Wastewater Treatment Plants in the Future

Presented by
Mike Hogan

- Biogas Use
- Biosolids to Fertilizer/Biofuel
- Recycled Water
- Wind Energy
- Solar Energy
- Heat Recovery
- Co-digestion (Organic waste & FOG)
- Hydroelectric Energy
- Recycled Water
- Biosolids to Fertilizer/Biofuel
Presentation Overview

• External Drivers
  – Water Supply
  – Integrated Waste Management
  – Energy
  – Climate Change
  – Economy

• Sustainability

• Future Wastewater Treatment Plants

• Strategic & Business Planning
Water Supply

- Drought
  - Northern California
  - Colorado River
- Environmental
  - Bay Delta > Pumping Restrictions
- Quantification Settlement Agreement
  - Reduced Colorado River Water to California – 4.4 MAF
- Population Demands
- Agriculture Demands
- Industrial Demands
- State Goal to reduce water use by 20% by 2020
Water Supply

• Rapidly changing before our eyes
• Paradigm shift in the water business; the old ways are over
• Water offset programs for new development

Re-Think Water
Diversifying San Diego County’s Water Supply Portfolio

1991
Local Supplies: 5%
MWD: 95%

2008
Groundwater
Local & QSA Supplies 29%
MWD 71%

2020
MWD 29%
IID Transfer 22%
Canal Lining Transfer 9%
Groundwater 6%
Local Surface Water 7%
Recycled Water 6%
Seawater Desalination 10%
Conservation 11%
## Water Rates

<table>
<thead>
<tr>
<th></th>
<th>Loss of Sales (Shortage)</th>
<th>2009-10?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spot Water Transfers</td>
<td></td>
<td>2008&gt;</td>
</tr>
<tr>
<td>State Water Project</td>
<td></td>
<td>2003-2007</td>
</tr>
<tr>
<td>Colorado River Water</td>
<td></td>
<td>&lt;2003</td>
</tr>
</tbody>
</table>

Supply challenges make securing water more expensive. Shift to more-expensive supplies is driving up the cost of water.
Future of Water Supply

- Diversified Supply Portfolio
- Conservation
- Water Recycling/Demineralization
- Indirect Potable Reuse
- Desalination
- Conjunctive Use/Ground Water
- Existing Supply Infrastructure Repairs
- Storage
- New Construction Water Off-Set Programs
Wastewater Regulations

- Proposed Legislation requiring Ocean Dischargers to Recycle 50% of Wastewater Effluent by 2030
- Proposed Recycled Water Policy Goals
  - Increase recycle water over 2002 levels
    - 1 MAFY – 2020
    - 2 MAFY – 2030
  - Increase stormwater use over 2007 levels
    - 0.5 MAFY – 2020
    - 1 MAFY – 2030
  - Increase conservation in urban & industrial uses over 2007 levels
    - 20% - 2020
  - Increase recycled water use for potable water as much as possible by 2030
- Proposed Recycle Water Policy mandates the development of Salt/Nutrient Management Plans to protect watershed basins to attain water quality objectives and protection of water uses
Conservation & Residential Water Reuse

What is the impact to Wastewater Treatment Plants?

Rotary Sprinklers

Conservation Garden

Gray Water Systems

Residential Wells

Waterless Toilet

The 70 Gallon Challenge

Save Water Now
Integrated Waste Management

- Integrated Waste Management: Reduction of waste to landfills = Resource Recovery
- Biosolids Reuse Restrictions
- G&O Restrictions

What is the role of Wastewater Treatment Plants in managing organic wastes?
Organic Waste Management
**Energy**

**Timeline for Electricity from Renewable Resources**

- **2002:** Senate Bill 1078 establishes the Renewable Portfolio Standard Program, requiring 20% renewable energy by 2017.

- **2003:** Energy Action Plan I accelerated the 20% deadline to 2010.

- **2005:** Energy Action Plan II recommends a further goal of 33% by 2020.

- **2006:** Senate Bill 107 codified the accelerated 20% by 2010 deadline into law.

- **2008:** Governor Schwarzenegger issues Executive Order requiring 33% renewables by 2020.
SAN FRANCISCO Sep 27, 2006 (AP) - Gov. Arnold Schwarzenegger on Wednesday signed into law a sweeping global warming initiative that imposes the nation's first cap on greenhouse gas emissions, saying the effort kicks off "a bold new era of environmental protection."

