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Annual themes on Intermodal Transport and Logistics:

2015 Theme: Intermodality leads to Sustainability

Report on Green Logistics

Note by secretariat

I. Mandate

1. At its fifty-eighth session, the Working Party held a workshop entitled “Intermodality leads to Sustainability”. It was decided, as part of the follow-up activities of this workshop, that the secretariat would provide the Working Party with information on the areas where intermodal transport and logistics contributes to sustainability. This report is the first to address this subject and looks at how Green Logistics contribute to environmental sustainability.

2. Throughout this report, reference is made to the green logistics of a selection of companies. These illustrate good practices but should not be considered as the only examples of green logistics in practice.

II. Background

3. Recent years have witnessed an increasing public and government concern for the environment global-wide. As a result, several national and international regulations have been adopted to mitigate the environmental impacts of economic activities, and to promote a “green economy”.¹

¹ A green economy refers to an economy which minimizes environmental risks, and that aims for sustainable development without damaging the environment.

4. As a key determinant of business performance, logistics activities² have also been subjected to these regulations, given their significant carbon footprint. Currently, freight transport is responsible for approximately one-quarter of all carbon emissions in Europe. At the global level, freight transport, warehousing and materials handling together account for 10–11 per cent of energy-related CO₂ emissions, while logistics activity represents roughly 5.5 per cent of total global greenhouse gas (GHG) emissions. Furthermore, two-thirds of transport GHG emissions originate from light and heavy good vehicles.³ Logistics activities also lead to negative externalities, including worsening the quality of air, noise and vibration, accidents and global warming.

5. With the advent of environmental regulations, companies have come under growing pressure to minimize the environmental as well as social impacts of their logistics activities. Their primary goal has shifted from only seeking to reduce economic costs and thus maximizing profitability, to adopting environmentally and socially friendly practices in their logistics operations. These “Green Logistics” practices include strategies for the reduction of freight transport externalities, reverse logistics and green supply chain management.⁴

6. Green logistics is a multipronged concept which encompasses all measures taken to assess and reduce the environmental footprint of logistic activities. First, this supposes the environmentally friendly transportation and delivery of goods to customers, which entails: the use alternative fuel vehicles, investing in vehicles designed to reduce their environmental footprint, planning vehicle routes, and bundling customers’ orders together rather than in individual parcels. Second, it is also about reverse logistics which includes the collection of used products and packaging for recycling and reuse. For example, some companies have started to recycle and then reuse discarded materials, after undertaking some recovery and remanufacturing actions (ranging from a simple cleaning of the material to a complex disassembly). By so doing, they lower the percentage of waste material going to landfill sites or being incinerated.

7. To minimize freight transport externalities, several other options are available to companies including: cutting the level of transport activity, revising the modal split of their transport operations (using services of intermodal operators), lowering the energy intensity of the transport operation (i.e. improve efficiency) and reducing the carbon content of their fuel.⁵

8. The presence of consolidation centres greatly contributes to the reduction of companies’ carbon footprint, particularly in large cities where freight transportation is important. Furthermore, the consolidation of loads of several customers and the coordination of shippers and carriers helps prevent the dispersal of freight in small units by poorly loaded vehicles to a multitude of locations, and thus results in lower traffic levels, energy consumption, emissions and costs.

9. In addition to green freight transportation and reverse logistics, companies translate their commitment towards the environment by integrating environmentally friendly practices within their supply chain management (known as Green (or sustainable) supply chain management, GSCM).

10. It is important to note that the above-mentioned green logistics operations are often part of company’s corporate environmental strategies on logistics. A 2008 survey revealed

² Logistics activities encompass 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.

³ Sources: Kahn Ribeiro and Kobayashi (2007) for CO₂ emissions and the World Economic Forum and Accenture (2009) for the GHG emissions.

⁴ This happens because environmental legislations affect companies’ supply chains and waste management.

⁵ Source: The Intergovernmental Panel on Climate Change – IPCC, 2014.

that 35 per cent of companies in Japan, the United States of America and Europe had a green supply chain strategy and that 81 per cent of them have modified their logistics activities to take into account environmental considerations.⁶ In addition, many companies adopt standards for environmental reporting and management as part of their corporate social responsibility (CSR) programmes. Furthermore, many companies disclose their carbon emissions in their annual reports or to external bodies.

