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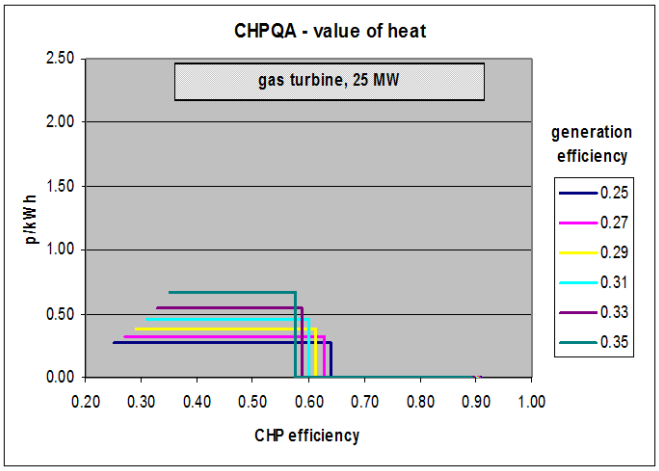
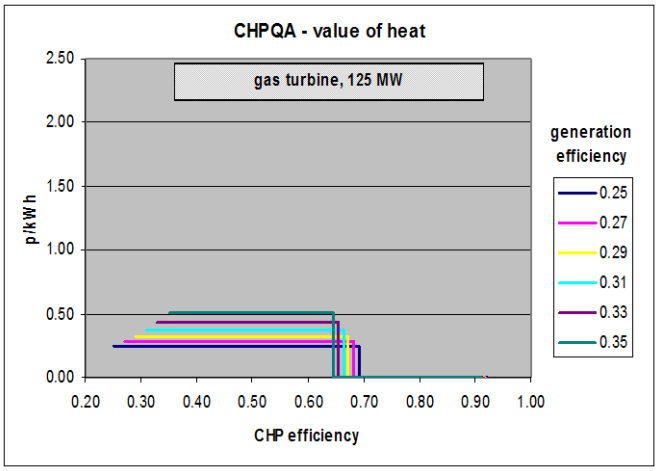
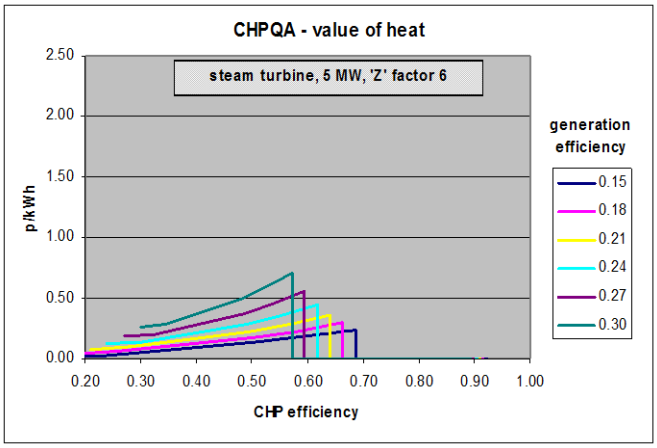
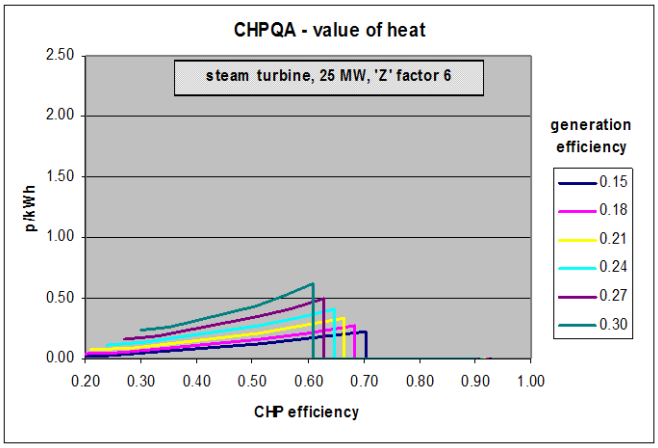
CHPQA An analysis of its signals to encourage the development of heat networks to utilise reject heat from power generation.

