Next Generation Water: Targeting Net Zero on a Healthcare Campus

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Speakers

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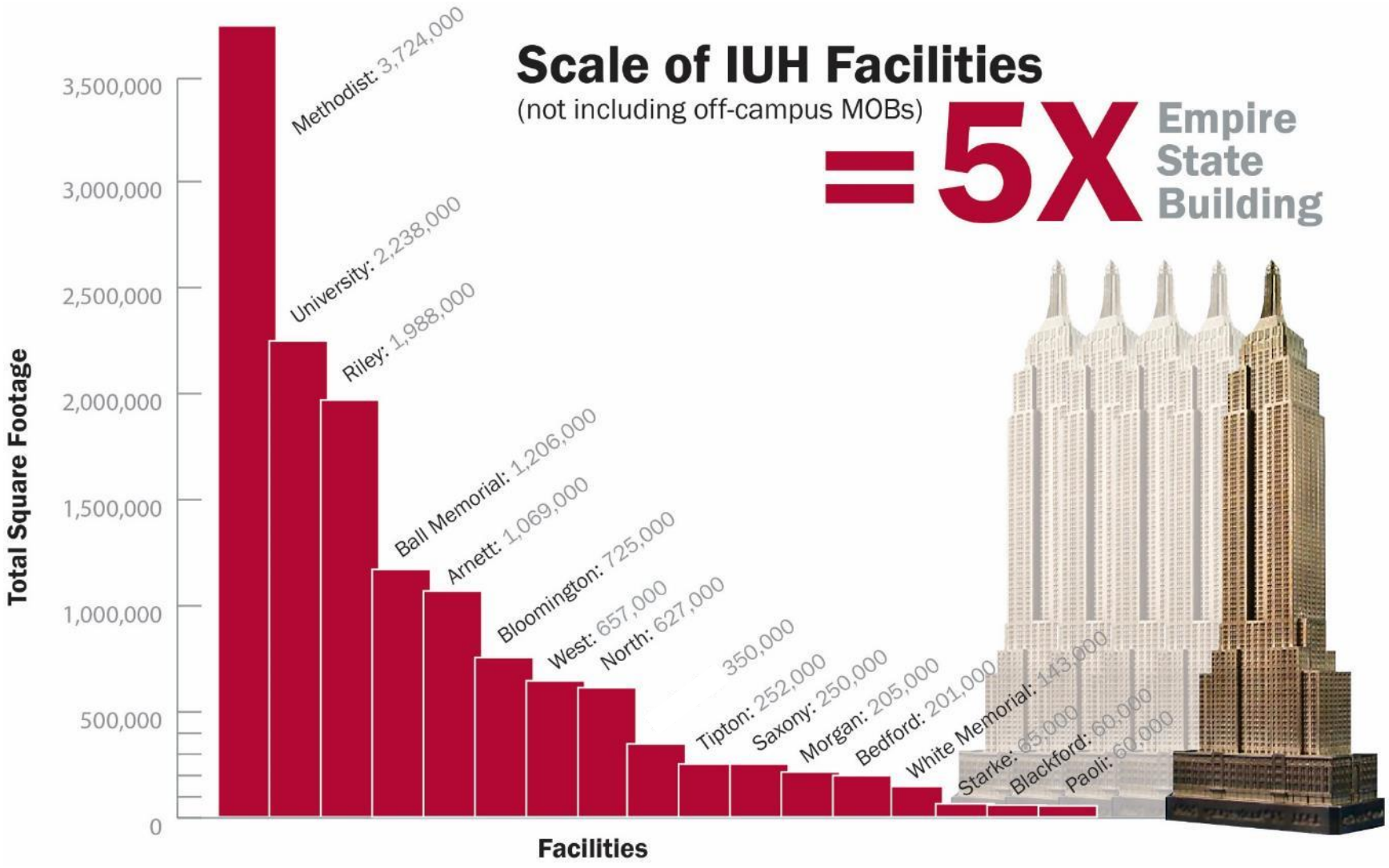
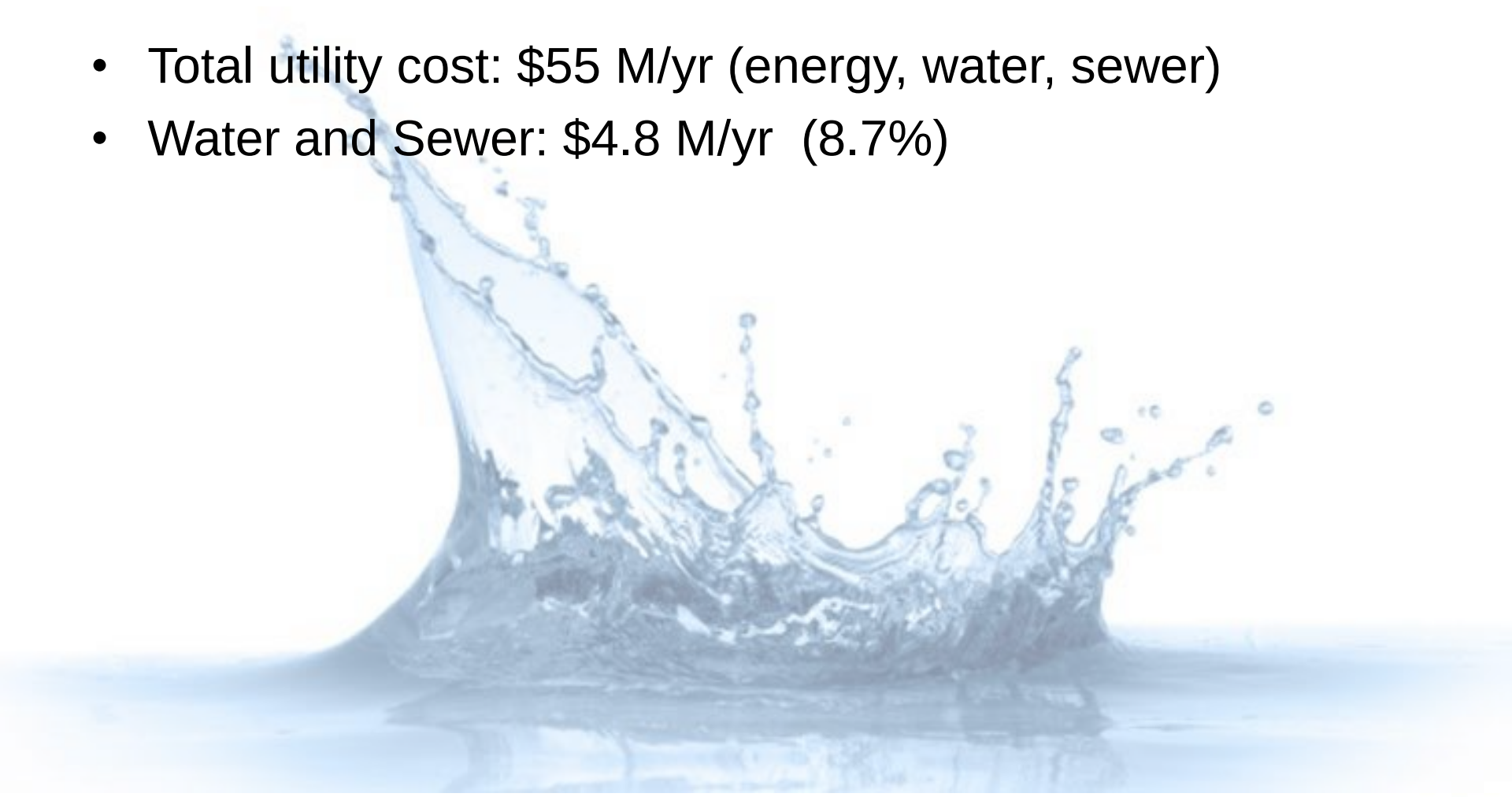
IU Health Facilities

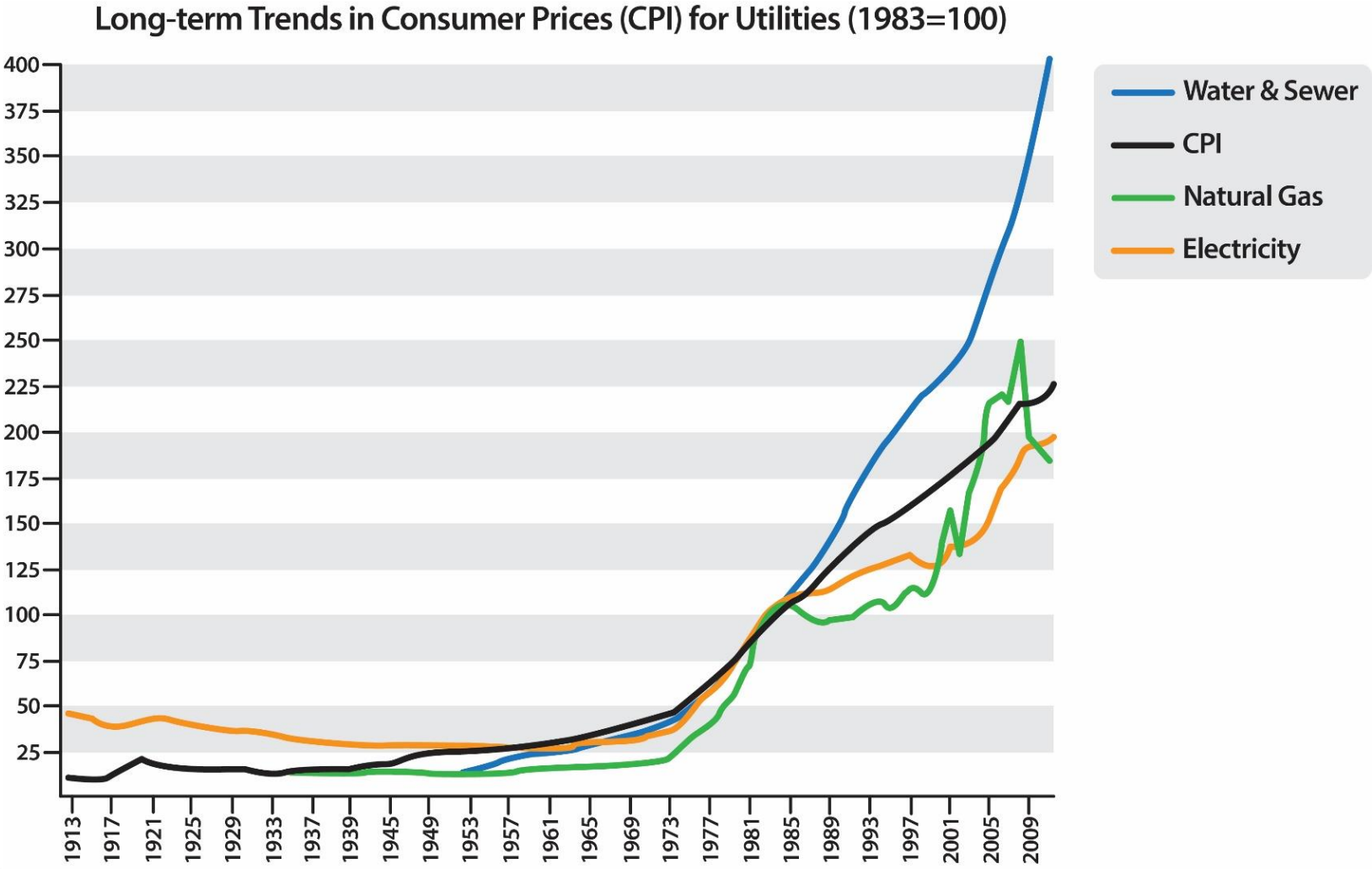


IU Health System-Wide Utility Costs

- Total utility cost: $55 M/yr (energy, water, sewer)
- Water and Sewer: $4.8 M/yr (8.7%)



