

Cambi: Solutions to turn your sludge into a valuable asset

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Lviv Eco Forum

Agenda

- About Cambi
- Thermal Hydrolysis Process
- Success Stories
- Value Proposition

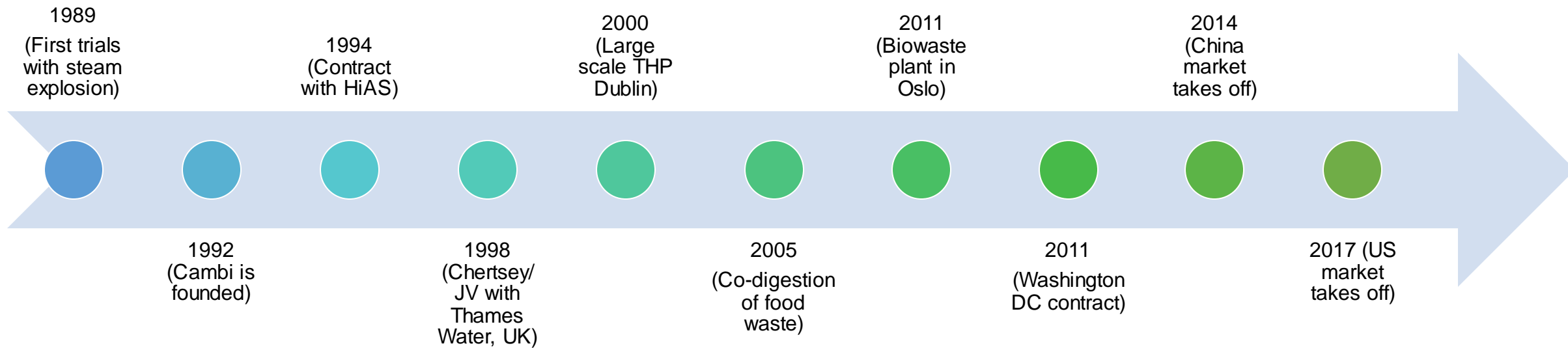
FROM WASTE TO WORTH USING ADVANCED ANAEROBIC DIGESTION



