

IMPACT OF ECOLOGICAL CHANGES AND ROLE OF ENVIRONMENTAL MANAGEMENT SYSTEM (EMS) IN INDUSTRY : [AN OVERVIEW]

B. D. Pande

B. D. Pande is a nationally known expert on HR Strategy and a product of XLRI. At present he is Executive Advisor (H.R., I.R. & Admn) Century Cement, P. O. Baikunth, – 493 116, Dist : Raipur, Chhattisgarh. He is also the Editor of Personnel Today the official organ of the National Institute of Personnel Management. He may be contacted on
bdpande@webmail.centurycement.co.in
personnel@webmail.centurycement.co.in

Abstract

The wave of the development and dissemination of technology has brought a range of goods and services to the consumer in a manner and price that is affordable with accessibility. However, this trend has also resulted in major externalities being imposed on society often in remote corners of the globe. An important example of this reality is the problem of climate change, which has resulted from a growth in the concentration of greenhouse gases as an outcome of industrialization and greater production and consumption of goods and services. Even though scientists well over hundred years ago highlighted the danger of greater consumption of fossil fuels leading to warming of the earth, these voices were not heeded till recently. The intergovernmental panel of Climate Change (IPCC) through a series of reports have highlighted the strong evidence showing human influence on the Earth's climate, and serious impacts that are being caused across the globe. Report of the IPCC elaborates on several technological solutions that can help to stabilize the Earth's atmosphere, and consequently the climate, within a reasonable period of time. Effective mitigation measures can be undertaken by adopting technologies that exist already. However, such action would be possible and effective only if a policy framework is created to facilitate technology development and dissemination. The most important part of such a policy would be to place a price on carbon that would ensure movement towards a low carbon economy across the world. If appropriate incentives and disincentives are used by governments, several low carbon technologies could come into existence. This paper highlights Environment Management System, the existing environment scenario and steps to tackle environment problem.

INTRODUCTION

It is a truism that the climate change problem can certainly be tackled through effective mitigation measures, which employ a menu of technologies currently available, but the evolution of policies that facilitate technology

development and large scale use is critical as a prerequisite. The world would have to move to a low carbon technological base not only if the threat of climate change at the global level is to be met effectively, but also to minimize local pollution and enhance overall security of energy supply. A country like India needs a

clear technology vision to achieve the benefits of developing clear technologies and using them on a large scale. It is necessary to target technology developments that can provide multiple benefits in the form of limiting greenhouse gas emissions, minimizing local pollution, creating energy security and making it possible for rural and urban poor societies to access good quality energy through the development of modern technologies.

The selection of Al Gore, the former US Vice President who has achieved greater acclaim as a 'climate campaigner', and the Intergovernmental Panel on Climate Change (jointly established by the United Nations and the World Meteorological Organization and headed by India's R.K.Pachauri), for the year 2007 Noble Prize for Peace has renewed public attention on prospective threats posed by global warming. The Nobel Committee credited Gore and the IPCC "for their efforts to build up and disseminate greater knowledge about man-made climate change and to lay the foundations for the measures that are needed to counteract such change".

Gore has taken on the responsibility of being an ambassador-at-large for promoting awareness on the issues and problems linked to climate change. He has already achieved global recognition for his sustained efforts in this regard, and many organizations and institutions around the globe, the US and West Europe in particular, look upon him as world's most passionate environmentalist politician. This year a documentary film produced by Gore, on the ways-and-means by which diverse vested interests (mainly politicians and big industry) evade their culpability in accelerating climate change, titled *An Inconvenient Truth*, even won the Oscar Award for its category.

The IPCC was set up in 1988, and its main task is to make governments and policy makers familiar with the latest scientific understanding on climate change. While it

does not conduct any research of its own or monitor the climate and related phenomena, the IPCC works towards continually updating scientific knowledge on climate change by creating a consensus among the 2,500 odd front-ranking scientists who are on its panel. The four Assessment Reports produced on the basis of such consensus are the bedrock on which all climate change debates, consideration, and negotiations around the world are conducted. R.K.Pachauri has headed the IPCC since 2004.

Yet, notwithstanding the fine work of Gore and the IPCC, there are myriad chasms that deeply divide nations, political leaderships, policy-making institutions, and economists over climate change. By and large, everybody recognizes that global warming is a reality and its terribly serious consequences, but everybody is equally divided and self-opinionated over the ways to check and mitigate the crises.

