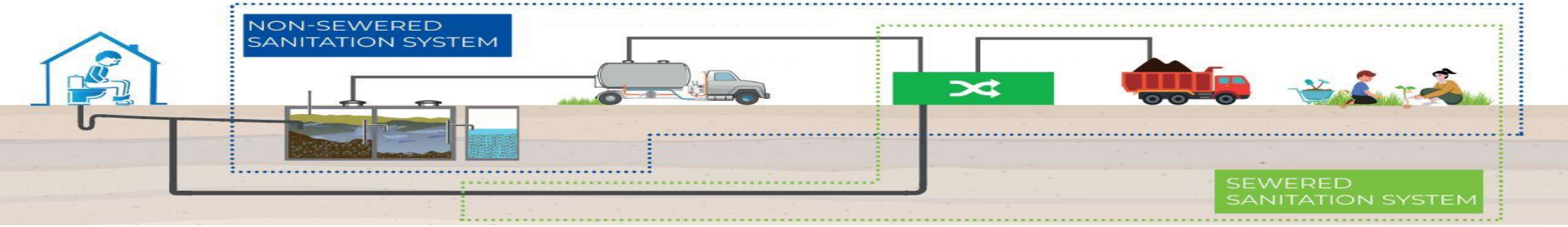
MuNASS II

Municipalities Network Advocacy on Sanitation in South Asia
दक्षिण एशियाका नगरपालिकाहरुको सञ्जालमा सरसफाइ पैरवी कार्यक्रम



Treatment Technologies

Training on Introduction of Faecal Sludge Management (FSM)/CWIS

BILL & MELINDA GATES foundation

UCLG ASPAC

MUNICIPAL ASSOCIATION OF NEPAL 2050

ENPHO
Creating Eco Societies

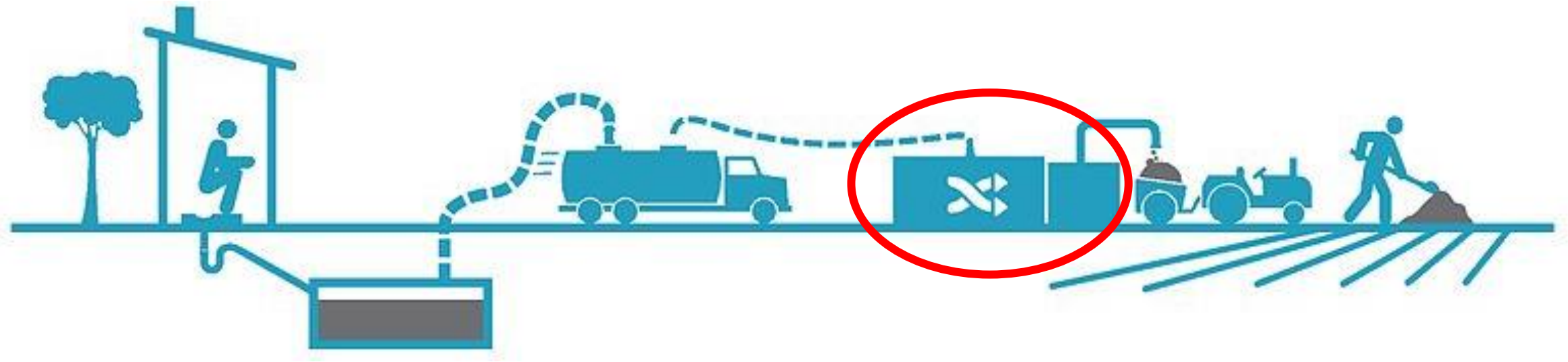
Learning Outcomes

- Summarize the transformative technologies for the FS treatment
- Explain urban sanitation options through CWIS approach

Presentation Outline

- Sanitation Service Chain
- Decentralized FS treatment technologies
- Centralized FS treatment technologies
- "Reinvent the Toilet", Transformative Technologies

Treatment Technologies



Types of Treatment Technologies

Based on treatment Location

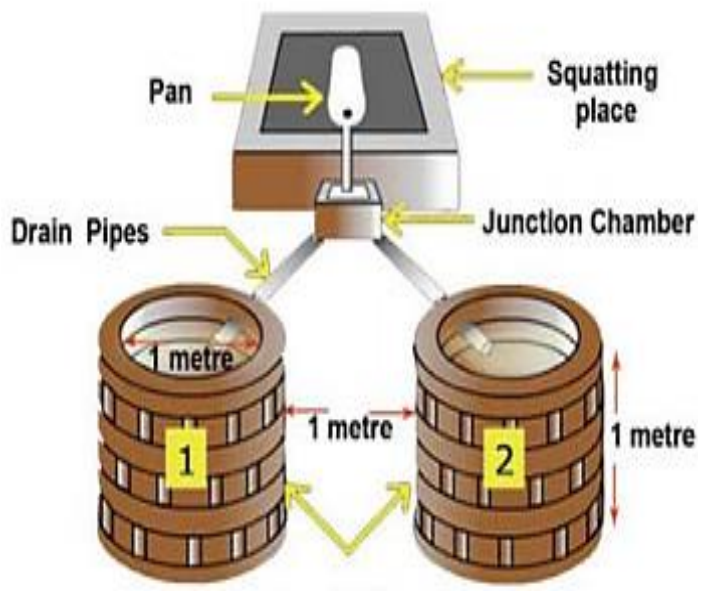
- On-site Treatment (Decentralized)
- Off-site Treatment (Centralized)

