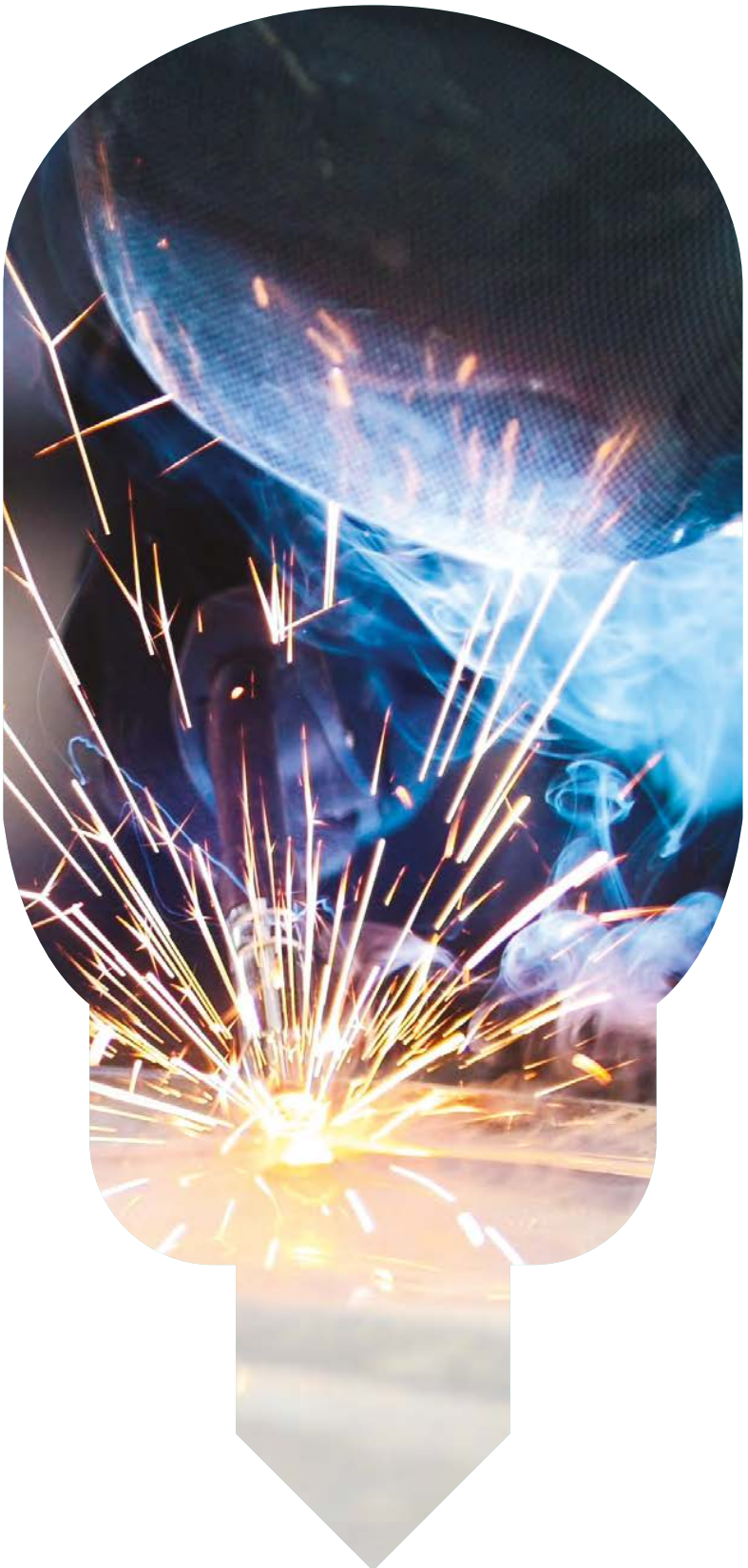
Energy efficiency guide

Manufacturing



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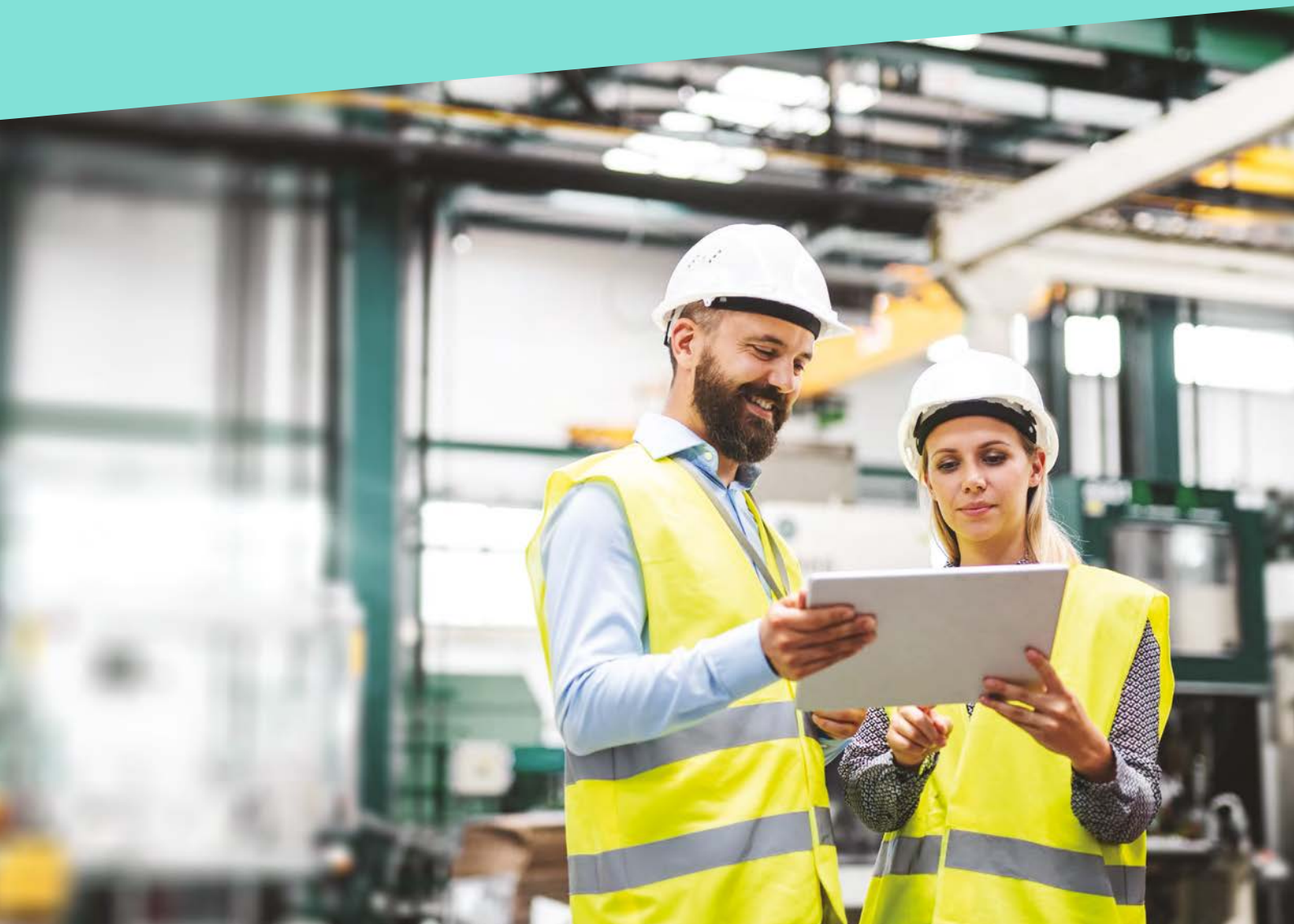


Get smart, save energy

The manufacturing sector, in all of its guises (see right), uses a considerable amount of electricity in terms of refrigeration, power distillation, drying and evaporation units, and compressed air.

However, there are some general ways it can cut back on energy usage.

5 steps to reducing your energy consumption

01 Commit to continuous improvement – involve staff, set goals and track progress

02 Analyse your start point performance, develop benchmarks and track improvements

03 Set realistic, measurable goals and target dates to see how you're doing

04 Choose the steps you'll take to achieve those goals and involve your employees

05 Implement and measure results, communicating all wins, no matter how small

What do we mean by manufacturing?

