

Innovating at the Nexus of Food, Water & Energy

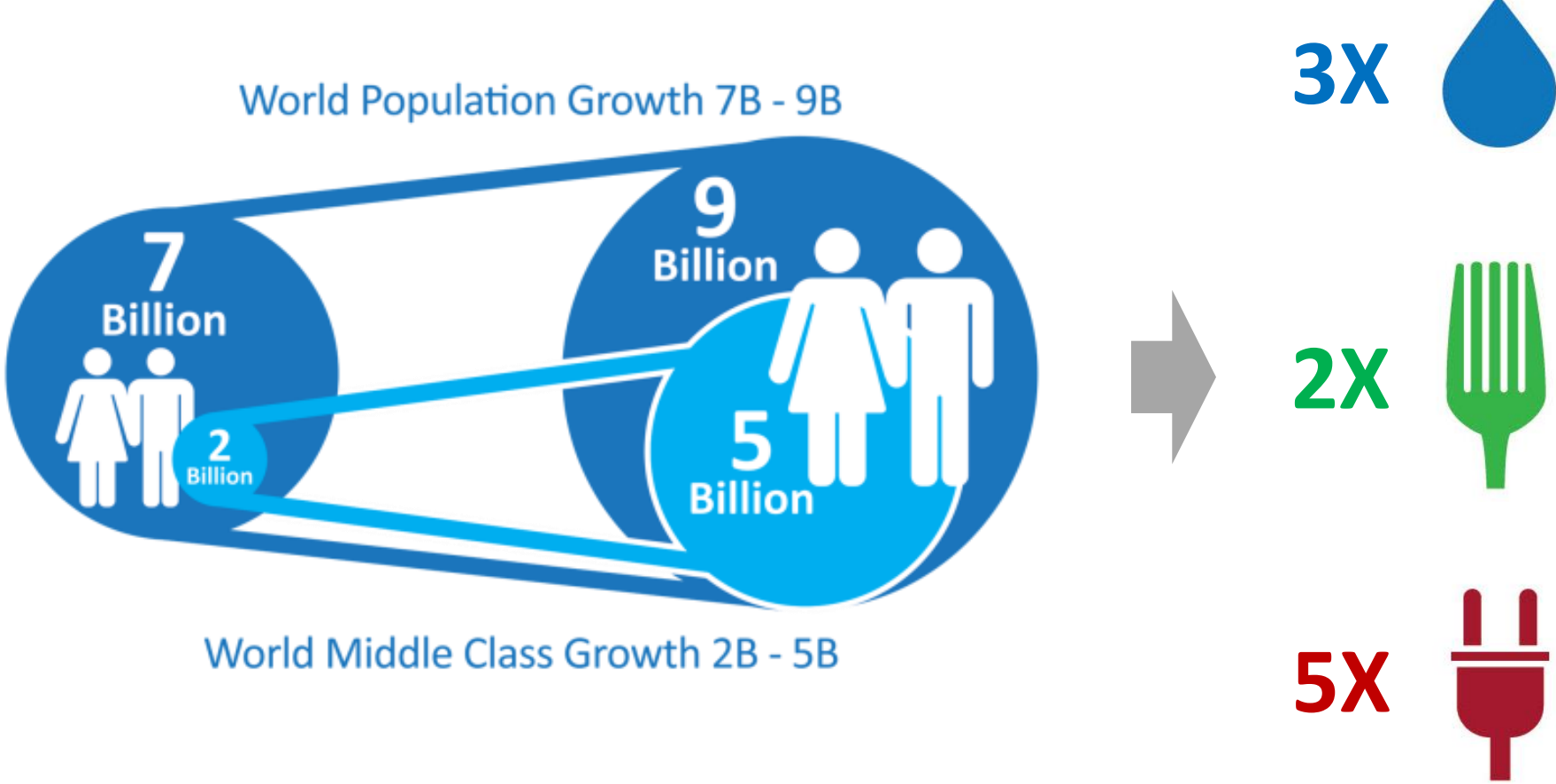
Minnesota Legislative Water Commission

June 22, 2015

PHILIP M. ROLCHIGO, PhD

Vice President of Technology

A GROWING & DYNAMIC NEW WORLD....



