
ENVIRONMENT ACCOUNTING AND REPORTING**En Evidence from Vishakhapatnam Steel Plants, India****Dr. Atul Bansal**

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ABSTRACT

In recent years, environmental pollution has become so acute and the stakeholders' awareness to this issue has become so serious that the environmental accounting has become a strong branch of accounting. With increasing social need and focus on the environment, accounting fills an expectation role, to measure environmental performance. Environmental Accounting is a field that identifies resource use, measures and communicates costs of a company's or national economic impact on the environment. While consistently emphasizing on the economic and industrial development, we have taken the environment for granted. The result of such leniency towards environment has resulted into several remarkable incidences in the past including the Bhopal chemical leak (1984), Tsunami in India (2004). The issue of environmental responsibility and the sustainable industrial development has given to the birth of new branch of accounting, i.e. Environmental Accounting and reporting. Environmental accounting is relatively a recent entrant in the domain of accounting. It is the process of identification measurement and commutation of information in the environmental responsibility of the performance of an entity to permit economic decision. In this paper, the theoretical foundation of environmental accounting and reporting is discussed with special reference to steel Industries in India and special reference to Vishakhapatnam Steel plant. The Environmental Policy shows that they are giving fully efforts for the better protection of environment but on the other hand the research findings doesn't shows the ecological cost , liability , and ecological expenditure

Keywords: environmental accounting, social accounting, environmental protection, Steel Industry

INTRODUCTION

The Accounting System is subject to multiple challenges of which this paper shall examine the challenges generated by environmental activities. The accounting system is ill-equipped to provide adequate information about the environmental activities of organizations. Environmental problems have become global, and as a

result environmental accounting may be interpreted at several different levels, such as organizational, regional, and national. Due to the fact that a significant part of environmental damage is linked to the business sector, the corporate aspects of environmental accounting are a key topic of research. The study seeks to find the factors that led to the formation of environmental accounting, the processes that it underwent as well as its current relevance on an international and domestic level.

In terms of structure, the study can be divided into two major logical sections. The first logical section explores the roots of environmental accounting, i.e., social accounting will be examined. The development of environmental accounting first started in connection with sustainability and environmental disasters, the topic of which will be also be discussed in this paper.

The second logical unit discusses the relevance of environmental accounting and the deficiencies of the traditional accounting system. An outlook on steel industry in India is included in this section.

Environmental Accounting primarily refers to the process of identification, measurement and disclosing the information with regard to the environmentally responsible performance of a business entity to allow economic conclusions. It is vital for any business entity to follow the concept of sustainable development as it will result into consideration of ecological activities of the entity in economic measurement of the overall results.

OBJECTIVES OF THE STUDY

- Understanding the concept of Environment Accounting and to depict the role and importance of Environment Accounting.
- To evaluate the balanced integration of environmental policy with economic policy.
- Organizations have to adopt appropriate environmental accounting and reporting system:
- To identify the environmental costs that may have been formerly concealed in overhead accounts;
- To incorporate the environmental costs and performance of processes and products leading to more accurate costing and pricing of products;
- To widen and better the investment analysis and evaluation process to end compass likely environmental impacts; and
- To aid the evolvment and operation of an overall Environmental Management System (EMS).

METHODOLOGY

In terms of the methodology of this paper, the study relies on the processing and interpretation of the relevant professional literature, while the relevance of the study lies in the fact.

The researcher has basically relied on the secondary method of data collection. The researcher has referred to books, research papers, and webs and has also looked at various Environment Accounting reports / studies published online.

CORPORATE ENVIRONMENTAL REPORTING IN INDIA

In view of the public concern about environment and the ambiguity in the accounting treatment of environmental costs and liabilities, the corporate undertakings world over, in their own way have started disclosing both qualitative and financial information about the role played by them in the improvement and maintenance of environment. In India, the corporate sector is making environmental disclosure both on account of statutory requirements -

- (i) **Statutory disclosure:** The legal provisions as to environmental disclosure in Annual Accounts are minimal. Section 217(1)(e) of the Companies Act, 1956, provides that the Directors' Report shall include the particulars as to "Conservation of energy, technology absorption, foreign exchange earnings and outgo in such a manner as may be prescribed," Consequently, the Government of India has prescribed the following information to be given by 21 industrial groups: .

