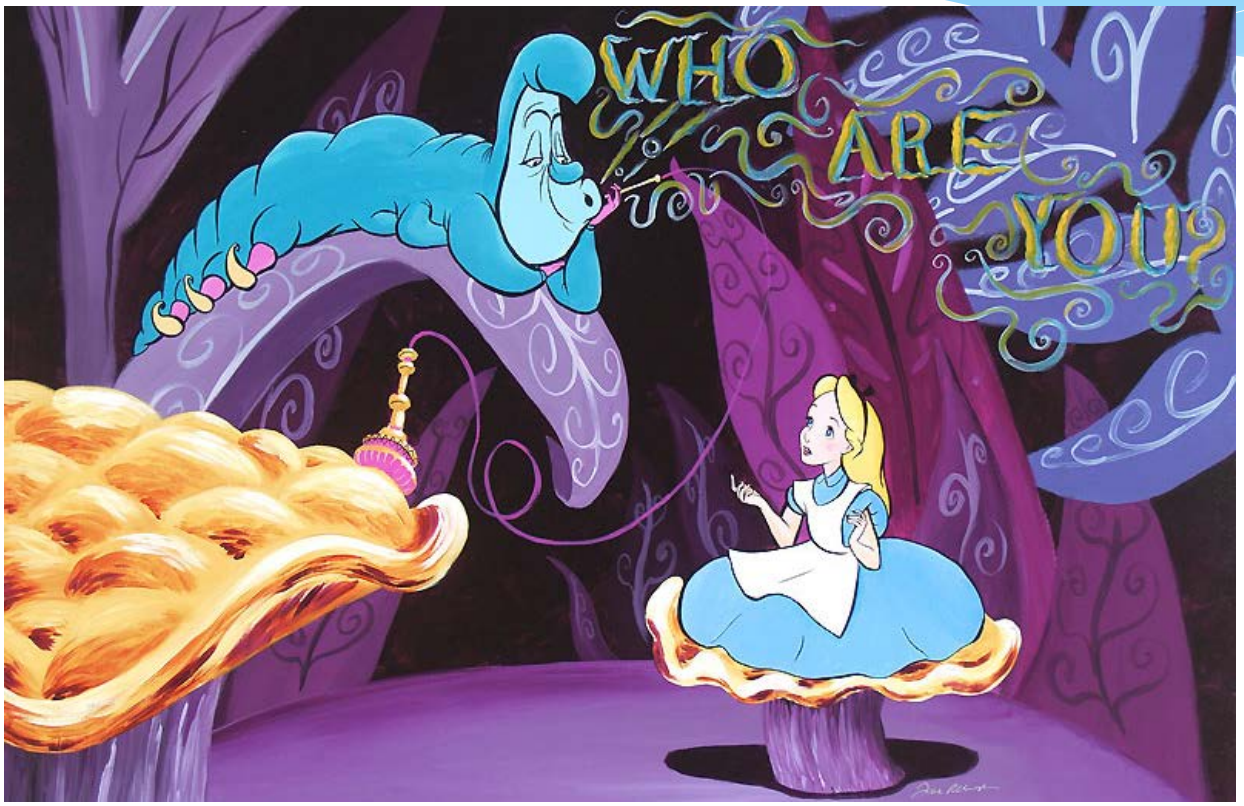
A (True) Tale of Two Finance Directors

Investing in Your WRRF's Energy Neutral Future

Who Are You?



Jeff Tucker
Dir. of Admin. Services/
Chief Financial Officer
Napa Sanitation District

How do you view your wastewater treatment plant manager?

What is a WRRF, exactly?

