Innovation through Industrial Symbiosis

A Dairy Viewpoint

Richard Laxton, 29/10/15

Items

Why IS (Industrial Symbiosis) matters to us...

- Arla and the Global Picture
- Our Vision
- Collaborative working – finding the synergies
- Case studies – 19 collaborations since 1998
- Conclusions

13,400+
OWNERS

THE 5TH
LARGEST
DAIRY COMPANY

MILK INTAKE
13.4+ BILLION KILO

PRODUCTS SOLD IN
100+ COUNTRIES

Euro 10
BILLION
REVENUE

17,000+
COLLEAGUES

3.5 glasses for everyone

To the moon

x 7

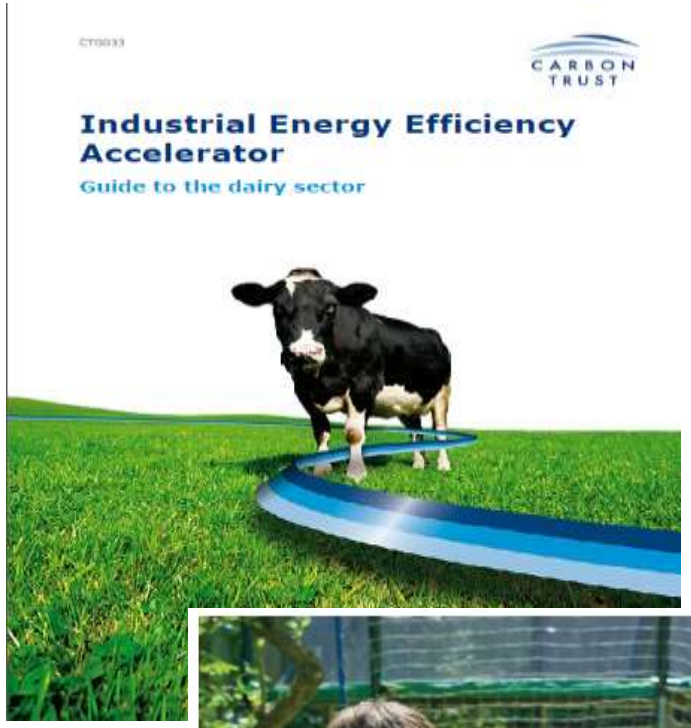
Around the world

x 47

Dairy is a global industry – and dairy is good for you

Working to a common goal is key - Dairy Sustainability Framework, Arla is a founder member

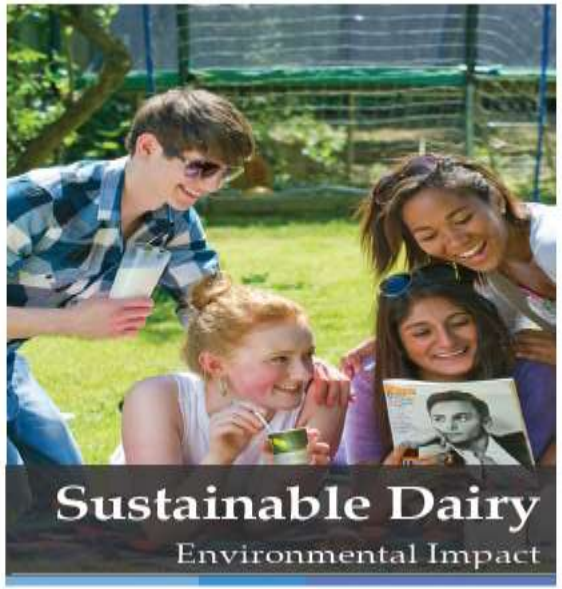
Working together in the UK and Europe



Welcome to the
European Dairy
Association

EDA is the association of the European dairy in
working on their common interests towards
stakeholders such as the EU institutions the
Commission, Parliament, Council of Ministers,
Economic and Social Committee... and the inter
bodies the Codex Alimentarius, the World Trad
Organisation.....

EDA is the platform for the European dairy indi
work together on many items like policy develop
on nutrition and health, on food safety, on
sustainability and on market management as pa
the EU Common Agricultural Policy.




Arla
“WE CANNOT CHANGE THE WORLD ON OUR OWN. HOWEVER, WE CAN, ALONG WITH OTHERS, MAKE CHANGE HAPPEN.”

