



# Best Design Practices for Odour Management for Organics Processing Facilities

A&WMA Waste Conference 2014

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# ORGANICS PROCESSING

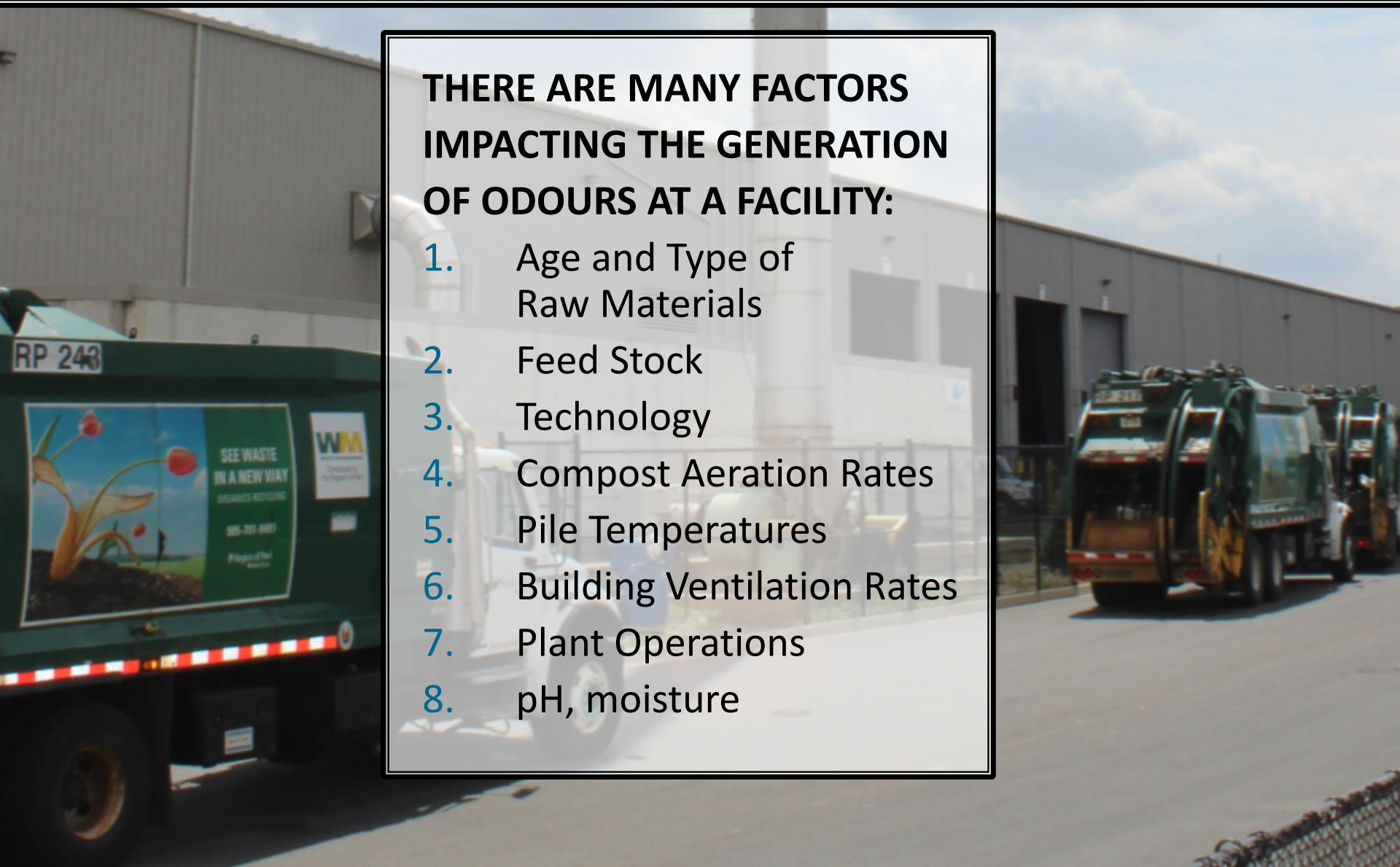
- Typically categorized into aerobic and anaerobic
- Aerobic or composting can be in static or aerated piles, high rate in vessel
- Anaerobic Digestion can utilize many different technologies (low solids, high solids)



