

# Carbon Disclosure Project Transport Report

Analysis based on CDP 2009 data



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Transportation and logistics are critical to the global marketplace. The sector's impact, both financial and environmentally, is evident in every corner of the globe. Transportation is responsible for almost 60% of oil consumption in OECD<sup>1</sup> countries and for 13% of all global emissions. The industry also employs millions of people and facilitates the flow of goods and commerce that lead to economic prosperity.

In light of this impact, the Carbon Disclosure Project (CDP) has produced its first report on the industry.

Worth noting is the broad range of transportation companies that are represented in this report. There are airports, passenger and cargo airlines, railroads, logistics companies, small package delivery companies, surface transportation companies and sea freight companies, to name a few.

Each has its own unique challenges to mitigate their carbon footprint, lower emissions and address climate change. And many are doing their best to take action.

But the Transport sector is behind other industries in terms of environmental impact reporting and goal-setting. Based on this report's findings, many transport companies also are struggling with identifying and reporting climate-related risks and complete carbon emissions.

As a member of CDP's Global Carbon Disclosure Leadership Index, we encourage our peers to comprehensively report on their environmental impact, to develop plans to reduce carbon emissions, and to work collaboratively to address climate change.

This report offers good information about best practices, emerging standards, market trends and investor expectations. It also highlights the market and financial opportunities that exist for the industry.

Our industry indisputably has a responsibility to address its environmental impact. We encourage the companies in our industry to act decisively to ensure a greener planet.

**Bob Stoffel**, UPS Senior Vice President Supply Chain, Strategy, Engineering and Sustainability

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1. Organisation for Economic Co-operation and Development.

# Introduction

The Transportation sector impacts and serves the vast majority of the business community. It is also one of the fastest-growing energy demand sectors. Transportation plays a crucial and growing role in world energy use and is strongly dependent on oil supplies. As a result it is a major contributor to greenhouse gas emissions. This has led to concerns about its impact on climate change, which have put the sector high on the political agenda. In the coming era of carbon emission constraints, transportation companies will have to reduce their dependence on fossil fuel energy. This will require energy to be used more efficiently and consumption to be switched to low or zero-carbon sources<sup>2</sup>. Regulatory changes and further investment into research and development (R&D) and into alternative fuels by both companies and the government will also be required.

CDP's first Transportation sector report, based on data submitted by the world's largest transportation companies to CDP in 2009, sets out to show the sector's level of preparation for increased carbon constraints and the transition to the low carbon economy. The report examines geographic trends and how the sector is currently positioned in terms of climate change. It focuses on climate change associated risks, opportunities and regulatory drivers. Using primary data, it also considers measures adopted and future plans and investments into low carbon solutions, as well as focusing on the external drivers that are forcing the sector to adapt towards more carbon efficient management practices in preparation for a carbon constrained future.

## Methodology

In 2009 CDP issued its annual global climate change information request to 3,700 companies. This included the world's 291 largest publicly traded transportation companies (by market capitalization). The corporate data received in response to CDP's annual requests provides investors with vital information regarding the current and prospective impacts of climate change on their portfolios, and represents an important resource for investment decisions.

The CDP questionnaire covers four major areas:

- a) Risks & opportunities that climate change presents to business;
- b) Greenhouse gas emissions accounting;
- c) Management strategy to reduce emissions, minimize risk and capitalize on opportunity; and
- d) Corporate governance with regard to climate change.

CDP drew on two datasets for the analysis. The trend analysis within the report focuses on the responses of 291 companies in the Transportation sector. The 291 companies are drawn from the transportation companies featured in the major indices that received the CDP 2009 information request. In order to drill down into the drivers of behavior and strategies within the Transportation sub sectors, CDP undertook more detailed analysis of a smaller group (53) of the world's largest transportation companies, drawn from the MSCI World Index<sup>3</sup>, submitted to CDP in 2009. These 53 companies are among the largest in the sector in the world.

The report is divided into six sections:

- 1) Market Overview – Outlines the current operating climate for the Transportation sector in terms of climate change. The analysis is based on the data from 291 companies in this sector.
- 2) Geographical Trends – Provides an assessment of key geographical trends in the Transportation sector. The analysis is based on the data from 291 companies in the sector.
- 3) Risks & Opportunities – Assesses companies' analysis of risks and opportunities, with particular focus on regulatory, physical and market related risks. The analysis is based on the data from 53 largest transportation companies drawn from MSCI World Index.
- 4) Target setting in the Transportation sector – Provides an analysis of target setting, based on the data from 53 transportation companies in the MSCI World Index.
- 5) Strategic Drivers in Setting Reduction Targets – Looks at internal and external drivers in terms of carbon management and target setting. The analysis is based on the data from 53 companies in the MSCI World Index.
- 6) Emission Mitigation Strategies and Investments – Addresses the strategies adopted by transportation companies to mitigate emissions. The analysis is also based on the data from 53 companies in the MSCI World Index. Investment into emissions reductions is also analyzed, based on the 291 companies.

2. Low or Zero-Carbon Sources Are Crucial for Future Energy Security, Ecology Global Network, April 2010.  
3. The MSCI World is a stock market index of over 1500 'world' stocks from developed markets as defined by MSCI.

## Summary

### Road transportation generates a significant share of emissions

Splitting the sector broadly into the three areas of land, air and sea reveals that road transportation accounts for approximately 80% of the Transportation sector's total contribution to CO<sub>2</sub> emissions, while rail accounts for just 0.5%. Air represents approximately 13% of the share of CO<sub>2</sub> emissions, with sea transportation at just 7%.<sup>4</sup>

### South American and European companies lead on putting emission reduction plans in place

A geographic focus on the full set of 291 Transportation companies in CDP 2009 reveals that South American and European companies demonstrate the highest levels of setting reduction targets.<sup>5</sup> In South America, 60% and in Europe 52% of all transportation companies asked to report through CDP have set an emissions reduction plan, compared to 18% in Asia and 47% in the US and Canada.

### Transportation companies lag behind Global 500 in setting targets

36% of the largest 291 transportation companies have set reduction targets, compared to 51% within of the largest global companies (Global 500 index of companies<sup>6</sup>). This shows that many more transportation companies need to set reduction plans in order to catch up with other sectors.

### Nearly half of the world's largest transportation companies have not yet recognized risks and opportunities

53% of the world's largest 53 transportation companies cite regulatory risks and 59% regulatory opportunities. Despite the fact that Transportation is exposed to a range of regulations globally, this figure is low, when compared to peers in

other sectors within the Global 500. 64% of Global 500 companies outline regulatory risks and 69% of companies regulatory opportunities. However, those transportation companies that do report climate change risks and opportunities show a detailed understanding of the issues. In particular, regulatory risks such as caps and taxes are most frequently cited. In addition companies cite other risks such as increased operating costs, increases in extreme weather and associated disruption and decrease of high carbon services.

### Some companies capitalize on the opportunities

Leading companies are also identifying and developing opportunities in new low carbon fuels and advanced technology vehicles (such as hybrids or hydrogen vehicles). They also report that competitive advantages can be achieved through carbon efficient products and cost savings from increased fuel efficiency.

### A small minority are reporting significant low carbon investments

Some companies are reporting significant investments into carbon reductions and low carbon technologies. Although carbon investment reporting is in its infancy, with just 9% of 291 companies reporting data on current investments and 4% on future investments, significant capital is flowing into the development of low carbon solutions in the sector. US\$31.93 billion has been invested into low carbon investments in the sector. New technologies include installation of renewable energy systems; developing more efficient transport routes, low carbon fuels, and innovative vehicle design; or product innovation into hybrids or electric powered vehicles.

4. <http://www.unep.org/climateneutral/Topics/Transport/tabid/154/Default.aspx>.  
5. The 291 companies comprise of 120 in Asia; 13 in Australia/New Zealand; 104 in Europe; 10 in South America; 2 in South Africa; 42 in USA/Canada.  
6. FTSE Global Equity Index, based on 2009 data reported to CDP.

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# 1. Market Overview

## Key findings:

- The Transportation sector generates 13% of total global emissions, compared to 26% from the power sector and 14% from agriculture.
- 60% of oil consumed in OECD countries is used in transportation.
- Road transport is responsible for the vast majority of emissions, followed by air, sea and then rail.
- The Transportation sector has high greenhouse gas emissions as a result of its heavy dependence on oil.
- Demand is projected to grow for both transportation and energy and will be led by China and India.

Transportation and logistics are key components of a successful economy and are essential for global prosperity and competitiveness. Little production and transfer of goods and services can take place unless inputs such as raw materials, labour and fuel can be moved between locations.

Transportation is a major sector of the U.S. economy. In 2008, transportation-related goods and services contributed \$1.38 trillion to U.S. GDP (9.5%).<sup>7</sup> In Europe, the Transportation sector generates an annual turnover of approximately \$465 billion (EUR 363 billion), or 4.5% of EU GDP and employs more than 8.2 million people.<sup>8</sup> In the EU, 44% of goods go by road, against 39% for short-sea shipping routes, 10% for rail and 3% for inland waterways<sup>9</sup>.

The Transportation industry can be broken down into the following main categories. Within the industry, transportation applies to passengers and logistics refers to freight.<sup>10</sup>

- Surface Transport (including road, rail and pedestrian transport)
- Air Transport
- Sea Transport

The sector is divided into the following subsectors: Air Transport (Airlines, Airports, Air Freight & Logistics), Surface Transport Transportation, Commercial Services and Supplies, Diversified Chemicals, Highways & Railtracks, Industrial.

## High energy dependence combines with growing demand

Globally 98% of transportation runs on fuel made from oil<sup>11</sup> and the Transportation sector is responsible for almost 60% of oil consumption in OECD countries.<sup>12</sup>

Figure 1 shows how global demand for oil from transportation will continue to grow in the future. The demand for energy is projected to be greater in emerging economies (Figure 2); about 93% of the increase in energy demand is expected to come from non OECD countries, largely China and India.<sup>13</sup> Demand for commercial transportation is also projected to grow in all regions and the fastest developing nations will have overtaken the OECD as the largest source of commercial transportation demand by 2030.<sup>14</sup> Increased demand on the sector leads to heightened risk of increased greenhouse gas emissions.