When referring to this sector, we're including manufacturers of:

- Automobiles
- Chemicals
- Household goods
- Sports equipment
- Other durable goods
- Jewellery
- Food and drink processors
- Other consumable (non-durable) products

How your manufacturing business can save energy

We've used the Carbon Trust's energy saving reports on chemicals, food and drink processing and other guides as sources of information for the following suggestions.

These tips highlight areas of consumption that, with improved efficiency, could deliver valuable savings. The amount you recoup depends upon your organisation and your investment.

To help with your budgeting and energy efficiency planning, the tips cover (where possible) three options: no-cost, low-cost, and long-term savings.

No-cost changes

You can make these simple changes quickly – and it won't cost a thing.

Low-cost changes

For a minimal spend you can soon achieve worthwhile savings – and relatively easily too.

Long-term savings

Make a more substantial investment now – and you'll see the returns over time.

Heating

No-cost changes

- Regularly check boilers to ensure there are no faults. Servicing your gas boiler once a year and oil boiler twice a year can save you up to 10% on heating costs.
- Reduce thermostats by 1°C – it can lead to an 8% cost saving.
- Monitor the steam distribution network for leaks or other issues. 10% of the heat produced by steam boilers can be lost through inefficient insulation.

Low-cost changes

- If you're in chemicals, consider pre-heating the combustion air using flue gases or exhaust fumes. If combustion air reaches 20°C, there should be a 1% improvement in boiler efficiency.

Long-term savings

- Consider using automatic controls / isolation to meet demand at varying rates of heat.
- If your heating needs vary, consider using several smaller boilers to match demand.
- Fit economisers / heat exchangers to the flue gas outlet. These will transfer heat from the gas to the water feeding the boiler, reducing the energy needed to heat the water.
- Control the flow of combustion air with variable speed drive fans rather than dampers.
- Isolate pipework that's no longer in use to prevent unnecessary heat loss.
- If you have hard water, an automatic treatment system can save 2% of energy use.

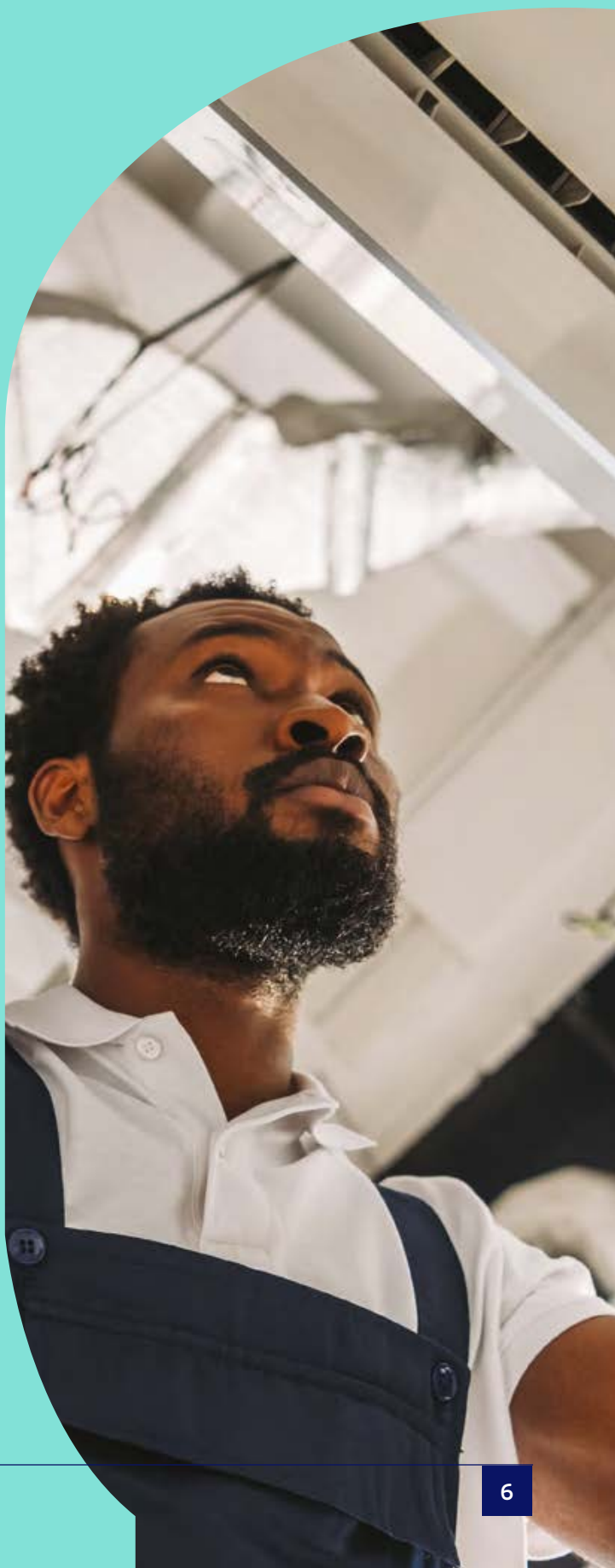
Ventilation / air conditioning (VAC)