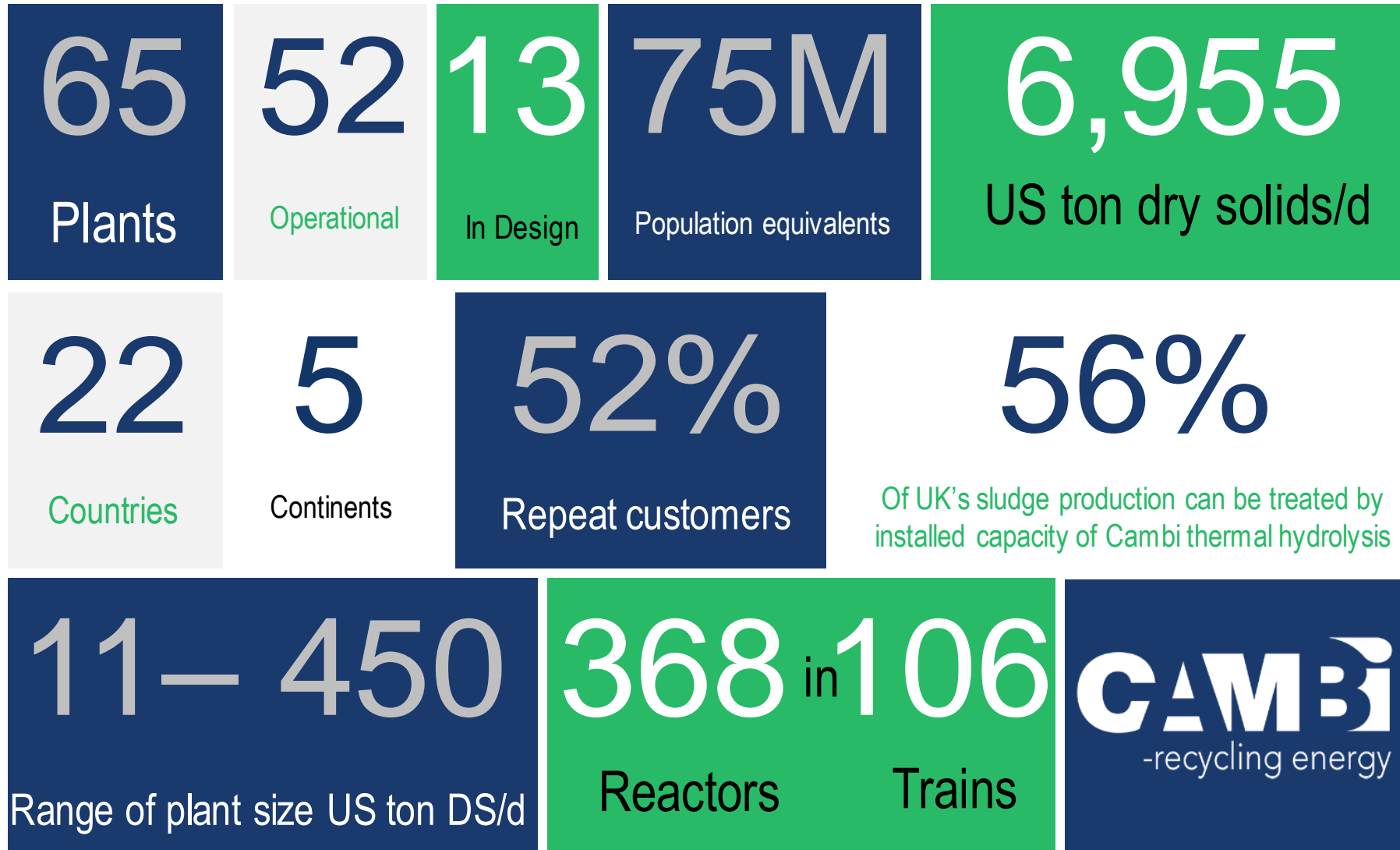
THE CAMBI SOLUTION TURNS
PROBLEMS INTO PRODUCTS:
FROM WASTE TO WORTH



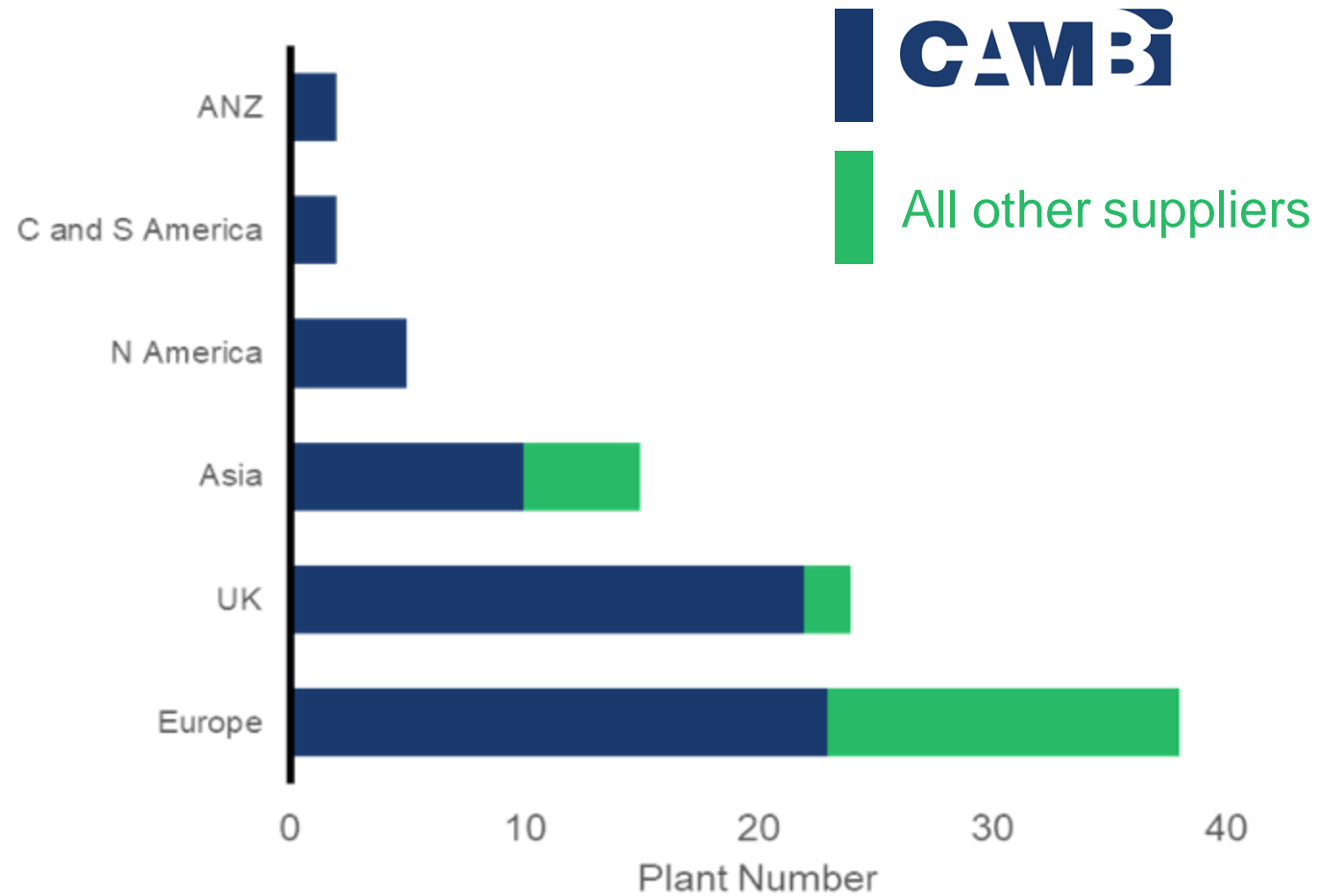
History



Cambi Thermal Hydrolysis (THP) as in 2018

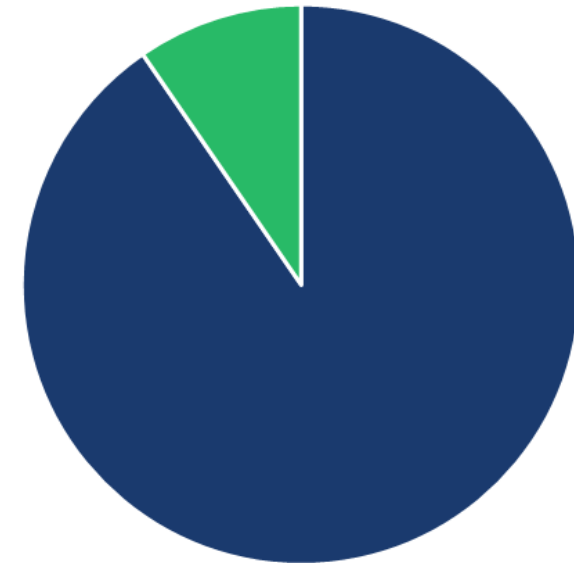


Thermal Hydrolysis Globally



Between 80 and 90 facilities

Market Share by installed capacity



Over 2 million tonnes dry solids processed annually

Cambi thermal hydrolysis – repeat clients



Gaoantun, 2017
 Huaifang, 2017
 Quinghe II, 2017
 Gaobeidian, 2016
 Xiaohongmen, 2016



