Annik Magerholm Fet, Michael Myrvold Jenssen

Sustainable Life Cycle Management and Decision Support

Summary of seminar 26.09.2014

Trondheim, 21. October, 2014

Sustainable Innovation and Shared Value Creation in Norwegian Industry

www.sisvi.no
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<th><strong>Report no.:</strong></th>
<th>Seminar Report-2014-02</th>
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<td><strong>Project no.:</strong></td>
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<td><strong>Cooperating companies:</strong></td>
<td><strong>Date:</strong></td>
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<tr>
<td>Plasto AS, Hexagon Ragasco AS, SINTEF Raufoss Manufacturing AS, Molde Kunnskapspark AS, Norsk Stålforbund, MRB AS, Forsvarsbygg, Raufoss Water &amp; Gas</td>
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<td>Department of industrial economics and technology management (IOT), Norwegian University of Science and Technology (NTNU)</td>
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**Summary:**

This report is a summary of the seminar “Sustainable Life Cycle Management and Decision Support” for researchers and master students at the Department for Industrial Economics and Technology Management.

The seminar was held in English.

**Appendices:**

Summary descriptions of the SISVI and SUSPRO projects, and the Strategic Research Area: Sustainability.

Key words: Green value creation, innovation, shared value creation, life cycle analysis

**Distribution/access:** Open
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2 Seminar introduction:
Sustainable Life Cycle Management and Decision Support

**Time:** Fredag 26. oktober 2014, 1300-1630

**Place:** Rom 217 (F5), Gamle Fysikk, Gløshaugen, Trondheim

**Attending (6):**

*External/guests:*
- Katarzyna Jakubzyk: PhD Internship at NTNU
- Sylvia Green: Exchange student at NTNU

*NTNU IØT:*
- Annik Magerholm Fet: Professor
- Sigurd Sagen Vildåsen: PhD student
- Michael Myrvold Jenssen: Researcher

*Master students:*
- Faheem Ali
- Gahyeong Kang

*Additionally, the following students submitted their project outlines for the summary:*
- Maria Tvedt
- Kristina Braut Kyllingstad
- Joost Kievitsbosch
- Hilde Martinsen
- Sigrun Søtvik

**The purpose of the seminar:**

The purpose of the seminar was to give students and researchers insights into what the researchers are working on, and an opportunity for students to present their specialization projects for the fall of 2014, related to the theme of the seminar, “Sustainable Life Cycle Management and Decision Support”.
3 Agenda:

13:00 – 13:30 Welcome to the seminar
Light lunch and introduction round

13:30 – 14:15 Staff Presentations
- The new NTNU Strategic Research Area: Sustainable societal development, with Annik Magerholm Fet
- PhD presentation, Sigurd Sagen Vildåsen
- The SISVI project and LCA case studies, Michael Myrvold Jenssen
- Introduction and internship work, Katarzyna Jakubczyk

14:25 – 15:15 Student Presentations
Presentations of your current working title, objectives and plans (including time schedule) for your specialization project, max 10 min per each including discussion and feedback.

Faheem Ali
Gahyeong Kang
Bishnu Chaudhary
Sylvia Green

15:15 – 15:45 Discussion and questions

All presentations are attached (see appendix).
4 Summary - researchers
The following are short summaries/outlines of the research activities presented.

4.1 Annik Magerholm Fet

Fakta om NTNUs tematiske satsning «bærekraftig samfunnsutvikling».

Hvorfor skal NTNU satse på dette?

Bærekraft er i sin natur en global utfordring. Tre sentrale fakta:

1. Målet om å bekjempe fattigdom og urettferdighet, samtidig som man ivaretar det globale miljøet for nåværende og fremtidige generasjoner, er vår tids største samfunnsmessige utfordring.


3. NTNU og Norge er sterke internasjonale aktør innen oljeutvinning. Men NTNU har også kompetanse og ansvar for å sikre at slik virksomhet forvaltes bærekraftig. NTNU er det eneste universitetet i Norge, og et av de få i verden, som har toppkompetanse på hele kjeden i oljevirksomheten – alt fra å finne olje til å bygge samfunnet med inntektene.

