

This presentation premiered at WaterSmart Innovations

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INNOVATIONS

“The Cost of Capacity”

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A photograph of a road sign on a foggy day. The sign is rectangular with a black background and white text. It is supported by two black posts. The road is a two-lane asphalt road with a white dashed line down the center and a solid white line on the right edge. The fog is thick and white, obscuring the background. The sky is a pale, hazy blue. The overall mood is mysterious and somewhat somber.

END OF EARTH 2



In Irish,
“Troy” means
“Water”



The Cost of Water and Sewer (per 100 Gallons)

- 💧 Olympia, WA: \$1.00
- 💧 El Paso, TX: \$0.60
- 💧 Boston, MA: \$1.05
- 💧 San Diego, CA: \$1.38
- 💧 Geneva, Switzerland: \$1.95
- 💧 Glasgow, UK: \$2.86

Source: "The World's Water 2008-2009" by Peter H. Gleick



U.S. / World Population

1960: 179 Million / 3.04 Billion

2010: 308 Million / 6.80 Billion



**U.S. Water Footprint
(per person/per day):
70-100 GPD**

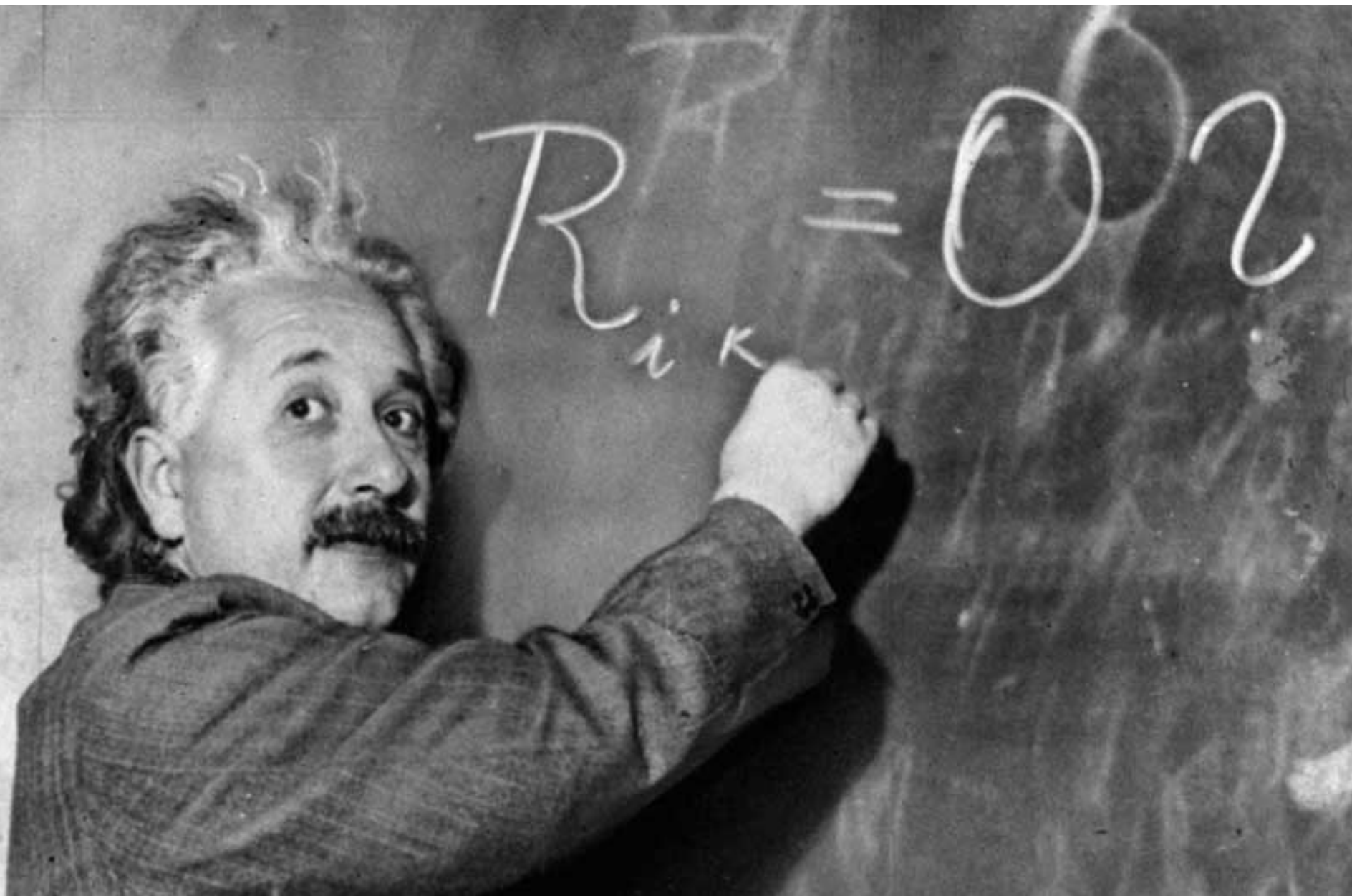




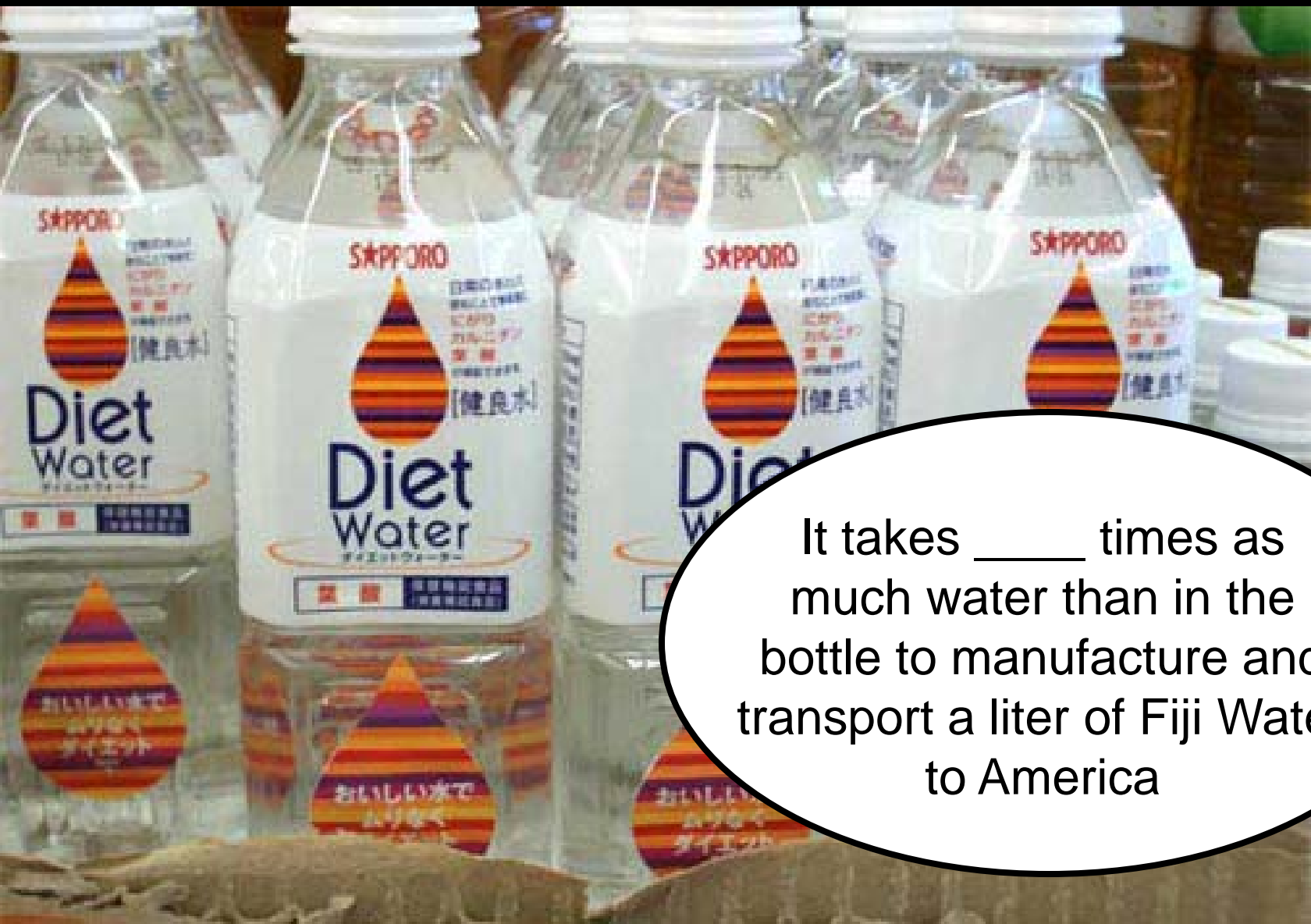
The Cost of Capacity



How is Cost of Capacity Calculated?



WATER FODDER



It takes _____ times as much water than in the bottle to manufacture and transport a liter of Fiji Water to America

WATER FODDER



It takes **6.74** times as much water than in the bottle to manufacture and transport a liter of Fiji Water to America