Standing on picturesque Treasure Island with San Francisco's skyline in the background, Schwarzenegger called the fight against global warming an important issue of modern times.
AB 32: California Global Warming Solutions Act

• Enacts Governor’s 2020 reduction goals to 1990 levels
• Gives California Air Resources Board (CARB) broad authority to regulate all “significant” sources and categories of sources
SCOPING PLAN - General

- Adopted by CARB 12/11/08
- Measures to be adopted by 2012
- Measures are a mix of strategies that combine market mechanisms, other regulations, voluntary measures, and fees
SCOPING PLAN - Goals

- Reduce GHG emissions to 1990 levels by 2020
- Set the stage for long-range goal of 80% reduction below 1990 levels

* Business-as-usual
SCOPING PLAN - Goals

- Make transition to a clean energy future
- Transform California’s economy
ISSUES FOR WATER/WASTEWATER SECTOR

• Uncertainty of how water/wastewater will be impacted?
  – Water sector measures
  – Inventory development (increase accuracy)
  – Local Government regulations
  – CEQA impacts

• Segments of water/wastewater in “cap and trade” program

• Facing infrastructure cost if global warming predictions accurate $$$$$$$
Has the Financial Crisis Hit Rock Bottom?
Circling Future Wastewater Treatment Plants

- Climate Change
- Economy
- Waste Mgmt.
- Water Supply
- Energy

POTWs Sustainability
Sustainability

Over the past few decades, questions have been raised about how sustainable our ecosystems and water; land, and other resources are, given the current management practices and expected changes.

California’s water resources are finite and now require managing for sustainability – management that may be different than what has been practiced in the first 150 years of the state’s history. *

*DWR California Water Plan Update Draft 2009
Sustainability

A system that is sustainable meets today’s needs without compromising the ability of future generations to meet their own needs. A sustainable system generally provides for the economy, the ecosystem, and equity.*

*DWR California Water Plan Update Draft 2009
## Planning for the Future

<table>
<thead>
<tr>
<th>Needs</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Integrated Waste Management</td>
<td>Class A Biosolids: Thermal, Co-compost, Gasification -&gt;Soil Amendment, Fertilizer, Biofuel</td>
</tr>
<tr>
<td></td>
<td><strong>Organic Waste Co-digestion:</strong> G&amp;O, Food, Animal Wastes</td>
</tr>
<tr>
<td>Energy</td>
<td><strong>Biogas Utilization:</strong> Boilers, Cogeneration, Natural Gas, Vehicle Fuel</td>
</tr>
<tr>
<td></td>
<td><strong>Biosolids Pellets:</strong> Biofuel</td>
</tr>
<tr>
<td></td>
<td><strong>Green:</strong> Solar, Wind, Geothermal</td>
</tr>
<tr>
<td>Climate Change</td>
<td><strong>To Be Determined:</strong> Integrated Management Approach; Treatment, Energy, Biosolids, Air -&gt; Energy Off-Sets for Plant Expansions</td>
</tr>
<tr>
<td>Economy (Political/Financial)</td>
<td>$$$$$$$ -&gt; Strategic Business Planning</td>
</tr>
</tbody>
</table>
Conversion of Resources to Beneficial Use

Wastewater → Reclaimed Water
Stormwater → Soil Amendment
Sun → Fertilizer/Biofuel
Wind → Biogas/Natural Gas
Organic Waste → Electricity

Integrated Resource Recovery Center
Distributed Recycle Water Systems
Storm Water Reuse
Santa Monica Urban Runoff Facility.
Beneficial Uses for Biogas

- Boilers
- I.C. Engines
- Gas Turbines
- Fuel Cells
- Stirling Engines
- Micro-turbines
- Natural Gas
- Vehicle Fuel
Green Power – Energy Off-Sets

Solar

Biodiesel

Wind

Pooptricity:
Flush your turbine toilet

Modular Geothermal Plant
Co-Digestion of Organic Waste

- Food Industry Waste
- Animal Manure & Crop Wastes
- Institutional Organic Waste
- Residential Organic Waste

Wastewater Solids

Digestion

Landfill or Land Application

CH4 and CO2

Cogen

Landfill
Co-Digestion Significantly Increases Biogas Production
Thermophilic Plant For Food Waste
Energy Management Facility

Biogas

Cogeneration

Electrical/Thermal Energy
Biosolids Heat Drying Facility

Class B → Class A EQ Pellets = Biofuel, Soil Amendment, Fertilizer
Biosolids Management Plan

- Identified Markets
- Determine Market Demands
- Project Costs/Revenues
- Implement Business Strategy

“Black Gold”
Sustainable Buildings

• “Green Building” Design Approach

Current administration building

Administration building with the incorporation of solar panels
Incorporating Plant into Multipurpose Buildings
Integrated Water Reclamation and Energy Management

