THE PATH TO WATER SUPPLY RESILIENCE IN AN ERA OF SCARCITY – EXAMPLES OF SUPPLY DIVERSIFICATION

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GLOBAL PRACTICE LEADER – ALTERNATIVE WATER SUPPLY
Q28. What are main drivers for Alternative Water Supplies (AWS) in your community? (Select all that apply) [DRINKING WATER SERVICES]

- Water Supply (drought): 59.2%
- Commitment to resource recovery: 39.4%
- Resilience: 33.8%
- Desire for fit for purpose water: 19.7%
- Wastewater disposal: 16.9%
- Don't know: 9.9%
CLIMBING THE LADDER OF WATER SUPPLY OPTIONS

Conservation

Groundwater

Surface Water

Non-Potable Recycled Water

Brackish Groundwater

Potable Recycled Water

Seawater Desalination

COST

COMPLEXITY

TIME
Q29. What is the biggest challenge your organization faces in developing new Alternative Water Supplies (AWS) projects? (Select one choice) [DRINKING WATER SERVICES]
### COMPARATIVE TREATMENT COSTS

<table>
<thead>
<tr>
<th>Type</th>
<th>Treatment</th>
<th>Cost ($/AF)</th>
<th>Cost ($/1000gal)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Groundwater</td>
<td>None or Filtration + RO</td>
<td>200 - 500</td>
<td>0.62 – 1.53</td>
</tr>
<tr>
<td>Surface Water</td>
<td>Pumping + Aqueduct + Filtration</td>
<td>450 - 1000</td>
<td>1.39 – 3.07</td>
</tr>
<tr>
<td>Recycled Water</td>
<td>Filtration + RO + UV + H₂O₂</td>
<td>700 - 1200</td>
<td>2.16 – 3.68</td>
</tr>
<tr>
<td>SWRO</td>
<td>Filtration + RO</td>
<td>800 - 1500</td>
<td>2.45 – 4.60</td>
</tr>
</tbody>
</table>
LOUDOUN WATER – SUPPLY DIVERSIFICATION

2000: 20 MGD
- Surface Water
- Additional Surface Water
- Conservation
- Recycled Water

2015: 49 MGD
- Surface Water
- Additional Surface Water
- Conservation
- Recycled Water

2030: 70 MGD
- Surface Water
- Additional Surface Water
- Conservation
- Recycled Water

- Have access to surface water
- Unanticipated growth in data centers
- Cooled with recycled water
CENTRAL FLORIDA INITIATIVE

- Historically a groundwater system
- Permitted withdrawals
- Limited surface water
- Projected 50% population growth

CURRENT

2030

GROUNDWATER
SURFACE WATER
CONSERVATION
RECYCLED WATER
CASE STUDY – SAN DIEGO COUNTY

- Wholesale water agency created by State Legislature in 1944
  - 24 member agencies
  - 36-member board of directors
  - 3 million people
  - $188 billion economy

- Mission is to provide safe and reliable water supply to member agencies

- Service area
  - 950,000 acres
  - 97% county’s population
SAN DIEGO SUPPLY DIVERSIFICATION

Resource Strategies to Manage Shortages

<table>
<thead>
<tr>
<th>Strategy</th>
<th>1991</th>
<th>2012</th>
<th>2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>Long-term Conservation</td>
<td>875</td>
<td>69,680</td>
<td>~100,000</td>
</tr>
<tr>
<td>Recycled Water</td>
<td>1,170</td>
<td>24,010</td>
<td>24,010</td>
</tr>
<tr>
<td>Brackish Groundwater</td>
<td>0</td>
<td>6,280</td>
<td>6,280</td>
</tr>
<tr>
<td>Colorado River Transfers</td>
<td>0</td>
<td>165,000</td>
<td>165,000</td>
</tr>
<tr>
<td>Seawater Desalination</td>
<td>0</td>
<td>0</td>
<td>56,000</td>
</tr>
<tr>
<td>TOTAL (Acre-Feet)</td>
<td>2,045</td>
<td>264,970</td>
<td>350,000</td>
</tr>
</tbody>
</table>

1991 Supply Portfolio
- MWD 95%

2012 Supply Portfolio
- MWD 45%

2017 Supply Portfolio
- MWD ~25%
COST OF SAN DIEGO ALTERNATIVES

- **Carlsbad (Poseidon)**
  - $/AF: $1,717 to $2,041
  - Costs for 100 mgd

- **Mission Basin Narrows**
  - $/AF: $1,475

- **Otay River**
  - $/AF: $1,717 to $2,086
  - Costs for 50 mgd

- **City of SD RWS * **
  - $/AF: $1,975
  - Costs for 2,375**

- **North San Diego County Regional Reuse**
  - $/AF: $1,628 to $1,730
  - Costs for 100 mgd

- **Camp Pendleton Desalination**
  - $/AF: $1,900 to $2,290
  - Costs for 50 mgd

Legend:
- **Brackish Groundwater**
- **Indirect Potable Reuse**
- **Seawater Desalination**
CURRENT AND FUTURE USE OF NON-POTABLE INDUSTRIAL REUSE

- **Power plants**: 24.1% Currently in use, no plans to increase, 8.4% Currently in use, increase in 3 years, 6.1% Not in use, implement in 3 years, 24% Not in use, no plants to implement, 65.1% Total
- **Cooling towers**: 16.0% Currently in use, no plans to increase, 11.1% Currently in use, increase in 3 years, 2.5% Not in use, implement in 3 years, 70.4% Total
- **Local industries**: 6.2% Currently in use, no plans to increase, 13.6% Currently in use, increase in 3 years, 6.1% Not in use, implement in 3 years, 74.1% Total
- **Refineries**: 6.2% Currently in use, no plans to increase, 3.7% Currently in use, increase in 3 years, 6.1% Not in use, implement in 3 years, 84.0% Total
- **Data Centers**: 8.7% Currently in use, no plans to increase, 8.6% Currently in use, increase in 3 years, 81.5% Total
- **Mining**: 6.3% Currently in use, no plans to increase, 9% Total

26. What is your organization’s current level of usage and future plans for the following types of non-potable industrial reuse? (Select one choice per row) [Answer choices shown: Currently in use (no future plans) (2) Currently in use, plan to increase within 3 years (3) Not in use – plan to implement in 3 years, (4) Not in use, no plants to implement/I don’t know] [DRINKING WATER SERVICES]
BENEFITS OF DIVERSIFICATION

- Enables continued growth
- Usually a local supply
- Hedge against supply limitation
- Improves reliability/system resilience
- Does come at a premium
- Economic benefit
Building a world of difference.

Together

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