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BUSINESS CASE ASSESSMENT
ENERGY EFFICIENT EQUIPMENT TOOLKIT

CONTENTS AND PARTNERS

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INTRODUCTION

Energy prices are putting increased pressure on the cost of running a food business in Australia. Businesses are naturally curious as to why electricity prices are increasing.

ASSESSING BUSINESS BENEFITS

Energy efficiency upgrades can yield a variety of benefits to the business. Find out how you can assess them with upgrades, cost saving measures, and improving your productivity and profile.

ASSESSING COSTS & RISKS

Food businesses are understandably excited when they see the possibilities that energy efficiency offers. Find out how you can assess the costs and risks.

ASSESSING CAPABILITIES

Once the benefits and costs of the energy efficiency upgrade have been quantified, the business should then identify the capabilities the business needs to see the upgrade through to success.

WHAT IS THE BUSINESS CASE?

Energy prices are putting increased pressure on the cost of running a food business in Australia.

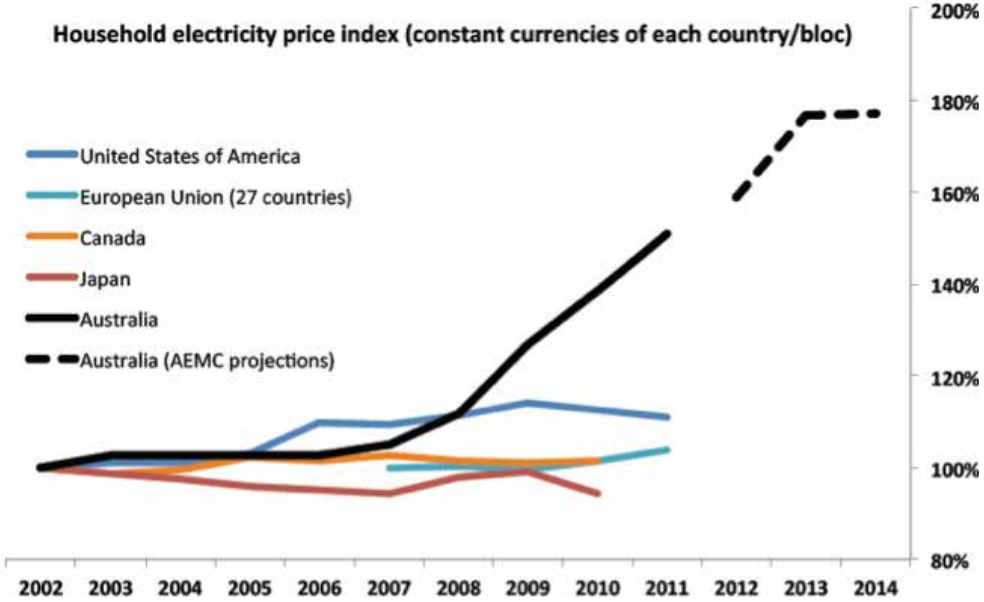
INCREASED ENERGY PRICES

Over the last three years, the cost of electricity for households and businesses in Australia has gone-up by as much as 50%. This trend is likely to continue (as described in Figure 1), with electricity prices expected to increase by an additional 37% by 2014. Gas prices are also likely to surge in the coming years as the gap narrows between domestic and international liquid natural gas (LNG) prices.

Progressive food businesses recognise that adopting energy efficiency improvements can benefit their business, for example reducing operational costs associated with energy consumption and maintenance, improving process productivity and equipment reliability.

