

Water Technology Markets

Key opportunities and emerging trends

By Paul O'Callaghan and Sze Chal Kwok,
with contributions from Tom Pankratz
and Matthew Stiff.

Water Meets Money

BlueTech Investing

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Water Intelligence

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Our Current Water System

1. Our current water system is inefficient and wasteful
2. Due to mounting global pressures we can no longer afford an inefficient and wasteful system
3. This is driving radical change and creating opportunities for technology development.

**In 2008 \$8.4Bn was invested in
Clean Tech**

***How much was invested in
Water Technologies?***

The Need for Change

- Increasing Population
- Climate Change
- Groundwater depletion
- Water scarcity
- Rising energy costs and GHG emissions.
- Urbanisation – > 50% now live in cities
- Ageing infrastructure in the developed world and a requirement for new infrastructure in the developing world.
- Resource depletion

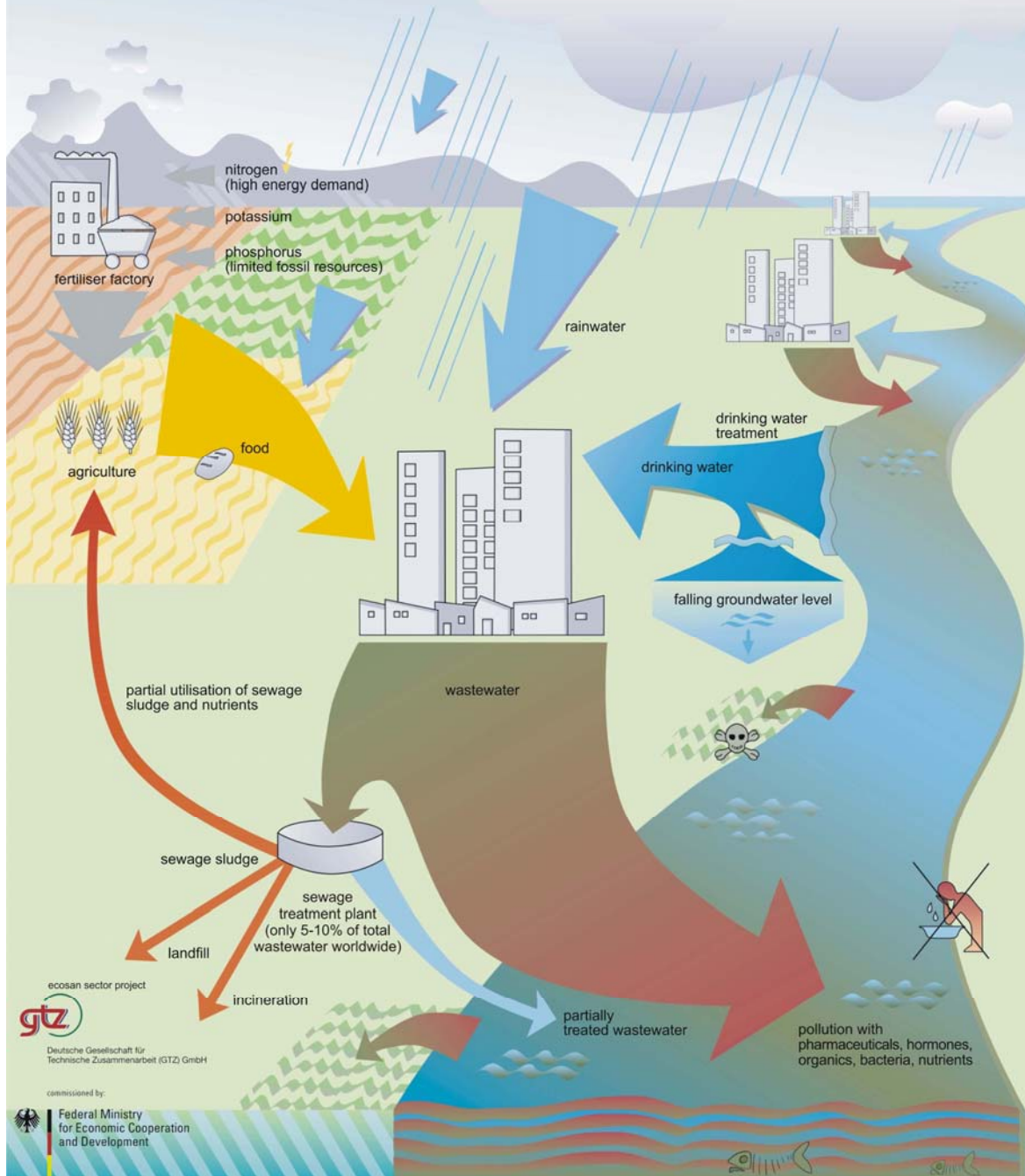
The BlueTech Investment Opportunity

- There is a new vision of a sustainable water system emerging.
- Creating of the technologies to make this alternative system a reality are where the opportunities lie in the water sector.

