Perspectives series
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Improving profitability by cutting refrigeration costs and food waste

Powering a sustainable future for cold chain

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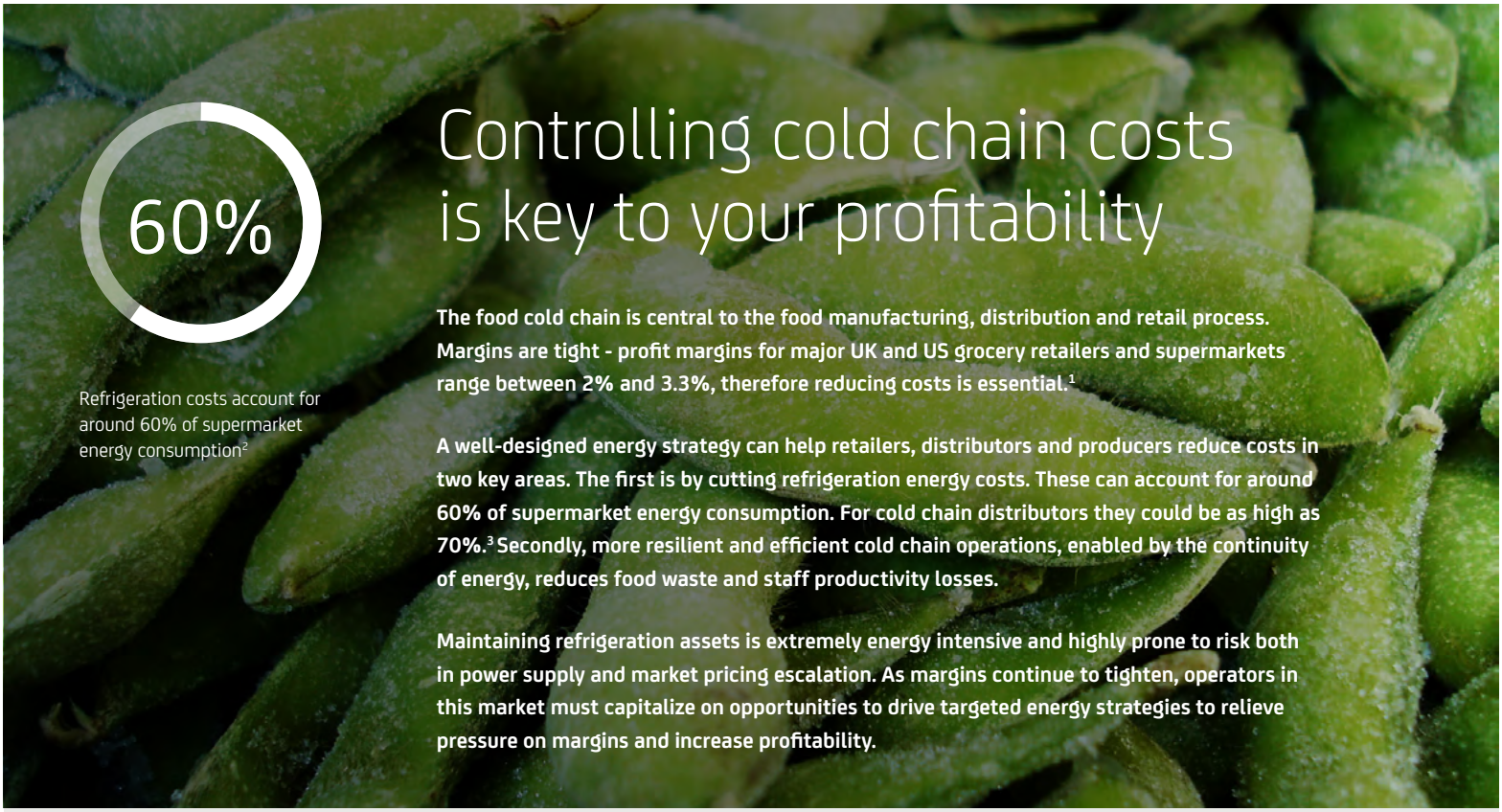

60%

Refrigeration costs account for around 60% of supermarket energy consumption[2]

Controlling cold chain costs is key to your profitability

The food cold chain is central to the food manufacturing, distribution and retail process. Margins are tight - profit margins for major UK and US grocery retailers and supermarkets range between 2% and 3.3%, therefore reducing costs is essential.[1]

A well-designed energy strategy can help retailers, distributors and producers reduce costs in two key areas. The first is by cutting refrigeration energy costs. These can account for around 60% of supermarket energy consumption. For cold chain distributors they could be as high as 70%.[3] Secondly, more resilient and efficient cold chain operations, enabled by the continuity of energy, reduces food waste and staff productivity losses.