7. [http://www.bts.gov/publications/pocket\\_guide\\_to\\_transportation/2010/html/chapter\\_05.html](http://www.bts.gov/publications/pocket_guide_to_transportation/2010/html/chapter_05.html)

8. Transportation Infrastructure and Environment, EurActiv Network, 22 December 2008.

9. Transport, Europa, 14 July 2010.

10. This index includes companies that may not at first glance appear to be relevant for the Transportation sector. Royal Vopak NV, for example, belongs to "Diversified Chemicals". As this company provides storage and transshipment facilities for fuels used in the Transportation, their inclusion in aggregate analysis for this report is appropriate. Abertis Infraestructuras and Kamigumi fall under "Commercials Services and Supplies". Both these companies engage in transportation logistics and are therefore also appropriate for inclusion.

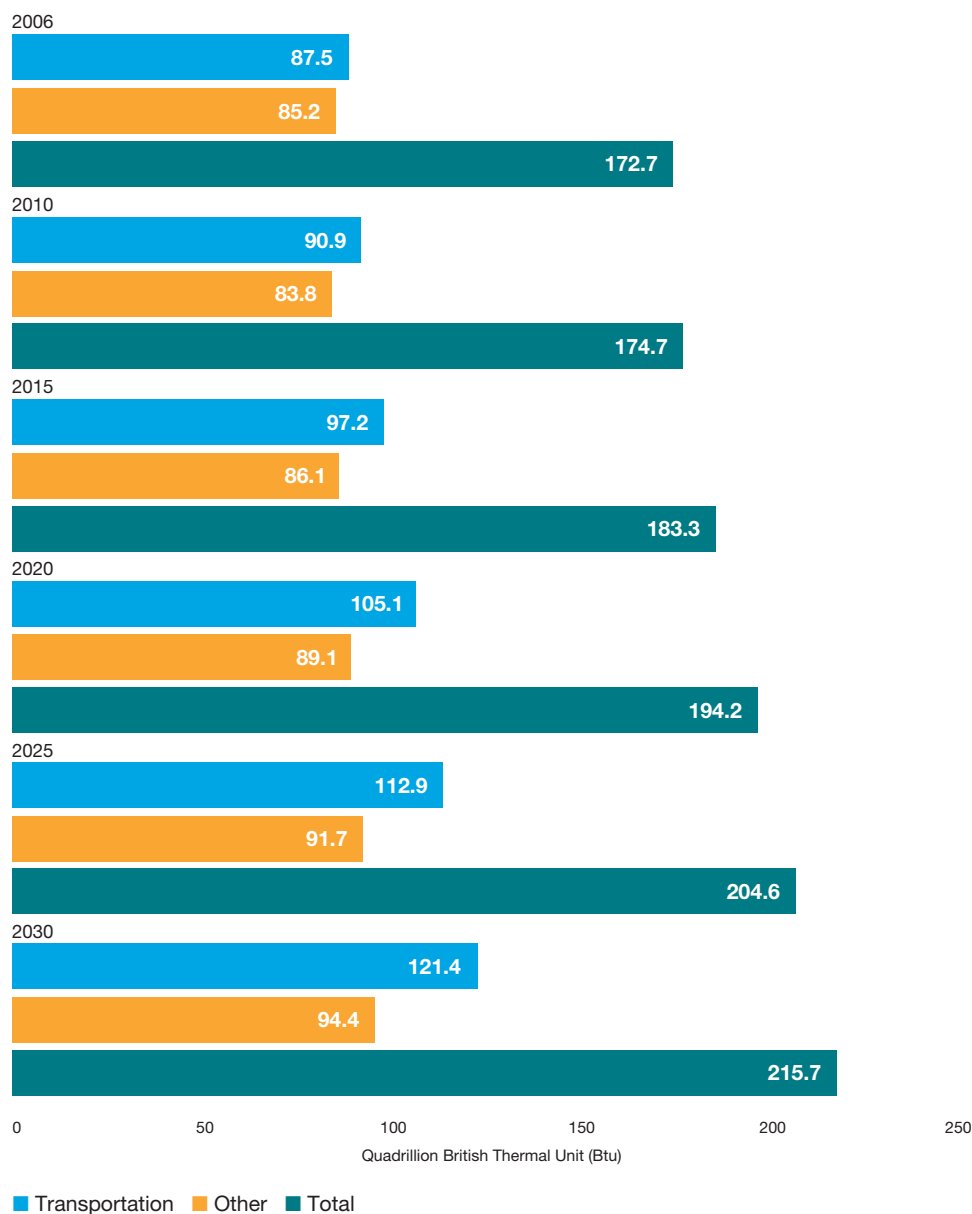
11. Global Transportation Demand, ExxonMobil, May 2010.

12. <http://www.oecd.org/dataoecd/28/54/2396815.pdf>

13. World Energy Outlook 2008: Even with demand static over next 22 years, 4 new Saudi Arabias needed to make up decline in existing oil fields, International News, 12 November 2008.

14. Global Transportation Demand, ExxonMobil, July 2010.

**Fig. 1: Liquid fuel consumption by end-use sector 2006 – 2030**

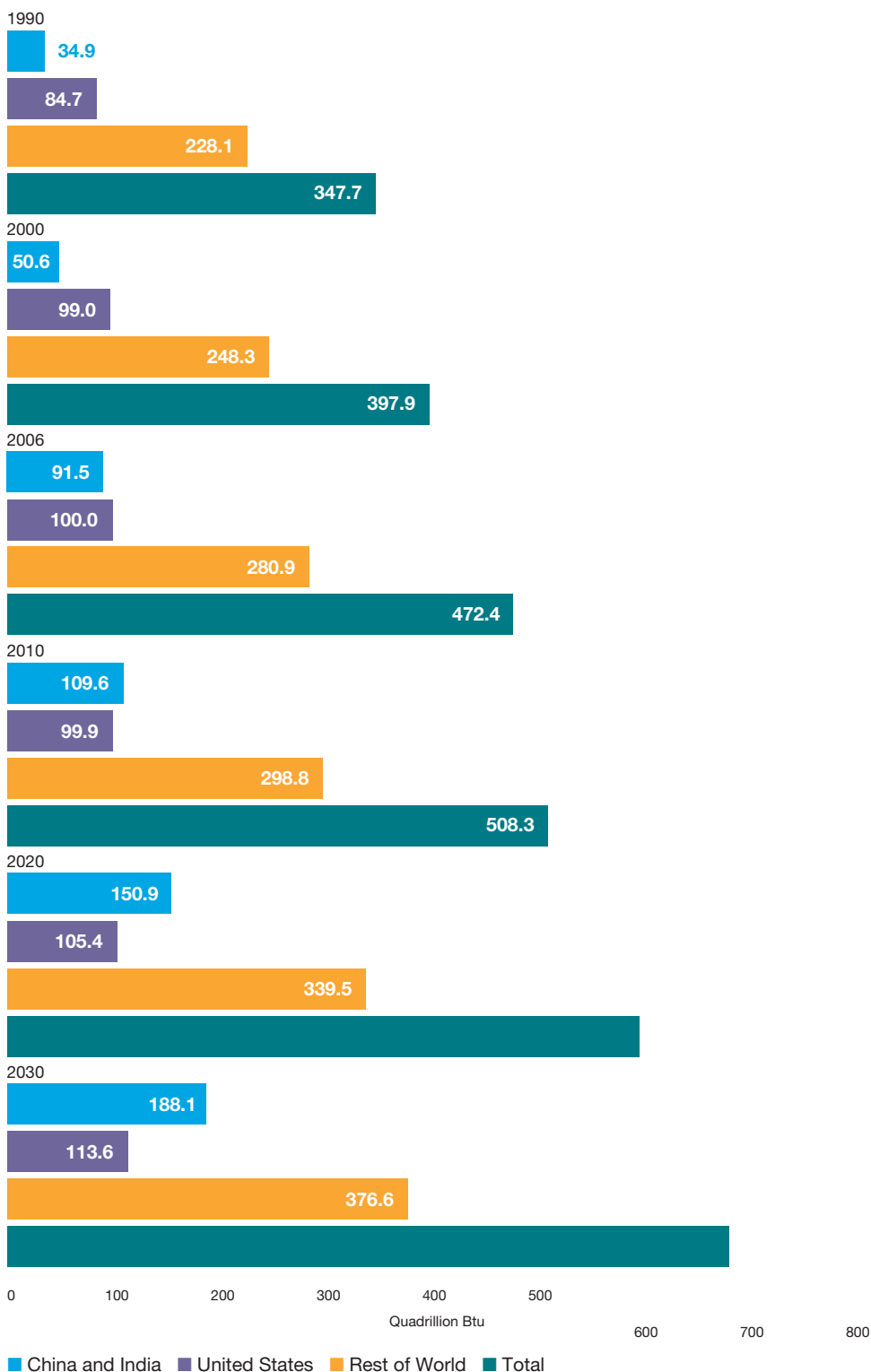


“The need to reduce carbon emissions from travel which has now become a legal requirement through the Climate Change Act clearly provides a public operator with business opportunities. Greater use of public transport will help reduce carbon emissions from travel as well as providing other broader social benefits such as reducing congestion, reducing local air emissions and providing a necessary public service.”

### First Group

Source: 2006 – Derived from Energy Information Administration (EIA), International Energy Annual 2006 (June – December 2008), web site [www.eia.doe.gov/iea](http://www.eia.doe.gov/iea). Projections: EIA, World Energy Projections Plus (2009)

**Fig. 2: Energy Use by Region 1990 – 2030**



**Heavy oil usage = high greenhouse gas emissions**

Heavy dependence on oil also results in heavy greenhouse gas emissions. Current estimates reflect that the Transportation sector is responsible for 13% of global emissions, as outlined in figure 3, similar to global emissions generated through agriculture and greater than both buildings and waste and wastewater emissions.

Within the Transportation sector, CO<sub>2</sub> emissions differ significantly between different modes of transport. Figure 4 highlights current estimates, which shows that Road Transport accounts for approximately 80% of the Transportation sector’s total contribution to CO<sub>2</sub> emissions. Air Transport represents approximately 13% of the share of CO<sub>2</sub> emissions, Sea Transport 7% and Rail Transport account for another 0.5% of the total share of CO<sub>2</sub> emissions from transportation.<sup>15</sup>

In order to decouple the links between growth in demand for transportation and associated greenhouse gas emissions growth, some companies are investing in alternative fuel to decrease oil dependency. It is this kind of investment that will help the sector flourish while also cutting oil dependency and emissions over time.

