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Energy Management in Commercial Kitchens

By James Brittain, energy sustainability practitioner and consultant

For commercial kitchens, wasting energy is as bad as wasting food. Energy costs have doubled in recent years, at a time when staffing, food and other costs have all been rising too.

To survive, kitchens need to apply a holistic approach to energy management, in the most cost-effective way, whilst keeping kitchens working and achieving longer-term business plans and sustainability goals.

Teams (who can impact on energy use) need to work well together to achieve this. Wasted energy is the invisible leak. It comes about through lack of awareness, know-how and disconnected priorities. Equipment left on most of the time not only increases energy and water use and cost but can also indicate local comfort and equipment reliability issues in commercial kitchens.

Decarbonisation pressures also mean operators are looking to move away from using fuels like natural gas to reduce carbon emissions as well. Kitchens often need to free up electrical capacity, by reducing waste, to make the shift over to clean electric appliances without having to invest in a new electricity supply.

There is no silver bullet; no two operations are identical. The same principles apply whether cooking is done using electricity, gas or even firewood or charcoal.

Energy Management Charter

The best way to connect purpose, place, people and performance, in terms of energy use, is to establish a local 'charter'.

An Energy Management Charter communicates the leadership vision to inspire colleagues, gives teams the authority to act and focuses objectives for change. It should draw on industry best practices from sources such as ISO 50001 (the international energy management system standard) [1], EnCO (the industry's leading not-for-profit initiative for people solutions, supported by the Energy Institute) [2] and CIBSE's technical memorandum for commercial kitchens (TM50) [3].

There is no one magic bit of kit. A charter can promote the wide range of opportunities. The best results usually come about by bringing together operational and technical solutions, with good simple management controls alongside.

Objectives include:

- Empower local energy conscious operational practices
- Enhance the energy efficiency of appliances and equipment
- Embed management processes to drive continual improvement.

Commercial kitchens are making good savings by taking such a holistic approach. In the UK, large operators are publishing their energy savings action plans, along with annual progress updates, as required by the Energy Savings Opportunity Scheme (ESOS) Regulations 2014. These plans illustrate actions being taken, subject to their reporting accuracy.

The Restaurant Group (with brands like Wagamama), for example, has reported savings of 2,340,493 kWh in last year's ESOS progress update [4], using a mix of operation and maintenance practices, equipment upgrades and ongoing management monitoring and targeting.

Projects have demonstrated that restaurants are using as little as half the energy of comparable operations using a combination of operational and technical measures [5]. Typical savings are often 15-30%.

It starts with significant energy users (SEUs).

Who's involved? – SEUs are those with either hands-on control of significant energy use (ie kitchen staff) and those who have decision-making ability or influence which impacts on significant energy use (ie management, finance, asset teams, facilities, others).

Why would they buy-in? – Pride in a better service for the customer, cutting out waste, keeping kitchens cool, greener operations, delivering the chosen kitchen offer in the most effective way, safeguarding jobs, doing it together, company net zero goals.

What scope to focus on? – Cooking equipment, dishwashing, refrigeration, extract ventilation, lighting, and other significant energy cost items, reducing energy or water consumption, cost and carbon whilst not compromising service and food safety. See figure 1 for an illustrative example cost split of energy uses.

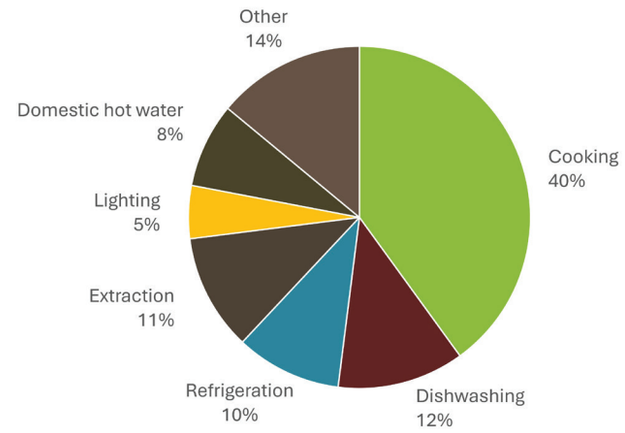
How to overcome any concerns? – Clear management backing, listen to colleagues, great response to ideas and suggestions, good communication, commitment to allocate resources, set up roles and responsibilities, close the loop and feed back on results.