NTNU ønsker å være en internasjonal samfunnsaktør som skal bidra med forskningsbasert kunnskap til FN, Rio+20, EUs 2020 strategi og norsk klimapolitikk. NTNU ønsker å bygge en internasjonal lederrolle innen miljø- og bærekraftsanalyser, basert på noen av NTNUs fremragende miljøer. Dette gjelder blant annet ved Senter for Biodiversitetsdynamikk. Dette er et senter for fremragende forskning hvor biologer og matematikere jobber sammen for å finne svar på hvordan og for hvilken mangfoldet. Et viktig mål for forskerne er å utarbeide prinsipper for at de skal kunne anses som levedyktige over tid, og på hvilken måte levedyktigheten påvirkes.

Fire spydspisser i NTNUs satsning:


En bærekraftig utvikling krever klare mål, teknologiske muligheter, samt holdninger og insentiver som sikrer at samfunnets aktører velger en bærekraftig tilpasning. Vår satsing på dette punktet er overgripende for de andre spydspissene, og skal bidra til å sikre at mulighetene benyttes.


Byveksten har i løpet av de siste tiåra vært dramatisk. For første gang i historien bor mer enn halvparten av jordas befolkning i byområder. Innen 2050 vil dette tallet trolig stige til 70 prosent med en årlig vekst på 50-60 millioner innbyggere. Storparten av veksten vil komme i byer i utviklingsland med livstruende forhold. Byene er allerede den desidert største forbrukeren av energi, og står for 80
prosent av alle utslipp av drivhusgasser i verden. Urbaniseringen utgjør i dag en av de største miljøutfordringene jordkloden står ovenfor.


This PhD project is part of the research-based innovation project SISVI (Sustainable Innovation and Shared Value Creation in Norwegian Industry) that runs in the period of June 2014 to June 2018. SISVI is funded by the Norwegian Research Council.

The overall goal of SISVI is to develop knowledge that strengthens competitiveness of Norwegian companies through shared value creation and sustainability. The PhD project will focus on applicable roadmaps and practical decision-support methods for implementation of sustainability strategies in the participating companies. Thus, the research is prescriptive in nature and will be based on industry needs. The following research question is derived based on an analysis of relevant literature:

**How can decision-support methods improve corporate decision-making and performance in the context of sustainability?**

This broad question will be sought answered through sub-questions and a collection of 4 articles published in international journals. The industry orientation makes the case study approach suitable for designing the research, and the research follows an inductive reasoning. Furthermore, systems thinking and the systems engineering methodology will be applied as a scientific approach. The following table shows the underlying logic:

<table>
<thead>
<tr>
<th>Inductive research</th>
<th>Systems engineering methodology</th>
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<tbody>
<tr>
<td><strong>Guiding question:</strong></td>
<td><strong>Step 1 Identify needs</strong></td>
</tr>
<tr>
<td>What are relevant issues and requirements for key stakeholders?</td>
<td>Step 2 Define requirements</td>
</tr>
<tr>
<td><strong>Guiding question:</strong></td>
<td><strong>Step 3 Specify systems and their performance</strong></td>
</tr>
<tr>
<td>What decision-support methods are related to performance in the context of sustainability and competitiveness?</td>
<td>Step 4: Analyze and optimize</td>
</tr>
<tr>
<td><strong>Guiding question:</strong></td>
<td><strong>Step 5: Design, solve and improve</strong></td>
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<tr>
<td>How can selected tools and models increase performance in the context of sustainability and competitiveness?</td>
<td>Step 6 Test and Evaluate</td>
</tr>
<tr>
<td><strong>Guiding question:</strong></td>
<td><strong>Step 6 Test and Evaluate</strong></td>
</tr>
<tr>
<td>What are key success factors when applying tools and models?</td>
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How can decision-support methods improve corporate decision-making and performance in the context of sustainability?
The starting point is principles within life-cycle management (LCM) along with methods such as life-cycle analysis (LCA) and life-cycle costing (LCC). Emphasis is put on how these tools can improve corporate decision-making and performance in the context of sustainability. Furthermore, anchoring in the needs of Plasto, Ragasco AS and Raufoss Water and Gas will be prioritized throughout the semester (fall 2014).

