

Innovation Pathway – EXPO & Networking” at Alcântara Green Roof WWRF

Advanced anaerobic digestion and co-digestion

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SUEZ Water Technologies & Solutions

ready for the resource revolution



who we are

We have been **experts** in water and waste management for 160 years.

We operate on 5 continents, on which SUEZ harnesses all its desire for **innovation** to achieve an **efficient** and **sustainable management of resources** throughout the world.

full-service provider delivering across the value chain

technologies



Equipment and systems



Water quality monitoring



Mobile Treatment

solutions & services



Specialty chemicals and expert services



Lifecycle services



Data intelligence for asset performance

delivery models



Engineering, Procurement, Construction

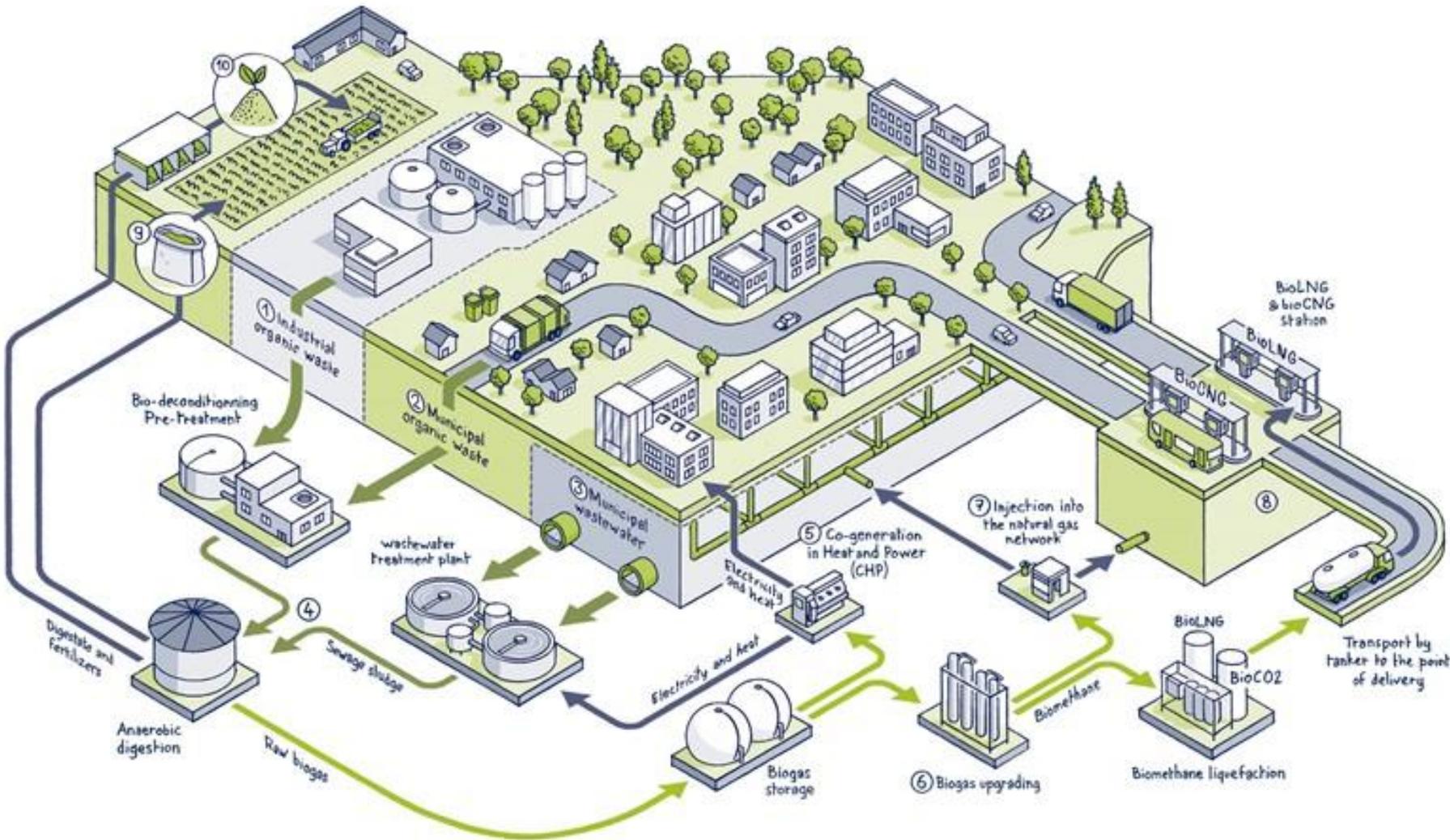


Build, Own & Operation

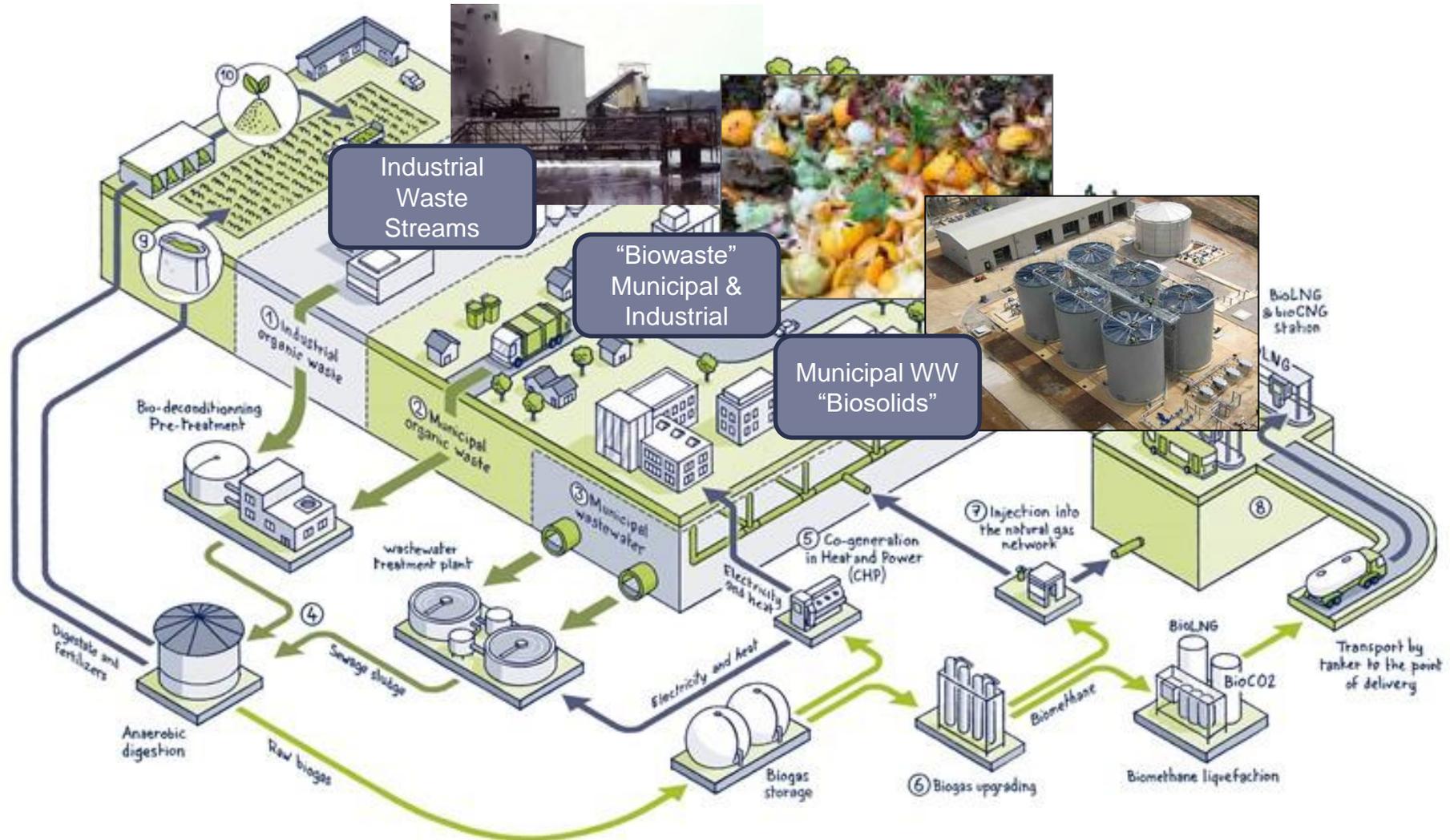


Operation & Maintenance

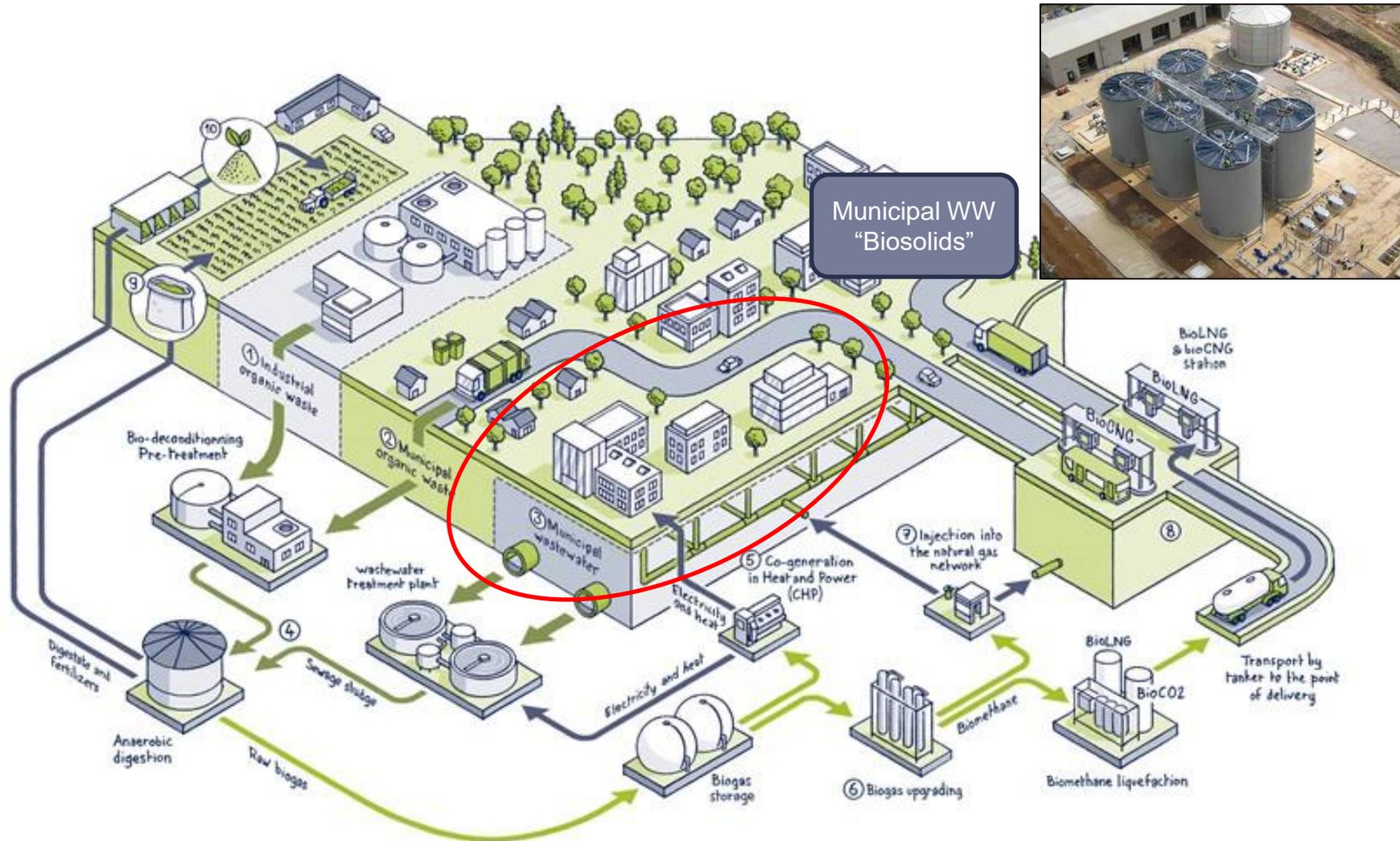
SUEZ WTS: project delivery across all AD sectors