Cotton Valley, 2008
 Whitlingham, 2008



Major extension, 2008
 Rings End, Dublin, 2002



Edinburgh, 2014
 Bruxelles Nord, 2006



Basingstoke, 2017
 Longreach, 2015
 Crossness, 2014
 Beckton, 2014
 Crawley, 2014
 Riverside, 2011
 Chertsey, 1999



Oxley Creek Upgrade, 2018
 Oxley Creek, 2007



Panama City, 2019
 Santiago, 2012



Howdon, 2012
 Tees Valley, 2009



Ourense, 2015
 Burgos, 2012
 Vigo, 2009



Five Fords, 2016
 Cardiff, 2010
 Afan, 2010



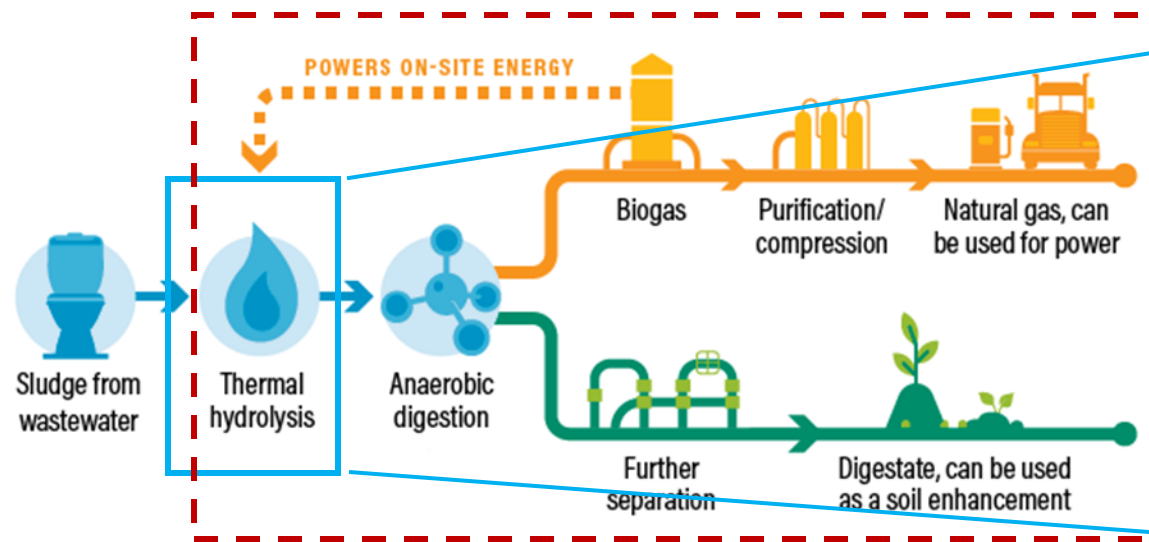
Leigh, 2016
 Burnley, 2016
 Davyhulme, 2011



