Department of
Primary Industries and
Regional Development

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Energy Snapshot Study:

Bakery Product Manufacturing

Contents

About this report 4

Bakeries: providing essential products to WA communities 6

Where energy is used 8

What the carbon data tells us 12

What WA bakeries are already doing 14

Operating costs: a key driver for action 18

Upfront costs to upgrade: a key challenge for bakeries 20

The future: a practical pathway for bakery product manufacturing 22

References 26

About this report

The *Bakery Product Manufacturing Snapshot* forms part of the Department of Primary Industries and Regional Development's (DPIRD) broader *Food and Beverage Manufacturing Energy Snapshot Study* (Study), undertaken in partnership with RSM Australia. Bakery product manufacturers contributed 11 of the Study's 124 responses, representing 9% of participants. Participants consisted of businesses operating across metropolitan and regional Western Australia, including local and café bakeries, wholesale bakeries, chain stores and larger commercial operations.

While this report focuses on bakery product manufacturing, it also includes cake and pastry, biscuit, and bread manufacturing across both factory-based and non-factory-based businesses. All businesses that contributed to the *Study* have been referred to as *bakeries* and the subsector is referred to as *bakery product manufacturing*, regardless of size, production model or type of bakery product produced.

This Subsector Snapshot explores energy use, operational emissions, actions already underway, barriers to further investment and opportunities to improve energy performance across participating bakeries.

Results are indicative of participating businesses and should be read alongside the Energy Snapshot Study report for the full methodology, emissions boundaries and sector-wide findings.

For WA bakeries, lower-emissions production starts with practical energy control — using ovens, refrigeration, hot water and retail equipment more efficiently before investing in larger upgrades.

For bakeries, energy is inseparable from production, but not every kilowatt-hour or unit of fuel contributes equally to output. The practical opportunity is to identify avoidable consumption, such as extended pre-heating, idle equipment, poorly controlled refrigeration or after-hours retail loads, and address it without compromising product quality, food safety or production schedules.

Behind each loaf, pastry, pie or cake is a sequence of energy-using activities: ovens brought up to temperature before opening, proofers controlling dough development, refrigeration protecting ingredients and finished products, hot water supporting cleaning, and retail or café equipment running through trading hours. While these systems are essential for product quality and customer service, they also contribute to operating costs and emissions.

This report draws on data from the Energy Snapshot Study to provide an overview of the current state of WA bakery product manufacturing, including:

- energy use in the manufacturing process
- proactive measures being used to optimise efficiency
- constraints to adopting efficient practices
- easy wins and opportunities to improve efficiency over time.

Meaningful progress does not require a complete transformation overnight. By measuring energy use, improving operational efficiency and making strategic equipment upgrades, bakeries can tailor a plan for lower-emissions production that fits their specific operational size and unique business model.

$890 million

In WA, bakeries are estimated to generate around $890 million in annual revenue

Bakeries: providing essential products to WA communities

Bakeries are part of the daily rhythm of WA. Before cafés and retailers open for the day, bakery teams are already weighing ingredients, firing ovens, proofing dough, cooling products and preparing fresh food for customers. This makes the subsector highly visible and locally embedded.

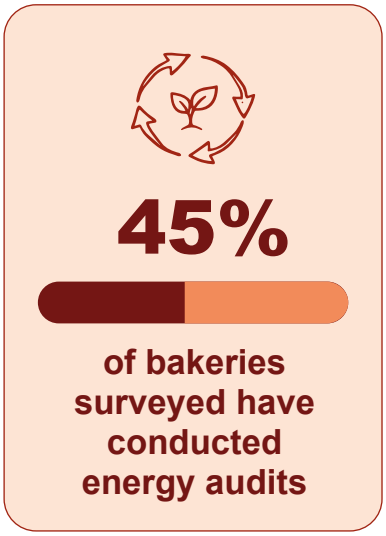
The subsector includes a broad mix of businesses from local café-bakeries and patisseries that serve as community anchors, through to large-scale manufacturers supplying products to supermarkets, caterers, restaurants and other retailers. Together, these businesses connect food manufacturing, retail, hospitality, distribution and local employment across the State. The broader WA bakery-related market, including manufacturing and retail-facing activity, is estimated to generate around $890 million in annual revenue.[1]

WA's grain industry provides an important backdrop to the subsector, with wheat underpinning a significant agricultural and processing supply chain. While not all flour used is locally sourced, WA bakeries form an important link between agricultural production and consumers, transforming basic ingredients into fresh, value-added products consumed every day.[2]

As consumer preferences shift, many customers are looking beyond standard bread and baked goods towards products that feel fresh, premium, locally made or that align with health and dietary preferences. This includes sourdough, seeded breads, high-fibre, high-protein, low-GI and gluten-free products.

IBISWorld notes that demand for premium and healthy breads is supporting bakery product manufacturing, even as supermarkets and cost pressures continue to shape the market.[3]

At the same time, bakeries are managing a challenging economic environment. Flour, sugar, dairy, eggs, oils, packaging, freight, labour and energy all affect margins. Energy is one cost that can be actively managed. Better energy management can reduce waste, improve equipment reliability, support production efficiency, reduce overheads, and strengthen business resilience.



