

# 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

## The Dairy Sustainability Framework Vision

A vibrant dairy sector committed to continuously improving its ability to provide safe and nutritious products from healthy cattle, whilst:

1. Preserving natural resources
2. Ensuring decent livelihoods across the country

### The Principles of the Dairy Sustainability Framework

The DSF is not a 'standard' nor a 'tick box' exercise, it is a collaborative approach to delivering its vision of global sustainability with three guiding principles:



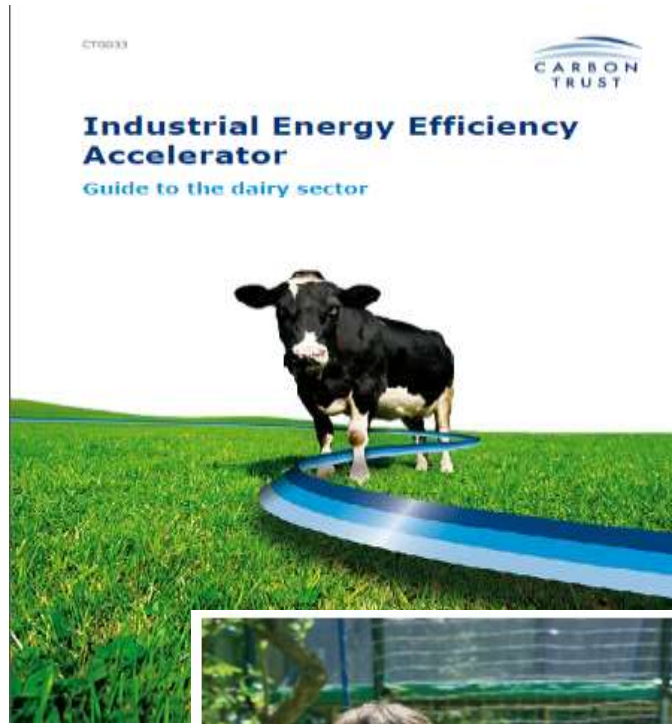
## Sustainability Criteria and Strategic Intent

The DSF is focused on eleven key, globally-applicable sustainability Criteria and outlines the high level objective (Strategic Intent) that the dairy sector commits to working towards for each of these Criteria.

After the prioritisation process is complete, projects will be established to work on the most urgent Criteria in a manner that will achieve the Strategic Intent for each of the prioritized Criteria.

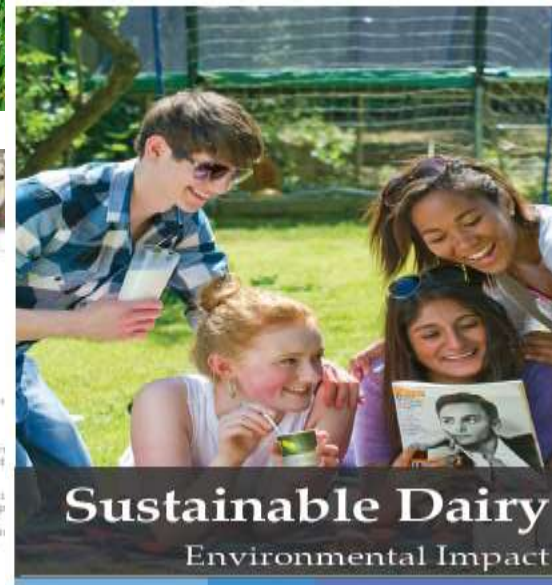
- Greenhouse Gas Emissions**  
GHG emissions across the full value chain are quantified and reduced through all economically viable mechanisms.
- Soil Nutrients**  
Nutrient application is managed to minimize impacts on water and air, while maintaining and enhancing soil quality.
- Waste**  
Waste generation is minimized and, where unavoidable, waste is reused and recycled.
- Water**  
Water availability, as well as water quality, is managed responsibly throughout the dairy value chain.
- Soil**  
Soil quality and retention is proactively managed and enhanced to ensure optimal productivity.
- Biodiversity**  
Direct and indirect biodiversity risks and opportunities are understood, and strategies to maintain or enhance it are established.
- Market Development**  
Members along the dairy value chain are able to build economically viable businesses through the development of transparent and effective markets.
- Rural Economies**  
The dairy sector contributes to the resilience and economic viability of farmers and rural communities.
- Working Conditions**  
Across the dairy value chain, workers operate in a safe environment, and their rights are respected and promoted.
- Product Safety & Quality**  
The integrity and transparency of the dairy value chain is safeguarded, so as to ensure the optimal nutrition, quality, and safety of products.
- Animal Care**  
Dairy animals are treated with care, and are free from hunger and thirst, discomfort, pain, injury and disease, fear and distress, and are able to engage in relatively normal patterns of animal behavior.

# Working together in the UK and Europe



## Welcome to the European Dairy Association

EDA is the association of the European dairy producers working on their common interests towards stakeholders such as the EU institutions, the Commission, Parliament, Council of Ministers, Consumers and Social Committees... and the wider bodies: the Codex Alimentarius, the World Trade Organization...  
EDA is the platform for the European dairy to work together on matters like policy development on nutrition and health, on food safety, on sustainability and on market management as at the EU Common Agricultural Policy.





**“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



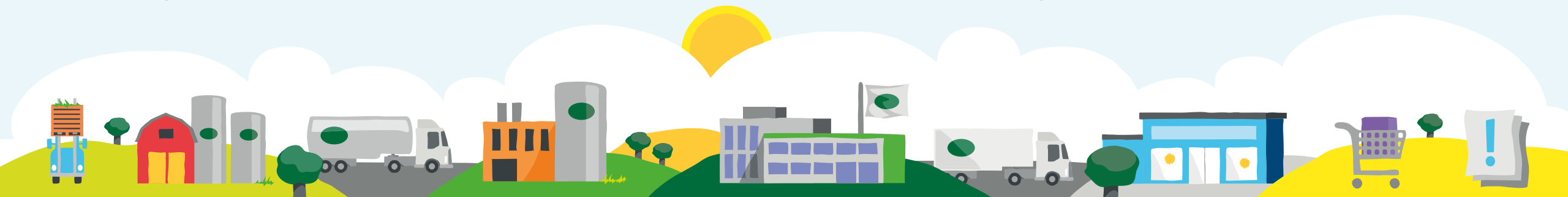
Greenhouse gas emissions



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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