Sewage Treatment Plant

Publicly Owned Treatment Works

Wastewater Treatment Plant

Water Resources Recovery Facility

Water-Energy Nexus

Nearly 20% of California's total electricity consumption is water-related

Source: CA Energy Commission

Budget Impact of Electricity

Over 900 Wastewater Treatment Plants in California

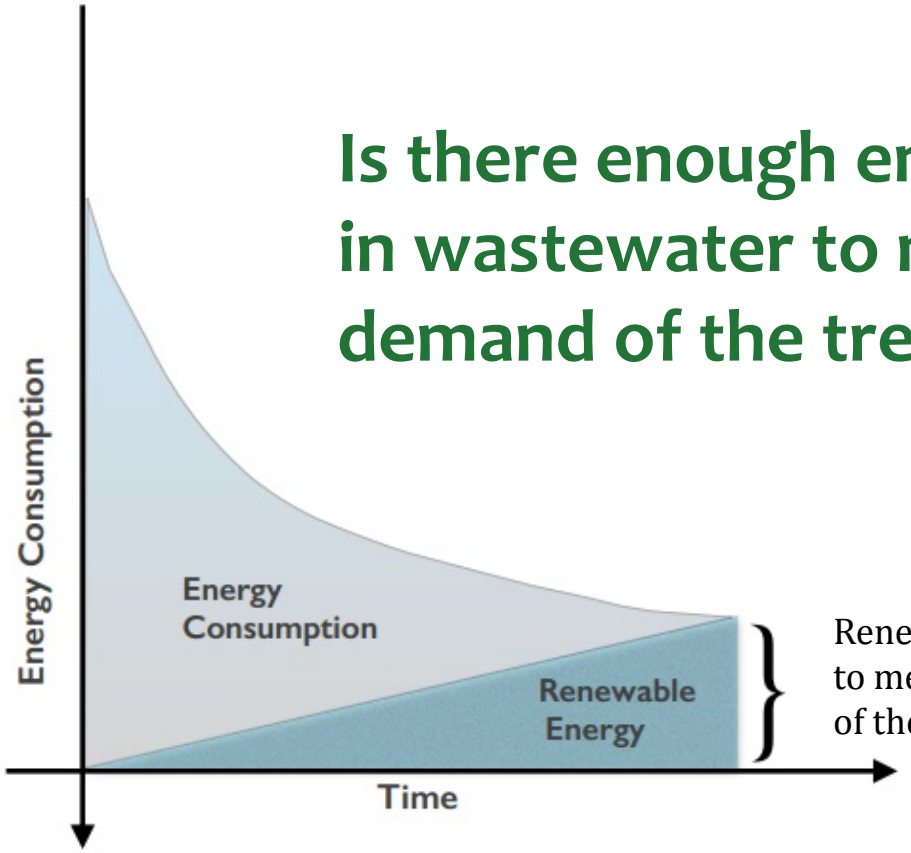
Sample Utility Costs:

Who	ADW Flow	Utility Budget
Coachella San	3 mgd	$415 k
Napa San	8 mgd	$951 k
Orange County San	190 mgd	$7.8 m

AWD = Average Dry Weather
mgd = million gallons per day

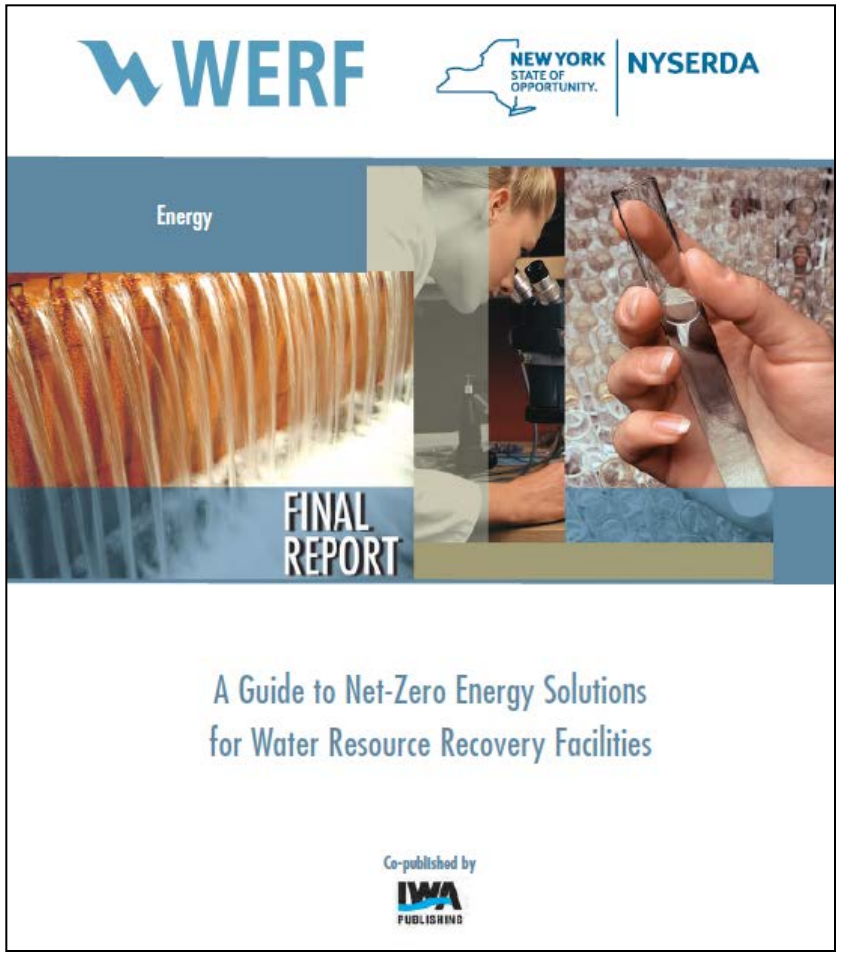
Is Net Zero Energy (NZE) Possible?