Based on treatment mechanism

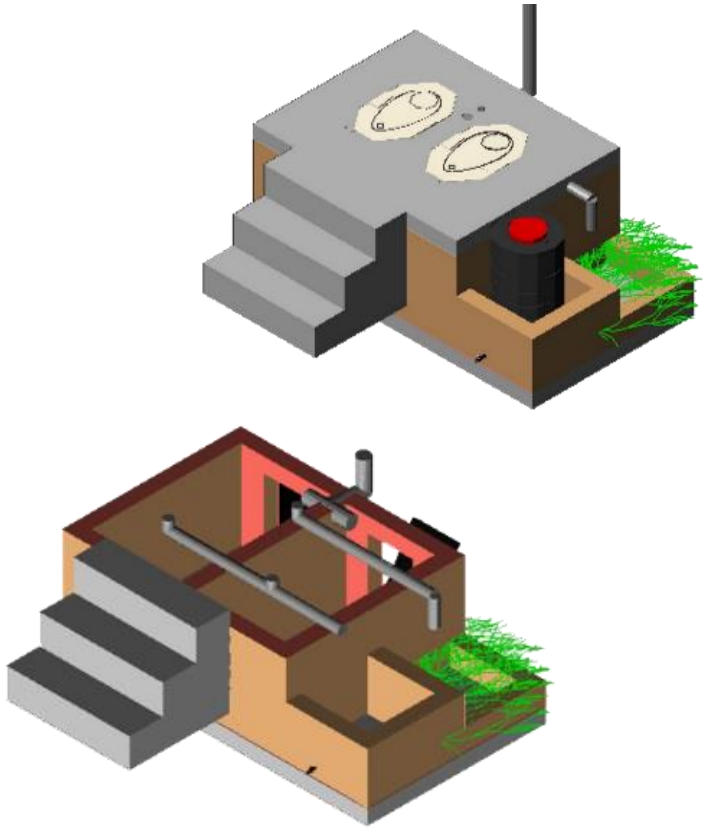
- Nature based/Biological Treatment
- Mechanical Treatment
- Hybrid treatment