Cost of Creating:

- 💧 New Water Capacity
- 💧 New Water Treatment Capacity
- 💧 New Nega-Gallon / Conservation Capacity



Calculation Parameters

- Cost comparisons are for illustration purposes only to demonstrate the concept of capacity cost relativity. Case-by-case cost comparisons will need to be made in your area for all presented alternatives as costs can vary drastically region by region.
- We are only comparing costs (per gallon/day) of:
 - New water creation capacity
 - New water treatment capacity
 - New nega-gallon / conservation capacity

Drilling New Water Wells



Cowlitz County, WA

Cost: \$38.7 Million*

Capacity: 10-20 Million GPD

Cost of Capacity: \$1.93 - \$3.87

Reclaimed Water (Purple Pipe)

A photograph of a water treatment facility. The scene is filled with industrial equipment, including large tanks, pipes, and valves. The pipes are painted in two colors: purple and yellow. The purple pipes are the focus of the image, representing reclaimed water. The yellow pipes are also visible, likely representing other types of water. The background shows more of the facility, with various structures and equipment.

Approximate Cost: \$10-\$20M*
Capacity Goal: 250,000 GPD
Cost of Capacity: \$40 - \$80

Rainwater Collection

Illustrated is an example of how a rainwater harvesting system could be used in a residential application.

Harvested rainwater can be used for:

- Toilets
- Irrigation
- Laundries or
- Other non-potable uses.



