



## Guide to minimising the local air quality impact of gas fired Combined Heat and Power Plant in the City of London

Combined Heat and Power (CHP) is the co-production of electricity and heat. A wide range of technologies and fuels can be used. The heat output of a CHP plant can also be used to provide cooling via absorption chillers. These installations are known as Combined Cooling, Heat and Power (CCHP).

There are policies in place to increase the amount of CHP and CCHP plant in London which is bringing electricity generation back into the City. Fuel combustion gives rise to air pollutants, particularly oxides of nitrogen (NO<sub>x</sub>), which convert to nitrogen dioxide (NO<sub>2</sub>) in the air. At high levels, nitrogen dioxide can have a negative impact on health. The City has been declared an Air Quality Management Area for nitrogen dioxide as concentrations do not meet health based standards. The City is implementing a wide range of measures to reduce the amount of NO<sub>x</sub> emitted in the City, which should in turn lower the concentrations of nitrogen dioxide. Some of the measures relate to controlling emissions through the planning process, for example developers are encouraged to install low NO<sub>x</sub> boilers i.e. appliances that meet a dry NO<sub>x</sub> emission rating of 40mg/kWh. Further details can be found in the City of London Air Quality Strategy [www.cityoflondon.gov.uk/air](http://www.cityoflondon.gov.uk/air)

This guidance outlines the City of London Corporation's expectations for CHP and CCHP plant installed to satisfy the requirements of the London Plan and City of London Core Strategy Planning Policies. The overall aim is to ensure that the wide-scale use of CHP will not lead to further increases in concentrations of nitrogen dioxide in the City. Only **gas fired** CHP and CCHP plant up to 20MW are considered. If fuels other than gas are to be used, please contact the Port Health and Public Protection department at the City of London on 0207 332 1162.

This document reflects the information provided in the Environmental Protection UK guidance: Combined Heat and Power: Air Quality Guidance for Local Authorities, February 2012.

### How can emissions be minimised?

Emissions from gas fired CHP and CCHP can be addressed via:

- The type and design of the plant
- The dispersion of emissions from the chimney
- Emissions abatement equipment

### Type and Design of the plant

Table 1 shows the approximate amount of emissions associated with different types of CHP technology. Gas turbines produce the lowest emissions and these should be

prioritised for installation in the City wherever possible. If a spark ignition engine is to be installed then it should include lean burn technology.

**Table 1: Typical NOx Emissions from Natural Gas Fuelled CHP systems**

Prime mover	Additional Technology	NOx emissions g/kWh	Further information
Gas turbine		1.1	Gas turbines are usually used in larger CHP, typically above 1 MWe. Smaller gas turbines in the range of 60 to 100 kWe are becoming more common. These produce clean exhaust gases, with low NOx emissions.
Gas turbine	Back pressure steam turbine	0.9	
Small scale gas turbine		0.2 – 0.5	
Compression ignition engine		5 - 10	Compression-ignition and spark-ignition engines are typically 70 kWe to 1,500 kW.
Spark ignition engine		5 - 20	
Spark ignition engine	Lean burn	3	

Source: Combined Heat and Power: Air Quality Guidance for Local Authorities Environmental Protection UK February 2012.

### **The dispersion of emissions from the chimney**

Consideration should be given to the location and height of a chimney serving a CHP or CCHP plant when the building layout is being designed. The building should be designed so the chimney is as high as possible to aid dispersion. In some parts of the City heights of buildings are restricted in order to protect views of important landmarks. If an adequate chimney height cannot be achieved, additional NOx emissions abatement equipment may be required.

CHP and CCHP plant that burn gas at a rate of 336.4 kW or more per hour will require formal chimney height approval from the City of London Corporation under the Clean Air Act 1993. Further information can be found on the City of London web site [www.cityoflondon.gov.uk/air](http://www.cityoflondon.gov.uk/air)

### **Emissions Abatement Equipment**

Selective Non-Catalytic Reduction (SNCR) or Selective Catalytic Reduction (SCR) can both be used to reduce emissions of NOx from CHP plant. They require substantial capital outlay often with significant running costs so they would only be required in exceptional circumstances. Their use can be avoided by installing a low NOx appliance with an adequate chimney height.