


T&E COMMITTEE #5
July 21, 2014

Discussion

M E M O R A N D U M

July 17, 2014

TO: Transportation, Infrastructure, Energy and Environment Committee

FROM:  Keith Levchenko, Senior Legislative Analyst

SUBJECT: **Discussion: WSSC's Power Reliability Study and Energy Conservation/
Renewable Energy Initiatives**

Rob Taylor, Energy Manager for WSSC, will provide a presentation (slides attached on ©1-22) on WSSC's Power Reliability Study and various energy conservation/renewable energy initiatives. JC Langley, Acting Chief of Production, and Chris Cullinan, Acting Chief Financial Officer, will be available to answer questions.

Background

During the review of the WSSC budget this past spring, the T&E Committee requested an update from WSSC on its power reliability study and on various other energy-related initiatives.

A major concern of the Council is the impact a large-scale electric power outage could have on the County when combined with a loss of key WSSC infrastructure (most notably the Potomac Water Filtration Plant, but also water pumping stations, sewage treatment facilities, and others) which are heavily reliant on electricity. At a Committee meeting on this topic last September, Councilmember Berliner, citing the Food and Drug Administration's success utilizing a microgrid¹ at its White Oak headquarters, also suggested that WSSC consider the feasibility of creating a "microgrid" for the Potomac Water Filtration Plant.

WSSC has been engaged in a comprehensive analysis of its emergency power capabilities and reliability for both its water treatment and distribution system and its wastewater treatment and collection system. There is an ongoing project in the WSSC CIP (\$4.8 million total project cost in the FY15-20 CIP), with almost all of the funds assumed to be spent by the end of the

¹ A microgrid is an independent power grid which balances energy generation and consumption. Energy generation can involve clean power (such as solar and wind) and/or brown power such as diesel generators.

recently concluded fiscal year (FY14). A consultant report for the power reliability study was completed in June 2013 by Greeley and Hansen; and Shah and Associates, Inc.

WSSC has assessed the report recommendations and is in the process of incorporating the recommendations into its upcoming FY16-21 CIP.

WSSC also has a number of other ongoing energy conservation-related initiatives underway or being studied. WSSC can update the Committee on these items as well.

Discussion

For the Committee discussion, Council Staff has asked WSSC to brief the Committee on the following items:

- 1) The findings and recommendations of the reliability study and the timing and budgetary impacts going forward.
- 2) How these improvements will improve reliability, both on a day-to-day basis and during emergency events such as widespread electric power outages.

The T&E and Public Safety Committees held a joint meeting on September 9, 2013 regarding WSSC emergency preparedness (including the continued vulnerability of WSSC facilities such as the Potomac Water Treatment Plant to electrical outages).

- 3) The potential for microgrids at some WSSC facilities such as the Potomac Water Filtration Plant.
- 4) WSSC's energy conservation efforts (such as its ongoing energy performance contracting work).

WSSC's presentation notes that since 2002, WSSC has developed and managed \$35 million in energy performance contracts, resulting in \$4 million per year in energy savings. A new \$20 million energy performance contract is projected to save an additional \$2 million per year in energy costs.

- 5) WSSC's clean energy efforts (both wind power purchases and its solar PV and other on-site generation efforts).

Since 2008, WSSC has been purchasing wind power directly from a supplier in southwestern Pennsylvania. This purchase equates to approximately 1/3 of WSSC's total electricity consumption. WSSC is paying a fixed price for 85 percent of the wind farm's output.

Last year, WSSC had ground-mounted solar arrays installed at its Western Branch and Seneca Wastewater Treatment Plants (each 2 megawatts in size involving approximately 8,500 panels at each site). These installations are expected to provide

about 17 percent of the power needs for these facilities. Washington Gas Energy Services owns and operates these systems through a power purchase agreement with WSSC that is expected to save WSSC ratepayers about \$3.5 million over the next 20 years.

6) WSSC's long-term Greenhouse Gas (GHG) Reduction Plan.

WSSC's Greenhouse Gas Reduction Plan is available for download on its website at: <http://www.wsscwater.com/home/jsp/content/green-energy.faces>.

As noted in the Plan, consistent with the State of Maryland, Montgomery County and the Metropolitan Washington Council of Governments, WSSC has adopted a GHG emission reduction goal to achieve a 10 percent reduction in emissions every 5 years through 2050, for a total reduction of 80 percent below the baseline year of 2005.

WSSC has developed a 20-year plan of action which outlines strategies to reduce future GHG emissions at WSSC by 10 percent every 5 years through the year 2030 using demonstrated technologies and practices available at the present time.

Attachments

F:\Levchenko\WSSC\Issues\Energy Performance Program\T&E Discussion 7 21 2014.docx

Presentation To Montgomery County Council - T&E Committee, 7/21/14

Agenda

- Power Reliability Study
- Energy Conservation
- Renewable Energy
- Greenhouse Gas Action (Reduction) Plan

Power Reliability Study

- Included evaluation of power reliability and arc flash exposure at all major WSSC sites.
- Recommended switchgear modifications at many WSSC sites (for arc flash protection).
- Recommended backup generation at Piscataway WWTP and Potomac WFP.
- WSSC accepted recommendation for Piscataway backup generation; however not needed if AD/CHP project proceeds.
- Potomac backup generation project was rejected by WSSC.

Microgrid- Potomac

- Would include gas fired on-site generation for base load.
- Could include some solar PV generation.
- Would maintain Pepco distribution network as backup and for peak loads.
- New gas supply line would need to be constructed by Washington Gas.
- Concept could be economical and is worthy of further investigation.

