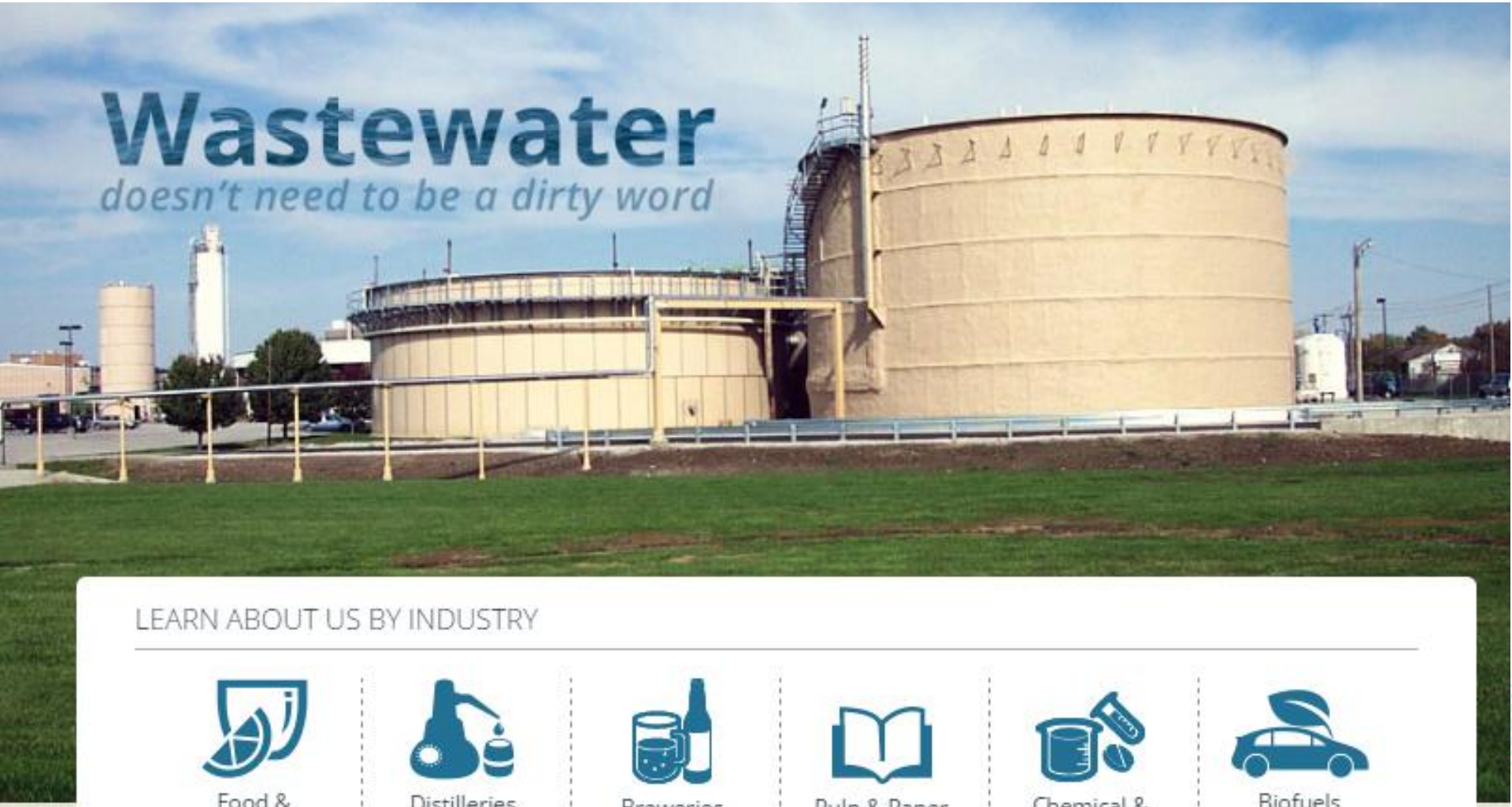
