

Steve James, FRPERC

# Reducing energy without compromising quality or safety 'The defra project'



# Fostering the Development of Technologies and Practices to Reduce the Energy Inputs into the Refrigeration of Food

## ACO403



# Drivers

Energy Prices

Legislation

R22  
F Gas

CCA Targets

# Aim

**The overall objective of this project is to identify and stimulate the development and application of more energy efficient refrigeration technologies and business practices for use throughout the food chain whilst not compromising food safety and quality**



# The Partners

- **Coordinators FRPERC (Judith Evans, Mark Swain, Tim Brown)**
- **London South Bank (John Missenden, Graeme Maidment, Ian Eames)**
- **Brunel (Savvas Tassou, Yunting Ge)**
- **Sunderland (David Baglee, Alsa Melvin)**

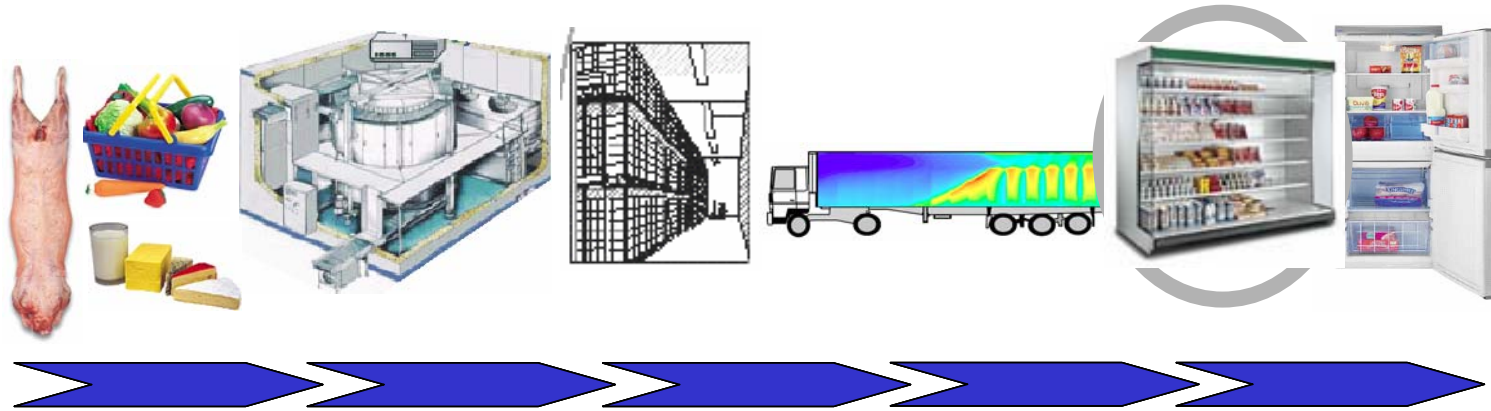


# Collaborating organisations

**Campden & Chorleywood Food Research Association (CCFRA), Dairy UK, Food & Drink Federation (FDF), Chilled Food Association (CFA), Meat and Livestock Commission (MLC), the Federation of Environmental Trade Associations (FETA), Cold Storage & Distribution Federation (CSDF), Catering Equipment Suppliers Association (CESA), Brewing Research International (BRi), Food Processing Faraday Partnership (FPFP) and the Institute of Refrigeration (IOR)**



# Cold chain



Whole cold chain:

Primary Chilling - Freezing, thawing & tempering - Secondary chilling - Chilled & frozen storage - Transport & distribution - **Retail** - Domestic handling

# Primary chilling

University of  
BRISTOL  
Food Refrigeration &  
Process Engineering  
Research Centre

**Brunel**  
UNIVERSITY  
WEST LONDON

LONDON  
SOUTH BANK  
UNIVERSITY

**University of  
Sunderland**

**defra**  
Department for Environment  
Food and Rural Affairs





# Retail display

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BRISTOL  
Food Refrigeration &  
Process Engineering  
Research Centre

Brunel  
UNIVERSITY  
WEST LONDON

LONDON  
SOUTH BANK  
UNIVERSITY

University of  
Sunderland

defra  
Department for Environment  
Food and Rural Affairs



# Main topics in work programme

- 1. Mapping of energy use.**
- 2. Identifying new technologies and business practices.**
- 3. Feasibility studies on promising technologies and business practices.**
- 4. Continuous interaction with food and refrigeration industries**



# 1 Mapping of energy use

## Objective

Identify and rank 10 'operations' (process/food combinations) in order of the **potential** by the use of improved technology and enhanced business practice to reduce energy usage in food refrigeration.



# 2 Identifying new technologies and business practices.



## Objectives

- 1. Develop generic technologies and business practices that have the potential to reduce refrigeration energy consumption.**
- 2. Identify the features of the most efficient current systems and make them and their energy saving potential widely known to the industry.**
- 3. Identify and overcome any barriers to the uptake of current technologies that have the potential to substantially improve the energy efficiency of the 10 operations identified in 1.**
- 4. Quantify work being carried out to fill gaps in knowledge/technology identified to improve energy efficiency of the 10 operations identified in 1.**
- 5. Develop programmes to obtain the funding required to provide the missing information if no current work identified in objective 2.4.**

# 3 Feasibility studies on promising technologies and business practices

## Objective

**Carry out feasibility studies on current technologies that have the potential to achieve substantial energy saving in food refrigeration that are developed to a stage where they can immediately obtain funding from other sources**



# Work programme first year (I)

- ***1) Mapping of relevant energy uses in different parts of the chain.***
- **LP: FRPERC** Ts: Start month 1 finish end month 13.
  - **1.1 Initial mapping (Month 1 to end of 3)**
  - **1.2 Detailed mapping (Month 3 to end 12)**
  - **1.3 Identification and ranking of operations (Month 3 to end 13)**

# Work programme first year (II)

- ***2) Identifying promising technologies, systems or business practice options.***
  - **2.1 generic studies (Month 1 to end 12)**
    - **2.1.1 Review new and emerging technologies (Month 1 to end of 6) EBERC & FRPERC**
    - **2.1.2 Assess energy savings potential from efficiency improvements of current technologies (Month 6 to end 24) EBERC**
    - **2.1.3 Development of system models (Month 1 to end of 24) LSBU**
    - **2.1.4 Assessment of business practices upon equipment requirements & performance (Month 10 to end of 30) SU**
    - **2.1.5 Development of dynamic food models (Month 3 to end of 12) LSBU & FRPERC**

# Work programme first year (III)

- **2.2 Identify best practice and transfer**
- **Lead Partner: LSBU**
- **Time scale: Month 10 to end 24**
- **2.3 Identify and overcome current barriers**
- **Lead Partner: SU**
- **Time scale: Month 10 to end 24**





# Flexibility

- **First year reasonably defined but we all need to be able to change if results suggest a need**
- **Any need for changes in further years discussed with steering group and defra will then decide on changes required**

# Progress so far

- **Partner presentations**
  - The mapping - Mark Swain
  - New Technologies - Savvas Tassou
  - Improved maintenance - David Baglee
  - Total system modelling - Ian Eames
- **Current Industrial optimisation - David Blackhurst**
- **Practical savings - Judith Evans**





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