Storage Tank Floating Filter and Hose
Fig. #RH9532C

- 3 The floating filter and pump extracts the harvested rainwater from the cleanest part of the tank, just below the water surface for use in the house.



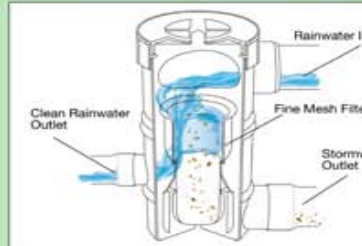
Figure Number: RH9530DOK – Multi-functional Overflow Device

- 4 The overflow/backwater device in the tank is designed to skim floating particles from the surface of the water when the storage unit overflows.

Overflow from a rainwater system can be used for groundwater recharge, reducing stormwater runoff.

Tank
Water quality in the tank is maintained by removing the organic matter and by the action of incoming water which introduces oxygen. Water that is kept aerobic in this way does not become malodorous even when stored for long periods.

How the Vortex Rainwater Filter Works



Residential

Cost: \$10,000

Capacity: 180 GPD

Cost of Capacity: \$55.55

Above or Below Grade Applications
Figure Number: RH9520-06

- 1 At the point of discharge, the high capacity vortex rainwater filter removes large and fine debris.



Smoothing Inlet
Fig. #RH9530SI

- 2 From the filter, the collected water enters the storage tank or cistern through the smoothing inlet which prevents agitation of sediment and oxygenates the water.



Float Switch
Fig. #RH9542FSC – Water Feed, Normally Closed (N/C)

Pump

NOTE: During low rainfall events, an alternative make-up water source such as the city or county water system is required to replenish the storage tank. The appropriate backflow preventer assemblies, per the local jurisdiction, are required for this application.