As political leaderships and economists have been forced to acknowledge the body of scientific evidence of increasing global warming and accelerating climate change caused by human activity – leading to the emission of so-called 'green-house gases' of which CO₂ is the most important – they now require even greater volumes of knowledge for fine-tuning the mitigating action. Over the years, the IPCC reports and other research has broadly identified the general impact of climate change; as well as the regions and populations at risk.

Many of the grave consequences of changing climate will start manifesting even with an average global warming of 2 degrees centigrade. Many economists and governments have used cost-benefit analyses to argue that climate change might not be such a bad thing, after all, because some regions would actually benefit from global warming. One of the examples of this group of experts is the American expert **William Nordhaus**, the Sterling Professor of

Economics at Yale University, whose ideas have been very influential on the US government's stand on global climate negotiations.

William Nordhaus has concluded that changing climate would lead to a huge expansion of the businesses of recreational sport that would substantially offset the damages caused to agriculture in Europe as well as the US. In a controversial paper published in the year 1998, he argued that the overall damage to the US economy would be damaged by 38 percent less due to "recreational gains". Even he believes that the global warming would hurt the economies of countries like India and many in Africa much more because "recreational opportunities there would worsen with global warming".

A large body of experts - including those belonging to the IPCC - project that large parts of Siberian Russia and American Alaska would open up to further economic exploitation with warmer climatic conditions. Oil sector experts avoid discussing it too much; but it is an open secret that all the world's major oil companies are betting on more amenable local weather to increase their operations north of the Arctic Circle in coming decades.

A senior Indian bureaucrat, who is currently serving with the United Nations Environmental Programme, points out that "there has been a discernible increase in the urgency with which nations such as Russia and Norway, Russia and Denmark, the United Kingdom and Norway, and even Canada and the US are negotiating their territorial disputes in regions lying north to the Arctic Circle. These are induced in a major way by perceived impacts of global warming". Of course, the attitudes being adopted by these countries are conditioned by economic perspectives that are relatively short-term given the time spans over which the real impacts of global warming and changing climate will play out.

The absence of critically detailed information as well as the absence of long term theoretical and policy tools have led to the third problem area with the current state of thinking about climate change. Most establishments and institutions have a fair degree of concern about climate change. However, they remain short on ideas for a genuinely multilateral approach to curb carbon emissions. The US simply refuses to any binding cut that would restrict its economy to an absolute threshold of carbon emissions. The industrialized countries of west Europe, as well as Japan and Australia, are amenable to absolute thresholds of carbon emissions; but with this level to be binding on every country in the world including India and China whose economies have moved into high gear only recently. Such thinking obviously throws global climate negotiations - on the best ways to implement the United Nation's Framework Convention on Climate Change - into a deadlock.

This, in turn, has created a political and economic situation where even despite professing the best of intentions, the industrialized countries have continued increasing the burden of their carbon pollution into the global atmosphere. The Kyoto Protocol of 1997 meant to practice some of the virtues and goals of the UNFCCC, and required the industrialized countries to cut their emissions by roughly 6 percent of their respective emission levels of the year 1990, by the period 2008-12. The US abstained outright from such a commitment; and by the end of the year 2007, carbon emissions by the US economy would be 25 - 30 percent over its 1990 levels. Figures released by the European Commission earlier in March 2007 show that collective emission levels of the industrialized European economy are also 1.5 percent over the 1990 level. Carbon emission levels of the Indian and Chinese economies are very significantly up too; but in per capital terms they are way, way lower than the culpability of the industrialized countries. Obviously, all

this amounts to a complex and messy state of affairs; and obviously many more Nobels will be awarded for thinking that can lead to effective mitigation of climate change.

A MATTER OF CULPABILITY

Total CO₂ output and per capital output of nations, 2005

The interest in environmental protection and sustainable development is growing. An organization may be increasingly challenged to demonstrate its commitment to the environment by customers, public, government or even from within the organization itself. Implementing an Environmental Management System (EMS)

Name of the country	Total CO ₂ <i>Million metric tonne</i>	Per capital CO ₂ output <i>Tonne per person per year</i>
Australia	564	26.1
Canada	758	23.5
USA	7147	23.4
Netherlands	215	3.3
Germany	854	10.4
Italy	570	10.1
Spain	402	10.0
Japan	1201	9.2
UK	540	9.1
France	390	6.3
China	3760	2.9
India	1050	1.0

Source : The UN Framework Convention on Climate Change; the UN sponsored Global Virtual University; the International Energy Agency.

