

INSURANCE AND THE MARINE ENVIRONMENT

EMERGING RISKS BRIEFING



AS POPULATIONS GROW, SO TOO DOES THE DEMAND ON MARINE RESOURCES WHETHER FOR FISHING, RESOURCE EXTRACTION, OR SIMPLY AS A RESULT OF INCREASED TRANSPORTATION.



INTRODUCTION

Welcome to our first Emerging Risks Briefing produced in partnership with WWF. These briefings will focus on key risks arising from environmental change, explore new research and consider the implications for the insurance industry. They will also provide practical guidance on how businesses can manage and mitigate these risks.

Our first briefing looks at the various elements of marine risk. As populations grow, so too does the demand on marine resources whether for fishing, resource extraction, or simply as a result of increased transportation. All these factors are placing the marine environment under ever-growing pressure and have the potential to radically alter already fragile ecosystems.

These activities are also increasing the risks for businesses seeking to make use of new resources or find alternative shipping routes. By engaging with businesses and governments, insurers can help manage these risks in a sustainable and responsible way that benefits and protects our marine environment.

In today's ever-connected world it is also vital that we consider how systemic risks interact. Actions in one commercial sector can often have a knock on effect in another. Businesses need to recognise how closely linked political, social and economic factors are.

As a leading global marine insurer underwriting shipping, cargo, aquaculture and fishing, RSA has a unique insight into the challenges and opportunities facing businesses operating in and interacting with the marine sector.

We are seeking to combine this expertise with the knowledge of WWF to create a series of briefings that provide practical guidance on emerging risk issues.

We hope you find this briefing useful. For further information on future briefings and our partnership with WWF please see the details below.

Richard Turner, Director Global Marine, RSA

ABOUT THE PARTNERSHIP

RSA and WWF are working together in a three-year partnership focusing on pertinent conservation projects and key research in Canada, UK, Sweden, Denmark and China. Find out more at www.wwf-rsapartners.com

EXECUTIVE SUMMARY

1. Marine risk needs to be considered beyond traditional boundaries, recognising the potential interaction between sectors

The marine environment is used by many different industries and their actions all have the potential to affect each other. These interactions can be positive or negative depending upon the economic, social and environmental factors at play. No business or sector should be thought of as a closed system. Thinking needs to extend beyond the traditional economic and regulatory risks to the wider interaction with the environment.

2. Growth in commercial use of marine resources is inevitable but can and must be managed sustainably

Growing populations and increasing economic activity will mean that demand for marine resources will continue to rise. By acting now, it is possible to manage this activity in a sustainable manner. Utilising renewable energy resources, making vessels more energy efficient, managing aquaculture effectively and safeguarding fish stocks will all help to ensure accidents and over-exploitation are avoided.

3. Environmental change has the potential to severely damage economic activity but can be mitigated if action is taken now

The changing environment will create challenges for businesses and may impact economic activity through pressure on natural resources. Investing in risk reduction measures can help minimise those effects and help make commercial operations more sustainable, protect against damage and minimise the risk to the environment. Managing insured risk often has the added benefit of reducing environmental risk.

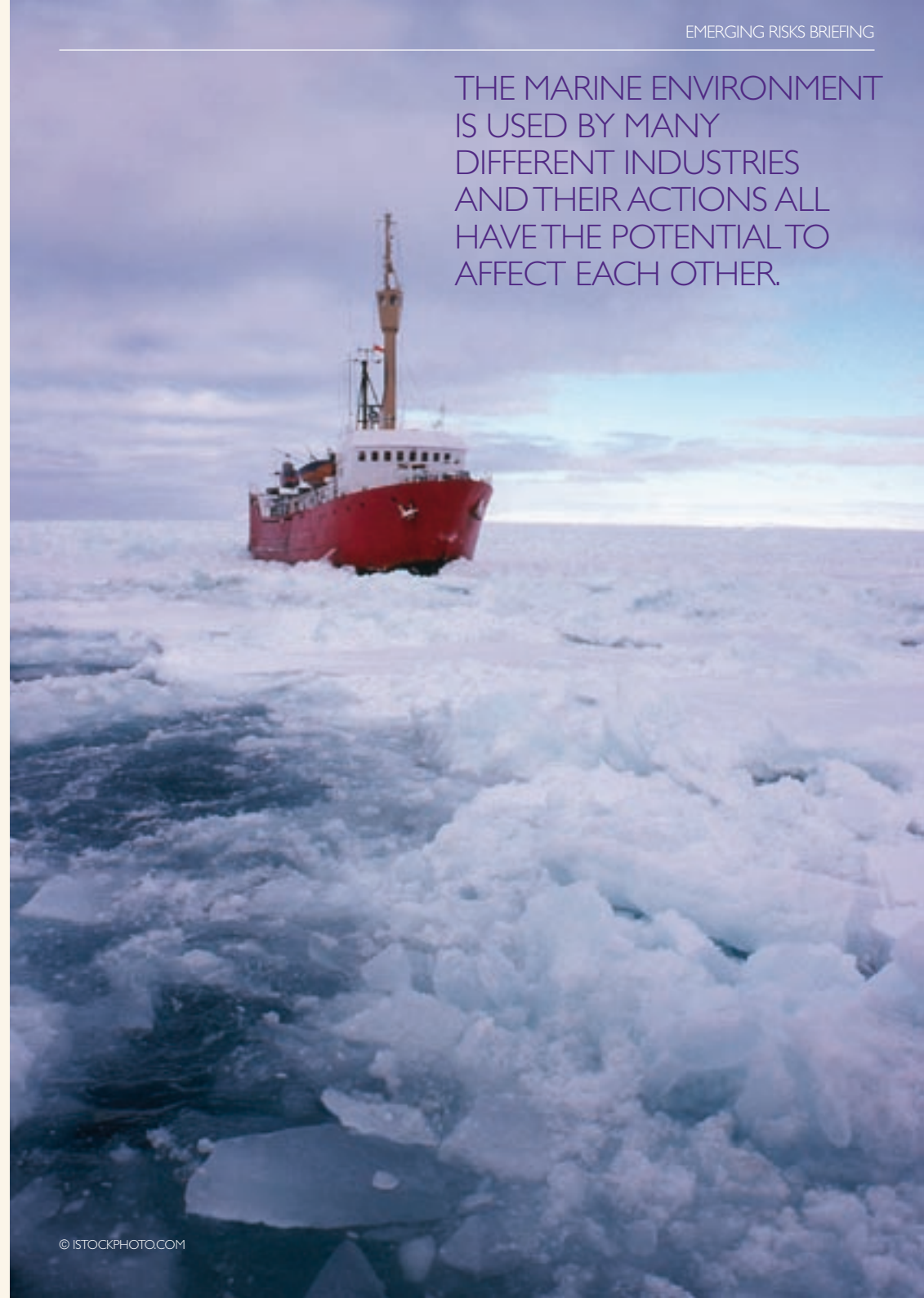
4. Regulatory measures to improve environmental conditions could have unintended results unless carefully planned and regularly reassessed

Regulatory measures need to be carefully considered over the long-term, with clear guidance given on implementation and be subject to regular appraisal. Well intentioned measures can result in negative impacts. For example, legislation to encourage the use of low sulphur fuel in ships can cause greater environmental damage if there is a lack of a preventative maintenance or technical knowledge.

