

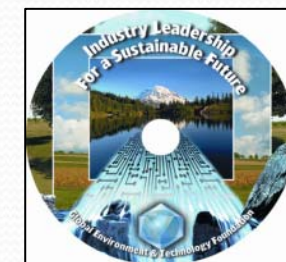
Wastewater Solutions & Watersheds

A presentation to the
Segundo Coloquio Internacional
“Cuencas Sustentables”



GETF Capabilities: Technology Deployment

- **Global Environmental Technology Enterprise**: 5 - year DOE project to deploy nuclear remediation technologies.
- **Worrell Water**: offer marketing & deployment counsel for a suite of innovative clean water & wastewater technologies
- **WaterHealth**: develop partnerships & funding to support access to clean, safe water to among the poorest communities in India & Southeast Asia
- **National Environmental Technology Strategy**: 15 month White House campaign to produce the first national environmental technology strategy



Key Messages

- Waste water & sanitation is improving worldwide
- Wise, immediate investments will result in multiple benefits (i.e., reuse, recycle, new technologies, etc)
- Improved waste water and & sanitation are important to address poverty & human health
- Success & sustained waste water management will take a new dimension in investment

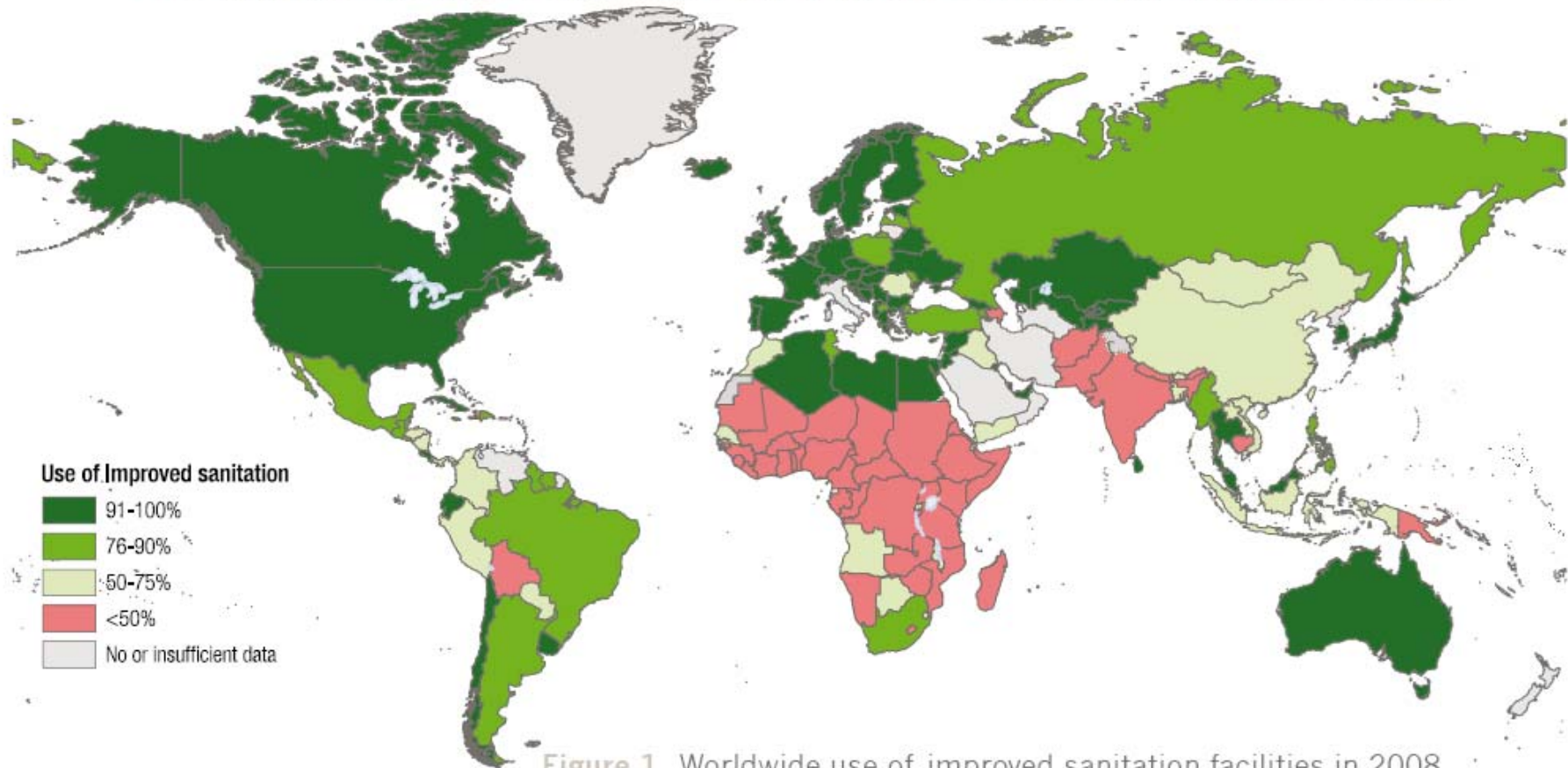
A new paradigm is needed.