11. Companies' green policies are sometimes seen as just reactive environmental policies, often implemented in response to government regulations or public protest. However, communities around the world are more and more conscious of the environmental impacts of various products. Therefore, environment protection is quickly becoming an important criterion behind purchasing decisions and consumer choice. Given this change in consumers' behaviour, an environmental conscience is a defining competitive factor for many companies today.

12. Studies have shown recently that greening supply chains helps companies to improve their financial performance, by achieving substantial cost savings and boosting sales. A 2013 study by Wang and Sarkis⁷ showed a positive relationship between joint implementation of social and environmental sustainable supply chain management (SSCM) programmes, on the one hand, and the return on equity (ROE) or return on assets (ROA), on the other hand. In addition, poor environmental performance can adversely affect a company's stock price, causing financial losses as seen in the 2015 study by Chin, Tat and Sulaiman.⁸ While companies that apply environmentally friendly policies can attract socially-concerned investors.

13. With this in mind, it is understandable that companies seek certification relating to the ISO 14000 family of environmental standards. These certifications signal to buyers, customers, suppliers and other stakeholders that processes are in place to review environmental standards appropriately.

14. Environmental protection has also become an input into the selection of business partners (through green procurement). This approach advocates that companies adopt a broad perspective on their GSCM, as they work with their suppliers to reduce the logistics impact of material flows. Stated differently, companies now seek to improve environmental performance throughout the value chain.

15. For the world's leading companies, "going green" is more than a buzzword, as they endeavour to turn green into gold. In fact, the use of innovative and sustainable solutions in green logistics helps them reinforce their competitive advantage through brand differentiation, which translates into higher profits, new markets and client fidelity.

16. Based on this information, Green Logistics can be divided into a number of categories and actions as set out in the table below.

⁶ Source: Insight, 2008.

⁷ Wang and Sarkis, (2013), "Investigating the relationship of sustainable supply chain management with corporate financial performance", *International Journal of Productivity and Performance Management*, Vol. 62, No 8, pp. 871–888.

⁸ Chin, Thoo Ai, Huam Hon Tat and Zuraidah Sulaimana (2015), "Green Supply Chain Management, Environmental Collaboration and Sustainability Performance", *Procedia CIRP* 26, pp. 695–699.

<i>Categories</i>	<i>Initiatives</i>
Distribution strategies and transportation execution	<p>Use of alternative fuels</p> <p>Use of more recent/less polluting vehicles</p> <p>Use of alternative vehicles (e.g. electric, hybrid)</p> <p>Vehicle speed reduction to save fuel and reduce emissions</p> <p>(Re) design of logistics system components for greater environmental efficiency</p> <p>Effective shipment consolidation and full vehicle loading</p> <p>Routing systems to minimize travel distances (Use of IT applications e.g. planning and routing software, internet matching system.)</p> <p>Intermodal transport, combined transport.</p>
Warehousing and green building	<p>Eco-friendly building design (e.g. energy-efficient lighting systems, building thermal insulation)</p> <p>Energy-efficient material handling equipment</p> <p>Use of alternative energy sources</p> <p>Water systems (e.g. plants and landscaping materials that minimize water waste, use of “grey water” systems)</p> <p>Efficient land use (e.g. brownfield redevelopment)</p>
Reverse logistics	<p>Waste reduction, transport and disposal</p> <p>Materials recycle whenever possible</p> <p>Consumption reduction whenever possible</p> <p>Materials reuse whenever possible</p>
Packaging management	<p>Packaging recycle or reuse</p> <p>Ecological materials for primary packaging</p> <p>Reduction of packaging waste</p>
Internal management	<p>Environmental compliance and auditing programs</p> <p>Environmental performance measurement and monitoring</p> <p>Use of “green IT” (e.g. reduction in server numbers, use of green software, optimization of backup numbers)</p> <p>Promote industry cooperative effort</p>

<i>Categories</i>	<i>Initiatives</i>
	Personnel training (office staff, employees and operators) Establishment of new expertise and sustainability-dedicated intercompany groups Promote environmental awareness among managers Provide incentives and benefits for green behaviour-practices Transparency policy (e.g. informing the consumer, the supply chain) Publicize environmental efforts/accomplishments Development of a formal environmental sustainability statement for the company
Collaboration with customers	Help customers comply with certification programmes and support their efforts to attain the “green” goal Collaboration with customers on reverse logistics and recycling programmes
External collaborations	Membership in environmental programmes Collaborative partnerships with other companies City logistics programmes and coordinated transportation Collaboration with suppliers and subcontractors

Source: Colicchia, Marchet, Melacini and Perotti (2013).