4.3 Michael Myrvold Jenssen

LCA Case study (Norwegian)


En måte å møte disse kravene på er å utføre livsløpsanalyser (LCA), som gir en helhetlig oversikt over miljøbelastningen til et produkt eller tjeneste over hele livsløpet. Kobler man dette sammen med en livsløpskostnadsanalyse (LCC) kan man få frem samspill mellom kost og miljø, og da spesielt hvordan miljøbesparelser kan være kostnadsbesparende over tid. Denne helheten er viktig, og et «problem» er at bedrifter anskaffer LCA for å møte miljøkrav, men mangler kunnskapen til å bruke dette som et aktivt verktøy – og dermed realisere den faktiske nytteverdien av verktøyet.

Et eksempel ble vist:

4.4 Katarzyna Jakubczyk

General information about the research problem and topic of Katarzyna Jakubczyk

Governments are looking for the possibilities of preventing the public money westage. The society want to have useful infrastructure. Europe Union (EU) have aspiration for sustainable development and encourage to sustainable buildings (constructions) which is described in the Strategy 2020. It is also compatible with social responsible (SR) thinking.

Public Infrastructural Project (PIP) such as railway line, ring roads, university buildings, on the one hand bring the society benefits in the form of shorter time and safer transportation, as well as saving some money. Additionally PIP increase the level of country and continent development. On the other hand the same infrastructure investment can make people life difficult because of leading building works and making a noise during the execute phase of project. Moreover, the building can lead to changes in the landscape, dangerous for the animals threat of population health etc.

Each project have stakeholders, who want make and finish the project according the plan. Some of them want the small or bigger changes. There are also some people or groups who do not want to start the project or try to break it (choke a building). Although project managers acquire more and more experience in the making project process and building, however they too often ignore the
interests and threats carried for many stakeholders (from organization, local community the same as natural).

Some research show the public project which finish in time, costs, quality and scope (project triangle) but they do not reach the success because of not satisfied key stakeholders. It is harder to obtain the success if take into account that the stakeholders including customer of PIP can be anyone from the world in the globalized world. The SR conception is using by companies, universities and NGOs for carrying about a relations with stakeholder. It could be also the remedy for fulfilling the expectation of PIP stakeholders. How social responsibility rules, behaviors, issues can be use in the PIP will be checking in the research the same as if it help in project management.

In order to checking the influence of social responsibility behaviors regards stakeholders on the reaching the success of project and its product, some big infrastructural public projects which are build by the university for increase the research and development possibilities will be analyze. It is important to select the PIP which are big (cost millions euros), they are almost finished or at least in the end of construction works stage and executed in time, cost and scope.

On the internship at NTNU it is important to write an article for high quality journal such as: Corporate Social Responsibility and Environmental Management, International Journal of Environmental Science and Technology, Business & Society or other. It will be the comparison of two PIP in order to identification of influence of social responsibilities behaviors regards stakeholders on project and product success through: recognize the key stakeholders, identification of social responsibility issues and best practices the same as potential mistakes.