Maintaining refrigeration assets is extremely energy intensive and highly prone to risk both in power supply and market pricing escalation. As margins continue to tighten, operators in this market must capitalize on opportunities to drive targeted energy strategies to relieve pressure on margins and increase profitability.

Growing opportunities mean new challenges for you

Demand for fresh, chilled and frozen food is rising. The cold chain Logistics and Storage industry is worth around $230bn globally[4] and growing fast. The US frozen food market is expected to grow from almost $52bn in 2015 to over $70bn by 2024.[5]

However, as demand rises, so does the need for reliable and efficient refrigerated storage. Costs to purchase and run refrigeration equipment are already high – and growing. By 2021, global cold-chain biopharma logistics spending will expand 38% to more than $16bn.[6]

There are other pressures. Firstly, consumers are demanding faster 'farm to fork' times, driving the need for automation. Secondly, tighter environmental and food safety regulations place new demands on the cold chain, with companies risking severe penalties for non-compliance. Indicative of this is the push by US regulators to phase out high greenhouse gas (GHG) refrigerants and transition facilities to lower GHG equivalents, using natural refrigerants such as CO_2 systems.

Food waste due to refrigeration failure eats into margins. Around 30% of food produced for human consumption globally is lost or wasted along the supply chain.[7] Even at leading retailers with "less than 1% of food wasted," this amounts to 53,000 tons a year, a significant hit to the bottom line. In the US, food waste costs the economy $218bn annually.[8]

The prize for overcoming these hurdles is a bigger slice of the growing chilled and frozen food retail spend. But in a market where profit margins are already thin, the journey has its risks.

You need ways to meet growing demand and market pressures while maintaining profitability – energy has a key role to play. Energy should not be considered an ever-escalating cost, but a strategic asset.

UPTO 3.3%

Profit margins for UK and US grocery retailers and supermarkets[9]

60%

of supermarket energy consumption is by refrigeration[10]

$53bn

US frozen food sales grew from $50bn in 2013 to nearly $53bn in 2016[11]

50x

A $1 saving in energy is equivalent to increasing sales by $59[12]

30%

of food is lost or wasted through the food supply chain[13]

The wide-ranging impact of energy in the cold chain

Energy costs associated with refrigeration are already high, and with prices set to rise even further, driving energy efficiency and adding on-site generation is vital to help cold chain retailers, distributors and producers improve tight margins. An effective strategy for sourcing and managing energy can help enhance the profitability of companies at all stages of the cold chain. By reducing energy consumption, optimizing usage and improving system resilience, firms can save refrigeration costs, reduce costly waste of goods, and prevent downtime.

Efficient technologies to reduce energy bills

More efficient equipment and energy technologies, including on-site generation, renewables, energy insights, and monetization of energy resources, offer numerous opportunities to reduce energy bills and improve system resilience.

For example, Trigeneration capabilities (Combined Heat and Power generation units with absorption chillers) reduce energy usage and costs within facilities with significant refrigeration requirements and improve resilience by reducing dependency on the grid. Ornua Foods achieved cost savings of $41,800 per year and reduced carbon emissions by 476 tons following the installation of a new CHP plant.

Introducing energy efficiency solutions such as LED Lighting and an effective Building Management System can also help to reduce the overall energy consumption of a cold chain facility. Solar and energy storage solutions leverage large roof spaces to further cut demand for grid power and clip outsized electricity demand charges.

Energy optimization solutions, such as Demand Response, also help to reduce net energy costs by optimizing assets such as refrigeration units and on-site energy equipment, to minimize consumption and generate revenues from the grid.

Case study: By implementing a Demand Response solution, a US supermarket chain reduces its electricity load by 5MW and generates average annual revenue of $250K to offset their energy costs.

Improved system resilience for quality and compliance

Eliminating food waste and cost of goods can have a significant impact on costs. Greater energy resilience reduces waste from refrigeration failures, reduces food safety and quality issues and cuts environmental incidents, which could threaten your reputation and mean lost customers and fines.

On-site generation and storage solutions reduce the risk of power outages by reducing dependency on the grid, which in many areas can be unreliable.

Energy insight solutions can also help improve resilience by providing early warning of potential equipment failures. Energy sensors can identify malfunctioning equipment, enabling swift action to reduce energy risk and limit spoilage.

Securing a more flexible and reliable energy supply also supports the increasing need for automation to accelerate delivery timescales through the cold chain.

