epiccleantec

From Waste(water) to Wealth

The Technology and Economics of Onsite Water Reuse Strategies

Presented by Eric Hough
Chief Commercial Officer

The Problem with Water

Aging Infrastructure

Growing Cities

Water Scarcity

Climate Change

Water Worries in the News

Why parts of America are 'certainly in a water crisis' and what can be done about it

Only 2.5% of Earth's water is freshwater.

This is why we can't dismiss water scarcity in the US

Florida Fresh Water Supply Isn't Projected To Keep Up With Population Growth

Arizona limits future home-building in Phoenix area due to lack of groundwater

As Colorado River Dries, the U.S. Teeters on the Brink of Larger Water Crisis

The megadrought gripping the western states is only part of the problem. Alternative sources of water are also imperiled, and the nation's food along with it.

Combating climate change and water scarcity in the U.S.

Billions of people lack access to clean drinking water, U.N. report finds

Lake Mead's water level has never been lower. Here's what that means.

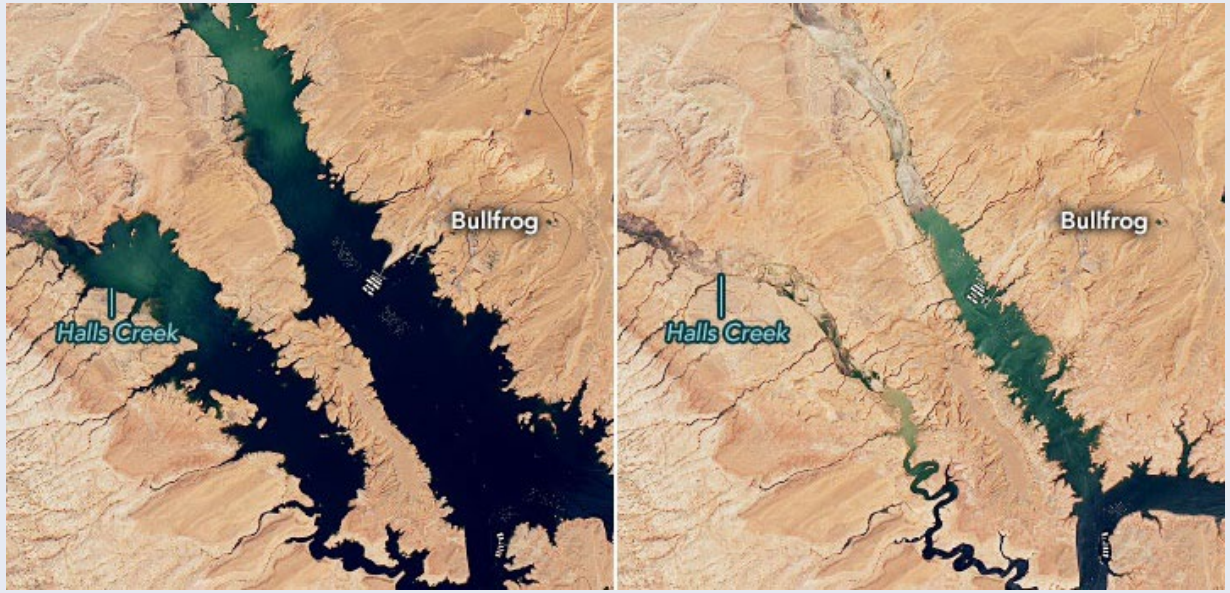
Two-thirds of the globe face water shortages, major study finds

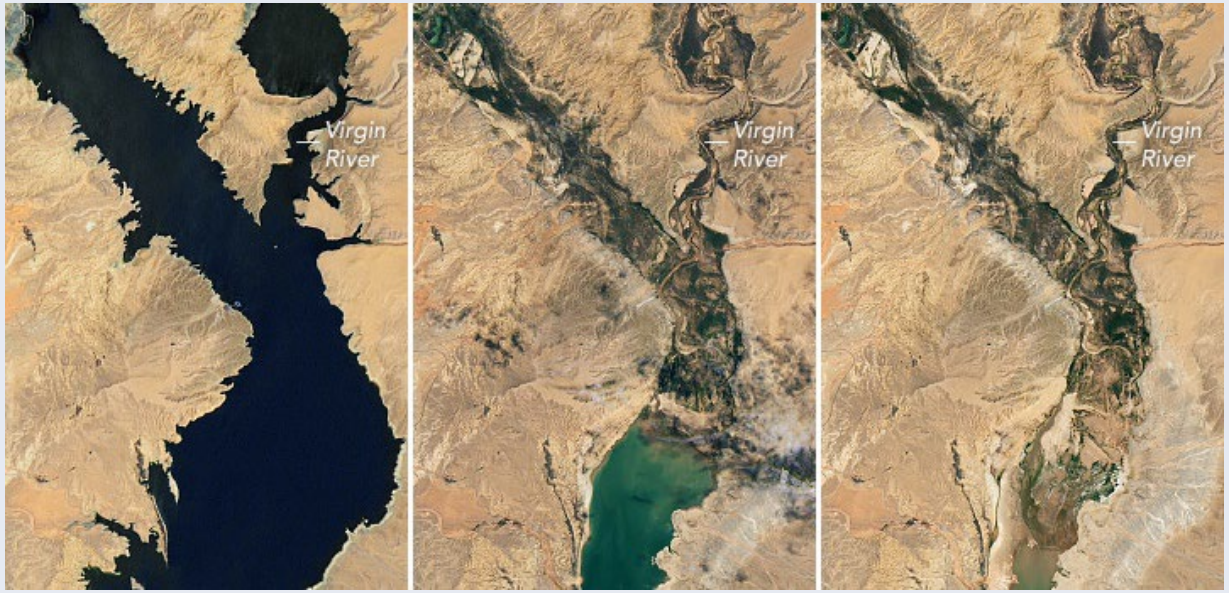
Global water scarcity is far more severe than previously thought

