



LUND UNIVERSITY

Benchmarking Environmental Policy in Transportation

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Executive Summary

Title: Benchmarking Environmental Policy in Transportation

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Problems: Transportation is one of the major contributors to environmental destruction. In order to achieve the goal of reducing CO_2 emission, Skånemejerier would like to enhance their performance in green transportation. Therefore there is a need to know the current trend and possible improvement in Skånemejerier's transportation policy and strategies.

Purpose: To identify improvement opportunities for Skånemejerier's environmental policy and strategies in Transportation, by benchmarking with other companies under the framework of green transportation characteristics.

Method: This project will perform content analysis mostly towards source of written information, for example articles, journals, institution website, official company website, environmental report, and corporate social responsibility report. This thesis utilizes the method of benchmarking for analysis. The benchmarking is conducted under the framework of green transportation characteristics, against direct competitor in the dairy industry, as well as the leading companies in the field of logistics.

Conclusion:

The objective of the research is to identify the improvement gap and provide suggestions for Skånemejerier. The findings are divided into two main topics, firstly, the review on environmental policy documents, which is the foundation of gaining capability in environmental management and secondly, the result of benchmarking in environmental policy and strategies.

For the first finding, in part of environmental policy documents, we would recommend to develop a comprehensive environmental policy document, especially for transportation operations which follow the guideline of creating environmental policy in section 6.1. A comprehensive policy document will remind the company about the relevant environmental regulations, improve the environmental impact monitoring system, and It shall be used for internal and external communication. Furthermore for external communication, expressing environmental commitment can increase the company image, and lead to increase in economic benefit.

The second finding about the result of benchmarking policy, in this research we used The European Parliament (2010) and the Clecat Best Practice Guide (2010) which is provide an extensive list of green characteristics to describe the current trend and FreightVision Europe 2050 (2011) to provide the future perspective as a framework for benchmarking.

As per the standards as mentioned above, we are able to conclude the list of green transportation characteristics accordingly, which are network optimization, route planning, intermodal solution, space efficient on vehicle utilization, intercompany transport consolidation, eco-driving, technology innovation in engine and other vehicle's component, environmental reporting and alternative fuel.

The benchmarking between Skånemejerier and the direct competitor in the dairy industry, as well as the leading companies in the field of logistics is conducted in order to identify the gap of improvement and provide the suggestions for Skånemejerier. The following are the list of recommendation according to the benchmarking result;

Network optimization

- Re-think number of links and length of the distribution system both Raw milk and Finished goods.

Route Planning

- To consider the possibility of enhancing the existing computerizes system to be able to retrieve real time traffic information and provide the most traffic-free route . (The research shows an expectation of 15% reduction in fuel consumptions)
- Ensure that the training course and periodical refresh course on using the computerized navigation system are in place.

Reverse logistics

- To consider setting "Proportion of vehicle-mileage run empty" as one of KPI to encourage an improvement in reducing unnecessary emissions.
- To increase the load utilization of return journey by carrying raw materials, packaging materials or any goods belong to other companies

Intermodal solution

Future Impact Key concern:

- EU policy tend to go with intermodal and Sweden try to align, by initiated “Green corridor” project.
- The inter-modal would be the effective tools for transportation across the border.

Recommendation

- The company should prepare the options to apply intermodal concept in the long term strategic plan.

Space efficient handling system

- Set KPI related to capacity utilization in Finished goods transportation for example *Percentage of space occupied by load (3 dimension)* or *Proportion of floor area covered (2-dimension)*
- Campaigns to motivate and maintain awareness of employee to work follow the standard.

Eco-driving

- Ensure that all drivers participate in training and period of refresh training
- Set campaign to motivate and encourage drivers to participate in environmental friendly driving behavior

Fuel efficient engine, Tires and Aerodynamics

- Besides fleet renewal, Skånemejerier should consider vehicle’s parts renewal.
- To monitor EU regulation regarding new technologies, such as Euro 6 and its due date, in strategic transportation plan.

Keywords: environmental policy, environmental strategy, green transportation, benchmarking.

This thesis has been written as a part of the degree project course in the Masters program “Sustainable Business Leadership” at the School of Economics and Management, Lund University.

The course was based on the methodology of action learning and self-managed learning. The students were all assigned to an in-company project as consultants. As a part of course the students were responsible for organizing several learning events addressing relevant issues related to the in-company projects. The students continuously documented their learning in learning journals and participated in tutorials on these journals. The assessments of the students are done partly on the written thesis, partly on the consultancy process and report to the client company, partly on performance in learning events and other parts of the course and partly on the ability to document and reflect on the student’s individual learning and development.

Acknowledgments

This has been truly an interesting period. There are many people who have helped us make this thesis possible, to whom we would like to express our thank you.

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To Chaiwat, our Family and Friends for their continuous support.

Though far from perfection, we hope this thesis would bring benefit to the readers.

Lund, June 2, 2011,

Tantip Puwiwattanangkura & Hilda Meutia

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Abbreviations

| | |
|--------------|--|
| ATM | Available Ton Mile |
| BPG | Best Practice Guide |
| BRC | British Retail Consortium |
| CNG | Compressed Natural Gas |
| EPA | States Environmental Protection Agency |
| GHG | Green House Gas |
| GPS | Global Positioning System |
| HACCP | Hazard Analysis Critical Control Points |
| HFC | Hydro-Fluoro-Carbon |
| HGV | Heavy Goods Vehicle |
| HVO | Hydro Treated Vegetable Oil |
| IEMS | Integrated Environmental Management System |
| ISO | International Organization for Standardization |
| KPI | Key Performance Index |
| LPG | Liquid Petroleum Gas |
| QEHS | Quality, Environmental, Health and Safty |
| RECs | Renewable Energy Credit |
| SRA | Swedish Road Administration |

Chapter 1

Background

This chapter describes background information of the research. The description, objective and delimitations of the research are presented in Section 1.1 and the background of Skånemejerier is described in Section 1.2.

1.1 Project Specification

1.1.1 Problem Description and Project Objectives

Transportation is one of the major contributors to environmental destruction. In order to achieve the goal of reducing CO_2 emission, Skånemejerier would like to enhance their performance in green transportation. Skånemejerier's environmental report 2009 has described various efforts, such as utilizing biogas and implementing eco-driving. However, those are relatively general approaches to green transportation. To explore the new area of green initiatives in transportation and identify the potential initiatives for Skånemejerier to take into their consideration, the current and future trend of green transportation policy and strategies are required.

Therefore, the main research question is,

“What are the improvement gaps of Skånemejerier's environmental transportation policy and strategies?”

In order to obtain data to answer the main research question, there are series of sub-questions to be examined:

Documentation

- Is the Skånemejerier policy and strategies in Transportation well documented/communicated internally and externally? What can be improved and why is this important? (Section 6.1.)

Policy & Strategy

- What are the characteristics of green transportation ? (Section 2.3)
- Does Skånemejerier fit the green transportation characteristics? (Section 6.2)
- Based on the characteristics identified above, how does Skånemejerier perform comparing to the competitor and Best Practice companies in logistics?(Section 6.2)

1.1.2 Project Objective

To identify improvement opportunities for Skånemejerier's environmental policy and strategies in Transportation, by benchmarking with other companies under the framework of green transportation characteristics.

1.1.3 Project Organisation

Client: Skånemejerier - Stig Olesen, Rickard Carlvik, Lars Erik Olofsson

Project Facilitator: Stein Kleppestø

Examiner: Christine Blomquist

Project group: Hilda Meutia, Tantip Puwiwattanangkura

1.1.4 Delimitations

- The information on company's environmental policy and strategies are limited to the information available on the official websites or public sources.
- The information retrieved from company's official website is intended for advertising and communicating the competitive advantage of the company, hence it might be biased.
- Lack of the primary information from the companies in-depth interview

The analysis is mainly based on qualitative data; which is rather subjective. Since it could not be directly compared as in quantitative analysis. The analysis might be bias because of the interpretation of data is based on author's opinion, perspective and experiences.

1.2 Company Background –Skånemejerier

1.2.1 Company Description

Skånemejerier is a cooperative owned company by about 600 dairy farmers in southern Sweden with turnover around 3 billion SEK and has approximately 580 full-time employees. The Skånemejerier Group includes the subsidiaries Hjordnära, Lindahls Mejeriprodukter and Östgöta Mjölk. The key products of Skånemejerier are juice, fruit drinks,

1.2. COMPANY BACKGROUND –SKÅNEMEJERIER

yoghurt and cheese. The year 2009 was an exciting year for Skånemejerier, as several products were launched such as gourmet butter, organic milk and yoghurt from Hjordnära. [3]

1.2.2 Quality Policy

In order to ensure product quality and food safety, Skånemejerier is certified for ISO9001, British Retail Consortium (BRC) and Hazard Analysis Critical Control Points (HACCP). HACCP is a system to monitor and control food safety by implementing risk analysis on product and process then define control points where there is the risk that such microorganisms can survive. Those quality control systems are part of daily operations to ensure that only high quality of products reaches the consumers.[3]

In addition, Skånemejerier is certified for environmental standard that is ISO14001:2004. Skånemejerier use ISO14001 as a tool to help them identify, prioritize and manage their environmental risks.[4]

Chapter 2

Theoretical Framework

This chapter described the theories which used as principle to analyze the data throughout the research. Section 2.1 describes how to create an environmental policy and its benefits; Section 2.2 the theory of benchmarking method is described; and in Section 2.3 presents the theory of Green transportation.

2.1 Environmental Policy in General

2.1.1 Creating an Environmental Policy

International Organization for Standardization (ISO)14001 is one of the environmental management systems that is considered as the most common and internationally known. As mentioned by Bansal and Hunter (1996), creating environmental policy is the first step of implementation in order to comply with ISO14001. The environmental policy has to be defined by Top management and ensured that:[5]

- It is relevant to nature, scale and environmental impacts of activities and products within the defined scope;
- a commitment to continuous improvement and prevention of pollution are included;
- a commitment to comply with relevant environmental legislation or regulations, and any other environment requirements that the company would like to apply;
- provides the reference for setting and constantly reviewing environment objectives and targets;
- It is documented, implemented, maintained and communicated in organization;
- It is available to the public.

