electricity at the plant to offset a portion of annual electricity purchases. The budget proviso calls for the division to provide a schedule to ensure energy co-generation at West Point Treatment Plant completes the design function by December of 2008 and construction by June 2009. However, to maximize the project's cost-effectiveness the division is pursuing an alternate schedule, as described below.

The division's schedule is driven by the need to ensure that the project is cost-effective and takes full advantage of any external funding opportunities. The division believes this project is a priority as it would promote turning waste to resources – but it is keenly aware of the need to expend financial resources wisely for maximum ratepayer benefits. Key events and concerns that have prompted division management to monitor the project closely and led to the division's current schedule include:

- Initial cost concerns. The Waste-to-Energy project originated with a previous project, the West Point Treatment Plant Cogeneration Upgrade that was designed to replace the outdated power generation facility at West Point. That project received construction bids during the summer of 2006 and construction was planned to take place during 2007 and 2008. However, the construction contract only received a single bid, and the bid amount greatly exceeded the engineer's estimate and the project budget, raising concerns about the project's economic viability. Concern about the high cost prompted division management to call for an independent project evaluation to determine whether better or less expensive options exist for converting digester gas to energy at West Point.
- Project Team evaluation. In 2007, a team including the engineering firm CDM, Inc. evaluated waste-to-energy options at West Point, and their analysis indicated that:
  - Use of internal combustion engines, as planned in the proposed 2006 project, is the most cost-effective and reliable approach to converting digester gas to energy at West Point;
  - Only a modest amount of savings can be attained in a redesigned the project; and
  - The division should seek external funding partners, most notably Environmental Protection Agency (EPA), to reduce project costs and make the project more economically viable before making any decisions on how to move forward.
- Ongoing cost concerns and mitigation strategies. The 2008 budget projects capital project costs of approximately \$35 million. The division is currently in the process of securing EPA funding for the project, which could reduce the capital cost to about \$27 million. The outcome of the grant application process, which requires a National Environmental Policy Act (NEPA) environmental review and preparation of an updated facilities plan for West Point, will not to be known until the summer of 2008. The division believes it prudent to secure the grant before pursuing contracts for design refinements and construction. Concurrent with the grant application, the division is addressing technical issues relating to co-generation, and investigating whether the project's benefits could be enhanced by marketing green energy credits. Division

management will move forward as appropriate following the outcome of the grant process, and final analysis of the project.

The division anticipates that the project will demonstrate reasonable lifecycle costs if the grant and energy credits are taken into account. However, the project will have clear benefits in terms of assisting the county to achieve its goal of a 50 percent use of renewable energy sources by 2012, as well as substantially reducing the need to flare methane gas. Co-generating electric power will also mitigate against any possibility of substantial future increases in energy prices.

- Proposed schedule. Given the background described above, the current schedule for implementation is:
  - January - July 2008: Secure EPA grant, (receipt of up to \$8 million of funding is possible), conduct NEPA review, and address technical issues relating to co-generation design.
  - July 2008 – May 2009: Revise design and prepare new bid documents as appropriate following results of the grant process. The division does not believe design will be completed by December of 2008 – but could brief the Council on the likely design and status of the project at that time.
  - May – December 2009: Solicit bids and award the construction contract.
  - January 2010 – December 2011: Construct and commission the project.

The division recognizes that this schedule differs from that identified in the council proviso. While it shares the council's desire to implement co-generation at West Point, the longer schedule is driven by the need to ensure that the project provides net financial and environmental benefits to ratepayers by obtaining the EPA grant funding.

### Summary

As this report has indicated, the division is taking several steps to reduce power use at existing facilities. It is in the process of hiring an energy manager, developing a division-wide energy plan, and assembling an energy team. This team will develop energy policies, identify and implement more "on the ground" projects to reduce energy, assess current and future demand, identify a plan to meet these needs, and develop standards by which to evaluate projects and monitor progress. While the division currently enjoys low and stable rates from its energy suppliers through its fixed rate schedules, it will continue to monitor the market and explore ways to improve on these terms in the future. The division is proceeding with the West Point co-generation project on a schedule that ensures the project provides maximum economic benefits to ratepayers.