ENVIRONMENTAL MANAGEMENT SYSTEM

An Environmental Management System (EMS) is a continual cycle of planning, implementing, reviewing and improving the process and actions that organizations undertake to meet its environmental obligations. An effective EMS is built on TQM concepts. TQM is a people-focused management system that aims at continual increase of customer satisfaction at continually lower, real cost.

Most EMS models, including the ISO 14001 standard, are built on the "Plan, Do, Check, Act" business cycle introduced by Shewart and Deming. This model, just like TQM, endorses the concept of continual improvement. In the EMS model, the "Plan, Do, Check, Act" steps have been expanded into 17 elements that are linked together. These 17 elements summarize the requirements of ISO 14001.

can help to meet these challenges in two ways.

First, an effective EMS makes good sense, whether your organization is in the public or private sector, big or small, old or new. By identifying the causes of environmental problems and then eliminating them, an EMS can help an organization save money.

Let us assume the scenarios:

- Is it better to make a product or provide service correctly the first time or to fix it later?
- Is it cheaper to prevent a spill in the first place or to clean it afterwards?
- Is it more cost effective to prevent pollution or to manage it after it has been generated?

Secondly, an EMS can be an investment in long term viability of your organization. An

EMS can help an organization to be more effective in achieving its environmental goals. And, when its goals are clear and effectively implemented, businesses are able to keep their existing customers and attract new ones. An EMS adds value to an organization.

The use of a systematic approach to planning, controlling, measuring and improving an organization's environmental performance is the key to an effective environmental management. And, assessing and improving the management processes enable the organization to achieve significant environmental improvements and cost savings. It requires efforts in planning, implementing and maintaining an EMS. An EMS is a vehicle for positive change.

While potential costs in the implementation and maintenance of an EMS include staff and other employees internally and potential consulting assistance and personnel training externally, the potential benefits far outweigh the cost.

Building or improving EMS, with the help of this guide, provides an opportunity to evaluate how your organization manages environmental obligations and find better and cost-effective solutions. As you identify some areas where your current EMS can be improved, there is no need to change those that are working well. By reviewing that what your organization does and how well it works, you can ensure that your EMS will be viable and effective, presently and in future. Remember that the focus is continual improvement.

One of the first standards for environmental management system (EMS) – BS 7750 – was developed and published by the British Standards Institution (BSI) in 1992. This standard was the model for the ISO 14000 Series developed by the International Organization for Standardization (ISO). ISO 14001, which established the requirements for an EMS, was finalized in 1996. BS 7750

was also the basis for the European Union's Eco-Management and Audit Scheme, known as EMS.

ISO is an international standard and therefore must incorporate the different interests of many countries. This standard has general requirements. By contrast, EMS is more stringent and detailed standard reflecting the high environmental standards of German interests and companies, which played a key role in developing it.

Because ISO 14001 and EMS are both based on BS 7750, all three standards are quite similar in their approach. If your organization complies with BS 7750 today, little effort will be needed to fulfill the requirements of ISO 14001 or EMS. It should be clearly understood that EMS emphasizes public environmental reporting.

BENEFITS OF EMS TO THE ORGANIZATION

With an effective EMS, your organization will benefit from:

- improved environmental performance
- reduced liability
- competitive advantage
- reduced costs
- fewer accidents
- employee involvement
- improved public image
- enhanced customer trust
- more favourable credit terms
- meet customer requirements

If your organization already has or is considering a quality management system, based on ISO 9001:2000, for example, you will find significant synergy between what you need for a Quality Management System and for an Environmental Management System.

COMMON ASPECTS OF QUALITY AND ENVIRONMENTAL MANAGEMENT SYSTEMS

- Quality Policy
- Adequate Resources
- Responsibilities and Authorities
- Training
- System Documentation
- Process Control
- Document Control
- System Audit
- Management Review

THE KEYS TO A SUCCESSFUL EMS

1. Top Management Commitment

It is top management's job to apply TQM principles to the environmental area and provide adequate resources. To initiate and sustain the EMS effort, top management must communicate to all employees about the importance of:

- making the environment an organizational priority by instilling that effective environmental management is fundamental to the organization's survival;
- integrating environmental management throughout the organization by implementing the environmental controls as part of product or service and process development and delivery, among others; and,
- looking at problems as opportunities, determining root causes and preventing problems recurrence.

