LECTURE NOTES
ON
GREEN BUSINESS MANAGEMENT
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(14E00402) GREEN BUSINESS MANAGEMENT

1. Introduction of Green Management: The concept of green management; evolution; Nature, scope, importance and types; developing a theory; green management in India; Relevance in twenty first century

2. Organizational Environment: Internal and External environment; Indian corporate Structure and environment; how to go green; spreading the concept in organization; Environmental and sustainability issues for the production of high-tech components and Materials, life cycle analysis of materials, sustainable production and its role in corporate social responsibility (CSR) and Corporate environmental responsibility (CER).

3. Approaches from Ecological Economics; Indicators of sustainability; Ecosystem services and their sustainable use; Bio-diversity; Indian perspective; Alternate theories

4. Environmental Reporting and ISO 14001; Climate change business and ISO 14064; Green financing; Financial initiative by UNEP; Green energy management; Green product management

5. Green Techniques and Methods; Green tax incentives and rebates (to green projects and companies); Green project management in action; Business redesign; Eco-commerce models

References:
- Green Marketing and Management: A global Perspective by John F. Whaik, Qbase Technologies.
UNIT-I
INTRODUCTION OF GREEN BUSINESS MANAGEMENT

Here is a global consensus on the need to reduce our collective carbon footprint. While much research attention has focused on developing alternative energy sources, automotive technologies or waste disposal techniques, we often ignore the fact that the ability to optimize (existing) operations to reduce their emissions impact is fundamental to this exercise. We believe that by transforming the problem into the domain of Business Process Management (BPM) we can leverage the rich expertise in this field to address issues associated with identifying areas for improvement, understanding the implication and performing carbon footprint minimization. We will use the term "Green BPM" to describe a novel class of technologies that leverage and extend existing BPM technology to enable process design, analysis, execution and monitoring in a manner informed by the carbon footprint of process designs and instances. This article describes the first steps in the development of this class of technologies.

INTRODUCTION

There is a global consensus on the need to reduce our collective carbon footprint. Due to external pressures such as legislative requirements as well as an increase awareness of the general public (choosing products from organizations with environmentally sustainable profile), organizations are forced to capture details about, understand and minimize their carbon footprint. We argue that by transforming the problem into the domain of Business Process Management (BPM) we can leverage the rich expertise in this field to address issues associated with identifying areas for improvement, understanding the implication and performing carbon footprint minimization. Transforming a problem into a more researched domain is a powerful principle often applied in mathematics and science. BPM is known for its focus on the understanding and improvement/optimization of an enterprise’s business processes. Process modeling technology has applications beyond what we would traditionally describe as business processes. We can also model and improve manufacturing and other “physical” processes. To leverage the BPM technology we need to inform the business process design with its associated emission impact. This article shows how business process designs can be informed by capturing and utilizing the relationship between resources and activities and how this paves the way for future green business process optimization.

DEFINITION

A business functioning in a capacity where no negative impact is made on the local or global environment, the community, or the economy. A green business will also engage in forward-thinking policies for environmental concerns and policies affecting human rights. **Sustainable business**, or **green business**, is an enterprise that has minimal negative impact on the global or local environment, community, society, or economy—a business
that strives to meet the triple bottom line. Often, sustainable businesses have progressive environmental and human rights policies. In general, business is described as green if it matches the following four criteria:

1. It incorporates principles of sustainability into each of its business decisions.
2. It supplies environmentally friendly products or services that replaces demand for nongreen products and/or services.
3. It is greener than traditional competition.
4. It has made an enduring commitment to environmental principles in its business operations.

A sustainable business is any organization that participates in environmentally friendly or green activities to ensure that all processes, products, and manufacturing activities adequately address current environmental concerns while maintaining a profit. In other words, it is a business that “meets the needs of the present world without compromising the ability of the future generations to meet their own needs.” It is the process of assessing how to design products that will take advantage of the current environmental situation and how well a company’s products perform with renewable resources.

The Brundtland Report emphasized that sustainability is a three-legged stool of people, planet, and profit. Sustainable businesses with the supply chain try to balance all three through the triple-bottom-line concept—using sustainable development and sustainable distribution to affect the environment, business growth, and the society.

Everyone affects the sustainability of the marketplace and the planet in some way. Sustainable development within a business can create value for customers, investors, and the environment. A sustainable business must meet customer needs while, at the same time, treating the environment well. In order to be successful in such an approach, where stakeholder balancing and joint solutions are key, a structural approach is needed. One philosophy, that include many different tools and methods, is the concept of Sustainable Enterprise Excellence.

Sustainability is often confused with corporate social responsibility (CSR), though the two are not the same. Banal and Desjardin (2014) state that the notion of ‘time’ discriminates sustainability from CSR and other similar concepts. Whereas ethics, morality, and norms permeate CSR, sustainability only obliges businesses to make intertemporal trade-offs to safeguard intergenerational equity. Short-termism is the bane of sustainability.

Green business has been seen as a possible mediator of economic-environmental relations, and if proliferated, would serve to diversify our economy, even if it has a negligible effect at lowering atmospheric CO2 levels. The definition of “green jobs” is ambiguous, but it is generally agreed that these jobs, the result of green business, should be linked to clean energy, and contribute to the reduction of greenhouse gases. These corporations can be seen as generators of not only "green energy", but as producers of
new "materialities" that are the product of the technologies these firms developed and deployed.

CORPORATE SUSTAINABILITY STRATEGIES

Corporate sustainability strategies can aim to take advantage of sustainable revenue opportunities, while protecting the value of business against increasing energy costs, the costs of meeting regulatory requirements, changes in the way customers perceive brands and products, and the volatile price of resources.

Not all eco-strategies can be incorporated into a company's Eco-portfolio immediately. The widely practiced strategies include: Innovation, Collaboration, Process Improvement and Sustainability reporting.

1. Innovation & Technology

This introverted method of sustainable corporate practices focuses on a company's ability to change its products and services towards less waste production and sustainable best practices.

2. Collaboration

The formation of networks with similar or partner companies facilitates knowledge sharing and propels innovation.

3. Process Improvement

Continuous process surveying and improvement is essential to reduction in waste. Employee awareness of company-wide sustainability plan further aids the integration of new and improved processes.

4. Sustainability Reporting

Periodic reporting of company performance in relation to goals. These goals are often incorporated into the corporate mission (as in the case of Ford Motor Co.).

5. Greening the Supply Chain

Sustainable procurement is important for any sustainability strategy as a company's impact on the environment is much bigger than the products that they consume. The B Corporation (certification) model is a good example of one that encourages companies to focus on this.
SIX ESSENTIAL CHARACTERISTICS

Paul Hawken (The Ecology of Commerce and Natural Capitalism), Bill McDonough and Michael Braungart (Cradle to Cradle), and Janine Benyus (Biomimicry) when he proposes that a mature and authentic sustainable business contains six essential characteristics.

1. Triple top-line value production

"The TTL Establishes three simultaneous requirements of sustainable business activities - financial benefits for the company, natural world betterment, and social advantages for employees and members of the local community—with each of these three components recognized as equal in status." Whereas many businesses use the triple bottom line, "triple top line" stresses the importance of initial design and is a term attributable to McDonough and Braungart in their book Cradle to Cradle.

2. Nature-based knowledge and technology

"This biomimicry-based principal involves the conscious emulation of natural-world genius in terms of growing our food, harnessing our energy, constructing things, conducting business healing ourselves, processing information and designing our communities"

3. Products of service to products of consumption

"Products of service are durable goods routinely leased by the customer that are made of technical materials and are returned to the manufacturer and re-processed into a new generation of products when they are worn out.(These products are mostly non-toxic to human and environmental health but toxic materials that are used will be kept within a closed loop type system and not be able to escape into the environment). Products of consumption are shorter lived items made only of biodegradable materials. They are broken down by the detritus organisms after the products lose their usefulness.(These are also non-hazardous to human or environmental health). This principal requires that we manufacture only these two types of products and necessitates the gradual but continual reductions of products of service and their replacement with products of consumption as technological advancements allow."

4. Solar, wind, geothermal and ocean energy.

"This principal[ic] advocates employing only sustainable energy technology—solar, wind, ocean and geothermal—that can meet our energy needs indefinitely without negative effects for life on earth." Other authors, such as Paul Hawken, have referred to this as utilizing current solar income.
5. Local-based organizations and economies

"This ingredient includes durable, beautiful and healthy communities with locally owned and operated businesses and locally managed non-profit organizations, along with regional corporations and shareholders working together in a dense web of partnerships and collaborations."

6. Continuous improvement process

"Operational processes inside successful organizations include provisions for constant advancements and upgrade as the company does its business. The continuous process of monitoring, analyzing, redesigning and implementing is used to intensify TTL value production as conditions change and new opportunities emerge."

**CHALLENGES AND OPPORTUNITIES**

Implementing sustainable business practices may have an effect on profits and a firm's financial 'bottom line'. At first blush, this challenge might make many corporate executives cringe. However, during a time where environmental awareness is popular, green strategies are likely to be embraced by employees, consumers, and other stakeholders. In fact, according to many studies, a positive correlation exists between environmental performance and economic performance.

If an organisation’s current business model is inherently unsustainable, becoming a truly sustainable business requires a complete makeover of the business model (e.g. from selling cars to offering car sharing and other mobility services). This can present a major challenge due to the differences between the old and the new model and the respective skills, resources and infrastructure needed. A new business model can also offer major opportunities by entering or even creating new markets and reaching new customer groups.

Companies leading the way in sustainable business practices can be said to be taking advantage of sustainable revenue opportunities: according to the Department for Business, Innovation and Skills the UK green economy to grow by 4.9 to 5.5 percent a year by 2015, and the average internal rate of return on energy efficiency investments for large businesses is 48%. A 2013 survey suggests that demand for green products appears to be increasing: 27% of respondents said they are more likely to buy a sustainable product and/or service than 5 years ago. Furthermore, sustainable business practices may attract talent and generate tax breaks.

**Environmental sphere**

A major initiative of sustainable businesses is to eliminate or decrease the environmental harm caused by the production and consumption of their goods. The impact of such human activities in terms of the amount of greenhouse gases produced can be measured in units of carbon dioxide and is referred to as the *carbon footprint*. The
carbon footprint concept is derived from ecological footprint analysis, which examines the ecological capacity required to support the consumption of products.

Businesses take a wide range of green initiatives. One of the most common examples is the act of "going paperless" or sending electronic correspondence in lieu of paper when possible. On a higher level, examples of sustainable business practices include: refurbishing used products (e.g., tuning up lightly used commercial fitness equipment for resale); revising production processes in order to eliminate waste (such as using a more accurate template to cut out designs); and choosing nontoxic raw materials and processes. For example, Canadian farmers have found that hemp is a sustainable alternative to rapeseed in their traditional crop rotation; hemp grown for fiber or seed requires no pesticides or herbicides.

Sustainable business leaders also take into account the life cycle costs for the items they produce. Input costs must be considered in regards to regulations, energy use, storage, and disposal. Designing for the environment (DFE) is also an element of sustainable business. This process enables users to consider the potential environmental impacts of a product and the process used to make that product.

The many possibilities for adopting green practices have led to considerable pressure being put upon companies from consumers, employees, government regulators and other stakeholders. Some companies have resorted to greenwashing instead of making meaningful changes, merely marketing their products in ways that suggest green practices. For example, various producers in the bamboo fiber industry have been taken to court for advertising their products as more "green" than they are. Still, countless other companies have taken the sustainability trend seriously and are enjoying profits. In their book “Corporate Sustainability in International Comparison”, Schaltegger et al. (2014) analyse the current state of corporate sustainability management and corporate social responsibility across eleven countries. Their research is based on an extensive survey focusing on the companies’ intention to pursue sustainability management (i.e. motivation; issues), the integration of sustainability in the organisation (i.e. connecting sustainability to the core business; involving corporate functions; using drivers of business cases for sustainability) and the actual implementation of sustainability management measures (i.e. stakeholder management; sustainability management tools and standards; measurements). The Gort Cloud written by Richard Seireeni, (2009), documents the experiences of sustainable businesses in America and their reliance on the vast but invisible green community, referred to as the gort cloud, for support and a market.

Green investment firms are consequently attracting unprecedented interest. In the UK, for instance, the Green Investment Bank is devoted exclusively to supporting renewable domestic energy. However, the UK and Europe as a whole are falling behind the impressive pace set by developing nations in terms of green development. Thus, green investment firms are creating more and more opportunities to support sustainable development practices in emerging economies. By providing micro-loans and larger investments, these firms assist small business owners in developing nations who seek
business education, affordable loans, and new distribution networks for their "green" products.

**Sustainable Businesses**

Among large corporations, Ford Motor Company occupies an odd role in the story of sustainability. Ironically, founder Henry Ford was a pioneer in the sustainable business realm, experimenting with plant-based fuels during the days of the Model T. Ford Motor Company also shipped the Model A truck in crates that then became the vehicle floorboards at the factory destination. This was a form of upcycling, retaining high quality in a closed-loop industrial cycle. Furthermore, the original auto body was made of a stronger-than-steel hemp composite. Today, of course, Fords aren't made of hemp nor do they run on the most sensible fuel. Currently, Ford's claim to eco-friendly fame is the use of seat fabric made from 100% post-industrial materials and renewable soy foam seat bases. Ford executives recently appointed the company’s first senior vice president of sustainability, environment, and safety engineering. This position is responsible for establishing a long-range sustainability strategy and environmental policy. The person in this position will also help develop the products and processes necessary to satisfy both customers and society as a whole while working toward energy independence. It remains to be seen whether Ford will return to its founder's vision of a petroleum-free automobile, a vehicle powered by the remains of plant matter.

The automobile manufacturer Subaru is a sustainability giant. In 2008 a Subaru assembly plant in Lafayette became the first auto manufacturer to achieve zero land fill status when the plant implemented sustainable policies. The company successfully managed to implement a plan that increased refuse recycling to 99.8%. In 2012, the corporation increased the reuse of Styrofoam by 9%. And from the year 2008 to the year 2012, environmental incidents and accidents reduced from 18 to 4.

