

2008 Salinity Summit

Case Study: Using Recycled Water to Facilitate Energy Generation

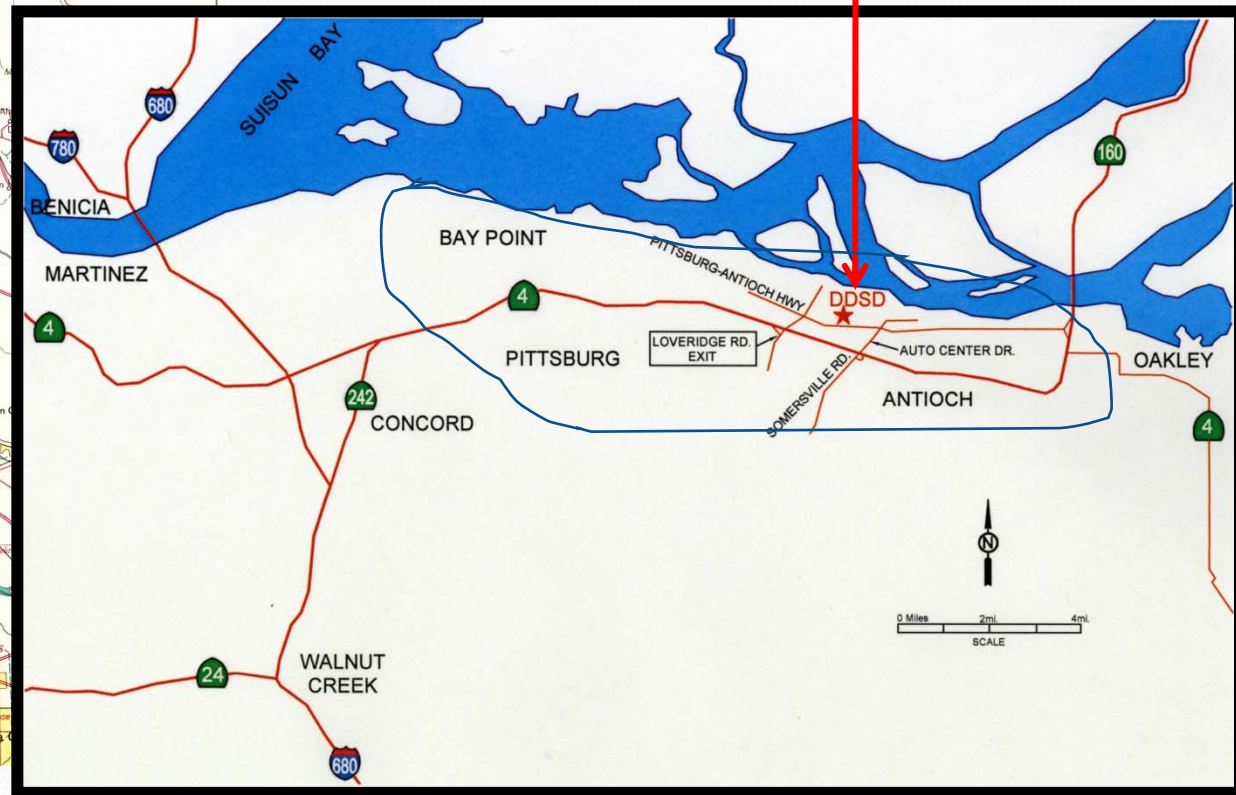


Gary W. Darling, General Manager
DELTA DIABLO SANITATION
DISTRICT

www.ddsd.org

January 15, 2008

Delta Diablo Sanitation District Service Area



San Francisco