5. Working in partnership with all stakeholders is critical to getting the right end results for both business and the environment

If viable and sustainable solutions are to be found, all stakeholders need to be involved. Regulatory measures aimed at managing specific interests without due consideration of all points of view are seldom long-term solutions and could negatively impact on the environment. Voluntary and certification measures may contribute to solutions but maintaining the difficult balance between stakeholders is critical to conserve the marine environment and the livelihoods that depend on it.

THE MARINE ENVIRONMENT IS USED BY MANY DIFFERENT INDUSTRIES AND THEIR ACTIONS ALL HAVE THE POTENTIAL TO AFFECT EACH OTHER.



RETHINKING RISK

“Systemic risk” is a term that’s gaining traction in the financial world, due to the financial crisis and ever growing pressure on resources. WWF uses the phrase to describe interactions between ecological, political and economic systems. Globalisation and the interconnected nature of the world we live in means that changes and imbalances in regions, markets and the environment can often have repercussions for the economy and society as a whole. These include changes and direct effects on the industries and customers insured by RSA.

The global economy is built on resources provided by the environment such as minerals, water, energy and food. As populations grow there is a significant danger that we will overexploit our natural resource reserves or pollute them through economic activity. Our actions already mean that more than 60% of our ecosystems are in decline⁽¹⁾.

Companies need to start factoring this thinking into their business strategy and assess the links between their activities and the impact on ecosystems. By considering the wider interaction of the economy, environment and society companies can also gain commercial advantage as they develop strategies for sustainable operating practices and utilising alternative resources.

Through these briefings a risk model is being developed by WWF and RSA looking at the direct impact of environmental changes on business and how they can jeopardise economic activity. In addition, the model will look at changes to consumer behaviour, government regulation and economic approaches to remedy the impacts.

By taking a holistic view of these factors we will assess how best to advise customers to minimise risks to them and protect the environment we rely on for our livelihoods. Each briefing will look at a subset of risks, building into a detailed risk framework over three years.

(1) UN Millennium Ecosystem Assessment



Oliver Greenfield, Head of Sustainable Consumption, WWF-UK

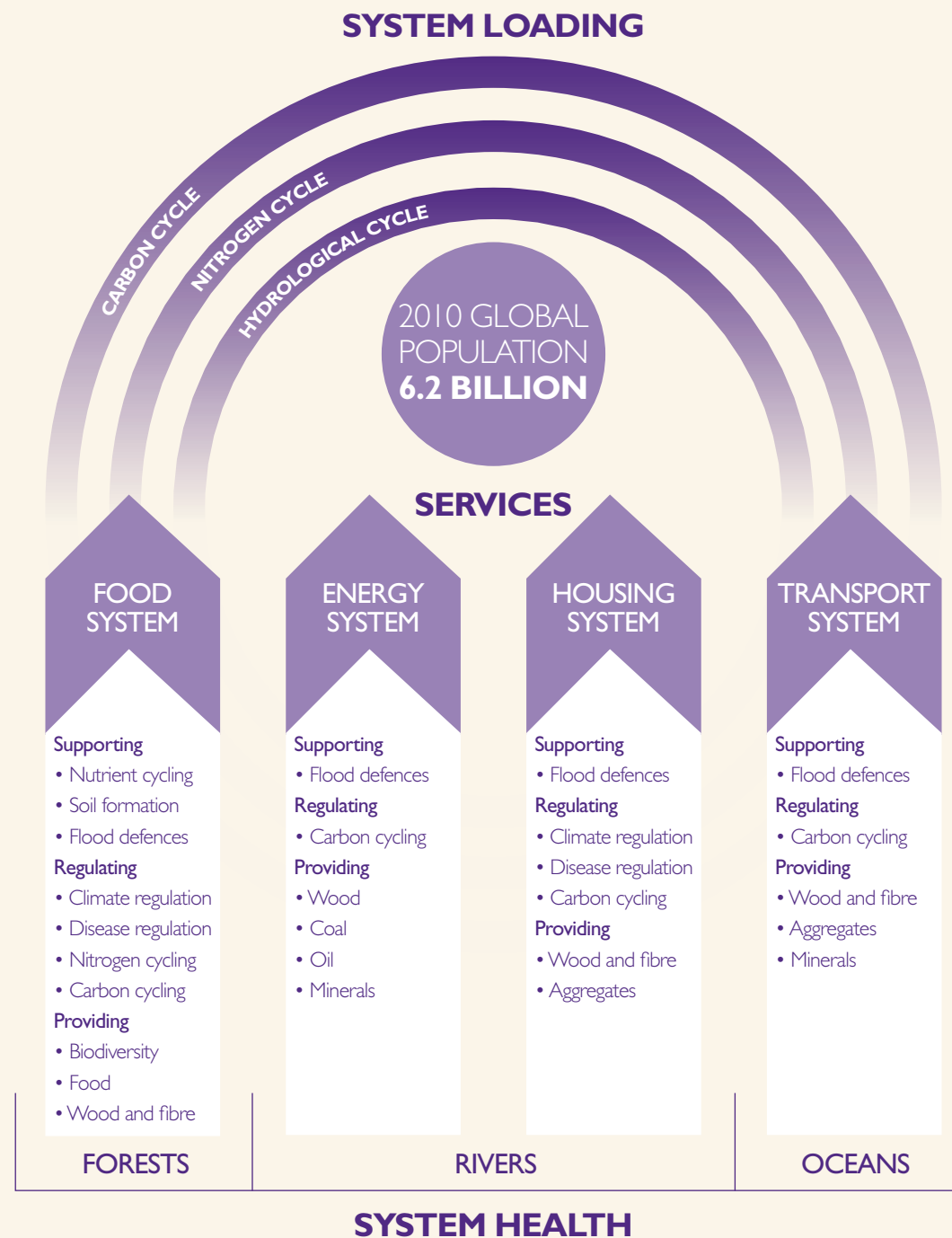
“This is an ambitious project which will inform RSA’s capability to underwrite marine risks and our investment decisions.

