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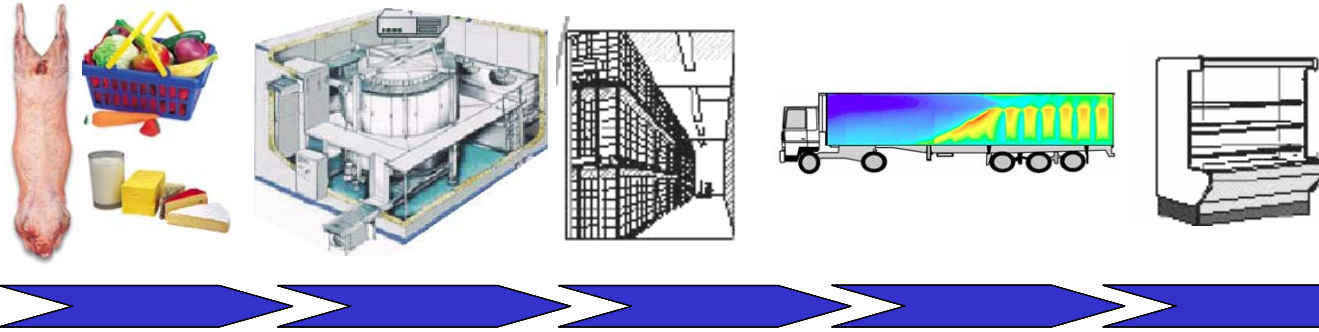
Where is the greatest potential for energy saving?

National Motorcycle Museum

3rd April 2009



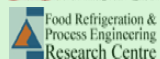
Energy mapping - refrigeration



	Chilling	Freezing	Thawing Tempering	Secondary cooling	Chilled Storage	Frozen Storage	Transport	Retail	Catering
Energy used									
Throughput									
Energy change in food									
Efficiency									
Energy that could be saved									

Top 10 in saving potential (GWh/y)

	Sector	Energy	Savings
1	Retail	12,700	6,300
2	Catering - kitchen refrigeration	4,000	2,000
3	Transport	4,800	1,200
4	Cold storage	900	360
5	Blast chilling - ready meals, etc	610	180
6	Blast freezing - potato products	420	130
7	Milk cooling - raw milk on farm	320	100
8	Dairy processing - milk/cheese	250	80
9	Potato cooling/storage	190	60
10	Chilling - meat carcasses	140	40



1 - Retail display

- **12,700 GWh/y**
- **Data sources**
 - **Market Transformation Programme**
 - **FRPERC test data**
- **Estimate of cabinets in use - agreement**
- **Average energy consumption - variable**



2 - Catering – kitchen refrigeration

- **4,000 GWh/y**
- **Data sources**
 - **Market Transformation Programme**
 - **FRPERC test data**
- **Commercial service cabinets**
- **Walk-in cold rooms**



3 - Refrigerated transport

- **4,800 GWh/y**
- **Data sources**
 - **Food Storage & Distribution Federation**
 - **Brunel University - Savvas Tassou**
- **52,000 refrigerated vehicles in use**
- **Average 26 litres/day for refrigeration**



4 - Cold storage

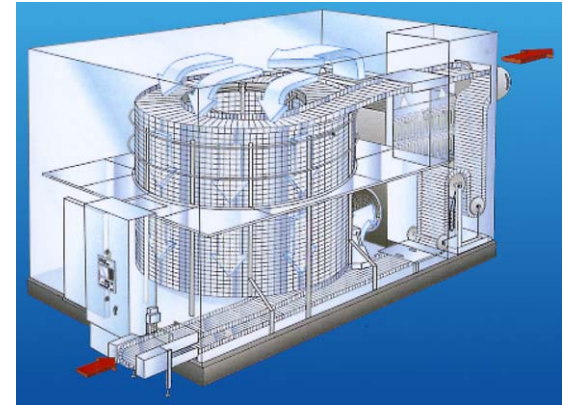
- **900 GWh/y**
- **Data sources**
 - **Food Storage & Distribution Federation**
 - **Carbon Trust**
- **Based on 2004 benchmarking exercise**
- **200 primary cold store sites**
- **9.65 million cubic metres capacity**
- **New study updating data**

