

On-Site Water Reuse Practice vs. Theory

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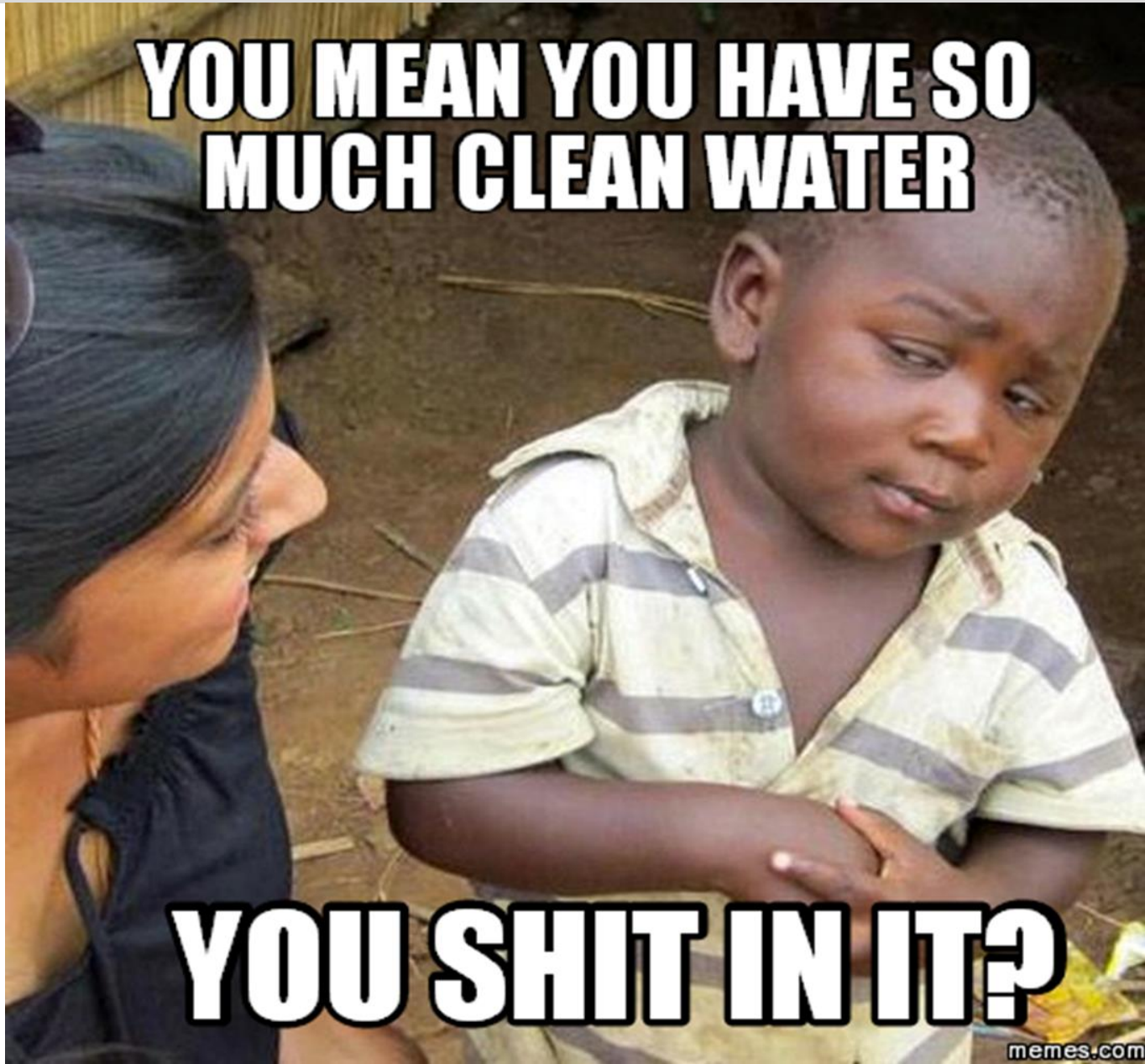