Calpine natural gas-fired, combined-cycle plants

Pittsburg, California

Recycled water is used for cooling

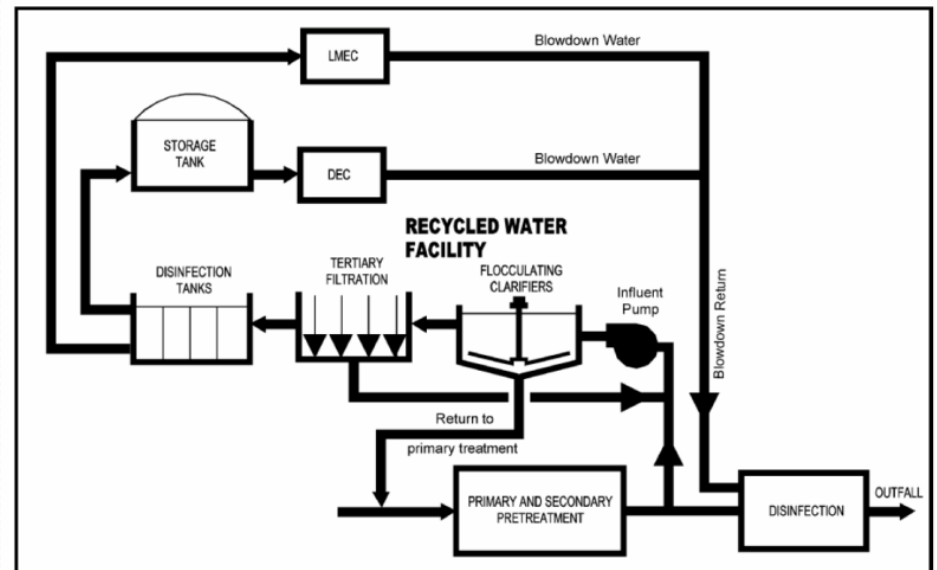


Delta Energy Center
Baseload Capacity: 818 MW



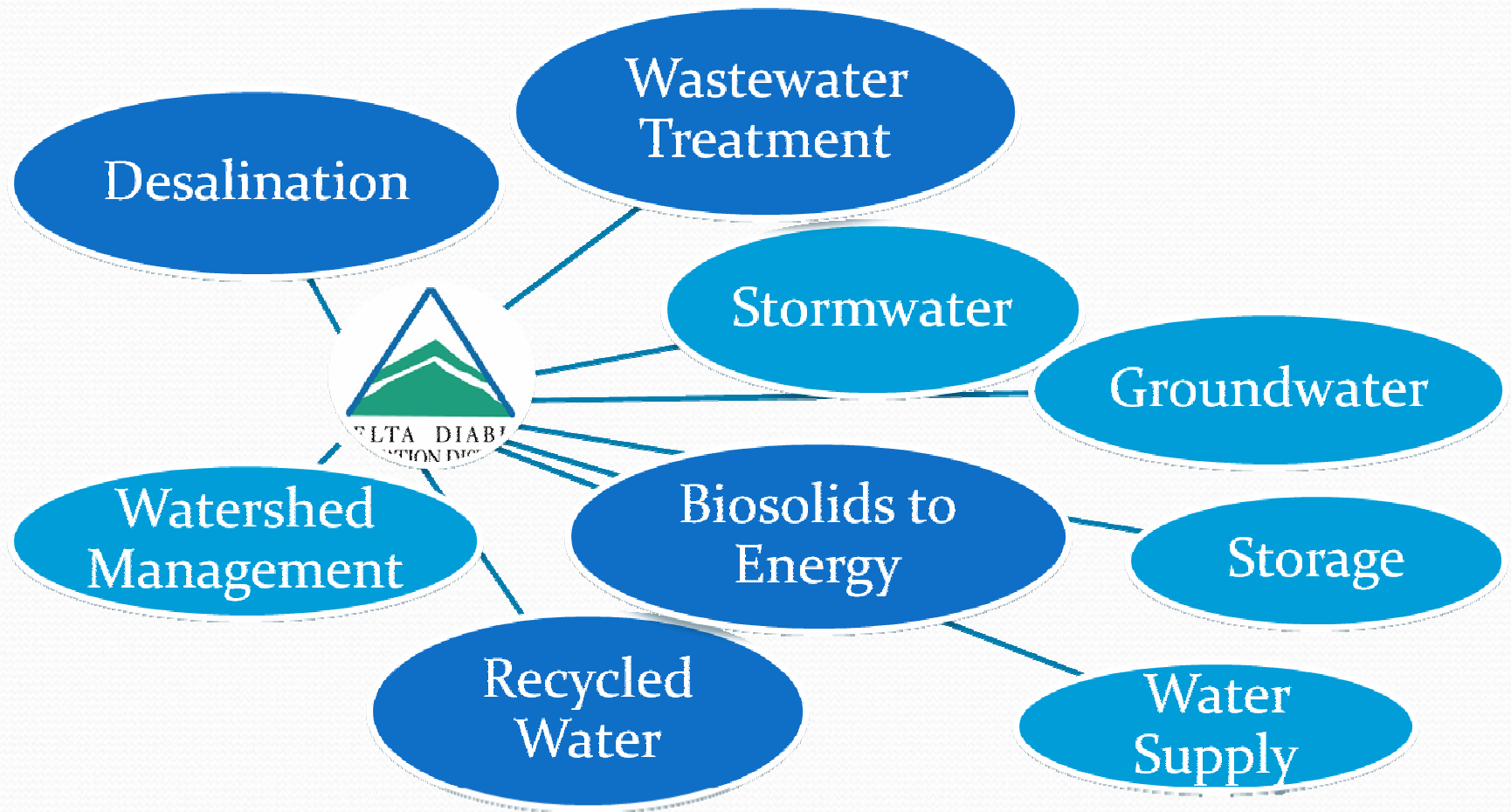
Los Medanos Energy Center
Baseload Capacity: 512 MW