1) Operational interventions

Objectives for operational actions can be structured around the pillars for energy conscious organisations (EnCO): Engagement, Alertness, Skills, Recognition and Adaptability. Existing practices can be benchmarked using the EnCO Matrix.

Local champions act as 'key connectors' talking and listening to colleagues and bringing the

Figure 1. Significant energy users' consumption cost split for a busy restaurant kitchen at Heathrow airport



organisation's energy goals to life by connecting-up teams for local improvements and projects [6].

Responsibilities should match up with capability and training; for example, mistakes made with programmable ovens can result in food and energy wastage.

The Snowfox Group (Japanese sushi brands YO!, Taiko, Bento and Snowfox) is introducing restaurant-specific staff user manuals on how restaurant facilities and kitchen equipment operate: optimising settings, reviewing operational hours, relocating equipment for more efficient operation, staff training and energy monitoring to better understand how energy is being used. Estimated savings potential is 1,612,439 kWh (by 5 Dec 2027).

Operating instructions need to be simple to understand and carry out, particularly where English may not be people's first language or staff churn levels are high. Enable (auto) eco setback modes on fryers, pasta cookers, grills and other equipment to switch into standby modes between use. Colleagues should listen out for and react to door alarms when fridge and appliance doors are left open accidentally.

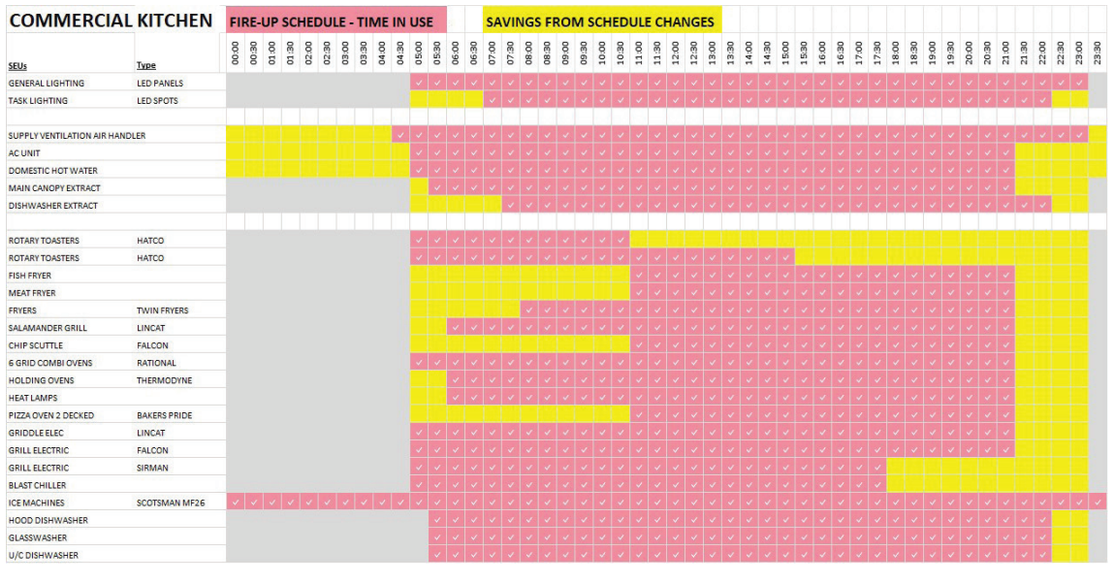
Operational communications should focus on the benefits of energy savings, what can be done to improve performance and roles and ownership of it. Many valuable energy saving ideas come directly from kitchen operators.

Training should focus on areas of kitchen energy or water waste, particularly where operators are switching appliances on too early in the day (and leaving them on), keeping fridge doors open, inadequate cleaning or defrosting. Whenever untrained staff operate within a kitchen, there is likely to be a negative effect on energy use and operational safety. Better practices ensure good levels of operational performance and efficiency.

Of course, kitchens with high staff turnover rates have more training needs. It needs to be remembered that investment in staff training and people will pay back through improved energy productivity and a more stable workforce. When a new type of energy-saving equipment is introduced, operators must become fully trained to maximise its use.

All colleagues should be made aware that their actions will have a direct impact on energy use and the environment, from the point they arrive on shift to leaving at the end of the day.

Figure 2. Snapshot of an illustrative commercial kitchen fire-up schedule



Regular staff appraisals can enable the identification of personal and team energy awareness and training needs.

