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RESEARCH ARTICLE

Increasing Awareness of the Future Leaders on Environmental Accounting

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Abstract

Improvements in technology, population growth, greenhouse effects, global warming and as a result of these effects, degradation of the ecological system day by day have led people to take preventive measures for environment. One of the preventive measures is educating individuals on social responsibility and at this point, universities have important tasks. Leaders of the future with the awareness of social responsibility will push their future institutions and managers to have an important and sensitive role in the means of environmental responsibility. Also, accounting has focused on the measurement and reporting of environmental issues as a part of "social responsibility" principle. In this study, bachelor degree business administration students who were enrolled in accounting classes before are selected as the sample. Difference in students' awareness of and concerns for environmental issues is statistically measured by the primer including environmental accounting and environmental management accounting with the case studies on reporting, best practices. According to the results of this research, the primer prepared for this study has a significant effect on the change of awareness. To raise a generation that is well aware of environmental issues, environmental accounting should be valued more in the curriculum. Increasing environmental accounting literature with cases and best practices is of utmost importance.

Keywords: *Environmental Accounting, Social Responsibility, Sustainability.*

Introduction

The agenda of countries and business world is formed by environmental pollution, global warming, and change of climate, acid rains, diminishing bio-diversity, and accordingly sustainable development along with similar issues. It is understood that instead of removing environmental pollution it should be prevented. Previously environmental problems was underrated and dealt by other bureaucratic organizations however the importance of this issue is understood lately and organizations responsible for environment purposes are established with those specific responsibilities. Environmental problems are of concern of various fields. For that reason, numerous foundations and organizations in national or international field are developing solution proposals, endeavoring to solve the problem in recent years.

Businesses are appearing as not only profit oriented organizations but also an element that ought to fulfill responsibilities towards society and environment. Businesses are social entities that have social responsibilities. As a necessity of social responsibility principle; voluntarily or as a legal necessity, businesses which have interactions with current economic and social surroundings, provide and render reports associated with corporate social responsibility and environment. These reports are gaining significance day by day due to expansions of traditional performance standards focusing on social and environmental performance indicators in addition to corporate net profit that causes more investors to advocate environmental and social factors effectiveness of corporate value of businesses. In preparation of these reports accounting has significant duty. Accounting information system gains important role on measuring, evaluation and reporting of every kind of information in businesses. Damages to environment caused by businesses are evaluated in that aspect. Beginning with that point accounting-environment relation which is initiated firstly in 1960s is handled intensively as a result of increasing awareness in recent years. Measuring, recognition and reporting of environmental pollution have acquired currency which is called negative exteriority. Mentioned developments brought about concepts such as "environmental accounting", "social accounting", and "social cost" TUSIAD [1] define environmental accounting as regulations towards classification of all activities as environmental, tracking inventory and alterations in it, clarifying real profitability of

businesses via incorporation of these alterations with balance sheet by exposing physical and financial dimensions of these changes.

Field professionals who will make use of environmental accounting accordingly accounting students should enhance their knowledge levels about environmental accounting gaining importance. Several views in international area support that the topic of accounting should be included in curriculums. In this study, it is aimed to measure perception levels of executives, financial advisors of future, and students taking accounting education towards environmental accounting. Necessity and importance of environmental accounting education is put forward through results and class discussion questions. In the study, literature review about environmental accounting is performed, previous years' studies are included and lastly application results (classroom testing) are presented.

The Concept of Environmental Accounting and Literature Review

As an extension of social responsibility concept, "social responsibility accounting" and "social accounting" concepts have arisen. Businesses are not only economic entrepreneurships, success or failure of businesses does not rest on just numbers. In that point, accounting or reporting concepts can provide inadequate and misleading info to businesses. By way of environmental accounting or social accounting this inadequacy are meant to be figured out. In recent years gaining of sustainable development concept, businesses start to prepare social responsibility reports. These reports include non-financial information besides financial info.

In 1990s Triple Bottom Line reporting method which is put forward by Elkington, provides economic, social and environmental components together. Contrary to traditional reporting that takes account net income as an indicator of performance, it includes a much further concept multidimensional reporting model comprising of social and environmental performance [2, 3].