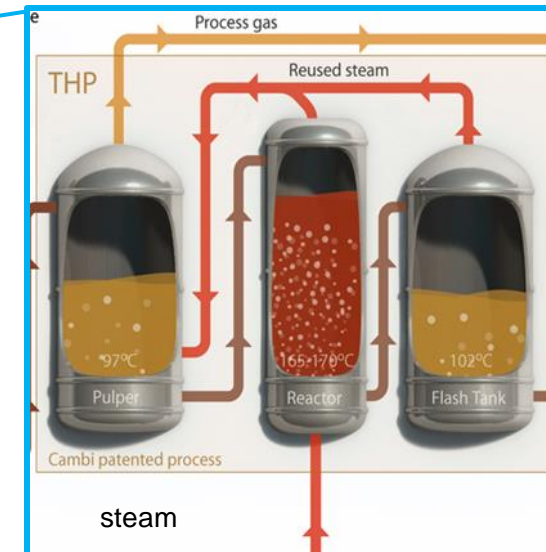
Strongford, 2018
 Minworth, 2017

Where is Cambi THP in a wwtp ?

Wastewater-to-Energy System



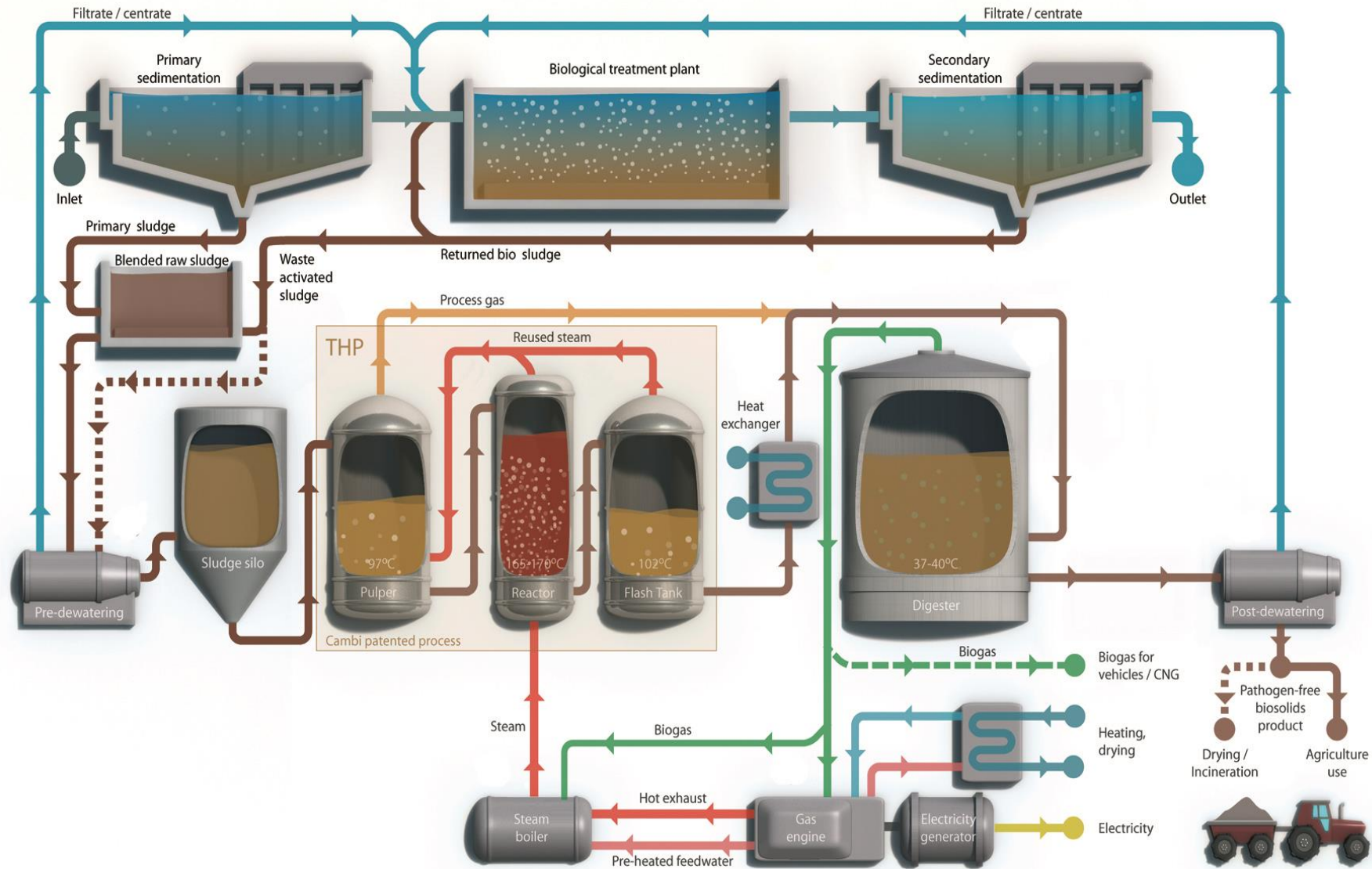
CAMBI Solutions



CAMBI Thermal Hydrolysis Process

Source: World Resources Institute, 2017

Cambi Thermal Hydrolysis pre-treatment - WWTP Integration



Why thermal hydrolysis?