“Deteriorating ecological systems have the potential to accelerate political, social and economic changes in ways that cannot always be predicted from what’s happened in the past. This increases the importance of trying to investigate links between these areas.

“We expect this model to evolve as we establish a framework; the first slice focusing on marine risks is covered in this paper. Our challenge will then be to look at links to other sectors such as energy, farming and transport.

“It’s critical for people in the insurance industry to consider risks more widely to their business as pressure on the environment grows and resulting feedbacks intensify.”

OUR ECOLOGICAL SYSTEM



AQUACULTURE

Growing demand for aquaculture

Aquaculture is one of the fastest-growing sectors in agriculture, due mainly to increasing pressures on wild fish stocks, rising world populations and increased competition for land use. Aquaculture now accounts for 50% of the world's fish. Another 40,000 tonnes of aquatic food per annum will be required by 2030 to maintain current per capita consumption⁽¹⁾.

Due to increasing demand, growth in aquaculture has been rapid and where unregulated, has led to environmental damage and fish health problems, causing huge financial losses for the fish farmers involved.

Also as the size and the sophistication of the industry has grown, so has the capital investment and need for specialist insurance products to protect farmers against financial loss.

Techniques for farming

Within aquaculture there are broadly two methods of raising fish, either onshore in tanks, ponds and lakes, or offshore in floating cages. Offshore cage aquaculture makes up the majority of risks currently insured, with these systems providing farmers with the scale and optimum water conditions for large farming operations.

To avoid conflicts with other marine activities aquaculture is moving further offshore. This brings with it a number of challenges for fish farmers, specifically with regard to equipment and nets used to secure stock within a marine environment that is subject to extreme weather and currents. Potential impacts of climate change are also a cause for concern with changing water profiles, currents and an increase in severe weather events adding to the risks.

Managing risk

The potential environmental risks from aquaculture include the escape of farmed species that could impact biodiversity, transfer of diseases between wild and farmed stocks and increased interactions with wild predators. There is also the risk of pollution by poorly designed farms and environmentally damaging practices, such as the removal of mangroves to build shrimp ponds.



**Dan Fairweather, Aquaculture Underwriter,
Marine Department, RSA**

"RSA first started writing aquaculture insurance in 2004. We now cover a whole range of species (fish, shellfish and even sea cucumbers and sea urchins) in over 25 countries.

"The risks facing fish farmers are considerable. Aquaculture equipment and moorings are only as strong as their weakest parts so it is vital to invest in good quality equipment to protect against losses. Offshore equipment must be of a high specification to cope with extreme conditions both above and below the waves.

"By working with customers through site and equipment surveys, analysing and modelling local environmental conditions, and assessing biological risks we can make a real difference.

"Equipment failures can be dramatic. In an extreme case one of our largest losses was caused by the degradation of a protective thimble covering the eye of a mooring line holding a cage system together. The thimble cost a few Euros, but the failure of this resulted in a loss of €7million."

However, when farms are built correctly and carefully managed, aquaculture can reduce pressure on overexploited wild stocks and help replenish depleted stocks in certain situations. Operational risks of aquaculture continue to reduce allowing the benefits to be maximised. New voluntary management standards, such as the Aquaculture Stewardship Council certification can help to highlight best practice environmental management of farms. Aquaculture can also provide security for the seafood industry, supplying food and new employment opportunities in traditional fishing communities.

(1) FAO (Food and Agricultural Organisation of the United Nations) Rome 2006, Fisheries Technical Paper 500, State of World Aquaculture



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AQUACULTURE CONTINUED

Spotlight on Chile: Industry in crisis

Aquaculture in Chile has grown from a fledgling industry in the 1980s to a major contributor to the country's economy. Chile is now the second largest producer of salmon globally. The quality of the fish it produces and the technology it uses allows it to compete with other major countries.

Cumulative risks

However, in 2007 disaster struck the industry in the form of Infectious Salmon Anaemia (ISA), a deadly disease not previously seen in the Southern Hemisphere. Coupled with a series of natural catastrophes, including earthquake-induced tsunamis, volcanic eruptions spreading ash along the coast and algal blooms sweeping through locations not previously identified as hotspots, 70% of the industry was wiped out over the course of two years.

The source of the disease and the cause of the outbreak is not known for certain but the proximity of the farms to one another and the flow of water currents around the coast may have contributed to the problem. Similarly, high concentrations of farms adding increased nutrient loads into the water may also have triggered a number of the algal blooms experienced but it is not certain what role farms played in these events. However, increased rainfall and the resulting run-off from land-based agriculture can also lead to more nutrients being washed into the sea, contributing to algal blooms.

Environmental groups accused Chile's salmon industry of poor sanitary conditions, citing submerged cages overcrowded with salmon and excessive use of chemicals and antibiotics. There were particular concerns over the possible escape of farmed fish, the risk of disease transfer and an adverse impact on wild species genetic diversity.

Taking action

As the largest aquaculture insurer in Chile the situation presented RSA with some real challenges. We worked alongside the industry on a raft of measures and guidelines ranging from improved spatial planning, area management agreements, algal bloom mitigation procedures and biosecurity standards. This has enabled our clients to keep trading in spite of environmental risks and the economic downturn.

The location of farm sites is a delicate balancing act, with intense competition over the best locations, both within the industry and between marine users. The only solution is to move further afield and carefully manage spatial planning to optimise farming operations, while assessing changes in risk.

RSA worked with customers to help manage their risks and enable them to recover as soon as possible. Already we are seeing signs of recovery and growth. It is hoped that the industry should emerge stronger and better prepared for the future.

Fishing under pressure

In Canada, the fishing industry remains under continuous regulatory and financial pressure.

Ongoing requests for larger catch quotas from fisherman are carefully balanced by the federal government's policies to prevent over-fishing to preserve the long-term viability of the industry.

However, as populations grow so do demands for food and on the environment. The economic incentive to cater for these demands has created an increasingly globalised industry utilising increasingly efficient technology to catch fish.

Livelihoods of fishermen depend on a sustainable industry and it is also in the interests of businesses, insurers and more broadly our world economy and society as a whole.

