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Annexes to the

GREEN PAPER

Towards a future Maritime Policy for the Union: A European vision for the oceans and seas

**"How inappropriate to call this planet Earth when it is quite clearly Oceans"
attributed to Arthur C. Clarke**

{COM(2006) 275 final}

BACKGROUND DOCUMENTS

FOR THE

GREEN PAPER

TOWARDS A FUTURE MARITIME POLICY FOR THE UNION:

A EUROPEAN VISION FOR THE OCEANS AND SEAS

ANNEX

BACKGROUND PAPER No. 1

on the

Competitiveness of the European Maritime Industries

Disclaimer:

The present document has been elaborated by European Commission services for the purpose of providing background material and information to supplement the Green Paper on Maritime Policy (COM (2006) xxx final) .

This background document is therefore purely illustrative and is not intended to represent the political views, nor to indicate or announce possible future initiatives of the European Commission.

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Ocean and Marine Energy Technology

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1. IMPORTANCE AND PROSPECTS OF THE EUROPEAN MARITIME SECTORS

1.1. The economic role of Europe's maritime sectors

The maritime industries and services encompass a wide range of sectoral economic activities, from shipbuilding to shipping and ports, to fisheries and aquaculture, to recreational activities and tourism, to offshore energy exploration and extraction, and to a large number of related technical and economic services. The activities related to shipping, ports and shipbuilding alone represent more than 2% of the EU's GDP and provide employment to ca. 3 Million persons. If one would include the contribution of tourism or the value of raw materials extracted from the sea, the figures would be much bigger. Overall, between 3 and 5 % of Europe's GDP is estimated to be generated by marine-based activities.

Calculating the economic value of the oceans and seas is difficult, as statistical data, in particular at the level of the EU-25, is incomplete. The data given below provides an overall impression of the maritime economy's worth, although some of the data must be used with caution (e.g. with relation to marine equipment or renewable energy).

2004	World value (in €Million)	European value (in €Million)	European share of world value
Shipping & Transport	342,743	151,137	44,1%
Marine Tourism	168,189	71,812	42,7%
Offshore Oil & Gas	91,146	19,112	20,9%
Fish/Seafood Processing	79,859	8,241	10,3%
Marine Equipment	72,871	16,675	22,9%
Fishing	55,983	4,758	8,5%
Shipbuilding	37,746	13,143	34,8%
Ports	25,017	10,478	41,9%
Marine Aquaculture	23,876	3,483	14,6%
Cruise Industry	12,000	2,365	19,7%
Research & Development	10,629	3,273	30,8%
Seaweed	5,988	n/a	n/a
Marine Commerce	6,840	2,736	40,0%
Marine IT	3,570	1,382	38,7%
Minerals & Aggregates	2,741	1,344	49,0%
Renewable Energy	128	121	94,5%
Marine Biotechnology	2,190	n/a	n/a
Submarine Telecoms	1,126	185	16,4%

Ocean Survey	2,013	538	26,7%
Education & Training	1,537	n/a	n/a

Table 1: World marine sectors, IMI¹

It can, however, be assumed that the total economic value gained from the seas will be considerably higher than these figures indicate. For example, the data on marine tourism in the above table does not include expenditure on travel, food and accommodation.²

The table below gives an estimate of employment in a number of maritime sectors in the EU-15 (2001).

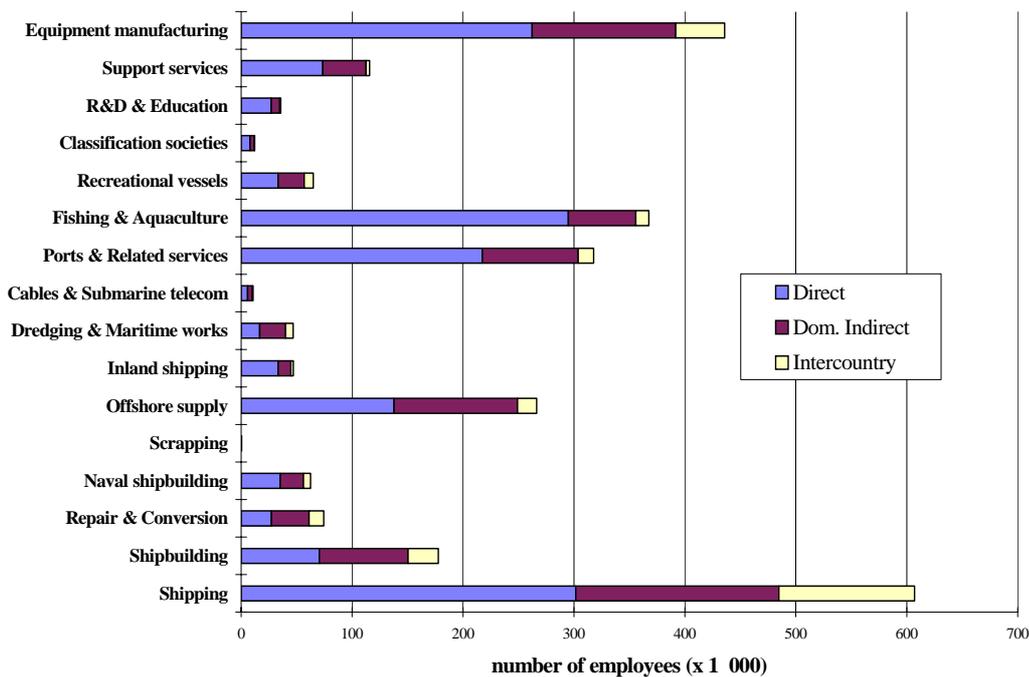


Figure: Employment in maritime sectors³

The figure does not provide a full picture as the information available is both outdated and incomplete. The Commission is currently carrying out a study to identify the number of jobs in Europe which are directly or indirectly related to maritime activities.