Population estimates projected in 2040

Has Created New Global Challenges & Opportunities

PENTAIR ADDRESSES THESE NEEDS GLOBALLY

~30,000

EMPLOYEES

7

CONTINENTS

\$7 Billion

ANNUAL
REVENUE

~100

MANUFACTURING
FACILITIES

500+

PRODUCT
LINES

90+

SERVICE
CENTERS

PENTAIR GOES TO MARKET IN 5 MAIN VERTICALS



- Oil & Gas
- Power
- Mining



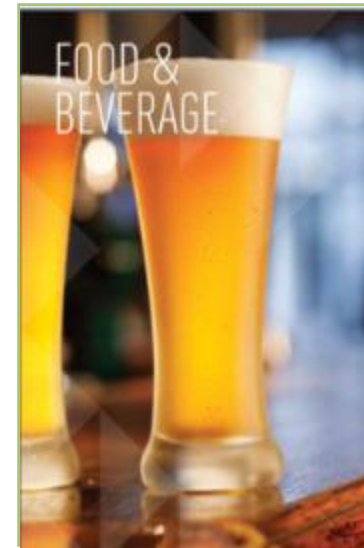
- General Industrial
- Automotive
- Process / Chemical



- Residential Homes
- Commercial Buildings
- Recreation & Leisure



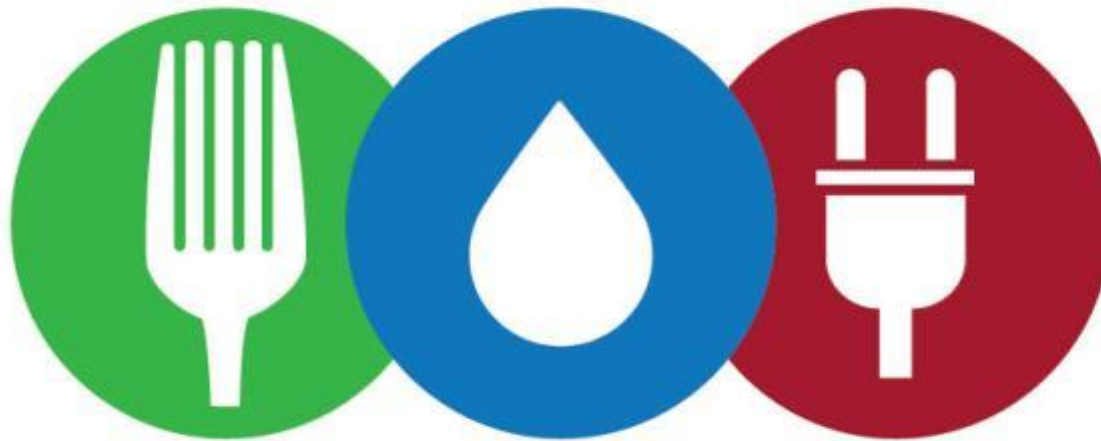
- Municipal
- Desalination
- Roads, Rail, Air Travel



