

COLLABORATION. INNOVATION. RESULTS.



NACWA

## 2014 National Pretreatment and Pollution Prevention Workshop

### Are We Treating Wastewater or Recovering Resources?

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## Utility of the Future: Major Paradigm Shift

**PAST:** collect wastewater, move it quickly downstream, treat it to acceptable standards, and dispose of waste without harming the environment.

**FUTURE:** manage resources to generate value for the utility and its customers, improve environmental quality at least cost to the community, and contribute to the local economy



## Water Management Institution Continuum



### Early 1800s – Water Supply Community

**Need:** Provide reliable water supply

**Function:** Supply Hydraulics



### Late 1800s – Sewered Community

**Need:** Protect Human Health

**Function:** Separate Sewerage Schemes



### Mid 1900s – Drained Community

**Need:** Increase Usable Land for Agriculture & Development through increased Flood Protection

**Function:** Dams, Drainage Systems, Channelization



### 1970s – Waterways Community

**Need:** Protection for Environment - Regulation

**Function:** Point & NP Source Pollution Mgmt



### 1990s – Water Cycle Community

**Need:** Address Natural Resource Limitations

**Function:** Diverse, Fit for Use Supplies, Conservation & Waterways Protection (MFLs)

**Future –  
One Water  
Community**  
**Need:** Integrated  
Management  
for Resilient,  
Sustainable,  
Engaged  
Communities





## Sustainable Integrated Water Management



**Need:** Reliable, Secure, Diversified Supply where Quality is based upon Use  
**Function:** Providing the Right Water for the Right Use

**Need:** Protect Human Health and Recover Valuable Resources  
**Function:** Use highly treated resource to recover Nutrients, Energy & Water



**Need:** Optimize built environment infrastructure  
**Function:** Integrate Green Infrastructure and water harvesting into development

**Need:** Flexibility in rules & legislation to protect environment & encourage innovation  
**Function:** Adaptive Regulatory Programs that recognize site specific needs



**Need:** Recognize agriculture as partner in water management systems.  
**Function:** Partner for Co-Generation and Agricultural Reuse Opportunities

**Need:** Take integrated approach to community, economic & water systems.  
**Function:** Improve quality of life and business outputs through integrated systems.



## From Waste to Wealth – Moving to a Resource Recovery Paradigm

FOG (Fats, Oils & Greases)



Biofuels, Digestion  
Enhancements (Energy)

Phosphorus



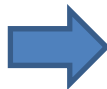
Fertilizer

Urine Separating Toilets



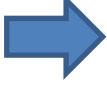
Fertilizer (Nitrogen)

Dissolved Metals



Usable metals

High quality water



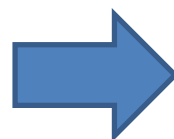
Potable water offset

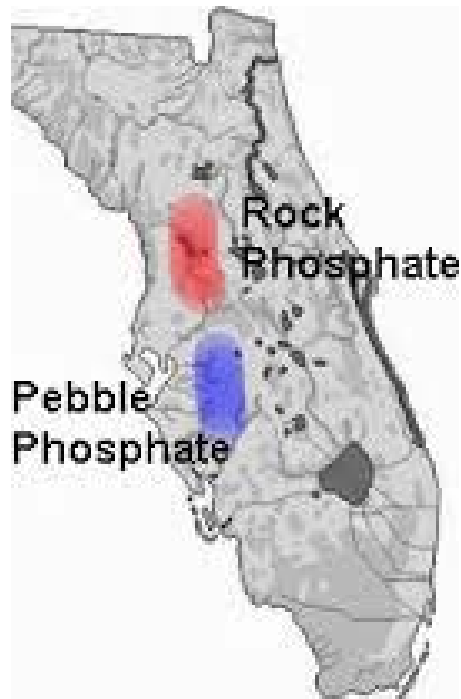
Biosolids



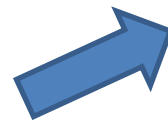
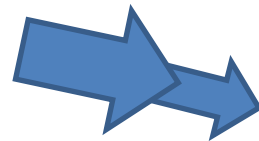
Energy, fertilizer