Approaches to safeguard the industry

On the Canadian west coast, depending upon estimations of the salmon run, the Department of Fisheries (DFO) will decide on the number of days commercial fishermen and indigenous peoples are allowed to fish.

Over the past 20 years this "Quota system" has had a major impact on the fishing industry. The Newfoundland Cod Fish Moratorium in 1992 shut down cod fisheries, due to the stocks nearing extinction, with 30,000 people losing their livelihoods. More recently, the Fraser River (British Columbia) was closed in 2008 to salmon fishing due to collapsing stocks. The exact cause of declining fish stocks is uncertain but key factors include warmer temperatures, declining food supplies and the impact of sea lice from aquaculture. Furthermore, seals are



AQUACULTURE CONTINUED

a major predator to fish stocks and partly because of the European Union ban on seal products, the seal population in Atlantic Canada has doubled over the last 40 years.

Unexpected consequences

These policies have unfortunately had unintended and unexpected consequences. As cod stocks collapsed, crab and shrimps flourished with no natural predators and the fishing industry changed their focus to these species. However, in 2003 the crab fishery in Nova Scotia and parts of Newfoundland began to decline. Quotas were decreased resulting in fewer catches thereby increasing financial pressure on fishermen.

Similarly, in April 2010 shrimp quotas in Newfoundland were reduced because of declining stocks. As a result, shrimp landings were down 30.1% from 2008 to last year.

From an insurance perspective declining stocks puts severe financial pressure on the industry. This has meant that some fishermen are not completing the necessary maintenance to their vessels or choosing to save the cost in insurance premiums and simply not buying cover. This puts increased pressure on public and governing bodies to subsidise the lost revenue.

Looking to the future

RSA and WWF are working together to help create a network of Marine Protection Areas (MPAs) in order to protect species and coastal communities' livelihoods. MPAs can boost fish numbers, increase their size and restore fragile ecosystems if based on strong scientific foundations and developed through consultation with key stakeholders.

Planning networks of MPAs, not just single sites, can create a foundation for sustainability across a region. Networks can help protect habitats, providing safe havens, allowing endangered species to also recover and contribute to sustainable fishing.

In addition we will map key areas of biodiversity and assess the impacts of commercial activities including shipping, fishing and oil and gas extraction in the Atlantic and Arctic Canadian coastlines.

The maps will help enable consultation with all stakeholders and determine the right direction to take, to create a sustainable fishing industry for all.



Kevan Gielty, President, Coast Underwriters

"Coast Underwriters is a leading marine underwriter involved in all recognised lines of marine insurance and part of RSA Canada.

"The main threat we face when insuring fishing vessels is the overall viability of the industry; there is a direct correlation between an industry downturn and an increase in claims. When times are good, more money is invested in equipment but this can impact on fish stocks further. This creates a vicious circle and unless we consider measures to tackle this situation therefore it's an unsustainable trend.

"There is always an active debate on what new scientific information on the environment reveals. Hydro power, fish farms and record high seal populations all play a role in affecting fish levels. Most interestingly what we are seeing is that political and social factors both impact on the environment. Decisions are made on where to locate fish farms, setting fishing quotas for different groups of people and controlling predators often for social reasons rather than the best environmental outcome.

"Engaging all stakeholders is critical to a successful outcome for everyone. We want to take positive action to help our customers and we are working with WWF to establish MPA's to protect species from extinction. We are going to be talking to key stakeholders involved in the fishing industry on how we can create a network of MPAs rather than just a single site."



SHIPPING

A growing industry

The shipping industry has inevitably suffered from the recent global economic downturn. The contraction in trade during 2008 and 2009 reduced the global demand for shipping as fewer goods were exported. A solid recovery is predicted in 2010 but it will bring with it new challenges for the shipping industry.

The international shipping industry is responsible for the carriage of around 90% of all world trade⁽¹⁾. Approximately 50,000 merchant vessels carry every kind of cargo and containers account for approximately 90% of non bulk shipments, i.e. those transported packaged in containers as opposed to directly into the holds of the vessel.

Knowing your cargo and keeping containers safe

Containers have become the major conduit for moving cargo to and from every corner of the world. They can contain anything from consumer goods to highly dangerous and toxic waste. Therefore, it is crucial that all containers are properly loaded and stowed to prevent cargo movement while in transit.

It is estimated that approximately 10,000 containers are lost at sea every year⁽²⁾. RSA has experienced a number of losses involving containers not being adequately declared and secured. This has meant cargoes have shifted in transit putting lives in danger and increasing the danger of environmental pollution.

Correct declaration of product type and weight within a container is critical within the shipping industry as very few containers are able to be opened/verified by the authorities or third parties involved within the supply chain. If goods are misdeclared the container may be stacked in an incorrect location on the vessel which may place the ship, personnel on board and the environment in danger. Problems can also be exacerbated where the mitigating response is based on incorrect information.

If a container is loaded incorrectly and the vessel then hits heavy weather, it could be lost overboard or shift within a stack causing damage, fires or even manoeuvring difficulties. If this happens, not only could there be a potential loss of goods but the vessel could be affected and/or create a hazard for other vessels on the sea.

Incorrectly declaring the contents of a container will also mean those responding to the incident will not know how they should prepare. The response could in turn aggravate any environmental pollution. This was highlighted in the 2007 MSC Napoli grounding where it was reported that a large proportion of containers had been misdeclared. The response efforts and assessment of the extent of environmental pollution were delayed due to inadequate information.

Looking to the future

It is vital to develop a better understanding of the benefits of loading, stowing, declaring and moving containers properly to reduce potential environmental impacts.