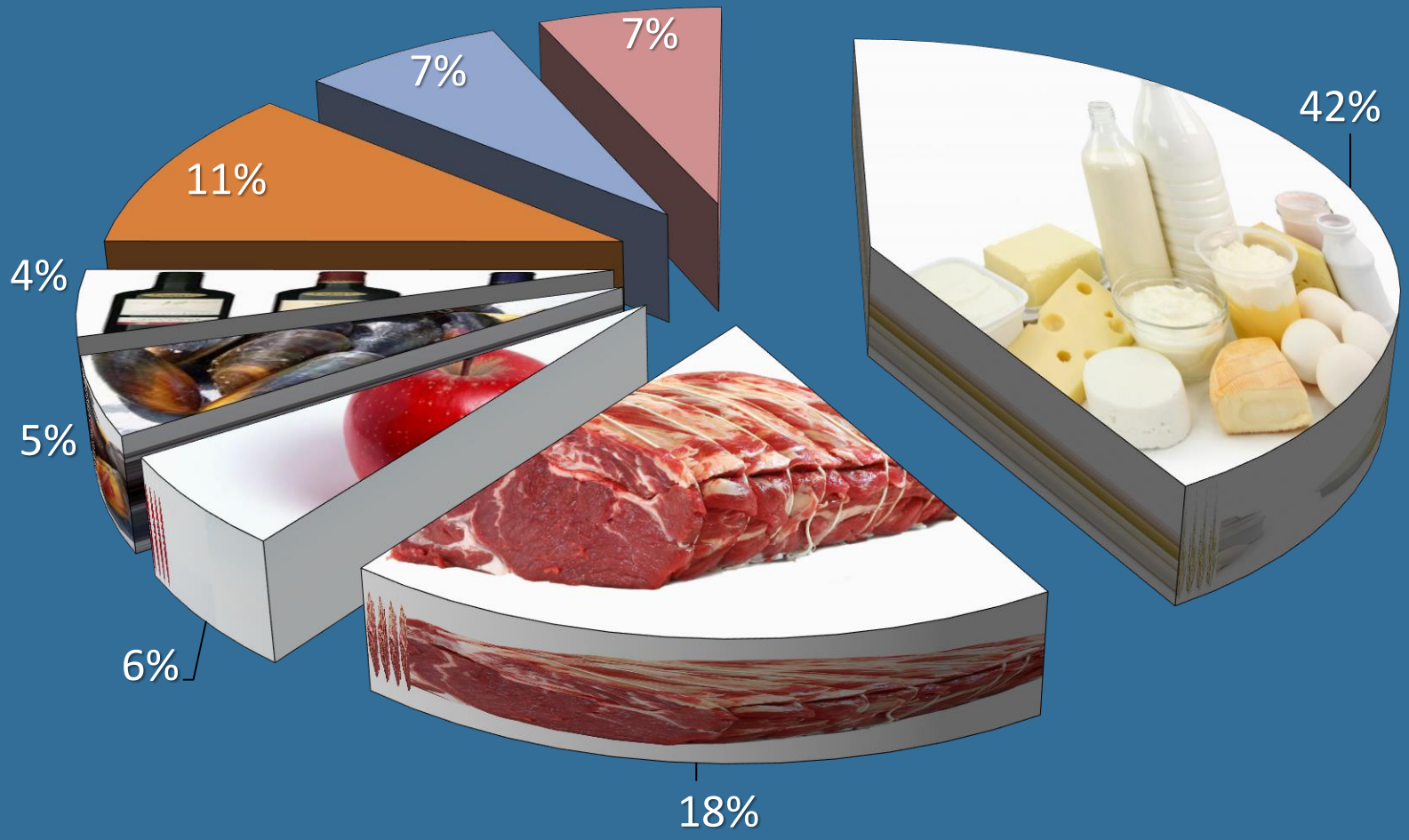
ADI Systems Asia Pacific