Source: Energy Information Administration (EIA), International Energy Annual 2006 (June 2008), web site www.eia.doe.gov/iea. Projections: EIA, World Energy Projections Plus (2009)

15. <http://www.unep.org/climateneutral/Topics/Transport/tabid/154/Default.aspx>



## UPS – Quick Facts on Alternative Fuels



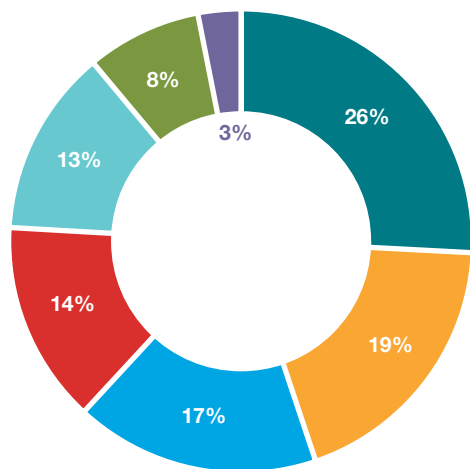
In the long term UPS aims to minimize dependence on fossil fuels by improving operational efficiencies and advancing new technologies. The emissions reduction strategy includes reducing fuel consumption and deploying alternative fuel and low emissions vehicles.

- UPS operates one of the largest private alternative fuel fleet in its industry, which includes more than 2,000 compressed natural gas, liquefied natural gas, propane, hydrogen fuel cell, electric and hybrid electric vehicles.
- The company’s global alternative fuel fleet includes vehicles in the US, Germany, France, Canada, Mexico and Brazil and the United Kingdom.
- UPS has invested over US\$25 million to deploy significant numbers of alternative fuel vehicles in its fleet.
- UPS is working with manufacturers, government agencies and non-profit organizations to advance new fuel technologies.

Source: CDP 2009 data

“BMW Group has initiated projects in the US, the United Kingdom and in Berlin with electric cars. An integral part of these projects are fact finding and scientific research on electric mobility with reference to the user behaviour and infrastructure topics. One of the central targets of these projects is to provide politics with the results of these studies in order to enhance the regulatory process to make electric mobility a viable solution in battling climate change.”

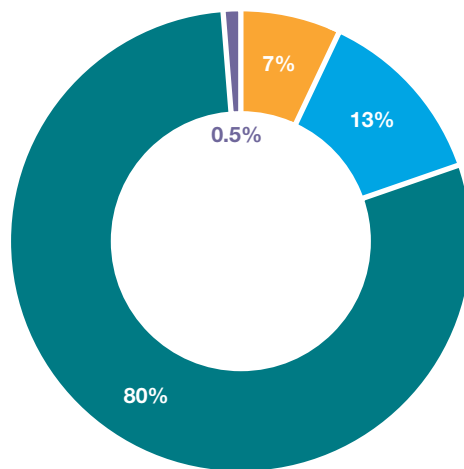
Fig. 3: Cross sector emissions



- Power
- Industry
- Land Use and Forestry
- Agriculture
- Transportation
- Residential and Commercial Buildings
- Waste and Wastewater

Source: World Development Report, 2010

Fig. 4: Transportation sector emissions



- Rail transportation
- Sea Transportation
- Air Transportation
- Road Transportation

Source: UNEP Climate Neutral Network

## BMW

## 2. Geographical Trends – disclosure and target setting

### Key findings:

- The response rate for the Transportation sector is 53%, based on the group of 291 companies, significantly lower than the Global 500's 82% response rate.
- South America followed by Europe leads the way on setting reduction targets.
- South America leads on response rate, followed by North America (USA and Canada), Europe and Asia.

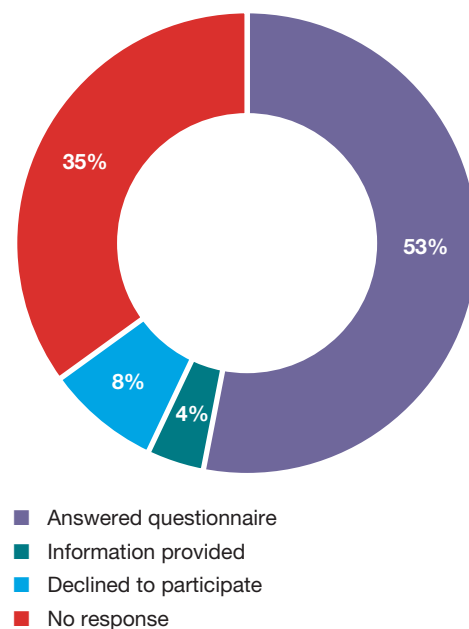
Primary data submitted to CDP shows how the sector is managing the challenges of energy exposure and associated greenhouse gas emissions. CDP's geographical trend analysis draws on data submitted through the CDP 2009 questionnaire, based on the largest 291<sup>16</sup> Transportation companies asked to report to CDP in 2009.

Overall responses rates are shown in Figure 5:

- (53%) 154 companies answered the questionnaire
- (35%) 101 companies did not provide a response
- (8%) 25 companies declined to participate and
- (4%) 11 provided information.

This sector shows a similar response rate to Electric Utilities in CDP 2008, when 53% of the largest 249 electric utilities companies reported to CDP. However it is low compared to the 2009 Global 500 response rate of 82%, or the US based S&P 500 66% response rate. Response rate to CDP is a strong indicator of corporate levels of engagement regarding climate change. The higher the response rate, the higher the levels of engagement.

**Fig. 5: Transport sector CDP 2009 response status**



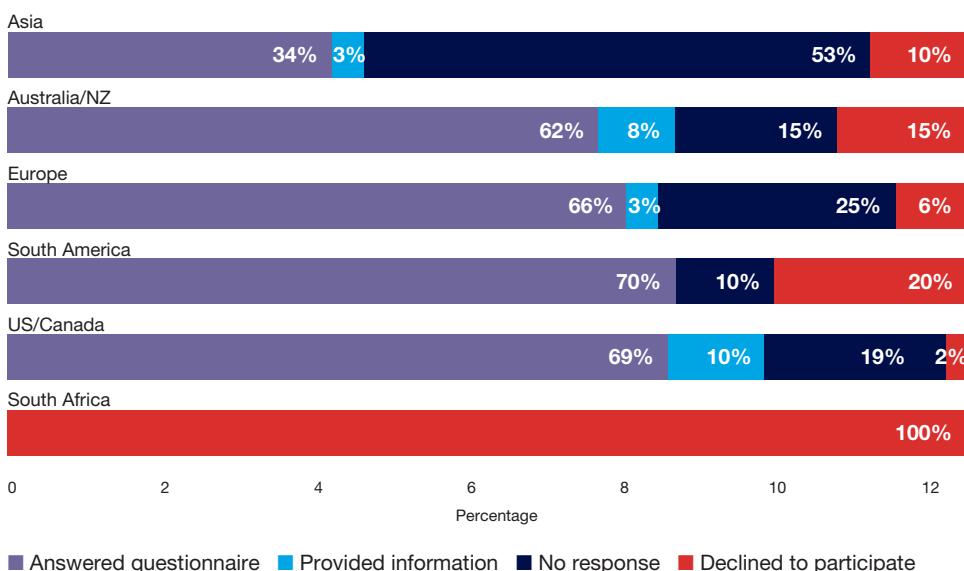
## Regional disclosure trends

The key geographical findings are shown in Figure 6:

- The US/Canada and Europe had respective response rates of 69% and 66%. European companies that provided responses included Abertis Infraestructuras, Air France-KLM, Deutsche Post AG and Iberia. It is noteworthy that despite the increasingly stringent regulations in developed countries, such as the EU Emissions Trading Scheme (EU ETS), a significant number of companies in Europe and US did not respond. Companies that did not respond or declined to participate included Kansas City Southern, Ryanair Holding, the Stobart Group and VTG.
- More than half (59%) of the companies that responded in Asia are located in Japan, which is the fifth largest emitter of greenhouse gases. Japanese companies are coming under pressure to strengthen and enforce their climate change policies after the country's CO<sub>2</sub> emissions in 2007 were above the Kyoto Protocol's 1990 benchmark levels.

- Elsewhere in Asia, a total of 7 transportation companies in China, India, Singapore, and Indonesia responded to CDP 2009. While these countries have rapidly growing greenhouse gas emissions, transportation companies in Asia still lag behind in critical disclosure on greenhouse gas emissions and reduction strategies. However, a few Asian companies including Mahindra & Mahindra and Tata Motors are setting disclosure best practice standards.
- South America has a high response rate of 70%. This is based on the second smallest questionnaire response rate of only 8 Brazilian companies and 2 Chilean companies.
- 100% of South African companies declined to participate, though this was based on just two companies and may not be a true reflection of the sector across the country.

**Fig. 6: Regional overview of global cross comparison**

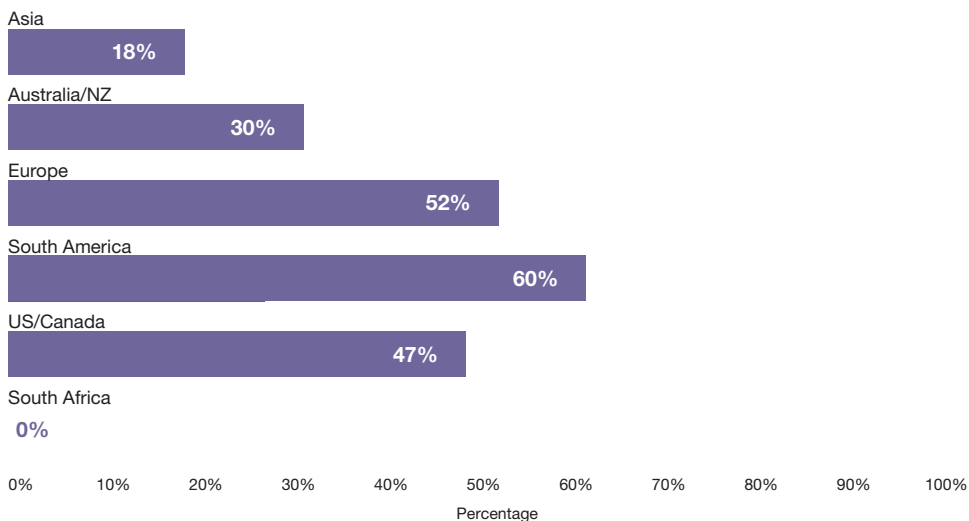


Overall disclosure trends give a good snapshot of engagement levels within a particular sector or geography. In order to gain a deeper understanding of corporate carbon management, trends in reduction targets is one of the most important indicators that a company is actively managing its carbon exposure. Based on the full listing of 291 companies, responses show that:

- South American and European companies are leading the way on setting targets – with 60% of all South American companies within the group of 291 setting targets and 52% of all European companies. (Figure 7)
- In the US/Canada 47% of companies are setting targets but in Asia, 18% have targets, including Cathay Pacific Airways Limited and Hong Kong Aircraft Engineering.