¹ [Marine industries global market analysis](#), March 2005, Douglas-Westwood Limited, Marine foresight series no 1 of the Marine Institute, Galway, Ireland (IMI 2005).

² The definition used includes only expenditure on ocean and freshwater angling, sailing and boating on and off shore, and cruises on rivers and lakes.

³ See http://ec.europa.eu/enterprise/maritime/maritime_industrial/economic_impact_study.htm

1.2. Key maritime sectors

Shipping and ports

Shipping and the related maritime activities play a strategic role in the EU. After successive enlargements, Europe can increasingly be seen as a big peninsula, surrounded by an ocean and several seas and irrigated by many rivers and canals.

Nearly 90% of all the EU external trade is seaborne and the percentage for all Intra-Community trade is higher than 40%. On the other hand, the EU merchant fleet is by far the largest in the world both in tonnage controlled and by flag. EU shipping companies rank among the biggest in the world, and, with 25% of the world tonnage under EU Member States flags, EU residents control nearly 40% of the world's merchant fleet.

On average, some 3.5 billion tonnes of cargo and 350 million passengers pass through European seaports each year. Around 350.000 people work in ports and related services, which together generate an added value of about €20 billion⁴.

Shipbuilding

Europe's shipyards hold strong positions in passenger and cargo ferries, cruise ships, coastal cargo vessels, dredgers, ice breakers, oil spill response and salvage vessels, patrol ships, offshore supply vessels and research ships. Direct employment by shipyards (civil and naval, new building and repair) in the EU now stands at 115.000 persons, compared to 450.000 in 1975, although it has to be recognised that certain activities previously undertaken by yards are now outsourced to the marine equipment industry which has a direct employment of some 350.000 persons.

The European marine equipment industry is a world leader with ca. 35% world market share. Equipment accounts for a large part of the value of a ship and the European marine equipment industry has about twice the turnover of the yards. The export quota (to non-European economies) is nearly 50%. In many instances, it is the marine equipment industry that actually drives innovation and progress in the sector. It is noteworthy that equipment accounts for some 70% of the value of a ship, a quota that is even higher with regard to naval vessels.

The recreational marine industry⁵ comprises some 37.200 businesses, mainly SMEs. The sector performs well in this highly competitive and knowledge-based market. The past 12 years have given steady growth and forecasts point to a 5-6% annual growth, with even higher rates in some leading countries⁶.

⁴ European Sea Ports Organisation (ESPO)

⁵ Boat building, engine manufacturing, hi-tech electronics, equipment, finance and infrastructure

⁶ European Union Recreational Marine Industries Group (EURMIG)

Tourism

The oceans and seas also generate income through many activities related to tourism in coastal areas. The direct turnover of marine tourism⁷ in Europe is estimated at 72 billion Euros in 2004. But it is clear that this figure is a gross underestimation of its impact on the local economy in coastal areas, as sectors such as hotels, restaurants or travel are not included.

The cruise industry in Europe has undergone considerable expansion over the last years with an annual growth rate of more than 10% since 2001. Thus, 2.8 million Europeans took cruise holidays in 2004, of which 2 million sailed in European waters, which results in more than 8.5 million passenger calls in European ports. Business continues to grow, with European cruise passengers expected to increase to 4 million in 10 years⁸. These figures indicate a rising contribution of the cruise industry to the European economy and the creation of thousands of new jobs throughout the continent in tourism, shipping, shipbuilding - as cruise ships are virtually all built in Europe - and many related sectors.

Extraction of materials from the oceans and seas

The sea also plays a major role in energy supply. 34% of the worldwide oil production was produced offshore in 2004, which should increase to 40% by 2015. This is mostly due to the increase of production in the deep offshore. During the same period, offshore gas production should increase from 28% to 34%. In 2004, production of oil and gas in the EU and Norway covered some 40% of the EU's demand for oil and some 60% for gas, whereby some 80% comes from the North Sea. The North Sea is the 4th largest source of oil and gas in the world after Russia, the US and Saudi Arabia. It is a relatively high cost producing region, but its stable conditions and proximity to European markets are an advantage, and investment is rising sharply.⁹

What is particularly interesting about the oil and gas sector is the extent to which it has generated, and continues to generate new technologies, even outside its own sector. For example, technology for acoustic positioning, allowing us to 'see' in all directions below the water surface, was developed for better pipe-laying, and has been adapted to serve fishing boats¹⁰.

The marine environment gradually presents other potential opportunities for energy generation. Offshore wind energy, ocean currents, waves and tidal movements represent a vast amount of energy. If successfully exploited, they could contribute a substantial supply of electricity in coastal areas, and beyond, in many parts of Europe.

⁷ Including all expenditure on ocean and freshwater angling, sailing and boating on and off shore, water sports and cruises on lakes and rivers. Excludes travel and accommodation etc.

⁸ IMI 2005 p. 65, GP Wild in *Economic impact of the cruise industry in Europe*, European Cruise Council 2005.

⁹ Data sources: the European Oil and Gas Innovation Forum (Eurogif) and the International Association of Oil and Gas Producers (OGP).

¹⁰ OGP

Whereas fisheries are under pressure, aquaculture is a promising industry. With the world's growing population, and the increasing per capita consumption of fishery products on one hand and with fish stocks under great pressure on the other, captures will not be able to grow and aquaculture production will have to increase to meet demand. Production levels in 2001 of 37 million tonnes will need to increase to around 80-90 million tonnes by 2030, or 50% of the world's total fish demand¹¹. The challenge will be to manage this increase in a sustainable and environmentally friendly way.