## FOG Lipids to Biofuels





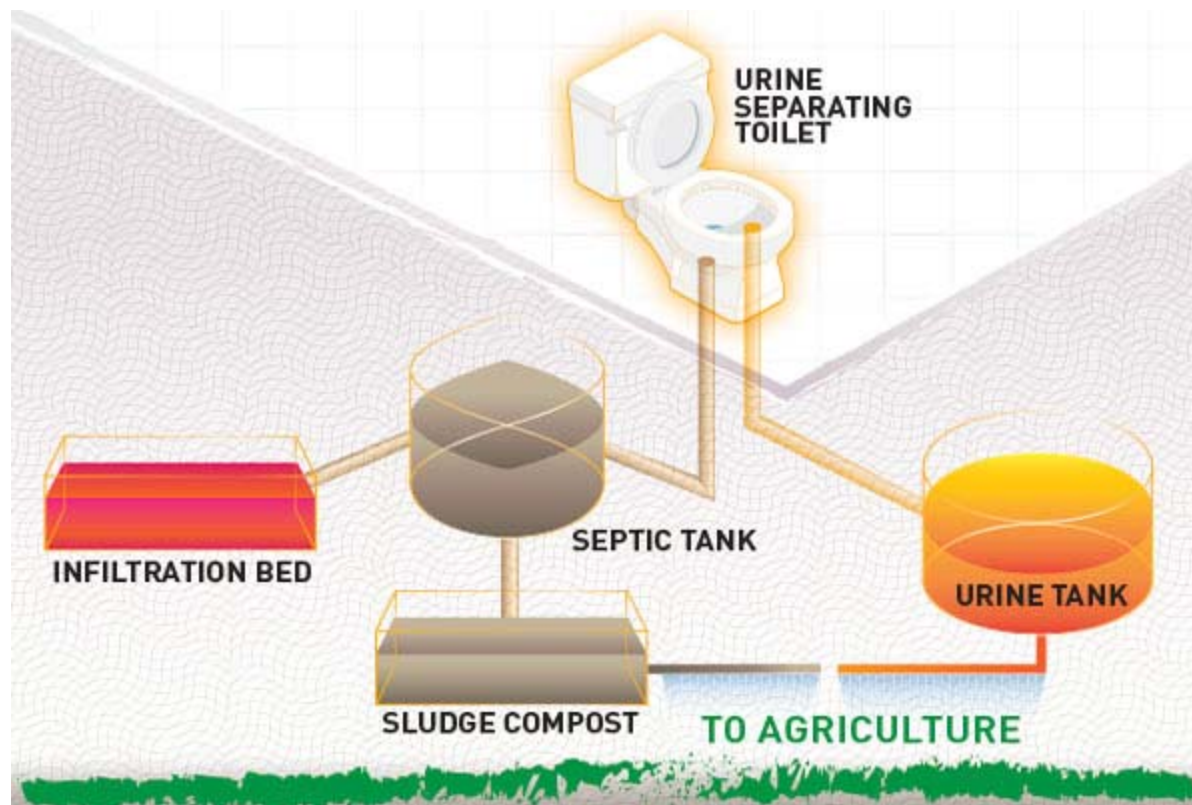
## Side Stream Nutrient Recovery



**Side Stream Nutrient  
Recovery Systems &  
High Quality Water  
Reclamation**



## On Site Water Systems including Stormwater & Graywater Harvesting & Urine Separating Toilets



## Some other recovery options being discussed:

- Recycling toilet paper for cellulose
- Harvesting casing compounds from pharmaceutical waste for use in veterinary pharmaceuticals
- Recovery of metals using chitin or a biomimicry process using bugs that remove metals out of water systems

