

Commercial Gas from Wastewater: King County's 20-year Commitment to Renewable Energy

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Committee on Energy Supply and Energy
Conservation***

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King County

King County's South Treatment Plant

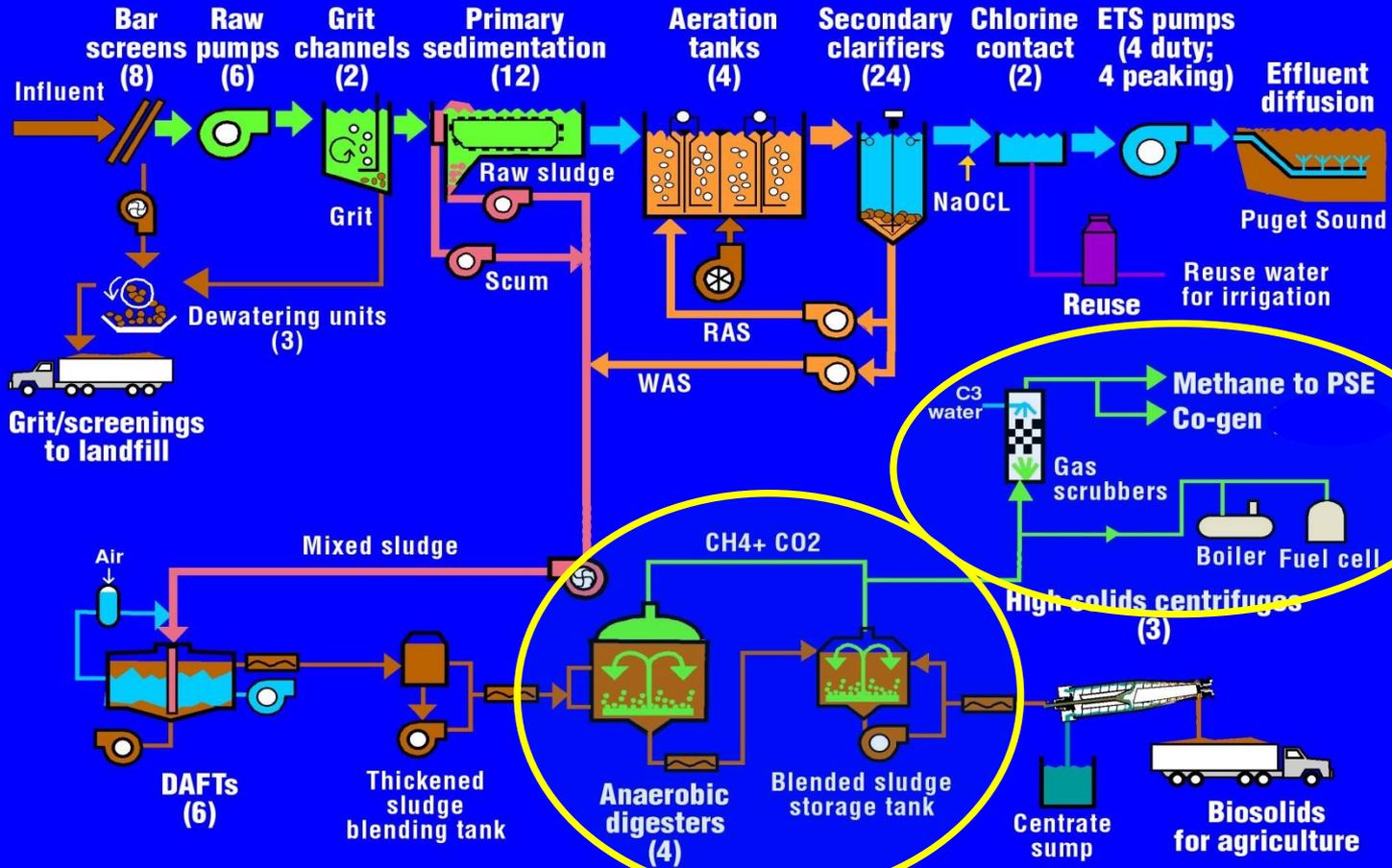


The County's South Wastewater Treatment Plant:

- 1 of 2 plants serving the Seattle metro area
- Population Served = ~ 700,000
- Flow (avg) = 75 million gallons/day
- Liquid/Secondary Treatment – since 1965
- Solids Treatment & Biogas Scrubbing – since 1987