Rising Cost of Water in the US



Source: "Trends in Consumer Prices (CPI) for Utilities Through 2011"
(Janice A. Beecher, Michigan State University Institute of Public Utilities Regulatory Research and Education)

Water Rate Increases

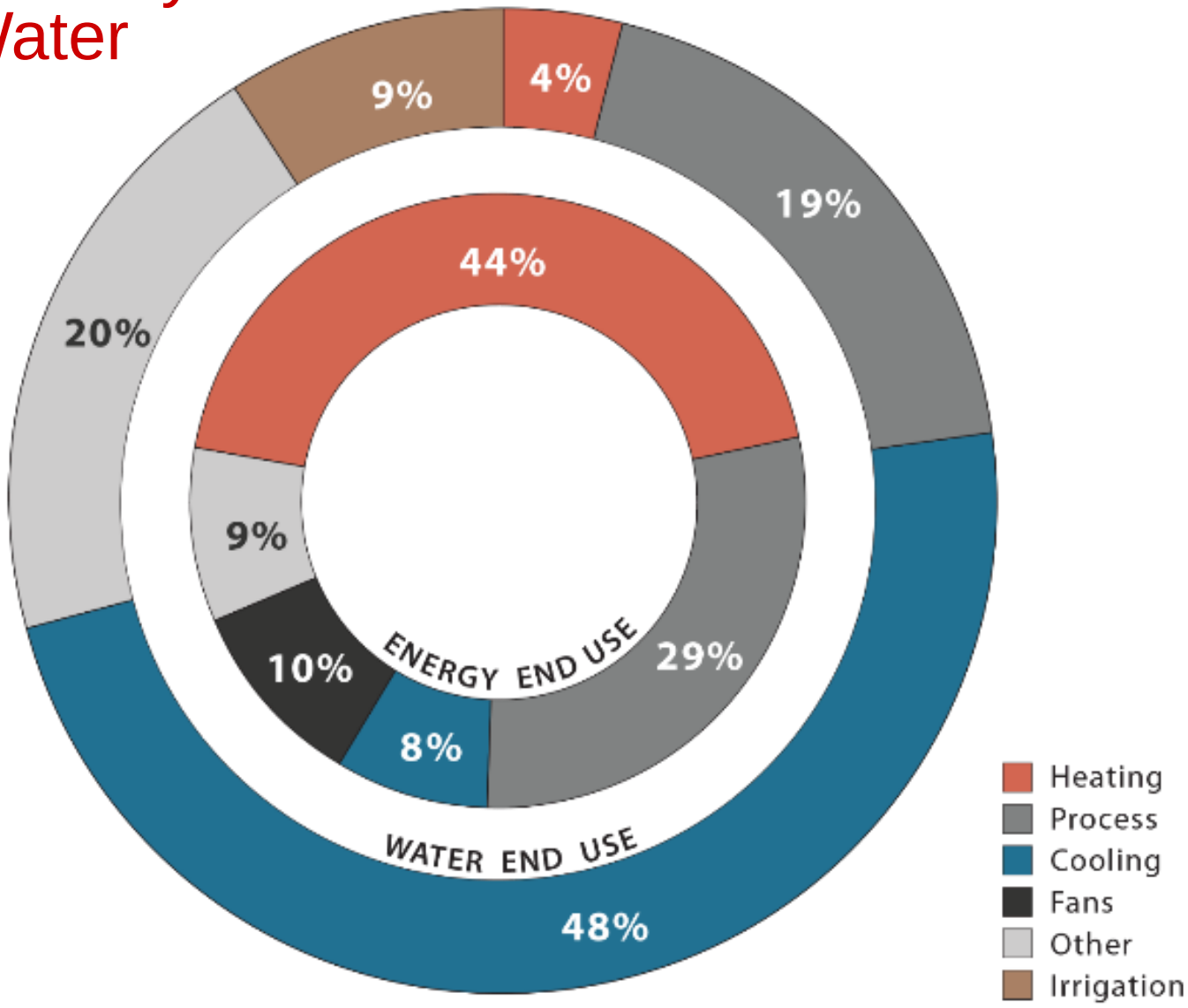
- Average 8% increase per year in our region (6-9% national average)
- Bloomington – 22% increase in the last year

External Risks: Aging Infrastructure

- Increased likelihood of systemic leaks
- Increased maintenance costs

Aging pipe infrastructure (Maryland)

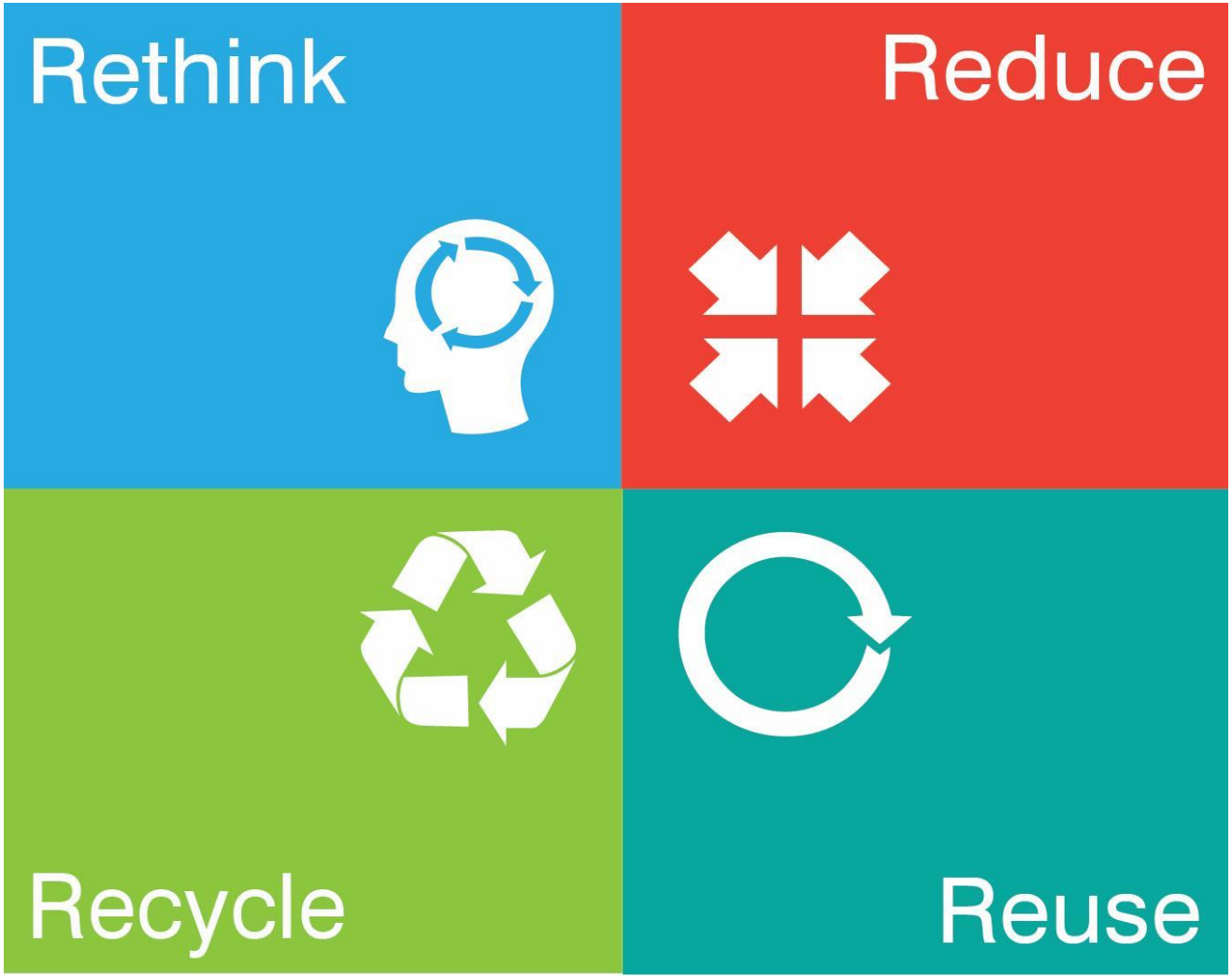
Energy Efficiency Leads to Water Efficiency