# ORGANICS PROCESSING

**THERE ARE MANY FACTORS IMPACTING THE GENERATION OF ODOURS AT A FACILITY:**

1. Age and Type of Raw Materials
2. Feed Stock
3. Technology
4. Compost Aeration Rates
5. Pile Temperatures
6. Building Ventilation Rates
7. Plant Operations
8. pH, moisture

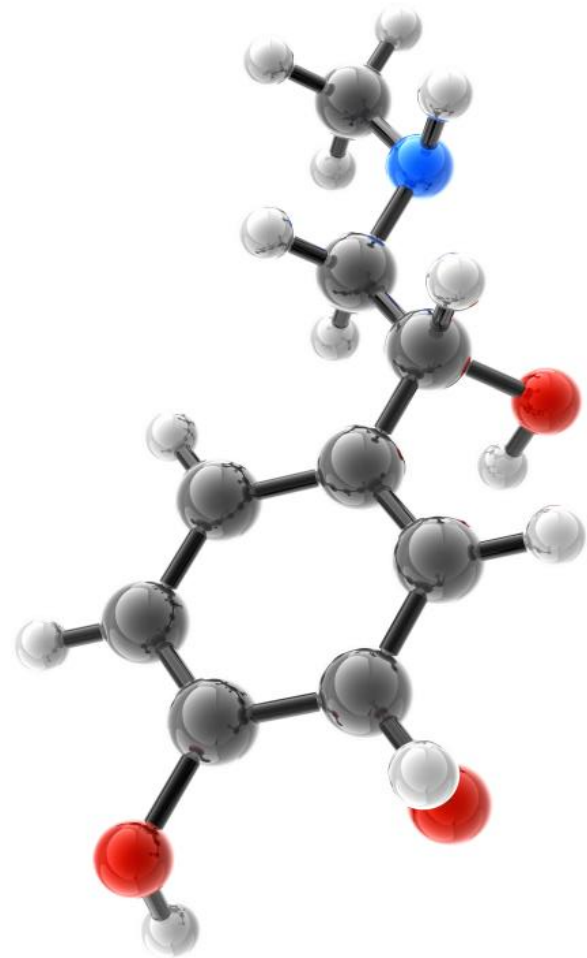




# ORGANICS PROCESSING

These processes generate a variety of odiferous compounds:

- Ammonia
- Amines and other Nitrogen-bearing Compounds
- Hydrogen Sulphide
- Organic Sulphides (MM, DMS, DMDS)
- Aldehydes
- Acetic Acid



# WHERE DO YOU FIND ODOURS?

- Transport to site
- Reception of material
- Pre-treatment of material
  - bag opening, mechanical separation, mixing/homogenization
- Transportation on-site
- Treatment process releases
  - composting, digestion, drying, etc.
- Fugitive emissions
- Waste material and by-products management
  - Waste water ponds
  - Leachate accumulations
  - Screening and blending



# DESIGN CONSIDERATIONS

## Containment

*(negative pressure, collection systems, air curtains, double-doors, in-vessel systems, operation protocols)*

## Air Volume Minimization

*(recycling, containment, in-vessel systems)*

## Abatement

*(process knowledge, technology selection, design and performance objectives)*

# REDUCING OFF SITE IMPACTS

**Organics facilities do not have to have a negative impact on the surrounding communities:**

- Integration of a facility wide odour management plan
- Integration of abatement device with building and process design
- Advanced abatement system designs

# ABATEMENT EQUIPMENT SELECTION

Criteria	Activated Carbon	Chemical Scrubber	NTP Ionization	Organic Media Biofilters	Biorem (engineered systems)
Capital Cost	Low	Low	Low	Moderate	Moderate
Operating Cost	High	High	Moderate	Moderate	Low
Maintenance	High	High	Moderate	High	Low
Safety	High	Low	Moderate	High	High
Performance	High	Low	Low	Moderate	High



# BIOLOGICAL

## Biofilters and Biotrickling Filters are examples of Fixed-Film Reactors

- Bacteria and fungi are immobilized on the surface of a matrix
- Malodorous compounds are utilized as substrate
- Two-stage process: phase transfer and oxidation
- No hazardous byproducts are created