UNEP, 2010



Global Sanitation Challenges

Use of improved sanitation facilities is low in Sub-Saharan Africa and South Asia



UNICEF, WHO. (2010). *Progress on Sanitation and Drinking-water: 2010 Update*. Geneva, Switzerland: WHO Press.
Retrieved from: <http://www.library.cornell.edu/resrch/citmanage/apa>



Global Sanitation Challenges

61% of global population uses improved sanitation facilities

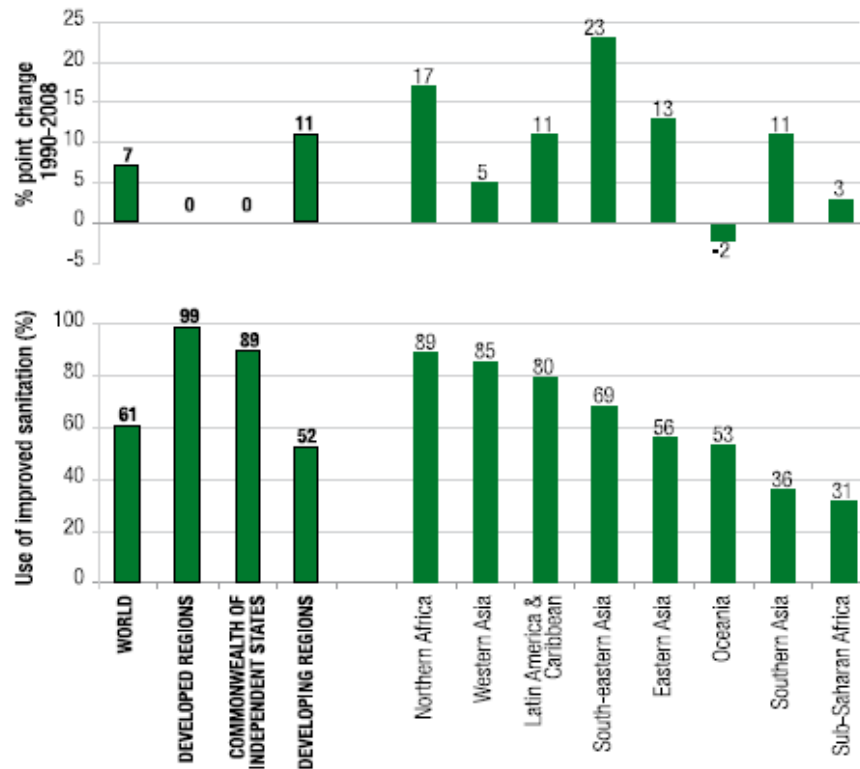


Figure 2 Regional use of improved sanitation facilities in 2008 and percentage point change 1990-2008

2.6 billion people – 72% of whom live in Asia – do not use improved sanitation facilities