Is there enough energy potential in wastewater to meet the energy demand of the treatment plant?



Renewable energy sufficient to meet the energy demands of the WRRF

WERF – Water Environment Research Foundation



* Sankey energy diagrams for energy usage, by different plant process/design
* Evaluated impact of "Best Practices"
* Evaluated 18 different technologies/processes to minimize energy use or maximize energy potential

Sankey Energy Diagram

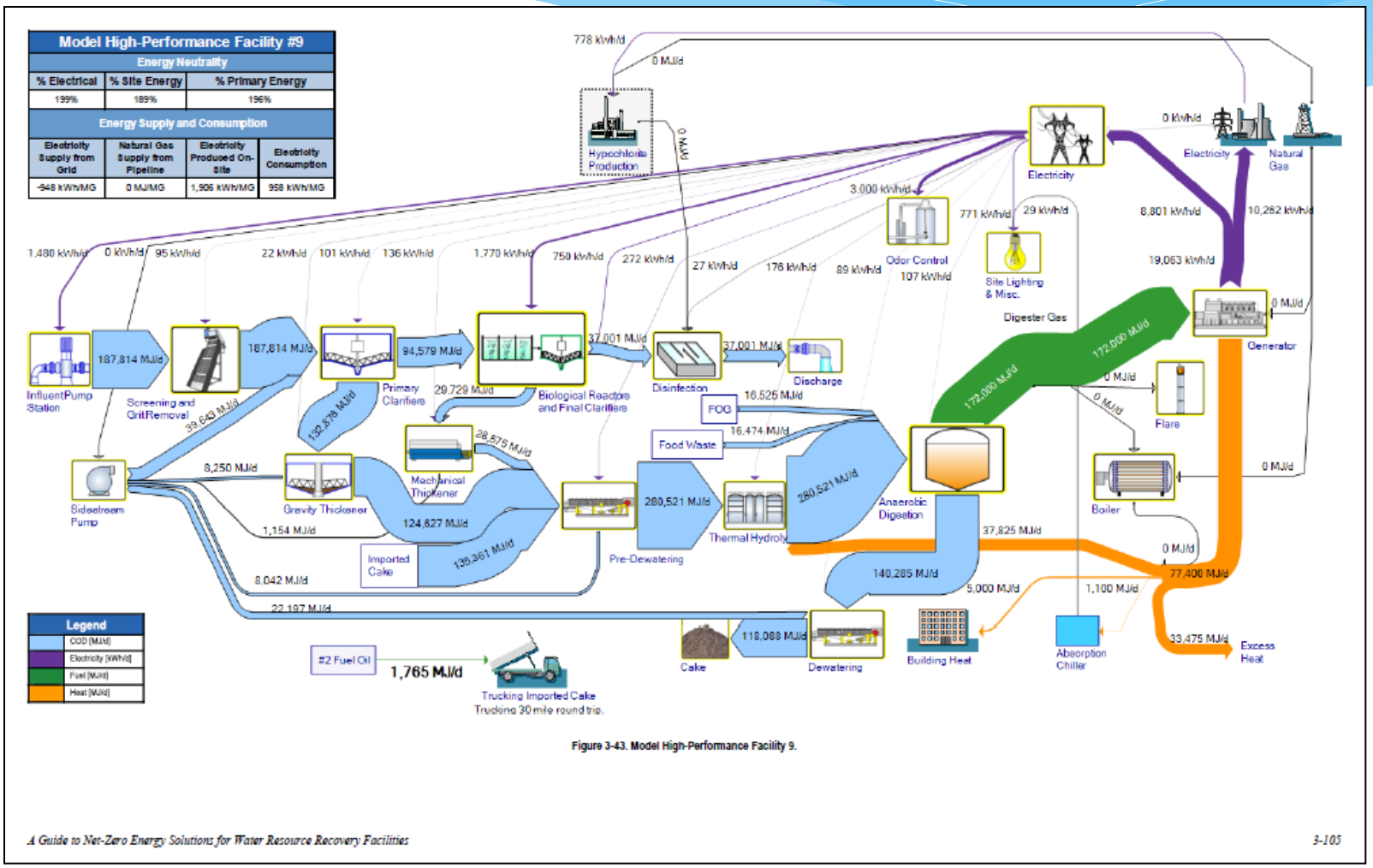


Figure 3-43. Model High-Performance Facility 9.

Sankey Energy Diagrams

Most significant ways to become NZE:

* 40% Reduction – Best Practices
  * Improved biosolids capture (e.g., CEPT)
  * Reduced blower fowling
* 35% – Anaerobic Digestion with Combined Heat & Power

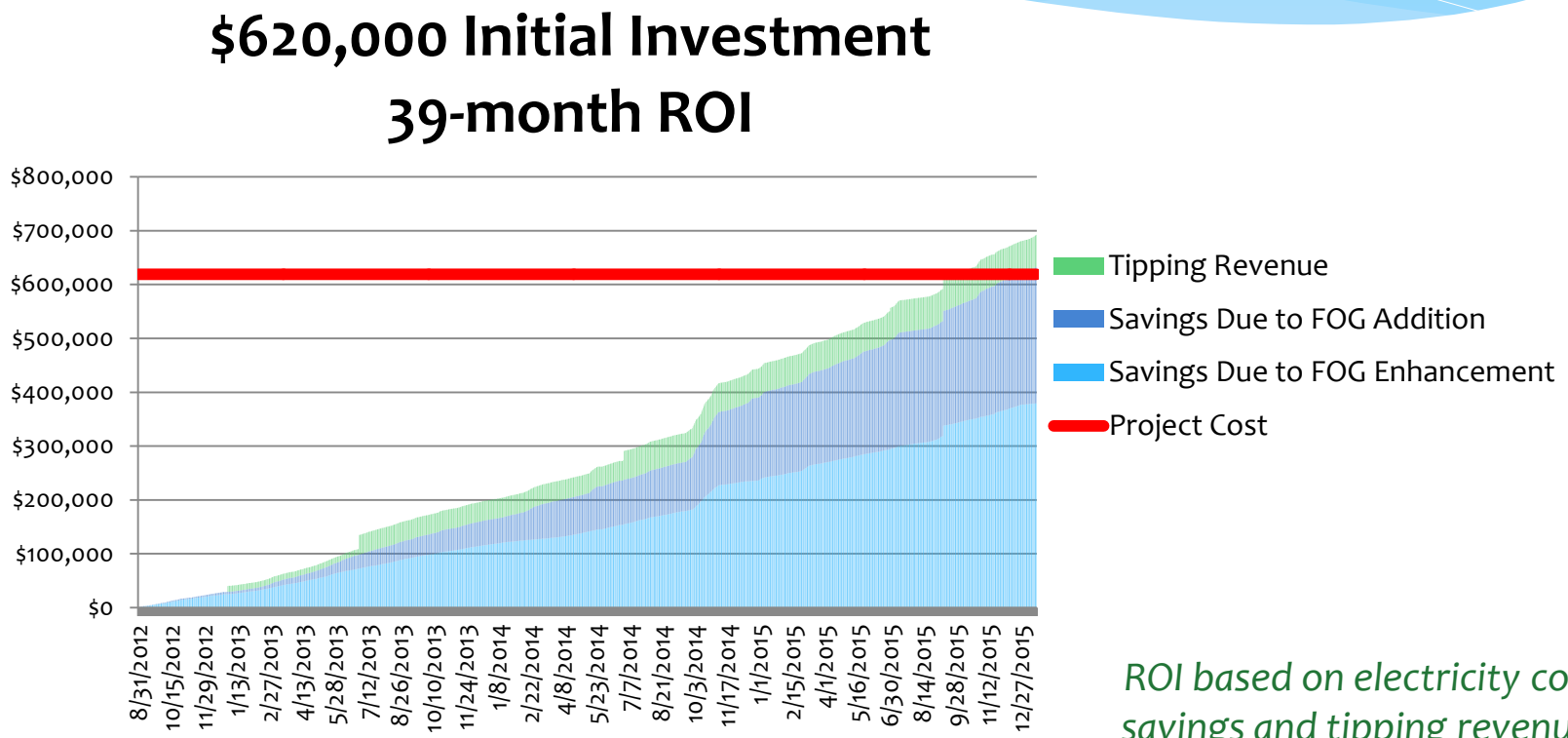
  About 15% of California WWTP have anaerobic digesters
* NZE – Co-digestion of high-strength waste (e.g., FOG)