Dealing with the short-term financial pressures of both running and growing a business is one of the biggest hurdles to overcome. For example, at any one time, SME food businesses may be focussing one or more of the following priorities:

- Managing cash flow
- Increasing revenues
- Creating a point of difference in the market
- Reducing costs/overheads
- Managing demand/growth spurts
- Avoiding liabilities and compliance issues
- Improving staff morale and productivity
- Obtaining financial capital to invest in growth
- Increasing the value of the business to sell it



(Figure 1) Household electricity price index
(Source: Energy Users Association of Australia, Energy Prices in Australia: An International Comparison, March 2012)

WHAT IS THE BUSINESS CASE? *CONT.*

INCREASED ENERGY PRICES *CONT.*

These issues are a hard reality for many SMEs and can make decision-making on implementing energy efficiency improvement very difficult, despite the exciting business opportunities that it may present. For example, upgrading an existing refrigeration unit with a more efficient system may yield massive savings in energy and cost of refrigerants, but the upfront cost may be too prohibitive for an SME to handle in the short-term. However, without these types of investments, food businesses will continue to struggle to keep costs low and maintain a healthy profit margin. It is a classic 'Catch 22' situation. Do we make long-term decisions and run the risk of impacting short-term business performance, or do we focus only on the short-term and put the business at risk of survival in the long-term?

To overcome this stalemate and have the best of both worlds, businesses need to bring together both the *strategic case* and *financial case* to assess whether any suite of sustainability initiatives should be given the go/no-go (see Figure 2). By doing this, an SME can use a balanced 'business case for sustainability' so that sound decisions can be made on funding initiatives that are both financially viable in the short-term and beneficial for the business in the long-term.

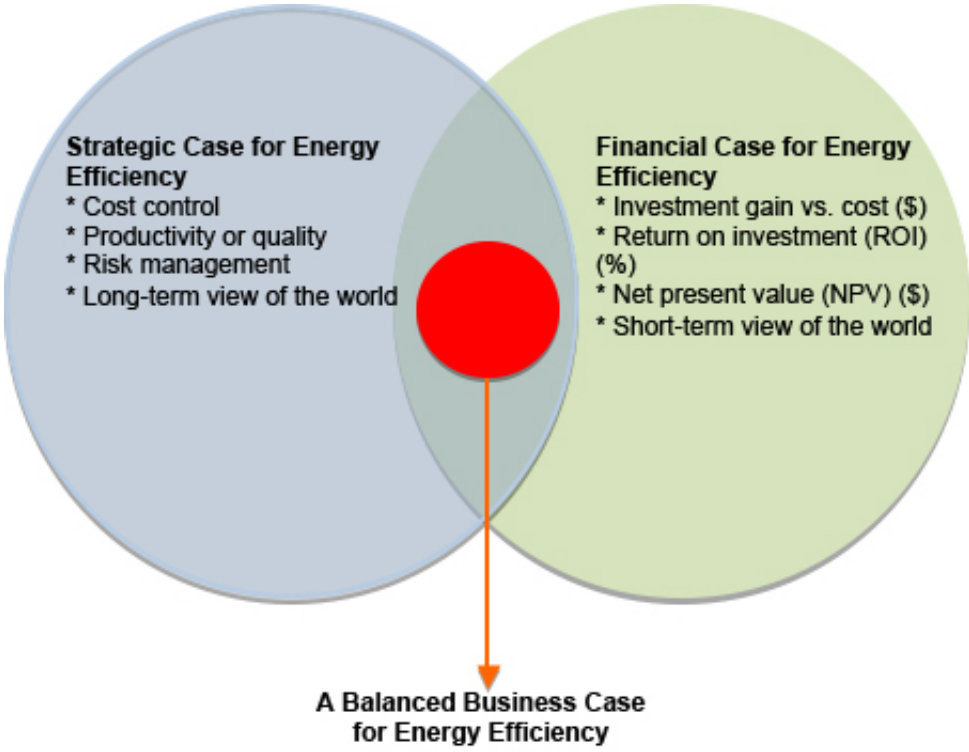
The Strategic Case verifies the company's long-term reasons behind investing in equipment upgrades for energy efficiency. In assessing the Strategic Case, questions such as the following must be answered:

- How will the upgrade make our business better in the long-term?
- How will the upgrade help our business meet its short *and* long term goals?
- Can our money be put to better use, or is this upgrade the best use of our funds at this point in time?