Moreover the policy should focus on the significant impact on the organization. For example the logistics provider company should have focused on transportation, either transportation mode or fleet efficiency, rather than administrative operations.[6]

2.1.2 Creating an Environmental Policy Statement

Nowadays, many companies recognize the benefit of drafting an environmental policy statement. Companies and businesses often create policy statements that summarize the objectives and goals of their business and setup the criteria to achieve those objectives and goals. By drafting an environmental policy statement, the company is able to begin to elaborate what is already understood and practiced on the company; and also provide a framework for future improvement and resource conservation.[5]

The commitment to the environment, employee health and safety is declared in an environmental policy. To consider about scope of environmental policy, the following steps have to be applied:[2]

- Refine list of environmental issues – List the general environmental concerns which can be addressed in the environmental policy statement
- Set policy boundary – consider scope of the policy, whether external operations for instance environmental performance of suppliers should be included or not. Consider also how to include outsourcing or contractors that working on site. Dropping down the issues that fall outside the scope of policy and as the company gain more experience, the company might consider on expansion of the scope of policy again.
- Draft the environmental policy statement in general term – identify list of specific issues in the policy statement. For example, if the chemical in the water from manufacturing process is potentially impact to community, the company should ensure about the process of reviewing and managing the impact properly.

Table 2.1 is a sample policy document in some way corporate most of the principles mentioned above; modified based on Integrated Environmental Management System (IEMS) Implementation Guide: Creating an environmental policy, States Environmental Protection Agency (EPA).[2]

An environmental policy should build the foundation of an environmental improvements made for the company. The significant benefits of having the environmental policy can be, for instance to help reminding the company of regulations compliance, to conserve energy and other raw material, to improve monitoring of the environmental impact, to enhance productivity which lead to reduce cost and to keep communicate with employees about their role and responsibilities to environmental issues. Moreover by demonstrating the commitment to environmental management system, the company is able to develop the good relation with stakeholders such as customers, suppliers or contractors, investors and local community which lead to the increased of company image and also economics benefit such as increased sales volume, market share or investment. [7]

2.1. ENVIRONMENTAL POLICY IN GENERAL

Table 2.1: Example of Environmental Policy, [2]

| | |
|--|------|
| THE COMPANY (AAA) | |
| HEALTH, SAFETY AND ENVIRONMENTAL POLICY | |
| <p>Here is the policy statement; AAA company is committed to managing Health, Safety and Environmental (HS&E) matters as an integral part of our business. In particular, it is our policy to assure the HS&E integrity of our processes and facilities at all times and at all places. We will do so by adhering to the following principles:</p> | |
| COMPLIANCE | |
| <p>We will comply with applicable laws and regulations and will implement programs and procedures to assure compliance. Compliance with HS&E standards will be a key ingredient in the training, performance reviews, and incentives of all employees.</p> | |
| RISK REDUCTION, PREVENTION, RESOURCE MANAGEMENT | |
| <p>We will seek opportunities, beyond regulatory compliance requirements, for reducing risk to human health and the environment, and we will establish and meet our own HS&E quality standards where appropriate.</p> | |
| <p>We will employ management systems and procedures specifically designed to prevent activities and/or conditions that pose a threat to human health, safety, or the environment. We will look for ways to minimize risk and protect our employees and the communities in which we operate by employing clean technology, including safe technologies and operating procedures, as well as being prepared for emergencies.</p> | |
| <p>We will strive to minimize releases to the air, land, or water through use of cleaner technologies and the safer use of chemicals. We will minimize the amount and toxicity of waste generated and will ensure the safe treatment and disposal of waste.</p> | |
| <p>We will manage scarce resources, such as water, energy, land, forests, in an environmentally sensitive manner.</p> | |
| COMMUNICATION | |
| <p>We will communicate our commitment to HS&E quality and to our company's environmental performance to our employees, customers and other stakeholders. We will solicit their input in meeting our HS&E goals and in turn will offer assistance to meet their goals.</p> | |
| CONTINUOUS IMPROVEMENT | |
| <p>We will measure our progress as best we can and review our progress at least on an annual basis. We will continuously seek opportunities to improve our commitment to these principles and to improving our environmental performance, and we will periodically report progress to our stakeholders.</p> | |
| (Signature) President | Date |

2.2 Benchmarking

2.2.1 Definition

Benchmarking is a method of measuring and improving organizational performance by comparing ourselves with the best. Two aspects of benchmarking are:

- Comparison to a certain organization(s) which has achieved superior performance level.
- Identification, adaptation/improvement, and adoption of the practices that lead to these superior levels of performance.[8]

Various literatures indicate that benchmarking methodology performs the same function as performance gap analysis. The gap between internal and external practices reveals what changes are necessary. [9]

2.2.2 Type of Benchmarking

Benchmarking can be classified into two main categories, namely internal and external. Internal benchmarking relies on sharing opinion between departments within the same organization. Once a part of an organization has better performance indicator, others can learn how it is achieved. The advantage of internal benchmarking is an easier data access and a similarity in culture and system. On the other hand, external benchmarking deals with seeking new ideas and method from external organization. This external organization can be a direct competitor (Competitive benchmarking) or those that are best in business from a different industry, yet performs similar activities (Functional benchmarking). External benchmarking can also be done between two companies under a benchmarking agreement, to assure that benefit is felt by both organization rather than one (Relationship benchmarking). [9]

2.2.3 Stages of Benchmarking

Zairi (1988) suggested that decision to benchmark started by answering the following most basic questions:

- *What do we want to benchmark and why?*
- *How relevant is the area to our strategic plan?*
- *How prepared are we to embark on such initiatives?*
- *What are the likely benefits we should expect?*
- *What is the likely impact expected on our competitiveness?[1]*

Figure 2.1 is an example of stages taken in the benchmarking process as applied by the American Express.[1] At each stage, there are key activities that need to be considered, for example acquiring commitment, and deciding on what improvement suitable for adoption.

2.3. GREEN TRANSPORTATION

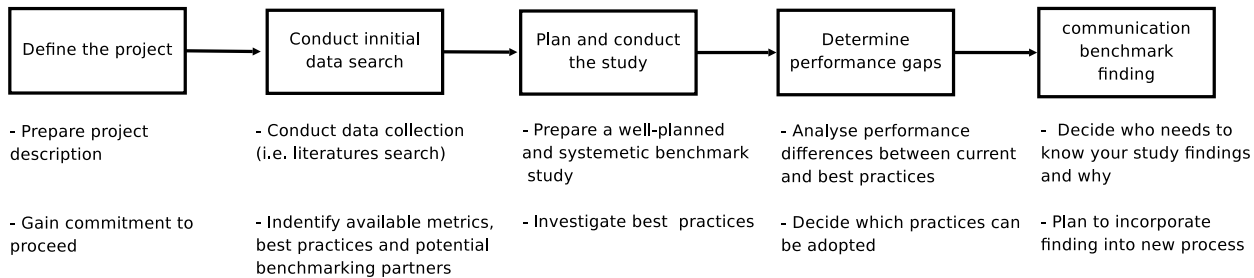


Figure 2.1: Stages in Benchmarking Process, modified from [1]

2.3 Green Transportation

Logistics deals with the transport, storage and handling of products as they move from raw material source, through the production system, to their final point of sale or consumption. The distribution of goods may have negative impacts on the local air quality, generates noise and vibration, causes accidents and makes a significant contribution to global warming [10]. Green Logistics refers to supply chain management practices and strategies that reduce the environmental and energy footprint of freight distribution. It focuses on material handling, waste management, packaging and transport.[11]

Among the activities of logistic, transportation seems to have a larger impact on the environment. It is estimated that freight transport accounts for roughly 8 per cent of energy-related CO_2 emissions worldwide. The inclusion of warehousing and goods handling is likely to add around 2–3 per cent to this total. Moreover, In the road transport sector, the amount of energy used to move freight is increasing at a faster rate than the energy consumed by cars and buses, and, in the European Union, may overtake it by the early 2020s (Kahn Ribeiro and Kobayashi, 2007, European Commission, 2003 see [10]).

Institution, such as the local government or an international union, plays an important role in shaping the choices made by the public and the private sector [12]. Institution uses tools such as incentive, financial aid, technical aid and raising awareness to shape behaviour. Nonetheless, innovative solutions are found in the best practices of the private sector. Often, measures that reduce the environmental impact of logistics also reduce cost, therefore making the choice to construct environmentally friendly transportation more attractive. Corporate may also reap benefit from having an enhanced environmental corporate image.

2.3.1 The Standards

What are the traits that characterized green transportation? The following are literatures that discuss the matter. The literatures will be made as standards from which a list of green transportation characteristics will be identified.

Policy Dept., European Parliament, Logistics as an instrument for tackling climate change (2010). This study explores how logistics activities may contribute to mitigation of climate change. The study presents 'green logistic' actions that can be developed by European institution and the private sector, to reduce Green House Gas (GHG) emissions. Area of green logistic intervention identified by this study is presented as in Table 2.2. The European parliament (2010) maps their green characteristics against case studies of companies such as IKEA-Sweden and Sieber-Swiss.

CLECAT, Best Practice Guide (BPG): To Save Energy and Reduce The Environmental Impact of Logistics, 2nd, (2010). CLECAT is a European association for forwarding, transport, logistic and customs services. The association tries to compile best practices from various private companies and disseminate it for others to learn. The collection of Best Practices was intended to show that both economic advantages and reduction of the environmental impact of transport can go hand in hand. The characteristics conveyed on the report are presented as well in Table 2.2. CLECAT views their documents as a 'living document' and encourage companies to continuously send their success story. From the first edition (2009) to the second edition (2010), CLECAT claims that the number of companies that participated in sending their success story has doubled. Nonetheless, the scope of green logistic characteristic remains the same between the edition. This indicate that the characteristics are still relevant.