Practice vs. Theory

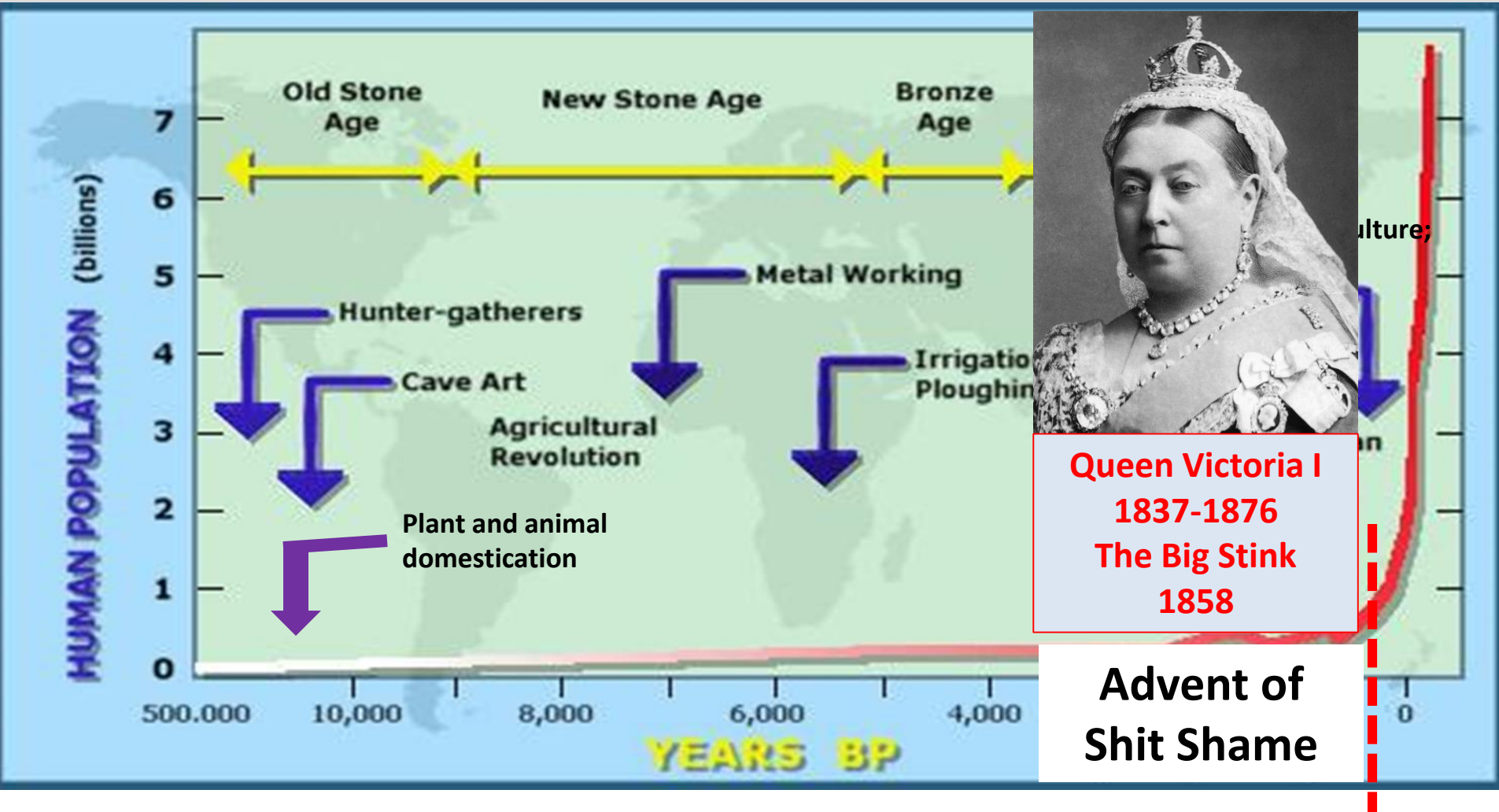


“In theory there’s no difference between theory and practice. In practice there is.”
—Yogi Berra

In Theory – We Would Recognize Our Fallacies



Population Growth and Social Norms



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



Historical – Theory Into Practice – 32 yrs, 45 Systems

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



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

1980s



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



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

2000s



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



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.



