FOODSA

Feeding connections

INTRODUCTION
ENERGY EFFICIENT EQUIPMENT TOOLKIT

PARTNERS

FOOD SA

Food SA is feeding connections to help industry grow, unite, lead and sustain South Australia's food industry into the future.

As the State's peak industry body, Food SA aims to grow value and opportunities for members and industry through key services and programs. Our focus is connecting businesses in the food industry with the services and expert advice they need to develop their businesses, grow their bottom line and connect with new markets.

Food SA is industry led and membership based; and also acts as a first point of contact for all of industry to access complementary services for non-members.

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DEPARTMENT OF RESOURCES, ENERGY AND TOURISM

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The views expressed herein are not necessarily the views of the Commonwealth of Australia, and the Commonwealth does not accept responsibility for any information or advice contained herein.

Australian Government
Department of Resources, Energy and Tourism

ZERO WASTE SA

Zero Waste SA, established by the Zero Waste SA Act 2004, provides strategic policy advice and direction to government and stakeholders on waste management, resource efficiency and business productivity.

It engages with the community, business and government, building partnerships for change, and provided funding and in-kind support for the development of this toolkit. It's content is believed to be correct at the time of writing.

Government of South Australia
Zero Waste SA

INTRODUCTION

Given that energy costs can be at least 15% of total operational costs of a food business, energy efficiency improvements are becoming critical to both future profitability and competitiveness of the food industry.

Use this Toolkit to understand and collect the right kind of information so your business can make informed commercial decisions on equipment upgrades and process improvements.

This Toolkit aims to help small to medium sized businesses (SMEs) food businesses to:

- Assess benefits and value of energy efficient alternatives
- Choose actions and upgrades to energy efficient equipment in their operations.

The South Australian food industry contributed $13.7 billion to the State economy in 2012. It is a critical contributor to South Australia's economic growth and to its future employment projections, but the industry is facing challenging times. Increasing electricity, fuel and materials costs (with projected flow-on effects from carbon pricing), rising costs of labour and the strong Australian dollar all impact on export revenues.

These factors have been squeezing the profit margins of local businesses and this is particularly a problem for SMEs with revenues less than A$50 million.

AN INTRODUCTION *CONT.*

Adopting alternatives to process based equipment, such as refrigeration systems, can provide the greatest energy efficiency improvements in the food industry. Refrigeration systems are often the greatest consumers of energy (around 60% of total energy costs).

Businesses need to balance current financial situation and restrictions against long term sustainability and profit. To do this businesses need to bring together the 'strategic case' and 'financial case' to assess which suite of efficiency improvements is suited to business operations and is both practical and sustainable.

Food SA's 'Your Guide to Sustainable Business in Food' introduces sustainable practices, ideas and 'quick wins' for energy, water, waste and more efficient use of materials. This 'Business Case for Energy Efficient Equipment Toolkit' offers the technical understanding you will need to make choices about how best to improve energy through types of equipment and the way equipment is used.

This toolkit will provide SME food businesses with information and guidance to:

- Identify opportunities to upgrade equipment to improve energy efficiency
- Know enough about the opportunity (without having to be an expert) to have an informed conversation with suppliers
- Collect the appropriate information to make an informed commercial decision on equipment upgrades and process improvements.

IMPORTANT NOTE ON COSTING

Prices quoted in this Toolkit are based on 2013 prices as revealed to the authors by industry suppliers. No responsibility is taken for any real world variation in prices of equipment.

Comparative pricing is recommended at the time of preparing your business case and prior to purchase.

BIG OPPORTUNITIES FOR ENERGY EFFICIENCY IN THE SOUTH AUSTRALIAN FOOD INDUSTRY

The South Australian food industry is extremely diverse, with manufacturers of all types and sizes consuming energy in different ways. The Toolkit follows seven common key technology areas that represent a majority (>90% in total) of a food business's energy consumption.