Geographic variations on setting targets are somewhat correlated to climate change regulation. However it is striking that South American companies lead on target setting, despite not having a cap and trade system or carbon tax. In Europe it is clear that the impact of the EU ETS has driven corporate awareness and target setting. In the next section, CDP looks at how transportation companies view climate change regulation, within the wider context of the risks and opportunities it poses to their business.

**Fig. 7 : Percentage of companies within each region setting reduction targets**



# 3. Risks & Opportunities

## Key findings:

- Approximately half the transportation companies within the MSCI World Index see themselves as exposed to regulatory or physical risks.
- Risks identified include: increased fuel prices; costs of compliance and potential litigation; rising sea levels; and damage to infrastructure by extreme weather.
- Opportunities identified include: fuel efficiencies to cut costs; development of new technologies and services; consumer demand for low carbon transportation; government funded mitigation schemes.
- The Transportation sector lags behind the Global 500 in understanding of regulatory risks. The Air Transport sector views itself as most exposed to regulatory and physical risks.

In order to drill down into the drivers of behaviour and strategies within the Transportation sector with regard to carbon management, CDP undertook more detailed analysis of a smaller group (53) of the world's largest transportation companies, drawn from the MSCI World Index, submitted to CDP in 2009. Companies' understanding and management of climate change-related risks and opportunities were analyzed.

- 53% (28 companies) recognize that they are exposed to regulatory risks, compared to 64% in the Global 500. These companies included Air France-KLM, British Airways and FedEx Corporation.
- 47% (25 companies) recognize that they are exposed to physical risks, compared to 69% in the Global 500. These companies included Cathay Pacific Airways, MTR Corporation and Qantas Airways Ltd.

The lower than average assessment of risks within the Transportation sector compared to the Global 500 suggests that an insufficient number of companies in the sector have understood the impacts of carbon constraints and climate change on their business. A minority of companies do demonstrate a good understanding of climate change risks, but for a sector with high exposure to regulation (appendix 3) and physical risks the knowledge gap for many companies around factors such as carbon prices and broader regulation, as well as physical impacts, needs to be closed. The data also shows that the Air Transport sector views itself as the most exposed to regulatory and physical risks. This is likely impacted by the forthcoming inclusion of Aviation within the EU ETS and the increased occurrence of weather or nature related impacts affecting the Airline industry.

**Table 1 – Reporting on regulatory & physical risks**

Sub Industry	Regulatory Risk	Physical Risks	Sub Industry	Regulatory Risk	Physical Risks
A.P. Moller - Maersk	✓	✓	Groupe Eurotunnel	✓	✗
Abertis Infraestructuras	✗	✗	Hong Kong Aircraft Engineering	✗	✗
Air France-KLM	✓	✓	Iberia	✓	✗
All Nippon Airways	✗	✗	Keisei Electric Railway Co., Ltd.	✗	✗
Auckland International Airport	✓	✓	Kintetsu Corporation	✗	✗
British Airways	✓	✓	MTR Corporation	✗	✓
Canadian National Railways	✓	✓	Nippon Express Co.	✗	✗
Cathay Pacific Airways Limited	✓	✓	Nippon Yusen Kaisha Line	✓	✓
Central Japan Railway	✗	✗	Norfolk Southern Corp.	✓	✗
CSX Corporation	✓	✓	Qantas Airways Ltd	✓	✓
Deutsche Post AG	✓	✓	Ryanair Holding PLC	✗	✗
Expeditors International of Washington	✗	✗	Soc Des Autoroutes Paris Rhin-Rhone	✗	✗
FedEx Corporation	✓	✓	Southwest Airlines Co.	✗	✗
First Group	✓	✓	TNT	✓	✓
Fraport AG	✓	✓	Tobu Railway Co., Ltd.	✗	✗

Sub Industry	Regulatory Risk	Physical Risks	Sub Industry	Regulatory Risk	Physical Risks
Transurban	✓	✓	UPS	✓	✓
Union Pacific Corporation	✓	✓	Yamato Holdings Co., Ltd.	✗	✗

### Increasing regulation impacts the Transportation sector

Tightening regulatory regimes and increased government commitments to energy efficiency or renewable energy measures will have significant impacts on the sector, due to its global nature.

The combination of increasing regulation and heavy dependence on oil will impact more and more companies and require them to manage carbon exposure in order to remain competitive on a global or regional scale.

### Quick Facts: British Airways and Regulatory Opportunities



British Airways provided a robust level of information on regulatory opportunities that can increase revenues and mitigate climate change impacts.

It states that the development of a global emissions trading system will generate significant revenues. There is potential for these to deliver real environmental benefits through low-carbon solutions. It is hoped that revenue uses would include:

1. Opportunity to reduce costs of abatement.
2. Support for developing countries for climate change adaptation, through internationally recognized institutions such as the Kyoto Protocol's Adaptation Fund.
3. Seed funding for sustainable biofuel feedstock cultivation and biojet refining capability in developing countries.
4. Avoided deforestation initiatives including capacity building, measurement and reporting through an international funding mechanism to coordinate efforts to slow deforestation.
5. A contestable fund for financing research and development of innovative technology solutions for aviation.

CDP 2009 data

“Where legislation is concerned, we are determined to find global solutions for the industries, and we actively engage in setting new standards and working towards global regulations.”

### **A.P Moller Maersk**

“Climate change, including the impact of global warming, could have a material adverse effect on our results of operations, financial condition, and liquidity. Restrictions, caps, taxes, or other controls on emissions of greenhouse gasses, including diesel exhaust, could significantly increase our operating costs.”

### **Union Pacific Corporation**

#### **Market driven risks and opportunities**

In addition to regulation, companies in the Transportation sector are also facing increasing exposure to the climate change risks due to shifting market conditions including customer demands, energy management and new technologies (Table 2). As well as these risks, there are also significant opportunities and 59% cite regulatory opportunities. The high levels of emissions across the sector provide opportunities to drive efficiencies and produce low carbon products and services which will differentiate transportation companies from their competitors. In addition, there are significant opportunities in cutting costs and driving efficiencies by setting emissions reduction or energy efficiency targets. Investors can use an understanding of variations in carbon performance within the sector to identify which companies pose the greatest risks to portfolio returns, as well as opportunities presented by those that are carbon-efficient relative to sector peers.



**Table 2 – Reported risks & opportunities**

	<b>Risks</b>	<b>Opportunities</b>
<b>Alternative fuel/energy</b>	<p>Increasing oil and fuel prices caused by political instability, climate change regulation and the scarcity of oil, petrol and kerosene.</p> <p>Companies that do not have market-ready new alternative fuel technologies risk a loss of competitive advantage.</p>	<p>With rising oil prices, bio- and synthetic fuels, which produce less greenhouse gas emissions than petroleum fuels, are becoming a viable alternative to gasoline and diesel.</p> <p>Less consumption reduces exposure to increase input costs (such as jet fuel and electricity) and the costs associated with related emissions.</p> <p>Operating costs can be lowered by finding alternatives to kerosene and exploring other more sustainable fuels.</p>
<b>Carbon compliance costs (including EU Emissions Trading Cost) &amp; regulation</b>	<p>Restrictions, caps, taxes, or other controls on greenhouse gas emissions can increase operating costs and cannot always be passed onto customers.</p> <p>Companies that do not manage environmental impacts may be exposed to potential pollution-related liabilities such as fines and clean-up costs.</p>	<p>Companies that emit greenhouse gas emissions can invest in low-carbon technology, trade emissions rights, invest in offset projects.</p> <p>Potential to generate or trade carbon credits.</p> <p>The development of a global or regional emissions trading system has the potential to generate significant revenues that can be used to fund a range of green services and products.</p>
<b>Litigation</b>	<p>Increased costs related to defending and resolving legal claims and other litigation related to climate change.</p>	
<b>Technology</b>	<p>Increased greenhouse gas emissions regulation can trigger required updating or replacement of old equipment.</p>	<p>Regulation of greenhouse gas emissions can lead to the acceleration of new technologies that are more fuel and cost efficient and emit fewer greenhouse gases.</p> <p>Investment in advanced technology vehicles (such as hybrid electric vehicles and hydrogen vehicles) can create competitive advantages.</p>

Table 2 – Continued

	Risks	Opportunities
<b>Weather</b>	<p>Climate change-related physical risks identified include damaged assets and disruption of operations due to increased incidence of severe climate change events and rising sea levels.</p> <p>Other material damage includes deterioration of infrastructure due to excessive heat waves, buckling of rails and the derailment of trains. This can lead to loss of revenue.</p>	<p>Participating in government funded research and development projects to reduce emissions can mitigate the impact of transportation companies on climate change.</p>
<b>Customers</b>	<p>Decrease in demand if other modes of transportation are shown to be less carbon intensive or less polluting.</p> <p>A lack of investment in carbon efficient products could lead to loss of competitive advantage and brand value impairment.</p>	<p>Customer shift in attitude towards social and environmental responsibility. Demand for carbon efficient transportation.</p> <p>Competitive advantages can be derived from technologies and carbon efficient products and services such as 'CO<sub>2</sub> neutral' packaging/postage, airlines and logistics companies putting into place carbon offset programs.</p>

“Fuel saving and the opportunity to move towards a more sustainable model are some of the direct advantages of regulatory requirements.”