1.3. Prospects for growth and employment

The perspectives for the maritime industries are of consistent growth, with world trade volume – especially with Asia – on the rise, and with the implementation and development of Motorways of the Sea and Short Sea Shipping within Europe.

According to the Marine Industries Global Market Analysis, the sectors with most growth potential are: tourism including cruise shipping, aquaculture, renewable energy, submarine telecommunications and marine biotechnology. These sectors are estimated to have a growth potential of around or above 15% in the next five years.¹²

New business opportunities may come from pushing forward Short Sea Shipping and the concept of 'Motorways of the Sea'. These opportunities might not only render shipping a more attractive transport mode, instead of roads. It may also help in mobilising finance and research for innovative ships, specifically developed for the trades in question. As far as this touches upon state aid issues, a non-discriminatory approach should be pursued while maintaining compliance with existing rules.

New opportunities for ecological vessels with low or zero emissions, using new propulsion concepts such as fuel cells or tapping into renewable energy sources such as wind and waves, might come from new environmental initiatives and the possible incentives accompanying them.

Some potential business opportunities require further R&D effort, such as the exploration and mining of methane hydrates which have a great potential as a new source of energy. Research is still needed to enable safe and efficient commercial exploitation as the accidental release of large quantities of methane hydrate could seriously contribute to the greenhouse effect.

2. EUROPE'S ECONOMIC ASSETS

For all maritime industries and services, the key assets first of all are the oceans and seas themselves. However, these sectors also thrive on the basis of the quality of the people working in them, the knowledge available to them through R&D efforts, the networks in which they operate and the regulatory framework that conditions their operations.

¹¹ Executive Summary, Farming the Deep Blue, James Ryan.

¹² [Marine industries global market analysis](#), March 2005, Douglas-Westwood Limited, Marine foresight series no 1 of the Marine Institute, Galway, Ireland (IMI 2005).

2.1. Human potential: employment, skills, education and training

The human potential (employment, skills, education and training) plays a prominent cross-cutting role when it comes to the competitiveness of the maritime industries. The European industry needs to be knowledge-driven to be able to compete on a global scale, for which it needs the continued availability of a skilled work force (men and women). However, the maritime sectors are perceived by many as unattractive. All stakeholders must be mobilised to discuss the pertinent issues and work on the improvement of the working conditions, e.g. through the established sectoral social dialogues. For shipbuilding, such a structure has been set up in the context of the LeaderSHIP 2015 initiative, which is described in section 3.1.

European crew numbers have gradually decreased: the problem is acute for ratings but increasingly also for the qualified and better paid officers. An EU promotion and awareness campaign is thus underway, which needs to be pursued on a permanent basis. In parallel, there is a need to check that the internationally required training level is ensured by third countries, who increasingly supply crews to EU flagged ocean-going vessels.

To ensure safety and quality on board of European vessels, the presence of qualified and skilled seafarers is crucial. This entails a need to ensure that all seafarers on board of EU-flagged vessels meet internationally required training levels.

Well-operated ships can only strengthen, in the long run, the competitiveness of the maritime sectors in the EU, despite the initial cost of new measures. The EU can support the development of employment potential in the maritime sectors, for example through its policy and financial support programmes.

2.2. Research, development and innovation

Research, development and innovation (RDI) is essential for the competitiveness of a modern maritime industry. Europe has a competitive advantage stemming from its wide knowledge base, but must do more to exploit this advantage to the full as Europe's competitors in the Far East are increasingly advancing their know-how. Consequently, Europe must continuously innovate: what was yesterday's innovation and market leading technology can quickly become the global standard. Industry has recognised this and increasingly collaborates within European Research Programmes.

Research can create entirely new and unexpected markets that in the long run might provide immense opportunities for employment. For example, a better understanding of the marine environment has underpinned substantial growth in aquaculture, providing employment in remote rural economies. RDI has helped to establish wind energy as a commercially viable technology, while cross-cutting research from the offshore industry has allowed wind farms to be situated at sea, thus avoiding on-shore environmental planning concerns.

Research is inherently risky and may not achieve the expected results. But the benefits can be massive, with huge implications for the economy and society. The risk of failure means that fully commercial investment is difficult to attain and

consequently a certain level of public support at national and European level will always be necessary in addition to the commitment from industry.

European Research Framework Programmes (FPs) have concentrated R&D efforts towards specific challenges faced at European level within a limited number of strategic thematic priorities, e.g. biotechnology, information society, nanotechnology, global change and sustainable development¹³. Within each priority, specific work programmes detail particular research topics and themes, supporting competitiveness in fields such as marine tourism, energy, shipbuilding, maritime transport, ports, fisheries and aquaculture. Other emerging opportunities can be found in marine biotechnology, supporting the search for new pharmaceuticals and food-related compounds, in new or alternative energy sources (tidal and wave power, off-shore wind farms), in mineral exploitation or in water desalination.

There has been an evolution of the underlying philosophies of FPs from a largely technology driven approach (FP4: 1994-1998), through problem solving (FP5: 1998-2002) to the establishment of the concept of the European Research Area (ERA) through FP6 (2002-2006). The current approach aims to integrate research efforts, better structure research capacity and coordinate European research efforts. Besides the FPs, research activities in Europe are undertaken also by national research programmes and private research. Unfortunately, the research output in Europe is still largely fragmented with duplicated research efforts and sometimes poor communication between national programmes. This is particularly the case when compared to the co-ordination of research by Europe's economic competitors.