4.5 Dina Aspen

Sustainability appraisals in ship acquisition
- A multi criteria perspective

Sustainability appraisals of ships and ship systems has become a natural part of the decision making process in ship acquisition due to regulatory requirements and technology development aimed at mitigating environmental impacts from shipping. In evaluating prospective ship designs, owners are required to consider several conflicting criteria simultaneously to arrive at a preferred design, such as costs/profits, technical/functional performance, risk and safety aspects as well as environmental impacts over the ship life cycle. This thesis seeks to provide a framework for structuring and modeling these decision problems in a manner that assists ship owners and other decision makers in the ship acquisition process in making value focused decisions. The thesis explores the following research questions

- What are the important criteria in sustainability appraisals and how can they be operationalized?
- Which multi criteria models are suitable for ship acquisition decision contexts?
- How can decision problems in ship acquisition be structured and modeled from a multi criteria perspective?
- How can holistic sustainability appraisals help decision makers evaluate life cycle impacts in ship acquisition?
- How can uncertainty be dealt with in ship acquisition decision-making processes?
5 Summaries of master students’ specialization projects

The following are short summaries/outlines of the various students’ specialization projects.

5.1 Joost Kievitsbosch and Bishnu Chaudhary

**Working title**

*Trust and Transparency: In the Norwegian firms’ Supply Chains and Networks*

**Focus**

Working in WP3 (SISVI)

**Preliminary problem statement**

“How can trust and transparency help the Norwegian firms’ strategies for sustainable value creation in the supply chain and network?”

**Preliminary project plan**

1. **Research on trust and transparency.** What is it? How can trust and transparency be established and improved?

2. **Research on supply chains and networks.** How do firms cooperate within these chains/networks? What are the main shortcomings within these chains/networks? (assuming trust and transparency are main factors)

3. **Linkage between trust/transparency and the supply chains/networks.** How can the knowledge about trust and transparency positively influence the supply chain and network for Norwegian firms?

4. **Improvement.** How can the Norwegian firms’ supply chain and network be improved regarding trust and transparency in the supply chain? (Maybe starting some shared project between those firms where they discuss best practices and experiences: learn from each other)

**Points of attention**

What kind of trust?
What kind of transparency?
Barriers and drivers
Advantages and disadvantages
Regulations

5.2 Hilde Martinsen and Maria Tvedt

**A discussion of tools that can contribute to Shared Value Creation in Norwegian industry**

Maria Tvedt and Hilde Martinsen

Shared Value Creation has been presented as a way for businesses to take social responsibility while simultaneously creating value for the business. However, the literature seems to lack guidelines for how business managers should use the SVC concept in day-to-day business.
Our project specialization will try to give an overview of different tools that can be used to integrate the SVC philosophy with the company’s strategy. To do so, we are performing a literature review of different tools related to value chain and life cycle management. We will present different tools and discuss their scope and relevance to SVC. In addition, we will look at synergy effects from combining different tools. By doing so, we hope to be able to create a framework that can be used by the case companies in the SISVI project.

Tools that will be evaluated:
Value Chain Analysis
Life Cycle Assessment
Life Cycle Cost
(Lean tools - maybe)

By providing the companies with a framework we hope to make the concept of Shared Value Creation more approachable. We also hope that the tools provided will be used to discover new potential for creating shared value.

5.3 Kristina Braut Kyllingstad
Corruption and anticorruption tools from a corporate perspective

The thesis will focus on corruption from a business perspective, aiming to identify relevant questions, challenges and provide input for further research. Firstly, the thesis will explore characteristics of corruption from a corporate perspective, reviewing definitions, causes and damages of corruption. The analysis is limited to Western/Norwegian multinational companies, focusing on relevant challenges in a globalized world. In particular, the analysis aims on identifying challenges of a corrupt environment, to form a background for the latter part of the thesis.

- **RQ1: What is corruption in a corporate perspective?**

The latter part of the thesis, aims on a broad overview of anti-corruption, ranging from corporate governance tools, broader factors such as culture and tools for management, control and risk assessment.

- **RQ2: Which tools and measures can be used to promote anti-corruption in businesses?**

A literature review is to be used for both parts of the thesis.
5.4 Sigrun Søtvik

Current working title: "Environmental declarations for building products: continuous improvement or continuous confusion? - From a user perspective".

