

# Towards dust-free wood combustion

March 3 2015

---



The Carola-precipitator (light green) is installed into the flue gas passage reduces the concentration of soot and fine dust by up to 90%. Credit: KIT/P. Langer

About 15 million wood-fired stoves and combustion systems exist in Germany, including central-heating boilers for apartment houses. They are subject to strict clean air regulations. New wood-fired boilers exceeding emission limits for particles have to be equipped with precipitators since the beginning of 2015. Next week, KIT scientists will

present the Carola-precipitator for boilers at the ISH trade fair, Frankfurt.

"All wood-fired boilers can be equipped with our compact, low-maintenance precipitator," Dr. Hanns-Rudolf Paur, one of the inventors and scientist of Karlsruhe Institute of Technology (KIT), says. The Carola-precipitator is installed into the flue gas passage between the boiler and the stack and reduces the concentration of soot and [fine dust](#) by up to 90%. If necessary, several systems can be connected in parallel or in series. The CCA system was developed to maturity for boiler systems of 25 to 1000 kW in cooperation with boiler manufacturers.

The functioning principle of the patented Carola-precipitator is rather simple: The precipitator consists of two chambers. In the ionization chamber the particles of the flue gas are electrically charged by corona discharge. A natural corona discharge can be observed on e.g. masts of ships during thunderstorms. In the downstream collector chamber of the CCA system the charged soot and dust particles are deposited on a helical brush. It rotates regularly over a scraper and the collected particles fall into the collection vessel. "The only maintenance work to be done by the user is to empty the vessel every few months," Paur explains.

"The advantages of our precipitator over other principles are obvious," Dr. Hans P. Rheinheimer, Managing Director of CCA GmbH, a startup of KIT, says. The system is nearly maintenance-free, can be integrated into the boiler, and consumes less energy than a bulb. Contrary to HEPA filters, it is not necessary to exchange wear parts and the cross section of the stack is hardly reduced. With a separation efficiency of up to 90%, modern boilers can comply with the limits given by the Federal Emission Control Ordinance (1. BImSchV) for 2015.

KIT's startup company CCA-Carola Clean Air GmbH is based on the

know-how on precipitator systems for wood fired [boilers](#). For the innovative process, the inventors were granted several awards, such as the Innovation Award of the Karlsruhe Chamber of Industry and Commerce and the Environmental Award of the Sparkasse Pforzheim Calw. Under a cooperation project with the boiler manufacturer HDG Bavaria, the precipitator was tested successfully.

Provided by Karlsruhe Institute of Technology

Citation: Towards dust-free wood combustion (2015, March 3) retrieved 26 April 2024 from <https://phys.org/news/2015-03-dust-free-wood-combustion.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.