2) Technical energy efficiency measures

CIBSE TM50 lays out the design considerations for selecting kitchen equipment, HVAC, lighting and metering systems.

Kitchen equipment, such as infrared plated food servers and salamander grills, can be fitted with presence controls to activate heating elements when food is detected, reverting back to standby when not in use. Griddles can also be powered on or off at specific times or during busy periods. Programmable controls on combi-ovens also offer chefs more options to batch cook on-demand to order, helping to cut down on food waste as well.

Demand-based ventilation is also an effective means of saving energy in commercial kitchens. Many canopy systems run extraction at maximum (100%), assuming all appliances are running. As this is highly unlikely, systems can be controlled to reduce extraction rates when full extraction is not required. This can be based on temperature or effluent sensing, optics or power draw of the cooking appliances in use. Affinity laws suggest that halving the extract rate reduces energy use by 87.5%. Care needs to be taken to ensure adequate minimum ventilation requirements are met and that ventilation systems don't get contaminated with grease.

The likes of the **Mayfair Hotel, St Andrews Healthcare and Turtle Bay Caribbean Restaurants** have also all reported they are trialling, or now making savings from, on-demand controls on their kitchen extract systems. **Deliveroo** is also looking to save 650,000 kWh by upgrading its ventilation within its delivery-only kitchens.

Heat recovery for hot water generation (or use for tempered supply air) exploits the large amount of wasted heat energy available in kitchens, mainly from the cooking, refrigeration, dishwashing and hot water discharge processes.

Other measures being reported by kitchen operators include upgrading lighting to LED, lighting controls, use of building management systems, upgrading insulation standards and using building fabric measures.

Lighting is a very visible user of energy. Illumination levels should be maintained at 500 lux on work surfaces. New dimmable LED fittings allow for dimming down when new fittings are installed to avoid over illumination. Consider use of absence or presence detectors (or timed controls) for storage and rest areas to switch off (or setback) light levels when areas aren't in use (without compromising health and safety standards).

Daylight is also important for staff wellbeing. Use of skylights or light pipes helps bring in more daylight. Where heat gain may be an issue, solar reflective films (or switchable mirror glass) can help. Where good daylighting exists, photoelectric (daylight sensor) switching or constant illuminance dimming should be used.

3) Management Processes

Draw on ISO 50001 best practices for 'continual improvement' to help focus local management controls for better leadership, planning, operational support, performance evaluation and improvement.

JKS Hospitality (running pubs, bars and Michelin-starred venues) has set an ESOS-3 energy management programme target for 1,231,107 kWh of savings, with 434,217 kWh delivered last year. **Compass Group** (largest contract caterer in the UK) target is for 2,230,906 kWh savings, with 156,774 kWh achieved in 2025.

To mirror the charter, senior management should also actively demonstrate their commitment and support, establish the appropriate policies, objectives and controls, assign accountabilities and reporting processes.

Energy intensity benchmarks (eg based on kWh per meal served) can be used to compare energy performance across food service operations, subject to understanding differences in setups. To be meaningful, accountable KPIs used should be based on relevant variables which are shown to impact on energy use for a particular site. For kWh per meal served, track and review daily consumption against daily numbers of meals served, making a note of any out of the ordinary events. The more

on-demand and energy productive a kitchen is, the better the correlation between variables.

Energy dashboards report actual energy use against budgets and baselines, based on validated metering. Some operators use automated monitoring and targeting systems, with AI reporting, to 'red flag' unexpected spikes in consumption, target opportunities and track improvements. Sub-metering helps to focus reporting at individual equipment or cook line level. Whole-site energy data shows that consumption has changed; sub-meter monitoring points to the why. 'Before' and 'after' comparable measurements can illustrate what has been saved.

Diverse Dining (with fast-casual restaurant chain Shake Shack) is looking to make improvements by refurbishing their kitchens. Their ESOS action plan estimates savings of between 58 and 100 MWh for each kitchen refurbished.

Kitchen fitouts are an opportunity to improve energy performance. Modelling techniques can be used to set design energy reduction targets for kitchen equipment as well as for regulated loads managed by the building regulations (ventilation, lighting, HVAC).