# BIOFILTRATION ILLUSTRATION

$H_2S$  (in air)

clean air

Media Particle

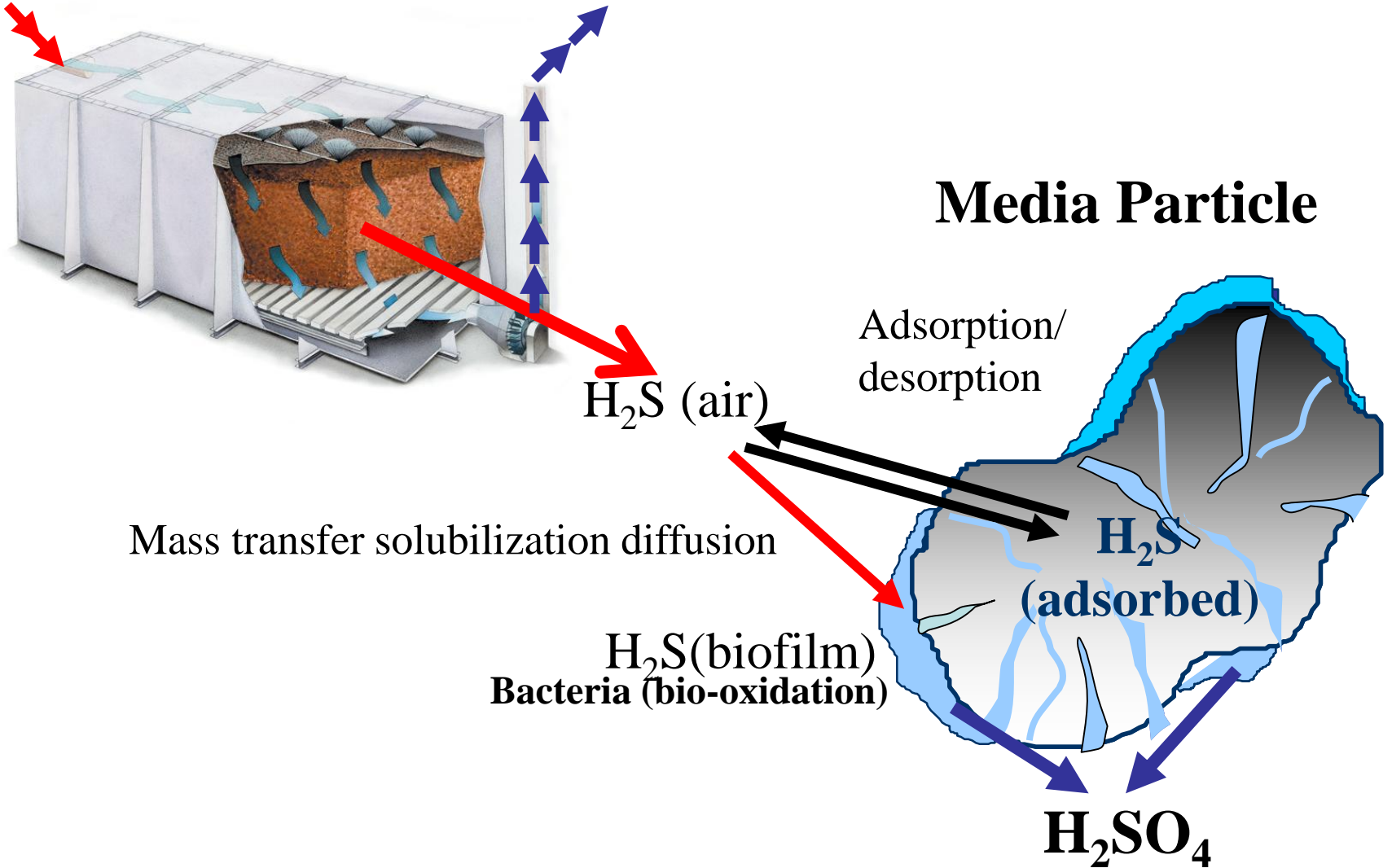
Adsorption/  
desorption

$H_2S$  (air)