It changes the properties of sludge at a fundamental level
(non-reversible reduction in viscosity)

Allowing higher loading rates to digesters



Improving dewaterability

Minimize or eliminate spending on digester upgrades

New digestion plants are significantly smaller

Less Biosolids exiting plant

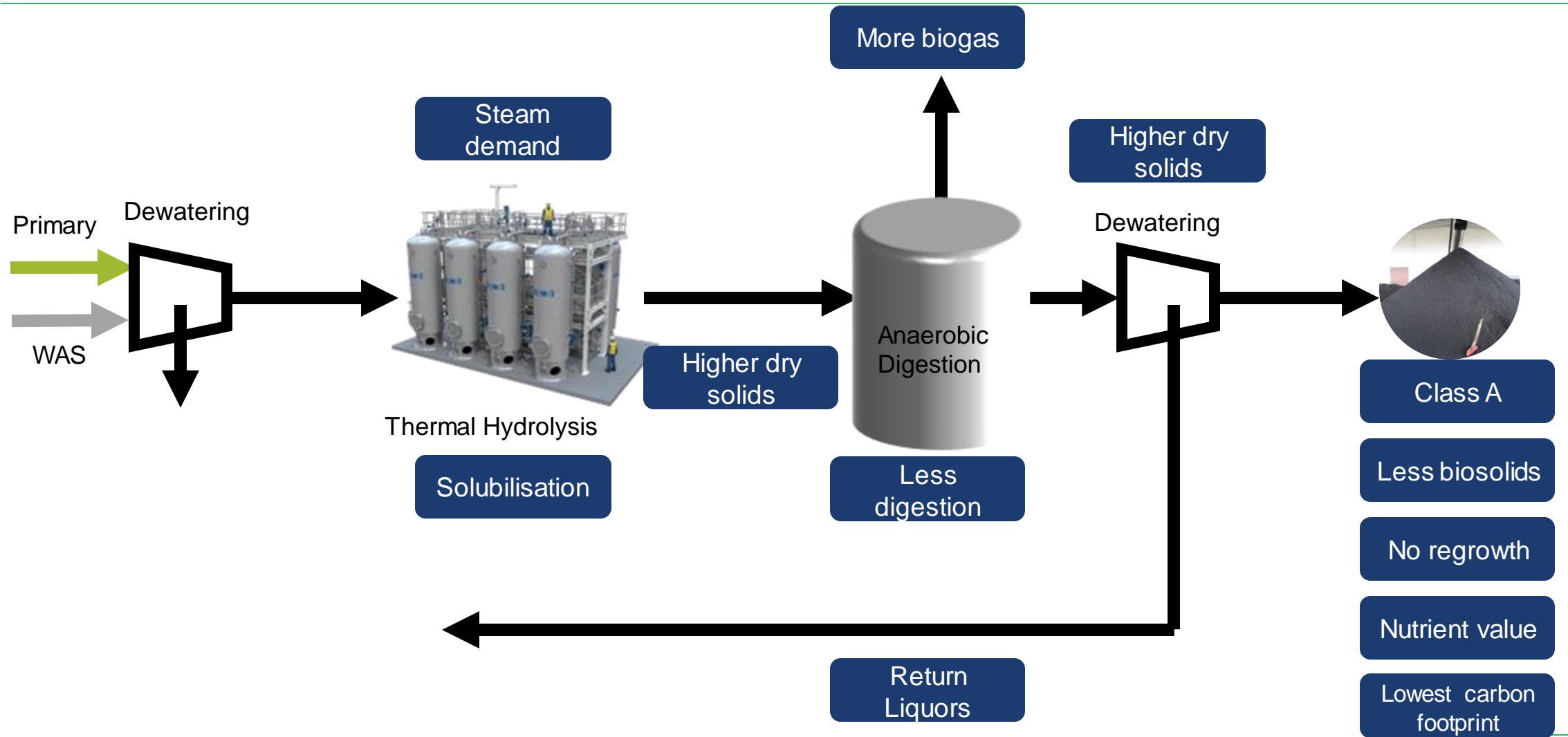
Lower energy requirements for downstream processing

