NewSan Prototype Simulator

Modelling the Next Generation of Sanitation Systems

Webinar 5: Innovation in resource recovery and reuse

1 Key goals of the model

2 Target audience

3 Users and applications to date

4 Main data sources

5 Main gaps or constraints to promoting this model

goals

✧ To model human excreta (and associated resource fluxes) from household to final disposal/reuse (based on Material Flow Analysis);

✧ To aid decision makers in identifying appropriate technologies for the optimization of sanitation systems towards sustainability (e.g. nutrient and energy recovery).
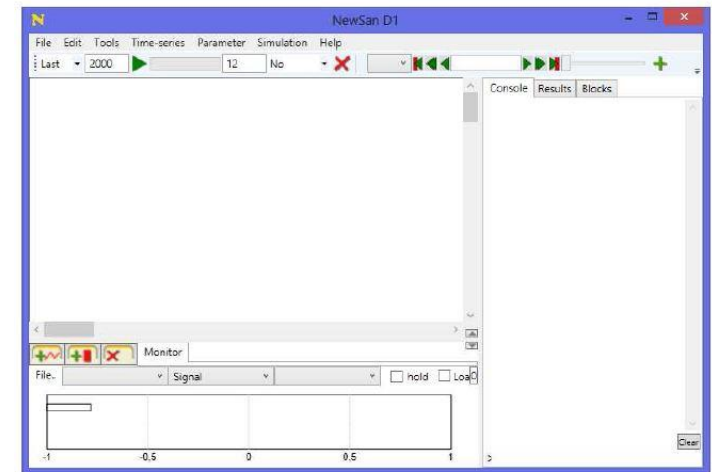
audience

Direct users:

- Engineers & consultants working on sanitation design, planning and management

- Business model developers

- Academic researchers

Beneficiaries:

- Investors, financers & donor agencies

- Governments

- City planners

An example of Newsan Prototype window

users & applications

Currently in use by:
• ifak
• University College London, UK
• University of Cambridge, UK
• International Water Management Institute (IWMI)
• University of KwaZulu-Natal, South Africa

Interests and future users:
• Duke University, USA
• University of Zimbabwe
• University of Zambia
• University Eduardo Mondelane, Mozambique
• EAWAG (Dorothee Spuhler)
• CEPT University, India
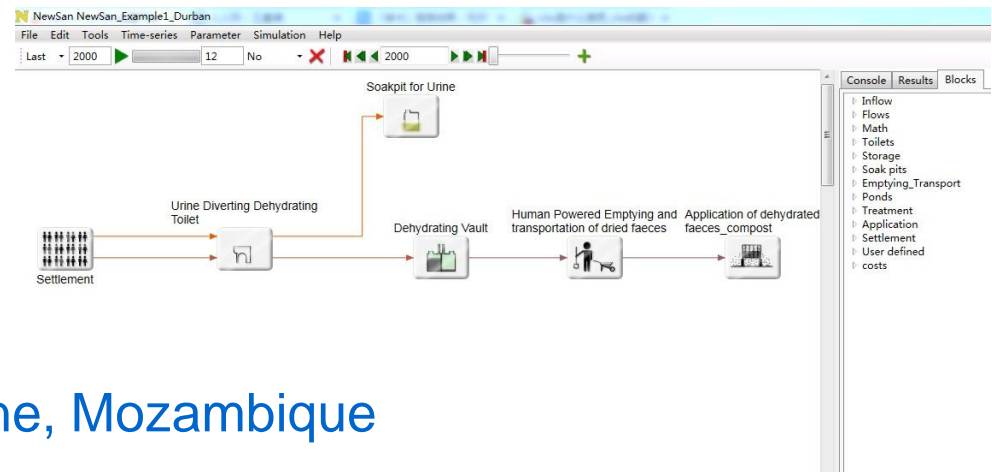
outputs