FreightVision: Sustainable European Freight Transport 2050. FreightVision is a project funded by European Commission, with goal to develop a long-term vision and action plan for sustainable transport system up to 2050. The sustainability aspect considered were greenhouse gas emissions, dependency on fossil fuels, accidents, and congestion. FreightVision's objective was to estimate the status and development of the four (4) sustainability criteria; and therefore one of the challenges of the project was to identify the key characteristics, with regard to the four sustainability criteria. This thesis tries to identify few characteristics that might be of Skånemejerier's interest, as the private sector. Result is presented in Table 2.2.

2.3. GREEN TRANSPORTATION

| Area | Characteristics (Current) | | Possible EU policy that might influence the private decision (Future) |
|--|--|--|--|
| | Europe Parliament 2010 - opportunities of Green Intervention | CLECAT Europe - Best Practice | FREIGHVISION - Europe 2050 |
| Supply Chain Organization | Network optimization | – | Increase in transport cost, congestion charge (internalizing externalities); CO ₂ Labels. |
| | Route planning | Route planning | Real time information at bottle neck, detection of disfunctional vehicles |
| | Reverse logistics and re-cycling | – | – |
| | – | Intermodal solution | Promote modal shift to rail and waterways through improved infrastructure, capacity, Intermodal transport, Standardize loading units, E - Freight |
| Vehicle utilisation | Space-efficient handling systems | – | – |
| | Inter-company transport consolidation | Inter-company transport consolidation | Inter-company transport consolidation |
| Fuel Efficiency through driver behaviour | Training in Eco-driving | Training in Eco-driving | Harmonize implementation of technology (eco-meters), Training and incentive system to influence driving behaviour |
| Technological innovation | Fuel efficient engines; aerodynamics; tyres | Tyres, Truck fleet up date (emission control tech, monitor engine performance, energy consumption) | Defining standard max. aerodynamics and rolling resistance level in certain corridors, in order to support new technology. |
| Communication initiative (inside & outside comp) | – | Environmental reporting | CO ₂ labels (in product) |
| Others | – | – | Support for alternative energy through higher tax in fossil fuel; Electric infrastructure in green corridors; resolving environment and socio-economics issues of biofuels |

Table 2.2: Characteristics of Environmental Transportation from Various References

2.3.2 The Green Transport Characteristics

There are various actions that transport department can take in order to become sustainable. Table 2.2 presents list and comparison of characteristics of green transportation from various sources. The following are explanation on the most common characteristics found.

Network Optimization

Network optimization is the effort to reduce the number and average length of links in the supply chain. Firstly, reducing the number of links deals with elimination of intermediate locations for processing and storing. A supply chain with many branches results in increase in handling cost. However, the decision to reduce number of links can also be counterproductive. Some links act as consolidation points, where goods are assembled into larger load for more efficient delivery. Therefore, decision should be made case by case. Secondly, reducing average length of links deals with sourcing from local suppliers or moving production close to home (near shoring). Moreover, literature also mentioned the effort to shorten the route between collection and delivery points[12], which is closely related to Route Planning.

The future of Network Planning might be determined by: Increase in transport cost, Congestion charge and CO_2 labels. This thesis feels the importance to highlight their status of prediction of the following future policy.

- CO_2 label. This label could be a high importance in the future by possible two means, increase in customer demand or being regulated by law. CO_2 label is a tag on a product to inform the customer about the product's carbon footprint, which is the total set of greenhouse gas emissions caused directly and indirectly by an individual, event, organization or product as CO_2 equivalent.[13]
- Congestion charge. The concept lies in the principle of internalizing externalities. It is to be implemented on particular time or place of congestion, to discourage travel demand.[13]

Route Panning

Route planning is the process of directing the route of vehicle between collection and delivery points.[12] Route planning can also mean the process of identification of less profitable routes, and make a decision to optimize it.[14] Besides the length of the route, transport planner should also consider congestion; even avoid left turns that would cause truck idling for minutes.[12]

Transport route planning includes two decisions, firstly, to find in advance the optimal

2.3. GREEN TRANSPORTATION

route between points (incl. frequently congested corridors). Secondly, to conduct real-time route planning based on information about traffic disturbance. A study conducted in Lund Sweden found that utilizing real-time information can save fuel up to 15% (Ericsson, et. Al. 2006 see [13]).

Managing Reverse Logistic

Reverse logistic is the management of material flow from point of consumption, back to the point of origin. Reverse logistics contributes to the reduction of CO_2 emission by reducing the need for new material. This is done by re-using returned packaging and product.

Intermodal Solution

Intermodal solution is the combination of various modes of transport, to improve performance.[14] Intermodal transport was also defined as the movement of goods, with at least two transport modes used successively, in the same loading unit, without touching the goods during modes switch.[15] The environmental solution behind intermodal is the shift from road to rail and waterborne. Road transportation emits higher emission of CO_2 compared to rail and waterborne.

In the future, it is predicted that intermodal solution would gain higher importance due to support from the European Union and national government. Nevertheless there is still issue to tackle such as information gaps concerning existing options, slowness of rail and waterways and automation of trans-shipments. The effectiveness of intermodal solution also depends on the nature of product being delivered.[13]

A greener transportation policy is now under development at European level. In line with EU policy, Sweden is trying out a pilot project of the Green Corridors.[16] Green Corridor deals with the flows of goods to and from the Nordic region, by using shipping, air, rail and road, separately or in combination. One of the projects of Green Corridors involves Volvo group, DB Shenker, VINNOVA (Swedish Governmental Agency for Innovation System) and the Swedish Road Administration (SRA). The project is testing loading and transferring goods between different transport modes, also trying out alternative fuels (www.Traffictechnologytoday.com).

Another aspect that would support the future of intermodal solution is E-freight. E-freight is an information system that allows shippers to identify combined transport service that suited their needs and to exchange information between actors of different transport modes.[13]

Space-efficient Handling System

Space-efficient handling system deals with the effort to maximize space, through combination of different type and size of products in the same vehicle.[17] Efforts to increase space efficiency can also relate to carrying full load in both directions by bringing back

pallet, waste, packaging and product back through the system[17], thus is closely related to Reverse Logistics.

Inter-Company Transport Consolidation

Intercompany transportation consolidation is a concept that encourages cooperation between companies, in order to maximize the use of vehicle and reduce the number of deliveries. It offers less freight traffic, better vehicle utilization and less environmental damages.[12] Transport consolidation can be assisted by a third party logistics. The near future for supporting this concept would be a common database with real time update on freight and vehicle space availability. However, potential must not be overestimated as some trucks are not compatible for certain goods.[13]

Eco-Driving

Eco-driving is a driving style that focuses on how to conduct fuel-efficient driving, also enhance safety for both drivers and goods. Through Eco-driving, it is expected to generate savings in the form of lower insurance premiums and less energy consumption.[14]

Most driving licenses for truck driver in the European Union already incorporate elements of eco-driving. The future recommendation for the implementation of these characteristics is to apply different strategies to maintain the habit once training is over, for example incentive system.[13]

Technology Innovation

Among technology in transport logistics that are often mentioned are tyres and engine technology. There are choices of tyres that can be re-treaded (having only the outer part changed)[14] and low rolling resistance tyres.[13] Low rolling-resistance tyres minimize wasted energy by decreasing rolling effort.

In regards with engine technology, a series of EURO standard engines have been introduced since 1990's. It have been proven successful in controlling non- CO_2 (traditional air pollutant). Although currently there are no Green House Gas (incl. CO_2) emission targets for heavy duty vehicles set by the EU Commission.[13] It is expected to influence the future development of the EURO engine series.

Government support in form of regulation can help the adoption of a new technology. For example, future recommendation by Düh, J in FreightVision state that there should be a minimum requirements for aerodynamics¹ standard and rolling resistance levels for trucks on certain corridor.[13]

¹Surface that smoothen air flow over and around the truck.

Chapter 3

Method

In this chapter, the data collection method is described as well as the Reliability and Validity of the source of data and the method of data analysis.

3.1 Methodology reflection

3.1.1 Method for collection the data

Data to be collected are qualitative. This project will perform content analysis towards source of written information, for example articles, journals, institution website, official company website, environmental report, and corporate social responsibility report. The data are mainly retrieved from secondary sources as mentioned above. In regards to Skånemejerier's environmental policy in Transportation, no comprehensive policy document is available. To be able to conduct benchmarking with other companies, data for Skånemejerier's had to be compiled from various sources, not only secondary sources, (company's internal report, environmental report, annual report and official website); but also from primary source by interviewing key personnel in transportation department and site observation.

3.1.2 Reliability and Validity

According to Joppe 2000 (see [18]), validity determines whether the research measures what it was intended to measure. Researchers generally determine validity by asking a series of questions and look for the answers in the research of others. Reliability is the extent to which results are consistent over time and an accurate representation of the total population, if the results of a study can be reproduced under a similar methodology, then the research instrument is considered to be reliable.[18]

Method

This thesis utilizes the method of benchmarking to the Best practices for analysis. The method is about studying of the higher performance companies and adopting their better practice to their business. According to the study by Adebajo and Mann (2008) many challenges were addressed in regard to data and data collection for this method such as data confidentiality policy of the best practice companies, which may have an effect in term of details and how clear the information. They mentioned further about some difficulties in getting long-term perspective of the best practices . Regardless of the difficulties, we believed that by identifying the proper benchmarking partners and adding the information of standards, regulations and long-term visions of government policy to compensate the lack of details of best practices will help to increase validity and reliability of the benchmarking method.

Source of Data

Sources of data were mainly from credible secondary sources for instance academic publications, journal and academic book or eBook. Therefore the reliability and validity have been proven. Other data were taken from the company website, which might be biased by the intent of promoting company. Those biases have been demoted by combining and reaffirm with other documents such as annual report or else.

