

# BIG GREEN MACHINES



## Gresham's Path to Becoming Energy Independent

City of Gresham, Oregon  
Department of Environmental Services

## Presentation Outline

- City of Gresham's Sustainability Policies
- Gresham's Wastewater Treatment Plant Goals
- 2008 Energy Independence Project
- WWTP Energy Sources Present and Future
- Energy Projects Update:
  - Digester Gas Cogeneration
  - Solar Power
  - Micro-Hydro Outfall Project
  - Fats, Oils and Grease (FOG)
  - Wind Power
- Education and Outreach

## Gresham's Sustainability Policy

The City of Gresham will strive to design and deliver services that:

- Support a stable, diverse and equitable economy  
*(for the ECONOMY)*
- Promote community health and well-being, outdoor recreation, cultural awareness, and encourage learning  
*(for the COMMUNITY)*
- Protect and improve the quality of the air, water, land and other natural resources by reducing human impacts and increasing public awareness of the valuable services they provide  
*(for the ENVIRONMENT)*

## Plant



- 114,000 service population (*Gresham, Fairview, Wood Village*)
- 20 mgd dry-weather capacity; 12 mgd current flowrate
- Operates under NPDES permit from DEQ
- 2009 – Received Platinum Peak Performance Award from NACWA  
*(5 years perfect discharge permit compliance)*
- 4 million "dry" pounds of biosolids per year
- Plant O&M provided under contract with Veolia Water

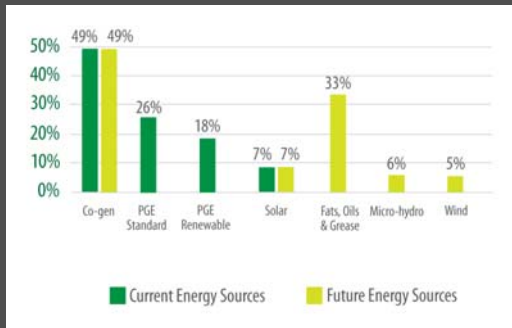
## WWTP Energy Goal

- To become energy independent
- Participated in Energy Independence Project prepared by Kennedy/Jenks for ACWA and the Energy Trust of Oregon
- Currently produce 56% (Cogen + Solar) of the plant power; another 18% is PGE renewable

## Energy Independence Project - 2008

- Prepared by Kennedy/Jenks for ACWA and Energy Trust of Oregon
- Provided Energy recommendations for all wastewater plants in Oregon
- Gresham and Corvallis – case studies
- For Gresham, recommended a combination of energy efficiency, Solar, and Micro-Hydro
- Gresham should also consider FOG and Wind
- Project won 2009 Grand Prize in Planning Award from American Academy of Environmental Engineers

## A LOOK AT THE NUMBERS FOR Gresham



## Cogenerator Unit (395 kW peak capacity)



## Cogen Cost Details

### Cost breakdown

- Total design/construction cost 1,128,633 \$
- Energy Trust of Oregon grant (82,379)
- Bus. energy tax credit pass-through (287,801)
- **Net project cost** 758,453 \$
- Total energy produced since startup: 13,000,000 kWh
- Avoided cost of energy ~ \$1,000,000
- Anticipated break-even date January 2011
- **Actual break-even date** May

## Solar Project Update



- 420 kW peak capacity
- 1 acre ground-mounted system
- RFP issued in April 2008
- Power Purchase Agreement signed with Tioga in Oct. 2008
- Transferred to SunEdison in July 2009
- Installation completed in Dec. 2009
- PGE net metering agreement
- No capital cost to City
- Initial electrical rate (~25% below PGE rate)
- Fixed annual escalation

## Solar Project Site



## Solar Project Update

- No upfront cost from the ratepayers
- SunEdison owns, operates and maintains
- COG purchases energy produced for the term of the contract
- Constructed through partnership with SunEdison, REC Solar
- Incentives provided by the Energy Trust of Oregon
- REC Solar designed & installed the system
  - over 20 jobs created for the project

## Solar Project Update

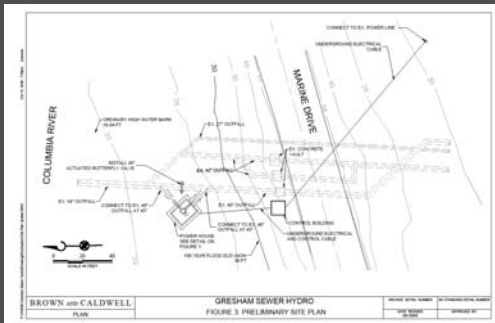
- 1<sup>st</sup> full year
  - projected to generate over 440,000 kWh of clean renewable solar energy
- 20 year period
  - expected to generate over 8 Million kWh of clean renewable solar energy
  - will offset the release of more than 8 million lbs of CO<sub>2</sub>

## Update

- Unit to be located on 48-inch outfall piping between Columbia Blvd and River
- Planning for a 50 kW unit
  - ~6% of plant power needs
- Brown & Caldwell completed Feasibility Study - 2008
- Total Cap Cost = \$823,000
- Project will require BETC/ETO funding (~\$350,000) to have positive cost payback
- Project Challenges:
  - We have obtained water right from Oregon Dept of Water Resources
  - Pursuing conduit exemption from Federal Energy Reg. Commission (FERC)
- Construction 2011



## Micro-hydro Site Plan



## FOG Program Update

- Fats, oils & greases collected, trucked to plant to be anaerobically digested
- Electrical power produced from methane gas
- CH2M feasibility study – 2009
  - 1<sup>st</sup> phase cap cost = \$900K
  - Apply for grant from OR Business Dept.
- Construction of 1<sup>st</sup> phase could start in 2010/2011
- Evaluating various project implementation methods; (design/bid; design/build, design/build/operate)



## Wind Power

- Wind power may produce up to 5% of plant power
- Applying for grant from OR Business Dept.
  - To fund Feasibility Study
  - \$50K grant; \$17K COG match
  - Study to determine if we move ahead with installation of units
- Wind Power at WWTP will likely be roof mounted units (20-100kW)



Akcasu Turbine, OEA International

## Educational Materials at WWTP

- Materials include tour booklet and interpretive panels
- Targeted 4<sup>th</sup> grade level
  - 4<sup>th</sup> graders in Gresham schools focus on the water cycle per OR State educational standards
- Booklet designed by elementary school teacher in 2009
- 9 panels created in-house to complement tour booklet



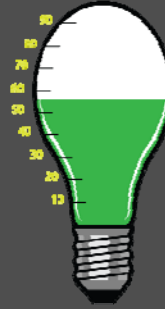
## Interpretive Panels

- 9 panels created in-house to complement tour booklet



- Panels tell how wastewater is treated & about the role water plays in our lives

## To Recap our Independence Goal



- 100% with micro-hydro (*our goal*)
- 94% with wind
- 89% with FOG
  
- Now @ 56% with Cogen and solar

## Questions?

*Thank you!*

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[www.GreshamOregon.gov](http://www.GreshamOregon.gov)