Smaller companies such as Nature's Path, an organic cereal and snack making business, have also made significant sustainability gains in the 21st century. CEO Arran Stephens and his associates have ensured that the quickly growing company's products are produced without toxic farm chemicals. Furthermore, employees are constantly encouraged to find ways to reduce consumption. Sustainability is an essential part of corporate discussions. Another example comes from Salt Spring Coffee, a company created in 1996 as a certified organic, fair trade, coffee producer. In recent years they have become carbon neutral, lowering emissions by reducing long-range trucking and using bio-diesel in delivery trucks, upgrading to energy efficient equipment and purchasing carbon offsets. The company claims to offer the first carbon neutral coffee sold in Canada. Salt Spring Coffee was recognized by the David Suzuki Foundation in the 2010 report *Doing Business in a New Climate*. A third example comes from Korea, where rice husks are used as a nontoxic packaging for stereo components and other electronics. The same material is later recycled to make bricks.
Social sphere

Organizations that give back to the community, whether through employees volunteering their time or through charitable donations are often considered to be socially sustainable. Organizations also can encourage education in their communities by training their employees and offering internships to younger members of the community. Practices such as these increase the education level and quality of life in the community.

In order for a business to be truly sustainable, it must sustain not only the necessary environmental resources, but also its social resources, including employees, customers (the community), and its reputation.

**IMPORTANTANCE OF GREEN BUSINESS MANAGEMENT**

*Green businesses are socially and environmentally responsible.*

Green companies adopt principles and practices that protect people AND the planet. They challenge themselves to bring the goals of social and economic justice, environmental sustainability, as well as community health and development, into all of their activities—from production and supply chain management to employee relations and customer service.

*Green businesses care for their workers.*

Green businesses ensure they don’t use sweatshop or child labor. Everyone who works directly for them or their suppliers earns a living wage and works in healthy conditions. They create jobs that empower workers and honor their humanity. They also serve as models for the role businesses can play in the transformation of our society to one that is socially just and environmentally sustainable.

*Green businesses protect their customers and clients.*

Green businesses ensure that they use the safest ingredients, to keep their customers and clients and their families healthy. They also provide green living alternatives to improve quality of life, with products and services that help in areas like affordable housing, sustainable agriculture, education, clean energy and efficiency, fair trade, healthy air, clean water, and more. And they reduce, reuse and recycle, setting a good example.

*Green businesses improve their communities.*

Along with ensuring their facilities aren’t polluting their local communities, many green businesses take steps to make the places that they call home better. Green businesses often spring up in marginalized communities—inner cities, rural and indigenous communities. Many are even started by the people in these communities who, in turn, bring respect and dignity to their employees and the wider neighborhood.
DEVELOPING A GBM THEORY

Normative and Cosmopolitan

One aspect of Green IR theory is normative theorising such as bioregionalism. The idea of a “land ethic” and the belief that people can “think globally and act locally” has given hope that norms can be directly or indirectly derived from nature.

Futurology and counterfactual reasoning, such as that promoted by Philip E. Tetlock & Aaron Belkin (1996) in "Counterfactual Thought Experiments in World Politics," may just as easily produce dystopias as utopias. Environmental security, while still questionable, is at least more basic than human security. Likewise, "ecology" (the study of households or habitats) has priority over "economics" (the applied laws of households or habitats).

The fit between people and their environments brings up the topic of positive and negative eugenics which has been a background challenge in Green theory. Healthy and unhealthy have seemed to replace the theology of good and evil. Holistic health is a popular part of green theories combined with green living. Public health with prevention and health promotion are more consistent with Green theory too.

The non-violent thread in Green theory has led to an anti-hierarchical standard which can seem to be anarchical in this theory. Eco-feminists may hold anti-hierarchical views. Living wages and more equality may be emphasized. Ernest Callenbach's "Ecotopia" seems to almost be a matriarchal totalitarianism. The choices and liberties can be shifted in Green theory.

Turn taking among Green leaders means sometimes the responsibilities of power and sometimes being the follower. All this within groups attempting consensus with group skills added to communication skills which can be overpowering.

A behavioural space with contingencies, classical and operant conditioning, plus systems of semiotic systems with underlying structures, even for individual cells, organisms, groups, and all conceivable units of analysis could certainly be overpowering. It would seem to be a case of Michel Foucault's "governmentality" where both individuals and populations are simultaneously controlled. And the governmentality would grow and evolve.

Growth of any particular species can be in numbers, qualities, adaptations (fitting in), and adjustments (changes to environment) which makes for complex practical syllogisms. As Thomas Szasz said in "Ideology and Insanity": "stars move, machines function, animals behave, and people conduct themselves." It is an idea of "ecopsychology" that contact with nature promotes mental health and wellness.

According to Morris Berman there is a "Shadow Side of Systems" from the Journal of Humanistic Psychology (Winter 1996). Just as democracy can make for a
tyranny of the majority so can systems thinking provide for authoritarianism and/or paternalism. A case study of Green theorists' dealing with the issue of "abortion" can illustrate this matter. Life and choice are both important to Green theorists. Disconnecting the conception decision from the birth decision can have eugenic consequences. Perhaps females could take charge of reproductive technology but then they would be in charge of eugenics too.

The compromises of living where you like and liking where you live; of doing what you like and liking what you do; and, of having the child you like and liking the child you have -- these do not make choices easier. Do we love the people we love and love the people we love -- both? Green theory does not always distinguish public space from private space. As for political ideologies and Green theory, Timothy O'Riordan (1990) in "Major Projects and the Environment" in Geographical Journal, indicates there to be "dry greens" (perhaps conservative and market centered), "shallow greens" (perhaps liberal and sustainable development centered), and "deep greens" (perhaps radical and ecosystem or earth centered). This, of course, may be an oversimplification. "Dry Greens" may be the least appreciated environmentalists and might not even be given that title. However, a very good economic treatment is given in "The Plundered Planet" by Paul Collier (2010). Collier may put the plight of the bottom billion (poorest and worst off people) on the planet above environmentalism. He believes protecting the viability of the planet and the bottom billion must both be done. Green theorists, of course, emphasize equality such that the bottom billion are equal to the top billion. How that works out is challenging. If the planet does need a billion less people, then there is no agreed upon way of choosing. Market solution would include rising food prices and only those with ability to pay survive. Each culture, religion, and academic discipline has developed and produced different solutions to the "Who survives?" conundrum.

GREEN BUSINESS IN INDIA

Green is in for India Inc

On the corporate side, the CII has initiated the 'GreenCo' rating for companies based on their environmental performance across nine parameters.
Going green makes strong business sense. Or so said management expert Michael Porter. As one of the key representatives of India Inc, the Confederation of Indian Industry (CII) realised the potency of those words more than a decade ago. In the summer of 2004, it unveiled the CII-Godrej Green Business Centre (GBC) in Hyderabad—a public-private partnership project between the Andhra Pradesh government, the Pirojsha Godrej Foundation and CII, with technical aid from USAID.

At the time it was India's greenest building—the only structure outside the United States and the third in the world to get a platinum rating, the highest level of certification for environment-friendly buildings under the Leadership in Energy and Environmental Design (LEED) system, developed by the U.S. Green Building Council. So what has this green power achieved? The building shows a 53 per cent saving in overall energy use, 35 per cent saving in the use of potable water, and 80 per cent usage of recycled and recyclable material. And that's just the tip of the proverbial iceberg.

Green then certainly seems in for India Inc. So you have cement companies such as ACC and Vasavadatta develop sustainable technologies in manufacturing, and real estate firm DLF ensuring some of its properties adhere to high standards of energy efficiency. In other sectors, Hindustan Unilever is aiming to cut carbon emission by 22 per cent, Pune-based Kirloskar Brothers is marketing a line of highly energy-efficient pumps, while in Jaipur UltraTech Cement helps burn 100 tonnes of municipal waste at its waste treatment plant every day.

That eco-friendliness is gradually finding its way into the Indian construction ecosystem is evident from the fact that as of May 2015, the country has at least 3,155 green building projects, covering more than 3 billion sq ft. That's more than all countries barring the United States. "There is an enormous potential for green business in India. Heavy energy users—such as those in steel, cement and paper—have adapted quickly to this change," says Jamshyd Godrej, CMD, Godrej & Boyce, and chairman, CII-Godrej GBC.

To encourage the movement, the Ministry of Power and the Bureau of Energy Efficiency have come up with a Perform, Achieve and Trade (PAT) programme for big energy consumers. The government has identified 478 companies that together consume 75 per cent of industrial energy and given them targets to reduce energy consumption over a period of three years.

On the corporate side, the CII has initiated the 'GreenCo' rating for companies based on their environmental performance across nine parameters, including energy efficiency, water conservation, use of renewable energy and waste management. Experts say it is more advanced than the ISO 14000 certification. "It is easier to convince companies on energy efficiency as the results are more tangible," says K.S. Venkatagiri, deputy executive director, CII-Godrej GBC.
Although there is a lot of ground still to be covered, here's a look at some of the success stories.

**ACC CEMENTING THE FUTURE**

Cement major ACC is a good case in point when it comes to green building initiatives. Step into its Mumbai headquarters near Church gate and you will be hard-pressed to believe the building spread across 68,000 sq ft is 75 years old.

At six floors high, excluding a basement that houses a canteen, 'Cement House' is the nerve centre for ACC, a company formed by the merger of 10 cement units in 1936, and was then called the Associated Cement Companies Limited. The architects, Ballardie Thompson & Mathews of Kolkata, had planned a central atrium for ventilation and natural light but over the years, compulsions of space and an expanding workforce ensured that this atrium was covered up and numerous cubicles added, cutting out much light and ventilation. Then, in 2008, the company went back to the basics, restoring the building to what the planners actually wanted it to be, with added benefits of a green building: an airy atrium, cubicle-free open workspaces, terrace gardens and intelligent lighting and cooling systems that get activated only when needed.

In 2009, the building received the LEED gold certification and 5-star energy efficiency status from the Bureau of Energy Efficiency. Another 50-year-old ACC building, the La Residency in Thane, and the Central Control Room building inside its new Chandrapur cement plant received platinum certification from the Indian Green Building Council. A fourth green building is under construction in ACC's upcoming project in Jamul, Chhattisgarh.

Besides these buildings, the cement major, now a part of Swiss company Holcim, has established energy and environment management initiatives across functions, which employs 9,000 people and has an annual production capacity of 31 million tonnes. According to ACC officials, the company has reduced its specific carbon footprint by more than 33 per cent since 1990, and as per its Low Carbon Technology Roadmap, this will further reduce by 20 per cent by 2040.

ACC's Thane complex, for instance, is powered by the company's three wind farms of 19 MW installed capacity in Tamil Nadu, Rajasthan and Maharashtra. Last year, ACC received one of the country's top honours for sustainability—the CII-ITC Sustainability Awards 2013 for large companies. The same year, ACC commissioned its first waste heat recovery power generation unit of 7.5 MW, which has a potential to reduce nearly 44,180 tonnes of carbon dioxide per year while providing 7.5 per cent green energy for the plant.

**KBL PUMPING DOWN MISSION**

A walk through the sprawling Kirloskar Brothers Limited's (KBL) corporate office campus in Pune can well be a lesson in botany. The gardens and ample open
spaces are lined with native species of trees and plants, and they require less water and maintenance. The water used is treated waste water. The company's CMD, Sanjay Kirloskar, wanted the new building to adhere to KBL's commitment towards the environment and therefore planned 'Yamuna', the first LEED platinum-rated green building in this region. In step with KBL's eco-friendly policies, the corporate office focuses on water conservation and harvesting, while waste from the cafeteria goes into the vermicompost.

This, though, is just one of the several measures KBL has taken in its quest for green business practices. In 2014, the group became India's first pump manufacturing facility to receive the GreenCo rating. Its plant in Dewas, Madhya Pradesh, was recognised as a 'Green Company' by CII's GBC. The units in Dewas and Kaniyur have received the CII GreenCo silver rating certification.

Using energy-efficient technology, the Dewas plant has reduced specific energy consumption by 30 per cent in the last five years. Besides creating awareness among employees about the need to conserve water, it has put in place rooftop rainwater harvesting projects. This has helped the Dewas plant reduce water consumption by 40 per cent over the last five years and become a zero water discharge facility for the last 15 years. According to KBL officials, 45 per cent of all power consumption at Dewas is wind energy and the facility has cut down carbon dioxide emission by 10 per cent in the last five years.

Waste management is another area where the plant scores high. It reuses 70 metric tonnes of mild steel scrap and recycles 100 per cent cast iron scrap. In supply chain management, KBL has taken initiatives to develop local vendors for components in order to reduce emissions due to transportation and has cut down the number of vendors from 87 to 72 besides reducing long-distance suppliers from 69 to 36.

Moving onto the green lane back in 2009, KBL had signed the CII code for "ecological sustainable business growth" and adopted the principle of 3R-Reduce, Reuse and Recycle. The focus is now on conservation of energy and water, minimising greenhouse gas (GHG) emissions and waste generation, improving recyclability, maximising material conservation, and use of recycled material.

**CII BUILDING GREEN**

A family of geese walks around from grass to stone and back on grass, totally at home, as you step into the CII-Godrej GBC in Hyderabad. Spread across nearly four and a half acres, natural rocks from the original site with more than 300 species of plants
surround the building. "The building demonstrates how green practices can be adopted and sustained," says S. Srinivas, deputy executive director of the centre. "Our sustainable methods have translated into an annual 100-tonne reduction in carbon dioxide emissions, 20 to 30 per cent reduction in potable water consumption over a conventional building and nearly 55 per cent reduction in energy consumption."

The building has a rooftop garden covering nearly 60 per cent of its surface and houses the 23.5-KW solar power unit that caters to 20 per cent of its lighting requirements. Lighting is needed typically only around dusk, before which sunlight streams through the uniquely positioned glass panels designed to ensure maximum light and minimum heat. Temperature is further reduced thanks to the two wind towers that harness wind power and cool down the building, in turn reducing the need for air conditioning. Over the years, maximum water penetration and rainwater harvesting have ensured an increase in the area's water table.

Quite aptly, the building houses the CII's Centre of Excellence for green buildings, energy efficiency, renewable energy, environment and recycling, water management and climate change activities in India. "Ultimately, we need to demonstrate how green practices make tremendous business sense in order to get more people involved in the green building movement," says CII's S. Srinivas. As one of its latest initiatives, the CII is in talks with owners of nearly 130 buildings in the vicinity of HITEC City in Hyderabad to convert them into green buildings.

The industry chamber's Indian Green Building Council is actively involved in the green building movement, with more than 15 chapters across India and ventures such as Green Product Certification Process and Green School Certification Process, awareness programmes, with 516 certified green buildings already in place and several other initiatives in the pipeline.

In promoting green business, India has thus made some definitive strides. With more awareness of the economic benefits and greater government push, the initiatives will surely bear more fruit in the days to come. There should also be a willingness to change. As Jamshyd Godrej says, "There are no major challenges for companies that want to go green. It is a mindset issue."
UNIT-II
ORGANISATIONAL ENVIRONMENT

INTERNAL AND EXTERNAL ORGANIZATIONAL ENVIRONMENT

By the word "environment" we understand the surrounding or conditions in which a particular activity is carried on. And we know that organization is a social entity that has a hierarchical structure where all necessary items are put together and they act within it to reach the collective goal.