As a natural prolongation of financial reporting, social responsibility reports enlarge business reporting in explaining environmental, social and economic performance of businesses. Like Gray and others indicate [4] businesses should contribute to these problems by prioritizing public interest as a necessity of social responsibility principle of accounting. Gray defines environmental accounting as measuring and identifying negative effects of environment, foreseeing them in accounting system and applications and enhancing financial and non-financial accounting systems.

Environmental accounting is deemed as green accounting in literature and in widest meaning it refers to recognition of usage of environmental resources and their effects accordingly generated.

There are nonprofit organizations which can give guidance to businesses about environment and reporting of environment related issues. One of them is CERES "Coalition for Environmentally Responsible Economies". A coalition including 13 businesses from fortune 500 are using 10 principles named "CERES Principles" [5].

CERES Principles cited as follows, are aiming potential emergence of self-governed businesses by highlighting healthy environment and economics relations.

- Protecting Biosphere
- Sustainable Usage of Natural Resources
- Decreasing and Clearing Off Wastes
- Energy Savings
- Diminishing Risks
- Product and Service Safety
- Environmental Renewal
- Informing Public
- Administrative Commitments
- Inspections and Reports

In 1993, Eco-Management and Audit Scheme (EMAS) is formed by European Commission. EMAS is a voluntary program which is used for upgrading and enhancing businesses performances towards environment. Corporations which are enlisted in EMAS are obliged to fulfill a number of regulations. Member corporations should have an environment policy, efficient environment governing system and their policies ought to be inspected in certain periods. For corporations can manage to carry out these conditions are given EMAS Certificate [6].

In 1997 SAGE Environmental Consulting, is formed by participation of countries in International Organization for Standardization (ISO) and International Electrotechnics Commission. As a result of SAGE's research in 1993 technic committee 207 (TC 207) is formed and ISO 14000 Environment Governing Standards are started to be prepared. ISO 14000 Standard Series are comprised of two main parts [7].

International contracts and regulations such as Montreal Protocol, Rio Declaration and Kyoto Protocol which are signed by many governments are increasing the awareness of society thus imposing responsibility to firms on behalf of humanity's and nature's favor. Complying with standards is generally on voluntary basis; however this becomes compulsory when national and international side of commerce is taken account so that businesses can increase their level of competition power. The formation of environmental information affecting

economic decisions has arisen as an outcome of environmental accounting and it gains importance. Because of that it is essential to acknowledge and apply environmental accounting as an instrument for managerial accounting which is a subtopic and necessary for reporting. For environmental accounting it can be cited that "a managerial accounting model designed for interior and exterior users for accurate evaluation of environmental performance, upgrading efficiency, defining and calculation of pertains to environment aiming to diminish relevant costs".

According to Buritt, Hahn, Schaltegger [8] and Bennett and James [9] EMA should carry the following characteristics i) focusing on internal rather than external users of accounting information and ii) separating identification of the need for monetary and non-monetary information to be gathered and tracked.

In the light of all above processes, accounting education's contributions to measuring of environmental costs, prevention of environmental pollution and raising field professionals has become to the agenda. Many views claim that "green accounting" concept should be covered in course programs. In this view it is effective that many accounting students have no or very little information about environmental accounting.

This phase entails a big responsibility to educational institutions and organizations as it is stated in European Commission's European Multi stakeholder Forum which is renewed in 2004 and 2011-2014 Corporate Social Responsibility Strategy Report. In the report it is declared that business schools, universities and other educational organizations have an important role to form relevant corporate social responsibility strategies and necessary capacity, these mentioned organizations are expected to develop corporate social responsibility foundations and awareness in future's corporate executives and employees.

In February 2012, offerings towards field professionals about demands of investors' environmental social and governance are published in meeting of board of executives of IFAC [10].

Likewise universities, educational institutions have important duties for raising individuals who have social responsibility awareness. With that educational awareness, leaders of future going to have an important role to urge administrators of corporations to act consciously. Similarly, accountants and relevant professional organizations have significant roles to urge corporate administrators to notice environmental responsibilities as a result of corporate social responsibility.

