GAS BURNER DESIGN PROJECT

LEAD ORGANISATION
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COST AND DURATION
The Carbon Trust contribution towards this project is £160,478. The project started in November 2003 and is due for completion in June 2005.

PROJECT REFERENCE NUMBER
2003-2-25

OBJECTIVES

The design of a full range (14-750kW) of pre-mixed fully modulated gas burners having 5% higher efficiency than conventional burners, and incorporating DC combustion motors with lower electrical consumption and noise emission.

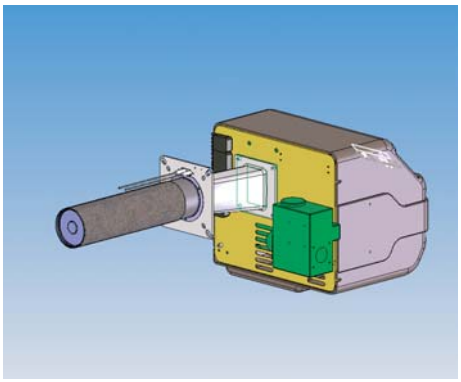
SUMMARY

Currently, gas burners are based on existing oil burner designs. In these conventional systems air and gas is mixed behind a plate in the firing tube before being lit with an uncontrolled flame. The result is that a large combustion chamber is required and only a low resistance in the boiler can be overcome.

Burnertech Combustion Engineers has conceived and, with funding from the Carbon Trust, is developing a new gas burner design. In this design air and gas are pre-mixed in the combustion fan of the burner before being blown onto a perforated matrix material, where they are ignited. This mode of operation leads to a much more controlled and shorter flame length and the following advantages:

- Smaller combustion chamber sizes are possible.
- More restriction can be placed in the boiler to reduce flue temperature and increase efficiency.
- Burner modulation is fully controllable.
- A radical rethink of boiler design is made possible.

All the above lead naturally to higher boiler efficiencies and, therefore, lower CO_2 emissions. Additional benefits accruing from this approach are quieter burner operation allowing boilers to be sited inside buildings, warmer intake air and



PM2 Pre-mix burner with output up to 300kW

therefore more efficient operation. It also becomes possible to offer full modulation at a fraction of the current price, thereby aiding the market penetration of this more efficient mode of operation. Reduced NO_x emissions is another environmentally friendly by-product of these innovations.

Experience with prototype burners has indicated a 5% reduction in CO_2 emission compared with their conventional counterparts. Energy consumption in commercial and domestic boilers is considerable, with an estimated 82TWh of energy consumption per annum in the UK. Adoption of the new design in 40% of the commercial and domestic market would lead to a 38,000-tonne reduction in CO_2 emissions.

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