5 - Blast chilling



- **610 GWh/y**
- **Data sources**
 - **Market survey data 1.2m tonnes**
 - **Food & Drink Federation data**
- **Cooling of (hot) products most energy**
 - **Ready meals**
 - **Pies**
 - **Pizzas etc.**
- **Lack of process benchmarking data**

6 - Blast freezing



- **420 GWh/y**
- **Data sources**
 - **Market survey data 3.2 m tonnes**
 - **British Frozen Food Federation**
- **Blast freezing of products**
 - **Processed potato - 1 m tonnes**
 - **Ice cream**
 - **Vegetables**
- **Benchmark data 70 to 133 kWh/tonne**

7 - Milk cooling - raw milk on farm

- **320 GWh/y**
- **Data sources**
 - Dairy UK
 - Milk Dev Council / Farm Energy Centre
 - US energy efficiency study
- **14.6 m tonnes raw milk cooled 37 to 4°C**
- **6.8 to 21.6 kWh/tonne measured**



8 - Dairy processing - milk/cheese

- **250 GWh/y**
- **Data sources**
 - Dairy UK
 - Milk Development Council
- **Dairy processing**
 - Milk pasteurisation/cooling - 6.9 m tonnes
 - Cheese production - 0.39 m tonnes
- **Milk published benchmark 20 kWh/tonne**

9 - Potato cooling/storage - bulk raw

- 190 GWh/y
- Data sources
 - AHDB - Potato Council
 - UK study – Devres & Bishop
- 71.8 to 93.4 kWh/tonne cooling/storage
- 6 m tonnes/y - estimated 2 m refrigerated



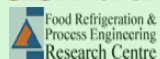
10 - Chilling - meat carcasses

- **140 GWh/y**
- **Data sources**
 - **Production data / Defra, FAO**
 - **FRPERC measured data**
- **3.39 m tonnes meat production**
- **Measured mean of 34 kWh/tonne beef**
- **Measured mean of 42.5 kWh/tonne pork**



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Further information:

<http://www.frperc.bris.ac.uk/defraenergy/index.html>

Specifically on top ten:

<http://www.frperc.bris.ac.uk/defraenergy/topusers.html>

Top 10 energy users

Site Location: [Home](#) > **Top energy users**

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- [About this project](#)
- [Sectoral focus reports](#)
- [Top 10 energy users](#)
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The mapping exercise has identified and ranked the top 10 processes (commodity/operation combinations) in terms of the potential to achieve the greatest total improvement in energy usage. The following table shows the energy used for the top 10 processes and the potential savings that could be achieved:

Rank	Sector	CO ₂ Emissions ('000 ton/yr)	Energy Consumption (GWh/yr)	Saving (%)	Maximum Saving (GWh/yr)	Download Report
1	Retail display	3098-6819	5768-12698	30-50	6349	Retail display
2	Catering - kitchen refrigeration	2147	3998	30-50	1999	Catering - kitchen refrigeration
3	Transport	1206	4822	20-25	1206	Not Yet Finalised - contact project team
4	Frozen storage - generic	483	900	20-40	360	Frozen storage - generic
5	Blast chilling - (hot) ready meals, pies	16-330	29-614	20-30	184	Not Yet Finalised - contact project team
6	Blast freezing - (hot) potato products	117-223	218-415	20-30	125	Not Yet Finalised - contact project team
7	Milk cooling - raw milk on farm	53-169	99-315	20-30	95	Not Yet Finalised - contact project team
8	Dairy processing - milk/cheese	134	250	20-30	75	Not Yet Finalised - contact project team