

THE ROLE OF INDUSTRIAL SUSTAINABLE DEVELOPMENT IN BUILDING SUSTAINABLE COMMUNITY DEVELOPMENT

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ABSTRACT

In this paper we discuss about various new concept approach of industrial sustainable development which are consist with resource, environment, technology and industrial economy, from the view of community empowerment of with environment friendly. Modern management theory is constricted by a fractured knowledge, which separates humanity from nature and truth from morality. New approach of industrial development is to support ecologically and socially sustainable development. Resources saving and environment friendly society is a goal of industrial sustainable development. It is a new kind of development, in the context of new development situation and tasks that India faced recent years. Industrial policy should be sustaining centrism.

I. INTRODUCTION

Industrial sustainable development is totally based on environmental management concept. Huge Industrial installations, faster mode of transport urbanization are the main outcomes of the civilization. These and large number of other are contributing to what is called environment pollution. Pollution of environment is one of the horrible ecological crisis to which we are subjected today. Pollution means to make dirty the addition of constituents to water, air, land, which adversely affect the natural quality of the environment. The environmental pollution is the result of urban industrial technological revolution and speedy exploitation of every bit of natural resources. Such activity of man has created adverse effect on the all living organism in the biosphere. Now environment become foul. Contaminated,, Undesirable and therefore harmful for the health of living organism including man. Therefore for sustainable community development the environmental pollution can be controlled.

Development and environment are considered two side of the same corn. One side development activities including industrial development. Transport, irrigation, construction, agriculture, energy etc. are essential for proper standard of living and prosperity of nature but on the on the other hand it pollutes the environment we live in. It is therefore essential to plan developmental activities in such a way that environmental degradation are minimum even though the process of environmental degradation started with the process of civilization. The world commission on environment and development in its report to the United Nations in 1987 defined the sustainable development as meeting the needs of the present without compromising. The ability of future generation to meet their own needs. Owing to the unprecedented population explosion and worldwide industrial expansion earlier practices of controlling pollutants at the “end of the pipe”(i.e. at the point where pollutant enter the environment) are no longer effective in controlling the present industrial effluents both in quantity are

complexity. For susceptibility to occur further advances in technology in process control, product design and monitoring are essential for efficient use of resources in production while simultaneously abating pollution. Ultimate objective of all these efforts is the quest for zero emission from the industrial processes. To keep the position of sustainable community development through environmental management concept.

II. LITERATURES

The concept of sustainable development firstly came into existence in the report of “our common future” in the United Nations world commission on environment and development (WCED) in 1987. It defined sustainable development as “meeting the needs of the present without compromising the ability of future generation to meet their own needs”.^[1]

With technological development, economic development and community development some elite scholars began to introduce the concept of industrial sustainable development.

Raymond P. Cote and Yiping Fang (2007) [2] pointed out the current situation of development of Chinese industry and put their suggestion about restrictions on industry to maintain the sustainable development. They think that some measures should be taken from the government, business, and international co-operation education. Finance and other areas to gear up the pace of industrial sustainable development. In India the research on industrial sustainable development integrated with the sustainable community development is in infancy stage.

De Zhou and Yijun Yuan (2008) [3] thought resource environment technology and economic growth ways are the determinants of industrial sustainable development the co-ordination of social and industrial development, resources use sustainability and ecological sustainability are the major factors to keep the position of sustainable community development.

In this paper author presents the new approaches of sustainable development to achieve the industrial sustainable development to community oriented. Our main aim is to eliminate the pollution from the environment to achieve the condition of eco-friendly environment. The all activities of the community is directly related to the existing environment. Pollution free environment accelerates the rate of sustainable community development along with industrial development with environment awareness.

III. A STUDY OF NEW APPROACHES OF SUSTAINABLE DEVELOPMENT TO COMMUNITY ORIENTED

3.1 Pollution Prevention

It is the proactive multimedia management approach to pollution to achieve “front-end” reduction of pollutants in the waste streams by strictly controlling the industrial processes with respect to process upsets, Undesirable emission and by improving the product quality, reducing the loss of raw material to the waste effluents and recycling the byproducts. Pollution prevention also eliminates the transfer of pollutants from one media to another because pollutants are not generated in the first place. The raw materials are used more efficiently and also the costs of liability of waste disposal and clean-up are avoided the success of pollution prevention strategies depends upon a multi-disciplinary approach where efficient process control and optimization are achieved by the combined efforts of chemical engineers and process analytical chemists.



3.2 Design for Environment

Apart from strict process control during the manufacturing of product, it is also essential to review the overall synthetic sequence in the production of chemical substances and to consider the substitution or elimination of hazardous chemicals wherever possible. In view of the new emphasis of pollution prevention by both the industry and regulatory agencies and also due to the huge costs of treatment, disposal and compliance, selection of any synthetic scheme solely on the basis of yield is no longer valid. All the scientific, environmental and economic impacts should be incorporated into the synthetic scheme being selected to ensure environmentally benign synthesis of a chemical substance thus a synthetic chemist too will have to play a major role in achieving pollution prevention. In the industrial world today “end of the pipe” control of pollutants is being superseded by a policy shift to “front-end” control emphasized by “pollution prevention” and also a shift to less hazardous chemical as advocated by the “design for environment” program as well as promotion of good operating practices and the concept of industrial ecology. Thus the paradigm shift for the future emphasizes pollution prevention by ensuring that industrial processes run under tight control, Substitute less hazardous chemical wherever possible and re-cycle by product of design new production processes which are environmentally benign. The future challenge therefore, it is switch over from the present environmental policy based on pollution controls and government mandated regulations to a new and more realistic environmental policy based on pollution prevention, source reduction, recycling and waste minimization.

