



Running a Sustainable Catering Business

Energy Efficiency in the kitchen

In some kitchens as little as 40% of energy is used in the preparation and storage of food, much of the waste energy is dispersed into the kitchen as heat. With moderate improvements in efficiency and effective use of equipment, savings of up to 20% are achievable ([Carbon Trust](#)). As well as saving money, there are the additional benefits of a better managed kitchen which provides a cooler, more pleasant environment for staff and better quality of food and hygiene standards - and when you have implemented the improvements you can tell people about it, thus enhancing the reputation of your business.

There are three areas to concentrate on when considering the energy efficiency of your kitchens;

- Energy monitoring and management and people solutions
- Catering apparatus – particularly cooking, washing and refrigeration equipment
- Kitchen and building services – particularly heating, ventilation and lighting

Energy Savings related to Monitoring and Management

- Sub-metering: If the energy costs for the kitchen are likely to be more than several thousand pounds then the installation of sub-metering should be pursued. For larger catering establishments it may be worth sub-metering particular pieces of equipment.

Monitoring enables;

- * you to benchmark the performance of your kitchen (calculate the average energy consumption per cover). Industry benchmarks are available for comparison (<http://www.hospitableclimates.org.uk>), calculate the energy used for cooking, dishwashing and cold storage separately from lighting, ventilation, heating and air conditioning).
 - * staff to be made aware of energy consumption
 - * staff to be involved in setting of realistic targets
 - * you to check that periods of high energy demand coincide with busy periods, and may help identify malfunctioning equipment.
 - * you to record reduced energy consumption which may allow justification of further investment in energy saving technologies
- Establish an energy management policy
 1. Appoint a member of staff as energy champion
 2. Become aware of energy consumption and areas of wastage
 3. Compare performance with industry benchmarks or past operation
 4. Prepare an action plan

5. Control and monitor

Energy savings related to working practices

Many of the potential energy savings in catering are related to working practices – because catering is a labour intensive activity. Catering establishments often have a high staff turnover - so ongoing training is necessary, all changes need to be introduced with full staff consultation and training to ensure maximum efficiencies. Discuss the following checklist with your staff and encourage them to become energy conscious. In larger establishments it is worth installing a meter to monitor the energy consumption in your kitchens, get your staff involved in the monitoring - perhaps providing incentives for energy savings.

- Use this checklist to see if you could save energy by changing your day-to-day working practices.
 - Use correct size of utensils, pots and pans for heating ring/oven
 - Avoid over filling saucepans, kettles
 - Use lids and covers to retain heat, steam and fumes
 - Switch off grills, fryers and hobs immediately after use
 - Display cooking equipment preheat times
 - Keep hot storage of cooked food to a minimum
 - Switch on equipment only when necessary
 - When pans come to the boil, turn hobs down to the minimum to simmer (boiling does not speed up the cooking process)
 - Use microwaves to reheat relatively small amounts of food
 - Switch off extraction fans when they are not in use
- Develop and implement a regular maintenance programme for all cooking equipment
- Keep equipment clean to remove deposits, scale and corrosion which affect heat transfer
- Regularly service equipment to ensure heating elements, burner jets, thermostats, seals, valves and switches are in good working order.

Potential Energy Savings related to Kitchen Equipment

Cooking

- Make it easy for staff by installing controls which automatically switches off or turns down cooking equipment which is not being used.
 - **Automatic pan sensors** (available for gas and electric hobs) can save 25% of cooking energy used in a typical kitchen.
 - **In-built piezo-electric spark generators** make it easier to relight gas hobs
 - **Fit easily visible oven thermometers** – to minimise door opening
- Consider replacing any equipment over 15 years old. Generally gas appliances are more efficient than electric. If demand is variable go for two smaller items of equipment rather than one large. Suppliers should be able to provide information on the expected running costs of their equipment, if they can't approach another supplier.
 - **Induction hobs** – deliver heat to the pan using a magnetic field. They heat up quickly and almost all the heat generated is transferred to the food, heating stops as soon as the pan is lifted. Induction hobs use 40-50% less energy than that of a conventional gas or electric hob. Less heat is wasted so the ventilation required is less.

- **Combi-steam/convection ovens** – can reduce energy costs by 50% compared to other equivalent cooking appliances. Energy saving features to look for include;
 - * triple glazed viewing door, can save up to 40% of energy compared to single glazed door,
 - * automatic fan switch off, with a brake initiated when the door is opened,
 - * utilisation of exhaust heat to preheat incoming fresh water for steam generation, saving 30% of energy input,
 - * a multispeed fan which enables better control and reduces energy consumption
- **Microwave Ovens** – require no warm up or preheat period, they are very fast. Some incorporate convection features for combination microwave/convection cooking, some brown using infrared and ultraviolet light.
- **Efficient Fryers** – there is significant variation in energy efficiency between models. Features to look for in energy efficient models include;
 - * reach cooking temperature in 10-12 mins or less,
 - * feature a submerged tube combustion which provides a quicker heat transfer and improved efficiency (gas fired fryers),
 - * allow oil to be easily filtered,
 - * require lower oil capacities, have fast recovery times and do not lose heat through combustion discharge. Electric submerged element fryers are more efficient in this respect compared to gas appliances.
- **Grills, chargrills and griddles** - the most efficient models have temperature feedback by thermostatic controls. Griddles are generally more energy efficient than a standard grill. A chrome plated, mild steel griddle is the most energy efficient, minimising heat losses to the kitchen.
- **Ranges and hobs** - open top ranges with individual burners which can be separately controlled are more energy efficient than solid top ranges with large single burner. An automatic shut off valve to each burner will switch it off when the pan is removed and reduce energy consumption by 30-50%

