“In theory there’s no difference between theory and practice. In practice there is.”
—Yogi Berra
In Theory – We Would Recognize Our Fallacies

YOU MEAN YOU HAVE SO MUCH CLEAN WATER

YOU SHIT IN IT?
Orthodox social imaginary driven by Queen Victoria < 175 yrs. Defecation becomes shameful and taboo. Disposal becomes the norm.
In Theory – This Becomes The Predominant Model

In Practice – Social Norms Rebuke This Model

Dockside Green, Victoria, CA
Historical – Theory Into Practice – 32 yrs, 45 Systems

Safe <Polluting <$$> >Water Balance >Resilience <Energy

1980s

Small Community On-site Wastewater Treatment
40 homes; Agriculture/ Open Space Preservation.

Bristol-Meyers Squibb, NJ
1st Pharmaceutical Onsite Water Reuse system in the US.

1990s

Copper Hill Elementary School,
East Amwell, NJ
1st public school water reuse system.

Sonoma Raceway, CA
NSU Operates both the Onsite water supply and wastewater treatment facilities for the raceway.

Sub-surface Treatment Wetland Systems,
Operates the most natural treatment systems in the U.S.

1990s

Gillette Stadium
250,000 GPD on-site water reuse system for New England Patriots, Foxboro, MA.

The Solaire,
Battery Park, NYC
1st residential water reuse project in the U.S.; LEED-Platinum.

2000s

Bristol-Meyers Squibb, NJ
1st Pharmaceutical Onsite Water Reuse system in the US.

The New School University, NYC
40,000 GPD in-building onsite water treatment & reuse for flushwater, cooling, irrigation & laundry.

MacDonald Island, AB, Canada
Integrated Water Reuse and Heat Recovery system utilizing treated wastewater effluent for irrigation and flush water while also recovering the effluent heat for pool heating within the rec center.

2010s

Durst Halletts Point,
Queens NYC
District scale redevelopment with in-building water reuse and thermal energy recovery systems.
Battery Park City – DNWS

- 15 yrs - Decentralized Non-Potable Water Supply.
- Reducing Consumption 45% - 90%.
- Reducing Pollutant Discharge 65% - 95%
Existing Case Studies – Battery Park City

- 15 years of NYC operating data. **ZERO permit exceedances and ZERO user complaints/public health concerns**
- Achieving >45% **Water Use** Reduction
- Achieving >65% **Sewer** Discharge Reduction
- **100% Reclaimed Water** For Cooling Tower Make-up
- Thermal energy recovery for **NET ZERO/NET POSITIVE ENERGY** water reuse
From Theory Into Practice - Better Technology

1. **Higher Performance ONWS**
   
   a) Net Energy Positive ONWS via Thermal Energy Transfer
   
   b) Process Optimization via Automation
   
   c) Population health monitoring via Artificial Intelligence
From Theory Into Practice – Better Regulations

2. **Best Quality Control Practices**
   a) Develop *commissioning, verification and challenge test* protocol
   b) Automate *surrogate pathogen detection* and system control methods

3. **Improved Public Health**
   a) Expand Quantitative Microbial Risk Assessment (QMRA) for more sources of supply and treatment processes.
   b) Implement *pathogen regrowth and control issues in distribution and storage systems* (Legionella)
In Theory – We should recognize the fallacy of our linear “pollutant allowance” water management approach and reinvent our infrastructure to eliminate pollution.

In Practice – It’s a lot easier to simply rebuild and hope for a different result.
Reference 1 - The POOP Project
Shawn Shafner - www.thePOOPproject.org
Changing the orthodox social imaginary regarding human excrement

Reference 2 - Pascal Dey, Chris Manson, **Overcoming Constraints of collective imagination**: An inquiry into activist entrepreneuring, disruptive truth-telling and creation of possible worlds, Journal of Business Venturing 33, 2018.