The Standards

Prior to benchmarking, a framework of green transportation characteristics needs to be identified. Most of the literatures found in green transportation choose to focus only on one or two characteristics for in-depth discussion. Such literatures are insufficient to map Skånemejerier's overall commitment on green transportation. This thesis requires standards that 1) provide an extensive list on the green transportation characteristics, 2) showing indication of being current or up to date.

The European Parliament (2010) and the Cleacat Best Practice Guide (2010) are among the few that provide an extensive list of green characteristics. Those standards are also valid to describe the current trend. The authors of these standards connect the characteristics of green transportation with various innovative solutions from the private sector. As companies are still trying to figure out how to implement green logistic (incl. transportation), innovative solutions will most likely come from the private sector.[12]

(Refer to Chapter 2 for further description on the Standards).

Nevertheless, we find that the standards also have limitations. Firstly, they do not cover the prediction of the future policy that the private sector should anticipate. We compensate the lack of future vision with adding another reference that is FreightVision Europe 2050 (2011). Secondly, the list of green characteristics provided are merely a broad framework. A company such as Skånemejerier might possess the characteristics, for example Route

3.1. METHODOLOGY REFLECTION

Planning, but it might not possess the best strategy. Therefore later on this thesis, discussion of characteristics compliance needs to be complemented with discussion on strategy or practical actions.

Chapter 4

Data collection: Environmental policy

This chapter presents the environmental policy and strategies of Skånemejerier and benchmarking companies. These data are gathered from various sources as described in Chapter 3: Methodology reflection. The environmental policy and strategies of each company are described in Section 4.1 Skånemejerier, 4.2 Direct competitor–Arla, and 4.3 Leading logistics companies – DHL, UPS, and FedEx.

4.1 Skånemejerier

In 2010, Skånemejerier has an on-going extensive environmental objective to reduce carbon dioxide emissions by 10% in relation to year 2001 and there is an obvious opportunity to fulfill this objective regarding to contribution from many on-going environmental friendly projects such as biofuel in Kristianstad, gas driven vehicles and low carbon footprint packaging etc. [3]

In early 2011, referring to environmental brochure retrieved from Skånemejerier's official website, the new environmental goal has been identified which composed of 2 parts, one is emissions from Skånemejerier's shipment will be decreased by 30% in 2020 in relation to 2010 and another is emissions from the production will be decreased by 50% in 2020 in relation to 2010. [5]

“Skånemejerier's operations are characterized by common sense and sustainable development, both in daily operation and long term. Our goal is to systematically decrease our environmental impacts and continuously improve. Potential areas include energy consumption, resource management and emissions of greenhouse gases. Through our ways of working, we can plan ahead for laws and regulations. This is what we called a healthy environment”. [4]

Environmental policy and strategy in Transportation

The scope of environmental concern in Transportation, start from collecting milk from

farm and distribution finished goods to store and customer. Type of vehicle is one of the most key concerned in Transportation, nowadays 95% of the trucks are biogas and Compressed Natural Gas (CNG) and 5% are bio-diesel. Also for the fuelling station, in summer 2009 Skånemejerier has inaugurated the biogas fuelling station and was the first dairy company which owned private eco-friendly fuel station. [19] Skånemejerier focused not only investing on eco-friendly fuel and vehicles but also pay their attention on route optimization and eco-driving habit in order to reduce consumption of the fuel. All drivers have to go for eco-driving training or so called "Heavy eco driving". Furthermore to provide the driving information and allow the drivers to create eco-friendly driving, the computerize system has been installed on the truck for tracking driving information. [20]

To express their strong intention to achieve environment impact reduction target and contribute to society, Skånemejerier has participated the program with Transportation authority to control speed of the trucks which able to save thousands liters of fuel per year.[20]

Fleets

Regarding to relatively high environmental impacts from conventional vehicles so that Skånemejerier strived for reduce the emission by replacing the conventional vehicle – Euro Class R49 and Euro III engine with compressed natural gas (CNG) engine.[20] Nevertheless all above information is based on data in 2002; currently Skånemejerier has seen the opportunity to step forward with Euro V engine with biogas instead. As a result, there are various types of engine used at the moment, which are Biogas, CNG, and Bio-diesel engines

Space-efficient handling system

According to the internal transportation report, capacity utilization is varying depend on what is being transported. In case of raw milk the utilization is claimed to be full load. The vehicles generally use swap bodies and tank swap that allows the truck basically full loaded. In regard of reverse logistics concept, Skånemejerier successfully implemented the concept by filled the return journey with roll carts and pallets.[20]

4.2 Direct competitors

According to the statistics data of world dairy market situation 2010 retrieved from Svenskmjolk (Swedish dairy association); Skånemejerier is ranked as No.1 and Milko is No.2 with turnover 0.4 and 0.3 in billion USD respectively. Arla has not been ranked in Sweden but Denmark with Turnover around 8.7 billion USD, however apparently Arla has played the leader role in Swedish market with almost 90% share by volume. In early 2011 there was an announcement at Milko's official website that Milko – the company in 2nd rank sold their dairy facilities in Sundsvall to Arla. Therefore in this paper, only Arla is brought to the consideration as a directed competitor.

The following part describes overall information of the direct competitor. The informa-

4.2. DIRECT COMPETITORS

tion is composed of background, company visions and mission, and Environmental policy in general. Considering that the objective of this paper is to define improvement gap for environmental policy in Transportation, hence the environmental policy which related to transportation will be emphasized.

4.2.1 Arla

Background

Arla Foods is one of the world's largest dairy companies which have strong market position in The UK, Sweden, Denmark, Finland, Netherlands and Germany.[21]

Continuous improvement and change are the driving forces behind their vision and strategy. One of the examples to illustrate is the investment in the world's most efficient and environmental-friendly liquid milk dairy manufacturer, located outside London and is going to start production in 2012. Their ambition to minimize environmental and climate impact are demonstrated through the campaign "Close to nature ®".[21]

"Constantly seeking to minimize the environmental impact of our operations is at the heart of everything we do. At the same time, it is unavoidable that production at our farms and dairies, and our transportation, affect the environment. At every level we consider whether we can change any aspect of our work methods in order to reduce our environmental impact"[21]

Environmental policy and strategy in Transportation

One of main strategy is minimize carbon footprint by reducing an emission of greenhouse gases from Transportation, Production and Packaging by 25 percent They work toward: "a natural evaluation"and emphasize that the natural choice is their first priority :

"Every level of our business is influenced by the ideal we work towards: a Natural Evolution. In our production, in our distribution, and within our own company, the natural choice is our first priority."

Theme "Closer to nature ®"launched as a Trademark in year 2009

There are insufficient details about environmental initiative in the annual report. Therefore in the following part, the data were collected from Arla's official website instead.

Fleets

Arla express their concern on transportation as part of the commitment to reduce CO_2 emission. In 2009 Arla decided to replace 55 vehicles with new Euro V standard, even though at that time Euro IV standard are still applicable. As a result, NO_x emission and CO_2 emission was reduced by 20 tons and 160 tons respectively. [22]

Energy and Emission

Arla emphasized that they are monitoring the change of new alternative energy and hybrid vehicle are one of the potential technologies that they keep an eye on because of the hybrid vehicles are still in the development period, therefore, the increasing of biofuel usage is the optimized solution for Arla to reduce emissions.[22]

Employee

Regarding to Arla believes that good driving habits are able to improve the environment by reducing the fuel consumption. So that Arla decided to implement program “Eco-driving practice”for the drives. Moreover to help drivers to drive more efficient, Fleets will be equipped with the computerize system which able to track three parameters that are excessive speed, cruising and idling tim.[22]

Arla setup the notice board to show the performance of each driver in order to create the competition situation among the drivers to improve environmental friendly driving skill. [22]

Improve operational efficiency and minimize environmental impact

Routing optimization

In order optimize the driving route, Arla use Global Positioning System (GPS) and navigation equipment to provide the information to drivers for their journey planning so that they are able to take the shortest route and prevent unnecessary CO_2 emissions.[22]

Environmental KPI relate to Transportation Reduction of emissions: “target reduce our direct and indirect emissions of greenhouse gases by 25 per cent in production, transport and packaging by 2020, compared to our 2005 levels”[23]

4.3 Leading logistics provider company

In this part, three well-known logistics provider companies were chosen to do environmental policy benchmarking for Skånemejerier.

4.3.1 DHL

Background

Deutsche Post DHL is the world’s leading mail and logistics services group. The Deutsche Post and DHL corporate brands offer a one-of-a-kind portfolio of logistics (DHL) and communications services. They provide their customers with both standardized products as well as tailored solutions. [24]

About 500,000 employees in more than 220 countries and frame a global network focused on service, quality and sustainability. With various kinds of programs in the areas

4.3. LEADING LOGISTICS PROVIDER COMPANY

of climate protection, disaster relief and education, Deutsche Post DHL is committed to social responsibility.[24]

“The Postal Service for Germany, The Logistics Company for the World”[24]

The below statement is an environmental statement which is a part of DHL environmental policy;

“We are committed to minimizing our impact on the environment and preventing pollution in all of our activities worldwide by continually improving our performance. Our goal is to offer sustainable solutions to our customers and to operate an environmentally sustainable and efficient network; we will achieve this goal by working with our employees, customers, suppliers and other key stakeholders”[25]

Environmental policy and strategy in Transportation

The environmental policy will be implemented in all companies within the Deutsche Post DHL Group under “GOGREEN” environmental protection program. It will help to frame efficiency and environmental awareness into day-to-day operation. [25]

Fleets

DHL promotes the innovations and adopt advance technologies to minimize emissions and noise especially from aircraft and ground fleets. The following are some of initiatives to achieve this objective;

- Trial and introduce alternative vehicle technologies as well as alternative fuels for example the ongoing pilot project of using Hybrid truck, testing of biofuels¹, and alternative diesel from Hydro Treated Vegetable Oil (HVO). [26]