Objectives:
- To identify what the role of EPDs for building products are in a green economy
- Get a general idea of what users of EPDs for building products think are strengths and weaknesses of the EPD
- Get a general idea of how the information in EPDs for building product is being used
- Get a general idea of how users of EPDs for building products think that information in the EPD could be used
- Get a general idea of how users of EPDs for building products think the use of EPDs can contribute to continuous improvement in the construction industry

There will be conducted a small literature study and a couple of simple, semi-structural interviews, to answer these questions. The interviews will mainly be of chosen people in the building company HENT, one of our "byggherrer", but also from EPD Norge, SINTEF Byggforsk and a developer of EPDs for building products.

In addition, an important goal for the specialization project is to use the results from the specialization project to refine the further research in the master thesis. It could emerge some information during interviews that may be particularly interesting to investigate further.

My plans/time schedule:
- Make an interview guide, complete the literature study and the method part (before 3rd of October)
- Conduct the interviews (during October)
- Analyze and write the results and discussion part (November)
- Deadline for submitting the specialization project, and make the final objective(s) for the master thesis: 17th of December
### Pre-Project Outline (Draft)

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<th>Topic</th>
<th>Environmental Life Cycle Management and Decision Support</th>
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<tr>
<td>Goals</td>
<td>Having an academic background for master thesis by understanding the concepts of LCM, Sustainability management and environmental management (in the maritime industry’s point of view) and correlations between them.</td>
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<tr>
<td>Activities</td>
<td>Reviewing, classifying and evaluating frameworks and regulation for Sustainability management (in the maritime industry)</td>
</tr>
<tr>
<td>Methodology</td>
<td>Methodology is based on literature survey</td>
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  - Methodology
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  - Regulations
  - Frameworks
- LIFE CYCLE MANAGEMENT AND ENVIRONMENTAL MANAGEMENT
  - Life Cycle Management
    - Definition, Life Cycle Thinking
    - LCM-models
  - Ship’s Life Cycle
    - Operation and maintenance
  - Sustainability Management
    - Environmental Management
- DISCUSSION
  - Environmental management tools for LCM-models
  - LCM for Maritime industry.
- CONCLUSION
- REFERENCE
- Further work (Thesis) | Assessing correlation between Maintenance & Environmental performance |
LNG Bunkering: Challenges and Possibilities

Student: Faheem Ali
Study Programme: MSc Project Management, IØT

Summary of Presentation (Sep 26)

The project would focus on the Liquefied Natural Gas (LNG) usage in ships as a marine fuel and the bunkering market for LNG fuelled ships. LNG has been in use for a long time in the maritime industry. However, it has never been widely used compared to other marine fuels such as MDO and MFO. The increased focus on environmental impact and the emissions from these conventional fuels had triggered the search for an alternative marine fuel. LNG is touted to be a cleaner and environment friendly substitute to many fuels currently being used. However, the LNG bunkering market and the LNG supply infrastructure is yet to be scaled up in order to meet the increased demand.

The project would take a ship manufacturer’s perspective while looking into the current scenario of LNG Bunkering market and the challenges it faces. The report would focus mainly on two areas, namely:

1. Challenges LNG bunkering is currently facing and the market condition
2. Identifying the risks involved in the bunkering activity (financial and technical)

The following areas would be addressed under each aforementioned topics:

1. Challenges LNG bunkering is currently facing and the market condition
   - Statistics on LNG bunkering market
   - Current LNG bunkering vessels status
   - Different types of LNG bunkering vessels
   - Economic viability of the vessels currently in operation
   - Existing practices in manufacturing of the LNG bunkering vessel
   - Supply chain limitations
   - Financial feasibility and projected market growth for the bunkering vessels
   - Recent developments in new types of LNG bunkering vessels and their economic dimensions

2. Identifying the risks involved in the bunkering activity (financial and technical)
   - Cost/benefit analysis of the LNG bunkering vessels
   - Required maintenance cycles
   - Technical challenges in developing a feasible bunkering vessel
   - Loss of commercial space on board vessels
   - CAPEX and OPEX in comparison to normal bunkering vessels
   - Business competition from LNG terminals to supersede the bunkering vessels
   - Regulations and codes addressing these risks
6 Appendix – Slides

**Sustainable Societal Development**

Arnt Magneboim Føl, Dr Ing, Professor
Director of Strategic Thematic Area Sustainable Societal Development
Norwegian University of Science and Technology (NTNU)
16.09.2014

**NTNU’s four strategic research areas 2014–2023**

NTNU has designated four strategic areas that have formed networks across faculties and departments to bring the best minds to work on cross-disciplinary subjects.

