Energy Efficiency

How to save energy in the kitchen...

what every caterer needs to know

FOSTER REFRIGERATOR

Green Paper

Energy efficient tips for the caterer

The move over recent years towards energy efficiency, resulting in the ECA Scheme, the Climate Change Levy and the Kyoto Agreement, has made energy efficient kitchen equipment even more important to caterers. This is particularly so in the case of refrigeration, as the refrigerator is one of the few pieces of equipment in the kitchen that uses energy 24/7, 365 days a year.

Now, as businesses experience increased costs for their gas and electricity, with prices rising by more than 40% in 2005, the search for energy-saving equipment has stepped up a gear.

Saving energy on your refrigeration

Minimising energy usage is a must, but fortunately there are many ways that you can make savings on your fuel bills:

USING YOUR FRIDGE

Where is the fridge located? Install your unit in the coolest part of your kitchen. Avoid placing the refrigerator near cooking equipment or in direct sunlight. If you do, you're making the refrigerator's compressor work harder than necessary to keep temperature. Allow adequate space above, behind and on the sides for free air circulation - at least 50 mm at the sides and 200 mm at the top and back but the more the better. Don't cover your refrigerator with any material that will prevent air flowing around the cabinet sides.

Minimise door openings To prevent warm air entering the refrigerator (again causing your unit to work harder than necessary), don't open your refrigerator door needlessly. Decide what you want to get out before you open it and remove several items at once.

Buy bigger If you are thinking of getting a second refrigerator, consider replacing your existing refrigerator with a larger unit instead. It's generally less costly to operate one big refrigerator than two smaller ones. That spare fridge could cost you an extra £35 to £110 a year in electricity. If however your refrigerator sees regular periods of low usage due to the nature of your business, it may be more economical to use two smaller fridges. This way, during a quiet period, you can switch off one fridge and keep the other well stocked. Running two half-full refrigerators will use more energy than one well-stocked one.

What are you storing in your fridge? By setting the running temperature specifically to suit the type of food stored in your fridge, you can make significant savings. Don't run you refrigerator colder than you need it. Use a fridge thermometer regularly to monitor temperature. All chilled food must be kept below 8°C in accordance with food safety legislation, with all commercial refrigerators set to a maximum of +5ºC to ensure this is met. If you are storing dairy items, these will need chilling to the usual manufacturers setting of +1/+4ºC. Meat should ideally be chilled to –2/+2ºC, whereas Wet Fish should be stored at -1/+1ºC. However if you are storing only salad or vegetable items, a temperature of around 6ºC will be best, whilst pastry items are ideally stored at +4/+6ºC. By setting the refrigerator to the correct temperature your energy usage should drop significantly.

Keep air flowing: Don't overstock your fridge! Although it's best to stock your freezer with food, for energy efficiency, don't fill refrigerator baskets and shelves to the point that air circulation around food is blocked. This increases the strain placed on the refrigeration system to keep foods cool and increases energy usage.

Cool hot foods by blast chilling before placing in your refrigerator. NEVER put warm or hot food straight into the fridge or freezer- it will raise the temperature significantly and use more energy to pull temperature down, as well as having serious implications on food safety.

Cover all liquids stored in the refrigerator. Besides stopping them picking up taints, this will stop them evaporating away and causing ice and condensation build-up.

CHOOSING YOUR FRIDGE

- Buying an energy efficient fridge and/or freezer to replace your old inefficient one could cut carbon dioxide emissions produced by up to 228 kgs a year, as well as saving you up to 70% in energy usage. Manufacturers should be able to advise you of annual energy usage levels

- Ensure that the supplier is registered on the Government's ECA Scheme. All ECA approved equipment has been independently tested to meet stringent standards on energy efficiency

- Make sure the supplier's quality controls and policies are rigorously maintained. Breakdown rates, leak tolerances etc should be subjected to strict controls. Ensure that the supplier can offer maintenance contracts, and preferably that they use factory-trained technicians to carry these out

- Choose a refrigerator size based on the needs of your kitchen - a refrigerator will use a little less energy when it is comfortably full (but not overfilled)