Refrigeration

- Refrigeration equipment represents a significant energy cost because it is used continuously.
- Location – place in the coolest part of the kitchen (not in a mechanically chilled cellar), and not next to cooking equipment or any other heat source (including solar gain). Each refrigerated cabinet must have >50mm of air gap around it to allow air to circulate.
- Minimise cold air escaping – keep door openings to a minimum. Try to place all food for one shift into one or more service refrigerators so that temperatures in storage units can be maintained. When stock is low, transfer remainder to other units.
- Always make sure the temperature setting satisfies the requirements for safe storage of food.

- Maintenance - keep evaporator coils clean, ice-free and unobstructed. Compressor and condenser fins for refrigeration and air-conditioning units should be free from dust and grime, clean every 3 months. Check door seals on a weekly basis.
- Defrost at least every 2 months
- Install self closing doors
- Consider installing motor optimiser controls on the refrigeration plant, this reduces the motor power input to match the load.
- Use 7 day time switches where possible to automatically switch off equipment at the end of shifts, or when not trading. These can be used on refrigerated drink vending machines, bar cabinets and display fridges where no fresh items are stored.
- Recover heat; heat recovery can be used to capture the heat given off from refrigeration to preheat hot water or help supplement adjacent space heating demands
- Install plastic curtains and night blinds to the front of cold storage areas and refrigeration units. Must be installed and fit properly.
- When choosing new equip compare total lifetime cost (annual energy and maintenance cost x lifetime in years + quoted capital purchase and installation cost).
- Select equipment with enhanced controls such as digital temperature display and defrost on demand.

Washing

- Fully load dishwashers and stack correctly
- Switch off taps after use and don't wash utensils under running water
- Use economy settings
- Ask staff to report leaking washers/taps
- Consider use of low temperature sanitising liquids.
- In hard water areas use an automatic water treatment or add a water softener, this will improve efficiency with less detergent.
- Install tap controls such as automatic switch off
- Install water efficient flow restrictors and aerators, these reduce volume of water whilst maintaining effectiveness
- Install shutoff valves for spray washers.
- For larger machines consider heat recovery from wash cycle
- If demand is variable install two smaller rather than one large dishwasher.
- Consider dishwashers with:
 - * Good insulation
 - * Low water use, with efficient filtration and recirculation of rinse water
 - * Preinstalled heat recovery
 - * Machines that can take a hot water supply (preferably from a central gas boiler)

Ventilation and Extraction

Ventilation and extraction can account for as much as 15% of overall electricity use in the kitchen.

- For maximum efficiency systems should include;
 - * Smoke capture
 - * Grease extraction and disposal
 - * Fire protection
 - * Maintenance of acceptable air quality and temperature
 - * Control of external emissions
 - * Heat recovery
- Must provide adequate air for combustion of gas-fired appliances.
- Controls must be set correctly and reflect demand, switch down or off during off-peak/closed hours
- Switch down or off when not cooking, i.e. when carrying out preparatory work
- Clean ventilation units and extraction hoods regularly.
- Review system annually
- Consider installing a variable speed drive (can fit to exhaust air and combustion air intakes)
- Maintain **slightly** negative air pressure in kitchen to prevent odours escaping into dining rooms/restaurants.
- Consider the use of air quality and temperature sensors to automatic ventilation control, this allows closer control
- Consider heat recovery, over 50% of waste heat from a kitchen can be recovered. An air to water recovery device can efficiently recover heat to preheat hot water
- Position extraction hoods as close to the source as possible

Heating

- Don't use cooking equipment to warm the kitchens when the staff arrive
- The optimum temperature for hot water is at or just above 60oC (sufficient to kill Legionella bacteria)
- The optimum kitchen temperature is 16-18oC, set thermostats to maintain this temperature
- Fit thermostatic radiator controls, they will reduce the heat output from radiators as the kitchens warm up.
- Fit automatic closures on external doors used for deliveries, consider fitting a draught lobby
- Avoid simultaneously heating and cooling, if the heating turns off at 20oC, then the cooling should come on at 25oC.

Lighting

- Review your lighting
- Label lighting so that staff select only those lights they need for the work being carried out.
- Switch off lights in unoccupied areas.
- Tungsten halogen lighting – use 35W bulb with infrared coating (IRC) rather than 50W bulb

- Keep light fittings, windows, skylights clean
- Always switch off fluorescent lights when not in use
- Change the larger (38mm) fluorescent tubes for slimmer (26mm) tubes.
- Choose lamp fittings with reflectors

Funding Capital Purchases

- ***Enhanced Capital Allowances*** – businesses can buy energy efficient equipment using a 100% rate of tax allowance in the year of purchase. The equipment purchased must be on the Energy Technology list (refrigeration, heating, heat recovery, lighting, heat pumps, water saving equipment). Go to www.eca.gov.uk, or [Carbon Trust](#).

May 2011