Özbirecikli and Ural [11] aim to measure "the importance of ethics and social responsibility" amongst 1.000 accountants in 7 provinces in Turkey. It is shown that any increase in level of importance attributed to ethics and social responsibility causes increased awareness to realize ethical problems and it will lead to more appropriate judgment and behavior in ethical decision taking processes.

Ateş and Senal choose undergraduate and associate degree students as samples to measure accounting's social responsibility in the context of corporate social responsibility. It is observed that openness to shareholders and societal sensitiveness are seen both a necessity for accounting's social responsibility and corporate social responsibility by the students. However, they relate it more to corporate social responsibility [12]. Another study in this area which has took students sample again; determine that they believe environmentally sensitive products can acquire firm's earnings in long term [13].

Dutse and Hilman [14] state that students do not believe business' adoption of social responsibility policies has an effect on long term profitability. On the contrary of Dutse and Hilman [14], Elias [15] alleged that corporate social responsibility is more important than profitability. However, Wong, Long and Elankumaran [16] gathered

different results on students' social responsibility perception in USA, China and India. Students in India and United States are inferred as more sensitive compared to Chinese students. Therefore it shows that culture and legislations have important roles in composition of this perception.

Specifically if we examine the studies about environmental accounting, Gordon [17] in his study indicate that students who take accounting theory as a mandatory course have shown difference about perception of environmental accounting before and after taking such courses. A similar result is reached by Fleischman and Schuele [3] study. These studies emphasize that issues about environmental accounting should be included in curriculums more. Gray report that students do not elect environmental accounting courses due to its hardness and unstructured basis [18].

This paper aims to make contributions to national and international literature, by measuring importance given specifically to environmental accounting and relevant issues from leaders of the future.

Classroom Testing

In this paper, bachelor degree business administration students who were enrolled in accounting classes before are selected as the sample. For this paper, difference in students'

awareness of and concerns for environmental issues is statistically measured by the primer including environmental accounting and environmental management accounting with the case studies on reporting, best practices. The method and questions used in testing is derived from the study of Fleischman and Schuele [3].

Classroom testing is performed in three classes in Dokuz Eylül University. Students who are enrolled in accounting classes before are selected as sample. The testing is divided into four steps. In first step, the lecturers administered a questionnaire for the assessment students' awareness of, concerns for to environmental issues. In the second part, it is asked read the material (hereafter referred to as 'the primer') including information about i) environmental accounting ii) environmental management accounting ii) a summary of environmental management accounting application of Xerox iv)a brief information about BP Oil Spill-Gulf of Mexico and v) a section from Apple Environmental Responsibility Report 2014. This premier is presented in appendix 1.

Each of the two questionnaires' contains Likert-scaled items ranged from one to five. The results (men change in response) of questions awareness of and concern for environmental issues, and student opinion on the need for and chance of various parties taking action on these issues are presented in table 1.

Table 1: Students' awareness of and concern for environmental issues before reading, after reading

	Mean Response(N-150)		
	Before Reading Premier	**After Reading Premier**	**Mean Change in Response**
1) How would you rate your awareness of environmental concerns[a](pollution of air and water, global warming, acid rain, toxic waste)?	1.67	1.61	-0.06
2)Do you feel young people of your generation are more aware of/concerned about environmental issues?[b]	3.24	2.95	-0.29*
3) Do you believe that environmental action should be mandatory ethically for?[c]			
i) Every individual	1.28	1.19	-0.08*
ii)Business	1.30	1.24	-0.06
iii)Public accountants	1.96	1.59	-0.36*
iv)Governments	1.11	1.11	0.00
4) How would you rate the chances of the following institutions to achieve a betterment of environmental conditions?[d]			
i)Big business	2.57	2.09	-0.48*
ii)Government	2.61	2.30	-0.31*
iii)International organizations (UN):	2.22	1.91	-0.30*
iv)Private agencies (Greenpeace):	2.04	1.82	-0.21*

[a & b]1) very aware 2) somewhat aware 3) unaware 4)moderately unaware 5) very unaware;

[c]1)definitely 2)very probably 3)probably 4)probably not 5)very probably not

[d]1)very good 2)good barely 3)acceptable 4)poor 5)very poor

*significant at %5 level.