### **Cathay Pacific Airways**

# 4. Target setting in the Transportation sector

## Key findings:

- 49% of transportation companies within the MSCI World Index report emission reduction targets, compared to just 36% of the 291 companies. Within the Global 500 the figure is higher at 51%.
- Air Transport leads the way on setting targets Surface Transport lags behind.
- The most popular targets are either CO<sub>2</sub>, energy or fuel related, showing the heavy focus of the sector on fuel use.
- The exposure of the Transportation sector to increasing carbon liabilities can only be decreased if companies translate current carbon emissions policies into robust clearly defined targets.

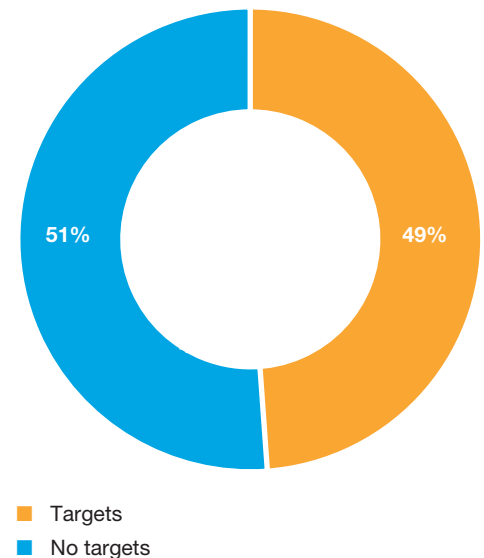
The most effective carbon management route for transportation is an emissions reduction route. Without a reduction strategy, companies will be more exposed to risk, particularly regulatory risk. The proportion of transportation companies in the MSCI World Index setting targets is far higher than within the broader group of transportation companies which received the CDP 2009 information request. This is likely due to the companies within the MSCI World Index being larger and better resourced. 49% (26) of the Transportation companies drawn from the MSCI World Index report emissions reduction targets (figure 8) compared to just 36% of the larger group of 291 companies. The most popular targets within Transportation are either CO<sub>2</sub>, energy, or fuel related. This illustrates the sector's heavy focus on fuel use.

The benefits for companies in planning for emissions reductions will increase as the spotlight continues to shine on the Transportation sector. Companies that do not invest in emissions reductions may face an increased risk of:

- Loss of strategic profit opportunities that can be derived from fuel efficiencies and new, more carbon efficient products and services
- Reputational damage.
- Increased exposure to regulatory interference/liabilities.

Within the subsectors, Airlines, Airports, Air Freight & Logistics outstrips Road and Rail in terms of setting targets.<sup>17</sup> This suggests regulation on the airline industry is encouraging companies to set targets, ahead of their peers in road and rail.

**Fig. 8: MSCI World Index transportation companies with emissions or energy reduction targets**



17. Note subsectors are not directly comparable, as each has differing numbers of constituents.

“25% improvement in carbon efficiency by 2025 and a further target to reduce net carbon emissions by 50% by 2050 based on a 2005 baseline.”

With just half of the total number of companies reporting any form of reduction target at all (see Table 4), it is likely that we will continue to see emissions within this sector rise, unless we see more companies adopting and delivering on targets. The evolution of target setting within the sector is likely to be closely linked to strategic drivers.

## British Airways

**Table 4 – Company reporting on targets**

Sub Industry	Targets	No targets
<b>Airlines, Airports, Air Freight &amp; Logistics</b>	<ul style="list-style-type: none"> <li>• Air France-KLM</li> <li>• British Airways</li> <li>• Deutsche Post AG</li> <li>• FedEx Corporation</li> <li>• Iberia</li> <li>• Qantas Airways Ltd</li> <li>• UPS</li> <li>• TNT</li> </ul>	<ul style="list-style-type: none"> <li>• All Nippon Airways</li> <li>• Expeditors International of Washington</li> <li>• Ryanair Holdings PLC</li> <li>• Southwest Airlines Co.</li> <li>• Yamato Holdings Co., Ltd</li> </ul>
<b>Road and Rail</b>	<ul style="list-style-type: none"> <li>• Canadian National Railways</li> <li>• CSX Corporation</li> <li>• FirstGroup</li> <li>• Union Pacific Corporation</li> </ul>	<ul style="list-style-type: none"> <li>• Central Japan Railway</li> <li>• Keisei Electric Railway Co., Ltd.</li> <li>• Kintetsu Corporation</li> <li>• MTR Corporation</li> <li>• Nippon Express Co.</li> <li>• Norfolk Southern Corp</li> <li>• Tobu Railway Co., Ltd</li> </ul>
<b>Marine</b>	<ul style="list-style-type: none"> <li>• A.P. Moller-Maersk</li> <li>• Nippon Yusen Kaisha Line</li> </ul>	
<b>Other – including Trading Companies, Distribution, Infrastructure</b>	<ul style="list-style-type: none"> <li>• Abertis Infaestructuras</li> <li>• Auckland International Airport</li> <li>• Fraport AG</li> <li>• Groupe Eurotunnel</li> <li>• Hong Kong Aircraft Engineering</li> <li>• Transurban Group</li> </ul>	<ul style="list-style-type: none"> <li>• Kamigumi</li> <li>• Soc Des Autoroutes Paris Rhin-Rhone</li> </ul>

## 5. Strategic drivers in setting reduction targets

### Key findings:

- Companies with board level control are more likely to set staff incentives to cut emissions.
- Investor, regulatory and price pressures are all driving increased attention on energy efficiency and cutting emissions.
- Surface Transportation has the lowest percentage of board level control on climate change. Transportation, Commercial Services and Supplies, Chemicals and Industrial have the highest.

Although the Transportation sector still has a long way to go in setting targets across the industry, the drivers for setting reduction and fuel efficiency targets as well as broader carbon management programs are significant and growing. CDP analyzed responses from the 53 largest Transportation companies to understand what internal factors are driving target setting within the Transportation sector:

- The majority of these companies (57%) have appointed a board level representative to manage climate change within the business. But 43% (23) of companies have yet to appoint a board or executive body responsible for climate change. Companies with the most advanced targets tend to have a board member responsible for climate change, including Air France-KLM, British Airways, Fed Ex Corporation and TNT.
- Only a minority (38%) of companies are providing staff incentives to cut emissions. 62% (33) of companies have yet to provide incentives for individual management of climate change issues including attainment of GHG targets. Staff incentives can be a major driver in internal behavior change and achieving targets. Companies such as FedEx Corporation and Iberia do provide such incentives for individual management on climate change issues including attainment of GHG targets.

“The inclusion of airlines in the EU ETS in 2012 is an example of how carbon regulation is producing implications for transportation companies. Complications arise from inconsistent and varying degrees of implementation of regulatory mechanisms around the world.”

### UPS

**Table 5 – Companies reporting board level accountability & climate change GHG targets**

<b>Company</b>	<b>Board committee/ overall responsibility – climate change</b>	<b>Incentives for individual management on climate change issues including attainment of GHG targets</b>	<b>Company</b>	<b>Board committee/ overall responsibility – climate change</b>	<b>Incentives for individual management on climate change issues including attainment of GHG targets</b>
A.P. Moller - Maersk	✓	✓	First Group	✓	✗
Abertis Infraestructuras	✓	✗	Fraport AG	✓	✓
Air France-KLM	✓	✓	Groupe Eurotunnel	✓	✓
All Nippon Airways	✗	✗	Hong Kong Aircraft Engineering	✓	✓
Auckland International Airport	✓	✓	Iberia	✓	✓
British Airways	✓	✓	Kamigumi	✗	✗
Canadian National Railways	✓	✓	Keisei Electric Railway Co., Ltd.	✗	✗
Cathay Pacific Airways Limited	✓	✗	Kintetsu Corporation	✗	✗
Central Japan Railway	✗	✗	MTR Corporation	✓	✗
CSX Corporation	✓	✓	Nippon Express Co.	✗	✗
Deutsche Post AG	✓	✓	Nippon Yusen Kaisha Line	✓	✓
Expeditors International of Washington	✗	✗	Norfolk Southern Corp.	✗	✗
FedEx Corporation	✓	✗	Qantas Airways Ltd	✓	✓

<b>Company</b>	<b>Board committee/ overall responsibility – climate change</b>	<b>Incentives for individual management on climate change issues including attainment of GHG targets</b>	<b>Company</b>	<b>Board committee/ overall responsibility – climate change</b>	<b>Incentives for individual management on climate change issues including attainment of GHG targets</b>
Ryanair Holding PLC	✘	✘	Transurban	✓	✓
Soc Des Autoroutes Paris Rhin-Rhone	✘	✘	Union Pacific Corporation	✓	✓
Southwest Airlines Co.	✘	✘	UPS	✓	✘
TNT	✓	✓	Yamato Holdings Co., Ltd.	✘	✘
Tobu Railway Co., Ltd.	✘	✘			

“We consider our company to be exposed to other risks because climate change is expected to bring about a number of risks, like extreme weather events, flooding and desertification, rising sea water levels, migration of people, political tensions and instabilities.”

## Deutsche Post

Decisions made by companies to set targets, allocate board level responsibility, or set staff incentives are motivated in part by external factors including:

- Investors including climate change data as part of their valuation models. Companies that do not disclose climate change related information, or do not shift to lower-carbon modes of transportation, are likely to be at a strategic disadvantage. A recent report produced by Goldman Sachs on climate change noted that “the equity market is only just beginning to reflect the magnitude of change that lies ahead and we are approaching a tipping point at which the issue’s importance to business performance and investors will escalate.”<sup>18</sup>
- Carbon abatement becoming an increasingly important investment consideration. CDP is working with other investor groups such as the UNPRI<sup>19</sup> to encourage companies to report emissions data and reduction targets.
- An increase in regulation pertaining to climate change, as detailed earlier in this report. In the US, in January 2010, institutional investors welcomed new guidelines issued by the Securities and Exchange Commission (SEC) that aim to clarify the information that public companies should disclose to investors in terms of ‘material’ effects on their business operations from climate-related issues.

