CLIMATE CHANGE AND MILK
– the carbon footprint of dairy products

Many small steps towards more climate-friendly dairy products

Consume and society in general are increasingly focusing on the climate impact of food and food consumption. A number of countries already require Arla’s products to carry a climate label – a carbon footprint – to enable consumers to make climate-friendly choices when shopping.

As we wish to meet the demand for climate-friendly products, we have been researching into climate-friendly milk production for several years and have worked dedicatedly to reduce greenhouse gas emissions – from cow to consumer – in order to reduce milk’s overall carbon footprint.

We would like to share our knowledge with milk producers and provide them with the opportunity to reduce the climate impact from their farms. As a result, we have compiled a number of facts in this folder for information and inspiration.

What is a carbon footprint?

The carbon footprint concept is used internationally – to express how much greenhouse gases a product emits throughout its life cycle. Methane (CH₄), nitrous oxide (N₂O) and carbon dioxide (CO₂), the three most important greenhouse gases, impact on the climate in different ways. To facilitate calculation, the impact from individual gases is converted into carbon dioxide’s effect. According to this model, one kilogram (kg) of nitrous oxide has the same impact on the climate as 298 kg of carbon dioxide, while one kg of methane is the equivalent of 25 kg of carbon dioxide.
It is inevitable that during food production, climate-impacting greenhouse gases are emitted throughout the whole production chain from cow to consumer.

According to the UN’s Food and Agriculture Organisation, FAO, the production of milk and dairy products accounts for 2.7 per cent of global emissions of greenhouse gases. Emissions, however, vary worldwide. Milk production in Northern Europe, for instance, is highly efficient. Arla’s climate impact per litre milk, therefore, is relatively low compared to dairies in other parts of the world.

The greatest potential is in agriculture
During the life cycle of dairy products — from cow to consumer — between 80 and 90 per cent of all greenhouse gas emissions derive from farms and the cows that supply the milk. As a result, methane gas, which mainly derives from the cow’s digestive process, accounts for 40–60 per cent of milk’s total climate impact, while nitrous oxide accounts for 20–35 per cent and carbon dioxide for 15–30 per cent.

The potential for reducing milk’s carbon footprint is, therefore, greatest within agriculture. By contrast, this is where the greatest uncertainty associated with emissions exists since the release of methane and nitrous oxide is difficult to measure and influence.

As there is great variation between the farms, the potential for reducing greenhouse gases varies from farm to farm.

**WHAT CAN WE DO ON THE WAY FROM DAIRY TO CONSUMER?**

**Production at the dairy**
(potential: 6–7 per cent reduction)
- use energy more efficiently
- increase the use of sustainable energy sources such as biogas, biomass, hydropower and wind energy to replace fossil fuels
- invest in new technology.

**Transport**
(potential: 1–3 per cent reduction)
- train drivers to drive their vehicles in an environmental-friendly way
- switch to biofuels, e.g. biodiesel based on slaughterhouse waste and biomethane from food waste digestion
- increase efficiency by improving route planning and use larger vehicles to reduce trips.

**Packaging**
(potential: 1–3.5 per cent reduction)
- reduce the amount of packaging materials
- use recyclate in packaging materials
- use environmental-friendly (carbon neutral or “green”) materials.

**WHAT WE’VE ACHIEVED SO FAR:**
In the production, transport and packaging areas, we have reduced CO₂ emissions by 5.5 per cent compared to 2005. Here are some examples:

**PRODUCTION**
- At Holstebro dairy we have saved 870 tonnes CO₂ emissions per year, equating to around 75 households’ annual emissions by replacing an old ice water machine with a more environmental-friendly model.
- Through increased focus on harnessing energy efficiently, Arla Foods Ingredients has saved 10 per cent of the total energy use at the four Danish milk powder factories in just three years.

**TRANSPORT**
- At several distribution centres in Sweden and Denmark, we have changed our procedures for loading lorries and the amount of product per lorry. At the export terminal in Vejle, this has resulted in a fall in diesel consumption of 9 per cent.
- We train drivers in environmentally-friendly driving in all core markets.
- In the UK, our lorries run on a mixture of biofuel and diesel. The mixture is already used in Sweden and it is being tested in Denmark.