FOG Receiving Station

Fats, Oil & Grease (FOG)

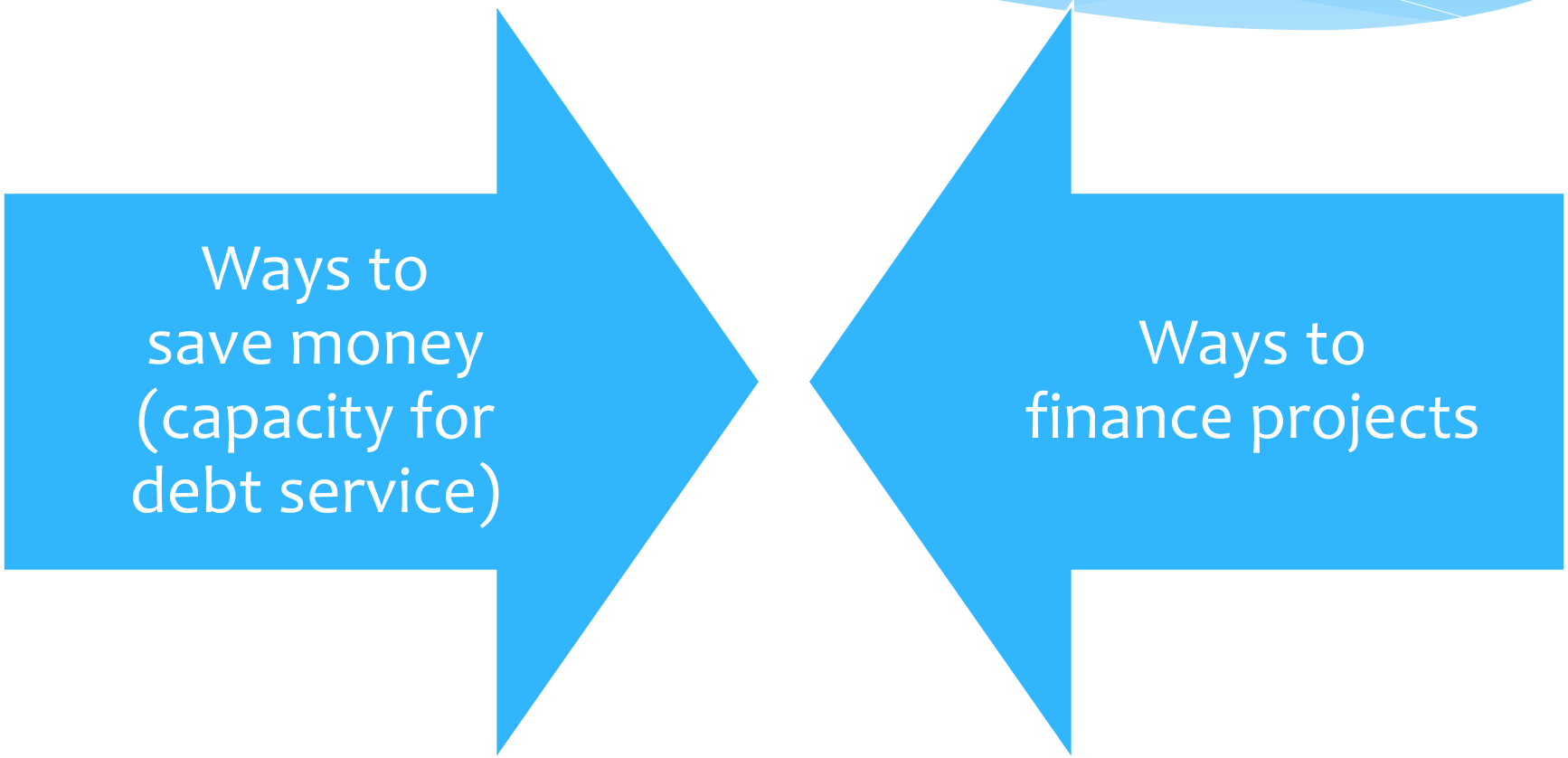
* Tipping fee charged
* Methane from FOG
* Increased methane production from biosolids