- The global credit crisis placing more pressure on the profit margins of companies resulting in some companies taking a more holistic view of social responsibility. Company CEOs are increasingly aware of the competitive advantages that can be derived from cutting emissions through targets.
- There is also a growing consumer demand for eco-friendly, for example a move to purchase low carbon products such as hybrid cars. Former UN climate chief Yvo de Boer said, “Instead of sidelining the fight against climate change, the global credit crisis could hasten countries’ efforts to create ‘green growth’ industries by revamping the financial system behind them.”<sup>20</sup>
- A future impacted by regulation and a likely increase in the cost of carbon will place a hefty financial burden on excessive polluters who will be forced to modify their products and services to emerging new standards. More stringent regulations will increase the materiality of climate change for investors and drive up costs for companies unable to manage their greenhouse gas inventories. A growing number of companies have recognized the importance of climate change to their long-term success and are embarking on long term reduction plans.

18. Change is coming: A framework for climate change – a defining issue of the 21st century, GS Sustain, May 2009.

19. UN Principles of Responsible Investment represents institutional investor assets of US\$ 20 trillion.

20. UN says credit crisis could enable “green growth”, Reuters, October 2008.



## 6. Emission mitigation strategies – How will companies achieve required emissions cuts?

### Key findings:

- Mitigation strategies include retrofitting, installation of renewable energy systems, raising employee awareness, alternative fuel use (e.g. solar, biomass), and product innovation.
- Alternative energy sources are attracting considerable attention.
- Airlines and Japanese car manufacturers lead the way on investments in cutting carbon.
- 9% of 291 Transportation companies report information on investments into emissions reductions.

In tandem with setting targets, companies also need to develop mitigation strategies to ensure they can hit their carbon reduction targets. For a growing number of investors emissions mitigation strategies are seen as a critical piece of forward-looking information. As outlined in table 6, transportation companies are investing in an array of projects to reduce greenhouse gas emissions on either an absolute or relative basis.

One of the major areas of innovation is alternative fuel sources. Significant investment is moving into this area from a variety of different sources, including some companies within the Transportation sector.

“CN is increasingly looking to the Leadership in Energy and Environmental Design (LEED)-inspired criteria when it expands or builds new office space.”

### **Canadian National Railways**

“FedEx Freight recently completed the installation of solar-electric systems, supplied by BP Solar, at facilities in Whittier and Fontana, California.”

### **FedEx Corporation**

**Table 6 – Emissions/energy consumption mitigation strategies**

Subject	Mitigation Strategies	Companies included
Fleet/vehicle renewal plans	Investment in modernization and improvement (retrofit and re-engineering programs) of vehicle fleets.	British Airways, Cathay Pacific Airways Limited, Iberia, Nippon Yusen Kaisha Line
Renewable energy	Installation of renewable energy systems (including investing in renewable energy credits) to enhance energy efficiency.	Air France-KLM, FedEx Corporation, UPS
Energy audits	Creation of emissions inventories and energy audits for buildings (including heating, ventilation, air conditioning and cooling (HVAC) and lighting).	Abertis Infraestructuras, Auckland Airport
Raising employee awareness	Raise staff awareness on climate change, waste and resources management. Training programs include: helping pilots gauge the amount of fuel they need to safely operate their flights at the most efficient fuel level possible; adjusting the speed of ships; and installing dash board traffic light systems to inform drivers of how efficiently they are driving.	Canadian National Railways, FirstGroup, Union Pacific Corporation, UPS
Routing efficiencies	Participation in task forces and programs to optimize routes and airspace in conjunction with air traffic controllers.	A.P. Moller – Maersk, FedEx Corporation, UPS
Alternative fuels	Lower carbon fuels produced from sustainable, second and third generation feedstocks such as jatropha, algae or biomass waste. Converting engines from gas-fuelled to electric power, the use of solar-electric systems and producing electric energy from renewable sources.	British Airways, Cathay Pacific Airways, FedEx Corporation, TNT, UPS
Building efficiencies	Programs to reduce energy usage in buildings, such as lighting, replacement of obsolete heating and air conditioning systems. The use of solar panels to supply electricity, viability studies to implement photovoltaic solar energy and wind turbines.	CSX Corporation, FedEx Corporation, FirstGroup, Qantas Airways, MTR Corporation, Transurban Group
Product innovation Technologies/design of vehicles	Investment in environmental efficient technologies such as hybrid electric vehicles. Other areas of design structure specified include the length of trains and aircraft weight.	Canadian National Railways, TNT, UPS

### Low carbon investment trends

Although reporting on investments into reducing emissions and new low carbon technologies and services is still in its infancy, a minority of companies are reporting significant investments including Canadian National Railways, Toyota and UPS. Strategies adopted by companies include employee training programs to ensure efficient fuel consumption, investment in environmentally efficient technologies such as hybrid cars, modernization of aircraft and vehicle fleets, energy audits, and investment in alternative fuels. Out of a total of 291 companies which CDP requested information from in 2009:

- (9%) 25 companies disclose information on investments to achieve emission reductions.
- (4%) 13 companies provide information on investment to achieve future emission reductions.
- For some companies investment into this area has not begun. There may also be commercial sensitivities around public disclosure of this information.

Of the companies which have reported investing in emissions reductions and energy savings, they report a total of US\$31.93 billion in investments. The largest investments come from Easyjet, Union Pacific Corporation and Air France-KLM.

*Companies reporting investments into emissions reductions and energy savings include: Air France-KLM, Auckland International Airport, Burlington Northern Santa Fe Corporation, China Merchants Holdings Company Limited, Easyjet, Nankai Electric Railway Co., Ltd, Nippon Yusen, NOK Corporation, Renault, SAAB, SAS, Toyota Industries Corporation, Toyota Motor, Transurban Group, Union Pacific Corporation, VT Group, Williams Grand Prix Engineering Limited, Yokohama Rubber Company, Limited.*

Disclosure regarding investments by companies in both Asia (48%) and Europe (36%) is significantly higher than their peers in the US and Australia/New Zealand.

In addition, there are 13 companies which report on investments which will be required in the future. The largest commitments are reported by Canadian National Railways, Nissan Motor and NOK Corporation. Total future investments reported are US\$ 11.89 billion.

The Transportation sector is an integral part of the economy and essential to the operations of the vast majority of businesses globally, so investments to develop low carbon solutions within the sector are crucial. Its heavy dependence on oil means it contributes to 13% of total global emissions and is responsible for more than half the oil consumption in OECD countries. As a result the sector needs to transform and those companies which are already investing in that transition, will be better positioned for a carbon constrained world.

### Quick Facts: Alternative Sources



- The IEA indicates that while energy consumption declined for the first time since 1981 as a result of the economic crisis, based on current policies it will resume its long-term upward trend once economic recovery is underway.
- In the long-term, energy consumption and prices are likely to have a significant impact on profitability levels in the Transportation sector.
- Transport can be fuelled by a number of alternative sources. These include gaseous fuels such as natural gas or hydrogen and electricity, with both hydrogen and electricity capable of being produced from a variety of feedstocks.
- Companies that invest resources into alternative fuels such as renewable energy and operate cleaner and more efficient vehicles are likely to maintain a competitive advantage over their sector peers.

# Appendix 1 – Summary table of Transportation companies included

Company name <sup>21</sup>	Country	Response State
Abertis Infraestructuras	Spain	Answered questionnaire
A.P. Moller – Maersk	Denmark	Answered questionnaire
ACE Aviation Holdings	Canada	No response
Adani Enterprises	India	No response
ADP (Aéroports de Paris)	France	Answered questionnaire
Aer Lingus Group PLC	Ireland	No response
Aeroflot	Russia	No response
Air Berlin	Germany	Information provided
Air Canada	Canada	Answered questionnaire
Air China Limited	China	Declined to participate
Air France-KLM	France	Answered questionnaire
Air New Zealand Ltd	New Zealand	No response
Aisin Seiki Co., Ltd.	Japan	No response
Alimentation Couche-Tard	Canada	Answered questionnaire
All America Latina Logistica S.A.	Brazil	Answered questionnaire
All Nippon Airways	Japan	No response
AMR Corporation	USA	Answered questionnaire
Ansaldo STS	Italy	No response
Antarchile AS	Chile	No response
Arriva	United Kingdom	Answered questionnaire
AS Latvijas kugnieciba	Latvia	Declined to participate
AS Tallink Grupp	Estonia	No response
Asciano Group	Australia	Answered questionnaire
Ashok Leyland	India	No response
Asiana Airlines	South Korea	Declined to participate
Astra International	Indonesia	Answered questionnaire
Atlantia	Italy	Answered questionnaire
Atlantska plovdba d.d.	Croatia	No response
Auckland International Airport	New Zealand	Answered questionnaire
Audi AG (see Volkswagen)	Germany	Answered questionnaire
Australian Infrastructure Fund	Australia	No response
Autostrade per l'italia Spa	Italy	Answered questionnaire

21. 291 Transportation companies which received CDP 2009 information request.

