Fume Cupboards

Fume cupboards use large amounts of energy. There are 649 fume cupboards operating at The University of Queensland:

<table>
<thead>
<tr>
<th>Location</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>St Lucia</td>
<td>312</td>
</tr>
<tr>
<td>Gatton</td>
<td>51</td>
</tr>
<tr>
<td>Herston (CCR, Block, Mayne)</td>
<td>32</td>
</tr>
<tr>
<td>Remote sites</td>
<td>23</td>
</tr>
<tr>
<td>Institutes (QPI, QBP, PACE, AIBN)</td>
<td>227</td>
</tr>
</tbody>
</table>

Labs use approximately 1.5 times the energy of office/teaching spaces at The University of Queensland. Fume cupboards make up approximately 16% of the energy use in a typical lab. Fume cupboards pull air out of the lab which then has to be replaced by fresh air. This places a large energy load on the air conditioning system. As a consequence, fume cupboard operation is probably responsible for another 30% of total lab energy use through increased air conditioning load. Therefore, operating fume cupboards as energy efficiently as possible can significantly reduce a lab’s energy requirements.

The approximate distribution of electricity use in UQ labs is shown below.

**Estimated energy distribution in a typical lab**

- Air conditioning: 60%
- Fume cupboards: 16%
- Appliances: 14%
- Lighting: 10%

**Dash the sash**

The sash is the protective barrier between the experiment and the researcher. Air is constantly drawn through the fume cupboard and discharged through the ducts outside.

For variable speed driven pumps on fume cupboards, when the sash is open the pump operates at a higher rate, using more energy. It draws more clean air from the lab through the cupboard. This also places a higher load (and uses more energy) on the lab air conditioning system.
conditioning system as the fresh air drawn into the lab to replace that discharged through the ducts needs to be either cooled in summer or heated in winter.

Below is a comparison of energy use of fume cupboards over a year with the sash fully open or fully closed.¹

<table>
<thead>
<tr>
<th>Open (over one year)</th>
<th>Closed (over one year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>20,000 kWh of electricity</td>
<td>2,000 kWh of electricity</td>
</tr>
<tr>
<td>125 GJ of natural gas</td>
<td>12.5 GJ of natural gas</td>
</tr>
<tr>
<td>$3500 operating costs⁵</td>
<td>$350 operating costs</td>
</tr>
<tr>
<td>30 tonnes of carbon</td>
<td>3 tonnes of carbon</td>
</tr>
</tbody>
</table>

The sash should be kept as low as possible during operation and only raised to the highest level during set up of the experiment. In general the sash should be shut. Fume hood sashes should not be propped open.

If it’s broken, fix it

The fume hood sash should be able to be lowered and raised using one hand. If that is not possible then look for obstructions that may be preventing it from closing and move them out of the way. If the sash is broken contact Property & Facilities (P&F) on pfassist@pf.uq.edu.au to arrange for someone to come and fix it.

Don’t store chemicals in fume cupboards

Generally a chemical is stored in fume cupboard because it starts vaporising and emitting odours. To make it safe for lab users, the researcher may store it in the fume cupboard so the vapours are removed. Generally chemicals vaporise because the bottle seal breaks down over time and chemical leaks out. The Chemical Store has a range of different bottle tops and seal and should have one to fit the bottle. This not only makes it safe for lab users but also reduces energy consumption through inappropriate use of the fume cupboard and vapours being released into the atmosphere. Email the Chemical Store at chemorders@uq.edu.au. (For more information on requirements for storage of chemicals, please refer to Australian Standard AS2243.)

² Based on $0.10/kWh for electricity and $0.012/MJ for natural gas.
Switch off and save

Most fume cupboards have a light. Switching the light off when you are not near the fume cupboard will save energy.

Some fume cupboards operate constantly but are no longer required. If there is a fume cupboard in your area that is not being used and will not be used in the near future, it may be possible to switch it off completely. P&F will need to check that it will not impact on the air balance or other fume cupboards. Once that has been approved, P&F can switch off the fume cupboard and apply a notice stating that it has been switched off to save energy and to contact PF Assist, pfassist@pf.uq.edu.au, if the fume cupboard needs to be reconnected. This notice is available from the Sustainability Office.

What goes up…

Some specialised fume cupboard ducts have scrubbers to remove some chemicals from the exhaust, however, most ducts have no treatment. What is released into the fume cupboard and sucked up into the duct is diluted with air and discharged into the atmosphere. If less toxic chemicals can be used for the experiments then less toxic chemicals are being released into the atmosphere. The fact sheet on Chemical Management has information on alternative and less hazardous chemical use.

Label your space

Stickers and laminated labels are available from the Sustainability Office to help you to Label your space. This is particularly useful in shared fume cupboards where there are several different groups working in the one space. It allows everyone in the lab to know who owns each experiment and allows lab managers to ensure fume cupboards are operated correctly.

For further information contact:
Sustainability Office
Property and Facilities Division
Ext. 69959 Email: greenlabs@pf.uq.edu.au Internet: www.uq.edu.au/sustainability