For WA bakeries, energy efficiency is not only an environmental issue, it has practical business benefits that can protect profit margins today, while preparing for future customer and supply chain expectations regarding emissions data, lower-emissions production and sustainability credentials.

1 RSM calculation based on IBISWorld (2025), Bread Production in Australia, Industry Report C1171; IBISWorld (2026a), Bakery Product Manufacturing in Australia, Industry Report C1174; and IBISWorld (2026b), Bread and Cake Retailing in Australia, Industry Report G4129.
2 Department of Primary Industries and Regional Development (DPIRD) (n.d.), 'Wheat Western Australia', Government of Western Australia.
3 IBISWorld (2026a), *Bakery Product Manufacturing in Australia*, Industry Report C1174.

Where energy is used

A bakery's load profile is generally shaped by three patterns: a concentrated production peak from ovens, proofers and hot water; a continuous base load from refrigeration; and, for café-bakeries and retailers, an extended daytime load from display cabinets, coffee equipment, lighting and HVAC. The key management issue is the overlap between these loads. Starting ovens earlier than required, running lightly loaded batches or allowing production heat to spill into cooled areas can increase both peak demand and total consumption without increasing output.

The baking process itself is usually the most energy-intensive stage. Ovens need to generate and maintain high temperatures, often over extended periods and across multiple batches. Energy use depends on oven type, age, insulation, seals, burner efficiency, pre-heat practices, loading patterns, exhaust settings and production scheduling.[4]

Bakeries also rely on refrigeration to store ingredients, manage dough processes and preserve finished products. Cool rooms, freezers and display cabinets can operate continuously, creating an ongoing electricity load that contrasts with the more cyclical nature of baking.

The interaction between heat and cooling is a defining feature of bakery energy use. Heat generated by ovens and production equipment can increase the load on refrigeration and air conditioning systems, particularly where production, storage and customer-facing areas are not well separated.

As the day progresses into trading hours, energy use often shifts toward retail and café operations. Display cabinets, lighting, coffee machines, dishwashers, HVAC and customer areas can operate for long periods and may be material for café-bakeries and bakery retailers. After production and trading have finished, refrigeration continues to operate, while cleaning may require hot water and equipment use.

4 Briceño-León, M., Pazmiño-Quishpe, D., Clairand, J.-M. and Escrivá-Escrivá, G. (2021), 'Energy Efficiency Measures in Bakeries toward Competitiveness and Sustainability—Case Studies in Quito, Ecuador', Sustainability, 13(9), 5209; Carbon Trust (2015), 'Carbon Trust takes the hot air out of baking bread'

Energy hotspot	Operational area
Baking and ovens	Usually the most important thermal load. Energy demand depends on oven type, age, insulation, burner efficiency, exhaust settings, pre-heat practices, loading patterns and production hours.
Proofing, retarding and humidity control	Proofers use heat and humidity to support dough development. Retarder-provers and chilled dough systems also use refrigeration to manage timing and product quality.
Refrigeration, freezers and display cabinets	Required for chilled ingredients, cream and custard products, frozen dough, pastry storage, finished goods and retail display.
Hot water, dishwashing and cleaning	Used for sanitation, tray and utensil washing, washdown, staff amenities and café operations.
Mixing, slicing, packaging and compressed air	Motors, conveyors, slicers, wrappers and compressed air systems can be material in larger or more automated bakeries.
Retail and café operations	Lighting, coffee machines, HVAC, display cabinets, dishwashers and customer areas can be important in café-bakeries and bakery retailers.[5]

5 Briceño-León et al. (2021), 'Energy Efficiency Measures in Bakeries'; Australian Government (n.d.), *The Good Loaf Sourdough Bakery & Cafe*.

Energy use in bakeries follows the rhythm of production and trading. Demand begins before opening hours with oven pre-heating and preparation, peaks during baking, remains elevated through refrigeration and cooling, and often shifts towards retail and café operations during trading hours.

