



**IMAGINE MORE**  
THE BRIGHTEST IDEAS IN SOLID WASTE

---

**SWANA FL 2023 Winter Conference**  
February 20-22 | Hilton Orlando Lake Buena Vista



Register online at <https://cvent.me/e8gEGz>



# How Can a Very High Diversion of Organics from Landfill Be Reached and at the Same Time Be Ecologically and Economically Viable?

Glen Tobiason  
InnoWaCon, LLC

2023-02-21



# Abstract

In this session attendees will learn what can be done when legislation and other factors regarding landfills will be force them to no longer accept any Municipal Solid Waste (MSW). Up until now, landfills have been the final and, on the surface, least expensive way to dispose of waste. Many still operating landfills are reaching their permitted limits and vertical or horizontal expansion plans are being met with fierce resistance by municipalities and as well by now more educated citizens. Recent studies and drone flyovers have shown that the methane gas emissions from many landfills is far greater than previously thought. Considering that methane gas is 86 times more harmful than carbon dioxide in our atmosphere one would have to question the real viability of such landfills into the future. The cost of landfilling MSW has and will also significantly increase because of ecological/legislative pressure, increased transport costs as well as regional diminishing landfill capacity. There are a number of solutions available to treat MSW in a complete way other than landfilling. Some of them are in their technological infancy and are not complete and flexible solutions. Others like a tried and proven Mechanical Biological Waste Treatment (MBT) are available now in North America. The presenter will illustrate such a tried-and-proven, flexible and adaptable solution. This solution offers the desired and now regulated extremely high diversion of organics from landfill, has outputs such as a high methane content biogas, very dry Refuse Derived Fuels (RDF) as well as remove recyclables from the waste stream, ecologically sound, extremely low emissions into the air, water and ground all the while being economical in CAPEX and OPEX.

# Points of the Presentation

- What's happening?
- A possible solution
- Basic concept
- Basic layout
- Scalability and Flexibility
- Outputs and Uses/Markets
- Costs of the plant
- Costs to the citizen
- Environmental Impact
- Availability
- Public Acceptance
- Conclusion

# What's Happening?

- Landfills:
  - last resort in waste hierarchy
  - filling up
  - vertical and horizontal expansions scutinized
  - *extreme* methane gas plumes detected
  - housing encroachment
  - transport costs skyrocketing
  - realization that landfills bury a resource, bury energy
  - total cost of ownership per ton – over time
- Incineration
  - Plants aging - viability?
  - NIMBY (NIMTOO)





- Municipalities/Counties/States/Provinces are:
  - Seeking tried-and-proven technologies
  - Creating legislation
  - Demanding diversion of organics from landfill (SB 1383)
  - Reducing tonnage to landfills
  - Demanding environmentally friendly, renewable energy sources
  - Embracing newer technologies and solutions not just status quo

# A possible Solution:

- The Mechanical-Biological Treatment (MBT) process to treat household waste
- Now available as a tried-and-proven, flexible very adaptable solution

**MYT<sup>®</sup> (Maximum Yield Technology)**

**MYT<sup>®</sup>**

Maximum Yield Technology

# Basic Concept of MYT®:

- Input of MSW *with* the organic components
- Mechanical-Biological treatment
- High quality outputs
- Sound, proven design
- Maintainable and sustainable process
- Flexible
- Scalable
- Low emissions