- Agriculture & Aquaculture
- Food & Bev. Processing
- Food Service

Technologies & Services Positioned To Solve The World's Greatest Challenges

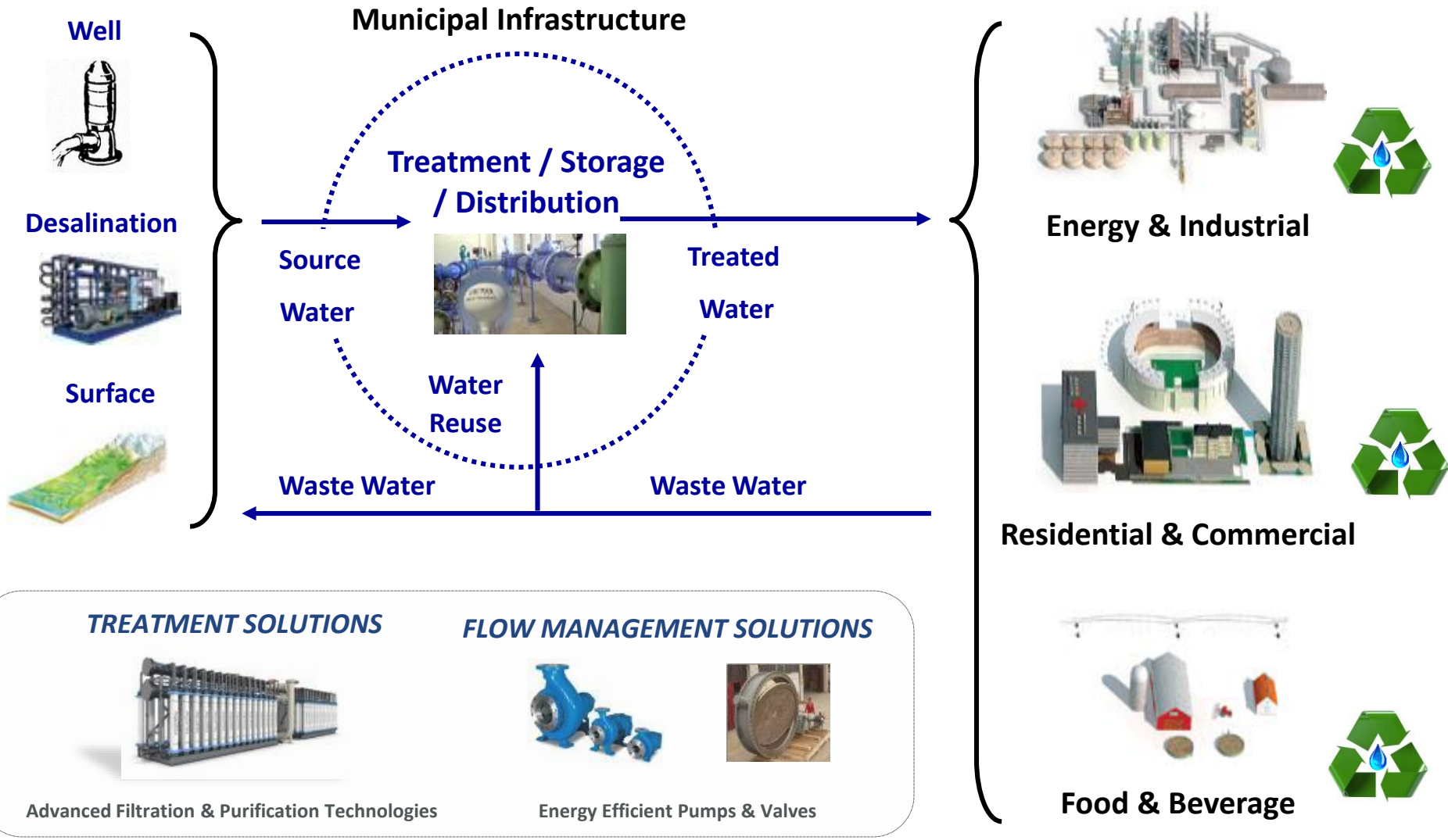
INSPIRED SOLUTIONS FOR A CHANGING WORLD



75% Of Our Solutions
Relate To Food,
Water & Energy

Innovating To Get More Food & Energy Out Of Each Drop Of Water

A LEADING PORTFOLIO OF WATER TECHNOLOGIES



Innovations To Relieve Scarcity, Improve Quality & Improve Energy Efficiency

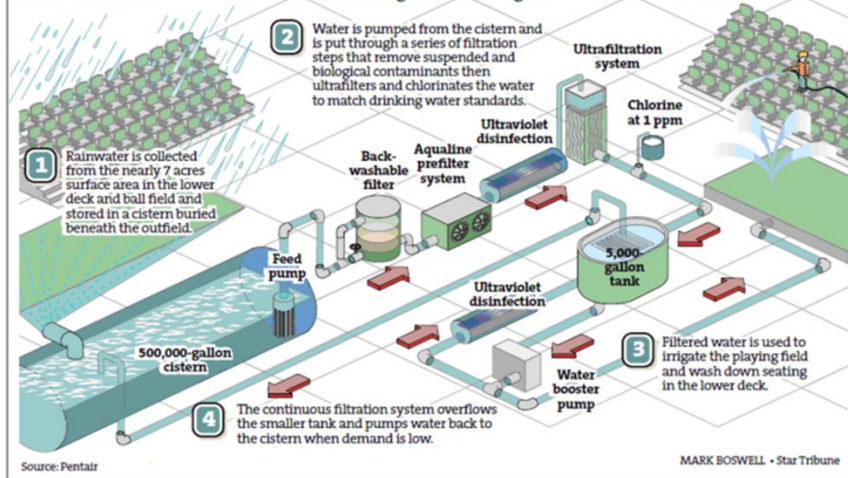
Some Examples of Our Innovative Solutions

TARGET FIELD RAINWATER REUSE TECHNOLOGY



RAINWATER RECYCLING AT TWINS FIELD

Target Field will have an operational rainwater recycling system built by Pentair that collects rainwater from the field and lower seating areas, stores it in a 500,000 gallon underground cistern, filters and disinfects it and reuses the water to clean seating areas and irrigate the field. Here's how it works.