- Built by Calpine \$21.4 million
- Dedicated to Delta Diablo
- 12.5 MGD
- 7 miles of distribution pipeline to two power plants and park/median landscaping
- 2.4 MG storage reservoir



- Cooling systems built specifically for recycled water
 - Design based on pilot testing performed by power plants
 - Special materials used in cooling towers
 - Water conditioning systems included in plant design

Climate Change . . . Greenhouse Gases . . . Changing the focus of wastewater agencies



BUILDING ON SUCCESS

- A regional approach to funding recycled water projects
- **Bay Area Regional Water Recycling Program**
 - 17 Agencies – 7 projects ready to construct
 - 32,205 acre-feet/year near term yield
 - \$36 million near term cost



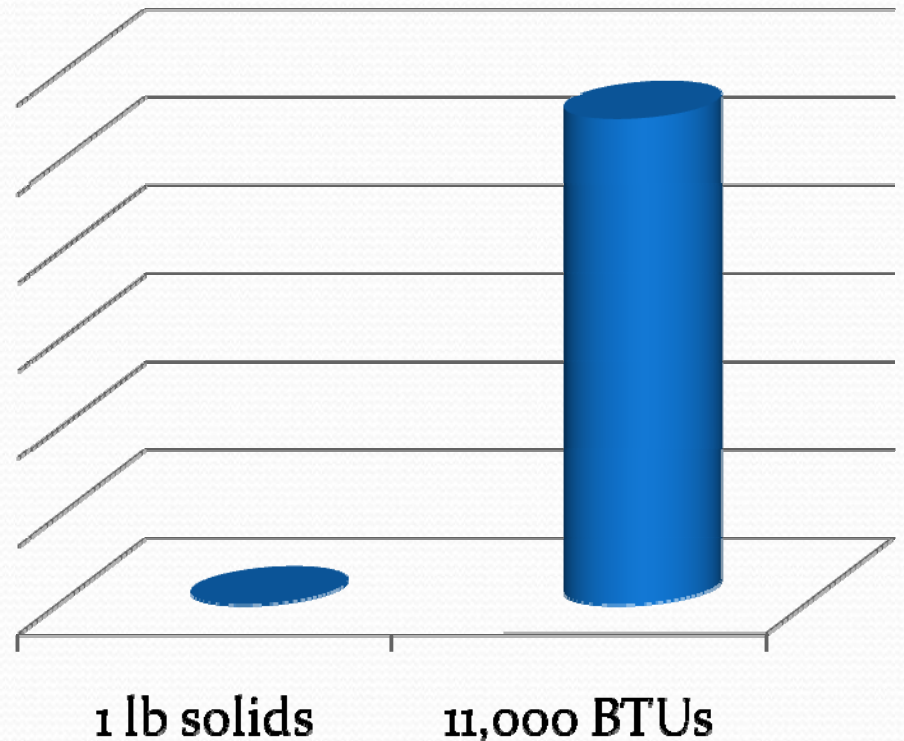
Regional Industrial Recycled Water Facilities Plan

