IEA Bioenergy

Task 38 – Greenhouse Gas Balances of Biomass and Bioenergy Systems

Task 40 – Sustainable International bioenergy Trade: Securing Supply and Demand

Greenhouse gas credits trade versus biomass trade – weighing the benefits

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ABSTRACTS

Session 1

International biomass trade and greenhouse gas accounting

State of the art at the Norwegian bioenergy scene

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This presentation gives an overview of bioenergy use, prices, markets and markets prospects in Norway. The current bioenergy use in Norway is about 15 TWh, of which about one half is produced and used in forest industries. The main share of bioenergy used by households consists of fire wood in stoves. The use of refined, solid biofuels is hampered by low coverage of water-borne heating systems and historically low end-user prices of electricity. On the raw material side, softwood (mainly spruce and pine) represents the main potential. Harvest levels in Norwegian forests are well below annual growth, implying that forest biomass resources steadily accumulates. Partly as a result of this, Norwegian wood prices have decreased substantially in recent decades. This trend, combined with rising prices of oil and electricity internationally in recent year, have improved competitiveness of solid biofuels compared to electricity, light fuel oil and kerosene in the heat market. Biomass for combined heat and power projects or domestically produced liquid biofuels seems to have limited potential in the short term.

Model projections of future bioenergy use in Norway suggest that bioenergy use will increase in some market segments with the current price levels of electricity and oil, and quite minor improvements of bioenergy competitiveness may release substantially higher bioenergy use. According to the model projections, imported biomass will take a significant share of the possible increasing market.

GHG Impacts of Pellet Production from Woody Biomass Sources in BC, Canada

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This study assesses whether there is sufficient long-term potential of surplus fibre to warrant investment in pellet plants in BC Canada, and compares GHG impacts of different supply options of wood fibre for pellet manufacture and transportation to markets, including Europe. Three biomass sources are considered, all of extreme interest to stakeholders; sawmill residue, trees killed by the Mountain Pine Beetle (MPB) infestation, and afforestation fibre. It is shown that there is sufficient surplus mill residue for more than ten pellet plants with capacity of 132,000t, but in the event that supply becomes scarce or costly there is an unlimited supply of MPB fibre. Afforestation can supply fibre in the future, when MPB fibre has decayed too much to be an energy source. The study considers a base case of incinerating sawmill residues, letting MPB stands decay or burn, and burning coal in European power plants. The base case emits 218,000 tCO_2e annually. In the project case, building a pellet plant sustains a one-time emission of 9,900 tCO_2e, while manufacturing pellets incurs 7,800 tCO_2e, and shipping a portion of production to Rotterdam incurs 5,000 tCO_2e annually. Fossil fuel emissions in fibre handling and land transportation are also considered. The net reduction in GHGc emissions from fossil fuels as a result of the plant 203,000 tCO_2e annually. The carbon stock impacts of Mountain Pine Beetle are determined by using the GORCAM model to assess changes in all relevant carbon pools including above and below ground biomass, dead organic matter and soils. The net loss in carbon stock is equivalent to emissions of 102,000 tCO_2e annually. Afforestation stock changes, calculated in the Forest Bio-economic Model developed by the Canadian Forest Service, increase over time and peak at 116,000 tCO_2e. The net of GHG emissions and stock changes is to reduce emissions by 258,000 tCO_2e in 2006 declining to 186,000 tCO_2e in 2014. Though the GHG benefit is clear, the project proponent would not own most of the emission reduction credits.

Electrabel's implementation strategy for large scale biomass imports.

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Belgium has commit itself to reduce the greenhouse gas emissions with 8% by 2010. In addition, since 2002 electricity sales are submitted to an obligation of 6% renewable power by 2010 in the frame of a targeted green certificate system. The obligation is coupled with a penalty of 10 to 12,5 c€/kWh for the unrealised share of green power.

Belgium has developed two major green certificate systems with a target increasing every year in each region. One system in Flanders in based upon the energy balance and the use of fossil energy along the supply chain that is then subtracted 'pro rata' from the granted certificate per MWhe of green electricity. The second one in Wallonia is based upon avoided fossil CO_2 emissions according to a LCA with respect to the reference of the combined cycle power plant firing natural gas with an efficiency of 55%.