# Basic Layout of MYT®:

Step 1 Waste Acceptance

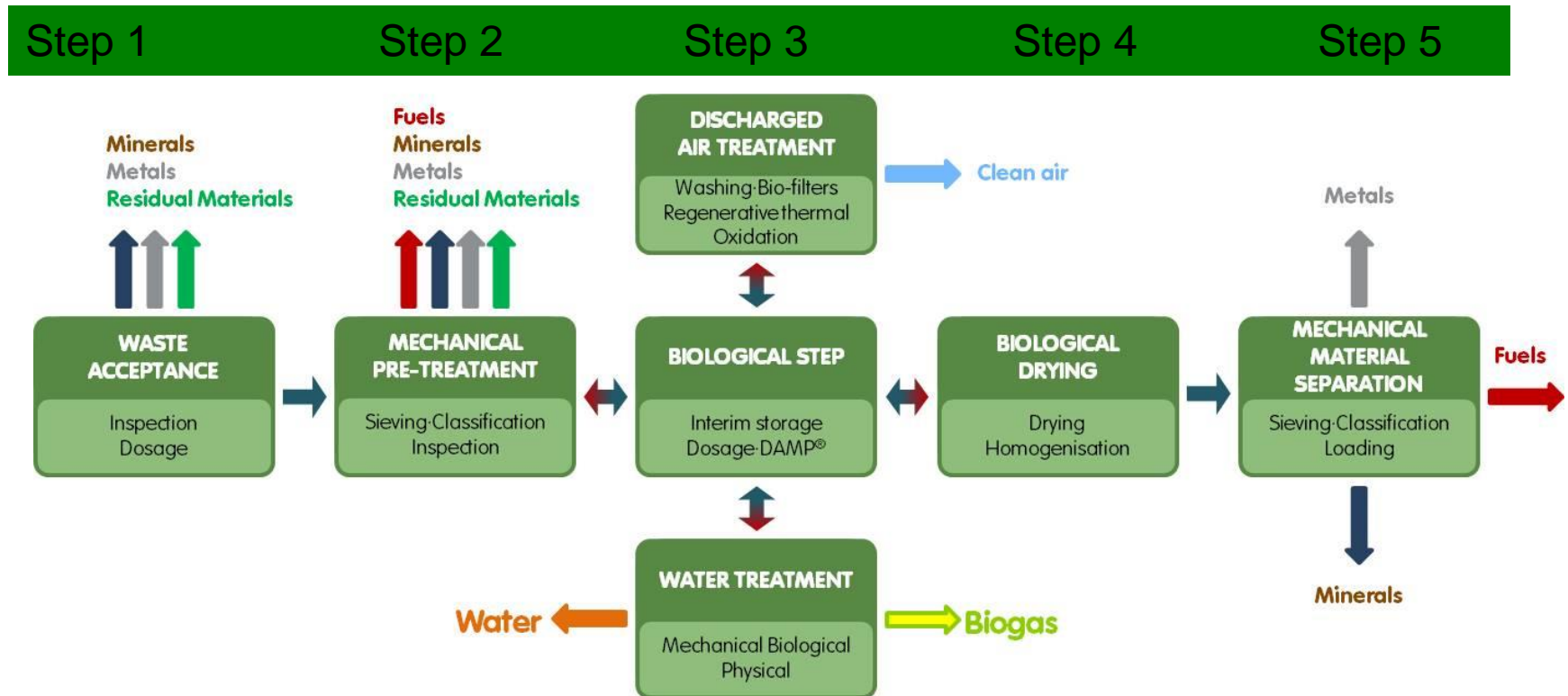
Step 2 Mechanical Pre-Treatment

Step 3 Biological Step

Step 4 Biological Drying

Step 5 Mechanical Material Separation

# Basic Layout:





**Exemplary – Waste acceptance hall – flat bunker**



**Exemplary - Mechanical pre-treatment**



**Exemplary – Biological drying**



**Exemplary – Mechanical Material Separation**

# Inputs:



Household waste

Organic-waste

Packaging

Paper

Glass

ZAK -Kahlenberg

MYT® can take....

**Waste management based on  
local/regional waste, needs & requirements**

# Scalability and Flexibility:

## Scalable:

min approx. 20,000 tpa

max 500,000 tpa or more designable

Modularly scalable

## Flexible:

Designed to fit the waste at hand now and in the future

MYT® – *Not a black-box, not a product, not a machine!*

*MYT® is BAT!*

# Outputs and Uses/Markets:

- Biogas
  - Proven, consistent 70 - 71% methane content
  - Conversion to natural gas quality (RNG) for use in vehicles or insertion into the grid
    - RNG to Diesel, Jet Fuel, Hydrogen, Cryptocurrency
  - Direct thermal utilization
  - Use in other complementary processes
  - No atmospheric release

# Outputs and Uses/Markets:

- Refuse Derived Fuels (RDF)
  - 90+% +dry
  - Calorific values - size dependent
    - e.g. 0-40 mm about 16,000 kj/kg or approx 6900 BTU/lb.
    - Smaller sizes considered as a biomass
  - Storable
  - Transportable (moving floor truck)
  - Usage: Cement kilns, Powerplants, RDF to Fuels, RDF to Syngas, RDF to Chemicals
    - Ash from these thermal use examples can be used in APTstone.