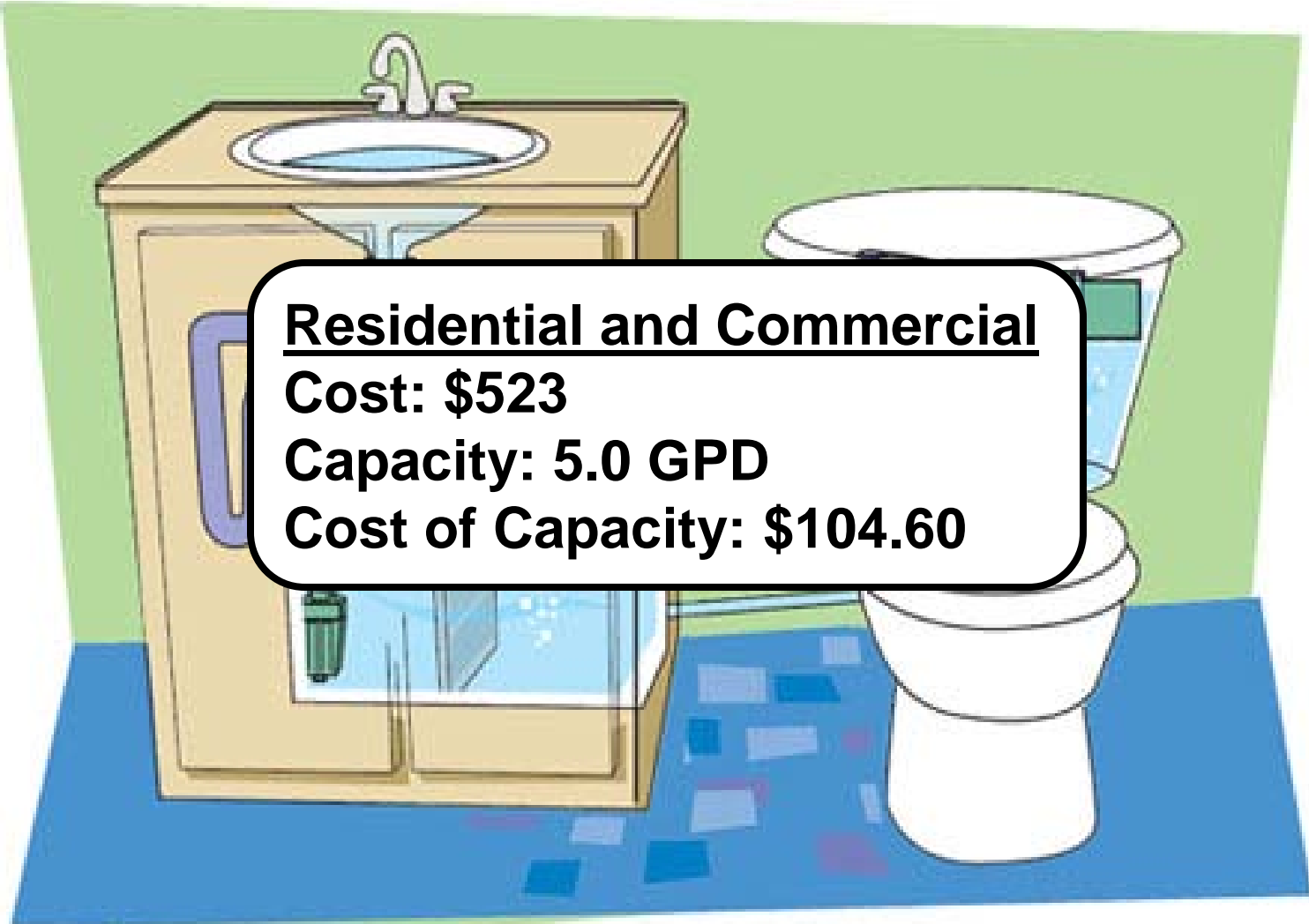


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Member of:  and 

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Greywater Systems



Residential and Commercial

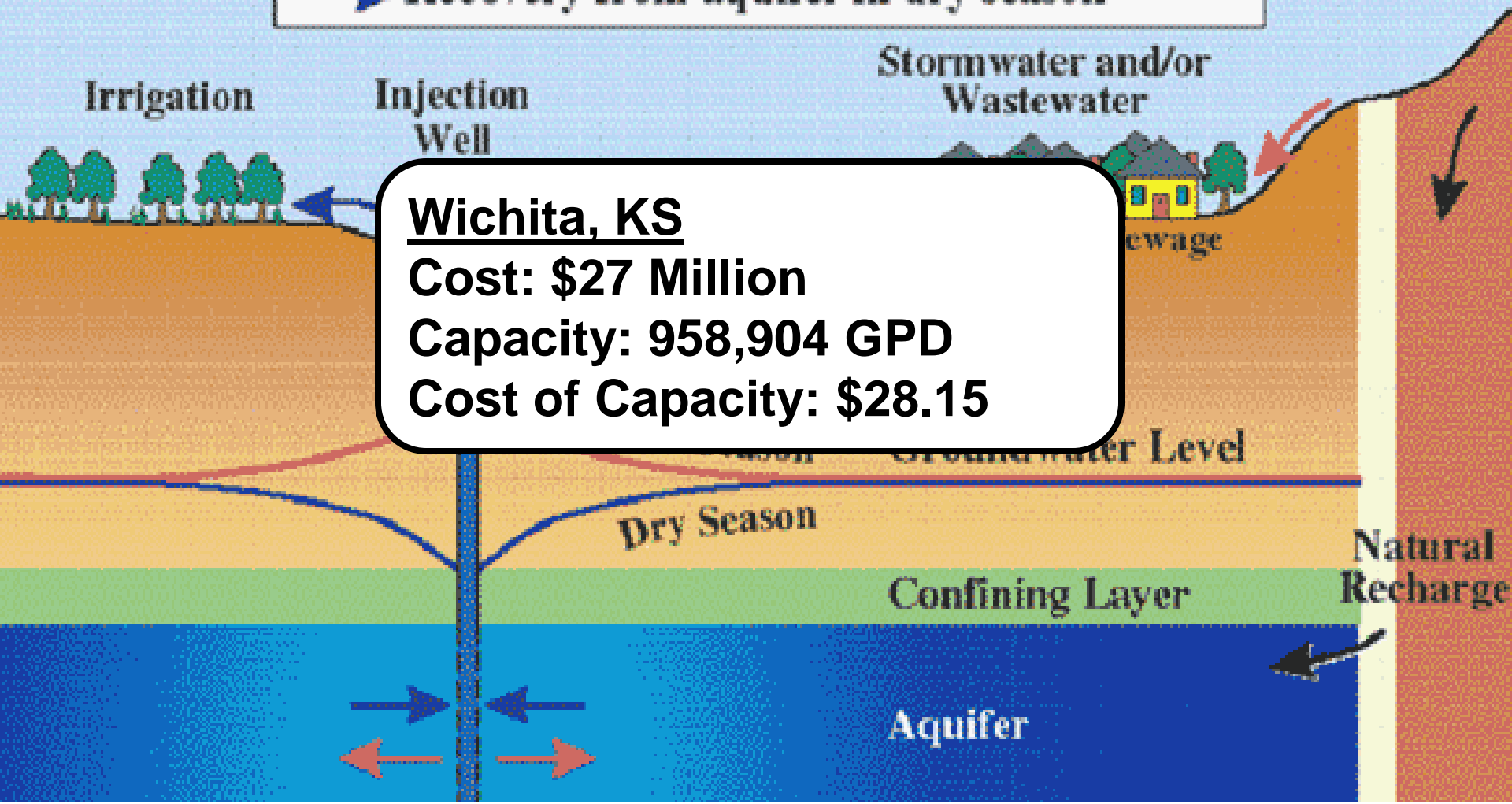
Cost: \$523

Capacity: 5.0 GPD

Cost of Capacity: \$104.60

Aquifer Storage and Recovery

→ Storm/Waste-water to aquifer in wet season
→ Recovery from aquifer in dry season



Wichita, KS

Cost: \$27 Million

Capacity: 958,904 GPD

Cost of Capacity: \$28.15

Desalination

The background image shows a vast industrial facility, likely a desalination plant. It features numerous rows of large, white, cylindrical membrane modules mounted on metal frames. The facility has a high ceiling with exposed steel beams and industrial lighting. The overall scene is a complex network of pipes, valves, and structural supports.