The Commission's proposal for FP7 represents a greater ambition in line with the needs of the Lisbon Strategy. Marine and maritime research, included in the relevant thematic areas, builds upon the inputs received from a wide range of stakeholders. It foresees in particular co-ordination of marine and maritime research across the relevant themes and the flexibility to respond to new policy needs as they arise.

Co-ordination of national research programmes will be strengthened. Community supported research concentrates on strategic objectives with a clear European dimension. Member states must be encouraged to recognise the value of research for their economies. It needs to be considered what steps could be taken to encourage further national, along with private, investment and to ensure the application of research results within a commercial environment.

Support will be provided to implement research agendas established by European Technology Platforms. The Waterborne Technology Platform (TP)¹⁴ brings together stakeholders within the waterborne transport sector (industry, policy-makers, infrastructure, regulatory bodies, research centres and universities) to jointly steer research efforts along a commonly agreed strategic vision for the waterborne R&D. Maintaining Europe's competitive edge requires strategic and efficient use of research capacity. By creating a platform for interaction for key stakeholders, the Waterborne TP encourages clustering of the R&D capacity in Europe.

¹³ See <http://cordis.europa.eu/en/sitemap.htm#eu-research>

¹⁴ See <http://www.waterborne-tp.org/>

The Waterborne TP can rally around common societal goals. Events such as maritime disasters or the scrapping of old ships receive front page headlines. Research can provide solutions in response to concerns about safety and the environment, by addressing issues such as climate change, protection of the coastal environment and maritime safety. Together with policy-makers and other stakeholders, Waterborne research can improve understanding and support regulation within this field.

The protection of technological know-how is important for maritime manufacturing industries, in particular where SMEs are involved. It is crucial that intellectual property is protected against product and knowledge piracy, focusing on enforcement and potentially going beyond the limited instruments available under WTO rules. The issue of "knowledge drain" merits further attention. In this context, the intense and increasingly sophisticated relationship between yards and equipment manufacturers needs deeper analysis and support along the value chain and the actual innovation processes.

2.3. Information and Communication Technologies

The improvement of the competitiveness of the maritime industries (incl. services) in Europe also depends on the adoption and extensive use of information and communication technologies (ICT). Innovative ICT solutions are considered as a key lever in this respect. The generic nature of ICT makes them important across the maritime business, from the design of vessels (e.g. modelling and simulation tools), to the support for navigation and port operations (e.g. route optimisation, safety and security checks, cargo logistics), to training of personnel. In particular, the Galileo project will play an important role here.¹⁵ A number of projects from past framework programmes have contributed to ICT based solutions targeted to improve the competitiveness of maritime business. It is therefore of paramount importance to intensify through appropriate means the adoption of innovative ICT based solutions and to prepare, including through European RTD programmes, the future generation of ICT tools and platforms targeted towards maritime applications.

2.4. Clustering

By working together in a cluster, companies, research partners, public bodies or others, have better means to boost their competitive performance than if they all would operate individually. Maritime clusters can derive benefit from knowledge sharing and knowledge transfer from research, encouraging joint innovation exercises (e.g. product development), ensuring availability of know-how (e.g. joint training programmes) or innovative organisation methods covering a group of enterprises (e.g. common procurement or distribution).

Exploiting the potential of clustering is especially relevant in sectors with complex supply-chains and a large number of Small and Medium-sized Enterprises (SMEs). In a number of maritime sectors, subcontractors account for the majority of the value-added produced. Their input, innovative power and reliability thus are vital to the main manufacturers. In turn, larger actors can offer the SMEs in a cluster, such as

¹⁵ See http://ec.europa.eu/dgs/energy_transport/galileo/index_en.htm

their subcontractors or customers, access to information and knowledge, which these SMEs cannot afford to acquire individually on the basis of their limited resources. Through their participation in clusters, sub-contractors can develop own expertise that opens new markets, even outside their own cluster. This can provide for new economic opportunities in sectors where the main activities are being relocated.

Clusters can act as a platform for the social partners. In this respect, it is noteworthy that for the following sectors, shipbuilding, maritime transport, inland waterways transport, fisheries and Horeca¹⁶, social dialogue committees already exist. This allows social partners to develop joint strategies. Through joint training and education strategies, clusters can be a tool in ensuring the skills base and improving the attractiveness of the profession by facilitating career switches between sea and land-based professions.

Cluster approaches could be strengthened through the EU regional and social cohesion policies. Best practice can be spread by connecting the existing maritime clusters in Europe, as demonstrated during the 2005 Maritime Industries Forum (MIF) in Bremen¹⁷, making them regional centres of maritime excellence (covering the full range of the maritime industries including services), as well as by connecting them to relevant actors in regions distant from the coast. That this is not unimportant is illustrated by figures on the origin of suppliers to the German shipbuilding industry, whereby both (maritime) Hamburg and (landlocked) Baden Württemberg each represent 21% of turnover share; equally (maritime) Schleswig-Holstein and (landlocked) Bavaria both have 16% of turnover share¹⁸.

Clusters concepts are being developed in a number of Member States.¹⁹ The Dutch government supports the Dutch Maritime Network, which aims to reinforce and promote the Dutch maritime industries and to increase the cohesion and visibility of eleven maritime sectors. The Danish Maritime Authority launched a project for the maritime cluster focusing on knowledge development. In Germany, the function of “coordinator of the Federal Government for the maritime industry” was created; a function that was also emulated at regional level in Schleswig-Holstein. France launched regional maritime competitiveness poles, covering issues such as security, safety, fisheries and manufacturing.

The centres of excellence all over the EU could form the basis for a strong European economic maritime development. Hereby, inspiration can be drawn from existing initiatives such as the World Maritime University or the International Space University²⁰, which bring together a range of key issues of common interest and thus provide synergy that can be decisive in gaining competitiveness for a whole sector.