3.3 Industrial Ecology

Industrial ecology is based upon an analogy of industrial system to natural ecological system. It offers a unique system approach within which environmental issues can be comprehensively addressed. In nature, an ecological system operates through a web of connections in which organisms live and consume each other and each other wastes products, the system seems to have evolved in such a way that no useful material or available energy is lost. Some or other organism manages to sustain its living with the help of waste product that provides available energy or usable material. Ecology seems to involve a food web that provides an interconnection of use of both organisms and their wastes. In the industrial context we may visualize such an interconnection of the use of product and waste product. From the stand point of industrial ecology, unit processes and industries should be considered as interacting systems, rather than isolated component. Therefore, different waste- producing processes, plants or industries should be connected into an operating web that minimizes the total amount of industrial material that goes to the waste disposal sinks or lost in intermediate processes. Thus, the focus shifts from merely minimizes waste from a particular process or facility (i.e. pollution prevention) to minimizing waste product by the larger system as a whole. It gives further emphasis on the already known idea that a waste should be considered a potential useful resource.

Industrial ecology promotes a system view of industrial products and process and processes that considers the total materials and energy cycle to minimize adverse environmental effects for effective implementation of industrial ecology concept, several changes in industrial practices are essential which include improving the efficiency and productivity of industrial systems, minimizing wastage of raw materials. Substituting environmentally benign and abundant raw materials wherever possible, developing useful applications for waste products and reusing / recycling of the manufactured products after use. For achieving this we should investigate

and understand the web of waste recycling and reuse found the natural system and try to explore the possibility of applying them in industrial context. Moving towards such a system involves radical changes in the various and complex interacting systems by improving the current information systems or creating new ones and devise attractive economic incentives. In industrial complex established in the city of kalundborg (Denmark) provides an excellent example of industrial ecology concept. In this a refinery supplies gas to a power plant and plastic board company, for their energy needs. The steam from the power plant is sent to a biotechnology plant and into direct heating system of the city, Lower temperature energy goes to an experimental fish farm. The gypsum produced in the desulfurization unit of the power plant is used by the plaster board manufacturing unit. By reusing energy and material this industrial ecosystem at kalundborg saves 19,000 tons oil 30,000 tons of coal and 60,000m³ of water every year, thereby saving about 14 million US \$ per year. Thus they have gone beyond traditional compliance monitoring to process monitoring, to avoid pollution they have literally shifted from “end-of-the-pipe-“ pollution control to from end pollution prevention by creating “design for the environment”.

3.4 Green Chemistry

Green chemistry program initiated by the United States environmental protection agency is another initiative under the “Design for environmental program”, the pollution prevention act of 1990 in the United States of America established a national policy to prevent or reduce pollution at its source wherever possible, this green chemistry program provided unprecedented grants for research, development and implementation of innovative chemical technologies that prevent pollution in a scientifically sound and cost effective manner. Green chemistry is the use of chemistry for pollution prevention by environmentally conscious design of chemical products and processes that reduce or eliminate the use or generation of hazardous substances the basic principles of green chemistry are discussed as follows.

Prevention – It is better to prevent waste than to treat or clean up waste after it has been created.

Atom Economy – Synthetic method should be designed to maximize the incorporation of all materials used in the process into the final product.

Less Hazardous chemical synthesis – Wherever practicable, synthetic method should be designed to use and generate substances that pose little or no toxicity to human health and the environment.

Designing safer chemical – Chemical products should be designed to effects their desired function while minimizing their toxicity.

Safer solvent and auxiliaries – The use of auxiliary substances (e.g. solvents separation agents etc) should be made unnecessary wherever possible and innocuous when used.

Used of renewable feedstock – A raw material or feedstock should be renewable rather than depleting whenever technically and economically practicable.

Design for degradation – Chemical products should be designed so that at the end of their function they break down into innocuous degradation products and do not perish in the environment.

Real time analysis for pollution prevention - Analytical methodologies need to be further developed to allow for real time, in process monitoring and control prior to the formation of hazardous substances.

Inherently safer chemistry for accident prevention - Substances and the form of a substances used in a chemical process should be chosen to minimize the potential for chemical accidents including release, explosions and fires.

3.5 Preventive Environmental Management

Preventive environmental management involves minimization or elimination of wastes and pollutants at their sources rather than at the end of pipe stage, the hierarchy for preventive environmental management can be summarized as below.