No-cost changes

- Check that you don't leave extraction fans or ventilation devices running unnecessarily. Despite its small baseload, an extractor increases the need for heat by around 5%.
- Minimise AC use by avoiding sources of unexpected heat - e.g. office equipment left on when not in use; artificial lighting on when daylight's available.
- Adopt a temperature range - e.g. 19–24°C - when heating and cooling are both off.

Long-term savings

- Consider interlocked control with time switches and sensors. These will automatically turn off ventilation when you turn specific equipment off.
- Look for energy efficient fans. Despite their higher purchase prices, they'll save you money in the long-run.



Lighting

No-cost changes

- Avoid leaving lights on – especially when daylight's available – and label switches, so people feel confident they're turning off the right thing.
- Move people closer to daylight and have blinds open during the day.
- Keep windows, skylights and light fittings clean.

Low-cost changes

- Use timers to automatically match working hours and/or occupancy to the lighting.
- See the Energy Saving Trust report: 'The right light – selecting low energy lighting'.

Refrigeration

No-cost changes

- Introduce a maintenance programme (checking for scaling, ice build-up and damaged vent fins) and, if you can see bubbles in the refrigerant, fix the leaks as soon as possible.
- Make sure the pipe insulation's in good condition and seals are sound.
- Don't overload the refrigeration systems – it makes the system work too hard to maintain the temperature. Don't run them empty either, as this wastes energy.
- Don't overcool – every 1°C warmer can save 2–4% of costs, so check the correct temperature for whatever you're storing.
- Keep doors closed whenever possible – they can account for up to a 30% increase in heat load. Ice build-up's a sign that too many air changes are occurring.

Long-term savings

- If your output varies, use two or more smaller refrigeration units rather than one large one and turn off any unused equipment.