Alzbeta Bouskova, Ph.D

Is There Life After Daf?



>250 installations around the world

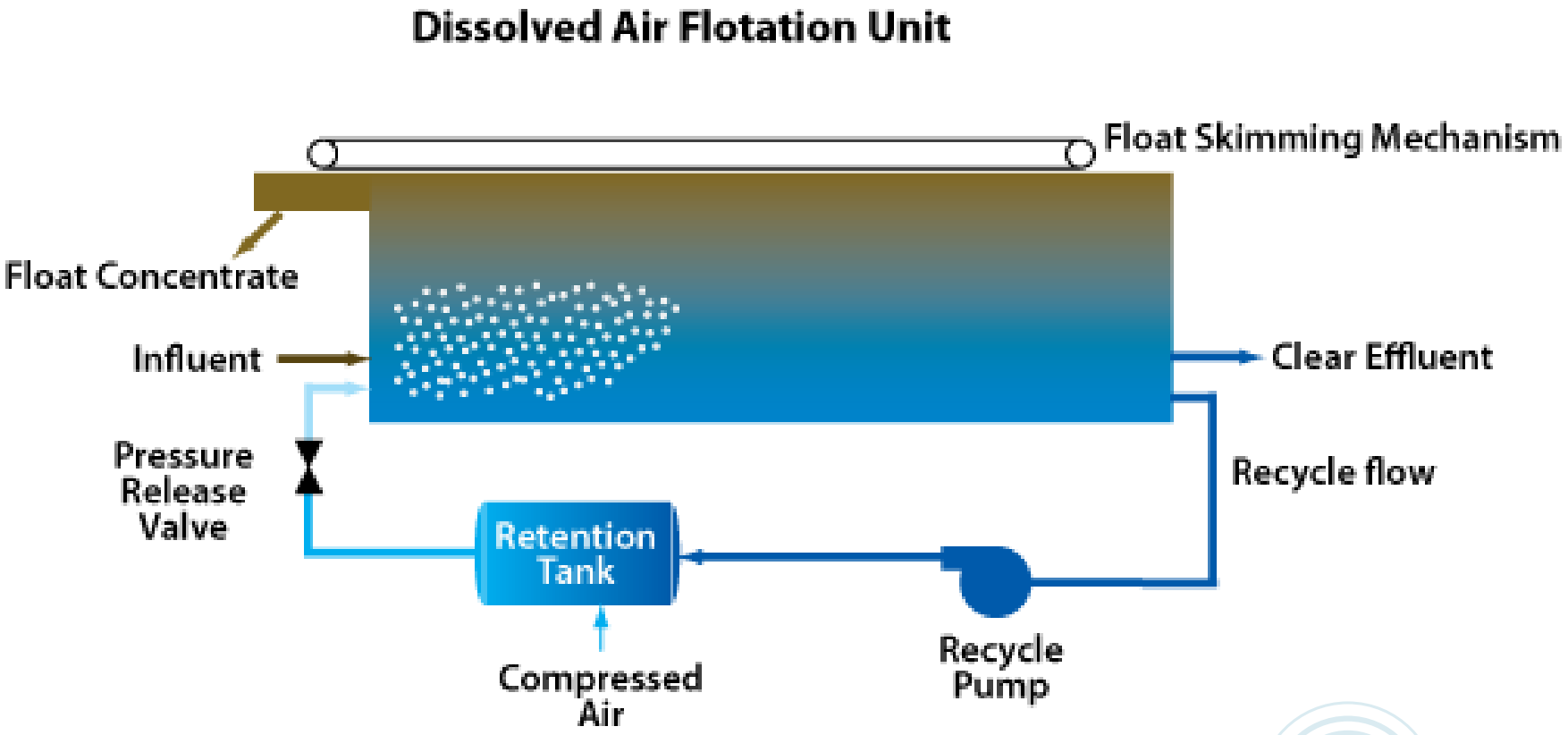


ADI Systems Asia Pacific

DAF

Dissolved Air Floatation

Photo: www.wikipedia.org



Komline-Sanderson

Photo: http://www.komline.com/images/tab_DAF_app.png

ACID, ALKALI,
Polymer,
Coagulant

WW

EQ