1. **Raw Sewage**
2. **Screenings Removal**
3. **Grit Removal**
4. **Primary Clarification (Chemically Enhanced)**
5. **Aeration (High Efficiency)**
6. **Secondary Clarification**
7. **Disinfection**
8. **Treated Effluent**
9. **Primary Sludge**
10. **Secondary Sludge**
11. **Filtration**
12. **Reclaimed Water**

Stream leading to **Reclaimed Water**.
Integrated Water Reclamation and Energy Management

- Screenings
- Grit
- Primary Clarification (Chemically Enhanced)
- Aeration (High Efficiency)
- Secondary Clarification
- Disinfection
- Filtration
- Treated Effluent
- Reclaimed Water
- Combined Heat and Power
- Electricity
- Gas Compression
- Landfill Gas
- Gas Flaring
- Biogas
- Gas Cleaning
- CO₂ Removal
- Gas Holding
- Gas Compression
- Hot Water Supply
- Hot Water Return
- Landfill
- Gas Flaring
- Combined Heat and Power
- Electricity
- Gas Compression
- Landfill Gas
- Gas Flaring
- Biogas
- Gas Cleaning
- CO₂ Removal
- Gas Holding
- Gas Compression
- Hot Water Supply
- Hot Water Return
- Landfill

- Organic Matter
- Thickening
- Screenings
- Removal
- Grit
- Primary Sludge
- Secondary Sludge
- Treated Effluent
- Reclaimed Water
- Combined Heat and Power
- Electricity
- Gas Compression
- Landfill Gas
- Gas Flaring
- Biogas
- Gas Cleaning
- CO₂ Removal
- Gas Holding
- Gas Compression
- Hot Water Supply
- Hot Water Return
- Landfill

- Raw Sewage
- Organic Matter
- Thickening
- Screenings
- Removal
- Grit
- Primary Sludge
- Secondary Sludge
- Treated Effluent
- Reclaimed Water
- Combined Heat and Power
- Electricity
- Gas Compression
- Landfill Gas
- Gas Flaring
- Biogas
- Gas Cleaning
- CO₂ Removal
- Gas Holding
- Gas Compression
- Hot Water Supply
- Hot Water Return
- Landfill

- Raw Sewage
- Organic Matter
- Thickening
- Screenings
- Removal
- Grit
- Primary Sludge
- Secondary Sludge
- Treated Effluent
- Reclaimed Water
- Combined Heat and Power
- Electricity
- Gas Compression
- Landfill Gas
- Gas Flaring
- Biogas
- Gas Cleaning
- CO₂ Removal
- Gas Holding
- Gas Compression
- Hot Water Supply
- Hot Water Return
- Landfill
Board of Directors

Strategic Planning

Strategic Direction

- Mission
- Vision

Organizational Values

Key Issues
Mission Statement

As an environmental leader, EWA provides sustainable and fiscally responsible wastewater services to the communities it serves while maximizing the use of alternative and renewable resources.
Vision Statement

Together, we are a model of excellence and innovation in the wastewater industry.

We give our best and work to create opportunities that enable each of us to reach our potential.

We strive continually to improve our organizational and environmental performance.

We pursue sustainable operations through resource recovery.

We explore new and creative methods to meet future challenges.

We support core values that guide us in our daily decision making to achieve our Vision.
Linking Strategic Direction & Management Strategies

Strategic Direction
- Mission
- Vision
- Organizational Values
- Key Issues

Board of Directors

Management/Staff

2013 Business Plan

OCTOBER 2013
2013 Business Plan

1. Introduction
2. Strategic Planning Process
3. Business Planning Process
4. SFA 1: Environmental Performance
5. SFA 2: Effective & Motivated Workforce
6. SFA 3: Asset Management
7. SFA 4: Continuous Improvement
8. Management Strategies & Objectives
2008
EWA Strategic and Business Planning Process

BOARD OF DIRECTORS
Strategic Direction
Mission Statement
Vision of Future
Organizational Values
Key Issues

MANAGEMENT
5-Year Business Plan
Strategic Focus Areas
Programs
Management Strategies

Strategic Focus Area 1
Environmental Performance

Programs
EWPCC O&M
Remote Facility O&M
Regional Source Control
Regional Laboratory
Biosolids Management
Energy Management

Strategic Focus Area 2
Effective & Motivated Workforce

Programs
Safety
Employee Recognition
Labor Relations
Professional & Leadership Development

Strategic Focus Area 3
Asset Management

Programs
E-CAMP
R-CAMP
Information Technology
Capital Improvement

Strategic Focus Area 4
Continuous Improvement

Programs
Strategic Planning
5-Year Business Plan
Best Mgmt. Practices
Financial Management
Regional Solutions

TACTICAL PLAN
Management Strategies & Objectives
Questions and Discussion