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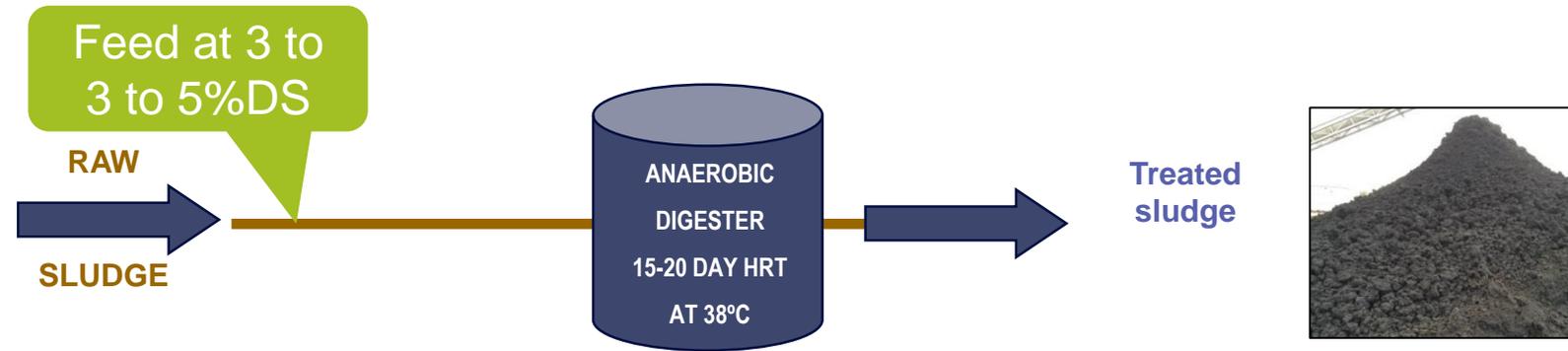