Decentralized Faecal Sludge Treatment Technologies

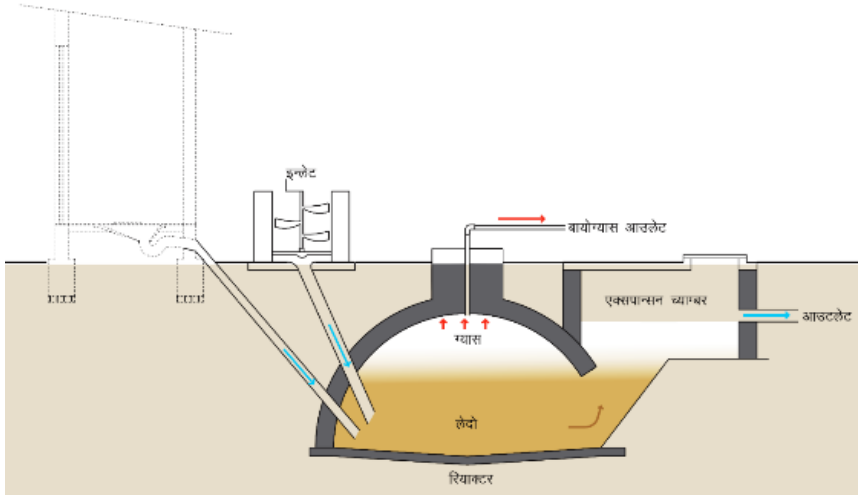
Twin Pits/ Sulav



Dry Ecosan

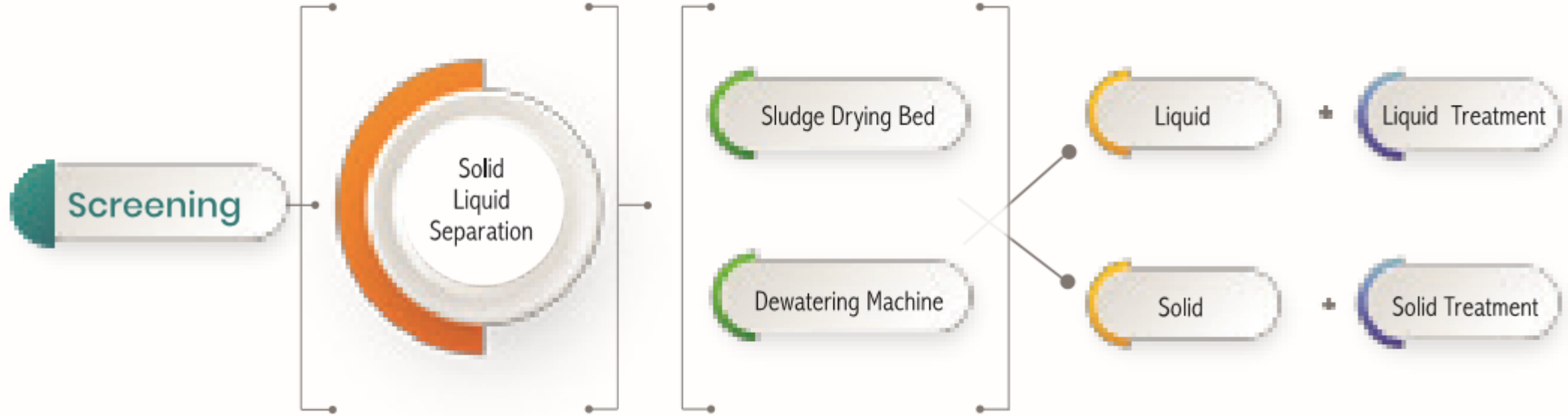


Biogas Digester



Source: ENPHO

Centralized FS Treatment Technologies



Centralized treatment options

- fully nature based,
- fully mechanized and
- hybrid

Viable Centralized FS treatment options

Pre-treatment technologies

- Bar Screen Chamber
- Thickening Tank
- Sludge Holding tank

Dewatering Technologies

- Planted Sludge Drying Bed
- Unplanted Sludge drying Bed
- Dewatering Machine

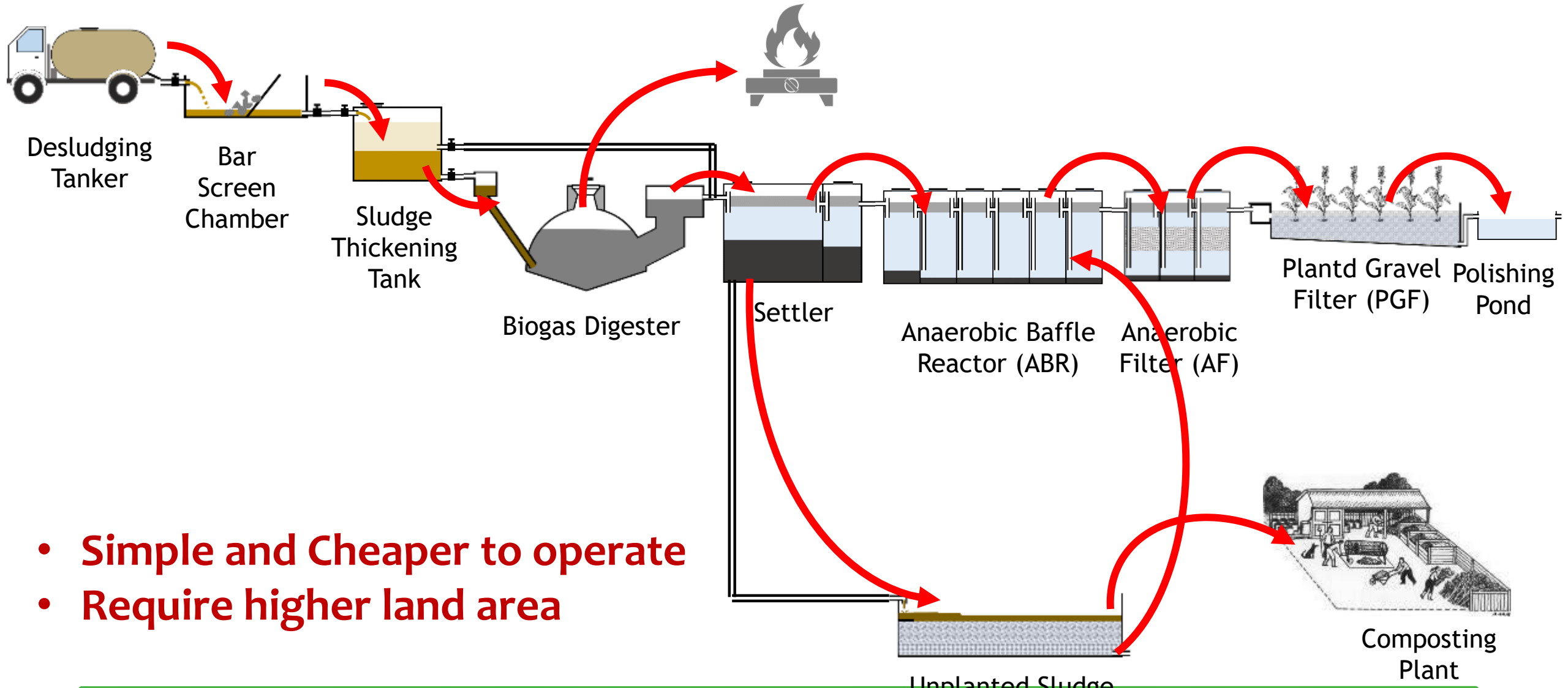
Liquid treatment technologies

- Septic Tank
- Anaerobic Baffle reactor
- Anaerobic Filter
- Constructed Wetland
- Waste Stabilization Pond