The Financial Case tests the financial rigour and profitability of the business opportunity that has been identified in the Strategic Case. There are a number of metrics that can be used to create a sound financial case for any business decision. One of the most common, every-day metrics is the Return On Investment (ROI) formula:

$$ROI(\%) = \frac{\text{Investment Gain} - \text{Investment Cost}}{\text{Investment Cost}} \times 100\%$$

The various types of Investment Gain (Business Benefits) and Investment Cost (Costs and Risks) are explored in the following sections.



(Figure 2) Assessing the strategic vs financial case for energy efficiency

WHAT IS THE BUSINESS CASE? *CONT.*

Businesses are naturally curious as to why electricity prices are increasing the way they are.

INCREASED ELECTRICITY PRICES

The following is a general breakdown explaining the main factors:

- *Wholesale costs (40% of the price increase)* are the costs associated with generating electricity and trading it in a wholesale market. The wholesale component is expected to increase to allow for changes in sources of electricity generation, higher capital and operational costs for generation, and higher hedging costs. The price on carbon also increases the wholesale component, accounting for about 10% of the electricity bill
- *Network charges (40% of the price increase)* are the costs associated with building and maintaining electricity networks. The network component will increase due to necessary investment in infrastructure upgrades to cope with increased peak demand, replacing aged assets, higher commodity prices (steel, copper, labour), and a higher cost associated with accessing capital for investment due to the Global Financial Crisis. Network charges account for around half of the total cost of a consumer's electricity bill
- *Retail costs (12% of the price increase)* are the costs relating to the 'shop-front' for a consumer's electricity supply. This component will increase because the retail margin is calculated as a percentage of the total cost to supply customers. As this total cost increases, retail costs increase
- *Renewable energy scheme costs (8% of the price increase)* relates to costs associated with the Renewable Energy Target, Feed-In Tariff and other State-based schemes. The increase in cost of this component relates to the continued management of these programs

HOW TO ASSESS THE BUSINESS BENEFITS

Energy efficiency upgrades can yield a variety of benefits to the business.

ENERGY EFFICIENCY UPGRADES

Benefits to the business include:

- Cost savings associated with energy consumption
- Reduced costs associated with water, materials consumption and waste management
- Reduced maintenance costs and downtime
- Improved productivity
- Enhanced brand and company profile

The most obvious reason for adopting energy efficiency upgrades is to reduce the cost of energy consumption. However energy solutions, if investigated and implemented well, can hit 'multiple birds with one stone'. They can create additional benefits for the business such as improving productivity or reducing the cost of labour. In many cases, businesses will find that these additional benefits often give bigger cost savings than those from the reduced energy consumption.

The more benefits that can be identified and counted, the stronger is the business case for the upgrade. For example, installing a variable speed drive on a refrigeration compressor may reduce energy consumption and generate enough savings warrant a 3-year payback.

However this particular upgrade does more than save energy – it reduces maintenance costs (less wear-and-tear on the compressor), prolongs equipment life (thereby saving on capital expenditure), and reduces the risk of compressor melt-down and disruptions to production – all of these additional benefits beyond energy savings can be counted to the extent that the payback for the upgrade is more like 1-1.5 years, making it easier for the business to justify.

COST SAVINGS

The most obvious benefit resulting from energy efficiency upgrades is reducing operational costs through reductions in energy (electricity, gas, and other fuels) consumption.

ENERGY COST SAVINGS

Estimating cost savings associated with electricity consumption involves comparing the electricity consumption of the current equipment versus the new equipment to be installed. The exact process for calculating these savings depends on the equipment (refer to energy efficiency workbooks related to the relevant Technology Area), but generally savings can be calculated using the methods in Table 1. These are measured in the following ways:

- Equipment Power Rating (PR) is measured in kW
- Equipment Efficiency (EE) is usually measured as a percentage or fraction; assume EE to be 1.0 unless otherwise specified by equipment supplier/specification sheet
- Running time (RT) per year (hrs/year)
- kWh: Electricity consumption
- $/kWh: Cost per unity of electricity consumed (note that this number can be found on your quarterly electricity bill)

(Table 1) Ways of calculating cost savings.