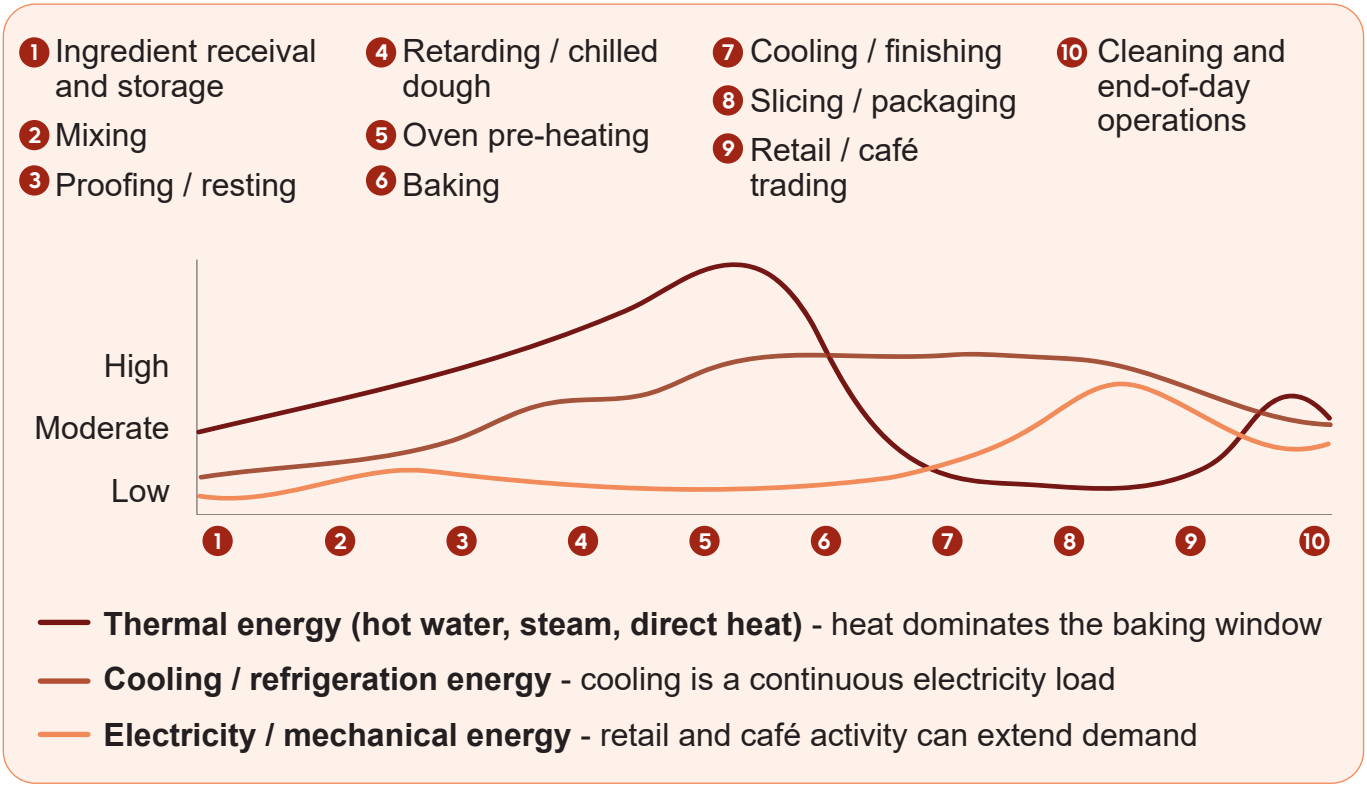


Figure 1: Baking process and shifting energy demand. Image for illustrative purposes only. Energy profiles vary by product mix, operations and equipment

Businesses tend to use the most energy where heating or cooling is required for long periods. Ovens are central because they must reach and maintain high temperatures before and during production. Energy can be wasted when ovens are turned on too early, left idling between batches, poorly loaded, poorly sealed or venting more hot air than necessary.[6]

6 Carbon Trust (2015), 'Carbon Trust takes the hot air out of baking bread'

> **Ovens are the biggest user of energy in our bakeries, accounting for about half of energy consumption. Andrew Pajic, Head of Store Solutions and Sustainability at Baker's Delight**

Proofing and fermentation are lower-temperature processes, but they still require controlled conditions. Good settings and maintenance help protect product quality while avoiding unnecessary heat, humidity and refrigeration demand. Refrigeration is a persistent load because it often runs outside production and trading hours. Its performance depends on door seals, airflow, set-points, condenser cleaning, insulation and how well hot production areas are separated from cold storage.

Retail and café operations can represent a significant share of energy use in smaller bakeries. Display cabinets, coffee machines, lighting, air conditioning and dishwashing may run for long periods and can sometimes operate when no longer required. This means everyday start-up, shutdown and control practices can be as important as major equipment upgrades.

What the carbon data tells us

This study focuses on the operational emissions that bakery businesses can most directly influence - fuels used on site and electricity purchased for business operations. This includes electricity used for ovens, refrigeration, lighting, HVAC and production equipment, as well as gas, LPG or diesel used for baking, hot water, heating or company-controlled vehicles. Value-chain emissions, such as ingredients, packaging and freight beyond the business's control, are outside the scope of this subsector report.

The Study estimates that WA bakery product manufacturing generates approximately **57,000 tonnes of Scope 1 and Scope 2 emissions each year**. This represents around 13% of the estimated 455,000 tCO2-e for the WA food and beverage manufacturing sector.[7]

57,000 tCO2-e

WA bakeries produce an estimated 57,000 tCO2-e every year

Around 73% of the estimate is Scope 2 emissions from purchased electricity, indicating that electricity use represents the largest operational emissions source across the subsector. The remaining 27% is associated with Scope 1 sources, including on-site fuel use, company-controlled vehicles and refrigerant losses.

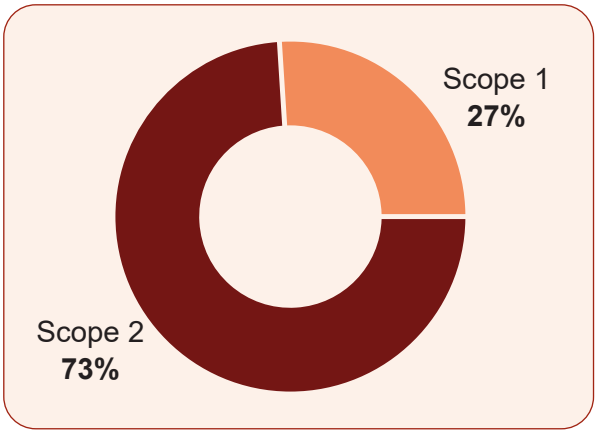


Figure 2: Scope 1 and Scope 2 emissions split for bakery respondents

This emphasises how closely a bakery's carbon footprint is linked to its energy costs. Reducing avoidable electricity, gas, LPG and diesel use can lower operating costs and reduce emissions at the same time. This is consistent with the Study findings, which showed that lower operating costs and reduced power bills are the strongest driver for action among respondents. Ovens and hot water are likely to be the main operational sources for bakeries with higher gas or LPG use. Where electricity use is higher, refrigeration, electric ovens, retail equipment, HVAC, lighting and motors are likely to be more important.