Energy & Emissions

In order to improve fuel efficiency, DHL focus on fleets replacement especially for aircraft replacement and invest in more aerodynamics vehicles and in drive technology. [24]

Improve operational efficiency and minimize environmental impact

DHL improve carbon efficiency by implementing *CO*₂ efficiency measures, and the list of initiatives as follows; [26]

Route and network optimization

These initiatives were implemented under the name “First and Last mile” which comprised of two innovations, namely Intelligence “SmartTrucks” with combination on dynamics route planning and real-time traffic data to provide drivers the traffic information such as the most traffic-free route; and The network of PACKSTATION service which located throughout Germany. The result of study shows that this innovation is able to reduce car

¹The fuel made from renewable sources such as fruits or seeds.

traffic around 35,000km per year. [26]

Capacity optimization

Regarding to the study that around 30% of vehicles mileage is empty running especially for return leg of journey therefore DHL target to increase backload² by training dispatcher to optimize capacity utilization, installed tools to monitor availability of the vehicles. [26]

Employees

In order to improve knowledge and skill of employees on environmental issues, Various kinds of program are established for instance eco-driving training, awareness campaign called “Global Road Safety” to encourage drivers to practice fuel-efficient driving and in purpose of encouraging employees to take the proactive role and offer the opportunities for employees to contribute to environmental protection program, DHL setup “Fuel saving idea 2009” competition which asked employees to generate ideas about eco-friendly driving techniques. [26]

Other initiatives

DHL emphasized their further concerns on the environmental issues; by cooperating with other stakeholders for improve an environmental protection program as follows;

- Works with Governments and policy makers on long-term environmental policy in order to minimize environmental impact from logistics sector
- Engage in dialogue with key stakeholder and cooperate with Universities and industries and keep working with environmental and sustainable organize either national or international level
- Keep monitoring and responding to emerging environmental issues
- Work with customer to assess and reduce their environmental footprint toward their environmental goal

To achieve transparency is one of DHL strategies, in order to achieve transparent DHL would have to; [25]

- Enhance quality of the environment data and being transparent by reporting environmental impact through corporate responsibility report; In 2009 the report and its transparency has been reward with the entry into Dow Jones Sustainability World index. [26]
- Improve the transparency of CO_2 emissions from DHL transportation subcontractors by introducing the green questionnaire and supporting environmental management embedded as part of Supplier’s code of conduct. [26]

²Backload is non-revenue generating load carried by vehicle during the return journey

4.3. LEADING LOGISTICS PROVIDER COMPANY

Environmental KPI relate to Transportation

- Improving carbon efficiency of DHL operations and their subcontractors by 30% in 2020 compare to 2007 baseline.[27]

In addition, according to Sustainability report 2009, DHL mentioned the target related on Environmental projects as follow,

- Test a new biomass fuel in Germany, and trial more hybrid trucks across Europe: Ongoing project.
- Target for air fleet replacement to be restated due to ongoing restructuring initiatives in our DHL Express USA operationsI
- Increase percentage of our operations which are certified to the ISO 14001 standard.

4.3.2 UPS

Background

UPS was established in 1907. According to annual report 2010, the company has 99,795 delivery fleet (with 1,914 alternative fuel vehicles), 400,600 employees, and 2,773 operating facilities around the world. The business run under respected of “Supply Chain Solutions®” trademark which provide forwarding and logistics services in 195 countries and territories including: [28]

- Supply chain design and management
- Domestic and international air freight
- Ocean, rail, and ground freight
- Transportation network management
- Customs brokerage and mail services

Environmental policy and strategy in Transportation

Regarding to UPS management approach, UPS recognized an important of focusing an environmental performance of their energy-intensive business assets especially ground and air fleets. [29]

Energy & Emissions

UPS believes that by using bio-fuel will be the optimal solution for environmental health in long term both for the company and planet. Hence UPS has developed plan to expand the use of bio-fuel in the future, as in the development project of jet-engines bio-fuels. According to UPS long-term plan are based on bio-fuel, the following are some expectations on the situation about bio-fuel; [29]

CHAPTER 4. DATA COLLECTION: ENVIRONMENTAL POLICY

- Regarding to the controversy about environmental trade-off of bio-fuel, UPS look forward to the time that bio-fuel are produced in the environmentally responsibility manner
- To be economically feasible
- Meet or exceed existing fuel performance and environmental performance.
- Available in fuel supply chain.

For other type of alternative fuel, UPS selected compressed natural gas (CNG) vehicles for operating outside United States for example France, Germany, Netherland and UK. [29]

CO₂ emission

Reporting on greenhouse gas emissions is the important part of UPS environmental report which compose of three part; Scope 1–3 emission report, especially for Scope 3 emission report³ which UPS claimed that the data collection method is so complex when it associated with 3rd parties, but UPS is able to make significant progress in collection and analysis of the scope 3 emission data. UPS used the emission data for monitoring and control CO₂ emission by comparing year to year, Yet there is no specific CO₂ emission target mentioned in the environmental report. [29]

Effluents and Waste

The solid wastes mainly are corrugated containers and wooden pallets. UPS implemented the recycling program for solid wastes but due to financial challenge from recession periods have made the recycling volume in total less than in 2008. [29]

Improve operational efficiency and minimize environmental impact

Ground network efficiency

UPS considered that, in long term, by focusing on increase ground network efficiency will be significant competitive in term of economics and environment. The strategy composed of the package of routing technology, the use of telematics and drivers training. [29]

Routing technology

The routing technology helps to achieve the target to driving less than 20.4 million miles in 2009, which is associated with the emission figure and 119 million miles – cumulative miles– since 2001. The technology composed of: [29]

- Efficient allocating the pick-ups and deliveries, to reduce the number of vehicles
- Efficient loading vehicles for the order of delivery
- Efficient routing vehicles to minimize time and miles driven
- Selecting route to minimize idle time spent for waiting for traffic light and turns

4.3. LEADING LOGISTICS PROVIDER COMPANY

- Selecting stopping location that enable multiple deliveries
- Using hand-held computer to help drivers keeping on route and time.

Telematics

Believing that the driver is the key factor to manipulate the efficiency of using energy and emissions, therefore UPS decided to use computerize system to provide the details information about the efficient route for the drivers. The vehicles will be equipped with sensors which are able to track speed, turns, idle time and other useful data and transmit it to the data server for analysis by using specific software. Drivers will receive the report from telematics system which allowing them to compare their performance with standard and improve themselves to increase efficiency.[29]

Other initiatives

Transparency and Third-party verification

UPS perceive Full transparency and Third party assurance of emission report as the drivers of carbon reduction strategies, with believes that the company that open for 3rd party assessment are most likely to struggle for sustainability credible and holistic carbon reduction.[29]

Alternative energy in Facilities

The energy used in facilities contributes to 10% of their carbon inventory in 2009, driving UPS to keep improving their initiative to reduce energy consumption in their facilities. Lighting is considered as one of the major sources of energy consume and emissions. By implementing “Lighting replace or upgrade” program since 2007 can create the annual energy saving around 25 million kilowatt hours. Some facilities such as in Palm spring, California, The solar energy has been produced approximately 70% of its own electricity which can reduce 500 metric tons of CO₂ emissions – or equivalent with taking off 95 vehicles from the road for a year. Furthermore UPS has just completed the development of fuel cell and it has been used in the facility in Alaska. The fuel cell could produce more than 300 MWh in 2009.[29]

Environmental KPI Relate to Transportation

- Scope 1³ and 2⁴ Emissions; unit in Metric tons per 1000 packages. [29]
- Energy consumption; unit in Gigajoule per 1000 packages. [29]
- Ground network fuel efficiency; unit Gallons of fuel per ground packages. [29]

³Scope 1 emission sources according to US standard; UPS defined as emission sources include: All jet fuel used in UPS owned vehicles, all ground fuel used in UPS owned vehicles, natural gas, propane and heating oil for facilities UPS owned or lease and Fugitive Hydro-Fluoro-Carbon (HFC) emission from facilities and vehicles. Scope 2 emission source according to US standard; UPS defined

⁴Scope 2 emission sources according to US standard; UPS defined as emission sources include: Emission sources for U.S. Domestic package include electricity consume for facilities UPS owned or lease.

4.3.3 FedEx

Background

FedEx provides an extensive portfolio of transportation, e-commerce and business services. Their core operating companies are Federal Express Corporation (“FedEx Express”), the world’s largest express transportation company; the subsidiary companies operate independently under FedEx brand; which consist of FedEx Ground Package System, Inc. (“FedEx Ground”) and the FedEx Freight LTL Group. [30]

FedEx environmental policy statement;

“FedEx Corporation and our subsidiaries recognize that effective environmental management is one of our most important corporate priorities. We are not only a leader in the transportation industry, but are among the best Fortune 500 companies for our initiatives in environmental issues. As a global company, we are committed to respecting and protecting the environment through outstanding environmental performance and efficiency in the conduct of our operations.”[31]

Environmental policy and strategy in Transportation

FedEx developed a trade mission program called Green industries trade mission. Their intention is not limited or defined only by geography or European countries but also cover the macro view throughout the European Union. FedEx organized an effort to achieve the goal through the program call “EarthSmartSM”[32]

Fleet

To work with hybrid in commercial fleets is part of EarthSmartSM program, FedEx has cooperated with Environmental Defense Fund since year 2000 in order to develop the first hybrid truck and the technology has spread though the transportation industry and were used by many companies. [32]

FedEx strategy is not limited just to invest in new electrical hybrid fleet but also retrofit the conventional trucks by replace with a hybrid electric motor. Currently, FedEx has been assisting in the development of zero-emission electric/hydrogen fuel cell and hydraulic hybrids, just past year they work with Modec⁵ to develop electric commercial truck to use in United Kingdom. [32]

Besides electrical hybrid fleet, there are various types of alternative fuel engine which operating in many countries around the world such as Liquid Petroleum Gas (LPG) in London, Compressed natural gas (CNG) in Milan, Biodiesel in Washington, D.C. [33]