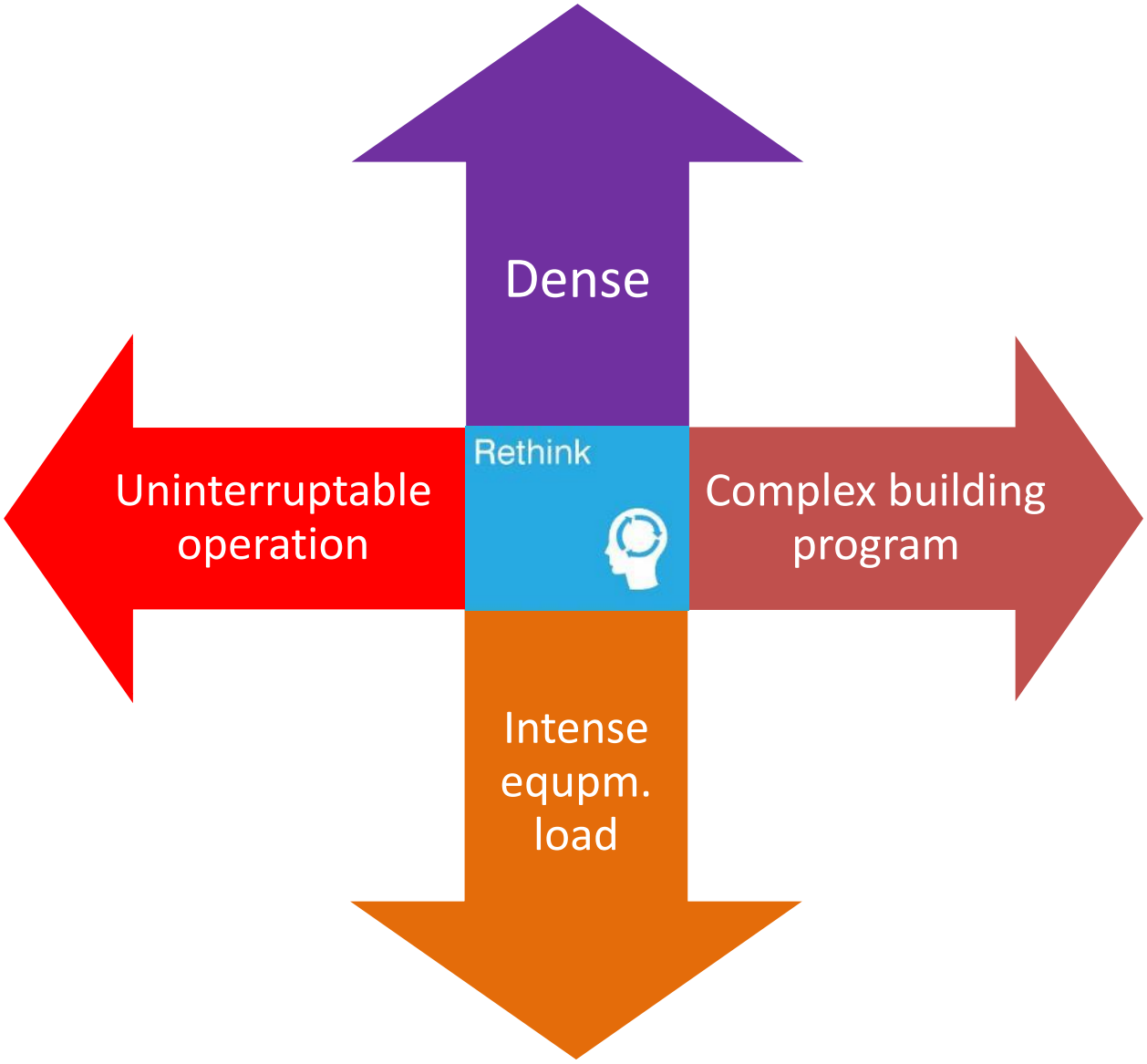


IU Health Energy Conservation Programs

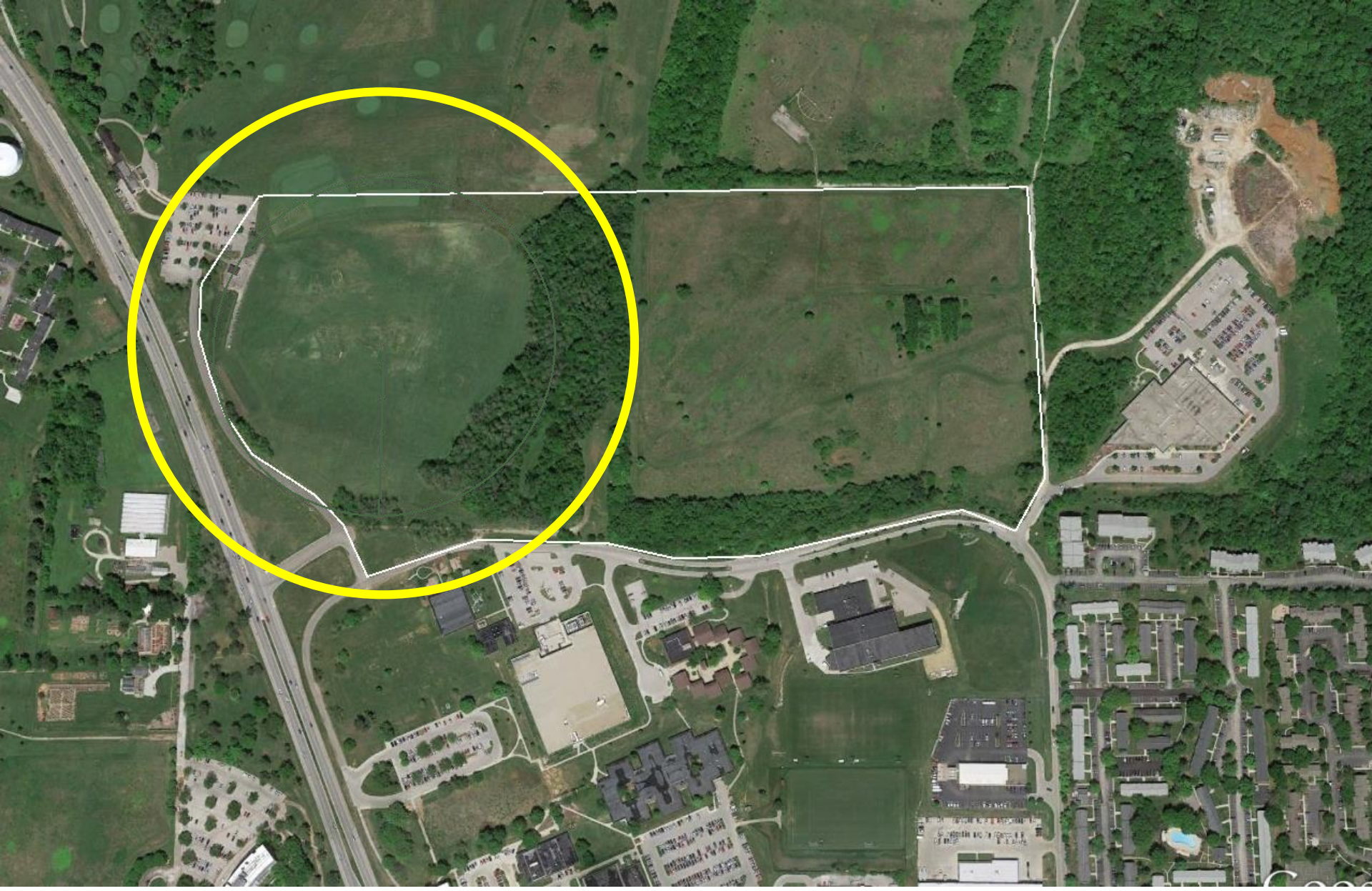
- $93 million over 10 years for energy conservation
- Projects will yield a 25% with an internal rate of return in less than 2.5 years with guaranteed returns for 11 years
- Savings leads to funding for future projects

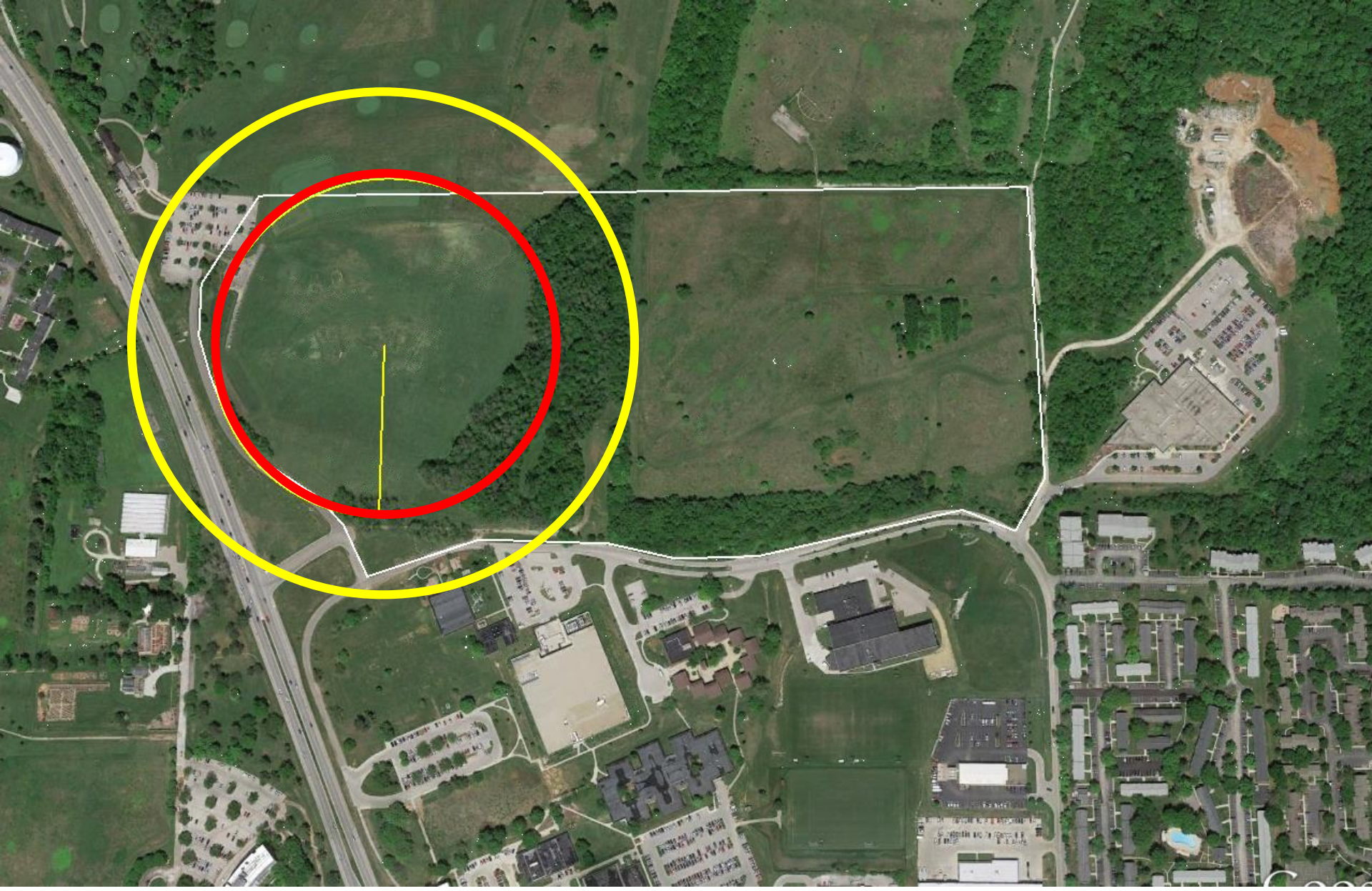
Can a Healthcare Campus be Net Zero for Water?