Solutions for Municipal Sludge Digestion

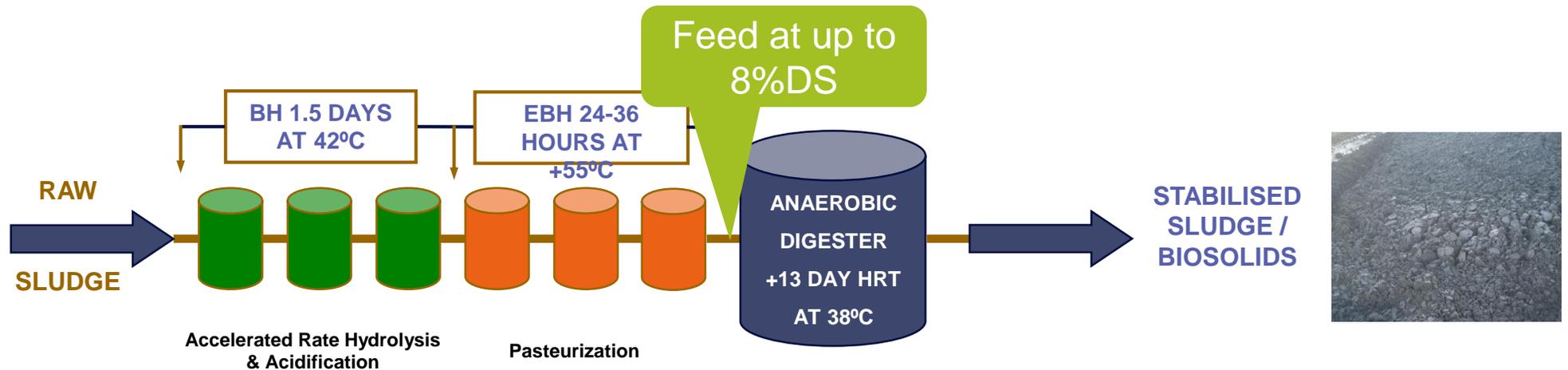


Integrating Biological Hydrolysis – Class A biosolids

Conventional
sludge
digestion

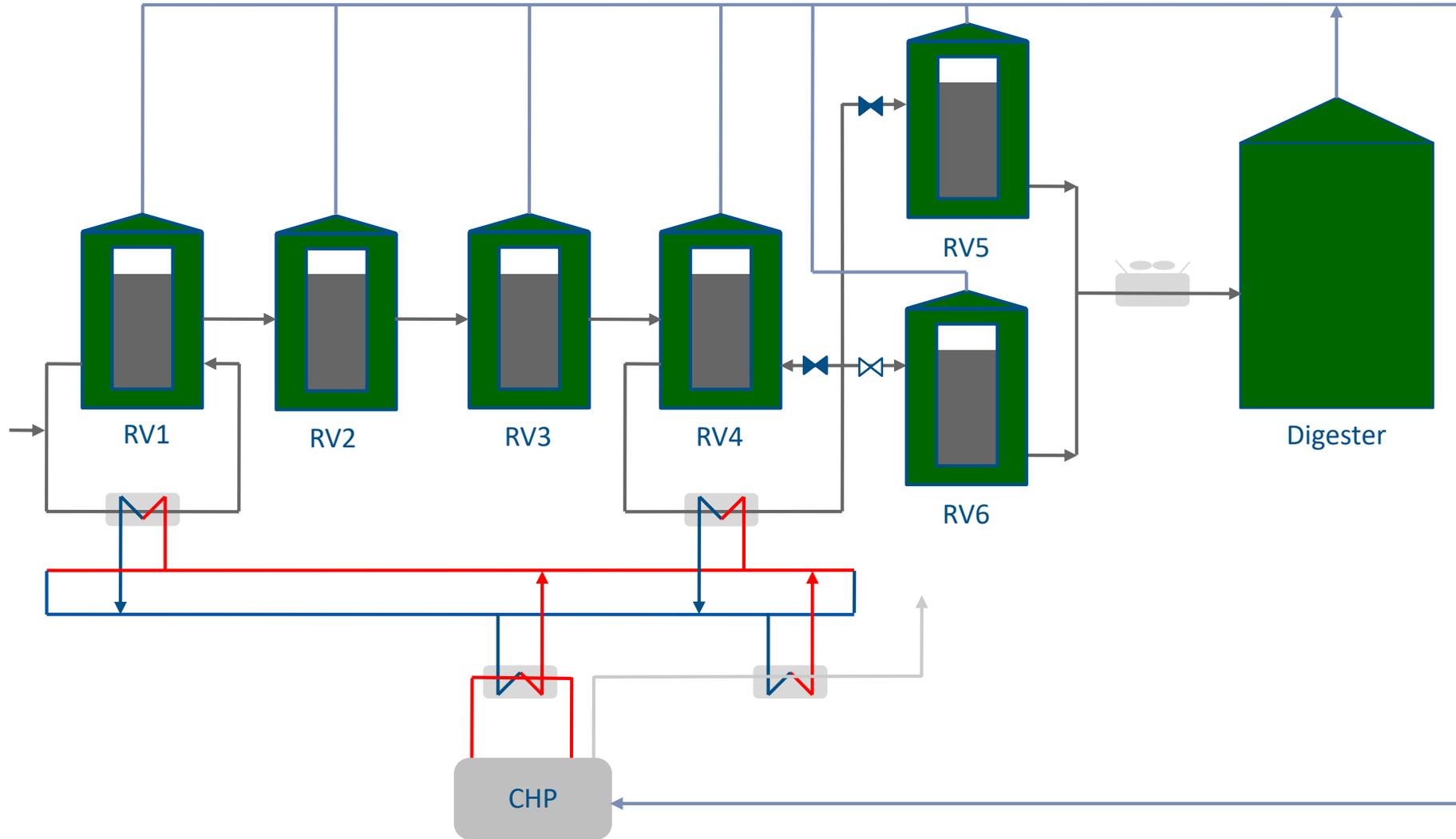


Advanced
sludge
digestion



Critical factor – All advanced digestion pre-treatment systems allow for significant increase in digester dry solids feed

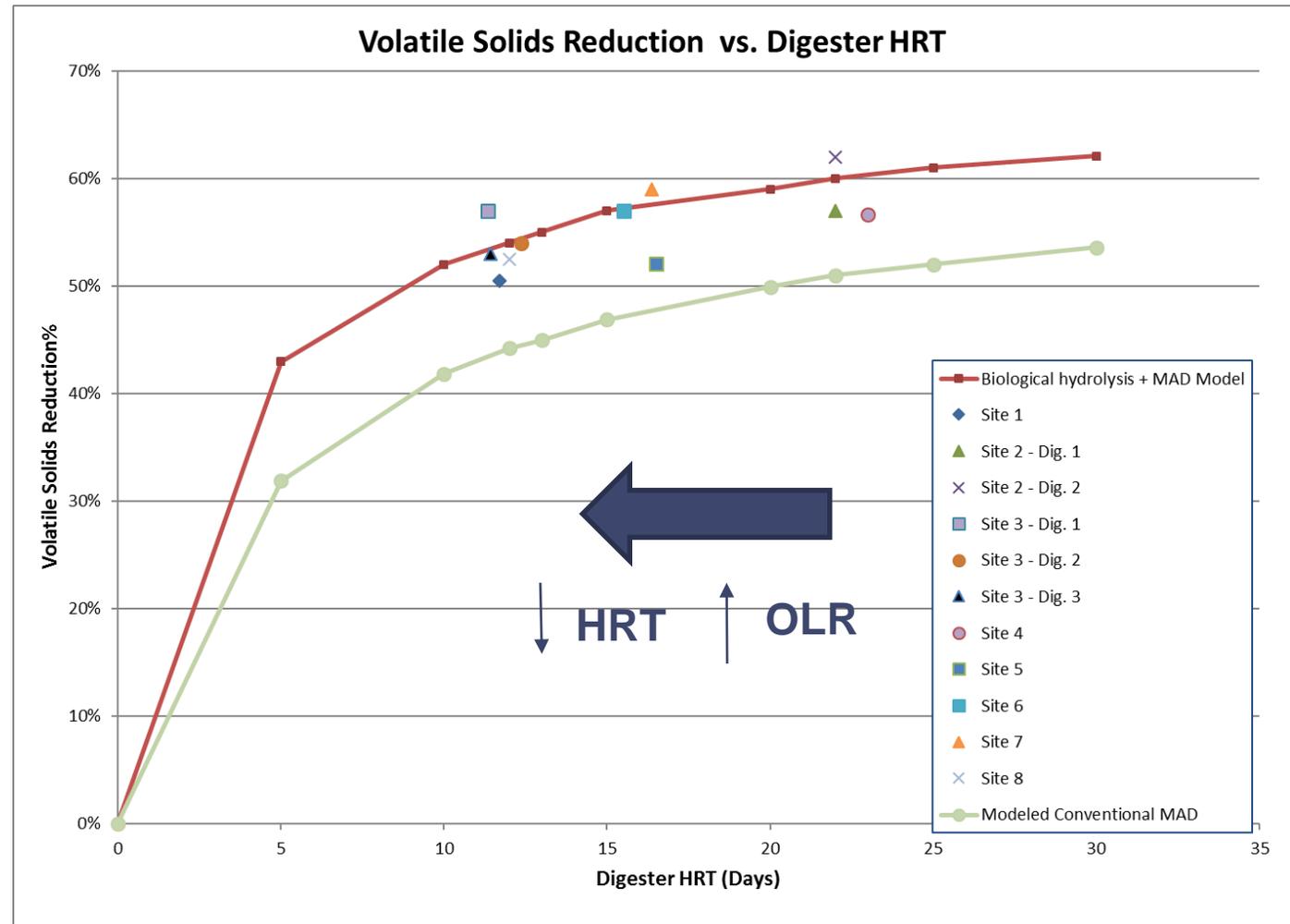
Monsal 55



Biological Hydrolysis Operational Performance

Technology to Maximize Digester Efficiency

- Digester HRT: 13 to 18 Days
- Up to 3x's Effective Capacity (Gas production)
- OLR: > 4 kg VS/m³-day
- VS Reduction: ~ 55% @ 15d HRT
- Biogas Yield: > 400 m³/tonne dry solids
- Auto thermal with gas to CHP – no additional thermal input required
- Reduced biosolids generation
- “Stabilised Biosolid” when needed