- An important environmental consideration when buying a refrigerator or freezer is to check what refrigerant (coolant) it uses. The UK industry standard refrigerants, R134a and R404a, (commonly known as HFCs) are Zero Ozone Depleting but do affect Global Warming. Another option is to buy a hydrocarbon-cooled model. Hydrocarbon is a tried and tested, readily available commercial gas that is Zero Ozone Depleting and has minimal Global Warming Potential; in independent tests Hydrocarbon has been shown to use up to 13% less energy than the widely used R404a refrigerant

- Ensure that your supplier has a "Zero Leak Tolerance" policy with regard to its refrigerant. Top refrigeration publication ACR Today states that "a system that loses 15% of its refrigerant charge through leakage will see a 50% drop in cooling capacity and 100% increase in energy consumption" (ACR TODAY April 2005). Foster use Helium Leak Detection, which can detect even the very smallest gas leak

- Check that your potential supplier has achieved the ISO 14001 environmental standard, or that they will have in place an established Environmental Management System (EMS) that has been independently audited by an accredited body. By ensuring this, you can rest assured that the supplier complies with environmental law and has procedures and controls to prevent pollution and ensure energy efficiency throughout their product range

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Choose a refrigerator with an energy efficient design

Choose equipment with the following features wherever possible to ensure minimal energy consumption:

- **Smart Temperature Control** means that your refrigerator automatically adapts to cope with how you use it. Sometimes a refrigerator will have to work much harder than others, for example a refrigerator placed in a high ambient busy fast food outlet, with very frequent door openings will work much harder than a storage fridge in a small school kitchen. Smart Temperature Control means that the control panel automatically adjusts operating parameters to suit by:

  ✔ Modulating storage temperature at the correct range
  ✔ Adjusting fan operation accordingly
  ✔ Adjusting Defrost operation accordingly

  This results in optimised energy usage. Smart Temperature Control also adapts to cope with seasonal changes, so you can always be assured that your refrigeration is working as efficiently as possible

- **Automatic Defrost** ensures the refrigerator is always running at maximum performance, by initiating 'Defrost' mode to remove ice build-up. This saves on energy usage and prolongs the lifecycle of the coil

- **Energy Efficient Fans** some manufacturers have improved energy efficiency by using fewer fans and more energy efficient components in the refrigeration system itself

- **Automatic Fan Cut-Out** when the door is open to avoid wasting energy

- **Large Capacity Evaporator** this ensures efficient cooling, preventing unnecessary energy usage in achieving temperature

- **Door Alarms** that alert the user if the door is left open accidentally

- **Self-Closing Doors** ensure that doors are not left ajar

Service & Maintenance

SERVICE

To maximise efficiency, you should ensure that a refrigeration engineer services your equipment regularly. How frequently a service is required will depend on site conditions. For example, a dusty hospital or bakery environment will need more regular servicing due to dust build-up on the coil, as will a fast-food outlet where the refrigerator is sited near the griddle, causing high grease build-up. Ask your service engineer how often he would recommend servicing. To obtain optimum performance this will be a minimum of once per year but could be as frequently as every 4-6 months.

Regular servicing can have a dramatic effect on energy consumption:

Problem	Increase in Energy Usage
Partially blocked condenser	23%
15% Refrigerant leak	100%
Faulty door seal	11%
Incorrect temperature settings	6%

Failure to carry out regular checks can also result in system failure, and subsequent need to replace key components such as the compressor or condenser fan.

Regular maintenance also prolongs the life of the equipment and reduces repairs, which has environmental impact and affects running costs. A standard Service & Maintenance Check should include the following:

- Thorough clean including evaporators and condenser, fan blades and guard
- Check drains are secure and clean
- Check oil levels in compressor where possible
- Check condition and state of wiring
- Check Automatic Defrost system
- Check efficiency and condition of door gaskets, lock, hinges and fasteners
- Check refrigeration system for leaks
- Test operating temperature
- Check and advise upon location and site conditions
- Check loading

MAINTENANCE

You can minimise energy usage by carrying out the following in-house maintenance checks:

- **Clean the condenser coils monthly.** Condenser coils allow the hot refrigerant inside their tubes to cool off: if they are covered in dust, this acts as insulation and prevents heat from escaping, making the refrigerator work harder- wasting up to 23% more energy. To clean the coils, simply unplug the unit, and carefully vacuum or brush them

- **Door seals and gaskets** Check the seal between the door and the refrigerator's shell regularly to ensure no warm air is getting in - the seals should be tight enough to hold a piece of paper securely when closed

- **Defrost** Ice build-up reduces your refrigerator's cooling ability. Ideally you should choose a refrigerator and freezer with an **Automatic Defrost** as this ensures that defrosting automatically takes place at the optimum time

General energy saving tips in the kitchen

Saving energy makes an immediate difference to your company's bottom line, and you protect the environment too. Global warming is caused by greenhouse gases such as carbon dioxide, a by-product of all types of energy consumption. By using energy more efficiently we can help to reduce carbon dioxide emissions, reducing the rate of climate change and the damage to the environment.