The results reported in Table 1 indicate that, overall, both the reading and class discussion increased students' awareness of and concern for environmental issues, and strengthened their beliefs about the chance of the institutions (big business,government,international organizations and private agencies) to achieve a better environmental conditions.

After reading the primer, students reported a statistically significant belief about increasing the awareness of young generation about environmental issues. The most substantial change in means for the section focusing on the question about "being mandatory ethically for" is seen in public accounts. After reading, students are giving more chance to big business about achieving a better environment. Lecturers also discussed some topics with students and answered their questions. These questions are i)

what are the advantages and disadvantages of environmental reporting for business enterprises ii)to what extent is environmental responsibility an ethical issue? Overall, both reading and class discussion increased students awareness of and concern for environmental issues and strengthened their beliefs to institutions about making a difference in achieving a better environment arena.

Table 2: Students assessment of interest and comprehension of the premier

	Mean Response (n=150)
The environmental accounting	
understandable	2.97
interesting	3.01
The environmental management accounting	
understandable	2.99
interesting	3.17
Environmental Reporting	
understandable	2.96
interesting	3.18
the cases (Xerox, BP Oil spill Mexico and Apple)	
understandable	3.61
interesting	3.98
NASA Images Oil Spill	
understandable	3.29
interesting	3.51
Slide Show about Environmental Management Accounting	
understandable	3.63
interesting	3.42

1-not understanble ve 5-understandable; 1-totaly boring ce 5-interesting

In table 2, student opinion on the premier's understandability and interest is summarized. After watching the slides show about environmental cost accounting and NASA images form the space about Oil spill in Gulf of Mexico[1] the survey is done again. As seen in table 2, students found cases more interesting then video and slide shows with animation and sound are more interesting for them. They mentioned that they'd like to watch and listen the topics and they like to share videos compared to documents in social media. They told that they believe that videos, slide shows with sound and animation are giving more information in a short time. It is also inline with the characteristics of generation Z. They want to be a part of social, visual and technological improvements.

Conclusion

Living with carrying capacity of natural resources of the Earth and keeping and improving the quality of human life are the most important environmental issue that we face today. Implementation of numerous arrangements to decrease the negative effects of industrialization has become a serious current issue. These regulations aim to push responsibility to the firms for the wellbeing of the public. Accounting, which is the language of business in numbers, needs to complete the adoption to the new situation for producing environmentally related information Also, accounting has focused on the measurement and reporting of environmental issues as a part of "social responsibility" principle. In this study, bachelor degree business administration students who were enrolled in accounting classes before are selected as the sample. Difference in students' awareness of and concerns for environmental issues is statistically measured by the primer including environmental accounting and environmental management accounting with the case studies on reporting, best practices. According to the results of this research, the primer prepared for this study has a significant effect on the change of awareness. To raise a generation that is well aware of environmental issues, environmental accounting should be valued more in the curriculum. Increasing environmental accounting literature with cases and best practices is of utmost importance.

In this study, the increase in awareness is achieved with onlythe4-pagesummary (the premier), slide shows and images. As declared in European Commission2011-2014 Corporate Social Responsibility Strategy Report and academic researches [3,19.20,21] relevant training materials

[1]These materials are available at http://education-portal.com/academy/lesson/full-cost-accounting-definition-example.html#lessonfaydalanılmıştır. Nasagörüntülerigünbazındawww.nasa.gov/goddard ve NASA | Satellites View Growing Gulf Oil Spill and http://youtu.be/mCWW5xt3Hc8

should take more place in the curriculum for the education of more sensitive generations on environmental issues. We believe thatcase studiesderived fromactual eventsand company's projects, supplementary materials enriched with videos, slide shows and animations will play an active role in the training of generationY and Zgeneration.