Elements of a Smart, Sustainable Water System

1. Energy generation from wastewater
2. Nutrient Recovery and recycling
3. Water Re-use

shortcomings of conventional wastewater systems



ecosan sector project
gtz
Deutsche Gesellschaft für
Technische Zusammenarbeit (GTZ) GmbH

commissioned by:
Federal Ministry
for Economic Cooperation
and Development

There is Energy in Wastewater

- *The energy in the wastewater produced by one person each day could power a 100 watt light bulb for 5 hours*

Energy from Wastewater

- **Anaerobic Membrane Bioreactors**
 - Proposed demonstration plant at the Masdar Ecocity in Abu Dhabi.
- **Microbial Fuel Cells**
 - The Israeli company EMEFCY is marketing the MEGAWATTER process which does just this.
- **Advanced Primary Treatment**
 - Micromedia Filtration have a demonstration plant operating in Woodsville, New Hampshire

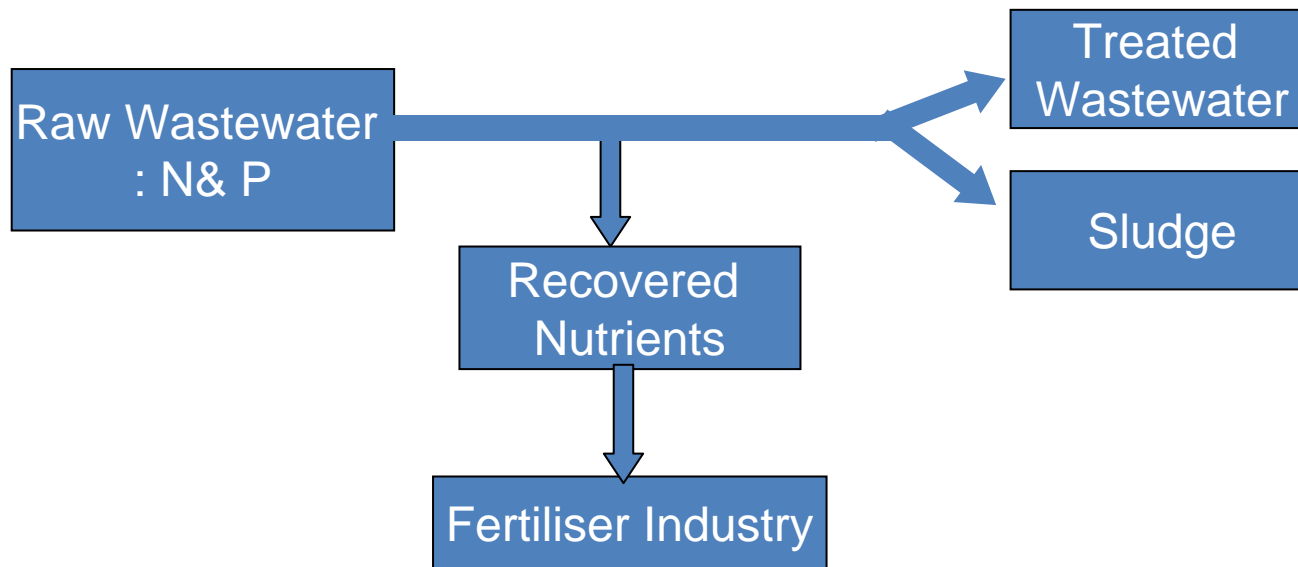
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Current Nutrient Removal

- Consumes energy
- Consumes chemicals
- Produces a waste product

Nutrient Recovery & Re-use



- Recovers Nutrients for re-use
- Produces a Fertiliser product which has a value
- Revenues helps to off-set treatment costs

Peak Phosphorus

– there is no man made alternative to phosphorus

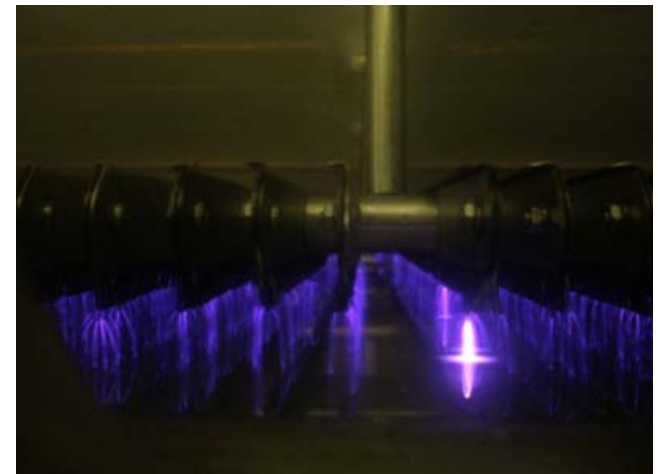
Nutrient Recovery Technologies

- Ostara
- DHV – Crystallactor
- Phosnix
- Pho-Strip
- REM-NUT
- P-RoC – Phosphorus Recovery
- Kemira- Kemicond & Krepro
- ThermoEnergy – Ammonia Recovery Process



Water Re-use

- Currently just 5% of the wastewater which is collected & treated is re-used.
- Aquifer Replenishment e.g. Orange County California
- Technologies:
 - Membranes & UV
 - Advanced Oxidation
 - AquaPure
 - HiPox



When there is Big Change there is Big Opportunity

Can a System That Evolved*:

- For Global Population < 2 Billion
- Mostly Rural
- Lacking Modern Technology

Be the Solution When:

- Global Population ~ 10 Billion
- Mostly Urban
- Experiencing Greater Resource Constraints?

* - Source: Glen T. Daigger, CH2MHill, WEFTEC, Chicago 2009

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SPARE SLIDES

Sludge to Energy

- Gasification – *e.g. KOPF*
- Sludge to Oil: *e.g. STORS*
- Sludge to Fuel: *E-coal and E-fuel*
- Supercritical Water Oxidation: *Aqua Critox*
- Biogas- *Microturbines / Stirling Engines / Siloxane Removal / Fuel Cells*

Microbial Fuel Cell