III. Green transport logistics in practice

17. This section sets out some examples of Green Logistics programmes undertaken by a small selection of companies in the sector based solely on desktop research.

A. DHL, the Go Green Program and other initiatives

18. Deutsche Post DHL is one of the leading international express service providers. In order to understand the trends in green logistics, DHL ran a global study called “Towards Sustainable Logistics” in 2009. This study suggested that customers were demanding environmentally friendly products and services, thus paving the way for a more carbon-efficient logistics industry.

19. In response to the perceived change, DHL developed an approach towards sustainable logistics, known as the “Go Green program”. This programme includes several green logistics solutions for companies willing to go green which work alongside its own internal efforts towards reducing its carbon emissions by 10 per cent by 2012,⁹ growing to 30 per cent by 2020 in every business area, including those delivered by subcontractors.

⁹ This goal was reached in 2010.

20. To do so, DHL has taken several measures, including the modernization of the fleet of road vehicle (by replacing old vehicles by more efficient and aerodynamic models, such as electric/hybrid vehicles or those using alternative fuels) and aircraft with the aim of achieving significant fuel savings.

21. Furthermore, the portfolio of green logistics services includes carbon reporting, green optimization in supply chain, climate neutral and environmental solutions.

22. The Track & Trace application of DHL enables companies to track their CO₂ emissions in two ways:

- Carbon Report: prepared periodically (either monthly, quarterly or annually), which describes the GHG emissions generated from the client's transportation within the DHL network (air, ocean and road freight moves);¹⁰
- Online Carbon Dashboard: a web-based graphical modelling of the supply chain, also setting out GHG emissions not only at the individual shipment level in real time, but from a company's full transportation supply chain– including third part networks.¹¹

23. The Carbon Dashboards' Key Performance Indicators (KPI) and analysis functionalities assist customer's decision-making process with the goal of creating more efficient supply chains. These actions are tied with actions aimed at designing eco-efficient processes by seeking to create "green optimization in the supply chain" through:

- Supply chain optimisation: which covers the optimization of strategic and operational resources, carbon footprint reduction programmes and transport network design with modal shift;
- Fleet performance management: which comprises a detailed fleet performance review and benchmarking, consultancy for new vehicle selection, fuel management, telematics solutions and driver training to maximize fuel efficiency;
- Real estate energy management: which proposes comprehensive energy audits, energy efficient building solutions such as power efficiency technologies including energy efficient lighting.

24. Finally, the service also provides reverse logistics solutions, which include:

- Waste management: a set of solutions to collect and recycle waste, in order to transform costs into revenue streams and support the "zero waste" objectives;
- Extended Producer Responsibility: this covers data collection, physical recycling, and the provision of evidence to meet complex legislative requirements;
- Lead Environmental Partner: consultancy services and support programmes across customer's entire supply chain, from employee engagement to comprehensive network design, to help them meet their environmental objectives.

B. DB Schenker Logistics

25. With operations in approximately 700 locations around the world, DB Schenker Logistics is a global leader in logistics services based in Germany. The company's engagement in green logistics is expressed in its DB2020 corporate strategy. DB Schenker aims to reduce its CO₂ emissions by 20 per cent of their 2006 levels by 2020; furthermore,

¹⁰ Carbon emissions Calculation conforms to the European Committee for Standardization (CEN) standard EN 16258, covering "Methodology for calculation and declaration of energy consumption and GHG emissions of transport services".

¹¹ One can also visualize carbon emission across the supply chain per transport mode.

the share of renewable energy sources in the traction current mix should increase to least 35 per cent by 2020.

26. In 2000, DB Schenker introduced a calculation tool, the EcoTransIT, that allows for the calculation of emissions from freight services and increases the transparency of the firm's environmental impact through the collection of KPIs. The company subsequently received ISO 14001 certification in 2002.

27. To reduce its carbon footprint, the company prepared a multi-pronged strategy, which included:

- the use of fuel efficient vehicles;
- smarter route planning;
- raising the rail component of container load freight;
- electricity generation from hydroelectric power stations, wind energy and solar power.