EFFLUENT

- Discharge
- Secondary treatment
- Land application

DAF SLUDGE

~80-95% TSS
~80-95% FOG
40-80% COD

- Landfill
- Composting
- Rendering
- Feedstock

ACID, ALKALI,
Polymer,
Coagulant

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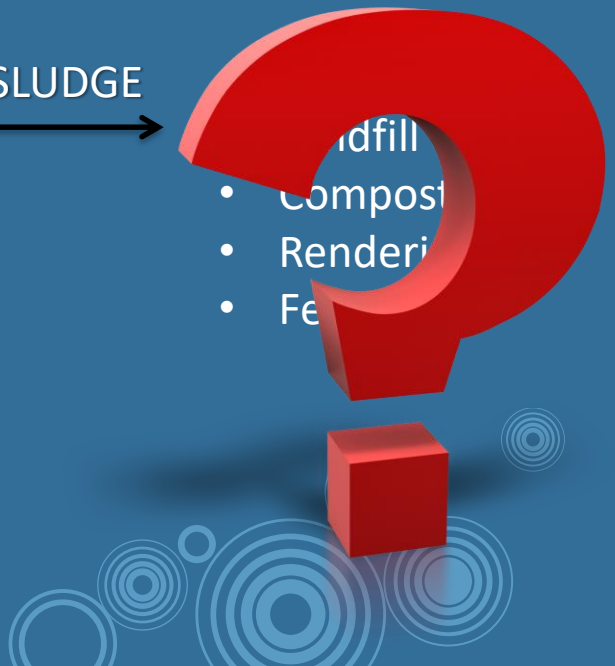
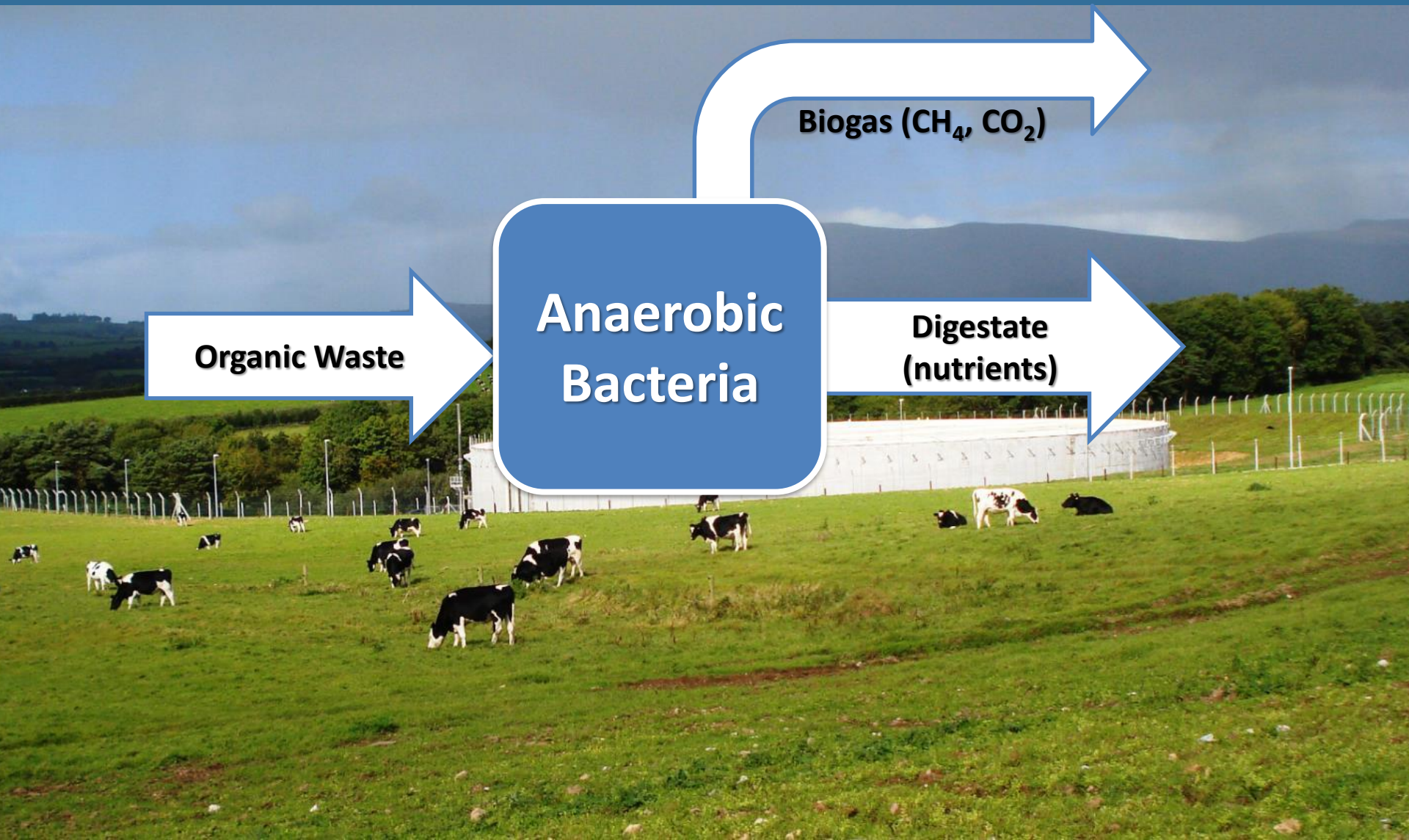
- Fe