**PACKAGING**
- In the UK, we have saved around 1,100 tonnes plastic in the three years between 2006-2009 by making milk bottles lighter. At the same time, the bottles contain 10 per cent recycled plastic. The screw tops have also become lighter, thus saving around 180 tonnes plastic per year.
- Our organic range, Arla Harmonie® now has more climate-friendly packaging with less cardboard and produced with less environmental impact. This saves us 4,000 tonnes CO₂ per year.
HOW CAN AGRICULTURE PLAY ITS PART?

Feed (potential: 2.5–10 per cent reduction)
- minimise feed waste
- increase feed efficiency by optimising the energy and protein content in feed
- ensure a diverse crop rotation with grass/clover
- use more locally produced feed
- store more carbon in the soil – by means of perennial crops and permanent pasture.

Energy use at the farm (potential: 2.5–10 per cent reduction)
- reduce energy use (e.g., electricity and diesel)
- increase the use of sustainable energy, e.g., wind energy and biofuel to replace fossil energy sources
- residue products such as straw and energy crops such as willow as an energy source.

Fertiliser (manure and commercial fertiliser) (potential: 2.5–5 per cent reduction)
- optimise consumption relative to need
- use commercial fertiliser produced in an environmentally way with a low carbon footprint
- spread fertiliser at the optimum time and with the best technology.

Biogas (potential: 5–10 per cent reduction)
By using cow manure in biogas systems it is possible to:
- reduce emissions of greenhouse gases associated with the storage of cow manure
- improve the quality of fertiliser (easily convertible nitrogen in degassed manure)
- replace fossil energy sources.

EXAMPLES OF ARLA’S INITIATIVES WITHIN AGRICULTURE:

- We have employed a PhD student who is researching into climate friendly milk production and is helping to identify the opportunities for reducing our climate impact.
- Together with the University of Aarhus’ Faculty of Agricultural Sciences, Danish Cattle Federation and AgroTech, we have launched a research project that charts the emission of greenhouse gases in the value chain from field to dairy.
- In Sweden, wood chips from the forests are used as fuel at Vimmerby dairy.
- In Denmark, we are planning to work with our owners to produce biogas from cow manure. The energy will be used at Arla’s own dairies.
- Biogas is already being produced from farm material. In Falkenberg in Sweden, for instance, several Arla farms supply manure to an energy company. When the biogas is extracted, the manure is transported back to the farms to be spread on the fields. The nutrients are retained, but the manure emits fewer greenhouse gases – and there is no odour.

What is milk’s overall climate impact?

Milk’s carbon footprint (from cow to consumer)

Source: A publication about food and the environment from 2002. LRF Sweden).
Milk’s impact on the climate

NATIONAL OBJECTIVES CONCERNING GREENHOUSE GASES

DENMARK

The government’s target to 2020 is to have reduced greenhouse gas emissions in the non-ETS sectors – including agriculture – by at least 20 per cent compared to 2005 levels. Greenhouse gas emissions in Danish agriculture have fallen from 13 million tonnes per year in 1990 to 9.9 million tonnes in 2008, i.e. 24 per cent.

SWEDEN

The government’s target to 2020 is to reduce greenhouse gas emissions in the non-ETS sectors – including agriculture – by 40 per cent compared to 1990. A Swedish study shows that industry’s emissions of greenhouse gases were reduced by 17 per cent between 1990-2005. Since 2005, emissions have been reduced by approx. 1 per cent per year.

UK

The government’s target for the period 1990–2020 is to reduce greenhouse gas emissions from milk production by 20–30 per cent. In addition, sustainable energy sources will account for 40 per cent of energy use on farms in 2015.

ARLA’S GREENHOUSE GAS TARGETS

OUR CLIMATE TARGET is to reduce our direct and indirect CO₂ emissions by 25 per cent within production, transport and packaging between 2005–2020. In agriculture, we work with our owners, research institutions and industry associations to reduce greenhouse gas emissions from livestock as much as possible.

EXAMPLES OF CLIMATE INITIATIVES IN ARLA’S EUROPEAN MARKETS:

SWEDEN

The organisations behind the organic label KRAV and the quality mark Svenskt Sigill are considering integrating climate criteria into their labelling systems over the next few years. Milk is expected to be included from 2011.

UK

With effect from August 2009, Tesco, one of Arla’s major customers, has decided that a number of products, including milk, should carry carbon footprint labelling.

FRANCE

According to French legislation, producers must provide details about their products’ carbon footprint through labelling, signs etc. from January 2011. Work on climate labelling has been ongoing since 2007 and several supermarket chains are currently running pilot projects in which milk carries a carbon footprint label.