TYPE OF EQUIPMENT	CALCULATION METHOD
Electricity Consumption of Current Equipment	$PR_{current}$ x EE x RT = $kWh_{current}$ per year
Electricity Consumption of New Equipment	PR_{new} x EE x RT = kWh_{new} per year
Total electricity consumption saved per year	$kWh_{current}$ - kWh_{new} = kWh_{saved}
Estimated electricity cost savings per year	($)= kWh_{saved} x $/kWh

Replacing old manufacturing equipment with newer, more efficient equipment can not only reduce energy consumption. It can also reduce consumption of other resources related to the process, making the cost savings of such upgrades even more attractive.

RESOURCE COST SAVINGS

In some cases, these related savings can be even more significant than the energy savings. Take the following examples:

- Reducing refrigerant losses
  - Installing a newer, more efficient refrigeration system may reduce the chance of refrigerant leakage common in older systems and
  - Given that refrigerants have significantly increased in cost over the last few years (some as steep as 400%), reducing refrigerant leakage (or swapping greenhouse-intensive refrigerants with lower CO_2eq alternatives) may result in thousands of dollars of cost savings
- Reducing water losses in cooling towers
  - Newer models of cooling towers significantly reduce the amount of wastewater created in the cooling process
- Reducing product wastage in ovens
  - Newer types of ovens that allow for rapid cooling improve productivity and
  - Further improve the quality of the product and
  - Reduce the chance of product spoilage/wastage, resulting in significant cost savings in terms of materials and waste disposal

Estimating cost savings associated with reduced materials consumption can be calculated based on the cost per unit of the materials or water reduced, such as:

- kg refrigerant saved based on the amount purchased for re-fills in the last 1-2 years x refrigerant cost (include forecasted cost increases)
- kL water savings
- Cost per unit of product saved (e.g. kg, litres, loaves etc.) as a result of reduced product spoilage

COST SAVINGS *CONT.*

More energy efficient equipment means more useful energy delivered as output (heating, cooling or other actions), which means less energy wasted as lost heat and less wear and tear on equipment (which can also save energy).

