

Technology Options in the Iron & Steel Sector

The energy demand for Industry has been modelled on the basis of autonomous improvement in energy efficiency and technology options (process). The level of penetration of efficiency having already been adopted, now the user may choose tech option in iron and steel, one of the two major energy consumer amongst the industrial sector (cement is the other). Five Technology options have been modelled in the Iron & Steel sector of Industry. In general, the default technology option is A and other options are denoted by increasing alphabets. Increase in the alphabet of the technology option is not necessarily an indicator of emissions reduction but in general denotes reduction in energy demand.

E. Increased Scrap

This tech option is a major driver for reduction of thermal energy consumption in iron and steel plants. European and Japanese plants are reportedly running with more than 30-50% iron being substituted by steel scrap. The utilization of scrap in steel plants in India is probably less than 3-5%. Increased scrap utilization has the potential to significantly reduce the thermal energy consumption in steel plants since typically 60% of the total energy is used for producing iron and this can be saved through the increased use of scrap in the downstream steel making process.

A. Default

This option does not invoke specific tech options and the trajectories are based on the levels which have been chosen and the SEC reductions are based on these chosen levels.

C. Increased Gas based Direct Reduced Iron

This option characterizes the impact of a concerted drive to increase the penetration of Gas based technologies in the manufacture of DRI. Plants using gas based DRI are under operation in developed countries and such plants have reported very low SECs and high efficiencies. In addition, the emissions from these plants is also much lower than coal based DRI plants. There are very few gas based DRI plants in India primarily due to the low availability of natural gas in the country. This tech option level assumes large induction of gas based process in this sector supported by large availability of gas.

B. Switch to Electric Furnace

This tech option studies the impact of a major shift to electric furnace processes instead of the oxygen furnaces which are expected to be dominant in the autonomous/default scenario. Under this tech option a major reduction of the Specific Energy Consumption (SEC) can be expected based on the increased efficiency of the electric processes.

D. Increased Electricity from the

This tech option models a major switch in the sourcing of electric power in the iron and steel sector. Current trends show that plants are preferring to produce most of their electric power through the use of Captive Power Plants (CPP). This tech option provides insights into the impact of a switch to procuring most of the electric power from the grid. Such a switch provides a major improvement in the energy efficiency of the specific plant since the inefficiency of the CPP now goes outside the plant boundary. The final energy use could be reduced significantly under this tech option.