The Carbon Trust offers free energy surveys, energy efficient loans and an energy helpline as well as various publications and fact sheets to help you cut down your energy usage. Contact the Carbon Trust to receive your free energy-saving programme starter pack: call 0800 085 2005. In the meantime, the tips below provide a start point:

COOKING

- Size up your pans. Match the size of your pot or pan to the burner you're cooking on. If the pot is too small, energy will escape around the sides. If it's too big, you'll need more energy to heat the outside of the pan
- Preheat no longer than 10 minutes to avoid burning energy unnecessarily, and turn the oven off straight after cooking
- Cook several dishes in one session – use a tiered steamer and all the shelves when using the oven
- Avoid opening the oven door unnecessarily - this drops temperature by around 15ºC
- When boiling food, such as vegetables, keeping the lid on will trap the steam and cook the food faster
- Ensure the door seals on your oven are in good condition
- Regularly clean the hotplate reflectors to ensure maximum heat reflection
- Make meals in slow cookers or pressure cookers for economy

GENERAL

- Fit a 7 day timer to vending machines and water coolers so that they are not unnecessarily using electricity at night and over the weekends
- Don't leave a tap dripping. Each cubic metre of water costs nearly £2
- Ensure water temperatures are set correctly. Water should be heated to 60°C to protect against Legionella. Water at hand washing sinks should ideally be set to 43°C
- Set your heating thermostat to reasonable levels. The statutory aim is 19ºC
- Ensure heaters are not blocked by furniture, as this not only causes a fire hazard, but inhibits the distribution of heat
- If it gets too hot in the winter, don't open a window, turn down the heater first
- Ensure all extractor fans are off overnight and when not required
- Don't leave doors open between areas of different temperatures
- Keep doors and windows closed in air-conditioned areas.
- Try to use as much natural light as possible and ensure windows are kept clean
- Switch off lights whenever there is no-one in the room, and make sure the last to leave in the evenings turns off all lights

Renewable energy

Renewable electricity from sources such as wind, wave and solar energy is crucial in helping cut harmful carbon dioxide emissions which can contribute to global warming. The Government's Climate Change Programme and Energy White Paper require that by 2010, renewable energy should be contributing 10% of the UK's electricity supply. This contribution should be doubled by 2020 - helping the country reach its ambitious target of UK carbon emission reductions. Less than 4% of our electricity supply currently comes from renewable sources. The main sources of renewable energy being considered are biomass, geo-energy, hydro-electric, hydrogen, solar, tidal, wave and wind.

In time, it should be an option for most of us to change electricity supplier to a green supplier using renewable sources, like wind or hydro. Contact the Centre for Alternative Technology for further information (Tel: 01654 705 989).

Sources

Food Standards Agency, ACR News, Foster Refrigerator Engineering Department, www.greenconsumerguide.com , www.west-norfolk.co.uk

For further information:

Food Standards Agency	www.food.gov.uk
The Carbon Trust	www.carbontrust.co.uk
Scottish Energy Efficiency Office	www.energy-efficiency.org
Centre for Sustainable Energy	www.cse.org.uk
Centre for Alternative Technology	www.cat.org.uk

Foster Blue papers include:

HACCP - An Update 2006
The ECA Scheme
The safe way to Blast Chill, Freeze and Thaw
Hydrocarbons in Refrigeration - What caterers need to know
The Climate Change Levy
Coldroom Panels, Polyurethane Foam & Fire Ratings: An Update
Food Temperature Laws
Inspection by Environmental Health Officers
Food Safety and E. Coli
Handling and Serving Ice
Safe Food Storage
Plan for a Catering Crisis
Food Hygiene & Staff Training

For copies of our Blue Papers, visit www.fosterrefrigerator.co.uk/food_safety or call 0500 691122

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