Workshop

Steel Industry in India: Potentials and Technologies for Reduction of CO_2 Emissions

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NEED TO CREATE ENVIRONMENT TO COMBAT CLIMATE CHANGE

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Feedback on identified areas

TATA Steel, Jamshedpur (*referred subsequently as* TSL) have been working on Energy Conservation since late 1970s and on Climate Change since late 1990s through modernization of infrastructure, participation in Worldsteel Association's Life Cycle Assessment exercise and joint initiative of WBCSD & WRI that culminated in the development of GHG Protocol.

- **Awareness of the steel industry and the individual company on CO_2 issue (e.g. Awareness of National Action Plan on Climate Change, awareness of PAT scheme)**: Tata Steel has tracking India's National Action Plan on Climate Change that was launched in Jun 2008, particularly in the Renewable Energy and Enhanced Energy Efficiency areas, and India's voluntary declaration in 2009 on reduction of GHG intensity of GDP. In fact Tata Group has proactive to identify Climate Change as an issue requiring the attention and Tata Steel had integrated CO_2 reduction in its Vision in 2007-08.
- **Major process steps causing CO_2 emissions/high energy consumption**: Tata Steel has been monitoring department-wise energy consumption since middle 1980s, CO_2 emissions from the overall site since middle 1990s and has started measuring department-wise CO_2 emissions since 2008-09. Process-wise gap analysis and benchmarking exercises have been taken up and the potential areas for the CO_2 emission reduction are thus identified. Some reduction needs paradigm shift through development of breakthrough & innovation in process & technologies e.g. alternate Iron Making without carbon as reducing agent, recovery of heat from slags, use of high volume of low grade heat e.g. from cooling water etc.
- **Actions/investments of the company related to CO_2 reduction in the past and in the future (actions planned related to operational efficiency and investments in CO_2 reduction/energy saving plants/processes)**: Tata Steel has been investing in phases over the years to improve effectiveness through improvement of operational efficiency, promoting 3R (reduce, reuse & recycle) and GHG mitigation on continual basis as well as during augmentation of its steelmaking capacity. Investments have been made to pursue R&D on beneficiation of iron ore and Coking Coal and to use higher agglomerates in BF burden. Some of the other initiatives pursued by TSL are use of by-product gases in Power plants & reheating furnaces, waste heat recovery in stoves & sinter plants, Coke Dry Quenching, Top gas Recovery Turbine, shift to big modern BFs with higher top pressure, Non-recovery coke oven, Con-cast, Continuous Annealing plant (CAPL) etc.
- **Willingness of the industry to take actions for reduction of CO_2 emissions, Any Requests to public authorities/the Government (e.g. pilot plants, grants)**: Tata Steel believes that implementation of prioritised solutions and strategic levers can add value to business sustainability and hence pursuing those (e.g. pursuing beneficiation of raw materials with higher yield, maximisation of in-house scrap usage, H_2 harvesting, Carbon Sequestration using water shift reaction etc.). Funds are to be allocated for clean technology development & deployment (e.g. part of Steel Development Fund, Government of India). Some of the areas where external world can help are outlined below (see sl.1 to 9 below).
- **Waste co-processing** (Willingness and opportunities to use waste in processes and as a substitute for fuel): Wastes are reused in Sinter Making, Iron Making, Coke Making and Steel Making. These include wastes like Flue dust, Sludge, Tar Sludge, Oily Sludge,

Waste Oil etc. Iron ore mines fines in pelletization plant, recovery & use of byproduct gases are some of the examples that have become industry norm. Plastic co-processing was tried back in 2004 and TSL is currently conducting trials in top charged battery under a pilot scale project of Central Pollution Control Board, Ministry of Environment & Forests, Government of India. Trials are also being conducted for utilisation of L.D.Slag in Cement Making. To produce world class steel with indigenous raw materials with inferior & fluctuating quality and maintain cost competitiveness is challenging. Hence, the opportunity of taking further wastes for co-processing within Steel Works is limited.

Barriers in confronting Climate Change Challenge

Model demonstration projects have been implemented for technology demonstration at Jamshedpur Works with International Aid. Different modernisation and expansion plans have been implemented while pursuing higher productivity, efficiency and profitability. Today at Jamshedpur Steel Works, the product intensity of GHG emissions is 20% less than 2000, 2/3rd of what it used to be 20 years ago and half of what is was 30 years ago. Further reduction is going to be challenging which is evident from the fact that the specific CO_2 emission trend is plateauing - is an industry wide feature - it's the scientific limits of the blast furnace technology. The industry needs explore at least one or perhaps two options involving either modification of current technologies (e.g.CCS) or develop completely new reduction technology to make the decisive step change. This will be both technically challenging and extremely expensive. Significant impetus is needed to pursue the next level. Based on analysis of current barriers, the following is being submitted.

1. **Climate Change is not mandate in India yet**: India has to address both internal prerogatives of a developing nation (alleviate poverty, health care, education, infrastructure etc.) and external issues (e.g. defence to ensure national security). The fund allocated to some of these could be redirected to sustainable development. International efforts to curb security concerns can create an environment that can allow Government of India to change its priorities. However, till such time, it shall be difficult for India to comprehensively pursue climate change agenda and Indian steel sector shall continue to pursue measures that essentially add direct economic value with short term outlook.
2. **High Cost of Technology**: Most of the GHG mitigation technologies are imported from developed nations, expensive and technology transfer often poses problem. Pursue development of future technologies at national / regional level is what Government of India needs to look at. In this regard, Tata Steel welcomes the initiatives of Government of India to pursue strategic knowledge management and the formation of the group to pursue clean growth through Ministry of Steel.
3. **High Cost of Capital**: One of the key priorities of Government of India is to arrest inflation that can help by ensuring better exchange rates while importing technologies & services required to combat climate change and reduce the cost of capital.
   To address 2 & 3 above, Innovative financing solutions to bring down the cost and economic incentives to offset the higher costs are required from International community.
4. **Match World Benchmarks is challenging**: With the quality of indigenous raw materials, it is difficult to match the efficiency of primary steel making that is achieved globally by sites using superior grade raw materials. Scrap market in India is not mature and recycling rates are poor. This is an impediment to invest in large scale facilities through secondary steel making for the corporates most of whom are currently pursing capacity expansion. While at national level steps are required to improve scrap recycling, immediately international support is needed to decarbonise primary steel making and develop raw material beneficiation technologies.

Key Message – International Funding required to promote GHG Abatement

5. **Onsite Renewable Energy not possible**: At its current efficiency, Solar or Wind does not appear to hold potential for large scale deployment barring supporting the

illumination load of offices. Deployment of nuclear or other non-carbon source based power utilities to supply power to steel plants on the other hand appears to provide a technically feasible option.

6. **Retrofitting Issues**: Innovative solutions are expected from Technology providers
7. **IPR Issues is an obstacle**

Key Message – Need to deliver Innovation

8. **Absence of International consensus detrimental**: Clear cut international regulation is 5 years away and more domestic regulation during this period are likely to emerge. Economical decisions needs risk mitigation and until long term stability in absence of which it becomes difficult to commit investment and implement strategic shift of business.
9. **Longer term perspective:** Climate Change is a very very long term issue. Plans are usually developed for 5 years and climate change prospects of India were assessed for next 20 years. There is a need to develop road map matching climate change time scales, optimise the cost of the same and possibly then actions towards combating climate change can be justified on economic scale alone.

Key Message – Create the PULL rather than PUSHing around to Combat Climate Change

We are ready to play a decisive and world leading role when the right institutional conditions are in place.

Thank you

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