Mass transfer solubilization diffusion

$H_2S$ (biofilm)  
Bacteria (bio-oxidation)

$H_2SO_4$



## Odour control systems have greatly improved over the last decade

- Multiple stage or hybrid systems
- Engineered medias
- Optimized control and monitoring systems
- Incorporation of modelling (performance/dispersion)

# ENGINEERED MEDIAS

- Low energy consumption
- Smaller footprint
- Low background odour
- Consistent, reliable performance
- Greater range of compounds treated
- Longevity (proven to last more than 18 years)





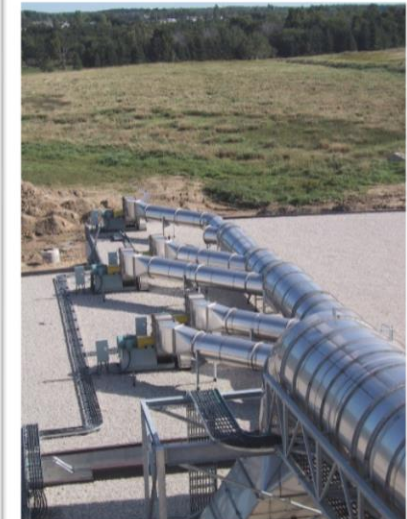
# NEGATIVE PRESSURE

- Prevents Fugitive Emissions
- Controlled Process Environment



# DOWN FLOW

- Moisture Control
- Biomass Control
- Particulates
- Troubleshooting



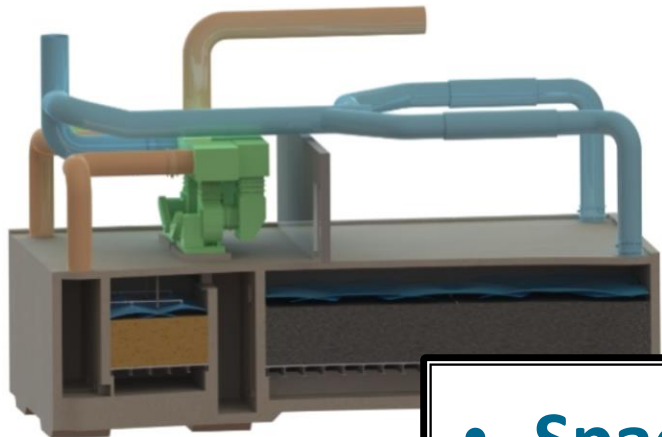
# DUAL STAGE

- Specific Contaminant Treatment
- Process Control

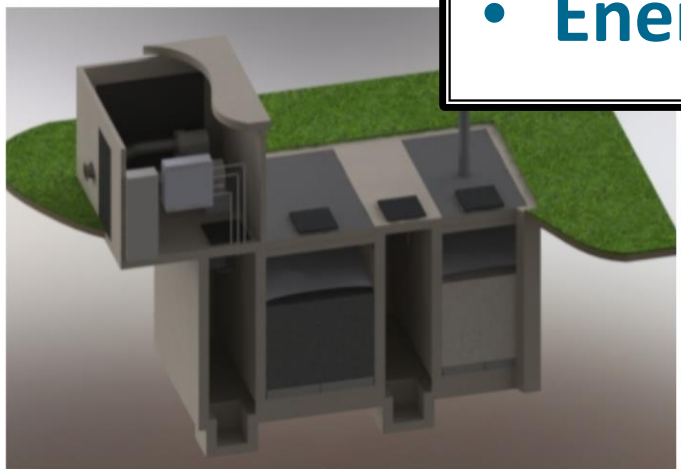




# INNOVATIVE REACTOR DESIGNS



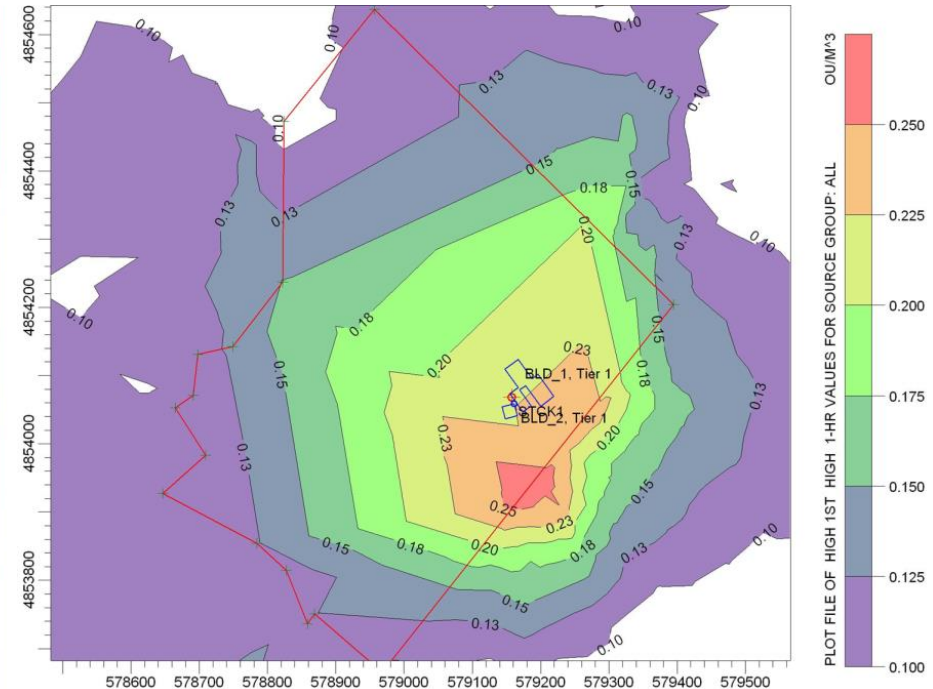
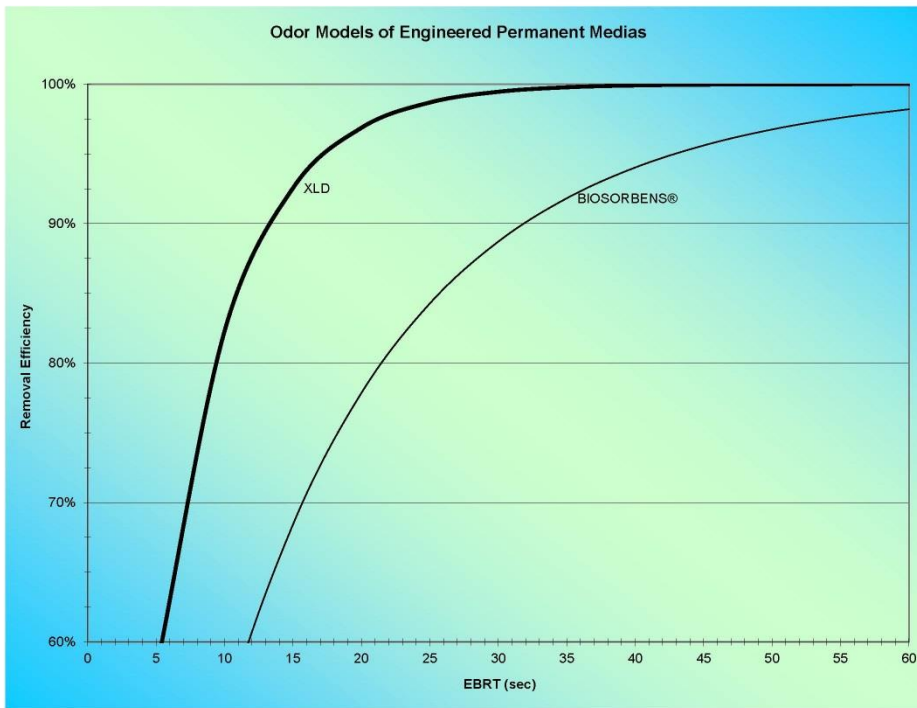
- Space Constraints
- Energy Efficiency