Drought Affected Nearly a Third of Americans in August

The share of the population impacted by severe drought or worse neared historic highs for the 21st century.

Global water crisis could 'spiral out of control' due to overconsumption and climate change, UN report warns


Bullfrog
Halls Creek
Bullfrog
Halls Creek


Virgin River
Virgin River
Virgin River

Why Reuse Matters in Buildings

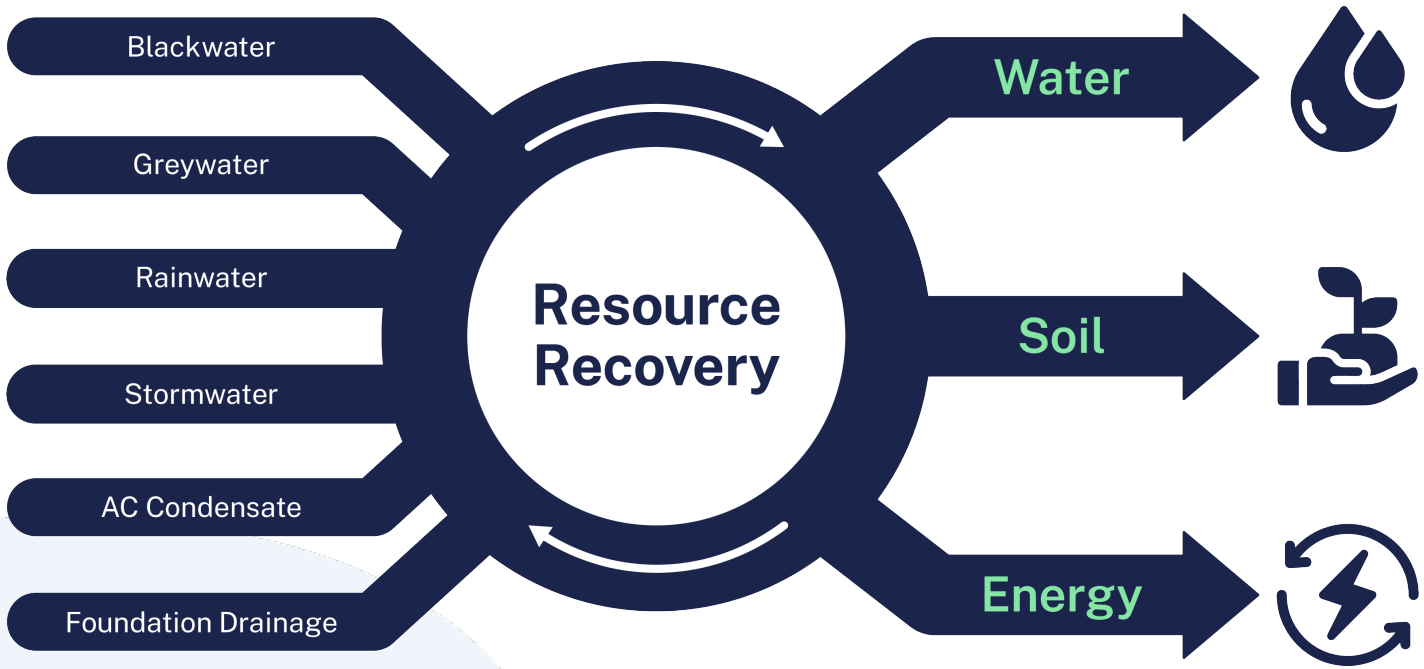
"The world's building stock is expected to double by 2060 — the equivalent of adding another New York City monthly between now and then."

— Bill Gates


Buildings globally use 14% of the world's potable water supply yet almost none reuse it.