Do not landfill! Too good to bury! *Why landfill energy?*

# Outputs and Uses/Markets:

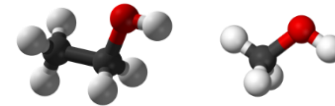
- Refuse Derived Fuels (RDF)



# Outputs and Uses/Markets:

- **Plastics**

- Extracted and sorted by type (PE, PP ...) - circular economy
- Thermally utilized
- Use in other complementary processes
- Unsorted and converted to a filler for concrete blocks



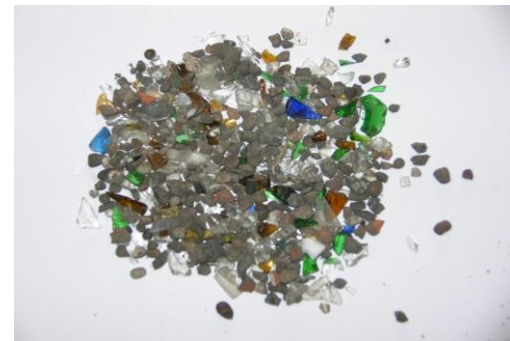
- **Metals**

- Sorted by type and sold to scrap dealers



# Outputs and Uses/Markets :

- Minerals / Inerts
  - Stones, Sand, Porcelain chips
    - Clean enough to landfill
    - Possible use as a road base material
  - Glass
    - Could be sorted by color - circular economy
    - Landfilling
  - Ideal for use in APTstone