Energy and emission

A program called the Fuel sense program is structured by 30 different teams which strive

⁵A commercial zero-emission vehicle manufacturer in UK website
<http://www.modcezev.com/content/index.asp>

4.3. LEADING LOGISTICS PROVIDER COMPANY

for searching new way to use less fuel and lower the emission throughout their aviation operation. One of the strategies is to replace the old aircraft with higher payload capacity and more fuel efficient aircraft. [32]

Improve operational efficiency and minimize environmental impact

FedEx realized that in order to be more sustainable in term of both Environment and Economics, the company requires more than just embracing new technology, but needs to gradually develop route efficiency to reduce the number of fleet and downsizing vehicle in the long distance route.[32] Moreover FedEx has redesigned physical distribution network to improve the efficiency of supply chain by using concept as same as carpooling.[33] These strategies so called “reduce, replace, and revolution strategy”[32]

FedEx highlight the project which is claimed as “a first-of-its-kinds”. With supporting by French government, the project’s goal is to develop high-speed train network in Europe in order to offer another alternative to aircraft routes. [33]

Other initiatives

Alternative energy in Facility

The EarthSmartSM program commit to use more efficient energy technology to reduce energy consumption and emission. Solar energy is an initiative to reduce the consumption of energy used for operating FedEx’s facilities – distribution hub. Among five distribution hubs which were installed the solar panel, the largest rooftop installation is in Woodbridge New Jersey. When all solar panel are operating, the capacity of electricity generation is approximately 5 Megawatts which means improvement of more than 200% over the past years. [32]

Environmental KPI relate to Transportation

There are environmental targets mentioned in Environmental report as below;

- % Decline Aircraft Emissions⁶ : target 20% by 2020
- FedEx Express Vehicle Fuel Efficiency Improvement: target 20% by 2020
- Renewable Energy: Expected FY08 goal of 25,000 MWh of Renewable Energy Credit (RECs) procured⁷
- Aircraft Emissions lbs./ATM⁸ CO₂⁹

⁶Cumulative improvement since 2005

⁷FedEx have plan to expand on-site renewable energy generation in addition to procurement of RECs

⁸Available Ton Mile (ATM) is defined as 1 ton capacity transported one mile

⁹Refer to the calculation indicated by the World resources institute and World business council for Sustainable Development Greenhouse Gas Protocol.

Chapter 5

Gap Analysis

In this chapter, the environmental policy and strategies are analyzed by using Green transportation characteristics framework as mention in Section 2.3.2. The environmental policy and strategies of each benchmarking company are described in Table 5.1: Environmental policy and strategies benchmarking table. The details information on each characteristic, presented in Table 5.1, will be discussed later in Chapter 6.

5.1 Green transport characteristics

Overall review This thesis finds that in terms of area covered, Table 5.1 shows that many characteristics of green transportation have been taken into consideration by Skånemejerier. However, in terms of depth, this thesis finds it difficult to conclude that Skånemejerier has taken the optimum measures of green transportation practices. This is due to two reasons. Firstly, the comparison is made not in numerical terms. Secondly, the green transportation characteristics as mentioned in Table 2.2) are merely a broad framework. For example, on Eco-driving, a characteristics that emphasize on the importance to conduct fuel-efficient driving and to enhance safety of both drivers and goods. All companies in this study have adopted the principal of Eco-driving. However, strategies to implement this characteristic will differ between companies. Some may take it only at surface level through training at initial years; others take it further by repetitive re-fresh course, incentive system and competition of ideas to encourage pro-active behavior among drivers. Different strategies may differ in result, although it is still in the same category or characteristic.

Table 5.1: Environmental Policy and Strategy Benchmarking

| Characteristics | Skånemejerier | ARLA | DHL | FedEX | UPS |
|---------------------------------------|---|---|---|---|---|
| Network optimization | N/A | N/A | Set up "PACKSTATION" close to customer, service 24hrs a day for 7days | N/A | Set up physical distribution network(carpooling concept) |
| Route planning | Route optimization (no implementation details) | GPS and navigation equipment: to provide info. to the driver in order to find the shortest path | Combination of dynamics - route planing and realtime traffic data to provide the quickest and most traffic-free route | Selecting route to minimize idle time waiting for traffic-light and turns | Developed route efficiency (no implementation details) |
| Computerize system | N/A | Computerized system and equipment: to track speed travel and idle time | Equipment: generate real-time traffic data | Telematics technology Equipment: collect traffic data | N/A |
| Inter-modal Solution | N/A | N/A | N/A | N/A | Developing an express-rail network in Europe to offer environmental - friendly alternative for - Aircraft route |
| Space efficient handling system | The portion of load for only Raw milk is measured | N/A | Developed forecast toos - or methodology, improve capacity report, training - staff for loading tecnique to optimize loading capacity and organize competition to build awareness to follow the loading technique | Efficient loading vehicles for order delivery | Downsizing vehicle in long distance route |
| Inter-company transport consolidation | Corporating with other - company in warehousing and transporation | N/A | N/A | N/A | N/A |

Table 5.2: Environmental Policy and Strategy Benchmarking, continue

| Characteristics | Skånemejerier | ARLA | DHL | FedEX | UPS |
|--|---|---|---|--|---|
| Eco-driving | Heavy Eco-driving training | Eco-driving training Create competition situation by posting the driving performance fo each driver on the notice board. | Eco-driving training Establish campaign to raise awareness of drivers : called "Global road safty" and Establish competition "Fuel saving idea 2009" | Eco-driving training | N/A |
| Fuel efficient engine | Replace of old diesel-power trucks to newer EuroV engine | Replace old EuroIV with EuroV vehivles | Working on testing alternative tech., replace part of fleets to lower noise and emissions level | N/A | Replace old aircraft with higher payload and more fuel efficient aircraft |
| Tyres, Aerodynamics | N/A | N/A | Investment in more aerodynamics vehicles and in drive techonology | N/A | N/A |
| Communication initiative (internal and external) | Annual report, and enviornmental report | Annual report, Corporate social responsibility report and company's official - website | Annual report,Environmental policy document,Corporate responsibility report and Sustainability report | Annual report and Environmental report | Annual report, a global citizenship update report, and Corporate social - responsibility report |
| Alternative fuel | Biogas Rapeseed Mehtyl Ester Compressed natural gas | Hybrid Biofuel | Electro/Fuel-cell Hybrid diesel Biodiesel/Rapeseed Oil NExBTL Liquefied petroleum gas Ethanol Compressed natural gas Biogas | Biofuel Compressed natural gas | Electrical hybrid/fuel cell Bio diesel Liquefied petroleum gas Compressed natural gas Solar-energy (distribution-hub) |

Chapter 6

Discussion & Suggested improvement

In this chapter, the contents of environmental policy document and the results of benchmarking environmental policy and strategies; are discussed. Both of which are the answer of the main research question.

“What are the improvement gaps of Skånemejerier’s environmental transportation policy and strategies?”

The contents of environmental policy document are discussed in Section 6.1. The results of benchmarking and the suggestions for the environmental policy and strategies improvement are discussed in Section 6.2.

6.1 Environmental policy document

Regarding to the finding that the environmental data related to transportation operations is strewed over several reports, which are annual report (2009), environmental report (2009) and internal transportation analysis report (2002). Both of annual report and environmental report are not focused only on transportation operations but the whole company; although the internal transportation analysis report (2002) focused directly on Transportation, it is not up to date.

Since the objective of Skånemejerier is to enhance green transportation performance in order to achieve the target of reducing CO2 emission, it is recommended to prepare the comprehensive environmental policy document in Transportation. It will be the first step to increase capability of managing environmental issues.

In this discussion part, the example of environmental policy of benchmarking partners will be reviewed by using Environmental policy creating guideline as described in chapter 2.1 as a frame.

Guideline No.1: “It is relevant to nature, scale and environmental impacts of activities and products within the defined scope;”[5]

According to the environmental policy document of each benchmarking companies, we have found that the part of environmental policy statement is the most relevant to guideline No.1. Therefore some parts of policy statement are taken for discussion below. The bold phrases indicate that the phrases are directly related to the guideline.

Arla’s policy

*“Commitment to this **Quality, Environmental, Health and Safety** policy will ensure that we provide safe and legal **products and services** that meet the requirements of our customers and other stakeholders at all time. This policy is **implemented throughout our supply chain from farm to the end consumers.**”[34]*

DHL’s policy

*“Due to the nature of our core businesses, the primary focus of our efforts is our **emissions of carbon dioxide (CO₂) and climate protection.** However, our environmental protection program, GoGreen, also covers a broad range of aspects such as **biodiversity, water, waste and local pollution...** ...We are committed to minimizing **our impact on the environment and preventing pollution in all of our activities worldwide** by continually improving our performance...”[25]*

UPS’s policy

*“As a global transportation company, UPS acknowledges that **greenhouse gas emissions impact the climate and pose a serious challenge to the environment**—and ultimately the global economy. ...We continue to review **all aspects of our business, including: systems, procedures, equipment, and operating processes.**”[29]*

FedEx’s policy

*“As a global company, we are committed to **respecting and protecting the environment** through outstanding environmental performance and efficiency in the **conduct of our operations.**”[31]*

There are two points to be concerned in regards to guideline No.1, firstly is the statement must relevant to the environment impact of activities and products, secondly is the scope of environmental concern must be defined.

Firstly, according to the environmental policy above, there is no policy statement that completely conforms to Guideline No.1. Some companies mentioned the environmental impacts of their activities such as DHL and UPS, but did not mention about the impact

6.1. ENVIRONMENTAL POLICY DOCUMENT

of their products or services. In opposite, Arla mentioned only products and services but did not state anything about their activities.