Organization or more specifically business organization and its activates are always being affected by the environment. In an organization, every action of management body is influenced by the environment.

Organizations have an external and internal environment;

1. External Environment
2. Internal Environment
External Environment of Organization

In a simple way factors outside or organization are the elements of external environment. Organization has no control of how the external environment elements will shape up. The external environment can be subdivided in 2 layers: the general environment and the task environment.

1. General Environment
2. Task Environment

General Environment of Organization

The general environment consists of factors that may have an immediate direct effect on operations but nevertheless influences the activities of the firm. The dimensions of the general environment are broad and non-specific whereas the dimensions of the task environment are composed of specific organization.

Let’s see the elements or dimensions of the general environment.

1. **Economic Dimension:** the economic dimension of an organization is the overall status if the economic system in which the organization operates. The important economic factors for business are inflation, interest rates and unemployment.

   These factors of economy always affect the demand for products. During inflation, company pays more for its resources and to cover the higher costs for it, they raise commodity prices.

   When interest rates are high, customers are less willing to borrow money and the company itself must pay more when it borrows. When unemployment is high, the company is able to be very selective about whom it hires, but customers' buying power is low as fewer people are working.

2. **Technological Dimension:** it denotes to the methods available for converting resources into products or services. Managers must be careful about the technological dimension. Investment decision must be accurate in new technologies and they must be adaptable with them.

3. **Socio-cultural dimension:** customs, mores, values, and demographic characteristics of the society in which the organization operates are what made up the socio-cultural dimension of the general environment.

   Socio-cultural dimension must be well studied by a manager. It indicates the product, services, and standards of conduct that the society is likely to value and appreciate. Standard of business conduct vary from culture to culture and so does the taste and necessity of products and services.

4. **Political-Legal Dimension:** the politico-legal dimension of the general environment refers to the government law of business, business-government relationship and the overall political and legal situation of a country. Business
A good business-government relationship is essential of the economy and most importantly for the business. And overall situation of law implementation and justices in a country indicates that there is a favorable situation in of business in a country.

5. **International Dimension**: virtually every organization is affected by the international dimension. It refers to the degree to which an organization is involved in or affected by businesses in other countries.

Global society concept has brought all the nation together and modern network of communication and transportation technology, almost every part of the world is connected.

**Task Environment Of Organization**

The task environment consists of factors that directly affect and are affected by the organization’s operations. These factors include suppliers, customers, competitors, regulators and so on. A manager can identify environmental factors of specific interest rather than having to deal with more abstract dimension of the general environment. The different elements of task environment may be discussed as under:

1. **Competitors**: policies of the organization are often influenced by the competitors. A competitive market place companies are always trying to stay and go further ahead of the competitors. In the current world economy, the competition and competitors in all respects has increased tremendously. The positive effect of this is that the customers always have options and the overall quality of products goes high.

2. **Customers**: “satisfaction of customer”- primary goal of every organization. Customer is who pays money for organization's product or services. They are the peoples who hands them the profit that the companies are targeting.

Managers should pay close attention to the customers’ dimension of the task environment because its customers purchase that keeps a company alive and sound.

3. **Suppliers**: suppliers are the providers of production or service materials. Dealing with suppliers is an important task of management. A good relationship between the organization and the suppliers is important for organization to keep a steady follow of quality input materials.

4. **Regulators**: regulators are units in the task environment that have the authority to control, regulate or influence an organization's policies and practices. Government agencies are the main player of the environment and interest groups is created by its members to attempt to influence organizations as well as government. Trade unions and chamber of commerce are the common example of interest group.

5. **Strategic Partners**: they are the organization and individuals with whom the organization is in an agreement or understanding for the benefit of the
organization. These strategic partners in some way influence the organizations activities of in various ways.

Internal Environment of Organization

Forces or conditions or surroundings with in the boundary of the organization are the elements of internal environment of organization. The internal environment consists mainly of the organization’s owners, board of directors, employees and culture.

1. **Owners:** Owners are people who invested in company and have property rights and claims on the organization. Owners can be an individual or group of person who started the company; or who bought a share of the company in the share market. They have the right to change the company’s policy at any time.

2. **Board of Directors:** The board of directors is the governing body of the company who are elected by stockholders, and they are given the responsibility of overseeing a firm's top managers such as general manager.

3. **Employees:** Employees or the workforce, the most important element of organizations internal environment, who performs the tasks of the administration. Individual employees and also the labor unions they join are important parts of the internal environment. If managed properly they can positively change the organizations policy. But ill-management of the workforce could lead to a catastrophic situation for the company.

4. **Culture:** Organizational culture is the collective behavior of members of an organization and the values, visions, beliefs, habits that they attach to their actions. An organization’s culture plays a major role in shaping its success, because culture is an important determinant of how well their organization will perform. As the foundation of the organization's internal environment, it plays a major role in shaping managerial behavior.

The environment irrespective of its external or internal nature, a manager must have a clear understanding about them. Normally, you would not go for a walk in the rain without an umbrella, because you understand the environment and you know when it rainsyoucangetwet.

Similarly if a manager does not know and understand the environment of organization, he or she will definitively get wet or dry and the organization also in today’s fast and hyper moving organizational environment.
INDIAN CORPORATE STRUCTURE AND ENVIRONMENT

Introduction

It is a well known fact that the way to growth is either through Greenfield expansions Leading to organic growth in one’s own unit, or Brownfield expansions leading to inorganic growth. Since the world is moving at a rapid pace and corporate are in a hurry to expand, restructuring through inorganic growth is an ideal medium. Corporate restructuring is the name of the game all over the globe. Indian companies too, have learnt that this is a faster mechanism of intensification. Restructuring through Amalgamations and acquisitions, if suitably chosen and implemented, can permit a organization to leapfrog into a novel orbit of markets, customers, products and technologies almost overnight. On the other hand, it may well take more than a few years of strive to get into that trajectory if a company is stuck to crude style of expansion alone. Inorganic growth, for this cause is the popular alternative. Restructuring through M&As all over the world have, therefore, been used quite significantly.

The Indian business environment has altered radically since 1991 with the changes in the economic policies and introduction of new institutional mechanism. The Indian corporate world, while befitting from decontrol, and deregulation, has now begun to feel the effect of these changes. Those most affected are the promoters who are today threatened by the possibility of hostile takeovers. At the same time, financial institutions, which have a significant stake in many companies, have started demanding better corporate governance.

Changes in the business environment ensuing from liberalization and globalization have contributed to dynamism in the Indian economy. The new environment poses challenges to the methods of operations practiced under the controlled economy.

These challenges have compiled Indian business to rethink the ways in which they previously operated. With growth becoming central to the new economic environment, mergers and acquisitions are gaining acceptance as a mode of growth in India. This new environment demands more stringently, than the controlled economy did, that the business either perish or restructure through amalgamations and takeovers.

As a result, Indian companies have been steadily restructuring themselves through amalgamations, divestitures, Leveraged buyouts (LBO’s), sell-offs, spin-offs etc., especially, post liberalization. The corporate world today is witnessing a sudden surge of M&As sweeping across all the industries, which has totally restructured the Indian corporate environment. This paper tries to Study and Analyze Corporate Restructuring with reference to Reliance Industries Limited (RIL), India.

Restructuring is the corporate management term for the act of rearranging the legal, ownership, perational, or other structures of a organization for the rationale of making it more beneficial, or better structured for its current needs. Other reasons for restructuring include a change of ownership or ownership structure, demerger, or a response to a crisis or chief alteration in the business such as insolvency, repositioning, or buyout.
Restructuring may also be described as corporate restructuring, debt restructuring and financial restructuring.

Rising competition, breakthrough technological and other changes, rising stock market volatility, major corporate accounting aspects have increased the responsibility to managers in order to deliver superior performance and enhance market value to shareholders. The organizations which not succeed to deal with the above effectively may lose their independence, if not face destruction. Rising competition, swift advances in technology, more demanding shareholders and increasing difficulty of the business conditions have increased the burden on managers to deliver superior performance and value for their shareholders. Corporate restructuring helps companies deal with poor performance, adopt new strategic opportunities, and achieve credibility in the capital market. It can also have a enormous impact on a company’s market value, often in terms of billions of dollars. But how does a corporate restructuring actually get done? How do the related bankruptcies, mergers and acquisitions, spin-offs, and buyouts affect creditors, shareholders, and employees? What are the options, issues, trade-offs, and conflicts? All through the past decade, corporate restructuring has increasingly become a staple of business and a common occurrence around the world. Unprecedented number of companies across the world have reorganized their divisions, restructured their assets and updated their operations in a bid to stimulate the company's performance. It has facilitated copious organizations to react rapidly and more effectively to new opportunities and unanticipated pressures.

**Corporate Restructuring**

A bonus for Competitive Advantage Crum and Gold berg define restructuring of a company as “a set of discrete significant measures taken in order to boost the competitiveness of the enterprise and thereby to augment its value.” It generally includes a array of company actions, from selling business lines to attaining new business lines, from rationalizing workforces to stock repurchase to debt elimination.

Conceptual Scaffold for corporate restructuring and reorganization consists of the following:
1) Management of Assets.
2) Constructing new Ownership Relationships.
3) Reorganising financial claims.
4) Corporate Strategies.

It as facilitated several organizations to react swiftly and more efficiently to novel opportunities and unanticipated pressures so as to reestablish their competitive advantage. The suppliers, customers and competitors also have an equally insightful impact while working with a reorganised company. In India, corporate houses have recently witnessed an increase of restructuring in different organizations. The main reasons for the sudden thrust to restructure in India are as follows:
A. Implementing strict MRTP provisions and new government policy of relicensing.
B.Fierce competition is another key element for giving rise to corporate restructuring.
C. Increasing pressure on margins have necessitated higher volume of business, ensuing mergers and acquisitions or the grand concentration of strategy has led to demergers of non profitable businesses.
D. All round resource optimization in active businesses to reorganize functioning profit and to stay fit in competition.

However, some organizations have done their restructuring through acquisition and mergers and some through demergers. Corporate restructuring is carried out through changes in corporate structure and optimization of resources including financial restructuring. When the market prices of shares are rising, the organizations like to use their equity to takeover other companies.

In this modern “winners take all” economy, organizations have to take a timely responsive action to save their organizations. At this point of time, company executives may ask whether it is time to restructure the company. However, before considering any action, they must first answer the questions: “Will restructuring work?” and “When does restructuring improve economic performance? 

A company’s financial stipulation could be weakened for a diversity of reasons. When the result does not tag on plans, the fiscal condition shrinks the settlement borrowing ability, which may stop the implementation of potential expansion plans. In such circumstances, an apt financial structure is crucial for sustenance of business. The corporate should try to achieve optimal capital structure in line with the earning capacity of the enterprise. There should be a proper debt equity mix, that is, debt suited for the company with respect to its cash flows. Financial restructuring enables the company to achieve an optimal capital structure. It helps in maintaining cash flow, thus enabling the company to focus on new business plans. Financial restructuring entails restructuring the assets and liabilities of corporations, in line with their cash flow needs, in order to promote efficiency, support growth, and maximize the value to shareholders, creditors and other stakeholders.

A number of companies in India have agreed for financial restructuring in order to create value for the shareholders. The outstanding among those who are going for financial restructuring are unquestionably those companies, which have tall wealth investments and are more affected by the global depression. Corporate are reorganizing their capital arrangement and retiring debt for lessening the growing interest commitments and unleashing the value for shareholders. In majority of the cases the practice of financial restructuring has been executed through Mergers, Takeovers/ Acquisitions etc. The Indian businesses environment has altered radically since 1991 with the changes in the economic policies and introduction of new institutional mechanisms. A series of reforms such as the formulation of the Takeover Code, simplification of the laws on Mergers and Amalgamations and the toning down of the MRTP Act, all set off a series of restructuring efforts among companies. The liberalization of foreign investment norms and the entry of foreign players into India through a Joint venture or direct investment added the spice in the restructuring. Multinationals who were in search of an excellent sourcing zone for the Asian countries suddenly found a heaven with the opening of the economy. In an attempt
to adjust to the new global environment that the corporate are exposed to, they speeded up the restructuring activity as they rightfully identified the need for such a move.

The restructuring exercise in India can be viewed as an attempt to keep pace with the global restructuring. The Indian Corporate world today is witnessing a sudden surge of Mergers and Acquisitions (M&As) sweeping across all the industries, which has totally restructured the market place. This surge in Mergers and Acquisitions is remodeling the corporate situation today at dizzying speed, spawning surprise pairings, recorded prices and mammoth sizes. This trend is poles apart from the earlier scenario wherein the Mergers and Acquisitions were looked upon as threat and had evoked images of dark shadows and backdoor entries to the corporate world. However, today managers have recognized Amalgamations and Takeovers as powerful weapons in their arsenal and they have become an integral component in the strategic initiatives of a well managed business.

With growth becoming central to the new economic environment, M&As are gaining increasing acceptance as a mode of inorganic growth. This section gives a definition of Mergers, acquisitions and Corporate Restructuring.

**Merger**

Merger is said to occur when two or more companies are united into one company, where one survives and the other lose its corporate being. The survivor attains the assets as well as liabilities of the merged company or companies. Merger is also the synthesis of two or more existing companies (also known as amalgamation). All assets, liabilities and stock of one company stand reassigned to the transferee company in deliberation of payment in the form of equity shares of transferee company or debentures or cash or a mix of the two or three modes.

**Acquisition**

An acquisition takes place when one company purchases another company or a part of it. The company completely buys out another company and the former company remains.

Examples include: - investment firm buys all the stock of a public company (Blackstone Group buys Harrah's Entertainment) The distinction between an acquisition (takeover) and a merger is that in a takeover, the direct or indirect control over assets of the acquired company passes to the acquirer, whereas in a merger, the shareholding in the combined enterprise will spread between the shareholders of the two companies. Often the distinction is a question of degree, and bases on the relative sizes of the two companies.
Demerger

A business strategy in which a single business is broken into components, either to operate on their own, to be sold or to be dissolved. A demerger allows a large company, such as a conglomerate, to split off its various brands to invite or prevent an acquisition, to raise capital by selling off components that are no longer part of the business's core product line, or to create separate legal entities to handle different operations.

Restructuring

A considerable alteration made to the debt, operations or arrangement of a company. This kind of business action is usually made when there are significant troubles in an organization, which are causing some form of financial damage and putting the overall business in danger. The hope is that through restructuring, an organization can reduce financial harm and improve the business.

