



## High Performance Engineering for Implementing the Green Economy

Iulian Hornet

S.C. Ecohornet S.R.L. Romania

Highway A1 Bucharest-Pitesti, km. 13.2, exit Ciorogarla, 4 Italia Street, Chiajna, 077040 Ilfov, Romania

Mobile: +40 745.050.050, +40 740.888.085

Fax: +40 21 351 5864

Email: [president@ecohornet.ro](mailto:president@ecohornet.ro)

Website: [www.ecohornet.ro](http://www.ecohornet.ro)

According to a report of the European Commission, the EU imports 53% of the energy it consumes. Energy import dependency relates to crude oil (almost 90%), to natural gas (66%), and to a lesser extent to solid fuels (42%) as well as nuclear fuel (40%). The EU external energy bill represents more than €1 billion per day (around €400 billion in 2013) and more than a fifth of total EU imports. The EU imports more than €300 billion of crude oil and oil products, of which one third from Russia.

Based on the above mentioned arguments, in the past few years, the European Union's efforts to limit dependence on fossil fuels and to reduce carbon emissions have led to significant development of the renewable energy market. Among the renewable energy sources, an important component is the biomass such as wood, agricultural crops or wastes, and municipal wastes, especially when used as a source of fuel or energy.

Pellets represent an economic and neutral biofuel, regarding CO<sub>2</sub> emissions, mostly produced from sawdust and wood waste, compressed at a high pressure without any bonding additives. They are cylindrical shaped, usually measuring between 6-10 mm diameter and 30 mm in length. Being a high-standard produced fuel, compressed pellets allow their transport to be economical and also the use of fully automated systems in units producing electricity and heat, from those serving a single family to the public ones. With the rapid growth of the market segment, they represent a key technology for increased use of biomass in Europe and worldwide.

Thus, in only six years, the use of wood pellets has increased more than three times (from 4.6 million tons in 2006 to 14.3 million tons in 2012). During the same period, the manufacturing has tripled (from 3.5 million tons to 10 million), while imports increased five times (800.00 tonnes in 2006 and 4.4 million tons in 2012).

EU's Annual Report 2013 on biofuel forecasts a usage of pellets in Europe located between 50-80 million tonnes per annum (2012: 14.3 million) by 2020. Pellets have considerable advantages compared to classic coal - for heating and power plants, which will help the transition to renewable energy and reduce use of fossil fuels.

At the same time, the Food and Agriculture Organization of the United Nations estimates that, in just 5 years (2000 - 2005), on average, 12.9 million hectares of forests, especially in South America, Africa, Asia, but also in Europe, were lost. These deforestations are also associated with thermal power generation, cogeneration and tri-generation with expensive, inefficient and polluting biomass plants.

Will we continue to cut more of the forest area of the planet to produce white (clean) pellets needed for outdated and inefficient combustion technologies? Are there some alternatives?

Pellets manufactured from: trash, debris, green waste, agricultural waste, forestry, energy crops, wood chips (especially dry and damaged wood from the forests and uncultivated land, even that with a high content of silica) are an ideal fuel for thermal energy production with the ecoHORNET equipment.

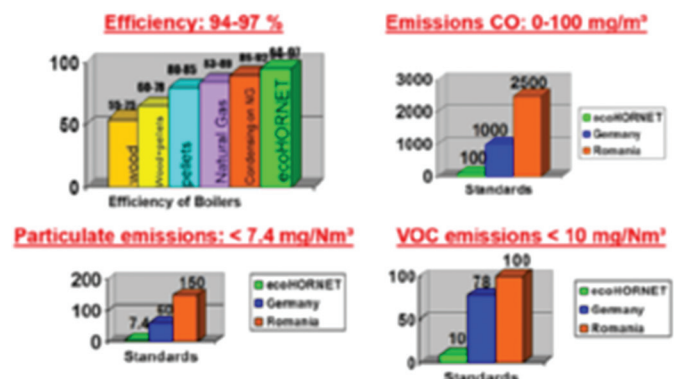


Figure 1. Performances of ecoHORNET heating units

This fuel source is available to all farmers through waste recovery and conversion into fuel. From year to year, the number of producers of agro-pellets in Romania increases. The pellets can be produced by anyone and in low-capacity plants (50-500kg/hour) with a minimal investment. The agro-pellets price does not exceed half of the price of wood pellets from sawdust and speaking in terms of calorific value, in the ecoHORNET equipments, they are only 15-18% weaker.

ecoHORNET owns a technology that harness the full potential of this environmentally friendly and fast regeneabil fuel, by burning it at a higher level (see figure 2) - incineration at temperatures above 1250 °C simultaneously integrating processes such as gasification, condensation, direct combustion, incineration post combustion and heat transfer optimization .

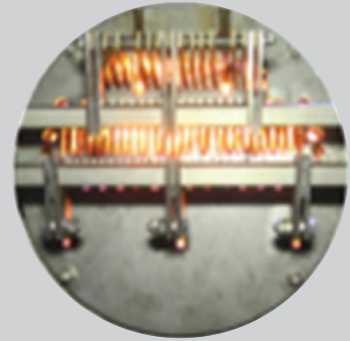


Figure 2. Innovative ecoHORNET pellet burner

Basically, with a small amount of pellets we produce heat at 1250 °C, and 94-97 % of it being transformed into useful energy. At exhaust, the combustion gases don't have more than 80-100°C with very low environmental impact (see figure 1). Where is the difference: in your house, in your equipments, in your savings. Hence, the result is efficiency and extremely low costs of producing heat and electricity.

Based on the use of the ecoHORNET original incineration technology, the pelletised BIOMASS became an efficient, economic and ecologic energy source, it represents an alternative solution to the energy crisis and allows the development and implementation of adequate energy strategies for isolated communities, social inclusion by generation of new jobs and a significant reduction of pollution.