Company name <sup>21</sup>	Country	Response State
BAE Systems	United Kingdom	Answered questionnaire
BBA Aviation	United Kingdom	Answered questionnaire
Bertrandt AG	Germany	No response
BERU AG	Germany	No response
Bharat Forge	India	No response
BMW Bayerische Motorenwerke AG	Germany	Answered questionnaire
Boeing Company	USA	Answered questionnaire
BorgWarner	USA	No response
Bourbon	France	No response
Bridgestone	Japan	Answered questionnaire
Brisa	Portugal	Answered questionnaire
British Airways	United Kingdom	Answered questionnaire
BSS Group	United Kingdom	Answered questionnaire
Burlington Northern Santa Fe Corporation	USA	Answered questionnaire
C.H. Robinson Worldwide, Inc.	USA	Answered questionnaire
CAE Inc.	Canada	Answered questionnaire
Canadian National Railways	Canada	Answered questionnaire
Canadian Pacific Railway	Canada	Answered questionnaire
Cathay Pacific Airways Limited	Hong Kong	Answered questionnaire
Celesio AG	Germany	Answered questionnaire
Central Japan Railway	Japan	Information provided
CHC Helicopter	Canada	No response
Chemring Group	United Kingdom	Answered questionnaire
China COSCO Holdings (H)	China	No response
China Merchants Holdings Company Limited	China	Answered questionnaire
China Shipping Container Lines (H)	China	No response
China Shipping Development (H)	China	No response
CIE Automotive	Spain	Answered questionnaire
CINTRA	Spain	Answered questionnaire
Cobham	United Kingdom	Answered questionnaire
ComfortDelgro Corp	Singapore	Declined to participate

Company name <sup>21</sup>	Country	Response State
Companhia de Concessões Rodoviárias – CCR	Brazil	Answered questionnaire
ConnectEast Group	Australia	Declined to participate
Container Corporation of India	India	No response
Continental AG	Germany	Answered questionnaire
Copenhagen Airports A/S	Denmark	Answered questionnaire
Cosco Pacific	Hong Kong	Answered questionnaire
CSX Corporation	USA	Answered questionnaire
Cummins India (See Cummins Inc.)	India	Answered questionnaire
DAEWOO International	South Korea	Declined to participate
Daihatsu Motor Co., Ltd.	Japan	No response
Daimler AG	Germany	Answered questionnaire
Dampskibsselskabet NORDEN A/S	Denmark	Answered questionnaire
Daqin Railway (A)	China	No response
Denso Corporation	Japan	No response
Denway Motors	China	No response
Deutsche Lufthansa AG	Germany	Answered questionnaire
Deutsche Post AG	Germany	Answered questionnaire
DFDS A/S	Denmark	Answered questionnaire
DSV A/S	Denmark	Answered questionnaire
EADS	Netherlands	Answered questionnaire
East Japan Railway	Japan	Answered questionnaire
Easyjet	United Kingdom	Answered questionnaire
Electrocomponents	United Kingdom	Answered questionnaire
ElringKlinger AG	Germany	Answered questionnaire
Embraer – Empresa Brasileira de Aeronautica S.A.	Brazil	Answered questionnaire
Essar Shipping Ports & Logistics	India	No response
Expeditors International of Washington	USA	No response
FedEx Corporation	USA	Answered questionnaire
Fiat	Italy	Answered questionnaire
Finmeccanica	Italy	Answered questionnaire
Finnair	Finland	Answered questionnaire

Company name <sup>21</sup>	Country	Response State
Finning International	Canada	Answered questionnaire
FirstGroup	United Kingdom	Answered questionnaire
Flughafen Zürich AG	Switzerland	Declined to participate
Ford Motor Company	USA	Answered questionnaire
Forth Ports	United Kingdom	Declined to participate
FOTEX Nyrt.	Hungary	No response
Fraport AG	Germany	Answered questionnaire
Fred. Olsen Energy ASA	Norway	No response
Frontline ASA	Norway	No response
Fuji Heavy Industries Ltd.	Japan	No response
Fukuyama Transporting Co., Ltd.	Japan	No response
General Motors Corporation	USA	Answered questionnaire
Geodis	France	No response
GKN	United Kingdom	Answered questionnaire
Go-Ahead Group	United Kingdom	Answered questionnaire
Gol Linhas Aereas Inteligentes S.A.	Brazil	Answered questionnaire
Golden Ocean Management AS	Norway	No response
Goodrich Corporation	USA	Answered questionnaire
Goodyear Tire & Rubber Company	USA	No response
Great Eastern Shipping Co.	India	No response
Great Wall Motor Company (H)	China	Information provided
Grindrod Ltd	South Africa	Declined to participate
Groupe Eurotunnel	France	Answered questionnaire
Guangshen Railway Co (H)	China	No response
Hamburger Hafen und Logistik AG	Germany	Answered questionnaire
Hanjin Shipping	South Korea	Declined to participate
Hankook Tire	South Korea	Declined to participate
Hankyu Hanshin Holdings, Inc.	Japan	No response
Hero Honda Motors	India	No response
Hino Motors, Ltd.	Japan	Information provided
Hitachi Capital Corporation	Japan	No response
Hitachi Transport System, Ltd.	Japan	No response

Company name <sup>21</sup>	Country	Response State
Honda Motor Company	Japan	Answered questionnaire
Hong Kong Aircraft Engineering	Hong Kong	Answered questionnaire
Hyundai Autonet – see Hyundai Mobis	South Korea	Answered questionnaire
Hyundai Merchant Marine	South Korea	Answered questionnaire
Hyundai Mobis	South Korea	Answered questionnaire
Hyundai Motor	South Korea	Answered questionnaire
Iberia	Spain	Answered questionnaire
Inchcape	United Kingdom	Answered questionnaire
Intereuropa Global Logistics Service, Ltd. Co.	Slovenia	No response
IRB Infrastructure Developers	India	No response
Irish Continental Group PLC	Ireland	No response
Isuzu Motors Limited	Japan	No response
Itochu Corporation	Japan	Answered questionnaire
ITT Corporation	USA	Answered questionnaire
Japan Airlines Corporation	Japan	Answered questionnaire
Japan Airport Terminal Co., Ltd.	Japan	No response
Jet Airways	India	No response
JTEKT Corporation	Japan	No response
Kamigumi Co., Ltd.	Japan	No response
Kansas City Southern	USA	No response
Kawasaki Kisen Kaisha, Ltd.	Japan	Answered questionnaire
Keihan Electric Railway Co., Ltd.	Japan	No response
Keihin Electric Express Railway Co., Ltd.	Japan	No response
Keio Corporation	Japan	Answered questionnaire
Keisei Electric Railway Co., Ltd.	Japan	No response
Kia Motors Corp.	South Korea	Declined to participate
Kintetsu Corporation	Japan	No response
Kirby Corporation	USA	Answered questionnaire
Koito Manufacturing Co., Ltd.	Japan	No response
Korea Express	South Korea	Declined to participate



Company name <sup>21</sup>	Country	Response State
Korea Line Corporation	South Korea	Answered questionnaire
Korean Air	South Korea	Answered questionnaire
Kuehne + Nagel International AG	Switzerland	Answered questionnaire
L-3 Communications Holdings, Inc.	USA	Declined to participate
Lanchile	Chile	Declined to participate
Leoni AG	Germany	Answered questionnaire
Li & Fung Limited	Hong Kong	Answered questionnaire
Liaoning Cheng Da (A)	China	No response
Localiza Rent a Car S.A.	Brazil	Declined to participate
Lockheed Martin Corporation	USA	Information provided
Luka Koper d.d.	Slovenia	No response
Macquarie Airports	Australia	Answered questionnaire
Macquarie Infrastructure Group	Australia	Answered questionnaire
Magna International	Canada	No response
Mahindra & Mahindra	India	Answered questionnaire
Mainfreight Limited	New Zealand	Answered questionnaire
Mangalore Refinery and Petrochemicals	India	No response
Marcopolo S/A	Brazil	Answered questionnaire
Marubeni Corporation	Japan	Answered questionnaire
Maruti Suzuki India	India	No response
Mazda Motor Corporation	Japan	Answered questionnaire
Meggitt	United Kingdom	Answered questionnaire
Michelin	France	Answered questionnaire
MISC	Malaysia	Declined to participate
Mitsubishi Corporation	Japan	Answered questionnaire
Mitsubishi Logistics	Japan	Declined to participate
Mitsubishi Logistics Corporation	Japan	No response
Mitsubishi Motors	Japan	No response
Mitsubishi Motors Corporation	Japan	No response
Mitsui & Co	Japan	Answered questionnaire
Mitsui O.S.K. Lines Ltd	Japan	Answered questionnaire
MTR Corporation	Hong Kong	Answered questionnaire

Company name <sup>21</sup>	Country	Response State
MTU Aero Engines Holding AG	Germany	Answered questionnaire
Mullen Group Income Fund	Canada	Information provided
Mundra Port & Special Economic Zone	India	No response
Nagase & Co., Ltd.	Japan	No response
Nagoya Railroad Co., Ltd.	Japan	No response
Nankai Electric Railway Co., Ltd.	Japan	Answered questionnaire
National Express Group	United Kingdom	Answered questionnaire
NGK Spark Plug Co	Japan	No response
Nippon Express Co.	Japan	No response
Nippon Yusen Kaisha Line	Japan	Answered questionnaire
Nishi-Nippon Railroad Co., Ltd.	Japan	No response
Nissan Motor	Japan	Answered questionnaire
Nissan Shatai Co., Ltd.	Japan	No response
NOK Corporation	Japan	Answered questionnaire
Norfolk Southern Corp.	USA	Answered questionnaire
Northrop Grumman Corporation	USA	Answered questionnaire
Odakyu Electric Railway	Japan	Declined to participate
Odfjell SE	Norway	Information provided
Panalpina	Switzerland	Answered questionnaire
Pirelli	Italy	No response
PLUS Expressways Bhd	Malaysia	No response
Porsche AG	Germany	Answered questionnaire
Port Of Tauranga Ltd	New Zealand	Information provided
Poslovni sistem Mercator d.d.	Slovenia	Answered questionnaire
PSA Peugeot Citroen	France	Answered questionnaire
Qantas Airways Ltd	Australia	Answered questionnaire
Qinetiq Group	United Kingdom	Answered questionnaire
Raytheon Company	USA	Answered questionnaire
Renault	France	Answered questionnaire
Rieter Holding AG	Switzerland	Answered questionnaire
Rockwell Collins, Inc.	USA	Answered questionnaire

Company name <sup>21</sup>	Country	Response State
Rolls-Royce	United Kingdom	Answered questionnaire
Royal Caribbean International	Norway	No response
Royal Vopak NV	Netherlands	Answered questionnaire
Russel Metals	Canada	Answered questionnaire
Ryanair Holding PLC	United Kingdom	No response
Ryder System, Inc.	USA	Answered questionnaire
SAAB	Sweden	Answered questionnaire
Safran	France	Declined to participate
Sagami Railway Co., Ltd.	Japan	No response
Sankyu Inc.	Japan	No response
SAS	Sweden	Answered questionnaire
Seono Holdings Co., Ltd.	Japan	No response
Shanghai Automotive (A)	China	Declined to participate
Shanghai International Airport (A)	China	No response
Shanghai International Port (A)	China	No response
Shipping Corporation of India	India	No response
SIAS	Italy	No response
Singapore Airlines	Singapore	Answered questionnaire
Sixt AG	Germany	No response
Snap-on Incorporated	USA	Answered questionnaire
Societe Des Autoroutes Paris-Rhin-Rhone	France	No response
Sojitz Corporation	Japan	Answered questionnaire
Southwest Airlines Co.	USA	Information provided
Stagecoach Group	United Kingdom	Answered questionnaire
Stanley Electric Co., Ltd.	Japan	No response
Stobart Group	United Kingdom	Declined to participate
Stolt Nielsen SA	United Kingdom	No response
Sumitomo Corporation	Japan	Answered questionnaire
Sumitomo Rubber Industries, Ltd.	Japan	No response
Sumitomo Warehouse Co., Ltd.	Japan	No response
Suzuki Motor Corporation	Japan	No response