Waste Flows

- Wastewater
- WW sludge
- Faecal Sludge

Nutrients/Pollutants
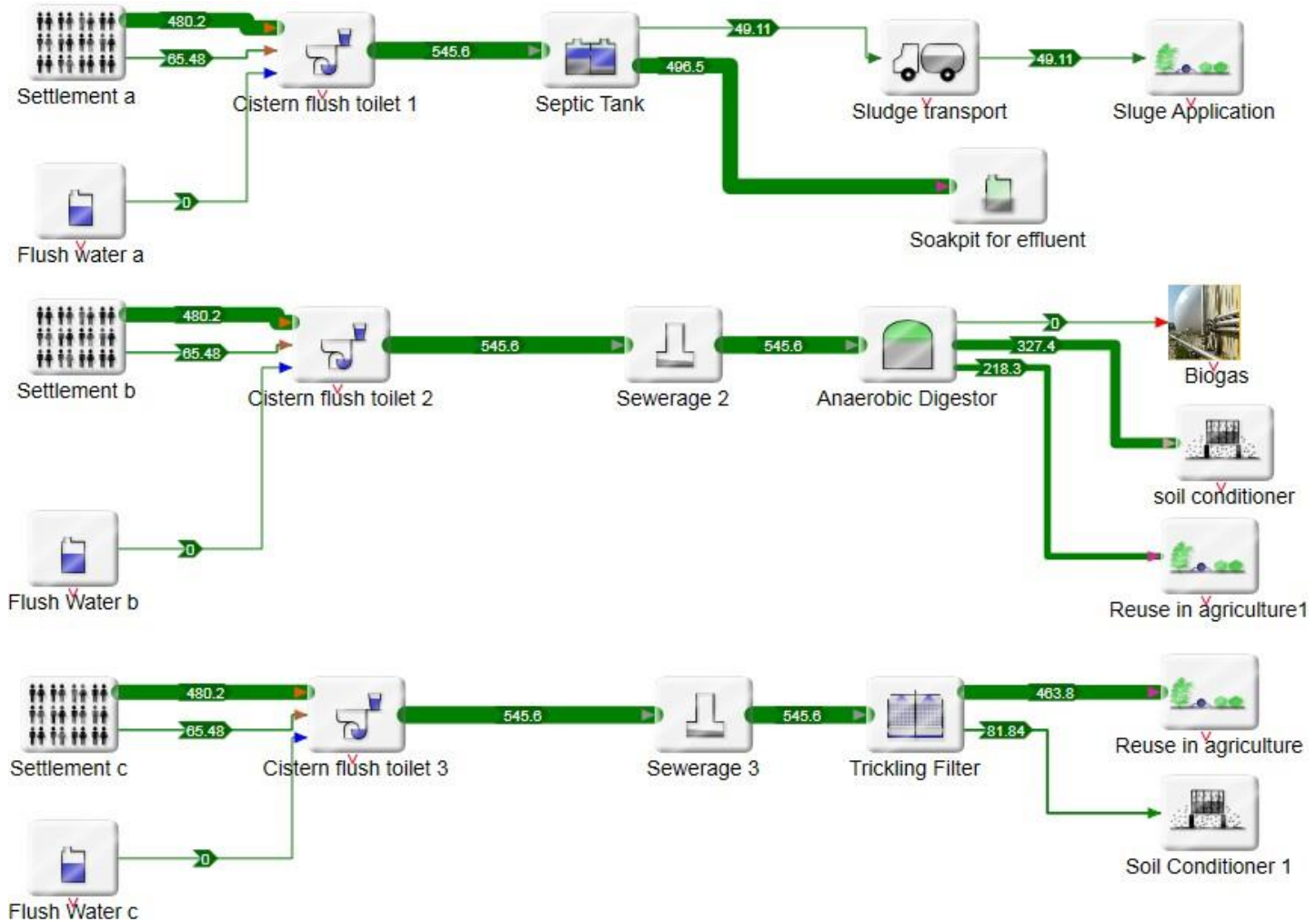
- Carbon
- BOD
- COD
- Nitrogen
- Phosphorous
- Potassium