Sydney, Australia

Cost: \$1,495 Million

Capacity: 66 MGD

Cost of Capacity: \$22.65

WATER FODDER



___ % of an
infants body weight
is water

WATER FODDER



80 % of an
infants body weight
is water

Cost of Creating:

- 💧 New Water Capacity
- 💧 New Water Treatment Capacity
- 💧 New Nega-Gallon / Conservation Capacity



Waste Water Treatment Plant I

Brightwater

Cost: \$1.84 Billion

Capacity: 36 Million GPD

Cost of Capacity: \$51.11



Waste Water Treatment Plant II



Hawks Prairie Estimate

Cost: \$99.4 Million

Capacity: 5 Million GPD

Cost of Capacity: \$19.88

On-Site Waste Water Treatment



Islandwood

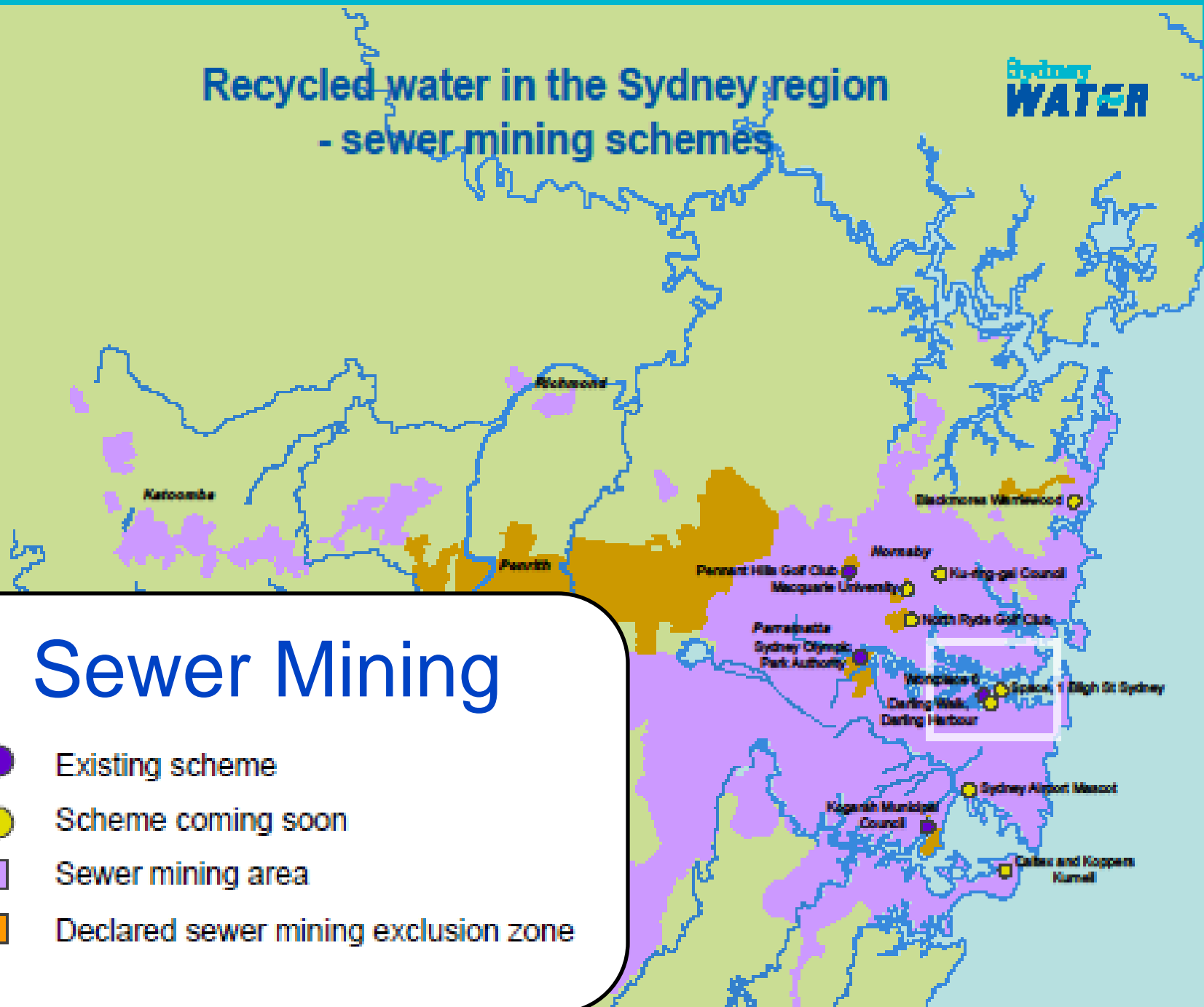
Cost: \$100,000 - \$150,000

Capacity: 3,000 GPD

Cost of Capacity: \$33.00 - \$50.00

Recycled water in the Sydney region - sewer mining schemes

Sydney
WATER



Sewer Mining

- Existing scheme
- Scheme coming soon
- Sewer mining area
- Declared sewer mining exclusion zone

Cost of Creating:

- 💧 New Water Capacity
- 💧 New Water Treatment Capacity
- 💧 New Nega-Gallon / Conservation Capacity