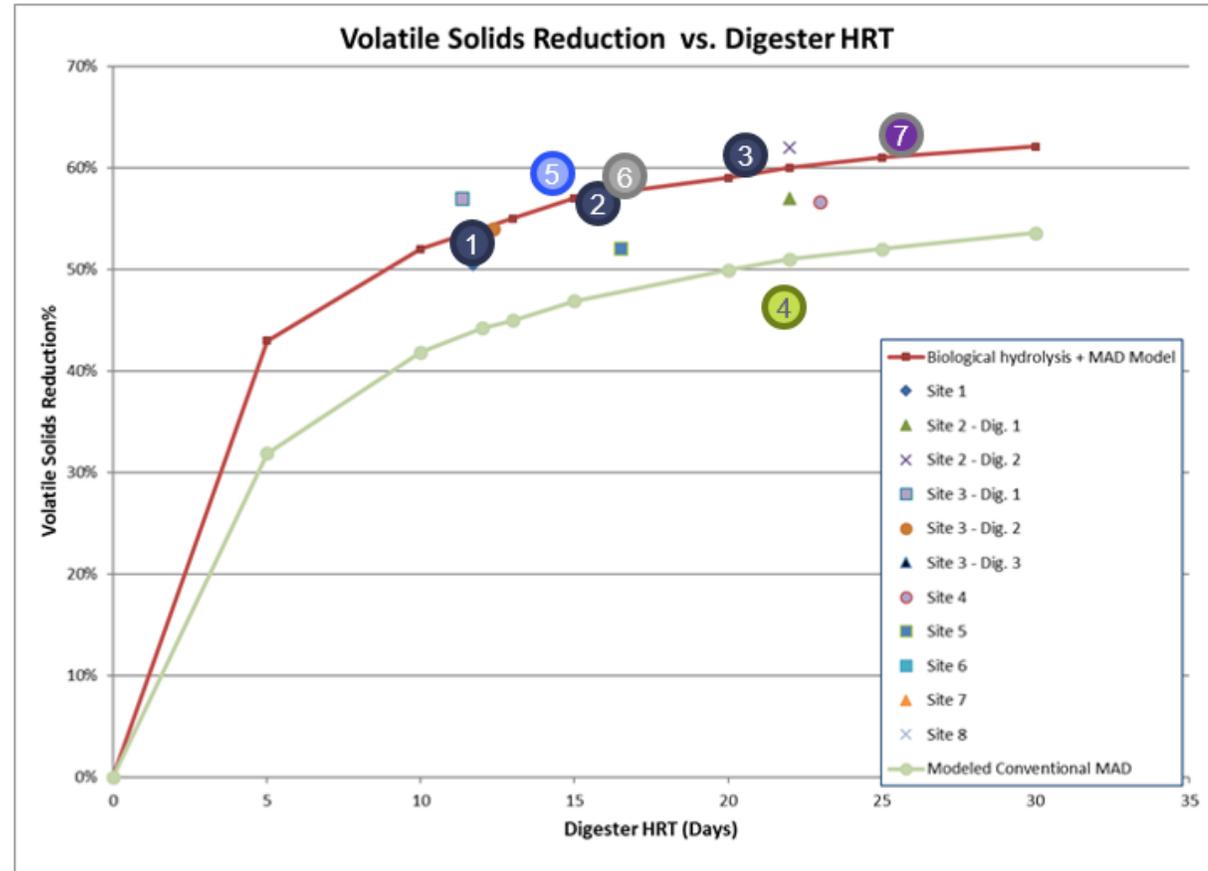


12 biological hydrolysis facilities installed globally

Continued performance Years after Commissioning

Sustained Performance

- #1 – Class A BH, 12 Day AD HRT – 52% VSR
- #2 – Class A BH, 16 Day AD HRT – 55% VSR
- #3 – Class A BH, 20 Day AD HRT – 60% VSR
- #4 – Full Scale Meso. AD, 22 Day HRT – 44% VSR
- #5 – Crewe WwTW – 14 Day AD HRT – 58% VSR
- #6 – Great Billing WwTW – 16 Day AD HRT – 58% VSR
- #7 – Lancaster WwTW – 26 Day HRT – 63% VSR