Appendix 1

Premier

Living with carrying capacity of natural resources of the Earth with keeping and improving the quality of human life is the most important environmental issue that human being face today. Rapidly growing industrialization, facilitation of international trade due to technological improvements and expansion of national and international markets which depend on growth of population cause depletion of sources offered by the Earth.

Living with carrying capacity of the Earth is directly related with the sustainability issue. In the 1st World Commission on Environment and Development Report sustainability is defined as "Development that meets the needs of the present without compromising the ability of future generations to meet their own needs" In other terms, corporations of today must not decrease the resources and they should leave the environment without any damage than they began operations.

The regulations issued by local governments, global agreements such as the Montreal Protocol, the Rio Declaration, and the Kyoto Protocol to prevent future environmental damages (with the increase in public awareness for environmental matters) push responsibilities to the firms for the wellbeing of the human being and the World. So with the help of world-wide regulations and national regulations environmental information has increasingly become economically relevant information for decision makers.

Environmental information which is the output of environmental accounting becomes important. Application and adoption of environmental accounting as a tool of managerial accounting for reporting and for company decisions is required. For accurate, reliable and relevant environmental information presented and used in annual reports, corporate sustainability and corporate responsibility reports, environmental reports and in any reports in any format or under any name, businesses should try to define environmental costs incurred while providing goods and services to their customers. At this point, environmental accounting is a necessary tool for the businesses.

Environmental Accounting

Accounting which is the language of business in numbers measures business activities, and communicates these results to decision makers as financial reports.

These financial reports are used by external and internal decision makers such as present and potential investors, lenders, managers, employees, owners, creditors, taxing authorities, and governing organizations.

Accounting can be divided into two fields, financial accounting and managerial accounting. Financial accounting provides information for external decision makers, such as outside investors and lenders. Managerial accounting focuses on information for internal decision makers, such as the company's managers. Managerial accounting provides data for insiders [22].

Environmental management accounting is positioned between financial and managerial accounting. In practice most of companies do not prefer to establish cost accounting or/ and managerial accounting. Reports or analyses are derived from financial accounting. Growing importance of environmental information creates a new requirement for calculating and identifying costs related with environment but there are no standard rules for defining, calculating environmental costs due to differences in sectors, environmental cost natures. Some environmental costs are defined as non-financial costs based on input-output analysis and flow charts of resources. So new accounting practice dealing with environmental costs, environmental impact should be derived according to the managerial accounting and financial accounting.

Why do we Need Environmental Management Accounting?

As stated before, environmental management accounting "is designed for internal and external financial information users for identifying, calculating and reducing environmental costs for accurate assessment of environmental performance and increasing efficiency". To provide accurate, fair and reliable information about environmental factors can be listed as the first target. Before identifying the aim, we should ask "why do managers need this environmental information about the performance and efficiency of business operations?"

There are many reasons and benefits of applying environmental management accounting. Briefly, environmental management accounting deserves attention of management due to following reasons[2]

- Identify environmental costs for more accurate product pricing
- Identify hidden environmental costs in overhead accounts

[2]The list stated above is combined of US EPA (1995), Bennett and James (2000).

- Decrease or eliminate environmental costs
- Gain competitive advantage by designing more environmentally preferable processes, products and services
- Meet obligations of national or international environmental laws
- Increase company value by enhancing customer value

For better environmental performance of the companies and for the well-being of the World from the view of sustainability, public agencies, governments enforce companies with regulations and laws. Companies that are not in compliance with applicable regulations will face with fines changing in a wide-range. For example, The Erika oil tanker of French oil, Total broke in two, caused polluting 400 kilometers of coastline in 1999. Total was fined 375,000 euros and ordered to pay nearly 200 million euros for damages to the French state and the local fishing industry[3].Another example, Exxon Mobil Pipeline Co faced a fine of nearly 2.7 million dollars for a pipeline spill of thousands of barrels of Canadian crude oil in an Arkansas suburb in 2012. The Pipeline and Hazardous Materials Safety Administration found nine probable violations of safety rules in the rupture of the nearly 70-year old pipeline that forced residents to evacuate their homes. The agency said Exxon did not adequately account for risks on the pipeline.[4]

Accounting systems can provide up-to-the-moment operational data that can help a firm reduce and avoid wasteful and environmentally damaging practices before they are transformed into significant major expenses in the form of purchases for pollution control devices, fines for exceeding regulatory limits, bad press for endangering the community and clean-up costs [8].

