Water Sanitation and Hygiene

FIFTH ARAB-AMERICAN FRONTIERS OF SCIENCE, ENGINEERING, AND MEDICINE SYMPOSIUM

Session Chairs
Antoine Ghauch, American University of Beirut
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Wicked Problem, about 70% of the world's population will live in cities by 2050

The water cycle today

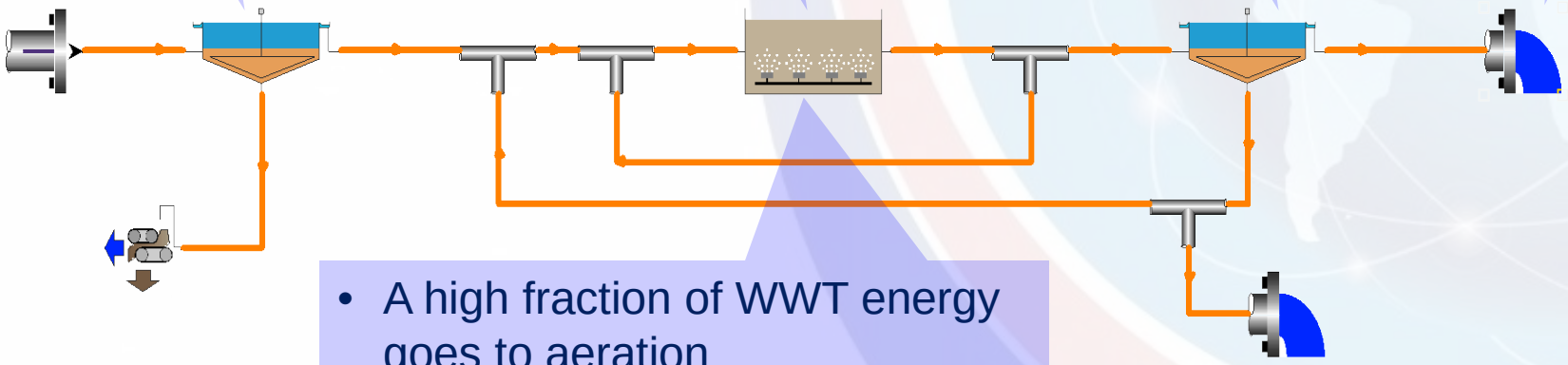
Brief overview of centralized sewage treatment