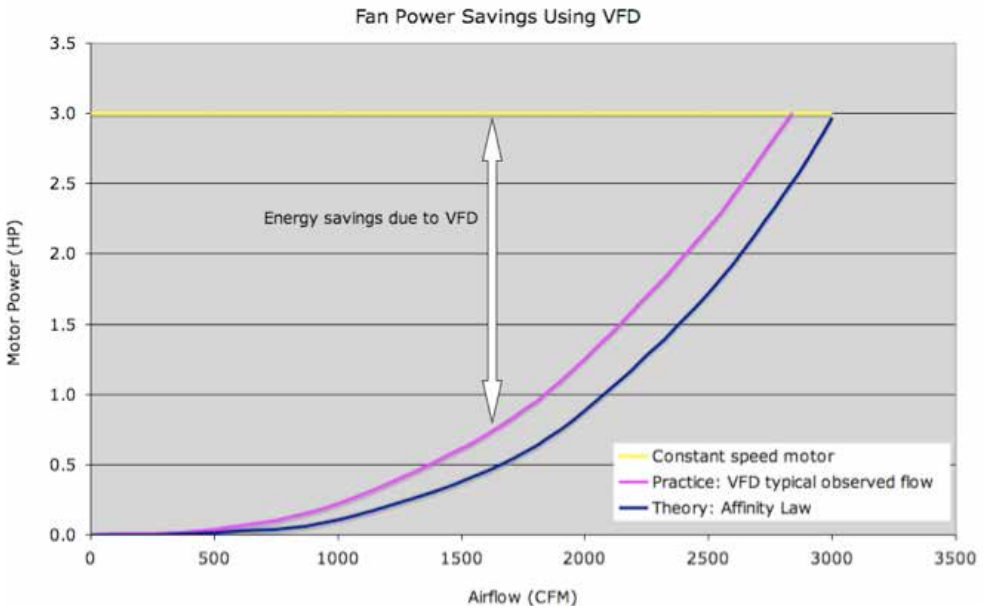
REDUCING MATENTANCE COSTS

This results in reduced repair and maintenance costs, and extends the useful life of equipment.

For example, single-speed compressors start abruptly, subjecting the motor to a high level of starting torque and current surges up to 10 times the full-load current. This increases wear and tear of the motor mechanism. Installing a variable speed drive on the compressor enables the motor to ramp up to the desired operating speed more gently, lowering stress and reducing overall electricity consumption.

Estimating cost savings associated with reduced maintenance can be calculated by looking at the following costs and is usually available within the business records:

- Cost of parts replacement
- Cost of external service providers (time/labour)
- Cost of staff required to maintain equipment (time/labour)
- Cost associated with equipment replacement due to shorter equipment life, and the frequency of replacement.



Comparison of motor power with VSD and without VSD

IMPROVING PRODUCTIVITY AND PROFILE

Replacing inefficient equipment with newer, more efficient alternatives is also an opportunity to put in place upgrades that improve manufacturing productivity so that the process can deliver the same or more product volume with less energy.

MAKING THE IMPROVEMENT

Besides increasing product volumes to meet demand, the resulting improvements in productivity may lead to cost reductions in labour and reduce the need for overtime to produce the required volumes. For example, vacuum cooling ovens used in baking provide an energy efficient alternative to traditional ovens and bread cooling systems by cooling the finished bread using less energy and with significantly less time (baking time reduced by 30%, cooling time in minutes instead of hours). Faster cooling times means more product can be baked, cooled and packed during normal hours, as opposed to relying on the early start needed by many commercial bakeries.

Energy efficiency upgrades can also help to reduce loads on the manufacturing facility's power infrastructure (transformer capacity) which can become an issue as food businesses grow. When a food business exceeds its transformer capacity, blackouts and power-shortages are likely to occur, which affect production.

Estimating cost savings associated with improved productivity can be calculated by looking at the following costs:

- Cost of labour and overtime (refer to wage statements)
- Cost of lost production due to blackouts/brownouts
- Cost of sales lost due to insufficient volumes
- Cost of back-up generators

To make sure that the equipment upgrade makes both energy savings and a productivity improvement, *energy intensity* metrics such as *kWh/kg of product*, can be used for measurement. If the upgrade results in a reduction in energy intensity, the upgrade is making more products with less energy consumed per unit of product.

Adopting energy efficiency improvements can do much to support brand positioning.

ENHANCING YOUR BRAND

Depending on the company's market and target audience, communicating and demonstrating the company's commitment to sustainability can go a long way to improving the value of the brand and positioning the business in the market.

Food businesses that have used energy efficiency in this way have gained through improved relationships with customer and with regulators and Government, which can provide easier access to sources of funding and support.

For further information on how to use energy efficiency for branding and marketing purposes, refer to 'Food SA's Your Guide to Sustainable Business in Food'.

HOW TO ASSESS THE COSTS AND RISKS

Food businesses are understandably excited when they see the possibilities that energy efficiency offers.

OVERVIEW

Besides the potential for cost savings, some upgrades have the potential to transform the way the business does business and create improve profitability and product quality.

However businesses should always consider the costs and risks of making investments in energy efficiency, and of any major upgrade to their business.

Most SME food businesses survive on cash flow and every investment decision needs to be the right one, or else it may have a severe impact on the health on the business. The best approach is to get a full understanding of all the costs and risks involved with making an upgrade, and to incorporate these into the business case assessment.