2. Focus on Continual Improvement

Continual improvement is enhancing your EMS to improve your overall environmental

performance. No organization is perfect. A committed organization learns from its mistakes and prevents similar problems from recurring. Learning and improving are ways to have healthy organizational growth.

3. Flexibility

An effective EMS is flexible and simple, adaptable and understandable. An EMS must be flexible so that it can easily adapt to the changes of the environment and it is for this reason that your EMS should be kept simple. It should also be understandable for all the organization's managers and other employees who will implement it.

4. Compatibility with Organizational Culture

It is important that the EMS approach and an organization's culture should be compatible. For some organizations, this involves choosing whether your EMS approach will be tailored to the organization's culture or the organization's culture will be tailored to the EMS approach. Although the later choice takes a longer time, keeping this compatibility issue in mind is important in implementing an effective EMS.

5. Employee Awareness and Involvement

Employee involvement is crucial. An effective implementation team is pivotal for success of an EMS in any organization. As you design and implement an EMS, roadblocks will be encountered from people who will view an EMS as a bureaucracy or extra expense, or resistance to change or fear of new responsibilities. To overcome these roadblocks, it is imperative that everyone understands why the organization needs an EMS, how this is done and who does what. Employee involvement demonstrates the organization's commitment to the environment and helps to ensure that the EMS is realistic, practical and adds value.

ENVIRONMENTAL POLICY

The top management shall define the organization's environmental policy and ensure that it:

- a) is appropriate to the nature, scale and environmental impacts of its activities, products or services;
- b) includes a commitment to continual improvement and prevention of pollution;
- c) includes a commitment to comply with relevant environmental legislation and regulations, and with other requirements to which the organizations subscribe;
- d) provides framework for setting and reviewing environmental objectives and targets;
- e) is documented, implemented and maintained and, communicated to all employees; and
- f) is available to the public.

EVALUATION OF ENVIRONMENTAL MANAGEMENT PRACTICE

Today, there are two major areas in the evaluation of environmental management practice. One area focuses on organizational issues, and the other on products, services and processes. The ISO 14000 series covers the following topics:

Organizational Evaluation

- Environmental Management Systems (ISO 14001, 14004)
- Environmental Performance Evaluation (ISO 14014, 14015, 14031)
- Environmental Auditing (ISO 14010, 14011, 14012)

Products, Services and Processes

- Life Cycle Assessment (ISO 14040, 14041, 14042, 14043)
- Environmental Labelling (ISO 14020, 14021, 14022, 14023, 14024)

- Environmental Aspects in Product Standards (ISO 14060)

For a better understanding of the EMS standards, it is key to understand that EMS standards are process, not performance standards.

In other words, these standards do not tell organizations what environmental performance they must achieve, besides compliance with environmental regulations. Instead, the standards describe a system that will help an organization to achieve its own objectives and targets. The assumption is that better environmental management will lead to a better environmental performance.

You can implement an EMS that is in line with one of the EMS standards without external certification. Once there is a clear reason to demonstrate conformance to third parties, external certification and registration becomes a factor.

SITUATIONS WHERE CERTIFICATION COULD BECOME IMPORTANT

- A customer requires an EMS certificate as a condition to sign a contract.
- Your organization supplies to a customer who strongly suggests you get a registration / certification.
- A government provides benefits to registered / certified organizations.
- You have European Union in view, where market pressure or the regulatory environment forces you to get a registration or certification.
- You export to markets where EMS registration / certification is a de-facto requirement for entering the market.
- You expect to gain a competitive advantage through EMS registration / certification.

Your major stakeholders, whether the local community, shareholders, unions, etc. expect environmental excellence and an EMS registration / certification is the way to demonstrate it.

You should decide whether to get a registration / certification for the organization as a whole or just for parts of it. If you are already certified against any of the ISO Standards, it makes sense to define its scope in a similar manner. If you go by a site-by-site registration / certification, you have the advantage of not losing the registration / certification for your whole organization if one of the sites does not comply with the requirements of the standard. Also, by this way, the process of implementing, certifying and registering the EMS is broken down into smaller projects that are easier to handle.

REGISTRATION / CERTIFICATION TO ISO 14001

Registration / certification to ISO 14001 does not mean that your organization is a “green facility, is environmentally friendly or that you have demonstrated superior environmental performance”. It means that your organization can claim it has documented an EMS that is fully implemented and consistently followed.

EMS registration / certification refers to the process whereby a non-biased third party attests that an organization's EMS conforms to the requirements of the ISO 14001 standard. An accredited registrar is one whose competence is evaluated by an independent third party also known as accreditation body. Most countries' own accreditation body are established either nationally or by government.