Company name <sup>21</sup>	Country	Response State
Tallinna Kaubamaja AS	Estonia	No response
TAM S.A.	Brazil	Answered questionnaire
Tankerska plovdba d.d.	Croatia	No response
Tata Motors	India	Answered questionnaire
Teekay	Canada	Answered questionnaire
Thales	France	Answered questionnaire
TNT	Netherlands	Answered questionnaire
Tobu Railway Co., Ltd.	Japan	No response
Tokai Rika Co., Ltd.	Japan	No response
Tokyu Corporation	Japan	Answered questionnaire
Toll Holdings Ltd	Australia	Answered questionnaire
TORM AS	Denmark	Answered questionnaire
Toyoda Gosei Co., Ltd.	Japan	No response
Toyota Auto Body Co., Ltd.	Japan	No response
Toyota Boshoku Corporation	Japan	No response
Toyota Industries Corporation	Japan	Answered questionnaire
Toyota Motor	Japan	Answered questionnaire
Toyota Tsusho Corporation	Japan	No response
Transat A.T.	Canada	No response
Transatlantic AB	Sweden	Answered questionnaire
Transurban	Australia	Answered questionnaire
Trencor	South Africa	Declined to participate
UAL Corporation	USA	Answered questionnaire
Ultrapar Participações S/A	Brazil	Answered questionnaire
Union Pacific Corporation	USA	Answered questionnaire
United Parcel Service, Inc.	USA	Answered questionnaire
Valeo	France	Answered questionnaire
Virgin Blue Holdings Limited	Australia	Declined to participate
Volkswagen	Germany	Answered questionnaire
Volvo	Sweden	Answered questionnaire
VT Group	United Kingdom	Answered questionnaire
VTG AG	Germany	Declined to participate

Company name <sup>21</sup>	Country	Response State
W.W. Grainger, Inc.	USA	Answered questionnaire
West Japan Railway	Japan	Answered questionnaire
WestJet Transportation	Canada	Information provided
Wilh. Wilhelmsen ASA	Norway	Information provided
Williams Grand Prix Engineering Limited	United Kingdom	Answered questionnaire
Yamaha Motor Co., Ltd.	Japan	Answered questionnaire
Yamato Holdings Co., Ltd.	Japan	No response
Yokohama Rubber Company, Limited	Japan	Answered questionnaire
Zodiac	France	No response

# Appendix 2 – Subsector overview

## Shipping

- The international Shipping industry is responsible for the carriage of approximately 90% of world trade. The operation of merchant ships generates an estimated annual income of over US\$380 billion in freight rates, representing approximately 5% of the total global economy. Almost 80% of the world's shipbuilding industry is located in Japan, Korea, China and the EU.<sup>22</sup>
- Europe is the world's largest dry cargo market, importing over 1.5 billion tonnes of commodities such as coal, iron ore and grain.<sup>23</sup> There has been a rise in acts of piracy and armed robbery against ships off the coast of Somalia, particularly in the Gulf of Aden (a strategic corridor between the Indian Ocean and the Red Sea.) The diversions around the Cape of Good Hope could result in both increased fuel consumption and emissions.
- Shipping companies are reducing capacity in container services and cancelling orders for more fuel efficient ships as a result of a decrease in demand.<sup>24</sup>
- An average cargo ship of more than 8,000 deadweight tonnage emits 14 to 15 grammes of CO<sub>2</sub> per tonne/km. This is significantly more carbon efficient than air freight, which emits up to 1,600 grammes of CO<sub>2</sub> per tonne/km.<sup>25</sup>
- The IMO base scenario predicts that emissions from international Shipping will increase from current levels by between 125% and 218% by 2050. The base scenario also predicts that increases over the next decade (to 2020) will range from a low of 9.7% to a high of 25.5% above current emission levels.<sup>26</sup>

## Automobiles

- The Automobile industry is accountable for more than 10% of GDP in the US, EU and Japan.<sup>27</sup> In Europe the Automotive sector directly employs over 2 million people, and indirectly supports approximately 10 million jobs in other industries.<sup>28</sup>
- The Automobile industry produces 60 million cars and trucks a year, and is responsible for almost half the world's oil consumption.<sup>29</sup>
- Despite the significant consolidation levels amongst car manufacturers, overcapacity in the industry is a constant issue. This keeps price and the return on invested capital under pressure. The industry is mature, especially in the European and American markets, while some Asian markets (such as China and India) continue to have growth opportunities.
- CO<sub>2</sub> reduction and vehicle efficiency improvement remain high on the political agenda. In the EU, Road Transportation is one of the few sectors where emissions are still rising rapidly. In the typical life cycle of an automobile 75% of automotive-related emissions occur during vehicle use (19% during fuel production, 4% during the production of materials, and 2% during assembly work).<sup>30</sup>
- In the context of climate protection western industrial nations would have to lower their greenhouse gas emissions by 60% to 80% by 2050 in order to limit global temperature increases to no more than 2°C of pre-industrial levels.<sup>31</sup>

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## Aviation

- The European Aviation sector employs approximately 375,000 people. The output of the industry totals approximately EUR 127.8 billion. The industry is highly concentrated in France, UK and Germany, which account for over 75% of total production. In 2008, the biggest markets for EU civil aviation exports in decreasing order of importance were the US, China, India, Brazil.<sup>32</sup>
- In 2009, Europe was the second biggest global producer of civil aircraft, after the US.<sup>33</sup> The growing demand for air travel has resulted in increasing levels of greenhouse gas emissions from the Aviation sector, despite efficiency improvements.<sup>34</sup>
- The Aviation sector accounts for approximately 1.5% of global anthropogenic greenhouse gas emissions per year. US aviation activities account for nearly 4% of these emissions.<sup>35</sup>
- The International Air Transport Association (IATA) has set a goal for its member airline to use 10% 'alternative' fuels by 2017.<sup>36</sup> In the long-term IATA aim to achieve carbon-neutral growth from 2020 and to reduce net carbon emissions 50% by 2050.<sup>37</sup>
- A combination of operational practices, lower-carbon fuels, and higher aircraft fuel efficiency could reduce annual greenhouse gas emissions from global aviation by more than 50% below "business-as-usual" projections, causing emissions from aviation to only double, as opposed to quadruple by 2050.<sup>38</sup>

## Railway

- According to the United Nations (UN), the Rail sector in Europe directly employs about 900,000, while the number of workers employed in manufacturing rail and tram locomotives and rolling stock has declined to 140,000.<sup>39</sup>
- The global rail market is worth EUR 125.5 billion. The world market for railway equipment and services has achieved strong growth in the last two years, with the market for equipment recording growth of 11%.<sup>40</sup>
- The total world market for the rail supply industry is estimated at EUR 103 billion with an expected steady annual growth of 2% per year over the next decade, resulting in 20% growth over the next 10 years. The EU Strategic Rail Research Agenda 2020 suggests that passenger numbers across all modes of Rail Transportation will double by 2020.
- Rail transportation is an energy-efficient but capital-intensive form of mechanized land transportation. The European rail sector has committed itself to cut the specific emissions of Rail Transportation (tonne CO<sub>2</sub> per passenger kilometer) by 30% over the period 1990 to 2020, while in some countries rail operators are already reaching carbon neutrality by using entirely renewable energy sources to power trains.<sup>41</sup>
- With 7% to 10% of market share, rail still contributes less than 2% of the EU Transportation sector's CO<sub>2</sub> emissions, while travelling by rail is on average 3 to 10 times less CO<sub>2</sub> intensive compared to Road or Air Transportation.<sup>42</sup>

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# Appendix 3 – Regulatory impacts

Country	Climate Change	Renewable Energy	Energy Efficiency	Transport
European Union	20% emission reduction from 1990 to 2020 (30% if other countries commit to substantial reductions); 80% reduction from 1990 to 2050	20% of primary energy mix by 2020	20% energy savings from the reference case by 2020	10% transportation fuel from biofuel by 2020
United States	Emissions reduction to 1990 levels by 2020; 80% reduction from 1990 to 2050	25% of electricity by 2025		Increase fuel economy standard to 35 miles a gallon by 2016
Canada	20% reduction from 2006 to 2020			
Australia	15% reduction from 2000 to 2020			
China	National Climate Change Plan and White Paper for Policies and Actions for Climate Change, a leading group on energy conservation and emission reduction established, chaired by the prime minister	15% of primary energy by 2020	20% reduction in energy intensity from 2005 to 2010	35 miles a gallon fuel economy standard already achieved, plan to be the world leader in electric vehicles, and mass construction of subways under way
India	National Action Plan on Climate Change: per capita emissions not to exceed developed countries, an advisory council on climate change created, chaired by the prime minister	23 gigawatts of renewable capacity by 2012	10 gigawatts of energy savings by 2012	Urban transportation policy: increase investment in public transportation
South Africa	Long-term mitigation scenario: emissions peak in 2020 to 2025, plateau for a decade and then decline in absolute terms	4% of the power mix by 2013	12% energy efficiency improvement by 215	Plan to be the world leader in electric vehicles and expand bus rapid transportation



Country	Climate Change	Renewable Energy	Energy Efficiency	Transport
Mexico	50% emission reduction 2002 to 2050, national strategy on climate change: intersecretariat commission on climate change set up for coordination	8% of the power mix by 2012	Efficiency standards, cogeneration	Increase investment in public transportation
Brazil	National plan on climate change: reducing deforestation 70% by 2018	10% of the power mix by 2030	103 terawatt hours of energy savings by 2030	World leader in ethanol production

Sources: Government of China 2008; Government of India 2008, Government of Mexico 2008, Brazil Interministerial Committee on Climate Change 2008, Pew Center 2008a and 2008b, Project Analyst 2009. Note: Some of the above goals represent formal commitments, while others are still under discussion.



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