Dual Flush Flushometers

Commercial

Cost: \$644

Capacity: 26.8 GPD

Cost of Capacity: \$24.02



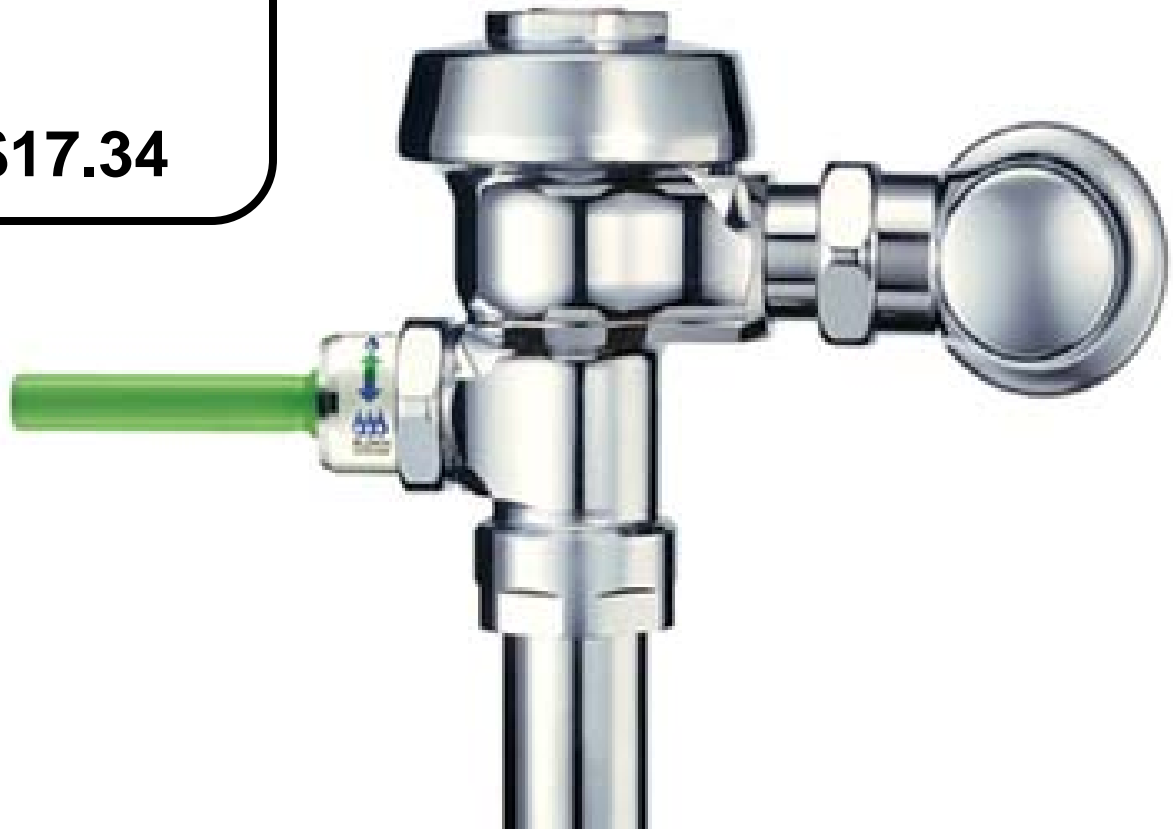
Dual-Flush Flushometer Retrofit Kits

Commercial

Cost: \$111

Capacity: 6.4 GPD

Cost of Capacity: \$17.34



1.28 / 0.8 GPF Tank-Type Water Closets

Commercial

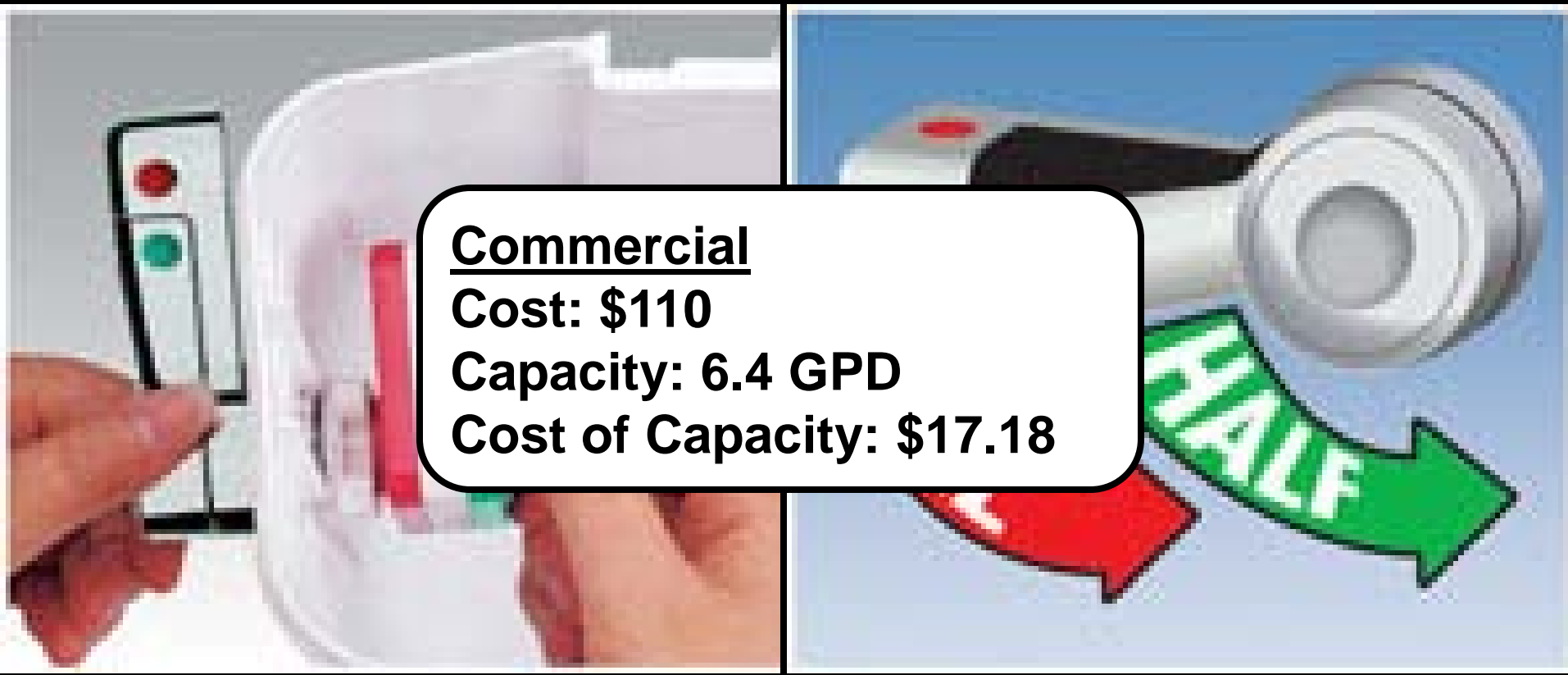
Cost: \$658

Capacity: 30.48 GPD

Cost of Capacity: \$21.60



Tank-Type Water Closet Dual Flushometer Retrofit Kits



Commercial

Cost: \$110

Capacity: 6.4 GPD

Cost of Capacity: \$17.18