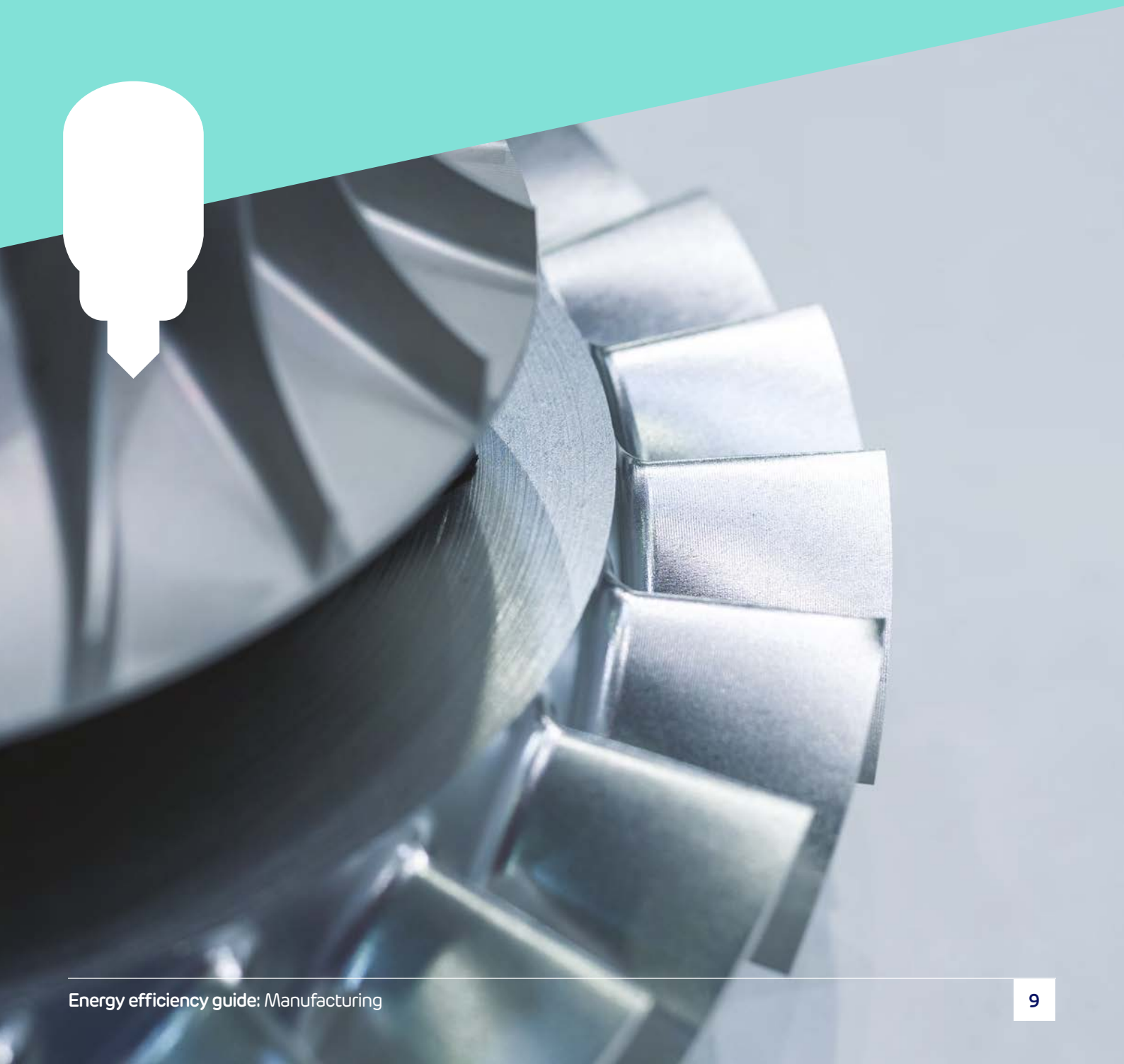
Compressed air

No-cost changes

- Determine whether you really need to use compressed air. Could air blown from a fan do the job more cost-effectively?
- Switch it off - an idle compressor uses 40% of its full load. Despite the high cost of production, many systems waste about 30% of the compressed air through leaks, poor maintenance, misapplication and poor control.

Low-cost changes

- If parts of the system - e.g. pipework for the compressor line - aren't necessary, isolate them to reduce waste.
- Use cool air to reduce load on a compressor - a 4°C drop increases efficiency by 1%.



Motors and drives

No-cost changes

- Switch off motors when you don't need them rather than keeping them idle.
- Lower motor speed. A 20% reduction can result in a 50% energy saving.

Long-term savings

- If motors are bigger than they need to be, consider installing smaller, more efficient replacements.
- When a motor fails, replace it with a higher efficiency motor for a 2-5% uplift in efficiency or install variable speed drives to boost efficiency by up to 30%.

Low-cost changes

- Maintain motor systems (e.g. regular cleaning and lubrication, plus checks for belt tension and alignment) to save up to 10% in energy consumption.

Distillation, drying and evaporation

No-cost changes

- Check whether you could re-use waste heat somewhere else on site.
- Regularly check product yield against energy use – anomalies indicate problems.
- Ask yourself whether you can use less water in the initial stages of production. Alternatively, consider whether you can use different techniques such as centrifugation to reduce the amount of water required before the drying stage.

Long-term savings

- Insulate equipment - these processes often suffer from a loss of insulationg.
- Consider reduced-pressure distillation, since it uses lower temperatures.