Solid treatment technologies

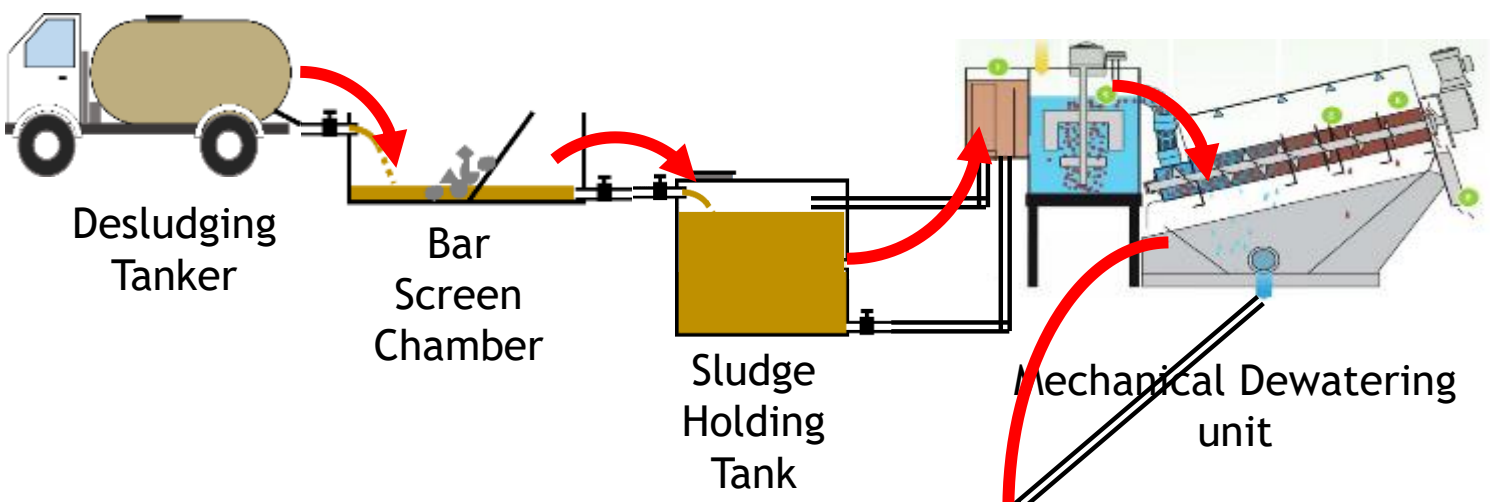
- (Co-) Composting
- Pelletizing

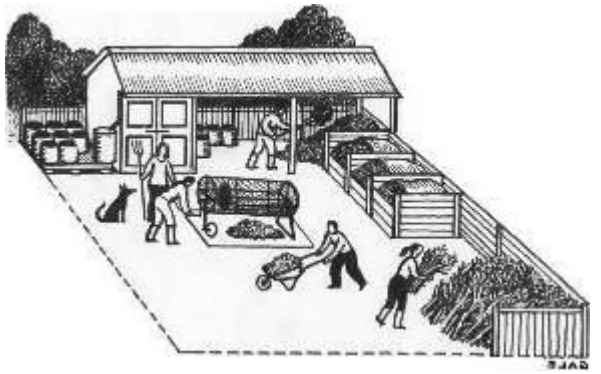
Fully Nature-based treatment option



- **Simple and Cheaper to operate**
- **Require higher land area**

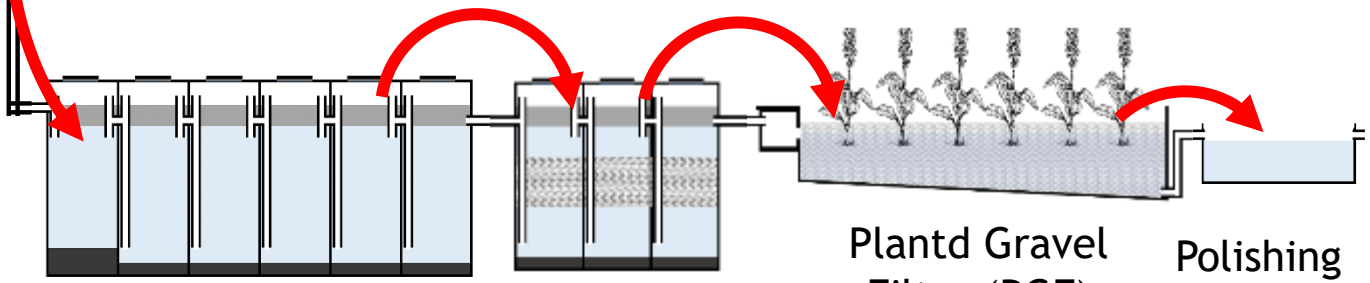
Hybrid Treatment Option





Composting Plant

- Basically Dewatering machine is used
- Reduces land area significantly
- Complex and Expensive to operate



Fully Mechanical Treatment Option

- Land requires minimal
- Complex and Expensive

Innovative and Transformative Technologies

Initiated by the BMGF in 2011

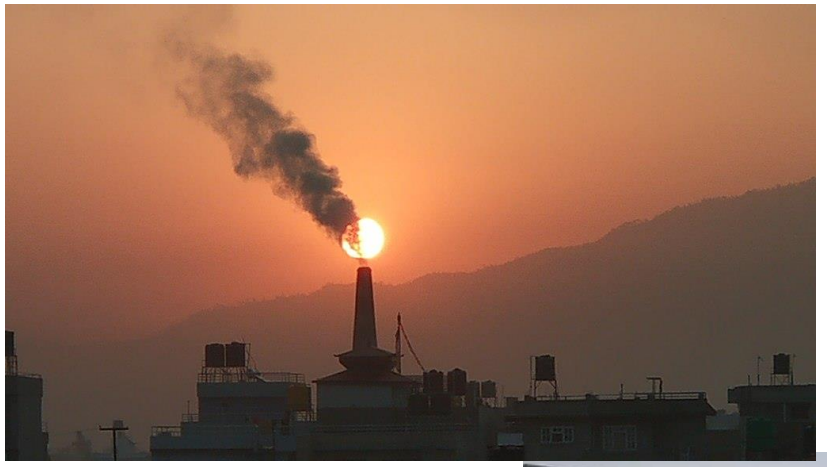
Transformative Technologies that:

- Remove harmful pathogens from human waste and recover valuable resources
- Operate "off the grid" and require minimal electricity
- Cost less than US$.05 cents per user per day
- Promote sustainable and profitable sanitation services and businesses in poor urban settings
- Can appeal to everyone, in developed as well as developing nations