Environmentally related costs are sometimes hidden in general overhead costs. These costs are often difficult to identify. A good environmental management accounting will help to identify, calculate these hidden costs. These costs are grouped as upfront hidden cots, regulatory and voluntary environmental costs and back-end environmental costs [9, 23]. Detailed information will be presented in environmental costs section.

Companies should not take action just for preventing risks about environmental issues or to avoid from potential fines and penalties that may occur as a result of new environmental law or regulation or any operational risk.Understanding and defining of environmental costs for every business is vital for accurate cost calculation. They can be hidden costs, contingent costs or costs for image, etc. To have better control on and understanding about costs may give opportunity to the firms for redesigning or designing of products or services as ecological –friendly products or services.

To be prior in designing products and services according to environmental preferences will also create competitive advantage. As stated in Bennett and James [9] gaining a better understanding of medium to long-term environmental costs and benefits can help to neutralize threats and ensure that opportunities are taken. This will also create an opportunity for eco-innovation. [5]

Another benefit of implementing effective environmental management accounting is enhancing customer value and corporate image. Better application of environmental management accounting will create costs saved by not polluting and by having a better product image and better employee relationships. These are listed as indirect benefits of environmental management accounting. Indirect effects are intangible. For example, they can include an enhanced image, increased customer and employee satisfaction, the transfer of know-how (intellectual capital) and the development of new markets for environmentally benign products [8].

Types of management decisions benefiting from environmental cost information according to US EPA (2005) can be listed as

• Product Design	• Waste Management	• Risk Management
• Capital Investments	• Purchasing	• Product Pricing
• Process Design	• Cost Allocation	• Environmental Compliance Strategies

Environmental Reporting

Companies tend to evaluate performance with financial indicators. In rapidly changing environment due to globalization and technological improvements, focusing only on financial indicators is not enough.

Elkington [2] suggests that financial reporting should expand beyond traditional bottom-line as net income, success indicators such as social and environmental performance should be also taken into account.

Many companies no longer see corporate responsibility as a moral issue, but as core business risks and opportunities. More and more investors accept that environmental and social factors put company value at stake. This leads to the question of what the potential financial impacts of those risks

[3] http://www.bbc.com/news/world-europe-19712798

[4] http://www.reuters.com/article/2013/11/07/us-usa-exxon-fine-idUSBRE9A603X20131107

[5] Fussler and James (1996) defines eco-innovation as 'new products and processes which provide customer and business value but significantly decrease environmental impacts'.

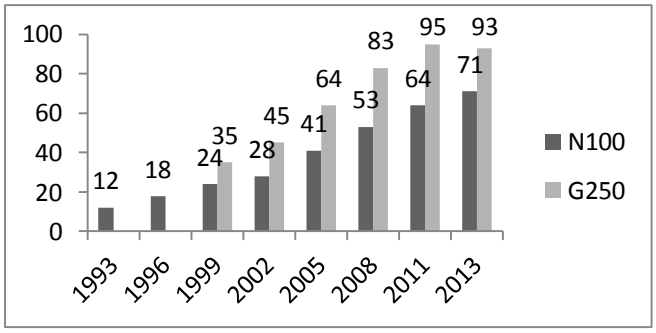
and opportunities could be and what the company is doing to mitigate or maximize them.

Demands for greater transparency and accountability are growing from investors and from civil society. Final approval by the European Parliament and the European Council is pending for the movement of corporate social responsibility from being voluntary to mandatory. If it passes, Some 6,000 large companies will be required to report on their policies on diversity, social issues and on corruption, as well as the risks they pose to human rights and to the environment, including through their supply chains. As such they will be making themselves accountable not just to their shareholders, but to stakeholders as well.[6]

The number of companies which issue stand-alone corporate reports or/and a corporate responsibility part in annual reports has been increasing.

