

Ultra low dust emissions for residential heating systems

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Eco Revolution technology for wood burning appliances:

**Wood heating with 100%
eco comfort!**



Presented by:



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Wood heating: future, perspectives and challenges

- ▶ The European Union has set three ambitious goals for 2020: to reduce total energy consumption by 20%, to reduce greenhouse gas emissions by 20%, and to increase the share of energy generated from renewable sources by 20% (Climate and Energy Package, 2008). Wood is a source of renewable energy and an essential component of the sustainable energy mix; in France, wood heating comprises 50% of the renewable energy share, with nearly 9 million households using wood burning domestic appliances.
- ▶ French building regulations (RT 2005 and 2012) include wood burning appliances as viable primary heating systems for private homes. They are an economic and ecological alternative to electric heating systems. However, more than 4 million French houses are still equipped with electric heating systems, accounting for 27% of single-family homes.
- ▶ Ambient air quality is of major concern to the European Union, which has established quotas of pollutant emissions by country. The relatively old stock of domestic wood heating appliances in current use contributes significantly to particulate matter (PM) emissions. More efficient appliances are being developed and governments are encouraging consumers to replace their appliances with cleaner models.

UltraLowDust project: goals and scope

- ▶ In the framework of the **FP7 project** EU-UltraLowDust, performed by a consortium of partners from 3 EU-countries, a European approach for **ultra-low emission small-scale biomass combustion** has been carried out. Three innovative technologies which cover the whole range of residential biomass heating appliances (ultra-low emission pellet and woodchip boilers; new stove technology based on optimised air staging and on automated control system; new ESP (electrostatic precipitator) system for old stoves and boilers fired with biomass fuels) have been demonstrated within the project.
- ▶ These three technologies have been evaluated and optimised by comprehensive **test stand tests** and **field tests during two heating seasons**. They define a **new state-of-the-art** regarding ultra-low emission biomass combustion, covering an intelligent combination of primary and secondary measures.
- ▶ Moreover, market studies as well as techno-economic analyses and overall impact assessments based on the results of the field tests have been performed. Additionally, the project aims at the development of recommendations for **future emission limits** under consideration of the results achieved, which shall then be discussed with national and EU authorities active in legislation making.

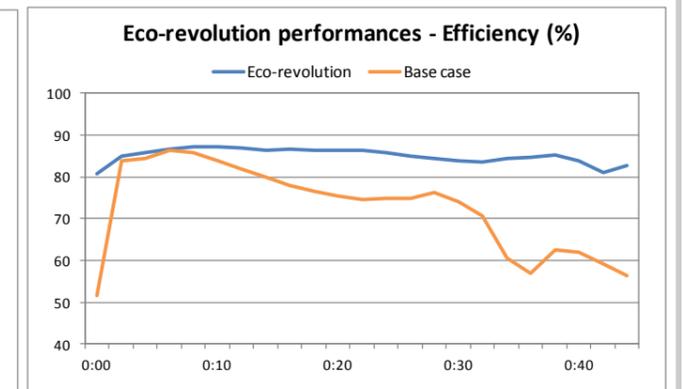
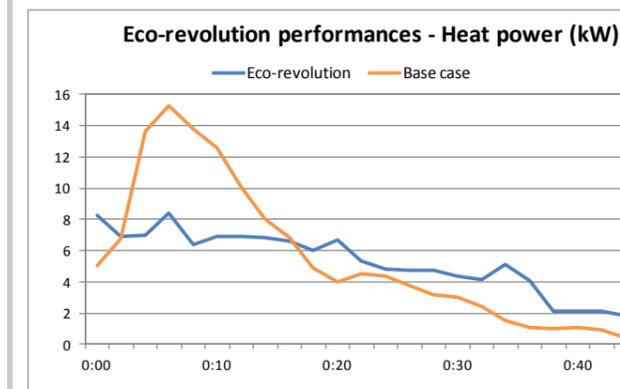
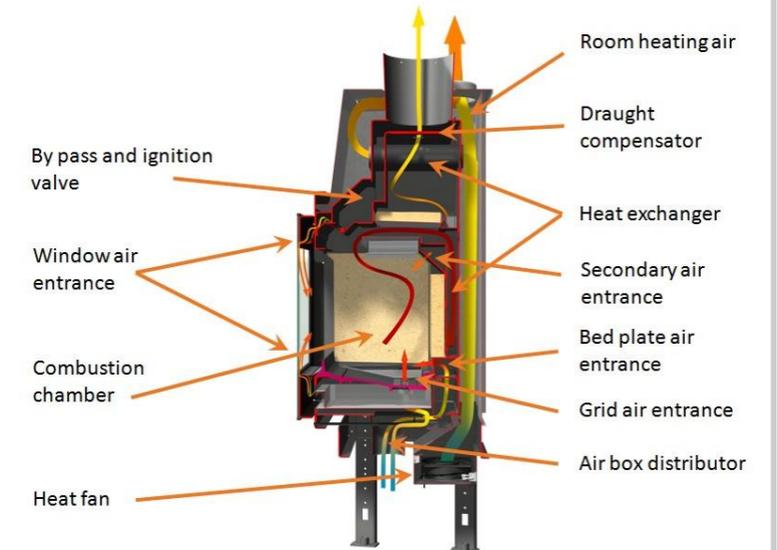
Eco-Revolution technology: performances

Through an optimised combustion chamber and **air inlet regulation**, this high performance Eco-Revolution technology meets already the strict requirements of the future EU regulation (Ecodesign draft, July 2013). It guarantees **optimal performance** during all phases of combustion.

	Heat power	Thermal efficiency	CO emission	NOx emission	OGC emission	TSP emission
	kW	% (NVC based)	mg/MJ	mg/MJ	mg/MJ	mg/MJ
Eco-revolution (lab test based on EN 13240)	7,2	86	577	83	30	22
Ecodesign requirements (Draft, July 2013)	-	80	1000	133	53	27

Eco-Revolution technology: main features

- ▶ Eco-Revolution technology allows for fully automatic operation; there is no need to control air inlets and combustion is cleaner throughout the entire operation. This technology combines easy handling with perfect **combustion control**.
- ▶ All devices in the Eco-Revolution range are equipped with an air distribution box that regulates air inlets through the different stages of wood combustion. The box injects **the necessary quantity of air at the right place and at the right time**. Emission levels remain low and constant during all phases of operation.
- ▶ Eco-Revolution devices are equipped with fans to increase heat exchange and to **distribute warm air** throughout the house.



- ▶ The automatic control of air inlets limits the impact of the user's behavior on combustion. It ensures **high performance** while maintaining **nice-looking flames** and **constant heat** production. Continuous heat, without temperature fluctuation, guarantees high levels of comfort when the stove is used all day.

Eco-Revolution technology: advantages and potential

- ▶ The new Eco-Revolution technology provides the user with:
 - **100% ecology:** a powerful device with low emissions throughout all phases of operation
 - **100% economy:** a high performance device with reduced consumption of wood, which fits to modern well insulated homes (Low Energy Buildings)
 - **100% comfort:** a device which is simple to use and produces constant heat and beautiful flames