FOG Receiving Station



ROI based on electricity cost savings and tipping revenue. Does not include reduced solids handling costs.

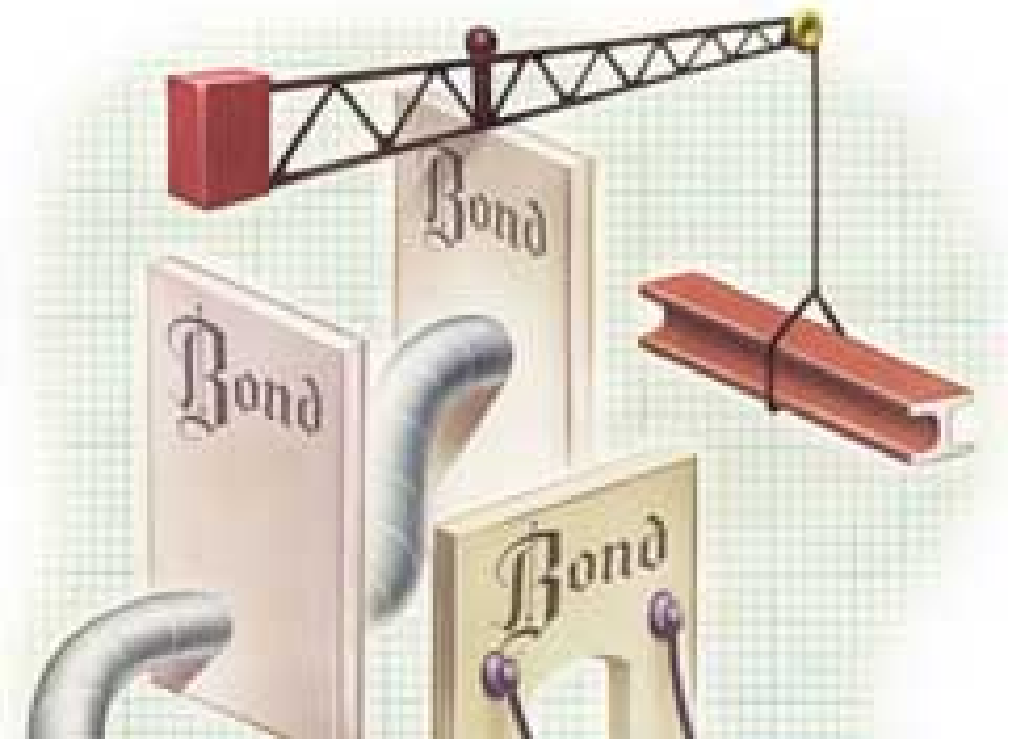
Convergence



How do we pay for it?

Traditional Methods - Bonds

* Muni Bonds
* Qualified Energy Conservation Bonds (QECBs)
* Clean Renewable Energy Bonds (CREBs)



How do we pay for it?