- Energy
- Ocean science and technology
- Health, welfare and technology
- Sustainable societal development

**Sustainable societal development**

- Conditions for sustainable politics and practices.
- Sustainable buildings, urban design, and transport solutions in cities.
- Understanding relationships between human activities and sustainable use of natural resources.
- Analytical tools that quantify the environmental impacts at the community level, product and business level.

**Examples of research questions**

- How can attitudes be influenced so that participants make decisions that support sustainable development?
- Should the design of social institutions be different if they manage non-renewable resources compared to if they manage renewable resources?
- How to conduct good governance to stimulate sustainable solutions?
- Which conditions are necessary for Norwegian sector to contribute to sustainable development?
Examples of research questions

SO2: Sustainable urban development

• How to prepare cities to tolerate the impacts of climate change?
• How to develop urban structures that minimize the need for transport and provide good conditions for sustainable transport (walking, cycling and public transport)?
• How can governments and suppliers of goods and services develop effective solutions for distribution in densely populated urban areas?
• Which institutional and procedural measures are necessary to integrate in urban development strategies?

SO3: Biodiversity and ecosystem services

• How robust are the various components of biodiversity and ecosystem services to the changes in land use?
• Is it possible to identify threshold values for populations and species’ response to environmental changes?
• How can biodiversity and ecosystem services be valued?
• How can we further develop and standardize the existing methods and technologies for mapping and monitoring biodiversity and ecosystem services?

SO4: Environmental and sustainability analyses

• How can we develop robust methods to correctly calculate and compare the environmental impact of different human activities?
• What is a sustainable lifestyle?
• How do analyses at the micro level (company level) connect to analyses at a meso- (region / large project) and macro level (society)?
• How can we connect knowledge about the effects land use and changes in land use have on biodiversity, with other environmental impact assessments?

Pervasive themes:

Climate, both understood as "mitigation" and "adaptation"

Land- and land use changes is important for the development of sustainable cities, changes in biodiversity and ecosystem services. Efficiency of energy, land and material resources is crucial for the realization of a sustainable development. Enabling technologies; information- and communication technology and materials technology

Fairness for poor countries and individuals, nature and future generations
Knowledge for a better world!

What are our major challenges?
• Preservation and management of natural resources
• Sustainable transport, production and consumption
• Climate change and clean energy
• Public Health
• Social inclusion, demography and migration
• Global poverty and the challenges of sustainable development

NTNU’s fundamental strengths:
• Technology and the natural sciences
• Broad academic base
• Interdisciplinary collaboration

Characteristics for the 4 new strategic research areas

Complex problems demand cross-disciplinary competence

Need for cooperation between technology, natural sciences, social sciences and governance

System thinking: integration of knowledge from the individual disciplines

Industrial Ecology, CSR and Green Value Creation at NTNU

Industrial Ecology is the broad framework for modeling production and consumption systems on natural eco-system principles in order to achieve industrial systems that are more eco-efficient and adjusted to the nature’s tolerances.

2-years international master program

IE studies
• the flows of energy and materials in industrial and consumer activities,
• the effects of these flows on the environment,
• the influence of economic, political, regulatory and social factors of the flow, use, and transformation of resources
Industrial Ecology, CSR and Green Value Creation, NTNU

Corporate Social Responsibility (CSR) is about business taking responsibilities beyond that of creating economic value.