7 *Unless otherwise stated, emissions figures relate to operational Scope 1 and Scope 2 emissions and are expressed as tonnes of carbon dioxide equivalent (tCO2-e). Industry and subsector totals are indicative estimates rather than formal greenhouse gas inventories and are subject to uncertainty arising from data availability, sample coverage, scaling assumptions, emission factors and differences between businesses. Figures have been rounded and should be interpreted as estimates of scale rather than precise totals. Scope 3 emissions are excluded.*

The Study also suggests that carbon measurement is still at an early stage for much of the bakery product manufacturing subsector. Around 82% of bakeries do not currently track emissions, while the remaining 18% track emissions internally but do not report publicly. Many bakeries are likely to already have the underlying information needed to estimate Scope 1 and Scope 2 emissions, including electricity, gas, LPG, diesel and refrigerant data. The challenge is often not data availability, but turning that information into a simple, repeatable baseline.

The bakery's business model is an important consideration when interpreting emissions. A café-bakery may have a material share of energy use in lighting, coffee equipment, display refrigeration and air conditioning. A wholesale bakery may have larger production, packaging, cold storage and delivery loads. A factory-based bread producer may have higher total emissions because of scale, even if it is more efficient per unit of output. For this reason, a useful emissions profile should be interpreted within the context of production volume, product mix, trading hours and site configuration.

Carbon accounting does not need to be complex. For most bakeries, the practical first step is to capture and track electricity, gas, LPG, diesel and refrigerant information, then link it to simple business activity measures such as production volume, flour use, oven hours, trading days or revenue. This creates a baseline that supports better decision-making, helps identify cost-saving opportunities and provides a practical foundation for future energy and emissions improvements.

Scope 1 and 2 emissions from bakery operations, including production and retail activities

Scope 1

Direct emissions from sources controlled by the business

- Natural gas or LPG — ovens, proofers, hot water, heating, cooking
- Diesel or petrol — company delivery vehicles, forklifts, generators
- Refrigerants — rooms, freezers, display cabinets, other cooling systems

Scope 2

Indirect emissions from purchased electricity

- Refrigeration, freezers, display cabinets
- Electric ovens, proofers, mixers, slicers
- Lighting, HVAC, controls
- Hot water, dishwashing, cleaning equipment
- Packaging, motors, compressed air
- Retail, café, customer-facing operations

What WA bakeries are already doing

Insights from the Study show that many bakeries are already taking practical and proactive steps to manage energy use and reduce emissions. The subsector demonstrates a strong awareness of energy costs, with some businesses implementing a range of improvements that deliver both operational and environmental benefits.

Common actions already underway include:

- upgrading to more efficient ovens and refrigeration systems
- improving insulation and sealing
- transitioning to LED lighting across production and retail areas
- refining operating practices to minimise unnecessary energy use while still maintaining product quality by:
  - optimising oven start-up times
  - reducing idle periods between batches
  - implementing clearer shutdown procedures
- regular refrigeration management to improve efficiency by:
  - adjusting temperature set-points
  - improving airflow and reducing door openings
- optimising energy use with trading hours by reviewing display cabinet operation, lighting schedules and HVAC settings
- adopting renewable energy solutions, such as:
  - rooftop solar, particularly where daytime production and retail loads effectively use on-site generation
  - electrification of certain processes.