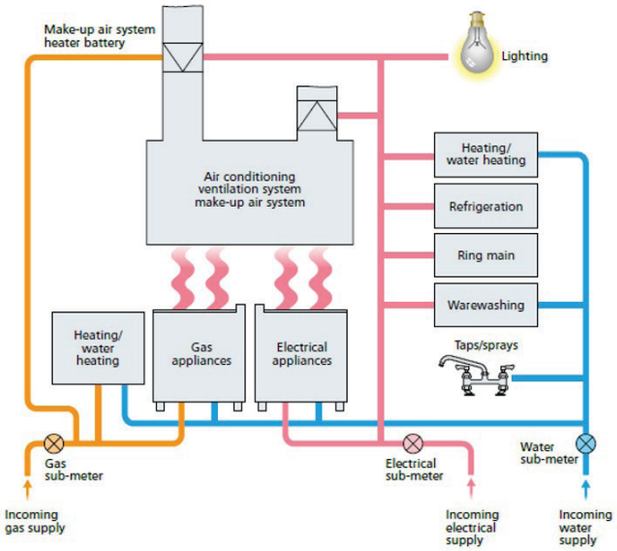
Modular and fast-acting equipment allows chefs to better match capacity with service output requirements, which increases kitchen energy effectiveness as well as efficiency. Multiple equipment units mean that large appliances don't need to run half empty as often and can give kitchens more space flexibility for better workflow as well as backup if units break down.

Use procurement policies to ensure new equipment is as efficient as possible as well as ensuring specifications are the 'right size'. Define energy efficiency labelling standards to be met for refrigeration. EC (electronically commutated) motors typically achieve International Efficiency ratings of IE4 (Super Premium Efficiency) or higher.

JD Wetherspoon is focusing efforts on operational awareness and training, enhanced metering, auditing energy use and embracing new technologies to make savings of 9,699,247 kWh over ESOS-3.

Kitchen energy audits review energy performance for a particular period or for a specific function (eg lunchtime service), review operating times and pick up faults. Look for further opportunities in operational, maintenance, stock management and cleaning practices as well as potential for upgrades and investments.

Figure 3. Example sub-metering arrangements for a commercial kitchen [3]



Communication tools are important to allow teams to continually review and improve operational times in a managed way. Fire-up schedules, for example, can be used to time-plan when significant energy-using equipment should be turned on and off (see figure 2).

What's Next?

Use weekly/monthly kitchen planning meetings to regularly review kitchen energy and water performance, discuss any changes needed in operational practices (in line with menu and planned meal service times) and to catch up on progress on improvement actions being taken, always asking 'what's next'.

Decisions need to be made in a timely fashion. Some small actions will be 'do now'. Others will require coordination with colleagues, or building the case before they can be prioritised and actioned.

Decision making should be led by the 'accountable energy user' for the kitchen, typically the owner (paying the bills) or the one with accountability for energy performance.

One of the latest technologies many operators are using is voltage optimisation. **Cook** (the frozen ready meal provider) has reported 268,000 kWh savings for two of their kitchens last year. **Greene King** reports 6,253,183 kWh of savings and **Pizza Express** 1,869,826 kWh across their sites in the same period.

Top 10 Actions for Kitchen Champions – First 100 Days.

1. **Validate site energy supply meters** against bills. Take manual monthly meter reads, include any kitchen sub-meters if present.
2. **Understand objectives and priorities** for saving energy and water use to be able to bring organisational sustainability goals to life for colleagues.
3. **Regularly put an energy savings 'hat' on,** look for energy waste opportunities, faults and controls that don't match requirements.
4. **Talk and listen to colleagues** about equipment use, operational procedures and practices, motivations and ideas to save energy.
5. **Make use of available training** to build up your confidence in championing energy sustainability as part of what the kitchen does every day.
6. **Baseline current practices** (eg using the EnCO Matrix [2]) and energy consumption / costs to measure the kitchen's improvements against.
7. **List out significant energy users** onto a fire-up schedule [eg figure 2] and regularly review on-times based on menu and planned meal service times.
8. **Record observations, changes, actions** as well as opportunities; take measurements before and after changes to track and report on savings made.
9. **Consult with specialist suppliers,** and invite in equipment manufacturers, to help review practices and offer further suggestions to save energy.
10. **Review monthly energy bills**, discuss at monthly kitchen planning meetings and prioritise the next wave of ideas and actions for continual improvement.

Energy management of course extends beyond the kitchen itself. **Sodexo** (the large catering service provider) has also saved 141,796 kWh through their eco-delivery initiatives (6 Dec 2024 - 5 Dec 2025) with plans in place to electrify 90% of their commercial fleet and 100% of company cars by 2030.