“Every company shall, in the report of its Board of Directors, disclose particulars with respect to the following matters, namely:

Conservation of energy:

- (a) Energy conservation measures taken;
- (b) Additional investments and proposals, if any, being implemented for reduction of consumption of energy;
- (c) Impact of the measures of (a) and (b) above for reduction of energy consumption and consequent impact on the cost of production of goods; and
- (d) Total energy consumption and energy consumption per unit of production as per Form A in respect of industries specified in the Schedule thereto..."

- (ii) **Voluntary disclosure:** Many corporate enterprises in India, on their own are giving information in their Annual Reports on the role played by them in environmental protection. Such information shows their concern about their social responsibility and their inclination to protect the interest of both the present and future generation. Some of the companies which are making such disclosures are: Asian Paints Limited, Chloride Industries Limited, Goodless Nerolac Paints Limited, Maruti Udyog Limited, Steel Authority of India Limited, Hindustan Lever Limited, etc.

Accounting is the languages of business or an information system of a corporate entity which provides quality and comprehensive information to various stakeholders to enable them to take decisions. Of late, environmental concerns play a significant role in the long term survival and development of business entities. Business entities are being expected to fully integrate environmental considerations into their life. World over, many organisations have already started recognizing and reporting the expenses they are incurring due to the environmental considerations.

ENVIRONMENTAL ACCOUNTING AND REPORTING: REVIEW

The process of identification, measurement and allocation of environmental costs and their integration into business decisions is environmental accounting, and the subsequent communication of the information to the company's stakeholders is called as Environmental Accounting and Reporting. Identification includes a broad examination of the impact of corporate products, services and activities on all stakeholders, After identifying the impacts on stakeholders, the entities have to measure those impacts (costs and benefits) as precisely as possible in order to permit informed decision-making by the stakeholders in general and the management of the organization in particular. Measurement might be quantified in physical units or monetized equivalents. The trading and non-trading concerns are required to adopt a reporting system to disclose to the community at large information about their environmental policies, environmental objectives, programs undertaken, and the costs and benefits related to these policies, objectives and programs, and to disclose and provide for environmental risks.

MAJOR ENVIRONMENTAL ACCOUNTING ISSUES

Distinction between environmental and normal business expenditure – By using the technology, such machines have been developed with state-of-the-art environmental technology and accordingly, some portion of the capital costs as well as the running and maintenance expenses of these machineries is attributable towards the corporate' contribution for environment. However, such expenditure is not easily separable from

the overall expenses incurred. It is very important to have such guidelines in place to identify the expenditure eligible to be termed as towards environment and towards normal business activities. Further, there should be monitoring by independent regulatory bodies to identify whether the business entity has properly allocated the capital and revenue expenditure between environmental and normal business expenditure.

Capitalization of environmental expenditures as against charging off them in the profit and loss account during the current accounting period – As we are aware that the environmental protection costs relating to prior periods and current period are generally very high, it is preferable to capitalize environmental cost instead of immediate expensing and adopt an amortization policy extending up to 10 years.

Recognition and disclosure of contingent liabilities related to environment–Contingent liabilities in relation to the environment are a matter of increasing concern throughout the world. As the environment is affected by a gradual process, the effect though emitted even in the current period, the results of the same would be reflected in the future. However, recognition of the contingent liability for hazardous waste or polluting emissions remediation most of the times depend on the ability of the organization to fairly estimate the remediation cost.

Considering the growing public and regulatory concerns about environment and the uncertainty in the accounting treatment of environmental cost and liabilities, the business entities across the globe have started disclosing both financial and qualitative information about the role played by them towards degradation and contribution in their own way. In India, the corporate sector is making environmental disclosure both on account of statutory requirements and also on their own as discussed below:

Statutory Disclosure: The legal provisions as to the disclosures with regard to the environment in annual accounts are very minimal. Section 217 (1) (e) of the Companies Act, 1956 provides that the directors report should include the particulars as to “Conservation of energy, technology absorption, foreign exchange earnings and outgo in such a manner as maybe prescribed”. Consequently, the Government of India has prescribed the following information to be given by certain industrial groups.