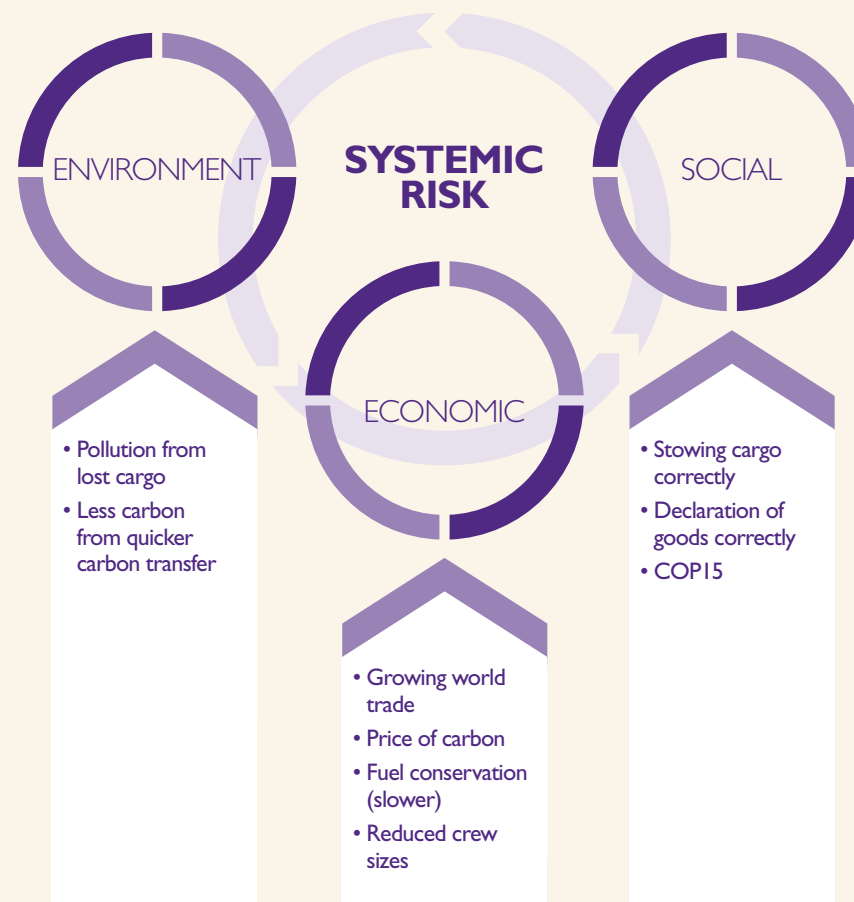
As an insurer we would expect customers to implement a number of basic risk management measures when transporting cargo:

- Firstly we expect customers to understand the rigours of transit that the container and enclosed goods will have to withstand. This will help to inform how to load, stow and secure the goods within the container appropriately; and
- Secondly, they must ensure all paperwork for the container is correct and that weights and cargoes are properly declared, including any hazardous properties. This will allow the vessel planner to ensure the container is stowed correctly to reduce the chance of loss and potential environmental damage.

RSA is working with an international consortium of Customs Authorities, third party logistics providers, cargo owners, research institutions, systems developers and port operators to develop a safer and faster means of container transport. Financed by the EU, our aim is to create a more transparent and secure door-to-door supply chain. Through a new certification system, Customs will not need to check contents and this should result in faster movement of cargo, minimising delays and reducing potential product damage.

(1) Annual Review 2009, International Chamber of Shipping, International Shipping Federation

(2) http://news.nationalgeographic.com/news/2001/06/0619_seacargo.html



SHIPPING CONTINUED

Regulating carbon from shipping

Although shipping is the least environmentally damaging form of commercial transport, a recent EU directive has been passed that requires member states to implement legislation which restricts the amount of sulphur in fuels burnt by ships while in an EU port.

The new regulations are part of a broader EU drive to further reduce the environmental impact from shipping and reflects wider global initiatives focusing on the same goal.

Impact of low sulphur fuel

The aim of using low sulphur fuel is to reduce emissions. It goes hand in hand with other efficiency improvements such as hull design. However, the legislation only covers vessels while they are in port, which means higher content sulphur fuels are still burnt on the open seas.

Switching of fuels can also have serious implications for the functioning and safety of engines. In two stroke engines corrosion can occur with calcium ash build up on the pistons. In four stroke engines, ash can build up on the exhaust valves, turbocharger and combustion chamber. If the fuel is used without the correct equipment or maintenance procedures in place, damage will occur which could materially damage vessel engines and endanger lives of crew members.

As ships are now increasingly technically sophisticated, they must be properly maintained and have the right equipment installed to ensure safe use of these fuels. This all takes time and obviously has a material financial impact.

A wider impact

The full life cycle impact of the reduction of sulphur dioxide emissions from low sulphur fuel needs to be considered. While using low sulphur fuel reduces emissions this could be cancelled out by the potential environmental impact from the additional maintenance and new equipment installed. While no formal studies have been completed into assessing the relative merits of low sulphur fuel, the potential consequences as listed above demonstrate the need to consider environmental regulation in more detail.

How to tackle the issue

A good maintenance programme and use of suitable lubricant can help to eradicate the detrimental effects of using the low sulphur fuel. These measures will help lower the risk of potential claims and reassure insurers that the vessels are being properly managed and have the environmental benefits realised from the fuels.

It is important that shipping companies have a detailed understanding of the damage that can occur with the use of these fuels and have defined loss prevention and maintenance programmes in place.

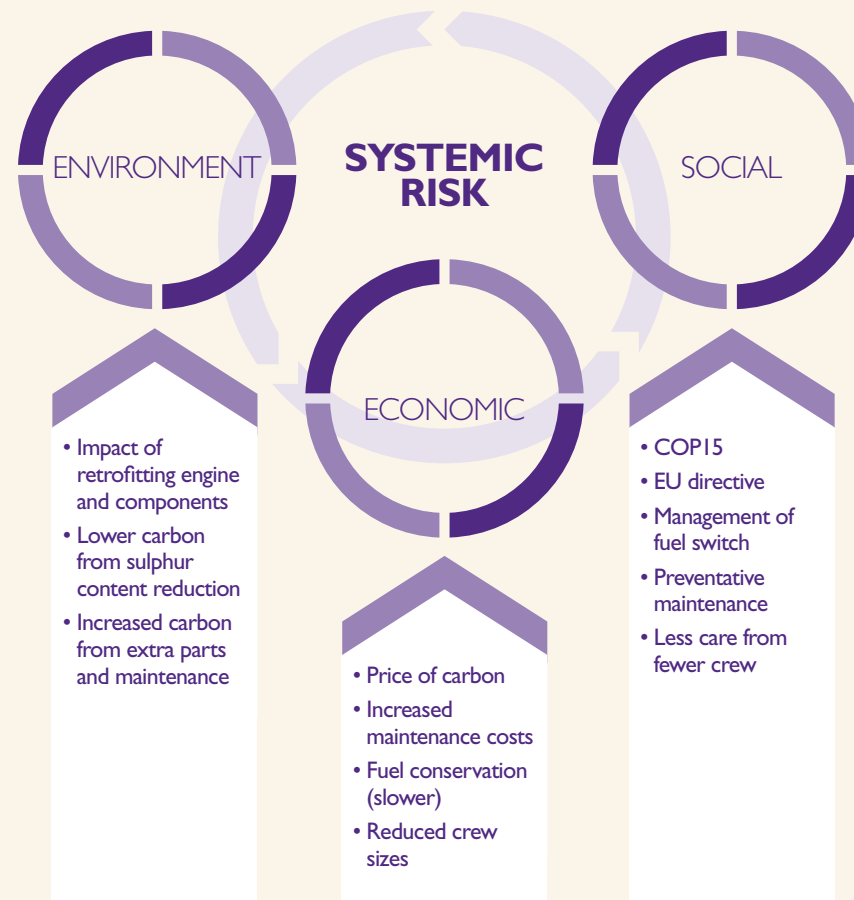


Nick Andrews, Marine Risk Manager, RSA

"The shipping and logistics industry has been under immense pressure to cut costs due to the economic downturn. The industry has responded by lowering speeds to conserve fuel, reducing crew sizes and taking ships out of service.