Full Resource Recovery is Possible

Turnkey, onsite reuse solutions utilize a building's wastewater for:



Recycle up to 95% of a building's wastewater

Epic's Value

Epic Cleantec is a full-service water technology company that deploys decentralized water treatment and reuse systems into individual or groups of buildings, converting wastewater into three sustainable outputs:

- Recycled water for non-potable applications
- Recovered energy from wastewater heat
- High-quality soil amendments

TIME BEST INVENTIONS 2022

Onsite Reuse System Outputs

Clean Water

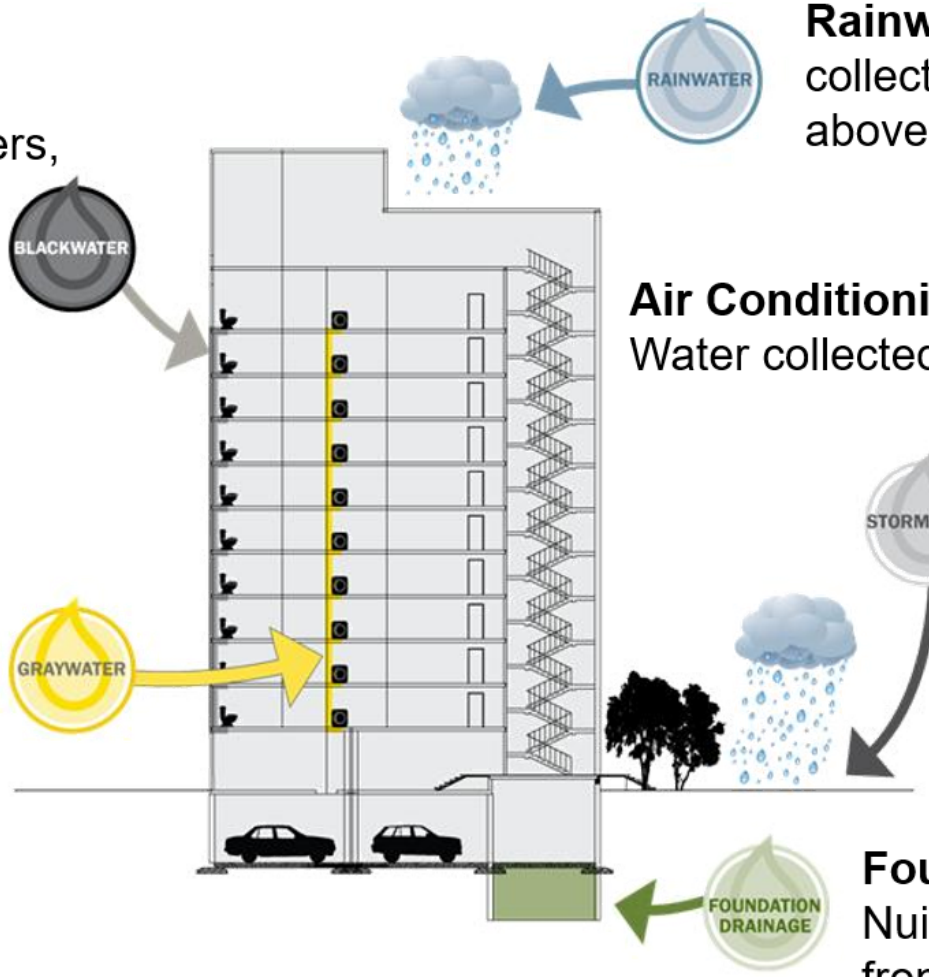
Soil

Heat Energy

Defining Water Reuse

Blackwater:
Wastewater from toilets, dishwashers, kitchen sinks, and utility sinks

Greywater:
Wastewater from clothes washers, bathtubs, showers, and bathroom sinks



Rainwater: Precipitation collected from roofs and above-grade surfaces

Air Conditioning Condensate:
Water collected from evaporator coils

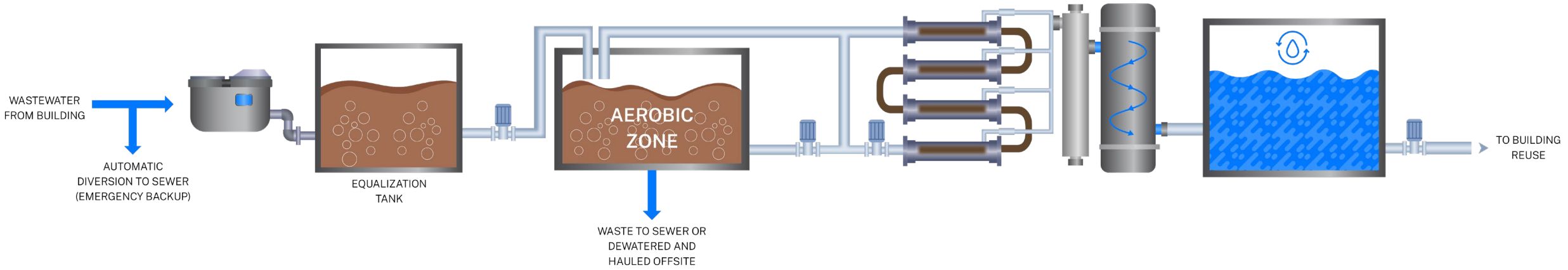
Stormwater:
Precipitation collected at or below grade