“Every company shall, in the report of its Board of Directors, disclose particulars with respect to the following matters, namely:

Conservation of Energy

- a. Energy conservation measures taken
- b. Additional investments and proposals, if any, being implemented for reduction of consumption of energy.
- c. Impact of the measures of a & b above for reduction of energy consumption and consequent impact on the cost of production of goods and;

d. Total energy consumption and energy consumption per unit of production as per Form A in respect of industries specified”

ENVIRONMENTAL REPORTING

Environmental reporting is the disclosure by an entity of environmentally related data, duly verified (audited) or not, regarding environmental risks, environmental impacts, policies, strategies, targets, costs, liabilities, or environmental performance either through (a) the annual report and accounts package; (b) a stand-alone corporate environmental performance report (CER); or (c) a site-centred environmental statement; or (d) some other medium (e.g. staff (newsletter, video, CD ROM, internet site) etc. for perusal of users of such information enabling them to take decisions and enrich their relationship with the reporting entity.

i. International Scenario:

In the past two decades around 25 countries have experimented with environmental accounting and reporting. Some European countries have established accounting system that is routinely applied. Some countries started it in a limited way. In 1990 no more than 10 or 12 of voluntary public reporting was made world wide and in 1998 estimated 2,000 companies reporting was done internationally. Major countries are: Australia, Austria, Belgium, Brazil, Canada, Colombia, Denmark, Finland, France, Germany', Hong Kong, Hungary, Italy, Japan, Korea, The Netherlands, New Zealand, Nigeria, Norway, Russia, South Africa, Sweden, Switzerland, United Kingdom, USA. As the corporate entities have to shoulder social responsibilities, they must disclose the impact on environment of their activities and must quantify the environmental impact and recognition of environmental expenses and losses.

An International Survey Conducted in twelve countries by a group of academicians in 1996 revealed that -

- 625/885 of companies surveyed (71%) mention environment in the annual report and accounts (58% in 1993).
- 220 companies (24%) produced some form of environmental report (15% in 1993).

Companies report a number of factors, which drive them into the reporting process:

- international standard/mandatory requirements (US ; Denmark; Netherlands ; Thailand)
- competitive advantage/best in class-I environmental management systems base
- supply chain pressures/credit and investment conditionality

- peer group pressure

The costs of environmental reporting identified are given as under:

The costs of reporting are mostly direct:

- installing the appropriate environmental management systems
- employing specialist staff/internal auditors
- appointing external verifiers
- publication/distribution costs/websites design costs
- there is also a potential reporting risk cost.

The costs of not reporting are mostly indirect :

- Poor environmental profile vis a vis competitors
- Potential loss of markets/investors
- Loss/foregoing of other benefits referred below

ii. The Indian Scenario

In the absence of physical form of accounting for recognition of environmental liabilities and costing treatment, the Indian Companies failed to adopt any appropriate system for accounting the environmental assets and liabilities. On disclosure aspect, only few companies have started disclosure voluntarily. Voluntary disclosure is simply an statement in annual reports about environmental protection without disclosure of company's behavior towards environment at the workplace in monetary terms and impact of such financial burden on the affairs of the organization. The companies do not specify any impending environmental liabilities or losses.

Moreover, there is no requirement by the Indian Companies Act about the reporting requirements covering the environmental impacts by a company. In other words the Companies Act is silent on compulsory disclosure of environmental costs and impact in annual accounts. For example the information required under section 217 (1) (3) of the Companies Act, 1956, read with Companies (Disclosure of particulars in the respect of Board of Directors) Rules, 1988, inter-alia are : Conservation energy, Technology absorption, Foreign exchange earnings and outgo. Some companies voluntarily disclose the particulars with respect to conservation of energy etc., (as per the requirements mentioned above) in the Board of Directors Reports.

Accounting Standard Committees at national and international levels have not formulated Accounting standards for disclosure of environmental costs and their impacts in Annual Reports of the companies in a specified manner.

Likewise there is a very limited disclosure requirement, about the environmental impacts by listed companies, in the listing agreements of Stock Exchanges in India. Last but not the least the Securities and Exchange Board of India (SEBI) has not come out with any remarkable requirement, such as in the guidelines for investor protection, about the environmental reporting by companies Indian companies do not report in terms of monetary value, how much amount it has charged to revenue and how much it has capitalised and the value of the environmental impacts and the' possible environmental liabilities. In other words, though every company is concerned about the environment and taking enough measures to safeguard the same (by spending money, of course), they have not reported and incorporated them in their final accounts so as to enable the stakeholders to fully appreciate the environmental impacts of the activities of these companies.