Environmental issues, environmental performances are a part of these reports but these reports are voluntary reports and there are no standardised rules for these reports.

Percentage of Companies Since 1993



Source: KPMG 2013 Survey of Corporate Responsibility Reporting 2013. N100 refers to assessment corporate responsibility reporting among the 100 largest companies in 41 countries: 4,100 companies in total. G250 refers to corporate responsibility reporting assessment the quality of reporting among the world's largest 250 global companies.

According to KPMG [24] many companies no longer see corporate responsibility as a moral issue, but as core business risks and opportunities. More and more investors accept that environmental and social factors put company value at stake. this leads to the question of what the potential financial impacts of those risks and opportunities could be and what the company is doing to mitigate or maximize them. Very few companies are yet declaring any quantified risks to the bottom line in their corporate responsibility reporting. Companies need to be prepared for this to change and should start to integrate the top and bottom-line implications in their business scenario planning and risk management. Only a small number of G250 corporate responsibility reports (5 percent) include information on the financial value at stake through environmental and social risk. Most G250 CR reports (87 percent) identify at least some social and environmental changes (or 'megaforces') that affect the business. Climate change, material resource scarcity and energy and fuel are the most commonly mentioned.

As stated in Rikhardsson et al. [25] the field of environmental accounting management is still diffusing, and there is no single optimal route through which EMA is likely to become applied to companies and other organizations with environmental impacts, but there are a number of different possible mechanisms, the relative importance of which will depend on the situation of the particular organization.

In this diffusion, governments, investors, the media, shareholders, environmental funds, non-governmental organizations and pressure groups play an important role. Especially governments with the help of international standards and rules issued by United Nations, OECD or/ and International Accounting Standards Board should increase environmental obligations, rules and reports for living with carrying capacity or natural resources of the Earth with keeping and improving the quality of human life.

Case - Environmental Management Accounting - Xerox

In 1990s, Xerox's faced with extensive and expensive logistics operation that resulted in substantial environmental impacts throughout the logistics chain, including high volumes of waste from the packaging materials due to transferring to 68 delivery points across Europe. They set-up a multi-functional project team including members from its environmental management and accounting functions to carry out re-design of logistics systems. The team concluded that 23 different types of copiers, each of which required its own specifically designed packaging were the main driver of both costs and environmental impacts. They found disposal process after delivering (such as taking back to factories for re-use) impractical and uneconomic effort. The solution of this multi-functional team was to replace present packaging approach with a system using a single standard container (tote) that could be used for all product-lines and then returned and re-used after each delivery. The valuable findings of environmental-related project was i) standardization of re-usable transport packaging from over 8,000 variants down to ten has generated savings of 2.1 million dollars per annum and greatly reduced waste. ii) ,increased use of 100% recycled packaging materials, reducing weight by an average of 5 kilos and cost by 20 dollars per unit iii) Introduction of two standard re-usable totes for internal transport, saving 1.2 million dollars per annum [9].

[6] **http://www.theguardian.com/sustainable-business/eu-reform-listed-companies-report-environmental-social-impact**

Case: BP Oil Spill- Gulf of Mexico

200 million gallons of crude oil was pumped into the Gulf of Mexico for a total of 87 days, making it the biggest oil spill in U.S. history in 2010. The oil spill was called the "worst environmental disaster the US has faced" by White House energy adviser Carol Browner6,000 total miles of coastline have been affected, including the coasts of Texas, Louisiana, Mississippi, Alabama, and Florida. Even though the gushing well was capped in July 2010, oil is still washing up on shores, which might cause long-term damages to people living in the area. The initial oil rig explosion killed 11 people and injured 17 others. BP's stock fell by 52% in 50 days on the New York Stock Exchange, going from $ 60.57 on 20 April 2010, to $29.20 on 9 June, its lowest level since August 1996. On 25 June, BP's market value reached a 1-year low. The company's total value lost since 20 April was $105 billion. Investors saw their holdings in BP shrink to $27.02, a nearly 54% loss of value in 2010.[71] A month later, the company's loss in market value totalled $60 billion, a 35% decline since the explosion. At that time, BP reported a second-quarter loss of $17 billion, its first loss in 18 years. This included a one-time $32.2 billion charge, including $20 billion for the fund created for reparations and $2.9 billion in actual costs President Obama announced that his administration would create a $20 billion spill response fund. [7]