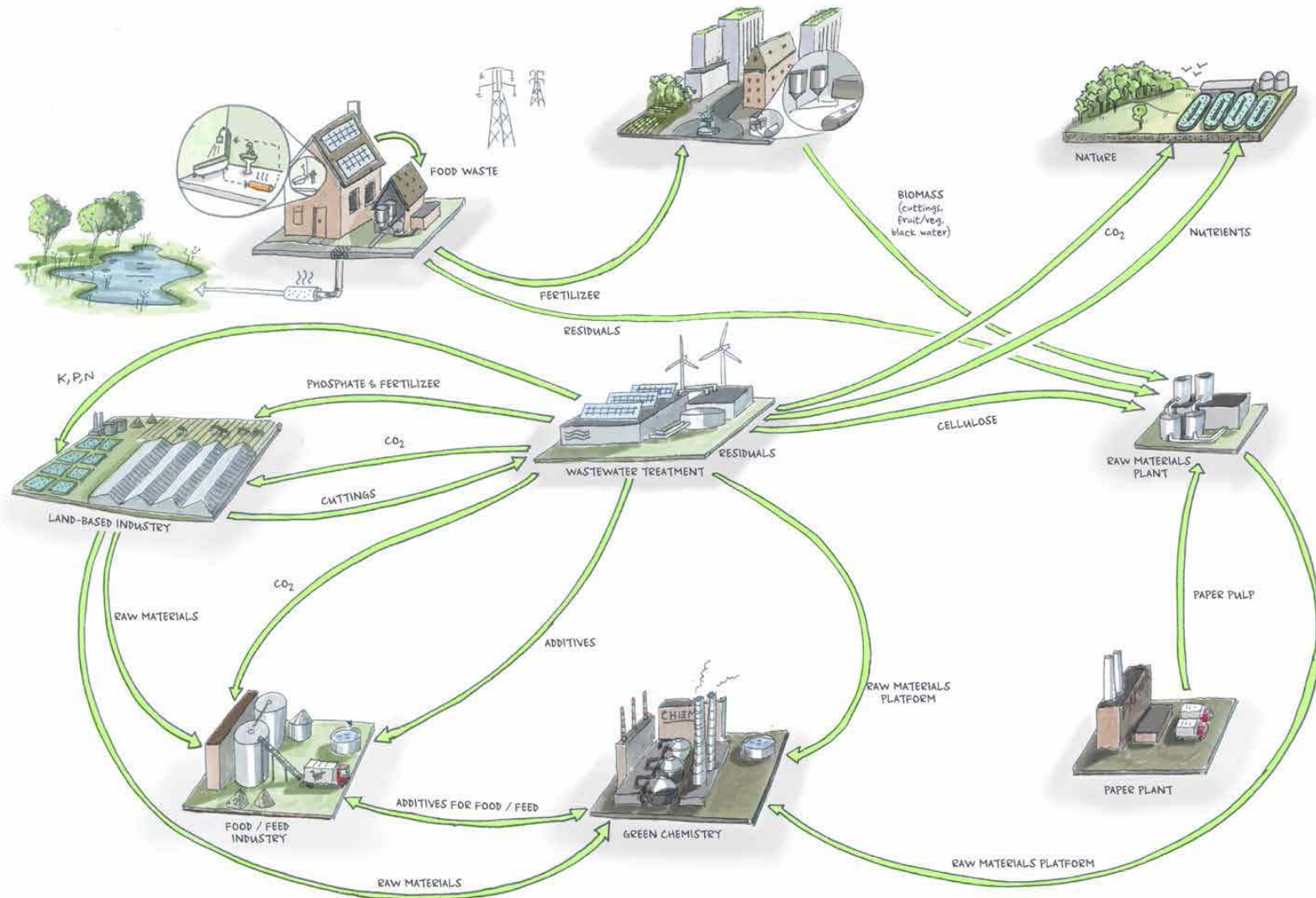
## Can you imagine how our water system would change:

- If we had self-cleaning fabrics;
- If we used gray water and/or stormwater harvesting in our development process;
- If we were only sending blackwater and sink water to the water reclamation facilities;
- If we were generating energy from our available water reclamation sources;
- If we were able to reclaim our highly treated water for beneficial use;
- If there were no waste?

**Would this benefit your community?**

# Welcome to the “Utility of the Future”

	Collect, Remove, Treat, Dispose Safely		
	Motivation	Activity	Innovation
PAST	Increase Revenue	Water Reuse	• Industrial Cooling, Recharge, Landscape, Golf Course Irrigation
		Materials Recovery	• NH <sub>4</sub> , P Compounds, N Compounds, Metals
		Materials Conversion	• Bioplastics, Pyrolysis Fuel Oil, Algal Biomass, Solid Fuels, Fertilizers
		Biosolids Reuse	• Liquid Fertilizer
		Energy Generation	• Photovoltaics, Wind Turbines
FUTURE	Reduce Cost	Energy Efficiency	• Energy Efficient Equipment & Networks
		Energy Recovery	• Methane & Hydrogen Recovery, Heat Recovery
		Operating Efficiency	• Automation and Smart Operations, Asset Management, Sourcing
	Support Community & Economy	Growth Planning	• Sectoral Expansion, Targeted Upgrades, Managed Package Plants
		Green Infrastructure Community Partnering	• NPS Controls, Biowaste Conversion To Methane, Green Infrastructure