Anaerobic Digestion

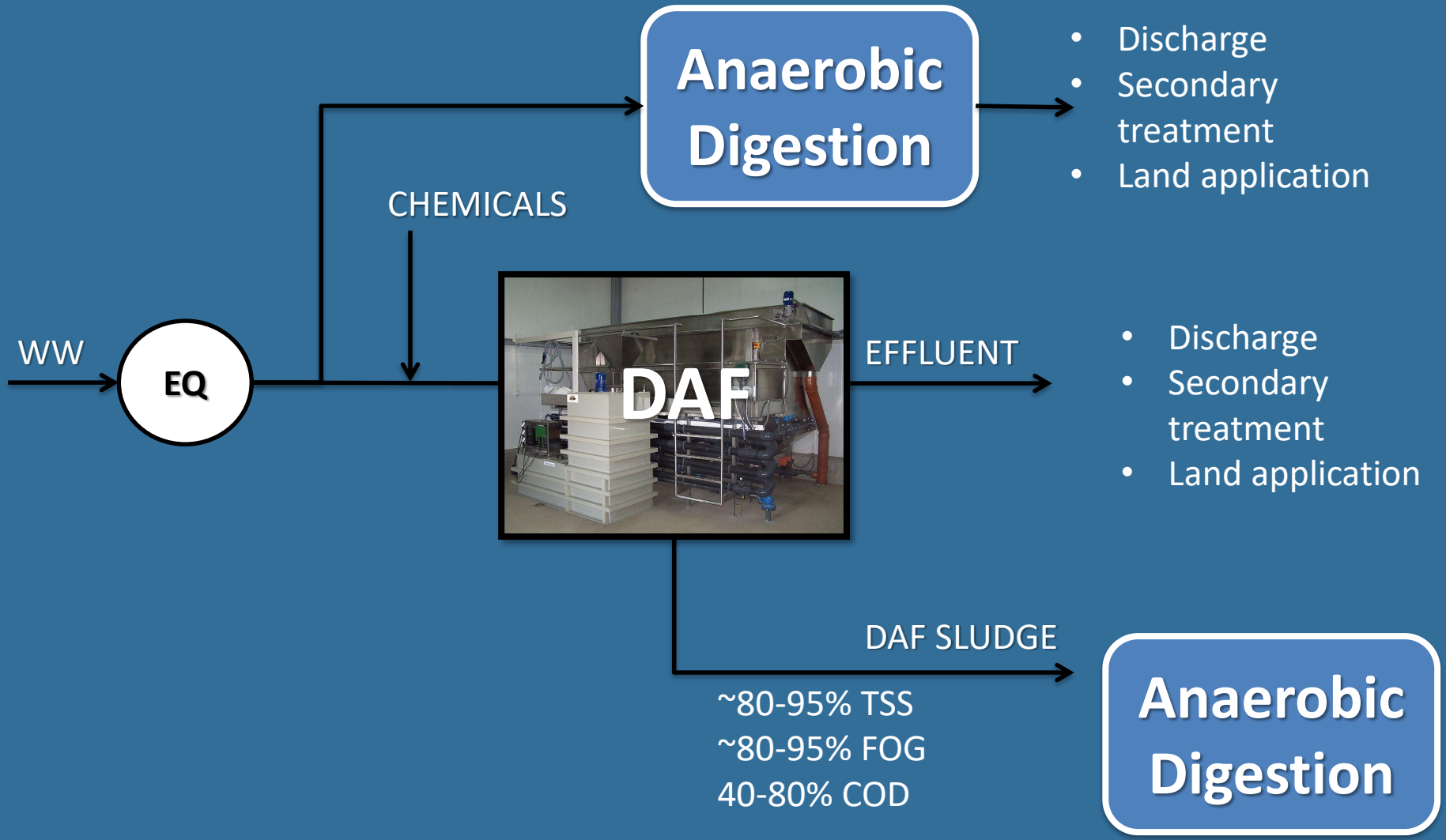



90% of energy goes into biogas
Fuel substitute

Nutrient-rich, stable Fertiliser substitute

Benefits of Anaerobic Digestion

- Energy recovery
- Waste solids reduction, sludge is stabilised
- Low energy requirement, low operating cost