CAMBI

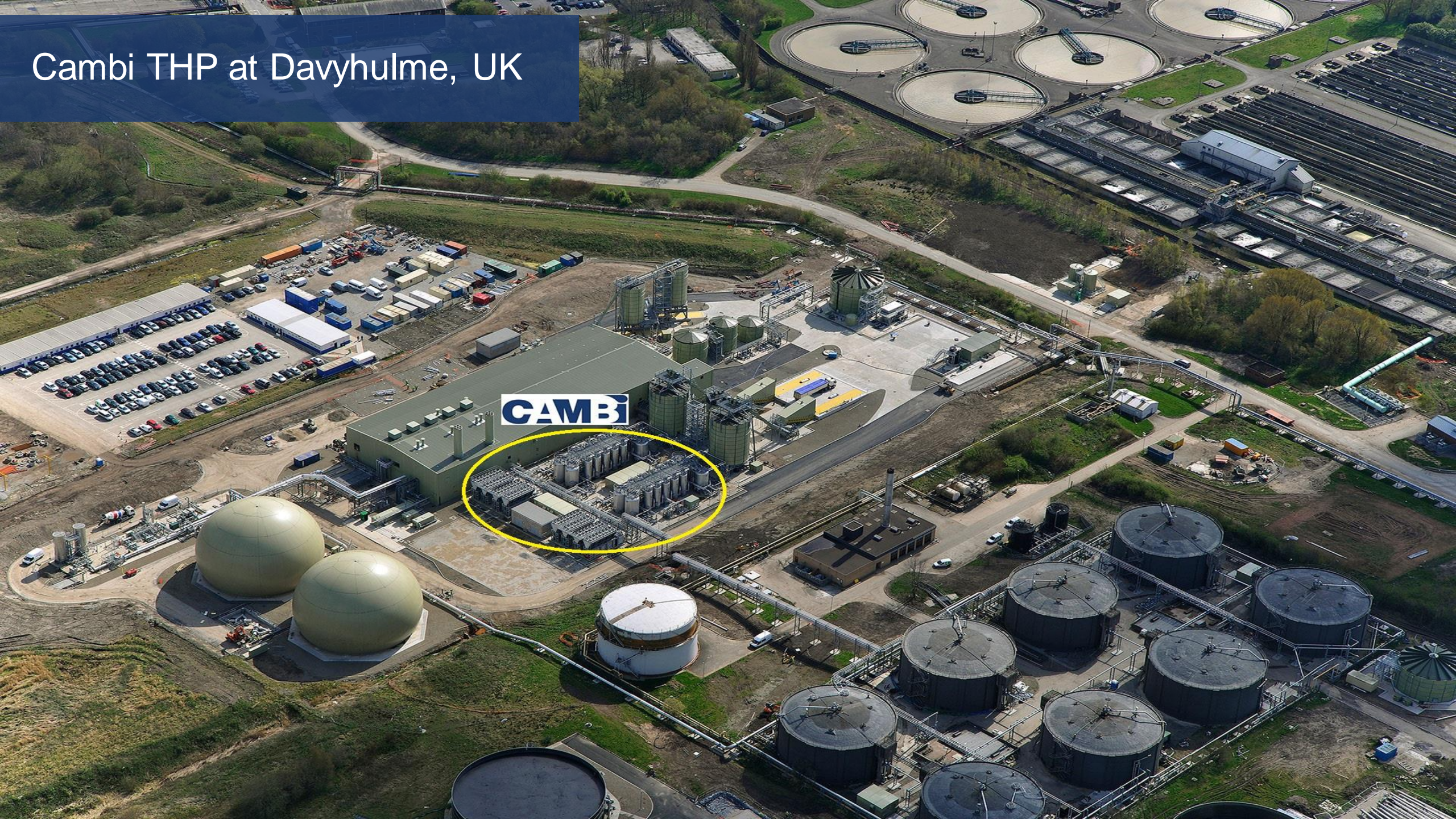
In addition

- Sterilization – Class A Biosolids without regrowth
- Improved digestion performance increases biogas production
- Minimized foaming potential
- Friable, minimum odor homogenous cake easy to spread on standard agricultural equipment
- Reduced carbon footprint

