Industrial combined heat and power

Combined heat and power (CHP), which in the South African context includes onsite co-generation, improves the efficiency of fuel consumption by either producing both heat and electricity from a central source or utilising otherwise wasted by-product heat to generate electricity. This reduces energy demand from the national grid. In 2006, around 500 MW of electricity and 2,500MW of heat are generated by CHP in the Pulp and Paper (PP), and Food and Beverage (FB) sectors[1].

In the 2050 Calculator the addition of CHP is in new industrial plants and it varies by sub-sector. In the Calculator it is presumed that the Mining and Non-ferrous Metals sectors would predominantly generate electricity. The Iron and Steel and Non-metallic Mineral sub-sectors are presumed to implement waste heat recovery for electricity production while the remaining sub-sectors optimise their CHP plant primarily for heat production as in the PP and FB sectors.

Industrial combined heat and power
Source: (www.cospp.com)

Level 1

Level 1 assumes that no new CHP capacity is developed and that it remains approximately 300 MW as it was in 2006.

Level 2

13% of industrial demand for electricity and heat is met by CHP by 2050.

Level 3

25% of industrial demand for electricity and heat is met by CHP by 2050.

Level 4

50% of industrial demand for electricity and heat is met by CHP by 2050.

The charts display the demand for industrial CHP electricity (MW$_e$) and heat (MW$_t$) for the milestones years 2030 and 2050 for levels 1 to 4.

The growth in electricity capacity is dominated by the mining sector which represents almost half the total.

Most of the growth of CHP occurs post 2030 as is depicted in the charts.

Note that the total equivalent is dependent on industrial growth assumptions for the period which would cause the actual values to vary.
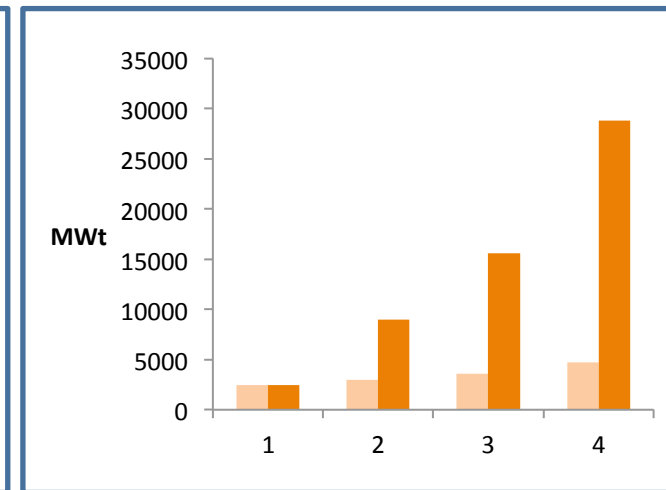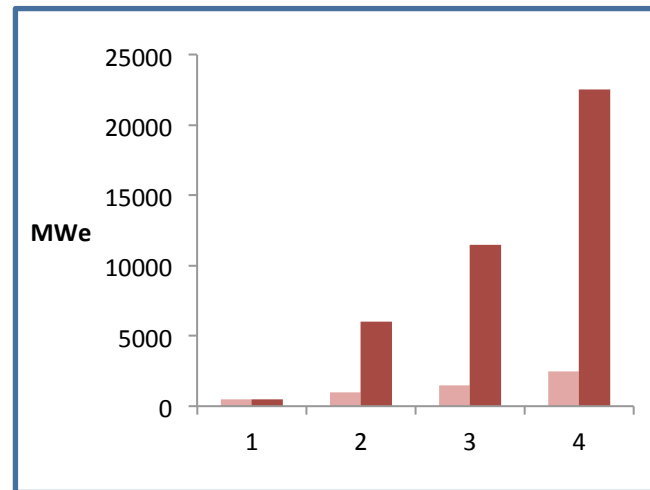
[1] Industrial Energy Balance, 2006 (ERC,2013).
[2] http://www.ietd.iipnetwork.org/content/combined-heat-and-power-chp-generation, Dingle (2012).
[3] Estimate based on useful heat demand.
[4] Estimated.