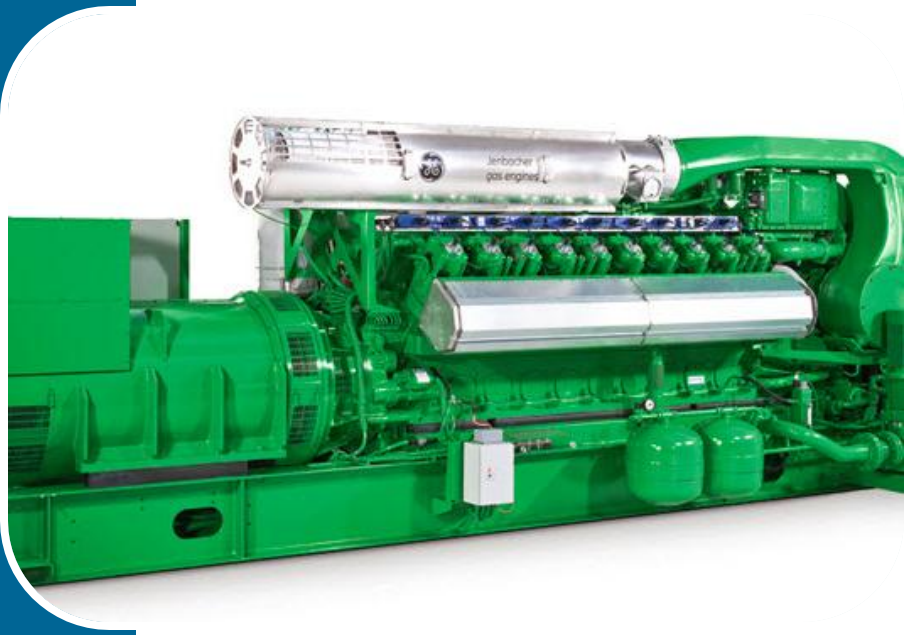

Clean Water Services – Durham Advanced Wastewater Treatment Facility

- **Cogeneration & Brown Grease Receiving Facilities**

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Overview

- Support for biopower at WWTPs
- Location
- Project description
- Co-digestible feedstocks
- Generation / Costs / O&M / Revenues / Financing
- Above-market cost
- Proposed incentive

Energy Trust's support for Biopower at Wastewater Plants

- Energy Trust support for cogeneration at WWTPs:
  - Gresham, Portland-Columbia, Medford, Pendleton
- 3,005 kW of installed capacity
  - ~20,000 MWh annually
- Previous incentives: $1,344,379 to 4 projects

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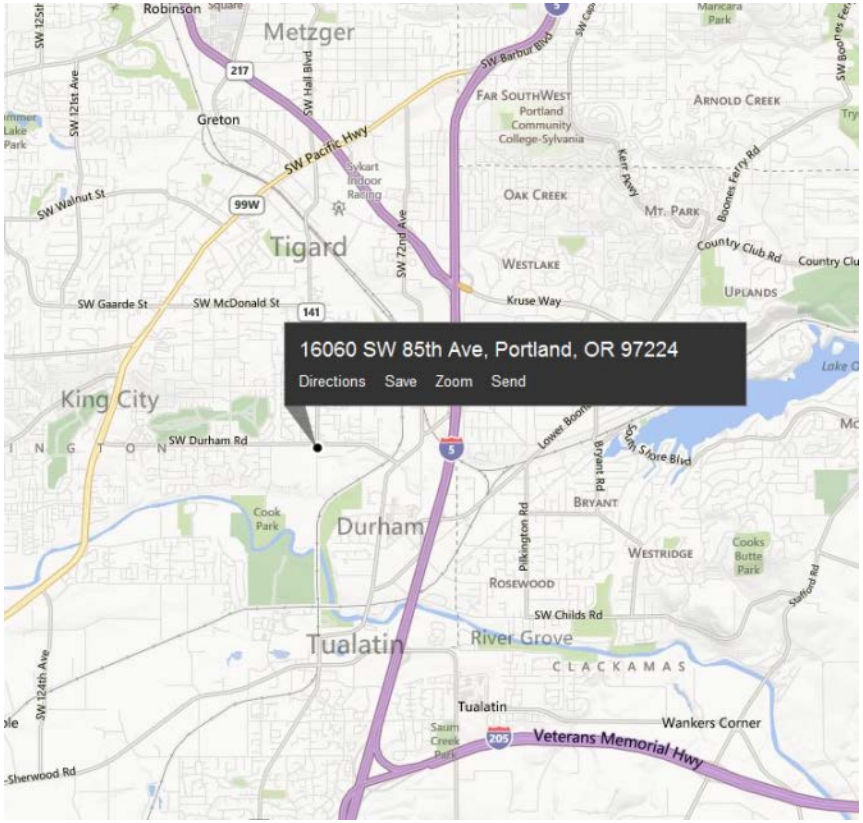
Location – Tigard, Oregon