The Energy Charter is a way of ensuring all teams are aligned to a shared vision (for a perfect kitchen), with a clear understanding of energy policies and practices. It can be tabled for new starters at inductions as well as being included within tender specifications for contract catering.

The **Mitchells & Butlers** (pub restaurant operator) shows what can be achieved overall: saving 20% in energy use (worth £10m) from transforming practices to putting in place champions who are regularly engaging teams, changing minds, sharing tips and celebrating success.

A continual focus on energy sustainability will ensure programmes don't fail and performance doesn't slip back to 'business as before'. Risks to watch out for include poor operational factors, thawing plans which require taps left running, use of inefficient or inappropriate appliances or inadequate operational, maintenance and management processes.

Investing in energy management and people will ensure energy use is better controlled, prolonging equipment life, boosting productivity and ultimately resulting in a more stable, happy workplace. See Box for top champion actions to kick off with.

There is no 'silver bullet', each type of commercial kitchen requires different operational strategies and sets of design parameters. The local team will know what works best for their operation. Specialist catering organisations can help with sector specific guidance [7,8].

References:

[1] Energy management systems – Requirements with guidance for use, BS EN ISO 50001:2018.
[2] EnCO for energy conscious organisations, www.encofoundation.com
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[6] Energy Champions on the front line, CPD Module 05, Series 23, Energy in Buildings and Industry, November/December 2025.
[7] Energy use and tips, Foodservice Consultants Society International, www.fcsi.org.uk
[8] Guide to electrifying kitchens, the Sustainable Restaurant Association, www.thesra.org

CPD SERIES 24 / Module 05
Commercial Kitchens

CPD Entry Form

Please mark your answers below by placing a cross in the box. Don't forget that some questions might have more than one correct answer. You may find it helpful to mark the answers in pencil first before filling in the final answers in ink. Once you have completed the answer sheet, return it to the address below. Photocopies are acceptable.

Questions

Question 1. By how much can most commercial kitchens typically cut their energy use?

- ☐ 0-5%
- ☐ 5-15%
- ☐ 15-30%
- ☐ 30-50%

Question 2. What kitchen scope would normally be prioritised by an energy management charter?

- ☐ Cooking, dishwashing, refrigeration equipment and extract ventilation
- ☐ Heating, air-conditioning, lighting and data equipment
- ☐ Microwave machines, drinks and vending machines
- ☐ Distillation, heating and conveyors process equipment

Question 3. What are the UK reporting requirements of the ESOS Regulations 2014 for large organisations?

- ☐ Corporate sustainability policies
- ☐ Energy savings action plans and annual progress updates
- ☐ Carbon reduction plans
- ☐ Education services for overseas staff

Question 4. What does EnCO stand for?

Energy Conscious Operatives
Energy Conscious Organisations
Environmental Conscious Organisations
Environmental Community Obligations

Question 5. Why should kitchen operating instructions be simple to understand and carry out?

- ☐ Ensure safety, efficiency and consistent food quality in a fast-paced environment
- ☐ Cater for unpredictable environments where staff face physical distractions
- ☐ Enable staff to scan equipment quickly while working
- ☐ Offset greenhouse gas emissions

Question 6. What is a kitchen fire-up schedule used for?

- ☐ Manages the warmup times for a new oven
- ☐ Brushing schedule to clear away after kitchen service
- ☐ Sets timelines for adding ingredients for cooking
- ☐ Time-plan for when significant energy using equipment should be turned on and off

Question 7. Why should staff be trained for energy sustainability action in kitchens?

- ☐ Identify and act on opportunities to reduce kitchen energy or water waste
- ☐ Switch on appliances early in the day (and leave them on)
- ☐ Keep fridge doors open
- ☐ Compromise safety standards

Question 8. According to the Affinity laws, what level of energy reduction is expected from halving extraction rates?

- ☐ 33.3%
- ☐ 50%
- ☐ 87.5%
- ☐ 100%

Question 9. What illumination levels should be maintained on kitchen work surfaces?

- ☐ 100 lux
- ☐ 200 lux
- ☐ 500 lux
- ☐ 1000 lux

Question 10. What is the fundamental concept that the ISO 50001 framework is based on?

- ☐ Continuous improvement
- ☐ Continual improvement
- ☐ Continual optimisation
- ☐ Continuous commissioning

Please complete your details below in block capitals.

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