Small & Micro Hydropower
TAPPING THE ENERGY POTENTIAL WITHIN WATER SUPPLY SYSTEMS
CONDUIT HYDROPOWER FOR MUNICIPAL WATER SYSTEMS
HARNESSING ENERGY POTENTIAL
Our small hydro solutions can help you achieve higher operating efficiencies, meet your sustainability objectives, reduce your carbon footprint, and maintain system reliability.

WHAT IS MUNICIPAL WATER SYSTEM (MWS) HYDRO?
- Built within the existing system
- Usually considered small or micro hydro
  - Small hydro <10 MW
  - Micro hydro <250 kW

BENEFITS OF MWS HYDRO
- Offsets power consumption for water utility
  - Extra power to be sold
- Federal and state financial incentives may be available
- Renewable energy source
- Reliable generation capacity
- Limited community impact
- Limited ecological impact since water is already in treatment system
- Technology continues to develop and increase zone of feasibility

IDEAL CONDITIONS FOR MWS HYDRO
- Existing pressure reduction facilities
- Large-diameter transmission pipes
- Zone 2 head and flow
  - Reliable and predictable flow and head
  - Zones 1 and 3 may be feasible in certain circumstances

1 MINIMUM STREAM FLOW RELEASE
Reliable head and flow at dam release
Robert V. Trout Hydropower Project
Discharge from raw water reservoir
- Part of Colorado Big Thompson Project
- Head = 160 ft.
- Flow = 160 mgd
- Output = 2.6 MW
- Construction cost = $5,300,000

2 RAW WATER
Head-breaking structure before water treatment plant
Rancho Penasquitos Pressure Control and Hydroelectric Facility
Located along 108-inch raw water pipeline
- Single turbine in parallel with four pressure control valves
- Head = 173 ft.
- Flow = 225 mgd
- Output = 4.5 MW
- Construction cost = $21,000,000

Arlington Outlet Hydroelectric Project
48-inch raw water outlet
- Head = 154 ft.
- Flow = 80 mgd
- Output = 1.3 MW
- Power sold to the grid
- Construction cost = $3,500,000

3 POTABLE WATER
Topography creates need for pressure reduction
Hillcrest Hydroelectric Project
On 60-inch diameter treated water transmission pipeline
- Transmission pipeline
  - Head = 170 ft.
  - Flow = 103 mgd
  - Output = 2.0 MW
  - Used to power pump station
  - Construction cost = $6,100,000

4 TREATED EFFLUENT
Energy recovery structure at outfall
- Many projects evaluated
- Costs not currently feasible
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EXPERIENCE
1 MINIMUM STREAM FLOW RELEASE
Reliable head and flow at dam release
Robert V. Trout Hydropower Project
Discharge from raw water reservoir
  ■ Part of Colorado Big Thompson Project
  ■ Head = 150 ft.
  ■ Flow = 160 mgd
  ■ Output = 2.6 MW
  ■ Construction cost = $5,300,00

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ZONE 1 HIGH HEAD
ZONE 2 IDEAL CONDITIONS
ZONE 3 HIGH FLOW

Head and Flow Relationship
Head and flow alone do not guarantee generation capacity. Project specific constraints must be evaluated on a case-by-case basis.

1 Minimum Stream Flow Release
Reliable head and flow at dam release

2 Raw Water
Head-breaking structure before water treatment plant

3 Potable Water
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4 Treated Effluent
Energy recovery structure at outfall
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