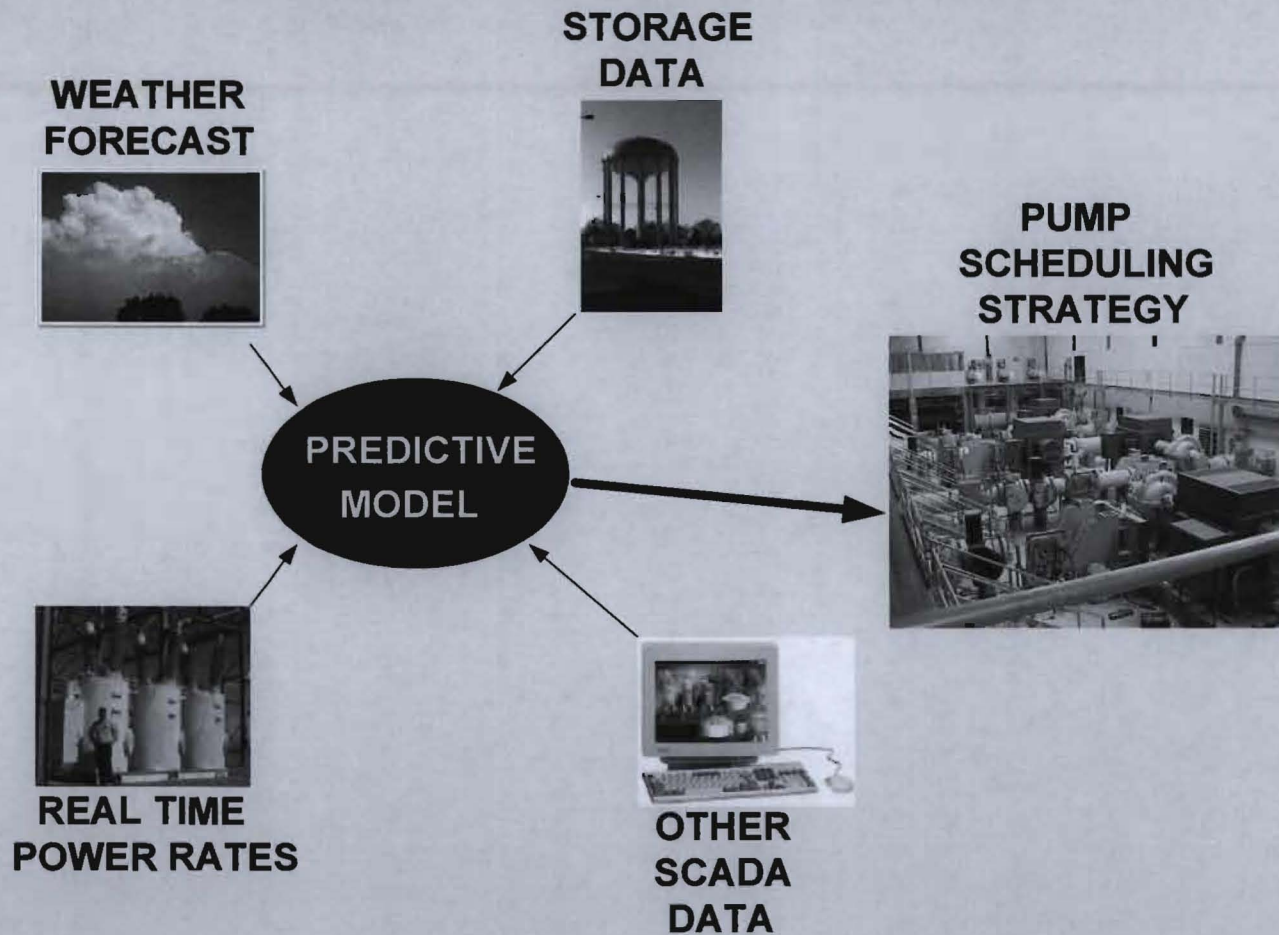
Energy Conservation – Energy Performance Contracts

- Since 2002, WSSC has developed and managed \$35 million in energy performance contracts, resulting in \$4 million/yr. in energy savings.
- A new \$20 million energy performance contract (currently in audit phase) is projected to save an additional \$2 million/yr. in energy costs.

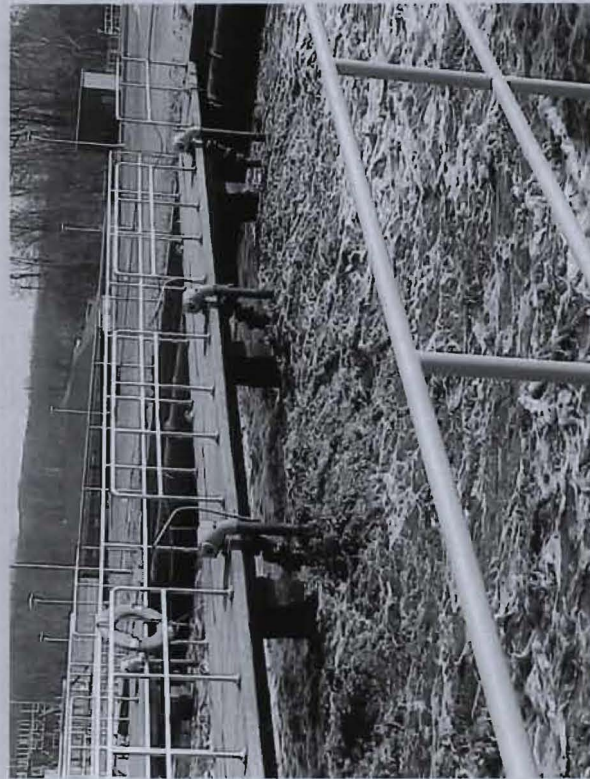
Energy Conservation Measures

- Energy Optimization for water distribution system.
- Fine Bubble Diffuser systems for WWTP.
- New (smaller) aeration blowers for WWTP.
- New (smaller) pumps for WWPS.
- Raw Water Pump Replacements.
- Peak Shaving Engine Generators.
- Variable Frequency Drives on Pump Motors.
- In-Pipe Electric Generation.