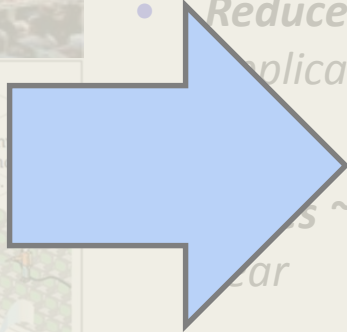
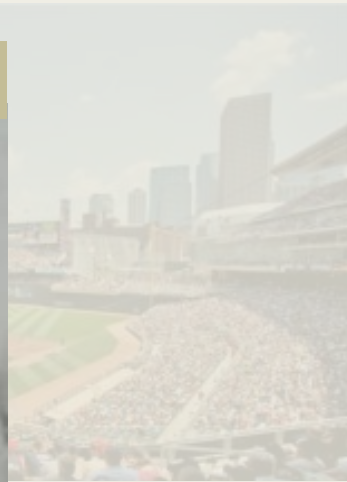
- **Innovative Rainwater Reuse System Captures, Purifies & Reuses Rain Water for Irrigating the Field and Washing Down the Stadium**
- **Reduces Municipal Water Used for These Applications by ~ 50%**
- **Saves ~ 2 Million Gallons of Water per Year**
- **Protects The Mississippi River from Storm Water Run-Off**

One of The Greenest Ball Parks In America

TARGET FIELD RAINWATER REUSE TECHNOLOGY



Untreated Water



Treated Water



- Innovative Rainwater Reuse System Captures, Purifies and Reuses Rainwater For Irrigating The Stadium
- Reduces Municipal Water Application
- Saves ~ 2 Million Gallons of Water Per Year
- Protects The Environment From Storm Water Run Off

Saving & Protecting One Of Minnesota's Most Precious Resources

MINNEAPOLIS DRINKING WATER TREATMENT PLANT

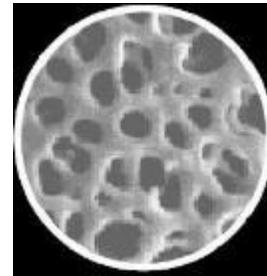
Advanced Treatment Using Hollow Fibers Ultrafiltration Membranes To Purify The Water

... Delivering Higher Quality Water Than Traditional Treatment Solutions

One of the 40 filtration units inside the Ultrafiltration Plant at Columbia Heights



Innovative Technology



These nano-scale pores are small enough to remove harmful pathogens like bacteria and viruses.

- **45 Million Fibers create a surface area of 1.7 million ft²**
 - Put end-to-end, these fibers would stretch > 40,000 miles, or about 1.6 times the circumference of the earth
- **The facility produces 70 MGD of drinking water meeting the highest regulatory standards**
 - At that rate, it could fill Lake of the Isles in a little more than four days

State of the Art Water Treatment Technology Serving ~500,000 Residents

REIMAGINING FARMING TO FEED THE WORLD

*The Demand for Fish is Outpacing the Natural Supply as Our Ecosystem is Over Fished...
Pentair's Aquaculture Technology has the Potential to Address this Challenge*