Accordingly it is felt that the standard setters, such' as Accounting Standards Board of the Institute of Chartered Accountants of India (ICAI), have to come out with appropriate pronouncement on the environmental accounting and reporting thereof. The same will go long way giving an impetus to the environmental accounting and reporting among the Indian corporate sector.

The Government of India should bring about appropriate amendments in the Indian Companies Act(may amend section 217 (1) (e) of the Companies Act, 1956, and Companies (Disclosure of particulars in the report of Board of Directors Rules, 1988) that will make mandatory for proper environmental accounting and reporting thereof. The SEBI should make it obligatory to incorporate the environmental impacts on the financial projections by companies whenever they attempt to tap the capital markets. Likewise, the stock exchanges should include the environmental reporting requirements in their listing agreements. All these coordinated efforts will create an atmosphere wherein the companies have to adopt environmental accounting and reporting immediately.

INDIAN STEEL INDUSTRY – A BRIEF REVIEW

The Indian Steel industry is almost 100 years old now. Till 1990, the Indian steel industry operated under a regulated environment with insulated markets and large scale capacities reserved for the public sector. Production and prices were determined and regulated by the Government, while SAIL and Tata Steel were the main producers, the latter being the only private player. In 1990, the Indian steel Industry had a production capacity of 23 Million Ton(MT). 1992 saw the onset of liberalization and the Indian economy was opened to the

world. Indian steel sector also witnessed the entry of several domestic private players and large private investments flowed into the sector to add fresh capacities.

The last decade saw the Indian steel industry integrating with the global economy and evolving considerably to adopt world-class production technology to produce high quality steel. The total investment in the Indian steel since 1990 is over Rs 19,000 crores mostly in plant equipments, which have been installed after 1990. The steel industry also went through a turbulent phase between 1997 and 2001 when there was a downturn in the global steel industry. The progress of the industry in terms of capacity additions, production, consumption, exports and profitability plateaued off during this phase. But the industry weathered the storm only to recover in 2002 and is beginning to get back on its feet given the strong domestic economic growth and revival of demand in global markets.

With a current capacity of 38 Million Ton the Indian Steel Industry is today the 8th largest producer of steel in the world. Today, India produces international standard steel of almost all grades/varieties and has been a net exporter for the past few years, underlining the growing acceptability of its products in the global market.

With capital investments of over Rs 100, 000 crores, the Indian steel industry currently provides direct/indirect employment to over 2 million people. As India moves ahead in the new millennium, the steel industry will play a critical role in transforming India into an economic superpower.

The present steel consumption per capita per annum is about 30 kg in India, compared to 150 kg in the world, and 350 kg in the developed world. The estimated urban consumption per capita per annum is around 77 kg in the country, expected to reach Approximately 165 kg in 2019-20

Present Scenario of Indian Steel Industry

India is uniquely placed to become a very large producer and consumer of finished steel products in the world. Substantial reserves of high grade iron ore, low wage rates, technical and managerial skills of a high order have all enabled India to gain this stature, by becoming 8th largest producer of steel in the world. Unfortunately for the Indian steel industry, the price and distribution controls to which it was subjected till about economic liberalization process began in the early 1990's did not permit the large integrated steel plants to modernize their steel manufacturing facilities or to upgrade their technologies to the state of art levels from time to time.

With the economic liberalization that was initiated in 1992, Indian steel Industry has to accept the inevitable i.e. to appreciate the implications of low import duty rates, face foreign competition and somehow improve its strengths and competitive edge to produce good quality products at lower prices and learn to survive in the market place. Following liberalization, the steel Industry is well set on the path of globalization. The dynamics of the world steel industry has a close relation with Indian steel Industry. Presently in India, Steel products are being produced from four different sources viz.,

- i. Integrated Steel Plants
- ii. Mini Steel Plants
- iii. Re-rolling Mills
- iv. Alloy & Special Steel Plants

Integrated Steel Plants have larger capacity and produce Steel from basic raw materials and the other three categories mentioned are characterized by low investment and low break-even point.