Foundation Drainage:
Nuisance groundwater from dewatering operations

Source: EPA

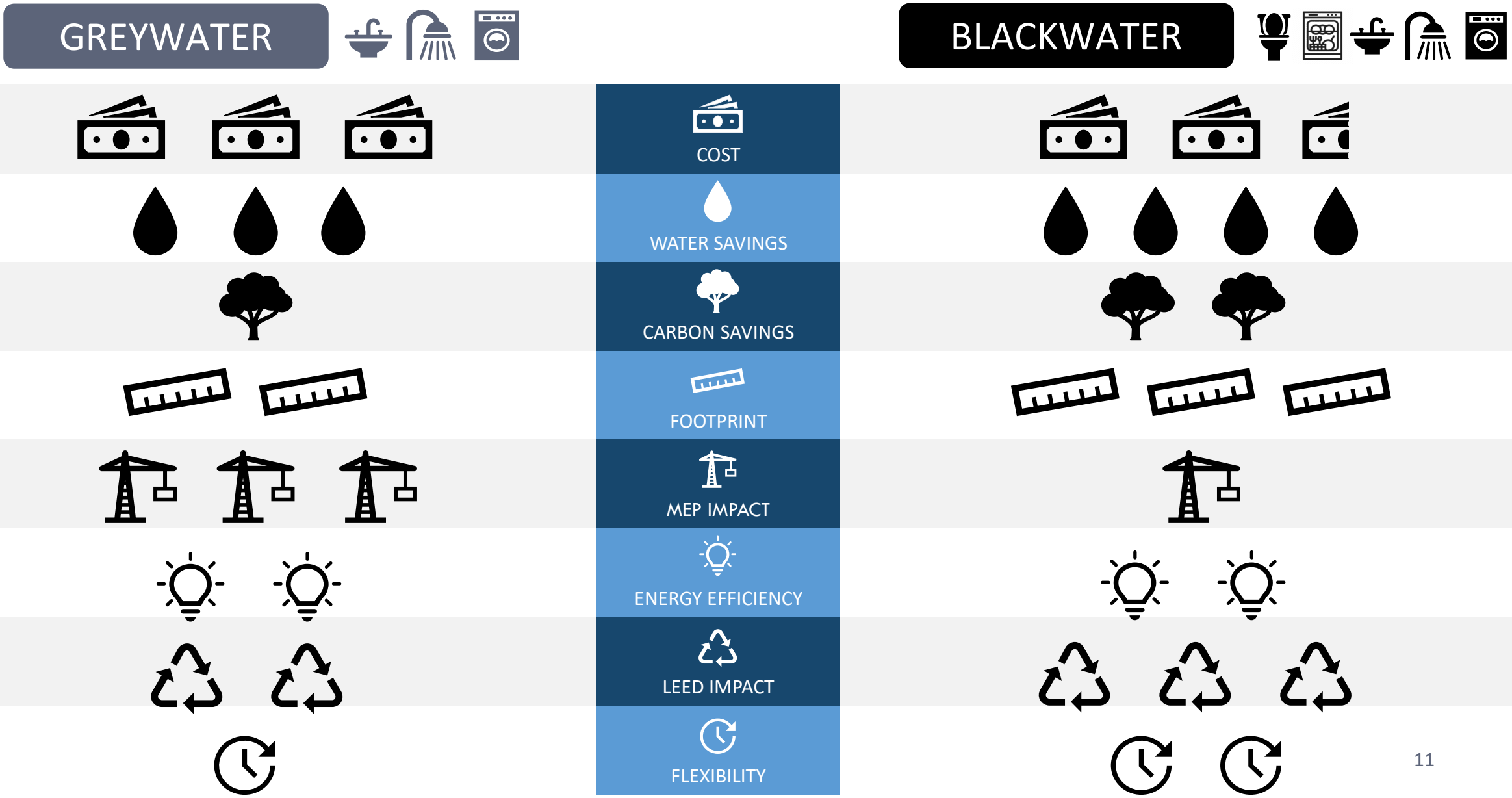
How It Works

Blackwater



1. Prefiltration & equalization
2. Biological treatment
3. Membrane filtration
4. Disinfection & heat recovery

Onsite Reuse System Evaluation



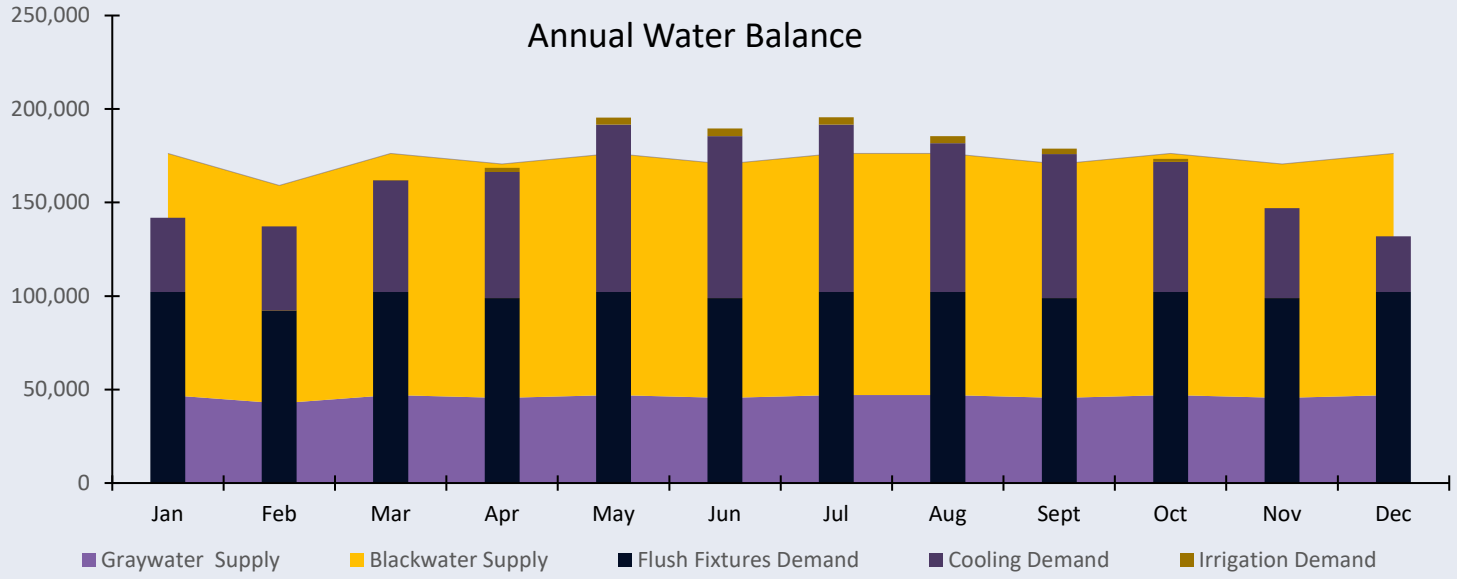
WATER BALANCE SUMMARY		
SUPPLY	Annual (gal/year)	Average Daily (gal/day)
Greywater supply	554,480	1,520
Blackwater supply	2,075,600	5,700
NON-POTABLE DEMAND	Annual (gal/year)	Average Daily (gal/day)
Flush fixtures demand	1,202,300	3,300
Cooling demand	782,400	2,890
Irrigation demand	27,850	160
Total non-potable demand	**2,006,980**	**6,350**

Project Inputs

Location: San Francisco, CA
Type: Laboratory
GSF: 216,165
Stories: 5 stories + 1 basement

Cooling Tower: Yes (Not Known)
Irrigation: Yes (Not Known)

- Irrigation footprint estimated at 2,000 square feet per A1102 – Site Plan (Proposed).
- Cooling tower estimated to serve full lab space.
- Project blackwater is expected to serve **95% of estimated non-potable demand**, including flush fixtures, cooling tower makeup, and irrigation.
- If cooling towers are not included in design, or recycled water is not desired for cooling tower makeup, the project blackwater supply will serve **100% of estimated non-potable demand**.
- Drain trap priming is estimated to add a negligible load to the non-potable demand.



APPLICATION FOR SITE PERMIT SUBMITTED AFTER JANUARY 1, 2022	
Required Alternate Water Sources	**Required Non-potable Uses**
Blackwater Condensate	Toilet & Urinal Flushing Drain Trap Priming