In addition Belgian authorities impose an audit being carried out by an independent body first of all for the supply chain including evaluation of greenhouse gas emissions, and secondly for assessing the sustainable character of the agricultural or forestry resources. Without any FSC-type forest certificate the prove has to be made that the local biomass resources are managed on a sustainable way. Documents originating from the local authorities as well as reports from important NGO's are also used to assess this issue.

REALISATIONS

Green power in Belgium is mainly generated with biomass according to the limited hydro potential (about 100 MWe in Wallonia) and the limited potential for efficient wind farms due to very population density and limited sea coast (64 km).

Since early 1996, Electrabel has carried out partial substitution of hardcoal in thermal power plants with bio-fuels : sewage sludge, wood dust and olive cake. In January 2003, a wood gasifier of 20 MWe has been commissioned and the syngas is used in substitution of coal in Ruien power plant.

In 2005, Electrabel has made an important additional step with the conversion of two existing pulverised coal power plants for firing wood pellets in Belgium. One is located near Gent and co-fires wood-pellets (25%) with hardcoal (70%) and olive cake from Spain (5%). The second one has been converted for firing 100% wood pellets.

Both plants operate at nominal load since September 2005 for a total of 145 MW installed power. The total mass of wood pellets shipped to the plants is about 700 000 tons a year. The suppliers are spread all over the world and the feedstock is transported to the Port of Antwerp and from there on by flat boats up to the sites of the power plants.

Next steps for co-firing biofuel and certification

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The last years, co-firing biofuel has proven to be a reliable technology for the production of sustainable energy. Many energy companies in Europe diversified their product portfolio of fossil fuels, like gas, coal and oil with renewable sources like wind and biofuel.

The most important source for biofuel at this moment is wood pellets. Because of the chemical and physical characteristics, wood pellets are well suitable to co-fire in coal-fired power plants. Also residues from the agricultural sector are used for co-firing, but still many problems like corrosion, slagging and fouling occur because of the negative chemical composition of agri-products (wheatbran, soyhull, palmkernel). Beside the solid biofuels, all kind of liquid biofuels are being used in mainly gas-/oil fired power plant.

The wood pellet market is facing a shortage since some time now. This occurred due to different factors. The demand from the energy sector has increased and the same goes for the demand from the consumer market, both stimulated by higher prices of the fossil fuels. This higher demand will speed up the development in the global biofuel market through the development of technology for pre-treatment of biomass, upgrading the biomass and securing the supply at the source.

Development in new technologies like torrefaction and pyrolyse will give the possibility to change the physical and/or chemical composition of products to make them (more) suitable for co-firing. Furthermore, changes in co-firing technologies will enable power plants to co-fire agri-products. This will lower the dependency on the wood pellet market. A third significant development will be the use of energy-crops. Large energy companies will invest in energy-crops of for example willow or eucalyptus in order to secure their future biofuel supply.

The more intensive use of biofuel will lead to an increasing demand for raw material like saw dust and agri-residues. This increasing demand can also have a negative influence on the environment (e.g. deforestation, loss of biodiversity, etc.). To minimize the negative impact on the environment, sustainable criteria for the production and use of biofuel have to be implemented combined with a suitable certification programme.

The interest for certification programmes for biofuel has risen over the years. In 2002 Essent, as predecessor in co-firing biofuel, already developed a certification label for biofuel together with SKAL-international, the Green Gold Standard. In 2005 also the Round Table of Sustainable Palm Oil formulated criteria for Sustainable palm oil based on the Green Gold Standard. At this moment, the Dutch government is working on the import criteria for biomass to guarantee sustainability.

To summarize, the use of biofuel will increase which will lead to pressure on the biofuel markets, with a shortage on the wood pellet market on the short to mid-term. Therefore investments in co-firing and pre-treatment technologies will increase to enable the use of agri-products. Besides this investments in energy crops will take place to secure pellet supply on the long term. Next to these developments we expect a stronger demand for a certification system based on strict criteria for sustainable biomass to avoid negative environmental impacts.

Trading biomass or GHG-emission credits?