- i. Pollution should be prevented or minimized at the source wherever possible
- ii. Pollution that cannot be prevented should be recycled in an environmentally safe manner wherever feasible.
- iii. Pollution that cannot be prevented or recycled should be treated in an environmentally safe manner wherever feasible.
- iv. Disposal or other release into environment should be used only as a last resort and it should be done in an environmentally safe manner.

Preventive environmental management offers a dependable way for protecting the environment and ensure more efficient use of resources however it should be appreciated the PEM is not something that can be just added to the existing system and practices. It involves identification of the underlying causes of waste and pinpointing the ways and means to minimize its generation, often by using materials and energy more prudently and efficiently since pollution occurs from all human activities. PEM poses a challenge to all sectors of society at all level of activity and decision making, thus environmental awareness becomes vital.

PEM requires acquirement of skills, creativity and a mind-set to holistically identify the various options for improvement and innovation.

PEM involves sincere implementation of a constellation of strategies, tools and concepts, the tools contemplated can be broadly categorized as follow.

- i. Tool related to product
 - a) Design for Environment
 - b) Industrial ecology
 - c) Life cycle assessment
- ii. Tools related to process
 - a) Pollution prevention
 - b) Cleaner production
 - c) Cleaner technology
 - d) Waste minimization
 - e) Toxic use reduction
 - f) Best operating practices
 - g) Eco-efficiency
- iii. Tools related to management
 - a) Environmental performance evaluation

- b) Environmental audit
- c) Environmental management system
- d) Environmental reporting and communication
- e) Eco-industrial development
- f) Trade and environment
- g) Environmental economics

Industry being a major contributor to environmental problems becomes to major focus for PEM. A number of big companies are developing structured programmes to facilitate the implementation of PEM into their operations and decision making and ensuring active participation of their employees.

3.6 Regulations on Occupational Safety and Health (OSH)

Many countries including India make efforts to strength occupational health and safty (OSH) by enacting laws and acts to regulate the measures taken by the companies towards the health and safety of their employees. Despite comprehensive legislations a large numbers of accidents still take place, this may be because of the lack of man power needed to enforce the laws, inadequate penalties or unrealistic provisions of the acts vis-à-vis local work situation. Hazardous and unhealthy workplaces result in huge expenditure for the employer, the cost of the treatment of the injured or sick worker has to be met by the employer. If the worker is not in a position to resume work after his recovery a substitute.

Has to be trained and it will take a lot of time for the new worker to attain the productivity levels of the previous workers, indemnification of the injured workers or those who have died and their family may cause considerable expenses which can impose heavy burden especially for small and medium scale industries. Therefore apart from moral and legal responsibility of the employers towards their employee, it is in the economic interest of the industry to take adequate steps to prevent accidents and occupational diseases in their factory, the expenditure towards occupational health and safety, should therefore be considered as an investment for a profit maximizing industry.

Many countries try to improve OSH by regulatory measures through labour law however economic incentives together with the legal provisions will be more effective in this realm. Standards on OSH are formulated on the basis of consensus arrived at by the representatives of all the economic stakeholders concerned standards represent a means to set a certain level of OSH without fixing minimum requirement. India has a bureau of Indian standards (BIS) which publish standards in order to respond to customer demands who want a certification from their suppliers for certain aspects such as product quality or environmental protection, the best known standards all over the world are ISO 9000 series for quality management and ISO 14000 series for environmental protection, both formulated by the International standardization organization (ISO) Geneva. India has formulated IS 1500:2000 Indian standard on occupational health and safety management system – specification and guidance for use. It comprises four phases of the improvement process, viz, planning, implementation and operation, measurement and evaluation and management review. It comprises six activities viz classifying work activities, identifying hazards, determining risk, deciding if risk is tolerable, preparing risk control action plan and reviewing of action plan, OSH can be intenerated into overall business management process.



IV. CONCLUSION

The government of India accepted that India should put itself on a path to achieve a goal by adopting various new approaches/ concepts of sustainable industrial development renewable energy sources, energy conservation concepts to accelerate the pace of sustainable community development. In this paper author wants put the views about environmental management which are essential to every enterprise to adopt, the various approaches to achieve the goal of nation and society. We cannot imagine to healthy community without maintaining the environment with pollution free, there have be several occasions in the history of chemistry when the chemistry community focused on goals, developing different reaction types to specific applications. Now it is the turn of green chemistry towards sustainable development via pollution prevention and resource conservation, goals merely provide an objective on which energy, knowledge and resource are focused. Sustainability also means that less materials have to be extracted from earth and less of them go into manufacturing thereby conserving materials and energy. Recycling has considerable impact on energy saving substantial energy conservation can also be achieved by recycling, the green chemistry perspective and industrial ecology approach for material and energy conservation and environmental protection have vital impact on the development of the community. Every activity of the industries should be eco-friendly and the main aim of the industries should be community oriented, obviously the success depends upon top level management, educating and motivating the employees and adopting long term planning strategies, the implementation of PEM in industries will ensure increased cost saving, improved workers safety, reduced legal liabilities and enhanced corporate image. There will be no community sustainable development if no industrial sustainable development and to oriented community development will never become true.

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