

Manufacturing



Contents

Get smart, save energy	3
Heating	5
Ventilation/air conditioning (VAC)	6
Lighting	7
Refrigeration	8
Compressed air	9
Motors and drives	10
Distillation, drying and evaporation	11
Furnaces	12
What's next?	13



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 to cutting 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
- The makers of other consumable (nondurable) 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 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 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)



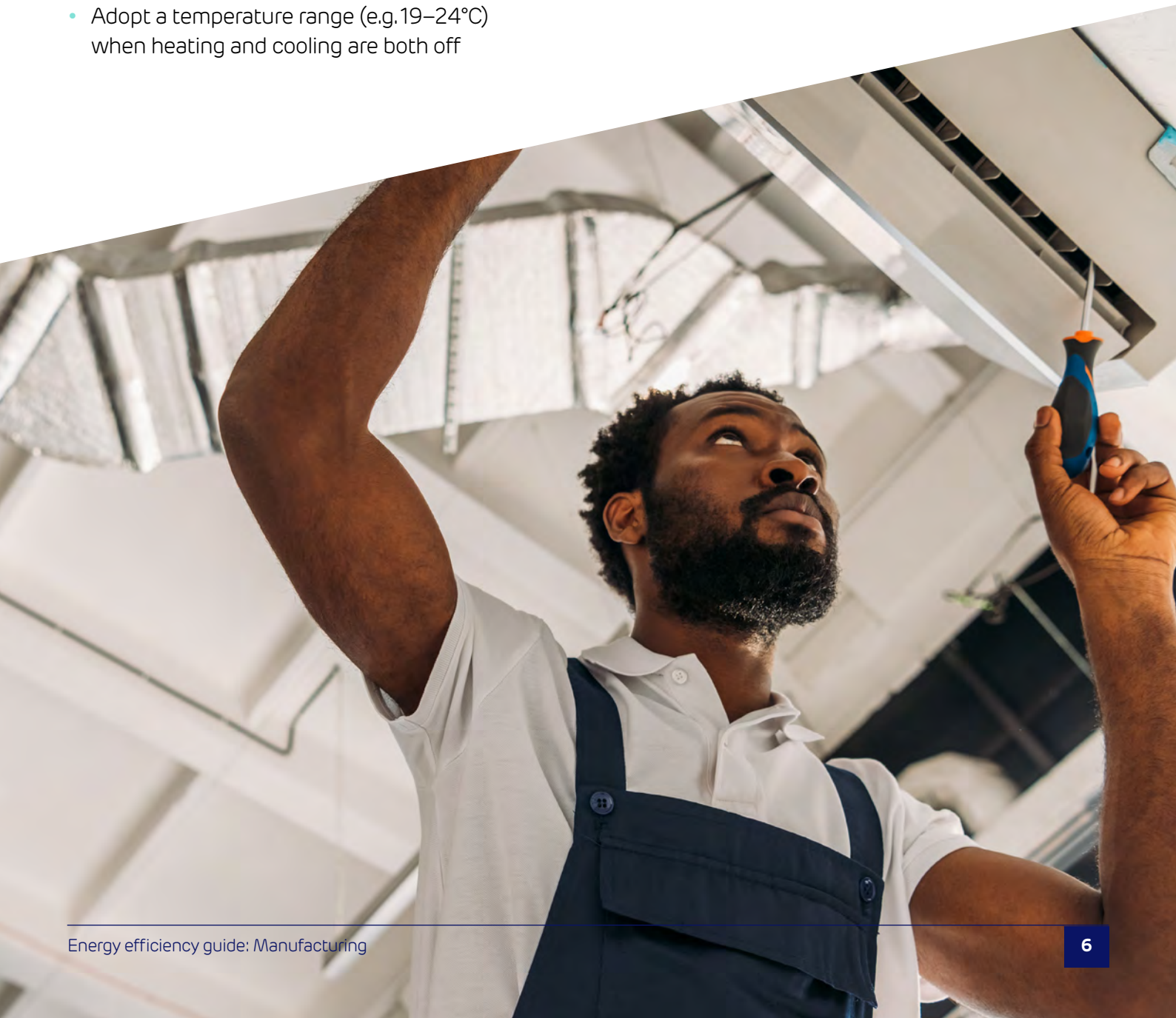
No-cost changes

- Check that extraction fans and ventilation devices aren't left running unnecessarily (despite its small baseload, an extractor increases the need for heat by around 5%)
- Minimise AC use by minimising sources of unexpected heat (e.g. office equipment left on when not in use; artificial lighting when daylight 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 specific equipment is turned off
- Look for energy efficient fans and ignore the upfront cost when making the decision



Lighting



No-cost changes

- Avoid leaving lights on – especially when daylight is 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, damaged vent fins) and, if you can see bubbles in the refrigerant, fix the leaks as soon as possible
- Make sure the pipe insulation is in good condition, and seals are sound too
- Don't overload the refrigeration systems – it makes the system work too hard to maintain the temperature – and don't run it too empty either, as it's wasteful
- 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 is a sign that too many air changes occur)



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

- Identify whether compressed air is really needed in tasks where it's used (e.g. could air blown from a fan do the job more cheaply?)
- Switch it off – an idle compressor uses 40% of its full load. Despite the high cost of production, many systems waste around 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 needed, isolate them to reduce waste
- Use cool air to reduce load on compressor – a 4°C drop increases efficiency by 1%



Motors and drives



No-cost changes

- Switch off motors when they're not required, rather than keeping them idle
- Lowering a motor's speed by just 20% can save up to 50% energy



Long-term savings

- If motors are too big for what's required, consider installing smaller, more efficient replacements
- When a motor fails, replace it with a higher efficiency motor (between 2% and 5% more efficient) or install variable speed drives (up to 30% more efficient)



Low-cost changes

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



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
- Can you use less water in initial stages of production, or use alternative techniques such as centrifugation, to reduce amount of water before the drying stage?



Long-term savings

- Insulate equipment – these processes often suffer from a loss of insulation
- 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



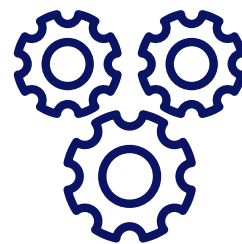
Low-cost changes

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



What's next?

If you've any questions,
call us on 01234 567890
or email smart@drax.com
energy.drax.com/smart



drax