Steel Research and Technology Mission of India-SRTMI

Introduction

The Indian steel industry is growing fast, at a rate second only to China. With production of crude steel reaching 101.4 MT in the year 2017, India is on the path to emerge as the second largest producer in the world, replacing Japan. In spite of the current challenges, Indian steel industry has significant potential for growth, underscored by the fact that the per capita steel consumption is only 67 Kg, way below the global average of 208 Kg. The "Make in India" initiative is expected to witness significant investments in infrastructure development, expansion of railway network, ship building industry, defense sector, anticipated growth in automobile and capital goods industry and construction in urban and rural areas. To provide impetus to the development and growth of Indian steel industry, a futuristic robust policy, namely, National Steel Policy 2017 (NSP 2017) has been formulated, whose key features are:

- Achievement of 300 MT of steelmaking facility by 2030 – 31.
- Increase in per capita steel consumption to 160 Kg from the current level of 67 Kg.
- Development of globally competitive steel manufacturing capabilities.
- Domestically meet the demand of high grade, value added steels.
- Domestic availability of iron ore, coking coal & natural gas at competitive rates.
- Create self-sufficiency in steel production by providing policy support & guidance to private manufacturers, MSME steel producers, CPSEs.
- Improving performance in various sections at par with global best practices

Thus, there exists a huge opportunity for the steel industry to grow both in terms of quantity and quality to meet emerging needs of the country and also, to make it self-reliant.With the rapidly changing global steel business environment and keeping in view, the new age obligations of ensuring safe industrial working, resource conservation, energy optimization and environmental sustainability in terms of CO2emission standards, there is a need to develop radically-new, disruptive and path-altering technologies in-house, which are more attuned to country's resources and capacities. This will not only make the country more self-reliant but would also present a lucrative opportunity of marketing these developments outside.Major technological developments of radical nature can only come about through an institutional national-level consortium facilitating concerted approach between steel industry, academia and research organizations through adoption of systematized technological development process involving (a) Identification, (b) Development, (c) Acquisition and (d) Deployment.

R&D efforts in the steel sector has mainly been driven by a few steel companies, namely, Tata Steel, SAIL, RINL, JSW, ESSAR and JSPL. In addition, national research laboratories such as, NML, IMMT along with academic institutes such as IITs, NITs, IIESThave contributed through sponsored research work. The major focus of R&D activities in India over the years relates to incremental technology development to address to the present and short term needs of various

production units. Although, in the last few years there has been some synergy among the industry, R&D laboratories and academia through cooperative working and collaborative research programs, there has not been any national level platform towards spearheading R&D programs of national importance and augmenting manufacturing capability of equipment's and systems indigenously.

Taking in to cognizance the current technological scenario of Indian steel industry and the future growth potential, a national level platform has been created under the aegis of Ministry of Steel, GOI with active participation of leading major steel industries. The platform, "Steel Research & Technology Mission of India"(SRTMI) will facilitate R&D programs of national importance, create state of art facilities to conduct cutting edge research, develop expertise and skill development, manage human resources and bolster a tripartite synergy among industry, national R&D laboratories and academic institutes.SRTMI will work in close coordination with MoS and will provide necessary inputs to fulfill the objective of NSP – 2017.

Vision

SRTMI vison is "To develop an industry – institution interface for making iron & steel industry globally competitive by utilizing expertise available in various academic and research institutes of national repute as well as by collaborating with international organizations in the field to meet NSP-2017 objective through cost effective, environment friendly, state of art technologies for optimum utilization of natural resources and strengthening design and equipment manufacturing capability in the country".

Objective

- Spearhead R&D programs of national importance in iron & steel.
- Facilitate development of innovative, cutting edge technologies indigenously.
- Augment expertise and skill level through human resource interventions.
- Establish world class manufacturing capabilities through joint collaborative programs.
- Develop world class steel products for high end applications thereby minimizing imports.
- Enhance dissemination and interaction among the industry – academia – R&D organizations – MoS,GoI through development of strong IEC program.
- Pursue and manage collaborations and synergy amongst industry, national R&D laboratories and academic institutes as per national objectives and aspirations.
- Meet the National Steel Policy(NSP-2017) goals through strategic R&D interventions.
- Enhance R&D investments to 1% of turnover in a phased manner.