LIFE-CYCLE ANALYSIS OF MATERIALS

Life-cycle assessment (LCA, also known as life-cycle analysis, ecobalance, and cradle-to-grave analysis) is a technique to assess environmental impacts associated with all the stages of a product's life from cradle to grave (i.e., from raw material extraction through materials processing, manufacture, distribution, use, repair and maintenance, and disposal or recycling). LCAs can help avoid a narrow outlook on environmental concerns by:

- Compiling an inventory of relevant energy and material inputs and environmental releases;
- Evaluating the potential impacts associated with identified inputs and releases;
- Interpreting the results to help make a more informed decision.

Four main phases

According to the ISO 14040 and 14044 standards, a Life Cycle Assessment is carried out in four distinct phases as illustrated in the figure shown to the right. The phases are often interdependent in that the results of one phase will inform how other phases are completed.
Goal and scope

An LCA starts with an explicit statement of the goal and scope of the study, which sets out the context of the study and explains how and to whom the results are to be communicated. This is a key step and the ISO standards require that the goal and scope of an LCA be clearly defined and consistent with the intended application. The goal and scope document therefore includes technical details that guide subsequent work:

- the functional unit, which defines what precisely is being studied and quantifies the service delivered by the product system, providing a reference to which the inputs and outputs can be related. Further, the functional unit is an important basis that enables alternative goods, or services, to be compared and analyzed.
- the system boundaries;
- any assumptions and limitations;
- the allocation methods used to partition the environmental load of a process when several products or functions share the same process; and
- the impact categories chosen.

Life cycle inventory

Life Cycle Inventory (LCI) analysis involves creating an inventory of flows from and to nature for a product system. Inventory flows include inputs of water, energy, and raw materials, and releases to air, land, and water. To develop the inventory, a flow model of the technical system is constructed using data on inputs and outputs. The flow model is typically illustrated with a flow chart that includes the activities that are going to be assessed in the relevant supply chain and gives a clear picture of the technical system boundaries. The input and output data needed for the construction of the model are collected for all activities within the system boundary, including from the supply chain (referred to as inputs from the techno-sphere).
The data must be related to the functional unit defined in the goal and scope definition. Data can be presented in tables and some interpretations can be made already at this stage. The results of the inventory is an LCI which provides information about all inputs and outputs in the form of elementary flow to and from the environment from all the unit processes involved in the study.

Inventory flows can number in the hundreds depending on the system boundary. For product LCAs at either the generic (i.e., representative industry averages) or brand-specific level, that data is typically collected through survey questionnaires. At an industry level, care has to be taken to ensure that questionnaires are completed by a representative sample of producers, leaning toward neither the best nor the worst, and fully representing any regional differences due to energy use, material sourcing or other factors. The questionnaires cover the full range of inputs and outputs, typically aiming to account for 99% of the mass of a product, 99% of the energy used in its production and any environmentally sensitive flows, even if they fall within the 1% level of inputs.

One area where data access is likely to be difficult is flows from the technosphere. The technosphere is more simply defined as the man-made world. Considered by geologists as secondary resources, these resources are in theory 100% recyclable; however, in a practical sense the primary goal is salvage.\[^{11}\] For an LCI, these technosphere products (supply chain products) are those that have been produced by man and unfortunately those completing a questionnaire about a process which uses man-made product as a means to an end will be unable to specify how much of a given input they use. Typically, they will not have access to data concerning inputs and outputs for previous production processes of the product. The entity undertaking the LCA must then turn to secondary sources if it does not already have that data from its own previous studies. National databases or data sets that come with LCA-practitioner tools, or that can be readily accessed, are the usual sources for that information. Care must then be taken to ensure that the secondary data source properly reflects regional or national conditions.

**Life cycle impact assessment**

Inventory analysis is followed by impact assessment. This phase of LCA is aimed at evaluating the significance of potential environmental impacts based on the LCI flow results. Classical life cycle impact assessment (LCIA) consists of the following mandatory elements:

- selection of impact categories, category indicators, and characterization models;
- the classification stage, where the inventory parameters are sorted and assigned to specific impact categories; and
- impact measurement, where the categorized LCI flows are characterized, using one of many possible LCIA methodologies, into common equivalence units that are then summed to provide an overall impact category total.

In many LCAs, characterization concludes the LCIA analysis; this is also the last compulsory stage according to ISO 14044:2006. However, in addition to the above
mandatory LCIA steps, other optional LCIA elements – normalization, grouping, and weighting – may be conducted depending on the goal and scope of the LCA study. In normalization, the results of the impact categories from the study are usually compared with the total impacts in the region of interest, the U.S. for example. Grouping consists of sorting and possibly ranking the impact categories. During weighting, the different environmental impacts are weighted relative to each other so that they can then be summed to get a single number for the total environmental impact. ISO 14044:2006 generally advises against weighting, stating that “weighting, shall not be used in LCA studies intended to be used in comparative assertions intended to be disclosed to the public”. This advice is often ignored, resulting in comparisons that can reflect a high degree of subjectivity as a result of weighting.

**Interpretation**

Life Cycle Interpretation is a systematic technique to identify, quantify, check, and evaluate information from the results of the life cycle inventory and/or the life cycle impact assessment. The results from the inventory analysis and impact assessment are summarized during the interpretation phase. The outcome of the interpretation phase is a set of conclusions and recommendations for the study. According to ISO 14040:2006, the interpretation should include:

- identification of significant issues based on the results of the LCI and LCIA phases of an LCA;
- evaluation of the study considering completeness, sensitivity and consistency checks; and
- conclusions, limitations and recommendations.

A key purpose of performing life cycle interpretation is to determine the level of confidence in the final results and communicate them in a fair, complete, and accurate manner. Interpreting the results of an LCA is not as simple as "3 is better than 2, therefore Alternative A is the best choice"! Interpreting the results of an LCA starts with understanding the accuracy of the results, and ensuring they meet the goal of the study. This is accomplished by identifying the data elements that contribute significantly to each impact category, evaluating the sensitivity of these significant data elements, assessing the completeness and consistency of the study, and drawing conclusions and recommendations based on a clear understanding of how the LCA was conducted and the results were developed.

**SUSTAINABLE PRODUCTION AND ITS ROLE IN CSR AND CER**

Sustainability has been defined as the ability “to meet the needs of the present without promising the ability of future generations to meet their needs.” As regulatory pressures and societal demands for greater environmental and social responsibility have increased, sustainability has become a key focus for many organizations. A sustainable organization can be defined as an enterprise that simultaneously contributes economic, social and environmental benefits—known as the “triple bottom line”—to society while also
ensuring its own long-term sustainability as an organization. Sustainability is seen by many as increasingly essential to creating shareholder value, as investors and employees look to organizations to be good corporate citizens. There is an emerging business case that corporate performance, under the right conditions, can be enhanced in firms focused on sustainability. For example, a 2003 meta-analysis of research studies suggests that corporate virtue in the form of social and environmental responsibility is likely to pay off financially.

Corporate Social Responsibility is defined as the voluntary commitment of businesses to include in their corporate practices economic, social, and environmental criteria and actions, which are above and beyond legislative requirements and related to a broader range of stakeholders—everyone influenced by their activities.

When we speak of sustainability, I think it is important to make one thing clear: sustainable development is not the sole responsibility of business. It is useful to point that we can set realistic expectations, and so that people and organizations can move forward effectively. Issues of sustainable development for the planet, for agriculture, and for our industry go well beyond business. While business plays an important role, for sure, and will continue to be an important part of the solution, we are looking at systemic issues that will require active participation by a broad set of actors. Yet, there is a very clear role and reason for business to be a committed partner.

That widening of the circle certainly does not absolve business and in fact it does quite the contrary by defining specific roles and responsibilities for business, generally covered under the heading of Corporate Social Responsibility (CSR). CSR assigns a role for business, but places some realistic edges that allow businesses to continue engaging in
things that businesses do like growing their markets. The new demand on business is that it pursue those activities with a broader awareness of the system in which it operates, in other words with thoughtful consideration and meaningful action toward environmental and social issues.

More specifically, CSR is defined as the voluntary commitment of businesses to include in their corporate practices economic, social, and environmental criteria and actions, which are above and beyond legislative requirements and related to a broader range of stakeholders—everyone influenced by their activities. Often captured under the more accessible heading of people-planet-profit, the definition becomes crisper looking at the United Nation’s Global Compact, which asks companies to work within their sphere of influence toward human rights, labor rights, environmental responsibility, and anti-corruption. CSR is not about philanthropy, cause-related marketing, nor generalized attempts at going “green”. It is a business strategy and one that take time to evolve.

A comprehensive CSR program includes stakeholder analysis, comprehensive strategy design that includes workplace, marketplace, societal, and environmental dimensions, activation programs, and measuring and reporting. In simpler terms it is about:

- Understanding the context and issues within which you operate, making the best choices you can, and continually progressing your role (perspective).
- Maintaining the desire to do better as an organization (leadership).
- Establishing the structure/systems to ensure you have the intended impact (management).
- Leveraging activities to bring value to the organization (communication).

More than anything, it is about commitment and that can be a difficult thing to cultivate in a business. CSR is only just emerging as a precise activity and has much room to grow. Although the field of metrics has advanced significantly in recent years, it remains challenging to accurately measure impact. Businesses accustomed to sharp calculations of return on investment are, in some ways, being asked to take a leap of faith. Ideas of management control have to be reframed as collaborative solutions take hold. You have to want to be a better business, but even those who are resistant to CSR changes should find sufficient motivation in the supply chain. While the technical definition of CSR encompasses voluntary measures, we are quickly finding there is no other choice but to actively contribute.

**Climate Change** | This year, we once again witnessed the effects of erratic weather in coffee producing countries. Eleven days of non-stop torrential rains affected nearly 2 million people in Central America. El Salvador was hit hardest. Beyond the human toll, the storms did considerable damage to the incoming coffee crop. Recent reports from local traders suggest production may be down by an additional 30% due to weather. Over the past decade, there have been persistent disruptions to the supply chain attributed to weather, exacerbating challenges in an already strained supply chain.
Economic Sustainability | As Michael Sheridan and Warren Armstrong elucidate in this issue, the situation for smallholder producers is challenging. Because small-scale farmers produce the vast majority of coffee—89% in Ethiopia, nearly 100% in Rwanda, just as two examples—their challenges quickly become ours. A very real outcome of systemic poverty is migration away from farms. In less than a generation, we could see the foundation of our supply chain move elsewhere.

Social Issues | When farmers struggle, the surrounding communities can suffer, making access to basic education and healthcare services difficult. As communities strain, poverty becomes embedded in the genetic code and a more difficult cycle to escape. There are a number of contributing factors including birth rates, laws of ownership, and cultural norms that businesses can’t solve. However, it is definitely within business interests to seek solutions.

One illustrative example relates to gender equality. At the recent EAFCA conference, there were several discussions about the role of women in the supply chain. It is well accepted that women do the majority of work but tend to receive little economic reward. Thus, the people picking cherries have very little connection to the end result and therefore very little incentive to contribute to a quality harvest. Social issues intersect with the supply chain and again, while sustainable development is not the sole responsibility of business, its pursuit is strategically tied to its interests.

Business is a tremendous driver and can be a powerful agent of change, but it can’t fix the impossible. Businesses shouldn’t feel over-burdened by the call to address something as challenging and layered as systemic poverty, but they should absolutely recognize the relationship to its goals and commit to its role.
UNIT-III
INDICATORS OF SUSTAINABILITY

An indicator is something that helps you understand where you are, which way you are going and how far you are from where you want to be. A good indicator alerts you to a problem before it gets too bad and helps you recognize what needs to be done to fix the problem. Indicators of a sustainable community point to areas where the links between the economy, environment and society are weak. They allow you to see where the problem areas are and help show the way to fix those problems.

Indicators of sustainability are different from traditional indicators of economic, social, and environmental progress. Traditional indicators -- such as stockholder profits, asthma rates, and water quality -- measure changes in one part of a community as if they were entirely independent of the other parts. Sustainability indicators reflect the reality that the three different segments are very tightly interconnected, as shown in the figure below:

As this figure illustrates, the natural resource base provides the materials for production on which jobs and stockholder profits depend. Jobs affect the poverty rate and the poverty rate is related to crime. Air quality, water quality and materials used for production have an effect on health. They may also have an effect on stockholder profits: if a process requires clean water as an input, cleaning up poor quality water prior to processing is an extra expense, which reduces profits. Likewise, health problems, whether due to general air quality problems or exposure to toxic materials, have an effect on worker productivity and contribute to the rising costs of health insurance.
Sustainability requires this type of integrated view of the world -- it requires multidimensional indicators that show the links among a community's economy, environment, and society. For example, the Gross Domestic Product (GDP), a well-publicized traditional indicator, measures the amount of money being spent in a country. It is generally reported as a measure of the country's economic well-being: the more money being spent, the higher the GDP and the better the overall economic well-being is assumed to be. However, because GDP reflects only the amount of economic activity, regardless of the effect of that activity on the community's social and environmental health, GDP can go up when overall community health goes down. For example, when there is a ten-car pileup on the highway, the GDP goes up because of the money spent on medical fees and repair costs. On the other hand, if ten people decide not to buy cars and instead walk to work, their health and wealth may increase but the GDP goes down.

In contrast, a comparable sustainability indicator is the Index of Sustainable Economic Welfare. In order to get a more complete picture of what is economic progress, the ISEW subtracts from the GDP corrections for harmful bases or consequences of economic activity and adds to the GDP corrections for significant activities such as unpaid domestic labor. For instance, the ISEW accounts for air pollution by estimating the cost of damage per ton of five key air pollutants. It accounts for depletion of resources by estimating the cost to replace a barrel of oil equivalent with the same amount of energy from a renewable source. It estimates the cost of climate change due to greenhouse gas emissions per ton of emissions. The cost of ozone depletion is also calculated per ton of ozone depleting substance produced. Additionally, adjustments are made to reflect concern about unequal income distribution. The correction for unpaid domestic labor is based on the average domestic pay rate. Some health expenses are considered as not contributing to welfare, as well as some education expenses. (See Indicator Spotlight for more on the ISEW as a sustainability indicator.)

Like the GDP, the ISEW bundles together in one index tremendous amounts of information, but the key difference is that the information takes into account the links between environment, economy and society.