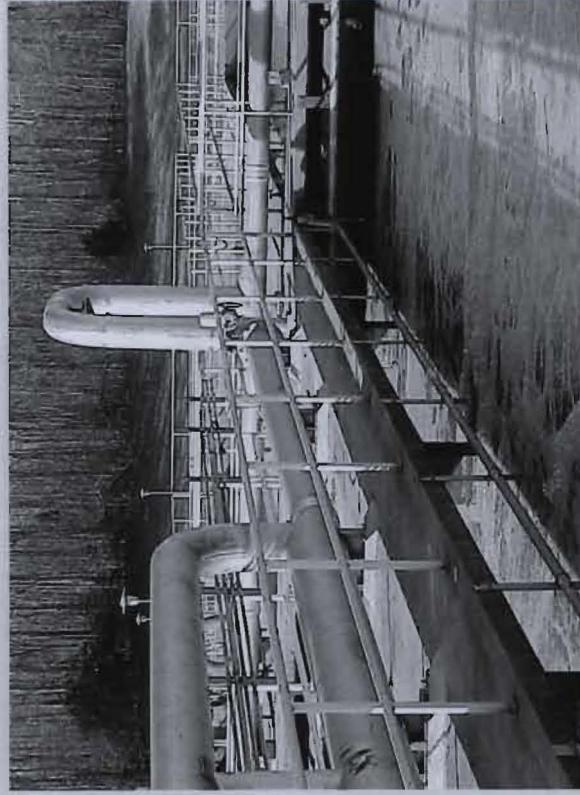
Aquadapt



Western Branch WWTP – Fine Bubble Diffusers



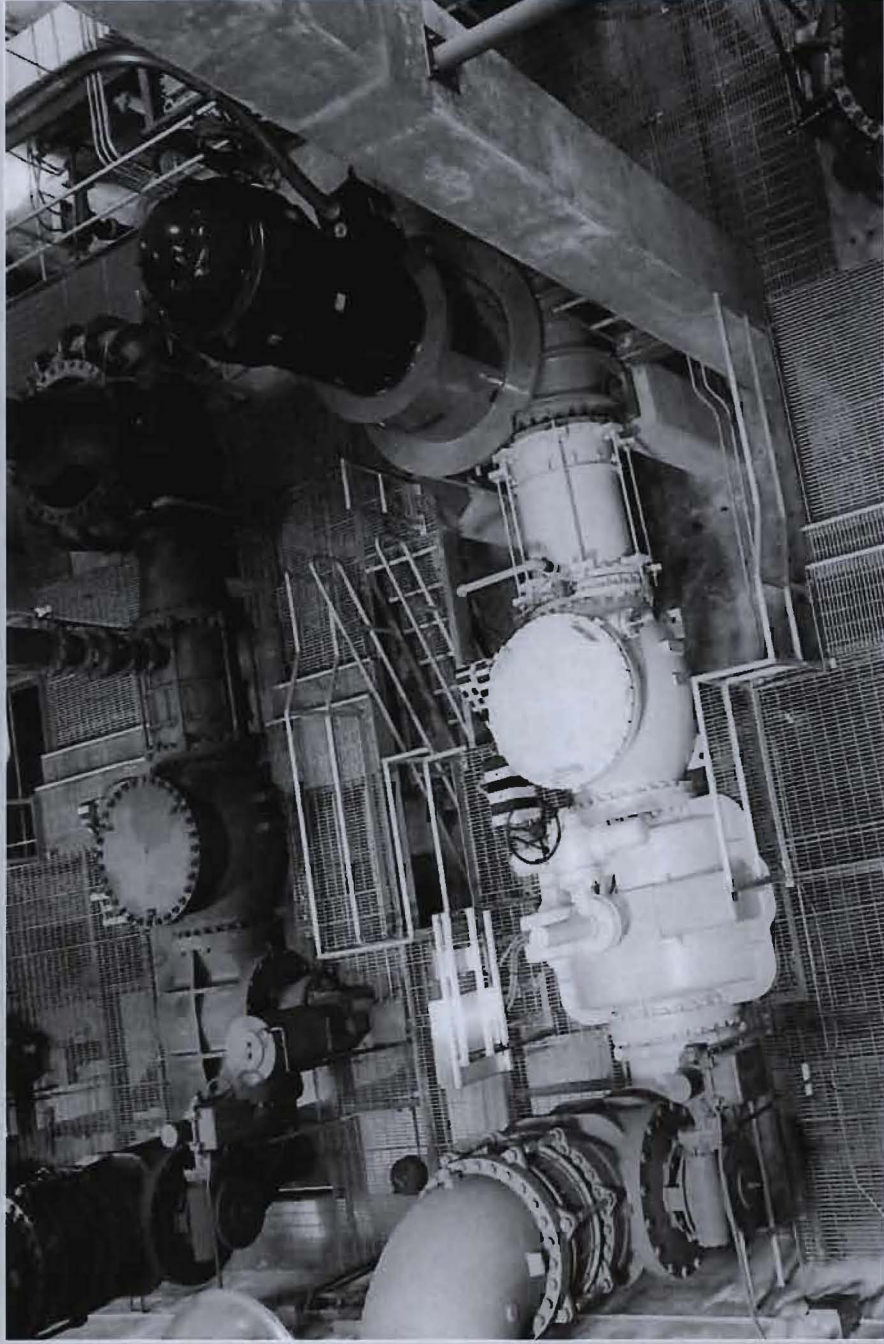
Coarse Bubble- Before



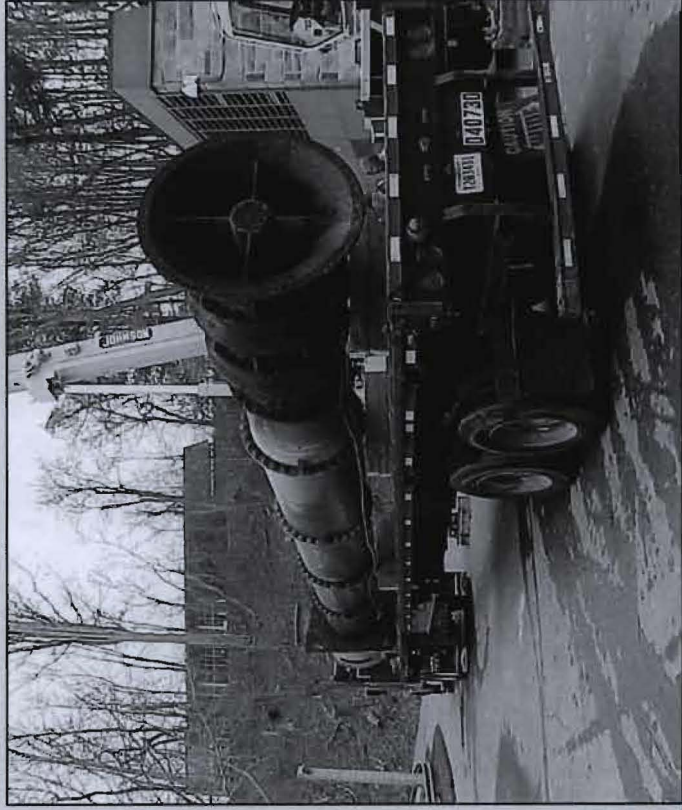
Fine Bubble & Piping- After

Anacostia II WWPS- Completed System

(1) motor, pump, check valve, throttling valve



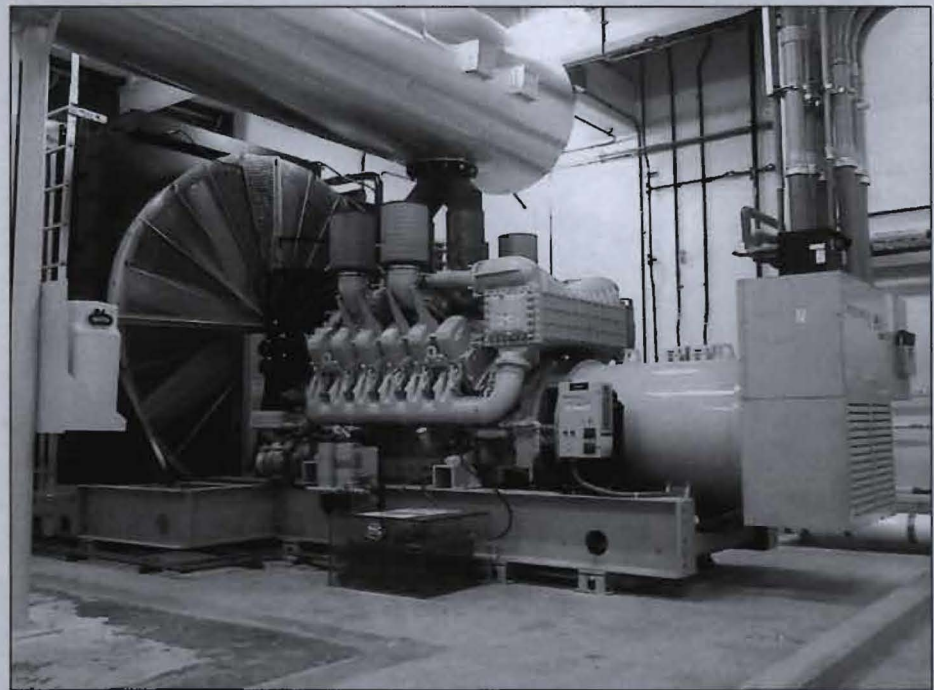
Raw Water Pump Replacements



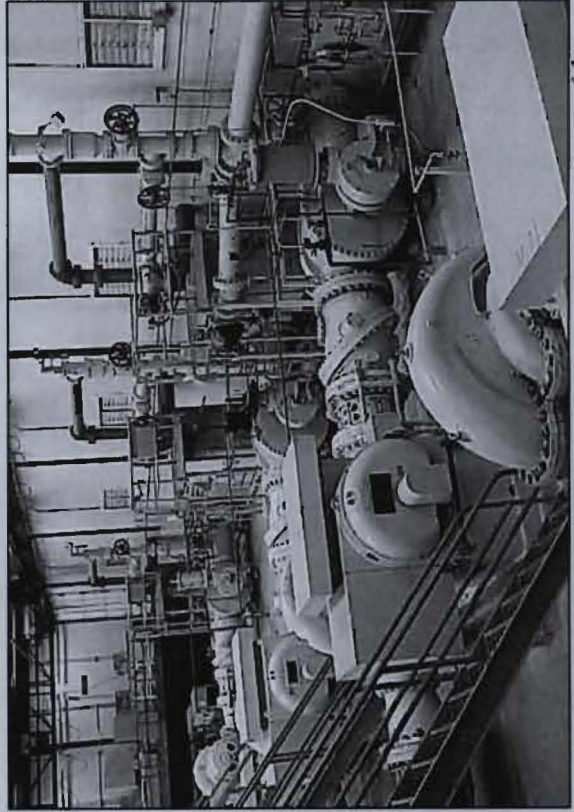