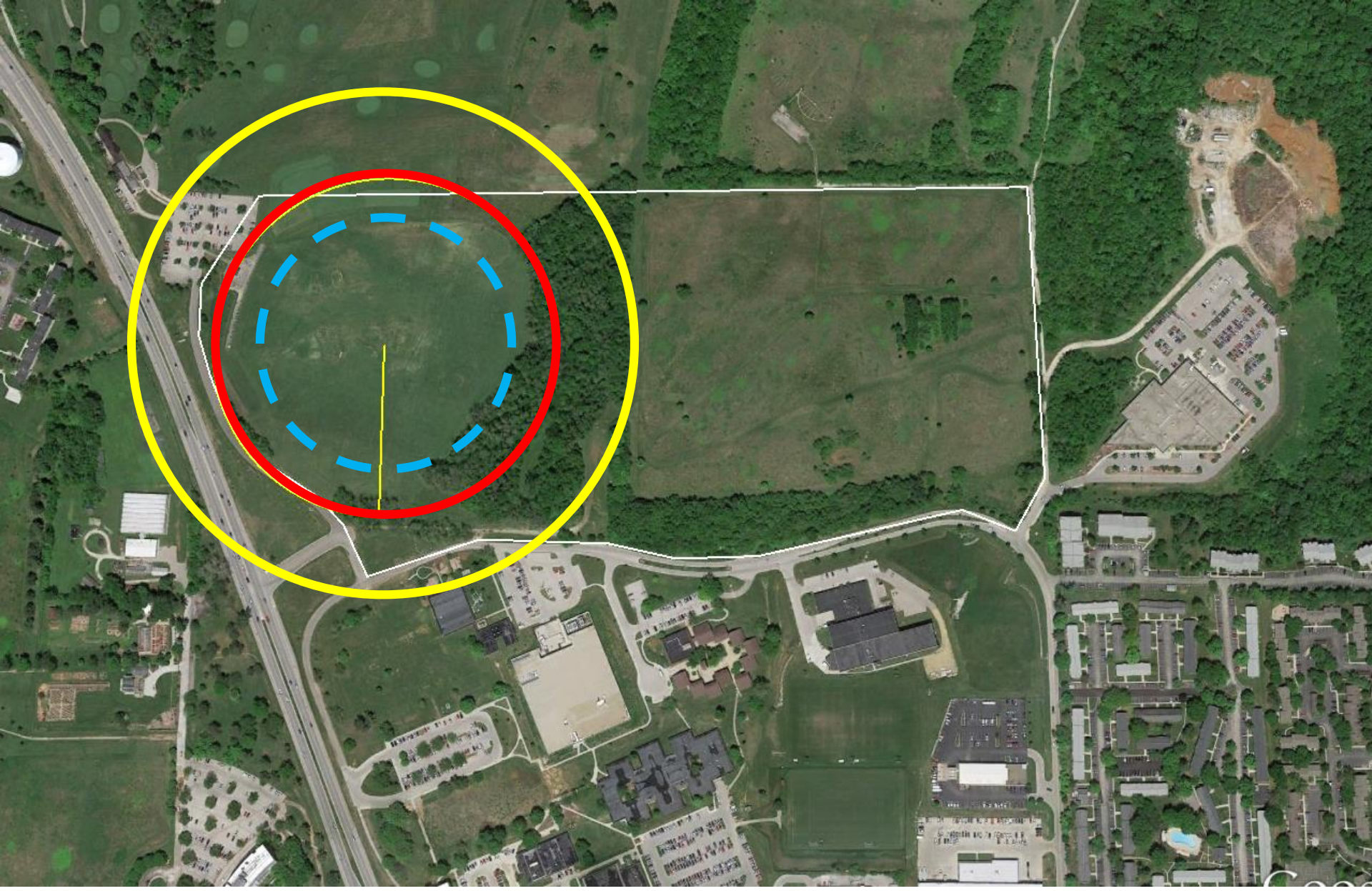



Dense
Uninterruptable operation
Rethink
Complex building program
Intense equpm. load

Case Study: IU Health Bloomington (preliminary site plan)





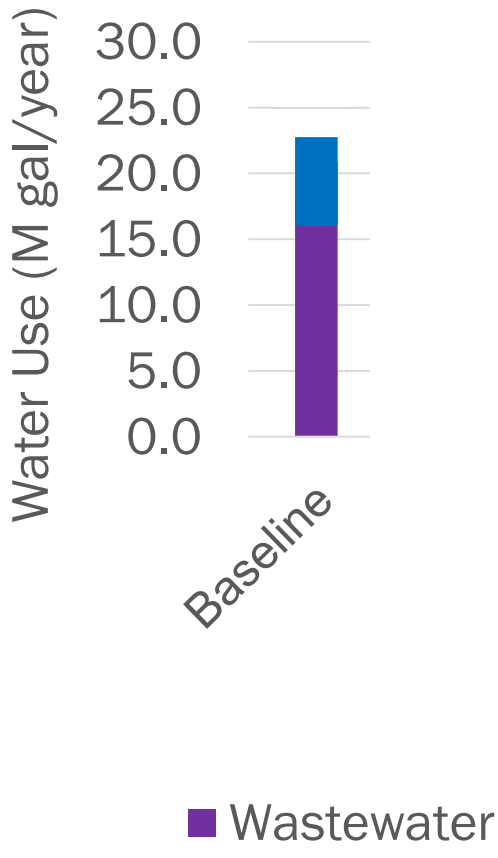


Case Study: Draft Program and Typical "Baseline" Water Use

BUILDING TYPE	GSF	WUI gal/sf/yr	H20 DEMAND gal/yr	WASTEWATER gal/yr
Inpatient	260,000	40	10.4 M	7.7 M
Outpatient	342,000	30	10.3 M	7.1 M
Academic	110,000	25	2.8 M	1.6 M
TOTAL	712,000	33	23.4 M	16.4M

Typical “Baseline” Campus

- H2O demand – 23.4 M gpy
- Wastewater generation – 16.4 M gpy

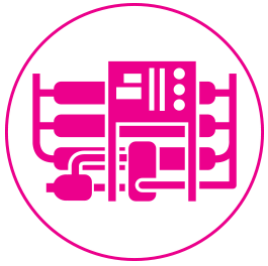


Discussion of key water end uses

1. Lawn – reduce size, plant selection, irrigation system
2. Energy efficiency - building orientation, massing, envelope, plug, lighting
3. Plumbing - low flow fixtures
4. Equipment - 80% efficient RO, closed loop cooling, ozone laundry, kitchen
5. HVAC - heat recovery chiller



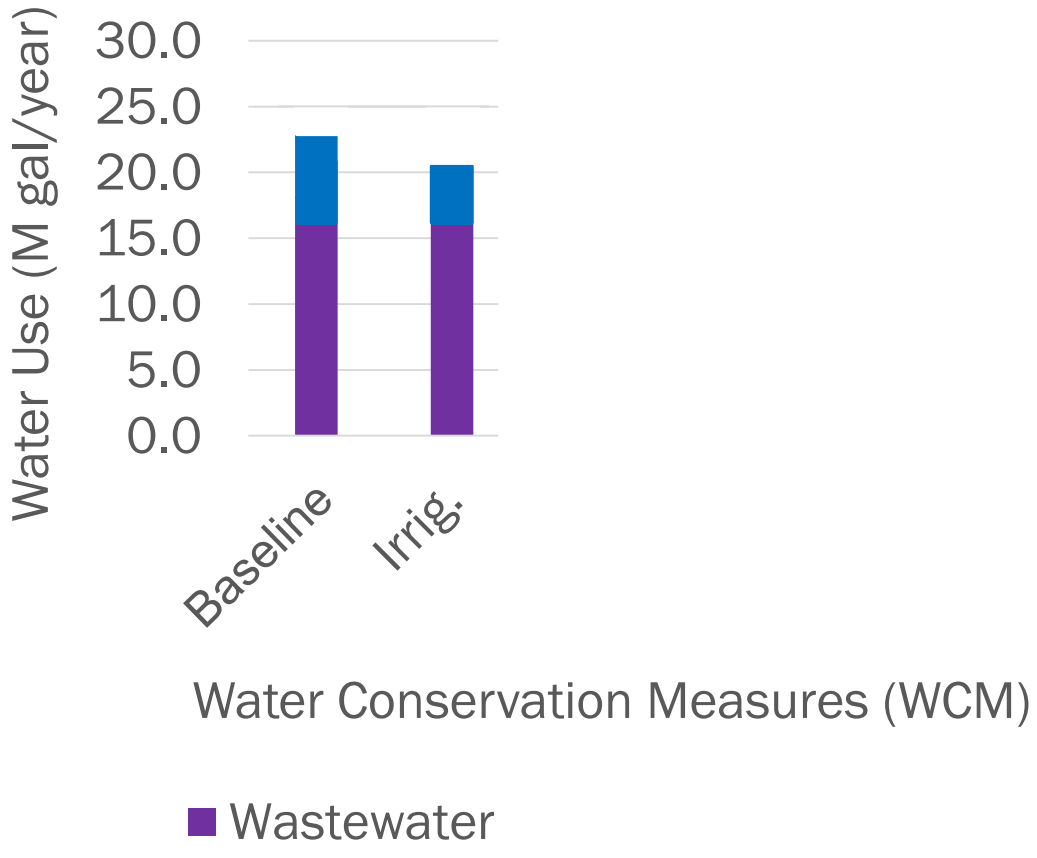




System upgrade opportunities: irrigation

Existing campus with improved lawn WCM

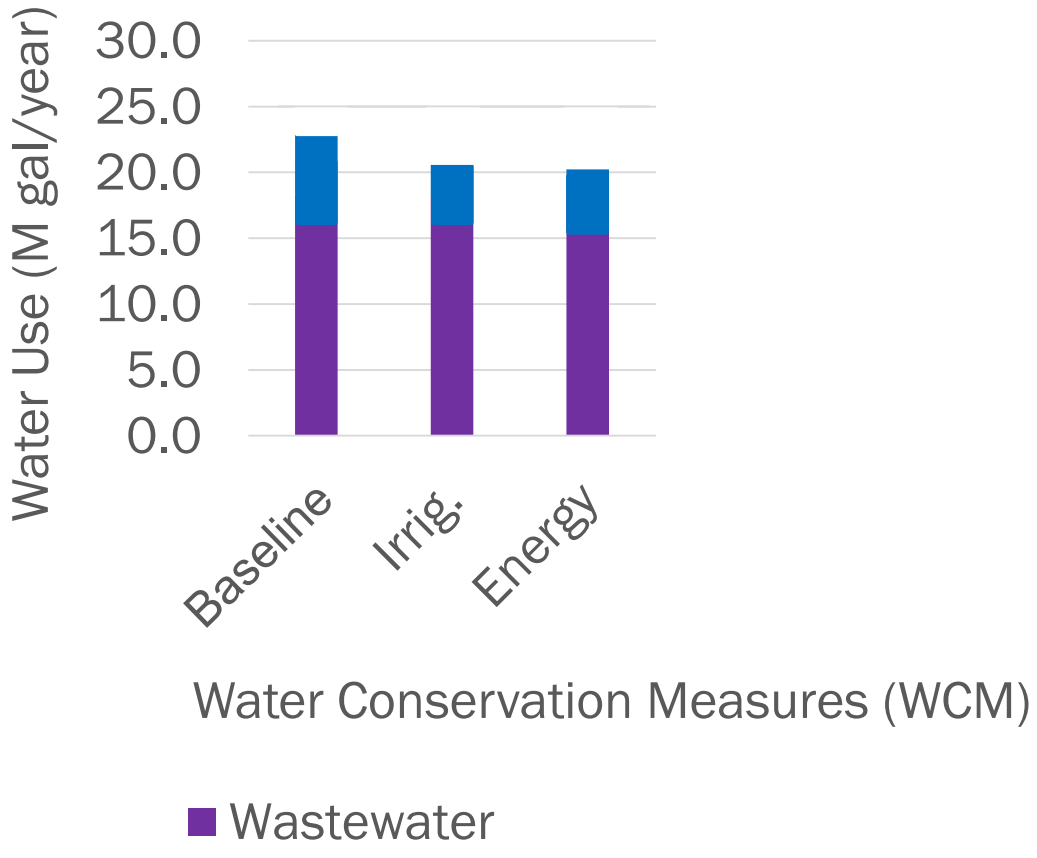
- H2O demand – 21.6M gpy
- Wastewater generation – 16.4 M gpy