Resources/Economy
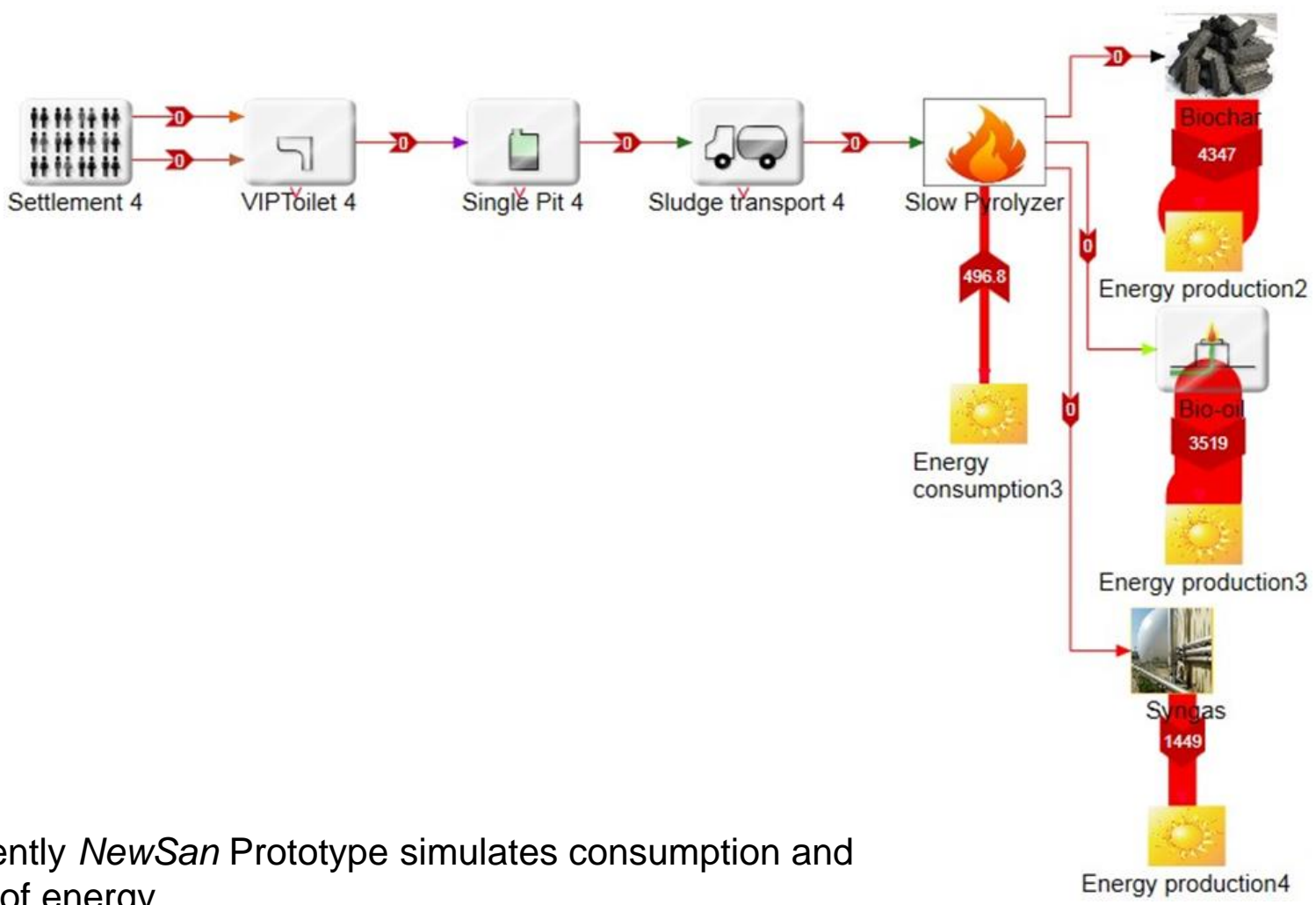
- Energy consumption
- CAPEX/OPEX
- Revenue

Pathogens

- Coliforms

Note: **NewSan** has a library with technologies and default values if data is not available