Indicators of sustainable community are useful to different communities for different reasons. For a healthy, vibrant community, indicators help monitor that health so that negative trends are caught and dealt with before they become a problem. For communities with economic, social, or environmental problems, indicators can point the way to a better future. For all communities, indicators can generate discussion among people with different backgrounds and viewpoints, and, in the process, help create a shared vision of what the community should be.
ECOSYSTEM SERVICES AND THEIR SUSTAINABLE USE

Ecosystem services are the benefits that humans derive from ecosystems. Recently, the importance of research into ecosystem services has been widely recognized, and many advances are being made in the field. Additionally, in recent decades, humans have been changing the world’s ecosystems more than ever before to satisfy growing demands for food, freshwater, timber, fiber, fuel and minerals. Ecosystems are being degraded and depleted, especially in urbanizing areas and other regions in which nature is being disturbed, such as where land with natural uses is being converted rapidly to human-dominated land uses. Therefore, research interest in the field of ecosystem services is rapidly increasing, and is likely to contribute significantly to the sustainable management of natural resources. A wide range of ecosystem services is required to satisfy current demands and changes. Some can be delivered by highly transformed ecosystems (such as fertile soil for intensive agriculture) while others depend on the maintenance of quasi-natural ecosystems (such as to ensure the steady supply of high-quality water).

The dynamics of an ecosystem are strongly affected by natural and human disturbances, and such changes can have direct and cascading effects on the spatial and temporal variations in the composition, structure, and processes of ecosystems. In developing countries, where short-term economic growth and social delivery are more important than conservation, placing a monetary value on ecosystem services is the only way to ensure intervention. The challenge is to ensure that these interventions are ecologically sustainability and fair, and efficient. Many assessment methods (both single-species and community-based methods) have been developed in the last century to quantify many ecological responses to disturbances. The concept of ecosystem services was introduced to promote a quantitative understanding of the use and management of natural resources. The Millennium Ecosystem Assessment Report (2005a) divides ecosystem services into four categories, which are supporting services (ecosystem and population processes), provisioning services (food, water, wood, fuel), regulating services (regulation of climate, water, disease and disturbance regimes) and cultural services (aesthetic and spiritual benefits, cultural identity, and recreation/tourism). This classification of ecosystem services can be used to develop a method for quantifying the responses of an ecosystem to various disturbances as well as the post-disturbance resilience. The results thus obtained will help in designing management policies and evaluating the effectiveness of management. Therefore, the critical objective of studies of ecosystem services is to improve our understanding of the sensitivities, response regimes and resilience of various categories of ecosystem services to a changing world, and thereby support the prediction and management of ecosystem change. Recently, the Global Land project report (GLP) (2005) mentioned that special attention must be paid to identify critical non-linearities (such as thresholds) and feedback loops in ecosystem responses that influence the resilience of ecosystems and their sustained capacity to deliver critical services.
Understanding of the embedded nature of trade-offs of ecosystem services is lacking. Assessments need to support efforts to resolve dilemmas and conflicts concerning ecosystem services, while promoting ecological sustainability and social fairness.

Sustainability science is motivated by fundamental questions about interactions between nature and society as well as compelling and urgent social needs. The purpose of sustainable development is to create and maintain prosperous social, economic and ecological systems. These systems are intimately linked with each other: humanity depends on services that are provided by ecosystems for wealth and security. Humanity receives various ecosystem services, including clean water and air, food, fuel, and others. Additionally, human beings can transform ecosystems to make their living conditions comfortable. Therefore, the concept of ecosystem service and their value can be a useful guide when distinguishing and measuring where trade-offs between society and the rest of nature are possible and where they can be made to enhance human welfare in a sustainable manner.

Many researchers have provided agendas for studying ecosystem services studies and implementing their findings. Kremen discussed essential questions and critical in four areas, which were (1) identifying the providers of important ecosystem services; (2) determining the various aspects of community structure that influence (the function of ecosystems in real landscapes, and especially compensatory community responses that stabilize that function, or non-random extinction sequences that rapidly erode it; (3) evaluating the effect of key environmental factors on the provision of services, and (4) measuring the spatio-temporal scale over which providers and services operate.

Egoh et al. noted that ecosystem services affect the implementation of conservation plans in many ways:

(1) Payments for ecosystem services are potentially an effective means of ensuring that important aspects of the ecosystem are preserved.

(2) Services have beneficiaries, facilitating the implementation of conservation plans.

(3) Targeting services in conservation evaluations may help to meet many biodiversity targets in an easy-to-sell manner while simultaneously improving the connection between conservation plans and human well-being.

Recently, Nicholoson et al. proposed the following research agenda in some detail and identified four priority areas in which further research in ecosystem services is urgently required.

(1) Agendas: the ethical and economic frameworks for defining the values those are derived from ecosystem services and for evaluating trade-offs among those values.
(2) Processes: the interactions between socio-economic and ecological systems, among multiple ecosystem services, and among the ecological processes that underlie the provision of ecosystem services.

(3) Metrics: the quantification of the value that is provided by ecosystem services and processes for evaluating those services and detecting trends.

(4) Uncertainty: identifying sources of uncertainty, reducing uncertainty, and making decisions in the face of uncertainty.

Concepts associated with ecosystem services should be integrated into land use planning for maintaining sustainable ecosystem services in a changing world. Recently, de Groot et al. showed that important research questions must be answered to improve the consideration of ecosystem services in landscape planning, management and decision-making.

For understanding how ecosystems provide services and quantifying relevant variables have listed as following.

(1) What is the state-of-the-art typology of ecosystem services?

(2) How can the relationships between the characteristics of a landscape and ecosystem and their associated functions and services be quantified?

(3) What are the main indicators and benchmarks for measuring the capacity of an ecosystem to provide services (and what are the maximum sustainable levels of use)?

(4) How can ecosystem/landscape functions and services be spatially defined (mapped) and visualized?

(5) How can relationships between the characteristics of, and services provided by, the ecosystem and landscape, as well as their relevant dynamic interactions, be modeled?

(6) What are the effects of (changes in) the (temporal and spatial) dynamic conditions of landscape functions on services, in terms of both sustainability and resilience? Do critical thresholds exist?

The world is changing rapidly, and current trends do not point to a clear future. Ecosystem services, which are the benefits that people gain from ecosystems, are essential to human existence, but demands for those services often surpass the capacity of ecosystems to provide them. Addressing ecosystem services is essential for sustainable development. However, a lack of ecological information frequently precludes informed decision-making that involves ecosystem services. Therefore, to help in management efforts, ecological information about the dynamics of these systems must be made
available to decision makers in a usable form and in a timely manner. Additionally, important areas of ecosystem services that are important to maintaining the components and functions of ecosystems that provide ecosystem services in a changing world must be carefully managed to secure the current and future provision of ecosystem services. Therefore, a major research effort is now being undertaken to quantify, value and manage ecosystem services that may inform fundamental changes in society’s approach to the environment. Additionally, research to quantify ecosystem services to support decision-makers and stakeholders may also provide useful and fundamental knowledge that will support the maintenance of the sustainability of those services, as well as further planning and management of natural resources to deliver sustainable benefits to human beings. However, a major challenge for future research remains the incorporation of dynamic processes in the model, including potential regime shifts of ecosystems. For the purposes of policy-making and planning, information on the degree of sustainability of management systems is important. Sustainability refers to the use of desired ecosystem services without a long-term decline in biodiversity, supporting the future use of the ecosystem. Nature-conservation and conservation management strategies are now widely recognized not necessarily to involve a trade-off between “the environment” and “development” but to require investments in the conservation, restoration and sustainable use of ecosystems to provide substantial ecological, social and economic benefits.

**BIO-DIVERSITY**

It is a measure of the variety of organisms present in different ecosystems. This can refer to genetic variation, ecosystem variation, or species variation (number of species) within an area, biome, or planet.

**Biodiversity**, a contraction of "biological diversity," generally refers to the variety and variability of life on Earth. One of the most widely used definitions defines it in terms of the variability within species, between species, and between ecosystems. It is a measure of the variety of organisms present in different ecosystems. This can refer to genetic variation, ecosystem variation, or species variation (number of species) within an area, biome, or planet. Terrestrial biodiversity tends to be greater near the equator, which seems to be the result of the warm climate and high primary productivity. Biodiversity is not distributed evenly on Earth. It is richest in the tropics. Marine biodiversity tends to be highest along coasts in the Western Pacific, where sea surface temperature is highest and in the mid-latitude band in all oceans. There are latitudinal gradients in species diversity. Biodiversity generally tends to cluster in hotspots, and has been increasing through time, but will be likely to slow in the future.

The number and variety of plants, animals and other organisms that exist is known as biodiversity. It is an essential component of nature and it ensures the survival of human species by providing food, fuel, shelter, medicines and other resources to mankind. The richness of biodiversity depends on the climatic conditions and area of the region. All species of plants taken together are known as flora and about 70,000 species of plants are
known till date. All species of animals taken together are known as fauna which includes birds, mammals, fish, reptiles, insects, crustaceans, molluscs, etc.

Rapid environmental changes typically cause mass extinctions. More than 99 percent of all species, amounting to over five billion species, that ever lived on Earth are estimated to be extinct. Estimates on the number of Earth's current species range from 10 million to 14 million, of which about 1.2 million have been documented and over 86 percent have not yet been described. The total amount of related DNA base pairs on Earth is estimated at $5.0 \times 10^{37}$, and weighs 50 billion tonnes. In comparison, the total mass of the biosphere has been estimated to be as much as 4 $\text{TtC}$ (trillion tons of carbon).

The age of the Earth is about 4.54 billion years old. The earliest undisputed evidence of life on Earth dates at least from 3.5 billion years ago, during the Eoarchean Era after a geological crust started to solidify following the earlier molten Hadean Eon. There are microbial mat fossils found in 3.48 billion-year-old sandstone discovered in Western Australia. Other early physical evidence of a biogenic substance is graphite in 3.7 billion-year-old meta-sedimentary rocks discovered in Western Greenland. More recently, in 2015, "remains of biotic life" were found in 4.1 billion-year-old rocks in Western Australia. According to one of the researchers, "If life arose relatively quickly on Earth .. then it could be common in the universe."

Since life began on Earth, five major mass extinctions and several minor events have led to large and sudden drops in biodiversity. The Phanerozoic eon (the last 540 million years) marked a rapid growth in biodiversity via the Cambrian explosion—a period during which the majority of multicellular phyla first appeared. The next 400 million years included repeated, massive biodiversity losses classified as mass extinction events. In the Carboniferous, rainforest collapse led to a great loss of plant and animal life. The Permian–Triassic extinction event, 251 million years ago, was the worst; vertebrate recovery took 30 million years. The most recent, the Cretaceous–Paleogene extinction event, occurred 65 million years ago and has often attracted more attention than others because it resulted in the extinction of the dinosaurs.

The period since the emergence of humans has displayed an ongoing biodiversity reduction and an accompanying loss of genetic diversity. Named the Holocene extinction, the reduction is caused primarily by human impacts, particularly habitat destruction. Conversely, biodiversity impacts human health in a number of ways, both positively and negatively.
INDIAN PERSPECTIVE, ALTERNATIVE THEORIES

Definition of green business

The term ‘green businesses’ is defined by Smith (2003: 1) and Friend (2009: 5) as businesses and practices that are viewed as environmentally sound, including the use of organic and natural products to build factories, tighter protection against emissions and environmentally friendly sourcing of materials. Zsolnai (2002: 656) defines a green business as a business that has adopted the concept of environmentalism across the various functions of the business. Gilbert (2007: 1) identifies a green business activity as any activity that is performed in a manner that has either limited negative ecological impact or directly benefits the natural environment in some way.

Morebusiness.com (2009) describes a green business as using less natural resources to complete the tasks needed and using sustainable methods and materials such as recycling (paper, plastic, electronics, glass and aluminium) and using sustainable products (recycled, plant-based or organically grown).

Impact of green practice implementation on the business functions

The effect of green business practices requires an in-depth knowledge of client requirements together with the ability to satisfy these requirements while contributing to environmental sustainability. Managers need to develop systems and structures within their business that satisfy the requirements of green business practices while still achieving strategic business goals. Various authors (for example, Bized 2010: 1; Bosch, Tait & Venter 2006: 32; Ghorpade 2004: 235; Seese, Reinhardt & Schlottmann 2008: v) use different classifications for the business functions. These classifications assisted the researchers in grouping the functions into six logical groups so as to eliminate duplication of activities, as well as to simplify the analysis of the empirical results. The functions were grouped as follows: manufacturing/operations; marketing/sales; purchasing/supply chain management; distribution/logistics; finance/information technology; and general management/human resources.
UNIT-IV
ENVIRONMENTAL REPORTING AND ISO 14001

CLIMATE CHANGE BUSINESS AND ISO 14064

What is ISO 14064?

ISO 14064 is an international standard against which GHG emissions reports are voluntarily verified. In parallel with the emergence of regulated or mandatory schemes relating to monitoring, reporting and verification of Greenhouse Gases (GHG), organisations outside of these schemes are now increasingly wishing to monitor and report their emissions (commonly referred to as the organisation’s carbon footprint). In response to this demand and to provide an international standard against which such reports can be voluntarily verified, ISO 14064 has been developed.

What does ISO 14064 Greenhouse Gas Emissions do?

ISO 14064 has been prepared in three parts:

- Part 1 details the principles and requirements for designing, developing, managing and reporting organisation level GHG inventories. It includes requirements for determining boundaries, quantifying emissions and removals, and identifying specific company actions or activities aimed at improving GHG management. It also includes requirements and guidance on quality management of the GHG inventory, reporting, internal auditing and the organisation's responsibilities for verification.
- Part 2 focuses on GHG projects or projects specifically designed to reduce GHG emissions or increase GHG removals. It includes principles and requirements for determining project baseline scenarios and for monitoring, quantifying and reporting project performance relative to that baseline and provides the basis for GHG projects to be validated and verified.
- Part 3 provides principles, requirements and guidance for those conducting GHG information validation and verification. It describes a process for providing assurance to intended users that an organisation's or project's GHG assertions are complete, accurate, consistent, transparent and without material discrepancies.

ISO 14064 benefits

ISO 14064 certification helps to deliver:

- Stakeholder engagement.
- Credibility and trust.
- Robust monitoring progress.
- Demonstrable commitment to reducing GHG emissions.
LRQA is at the leading edge of GHG verification services across a range of sectors and schemes world-wide. This places LRQA in a prime position to share experience and expertise to help clients manage their GHG data gathering, monitoring and reporting and gain robust third party verifications of their assertions.