SFPUC Non-potable Water Ordinance

ROM Cost & Area

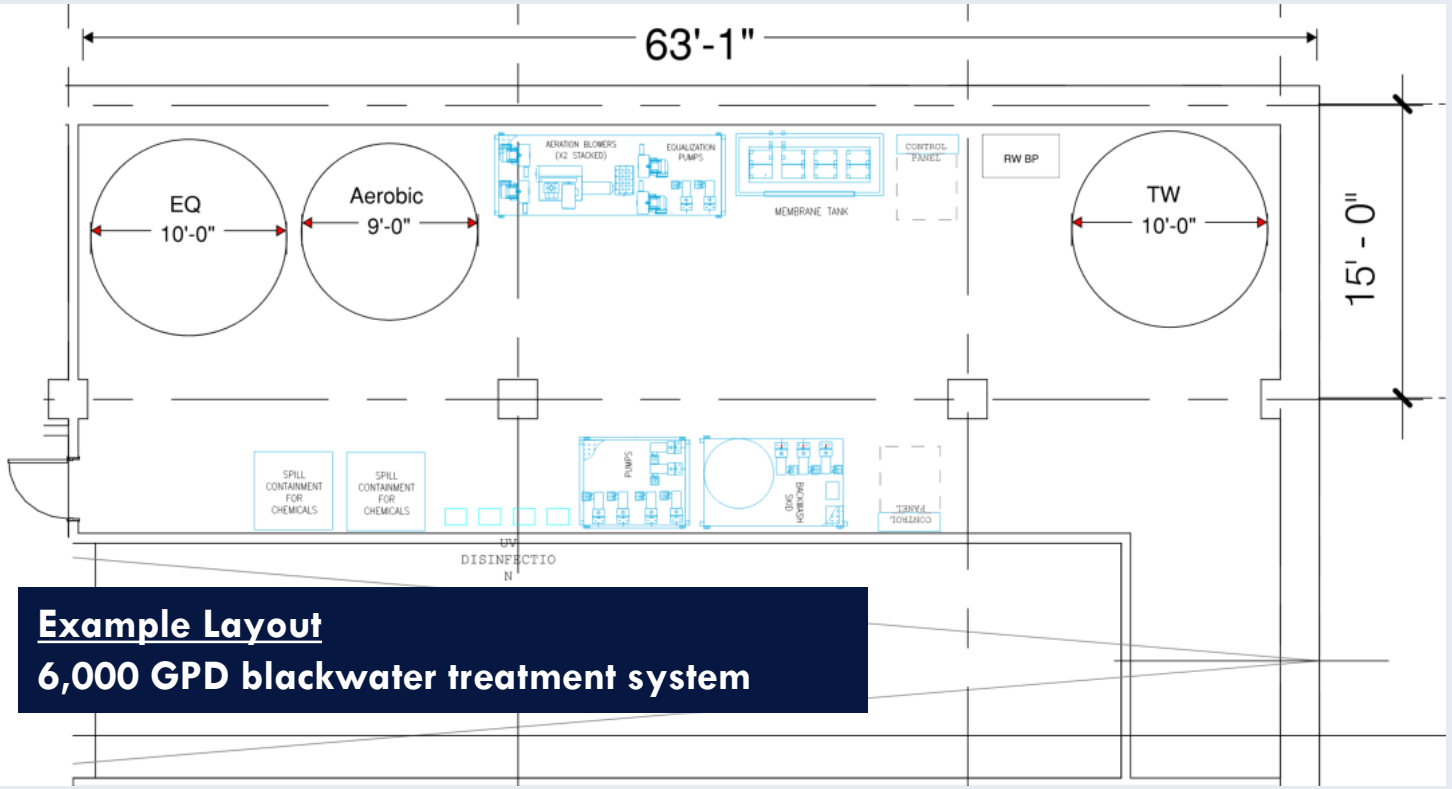
STRATEGIC OPTIONS SUMMARY

Scope	Design Flow	System Cost	Est. Footprint
Blackwater	4,000 gal/d	$XXX	800 SF
Blackwater	6,000 gal/d	$XXX	950 SF

Estimate Notes

- ROM system cost information includes reuse system, design, permitting, installation, and system startup.
- Heat recovery, power distribution, distribution pumps, dual plumbing and other building/infrastructure MEP systems not included.
- Proforma does not account for savings associated with water and sewer connection fee reductions, or meter charge reductions.
- Annual operating costs includes onsite presence, remote monitoring, all required regulatory water quality sampling and reports, general maintenance needs, and emergency maintenance needs.
- Estimated footprint does not include all required clearances. The final footprint will be based on the project layout.

Layout



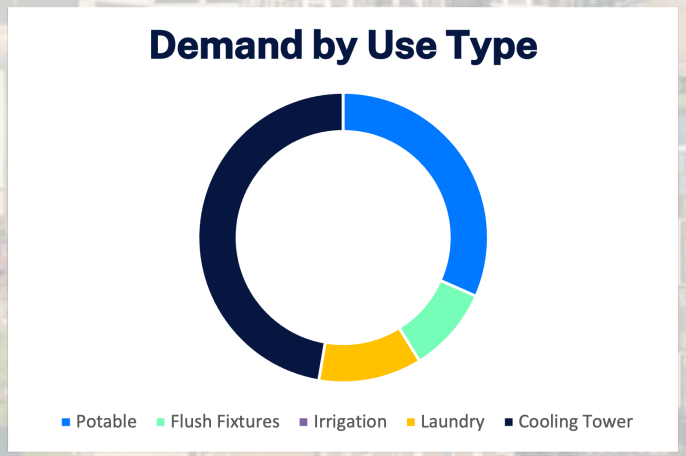
Example Layout