Anaerobic Digestion
Discharge
Secondary treatment
Land application
CHEMICALS
WW
EQ
DAF
EFFLUENT
Discharge
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DAF SLUDGE
~80-95% TSS
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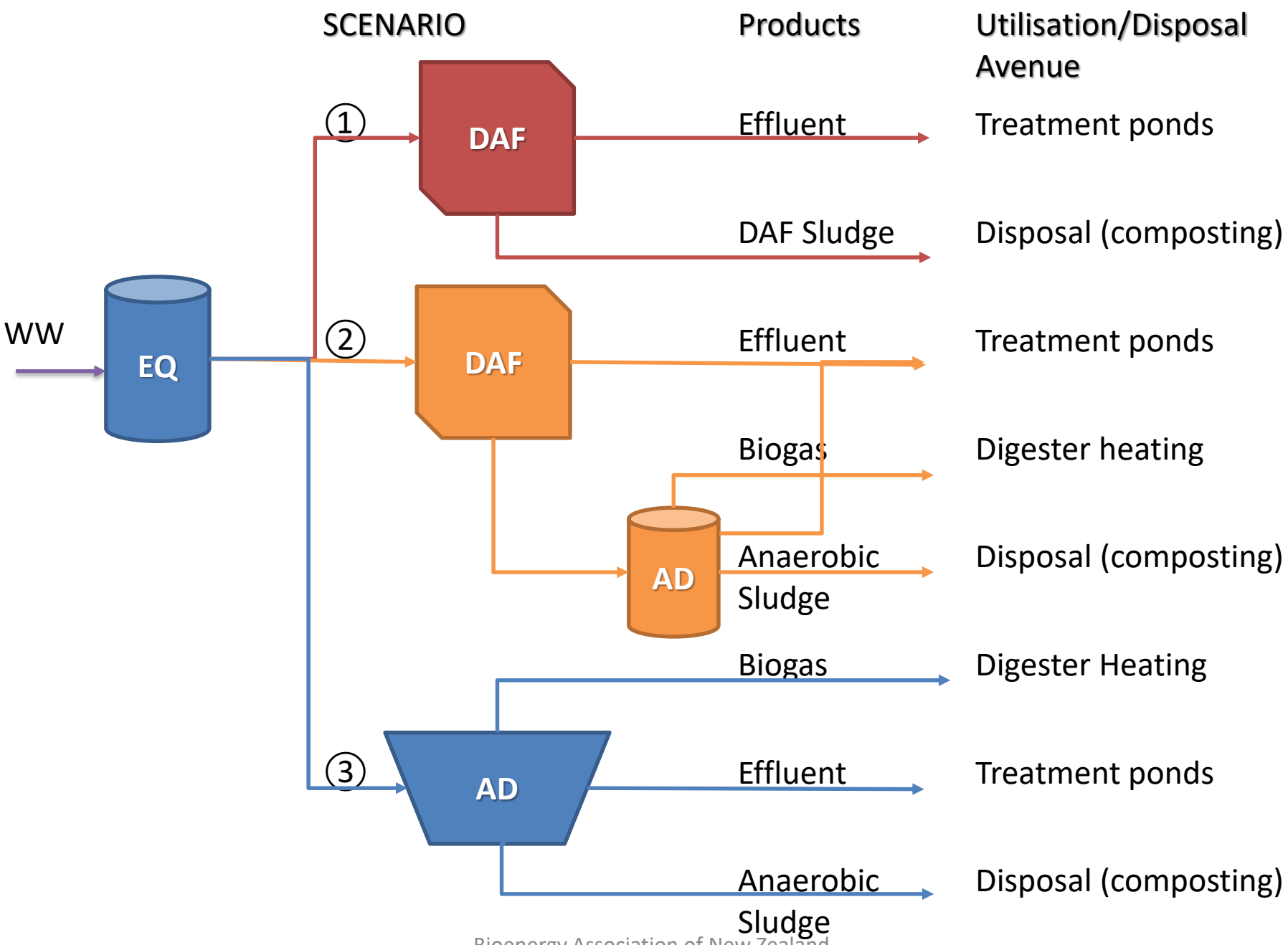
40-80% COD
Anaerobic Digestion