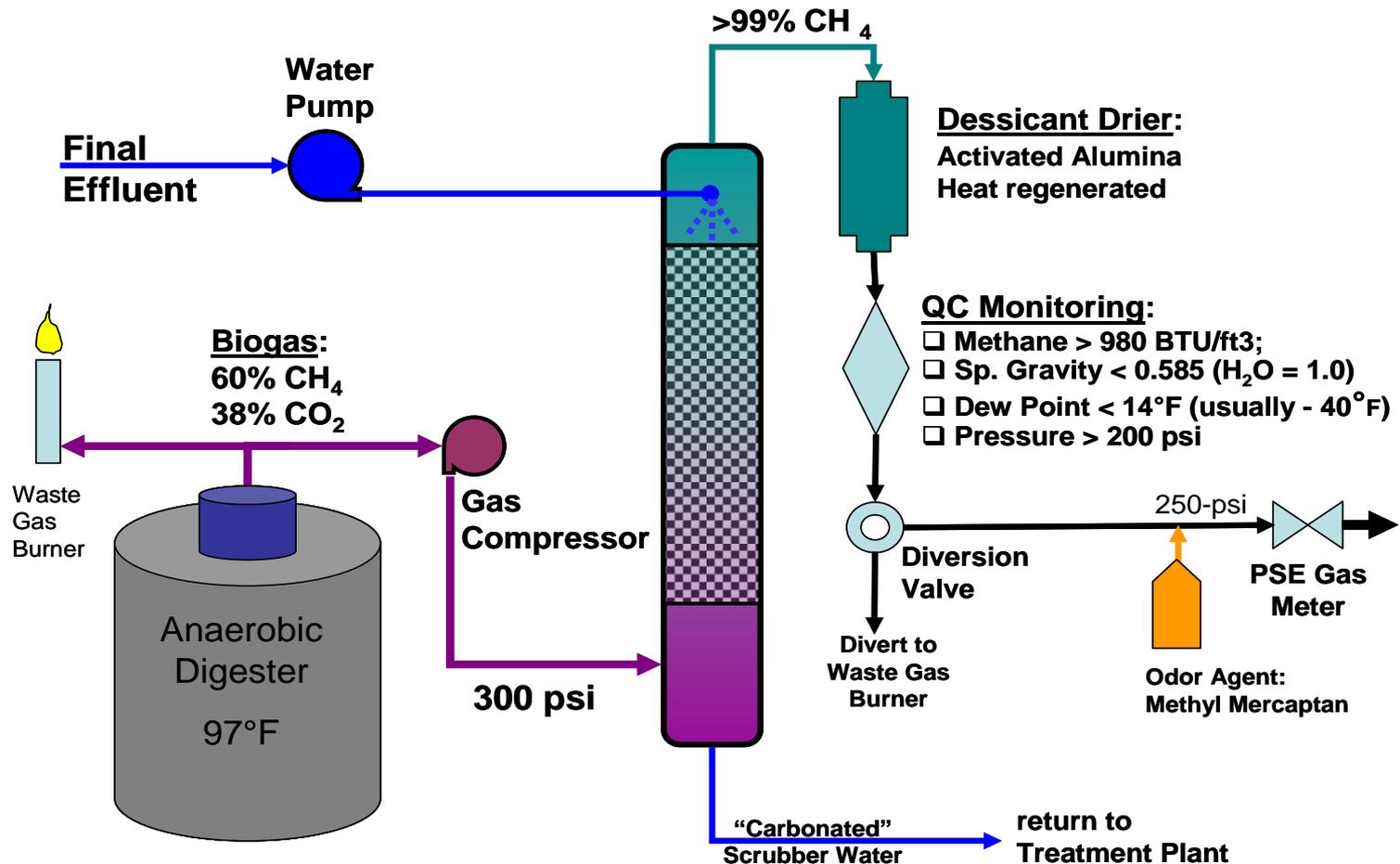


Commercial natural gas from wastewater – how does that work?



... Basically, we just “wash out” the impurities

“Binax” Gas Scrubbing System



Practically, a bit more complicated than that

- Anaerobic Digesters – produce biogas
- Mix Biogas & Water under Pressure
 - Gas Compressors: 300-psi
 - Water Pumps/Turbines: 0.7-gal/ ft³-Biogas
 - Contact Tower: Packed Bed
- Drier
- Quality Control Monitoring
- Diversion Valves/Waste Gas Burners
- Sales Meter



South Plant Economics

- Gas Sales Price: 75.95-¢/Therm
 - PSE Schedule 101 – “Cost of Gas”
- Electricity Cost: 14-¢/Therm
 - PSE Electricity Cost - \$0.065/kwh
- Parts & Supply Costs: assume 6-¢/Therm
- Labor Costs: assume 10-¢/Therm
- Capital Costs: \$5-10 million replacement cost



Plant Statistics – A Valuable Resource

- Operating since 1987
 - Predates “Carbon Markets” – so no GHG offset credits or renewable energy certificates (RECs) can be produced (though renewables)
- 2007 Gas Sales: \$1.25 million
 - 1.8 million Therms (180 million ft³ NG)
 - 3000 homes (~50 Therms/month/house)
- 2007 Production Costs: \$0.5-0.7 million estimate
 - Electricity used: 4-million kWh (7% of South Plant’s total)
- 2007 Biogas Recovery & Use
 - 89% recovery (11% was flared)
 - 57% sold to PSE
 - 16% used on-site to produce heat (boiler)
 - 16% used on-site to produce electricity (cogen)



South Plant's Keys to Success

- Steady Supply of Biogas
 - 6000-8000 Therms/day (700,000 population)
 - Wastewater Rule of thumb: 1.25-Therms per 100-people
- Ready Supply of Water (effluent)
 - 0.8-1.0 million gpd (75-mgd plant flow)
- Equipment Reliability: 24-hr O&M
- Proximity to Major PSE gas pipeline
- Commodity prices: Electricity vs. Natural Gas
 - 6.5 ¢/kwh vs. 75 ¢/Therm



Some Other King County Projects

➤ Cedar Hills landfill gas project

- Gas purifying-compressing-sale plant under construction
- Estimated production of 4.5 million ft³ per day
- Again, proximity to major gas transmission pipeline is key
- King County expects to be able to produce GHG offset credits



➤ West Point Cogeneration Plant (electric generation)

- At another wastewater treatment plant – in planning / design to generate ~ 2.3 average megawatts electricity, and heat for plant
- County expects to be able to generate renewable energy credits



Thanks for your interest...

Questions?

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