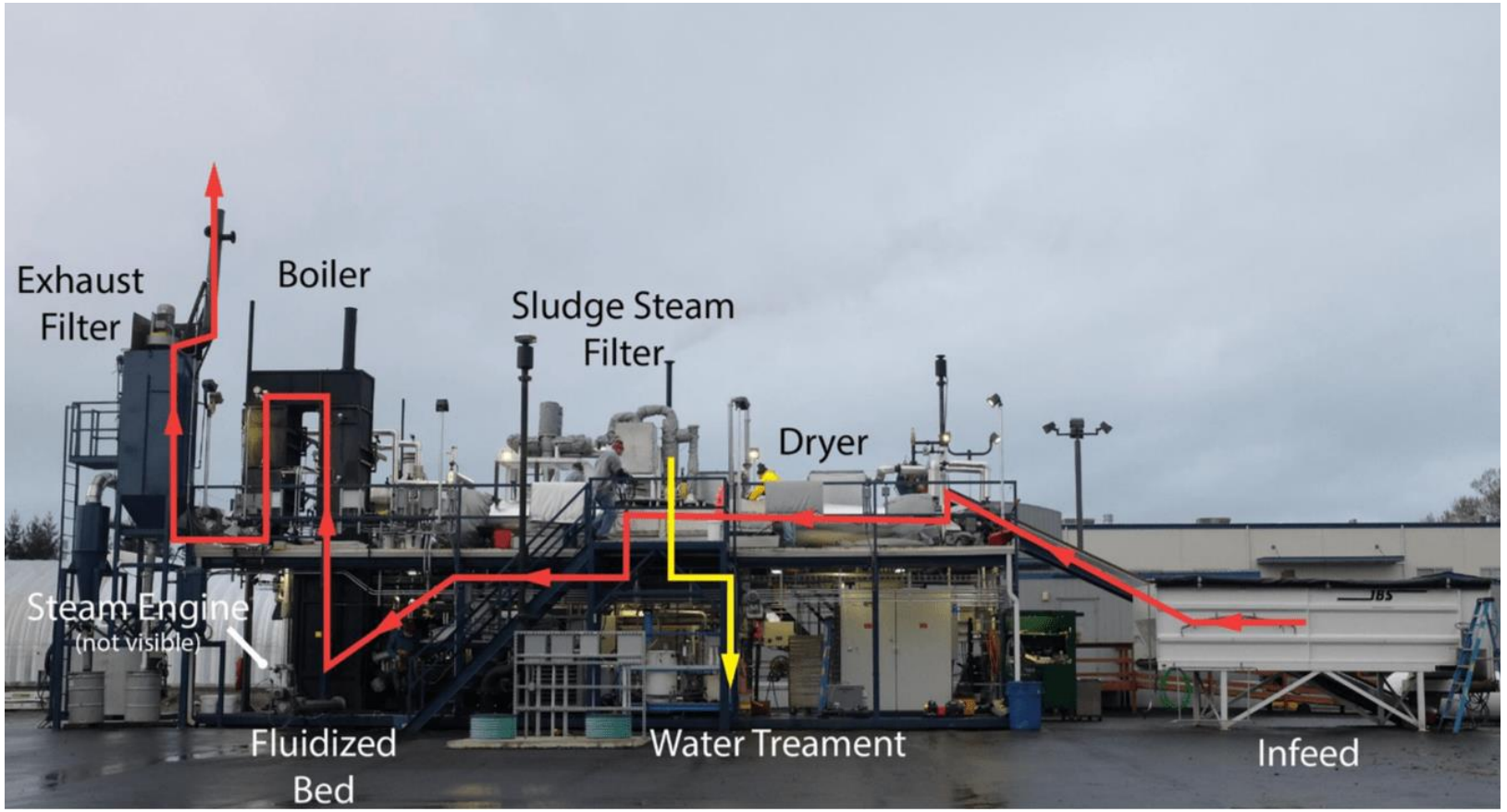
Evolving Transformative Technologies

With respect to the processes employed, the evolving transformative technologies could be divided into the following broad categories:

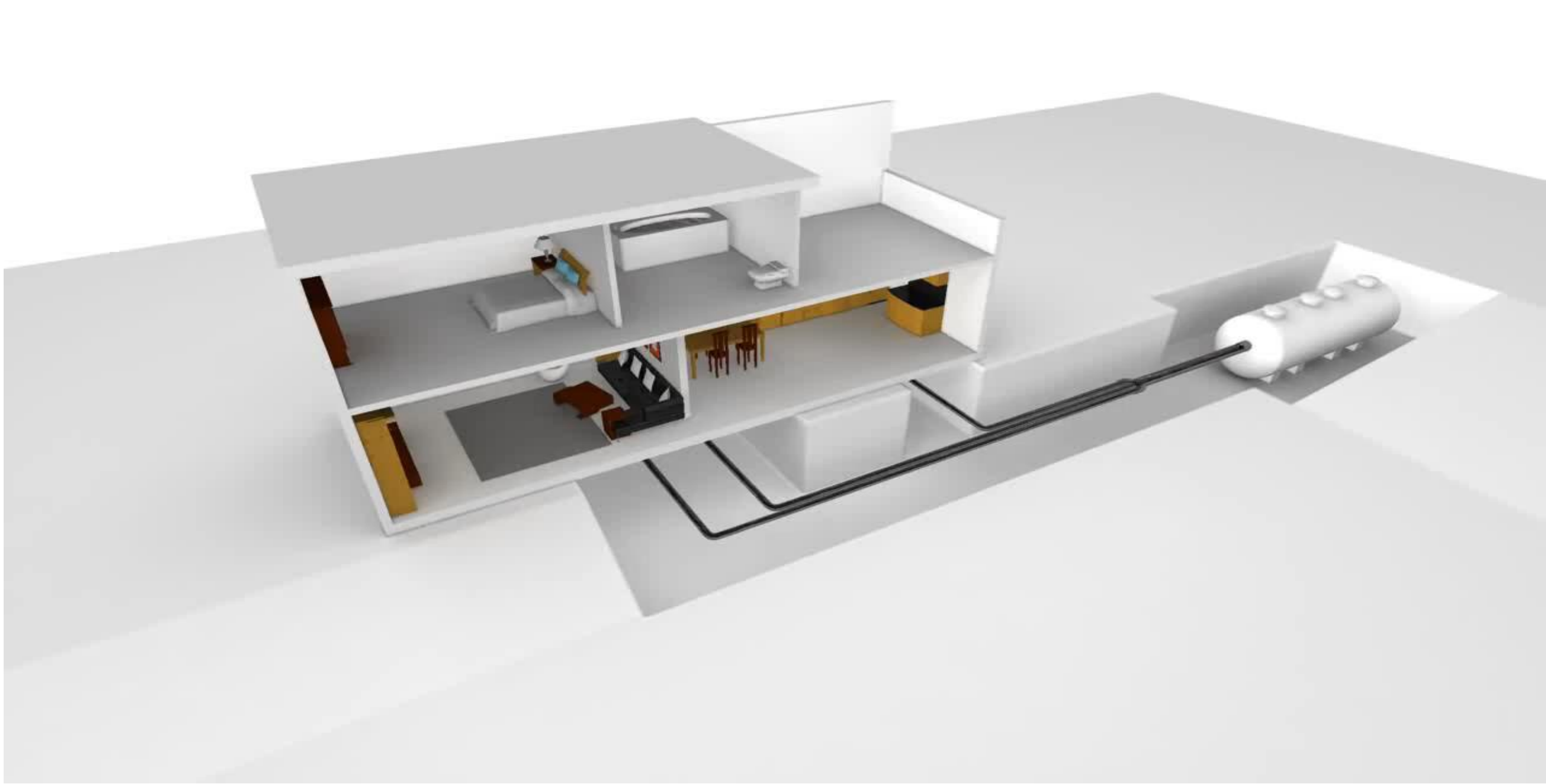
- Thermal
- Electrochemical
- Biochemical
- Mechanical
- Thermochemical



Omni-Processor (Thermal Process)

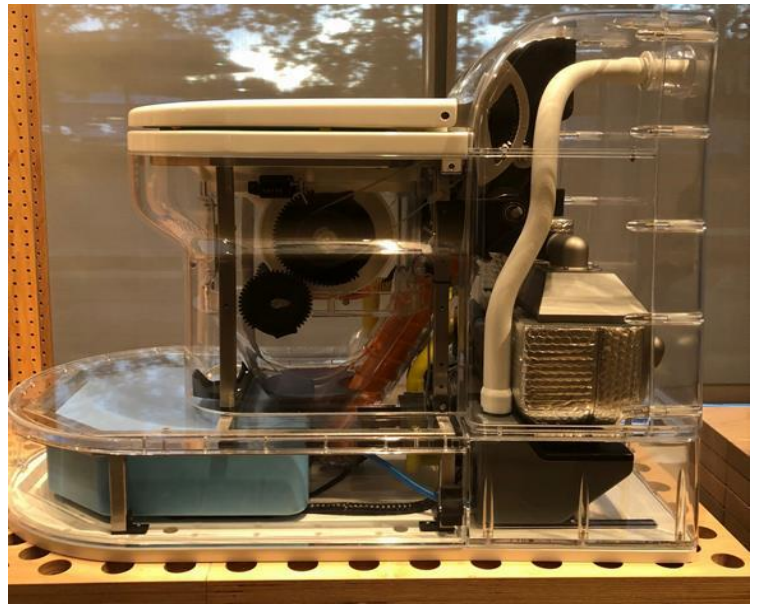


JOHKASAU Technology



Nano-Membrane Toilet (Mechanical Processes)

IWA Project Innovation Awards – Gold winner!!



http://www.nanomembranetoilet.org/

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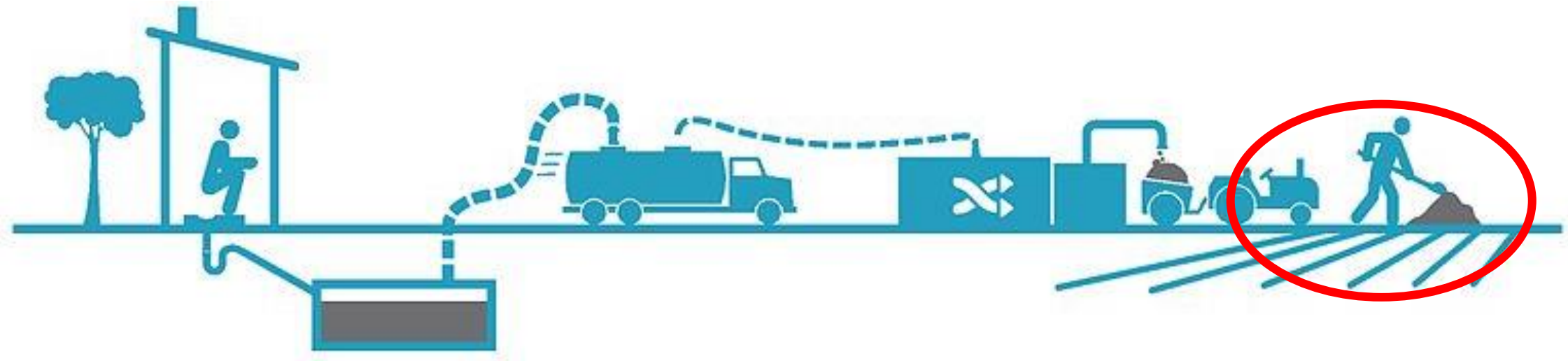
Reuse/Safe Disposal