Potomac WFP

Peak Shaving – Engine Generators

- Reduce load (capacity) reduction during high demand periods or grid emergencies.
- Provide electrical backup power in event of a utility outage.



Peak Shaving - Potomac

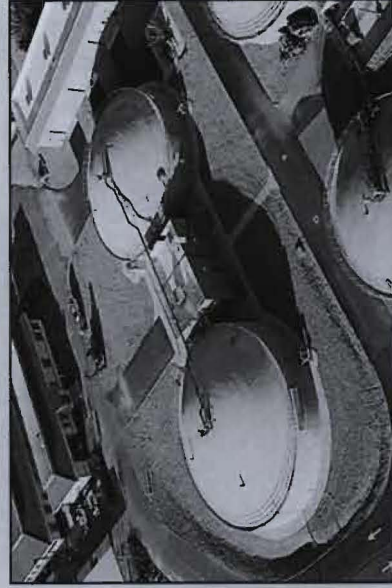
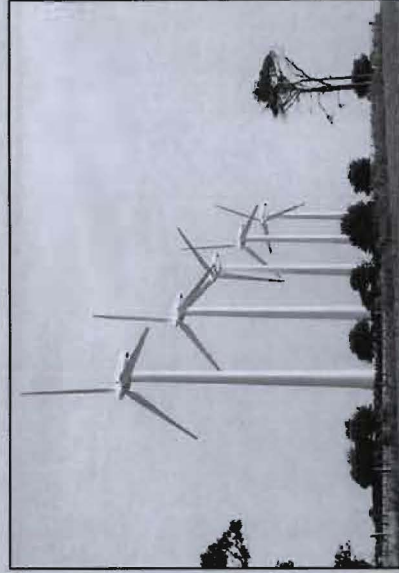


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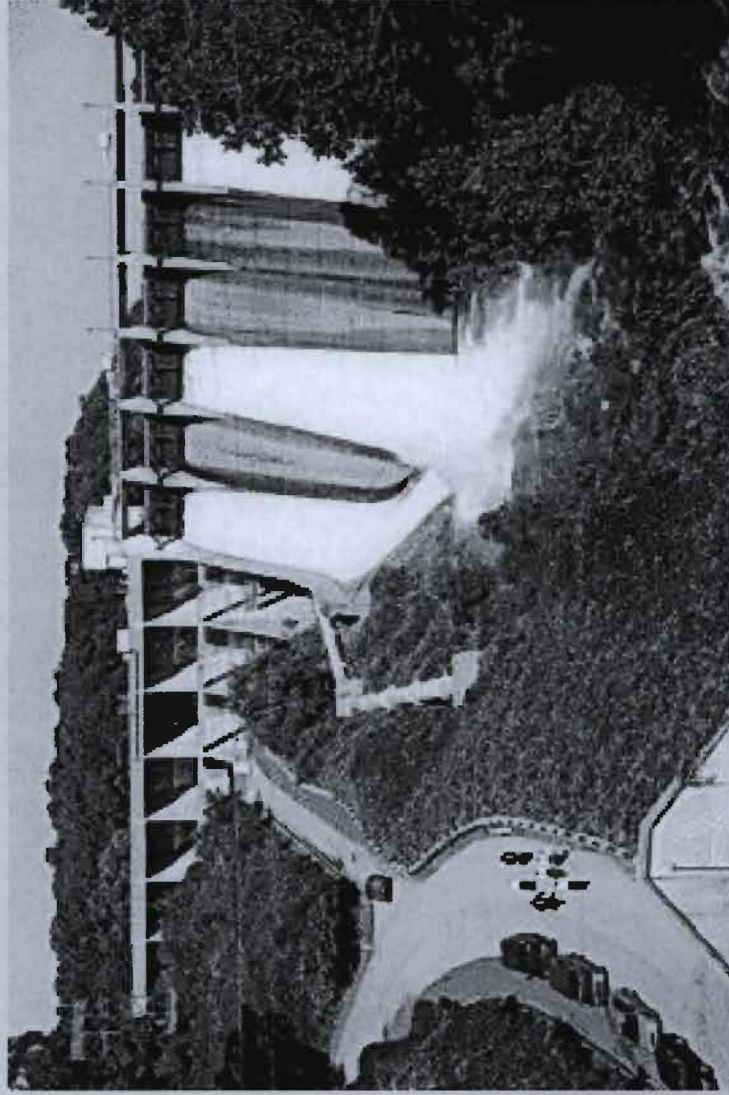
Renewable Energy