Businesses need to identify the full suite of potential risks it may face through the installation of new equipment.

ASSESSING RISKS

Once these risks are understood, risk management strategies can be put in place throughout the equipment purchase, installation and operation phases to mitigate negative impacts on the business.

Common types of risks to consider include:

FINANCIAL

Risk includes the impact of the upgrade on cash flow, budgetary requirements, tax obligations, creditor and debtor management, remuneration and other financial management concerns

EQUIPMENT

Risks may attach to the reliability of the new equipment to 'operate as planned', and the effect new equipment may have on day-to-day operations.

ORGANISATIONAL

Organisational risks relate to the upgrade's effect on the culture, business structures and human resources of your business (such as staff's ability to understand and operate the new equipment, or staff concerns about job security).

COMMERCIAL

Identify risks associated with the impact on product quality and safety (and ultimately reputation and customer retention/relationships), growth and diversification plans.

LEGAL AND REGULATORY COMPLIANCE

Identify any effect on your ability to meet legislation, regulations, standards, codes of practice and any contractual requirements that could be compromised with the introduction of new equipment.

PROJECT

These risks are associated with the management of equipment, finances, resources, technology, timeframes and people involved in the management of the upgrade

SAFETY

What risks might the new equipment pose to health and safety of everyone associated with the business. Consider individual workplace as well as public safety.

HOW TO ASSESS THE COSTS AND RISKS *CONT.*

It is important to assess the costs associated with energy efficiency upgrades.

ASSESSING COSTS

The following table outlines a number of common costs that food businesses may incur when implementing an equipment upgrade. Businesses will need to familiarise themselves with these costs before making an investment in energy efficiency.

(Table 2) Common Costs that food businesses may incur when implementing an equipment upgrade.

COST TYPE	DESCRIPTION	HOW TO IDENTIFY
Capital Cost	The cost of purchasing equipment	Provided by the supplier and/or installer
Installation Cost	This may be driven by the Australian dollar, whether/where the equipment is available in Australia (freight costs), and whether the technology is common/standard or new to the market	Provided by the installer, or internally by the operational staff managing the installation
Recurring Costs	The cost of installing equipment Normally this is driven by labour costs and materials, and may also include building/construction costs	Provided by the equipment supplier (as estimates) and/or company responsible for servicing the equipment or monitored from billing or metering/monitoring data
Maintenance Costs	The ongoing/recurring cost of running equipment This is driven mostly by consumables, such as energy, water, waste and other materials (e.g. cost of refrigerants for freezer systems)	Provided by the company responsible for servicing the equipment, or calculated based on estimated staff time allocated to maintenance
Downtime Costs	Costs associated with production downtime due to the shut-down of old equipment, and to enable installation of new equipment	Estimated by the number of days of shut-down, multiplied by the revenue generated per day through production
Finance Costs	Costs associated with accessing finance/loans to secure the equipment, including interest payable	Provided by the bank/lender
Opportunity Cost	The value of an alternative upgrade/investment that your business is foregoing (perhaps a product marketing campaign) in order to invest in the energy efficiency upgrade	Determined by the CEO and/or Financial Officer of the business, and depends on the cash-constraints of the business

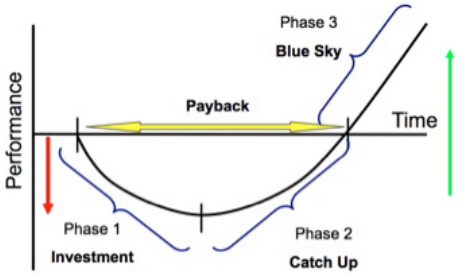
PLAN WELL

Once the benefits and costs of the energy efficiency upgrade have been quantified, the business should then identify the capabilities the business needs to see the upgrade through to success.