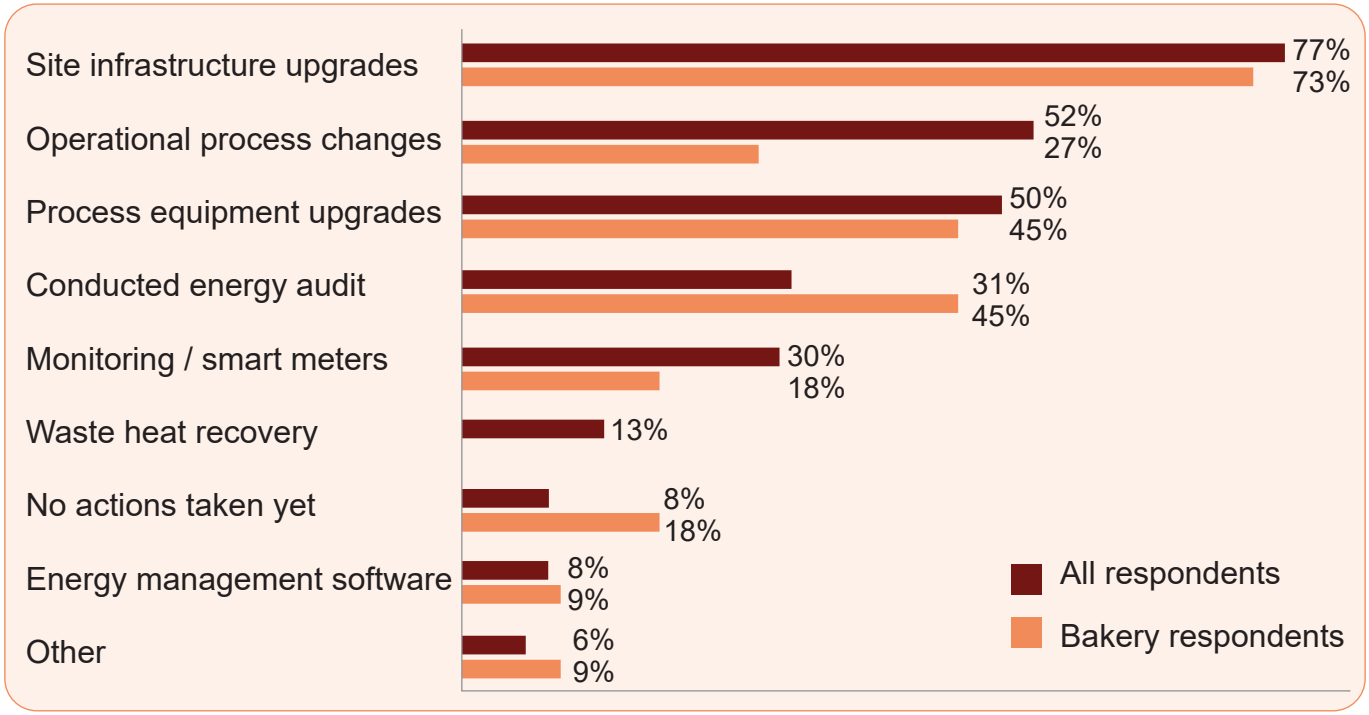


Figure 3: Energy efficiency actions of WA bakeries

These actions reflect a practical, business-led approach. Many bakeries are integrating energy improvements into routine maintenance, equipment replacement cycles and broader business upgrades. While there is still an opportunity to expand the use of advanced tools such as sub-metering, energy management systems, and waste heat recovery, the subsector is already building a strong foundation of energy awareness and continuous improvement.

Study insights suggest renewable energy is an emerging opportunity for WA bakeries. Around 45% of bakeries already use renewable energy as part of a mixed energy supply, while the remaining bakeries indicated they are considering it. On-site solar was the most common form reported, particularly relevant for bakeries with daytime production, refrigeration, café, retail or packaging loads.

73%

of bakeries have undertaken site infrastructure upgrades

While many industries turn to renewables as a first solution to managing energy costs and reducing emissions, bakeries often operate on leased premises or shared sites where implementing solar is challenging or not possible.

The opportunity is strongest for stand-alone bakeries and larger commercial bakeries that have roof space, direct energy accounts and more control over building infrastructure. For bakeries in shopping centres, retail strips, leased premises or shared sites, renewable energy can be more difficult due to landlord approvals, embedded networks, roof access, lease terms or split incentives. Where on-site solar is not practical, bakeries can still improve energy efficiency, reduce avoidable electricity demand and explore renewable electricity options through their retailer or landlord.

Lawley's Bakery – baking efficiency into every shift

For Lawley's Bakery, energy efficiency has been a gradual journey of smarter decisions across the bakery floor. The business started by looking more closely at how and when energy was being used. Smart meter data helped the team understand peak demand periods and plan when machinery should run, reducing pressure on the electrical system during busy production periods. Simple maintenance practices, such as cleaning solar panels, also helped improve system performance.

General Manager Callum Thomas with Lawley's new efficient rolling machine (photo: Lawley's Bakery)

Lawley's has also focused on changes that improve production flow and reduce unnecessary equipment run time. The bakery invested in automated dough and pastry equipment, to move more products smoothly through preparation. Faster, more consistent preparation has reduced waiting time for proofers and ovens, while also easing physical demands on staff.

Looking ahead, Lawley's is considering future improvements including oven upgrades, enhanced door systems, water filtration and refrigeration upgrades. These refinements support better temperature control, protect equipment, maintain product quality and improve efficiency across the bakery.

A standout feature of Lawley's efficiency journey has been the procurement of a new dishwasher imported from Portugal. This significant investment has enhanced one of the bakery's most heavily used cleaning processes, enabling racks, crates and equipment to be washed faster and more consistently.

Faster cleaning means less time running hot water, pumps and associated equipment, which minimises avoidable energy use during clean-down. It also reduces the need for manual washing and high-pressure hoses, helping cut water use, labour time and process delays.

> **"We look for upgrades that improve the whole process, not just one task. With energy and labour costs rising, better technology can help bakeries produce more efficiently, reduce equipment run time, protect machinery and make work easier and safer for staff. Lawley's Bakery CEO, Sarah Thomas"**

While energy and emissions outcomes are still being tracked, Lawley's experience shows that efficiency is built through both everyday improvements and larger strategic investments.