Aquaculture Production Processes

Net Pen
Aquaculture
Systems



The most common processes, but have significant ecological challenges

Pond
Aquaculture
Systems



Pentair's Recirculating
Aquaculture Systems



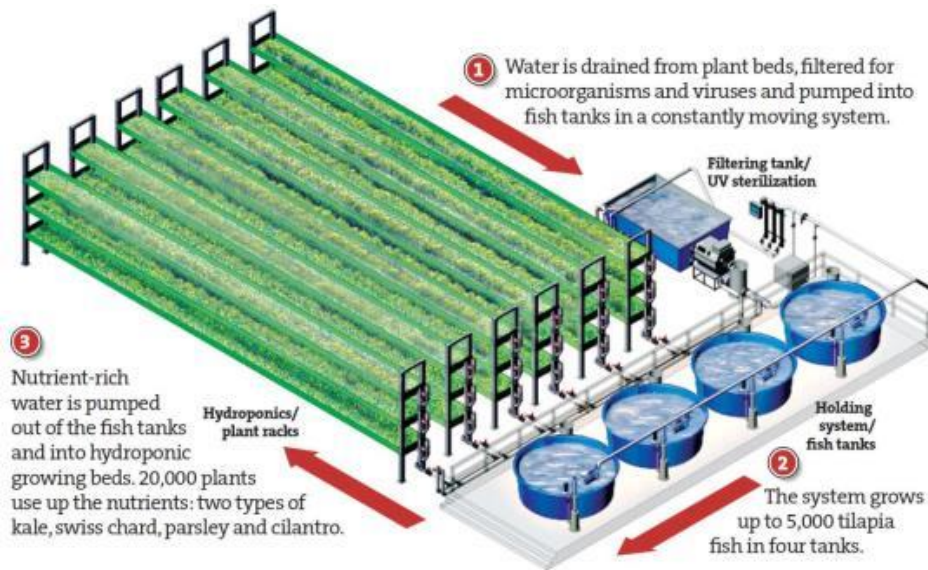
A sustainable, closed loop system, engineered to be highly energy efficient and minimize waste

Recirculating Aquaculture Systems ... A Sustainable Path To Address The Demand

URBAN FARMING IN OUR OWN BACKYARD

AQUAPONICS ... *Combining Aquaculture & Hydroponics* Into A Synergistic System

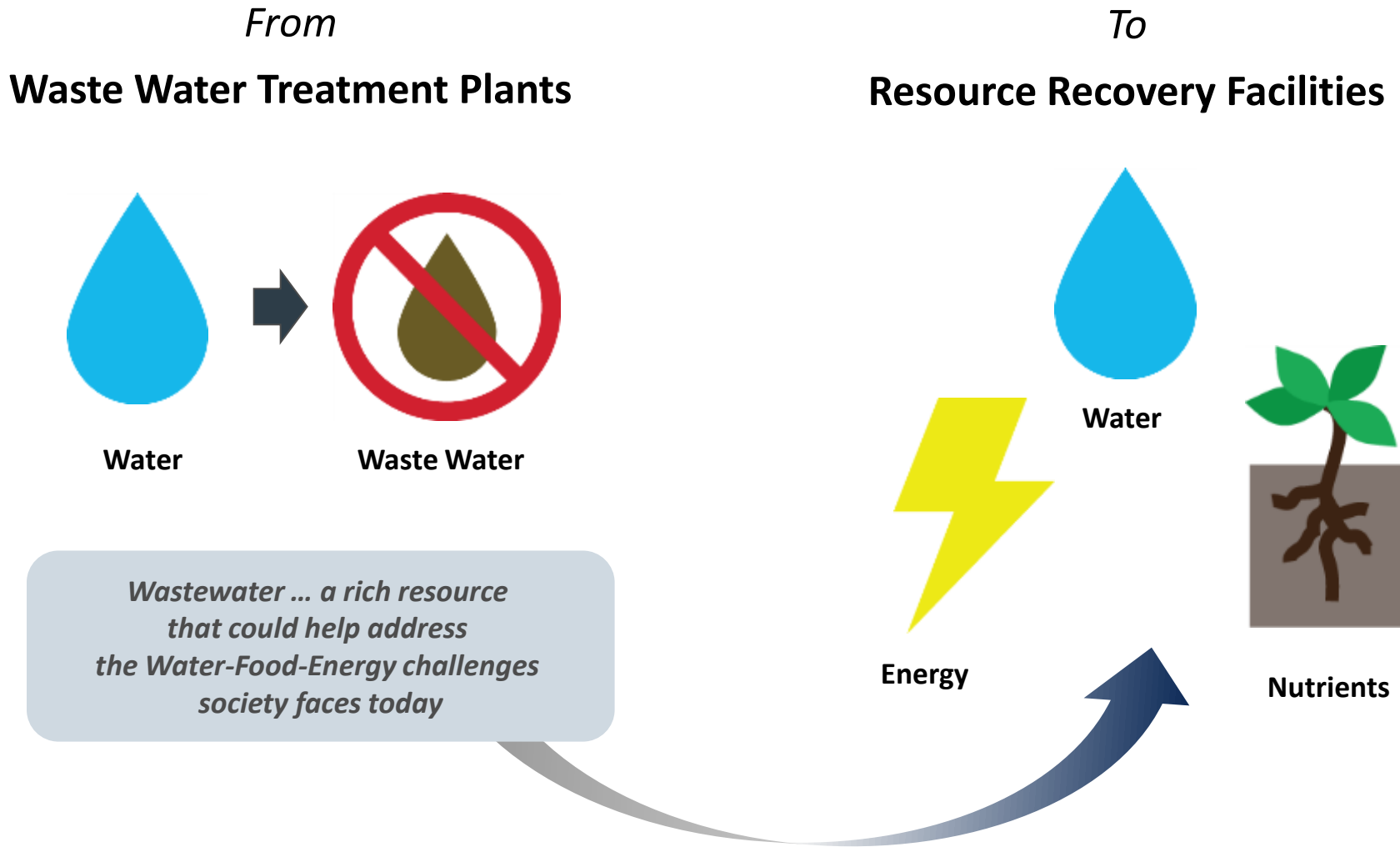
- Urban Organics Project ... An Urban Fish & Produce Farm
 - The largest scale commercial aquaponics system in the world to date
- Innovative coupling of waste from aquaculture as a nutrient for plants ... reduces fertilizer costs
 - Potential to meet organic standards
- Plants further purify the water for the fish reducing filtration costs
- Local production saves significant farm-to-table energy costs
- Elimination of soil borne diseases in vegetable production