It is important to have a good understanding of clusters in terms of definitions, actors and working mechanisms. Some groundwork has already been done by the European Network of Maritime Clusters (which builds on the work done in a number of EU Member States). Useful elements from the national cluster approaches developed so

¹⁶ Hotels, restaurants, cafes, catering

¹⁷ Information on this Forum and the MIF, see <http://www.mif-eu.org/>

¹⁸ VSM Annual Report 2004

¹⁹ See ‘National approaches to maritime affairs’

²⁰ See <http://www.wmu.se/> and <http://www.isunet.edu/>

far are, for example, detailed SWOT (strengths, weaknesses, opportunities, threats) analyses (also in comparison with maritime centres outside the EU), specific forums on innovation, employment and export competitiveness, and awareness campaigns including branding ("Maritime Nation"), participation in trade fairs and the production of merchandise.

2.5. Regulatory framework

A predictable business environment is vital to the industry's future development plans. Many maritime sectors are exposed to increasing challenges in terms of market changes, regulatory requirements, or even the effects on business operations of political instability or climate change.

A single natural disaster, a major oil spill or a terrorist attack can be sufficient to cause serious consequences for the maritime sectors. To anticipate future security challenges when drawing up strategies, businesses need comprehensive information on those elements that may have impacts on them.

Short term changes in regulations and standards can discourage investments in business operations if there is uncertainty as to the continuity of rules allowing a certain technique, technology or business method. To facilitate growth, stability in regulations is essential. This can be achieved both through better, and better planned, regulation, and through the EU working for an international level playing field in the regulatory and enforcement sphere.

Risk analyses are undertaken by re-insurance companies and others (e.g. regarding container shipping, sea based wind power or risks of climate change impacts). Making good use of this information, for example through dialogue between science, policy, marine business, insurance and re-insurance on risk could help stakeholders to reach a common understanding and thus support competitiveness.

Codes of conduct and quality labels can provide a flexible, non-bureaucratic and industry friendly complement or alternative for "hard" regulation to achieve certain societal objectives.

Bottom-up initiatives must be pursued in this respect, as well as high-level approaches to better governance. Corporate Social Responsibility (CSR) strategies can represent a competitive advantage as they help in achieving long-term and sustainable growth and in avoiding incidents and the related tangible and intangible costs. Formal CSR strategies and disclosure of performance in relation to announced goals can improve the public image of sectors that today have image problems, such as shipping. This approach in particular has been used successfully by companies which had to deal with negative media reactions, such as in the oil industry.

Although shipping accounts for only 12% of marine pollution, accidents with oil tankers have stigmatised the whole industry. Therefore, the round table of the major international shipping associations, recognising the importance of establishing a coherent voice for the maritime sector, is promoting a stable, profitable and quality-minded shipping industry. This entails a better image for the sector, promoting self-regulation and quality shipping, and the attractiveness of the maritime professions.

Whenever good initiatives taken by industry prove to be effective, they could be supported along with good and proper ship maintenance and ship repair practices. Appropriate incentive (and disincentive) mechanisms such as green labels are important instruments in promoting and consolidating responsible behaviour.

Under the term “quality shipping”, the maritime transport sector is actively developing initiatives for quality performance, considering societal expectations regarding e.g. safety and environmental concerns. These are further described in section 3.2.

3. COMPETITIVENESS OF MARITIME SECTORS

Some maritime sectors are closely related and need to be analysed together (e.g. shipping and ports), some activities are linked through their respective markets (e.g. shipbuilding and shipping), others stand somewhat apart (e.g. on-shore tourism, recreational vessels and marinas, sub-sea cables).

It is not possible to use a single or uniform approach to the problems of competitiveness of the maritime industries. Hence, there is a need for analysis of the specific competitiveness challenges of each sector. Considerable work in this respect is underway within the Commission in the context of sectoral policies. By way of example, sectoral policies focusing on shipbuilding, shipping and tourism are outlined below.

3.1. Shipbuilding, repair and marine equipment

Vessels and marine constructions are crucial assets as basically all maritime and marine activities require ships, boats and floating structures. Maintaining a dynamic and economically viable shipbuilding industry in Europe is key to the performance of a broad range of maritime sectors, as they provide the essential hardware and know-how. Shipbuilding, ship repair and marine equipment industry need to provide the maritime economy with vessels and marine systems that are innovative, efficient and ecological. In addition, they need to be able to respond to the broad range of specific needs of these actors.

Treating ships as a global commodity that can be procured on the world market at the lowest price threatens the ability to innovate and the willingness to take risks with new untested designs. Such an approach would ultimately endanger the ability of Europe to develop and construct the vessels it needs.

The shipbuilding industry has repeatedly experienced serious difficulties since the first major crisis in the sector in 1973. Over the years, the Commission has addressed the problems in shipbuilding through a variety of policy measures, although with moderate success due to the limitations of the international instruments available.

The shipbuilding industry is truly global, which means that ship owners can buy vessels anywhere in the world without any technical, commercial or legal restrictions. It has suffered from the weakness of global trade and competition rules and a tendency of (state-supported) over-investment, in particular in the Far East. Consequently, the European shipbuilding industry has lost significant market share

and employment in the last three decades to countries in the Far East. The construction of new vessels is no longer undertaken in formerly leading countries such as Sweden and Belgium. Other countries, such as the UK, Finland, Greece, the Netherlands, Spain, France or Germany have seen dramatic reductions in shipyard workforces. Further adjustments may be needed in Poland and Croatia.