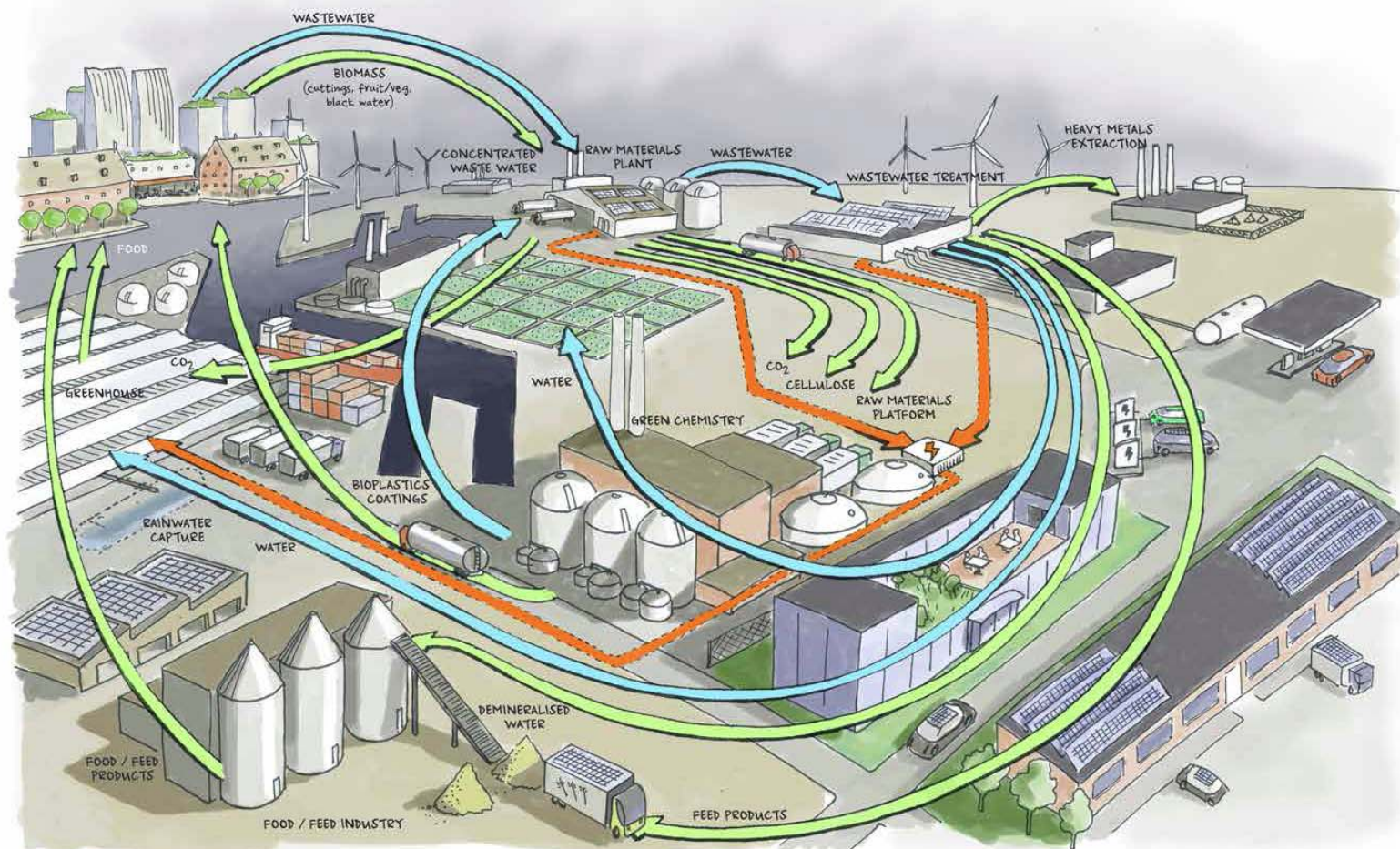


Source: Netherlands 2030 Vision Brochure



## Wastewater management roadmap towards 2030

Industrial area



Source: Netherlands 2030 Vision Brochure

## Do you agree?

- As our economy changes, different elements of resource recovery will become important in your area.
- There is a chance to improve the economy and improve the environment by looking for opportunities to recover resources.
- Pretreatment departments will be on the front line of these changes/opportunities.

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