1990s

2010s



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.



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



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

Battery Park City – DNWS

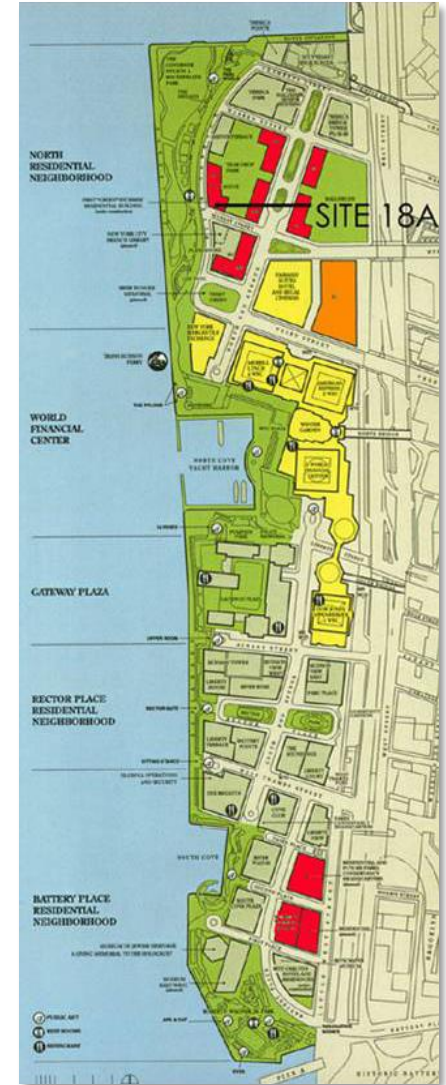


- 15 yrs - Decentralized Non-Potable Water Supply.
- Reducing Consumption 45% - 90%.
- Reducing Pollutant Discharge 65% - 95%



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



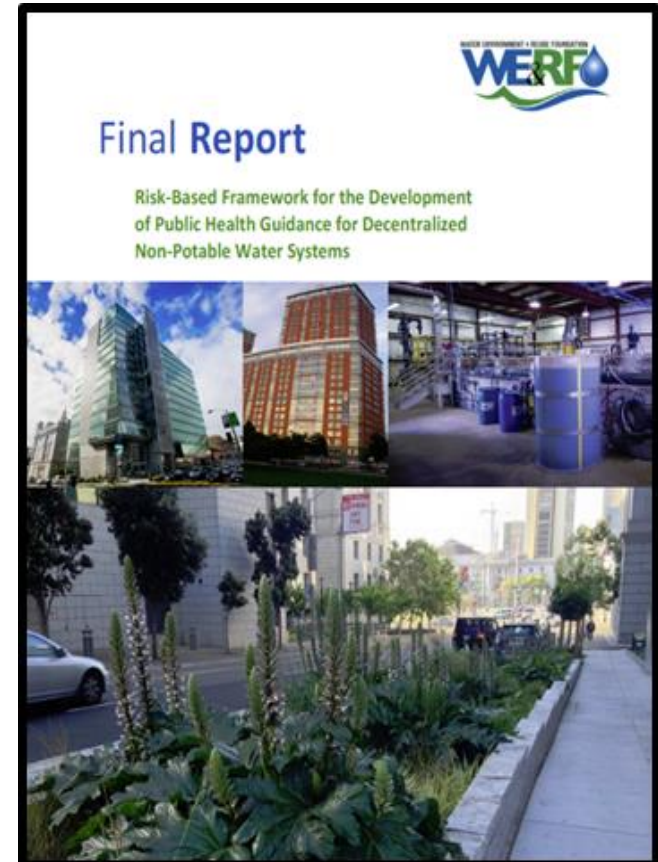
From Theory Into Practice – Better Regulations

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)



Thank You!

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 - Entrepreneurs As Social Change

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.