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Given the large global bio-energy production potential and the various possibilities to reduce GHG-emissions under the Kyoto Protocol (i.e. domestic action, JI, CDM, ET), the question arises how to make optimal use of this large renewable source. In this study, two trading options are analysed and compared: physical trade of biomass (fuels) and the trade of emission credits derived from bio-energy projects. Firstly, an overview is provided from all factors that influence the amount of emissions that can be reduced in both trading systems and the associated costs. Current rules and interpretations on how to account for carbon gains and losses are analysed. Special attention is given to the role of baseline vegetation, accounting rules, transaction costs, insurance buffers, leakage, reference energy system and upstream emissions and costs. In the second part, two case studies (Mozambique and Brazil) are carried out, both including a physical trading system and an emission credit trading system, to analyse which of the trading options provides the cheapest possibilities to reduce GHG-emissions and which factors have the largest influence on these results. After taking into account other factors like diversification of energy sources, logistical capacities, policies and regulations etc., the question is answered under what conditions should we invest in bio-energy projects in the country of biomass origin and under what conditions should we import the available biomass?

CO_2 emissions from international biomass transport

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Biomass fuels that are sustainably produced yield net, life-cycle, CO_2 emissions only to the extent that fossil fuels are used to operate the fuel system. Recovery and transport of biomass require energy and result in CO_2 emissions, and the further it is transported the more CO_2 is emitted. However, investment of more primary energy in the recovery process can make the full system more efficient with lower dry-matter losses and that more biomass per hectare are delivered to the end-user. We suggest that there are two circumstances where it makes CO_2 sense to transport biomass fuels over long distances rather than to use it locally: 1.) when local supply is in excess of opportunities for local use and the CO_2 cost of transport is smaller than the CO_2 displacement at the point of final usage and, 2.) when the biomass will be used with greater efficiency elsewhere and the gain in efficiency is greater than the CO_2 cost of transport. In this presentation we look at the CO_2 cost of biomass transport on a full system analysis from the clear cut to the end-user. Our analysis is for forest residues and the data are based on real experience in central Sweden.

Greenhouse gas reporting and accounting rules for wood products including biomass for energy

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Rules for reporting carbon balance of harvested wood products (HWP) in national GHG emission inventories under the UNFCCC is an issue that has been argued already for one decade without finding any mutual understanding internationally. HWP are intended to be a part of the Land Use, Land-Use Change and Forestry (LULUCF) sector reporting (referred to Agriculture, Forestry and Other Land-Use (AFOLU) sector in the forthcoming 2006 IPCC Guidelines for national GHG emission inventories). Confusion and misunderstandings are rooted in diverging interpretations of the terms “emissions” and “removals” in the context of land use and HWP, having an impact on the controversial issue of HWP reporting. One interpretation sees emissions and removals to be approximated by a change in carbon stocks in a number of selected carbon pools within the LULUCF/AFOLU sector. Another interpretation views emissions and removals as gross fluxes between the atmosphere and the land / HWP system. The various alternative approaches that have been proposed for reporting for harvested wood products are applicable to one or the other of these interpretations: the Stock Change and Production Approaches, focussed on stock changes, are applicable to the first interpretation; the Atmospheric Flow and Simple Decay Approaches focus on fluxes, as in the second interpretation. Another difference between the approaches is, whether they consider all HWP pools within country borders (including imported products) or they consider just HWP pools grown in the country (excluding thus imported wood but including domestic wood in the export market). The approaches are mutually exclusive: a similar reporting rule must be applied in all countries globally to preserve the mass balance of HWP. In addition, whether emissions/removals are approximated by stock change or from gross fluxes, it is critical that a consistent approach is applied across the whole LULUCF/AFOLU sector.

The optional reporting rules for HWP defined by the alternative approaches above have also major implications for emission-neutrality of bioenergy, some of them also incoherent. For instance, by the Atmospheric Flow Approach combustion of imported wood-based biofuels would be reported in the LULUCF/AFOLU sector as a national emission, like fossil fuel use in the Energy sector. However, non-wood biofuels would still preserve their emission-neutrality.

An international agreement on the reporting rule for HWP is a requisite for including them in the national emission inventories under the UNFCCC. Next possible step would be their inclusion in national obligations in the future commitment periods. This, however, would require an agreement on HWP accounting rules, which might differ substantially from the reporting rules whose basic objective is just to estimate the carbon balance in HWP as accurately as possible. The position of renewable bioenergy should be considered very carefully when negotiating these accounting rules.

Session 2

Biomass use under emission trading and certificate trading schemes

The EU ETS in the Finnish context: Does the ETS support local bioenergy implementation?

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Overview of CDM bioenergy projects

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This presentation is based on the analysis of the data compiled in the UNEP Risoe CDM Pipeline Overview, which is regularly updated on the web-site: www.cd4cdm.org. All these data are extracted from the project design documents (PDDs) for the 661 CDM projects which have been available for public comments on the CDM web site of the UNFCCC: www.unfccc.int .