System upgrade opportunities: energy efficiency

Plus energy efficiency

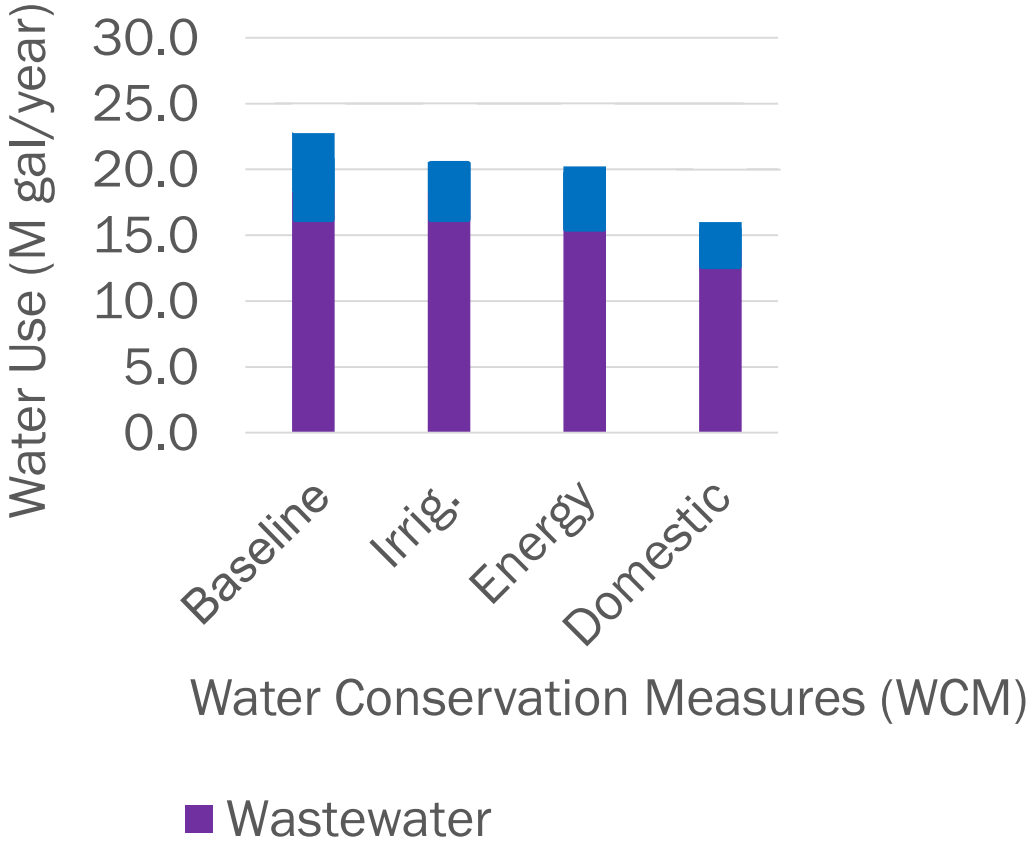
- H2O demand – 20.6 gpy
- Wastewater generation – 16.0 M gpy



System upgrade opportunities: plumbing

Efficient fixtures

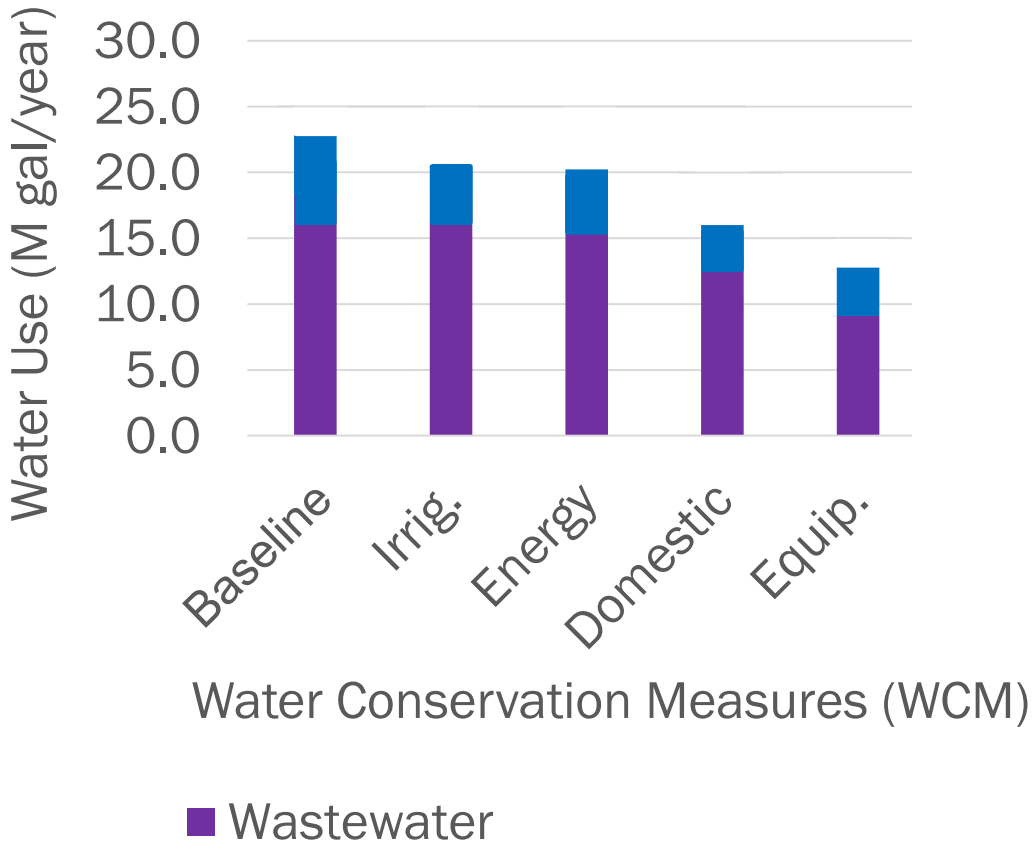
- H2O demand – 16.6 M gpy
- Wastewater generation – 12.4 M gpy



System upgrade opportunities: equipment

More efficient equipment

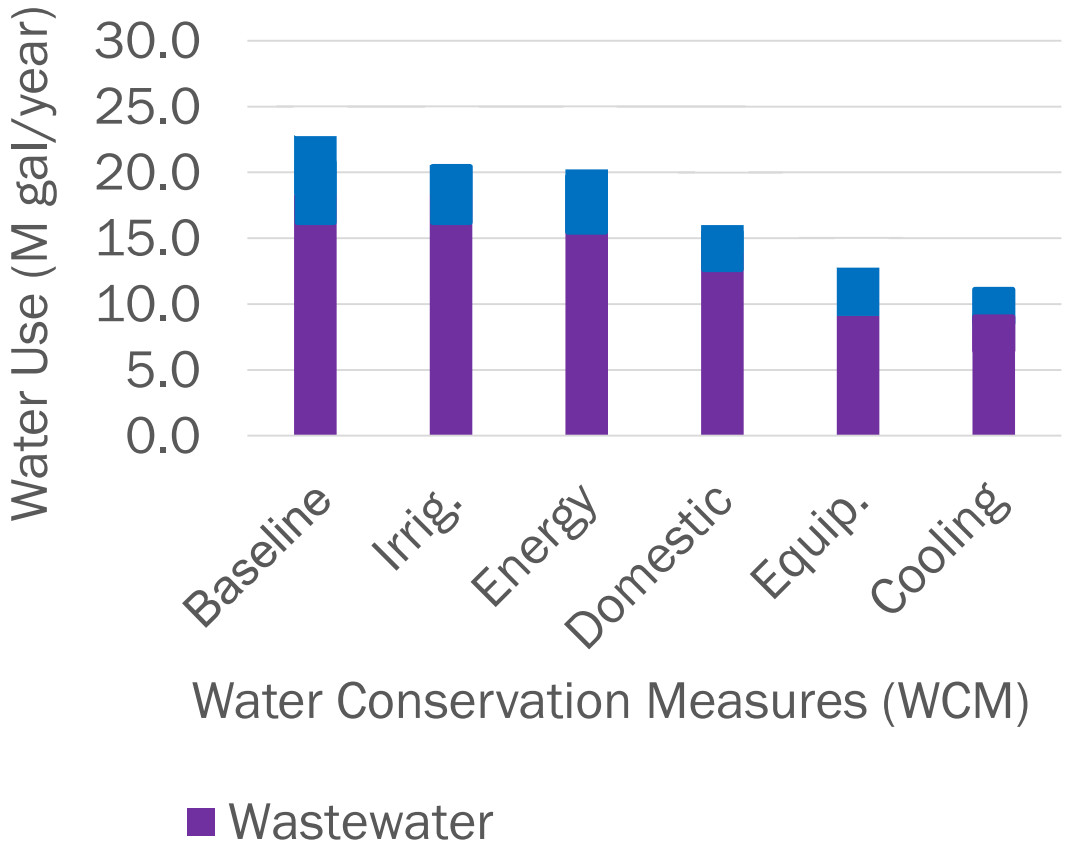
- H2O demand – 12.5 M gpy
- Wastewater generation – 8.9 M gpy



System upgrade opportunities: cooling

More efficient equipment

- H2O demand – 11.7 M gpy
- Wastewater generation – 8.7 M gpy



Rethink

Reduce

Recycle

Reuse

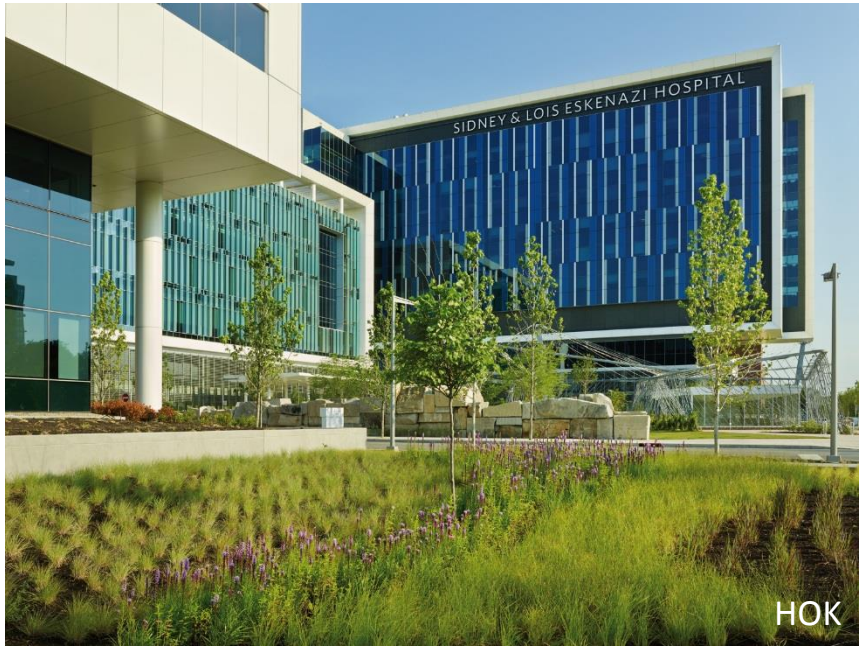
Municipal Reclaimed Water

- Mechanical
- Irrigation (subsurface)
- Toilet flushing in non-inpatient facilities