Registration may have different registration methods, but must follow the basic two processes:

Stage 1- Planning for the Audit

The purpose is to determine the organization's preparedness for the registration / certification audit. This stage is primarily a review of the EMS in the light of the possible significant environmental aspects and can include a document review and possibly an on-site visit.

Stage 2 – Evaluating Performance

This stage takes place at the organization's location. An audit team conducts an on-site audit to evaluate and verify through objective evidences (interviews, procedures, records, etc.) that the EMS conforms to the requirements in ISO 14001 and is implemented and maintained.

Once you achieve registration / certification, regular surveillance audits by the registrar / certifying body are required. These may be conducted either annually or semi-annually.

You have to conform to ISO 14001 Standard requirements, and also have to conform to:

- Your own organization's policies and procedures
- The policies and procedures of the registrar / certifying body

You will not be audited to the registrar's policies and procedures, but they will include your responsibilities, such as time-frames for corrective actions and rights within the registration / certification process, such as auditor approval, and processes you should be aware of, such as confidentiality and dispute resolution.

REGISTRATION / CERTIFICATION AND COMPLIANCE

A registration / certification audit is not a compliance audit. An EMS auditor will not perform a detailed compliance inspection, but he will gather data on how your

organization manages its compliance programme. Pertinent questions may include:

- How do you stay informed of new requirements?
- How are these communicated to employees?
- How do you evaluate compliance with regulations?
- What process do you have for resolving any identified non-compliances?

ENVIRONMENTAL ACTIVISTS IN INDIA

India has produced a host of environmental activists who have made their mark. In the seventies, it was the **Chipko movement** that showed the way against deforestation. In the eighties, **Medha Patkar** pushed the world to reconsider the benefits of large dams. In the nineties, **Vandana Shiva** took on the battle against genetically modified foods and **Asho Khosla** provided low tech development alternatives. Meanwhile, wildlife activists like **Valmik Thapar** fought to save the tiger from extinction. At the turn of the century, **Sunita Narain** successfully took on the soft drink giants on pollution.

All through R.K.Pachauri remained in the limelight carving a niche for himself. Rather than adopting a confrontationalist approach, he actively collaborated with the government in bringing about a change. His networking skills saw TERI seminars rope in the best speakers in the world. An engineer and energy economist of repute, R.K.Pachauri believes that at the centre of the solution is the individual himself. "We are already living well beyond the earth's means. Yet, people will not think twice before driving down to buy a loaf of bread. We need major behavioural changes."

Though under the Kyoto Protocol, developing countries like India are exempt from mandatory reduction in green house gases,

the nation can't be complacent. Among them are "no regret measures" like improving public transport, making buildings more energy efficient apart from moving towards greater use of renewable energy.

It is a fact that worldwide, the impact of climate change is setting in so rapidly that the window of opportunity to do something about it has shortened considerably.

CONCLUSION

Our home, the Earth, is in danger. Without realizing consequences of our actions, we have begun to put so much carbon dioxide into the thin shell of air surrounding our world that we have literally changed the heat balance between the Earth and the Sun. If we do not stop doing this quickly, the average temperature will increase to levels humans have never known, and put an end to the favourable climate balance on which our civilization depends.

In the last 150 years, in an accelerating frenzy, we have been taking increasing quantities of carbon from the ground, mainly in the form of coal and oil, and burning it in ways that dump 70 million tones of CO₂ every 24 hours into Earth's atmosphere.

The concentrations of CO₂, having never risen above 300 parts per million for atleast a million years, have been driven from 280 parts per million at the beginning of the coal boom to 383 parts per million in 2007.

Scientists have warn that we are moving closer to several "tripping points" that could, within 10 years, make it impossible for us to avoid irretrievable damage to the planet's habitability for human civilization.

Latest studies have shown that the North Polar ice cap, which helps the planet cool itself, is melting nearly three times faster than the most pessimistic computer models predicted. Unless we take action, summer ice – the permanent ice cap over the Arctic

Ocean that survives through the warm summers – could be completely gone in just 35 years. Similarly, near the South Pole, scientists have found new evidence of melting of snow in West Antarctica across an area as large as California.

This is not a political issue. This is a moral issue, one that affects the survival of human civilization. It is not a question of left versus right; it is a question of right versus wrong. It is wrong to destroy the habitability of our planet and ruin the prospects of generations that follow ours.