CSR-Norway:
- is the premier Norwegian network of academic and industry organizations
- exists to establish a network between academic institutions and industry at the national, regional and local levels
- stimulates research aimed at increasing the CSR competence of Norwegian organizations
- will promote best practice in the international community

Green Value Creation, a multidisciplinary strategic research area, with the overall goals to:

- contribute to increased competitiveness and sustainability for industry and public sector by means of environmental value creation
- facilitate collaboration between researchers and external stakeholders

Increased use of systems thinking
The value of life cycle assessment as a tool

Michael M. Jenssen
Department of Industrial Economics and Technology Management, NTNU

Program:

1. Background
2. What is life cycle assessment (LCA) and life cycle costs (LCC)?
3. Examples of LCA in use: case screening in SISVI
4. Capturing the value of LCA and LCC

Background

- Increasing pressure on environmental conduct for Norwegian companies
  - Stakeholder pressure and initiatives
    - Environmental documentation, eco-labels, environmental product declarations (EPDs)
  - Legal
    - Product control Act (1976)
    - Procurement Act (2001)
    - The public purchaser shall assess the environmental consequences of the procurement
    - The updated Accounting Act (2013)

Life cycle assessment

- A holistic approach and overview of the environmental impact of a product or service
- Includes consumption of materials and energy, emissions and wastes
Life cycle cost analysis

- An overview of the costs incurred over the whole life cycle of a product or service
- Renders visible where in the life cycle costs occur

Typical costs
- Investments
- Operation and maintenance
- Disposal
- R&D

Plastics – LCA screening

- High-density polyethylene, injection molded
  - Incineration plant or waste disposal plant?
- Global Warming Potential for 1kg of HDPE:

  Scenario 1 - 80% for incineration, 20% to landfill. No recycling.

  Scenario 2 - 20% for incineration, 80% to landfill. No recycling.

The value of LCA

- Beyond meeting stakeholder demands?
- In the design phase
  - Choosing production techniques
  - Material choices
  - Design choices for better products
- Meets demands for documentation
- Tool for setting up environmental management systems
- Increases internal competence in the company (e.g. purchasers, designers etc.)
- Competitive advantage
  - Double edge; early adopters may have an advantage – but do they get the recognition for it when no one else uses it?
- Helps to see where there are ‘hot spots’ in the production or value: Energy expenditure, costs, environmental problems etc.

Value of combining LCA and LCC?

- Increases value and relevance for decision making
- Makes visible the relation between environmental ‘costs’ (burdens) and monetary costs
- SISVI goals
Social Responsibility in the Project context

infrastructural, public projects

Katarzyna Jakubczyk
PhD student
Gdansk University of Technology

Presentation plan

1. Introduction to the research problem
2. Internship plan

Abbreviation:
PIP – Public Infrastructural Project
SR - Social Responsibility

Short story about PIP

Short story about PIP
...Social Responsibility

Research Design - thesis

Research Design & Research Methods

Research beginning

Research question:
How the social responsibility behaviors influence on the success of project and product?

The Aim:
• recognize the SR behaviours
• identification of best practices and potential errors
• checking the influences of SR on the success

Research design - article

feasibility studies
Results

- Key persons and groups of stakeholders for product on each phase of project and for the product
- Features of social responsibility projects
- Best practices
- Influence of SR on the success

Tusen takk

Sustainable Innovation And Shared Value Creation In Norwegian Industries (SISVI)

WORK PACKAGE 3
Luitzen deBoer, Supervisor
Bishnu chaudhary MSPROMAN
Joost Kievitsbosch MSGLOMAN

Sustainable Development
Norwegian ministry of finance

- Decreasing the pressures in earth’s ecosystems
- Lifting millions out of poverty
- Preventing climate change disaster
Sustainable Development Principles (UK and Ireland)

- Core strategies should be defined by societal needs, NOT the conventional business needs.
- Should be scalable
- Measurable benefits
- Sources of competitive advantages

Shared Value Creation (Porter & Kramer)

- Core strategies should be defined by societal needs, NOT the conventional business needs.
- Should be scalable
- Measurable benefits
- Sources of competitive advantages

Key objectives in WP3

- Drivers and barriers of shared value creation
- Examining the behaviour of Norwegian industries and counterparts, how they respond to the drivers.
- Strong, weak and conflicting drivers in sustainable supply chain

Contd...