LRQA have experience of validation and verification within both voluntary mechanisms such as ISO 14064 and the Japanese Voluntary Emissions Trading Scheme and regulated schemes at a national level such as the UK Emissions Trading Scheme, at regional level such as the EU Emissions Trading Scheme and at international level such as the UNFCCC Clean Development Mechanism (CDM) and Joint Implementation. LRQA also have experience within other relevant areas of corporate report verification, including Corporate Sustainability and/or Environmental Reports.

Standards

Enormous economic and population growth worldwide in the second half of the twentieth century aggravated the factors that threaten health and the world — ozone depletion, climate change, depletion, fouling of natural resources, and extensive loss of biodiversity and habitat. In the past, the standard approaches to environmental problems generated by business and industry have been regulatory-driven "end-of-the-pipe" remediation efforts. In the 1990s, efforts by governments, NGOs, corporations, and investors began to grow substantially to develop awareness and plans for investment in business sustainability.

One critical milestone was the establishment of the ISO 14000 standards whose development came as a result of the Rio Summit on the Environment held in 1992. ISO 14001 is the cornerstone standard of the ISO 14000 series. It specifies a framework of control for an Environmental Management System against which an organization can be certified by a third party. Other ISO 14000 Series Standards are actually guidelines, many to help you achieve registration to ISO 14001. They include the following:

- ISO 14004 provides guidance on the development and implementation of environmental management systems
- ISO 14010 provides general principles of environmental auditing (now superseded by ISO 19011)
- ISO 14011 provides specific guidance on audit an environmental management system (now superseded by ISO 19011)
- ISO 14012 provides guidance on qualification criteria for environmental auditors and lead auditors (now superseded by ISO 19011)
- ISO 14013/5 provides audit program review and assessment material.
- ISO 14020+ labeling issues
- ISO 14030+ provides guidance on performance targets and monitoring within an Environmental Management System
- ISO 14040+ covers life cycle issues.
GREEN FINANCING

Soaring energy needs, volatile oil prices and an increased focus on curbing global warming have spurred investments in clean energy, or “green financing,” in the last few years. Indeed, the PEW Charitable Trusts remarked the dawning of a new worldwide industry – clean energy – in 2005, when governments, financial institutions, investors and businesses started pouring money into technologies that would help the world address its energy requirements with a minimal impact on the environment.

Green financing – a roller coaster ride so far

Experiencing more than a 200% increase in growth since 2005, investments in clean energy received a setback in late 2008-09, owing to the global financial crisis. However, 2010 broke all records – at $243 billion, investments were double the figure in 2006 and nearly five times that from 2004. Marking a complete turnaround from the recession hit low of 2009, the main drivers of the rapid growth were China with an investment jump of 30% – the single largest for any country, European offshore wind and solar projects and an increased focus on research and development (R&D).

Asset finance continued to dominate the scene with investments in utility scale projects such as wind farms, solar parks and biofuel plants rising 19% to $127.8 billion. Venture capital and private equity investment also had a strong year, up 28% from 2009 to reach $8.8bn, while public market investment bounced back from the recession driven lows in 2008 and 2009, up 18% to $17.4bn in 2010.

In fact, bolstered by such strong growth figures, a question that begs to be asked is whether 2010 was a flash in the pan or the beginning of a solid, sustainable growth.

The growing energy challenge – particularly in Asia – will lead and sustain future growth in clean energy investments

As long as the world’s energy needs keep growing at a feverish pace, the future outlook of clean energy investments will continue to burn brightly. According to projections by the International Energy Agency (IEA), in the absence of an overhaul of regulatory policies by governments worldwide, demand for primary energy will increase by 40% between now and 2030. Non-OECD countries will account for over 90% of this increase, and China and India together for over half.

According to the Chinese government’s forecasts, the country’s demand for electricity is expected to double by 2020; with the IEA estimating that China will pass the United States around 2025, becoming the world’s biggest spender on oil and gas imports to meet its burgeoning energy needs. No wonder, already in 2009, China replaced the United States to emerge as the leader in clean energy finance and investments for the first time.
This trend is only expected to continue with China leading the way in attracting clean energy investments in the near future. Along with China, India, Japan and South Korea will account for the lion’s share of investments in 2020 with the Americas and Europe trailing. While the United States will lose its leadership position, it does maintain the potential to attract $342 billion in private clean energy investments over the next decade. Similarly, given its early leadership in clean energy development, the European marketplace is expected to mature, with growth opportunities strongest in Southern Europe and offshore wind.

**Financing the green movement**

One of the main drivers of the unprecedented growth we saw in clean energy investments in 2010 was the direct result of government intervention. To combat the slowdown, governments were quick to create incentives to encourage activity in the space – whether this was in the form of cheap debt in China, feed in tariffs for solar projects in Europe or a more concerted push towards smart grids and other smart technologies such as electric vehicles, countries with more well-defined policies leapt to the front of the race.

Going forward, the future trajectory of investments in clean power projects will be determined by the strength of policies adopted by G-20 countries. In fact, according to a recent report brought out by the PEW Environment Group, if clean energy policies are strengthened significantly in the coming years, as much as $2.3 trillion stands to be invested in clean power assets over the next 10 years.

The on-ground situation already seems to reflect a certain enthusiasm for clean energy investments. Mercer, a global consulting firm, states in a report entitled “Top Investment Trends of 2011” that across markets, environmental, social and governance factors are increasingly being integrated into investment decision making today. Furthermore, climate change is becoming a driver of investment risk mitigation and opportunity, with investors directing capital to “sustainable” themed investments such as renewable energy and cleantech.

**Realizing the twin goals of growth and sustainability**

Whichever way you look at it: green financing offers the right answers to the challenges of rising global energy demand, limiting the use of fossil fuel and depletion of natural resources. By tapping renewable energy sources and other environmentally-friendly technologies, it not only facilitates sustainable socio-economic growth but also offers an attractive opportunity to investors around the world. Increasing environmental consciousness across the globe and government support will keep the spotlight on clean energy, driving it into the mainstream in the foreseeable future.

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FINANCING INITIATIVE BY UNEP

Founded in 1992 in the context of the Earth Summit in Rio, and based in Geneva, Switzerland, the United Nations Environment Programme Finance Initiative (UNEP FI) was established as a platform associating the United Nations and the financial sector globally. The need for this unique United Nations partnership arose from the growing recognition of the links between finance and Environmental, Social and Governance (ESG) challenges, and the role financial institutions could play for a more sustainable world.

UNEP FI is continuously building its membership, and works closely with over 200 members, who have signed the UNEP FI Statement of Commitment. The membership is made up of public and private financial institutions from around the world and is balanced between developed and developing countries. They recognize sustainability as part of a collective responsibility and support approaches to anticipate and prevent potential negative impacts on the environment and society.

Banking, insurance and investment, the three main sectors of finance, are represented and brought together in this unique partnership. In addition, UNEP FI develops selective collaborations, UN-driven and finance sector-driven, with other partner organizations, in order to increase awareness and raise support for critical activities. UNEP FI contributes the perspectives of financial institutions to the various United Nations and global activities on sustainable finance.

The Initiative's work includes:

• Capacity building and the sharing of best practices;

• Pioneering research and tools;

• Setting global standards and principles;

• Engaging stakeholders, both public and private;
• Facilitating the networking of members and stakeholders through global events and regional activities.

UNEP's cross-cutting themes are embedded throughout UNEP FI's activities, specifically in its thematic work areas of Climate Change, Ecosystems Management, Energy Efficiency and Social Issues.

UNEP FI has contributed to the launch of the Principles for Responsible Investment (PRI) and has developed the Principles for Sustainable Insurance (PSI).

**Mission Statement**

UNEP FI’s mission is to bring about systemic change in finance to support a sustainable world, and is highlighted in its motto, Changing finance, financing change.

**Motto**

Its motto *Changing finance, financing change* reflects a vision of a sustainable world economy that needs to be supported by a sustainable financial system.

*Changing finance*: promoting the integration of sustainability concerns into mainstream financial system, and financial institutions’ operations and decisions in all markets, as well as in their general business and governance.

*Financing change*: mobilizing finance to foster a more sustainable economy.

**GREEN ENERGY MANAGEMENT**

**Energy management** includes planning and operation of energy production and energy consumption units. Objectives are resource conservation, climate protection and cost savings, while the users have permanent access to the energy they need. It is connected closely to environmental management, production management, logistics and other established business functions. The VDI-Guideline 4602 released a definition which includes the economic dimension: “Energy management is the proactive, organized and systematic coordination of procurement, conversion, distribution and use of energy to meet the requirements, taking into account environmental and economic objectives”.[11]

**Organizational integration**

It is important to integrate the energy management in the organizational structure, so that the energy management can be implemented. Responsibilities and the interaction of the decision makers should be regularized. The delegation of functions and competencies extend from the top management to the executive worker. Furthermore, a comprehensive coordination can ensure the fulfillment of the tasks.
It is advisable to establish a separate organizational unit “energy management” in large or energy-intensive companies. This unit supports the senior management and keeps track. It depends on the basic form of the organizational structure, where this unit is connected. In case of a functional organization the unit is located directly between the first (CEO) and the second hierarchical level (corporate functions such as production, procurement, marketing). In a divisional organization, there should be a central and several sector-specific energy management units. So the diverse needs of the individual sectors and the coordination between the branches and the head office can be fulfilled. In a matrix organization the energy management can be included as a matrix function and thus approach most functions directly.

Production planning and control

Usually, production is the area with the largest energy consumption within an organization. Therefore also the production planning and control becomes very important. It deals with the operational, temporal, quantitative and spatial planning, control and management of all processes that are necessary in the production of goods and commodities. The "production planner" should plan the production processes so that they operate on an energy efficient way. For example, strong power consumer can be moved into the night time. Peaks should be avoided for the benefit of a unified load profile.

The impending changes in the structure of energy production require an increasing demand for storage capacity. The Production planning and control has to deal with the problem of limited storability of energy. In principle there is the possibility to store energy electrically, mechanically or chemically. Another trend-setting technology is lithium-based electrochemical storage, which can be used in electric vehicles or as an option to control the power grid. The German Federal Ministry of Economics and Technology realized the significance of this topic and established an initiative with the aim to promote technological breakthroughs and support the rapid introduction of new energy storage.[12]

Maintenance

Maintenance is the combination of all technical and administrative actions, including supervision actions, intended to retain an item in, or restore it to, a state in which it can perform a required function.[13] Detailed maintenance is essential to support the energy management. Hereby power losses and cost increases can be avoided.[14]

Energy management challenge

Through the energy efficiency it management is remain the key for the any industrial user across globe, to achieve the energy management goal for the federal government or industry the efficiency of water and energy resources play a vital role

Examples of how it is possible to save energy and costs with the help of maintenance:
- Defrost the fridges
- Check the barometer of cars and trucks
- Insulation of hot systems
- Improve leaks in building envelopes

GREEN PRODUCT MANAGEMENT

GPMS industrial standard

This is the proposed standards in response to the EU environmental directives for the E&E products. The Green Product Management System — Requirements for Hazardous Substance Process Management (GPMS-HSPM) is included within the G Plan program. The function of which is to provide to the enterprises a reference in establishing internal management system. The GPMS can be also served as the criteria for the second and third party certification. After collecting opinions and requirements from the major productions systems in Taiwan, primary plants and suppliers for the components and materials, and the viewpoints of the various independent certification entities, the GPMS, having included the primary structure of ISO 9001:2000 quality management, has been compiled by integrating ISO 14001:2004, QC 080000 (IECQ HSPM was formerly the EIA ECCB-954), and specifications required by the international vendors to the suppliers.

GPMS standard benefits

Based on the EU 2002/96/EC WEEE directives and the 2002/95/EC RoHS directives, this standard is expected to satisfy the identification, control, management of the green products and the requirements of non-hazardous operations. The testing and analyses of the non-hazardous materials are also regulated. It is wished that the relevant promotion and training would become the common practice in Taiwan and that it would be beneficial in assisting vendors to build up their own management systems that could be adapted as the certification guidelines. Moreover, the GPMS would be synchronized with international standards and be recognized in the international market.

Green Products and Services

Green Product Liability

Regarding product safety, UMC poses no direct potential threats to its customers or the general public since UMC does not have its own end products. However, to ensure that products provided to customers meet international standards and customer requirements, UMC established a cross-divisional HSPM committee to improve the efficacy of green product management. We have completed third-party QC080000 IECQ certification for management of hazardous substances to ensure that UMC provides products that conform with RoHS directives and customers’ requirements.
Hazardous Substance Management

In June 2006, UMC completed Hazardous Substance Process Management (HSPM) and has received IECQ-QC080000 qualification, making UMC the first semiconductor manufacturer in the world to achieve QC080000 HSPM for all fabs. The QC080000 IECQ HSPM standard is based on the "flow orientation" measure to manage the use of hazardous substances, which covers the stages from design and development, procurement, and manufacturing to shipment. The success of this system demonstrates UMC's capability in managing hazardous substances and ensures UMC provides environmental friendly products that are free of hazardous substances that conform to customers' requirements and international regulations.

Green Procurement Process of Raw Materials

Hazardous substances control is also applied to material merchandising. All materials that violate the control will be deemed as disqualified products and returned to the suppliers, who are then required to provide correction and prevention measures.

Constructed a New System for Evaluating Raw Materials

To effectively manage new materials used in newly developed manufacturing, UMC has constructed a sound process for evaluating new materials to determine if they are banned/controlled toxic or hazardous substances and fully determine their impact on environmental safety and health.

Hazardous Materials Replacement Program

UMC has plans to phase out hazardous raw materials through replacement programs to reduce the impact of chemicals to the environment. The target substances are chosen based on international environmental protection trends, government laws and regulations, and customer requirements.
In 2013, PFOS-containing raw materials were replaced by other substances, which represents a replacement rate of over 99%. In the first quarter of 2015, UMC has abolished using raw materials containing PFOS processing.

The use of PFOA has been abandoned for new products since 2011. Meanwhile, UMC has started an evaluation plan in an attempt to replace PFOA with existing materials. PFOA will be completely phased out once the replacement technology finishes verification.

**CMR Substance Management**

UMC started to promote CMR Substance Management in 2011, with the following key focus areas:

1. Continue researching and testing substitute gasses in semiconductor thin film process to lower the emission volume of greenhouse gasses.
2. Conduct inventory on existing chemicals in use and place Category 1 of CMR under control. UMC will identify departments that use such substance and establish plans to improve the usage.
3. On the regulation of newly adopted CMR substances, in principle, use of category 1A is abandoned and use of category 1B requires protection measures.