Being forced to abandon the construction of large but comparatively simple merchant ships such as tankers and bulk carriers, European shipbuilders have developed strong positions in other market segments, such as cruise and passenger ships, small merchant ships and specialised tonnage. This, together with the strength of the European marine equipment industry, explains why European shipyards have a higher turnover than the yards in the Far East, although their output is less than half in terms of tonnage produced. European yards are also strong in the construction of naval vessels.

Europe accounts for almost all ship innovations. The latest include the world's largest cruise liner (the Queen Mary II) and the example of podded electric drives for marine propulsion. Europe's research leads the world within fields such as computational fluid dynamics, risk based safety and production techniques. European research such as European projects HARDER and FIREEXIT routinely underlies the basis for world regulation via the IMO.

Still, the problems in world shipbuilding persist. Public action is needed to address market distortions and unfair trading practices and to help in the development of measures to assure a sustainable shipbuilding sector, able to fulfil the complex needs of the wide range of maritime actors.

The marine equipment industry accounts for a considerable number of innovations in the sector. This sector, which represents many SMEs, faces specific challenges in terms of strengthening its innovation potential and research capacity. It is also confronted with costs stemming from the lack of standards and the inconsistency in international certification procedures. In the latter respect, an extension of the scope of the Marine Equipment Directive and a new approach regarding the mutual recognition of classification certificates between the leading European classification societies should be considered.

In the context of LeaderSHIP 2015²¹, the EU shipbuilding industry has analysed its key problems and, on that basis, developed 30 recommendations to improve its long term competitiveness. The Commission has responded to this initiative by industry through a Communication²² in which it reflects on the pertinent issues and concludes on the necessary measures as far as those fall under the responsibility of the European Community.

Policy to strengthen the competitiveness of the European shipbuilding industry fall into two categories: remedial measures and prospective measures.

A very important issue is to address international trade distortions, caused by structural over-capacities in world shipbuilding (currently masked by an exceptional

²¹ http://ec.europa.eu/enterprise/maritime/maritime_industrial/leadership_2015.htm

²² COM 717/2003 final of 21.11.2003

order boom) and the continued expansion of shipbuilding facilities around the world. Given the cyclical nature of the industry, the expected market downturn will inevitably lead to unreasonable pricing by yards (in order to maintain acceptable utilisation rates of their facilities) and ultimately the request for subsidies from national governments. The Community can work through international fora and bi-lateral trade contacts to avoid the repetition of previous shipbuilding crises. The stabilisation of the world shipbuilding market must be a key concern for any future-oriented maritime industrial policy and a shipbuilding-specific anti-dumping approach needs to be developed, in order to overcome deficiencies in WTO law.

Another important field for action consists in the protection of the European shipbuilding and marine equipment know-how, in particular where SMEs are involved. Europe's shipbuilding industry is now dependent on keeping its competitive edge through innovation, and the intense and increasingly sophisticated relationship between yards and equipment manufacturers needs deeper analysis and support along the value chain and the actual innovation processes (in this respect see also the cluster issue developed above). It is crucial that intellectual property is protected against product and knowledge piracy, focusing on enforcement and potentially going beyond the limited instruments available under WTO rules. Moreover, the issue of "knowledge drain" should also be addressed. Concrete action in the relevant fora and through bi-lateral structures needs to be considered.

European shipyards are subject to the state aid regime applicable in the EU, whereas the direct competitors in Asia know no similar constraints. The state aid rules for the sector are up for revision in 2006, when questions need to be answered on how to address the specificities of shipbuilding, while ensuring a level playing field within the internal market. Moreover, reflection should also be continued on whether EC rules can be "exported" to competing economies.

In a similar way, European yards find it more difficult than their direct competitors to have access to working capital and measures need to be taken to overcome this structural problem without distorting competition.

New business opportunities will come from promoting Short Sea Shipping and Motorways of the Sea. These opportunities might help to pool resources and research to develop innovative ships, tailored to the needs of these trades. As far as this touches upon state aid issues, a non-discriminatory approach should be pursued while maintaining compliance with existing rules.

Environmental policy initiatives and the eventual incentives accompanying them can be an impetus for the development of ecological vessels with low or zero emissions, using new propulsion concepts such as fuel cells or tapping into renewable energy sources such as wind and waves.

In order to help in the development of safer ships mandatory insurance and a bonus-malus system as used in other transport modes should be explored.

3.2. Competitiveness of shipping and the related industries

Shipping today is the key instrument and facilitator for ensuring economic growth and prosperity through trade. It is also a way to promote the EU's internal market

and territorial cohesion, by linking its insular territories to the mainland. Such a European presence on the world stage associated with a dynamic maritime cluster is a fantastic asset which has to be preserved as well as strengthened. In a global and open economy this requires efficiency, competitiveness and quality of service.

Short Sea Shipping (SSS) routes need to be developed to achieve and accelerate the necessary modal transfer and cargo shift from Europe's increasingly congested roads to maritime and inland waterways. Being environmentally friendly and relatively cheap, the comparative advantage of waterborne transport is obvious. Progress is notably still needed to shorten the waiting times for ships at EU ports by increasing efficiency, eliminating bottlenecks and simplifying procedures.

SSS needs to improve its competitiveness *vis-à-vis* other, land based, transport modes if it is to succeed. While the EU actively promotes SSS, the EU customs rules impose renewed controls of shipped goods if the vessels have left the 12 mile zone, in contrast to trucks crossing the border. This regulatory disadvantage contradicts the aim of SSS and should be addressed.

The concept of a "Common EU maritime space" would be governed by the same rules of safety and security, thus facilitating transport and trade between Member States. It would put Short Sea Shipping in the same situation as transport on land in the Member States. It would also have implications for cabotage within international trade negotiations.