- At what level are the drivers ignored or passed further upstream or downstream
- How firms can influence the interaction in supply chains?
  - Determinants for the synergies in the inter-business networking
Drivers of shared value creation

- Demand planning within the firms
- Inventory
- Transportation
- Facilities
- Innovation and Technology

Drivers contd.

- Information and Technology
- Outsourcing
- Globalization
- Increased competition and pressure in prices

Barriers for sustainability

- Government and international regulatory policies
- Corporate social responsibility being a form of obligation
- Lack of leadership
- Too expensive initiative

Barriers contd..

- Lack of trust between the networking partners
- Non transparency of the organization policy on supply chain practices
- Supplier options
Thank You
Alone we can do so little; together we can do so much.  - Helen Keller

Sustainable Life Cycle Management and Decision Support

Research seminar
26.09.2014
Gahyeong Kang

Personal Information
- Republic of Korea (South Korea)
- Marine Technology Department, Specializing in Marine Operation & Maintenance.
- BEng in Naval Architecture & Ocean Engineering (PNU, 2013)
- 1 year Exchange student in NTNU (2012)
- Summer Internship in DNV GL (2014)

Project work title
- Sustainable Life Cycle Management and Decision Support

Life Cycle Management
Environmental management
Naval architect
Ship industry
Operation & Maintenance
Planed Work & Objectives

Objective
- Understanding key concepts of LCM-models and environmental management.
- Describing how environmental management tools can be combined into an LCM-model.

Objective
- Exploring the relationship between design for maintenance, LCM-models and maintenance management of a ship.
- Selecting a promising technology of improved environmental performance and assessing its impact on sustainability & system availability.

Actual Activities in Fall 2014

- Reviewing, classifying and evaluating frameworks and regulation for sustainability management (in the maritime industry).
- Reviewing literature and characterize LCM-models.
- Understanding and describing how environmental management tools can be combined into an LCM-model.

Guidance & Supervision

- Environmental Management- Annik Magerholm Fet
- Life Cycle Management- Dina Margrete Aspen
- Maintenance Management- Ingrid Bouwer Utne

Please give you feedback!
Thank you.
LNG Bunkering Possibilities and Challenges

Faheem Ali
MSc Project Management
Department of Industrial Economics and Technology Management

Background

- Liquefied Natural Gas
  - LNG price range: 3 Euro/GJ - 4 Euro/GJ, over the past 10 years
  - NOX, SOX and PM emissions are considerably lower
  - LNG transportation has been the costliest element
  - Environmental consequences of spillage is lower than conventional fuels
  - Low Global Warming Potential
  - Fuel of choice in ECAs

- However it is yet to capitalize on these advantages and become a common fuel in ships

Project Definition

- The project would look into the challenges LNG bunkering is currently facing and the market conditions.
- The project also aims at identifying the risks involved in the bunkering activity (financial and technical)
- MCDA approach would be used to prioritize these risks
- Analysis of the MCDA results to identify the opportunities in the LNG Bunkering Industry from a Shipyard owner’s perspective

Chapters Outline (tentative)

- Introduction
  - Introduction to LNG and its features
  - SUSPRO
  - A brief introduction to tools used in the project
  - LNG in Ships - needs and regulations
  - What is LNG Bunkering

- Literature Overview
  - Brief history of LNG Bunkering
  - Recent trends in the LNG Bunkering Market
  - Challenges in LNG Bunkering
  - Current situation of LNG Bunkering technology
Chapters Outline (Contd.)

- MCDA
  - MCDA Theory Introduction
  - Identify and prioritize risks that need to be mitigated in LNG Bunkering
  - Analysis of MCDA results
- Discussion of Results
- Conclusion and future work areas

Thank you