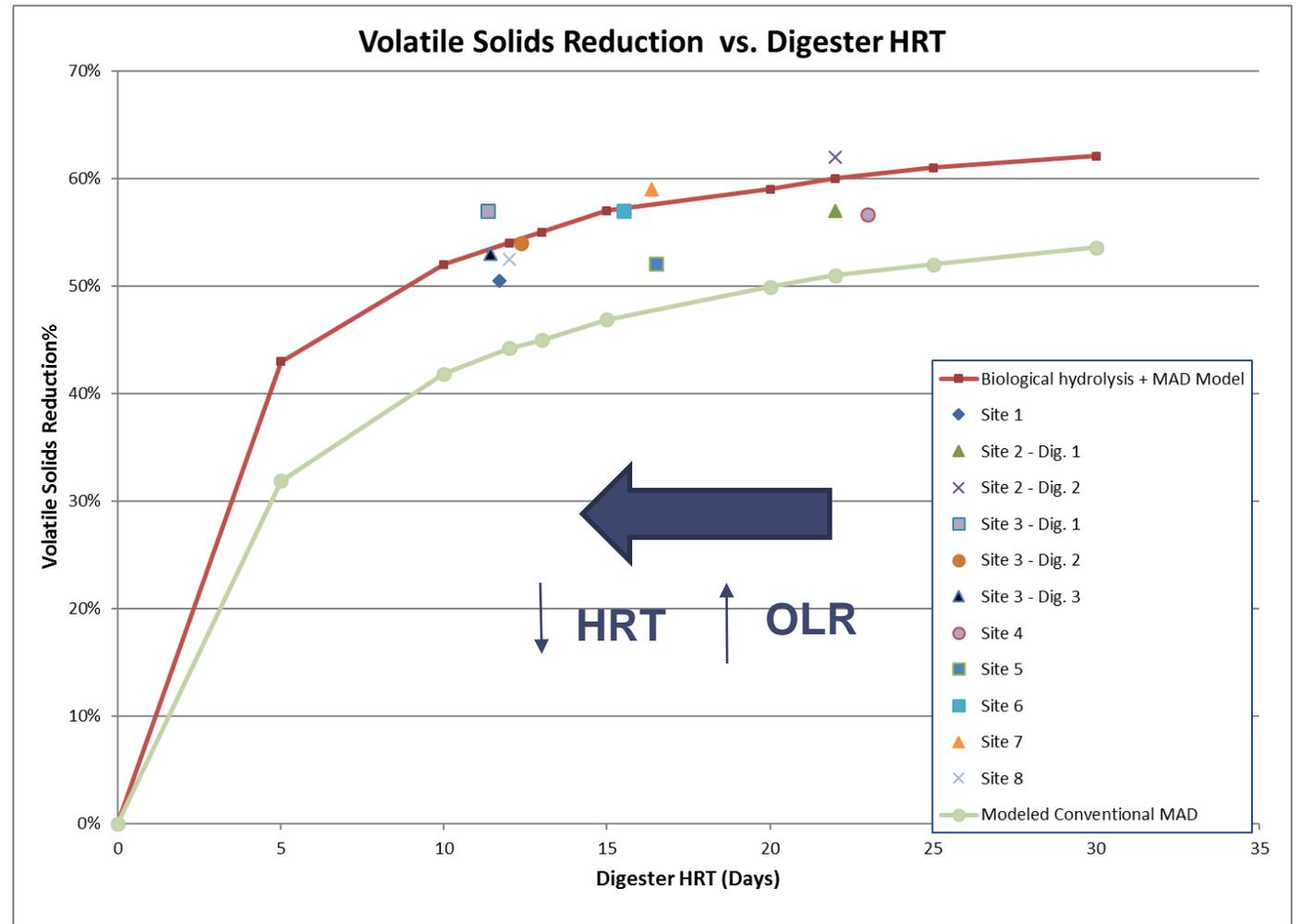


Follows Trend > 10 years after Commissioning

Biological Hydrolysis Operational Performance

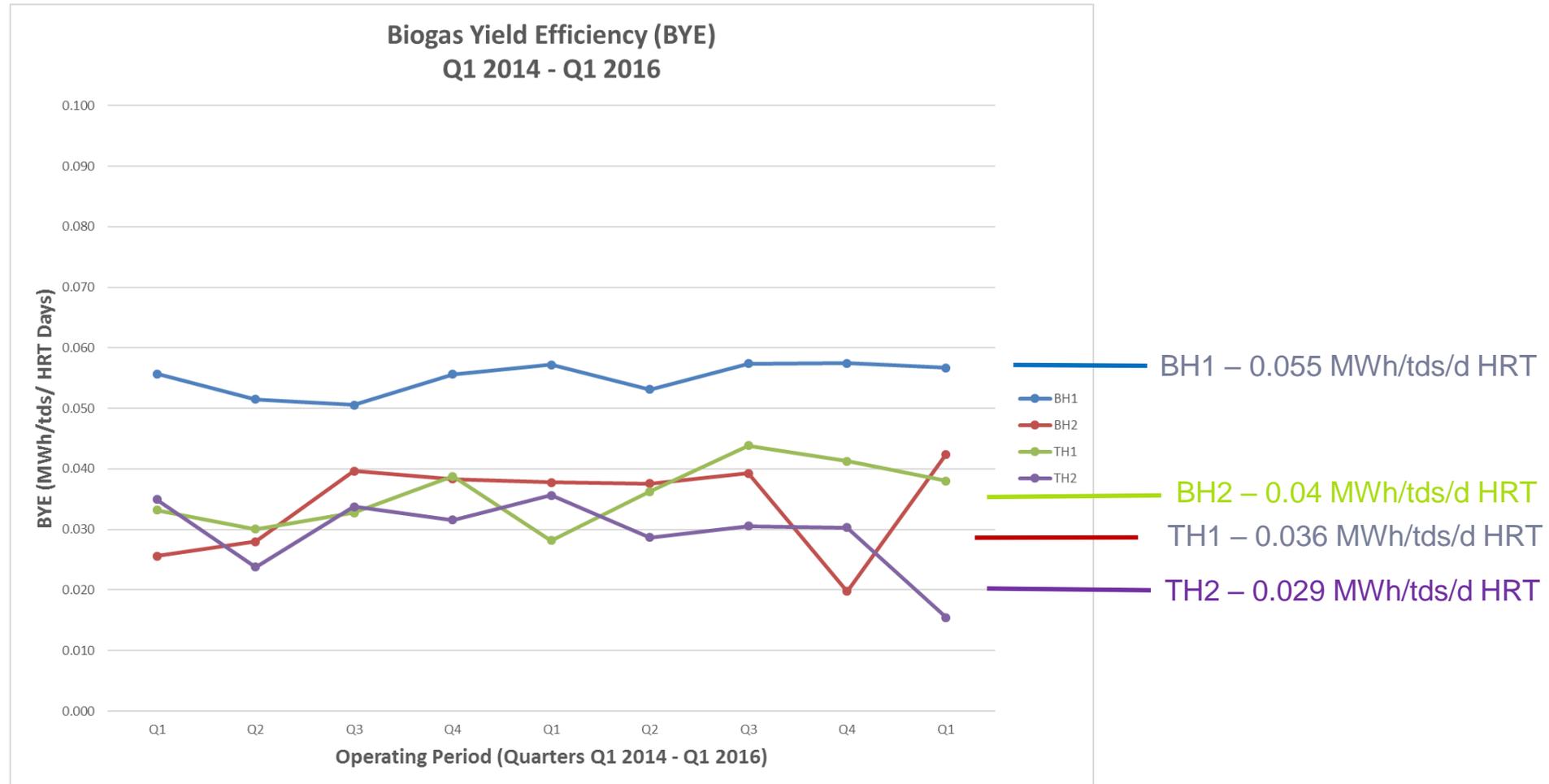
Technology applications

- Only suitable for mixed sludge (50% primary)
- New built plants or retrofit to existing Sludge Treatment Centres
- Allows optimisation of digester asset
- Typically viable on plants +30TDS/day (Range 30 to +100TDS/day)
- Plant capacity expansion for additional sludge, co-digestion or co-location



12 biological hydrolysis facilities installed globally

Biogas Yield Efficiency (MWh electricity per tds / Digester HRT)



2 | Case studies and references

Case study 1: Avonmouth WWTW

Whole facility optimisation



The challenge

- ✓ Phased development on a 1.1M PE WWTP
- ✓ Optimise digestion on existing infrastructure
- ✓ Increase digestion / reduce lime stabilisation of sludge
- ✓ Optimise utilisation of available CHP units (5.75MWe)
- ✓ Maintain operations during development
- ✓ Electricity generation for own use and export
- ✓ Enabler for commercial waste treatment activities

