Energy & Water:
A Growing and Increasingly Important Partnership

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First Western Forum on Energy & Water Sustainability
“Water is for life, power for progress.”

Unknown
First Steps
Building the Aqueduct
Metropolitan Water District of Southern California

- 6 counties; 5,200 Square Miles
- 18+ million people
- Regional economy: $600+ Billion
- Projected growth: ~220,000 people/year
- MWD provides about half of Southern California’s supply
Where Southern California Gets its Water

LAKE SHASTA

LAKE OROVILLE

Bay-Delta

STATE WATER PROJECT

COLORADO RIVER AQUEDUCT

METROPOLITAN WATER DISTRICT SERVICE AREA

LOCAL

LOS ANGELES AQUEDUCTS
Colorado River Aqueduct

- 240 miles
- 5 pumping plants
- 300 MW demand
- 1600 foot lift
- 2 MWh/AF
- 890 TAF - 2005
California State Water Project

- 440 miles (East Branch)
- 8 pumping plants
- 5 generating plants
- 3400 foot lift
- 3 MWh/AF net
- 1.5 MAF - 2005
- 70% of power cost
Metropolitan’s Power Costs & Revenues

- Transportation: $200 million
- Treatment: $5 million
- Generation: $20 million
California Energy Commission has begun to look at the water-energy relationship

“...total water-related energy consumption is large, using roughly 19 percent of all electricity used in California,...”

Metropolitan Small Hydro Power Plants

16 Plants – 126 MW – 450M kWh
FY 2006/07 Capital Investment Plan
$1.84 Billion Budget
CIP FY 2006/07 Expenditure Plan
$561 Million

- Water Quality: $179 M
- Infrastructure Reliability: $173 M
- Stewardship: $56 M
- Info. Tech.: $12 M
- Supply & Delivery Reliability: $142 M
Efficiencies for Energy

- Facilities designed with high-efficiency motors and lighting systems
- Reduced peak energy usage with variable frequency drivers
- Energy management systems
- More efficient air conditioning systems
- Energy audits
Water / Energy Partnering

- Energy Utilities
- Energy Regulatory Agencies
- Research Efforts
Hoover and Parker Dams: An Early Linkage
Electrical Transformers at Gene Pumping Plant
Treatment Technologies
Ozone Generators
Skinner Plant Solar Generation Facility

- 1 MW Solar Facility
- Ground Mounted
- Single-Axis Tracking
- 5-6 Acres Required
- Produce up to 2M kWh/year
- 10M kWh Current Usage
Wind Power
Along the CRA

- Monitoring 4 Sites at Hinds Pumping Plant
- 2 Years of Data
- Additional Pumping Plants in 2007
Solar Power

• Investigating since 2002
• New Water Treatment Increases Electrical Load
• Thin Film on Solid Reservoir Covers
• Roof/Parking Structure/Open Land
• Consultant Study 2006
• Skinner First Installation
Small Hydro Development

- Two 4.5 MW Units Under Investigation
- Reconfiguration of Hydro at Diemer
- Study of Potential Sites
Water / Energy Drivers

- Increasing population
  - Thirsty millions
- Changing water treatment technologies
  - Ozone
  - UV
- Acquiring new sources of water
  - Seawater
  - Reclaimed
  - Transportation
Conservation Efforts

- Residential
  - Toilets
  - Washers
- Business
  - Equipment upgrade
  - Application process
- Landscaping
  - California native
California Friendly Technologies
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“Products”

"CALIFORNIA FRIENDLY" MODEL HOME

This landscape irrigation system is designed based on plant water use requirements and hydrozones for the most efficient use of water. Irrigation of low water use shrub and ground cover areas are separated from the irrigation of higher water use turf areas.

Low gallonage sprinkler heads, automatic irrigation timers, and drip irrigation to the pots have been used to create an efficient water delivery system with very little water waste.

Shea homes has also installed drought tolerant landscaping throughout this model complex as an example of the aesthetic qualities which this type of landscape can produce.
Local Resources

GROUNDWATER BASINS

GREAT BASIN WATER DISTRICT OF SOUTHERN CALIFORNIA
The End