- Not inside inpatient facilities (today)

Redwood City Hospital: reclaimed water for irrigation

Rainwater Use for Irrigation



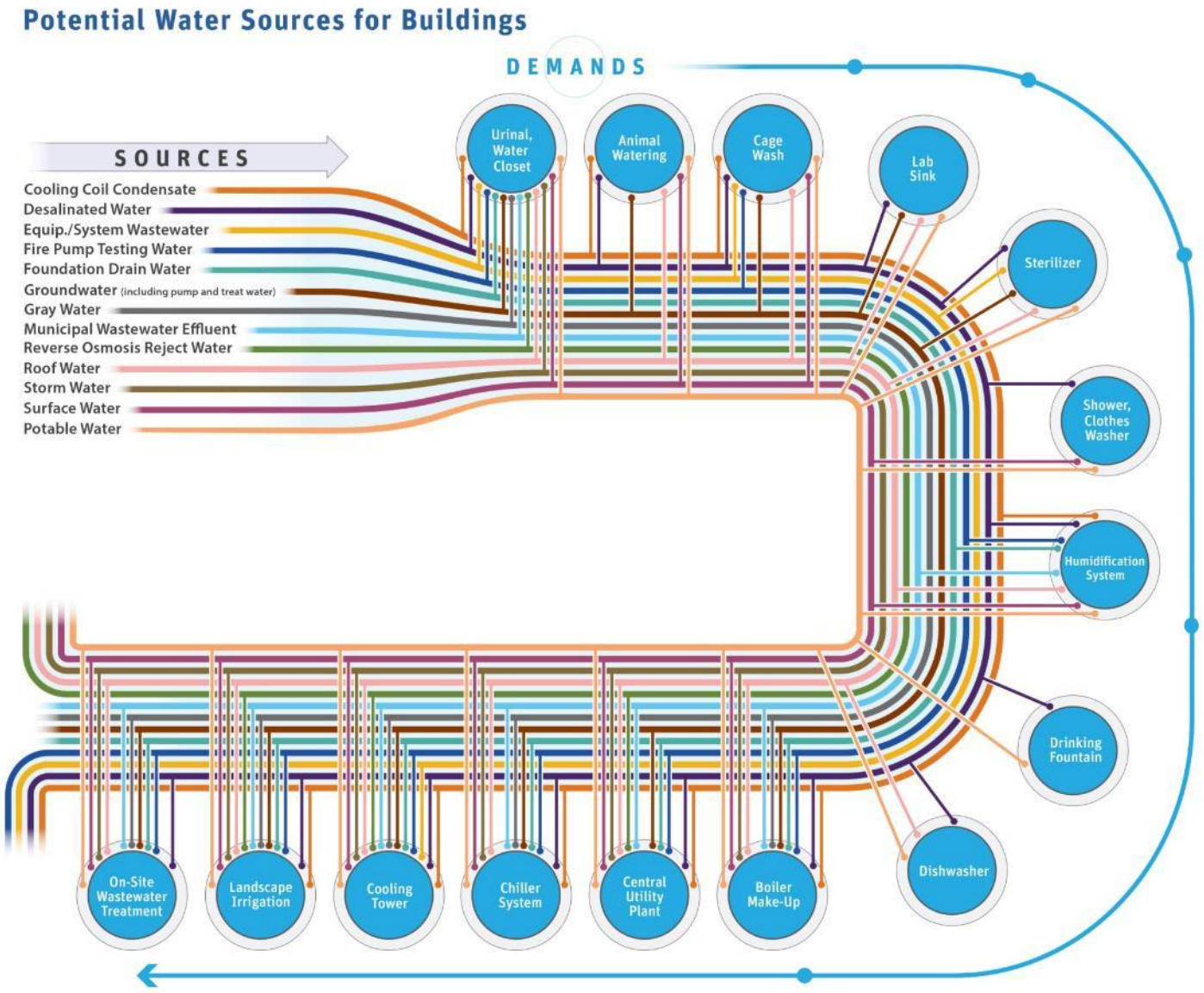
Eskenazi Hospital Main Campus: 100% of irrigation from rainwater

Blackwater Reuse Requirements

- On-site treatment for large buildings >250,000 square feet

San Francisco Public Safety Building – reclaimed shower water for irrigation

Reuse and Recycle: Match Sources and Demands



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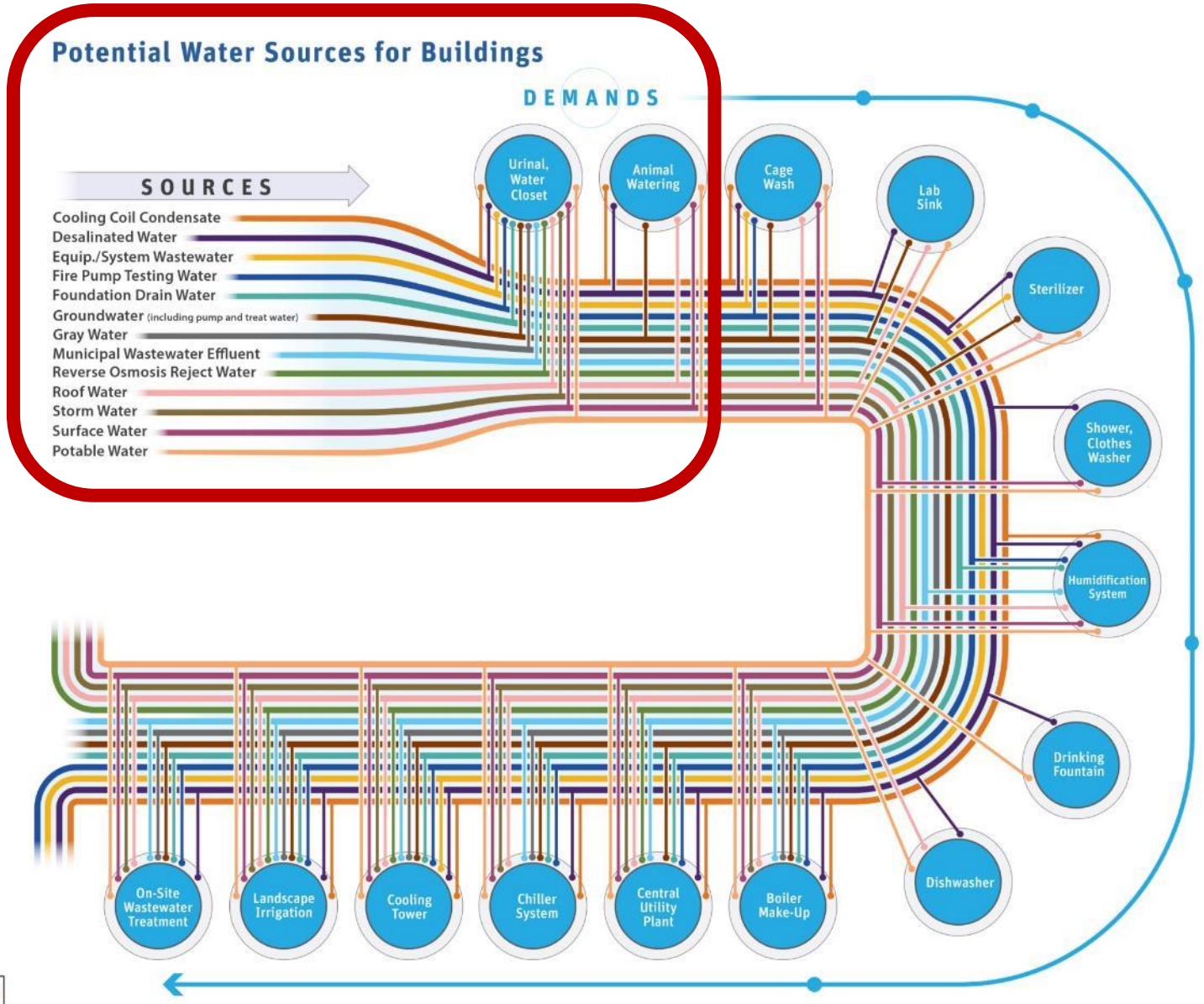
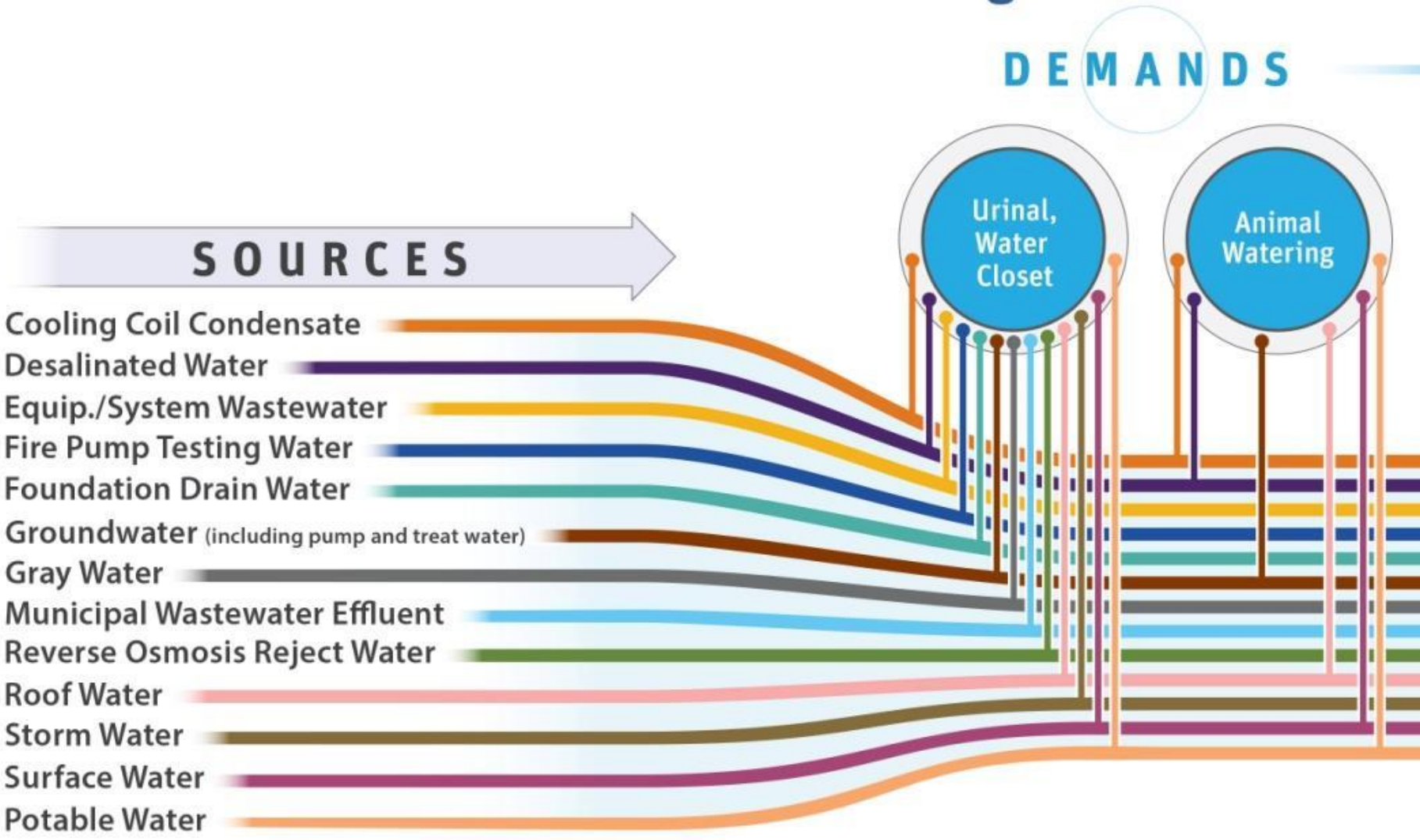