The fist of the 661 CDM projects in pipeline were sent for validation by a private entity in December 2003 and the first CDM project was registered by the EB in November 2004. Now 492 of the CDM projects are at validation, but 25 more projects have requested to be registered, and 142 have been registered by the EB. Finally 7 projects have got Certified Emission Reduction units issued. The CDM is speeding up; about 50 new projects are sent for validation each month. In total 64 bioenergy projects have been registered.

The sectoral distribution of the 661 CDM projects in the pipeline shows that "biomass energy" projects using solid biomass are the most popular type with 158 projects. The total expected installed capacity in all the 158 biomass energy projects is 2511 MW, with the largest capacity in cogeneration from bagasse (69 projects with 1890 MW). The second most popular biomass category is projects using agricultural waste (67 projects). Adding the 95 biomass projects based on solid and liquid waste shows that India is the host country for most projects (81) followed by Brazil with 75 of all the bioenergy projects. Finally two projects have used the newly approved reforestation methodology.

Implementing the Clean Development Mechanism
A project developer's perspective

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The CDM is a much talked about component of the Kyoto protocol, probably because it represents the interface between Annex 1 and non-Annex 1 countries. Perceptions of the CDM in host countries can range from constructive and purposeful to exploitative and imperialistic.

A visit to the project website (http://cdm.unfccc.int/Projects) shows just how broad a range of potential areas the mechanism operates within. These cover all imaginable areas of energy based activities, from food preparation through home insulation, domestic heating & lighting, as well as the generation of industrial process energy in the form of heat and/or electricity. Innovative projects show the multitude of possibilities of generating or saving energy in developing countries across the globe, harnessing renewable energy sources such as solar, wind, hydro, tidal, or biomass. The consequences of land use and land use change are also quantified and managed for through the CDM.

However, the introduction of a new global market which transcends the plethora of technologies, domestic and national economies, policies, cultures and ethics in the developed and developing worlds, in such a short space of time, is likely to be fraught with difficulties. For a mechanism to be able to function in this environment, a comprehensive set of rules and guidelines is required.

This presentation provides an introduction into how the mechanism is pieced together, what some of the intentions are, and how these should be achieved. The steps required in fulfilling the process will be presented together with some of the author's own experiences as a project proponent for a combined heat and power plant in South Africa.

Bioenergy and Climate Change Activities in Canada: Carbon Offset Trading, CDM/JI and Government Incentives

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As governments implement strategies to meet their Kyoto Protocol and broader climate change objectives, domestic and international carbon trading schemes are emerging as a potential market-based mechanisms for reducing greenhouse gas (GHG) emissions reductions. In addition, governments are also exploring other policies and incentives that will promote new investments in technologies that not only result in lower GHG emissions but can also encourage innovation to improve industry competitiveness.

The Kyoto Protocol's treatment of bioenergy as a carbon neutral activity provides countries and their governments with an additional rationale to support and encourage new bioenergy projects. The Government of Canada recognizes the importance and the potential role of bioenergy to achieve a wide range of economic and environmental benefits. As such, Canada has been conducting research and exploring new and targeted policies that will encourage the development of new industrial-based bioenergy projects.

The purpose of this presentation is to review the Kyoto Protocol's treatment of bioenergy and discuss some of the Government of Canada's research activities and proposed incentives (including carbon trading and CDM/JI) that may help contribute to Canada's GHG emission reduction goals. This presentation will also provide some thoughts on future challenges that face domestic bioenergy projects and international trade that policy makers and industry will need to consider.

Future developments of CDM / JI - policy, programmes, approaches

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CO_2 trade versus biomass trade from the view of the local sustainable development of the exporting / host country

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When CDM projects are approved by the Designated National Authority (DNA) of the host country, emphasis is on ensuring that the project supports the sustainable development of the host country. This could include local environmental benefits, socio-economic benefits including job creation, or a reduction of the dependence on fossil fuels. The interpretation of "sustainable development" is up to the host country. Similar safeguards are not in place when the country decides to physically export biomass in various forms (wood chips, pellets, liquid biofuels etc), although the production of biomass can have either positive or adverse effects on the local sustainable development.