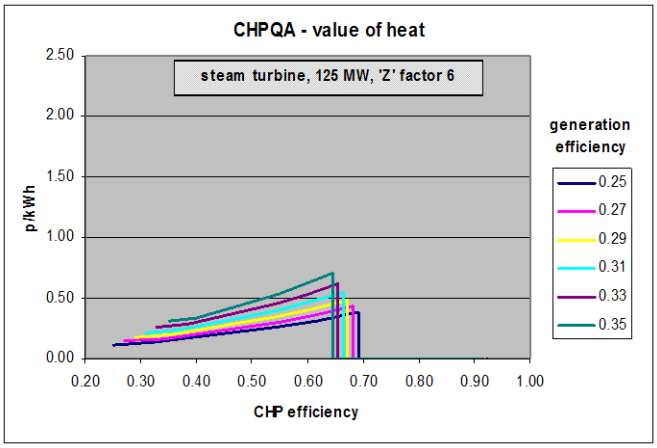
Maximising use of reject heat from electricity generation is an EU target, with a recent proposal that all new plants should be built as CHP. CHPQA is the UK methodology intended to encourage use of such heat but is constrained by the structure of current EU directives. The incentive is paid per unit of electricity. An unintended consequence of the current EU formula is illustrated in the following charts.
The charts show how incentives cut off at overall efficiency of 60% to 70%, when their potential is 86%. For a power plant with an electrical efficiency of 50%, only 10% of the available 36% of the heat is incentivised. The fundamental

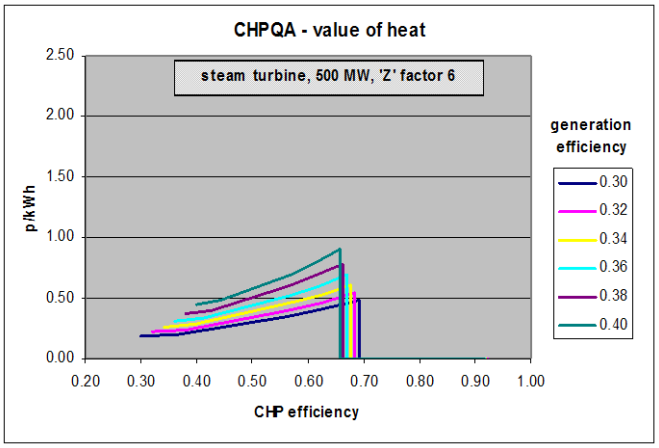












problem arises from EU methods that analyse the saving from the use of the waste heat as having an influence on the electricity sector as well as the heat sector when use of the heat can only generate savings in the heat sector.