Influence of thermal hydrolysis on overall process











Cambi THP at Davyhulme, UK



CAMBI

Advantages of Cambi advanced digestion versus conventional anaerobic digestion



INCREASED DIGESTER YIELD	ENERGY EFFICIENT AND CLOSED PASTEURIZATION	INCREASED BIOGAS PRODUCTION	HIGH CLASS BIOSOLIDS/ FERTILIZER
<p>Conventional</p> 	<p>Conventional</p> 	<p>Conventional</p> 	<p>Conventional</p> 
<p>Cambi THP</p> 	<p>Cambi THP</p> 	<p>Cambi THP</p> 	<p>Cambi THP</p> 

Effects of pressure cooking sludge



Cambi Solutions




CAMBI
conventional
THP

Solid Stream

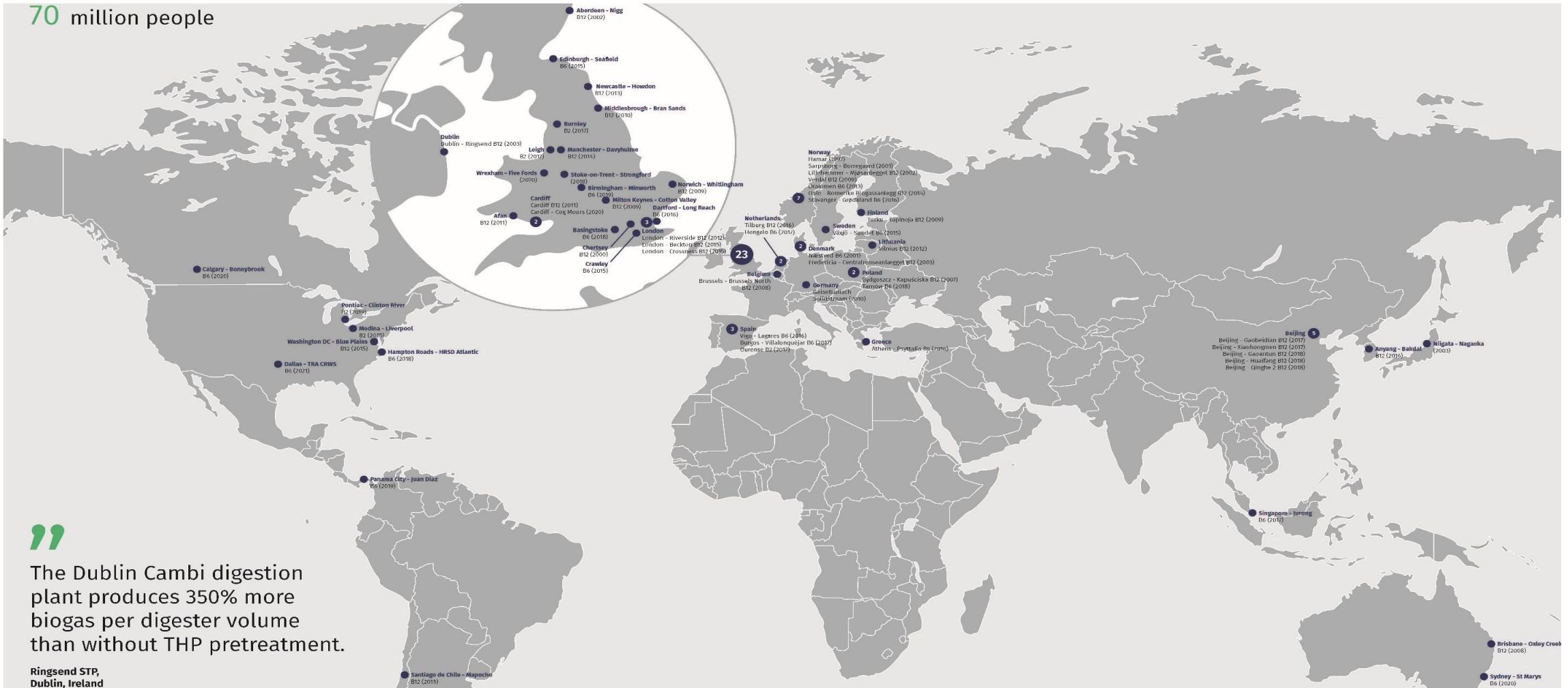
Sludge Line

Services

Cambi THP plant range

B – 2 (2 m ³ reactor)	B – 6 (6 m ³ reactor)	B – 12 (12 m ³ reactor)
		
<p>Small size projects</p> <ul style="list-style-type: none"> - Standardised package unit - pre-assembled & pre-tested - containerized unit 	<p>Medium-large size projects</p> <ul style="list-style-type: none"> - Standardised package unit - Pre-assembled skids 	<p>Extra large size projects</p> <ul style="list-style-type: none"> - custom-made - on-site construction
<p>5 – 20 tDS/day</p>	<p>20 – 80 tDS/day</p>	<p>60 – 500 tDS/day</p>

References



Plants around the world



AmperVerband - Geiselbullach

Cambi's first plant with post-digestion thermal hydrolysis (Cambi SolidStream), in operation near Munich (Germany) since 2009.