28. DB Schenker also operates its own fleet of low-pollutant trucks and also ensures its subcontractor's fleets keep up with modern developments through strict monitoring. In addition, company's own drivers and subcontractors throughout Europe are trained ECO-driving techniques that help cut energy consumption. This training has proven to diminish fuel consumption on average by 5 per cent. In addition, the FleetBoard systems permanently monitor driver's actions which reduces fuel consumption up to roughly 10 per cent. This initiative is supplemented by the publication of an informational brochure for employees, which fosters environmental awareness.

29. DB Schenker Logistics uses e-freight, the paperless air cargo transport system, aimed at saving the air cargo process of paper documents. By replacing paper with digital documents, the company not only saves paper, but also eliminates countless vehicle movements.

30. The firm has also endeavoured to increase the capacity utilization of its existing trains, which means fewer trains are circulating, leading to lower emissions. As a result, where possible, longer freight trains with lengths of up to 835 meters, circulate instead of the usual 740 meters long trains.

31. Renewable energy accounts for about 15 per cent of all energy consumed by DB Schenker's stations and warehouses around the world. In fact, some of these buildings are equipped with photovoltaic system and solar-powered water heating. Other green features of these facilities include smart lighting systems,¹² natural lighting system, heating, ventilation and air conditioning systems, and a liquefied gas station for vehicles that run on compressed natural gas. The company intends to increase this share in order to meet its targeted GHG emission reduction goal.

32. The firm also consolidates individual consignments at central DB Schenker Logistics hubs, as a way to avoid needless carbon emissions and journeys. The company also performs reverse logistics operations. For example, DB Schenker recycles discarded office equipment (e.g. computers, fax machines) through manufacturer's return programmes.

33. Environmental considerations play an important role in the selection of service providers. As an example, energy efficiency and the low lifecycle costs of the electric locomotives were the key factors in awarding the rail procurement contract. The development of climate-friendly electric trains contributed to the reduction of CO₂ emissions.

¹² By switching to fluorescent lights and LED lighting, the company reduces consumption by 30 to 40 per cent.

34. DB Schenker also provides Eco Consulting. With the help of the calculator EcoTransIT, clients can assess their emissions from aircraft transport, rail, road and ship in any combination.

C. GEODIS commitment to Sustainable Transport

35. A part of SNCF Logistics, GEODIS is the largest transport and logistics operator in France and one of the largest in Europe, whose activities span the globe.

36. In 2008, the company initiated its sustainable development programme, labelled “Blue Attitude”. GEODIS’ vision for green logistics is to:

- encourage the purchase of environmentally friendly vehicles;
- implement greener practices in its offices;
- increase the use of multimodal transport to lower emission levels;
- increase employees’ awareness through training and communication programmes.

37. To enact this vision, the firm invests in trucks that comply with Euro 4 and 5 standards.¹³ These Environmentally Enhanced Vehicles (EEVs) include electric models and compressed natural gas vehicles (CNGs). Furthermore, GEODIS teaches its staff ECO-driving and imposes a speed limit of 82 km/h instead of 90 km/h on its trucks since 2006.

38. The firm also invests in energy-saving buildings, such as “green warehouses” that conform to high environmental quality guidelines and include features like photovoltaic panels, a rainwater recovery system, low-energy lighting and a centralised energy management system.

39. Since 2008, the company offers rail-road transport between France and Italy (the “Ecoway service”) thanks to new models of semi-trailers that are 40 cm lower than conventional ones. This adaptation opened the Alpine rail motorway, which previously was accessible only to tankers and to the transport of heavy goods (metal, mechanical parts, paper, packaged liquids, large bulk recipients, etc.).

40. To encourage employees’ involvement, GEODIS provides regular updates on sustainable development issues through the Group’s internal media (a bimonthly magazine “Geodis Mag”, the Group Intranet “Connect” and the newsletter “Geodis News”. In order to facilitate the exchange of best practices in ecomobility between SNCF and its subsidiaries, a network of sustainable development managers was set up; this is a means to promote benchmarking, method sharing and new initiatives.

41. Moreover, teaching green practices at its sites has resulted in a lower consumption of electricity, gas, consumables and paper and has promoted waste recycling through sorting. GEODIS also offers its clients a reverse logistics system for end-of-life goods through seven processing centres in Europe, especially for electric and electronic items; the company provides traceability and total reliability for operations such as disposal, dismantling and recovery.