On September 21, 1987, President Ronald Reagan said: “In our obsession with antagonisms of the moment, we often forget how much unites all the members of humanity. Perhaps, we need some outside, universal threat to recognize this common bond. I occasionally think how quickly our differences would vanish if we were facing a threat from outside this world.” We now face that universal threat. Though it is not from outside this world, it is cosmic in scale.

The Live Earth concert, held in all seven continents, asked for the attention of mankind to begin a three-year campaign to make everyone on our planet aware of how we can solve the climate crisis in time to avoid catastrophe. Individuals must be a part of the solution.

But individual action will also have to shape and drive government action. We should demand that the United States join an international treaty as soon as possible that cuts global warming pollution by 90 percent in developed countries and by more than half worldwide in time for the next generation to inherit a healthy Earth.

Our children have a right to hold us to a higher standard when their future is hanging in the balance. They deserve better than such government that censors the best scientific

evidence and harasses honest scientists who try to warn us about looming catastrophe. They deserve better than such politicians who do nothing to confront the greatest challenge that mankind has ever faced.

We should focus instead on the opportunities that are part of this challenge. Certainly, there will be new jobs and new profits as corporations move aggressively to capture the enormous economic opportunities offered by a clean energy future.

But there is something even more precious to be gained if we do the right thing. The climate crisis offers us the chance to experience what few generations in history have had the privilege of experiencing: a generational mission; a compelling moral purpose; a shared cause; and the thrill of being forced by circumstances to put aside the pettiness and conflict of politics and to embrace a genuine, moral and spiritual challenge.

Climate change activists gain recognition for their efforts. But with nations still dragging their feet over commitments, **Intergovernmental Panel for Climate Change (IPCC)**'s R.K.Pachauri warns that it is either now or never. He is the first to acknowledge that he is “a mere functionary” of the **Intergovernmental Panel for Climate Change (IPCC)** that along with **Al Gore**, former Vice President of the USA from 1993 to 2001 has been jointly awarded the prestigious Nobel Prize for Peace 2007.

Functioning since 1988, the panel was set up by two UN agencies to scour through the mass of scientific, technical and socio-economic data and assess the impact of anthropogenic climate change and how to mitigate it. The IPCC does not carry out research but instead engage 600 direct authors, many of them Nobel Laureates, along with 2,500 others to prepare assessment reports.

In the past, the IPCC has brought out some stunning reports confirming that the earth's temperature has risen to an alarmingly high level in recent history and that we could only ignore the warning signs at our peril. In doing so, the IPCC report ended decades of dispute over the existence of climate change itself. The IPCC report and Al Gore's riveting lectures on "the inconvenient truths" created a whole new awareness about the debilitating effects of global warming. They goaded recalcitrant nationals like the US to begin to make commitments on reducing their emissions of green house gases (GHG). Most importantly, it brought about a climate for change.

It is another matter though that despite IPCC's pioneering efforts, most nations are yet to fulfill their commitments to bringing down their own emission levels. IPCC is exasperated by such dithering and says that "the record has been poor internationally." Developed countries had taken up obligations under the Kyoto Protocol to reduce their emission levels, but most have defaulted. The US, the world's GHG emitter, is also the worst culprit. IPCC has been pushing for "a workable timetable for action" among these countries for a new protocol that is likely to come into effect in 2012.

References:

- Federal Facilities Council
Environmental Management System and ISO: 14001
National Academic Press, Washington DC 1999
- Christopher & Mark Yoxm
Environmental Management System
Earthscan Publication Ltd. UK 2002
- Stephen Tinsley & Ilona Tillai
Environmental Management System
Taylor & Francis Inc. UK 2001
- Richard Welford Corporate
Environmental Management System

and Strategies Earthscan Publication Ltd. UK (2nd rev.Ed.) 1998

- B. Margugilo
Environmental Management System
CRC, Canada (1st Ed.) 1991
- Sheldon Christopher
Installing Environmental Management System – A step by step Guide
Earthscan Publication Ltd. UK (2nd Ed.) 1998
- Anupam Goswami
Increasing Heat
Business India, November 4, 2007

- 18 -

- Steven Lewis, Yaffee
Ecosystem Management in the United States : An assessment of current experience
Island Press, USA, 1996
- James Gerard Cantrill, Christine Lena Oravec
The Symbolic Earth : Discourse and our creation of the environment
University Press, Kentucky 1996
- Mark J. Smith
Thinking through the environment : A Reader
Routledge, 1999