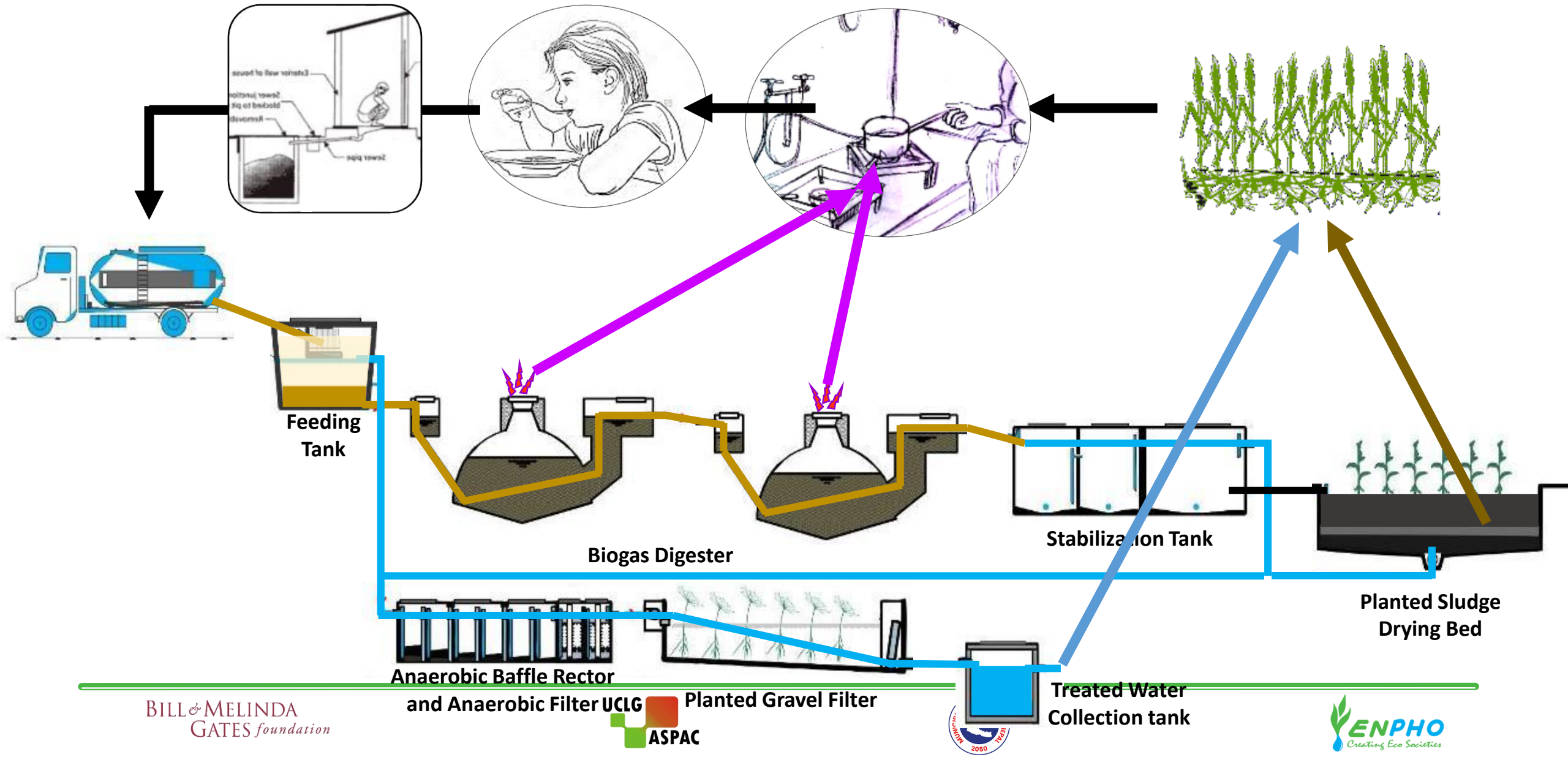
Reuse and Safe Disposal

Treated wastewater for irrigation

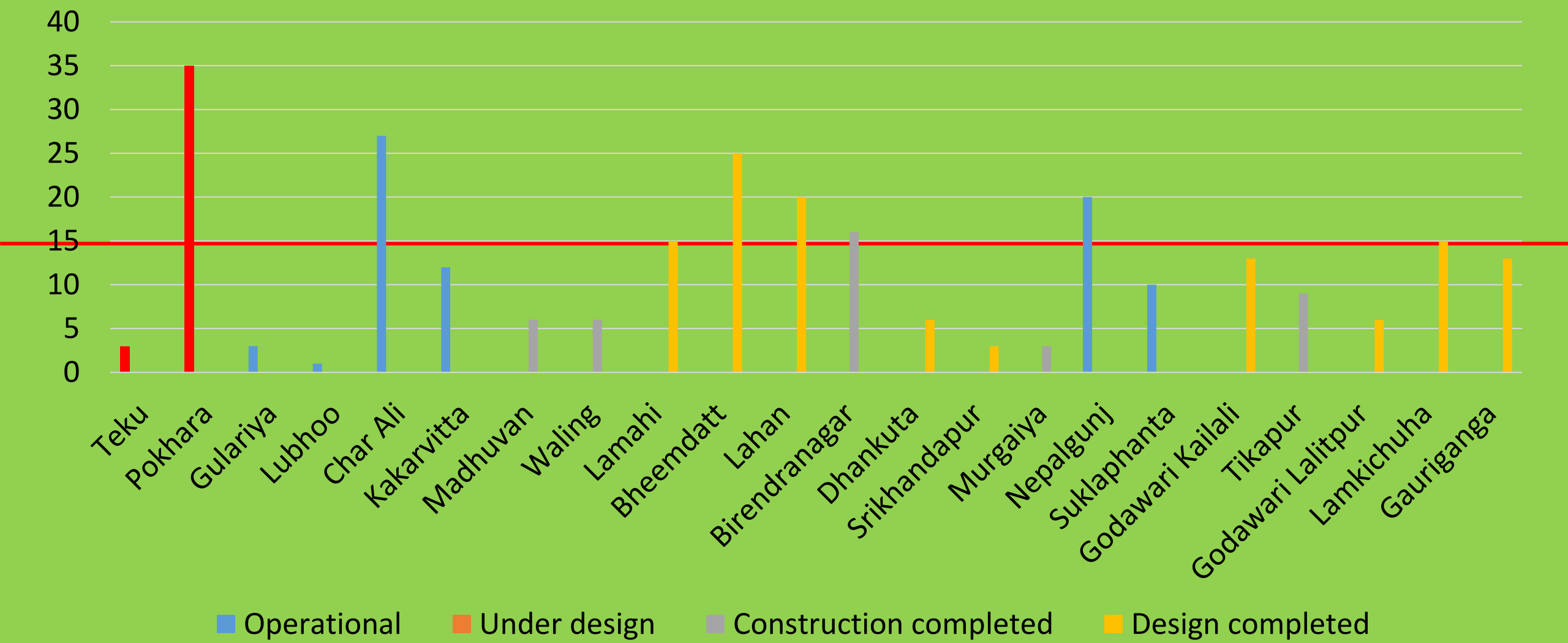
Biogas used as fuel

Dried sludge as compost

Case Study : FS Treatment with Resource Recovery



FSTP in Nepal



Examples of Feacal Sludge Treatment Plant

Feacal Sludge Treatment Plant in Nepal

Kathmandu 1998

Pokhara 2000

FSTP at Gulariya municipality

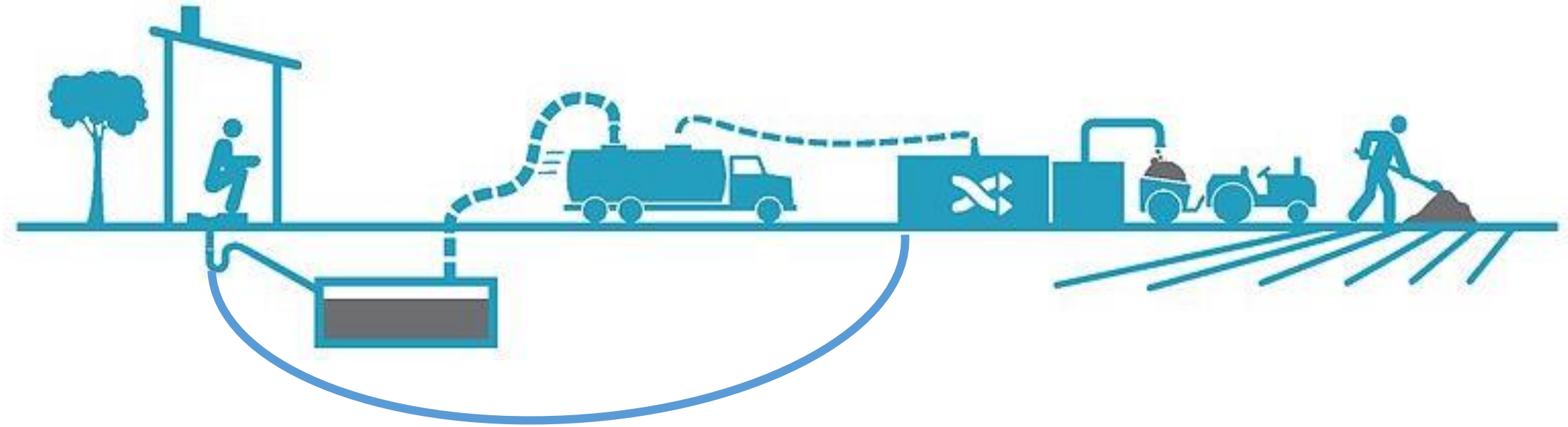
Feacal Sludge Treatment Plant
Waling, Syanja

Feacal Sludge Treatment Plant Mahalaxmi municipality

Feacal Sludge Treatment Plant
Charali Jhapa

Feacal Sludge Treatment Plant
Birendranagar, Surkhet

CWIS perspective on Sanitation Service Chain



OUTCOMES	Equity	Safety	Sustainability
FUNCTIONS	Responsibility	Accountability	Resource Planning and Management

References

- https://www.youtube.com/watch?v=9H_3i2A-onw&t=8s
- https://www.youtube.com/watch?v=-qIxyxsNqhI
- https://www.youtube.com/watch?v=bVzppWSIFU0
- https://www.youtube.com/watch?v=tRzEtOHLeBk
- https://www.youtube.com/watch?v=jGPpXF7y9Rg


Thank you