- Hydro
- Wind
- Solar
- Biomass

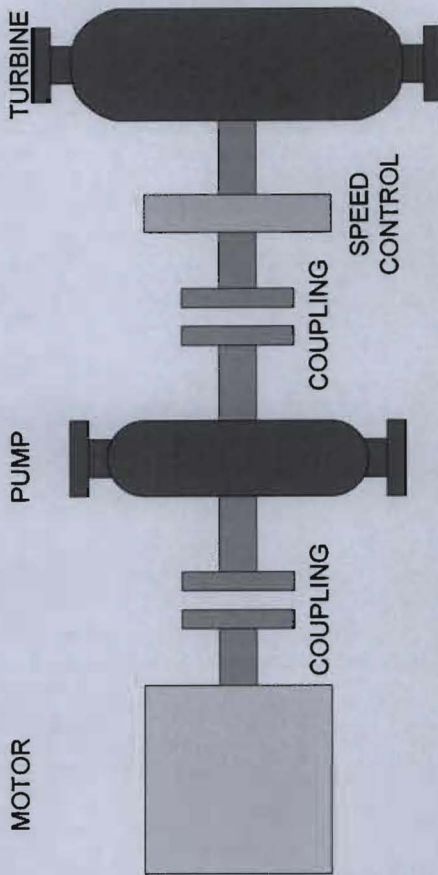
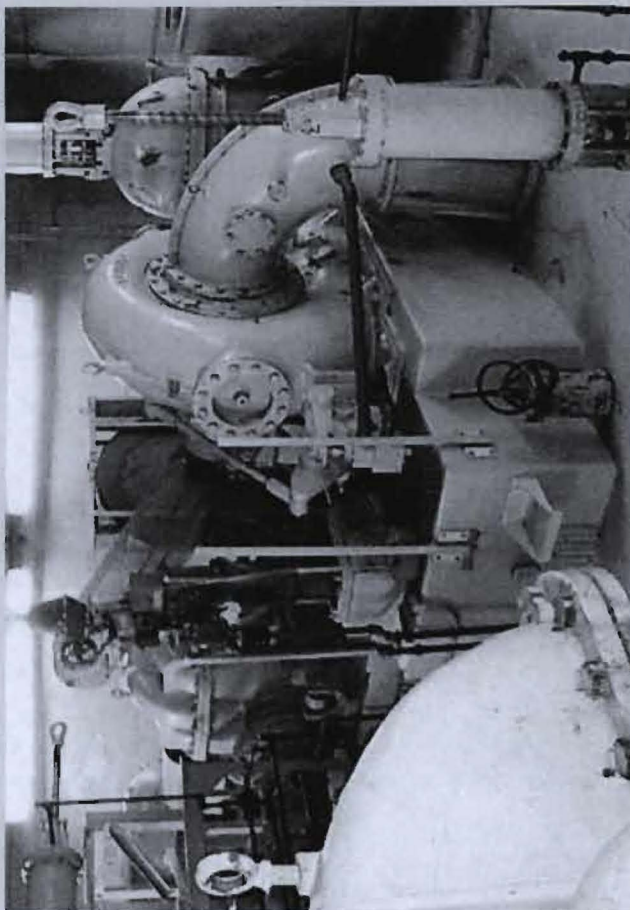