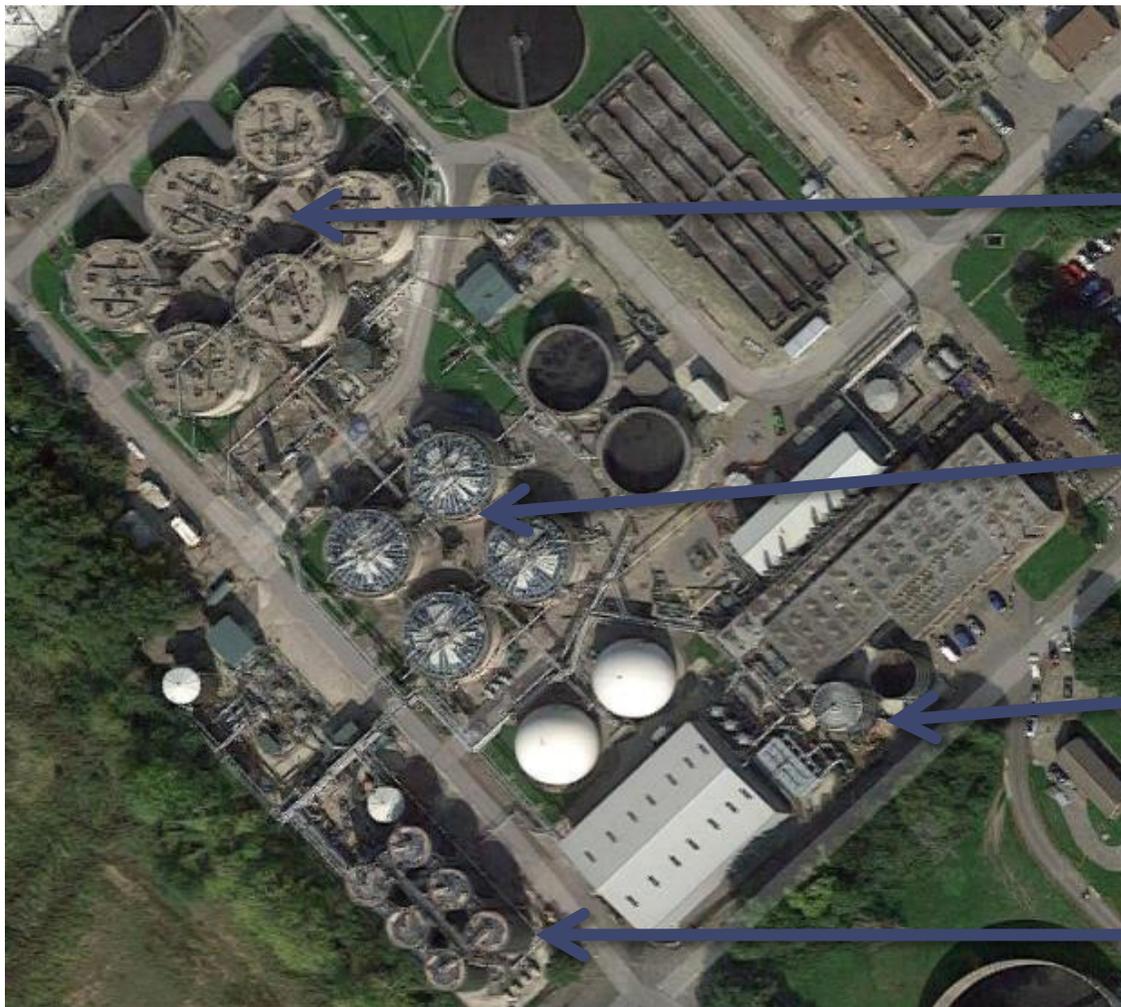
Avonmouth: Whole facility optimisation

- ✓ Conventional Mesophilic Digestion
- ✓ 6 No 2,700m³ Digesters
- ✓ 22,000 tonnes dry solids per year to AD
- ✓ 21,097 tonnes dry solids per year to lime stabilisation

Avonmouth: Pre 2007



Avonmouth: Whole facility optimisation



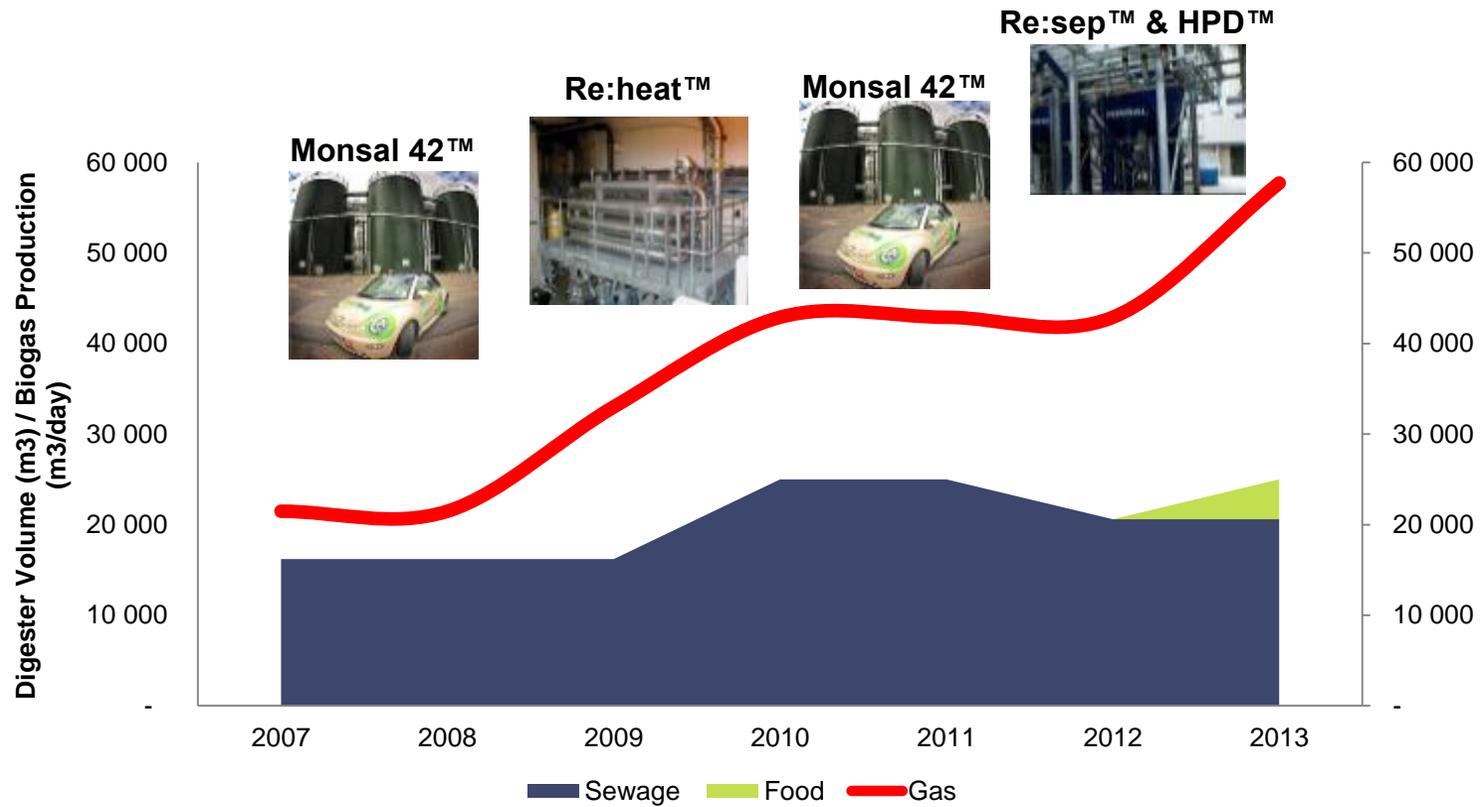
Primary Digester
upgrade
6 X 2,700m³
2012

