



Energy Minimization & Greenhouse Gas Reduction Plan

Presented By: Linette Almond, City of Santa Cruz



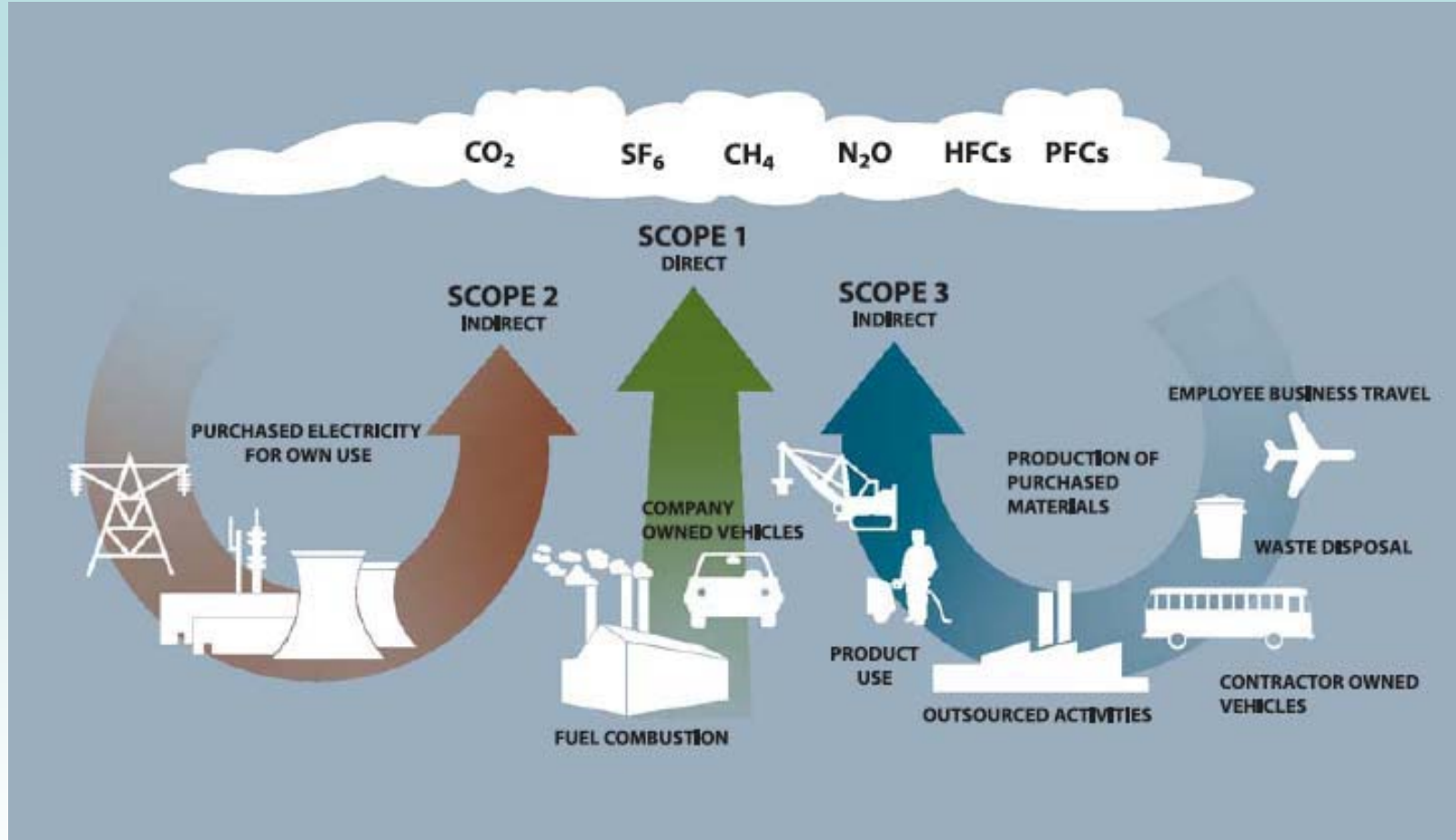
Objective

- ◆ Hired consultant to assist in completion of evaluation and plan: Spring 2009 – Spring 2010.
- ◆ Assess the feasibility of a carbon neutral 2.5 million gallon per day (mgd) seawater desalination facility.
 - Plan will support the project specific environmental impact report (EIR) and permitting.

Key Project Considerations

- ◆ Local environmental interest: During the IWP and program EIR for the IWP, our customers expressed concern with increase energy required to treat ocean water.
- ◆ California State Law
 - We will meet the intent of AB 32.
- ◆ California Coastal Commission (CCC)
 - We are working with regulatory staff to meet their requirements.
- ◆ Proposed California Environmental Quality Act (CEQA) guidelines for Greenhouse Gas (GHG) emissions