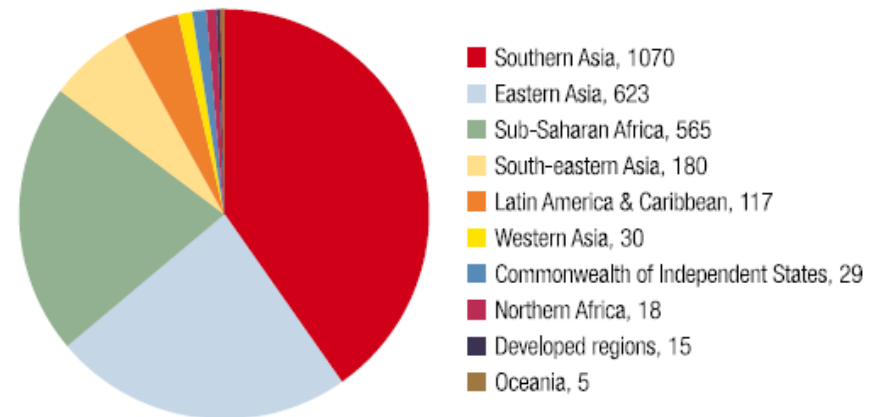
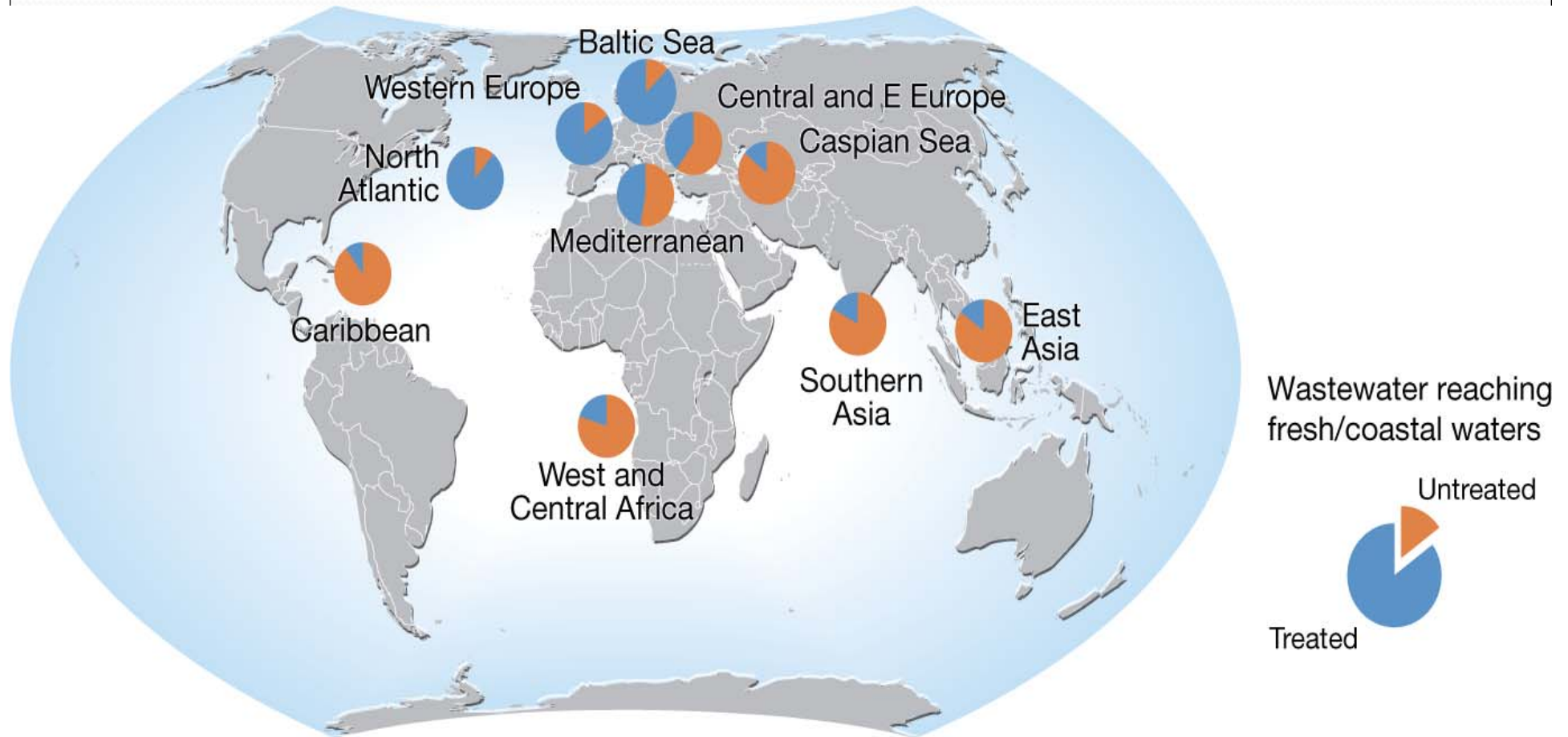


Figure 3 Regional distribution of the 2.6 billion people not using improved sanitation facilities in 2008, population (million)