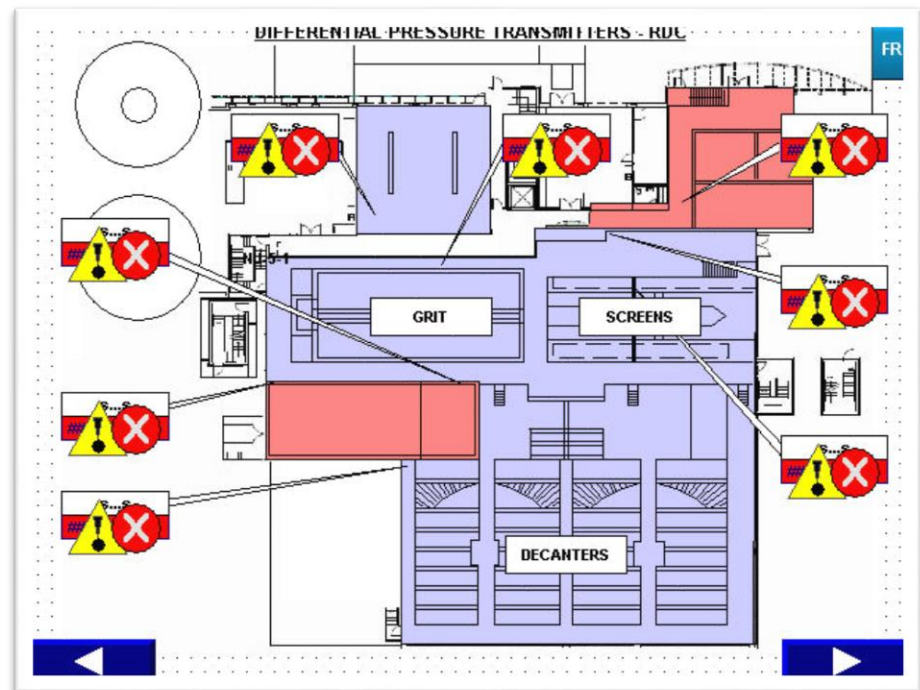
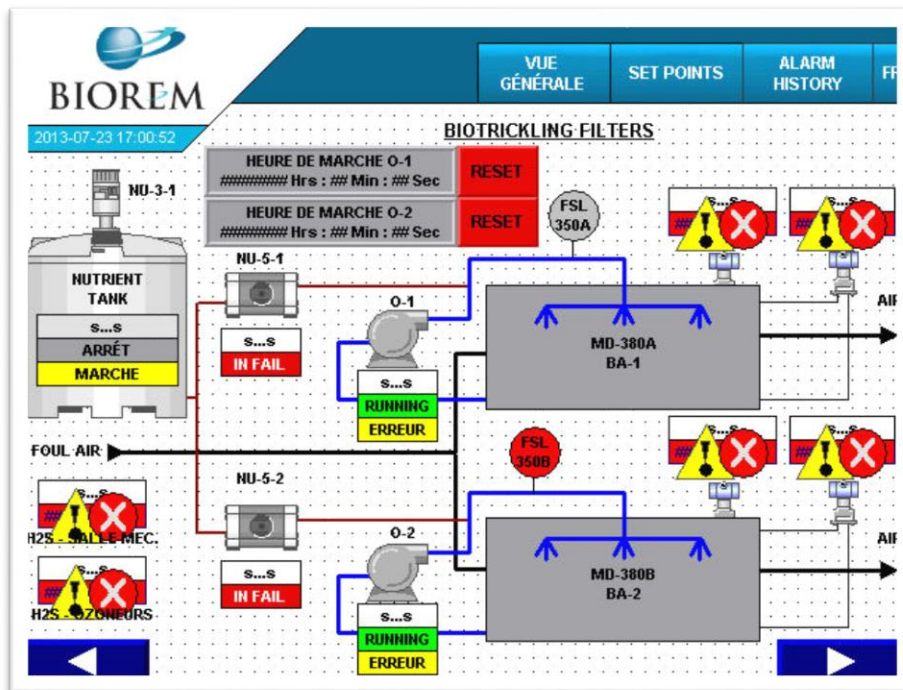
# MODELLING

- Predictability
- Understanding Offsite Impacts



# CONTROLS

- Monitoring Process Parameters
- Remote Control
- Notifications



# Thank you!

For additional information please contact:

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