Operating costs: a key driver for action

Cost is the clearest driver for bakery businesses. All bakery respondents identified lower operating costs and reduced power bills as a driver for reducing energy use or greenhouse gas emissions. This is unsurprising given the energy profile of bakeries: ovens, proofers, refrigeration, hot water, HVAC, lighting, display cabinets and retail equipment can all operate for long periods, often within the context of tight margins and daily production pressures.

For bakeries, energy efficiency is closely linked to commercial resilience. Reducing avoidable energy use can help manage exposure to rising power and gas costs, improve equipment reliability, reduce unnecessary run-time and protect margins in a subsector already exposed to higher ingredient, labour, rent, freight and packaging costs.

Business values and ethics are also important, selected by just over half of bakery respondents. This suggests many bakeries see energy efficiency as part of running a responsible local business, not only as a cost-saving exercise. For community-facing bakeries and café-bakeries, sustainability credentials can also support customer trust, local reputation and alignment with changing consumer expectations.

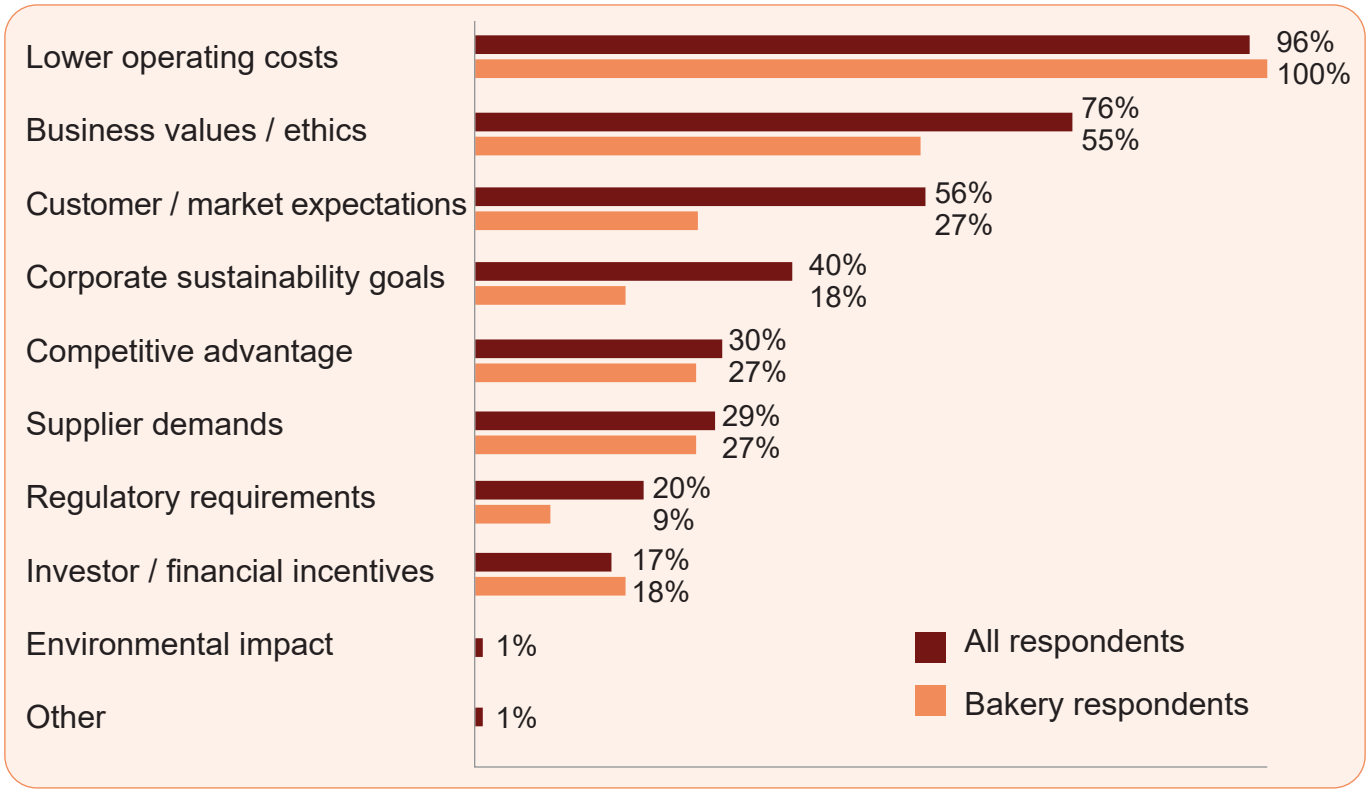


Figure 4: Emissions reduction drivers for WA bakeries

Upfront costs to upgrade: a key challenge for bakeries

WA bakeries are motivated to reduce energy consumption but the next step is not always simple. High upfront costs, specialised equipment, leased premises and uncertainty about technology options can slow action.

High upfront costs were identified by 82% of bakery respondents, highlighting that many businesses may understand the opportunity but face challenges in funding equipment upgrades, energy audits, metering, solar, controls or refrigeration improvements.

Specialised equipment constraints were also more prominent for bakeries than for the broader food and beverage sector, selected by 55% of bakery respondents compared with 48% of all respondents. This reflects the nature of bakery operations, where energy-using assets such as ovens, proofers, retarder-provers, refrigeration systems and display cabinets are highly specific to production needs, product quality and food safety. Replacing or modifying this equipment can be expensive, disruptive and technically complex, particularly where businesses rely on existing bake schedules, gas connections, electrical capacity or leased premises.