"While slower speeds and less traffic are positive for the environment, lower crew sizes tend to go hand in hand with a reduction in maintenance. This is a concern for insurers and could have implications for safety standards.

"RSA supports initiatives to reduce environmental impacts but it is important to recognise that some regulatory measures do not always deliver what they intended. In the case of low sulphur fuels a proper understanding of their effects on vessel engines must be understood to ensure the savings in SO_x are not negated by increased CO₂ due to additional repairs and replacement of parts."



SHIPPING CONTINUED

Improving energy efficiency in ships

In 2009 the International Maritime Organisation agreed a range of measures to help improve the energy efficiency of the global merchant fleet. The fleet provides transportation for oil and gas, containers, people and bulk cargoes such as timber and iron ore. When fully implemented in 2011, these are expected to have far reaching improvements on standards of marine construction and operation.

The measures include:

- An energy efficiency rating index specifically for ships, similar to those used to rate cars and electrical appliances;
- A management system for all ships to monitor and reduce CO₂ emissions covering route planning, speed control, weather routing, engine optimisation, navigation control, hull maintenance and fuel selection;
- Possible taxes, emissions trading or other market based mechanisms to be applied globally to the sector; and
- Global principles for developing regulation on reducing CO₂ emissions regardless of the national flag being flown.

Implementing the measures

WWF hopes that the design and operation indices become mandatory for the entire fleet. By having minimum standards applied to all vessels it will have a real impact on the environment and safety levels.

A balance of financial incentives and penalties will need to be maintained to ensure compliance. The agreements should also be structured to encourage incentives that go beyond efficiency savings.

If a financial mechanism such as a carbon trading scheme were to be introduced it could potentially provide the right stimulus. To work it would need to limit the amount of carbon available to create a demand between participants. Each year this amount of carbon would reduce encouraging ships to continue to improve emissions.

If carbon is assigned a cost for shipping it will have less financial impact on the more efficient vessels. Voyage optimisation is one way to minimise costs and carbon. By carefully planning routes, avoiding adverse weather conditions and travelling at slower speeds, cost and

carbon savings can be achieved. Caution is needed to make sure that engines do not operate below the speeds they were designed for. This could damage them and create a bigger environmental impact.

Implementation in a diverse fleet cannot be expected overnight. It is likely that it will take five years for all the measures to come into force. Many vessels already operate at efficient standards, enjoying reduced fuel costs and lower insurance premiums. Vessels over 25 years old tend to be a higher risk, although a very well maintained 30 year old vessel may actually be in a better condition than a 15 year old one that's been poorly maintained.

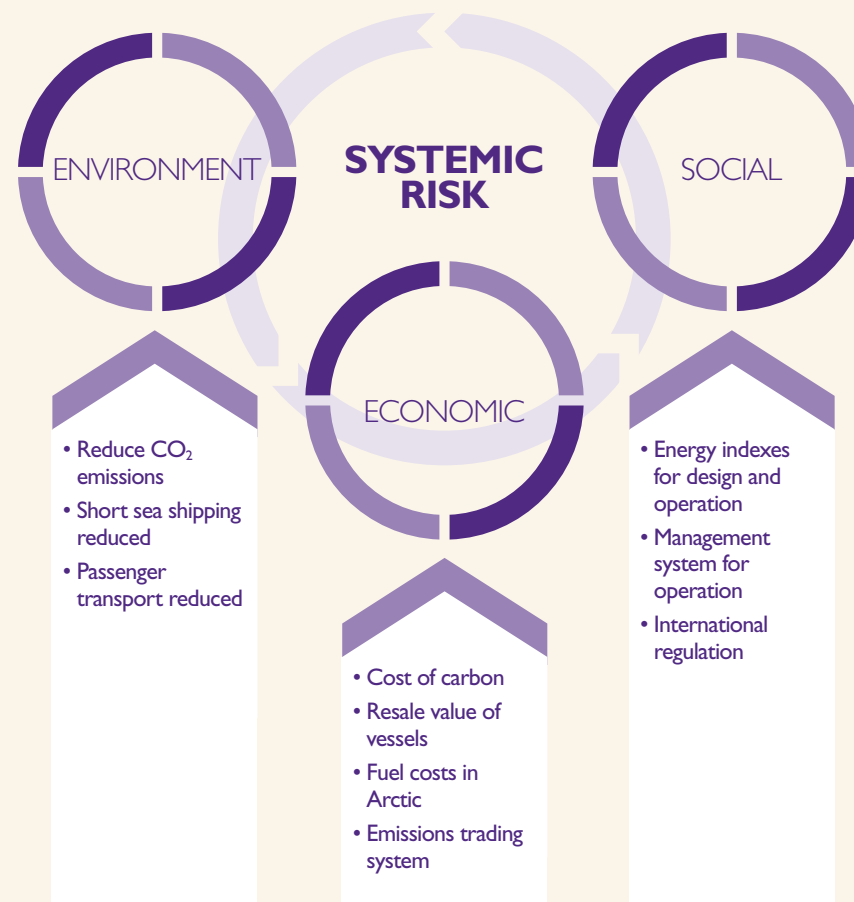


**Simon Walmsley, Marine Manager,
WWF International**

"It's likely that resale values for vessels could be lower in future because of their carbon footprint. This would have been more significant if shipping had been included into an emissions agreement in the Copenhagen COP15 talks in 2009.

"A key concern about emissions agreements is that we need to make sure we don't drive passengers and short sea shipping towards more environmentally damaging forms of travel. These commercial activities use a sustainable form of transport but are cost sensitive and extra carbon penalties may make them too expensive.