Potential Water Sources for Buildings



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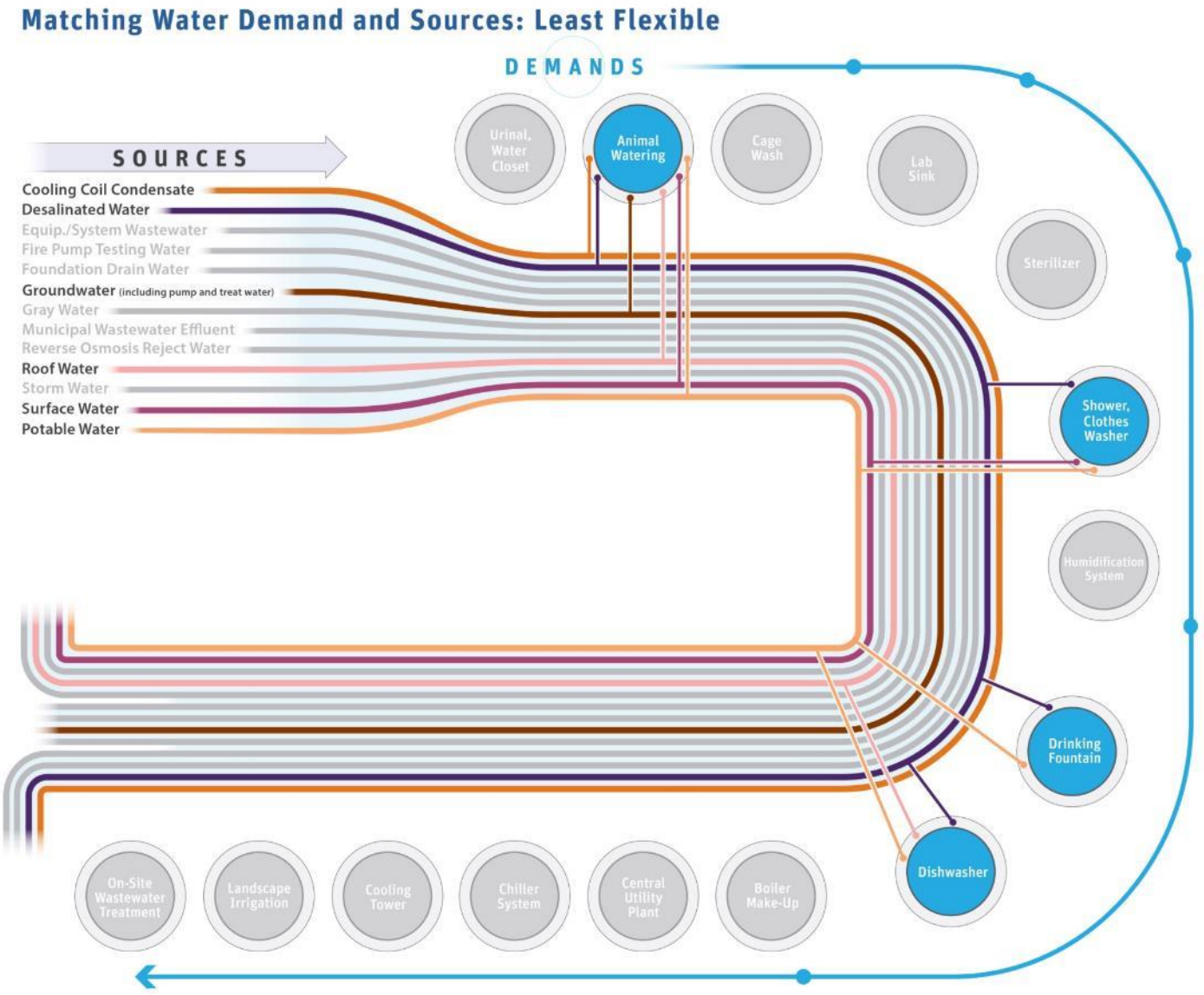

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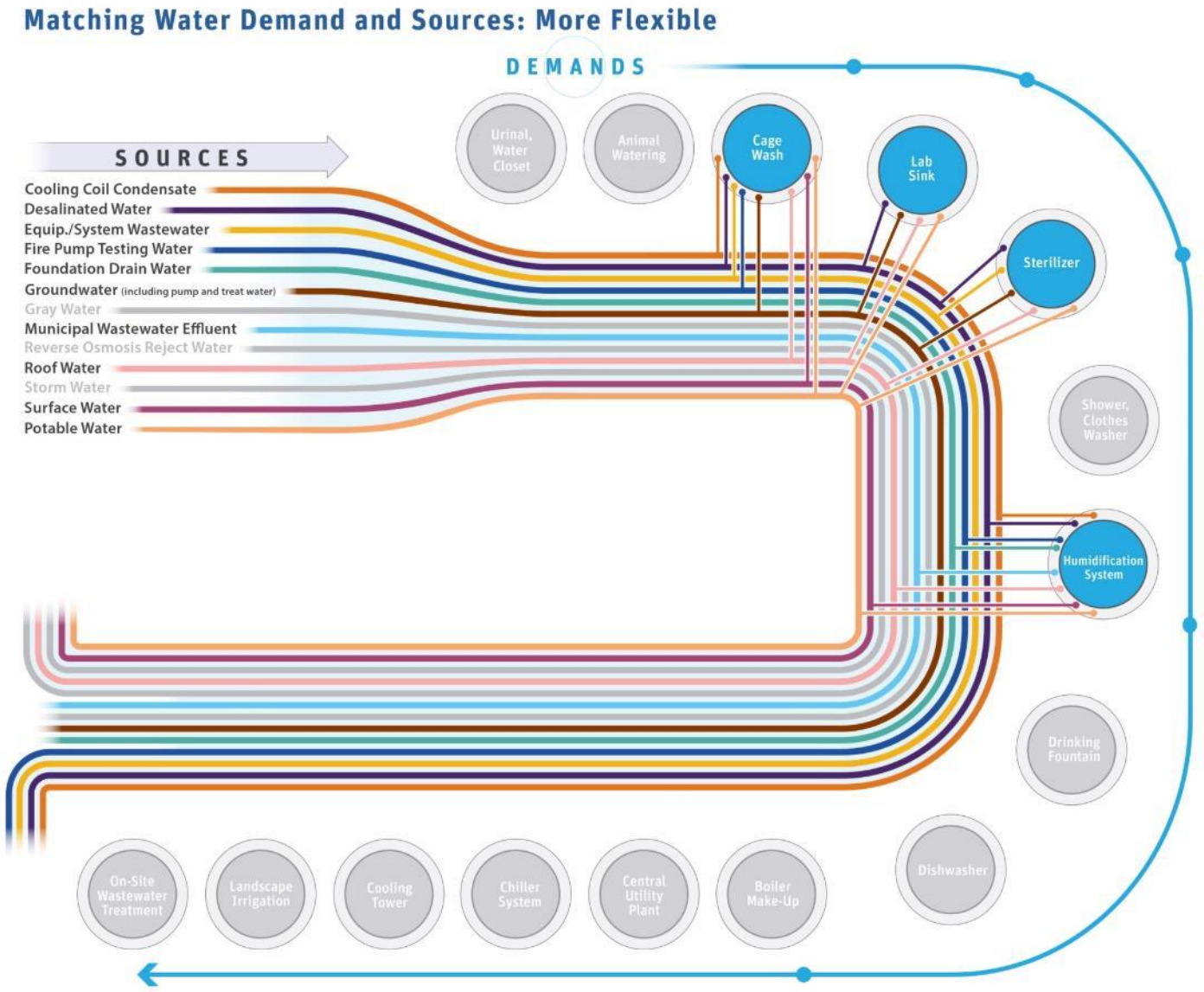