The integrated Steel Plants in India are :

1. Rourkela Steel Plant
2. Bhilai Steel Plant
3. Bokaro Steel Plant
4. Durgapur Steel Plant
5. Indian Iron and Steel Company (IISCO)
6. Tata Iron and Steel Company (TISCO)
7. Visakhapatnam Steel Plant (VSP)

ENVIRONMENT MGMT & REPORTING IN VISAKHAPATNAM STEEL PLANT

Disclosure of environmental activities in the annual report of a company is considered as one of the most important tool of environmental management. Environmental report is a document published and circulated by a company with the objective of having communication with its stakeholders about relevant environmental issues like use of environmental resources, pollution and other effects of the company on environment, various controlling measures to prevent pollution, company's environmental accounting, environment audit and environment management system. This report establishes a link between company and environment where both the following qualitative and quantitative aspects are taken care of.

Qualitative Information:

- a) Company description along with main environmental issues related to Production
- b) Company's environmental policy indicating the approach towards protection of environment and the areas of failure.
- c) Environment management system.
- d) Compliance with the government legislation with regard to environment.
- e) Company's environmental activities with the neighbouring communities for their maximum benefit.
- f) Steps taken by the company for management of risk to the safety and health of employees and the local community.

Quantitative Information:

- a) Company's total expenditure on protection or enhancement of environment.
- b) Total stock of assets on resources related to environment.
- c) Assessment of environmental costs and benefits and preparation of environmental budget.
- d) Discharge of effluents by the company and its effect on air, water and land.

Environment Management in VSP :

Visakhapatnam Steel Plant has been built to international standards in design and engineering incorporating the latest state of the art technologies with emphasis on energy conservation, waste heat utilization, water conservation and pollution control measures. The Plant has adopted the most extensive pollution control measures ever taken in the Indian steel industry at a cost of Rs. 488 crore which works out to almost 5.7 per cent of the total capital investment, and is the highest in India.

ENVIRONMENT MANAGEMENT SYSTEM:**i. Water management**

Today VSP has become a leader in water conservation amongst the Indian steel makers after having achieved specific water consumption of 2.6 cu.m per ton of liquid steel. This figure is comparable with that of major steel producers like Pohang Steel Works (3.52 cu.m/tls) and Gwayyong Steel Works, South Korea (3.43 cu.m/tls). VSP is now all set to achieve a figure less than 2.5 cu.m/tls as a bench mark. About 1120 cu.m/hr of water has been saved by implementation of various water conservation schemes (Table 4.2)

Table 4.2 : Conservation activities and Estimated Savings of Water at Visakhapatnam Steel Plant

Sl. No.	Conservation Activity	Estimated Savings (cu.m/hr)
01	Provision of third pump at diversion channel for pumping drain water to ash pond.	100
02	Reclaiming the filter backwash water at PH - 28 and DM water plant in TPP.	40
03	Reclamation of bed drainage water from slag granulation pump houses in BF - I & II Sinter plant and Coke ovens.	80
04	Through water conservation measures in F&D water system inside the Plant	500
05	Through water conservation measures in township drinking water system	200
08	Provision of additional pump at KBR toe drain for pumping seepage water back to KBR.	50
09	Miscellaneous others	150

Source : Records of Visakhapatnam Steel Plant

ii. Energy Management

Energy conservation is a continuous on-going activity in Visakhapatnam Steel Plant and many innovative strategies have been implemented to achieve the reduced specific energy consumption of 6.33 G.cal/t of crude steel for the year 2004-05 and 6.30 G.cal/tcs for the current year (April to Oct2005) the best among Indian integrated steel plants in India. VSP has further drawn up strategies aimed at reduced specific energy consumption to 5.9 G.cal/tcs.

VSP has been awarded the “National, Energy Conservation Award-Special” in recognition of its outstanding performance winning the National Energy Conservation Award - First prize for three consecutive years i.e. 2002, 2003 and 2004, which is a rare distinction in the history of integrated steel plants as well as public sector undertakings in India.

iii. Air Pollution Control :

The total length of belt-conveyors in VSP transporting various kinds of raw materials and intermediate products to different process units is an incredible 138 km! At each transfer point substantial quantity of dust is generated. This is contained by providing a total of 180 dust extraction (DE) systems viz. 27 cyclones, 58 bag-houses 80 wet rubbers and 15 Electrostatic precipitators in various dust-prone departments.