6,000 GPD blackwater treatment system

Layout Notes:

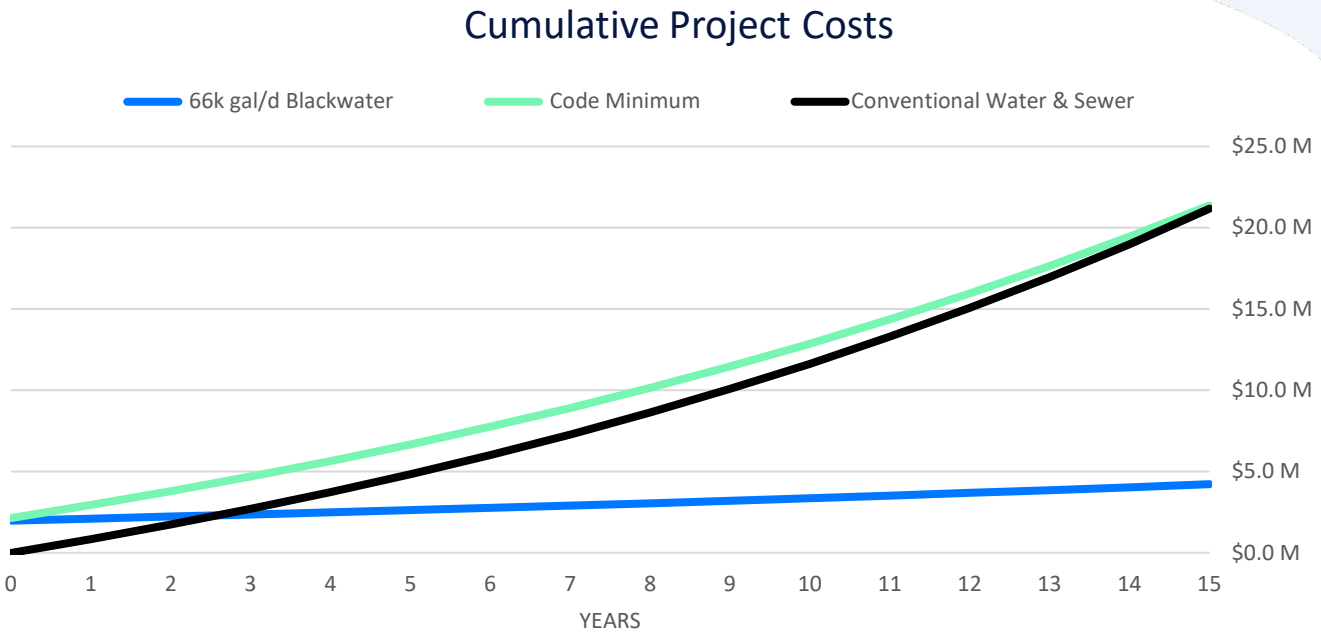
- BOH room background (on level B1) found on sheet A2201 – Floor Plan – Levels B1 & 1
- Assumes minimum 12’ ceilings due to car stacker. Tanks shown are 10’0” height.
- If irrigation is included as an end use, coordination with the irrigation consultant will be required to confirm water quality requirements for plantings. If denitrification is needed for plant health, an additional (estimate 3’0”) tank will be required for anoxic treatment.
- Skid sizes may be adjusted in design development. Skid locations may also be adjusted in design development based on coordination with other trades.
- Layout is shown as an example only and will be refined during design. Alternate layouts are acceptable. It is best to locate skids and tanks such that air and water piping is as minimal as possible.
- Plumbing components such as floor drains, floor sinks, and emergency eyewash are not shown, but are required.