For example, in the context of CDM liquid biofuel projects, the baseline and monitoring methodologies - of which none has been approved yet - are expected to put great emphasis on ensuring that the production of biofuels does not increase deforestation, forest degradation, or other negative effects on ecosystems. This safeguard is in addition to the approval by the DNA. Therefore CO_2 export by the host country is scrutinized much more than the physical export of biomass, although in general both options may have similar environmental and socio-economic outcomes, and in fact the CO_2 export may leave a greater share of the value added in the host country. Certification of traded biomass fuels may be one way of addressing this concern.

Norwegian experiences in marketing and trading of renewable energy and green certificates

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Certificates are used to document origin of energy where the physical part is a standard product, i.e. kWh. Certificates are normally utilised to document origin of electricity. Physical energy and certificates can be handled separately and sold through different marketing channels. To facilitate trade internationally harmonised certificate systems are necessary. Non-harmonised issuing, transfer and redemption introduce trade barriers with extra costs to producers and/or consumers. In Europe the RECS-system defines a standardised certificate and gives market participants an effective pan-European system.

Voluntary demand for renewable electricity documented by certificates mainly comes from three different groups: Large companies concerned about their social responsibility (for instance listed companies wanting green funds to invest in their shares), public sector that often are early adopters of environmentally friendly products, and power suppliers wanting to have a green marketing profile (fuel-mix disclosure with large renewable energy share and energy products with a green profile, often with green labels from NGOs). In some countries there are certificate buying obligations and special tax-regimes that stimulate demand for renewable energy in excess of the voluntary demand.

The supply side currently is dominated by companies with much hydro power production, but also electricity produced from biomass and wind is actively traded in the market. Biomass electricity is some more complicated as long as fuel specifications has to be prepared on a regular basis to provide information about renewable and non-renewable primary energy sources.

From traditionally forestry to biofuel and bioenergy

Pål Bæverfjord and Ole Lauglo

ALLSKOG, Trondheim, Norway

ALLSKOG is an association of forest owners in the northern part of Norway, and is the major forestry organisation in this part of Norway. As other forestry traders, ALLSKOG has traditionally focused on sawmills and the paper industry as main customers.

Yet, ALLSKOG has since the early seventies built up a daughter company called Industriflis, which produce raw wood chips to the silisium industry. In addition, ALLSKOG has over the latest five year period, taken part both in manufacturing of wood pellets and production of wood heating chips. Thus, ALLSKOG most likely is the one of the Norwegian forestry traders that has reached furthest in developing bioenergy commercial activities.

The strategic basement behind these engagements is a belief in strengthening growth in the energy consumption, the deregulation of the Norwegian energy market some years ago, and the fact that Norwegian energy prices historically have been very low. We believe the energy sector will be one of the fastest growing business sectors both in Norway and world wide, and that the future growth in demand and prices will be much stronger in the energy sector than in the traditionally forestry markets.

The presentation that mr. Pål Bæverfjord will give in the workshop will explain how ALLSKOG acts in the local energy market, in which terms we are marketing our energy products, and which challenges we experience in the Norwegian energy market.

Dry bulk shipping, an essential in developing efficient biofuel supply chains

Emil Brandrud

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Over the most recent years, demand for dry bulk ships has been intense and resulted in freight rates never experienced earlier. In 2004, for example the freight rate for one tonne of iron ore transported from Brazil to Rotterdam reached $25. In comparison, in the period from 1990 and upto end of 2002, freight rate in this trade, for the same commodity, fluctuated between $5 - 7 per tonne.

In 2005, freight rates fell around 25 percent from the year before, measured on a yearly average basis. This was a result of a nearly 7 percent jump in the shipping capacity compared with around 4 percent increase in ship demand.

The world seaborne dry bulk commodities consists a wide varity of commodities, but the largest volumes are generated from the steel industry. Iron ore, coking coal and other steel related products together account for more than 50 percent of the total dry bulk trade.

Forestry products account in total for less than 9 percent of seaborne dry trade. Wood pellets and woodchips used for bio energy accounts for only a minor share of total sea transports. Therefore, forestry transports have in general limited impact on the total tonnage demand and thereby also the freight rate development.

The largest importers of dry bulk commodities are China, Japan, other Asian countries and West Europe. China has been the quickest growing country in terms of dry bulk imports in recent years. In 1990, China accounted for only 4 percent of seaborne dry trade, increasing to 18 percent in 2005. Japan and West Europe, accounted for nearly 2/3 of global imports in 1990, but for less than 50 percent in 2005.