Hydro

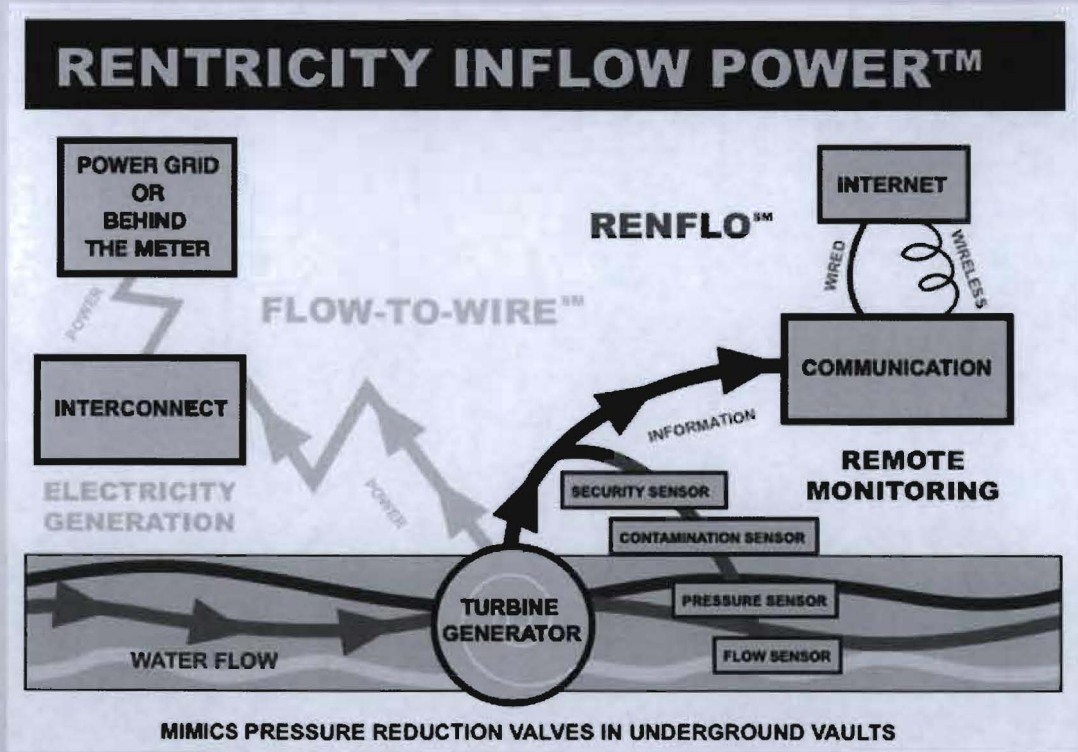
Turbines



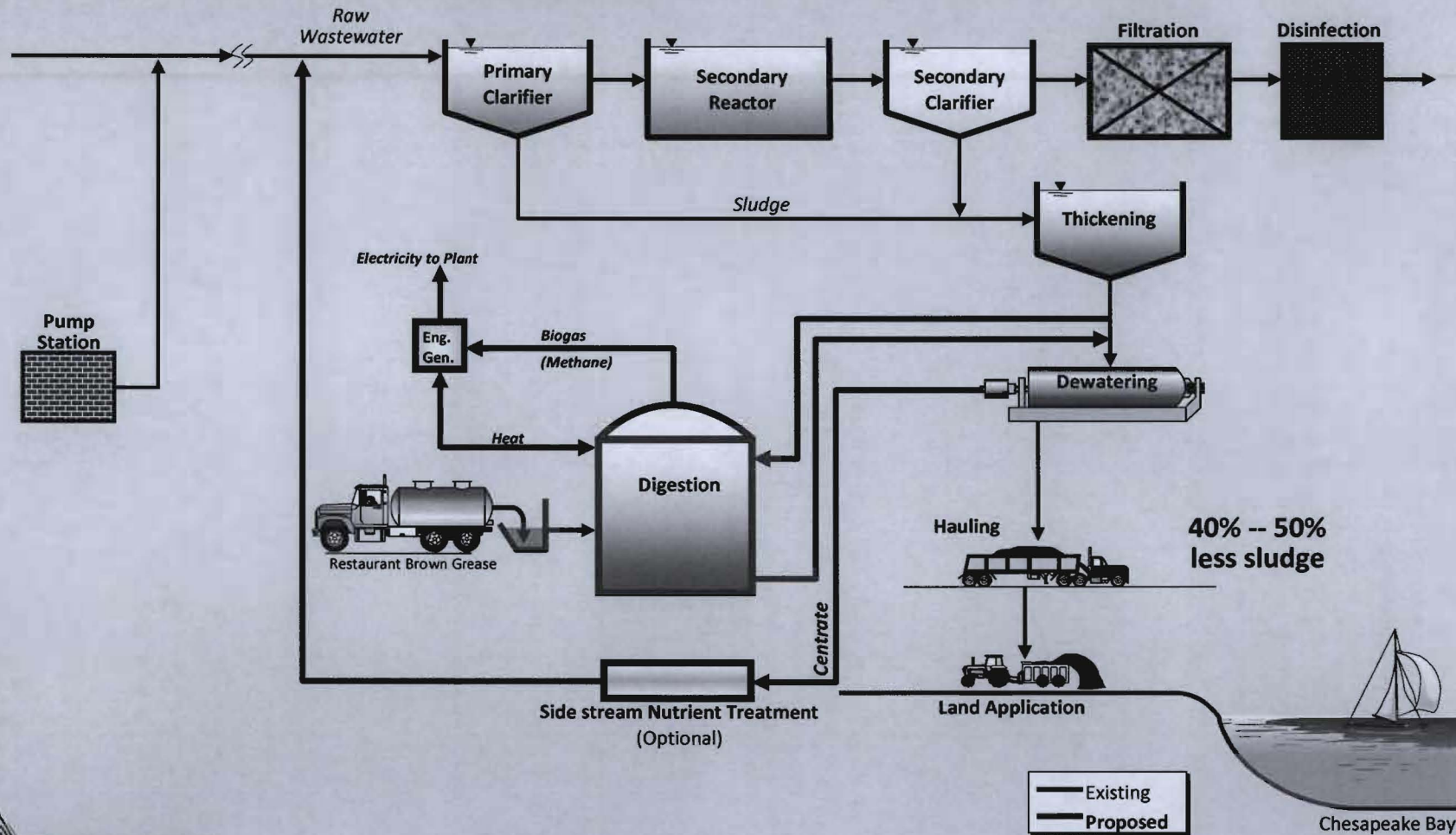
Turbines



In- Pipe Electric Generation



Wastewater Treatment Plant Modified for Anaerobic Digestion & Combined Heat & Power Generation

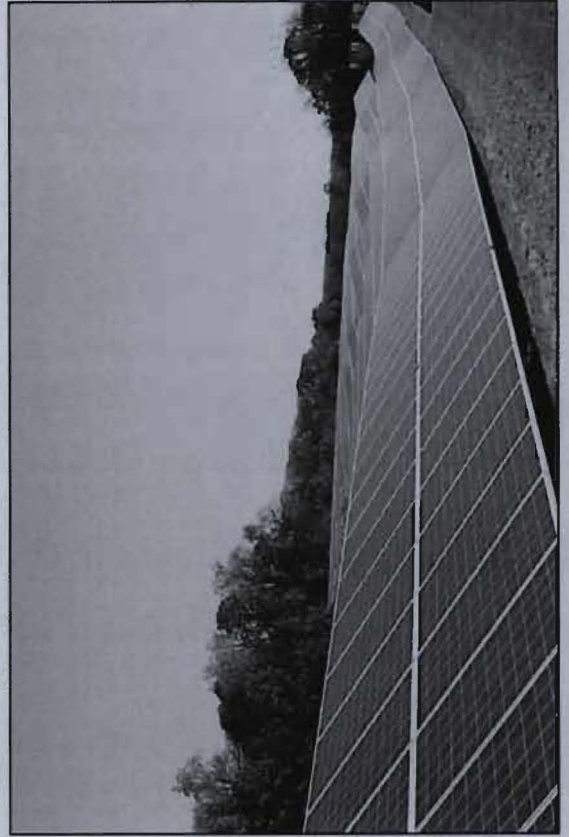
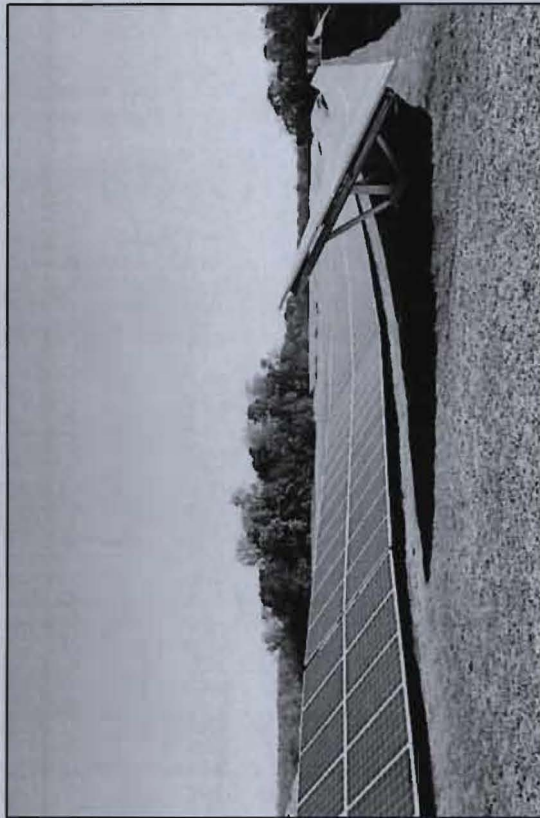