Annual Water/Wastewater Cost

$2.5M w/o Epic vs. **$1.3M** with Epic



Savings Potential



- ✓ **$300,000** saved on one–time water and sewer impact fees
- ✓ **48%** annual savings
- ✓ Cumulative 10-year water/ sewer bill savings **$12M+**
- ✓ Potential to reuse **24.5 million** gallons annually

Path to Permitting

Research

Meet with Stakeholders

Submit Documentation

Respond to Comments

Permit Approved

Inspections

Identify Roadblocks

Water Incentive Programs

Program Name	Type	Location	Amount	Qualification Details
Onsite Water Reuse Program	Grant	San Francisco, CA	up to $1,000,000	Projects that are voluntary, go above and beyond baseline compliance, or reuse brewery process water
LADWP Technical Assistance Program	Grant	Los Angeles, CA	up to $2,000,000	Projects that replace at least 50,000 gallons of potable water over two years
Water Efficient Technology (WET) Program	Rebate	Santa Clara County, CA	up to $100,000	Projects saving at least 74,800 GPY of potable water
Water Wise Rebates	Rebate	Sacramento, CA	up to $50,000	Installation of new water saving technologies
Water Savings Incentive Program (WSIP)	Incentive	Southern California	Varies	Any non-residential project that saves at least 10,000,000 gallons of water
Onsite Water Reuse System	Incentive	Austin, TX	up to $500,000	Projects that reuse 1,000,000 GPY+ of potable water
Commercial Custom Rebate Program	Rebate	San Antonio, TX	Varies	Water savings expected must exceed 1 million gallons per year
WaterSMART Small-Scale Water Efficiency Projects	Grant	Nationwide locations	up to $100,000	Available to non-profits, tribes or governments in eligible states
Clean Water State Revolving Fund (CWSRF)	Loan	Nationwide locations	Varies	Low interest loans for water reuse projects
Wastewater Capacity Charge Reductions	Rate Reduction	Nationwide locations	up to $500,000	Some cities will agree to reduce upfront water and wastewater capacity charges in proportion to the anticipated flow reductions
Water Conservation and Reuse Grant Pilot Program	Grant / Rebate	New York	Varies	25% water fee discount to customers who install water reuse systems that reduce the building's water consumption by at least 25%. A 76% wastewater fee discount is also offered for properties that discharge less than 25% of their flow.
The Water Infrastructure and Innovation Act (WIFIA)	Credit	Nationwide	Varies	Federal credit program administered by the EPA for eligible water and wastewater infrastructure projects, including water reuse. Qualifying WIFIA applicants must provide matching funds from another source.