42. In order to satisfy customer requirements and regulatory obligations, GEODIS has developed a CO₂ calculator for end-to-end flows, regardless of the country and transport mode.¹⁴

¹³ Euro 5 and 6 Regulation 715/2007/EC sets the emission limits for cars for regulated pollutants, especially nitrogen oxides.

¹⁴ Since 2011, transport companies in France are required to inform customers about the carbon emissions produced in the performance of their contracts.

43. Suppliers and subcontractors are also evaluated on the basis of assessment grids on sustainable development and preference is given to those showing the best performance. However, the company works proactively with suppliers and subcontractors through training and audits to encourage them to go green.

D. UPS and sustainability in logistics

44. UPS is an American logistics company, which delivers millions of packages and documents in 195 countries.

45. The company has taken several initiatives as part of its green policy. UPS uses big data solutions such as the ORION software (On-Road Integrated Optimization and Navigation) to optimize routes, driving behaviours, and maintenance schedules. Telematics enables the company to analyse information from the vehicle in combination with GPS data, customer delivery data, and driver behaviour data. The resulting information provides management with the ability to make small adjustments, which can have a large impact, considering it is applied to over 100,000 drivers around the world.

46. UPS has also enhanced its fleet with more fuel-efficient equipment, that comprises a diversified fleet powered by a variety of alternative fuels (i.e. CNG, propane, liquefied natural gas (LNG), hybrid electric, hybrid hydraulic, biomethane, ethanol and full electric vehicles). All these changes have led to a decrease in energy intensity.

47. Several sustainable delivery solutions have been introduced, including “UPS My Choice”, which allows customers to select a convenient time and place for delivery, and “UPS Access Point”, which gives a consolidated delivery point – such as a gas station or convenience store – for multiple customers in the same area. With both options, less fuel is burned, as unnecessary trips and stops are eliminated.

48. In megacities like London, one sustainable solution put forward by UPS is to convert certain delivery trucks from diesel to electric power, a solution that cuts emissions. In addition, an electrically assisted tricycle, the “Cargo Cruiser”, is being tested which addresses both air quality and congestion concerns.

49. UPS also encourages smarter packaging, for example, “Packsize On Demand Packaging” companies make a fit-to-size box for any item on demand, instead of storing cardboard boxes. This enables UPS to better use its cargo space and transport more efficiently. The company is also active in eco-friendly packaging; through the Eco Responsible Packaging Program, UPS works toward increasing post-consumer recycled content in express envelopes and boxes.

50. Finally, UPS uses its analytical data capabilities to advise customers on how to reduce their environmental impact associated with shipping. Moreover, it contributes actively to public discussions about environmental sustainability.

IV. Training programmes in green logistics

51. Green logistics builds up from activities within single companies but its main components can also be learned from external sources. Several institutions around the world offer different training programmes in green logistics, which vary in length and content. These include professional organizations (POs), specialized training institutions and universities. Hereafter, we provide few examples of different programmes, based on a desktop analysis.

52. Among POs, the Chartered Institute of Logistics and Transport, based in Northamptonshire (the United Kingdom), offers an 80-hour course in green logistics. Targeted at managers and supervisors, this course covers a wide range of the green logistics and environmental topics related to business activities in expanding markets. It also reviews the environmental impact of logistics and supply chain operations, modal considerations, energy efficiency, future trends and strategies. Finally, this course introduces learners to how they should successfully manage green change and how to monitor it. This programme can be taken both full-time and part-time, through distance learning or classroom attendance: 1 in Mauritius, 1 in Namibia and 17 centres in the United Kingdom of Great Britain and Northern Ireland.¹⁵

53. BMC Training, a London-based company, offers a training course in Green Logistics in warehouse, logistics, supply chain and inventory. The course has 5 modules: the first one assesses the environmental effects of logistics, module 2 addresses strategic issues such as restructuring road freight networks and transferring freight to “greener” transport modes. Module 3 deals with operational questions, e.g. improving vehicle utilization, optimizing the routing of vehicles, increasing fuel efficiency and reverse logistics. Module 4 discusses various issues such as sustainability strategies for city logistics and the benefits and costs of switching to alternative fuels. Finally, module 5 talks about the role of government in promoting green logistics. BMC Training offers its four-week course in Dubai, Istanbul, Paris, Kuala Lumpur and London.¹⁶

54. Some universities also offer programmes or courses dedicated to green logistics. These programmes deepen participants’ knowledge of logistics and sustainability and present topics following various approaches (economic, environmental, technical and societal perspectives, operations research and operations management). Examples include the MSc Logistics with Green and Sustainable Supply Chain Management from Herriot Watt University (the United Kingdom), the PhD course in sustainable logistics from the Norwegian University of Science and Technology, Sustainable Logistics and Supply Chain Strategies course from Haaga-Helia (Finland).