**Life Cycle Assessment, LCA**

LCA is a tool to improve products and the manufacturing process and reduce pollution. It helps decision makers to become involved with more environmental aspects. The steps to conduct LCA include: Scope Definition, Inventory Analysis, Impact Assessment, and Result Interpretation. In 2005, UMC authorized the Industrial Technology Research Institute (ITRI) to implement a Life Cycle Assessment in each fab.

The results of such an assessment would help UMC to meet the Ecological Design Directive (ErP Directive) vis-à-vis its products, understand the impact on the environment caused by customer products manufactured at UMC, and develop improvement plans. From raw silicon to chips, investigations were conducted targeting energy consumption, materials, and pollutants of each customer product. Through the evaluation of the environmental impact on the entire supply chain and manufacturing processes, the impact on the environment resulting from products is clarified and the result of evaluations is used as a reference for the environmental management system. The assessment results are open to the public and can be provided for reference upon customer request. According to inventory results, environmental impact is greater from manufacturing rather than from suppliers. As a result, UMC continues to improve its processes, reduce resource consumption and bulk materials, with the goal of minimizing environmental impact over time.
Carbon Footprint

Although UMC is not an end product manufacturer, it strives to help customers to produce green products with high quality and achieve environmental sustainability and coexistence. In order to establish the basis for UMC to further promote green products, green manufacturing processes and green design, UMC has actively implemented the Total Carbon Management Project, internal GHG emission inventory and verification, and Carbon Footprint Inventory Plan.

In the carbon footprint inventory process, UMC used product Life Cycle Assessment (LCA) to assess the greenhouse gas emissions of the primary material silicon, from refining and manufacturing through production. In addition to Scopes 1 and 2 of the inventory process, Scope 3 -- Other Indirect GHG Emissions, measures emissions from the supply chain, employee business travel, product use and disposal. External waste distribution/logistics, etc., were also measured. The major contributors of Scope 3 GHG emissions come from the supply chain.

UMC completed the foundry industry’s first reported carbon footprint and EPD (Environmental Production Declaration) verification for integrated circuit wafers produced at its facilities in 2009. Follow-up for the whole company continued in subsequent years.

UMC conducted carbon footprint inventory on its 300mm wafers at the company's Fab 12A according to international carbon footprint standard PAS2050/ISO14067(CD) in 2010.

All UMC facilities completed carbon footprint inventory in 2013. The company will build upon this achievement to help enhance the entire supply chain by vigorously implementing green supply chain programs and helping customers to produce green products that have lower impact on the environment based on Carbon footprint and EPD (Environmental Production Declaration). In 2014, the carbon footprint was promoted according to the UMC LCA-to-go Project implementation content.
Water Footprint Verification

In 2010, UMC completed verification of product water footprint for its 8" and 12" IC wafer inventory. UMC's water footprint results will act as a future basis for optimization of water resource utilization. Also, we found that water used directly in the company's manufacturing processes at the current stage is greater than in the indirect supply chain, and the proportion of grey water is high. Therefore, UMC will take water footprint verification into consideration for any new fabs built. Through gathering data on the water usage impact of suppliers throughout the supply chain, we plan to collaborate on increasing the efficient use of water resources and join forces in water conservation and protecting the earth we live in.

UMC completed water inventory and verification in 2014. We will continue to carry out the task in the future to track the effectiveness of our water conservation measures.

SONY Green Partner

UMC became a Sony Green Partner in 2003, and passed and maintained qualification since then. These actions demonstrate that UMC's progress in hazardous substance management has gained recognition from our customers.

LCA to go project

The European market is one of the important markets for UMC. It's an advanced area with regard to the development of green measures. We are honored to participate in FP-7 as it gave us the chance to invest efforts in developing and establishing green measurement. Joining this project improved our ability to inventory and predict CFP, thus enhancing our foundry service to customers by providing them with specific CFP information. The simplified LCA tool that we developed could help SMEs quickly obtain CFP without incurring high costs.

To fulfill its duties as a global and corporate citizen, UMC has made efforts to promote carbon disclosure with significant investment of financial and human resources. With the help from Industrial Technology Research Institute (ITRI), in 2010 UMC became an official member of the FP7. We started working with 18 teams from 9 member organizations from industry, government and academia to jointly develop "Boosting Life Cycle Assessment use in SMEs: development of sectoral methods and tools." With extensive experience in carbon footprint and robust supply chains, UMC led the case study for carbon footprint tool applications for the semiconductor industry to build a "carbon footprint calculator" that includes a simple universal calculation method. With UMC's carbon footprint experience and the support of supply chain partners, our collaboration with the EU in green technology provides small and medium enterprises in Taiwan with comprehensive, tailored, low carbon services. We also help them acquire information on their products' carbon footprint with minimal time and resources to reduce negative impact from green trade barriers. At the same time, the results of the "LCA to go" project will promote carbon reduction and raise low-carbon competitiveness for the
industry. With considerable efforts in recent years, UMC has achieved international standards in terms of green technology development and received wide recognition among different EU sectors.
UNIT-V
GREEN TECHNIQUES AND METHODS

GREEN TAX INCENTIVES AND REBATES

Energy-efficient commercial business deduction (Section 179D)

Businesses can deduct up to $1.80 per square foot of space in new or existing buildings where they install interior lighting, HVAC or hot water systems, or building envelope property that reduces power use to 50 percent compared to a reference building. A $0.60 per square foot deduction is available for certain lesser reductions. Certification is required and the provision expires for property placed in service after 2013. If the property is installed in government property, the deduction can be allocated to the person responsible for designing it.

Business energy investment tax credit (Section 48)

Provides taxpayers a 10 percent or 30 percent credit for alternative energy property designed to generate power for the taxpayer’s own use. The recently passed stimulus bill also allows businesses to apply to the IRS to take this credit as a grant, allowing the incentive to benefit for-profit businesses regardless of their tax situation. Property qualifying for the 30 percent credit includes the following:

- Qualified fuel cell property that generates electricity
- Solar property used to generate electricity, for heating or cooling, or to provide solar process heat (10 percent credit after 2016)
- Solar property used to illuminate a building using fiber optic distributed sunlight (expires after 2016)

- Qualified small wind turbines Property qualifying for the 10 percent credit includes the following:

  - Equipment for producing or distributing geothermal energy
  - Qualified micro turbines (small combustion turbines)
  - Combined heat and power systems
  - Equipment that uses the ground or ground water to heat or cool a structure (expires after 2016)

vehicle credits (Section 30B and 30D)

Sections 30B and 30D provide a variety of significant credits to encourage taxpayers to produce and buy alternative and fuel-efficient vehicles. The credits are available at the time of purchase to individuals and businesses.
If a qualifying vehicle is purchased by a tax-exempt entity, the credit may be claimed by the seller. The incentives range from a few hundred dollars to up to $40,000 for the heaviest vehicles such as buses. The amount depends on the type of vehicle and its specifications, and there are various phases -outs depending on the date of purchase and how many vehicles have been sold. So the credit amount will vary according to the make and model of each vehicle purchased. Credits are currently available for the following:

• Fuel cell vehicles  
• Hybrids and heavy hybrids  
• Advanced lean burn vehicles  
• Plug-in hybrids, including three-wheeled vehicles, motorcycles and slow-moving vehicles  
• Alternative fuel vehicles such trucks and buses that run on natural gas

**Alternative refueling property credit (Section 30C)**

Section 30C provides a 50 percent credit (30 percent for hydrogen) of up to $50,000 ($200,000 or hydrogen) for installing qualified clean-fuel vehicle refueling property to be used in a trade or business.

Clean-burning fuels are at least 85 percent composed of ethanol, natural gas, compressed natural gas, liquefied natural gas, liquefied petroleum gas or hydrogen — or any mixture of biodiesel and diesel fuel containing at least 20 percent biodiesel.

**Qualified reuse and recycling property (Section 168(m))**

Businesses can take the equivalent of bonus depreciation for qualified reuse and recycling property that otherwise would not qualify for bonus depreciation. Qualified property reuse and recycling property is machinery or equipment, other than rolling stock, that is used exclusively to collect, distribute or recycle qualified reuse and recyclable materials. It also includes software necessary to operate such equipment.

**Fringe benefits for employees (Section 132)**

There are two new “green” provisions allowing increased fringe benefits. Fringe benefits provided to employees are not taxed as income, even if the employer offers the employee a choice between cash compensation and the fringe benefit.

• Bicycle commuters are now allowed a $20 per month fringe benefit exclusion.
• The fringe benefit exclusion for transit is increased from $120 to $230 in 2010.

**Incentives for specific manufacturers and developers Energy -efficient appliance credit (Section 45M)**

Section 45M provides manufacturers of appliances a credit for the production of energy-efficient clothes washers ($150–$250), dishwashers ($75) and refrigerators ($10 0–$200).
Energy-efficient new homes credit (Section 45L)

Section 45L expired at the end of 2009, but legislative proposals under consideration in Congress would retroactively extend it for 2010. It would provide homebuilders and developers a credit of up to $2,000 for newly constructed homes that meet certain energy-efficiency standards.

Renewable bio-fuels (Sections 40 and 40A)

Sections 40 and 40A provide incentives to encourage growers and producers to create renewable fuels from biological sources. Section 40 provides:
• $0.60 per gallon credit for alcohol fuel other than ethanol;
• $0.45 per gallon credit for traditional ethanol, such as ethanol produced from corn, with an extra $0.10 for small producers; and
• $1.01 per gallon credit for ethanol produced from cellulosic sources such as switchgrass.

Section 40A expired at the end of 2009, but legislative proposals under consideration in Congress would retroactively extend it for 2010. It provides a $1.00 per gallon credit for qualifying biodiesel, agridiesel, and renewable diesel, plus an extra $0.10 for small producers.

Incentives geared to energy industry

Renewable electricity production credit (Section 45)

Section 45 provides a perkW credit for producing and selling electricity from renewable sources such as wind, solar, hydro, geothermal and biomass. Typically, it is used by the utility industry, but it is also used by some manufacturers and businesses that produce excess electricity from renewable sources and sell it back to the grid. Taxpayers who place property in service that would qualify for this credit from 2009 to 2013 (2012 for wind facilities) may elect to claim a 30 percent Section 48 credit instead. Taxpayers may apply to take this credit as a grant provided they file their application by Oct. 1, 2010.

Advanced energy manufacturing credit (Section 48C)

Section 48C was added in 2009 to provide a new 30 percent credit for investment in qualified property used in qualified advanced energy manufacturing projects. It was one of the only credits created specifically for energy property manufacturers (rather than the taxpayer placing energy property in service). Treasury has already committed its $2.3 billion allocation for this program to existing projects, but the administration has proposed adding an additional $5 billion allocation.
Alternative fuel credit (Sections 6426 and 6427)

The $0.50 per gallon tax credit for alternative fuels in Sections 6426 and 6427 expired at the end of 2009 (except for liquefied hydrogen), but legislative proposals under consideration in Congress would retroactively extend them for 2010. They were available for the following:
• Liquefied petroleum gas
• P series fuels
• Compresses of liquefied natural gas
• Liquid fuel derived from coal
• Compressed or liquefied gas from biomass
• Liquid fuel from biomass

Personal incentives for individuals

Residential energy efficient home improvements credit (Section 25C)

Individuals can take a 30 percent credit of up to $1,500 for installing in their homes energy efficient property, such as the following:
• Water heaters
• Furnaces
• Boilers
• Heat pumps
• Air conditioners
• Building insulation
• Windows, doors and roofs
• Circulating fans used in a qualifying furnace

The credit can generally be used against the cost of installation with some exceptions for building envelope property, and taxpayers can generally rely on the manufacturer’s certification to determine if they qualify.

Residential energy-efficient property credit (Section 25D)

Individuals can take a 30 percent personal tax credit for energy-efficient property, such as the following:
• Solar water heaters
• Geothermal heat pumps
• Fuel cells
• Wind turbines
The credit can be used against the cost of installation and can taxpayers can generally rely on the manufacturer’s certification to determine if they qualify.
Alternative vehicle credits (Section 30B and 30D)

These credits for alternative fuel and energy-efficient vehicles discussed previously are also available for individuals. Recent legislation allows the credits to offset the alternative minimum tax (AMT) beginning in 2009.

Incentives for investors Tax credit bonds(Sections 54C and 54D)

Sections 54C and 54D provide tax credit bonds that are designed to stimulate demand and provide a significant incentive for additional investment in energy projects. A portion of the interest on tax credit bonds is paid in the form of a tax credit rather than cash, provided that the proceeds of the bonds are used for their designated purpose. Clean Renewable Energy Bonds (CREBs) under Section 54C are provided for investments in renewable energy facilities and generally must be spent on the facilities within 3½ years of issuance. CREBs may be issued by the following entities:
  • Public power providers
  • Governmental bodies
  • Cooperative electric companies
  • Certain not-for-profit electric utilities
  • Certain other lenders

Qualified Energy Conservation Bonds (QECBs) under Section 54D may be used to fulfill a wide range of qualified conservation purposes, including the following:
  • Capital expenditures for reducing energy consumption in public buildings
  • Research in alternative-fuel technologies
  • Construction and maintenance of mass commuting facilities
  • Performance of demonstration projects designed to promote the commercialization of green buildings public-education campaigns

State and local incentives

States offer numerous incentives to promote the production and use of renewable energy. These incentives, which vary widely among states, include corporate income tax deductions, exemptions and credits.

States provide property tax assessment relief and exemptions, as well as sales tax exemptions and refunds. Many states also offer grant and rebate programs.

Incentives for businesses

Many states encourage businesses to develop renewable energy and to improve energy efficiency. For example, several states provide both credits and incentives for the construction or remodeling of energy-efficient properties, and many local utilities offer significant incentives (including cash rebates for building owners) as well.
State tax credit programs can help finance the costs of renewable energy projects such as solar equipment and wind farms and can provide dollar-for-dollar reductions of tax liability for the owners or lessees of these facilities. Some programs (the Pennsylvania Resource Enhancement and Protection (REAP) program, for example) allow the matching of a developer and investor, allowing both sides to benefit from the transaction. Frequently, a potential developer is capital constrained and has limited or no tax liability (and therefore, little use for the tax credit). As a remedy, a third-party investor can be found to provide the financing in exchange for the tax credit. States offer a wide variety of green credits and incentives. For example, Florida provides a corporate income tax credit based on the taxpayer’s production and sale of electricity from a new or expanded Florida renewable energy facility. Florida also provides sales tax exemptions for solar energy systems and equipment, machinery and other materials for renewable energy technologies. In addition, Florida offers rebates under the Solar Energy System Incentives Program and grants through the Renewable Energy and Energy-Efficient Technologies Grants Program. Florida also has numerous local incentive programs.