Global Ratio of Wastewater Treatment



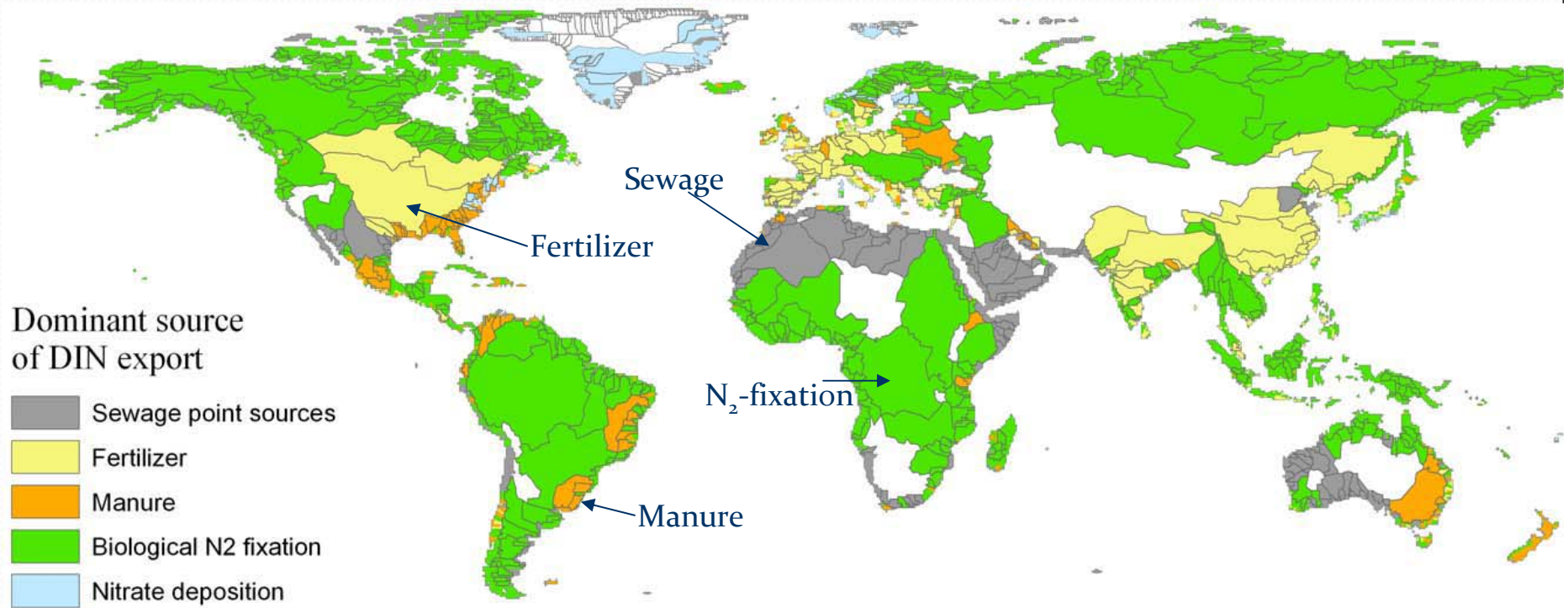
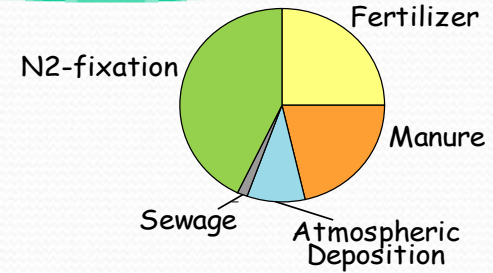
Source: <http://maps.grida.no/go/graphic/ratio-of-wastewater-treatment>

Impact on Watersheds

- **Leaching of human waste** into shallow groundwater
- Contaminating **aquifers** that impacts the clean water supply
 - Public health – blue baby syndrome
 - Biodiversity
 - Economic growth

Impacts on Watersheds:

DIN Export Variation in Dominant Source (Single largest source)



From: Dumont, et al. 2005 GBC

Wastewater Objectives in Mexico

- Given the essential nature of water for Mexico's economic, social and industrial development, successive government administrations have declared water a “**strategic matter of national security.**”
- Mexico's **most marginalized municipalities** are generally those with the lowest drinking water and sanitation coverage.
- One of the main aims of the current National Water Program is to **treat and reuse wastewater.**

	Past	2010	2012 Goal	2020 Goal	2025 Goal
% of Treated Collected Wastewater	23%	36%	60%	100% Municipal Wastewater	100% Industrial Wastewater

Source: National Water Commission, México(CONAGUA)



Technology Challenges/Barriers

- Fragmentation of information & institutions
- Economics
 - Free good vs. fairly priced commodity
- Investment model
 - Historically too top-down
- Project scale
 - Need better mix of macro and micro
- Appropriate technology
 - Match needs and community capacity

Technology Deployment: *Critical Success Factors*

1. Shared understanding of problem and a sense of need—
thirst for solutions
2. Financing mechanisms
3. A business model and partners that support a sustainable
enterprise
4. Continuous improvement cycle