Our Responsibility

"We want to grow, and we care about how we do it"

Responsible business

Business principles
Operational principles
Market conduct
Procurement

Confidence in products

Food Safety
Food & Health

Respectful relations

Workplace
Community relations
Human Rights

Care for the environment and animal welfare

Environment & Climate
Agriculture

We continually improve our environmental performance by applying **sound** and **sustainable** principles

Sustainable agriculture

Greenhouse gas emissions

Water and energy

Food waste and zero waste

A history of searching for industrial symbiosis in UK

1998 – 2009 – 9 years, 8 collaborations

- 1998 – Development of liquids crushing and recovery equipment – ET2, now Revolution. In use at 3 sites. Success
- 2000 – Local waste partnership investigated at one site. Failed. But 2011 – development of the MRF and RDF systems with waste contractors with Landfill Tax, giving zero to landfill options.
- 2007 – AD. NISP partner Biogen (UK) was identified to take Category 2 ABP in January 2007 through a NISP member, and the supply of rejected milk (with traces of antibiotic) for biogas through Biogen was started in March 2007. Success.
- 2008 - Alternative fuel systems. LNG/LBM dual fuel trucks are on the road after extensive testing in 2010 & 2011. Oil price & lack of current tax advantage an issue. Developing.
- 2008 - Microbial Fuel Cell. UoN, through NISP. Now called H2AD, progressing towards commercial reality within 18 months. Developing.
- 2009 - Reverse osmosis study with the potential to reduce water use by 50% through NISP. Installed 2011. Now built into Aylesbury 2014. Success. Water price dependent.
- 2009 - Using milk effluent in aggregate materials through NISP. Production trials have been successful and the synergy proved in 2009. But housing crash stopped demand for bricks. Failed.
- 2009 - A simple materials handling opportunity for providing pallet stability without shrinkwrap through NISP. The system is now in use, although not universal. Developing.

A history of searching for industrial symbiosis in UK

2011 – 2015 – 5 years, 11 collaborations

- 2010 - Dissolved air flotation (DAF) options without the use of chemicals to produce fats that could go for biodiesel production investigated through NISP contact. DAF installed but for efficiency, now using acid fat cracking. Failed, but developing?
- 2010 – use of recycled HDPE in milk bottles. Dairy Roadmap, 10% in 2010, 30% in 2015. Success. But: oil price collapse.
- 2010 – IEEA – Facilitated by Carbon Trust, Government program. Stalled. Still used as basis for energy opportunities. Developing.
- 2011 - Oil recovery technology (through NISP) extracting a valuable by-product from a waste stream is installed at one site, operational March 2012. Currently biodiesel, but could be plastics. Success.
- 2011 - Supply of biogas feedstock to an external facility. Cat 2 and Cat 3 ABP milk now going to GWE Biogas Driffield (NISP contact in Yorkshire). Success.
- 2011 - discussion of single stream anaerobic digestion options with a Regional Development Agency (NISP contact). RDAs were dissolved in 2011, but the concept now taken forward with installation at Aylesbury. More to follow? Developing.
- 2012 – Waste milk to fibreboard. Stalled. Failed.
- 2012-2014 – Aylesbury Dairy. A different approach. Energy requirement reduced by 50%. Success.
- 2013 – Development of Combination trailer. Extensive work across businesses. In use and expanding. Success.
- 2014 – Shift from AD to animal feed. Working with farmers and waste contractor to recover feed AND packaging at one site. EU Fusions influence. Success.
- 2014-2016 – EPS. Developing the use of milk wastes from separator flushes. UoB through ex NISP contact. Developing.

The Criticality of Driving IS

The IS genie is out. Let's work together. But we need help to drive forward.

Chart showing stakeholder engagement by number of projects

Interaction	Arla	Business 2,3	Government	Govt / external Finance availability	Government assisted Agency (e.g ISL, NISP, KTP)
Successes	9	9	5	4	9
Developing	6	6	2	3	4
Failures	4	4			

Note: Successes appear directly related to assistance by IS agency, with some State sponsoring and seeding

We cannot change
the world on our **own**.
However, we can,
along with other players,
make **change happen** over
time.

Thank You for listening

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