- ✓ State approved Plan of Study
November 2007
- ✓ Team: Delta Diablo, Ironhouse
Sanitary District, Central Contra Costa
Sanitary District, Contra Costa Water
District, Cities of Pittsburg and Antioch,
Mirant, PG&E

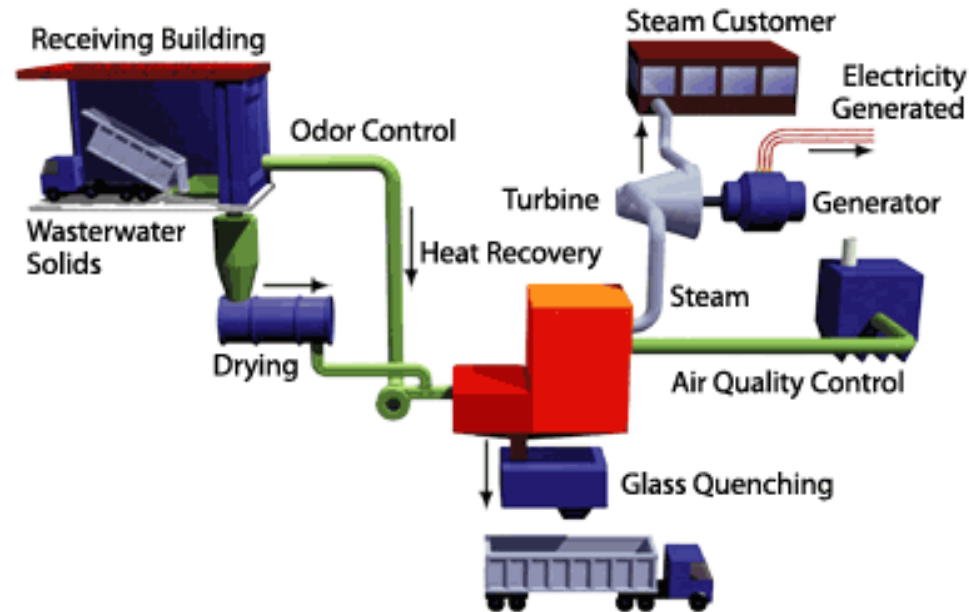
BIOSOLIDS TO ENERGY

1 dry pound of volatile solids =
10,000 to 12,000 BTUs

**biosolids can be
a valuable
biomass fuel**



Biosolids to Energy Technologies



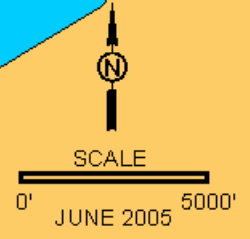
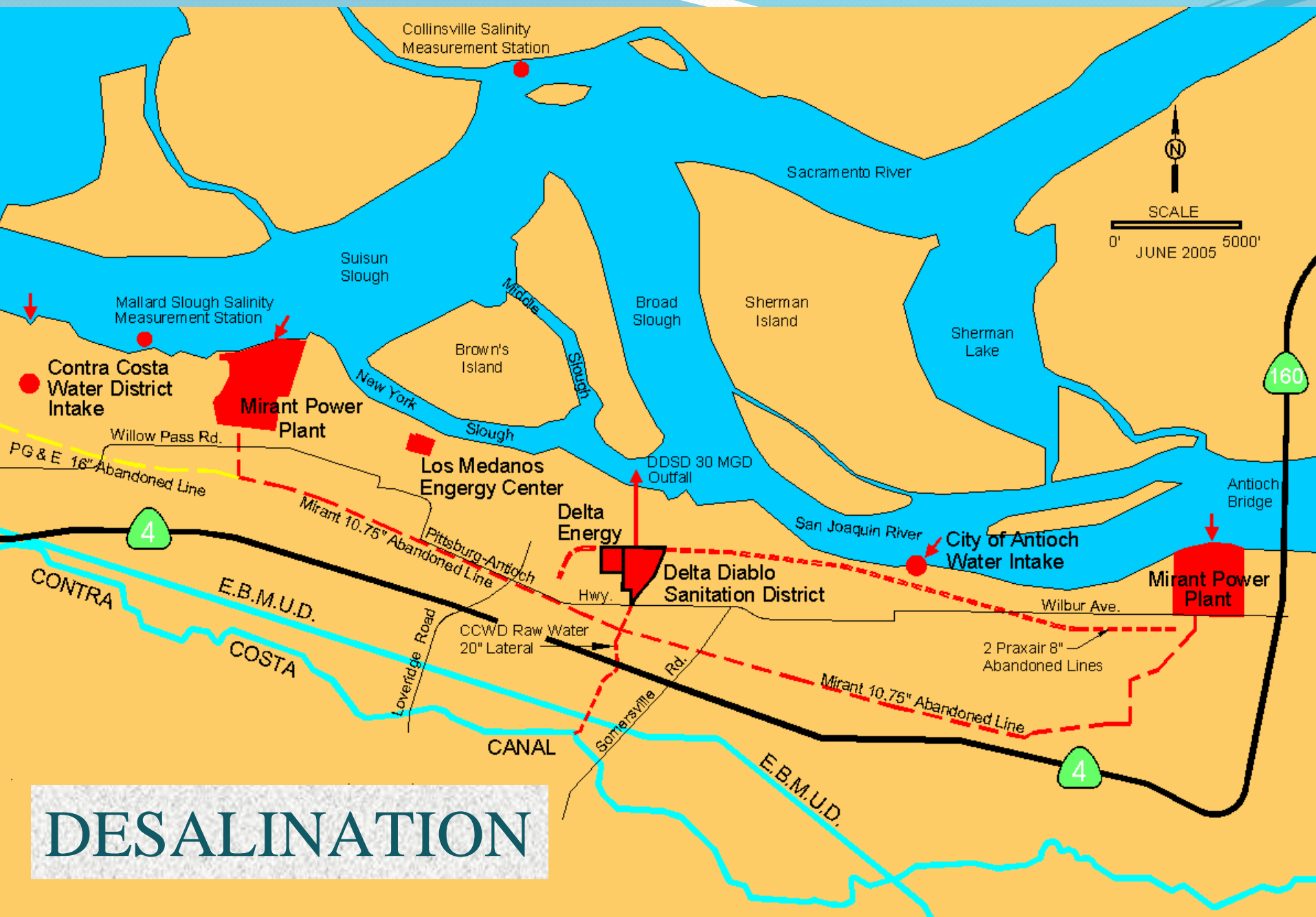
- Thermal oxidation
- Biogasification,
- Anaerobic digestion
- Thermal drying

Energy to operate
treatment
plant/sell

Product to sell

BAY AREA REGIONAL DESALINATION PROJECT

- East Bay MUD, San Francisco PUC,
Contra Costa Water District, Santa Clara
Valley Water District
- 2003 Study identified three potential Bay
Area locations
 - Pittsburg, Oakland, San Francisco



DESALINATION



DELTA DIABLO
SANITATION DISTRICT

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