Maintaining for lower energy consumption

Effective maintenance and design of refrigeration units also impacts energy consumption. An effective Energy Management Program should include monitoring of all cold chain facilities to identify and replace or repair equipment with an excessive load profile, which will reduce of operational and maintenance costs.

A 2015 report found that "savings of 30-40% were achievable by optimizing cold store usage, repairing current equipment and retrofitting energy efficient equipment."[14]

Overcoming the barriers to lower costs

Taken together these measures not only reduce energy costs, food waste and chiller downtime, but also lower a company's carbon footprint – helping meet consumer, regulator and stakeholder demands for improved sustainability.

However, one of the key challenges to implementing an energy strategy can be a lack of the necessary experience, skills, resource gaps and capital to deploy more efficient, integrated energy solutions.

Cold chain operators should therefore explore opportunities to work with energy companies that deliver 'end-to-end solutions' and flexible funding options, to take advantage of these new energy opportunities – and maintain profitability.

US $30 billion

US storage facilities have the highest energy demand of any US industrial category, consuming over US$30bn of power every year[15]

$200K

For an average, 50,000 square foot supermarket store, annual energy costs are more than $200K and 1,900 tons of CO_2 are emitted into the atmosphere[16]

75%

A UK dairy that processes 35 million litres of milk per year is using a 190 kWe CHP Biogas unit to help generate 75% of the site's energy via an Anaerobic Digestion system. The dairy is aiming to reduce CO2 emissions by 1,200 tonnes per year

1 IBIS World data, June 2018
2 https://www.dexma.com/energy-saving-solutions-for-supermarkets/
3 https://www.dexma.com/energy-saving-solutions-for-supermarkets/
4 http://www.coldchainhub.org/2015/03/
5 https://www.grandviewresearch.com/industry-analysis/us-frozen-food-market
6 http://pharmaceuticalcommerce.com/brand-marketing-communications/2017-coldchain-outlook/
7 FAO. 2015. Global Initiative on Food Loss and Waste Reduction. Rome, FAO. (also available at http://www.fao.org/3/a-i4068e.pdf
8 https://www.biologicaldiversity.org/programs/population_and_sustainability/grocery_waste/pdfs/CheckedOut.pdf
9 Stats based on IBIS World figures for UK and US supermarkets – CBS – Analysis & Statistics excel spreadsheet – June 2018
10 https://www.dexma.com/energy-saving-solutions-for-supermarkets/
11 The Retail Gazette - https://www.retailgazette.co.uk/blog/2018/01/frozen-food-retail-sales-up-6-per-cent/
12 https://www.energystar.gov/sites/default/files/buildings/tools/SPP%20Sales%20Flyer%20for%20Supermarkets%20and%20Grocery%20Stores.pdf
13 FAO. 2015. Global Initiative on Food Loss and Waste Reduction. Rome, FAO. (also available at http://www.fao.org/3/a-i4068e.pdf
14 http://www.cold.org.gr/library/downloads/Docs/Specific%20energy%20consumption%20values%20for%20various%20refrigerated%20food%20cold%20stores.pdf
15 https://www.supplychaindive.com/news/how-cold-storage-3pls-reduce-energy-costs-infreezers/518632/
16 https://www.energystar.gov/sites/default/files/buildings/tools/SPP%20Sales%20Flyer%20for%20Supermarkets%20and%20Grocery%20Stores.pdf

What do you need to do?

With our experience of working with cold chain companies across retailers, distributors and producers, Centrica Business Solutions has identified the energy strategies that should be prioritized to maximize profitability:

- **Improve visibility of energy usage** to enable waste and inefficiencies to be identified and enhance energy usage
- **Maximize energy efficiency to reduce refrigeration costs** and improve margins
- **Improve energy resilience** by generating your own power, on site to minimize outages and food wastage
- **Comprehensive energy management for operations and maintenance** to ensure 24/7 operations. Consider outsourcing energy management to reduce demands on in-house teams
- **Optimize energy assets** to reduce costs and drive additional revenue

Our solutions

Centrica Business Solutions can help cold chain companies with:

- **Energy insights and analytics** to identify opportunities to improve energy efficiency and provide early warning of refrigeration failures
- **Efficient renewable technologies** such as solar reduce energy costs and carbon emissions from refrigeration
- **On-site generation** including CHP reduce exposure to grid failures and ensure secure, scalable energy supply
- **Optimization solutions** including demand response to optimize your energy assets, including your refrigeration units, reducing your net energy spend
- **Operations & Maintenance** support of energy assets ensures the reliability of your infrastructure
- **Flexible funding models** remove the barriers to deploying new energy technologies

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