V. The impact on environmental sustainability

55. The green initiatives mentioned above, through the use of environment calculators, allow companies to quantify the ecological impact of their interventions on environment sustainability. This section presents some of the results obtained by the companies identified in the previous section.

56. Green electricity represents 34 per cent of energy sources used by Deutsche Post DHL in 2015. The use of renewable energy allows DHL to cut 450,000 tonnes of GHG gas emissions and allows a 2.4 per cent reduction in total energy consumption in its buildings and facilities.

57. DB Schenker measures the environmental impact of individual initiatives. The introduction of 835 m long trains cut carbon emissions from rail freight transportation by 350 metric tons of CO₂ per annum. Furthermore, the installation of the new photovoltaic system at the branch office in Bratislava cuts 70 metric tons of CO₂ per annum.

58. One of GEODIS’ customers estimates that the use of intermodal services has helped it save 1,500 tonnes of CO₂ every year since 2006. Overall, GEODIS notes that

¹⁵ For further details, please visit www.ciltinternational.org/education-development/global-training-directory/cilt-uk-level-3-award-green-logistics/.

¹⁶ For more information, please visit <http://bmcuk.org/Green-Logistics>.

transportation by train results in 7,031 fewer tonnes of CO₂ than were released by trucks on parallel routes. Furthermore, the use of warehouse compliance with high environmental standards has contributed to reduce CO₂ emissions by 21 tonnes a year and has led to annual savings of about €1,000.¹⁷

59. The company also pays attention to this fleet, for example, through the use of hybrid refrigerated heavy goods vehicle which reduces diesel consumption (-20 per cent) and CO₂ emissions (-10 tonnes per year). Diesel vehicles have also been replaced by electric vehicles or by delivery tricycles for last mile deliveries in city centres.

60. Through all these initiatives, the company seeks to reduce average fuel consumption by 1.2 litres/100 km. GEODIS has also equipped its fleet with its own IT systems (geolocation and on-board data systems) that help optimize transport routes and thus reduce CO₂ emissions. Moreover, the speed limiter technology has become a key specification for trucks supplied to GEODIS. As a result, the company saves 3.5 million litres of diesel fuel a year.

61. UPS estimates that its initiatives have resulted in fuel savings of 8.3 million litres and a reduction in CO₂ emissions of about 21,000 tonnes in 2014. In order to reduce aircraft fuel consumption, UPS replaced pilot flight bags, which weigh at least 32 kilograms, with iPads that contain all the flight documents in digital format. In fact, this simple operation reduces fuel consumption by 473,000 litres, reduces CO₂ emissions by 1,200 tonnes, and cuts paper usage by 5.7 million pages per annum.

VI. Key issues

62. The purpose of this document is to shed some light on green logistics; and particularly, on what facilitate the adoption of environmental initiatives by enterprises. Government regulations and consumer awareness seem to play a major role in this regard. For large corporations, “going green” is a potential source of competitive advantage as it allows for product differentiation, which is conducive to more business opportunities and thus, higher profitability. Therefore, one can conclude that companies go green for image and economic motives.

63. The fact that logistics companies deploy a battery of initiatives and assess the impact of their activities suggests that green logistics is more than a fashion. Moreover, the fact that they dedicate resources to environmental affairs (EAs) reinforces this. The importance of these activities within the corporate world is also clear when looking at the reporting structure within the companies identified in this report. UPS has a department of EA headed by a chief sustainability officer and vice-president of EAs, as well as Geodis, where the Sustainable Development department reports to corporate management. At DB Schenker, EAs are under the responsibility of Chief Sustainability Officer, who is also member of the Management Board in charge of Transportation and Logistics. At DHL Group, the environmental strategy and the development of environmental products is the preserve of the GoGreen Sponsors Board. Under the authority of the CEO, the Board consists of executives from all divisions and delegates from corporate functions such as Control, HR, and Fleet and Facilities Management.