Climate Change 101--GHG Source Types



Source: WRI/WBCSD GHG Protocol with modifications

Work Plan

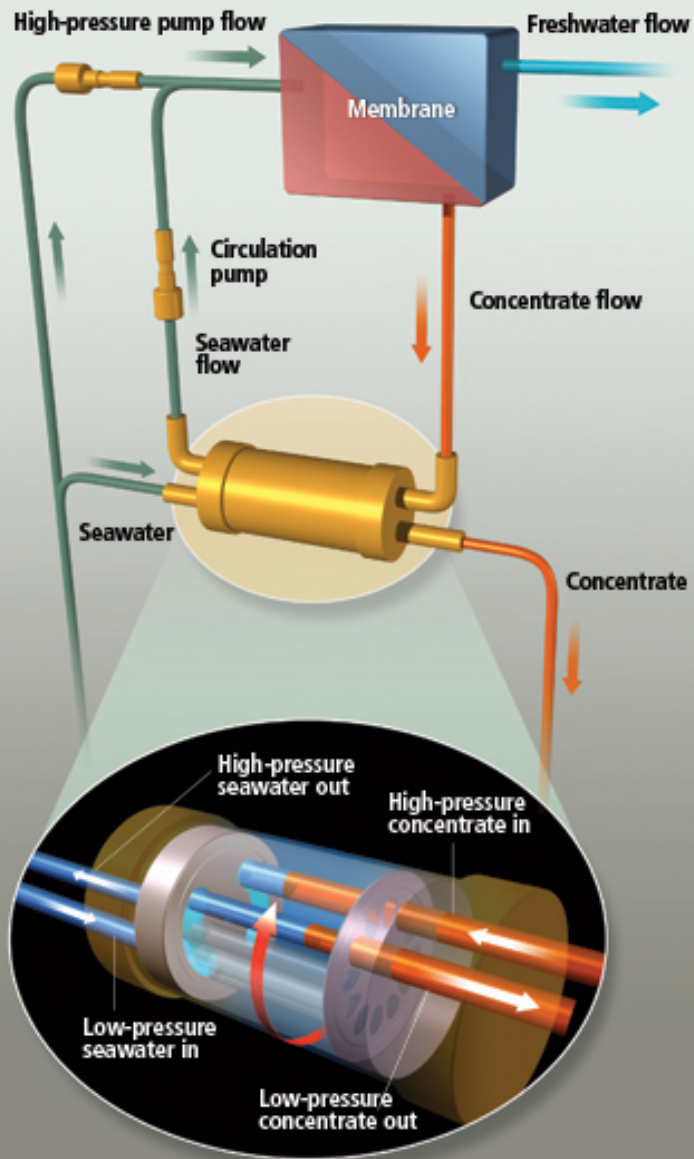
1. Establish a preliminary energy baseline for operation by each agency.
2. Apportion energy and GHG impacts to SCWD & SqCWD.
3. Study the options to feasibly avoid, reduce, and sequester the net GHG emissions (direct & indirect) produced by the desal facility.
 - Current/existing carbon offset projects.
 - Potential carbon offset projects/ programs.

1. Establishing Baseline scwd² Energy Consumption

- ◆ Normal (Standard) Efficiency Design
 - Industry range \approx 15-23 kWh per 1,000 gallons
- ◆ Proposed “high efficiency” design
 - High-efficiency motors
 - High-efficiency variable frequency drives (VFDs)
 - Solar heated clean in place (CIP) solutions
 - Industry range \approx 12.5-16 kWh per 1,000 gallons

*Includes energy for every system component, including intake, treatment, and brine discharge.

Proposed “high efficiency” design



Isobaric energy recovery device (ERD) utilized in lieu of Pelton wheel



2. Apportion

- ◆ City of Santa Cruz use of SWRO
 - = 2.5 million gallons per day during drought
- ◆ Soquel Creek Water District use of SWRO
 - ~ 1 million gallons per day during non-drought.

3. Offsetting Energy

EXISTING Carbon Offset Projects

- ◆ Graham Hill Treatment Plant Solar Roof Hydroelectric units (future power generation, typ)
- ◆ Advanced energy efficiency components in the SCWD's new Locust Street Office Higher-efficiency lighting and office equipment at the SqCWD offices
- ◆ Pump and motor replacement with higher-efficiency equipment
- ◆ Off-peak pumping
- ◆ Energy savings through water efficiency, conservation measures, conservation programs, and drought-related curtailment



3. Offsetting Energy POTENTIAL Carbon Offset Projects

- ◆ Home or business solar water heater rebate program
- ◆ Desalination facility “green” building design following LEED program principles
- ◆ Desalination facility on-site solar power generation
- ◆ Additional energy efficiency and load management measures
- ◆ Forestry management
- ◆ Salinity gradient power (brine-to-energy)
- ◆ Foodwaste-to-energy through anaerobic digestion
- ◆ Alternative WWTP biosolids end-uses
- ◆ Wetland restorations

Next Steps

- Completion of Energy Minimization and Greenhouse Gas Reduction Study: Spring 2010
- Will provide technical information to EIR

How to stay informed about the project

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Questions?

Energy Consumption Comparison

Plant	Date	Power Consumption (kWh/kgal)	Treatment Capacity (MGD)	Design Type (standard vs high efficiency)
Tampa Bay	2008	14.03	25	Standard
Barcelona	2009	15.78	51	High Efficiency
Perth I	2008	12.87*	38	High Efficiency
Larnaca, Cypress	2001	17.11	14	Standard
Ashkelon, Israel	2005	14.76	88	High Efficiency
Fujairah, UAE	2004	26.42	44	Standard
Pt. Lisas, Trinidad	2007	14.4	36	Standard
Sydney	2008	15.90	64	High Efficiency
Queensland	2009	11.62-13.55	66	High Efficiency

*Only includes energy associated with the treatment facility.