In order to better monitor the EU's coasts and waters, the Commission was invited to submit by end 2006 a feasibility study on a European coastguard dedicated to pollution prevention and response, clarifying the costs and benefits²³.

Good connections of maritime transport with inland waterways, rail and road to achieve an integrated, inter-modal, door-to-door transport service are crucial for the competitiveness of the 'sea leg' in the European transport chain. As a response to this challenge, the Marco Polo programme will contribute to the general need for an inter-modal approach.

The mid-term review of the 2010 European Transport Policy White Paper focuses on these aspects with a view to fine-tuning or adapting ongoing EU policies and should lead to a necessary reassessment of our objectives and policies.

Community legislation, measures and controls have been reinforced after the Erika and Prestige disasters in 1999 and 2002²⁴. This includes actions such as the gradual withdrawal of single-hull oil tankers, the close monitoring and strict enforcement of the implementation of existing legislation, more controls in EU territorial waters and inspections in ports, the introduction of penal sanctions for marine pollution, a wider mandate for the European Maritime Safety Agency (EMSA). The Commission has submitted a third maritime safety package to Council and Parliament in order to

²³ Article 11 of Directive 2005/35/EC of 7 September 2005.

²⁴ See http://ec.europa.eu/transport/white_paper/index_en.htm

further complete and reinforce legislation on e.g. classification societies, flag states, the elimination of substandard vessels or civil liability issues²⁵.

Quality shipping is to become the *motto* for the years to come to improve the image of the sector. Quality shipping must be the result of not only better regulation, but also of industry's action in terms of self-regulation and CSR. Where the shipping industry demonstrates effective action, these could be supported along with appropriate ship maintenance and ship repair practices. Quality shipping is intrinsically linked with competitiveness and quality of service to customers. The development of appropriate incentive (and disincentive) mechanisms such as green labels can help in progress towards maritime safety in European seas. Quality shipping practices should be promoted at global scale.

During the 80's and 90's, European merchant ships were increasingly registered and flagged in third countries under open registries, which offered lower costs and taxation along with less stringent controls. International organisations such as the IMO or ILO should be given better means to ensure that international law and rules are effectively applied and enforced, by all actors and countries. Notably, it is important to strive for open registers to meet their responsibilities and international obligations.

The Community State Aids Guidelines²⁶ have been instrumental in reversing the trend, encouraging a re-flagging of the EU merchant fleet. In the 80s, the Commission proposed an EU maritime register 'EUROS', which was then withdrawn due to major objections from industry, trade unions and Member States. Convergence of state aid measures in Member States, notably the tonnage tax systems, has improved the situation. The question remains whether a fresh look at a possible complementary and optional European register could again be contemplated. Keeping and developing in Europe the strategic decision-making centres of the European shipping industry is crucial.

Shipping would benefit from reciprocal market access conditions between the EU and third countries. Opening up of markets and ensuring non discriminatory practices have helped in concluding EU bilateral agreements, e.g. with China or the one under preparation with India and to structured dialogues, fully encompassing maritime and safety issues, with countries like Japan, the US, Russia or Brazil. Major efforts will be devoted to reaching a multilateral agreement on the liberalisation of maritime transport services in the WTO/GATS negotiations.

The competitiveness of European port operators at international scale would benefit from requiring full reciprocity from third parties as well as open and non-discriminatory market access procedures.

Generally speaking, at international level, the EU needs to see its real weight in shipping better reflected in relevant institutions such as the IMO or the ILO, either by co-ordinating the different Member States' views or, where appropriate, by speaking

²⁵ See Communication from the Commission 'Third package of legislative measures on maritime safety in the European Union', COM (2005) 585 final.

²⁶ Communication (2004) 43, OJ C 13 of 2004, Page 3.

with one voice in matters of Community competence. In this context, the Commission has already requested Community membership to IMO²⁷.

3.3. Tourism

Tourism can play a major role in the EU efforts to create growth and jobs and promote regional development. Together with its related activities, it is one of the biggest and fastest expanding European economic sectors. The HORECA (hotels, restaurants, cafeterias) sector only, represented more than 4% of EU employment and 6% of services in 2004²⁸. The demographic evolution in Europe promises an even bigger growth of tourism since aged persons can afford to travel more. Furthermore the cruise sector foresees that it will grow fast in the coming years with most tourists travelling in European waters.

As other destinations around the world emerge or develop further, the EU must reinforce its competitiveness²⁹ if it wants to remain the world's top destination. Tourism can contribute to the development of coastal areas and islands by improving the competitiveness of businesses, meeting social needs and preserving the natural and cultural heritage.

Europe has also developed a strong position in other market segments, such as leisure boats and equipment, including super yachts, sailing yachts and custom and semi-custom power yachts, despite strong competition from abroad. This is a highly competitive sector because of its modern and advanced production engineering. Domestic demand in the home market for these products is on the increase from, for example, the growing number of retirees in Europe³⁰.

Some coastal tourist destinations are making real efforts to implement an integrated quality management approach. They have defined strategies³¹ with the key partners, are implementing good practice and are developing monitoring and evaluation tools for adjusting that approach according to its economic, social and environmental impact. Lessons can be drawn from their experience and recommendations disseminated to all coastal tourist destinations in the following areas:

- defining a tourist strategy with all stakeholders under a clear leadership;
- marketing and communication;
- information and visitor care;
- accommodation and catering;
- recreation, attractions and events and;
- monitoring and evaluation of economic, social and environmental impact.