Project Context

- Good strategic opportunity
  - Municipal owner;
  - Operates 24 / 7 / 365;
  - Electricity use: 21,000 MWh / year.
- 2009 technical analysis
  - Quantified adding brown grease to increase energy
- 2011 Grease Supply Study

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Project Summary

- Owner: Clean Water Services
- Project cost: $17,660,863
- Components:
  - Digester reconfiguration & gas storage
  - Brown grease (FOG) receiving / processing station
  - Gas cleaning system
  - 1,696 kW (2 – 848 kW JenBacher cogeneration engines)
- Commercial operation: Jan 2015
- Proposed incentive: $3,000,000

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Background

- Cogeneration since 1993; 500 kW engine operating.
- 2008 *Facilities Plan*
- Digestion of municipal wastewater solids alone → ~64% of biogas needed for new 1700 kW cogen system
- Increased level of complexity

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Biogas Feedstocks

- Biogas production
- Biogas feedstocks: ~ 23,000 gal / day in Washington County alone.
- Grease Removal Device Regulations
- Increased population = increased wastewater solids
- Confidence in volume of co-digestible material for biogas production

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Estimated Generation

- Energy goal: reduce retail power purchased from PGE
- ~15,000 gallons of brown grease needed
- Expected to generate 12,366 MWhs/ year – 83% net C.F.
- Off-sets ~ 60% of Durham's load

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Development Schedule

- Construction bid selected
- Commercial operation January, 2015
- Brown grease (FOG) feedstock contracts in 2014

Revenue & Costs

- 25-year project
- Off-set retail rate: $0.06025 (2015)
- Interconnection Agreement with PGE – stay on their current rate schedule.
- Brown grease tipping fees → 15,000 gal / day for 25 years (~ $330,000 / year)
- O&M ~ $0.0325 / kWh escalating at 2%

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Project Costs

Site & Civil	**$**	2,887,055
Engineering / Design / Const. Mngt.	$	3,946,949
Cogen Engine System	$	3,037,596
Gas Cleaning & Balance of Plant	$	3,562,005
Electrical & Mechanical	$	2,860,442
Brown Grease Receiving Station	$	1,388,816
Total	$	17,660,863

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Project Financing

- 50% debt / 50% equity from cash reserves;
- Debt funded by from previous sale of 3.26% revenue bonds
- ODOE Combined Heat and Power (CHP) tax credit → $2,851,503 pass through value

Financial summary (NPV basis)

ETO assigned project risk adjusted rate of return		8%
Project Financial Summary - Present Value Basis - Evaluated over 25 years		
Revenues		
Power Sales	$	9,454,935
CHP Tax Credit Sale	$	2,640,281
Brown Grease (FOG) Tipping Fees	$	3,506,664
NPV Total Revenues	**$**	**15,601,880**
Costs		
Equity	$	8,830,432
Principal and Interest Payments	$	5,721,030
O&M	$	5,574,454
NPV Total Project Cost	**$**	**20,125,916**
Above Market Cost (Revenues minus Costs)	**$**	**(4,524,036)**

Proposed incentive

Above Market Cost (NPV):	$4,524,036
<u>Suggested Incentive</u>	
Suggested Incentive:	$3,000,000
Payment Terms:	Three payments: $1MM upon commissioning; two additional based on meeting generation thresholds
REC Allocation:	65% for 25 years (200,948 RECs)
PUC measure	$14.93 / REC
($) / aMW (straight-line)	$2.1 MM

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Comparison with other biopower projects

Project	$ (MM) / aMW
City of Medford	$0.77
JC-Biomethane	$1.39
Clean Water Services- Durham	$2.13
City of Pendleton	$2.68

Risks & Strengths

Risk:

- Not securing sufficient volume of co-digestible material → negative effect on biogas / energy and "tipping fee" revenue

Strengths:

- Incentive paid over time based on generation thresholds
- Proven technology
- More than sufficient co-digestible material in market; biogas from this material not needed by 2025
- System designed for greater future volumes of waste and generation

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Next steps

- Board – December 13th.

- Project Funding Agreement