Case Study #1 – Milk Processing Plant

Parameter	Unit	Average	Design
Flow	m^3/d	2,700	3,600
COD	mg/l	2,600	6,600
TSS	mg/l	660	1,400
FOG	mg/l	80	180
pH	-	2-12	2-12
TN	mg/l	120	250
TKN	mg/l	50	110
Temperature	°C	15	15


SCENARIO
Products
Utilisation/Disposal Avenue
WW
EQ
①
DAF
Effluent
Treatment ponds
DAF Sludge
Disposal (composting)
②
DAF
Effluent
Treatment ponds
Biogas
Digester heating
AD
Anaerobic Sludge
Disposal (composting)
Biogas
Digester Heating
③
AD
Effluent
Treatment ponds
Anaerobic Sludge
Disposal (composting)

Case Study #1 – Basis of design

	DAF	AD
COD removal	25%	87%
TSS removal	95%	85%
FOG removal	95%	95%
Sludge moisture	95%	80%

Case Study #1 – Cost Analysis

	DAF	DAF + AD	AD
CAPEX ($) - turnkey	**3,025,000**	**6,208,000**	**8,250,000**
DAF chemicals	170,700	170,700	0
pH correction	1,043,700	1,043,700	1,700
Dewatering polymer	0	88,000	34,800
Electricity demand	225,630	317,550	121,100
Sludge disposal	868,700	96,800	38,300
Maintenance cost	7,100	14,800	15,000
Total OPEX (AUD/pa)	**2,315,830**	**1,731,550**	**210,900**