Lately, sea related tourism activities have developed beyond the traditional sea and sun concept. The diversification of the tourism products and services can contribute in a significant way to the competitiveness of the coastal and island destinations; especially when tourists are offered the opportunity to visit cultural and natural sites on the coast and in the rural hinterland as well as to enjoy sea attractions (e.g. sea

²⁷ Communication COM (1993) 66 final of 24.2.1993 and SEC (2002) 381 final, 09.04.2002.

²⁸ See: http://epp.eurostat.cec.eu.int/cache/ITY_OFFPUB/KS-NP-05-032/EN/KS-NP-05-032-EN.PDF.

²⁹ See also: <http://europa.eu.int/comm/enterprise/services/tourism/policy-areas/sustainability.htm>

³⁰ EURMIG

³¹ The Commission has also studied the benefits of IQM in coastal areas. See: http://europa.eu.int/comm/enterprise/services/tourism/tourism-publications/documents/iqm_coastal_en.pdf

mammal watching) even below water (e.g. underwater archaeology). This diversification would produce multiple benefits such as reduction of the tourist flows on the beach areas, alternative sources of incomes for the coastal and rural communities involved in the management of cultural and natural sites (e.g. fishermen and farmers families) and funds supporting the preservation and development of the natural and cultural heritage. It could also help prolong the tourism season and address markets such as social tourism thus creating more growth and employment.

Annex

Ocean and Marine Energy Technology

Renewable energy is seen as a major growth industry in response to the commitment of policy makers to promote alternative forms of energy. There is an increasing interest in offshore energy generation, combining the availability of space with good energy conversion efficiency. Renewables are key drivers to reduce the excessive dependence on imported fuels, hence economic vulnerability due to shocks in energy prices. They can contribute to energy price and market stability.

Wind, wave, ocean and tidal energy are still in an early stage of commercial exploitation, but may be promising for the future. Offshore wind energy has the most immediate potential. Latest Commission projections suggest that offshore wind power generation could reach some 14.000 MW, the European Wind Energy Association has even adopted a target of 70.000 MW by 2020.

Over the last twenty years, the EU has financed ocean, wave and tidal energy developments. In total, 29 projects have been funded in these three areas. In the 5th Framework Programme the Community contribution was ca. €3 Million and in the 6th Framework Programme to date 1,7 Mio. Euro have been allocated, while more than € 5,7 Million are under negotiation, raising the cumulated Community contribution over the last fifteen years to above €20 Million.

Increasing R&D funding is critical to advancing the development of ocean energy systems. Ocean energy technologies must solve two major problems concurrently: proving the energy conversion potential and overcoming a very high technical risk from a harsh environment. When deploying their prototype, device developers are confronted with the possibility of losing five years of development and investment in few hours time. Furthermore, the majority of the developers are SMEs for whom such a loss can be overwhelming. Additional R&D funding would help to mitigate the substantial technical risk faced by device developers daring to harness the energy of the marine environment.

Ocean energy systems cover a range of applications that can be deployed on the shoreline and offshore. Technology is emerging to allow large scale demonstration projects, but so far there are few demonstration prototypes, mainly in Europe. The research activities cover the areas of shoreline and offshore wave energy devices, of tidal current turbines and of salinity gradient systems. Salinity gradient systems are a recent development and could be deployed in many European river estuaries.

The flagship prototypes are:

- Shoreline Wave Energy: two demonstrators of 400kW_e each, one on the island of Pico, Azores, and one on the island of Islay, Scotland (FP4 projects)
- Offshore Wave Energy: one 1:4 prototype of 20kW_e (FP5 project)
- Tidal current turbine: one prototype of 300kW_e (FP4 project)

Since October 2001 the Commission participates in the latest developments at international level through the Implementing Agreement on Ocean Energy Systems.

Annex

Illustration projects: European Research supporting competitiveness

InterSHIP: Improving European shipbuilding

InterSHIP is an EU-funded project aimed at increasing EU shipbuilders' competitiveness by improving the integration of tools and methods used to design and manufacture complex vessels. It will enable shipyard engineers to analyse simultaneously leading-edge knowledge in environmental aspects, safety, comfort and cost-efficiency, ensuring that optimum solutions can be obtained for the total life cycle of vessels such as cruise ships or gas carriers. The project brings together a significant proportion of the European production capacity and proposes a programme that will advance the integration of production processes in shipyards and reinforce future research and industrial co-operation among Europe's shipyards.

CHITOMED: Seafood waste that heals

The processing of shrimp and similar crustaceans by the seafood industries generates large volumes of shells, generally as a waste product. However, this material contains a potentially useful chemical, chitin, an abundant biodegradable fibrous polymer that could be used in a number of industrial and medical applications. The CHITOMED project is investigating the production of Biomedical Textiles from Dibutrylchitin and Chitin, aiming to produce biocompatible dressings that will aid the healing of wounds.

ENDOW: Efficient offshore wind farms

Europe has large offshore wind energy potential that can contribute substantially to providing a clean, renewable and secure supply of energy. The ENDOW project will reduce uncertainties in estimating power production due to wake effects in large offshore wind farms. By evaluating wake models in offshore environments, ENDOW will produce a tool that can to assist planners and developers in getting the most out of offshore wind farms.

Wave Dragon: Turning waves into energy

Offshore waves carry a great deal of power. The Wave Dragon project is developing ways to turn wave power into clean energy. The concept is based on a wave energy converter. Two wave reflectors focus the incoming waves towards a ramp leading to a reservoir that collects the sea water. The water reservoir flows out through hydro turbines, like a hydropower plant. The main aims are the development and testing of the floating structure, of small head hydro turbines operational in sea water and of a control strategy to maximise power generation. A prototype was built and launched in a Danish fjord and connected to the grid, becoming the world's first offshore wave energy plant to deliver electricity.