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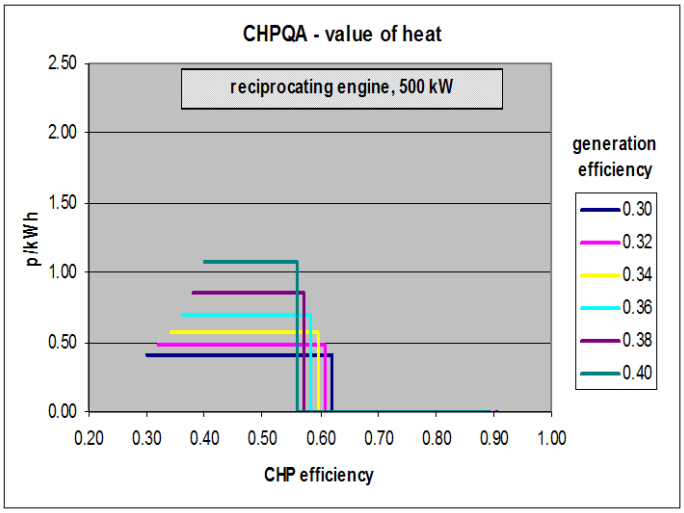
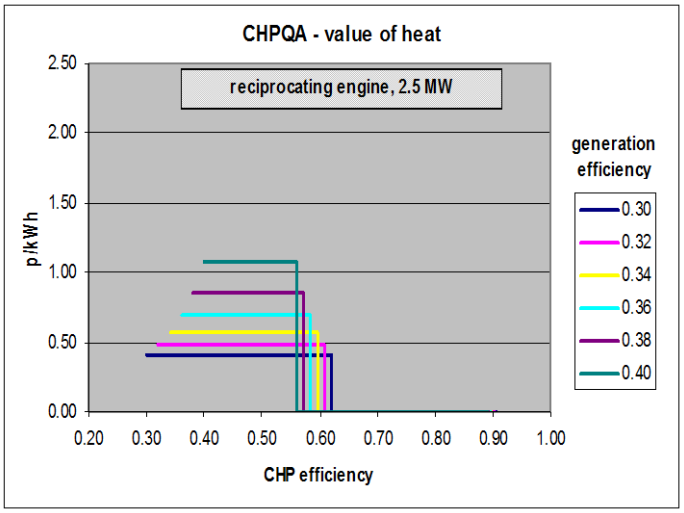
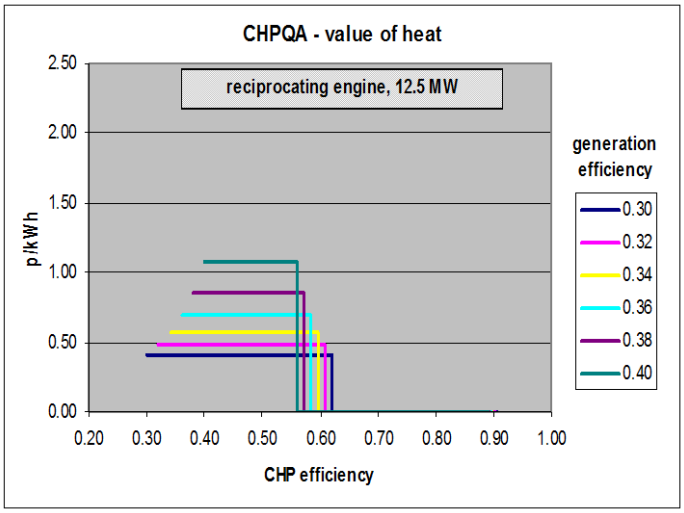
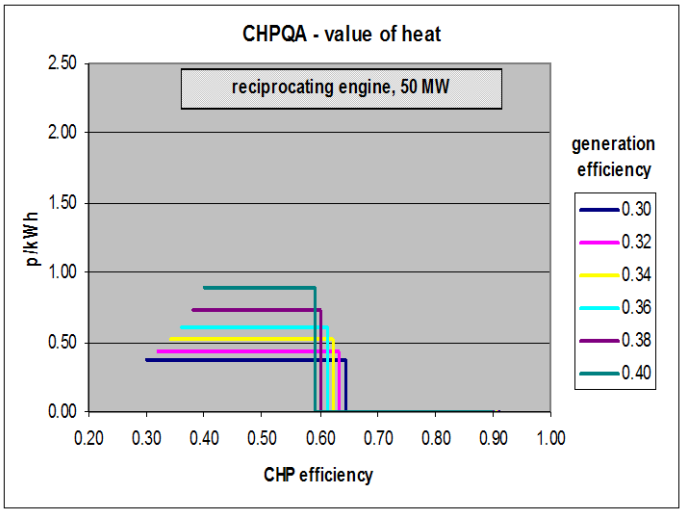
Optimisation of CHP, Chart of current UK incentives for waste heat use under CHPQA









The limitation on waste heat utilisation is availability of heat networks. The UK plans to encourage direct investment in such networks through “Renewable Heat Incentives”. These apply to heat from electric heat pumps, biomass boilers and but not waste heat from CHP. Average emissions for heat from CHP are lower than electric heat pumps as evidenced in Energy Paper 35. One example is waste heat from peak load electricity generation using simple cycle gas turbines - an effectively “Zero Carbon” untapped heat source. This electrical efficiency of this type of peaking plant does not change when the reject heat is stored and used, Danish practice, and piped to heat buildings. No electricity is “lost” through heat use.

CHP a “virtual heat pump” Professor David Mackay, upgrades heat being rejected to the environment at around 30C to temperatures useful for heating buildings with COPs of 8 -14. The electric heat pump with lower winter heat sources of 8C to minus 4C inevitably has a lower COP of 3-4, a measure of the amount of electricity used per unit of heat, due to its lower temperature heat source.

If low temperture heat networks 75C flow 30C suitable for retrofitting UK housing stock to heat from large scale heat pumps and heat from CHP are to be encouraged then the current revisions to CHPQA need to encourage maximum use of such heat and the incentives for feeding such networks need to be put on the same footing for all low CO2 heat sources. WRH Orchard July 2012