Example from Apple Environmental Responsibility Report 2014 (Covering 2013 fiscal year)

".....Apple's 2014 Environmental Responsibility Report, covering fiscal year 2013, highlights the progress we've made toward that goal. We have set three priorities for our work where we believe Apple can make the most impact going forward:

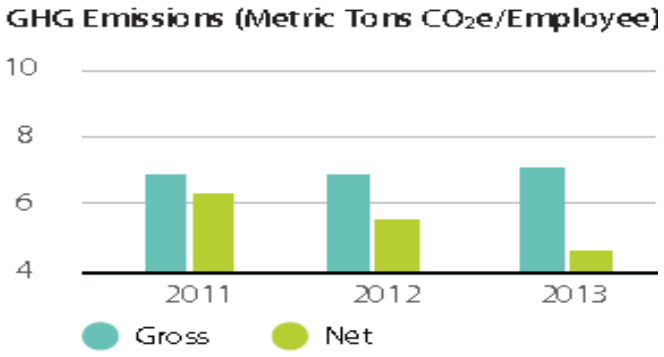
- Reduce our impact on climate change by using renewable energy sources and driving energy efficiency in our products.
- Pioneer the use of greener materials in our products and processes.
- Conserve precious resources so we all can thrive.
- This report details how we are approaching each of these priorities, and highlights the progress we have made to date."

..."For starters, every one of our data centers is powered entirely by clean sources such as solar, wind, and geothermal energy. So whenever you download a song, update an app, or ask Siri a question, the energy Apple uses is provided by nature [26].

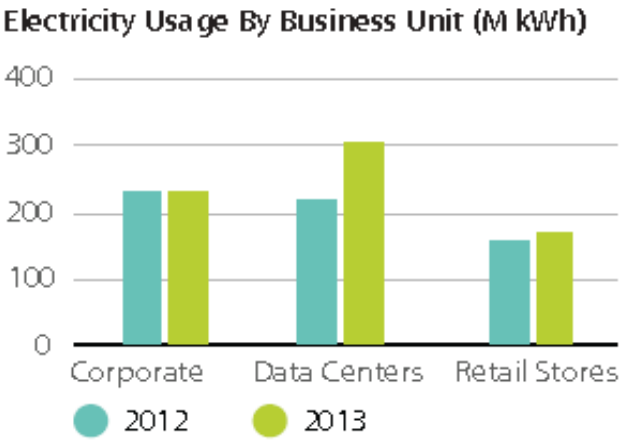
Of course, the cleanest energy is the energy you never use. That's why we've reduced the average total power consumed by Apple products by 57 percent since 2008- helping reduce our customers' electricity bills and carbon emissions. And each one of our products far exceeds the strict energy efficiency guidelines set by ENERGY STAR"

Product Usage

...."The energy consumed by our products during everyday use represents a big share of our carbon footprint. So we look at three ways to reduce a product's energy consumption: more efficient power supplies to bring electricity from the wall to the device, more efficient hardware, and smarter power management software. As a company that designs both the hardware and the software for its products, we're able to use that technological collaboration for greater energy efficiency. OS X, the Mac operating system, never misses a power-saving opportunity, no matter how small. It puts hard disks to sleep and runs processors in an ultralow power mode when you're not hard at work on your Mac"



Emissions data includes natural gas and electricity consumed at Apple-owned and leased facilities worldwide, in addition to employee commute, fleet vehicles, and business travel.



Electricity and natural gas data is compiled from utility consumption data for sites owned and leased by Apple.

[7] https://www.dosomething.org/facts/11-facts-about-bp-oil-spill

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