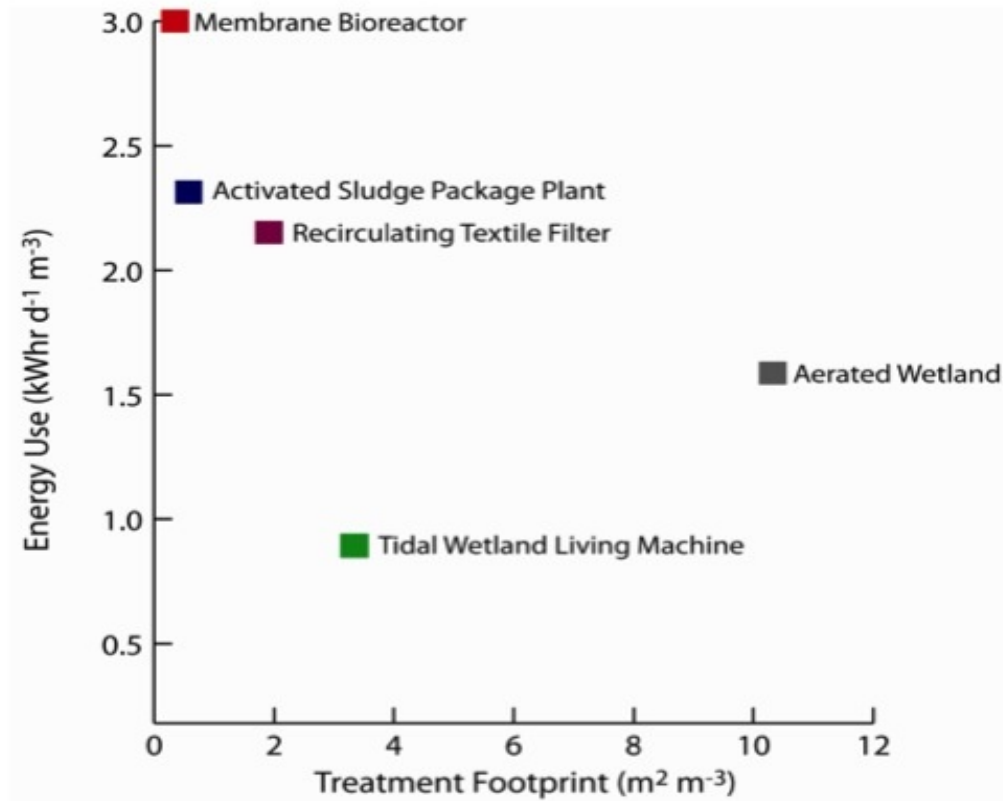
Solutions Comparison

+ better than average; 0 mid range; - worse than average

Technology Type	Cap Ex	O&M	Energy use	Treatment Efficiency
Activated sludge	-	-	-	+
Filtration	+	0	0	0
Vertical Biological Reactors	-	-	-	+
Natural	0	+	+	+
Septic	0	+	+	-
Constructed Wetlands	+	+	+	0

Foot Print

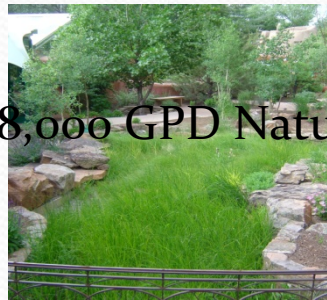
Technology: Energy vs. Footprint



WW Technology Deployment

1. Increase access to WWT & sanitation by:
 - Facilitating purchasing relationships with primary conventional & innovative, decentralized technology developers
 - Evaluating & offering recommendations on appropriate technologies for local conditions

Sample decentralized options



8,000 GPD Natural WWT



\$3 per gal packaged system

Sample conventional options

Size	People	Capacity	Average Cost
Small	< 10,000	< 1 MGD	\$1.5 M to \$2 M
Medium	>10,000, < 100,000	1 to 5 MGD	\$2 M to \$15 M
Large	>100,000	5 to 20 MGD	\$15 M to \$100 M

Low Cost Intervention

- Constructed Wetlands:
 - Less expensive (between \$145,050 - \$255,012 per hectare)
 - Long life expectancy
 - Pleasing aesthetics
 - Removes pathogens
 - Provides denitrification
 - Removes nitrogen and phosphorous with no sign of reduced capacity
 - Multiple uses (biodiversity and carbon sequestration)
 - Most promising technology to be applied in developing countries, because of the simplicity of their design, operation and maintenance and lower cost

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Gracias!

