

# Wood Combustion – Clean Energy?

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CO<sub>2</sub> emissions need to be reduced because of their major contribution to global warming. In the Kyoto protocol the European countries agreed to lower their emissions through the rational use of energy and the promotion of renewable energies. While some countries focus on wind or solar energy in Switzerland biomass burning and wood combustion in particular possess a great potential.

Unfortunately, wood combustion may result in considerable emissions, depending on prior usage and exhaust gas aftertreatment. Ten Swiss incinerators were studied using their typical wood assortments. Wood samples as well as ashes and waste gases were analysed for organic (dibenzo-p-dioxins and furans, polycyclic aromatic hydrocarbons etc.) and inorganic (heavy metals, halogens etc.) components to enhance our understanding of formation and transport of pollutants.

Natural untreated wood with a low content of pollutants can easily be burned in a modern wood combustor at low emissions and in compliance with Swiss regulations. A more complex situation appeared when looking at different wood assortments from building sites, joiner's workshops, packing and breakups. Generally, a good correlation was found between the heavy metal content in the starting material, the ashes and the waste gas. However, the proportion of heavy metals found in bottom ash, cyclone ash and waste gas depends on their volatility. Therefore, the dominating proportion of chromium, copper and nickel was transferred to the bottom ash, whereas lead, zinc, cadmium and mercury were mainly found in the waste gas.

While emissions of polycyclic aromatic hydrocarbons mainly depended on combustion quality (correlated with CO-emissions), the formation of dioxins and furans was accelerated by the presence of chlorine and extractable organic halogens. In one case, burning wood with a high content of chipboards lead to PCDD/F concentrations above 6 ng I-TEQ/m<sup>3</sup>, which is far above the legal limit of 0.1 ng/m<sup>3</sup> valid in many European countries.

Our study can help to assess the suitability of a specific type of wood for combustion in an ordinary wood combustor, or evaluate the necessity to use an exhaust gas aftertreatment to lower the emissions for compliance with legal regulations.

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