



Residential wood burning – a major cause of harmful pollution

In Northern Europe, wood-burning to heat homes in residential areas may be the main source of a number of harmful pollutants in local air, new research has shown. Restricting wood burning could reduce public health risks and help meet the requirements of the EU directive on air quality¹.

Recent studies have indicated that wood combustion is an important contributor to air pollution, releasing fine particles and organic compounds as emissions. PM_{2.5} and PM₁₀ particles in particular are a recognised health hazard, contributing to respiratory disease. Many volatile organic compounds have toxic effects on human health and the environment. Benzene in particular, one of the main organic compounds emitted by wood-burning, has the potential to cause cancer.

Burning wood to heat homes is increasingly common in residential properties, particularly in Northern Europe. Wood burning stoves are becoming popular household additions and have been recommended as an energy source, because they use a renewable fuel resource. Finnish researchers have now identified the exact compounds released by wood combustion, and have measured the proportion of pollutants in the air produced by burning wood.

Measurements were taken during winter in a residential area of Finland, selected for its isolation from other major sources of air pollution, such as main roads and local power stations. Modelling techniques were used to match the chemical profile of pollutants to their source. For example, compounds in the atmosphere produced by car exhaust fumes could be separated from the same compounds released by the combustion of wood.

The main sources of the pollutants were found to be from wood burning and traffic emissions, but wood smoke was the biggest contributor of many organic compounds, including benzene, ethene and ethyne, all of which are known to be harmful to human health. Up to 70 per cent of benzene detected in the air was from wood smoke.

When weather conditions, such as the wind speed and direction, were favourable, brief surges in the concentration of some organic pollutants were detected. Fluctuation of levels of benzene in the air also occurred in the same daily pattern as the levels of wood use.

The association between the levels of fine PM_{2.5} and PM₁₀, and wood combustion in this study was less definite. But the study suggested that peaks detected in the levels of particles were linked to the increase of local wood burning. Another recent study comparing the origin of fine particles (PM_{2.5}) at a number of different sites in Europe found a link between biomass burning and increases in fine particulate matter in the winter. This study attributed 50-70 per cent of winter carbon pollution to biomass burning².

Previous research has already shown that wood smoke is detrimental to public health and this study has helped quantify the problem.

1 <http://ec.europa.eu/environment/air/quality/legislation/directive.htm>

2 The CARBOSOL Project: <http://www.vein.hu/CARBOSOL/> received Euros 1,299,695 in funding from the Fifth Framework Programme's 'Energy, environment and sustainable development' thematic programme. This study was reported by Science for Environment Policy on 17th January 2008. http://ec.europa.eu/environment/integration/research/newsalert/chronological_en.html

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