Additional Primary
Digesters on line
4 x 2,200m³
2009

Monsal Re:Sep &
HPD
40,000 tonnes/year
Installed 2012

Monsal 42 –
Hydrolysis plant
Installed 2007

Avonmouth: Whole facility optimisation



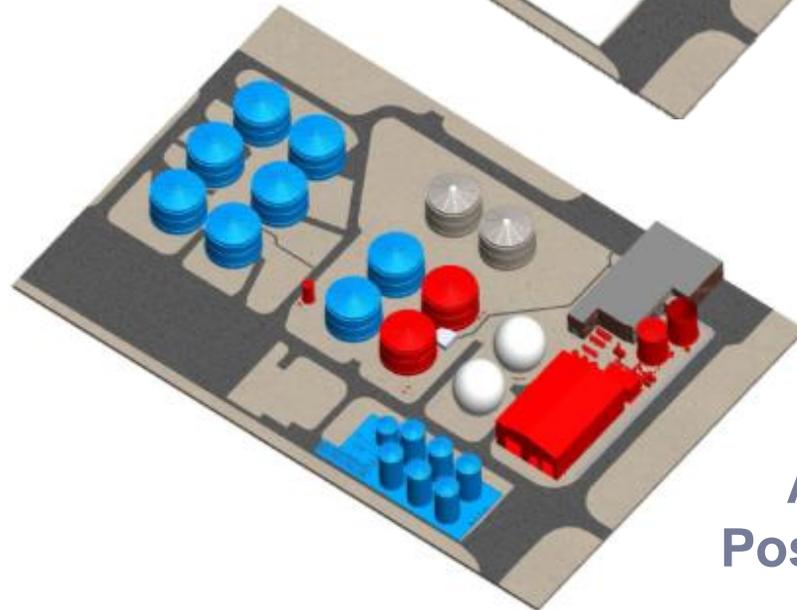
Avonmouth: Whole facility optimisation

Avonmouth:
Pre optimization



● Biosolids digestion investment

● Biowaste digestion investment



Avonmouth:
Post optimization

Ongoing developments
Biomethane upgrade plant
Class A biosolid with Monsal
55
Increase biowaste capacity

Case study 2: Great Billing WWTW

Centralisation of digestion



The challenge

- ✓ Optimise digestion on existing infrastructure ~20,000m³ digestion volume.
- ✓ Accommodate increased solids load from additional sludge imports for 1.6M PE WWTP
- ✓ Retain digesters
- ✓ Maintain operations during development
- ✓ Produce Class A biosolids
- ✓ Target energy export

Great Billing WWTW: Centralisation of digestion



40,000 TDS p.a. WWTW
(~12,000 TDS indigenous, ~28,000 TDS imported)
Solution as part of an integrated power and sludge upgrade
4 existing digesters retained
4.2MWe CHP capacity

VALUE PROPOSITION

- ✓ Optimization of existing digestion assets
- ✓ Increased sludge intake (imports from satellite centres)
- ✓ +ive thermal energy balance critical
- ✓ Class A product
- ✓ Low maintenance and intervention system
- ✓ Electricity output optimised

Great Billing WWTW: Centralisation of digestion



Monsal 55 EBH plant

Incorporating

- Monsal GasLift™ System
- Monsal GasMix™
- Monsal Heating Equipment (HX and Steam)



SYSTEM PERFORMANCE

- ✓ 7.5% DS sludge
- ✓ Daily sludge flow of ~1,400cu.m/day
- ✓ Digester HRT 15days with additional digester
- ✓ VS conversion +55%

Hydrolysis plant reference list

- **Macclesfield BH**

4,500 tds/annum, 6% BH feed, 2 day BH HRT, 17 day MAD HRT

- **Crewe BH**

12,500 tds/annum, 6.5% BH feed, 2.1 day BH HRT, 16 day MAD HRT

- **Blackburn EBH**

16,200 tds/annum, 6.0% EBH feed, 2.2 day EBH HRT, 12 day MAD HRT

- **Cambridge EBH**

11,500 tds/annum, 4.5% EBH Feed, 2.1 day EBH HRT, 11.4 day MAD HRT

- **Avonmouth BH**

30,700 tds/annum, 3 day BH HRT, 11 day MAD HRT

- **Kings Lynn EBH**

19,200 tds/annum, 3 day EBH HRT, 15 day MAD HRT

- **Great Billing EBH**

39,000 tds/annum, 7.5% EBH feed, 3.1 days EBH HRT, 11.3 days MAD HRT

- **Lancaster EBH**

9,500 tds/annum, 5.2% EBH Feed, 3.0 days EBH HRT, 14.4 days MAD HRT

- **Trowbridge BH**

10,950 tds/annum, 6% BH Feed, 2.0 days BH HRT, 14.0 days MAD HRT



Thank you for your attention and Questions

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