LEED V4.1 Potential Points

Key Advantages

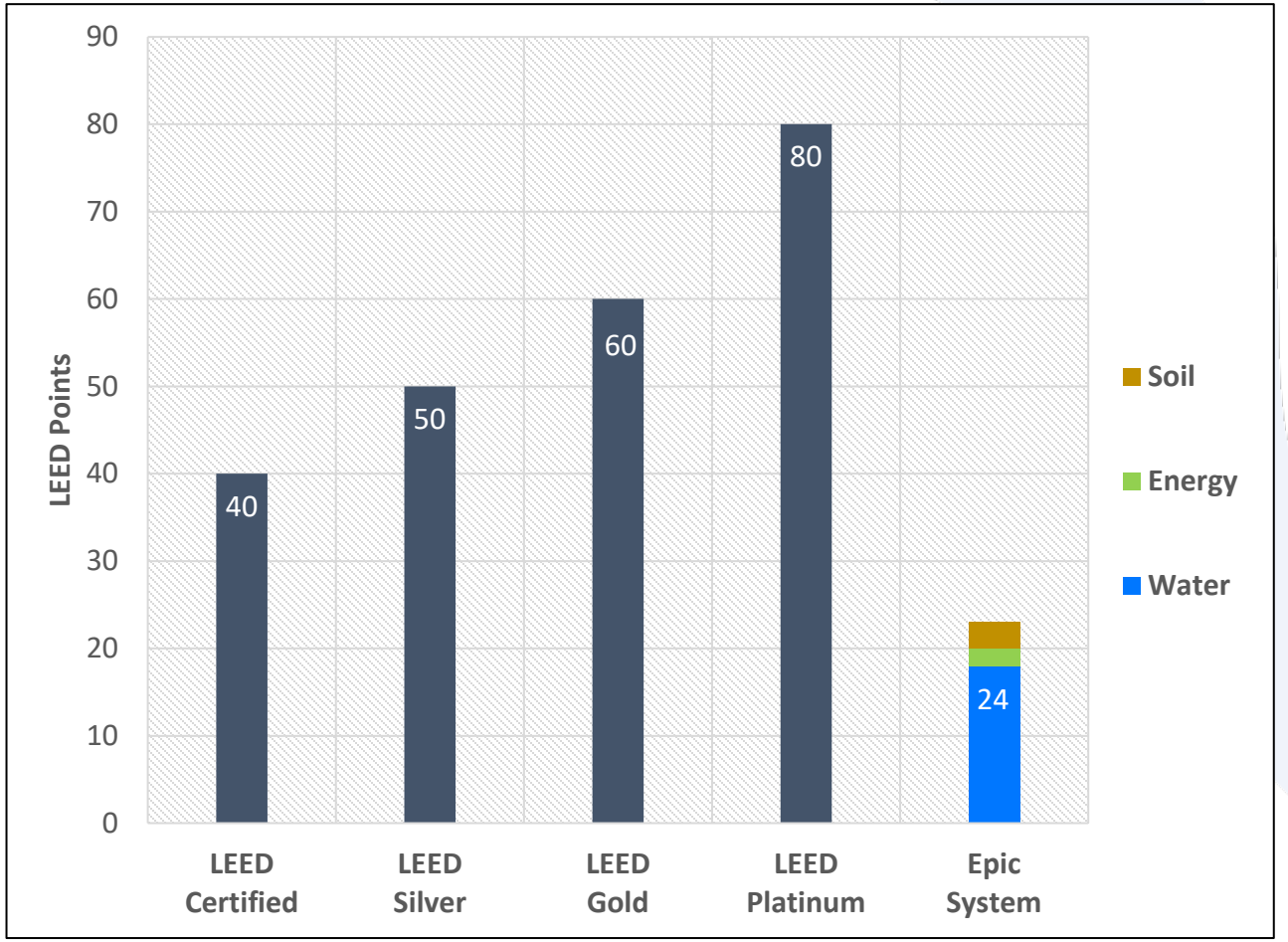
By offering unique features such as solids recovery and wastewater heat recovery, Epic systems can expect to achieve LEED credits exceeding direct competitors in the following credit categories:

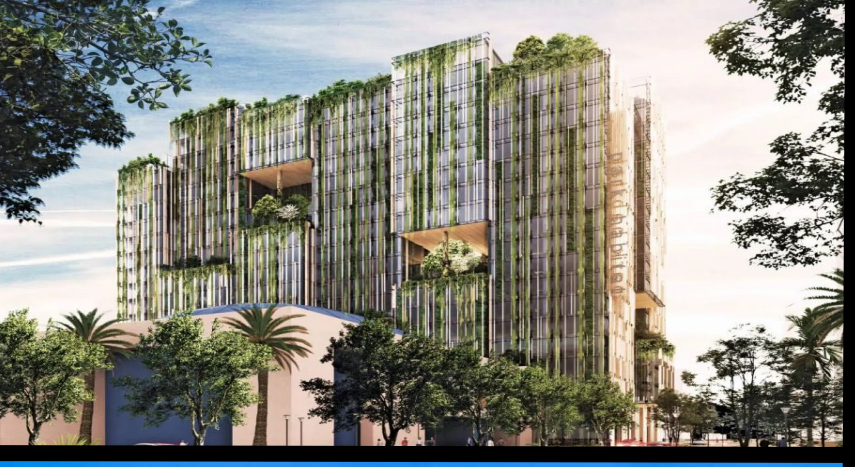
- *Optimize Energy Performance*
- *Building Life Cycle Impact Reduction*
- *Innovation Credit*

Calculation Notes

- The Potential Points column represents the total possible number of LEED points in that category. The estimated points earned by the Epic packaged system will vary based on each project's specific conditions.
- The estimated points earned by the Epic packaged system is based on a system including:
  - Blackwater treatment
  - Wastewater heat recovery
  - Wastewater solids recovery

*The number of points earned for this credit will depend on the percentage of water savings, which varies per project.
**The Rainwater Management Credit is applicable when the Epic packaged treatment system also includes a rainwater/stormwater treatment system.



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Thank You

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