A further insight is that **unfamiliarity with technologies** was selected by 27% of bakery respondents, well above the broader food and beverage average of 11%. This suggests that some bakeries may be interested in reducing energy consumption but are unsure which technologies are suitable, reliable or commercially viable for their operations. This is particularly relevant for options such as efficient ovens, heat pumps, refrigeration upgrades, solar and batteries, automated controls, energy management systems or alternatives to gas and LPG equipment.

These barriers suggest that bakeries may benefit most from practical, staged support rather than one-off recommendations. Lower-cost actions such as better controls, maintenance, timers, shutdown routines and energy monitoring can help businesses build momentum. Larger upgrades may require supplier-neutral advice, feasibility assessments, financing options, rebates or grants.

Bakeries are motivated to reduce energy use, but affordability and specialised equipment requirements can make action difficult, particularly where major ovens, proofers, refrigeration or electrical upgrades are involved.

55%

identified specialised equipment constraints as a barrier to reducing energy use

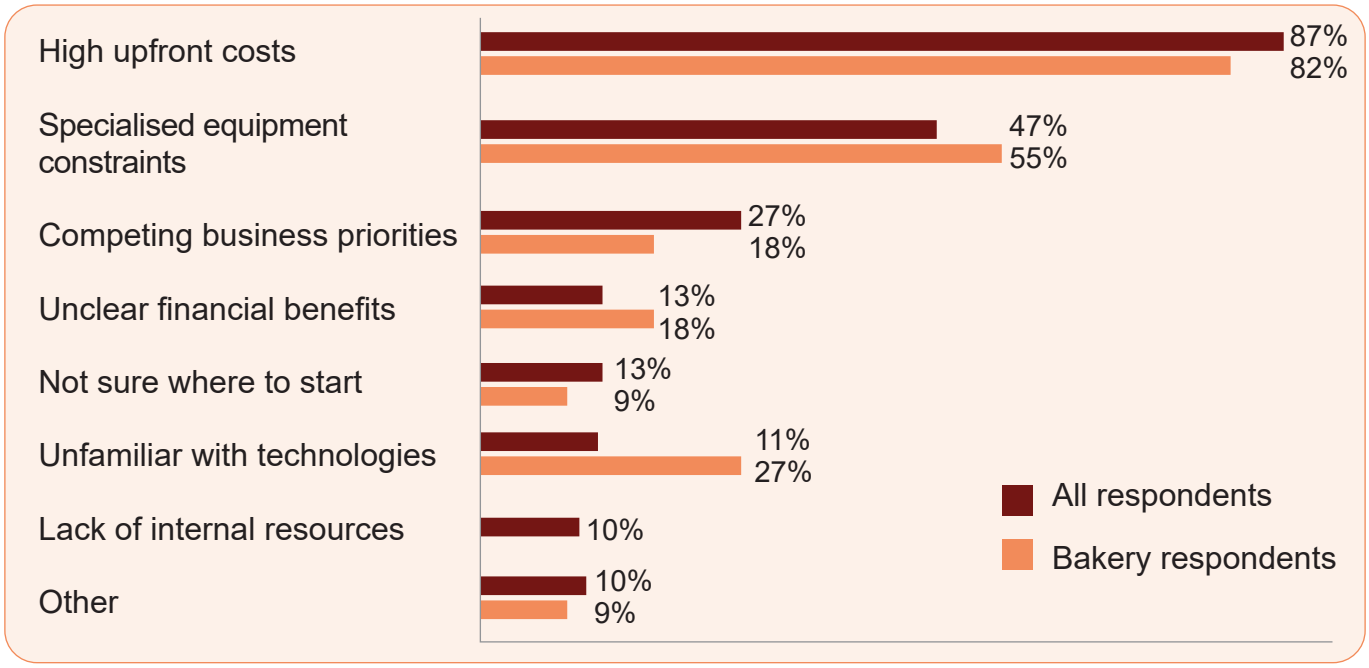


Figure 5: Barriers to energy efficiency for WA bakeries

The future: a practical pathway for bakery product manufacturing

The most effective approach to improve energy performance for WA bakeries is likely to be practical, staged and aligned with each business's equipment, operating hours, premises and investment capacity.

Study results show a strong commercial motivation for action, with all respondents identifying lower operating costs and reduced power bills as a driver. At the same time, further investment can be constrained by upfront costs, specialised equipment requirements, production disruption and competing business priorities.

The pathway therefore needs to focus on practical actions that can be implemented progressively — from understanding energy use and improving day-to-day controls, through to planned equipment upgrades and lower-emissions energy sources.

Using the **Measure → Optimise → Upgrade → Decarbonise** framework, the pathway for bakeries can be staged according to each business's energy maturity, equipment profile, premise arrangements and investment capacity.

This approach allows bakeries to reduce energy use and emissions while managing affordability, equipment constraints, production risk and technical complexity.