"It's important that all vessels try to adhere to best practice and work together to reduce emissions. By doing this it will help us try to keep below the two degrees of climate change needed to stabilise our environment."



RISK SCENARIOS: OIL SPILL OFF THE SCOTTISH COAST



**Rob Osment, Technical Manager,
Geographic Risks Assessment Unit, RSA**

"It is fundamental as an insurer to fully understand your risk profile. This affects your underwriting criteria, how much reinsurance you need and the extent of exposure in the event of a catastrophe.

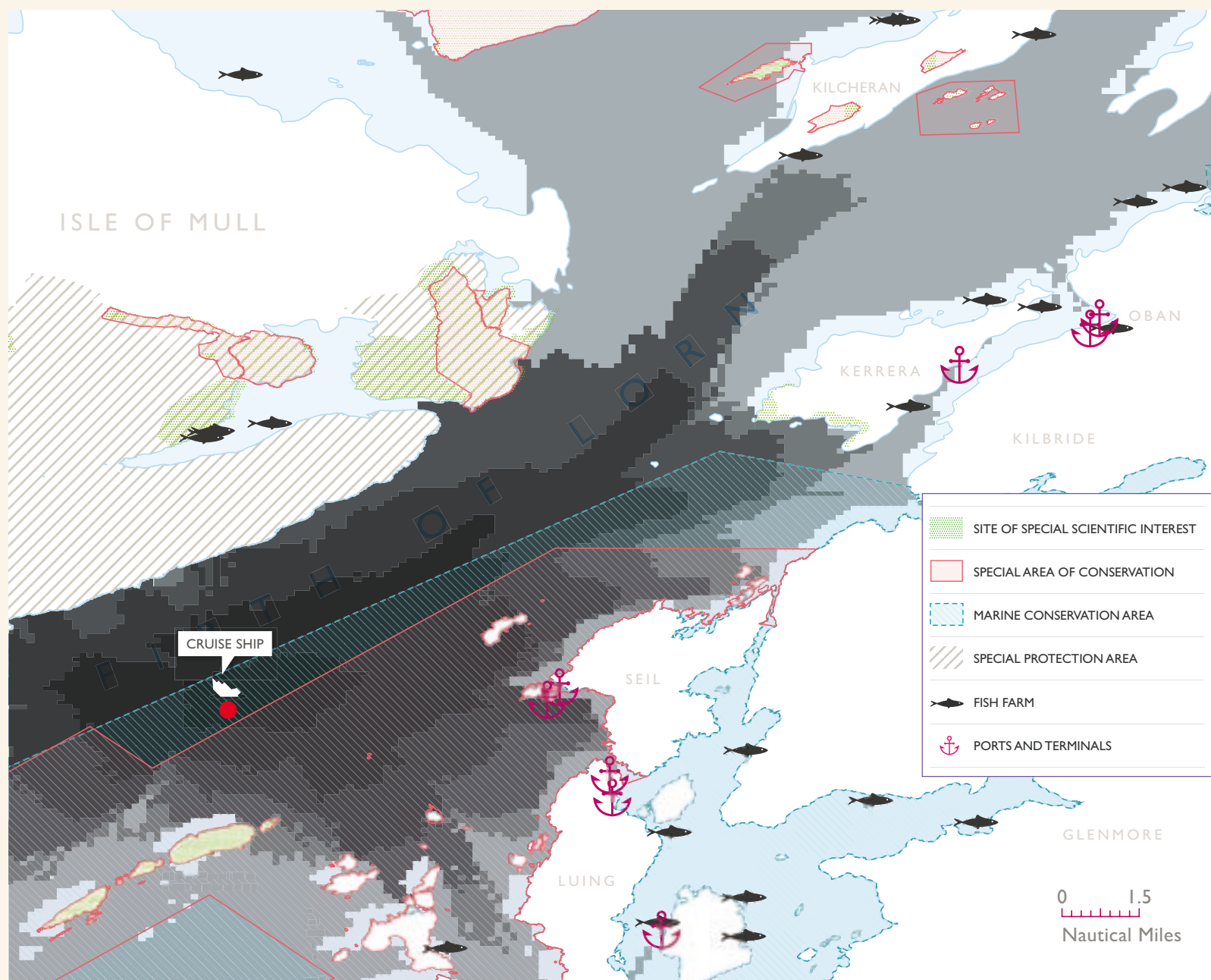
"RSA and WWF use Geographic Information Systems (GIS) for a wide range of tasks from mapping customer exposure to crime to charting areas of biodiversity. It's a powerful tool to analyse and assess information in new ways.

"This scenario shows what would happen if a passenger vessel ran into difficulty off the coast of Scotland and how loss of its fuel would spread within the space of a day. With growing economic activity we are seeing increases in shipping traffic raising the risk of occurrences.

"The area selected has a range of valuable biodiversity hotspots and conservation areas. There are large numbers of fish farms close by with many ports and lots of shipping traffic. Highlighting the location of risks is useful to RSA to protect against losses and work with customers, helping raise awareness of the benefits of good risk management.

"By working with WWF we can map where commercial activity and environmentally sensitive areas overlap. This allows us to work together in making commercial activity sustainable. Together we will map risks in the Canadian coastline, Barents Sea and Baltic Sea over the next three years trying to achieve these goals."

This scenario shows an oil spill of 2,500 tonnes from a cruise ship over the course of 120 hours. A full interactive version of the model including further information and source information is available at www.wwfrsapartners.com



RENEWABLE ENERGY



Tom Pocklington, Hull & Liability Underwriter, RSA

"Our approach to ensuring commercial energy operations is to bring together expertise from our Marine, Renewables, Construction, Power and Engineering businesses. It is vital to use all these skills in looking at marine based or 'wet renewables'.

"We were one of the first insurers to cover the development of wind technology 30 years ago and are now world leaders in the field. We believe that wave and tidal energy is at a crucial point of development. The potential for energy generation and current political climate means it could be a major source of the UK supply in the future.

"Naturally, to make the technology viable we need to work together with the industry and other stakeholders to create installations which are low risk, both from a commercial stance and environmental."

Growing wet renewable potential

Renewable energy is set to play a key part in the UK's future energy strategy, with Britain potentially becoming the Saudi Arabia of wave power. The UK is aiming to achieve a 20% target of renewable energy production by 2020. The recent leasing of sites by the Crown Estate is projected to generate 1.2GW of installed capacity, enough for 750,000 homes.