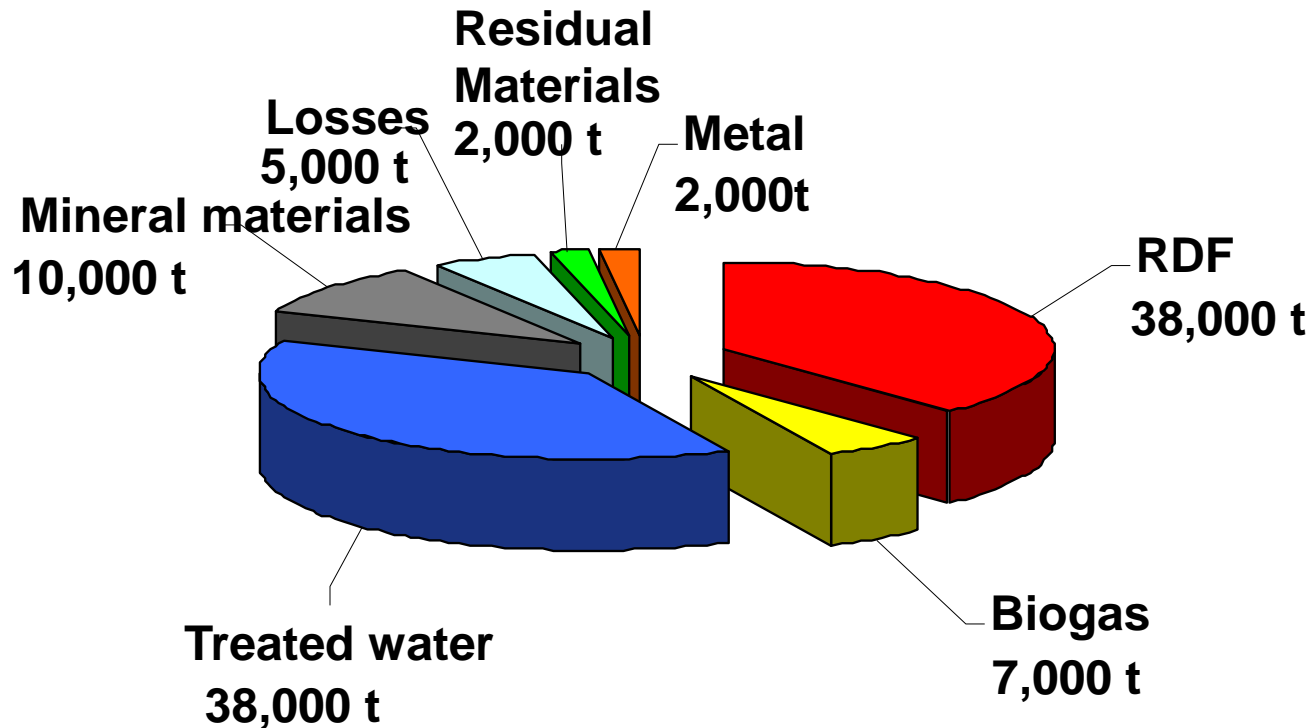


# Outputs and Uses/Markets :

- Treated process water
  - Is the feedstock for the biogas fermenters
  - practically eliminates use of fresh water
  - Possible usage as fertilizer
  - Possible use in other processes
  - Clean enough for the local sewage treatment plant



**For the MBT Kahlenberg**  
**The important outputs generated from the treatment**  
**of about 100,000 tons of household waste / a**



# Costs of the plant

If MYT plant in Germany, processing 100,000 tons/year of MSW with the organic components, was rebuilt now:

Approx. 62 Mio. EURO or approx. USD 68 Mio or CAD 86 Mio.

- Based on German costs
- The final US / Canadian price would vary
- Large portion of machines, equipment, parts etc. – sourced in USA/Canada!
- „Local“ qualified GC
- Know-How transfer
- O&M – standard values

# Costs to the citizen

- Low - especially when a total package of waste collection, recycling centers and the MYT® -process is well thought out. PAYT
- Example: 4 Person household in the Ortenau county (Germany) pays 91,00 Euro / year (approx. USD 100 or 127 CAD/year) for the **complete service!** (2022)
  - MYT-Plant and operation
  - Complete collection of all waste streams
  - 20+ recycling centers
  - Admin

# Environmental Impact

- ✓ Extremely low emissions into air, water and ground
  - Monitoring emissions according to regulations imposed
  - Air: Subjective „odor-units“ less than half than what permitted
  - Water: Subsequent cleaning as if normal sewage - locally
  - Ground: nothing
  
- ✓ Net energy producer! Renewable energy source
- ✓ Minimal resources needed for operation
- ✓ Supply all collection vehicles with RNG
  - Renewable, not fossil fuel!
- ✓ Only non-organic material in landfills – if at all

# Availability

- In the first sense:
  - The Kahlenberg facility - at full load since Aug. 2006 - no downtime!
  - No typical two weeks / year overhaul time!
- In the second sense:
  - Now!

# Public acceptance

- Located adjacent to a landfill
- Various solutions evaluated - MYT<sup>®</sup> MBT chosen because of distinct advantages
- Visitors walk right by the ZAK MYT<sup>®</sup> plant 24/7
- 300 meters!



# Conclusion

- Advantages of **MYT® Maximum Yield Technology**
  - Truly viable, sustainable, economical and environmentally sound mechanical-biological waste treatment process
  - Tried-and-Proven
  - Reliable
  - High availability
  - Flexible
  - Adaptable
  - Sustainable
  - Incorporation into existing local waste regime
  - Safe and clean work-place
  - Regulations upheld
  - Costs kept to a minimum – designed to fit

# References

- ZAK in Ringsheim, Germany, 100.000 tpa MSW, operating since 2006
- Symevad, Hénin-Beaumont, France, 86.000 tpa MSW, operating since 2015
- Hangzhou, China, 50 tpd kitchen waste, operating since 2015
- On-Nut, Bangkok, Thailand, 800 tpd MSW, operating since 2019
- Shanghai, China, 260 tpd kitchen waste plus, commissioning since 2020
- Shanghai, China, 260 tpd kitchen waste plus, under construction
- Shanghai, China, 200 tpd kitchen waste, under construction

*Thank you!*



**InnoWaCon LLC**  
Innovative Waste Conversion technologies

Glen Tobiason

President & CEO

734 East Penacook Road

Hopkinton, NH 03229-2911

Cell: +1 603 406 9883

E-Mail: [glen.tobiason@innowacon.com](mailto:glen.tobiason@innowacon.com)

URL: <https://innowacon.com>

LinkedIn: <https://www.linkedin.com/company/71246538>

# Short Video