Secondly on “defined scope” Arla stated the scope quite clear that the scope is “*throughout the supply chain from farm to end consumers*” or the case of UPS that mentioned more specific that “*all aspects of our business, including: systems, procedures, equipment, and operating processes.*”

Key concerns on Guideline No.1

The environmental policy statement should;

- Clearly define the environmental impacts which covers both products/services and activities.
- Clearly define the scope or boundary of policy and ensure that is manageable.

Guideline 2: “a commitment to continuous improvement and prevention of pollution are included;”[5]

The following are the policies of each benchmarking company which relevant to Guideline No.2

Arla’s policy:

“*To continually improve our Quality, Environmental, Health and Safety (QEHS) performance and management systems,... preventing pollution and minimizing the impacts fo our activities on the environment and the communities around us*” and “*...commitment to a continual improvement programme of our quality, Environment, Health and Safety performance and management system...*”[34]

DHL’s policy:

“*We are committed to minimizing our impact on the environment and preventing pollution in all of our activities worldwide by continually improving our performance*”[25]

FedEx’s policy:

“*Commitment to a continual improvement process in environmental management*”[31]

’UPS’s policy

“*We will continue to improve our operating efficiency, which is one of the most significant ways we reduce our energy and fuel use.*”[29]

As stated above, most of the companies used the exacted word “commitment” with continually improvement in the policy statement except UPS. UPS expresses their intention on continuous improvement by saying “we will” instead of “commitment” which might

weaken their statement. However, the interesting thing about UPS's policy is the statement that shows their focus on improving "operating efficiency" because they considered that as the most significant strategy to reduce the energy and fuel used.

Key concerns on Guideline No.2

- Use word "commitment" in order to make the strong intention rather than "will".
- State the significant strategy with most impact to the environment target, as in UPS's policy.

Guideline No.3: "a commitment to comply with relevant environmental legislation or regulations, and any other environment requirements that the company would like to apply;"[5]

FedEx's policy:

"Compliance with all applicable environmental laws and regulations."[31]

DHL's strategy:

"Complying with applicable international, regional and national environmental regulations, and taking additional measures to continually improve our environmental performance"[25]

Arla's policy

"To produce and Supply products and services at sites that are fully compliant with all relevant legislation, industry standards and other requirements to which we subscribe"[34]

In regards to Guideline No.3, the most relevant part of environmental policy is environmental objectives or environmental initiatives/strategy. The part of policy above illustrate that the companies aim to comply with all applicable or relevant international, regional and national environmental regulations; as mentioned in Guideline No.3.

Key concerns on the Guide line No.3

- The aim to comply with all relevant environmental regulations and other specific regulations that company subscribed to; should be indicated as one of the environmental objectives.

Guideline No.4: "provides the reference for setting and constantly reviewing environment objectives and targets;"[5]

Arla's policy:

"To plan, prepare and regularly review our objectives, targets and action plans for improving QEHS performance ..."[34]

DHL's policy:

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“...The corporate *Environmental policy objective and targets will be reviewed on a regular basis.*”[25]

UPS’s policy:

“*We continue to review all aspects of our business, including: systems, procedures, equipment, and operating processes.*”[29]

Regards to Guideline No.4, the sample policy demonstrated above; emphasize the continual reviewing on the objective and target, especially the UPS’s policy that not only intend to review all environmental aspects, related to their business but also clarify further for the specific part that they would like to review such as procedure, equipment and operating processes. At this point we consider that UPS’s policy specifically point out for the aspects, which can be clearly used as a reference frame for setting and reviewing the objective and target as mentioned in the Guideline No.4.

Key concerns on Guideline No.4

- Ensure that the reviewing of environmental objective and target are included in the environmental policy and compliment it with specific the period of time.

Guideline No.5: “is documented, implemented, maintained and communicated in organization;”& **Guideline No.6:** “is available to the public. [5]

Arla’s policy:

“*To plan, prepare and regularly review our objectives, targets and action plans for improving QEHS performance and to monitor and communicate our achievement against our plans, both internally and externally*”[34]

DHL’s policy:

“*This policy will be communicated to employee via the Corporate Intranet and other internal communication channels, and will be made available to all others interested parties via our corporate internet site.*”[25]

FedEx’s strategy:

“*...Promotion of awareness of environmental policies to employees and the public...*”[31]

As per the guideline No.5 and 6, the company has to make sure that the policy is not only documented and implemented but also communicated internally and externally. Both of Arla and FedEx stated the internal and external communication, but even better for DHL who also specify on the means of communication. In additions, Arla emphasize on having an action plan which imply about implementation as mentioned in the guideline.

Conclusion

Creating the Environmental Policy will allow company to have a clear vision on environment issues related to their business and provide guideline for employees and management

team the strategies to overcome those issues. Most of the companies prepared the environmental policy and communicated to public only for the activities related to the core business, however to prepare the environmental policy in Transportation which is not the core business for Skånemejerier is still recommended in order to achieve the company target of reduction of environmental impact which Transportation is one of the key contribution of environmental impact reduction. The guideline and examples above will be useful for Skånemejerier as a basic framework to create environmental policy in Transportation.

6.2 Green Transportation Characteristics

6.2.1 Network Optimization

Definition

Network optimization is the effort to reduce the number and average length of links¹ in the supply chain.

Discussion

Skånemejerier environmental report 2009 did not discuss network optimization. In this thesis, we would argue on the importance of discussing Network Optimization in the environmental transportation policy. Prediction of future Europe level policy that might influence the decision on network optimization is given by Bauer et. al (2011) on FreightVision 2050. The study mentioned that increase in fuel price, tighter regulation on carbon emission will force company to optimize their distribution network

Tabel 5.1 shows that DHL and FedEx came up with a concept that reduce the number of their distribution links, therefore reduce the route need to be taken. With establishment of "PACKSTATIONS", DHL need not to go to each houses, and have the customer pick up their package at the nearest PACKSTATIONS, perhaps on their way to work or to the grocery stores. This case may not directly applicable to Skånemejerier, due to different nature of services or industry sector. However, it should inspire companies to re-think their current number of their distribution links and length.

Recommendation

- Re-think the current number of links and length of the distribution system either raw milk or finished goods.

6.2.2 Route Planning

Definition

Route planning is the process of directing the route of vehicle between collection points and delivery points.

6.2. GREEN TRANSPORTATION CHARACTERISTICS

Discussion

In the environmental report, Skånemejerier mention the efforts to optimize route has been taken, unfortunately the report did not specify on the type of measures taken or the tool used; while other benchmarking companies highlight the use of computerized system for route optimization.

Arla mentions the system that is able to track excess speed and idle time. The system used by Arla seems to be standard system nowadays, since it is used by most of the companies in this research. To enhance the benefit of using computerize system, the system have to be combined with real time information feed system in order to re-route based on the current traffic situation and provide the quickest and the most traffic-free route. According to the research, Re-routing as per real-time information such as traffic congestion can reduce not only the time but also the fuel consumption around 15% [35]

The data in Table 5.1 shows that DHL is the only one company that highlight the used of real time data to provide the shortest and quickest route.

Recommendation

- To consider the possibility of enhancing the existing computerizes system to be able to retrieve real time information and provide the most traffic-free route (The research shows an expectation of 15% reduction in fuel consumptions)
- To be able to maximize utilization of the system, ensure that the training course and periodical refresh course on using the computerized navigation system are in place.

6.2.3 Reverse Logistics

Definition

Reverse logistic is the management of material flow from point of consumption, back to the point of origin

Discussion

According to the study mentioned in DHL corporate responsibility report, 30% of the total driving mileage is empty load. The implication is the extra mileages creating unnecessary emissions to the environment.

A reverse logistic or back load concept is implemented by DHL; the empty load time is utilized by filled up the truck with non-revenue transportation. The same case with Skånemejerier, who fills up the truck in return journey by transportation of their trolleys and pallets.

Despite Skånemejerier has implemented the reverse logistics concept as part of their normal operation, there is no evidence of the intention to further improve utilization rate of

reverse logistics.

Recommendation

From above reasons, in order to make use of an opportunity to reduce those 30% of unnecessary emissions (Ref: DHL's study); we would recommend Skånemejerier as follows,

- To consider setting “Proportion of vehicle–mileage run empty” as one of key performance indicators to monitor and encourage an improvement in reducing unnecessary emissions. [36]
- To consider the opportunities to increase the load utilization of return journey by carrying raw materials, packaging materials or any goods belong to other companies which might have chance to generate revenue as well as reduce the emissions.

6.2.4 Intermodal Solution

Definition

Intermodal solution is the combination of various modes of transport, to improve performance. The environmental solution behind intermodal is the shift from road to rail and waterborne.

Discussion

Skånemejerier operates on single mode of transportation that is road transportation, but not yet intermodal solution. Road transportation emits significantly higher average CO_2 emission per ton–km compared to rail and waterborne transport, estimated by 4 to 23%. [12] Underutilization of intermodal solution is understandable as there are still many problems faced mostly in infrastructure, namely the need of larger terminal and feeder transport, as well as lack of flexibility in destination. [15]

However, there are indications that intermodal will play a big role in the future of transportation. According to the Swedish Ministry of Enterprise Energy and Communication (2009), a greener transportation policy is now under development at European level. In line with EU policy, Sweden is trying out a pilot project of the Green Corridors. [16]

Table 5.1 shows that FedEx is the only company that mentioning intermodal solution in their external report. FedEx highlight the project which claim that is “a first –of–its–kinds”. With supporting by French government, the project's goal is to develop high–speed train network in Europe as an alternative to aircraft routes. [33]

Future Impact Key concern: The inter–model would be the effective tools if the company looks for transportation outside Sweden or outside Skåne with rather long route, because EU policy tend to go with inter model. Skånemejerier's scope of concern might be the import of raw material or packaging material from outside Sweden.

Recommendation

6.2. GREEN TRANSPORTATION CHARACTERISTICS

- The company should prepare the options to apply inter-model concept in the long term strategic plan.

6.2.5 Space efficient handling system

Definition

Space-efficient handling system deals with the effort to maximize space, through combination of different type and size of products in the same vehicle.

