INDUSTRIAL ECOLOGY: A PANACEA FOR ENVIRONMENTAL DEGRADATION

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Resource demand and environmental degradation have reached unsustainable levels. A sustainable future requires industrial systems' attention and improvement. Industrial ecology springs from interests to integrate the notions of sustainability into environmental and economic systems (Allenby 1992). The fact is that the economy operates as an open system, drawing raw materials from the environment and returning vast amounts of unused by-products in the form of pollution and waste. The products that firms market are only a small portion of what their processes turn out; a significant portion of their output eventually leaves the economy as waste and returns to the environment in forms that may stress it unacceptably. (Ehrenfeld & Gertler, 1997). Increased economic output will still cause increased environmental harm. Thus, accomplishing economic growth and environmental protection simultaneously requires fundamentally new ways of examining and designing socioeconomic systems. One way to achieve this is through industrial ecology

Industrial Ecology is the scientific study of environment and its organisms with respect to their abundance, habitat, interaction, climate and distribution. Thus it, studies the physical, chemical and biological interactions and relations between the industrial processes and ecosystems. It evaluates the effects of industrialization on the environment. The study revolves around the flow of materials from industrial processes into the nature - the way in which industrial systems interact with the biosphere.

The objective of Industrial ecology is to reduce the negative impact of industrial process on nature, thereby clearing off the threat posed to the environment at the same time diverting industrial systems towards a more sustainable approach. It is concerned with the shifting of industrial process from linear (open loop) systems, in which resource and capital investments move through the system to become waste, to a closed loop system where wastes can become inputs for new processes. Industrial activity based on such an ecological conception can greatly reduce harmful impacts associated with pollution and waste disposal, while easing the drain on finite strategic resources. Familiar practices such as reuse, remanufacture, and recycling represent a move in this direction.

Industrial ecology as a panacea for environmental sustainability applies the following approaches.

Firstly, it draws on and extends a variety of related approaches including systems analysis, industrial metabolism, materials flow analysis, life cycle analysis, pollution prevention, design for environment, environmental impact assessment, product stewardship, energy technology assessment, and eco-industrial parks. All these variables will provide a long-term perspective, encouraging consideration of the overall development of both technologies and policies for sustainable resource utilization and environmental protection in the future. They will emphasize opportunities for new technologies and new processes, and those for economically beneficial efficiencies. The outcome of these processes will be greater material efficiency, the use of better materials, and the growth of the service economy which would contribute to the "dematerialization" of the economy. Resources that are cheap, abundant, and environmentally beneficial, may be used to replace those that are expensive, scarce, or environmentally harmful. Such a substitution can be seen in the many important changes in energy sources that have occurred over the past century. As the energy sources have shifted from wood and coal toward petroleum and natural gas, the average amount of carbon per unit energy produced has decreased significantly, resulting in the “decarbonization” of world energy use.

Secondly, industrial ecology adopts the use of waste products as raw materials. These efforts often come into conflict with concerns about hazardous materials in the wastes, such as the concern that trace metals in ash from power plants recycled in fertilizer may contaminate soil. However, a well planned waste reuse has always been successful. In the industrial district in Kalundborg, Denmark, several industries, including the town's power station, oil refinery, and plasterboard manufacturer, make use of waste streams and energy resources, and turns by-products into products. There are many examples of technological innovations that have had significant environmental benefits. An important example is the replacement of chlorofluorocarbons (CFCs) with new compounds in order to protect the stratospheric ozone layer. Other examples are the elimination of mercury in batteries, and the elimination of lead in gasoline, paint, and solder.

Thirdly, Industrial ecology advocates the substitution of service for product as a way of reducing environmental impacts, meaning that customers do not seek specific physical products, but rather the services provided by those products. For example, an integrated pest management service might provide crop protection rather than selling pesticides. The service thus saves money and the ecosystem by using only as much pesticide as needed.

The challenge of industrial ecology is to understand how technological and social innovation can be harnessed to solve environmental problems and provide for the well-being of the entire world. Thus, effective implementation of the various methods of Industrial ecology as mentioned above will encourage the ecosystem sustainability and help secure our environment. Each one of us can contribute to a safer world and save our planet by being a part of the revolution against environmental degradation through.

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