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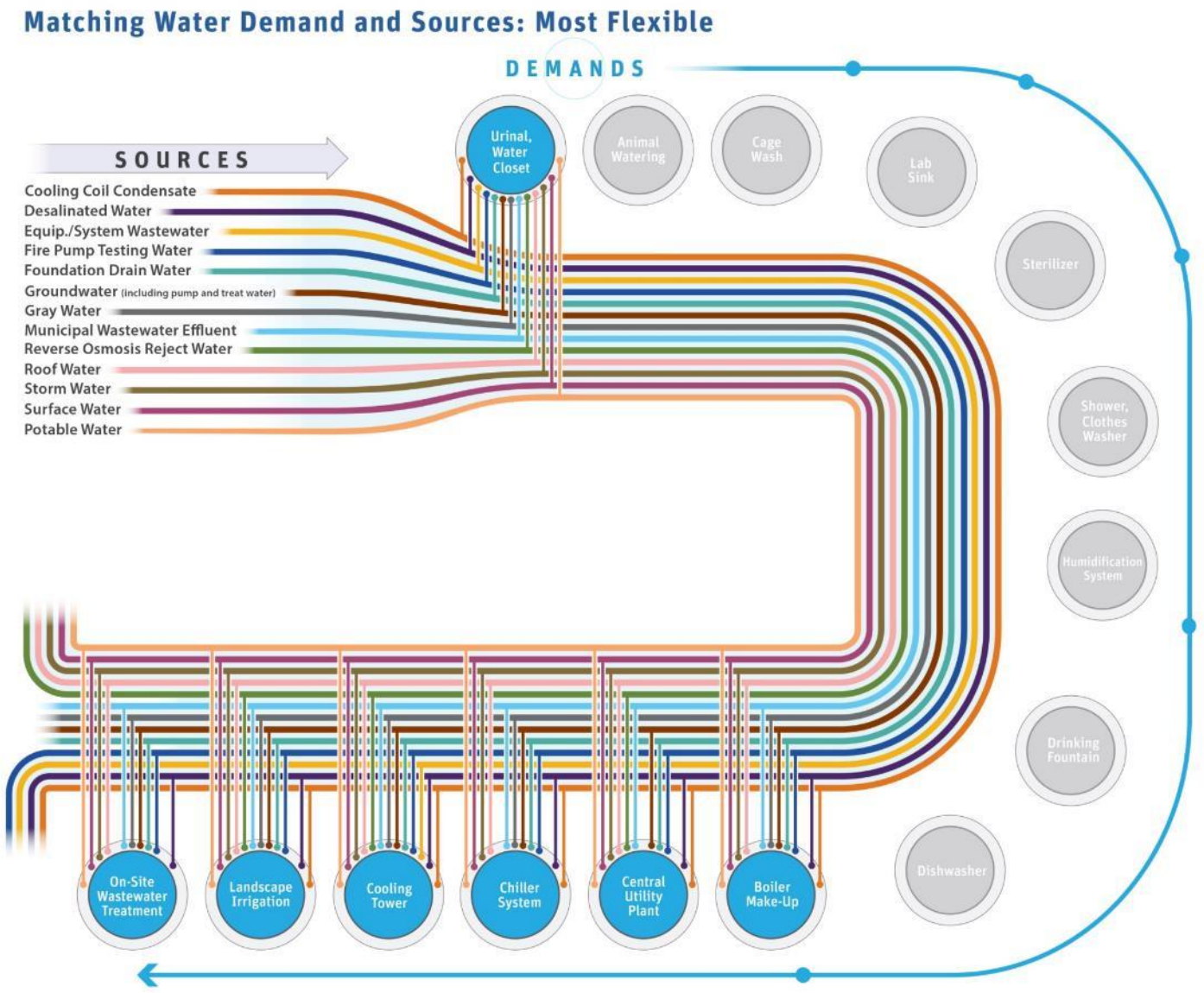
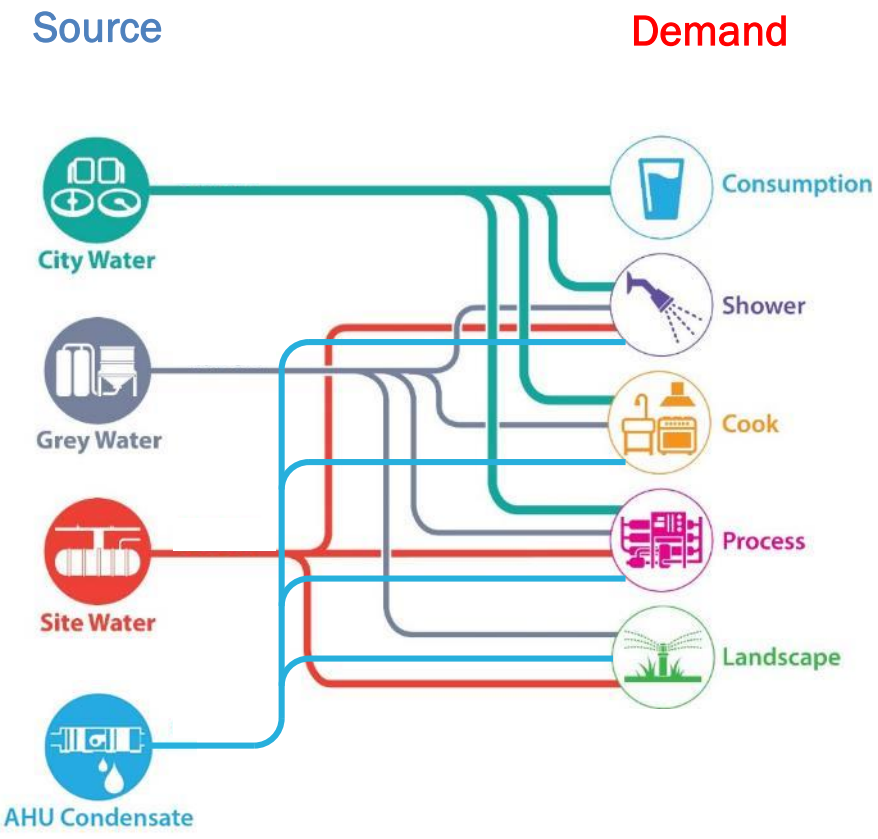
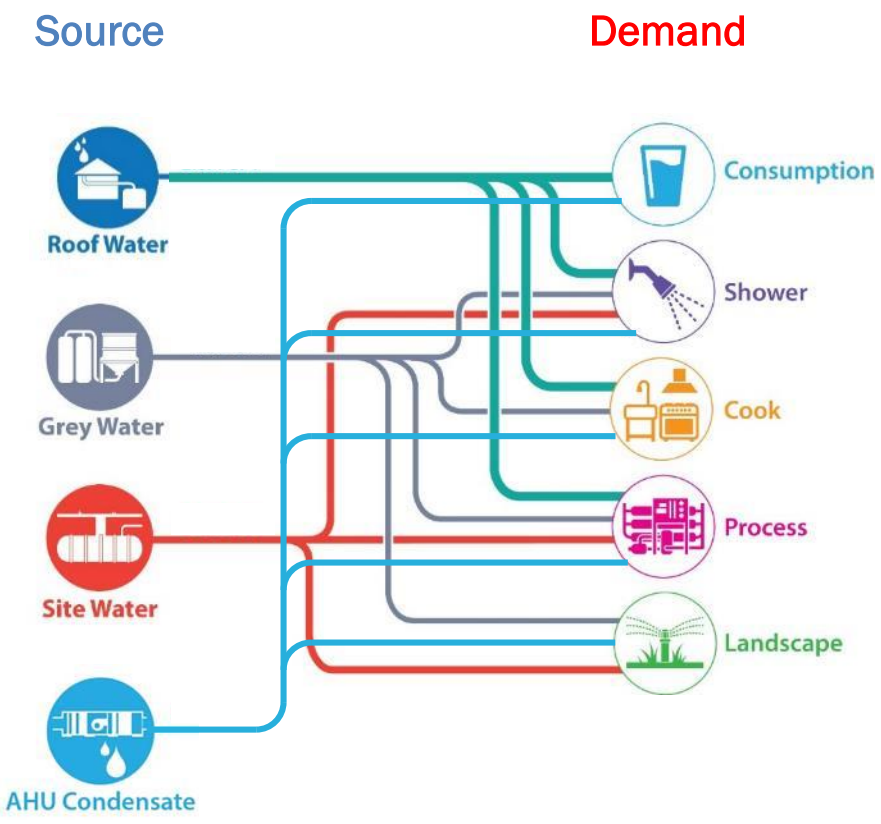


Providing for Today's Definition of "Potable Need"

OPTION 1



OPTION 2



Providing for Today's Definition of "Potable Need"

Option 1

Potable = city only

Import: 1.6 M gpy

Export: 8.2 M gpy

Net: Export: 6.7 M gpy

Option 2

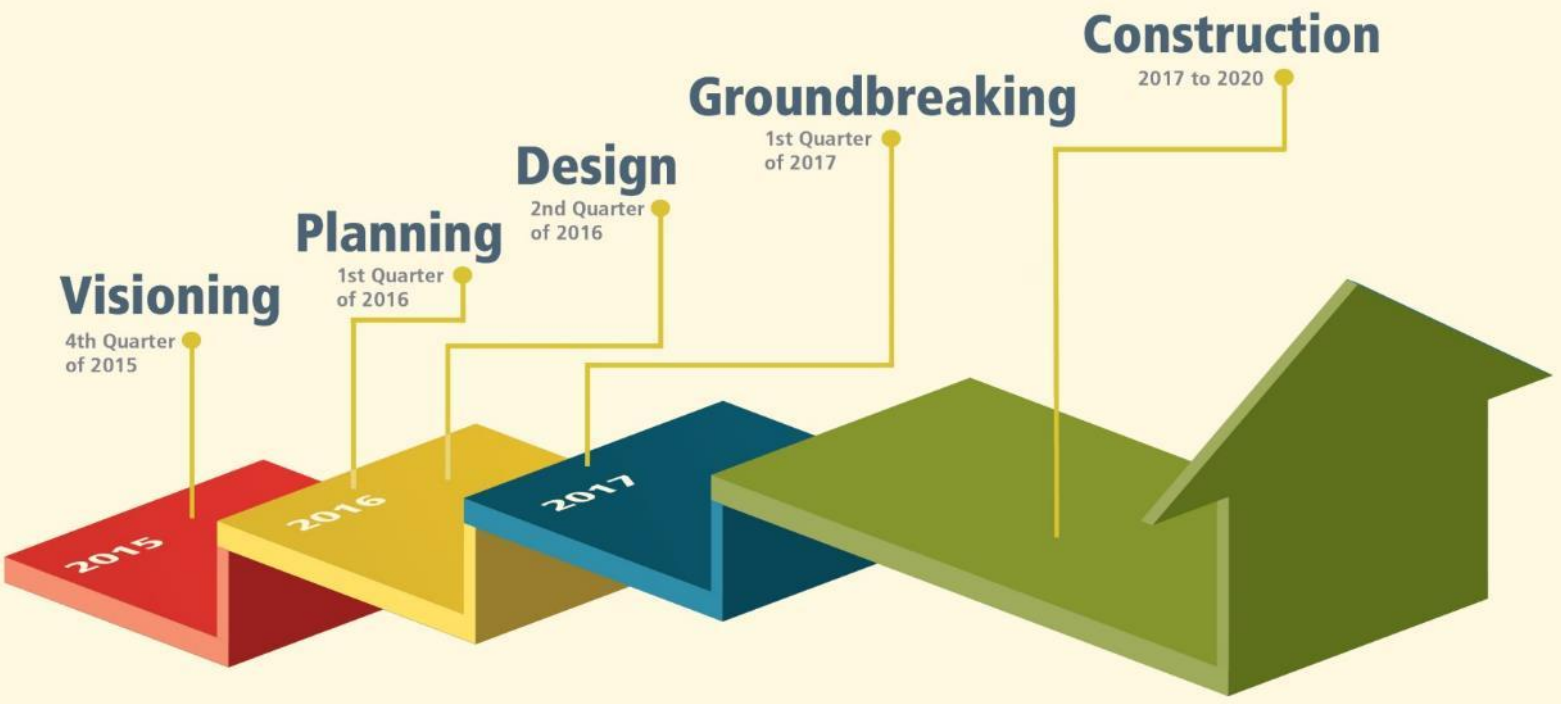
Potable = AHU condensate and rain water

Import: 0 gpy

Export: 6.7 M gpy

Net: Export: 6.7 M gpy

Next steps at IU Health Bloomington medical campus



Visioning: Input gathered from wide range of stakeholders to inform the overall look and feel of the campus.

Planning: Input gathered on space needs and functional requirements, initial testing of space plans.

Design: Input gathered for specific building systems. Final design documents issued for construction.

Construction: After groundbreaking, construction work on RAHC will begin.

ASHRAE 191P

- ASHRAE 191P Standard for the Efficient Use of Water in Building Mechanical Systems

- Goal is to set a minimum standard for water performance similar to ASHRAE 90.1 for energy and ASHRAE 62.1 for air quality.

- http://spc191.ashraepcs.org/index.html

To Conclude

Technology: all available today

Magnitude of **impact** is huge

Reduction can get you really, really far

Use: Address **potable vs. non-potable** differently

Today's regulatory limitations are real but may be temporary barriers