Discussion

Through the interview, Skånemejerier expressed their concern on optimizing vehicle utilization.

- In this topic, the result of benchmarking shows that DHL describes their strategies to support the increasing of space utilization in more details than others. DHL states several interesting initiatives while Skånemejerier discuss only the fill ratio of raw milk transportation. The following are some of interesting initiatives done by DHL, Software program: Capacity Utilization
- Improve Capacity report to support better decision making.
- Training course: Loading technique
- Organize Competition to motivate awareness to follow the Loading technique

According to the list of strategies above, we conclude DHL has a comprehensive solution to vehicle utilization that includes Tools/System, Report/Communication and also knowledge and awareness of employee. Up to this point, we would suggest that Skånmejerier should,

Recommendation

- Concern on the standard of method/Procedure of loading and how to control
- Set KPI related to capacity utilization in Finished goods transportation for example Percentage of space occupied by load (3 dimension) or Proportion of floor area covered (2-dimension) [36]
- Monitoring and report system on the capacity utilization
- Training course, to make sure that Employee understand the standard procedure
- Campaigns to motivate and maintain awareness of employee to work follow the standard.
- All above strategies should review on regular basis.

6.2.6 Inter–Company Transport Consolidation

Definition

Intercompany transportation consolidation is a concept that encourages cooperation between companies, in order to maximize the use of vehicle and reduce the number of deliveries.

Discussion

Neither companies in Table 5.1, reported effort in Inter–company transportation consolidation. Clecat 2010 describe this situation as tendency of the “ownership”prejudice, which often makes ones “own”warehouse, truck, van, aircraft look better than a shared one. [14]

Through site observation, we noticed that Skånemejerier has collaborated with other manufacturers in warehousing and distribution of dairy products to store, although it seems to be in a small amount. In theoretical point of view, this is a positive decision, considering co–operation with other supplier would reduce number of deliveries; therefore reduce the fuel consumption and emissions.

Indeed pros and cons shall be considered, especially in term of assuring product quality, down to the very end of the distribution chain. Transport consolidation can be assisted by third party logistics. This would resolve the trust issue that might occurs when cooperating with the competing companies.

Recommendation

- To consider scaling up the official cooperation for inter–company in warehousing and transportation.

Key concerns: Quality assurance of Products.

6.2.7 Eco–driving & Vehicle Maintenance

Definition

Eco–driving is a driving style that focuses on how to conduct fuel–efficient driving, also enhance safety for both drivers and goods.

Discussion

From Skånemejerier environmental report 2009, we know that heavy eco–driving training and a vehicle maintenance program for vehicle existed. We do not have in depth information on its practices. We had to assume that under the Skånemejerier’s compliance towards ISO 14001, there are system to monitor and measure operational activities, including training effectiveness and implementation of preventive maintainance as well as record system.[6]

6.2. GREEN TRANSPORTATION CHARACTERISTICS

On eco-driving, literature recommends that the measures to introduce this particular driving style is taken further to periodic re-fresh training and incentive system. The long term impact seems to be around 2–3% fuel saving with no follow up incentive program. However, with a re-fresh course every 5 years and implementation of incentive scheme, it is estimated that around 7 to 8 % in fuel reduction should be possible.[13] Table 5.1 shows that DHL constantly run eco-driving training and combining it with fuel saving competition.

Recommendation

- Ensure that all drivers participate in training and period of refresh training
- Set campaign to motivate and encourage drivers to participate in environmental friendly driving behavior

6.2.8 Fuel efficient engine & Tires, Aerodynamics

Discussion

So far, there is no information on Heavy Goods Vehicle (HGV) engine, however for Light vehicle; currently Euro 5 is indeed the current best engine available in term or emission limits. Skånmejerier and Arla use this specific engine (Table 5.1). This shows that Skånmejerier is already on the right track and needs to continue to be alert of the future advances in this technology. For the aforementioned light vehicle, the Euro 6 standard will come into force on September, 2014 for the approval of vehicles, and from January 2015 for the registration and sale of new types of cars http://europa.eu/legislation_summaries/environment/air_pollution/128186_en.htm).

Tire's technology has not been mentioned by any companies. Nevertheless, in regard to environmental impact from tire production, the choice of re-treadable tires may be taken into consideration. The environmental benefit of adopting this technology are reduction in waste and emissions from production process, as well as re-use of old tyres by burning for energy production, generating more power than coal. [14]

Recommendation

- Besides fleet renewal, Skånmejerier should consider vehicle's parts renewal, for example the engine's components or tires. The vehicle's parts renewal is a lower investment compare to the whole fleet, yet still contribute to increase the fuel efficiency and reduce emissions.
- Add the concern of the new technologies and EU regulations, such as aerodynamics fleet design also Euro6 and its due date, in strategic transportation plan

6.2.9 Communication initiatives

Discussion

In comparison to the best practice in logistic field (DHL, UPS, FedEx), Skånemejerier transportation information in the external environmental report is not extensive. We understand this is due to transportation is not Skånemejerier's core business. However, we think that there is still scope of improvement. It would be good if the report describes clearly policy, strategy, target endorse by the senior manager (refer to example in Appendix DHL QEHS policy version: 1.1.)

This is in line with ISO 14001 guideline, which state that top management is required to define the environmental policy and ensure the setting and the constant reviewing of environment objectives and targets; have it documented, implemented, maintained and communicated in organization.[6]

Recommendation

- Develop a comprehensive environmental policy document specific for Transportation and use it as a tool for communicating internally and externally
- Ensure that the target is periodically reviewed.
- Ensure that the policy is “formal”communicated to employee and contractors or out-sources
- Set campaign open for employee suggestions and other involvements.

6.2.10 Alternative Fuel

Discussion

It is obvious that all companies considered biofuel as an alternative fuel. DHL took it further by mentioning the debate on the environmental friendly issue of the biofuel.

There is an uncertainty in direction of new technologies so that Skånemejerier should not rely on only biogas or biofuel, but instead start to consider other alternatives such as Hybrid, Electricity, or Fuel cell,[13] while keep monitoring the regulation EU.

Recommendation

- Keep monitoring the future direction of regulation both national and EU or internal level.
- Ensure that there are no other alternative fuels that generate more economic benefit than Biogas or Biofuel under this current situation.
- Feasibility study on Biofuel need to be review again to ensure that assumptions are still valid.

Chapter 7

Conclusion

The objective of the research is to identify the improvement gap and provide suggestions for Skånemejerier. The findings are divided into two main topics, firstly, the review on environmental policy documents, which is the foundation of gaining capability in environmental management. Secondly, the result of benchmarking in environmental policy and strategies.

In term of environmental documents availability, we acknowledge the positive sign that Skånemejerier has external environmental report 2009 and supporting internal documents. The mentioned documents have provided this research with background information. However, those are not sufficient. It is recommended to develop a comprehensive environmental policy document, especially for transportation operations (as per the guideline provided in section 6.1. & the samples in the Appendix). A comprehensive policy document will help to remind the transportation department about the relevant environmental regulations, improve the environmental impact monitoring system, and shall be used for internal and external communication. Furthermore for external communication, expressing environmental commitment can increase the company image, and lead to increase in economic benefit.

Green Logistics refers to supply chain management practices and strategies that reduce the environmental and energy footprint of freight distribution. It focuses on material handling, waste management, packaging and transport.[11] In this research we used The European Parliament (2010) and the Clecat Best Practice Guide (2010) which is among the few that provide an extensive list of green characteristics to describe the current trend. Moreover we add up the future perspective with the information on European vision in environmental policy and strategy called FreightVision Europe 2050 (2011). As per the standards as mentioned above, we are able to conclude the list of green transportation characteristics accordingly, which are network optimization, route planning, intermodal solution, space efficient on vehicle utilization, intercompany transport consolidation, eco-driving, technology innovation in engine and other vehicle's component, environmental reporting and

alternative fuel.

The list of green characteristics is applied as a framework to benchmark Skånemejerier with the direct competitor in the dairy industry, as well as the leading companies in the field of logistics in purpose of identify the gap of improvement and provide the suggestions for Skånemejerier. From documents review, site observation and interviews, we have found that Skånemejerier has implemented projects that cover many of the above characteristics. Nevertheless, we are unable to conclude that in terms of depth, Skånemejerier has taken the optimum effort for each of the characteristics. There are still gap for potential improvements . This research recommends as follow:

Network optimization

- Re–think number of links and length of the distribution system both raw milk and finished goods.

Route planning

- To consider the possibility of enhancing the existing computerizes system to be able to retrieve real time traffic information and provide the most traffic–free route . (The research shows an expectation of 15% reduction in fuel consumptions)
- Ensure that the training course and periodical refresh course on using the computerized navigation system are in place.

Reverse logistics

- To consider setting “Proportion of vehicle–mileage run empty”as one of Key Performance Index (KPI) to encourage an improvement in reducing unnecessary emissions.
- To increase the load utilization of return journey by carrying raw materials, packaging materials or any goods belong to other companies

Intermodal solution Future Impact Key concern:

- EU policy tend to go with intermodal and Sweden try to align, by initiated “Green corridor”project.
- The inter–modal would be the effective tools for transportation across the border.

Recommendation: The company should prepare the options to apply intermodal concept in the long term strategic plan.

Space efficient handling system

- Set KPI related to capacity utilization in Finished goods transportation for example *Percentage of space occupied by load (3 dimension) or Proportion of floor area covered (2-dimension)*
- Campaigns to motivate and maintain awareness of employee to work follow the standard.

Eco-Driving

- Ensure that all drivers participate in training and period of refresh training
- Set campaign to motivate and encourage drivers to participate in environmental friendly driving behavior

Fuel efficient engine & Tires, Aerodynamics

- Besides fleet renewal, Skånemejerier should consider vehicle's parts renewal.
- To monitor new technologies and EU regulation, such as Euro 6 and its due date, in strategic transportation plan.

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