

Advanced Combustion Unit for Biomass „AdCUB“

Projektmanager: Dr.- Ing. Hans-Joachim Gehrman

Duration:

11.11.2011 – 11.11.2015

KIC Inno Energie – Project

Objective

Because of legal requirements it is expected, that within the next five years more than 4 GW electrical power from small and medium-sized biomass based firings will be generated all over Europe. Therefore it is important to address various challenges like fuel diversity, national support programs, and legal requirements in a highly fragmented market to the adequate technologies. Currently more than 90 % of the electrical power from solid biomass is generated in decentralized plants with a capacity of 2.5 to 6 MW_{el}.

Beside technical challenges like investigations of the combustion- and slag formation behavior of alternative fuels, the economic compulsion consists of constructing and operating facilities in a cost-efficient way and the in a short delivery time.

Within in the scope of the project *AdCuB* (Advanced Combustion Unit for Biomass) supported by the KIC-InnoEnergy, the objective was to reduce CAPEX und OPEX with the help of a modular designed, innovative grid system.

Figure 1 shows the basic idea of the project schematically (Figure 1).

Realization

To achieve these objectives, the ITC in cooperation with AREVA was responsible to submit proposals in the boiler section as well as to make investigations concerning the combustion and emission behavior with selected fuels in a laboratory reactor to generate data for the design of a prototype of the AdCUB boiler.

The experimental investigations for the characterization of the combustion features of solid fuels (summarized in the service package FuBe) are done in the fixed-bed reactor KLEAA of the Institute for Technical Chemistry (ITC).

FuBe[®] is a service package for a comprehensive fuel characterization including the identification of the combustion behavior.

The philosophy of AdCUB

FROM MODULES DESIGN TO MODULAR SOLUTION FOR BIOMASS POWER PLANT



© Module-R



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Figure 1: System of AdCUB (modular)

Source: F. Castagno, F. Damerval, C. Lange, M. Peyrot, H.-J. Gehrman: AdCUB – Advanced Combustion Unit for Biomass

Quelle: Power-Gen Europe 2014 – AdCUB project – June 06, 2014

Results

First results from internal calculations show that capital costs in the modular designed system can be reduced by about 20% and the delivery time by 6 months.

From the combustion investigations and the estimations of the emission behavior, data for the basic-engineering of a plant with e.g. 20 MW was generated, which also had an influence on the tenders of AREVA.

Currently the CFD simulation program SoWaCo[®], developed within in the project AdCUB, is tested in Cooperation with a boiler manufacturer on a specific boiler design.