➢ Example 1:Simulation of Nitrogen fluxes (kg/day) for flush toilets followed by (a) Septic tank; (b) Anaerobic digester; (c) Trickling filter
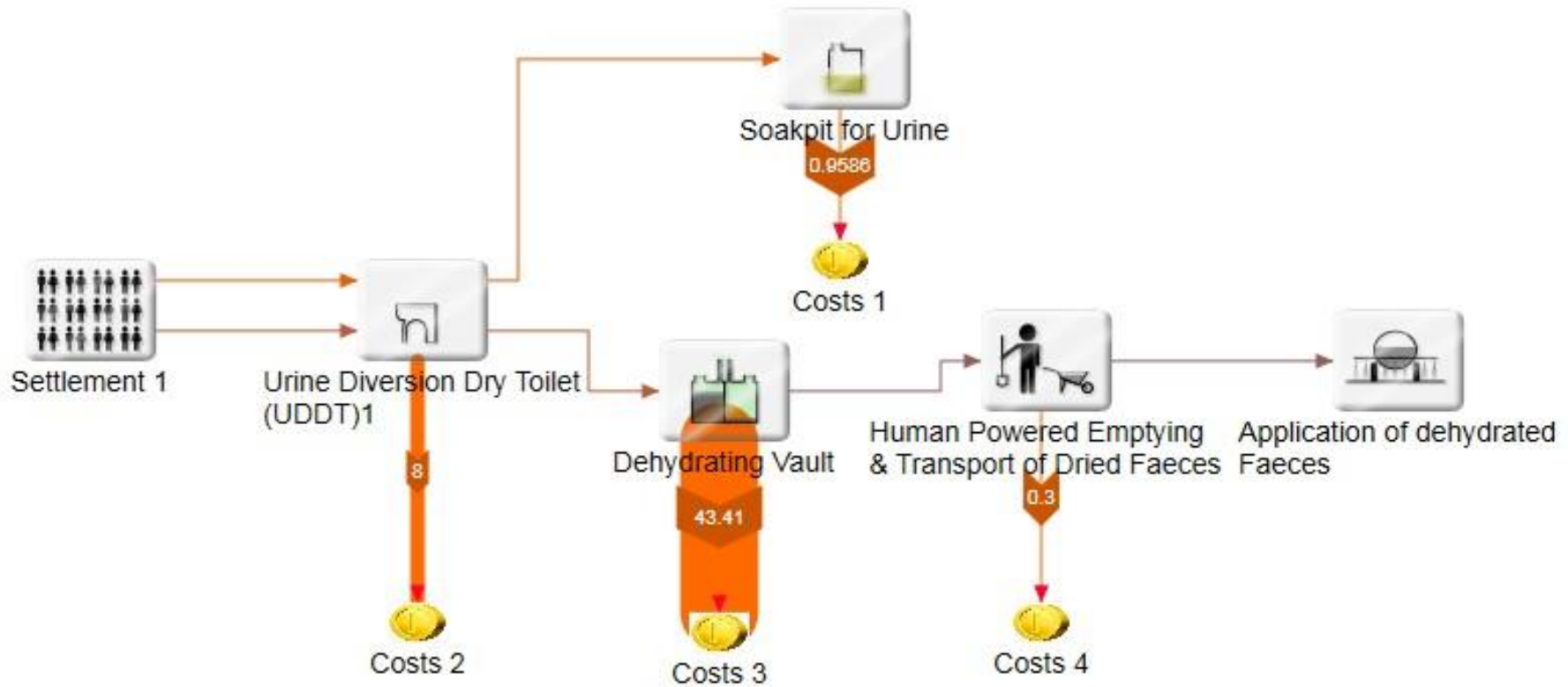
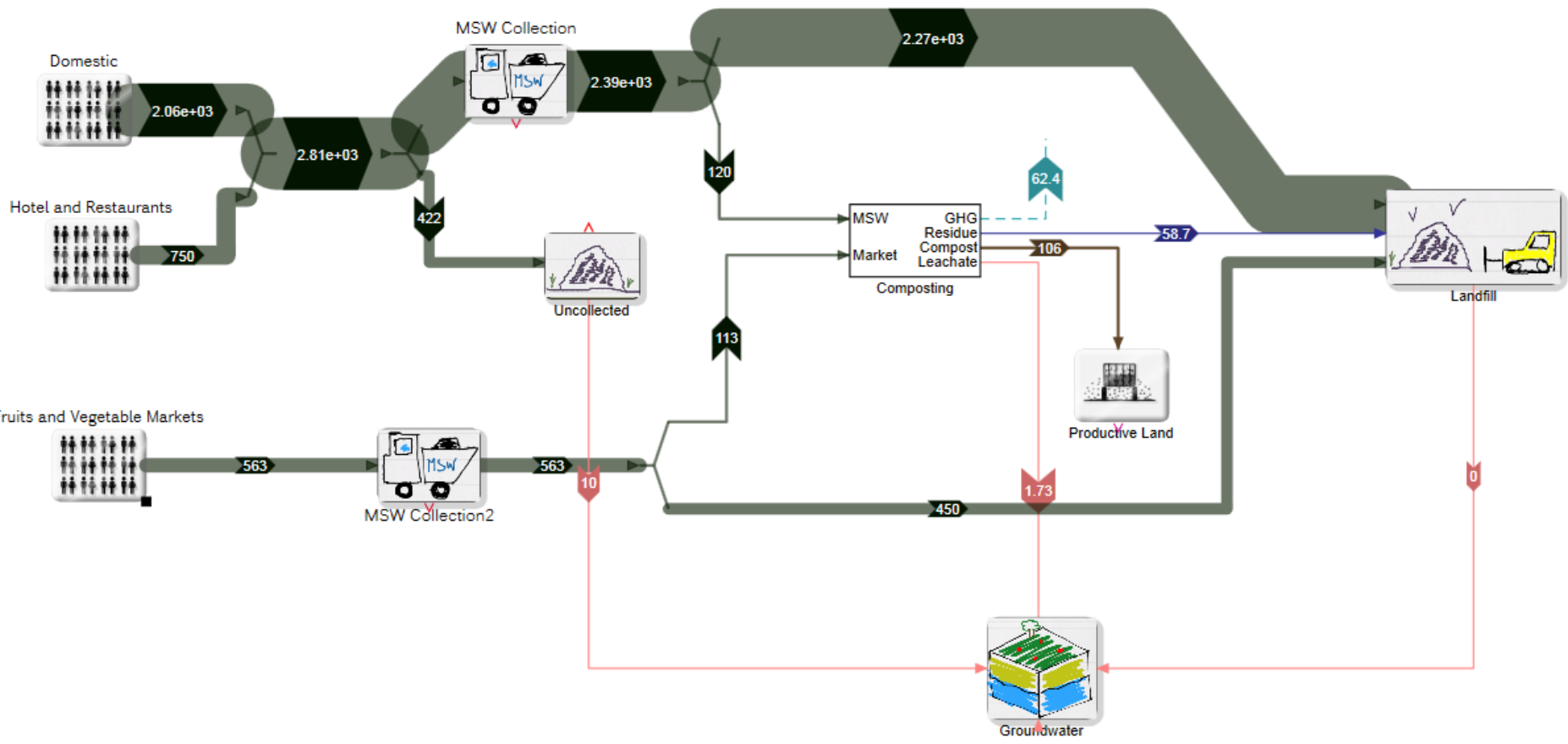➢ Example 2:Simulation of energy fluxes (MJ/day) for VIP toilets followed by Slow Pyrolyzer

Note: Currently *NewSan* Prototype simulates consumption and production of energy

➢ Example 3:Simulation of Capex (1000USD/year) for conventional UDDT sanitation system

> Example 4: Waste Flows Simulation of Bangalore
> (by Luca Di Mario, University of Cambridge)

gaps & constraints

- Prototype version, it needs refinement and finalisation

- One dimension model

- GIS interface has not been fully developed yet

- Use standard numbers obtained from literature

- Lack of costs and energy data

- Needs calibration

Appendix

➢ View of the various options for visualization of simulation results in NewSan Prototype

Area data:

- Population
- Population development
- Area (km^2)

Household level data:

- Type of technology
- Water consumption (per person per day)
- Household size

Collection System

- Type & capacity of system
- Energy consumption
- CAPEX & OPEX
- Distance to treatment

Treatment data:

- Type of technology
- Treatment capacity
- BOD & COD reduction
- Pathogen type & reduction
- Biogas production
- Energy consumption
- CAPEX & OPEX
- Waste/Sludge production
- Distance to final disposal

Final disposal
- Transportation costs
- Type of final disposal/reuse
- Volume/loading of reuse

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