- The UK owns 50% of Europe's tidal energy resource and 10-15% of the global resource
- The UK owns 35% of Europe's wave energy resource
- The UK could get 10-15% of its energy demand from wave power

Trading Carbon Magazine

Beyond prototypes

RSA is the market leader in global renewable energy insurance. RSA covers insurance for renewable energy projects at every stage of development, from plan, to test site, to construction through to operation, and we are one of the few insurers to offer both onshore and offshore cover for wind energy projects.

As well as centres of excellence in solar, biomass and small scale hydro-electric power, RSA has a leading marine insurance capability. This is particularly important when it comes to wave and tidal power and developing a full Renewable Energy proposition.

Wave and tidal technology is relatively new and there is a high degree of uncertainty over how it will perform in some very challenging ocean environments. Naturally, this increases the degree of risk but the big potential advantage is the predictability of the tides over wind and solar for power generation.

Moving to commercial use

The first commercial facilities are starting to open with a wave farm in 2008 in Portugal. A tidal energy installation was first connected to a national power grid in Norway in 2003 and a device in Northern Ireland is the first commercial scale device of just over 1.2 Mw. Devices are currently being tested at a specially designated facility off the Orkney Isles with full scale commercially operational sites expected off the UK Coast by 2012.

It becomes easier to manage the risks associated with tidal and wave energy as more commercial devices open. With more detailed knowledge of the risks and claims data being built up the underwriting of wind and tidal energy becomes more competitive.

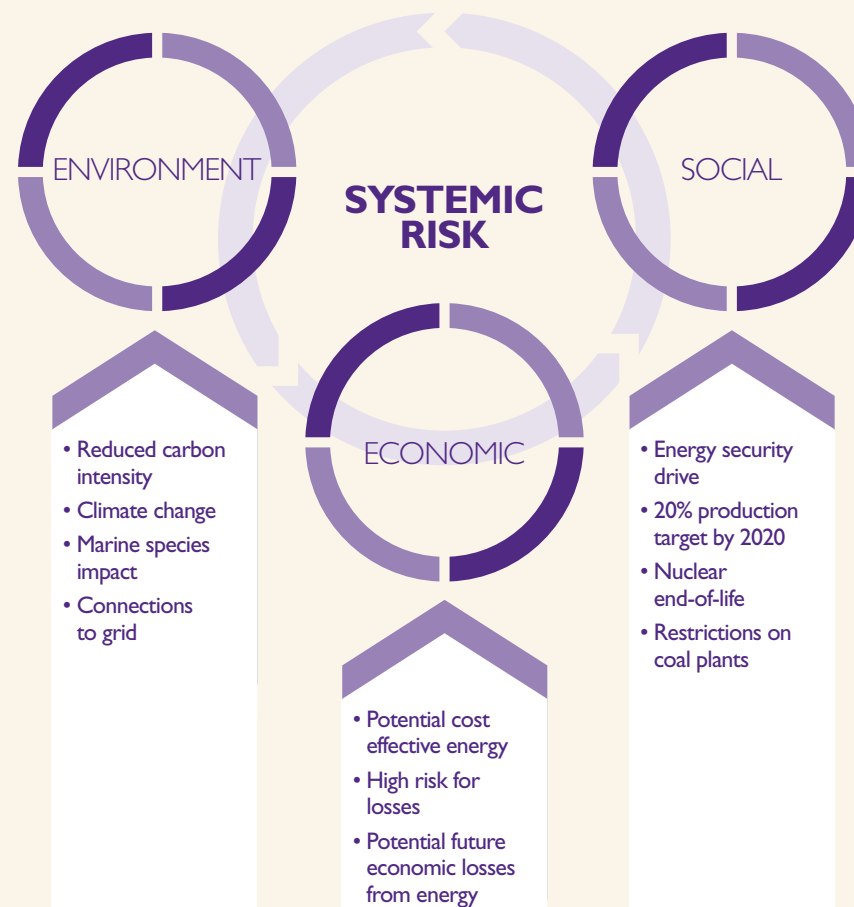
Environmental dilemma

While most commercial devices are small-scale installations, the potential for bigger farms are being considered. The potential environmental impact also

increases with the size of installation with greater care and attention needed to how it affects local ecosystems. This raises the question of whether a trade-off needs to be made between local environmental impact and the reduction of greenhouse gases from a renewable energy source.

The proposed Severn Estuary barrage was estimated as having the potential to generate 5% of the UK's electricity⁽¹⁾. The ten mile long hard engineered barrage would have crossed the entire River Severn. While the project would have contributed to reducing the UK carbon emissions it was widely criticised by environmental groups. The initial proposal was expected to impact habitats for birds, restrict large tanker traffic and possibly increase flooding. Alternatives are being considered using less intrusive tidal energy lagoons with a much smaller impact and a 12 mile long tidal reef to try and balance the interests of all stakeholders.

(1) Department of Energy and Climate Change



CONCLUSION

The pressure on the marine environment is growing, driven by expanding populations and a changing environment. The interactions between the different factors are complex and require thinking beyond traditional risk boundaries.

For business to be competitive in this environment, commercial activity cannot consider itself a closed system. Different commercial activities have the potential to affect each other and are reliant on the environment for continued operation.

It's inevitable that commercial use of marine resources will continue to grow and solutions to manage this sustainably are essential to prevent long-term damage to our livelihoods and environment.

Businesses can take practical measures to help the environment. By reducing risk in insurance it helps to reduce environmental risk too, for example:

- Improving management standards and spatial planning of aquaculture reduces commercial risk but also prevents wild species being affected;
- Correct loading, stowing and declaration of cargo helps reduce accidents and the risk of environmental pollution;
- Preventative maintenance and correctly installed equipment reduces the risk of engines being damaged from low sulphur fuels; and
- Efficient standards of operations and design leads to lower premiums, potential carbon taxes and environmental impact.

Working in partnership brings new perspectives on helping to assess and manage risk. By using tools such as GIS we can visualise risk in ways not seen before and gain a clearer understanding of them.

RSA and WWF will be working together over the next three years to develop further technical briefings and risk models which focus on systemic risk for insurance. To find out more and register for further updates please visit www.wwf-rsapartners.com

FURTHER INFORMATION AND RESOURCES

About the partnership

www.wwf-rsapartners.com

International Maritime Organization

www.imo.org

International Union of Marine Insurance

www.iumi.com

Millennium Ecosystem Assessment

www.millenniumassessment.org

RSA Marine

www.rsacommunity.co.uk/marine/

WWF Oceans

http://www.wwf.org.uk/what_we_do/safeguarding_the_natural_world/oceans/