Solar Array - Seneca WWTP (2 MW)



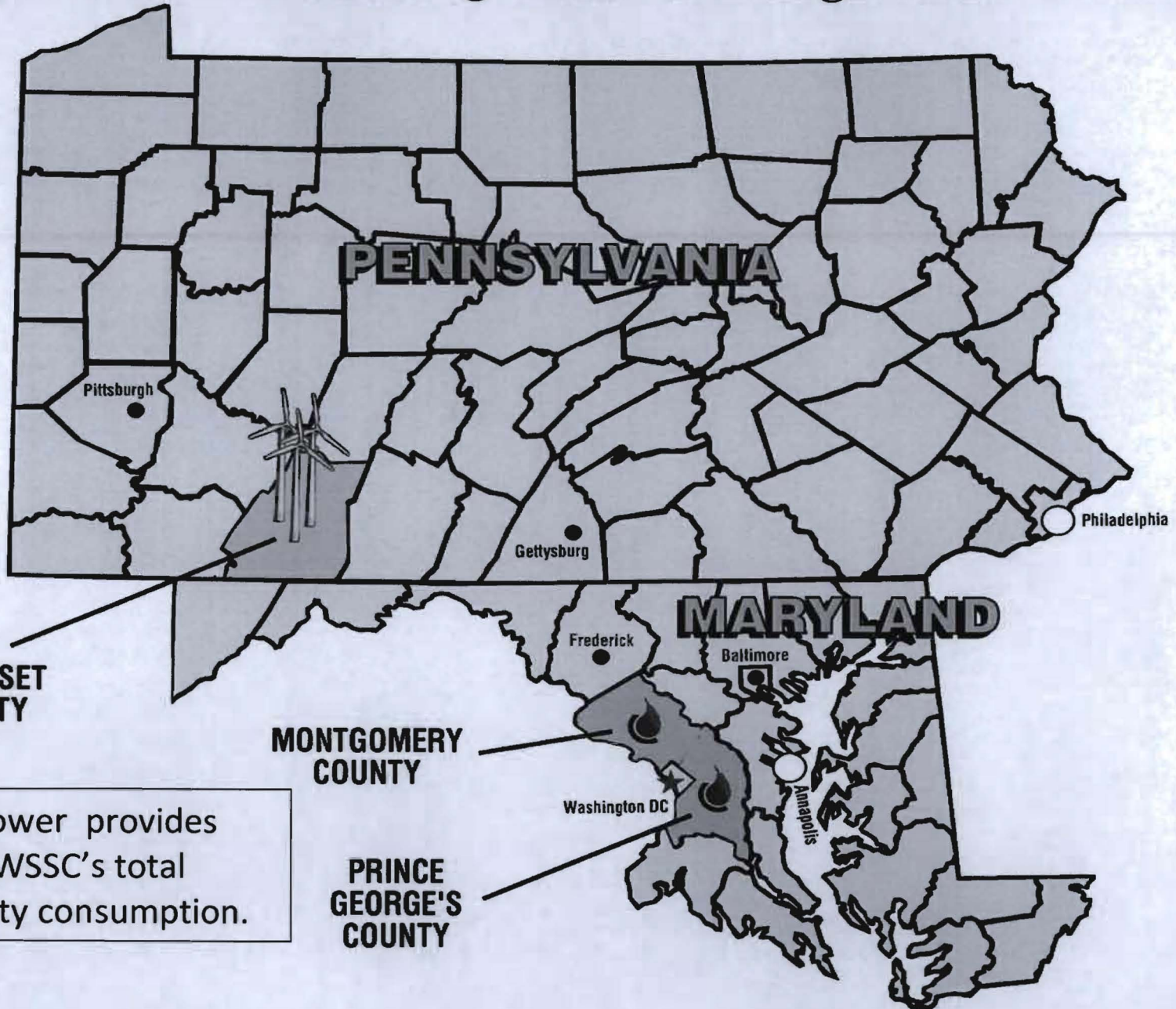
Solar Array – Western Branch WWTP (2 MW)

Solar Energy at Western Branch
and Seneca provides 6% of
WSSC's electricity consumption