64. However, there is an important factor that may dampen the environmental initiatives of logistics companies — customers may not be willing to spend more for more sustainable logistics services. This constitutes a barrier to long-term environmental initiatives. As a

¹⁷ The warehouse is 28,000 square-meters and is located near Lyon. The facility’s features encompass photovoltaic panels, a rainwater recovery system, low-energy lighting and a centralised energy management system.

result, some logistics companies will adopt short-term green programmes with a limited impact on processes and costs.

65. As shown in the table in section II, the spectrum of Green Logistics initiatives is very wide. However, the review of Green logistics programmes undertaken by companies above presents common features, which can serve as standard models. These include notably:

- In the area of distribution and transportation: the use of intermodal transport, alternative fuels and telematics (GPS systems) to minimize travel distance, a management policy of the vehicle fleet that seeks to replace old vehicles with alternative (eco-friendly) ones and finally, training drivers to “ecodriving” practices.
- Other areas (see table in section I): the use of energy-efficient heating and lighting systems, environment-friendly facilities and recycled materials for packaging, to name a few.

66. While it is true that ecological practices are a source of competitive advantage, they also impose a financial burden on firms. This can be particularly difficult for small enterprises. Governmental support in the form of subsidies or tax breaks has proven to be helpful in this regard.¹⁸

67. Although a key driver, excessive regulation can also be an important barrier. In fact, depending on the geographical scope of their activities, companies have to comply with various national regulations. Carrying out green logistics initiatives becomes harder in the present heterogeneity in environmental regulations between and within countries.

VII. Next steps

68. The Working Party may wish to discuss the contents of this paper and consider any next steps in this area.

VIII. References

1. Chin, Thoo Ai, Huam Hon Tat and Zuraidah Sulaimana (2015), “Green Supply Chain Management, Environmental Collaboration and Sustainability Performance”, *Procedia CIRP* 26, pp. 695–699.
2. Colicchia, Claudia, Gino Marchet, Marco Melacini, Sara Perotti (2013), “Building environmental sustainability: empirical evidence from Logistics Service Providers”, *Journal of Cleaner Production* Vol. 59, pp. 197–209.
3. DB Schenker (2014), *Environmental Brochure 2014, Acting green – out of responsibility and conviction*, accessed on 22 July 2016 at www.dbschenker.com/ho-en/sustainability/environmental/publications___.html
4. Deutsche Post DHL Group, *Corporate Responsibility Report 2015 ENVIRONMENT & SOLUTIONS*, accessed on 8 July 2016 at <http://cr-report2015.dpdhl.com>.
5. DHL, *Green Logistics Solutions*, accessed on 7 July 2016 at www.dhl.ch/en/logistics/green_logistics_solutions.html#environsolutions.

¹⁸ For more on this topic, see Zhu and Sarkis (2007). The moderating effects of institutional pressures on emergent green supply chain practices and performance. *International Journal of Industrial Engineering & Production Research*, Vol. 45, No. 18–19, pp. 4333–4355.

6. GEODIS, Committed to Sustainable Transport, Sustainable Development Report 2011 accessed on 14 July 2016 at www.media.geodis.com/internet/corporate/communication/websitecorporate/RAPPORTS%20DD-RSE%20GEODIS%20ANGLAIS/Geodis-SD-Report-2011.pdf.
 7. GEODIS, Sustainable Development Report 2008, accessed on 14 July 2016 at www.media.geodis.com/internet/corporate/communication/websitecorporate/RAPPORTS%20DD-RSE%20GEODIS%20ANGLAIS/Geodis-SD-Report-2008.pdf.
 8. IPCC (2014) Mitigation of Climate Change: contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change, Chapter 8, Cambridge University Press, Cambridge and New York.
 9. McKinnon, Alan, Michael Browne, Maja Pieczyk and Anthony Whiteing (2015), Green Logistics: Improving environmental sustainability of logistics, Third edition (Kogan Page, London).
 10. UPS, UPS 2014 Corporate Sustainability report, accessed on 8 July 2016 at <https://sustainability.ups.com/sustainability-reporting/>
 11. Wang and Sarkis, (2013), “Investigating the relationship of sustainable supply chain management with corporate financial performance”, International Journal of Productivity and Performance Management, Vol. 62, No. 8, pp. 871–888.
 12. Zhu, Q. and Sarkis, J., (2007). The moderating effects of institutional pressures on emergent green supply chain practices and performance. International Journal of Industrial Engineering & Production Research, Vol. 45, No. 18–19, pp. 4333–4355.
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