Pint Urinals

Commercial

Cost: \$1,330

Capacity: 27.4 GPD

Cost of Capacity: \$48.54



High Efficiency Shower Heads

Residential / Commercial:

Cost: \$78

Capacity: 10.0 GPD

Cost of Capacity: \$7.80



High Efficiency Faucets

Residential / Commercial:

Cost: \$65

Capacity: 4.0 GPD

Cost of Capacity: \$16.25



WATER FODDER



A dairy cow must drink
___ gallons of water to
produce 1 gallon of milk

WATER FODDER



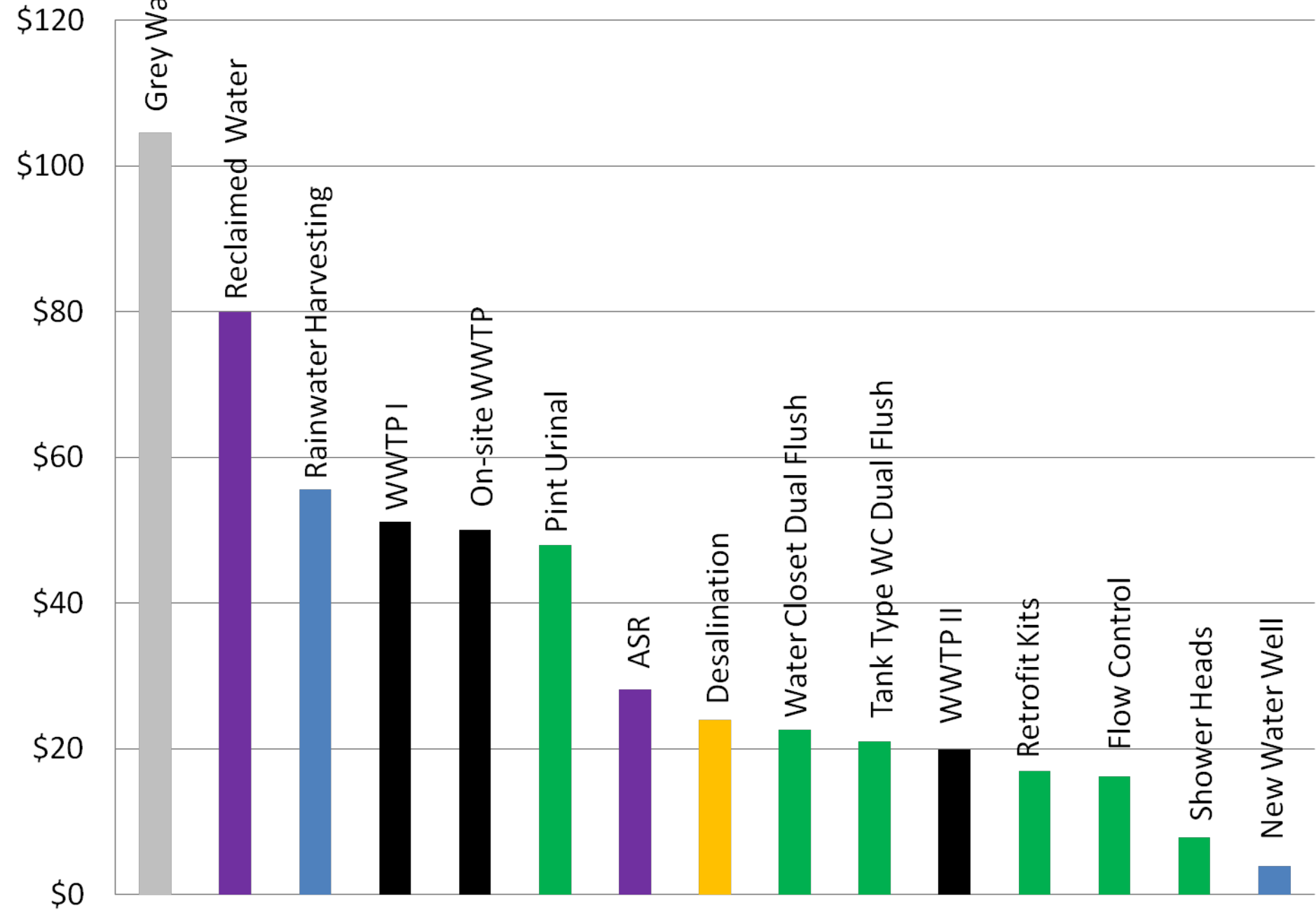
A dairy cow must drink
4 gallons of water to
produce 1 gallon of milk