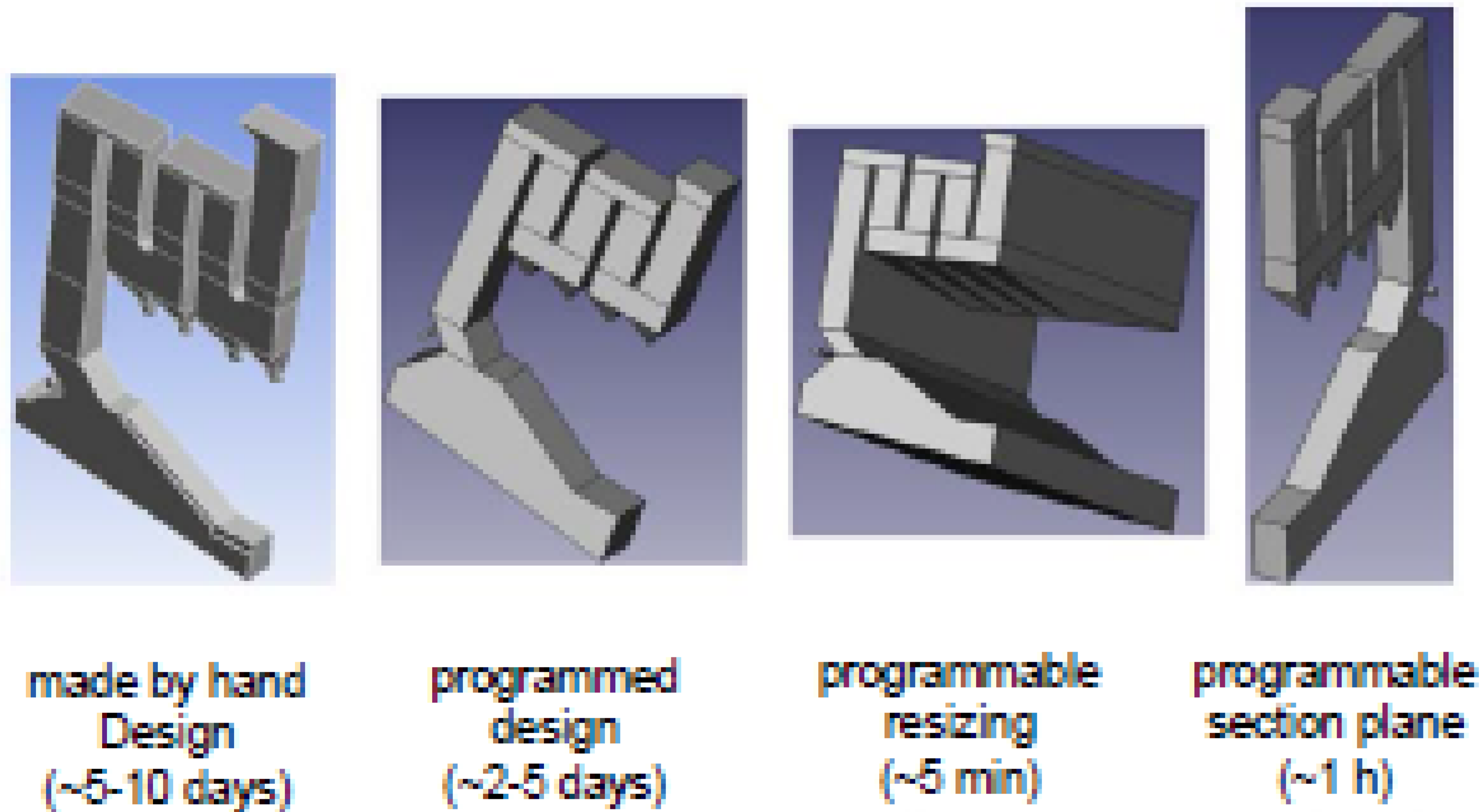


Figure 2: Fast calculations of different sizes via CAD

Source: KIT

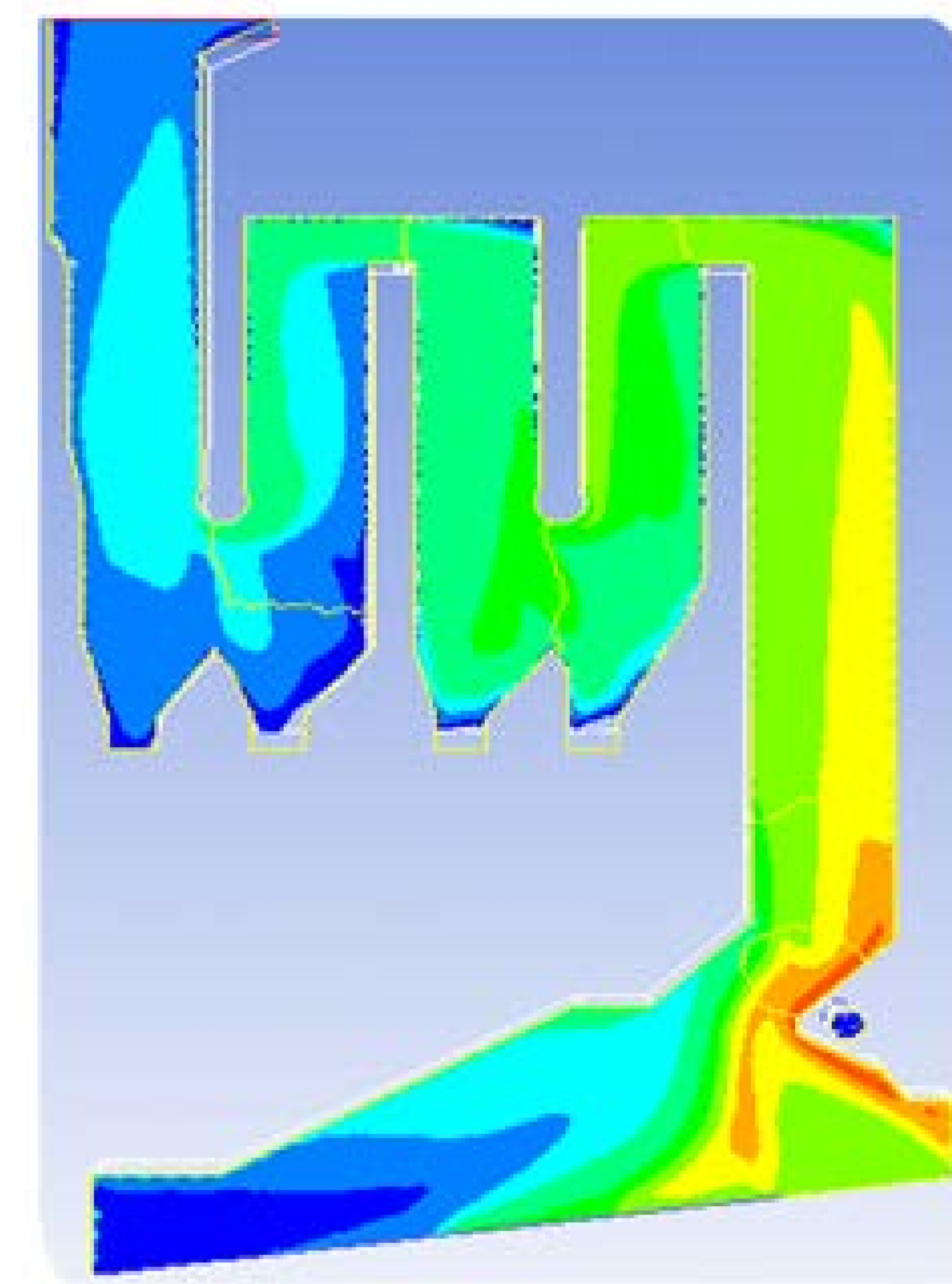


Figure 3: Presentation of the flow conditions with the help of SoWaCo[®]

Quelle: KIT

Project partners

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