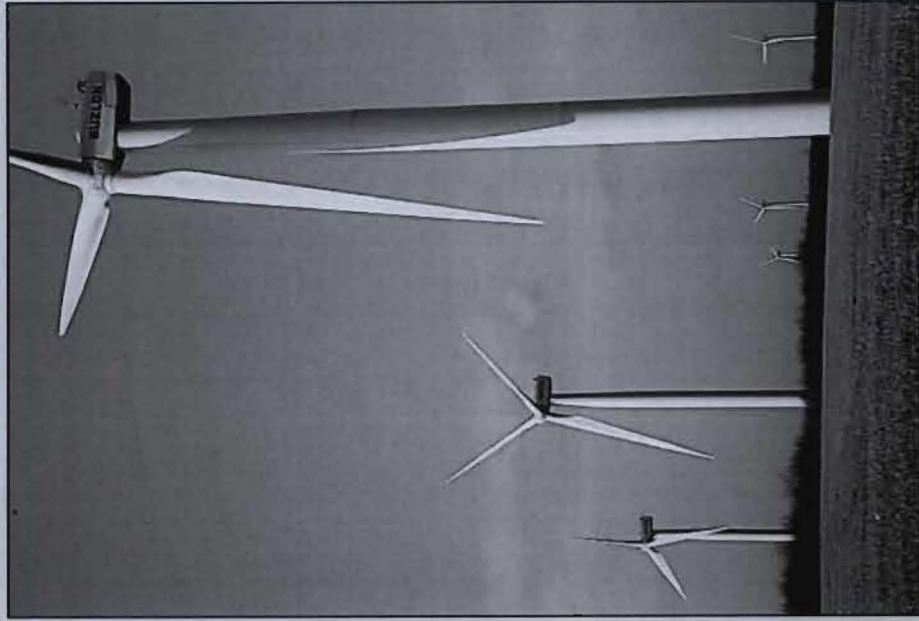
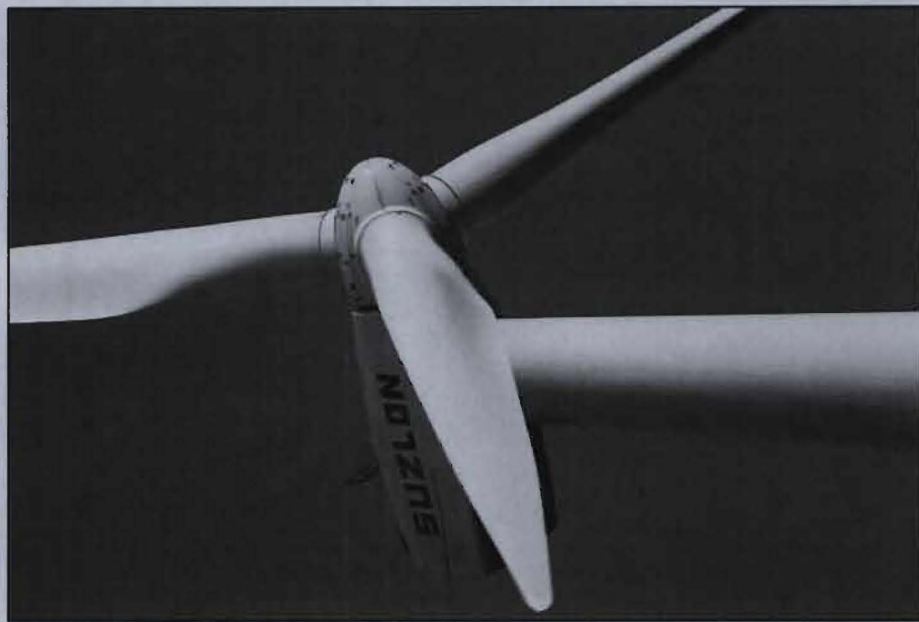


WSSC: *Producing Water Through Wind Power*



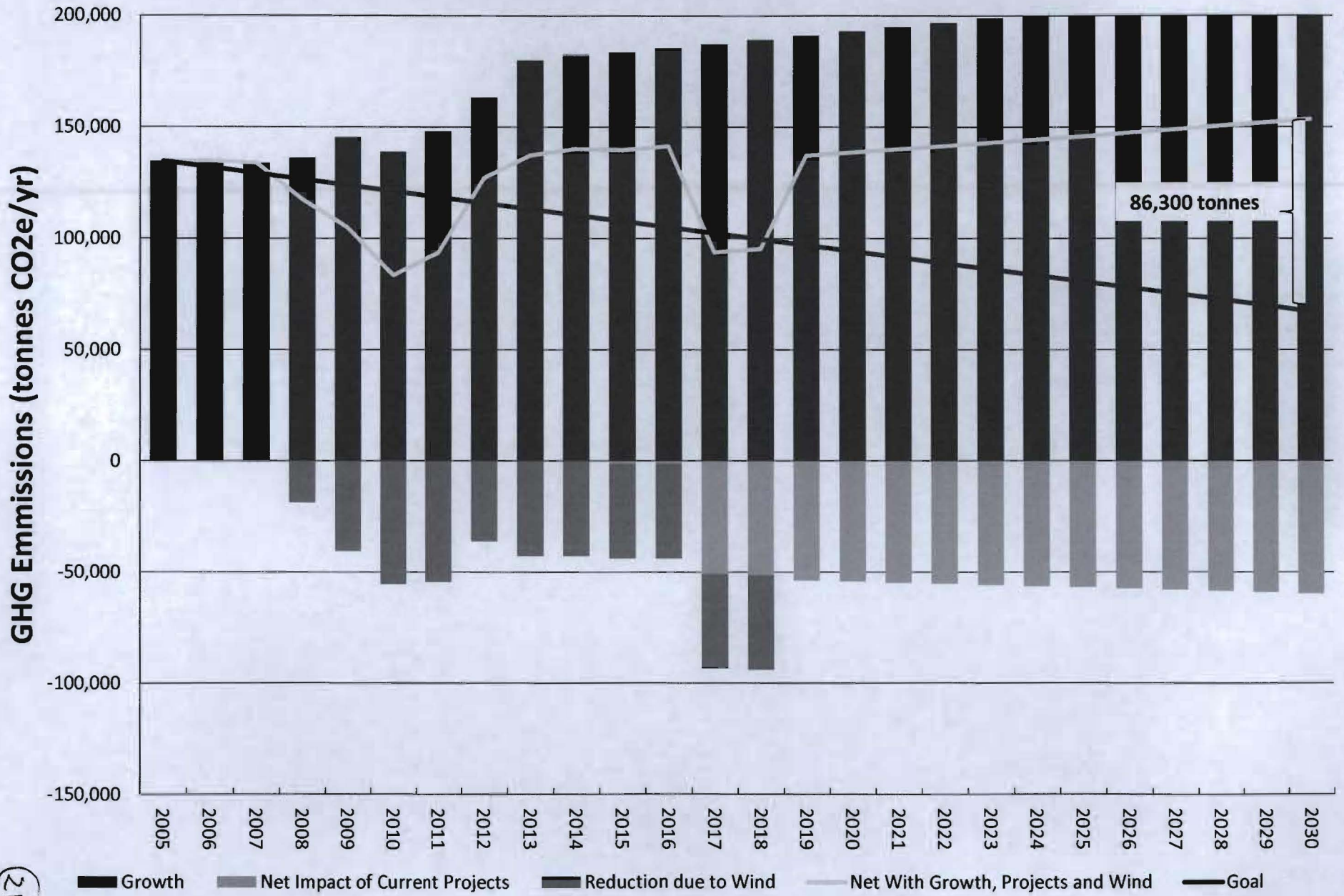
Wind Power provides 30% of WSSC's total electricity consumption.

Forward Wind Farm Somerset County, PA (2008-2018)



WSSC GHG Projections (2005 - 2030)

Growth and Current Capital Improvement Projects vs. Goal



WSSC GHG Projections (2005 - 2030)

Impact of Selected Strategies