Cost of Creating:

- 💧 New Water Capacity
- 💧 New Water Treatment Capacity
- 💧 New Nega-Gallon Capacity



Cost of Capacity Comparisons

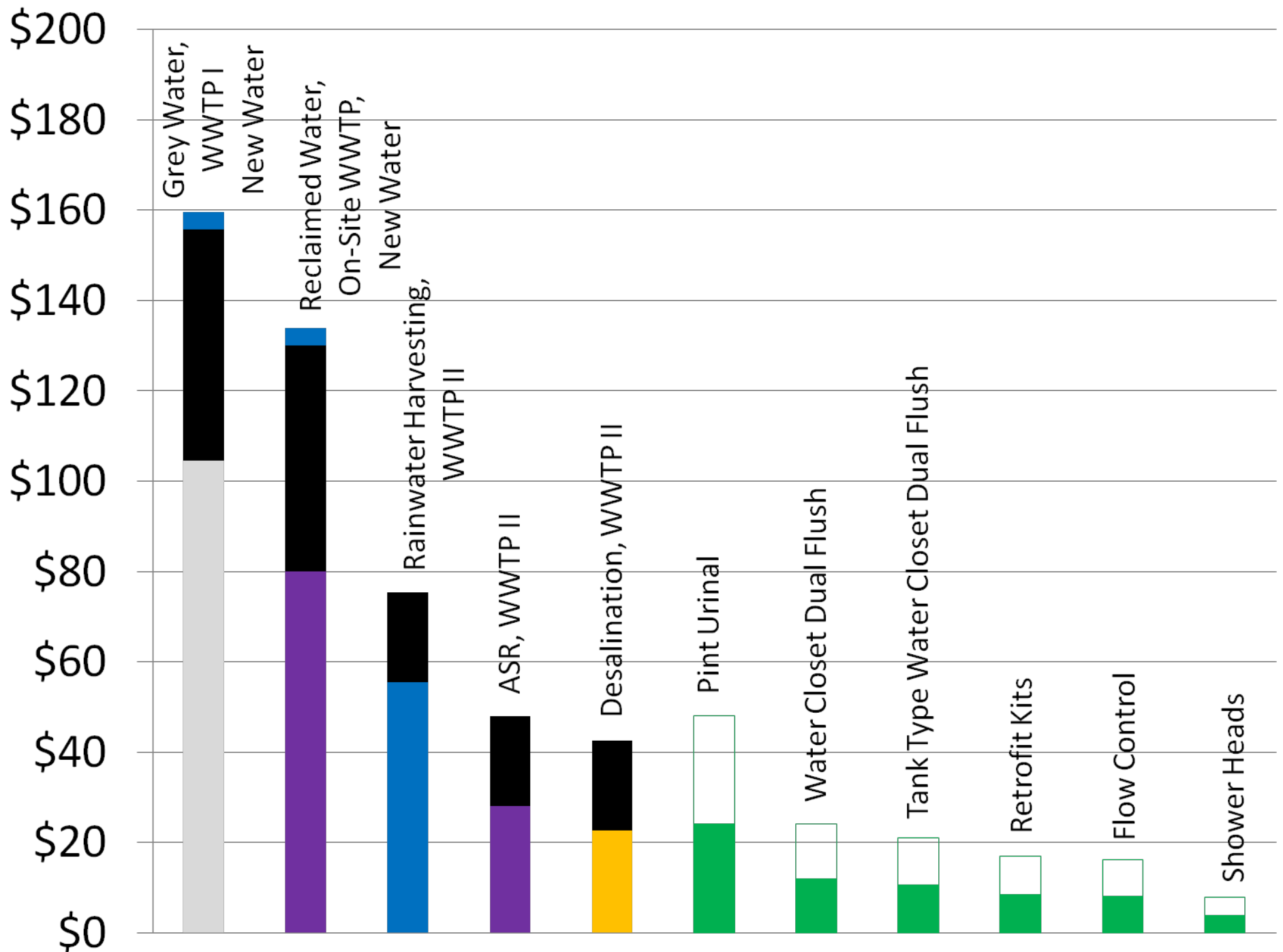




A better comparison:

💧 (New Water Capacity +
New Water Treatment
Capacity) **vs.**

💧 _____% New Nega-
Gallon Capacity



Time Frame Considerations

- Purple Piping Systems: 6-10 Years
- WWTP: 6-10 Years
- Desalination: 6-10 Years
- Aquifer Recovery and Storage: 5 Years
- New Wells: 1-5 Years
- Nega-Gallon Construction: 1-6 Months

WATER FODDER



It takes ___ gallons
of water to make 1 pint
of beer

WATER FODDER



It takes **40** gallons
of water to make 1 pint
of beer



THANK

YOU