J-CURVE MANAGEMENT

Any strategic decision to spend money today for a benefit tomorrow is called a J-Curve investment. J-Curve investments create short-term financial loss with the intention of recovering the investment in the future, and overriding it with long-term strategic gains. Energy efficiency upgrades are J-Curve investments.

In order to see energy efficiency upgrades through to a successful outcome, businesses must recognise that there are three phases to a J-Curve investment (Figure 3). Each phase requires a different set of tasks, skills and capabilities:



J-Curve Model (Source: Nick Setchell, RealTimeCEO,www.realtimeCEO.com)

PHASE 1 INVESTMENT – CASH GOING INTO THE INVESTMENT

This phase may begin with purchasing the new equipment, or may begin earlier with money and time spent in identifying energy efficiency opportunities (energy audits), investigating technologies and scoping the new equipment upgrade. This step also involves time/money spent in installing and testing the new equipment.

PHASE 2 CATCH UP – INVESTMENT RETURNS BEGIN

Cost savings from reduced energy consumption and other benefits such as improved productivity or reduced labour costs are counted. During this phase the equipment is operational and being used by staff on a daily basis.

PHASE 3 BLUE SKY – PAY BACK OF INITIAL INVESTMENT

The investment has paid back the initial cash outlay and is now generating value for the business.

In order to move from Phase 1 to Phase 3 as quickly and safely as possible, adhere to the following rules:

MEASURE AND MANAGE DEPTH AND BREADTH

Be prepared for the valley (when more money is going out than is coming in) to be deeper and wider than anticipated. Encourage discussion about costs and create an environment where new ideas are welcomed.

DO NOT BECOME EMOTIONALLY CONNECTED

Watch out for projects in Phase 1 that start costing much more than originally intended (referred to as a 'ski slope') and the emotional arguments by staff (especially those attached to the project) that keep the ski slope going.

DO NOT TAKE ON TOO MANY MACRO INVESTMENTS

Identify, prioritize, and stagger J-Curves. Understand how many your company can handle at one time. Always ask two questions when considering any new J-Curve investment. Will it benefit the business? Is now the right time?

CREATE AND MANAGE A PLAN TO QUICKLY

MOVE PHASES

Focus on the critical transition between the innovator of the project and the implementer by using clear communication, documentation, and procedures. Note that for most SMEs, the 'innovator' and the 'implementer' are the same person – the business must make sure that person understands the difference in their role between Phase 1 and Phase 2 of the J-Curve.

KEEP AND UPDATE AND INVESTMENT REGISTER

The register will track the number of J-Curves active in the business. Maintain the register in a spreadsheet and update it every 30 days. The register is not a project management system; it's a higher level view of all the business' strategic investments.

POSSIBLE FUNDING

The most critical capability needed to implement an energy efficiency upgrade is cash flow, money to fund both the purchase of the equipment and any other costs associated with the project.

POTENTIAL SOURCES

For many SME food manufacturing businesses, this type of cash flow is difficult to come by. However, a variety of funding options are available to help businesses to implement energy efficiency, including:

GRANT PROGRAMS

Grant programs are offered by Commonwealth and State/Territory governments and can reduce the payback period of energy efficiency projects to support investment in clean technology projects.

LOAN FINANCING

Financing arrangements can be designed to suit different business requirements. This can include no/minimal upfront costs, longer repayment terms, and/or repaying loans with the savings generated from the energy efficiency project.

TAX INCENTIVES

Research and Development tax incentives provide tax offsets to encourage more Australian companies to invest in research and development. This can include research and development of new energy efficiency technologies.

MANDATORY OBLIGATION SCHEMES

Tradable certificates provide a financial incentive for energy users to invest in clean energy initiatives, on top of the ongoing energy savings generated by the project

TRANSITIONAL ASSISTANCE SCHEMES

The Australian Government's Clean Energy Future Package contains a series of assistance measures to support energy intensive industries transform to a low carbon economy.

For further information on these opportunities, refer to the Energy Efficiency Exchange website: http://eex.gov.au/business-support/grants-funding/