The driving force in dry bulk imports in recent years has been a substantial increase in China's dry bulk imports. China's increasing dry bulk imports is mainly a result of a substantial increase in iron ore imports. years. In 1999, China imported 55 mill tonnes iron ore, increasing to 275 mill tonnes in 2005. The reason behind higher iron ore imports is an substantial increase in the domestic steel production and consumption. The dramatic shift in Chinese steel consumption growth came after the country's entry of WTO in 2001. The industralization process in China has accelerated very quickly, driven by strong increase in investments. With a GDP growth of around 10 percent and investment growth of 20 - 30 percent p.a., steel consumption in China has jumped by more than 20 percent p.a. in recent years. In 2005, China accounted for 32 percent of the total world steel consumption, especially in iron ore.

In 2003 and 2004, seaborne trade in dry bulk commodities rose by 7 and 8 percent respectively. In 2005, about 4 percent higher volumes were noted. In addition to strong growth in cargo volumes, the dry bulk fleet productivity experienced a severe reduction in this period due to longer than normal waiting in ports either to load or discharge cargoes. The world logistics were simply not dimensioned for such a quick jump in cargo volumes as experienced in 2003/04. This resulted in even stronger growth in tonnage demand compared with growth in cargo volumes.

Among other commodities, transport of energy coal rose briskly in 2003 and 2004. This was partly driven by high oil and gas prices which supported the use of coal in electricity production. In addition, a large part of Japan’s nuclear power plants were out of operation in this period due to technical problems. This was replaced by higher use of coal in the energy sector.

Transport of forestry products have also shown healthy growth in the latest years. Lumber shipments has increased tremendously to USA, while wood pulp imports have been driven by increasing Chinese imports. Increasing shipments of logs and woodchips for pulp making have been driven by higher West Europe imports and to some extent China..

The future demand for dry bulk ships will to a large extent be a function of the world's appetite for steel. There is a significant correlation between world steel consumption and world economic growth. Nearly 70 percent of the yearly changes in world steel consumption can be explained by the annual changes in world GDP. The yearly changes in investments shows an even closer correlation with steel demand.

In 2004, world GDP rose by 5.1 percent, the highest global economic growth since 1974. In the same year, world steel consumption jumped by an amazing 9 percent. In 2005, world GDP rose 4.5 percent, while the apparent steel consumption climbed around 5 percent.

The latest predictions for world economic growth in 2006 and 2007 suggest around 4 – 4.5 percent increase p.a. Given that the historical correlation between world economic growth and steel consumption will be there also in the coming year, world steel consumption should increase between 4 and 5 percent p.a. in this period.

On this basis, seaborne transports of steel related products should rise further in this period.. We also expect there will be further growth in steam coal shipments as well as in forestry products and other bulk cargoes. In total, we estimate seaborne dry bulk to increase around 4 percent p.a. in 2006 and 2007. Recent investments in port and on-land infrastructure are expected to take some effect in the coming years and thereby improve the fleet productivity. Tonnage demand may therefore increase somewhat less than volumes in this period.

The substantial increase in freight rates in 2003 and 2004 has resulted in high ordering of new ships. Per March 1, 2006, the orderbook of newbuildings due for delivery over the next 3 years consist 63 mill dwt, equivalent to 760 ships. Scheduled deliveries in 2006 and 2007 are equivalent to 24-26 mill dwt, while deliveries in 2008 is expected to be less than 20 mill dwt .

Scrapping of old ships will to a large extent be determined by the freight rate levels. Taking into account lower freight rates in the next coming year, we assume future scrapping to increase, especially in 2007 and 2008. Scrapping of bulk carriers will to a large extent take place in the smaller sizes (less than 40,000 dwt) because these ships constitute the oldest part of the dry bulk fleet.

In total, we foresee the dry bulk fleet to increase by 6.6 percent in 2006 and slightly less than 6 percent in 2007. In 2008, less than 4 percent fleet increase is expected.

A combination of around 6 percent increase in ships capacity and some 3.5 - 4 percent increase in tonnage demand, we foresee lower capacity utilization over the next coming years and thereby lower freight rates. We should however, be prepared for high volatility in the short term because of the current high capacity utilization of the fleet.

In the longer term, we believe the freight market for dry bulk ships will "normalize" because significant expansion of the world shipyard capacity, especially in China, will give room for quick expansion of the fleet if necessary.