Traditional Methods - Loans

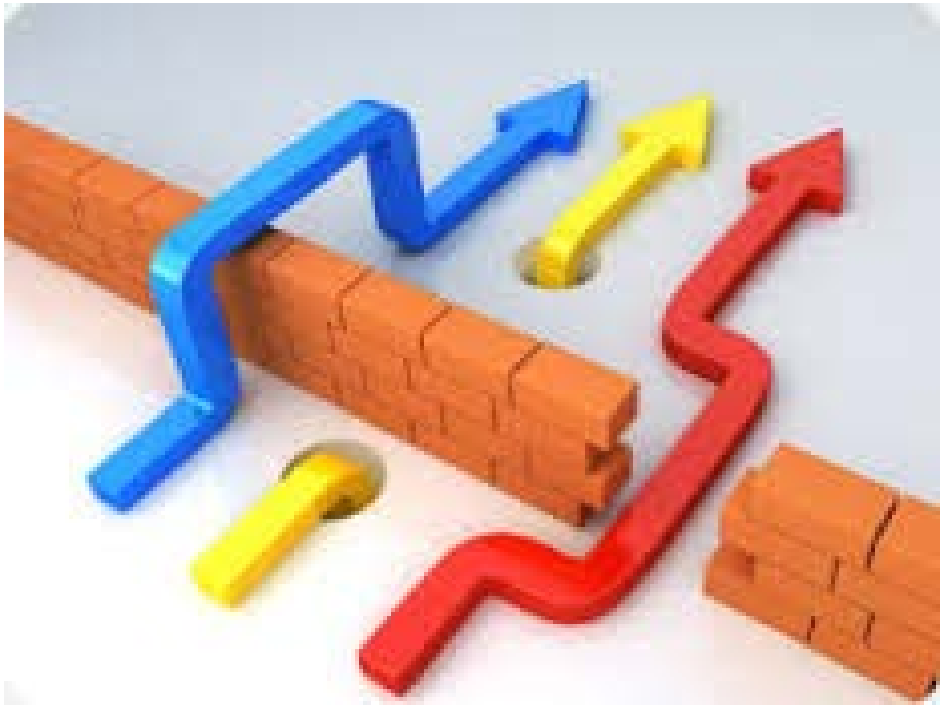
* State Revolving Fund (SRF) Loans
* Private Placement Loans or Capital Leases

Clean Water
State Revolving Fund

How do we pay for it?

Alternative Methods

* Utility Financing / Incentives
* P3 (that really works!)
* Internal Financing



How do we pay for it?

Utility Financing / Incentives

* **Self-Generation Incentive Program (SGIP)**
  (Solar / Co-Generation / Waste Heat Capture)
* **Local Government Renewable Energy Self-Generation Bill Credit Transfer Program (RES-BCT)**
* **Net Energy Metering (NEM)**

How do we pay for it?

Utility Financing / Incentives

* **On-Bill Financing**
  * Up to $1 million
  * 10 years
  * 0% interest
* **Demand Response** ("Load Shedding")

How do we pay for it?

Private-Public Partnerships (P3)

* **Power Purchase Agreements** (PPAs)
  * E.g. Solar

    Price per kwh less than PG&E/SCE

* **Shared Savings Financing**
  * E.g. Stationary Battery Storage

    50%-50% split of
    demand charge savings

How do we pay for it?

Private-Public Partnerships (P3)

* **Design / Build / Finance**
  * E.g. San Luis Obispo WRRF

Construction cost:	$9.5m
O&M Avoided Cost:	$168k
Energy savings:	$157k

Team:
AECOM – Design
PG&E – Contractor
Financing – SRF Loan

Results:
25% Reduction in electricity usage
Savings pay Debt Service

Project:
Cogeneration Engine
Headworks
Tertiary Filters
Dewatering
VFDs
Lighting Efficiency
SCADA upgrade

How do we pay for it?

Internal Financing

How do we pay for it?

Internal Financing

* Change to Investment Policies
* Structure like Private Placement Bond (revenue pledges)
* Use of Financial Advisor
* Advantages: Risk Management, Yield

Other Thoughts

Total Cost of Ownership – Example

AB Diffuser Replacement

Energy Audit:

Energy Savings (audit) $50,000/yr

Project:	Cost	ROI
Diffuser Replacement	$200,000	4.0 yrs
Outside Engineering	$25,000	4.5 yrs
DO probes, new manifold	$120,000	6.9 yrs

Life expectancy: 6-8 years

Other Thoughts

Cal. Government Code § 4217

Public bidding not required if
the cost of energy under the project
is less than the cost for energy otherwise provided
or
if the cost of financing the capital project
is less than the cost of energy otherwise provided

Other Thoughts

Manage the Message with Board / City Council

* Expense vs. Investment
* Green Energy / Sustainability
* Lower Rates = Easier Rate / Prop 218 Processes

Comments?

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