M.E. 523

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Renewable Energy and Green Power

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Presentation Highlights

- PSE Overview
- Terminology
- Recent Local Legislative Activity
- PSE Renewable Energy Policy/Initiatives
- Green Power Program/Initiatives
- Small Scale Projects

Puget Sound Energy Overview

- Investor owned combination electric/gas utility
- Merger of Puget Sound Power & Light and Washington Natural Gas - 1997
- Largest Electric and Gas Utility in Washington State
- Electric Customers ~ 968,000
- Gas Customers ~ 633,000
- Service Area Covers approximately 6,000 square miles and 11 Counties
- Employees ~ 2,200

PSE Service Territory

Combined Electric service Natural gas service

Electric System

Total miles of transmission

230kV and over 862 miles
55kV - 115kV 1,139 miles
Transmission substations - 45

Total miles of distribution

Overhead	10,512 miles
Underground	8,418 miles
Distribution substations	303

Natural Gas System

Total main: 10,798 miles

Cast Iron	76 miles
Bare Steel	206 miles
Wrapped Steel	4,020 miles
Plastic	6,496 miles

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Terminology

- Green Power

  The term "green power" generally refers to electricity supplied in whole or in part from renewable energy sources, such as wind and solar power

- Renewable Energy Certificates

  Renewable energy certificates (RECs), also known as green certificates, green tags, or tradable renewable certificates, represent the environmental attributes of the power produced from renewable energy projects and can be sold separate from commodity electricity

- Net Metering

  Means that the customer-generator is billed according to the difference between the amount of electricity supplied by the electric power supplier in a given billing period and the electricity generated from the customers' side of the meter, with customer generation in excess of electricity supplied

  credited over an annualized period

Terminology cont....

- Energy Market (Mid-C, COB...)

  Indexed electric pricing

- Renewable Portfolio Standard

  Mandated targets to include renewables in portfolio mix

- Renewable Energy Technologies/Fuels

  Washington State:

  Wind, solar,geothermal energy, landfill gas,wave or tidal action, gas from wastewater treatment, qualified hydro, biomass based on animal waste, wood and crops …

  WREGIS:

  All of the above plus - Biodiesel, MSW (limited)

Recent Legislative Activity

- RCW 19.29A Customer Choice (Green Power)

  Required utilities to offer Green Power Programs beginning January 2002.

- HB 2333 - Concerning energy efficiency and renewable energy standard

  Energy Efficiency

  2006-2009 - 75/100 of 1% of 2005 retail load to be supplied through conservation

  5% of this from low income programs Includes high efficiency cogeneration

  Renewable Energy

  2010 - 2014 meet 5% of annual retail load through renewable energy generation or credits

  2015 -2022 meet 10%; by 2023 15%

- HB 2341 - Simplifying interconnection process

- SB 6146 - Encouraging renewable energy & energy efficiency business

- SB 6131 - Incentives to support Renewable Energy (Solar/Wind)

- SB 6132 / HB 2445 - Tax incentives to solar electric industry

Corporate Renewable Energy Policy

- Part of our resource supply portfolio beginning in 2004
- Meet 5-10% of our customer's energy needs with renewable energy by 2013
- In 2004 the company will acquire renewable energy for 50% of its own Corporate HQ facilities use
- Set goals for renewable energy use by its customers
- Increase net metering limit from 25-50KW

Renewable Energy Initiatives

- Issued wind resource RFP late 2003, 150MW nameplate capacity
- Issued all source RFP including renewable resources early 2004
- Currently purchasing 25 MW wind capacity to study portfolio integration
- Developed Residential Solar Photovolaic Rebate Program
- Beginning in 2004- offer incentives to encourage small-scale renewable projects
- Anaerobic digesters (Dairy Farms)
- Land-fill Gas
- Customer owned generation
  - King County WWTF Fuel Cell
  - Digester Gas Generation

PSE View on Wind

Positives

- No fuel price volatility
- No air emission problems
- Cost competitive with conventional resources
- Environmental advocates provide strong support

Negatives

- New transmission lines may be needed
- Power is intermittent and not dispatchable
- Backup capacity may be required
- Visual impacts are an issue in certain locations

Solar PV Rebate

- All residential electric customers are eligible
- Rolled-out June 2003
- Rebates for systems between 500 W and 25 kW
- Rebates are ~ 10% of total costs

Green Power Program

- Contract with Bonneville Environmental Foundation
- Resources

  Stateline wind project and,

  Hanford/White bluffs solar project
- Customers purchase 100 kWh blocks @ $2.00 ea.
- Over 10,500 participants; mostly residential
- Over 6,000 MWH sold first 2 months of 2003
- Contributions go toward development of regional renewable energy projects
- 2004 Corporate Goal of 45,000 MWH

Green Power Program Initiatives

- Enhance Marketing Strategies
- Increase Commercial/Industrial Customer Emphasis
  - Develop C/I customer recognition program (based on participation level)
  - Address unique billing issues
- Regional Marketing Effort
  - Joint Green Power Campaign with other local utilities
- Local Small Scale Projects
  - Encourage the development of small scale renewable projects in our service area as an additional source of Green Power supply

Joint Marketing Activity

- Participants
  - Tacoma Power
  - Snohomish PUD
  - Bonneville Environmental Foundation
  - Belo Marketing (KING 5)
- Eight Week Campaign
  - Television Commercials on KING, KONG and/or NWCN
  - Permission Based E-Mails
  - Internet Tile Ad and Informational Web Page
  - Thank You Gift

Digester Project Centralized

- King County Dairies Anaerobic Digester Study
  - Compares Farm Level (500 cow) project Vs. Centralized facility (6,000 cow)
  - PSE partially funded study
  - Final Report completed June 2003
- Centralized Digester Meets All Feasibility Criteria
  - Technically sound
  - Meets the needs of affected parties
  - Shows an acceptable return on investment
- Project Annual Inputs/Outputs
  - Manure input ~252,000 Tons
  - Electric output ~10,400 MWh/year
  - Liquid Organic Fertilizer ~3,000,000 gallons
  - Solid Organic Fertilizer ~36,500 tons
- Project costs ~$7.5M (5,000/kW)

Digester Project Single Farm

- Single Farm
- Project output ~2,000 MWh
- Project costs ~$1M ($4,000/kW)
- 1,500 Cows
- PSE Involvement
  - Power Purchase (Market Based)
  - Green Tags (supply for green power program)
  - Incentive (in exchange for data)
  - Interconnection
- Construction Planned Summer 2004

Small-Scale Projects

- Solar
  - $7,000-$10,000/kW
  - ~1,000 kWh/year per installed kW (Western Washington)
  - Simple payback = longtime
- Anaerobic Digesters (dairies)
  - $3,000-$5,000/kW installed
  - Rely on several revenue streams electric sales, green tags, and other byproducts
- Wind
  - Need good wind resource
  - Capacity factors around 30-35%
  - $3,000-$5,000/kW small scale (10kW)

QUESTIONS?