Measure: Understand what is driving energy use

The first step is to **measure** energy use and emissions by establishing a simple and repeatable Scope 1 and Scope 2 baseline. This should include electricity, gas, LPG, diesel, petrol and refrigerant data, supported where possible by business activity data such as production volume, flour use, oven hours, trading days, refrigeration loads, delivery activity or revenue. A simple monthly spreadsheet may be sufficient to identify trends, unusual changes and priority areas for action. Where practical, smart meter data, temporary data loggers or sub-metering can help bakeries better understand priority loads such as ovens, refrigeration, HVAC, hot water, retail areas and packaging equipment. Better visibility of energy use can inform stronger business cases that justify upgrades to equipment and systems.

Optimise: Make existing systems work smarter

Once energy use is better understood, bakeries can **optimise** existing systems through lower-cost operational improvements, including:

- **Baking and ovens:** review start-up and pre-heat times, idle times between batches, oven loads, seals and exhaust settings.
- **Proofing and refrigeration:** review proofing settings, refrigeration set-points, cool room seals, airflow, insulation and condenser cleanliness.
- **Retail and HVAC:** align lighting, display cabinets and HVAC schedules with trading hours.
- **Hot water and controls:** review hot water use, shutdown routines and unnecessary runtime.

A useful question for each site is: what is running when it does not need to be? Consider whether hot production areas are increasing refrigeration or air conditioning demand. These actions are generally lower cost and are less disruptive than major equipment replacement, and can also improve equipment reliability, reduce avoidable energy consumption and support product quality.

Upgrade: Where the business case is strongest

The next stage is to **upgrade** equipment and controls where there is a clear business case. Upgrade decisions should be based on a measured load, rather than a technology list. For each option, assess the expected energy saving, effect on peak demand, maintenance and labour impacts, production downtime, electrical or gas capacity, product-quality risk and remaining life of the existing asset. Equipment replacement, lease renewal, expansion and major maintenance are practical points at which to compare lower-energy alternatives. Opportunities include:

- **Ovens and processing equipment:** efficient ovens and burners, improved proofing controls, efficient motors, variable speed drives.
- **Refrigeration and display:** refrigeration upgrades, display cabinet upgrades, lower-impact refrigerants, efficient hot water systems.
- **Digital and site energy:** timers, automated controls, smart meters, energy management systems, LED lighting.
- **Retail and cafe:** HVAC improvements, efficient coffee equipment, solar PV, dishwashing and customer areas.

Decarbonise: Shift remaining demand to cleaner energy

Over the longer term, bakeries can decarbonise by shifting remaining energy demand to lower-emissions sources (where technically and commercially viable). Renewable electricity may suit bakeries with daytime production, refrigeration, café, retail or packaging loads. On-site solar may be more challenging for early morning oven loads unless paired with operational changes, battery storage, tariff management or renewable electricity procurement. Opportunities may include renewable electricity contracts, heat pump hot water, electric or hybrid heating technologies, battery storage, lower-impact refrigerants, electric delivery vehicles and electrification of ageing fossil-fuel equipment where site capacity and equipment availability allow.

The transition pathway should be aligned with normal maintenance, lease and asset replacement cycles. This allows bakeries to avoid locking in inefficient or higher-emissions equipment where lower-emissions alternatives may become viable. It also helps ensure investment decisions are commercially realistic and do not compromise production timing, product consistency, food safety, customer service or trading hours.

The opportunity for WA bakeries is to improve energy productivity, reduce avoidable energy use, manage cost exposure and strengthen sustainability credentials while continuing to serve local communities, retail customers and foodservice markets. The future of lower-emissions baking is likely to be shaped by a combination of better data, improved day-to-day controls, staged equipment upgrades and practical support. Together, these measures can help bakeries reduce emissions while accounting for the operational realities of production equipment, refrigeration, retail operations, leased premises and commercial viability.

Bakery Product Manufacturing

A practical pathway to efficient, resilient and lower-emissions baking

Step 1: measure

Establish simple and repeatable baseline data

- **Capture energy and emissions:** electricity, natural gas, LPG, diesel, petrol, refrigerants
- **Capture activity:** production volume, flour use, oven hours, trading days, refrigeration loads, deliveries, revenue
- **Track:** both absolute emissions and emissions intensity over time
- **Tools:** smart data loggers, sub-meters, spreadsheets

Step 2: optimise

Prioritise low-cost operational improvements first

Baking and ovens	**Proofing and refrigeration**	**Retail facility and HVAC**	**Hot water and controls**

Fast, low cost, low disruption improvements to boost reliability and reduce energy waste

Step 3: upgrade

Make targeted investments in equipment and controls

Ovens and process equipment	**Refrigeration and display**	**Digital and site energy**

Opportunities: commercial bakeries
Ovens, proofers, refrigeration, packaging and hot water

Opportunities: retail and café bakeries
Display refrigeration, lighting, HVAC, dishwashing and customer areas

Develop a strong business case to support payback periods, leased premises, production disruption, and/or site constraints

Step 4: decarbonise

Plan for longer-term decarbonisation opportunities

Renewable electricity	**Solar PV and battery storage**	**Heat pump hot water**	**Electric or hybrid heating**
Lower-impact refrigerants	**Electric delivery vehicles**	**Electrification of ageing fossil-fuel equipment**	**Renewable electricity for retail and café loads**

Site-specific options are most viable for stand-alone bakeries with suitable roof space, or with plans to replace equipment or relocate premises

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