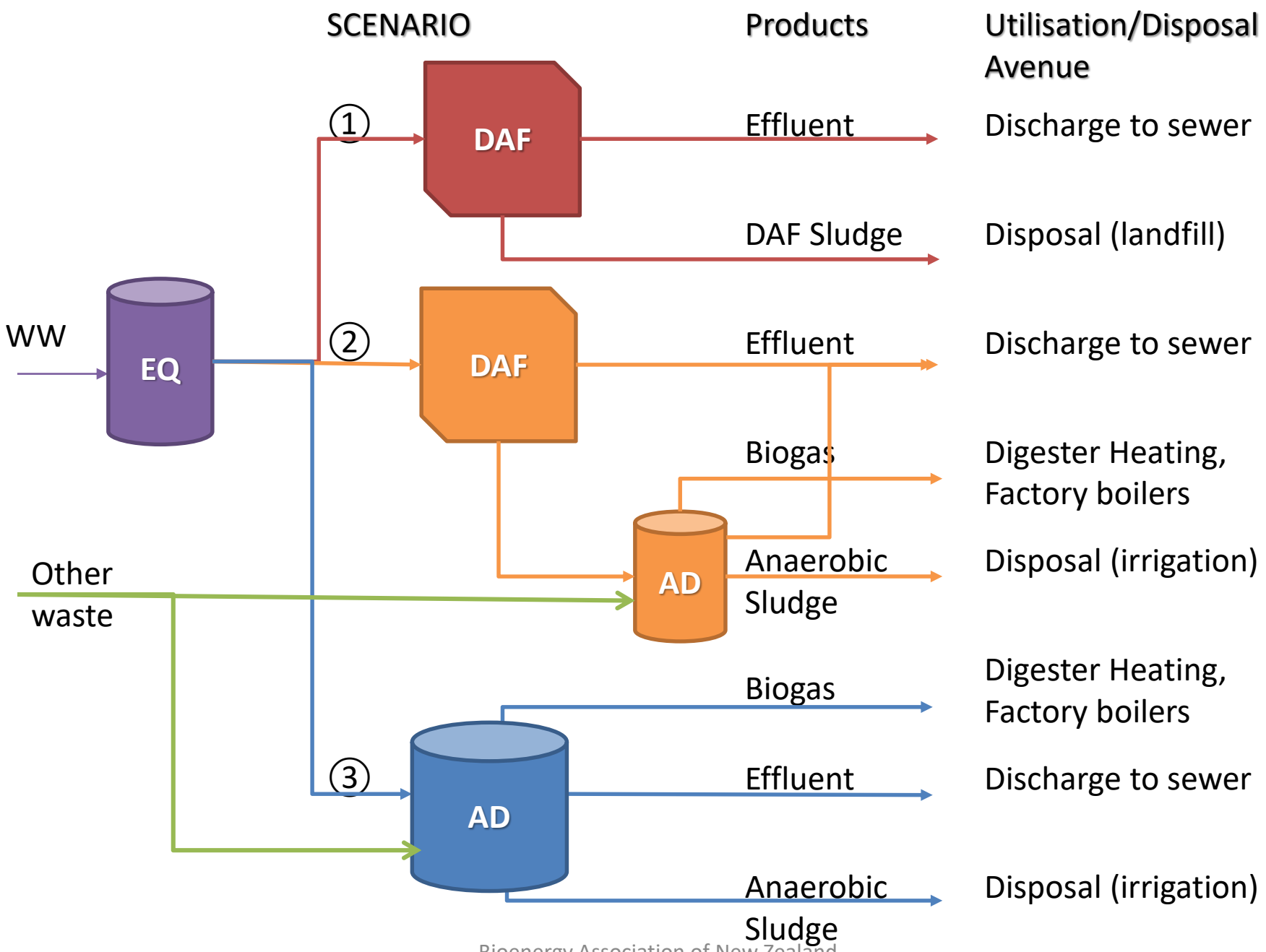
Case Study #1 – Operating Cost Savings

		DAF & AD	AD
Waste disposal	$/year	771,870	830,430
Electricity	$/year	- 91,920	104,530
Chemicals consumption	$/year	- 88,000	1,179,600
Net Savings	**$/year**	**591,940**	**2,114,560**
CAPEX	$	6,208,000	8,250,000
simple payback	year	10.34	4.04
IRR (10 years)		-1%	21%
NPV (10 years, 5%)		-1,559,200	7,693,400

Case Study #2 – Meat Processing

Parameter	DAF sludge + other waste*	Wastewater + other waste*
Flow (m^3/d)	27	2,026
COD (mg/l)	257,200	4,000
TSS (mg/l)	127,280	1,700
FOG (mg/l)	44,800	550
TN (mg/l)	8,920	110
Temperature	15-20	15-20

* - hatch waste, feed mill waste, meat waste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EQ
②
DAF
Effluent
Discharge to sewer
Biogas
Digester Heating, Factory boilers
Other waste
AD
Anaerobic Sludge
Disposal (irrigation)
Biogas
Digester Heating, Factory boilers
③
AD
Effluent
Discharge to sewer
Anaerobic Sludge
Disposal (irrigation)

Case Study #2 – Operating Cost

	DAF	AD for DAF sludge	AD for wastewater
CAPEX ($) turnkey	**existing**	**4,400,000**	**5,820,000**
DAF chemicals	150,000	150,000	0
Dewatering polymer	0	104,000	8,200
Electricity demand	31,500	92,500	52,600
Sludge disposal	499,200	36,400	54,600
Trade waste charges	1,240,000	1,2400,00	726,400
Maintenance cost	7,100	25,000	12,000
Total OPEX ($/pa)	**1,927,800**	**1,647,900**	**853,800**

Case Study #2 – Operating Cost Savings

		DAF & AD	AD
Sludge disposal	$/year	462,800	444,600
Electricity	$/year	- 61,000	- 21,100
Chemical consumption	$/year	- 104,000	141,800
Trade Waste charges	$/year	0	513,600
Biogas utilisation	$/year	144,000	178,000
Net Savings	**$/year**	**441,800**	**1,256,900**
CAPEX	$	4,400,000	5,820,000
simple payback	year	10	4.6
IRR (10 years)		0%	17%
NPV (10 years, %)		-941,464	3,700,400

Summary

- Anaerobic digestion can be a cost-effective alternative to DAF treatment
- Needs to be judged on a case-by-case basis
- Waste disposal cost is the main determinant

Anaerobic Technologies

LOW-RATE

MEDIUM-RATE

HIGH-RATE

ADI-BVF®

- Very stable operations (handles shock loads/flows)
- Handles wastes with high TSS and FOG concentrations
- Simple to operate/low manpower and O&M costs
- Typically no primary treatment needed ahead of reactor
- Provides equalisation for downstream processes
- Reduces sludge handling

125 installations worldwide


Watch this space.....

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