	TECHNOLOGY AREA	DESCRIPTION	PROPORTION OF ENERGY CONSUMPTION IN SME FOOD BUSINESS
1	Refrigeration and chilling	Equipment used for product chilling and cold storage (refrigeration systems)	30-80%
2	Cooking and heating	Equipment used for product cooking, baking and pasteurisation	10-50%
3	Steam and hot water	Equipment required for the generation and distribution of steam and hot water to manufacturing processes and for cleaning	10-30%
4	Pumping	Equipment required for the transfer for water and other fluids throughout the manufacturing process, which form a component of most machinery	10-30%
5	Compressed Air	Equipment required to supply compressed air to manufacturing processes and for cleaning	5-20%
6	Heating, Ventilation and Air Conditioning (HVAC)	Systems installed within the manufacturing building to manage indoor air temperature and ventilation	5-15%
7	Lighting	Systems installed to provide adequate lighting to the manufacturing facility	5-15%

HOW TO USE

There are eight Workbooks for this Business Case for Energy Efficient Equiptment Toolkit. These cover key technology areas of energy efficiency for the food industry. The Workbooks are accessible online via the Food SA website at www.foodsa.com.au.

In conjunction with this Workbook, businesses can access the following supporting information and resources:

1. Energy Use Resources data collection template (excel) – a template to help businesses with collecting their energy consumption data, and calculating energy and greenhouse emissions savings from energy efficiency upgrades
2. Case studies
3. List of formulas and calculations for each Technology Area (for businesses who wish to use these formulas in future assessments)
4. List of service providers related to each technology area (linked through via the Clean Technology Supplier Advocate and Australian Clean Tech Network)

This Workbook is designed to help you access the information you need, as quickly as possible

The Workbook is divided in to four key steps:

1. Explore options to optimise existing equipment, which provides a list of opportunities to 'tweak and fine-tune' existing processes to improve energy efficiency. We ask food businesses to begin with this step as it usually results in low-cost, 'quick wins' in energy efficiency without the risk of disrupting production due to equipment installation/replacement
2. Explore options to retrofit and replace equipment, which provides a list of opportunities to retrofit existing equipment or upgrade to new systems to improve energy efficiency. These opportunities do come at a higher cost, however the energy efficiency gains are often more significant than those found in Step 1
3. Select and prioritise energy efficiency opportunities to pursue, which provides a template for listing selected energy efficiency opportunities and actions, allocating responsibilities and timeframes
4. Collecting information to support energy efficiency projects, which provides businesses with guidance on which information to collect from within their business and from the equipment supplier to assist with assessment of the selected energy efficiency opportunities

DEFINITIONS

A few important definitions to know in using this Toolkit.

BYPASS FLOW

A section of the distribution load that carries excess fluid in parallel to the main flow.

COOLING LOAD

The level of cooling needed to achieve the required product temperature.

END USE

The end point at which the cooling, heating or fluid flow occurs or is needed.

LIQUID-INJECTION OIL COOLING

The direct injection of high-pressure liquid refrigerant into the compressor.

LOAD PROFILE

The usual pattern of variations in the demand for the output of the equipment, such as:

- cooling load (refrigeration and air conditioning equipment)
- heating load (cooking and heating equipment)
- steam or hot water load (boilers)
- fluid load (air compressors, pumps, and fans)
- lighting load (lights and luminaires)

PAYBACK PERIOD

The length of time over which savings will equal capital expenditure outlay

PRESSURE DROP

Pressure drop is the difference in fluid pressure measured between the inlet and outlet of a component or section of the distribution network.

PRIMARY REFRIGERANT

The fluid that circulates through the refrigerator equipment, such as R717 (ammonia) or R22, HCFCs (R22, R134a) or propane.

SECONDARY REFRIGERANT

The fluid that is cooled by the primary refrigerant and carried to the end use in a separate fluid circuit, such as brine, chilled water or carbon dioxide.

TEMPERATURE LIFT

The difference between the evaporating temperature (at the cold end) and condensing temperature (at the hot end) of a refrigerator.

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