Graphic courtesy of Mark Boswell Star Tribune

Aquaponics ... An Exciting Application To Meet Growing Demands For Food

RE-IMAGINING THE WATER TREATMENT CYCLE

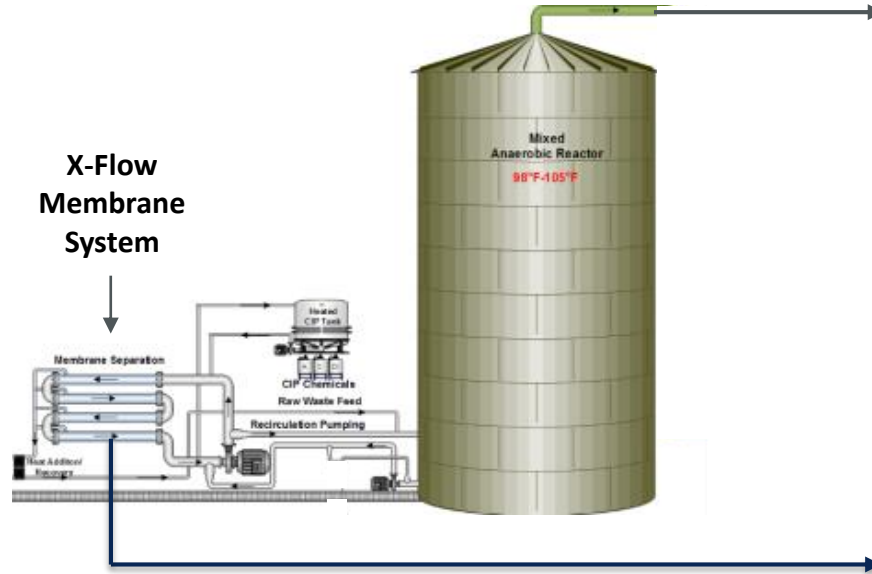
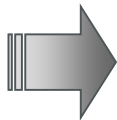


Accelerating Nature's Processes ... Helping To Ensure A Sustainable Future

RE-IMAGINGING THE WATER TREATMENT CYCLE

Advanced Treatment Technology

Waste From A Dairy
Processing Plant



Methane Used To Offset
The Natural Gas supply

Treated Water
Suitable For Reuse



Innovative Technologies...

20 to 30% Higher Methane Production Than Conventional Treatment

While Producing Water Suitable For Reuse

From Waste To A Source Of Energy & Water ... New Opportunities Possible



PENTAIR

INSPIRED SOLUTIONS
FOR A CHANGING WORLD