Solids, inerts separation

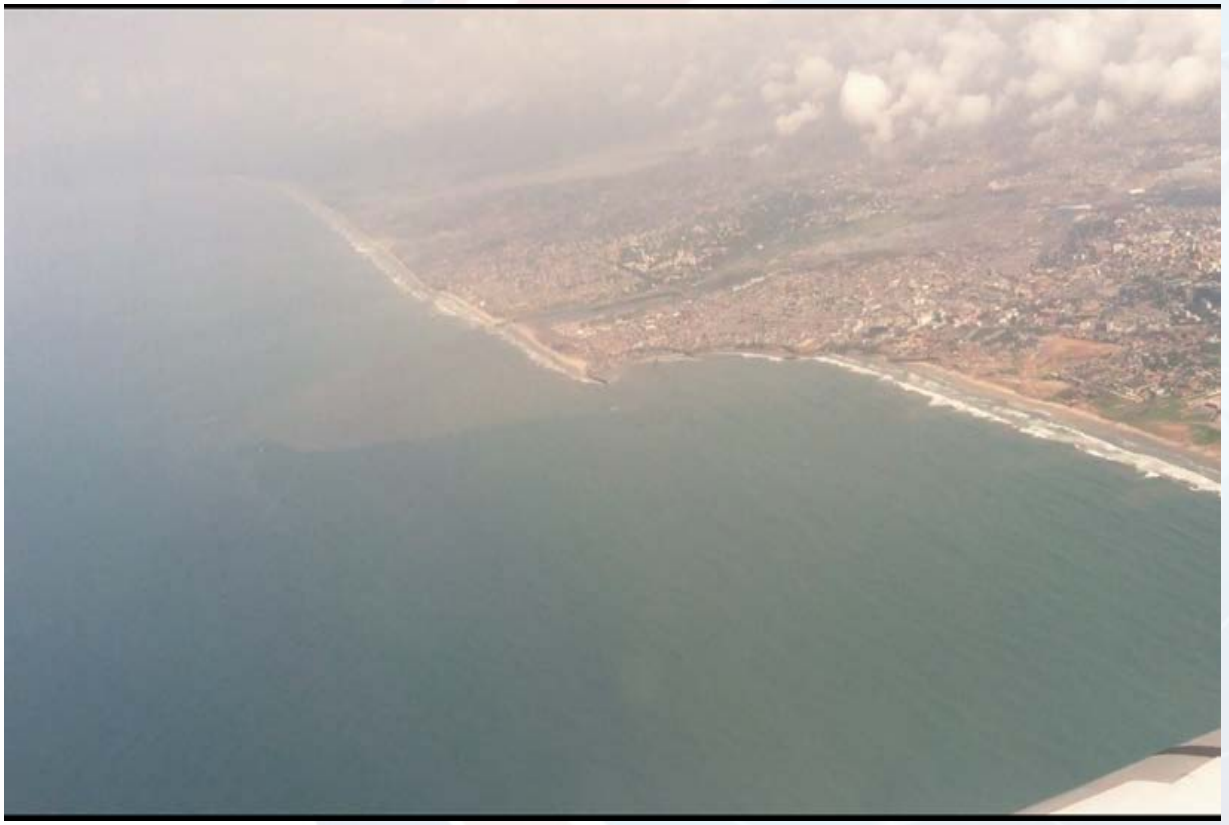
Aerobic C &N removal

Recycle of bacteria

Disinfection and discharge

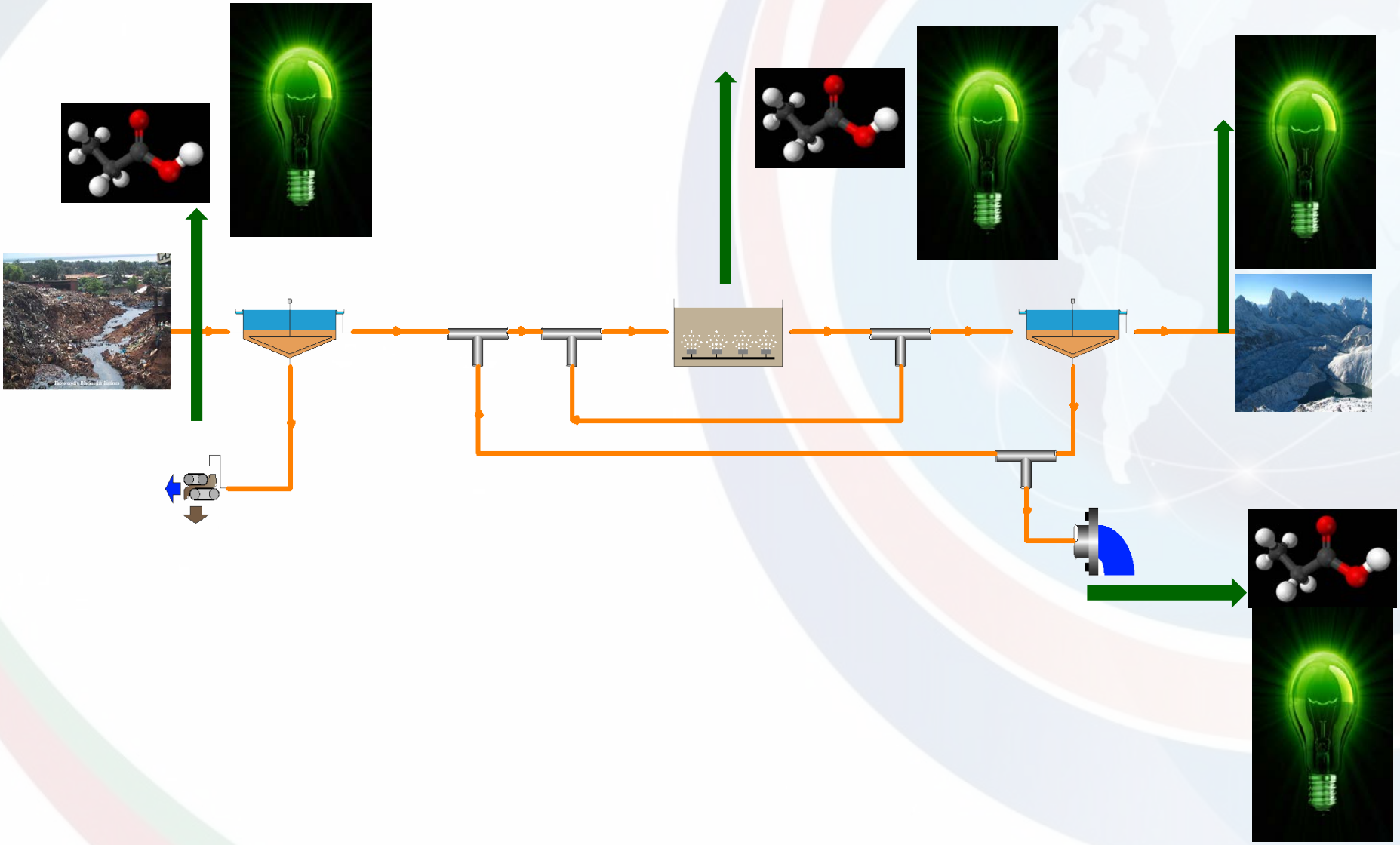


- A high fraction of WWT energy goes to aeration
- $MM in organic chemical purchase
- Bacteria could produce unwanted products (N_2O)



	Energy consumed annually (tera tons oe)	Energy consumed annually for water (assuming 3%, tera tons oe
USA	2.4	0.07
Ghana	0.01	?

Engineered Resource Recovery from ‘Waste’ Streams



Energy self-sufficiency for sewage treatment?

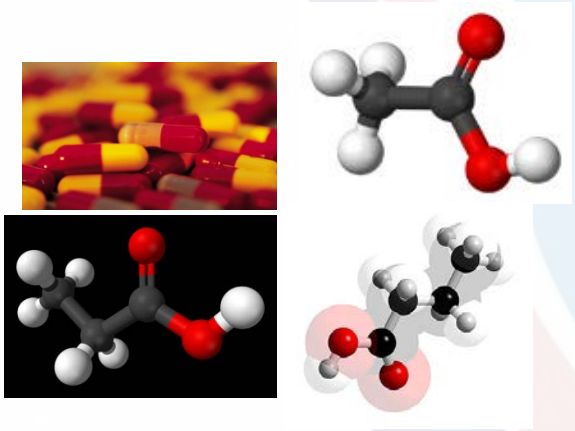
Energy present	Energy needed
~ 2500 kWh/MG	~2500 kWh/MG

- **Assuming 34% conversion of organic matter to methane and electricity**
- **Assuming 'conventional' nitrogen removal**

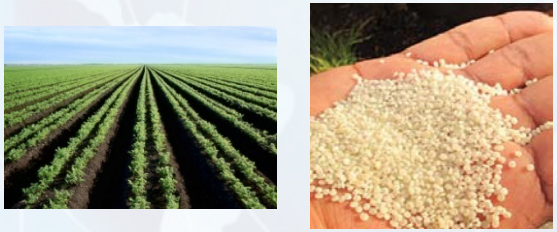
Think beyond CH_4

All based on anaerobic (+) technologies

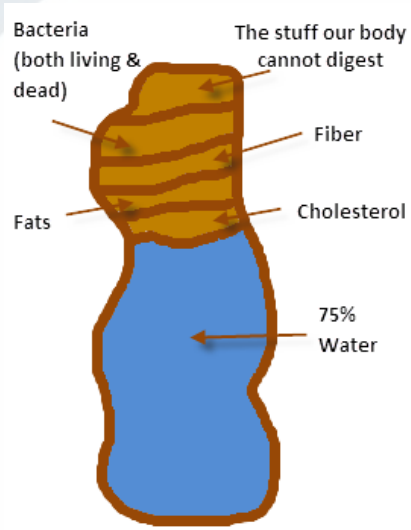
Fuels



Commercial chemicals



Fertilizer(?)



Need improved characterization of feedstock

Technologies informed by sounds science

End products driven by appropriate business models

Session Themes

- Disruptive game-changing approaches to WASH
- Innovative technologies for removing microbial contaminants
- Resource Recovery
- Investing for sanitation research in Morocco

Disruptive game-changing approaches to WASH

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Innovative technologies for removing microbial contaminants

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Resource Recovery

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Investing for sanitation research in Morocco

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