Scope of Work

- Identify areas of national importance for primary and secondary sectors.

- Evolve R&D programs of national importance, as per guidelines of SRTMI along with industry – academia participation.
- Develop indigenous capabilities for manufacture of steel plant equipment & systems.
- Facilitate establishment of international benchmark and best practices for primary and secondary sectors.
- Introduce new technologies for cost effective production of quality steels in the secondary sector.
- Introduce a mechanism for greater synergy and cooperation between the industry and academia.
- Augment skill and human resource development to facilitate in-house expertise to handle R&D programs of national importance and manufacturing capability.
- Coordinate ongoing Government funded R&D initiatives such as Steel Development Fund (SDF), Govt. Budgetary Support (GBS), and Centre of Excellence (COE) projects and ensure their successful completion and commercial exploitation.
- Provide necessary support and augment facilities of existing R&D establishments such as NISST, BPISTD and INSDAG etc.
- Create/ tie-up with institute to promote diploma programs specifically for the steel industry for human resource development.
- Mapping of expertise and diagnostic facilities available in the country to conduct programs of national relevance.

Roadmap for SRTMI

To make the steel industry sustainable and globally competitive, SRTMI shall actively support the following programs of national importance.

A. Mission – 300

- Provide necessary R&D thrust to achieve the goals and targets of NSP-2017.
- Improve performance indices as per international benchmarks
  - 300 kg/ Thm of coke consumption against present value of 400 – 600 kg/ Thm
  - 300,000 T (max) of waste generation per million ton of steel produced. Identify end-use of the waste and achieve 100% utilization.
  - Blast furnace productivity of 3T/ Cu.m/ day
  - Achieve minimum 30% reduction in energy from 6.7 to 5 G cal/ tcs to meet COP-21 commitment of 30-35% reduction in CO_2.
  - Specific water consumption of 3 Cu.m/ tcs max
  - Use of pellets in BF up-to 25%

B. Strengthening "Make in India" through import substitution

- Focus on production of value added steels of national & strategic importance, which are presently being imported such as, CRGO, amorphous steel, automobile grades, line-pipe steels, defence grades etc.
- Augment design and manufacturing capabilities through in-house expertise for indigenous development of equipments and systems.
- Making secondary sector more cost effective,energy efficient and quality conscious through introduction of new technologies.

C. Zero discharge, zero waste and zero harm

- Achieve CO_2 emission of 2T/ Tcs in existing facilities.
- Minimize CO_2emission through CO_2 sequestration and methanization.
- Develop ultra lowCO_2 steel through non-coking coal based technology.
- 100% utilization of waste through existing and new applications.
- Establish alternative routes of power generation through dry quenching of coke, dry slag granulation, heat recovery from concast slabs, hot charging etc. to minimize external power requirement.
- Zero discharge through 100% recycling of waste water by effective waste water treatment solutions.

Project Selection

Project selection of national relevance will be prepared and submitted by participating industries/ Organizations in line with “Roadmap of SRTMI”. The proposal shall include developmental plan, participating organizations assessment and identification of resources, time- frame, stage wise fund requirement, implementation plan, design and manufacturing plan etc., as per the need of the project. The proposing organization shall play the lead role and shall take the help of experts from member industries, academia and research institutions within India and abroad.

Most of the national projects shall require fundamental understanding of the subject before it is carried forward for prototype/ pilot scale development and finally up-scaling for industrial scale commercial applications. Thus, a three stage approach involving fundamental research and concept development, followed by prototype development for proof of concept in the second stage, and finally up-scaling for commercial scale operation in the final stage may be contemplated.