iv. Initiatives in Waste Management: 2010-11**a. Fly Ash :**

- i. Facility for dry fly ash handling, storage and delivery system of 3.42 t/hr capacity (silo capacity-100t), to start with, at a cost of Rs 2.94 crore is under implementation. Target date for commissioning is 31st March 2016. The dry fly ash shall then be given free to the interested parties.
- ii. In addition, an expression of interest (EOI) has also been invited for setting up manufacturing facilities in VSP's land-area for fly ash bricks and fly ash-based products. There has been a very good response to this and the offers are being evaluated.

v. Hazardous Wastes

Hazardous wastes (4100t/yr) like tar sludge, activated sludge, benzol muck and sludge from ammonium sulphate plant (acid tar) are regularly recycled in coke oven batteries. Used oil j oil sludge is stored for sale to “Authorised Recyclers” as per the Hazardous Wastes (Management & Handling) Rules, 2003.

vi. Environment Training

In compliance with the new version 150-14001 : 2004 the following have been implemented:

- a) Training of all regular employees and contractors' workers on environmental aspects has been started w.e.f. 21.11.2005.

- b) Legal requirements pertaining to safety and healthy having environmental aspects have now been included in the Environmental Management System (EMS).

vii. Expenditure on Environmental Activities

The total expenditure on various environmental activities and in the operation / maintenance of pollution control equipment (206 nos) has increased to over Rs. 100 crore/year.

ENVIRONMENT MANAGEMENT REVIEW :

The commitment of VSP management for preservation of the environment as an integral part of its products and services has always remained a guiding principle of its business strategy. Being an ISO-14001 certified company since May 2001, VSP has expressly included social and environmental responsibility in its corporate objective which is regularly reviewed and improved.

Major Environmental Projects under implementation :

All statutory requirements are fulfilled and over a dozen projects to improve the environmental standards further in VSP are under implementation at an estimated cost of over Rs. 263 Crores. This is an enough evidence on the part of VSP that it giving priority to people before profits. The major projects under implementation include the following (Table 4.3) :

Table 4.3 : Major Environmental Projects under implementation with estimated costs in Visakhapatnam Steel Plant

Sl.No.	Projects Under implementation	Estimated Cost (Rs. Crore)	Target Date
1.	Pulverised coal dust injection in BF -1, 2	181.00	31 st December, 2014
2.	High temperature membrane bag filers in CRMP :FK – 1,2,3,4	7.16	31 st December, 2012
3.	Replace compressors working on 'ODS' with non-ODS (R-22/ R-134a) :	1.50	31 st December, 2012
	a) Chillers of CWP – 4		
	b) 4 chillers of CWP – 4	4.87	31 st December, 2012
4.	Dry fly ash handling, storage and delivery system	2.49	31 st July, 2012
5.	a) Continuous on-line stack monitoring systems (10 nos.)	2.05	31 st August, 2012
	b) Continuous on-line stack monitoring stations (10 nos.)	2.49	31 st December, 2012

Source : Records of Visakhapatnam Steel Plant

VSP Certified to ISO 14001 : 2004

VSP was first certified to ISO 14001 : 1996 in May 2001 and recertified on 15.12.2010. However, the standard was upgraded to ISO 14001 : 2004 and VSP took rapid strides to comply with the new standard. VSP was audited for its EMS from 6th to 8th February 2012 and having complied with all the new requirements, VSP has been certified by M/s. BVQI for certification to ISO 14001 : 2004.

SUMMARY AND CONCLUSIONS

Environment protection measures have been incorporated in the design stage itself with an investment of Rs. 488 crores in Visakhapatnam Steel Plant. The major environment protection facilities are detailed in Chapter Four. The commitment towards Environment is enunciated through the company's Environment Policy. VSP obtained ISO 14001-1996 for Environmental Management System.

Solid waste recycling has been given prime importance in VSP. Some of the fresh initiatives taken during the year at VSP are also given in Chapter Four. With this the solid waste recycling increased from 76% to 78%.

As a commitment towards Safety and occupational health, VSP is following occupational health and Safety Management Systems (OHSAS : 18001-1999). Towards, this, VSP has formulated Occupational health and safety policy. The occupational Health Service and Research Centre is carrying out many activities as part of Occupational health and safety policy, VSP has been awarded OHSAS : 18001, 1999 certificate in the month of April 2008.