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Athens - Psyttalia

Cambi thermal hydrolysis plant in Greece, delivered to EYDAP, in operation since 2015. Operated by Aktor.

[READ MORE](#)



Dublin - Ringsend

Cambi thermal hydrolysis plant in Ireland, delivered to Celtic Anghian Water, in operation since 2002.

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Lillehammer - Mjøsanlegget

Cambi thermal hydrolysis plant for biowaste, servicing Norway's Hedmark and Oppland counties. In operation since 2001, fully refurbished in 2016.

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Oslo - Romerike Biogassanlegg

Cambi thermal hydrolysis plant for biowaste in Norway, delivered to the Waste-to-Energy Agency in Oslo, operational since 2013.

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Vigo - Lagares

Cambi thermal hydrolysis plant in Spain, delivered to Acuaes, in operation since 2016.

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Tilburg

Cambi thermal hydrolysis plant in the Netherlands, delivered to Waterchap De Dommel, in operation since 2015.

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Hamar

Cambi's first thermal hydrolysis plant, delivered to Hias IKS in Norway, in operation since 1996. Expansion and upgrade carried out in 2005.

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Drammen - Lindum

Cambi thermal hydrolysis plant in Norway, delivered to Lindum, in operation since 2012.

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Manchester - Davyhulme

Cambi thermal hydrolysis plant in England, delivered to United Utilities, in operation since 2013. Functions as sludge centre for the Manchester area.

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Chertsey

Cambi's first thermal hydrolysis plant in England, delivered to Thames Water, in operation since 1999.

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Edinburgh - Seafeld

Cambi thermal hydrolysis plant in Scotland, delivered to Scottish Water, in operation (by Veolia) since 2002.

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Kapusciska, Bydgoszcz, Poland

- Started in 2006
- CAMBI THP- B12-2
- Mixed sludge
- THP design capacity: 7,650 metric tonnes DS/year
- Digester capacity: 2 x 3,800 m³
- Grade A/pathogen-free biosolids with no odour and no re-activation/ re-growth
- Services: pre-dewatering, silo, cogeneration plant for electricity and steam, buildings and all necessary civil works



Glør, Lillehammer, Norway

- First plant in 2001
- Second plant in 2016
- CAMBI THP- B6
- Biowaste
- THP design capacity: 9800 tDS/yr
- Digester capacity: 5,000 m³
- Disposal method: Land application
- Services: Installation, Commissioning, Training



FIVE CAMBI PLANTS IN BEIJING – soon all online! 4.2 million m³/d = 4200 MLD, 6000 t of sludge/day



GAOBEIDIAN WWTP



GAOANTUN WWTP



HUAIFANG WWTP



XIAOHONGMEN WWTP



QINGHE II WWTP



Cambi THP at Blue Plains WWTP in Washington DC (USA) – 4 million p.e.

- 174 000 m³ designed originally



CANCELLED TRADITIONAL DESIGN



NEW SOLUTION

CAMBI PROCESS

CAMBI SOLUTION

- PLANNED TRADITIONAL DESIGN

- 4 digesters = 58 100 m³ (1/3 of traditional)
- Saved \$200 million CAPEX vs traditional
- Saved >\$20 mill in OPEX/year

Our Value Proposition

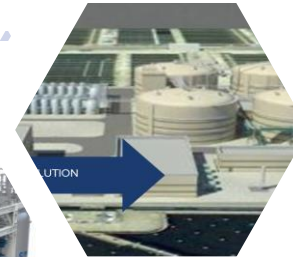
Reduce carbon footprint



Pathogen free cake



Class A Sludge

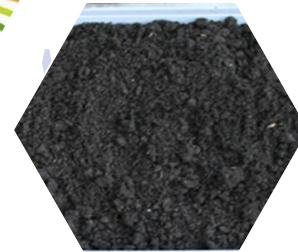


Build fewer digesters

Approach energy self-sufficiency



Increase digester capacity and renewable energy production



Reduce biosolids and cake production

THANK YOU FOR YOUR ATTENTION QUESTIONS?