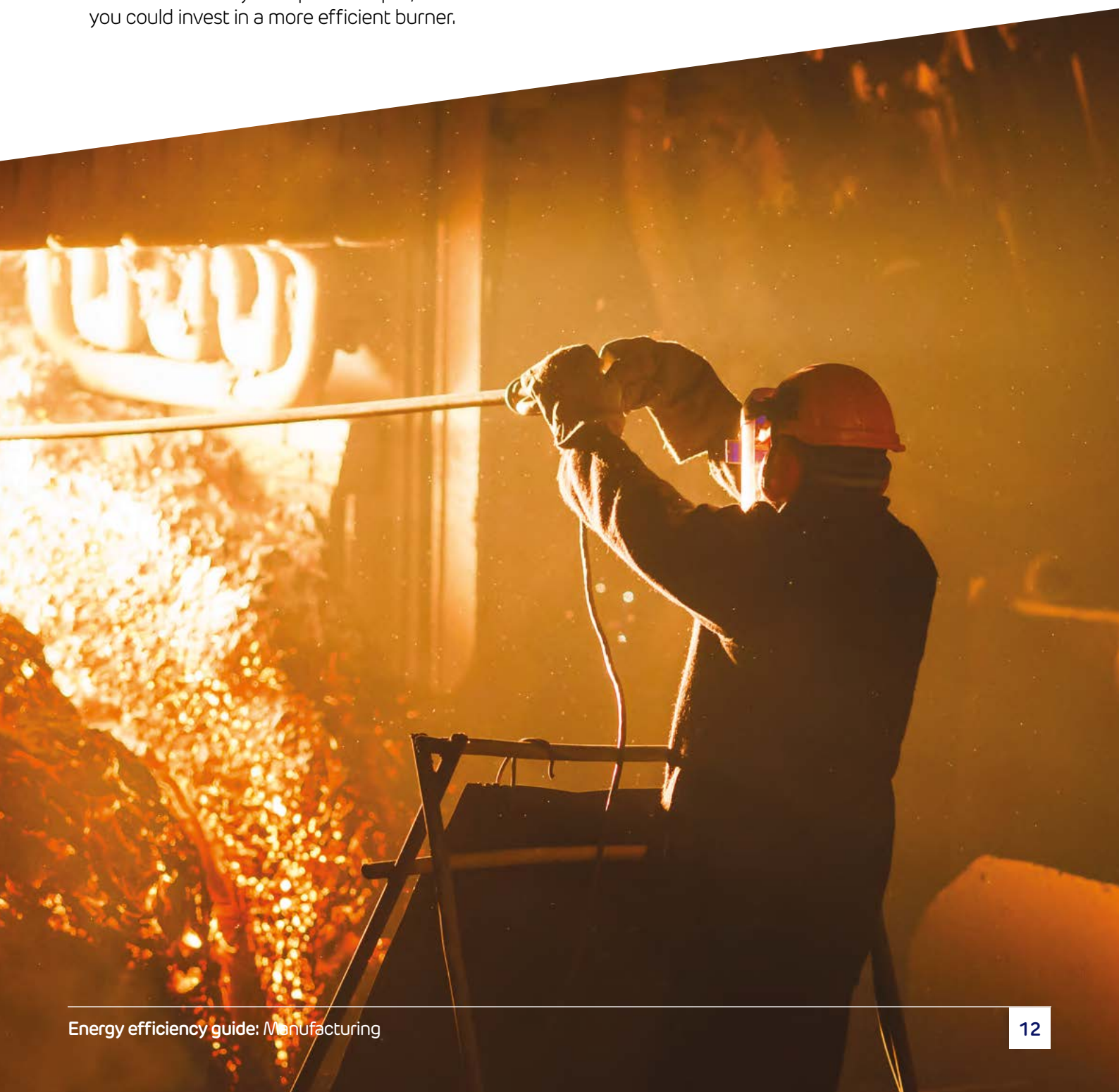
Furnaces

No-cost changes

- Record furnace performance daily (check against manufacturer recommendations) by looking at the ratio of energy use and yield. Deviations highlight problems or opportunities to improve yield with the same energy input.
- Explore whether you can charge and unload the furnace differently to improve output, or whether you could invest in a more efficient burner.

Low-cost changes

- Find out what variables to monitor to control the quality and emissions of the furnace.
- Maintain furnaces regularly and check the air/fuel ratio for correct combustion versus fuel consumption.



What's next?

Smart meters are the first step towards energy efficiency, automating your readings and enabling insights into your energy use. But they can also support you on your journey to net zero, too.

Join the smart revolution by registering your interest in smart meters today. Call 01473 617213 or email smart@drax.com.

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