The efforts of VSP are being recognized by various forums. In addition to National Energy Conservation Award in Integrated Steel Sector, VSP has bestowed with Prestigious "Prime Ministers Trophy-2003" for Steel Industry for overall improvement. Some of the major awards received by VSP are also given in Chapter Four.

The Effectiveness of Energy Efficiency Movement at VSP has been recognized internationally. The International Iron and Steel Institute, Brussels in its Publication of Global Sustainability Report landed the efforts of VSP in Energy Conservation.

The Commitment of top management as well as the participation of employees has facilitated energy conservation at Rashtriya Ispat Nigam Limited (RINL's) Visakhapatnam Steel Plant (VSP) in India. The company appointed a designated Energy Manager in 2008, thus giving further momentum to energy conservation efforts. Employees were motivated to save energy and to suggest ways in which energy efficiency could be improved by actively participating in Samalochana (an internal communication forum) and quality circle projects.

Energy Conservation measures put into effect at little or no cost over the past three years at VSP have resulted in significant energy savings. Though the improvement of the calorific value of coke oven gas, the reduction of fuel gas consumption, increasing blast furnace gas utilization in thermal power plant, optimization of coke

consumption in blast furnace, the installation of vector control for conveyors and stackers and other measures, the energy intensity of crude steel at the plant was reduced from 28.6 GJ per tonne in 2001 to 26.2 GJ per tonne in 2009.

Challenges before Corporate sector:

- a. **New costing and capital appraisal systems:** New costing and capital appraisal systems need to be developed for full fledged environmental accounting and reporting. Whether these systems, are based on standard or unconventional accounting information systems, they, must give the stakeholders adequate information about environmental costs and risks.
- b. **Long-term-planning forecasting systems:** Long-term planning forecasting systems are needed that incorporate environmental improvement targets and their financial implications. Accountants must assess the need for new and for modified information and financial systems.
- c. **Support of Senior management :** For implementing new cost accounting system in an organisation requires the support of senior management as well as formal implementation plan. An implementation plan should anticipate requirements such as employee training, assignment of responsibility for providing input into the system, and the likely effects of the new information on current operations.
- d. **Cost accounting system:** Conversion of any cost accounting system must be shown to be cost-effective, as with any other investment.
- e. **Identification of concealed overheads:** Environmental costs are often concealed into overhead accounts. These costs must be-removed and applied to appropriate accounts in order to help the company better understand its environmental costs and their causes.
- f. **Identification of relevant environmental factors:** Accountants need to find ways to account for quantifiable and tangible environmental factors in investment decisions. Otherwise, some proposals that are economically and environmentally sound in the long term may be rejected; alternatively, omission of significant environmental costs might cause the company to accept environmentally unsound proposals.

- g. Formulation of long term environmental accounting goals :** Companies must adopt long-term accounting goals for producing environmental accounts that reflect the full cost of production even when monetary values cannot be assigned.

If all the above challenges are met with successfully, the environmental management accounting and reporting undoubtedly helps to get the following benefits:

An organization's decision-makers can use the physical flow information and cost information provided by EMA to make decisions that impact both the environmental and financial performance of the organization. It is important to note that, while EMA supports internal decision-making, the implementation of EMA does not guarantee any particular level of environmental or financial performance. However, for organizations and programs that have the goals of minimizing costs, especially environmental costs, and minimizing environmental impacts, EMA provides an essential set of information for meeting those goals.

EMA data are particularly valuable for management initiatives with a specific environmental focus. EMA provides not only the cost data necessary for assessing the financial impact of these management activities, but also the physical flow information (e.g., raw materials use and waste generation rates) that help characterize environmental impacts. Examples of the many environmental initiatives that benefit from EMA include

- Pollution Prevention
- Design for Environment
- Environmental Life Cycle
 - Assessment/Costing/Design
- Environmental Supply Chain Management
- Environmentally Preferable Purchasing
- Extended Producer/Product Responsibility
- Environmental Management Systems
- Environmental Performance Evaluation & Benchmarking
- Environmental Performance Reporting

Thus, EMA is not merely one environmental management tool among many - rather, EMA is a broad set of principles and approaches that provides the materials/energy flow and cost data critical to the success of many other environmental management activities.

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