The multistate green credit matrix in Appendix A provides a convenient method for identifying information and state programs related to renewable energy and energy efficiency. The matrix details a variety of state energy credits and other tax incentives available to businesses throughout the United States, including:

- corporate income tax deductions, exemptions and tax credits;
- excise tax, green building, production leasing, lease purchaser and other incentives;
- industry recruitment and support;
- state and local bond, loan, grant and rebate programs, plus private grant programs;
- utility grant, loan and rebate programs, plus utility rate discounts;
- personal income tax deductions and tax credits;
- property tax assessment relief and exemptions; and
- sales tax exemptions and refunds.

A particular state may offer numerous types of tax credits and incentives to encourage renewable energy and energy efficiency.

**Personal incentives for individuals**

Alternative fuel and vehicle incentives State laws include provisions to encourage the production and use of alternative fuels. States promote the use of alternative fuels with credits, grants, loans, rebate programs, tax refunds, tax deductions, tax reductions, incentives and exemptions. To encourage the use of alternative fuel vehicles, states offer credits, grants, loans, rebate programs, incentives and exemptions.

States provide numerous tax incentives for alternative fuels and alternative fuel vehicles. For example, Illinois has grants available under the Renewable Fuels Development Program Act and rebates available under the Alternate Fuels Act. New York offers an alternative fuels credit, biofuel production credit and funding programs for alternative fuels and alternative fuel vehicles.
GREEN PROJECT MANAGEMENT IN ACTION

Background

Sustainable products and services are usually labeled as quality products. Governments, designers, project developers, producers and suppliers are all getting more convinced of their value. Both from a view of urgency as from a view of social responsibility. Both the supply of and the demand for eco innovations have risen significantly during the last years. These are necessary conditions for new markets. An important issue in marketing the eco-innovations is the business model that is chosen by companies to scale up technologically successful innovations. Business models are an important criteria for funders to provide access to venture capital.

When entrepreneurs meet and start talking about their business model everyone seems to have a different perception of the business model. New products are made very quickly, lean and efficient production is a challenge from the past, the network economy challenges companies to create different value proposition for every possible group of clients and experiment on this.

Disruptive innovations bring both winners and losers. The roadmap to business success in a period of change will demand a premium for innovation, collaboration and smart investments to shape a globally prosperous and sustainable future.

Characteristics of Eco-Innovations

Definitions and categories

The term environmental innovation - short: eco-innovation, and defined broadly:

"eco-innovations are all measures of relevant actors - firms, politicians, unions, associations, churches, private households which:

Develop new ideas, behavior, products and processes, apply or introduce them; Contribute to a reduction of environmental burdens or to ecologically specified sustainability targets." --- or “eco-innovation is any form of innovation aiming at significant and demonstrable progress towards the goal of sustainable development, through reducing impacts on the environment or achieving a more efficient and responsible use of natural resources, including energy”.

Eco-innovations in two categories:

1. Activities of traditional eco-industries, i.e. products and services whose main purpose relates to pollution prevention and management, or natural resources management. In this case, any innovation related to their core activities can be considered eco-innovation.
2. Other activities where eco-innovation can reduce pollution and/or optimize resources use. In this case, an innovation can be considered to be an eco-innovation if the expected benefit for the environment is clearly identified (measurable as far as possible) and substantial (going beyond gains in re-sources efficiency generally resulting from process improvements). A life-cycle approach should ensure that the environmental impact is not shifted from one part of the life-cycle to another (for example from production to use or disposal).

To overcome the barriers that hinder the development of environmental technologies, is being achieved through a series of measures to promote eco-innovation and the take-up of environmental technologies. Priority is given to:
• Getting inventions from the research laboratories to markets;
• Improving market conditions, particularly by providing positive incentives such as a supportive regulatory framework and access to finance;
• Acting globally with actions supporting developing countries and promoting foreign investment;
• The innovations in three phases differ in complexity and scope: short term (<10 years), midterm (10-40 years) and the long term (>40 years).

Short term

In the first phase technologies can be used mainly for ‘good housekeeping’ and ‘end-of-pipe’ measures. Good Housekeeping entails all actions within the organization to prevent waste of material and energy. A more efficient organization and communication in the production process is often sufficient to prevent unnecessary emissions. This goes hand-in-hand with cost reductions and support is therefore easily found. End-of-Pipe measures are intended to counter attack polluting emissions. This technology does not alter the production process dramatically and is therefore relatively easy to install and implement. Companies most of the times do not implement this technology unless it is compulsory by regulation.

Mid term

Contrary to end-of pipe measures that counter attack the emissions, process innovations prevent emissions. Environmental Process Innovations are aimed at the prevention of unnecessary emissions in the production process. Environmental Product Innovations aimed to the development of new products with the characteristics to minimize the use of resources, minimize the use of energy, minimize emissions and upgrade the quality, life cycle and the ability to be repaired and taken apart of the ultimate product.

Integral Supply Chain Management contains a broader scope than production within one company, but instead examines the entire supply chain as a whole. It examines
environmental load in four phases, the use of resources, production, use of the product and the disposal phase.

The goal is to develop products and services designed to their entire life cycle. To close the material and energy cycles. This can be done by designing products or services that are easily recycled for example. The promising these types of innovations appear, there is a remark to be made. The risk of these types of innovations is that the focus lies within known framework of production processes. By focusing on integral supply chain management one builds upon processes that itself are in essence not environmental friendly and thereby possibly restraining the development ‘real’ eco-innovations.

**Long term**

System Innovations are fundamental changes in the way demand is met - and markets arise or are created. Innovative solutions to reach a more sustainable society can only be reached by changing vested interests and processes (transitions), creating new products and services to fulfill demand. The question is not how we can make cars more environmental friendly, but the question is, how to fulfill the demand for transport in a sustainable fashion.

**Determinants of Eco-innovations**

Significant eco-innovations have occurred in the energy sector but only a small share has been implemented and been scaled up. Higher initial costs are one of the major barriers for eco-innovations. Together with information asymmetries this prevents the market diffusion of eco-innovations. Information asymmetries are based upon the general impression of ‘green and expensive’ versus ‘brown and cheap’. Recently suggested research on energy efficient products breaking down the costs of eco-innovations into two dimensions, namely initial costs and operating costs. This in order to clarify that a wide range of eco-innovations has a different investment profile, higher initial costs versus lower operating costs.

**Market pull factors**

A supportive basis form the demand side is vital for sustainable up scaling of our long term eco-innovation. Customer support has several known barriers that can occur while up scaling the innovation. Long term systematic innovation demands a broad social basis in which customer support plays a vital role for long term transition in a systematic scope.

Barriers influencing the market pull factors: “Customer investment decisions regarding eco-innovations are characterized by:

Different investment profiles over time – that is, often higher initial costs (purchase price and set-up costs) and lower operating costs (maintenance and running costs).
Information asymmetries due to search experience, and credence attributes. Externalities (e.g. environmentally sound alternatives imply a higher collective benefit but lower or equal private benefits than conventional alternatives; Environmental benefits have the characteristics of a public good and therefore underlie double externality and enhanced quality does not benefit solely the innovator; Infrequent decisions that require the consumer to engage in an extensive decision making process, which implies high involvement, high cognitive effort, and a substantial need for information due to limited experience). Up-scaling phase of eco-innovators in entering the niche-markets; Every niche market exhibits several barriers. Aside from the barrier of infrequent decision making, it is to be believed that the barriers in the business to consumer market are equal to the barriers in the business to business market, so called customer barriers.

**Technology push factors**

Often when firms fail to commercialize their product or innovation it is perceived as a failure in their vision or management. However in reality there seems to be a gap in what is demanded from investors and what investors are willing to provide. Public funding is aimed at the early innovation phases and decreases rapidly when the innovation reaches market introduction. Private investors and angel investors have to take over. In this phase the demand for capital is high but the availability is rather low (or very expensive). This is called the ‘Valley of Death’.

Eco-innovations in niche markets can experience serious barriers in the access to capital, as niche markets are often small and/or immature markets. Investors tend to be careful in providing capital given the uncertainty concerning up scaling a niche markets.

Eco-innovations experience the problem of the unknown. Investors are often not familiar with the eco-innovative technology. This combined with the barrier, asymmetric information, that eco-innovations have to coop with the ‘green=expensive’ label, fosters the gap between investors and the eco-innovation. Investors often use the tool of credit rating to make the judgment whether or not to make the investment. However these ratings are designed for traditional innovations and do not capture all feature of an attractive eco-investment. There seems to be a mis-link. The current focus is still on conventional innovations and the characteristics they display. This conventional method of analysis is embedded in fiscal policies. Depreciation of economic assets is determined within fiscal policy. The number of years one is allowed to depreciate its assets is the base of the conventional investment analysis. There is clearly a demand for more awareness of the need for eco-innovations. People tend to be skeptical about ongoing changes in our climate. This skepticism blinds the eyes for societal demand that is rising. Investors need to be familiarized in the field of eco-innovations and new tool need to be developed to address the new characteristics of these investment opportunities.
Regulatory push factors

An innovation can be supported by the government in several ways. Government institutes can function as early adaptors, the so called launching customers. There are several programs to facilitate this functioning with eco-innovations. This way government institutions can set an example an thereby create a market (launching customer). Innovation and environment together demand for a sustainable marriage between policymakers. Taxations and substitutions can however also be a barrier for eco-innovations. These policy instruments are often based upon existing knowledge about resources and methods. This forces innovators to innovate within an existing framework (box) of resources an production methods. By stepping back and facilitating an innovative platform which can be supported but less regulated, the government can support eco-innovations with less involvement. The situation in the United States is a good example where government let commercial organizations be the driver of innovations by simply giving them space to innovate.

Government institutes can act as a partner or facilitator in this up scaling phase, the so called Public Private Partnerships (PPP). Research has shown us that a consistent policy is expected to stimulate this acceptance. Entrepreneurs and organizations ask for a consistent governmental policy to ensure them a calm and consistent entrepreneurial climate.

Definitions and Categories

Every business organization has a business model or a business concept. This is a growing field of research initiated around the dot.com boom. There is little explicit reference to business models and its key elements. Business model is a often used term in various contexts.

There are many used definitions of a business model. A short overview of these definitions to show their similarities and differences. We can divide definitions used in two categories based upon their point of view:

The first category is characterized by the aim of value creation. A business model as the method of doing business by which a company can generate value to sustain itself. The business model as the organizations core logic to create value.

The second category is characterized by a more organizational point of view. A broad definition is a business model as a description of roles and relationships among firms consumers, customers, allies and suppliers that identifies the major flows of product, information, money and the major benefits to participants. A transaction-based definition of a business model: “a business model depicts the content, structure, and governance of transactions designed as to create value through the explosion of business opportunities.

A business model includes the design of: transaction content - goods/services - resources/capabilities, transaction structure - parties involved; linkages; sequencing;
exchange mechanisms), transaction governance - flow control. A business model describes the steps that are performed in order to complete transactions.

A general understanding of what a business model seems to be, its key elements, dimensions and frameworks: a business model is an architecture for the product, service and information flows. A description of the various business actors and their roles, the potential benefits for the various actors and the sources of revenues.

BUSINESS REDESIGN ECO-COMMERCE MODELS

Ecological Entrepreneurship

An "entrepreneur" is someone who thinks of a new idea or opportunity in business and who takes the risks necessary to convert his or her vision into a reality. Entrepreneurs are absolutely essential to the forwarding of human progress. An ecological entrepreneur is someone who is driven not only by the possibility of making a profit, but is also driven by environmental and social concerns. They want to make the world a better place by improving the environment.

One interesting thing about entrepreneurship is that it is a market-based approach, which encourages us to seek out positive rewards, mainly in the form of profit. Governmental oversight, the main way we address environmental issues, often involves punishing offenders in order to change people's approach to the environment. Ecological entrepreneurship is a reward-based approach to addressing environmental problems, rather than a punitive approach, and may prove more successful at changing attitudes and practices in the long run.

Business practices fundamentally affect the business world, the environment and our lives. Ecology implies community, and ecological entrepreneurs understand the connections between their actions and the greater community as a whole. The field is socially important because ecological entrepreneurs are instrumental in reshaping the way we approach the environment and its relation to business.

Types of Innovation

A Process Innovation
The implementation of a new or significantly improved production or delivery method. This includes significant changes in techniques, equipment and/or software.

A Product Innovation
The introduction of a good or service that is new or significantly improved with respect to its characteristics or intended uses. This includes significant improvements in technical specifications, components and materials, incorporated software, user friendliness or other functional characteristics.
A Marketing Innovation

The implementation of a new marketing method involving significant changes in product design or packaging, product placement, product promotion or pricing. This includes changes in positioning of products or services offered by companies e.g. low-cost airlines.

An Organizational Innovation

The implementation of a new organizational method in the firm’s business practices, workplace organization or external relations.

Material Flow Innovation.

This type will capture innovation across the material value chains of products and processes that lower the material intensity of use while increasing service intensity and well-being. It aims to move societies from the extract, consume, and dispose system of today's resource use towards a more circular system of material use and re-use with less total material requirements overall.

Social Innovation

Characterized by different rationale and mechanisms. This is closely linked with the field of social entrepreneurship. Social innovation is “a novel solution to a social problem that is more effective, efficient, sustainable than existing solutions and for which the value created accrues primarily to society as a whole rather than private individuals. Two key elements of social innovation: 1. To create social change and value, rather than commercial innovation and financial value 2. Social innovation processes often involve not only business, but also the public sector and non-governmental organizations.

Eco Commerce

Is a business, investment, and technology development model that employs market-based solutions to balancing the world's energy needs and environmental integrity.

Eco Innovation

Is a term used to describe products and processes that contribute to sustainable innovation. Eco Innovation is the commercial application of knowledge to elicit direct or indirect ecological improvements. It is often used to describe a range of related ideas, from environmentally friendly technological advances to socially acceptable innovative paths towards sustainability.

Cleantech

Is a term used to describe products or services that improve operational performance, productivity, or efficiency while reducing costs, inputs, energy consumption, waste, or pollution. Its origin is the increased consumer, regulatory and industry interest in clean forms of energy generation.
Sustainable Innovation

Is 'innovation for long term benefit to people, society, economy and nature' harvesting the creativity and innovativeness of people to solve problems. By developing and implementing new technology we can better adapt to new challenges creating renewable energy and improving energy and material efficiency. To change the habits of people and the operating models of firms and institutions social innovations are needed. Sustainable innovation is based on ethically, socially, economically, environmentally sustainable principles. These principles include:

- Sustainable development.
- Inclusive Innovation.
- Continuous Innovation.
- Global Innovation.
- Innovative Leadership.