

KEYNOTE LECTURE

GL-Group – Safer, Greener, Smarter

Mr. Erik van der Noordaa, CEO GL Group, Hamburg

The following presentation gives an update on the recent developments and activities of Germanischer Lloyd SE.

During the last years, Germanischer Lloyd has been transformed into a global operating group focussing on the Maritime Industry, Oil & Gas and Renewables.

The presentation focuses on this transformation. It gives a detailed service portfolio of all three business segments (Figures 1 - 4) and addresses a number of research & development topics relevant to the work of ISSC.

The focus of Maritime Research and Rule Development is based on three objectives: Safer, Greener, Smarter (Figure 5):

- *Safer* stands for reducing the risks in shipping.
- *Greener* stands for assisting our clients in reducing emissions and by doing so protecting the environment.
- *Smarter* means supporting our clients in operating their assets efficiently.

In addition to these three objectives, we distinguish between long-term research - exploring new technologies - and short-term developments focussing on product development and enhancement.



Figure 1: GL Group business segments

Core services

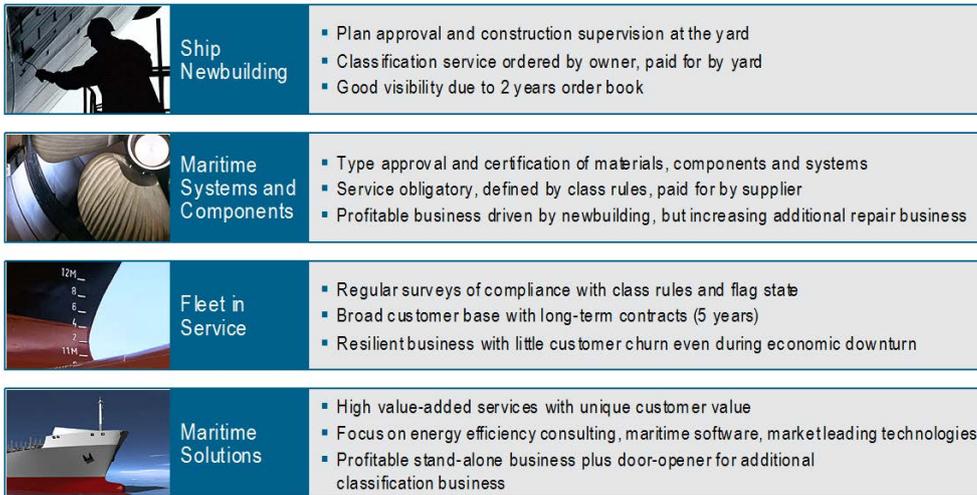


Figure 2: Maritime Services portfolio

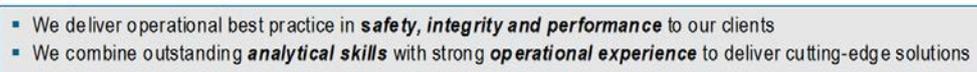
All of the selected topics are supported by a project plan incorporating a timeline, deliverables and objectives. The selection of the topics was a result of an intensive exchange between our experts, the industry and knowledge institutes.

Traditionally, GL supports R&D for joint industry and public funded projects.

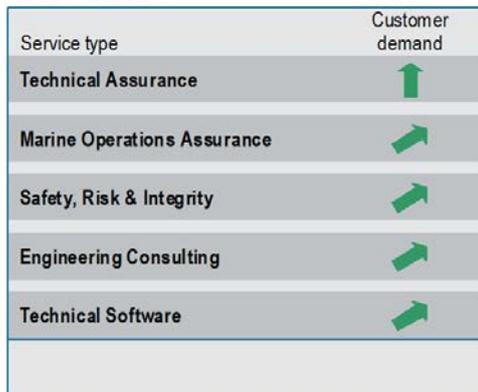
GL's typical objective in these projects is to explore new technologies for later implementation by our customers resulting in new rules & regulations, services or software tools.

GL focuses on all ISSC technical committee key areas. This applies to core competencies like predicting wave-induced loads on ships and the structural response of the hull.

Strategic Positioning



Core Services



Core Asset Know-how



Figure 3: Oil and Gas Service Portfolio

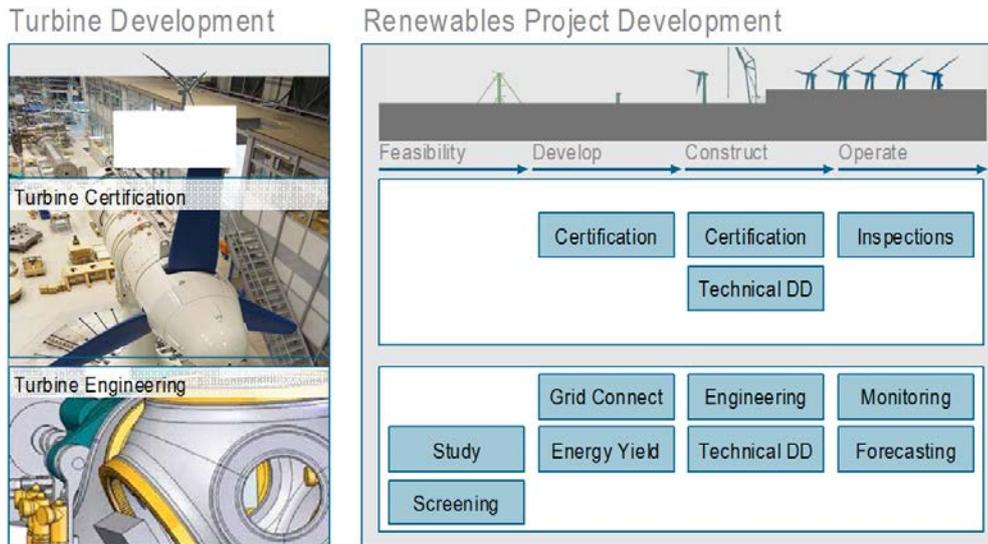


Figure 4: Renewables Service Portfolio

Recently, GL participated in developing concepts for future designs. Our focus in these projects is to integrate several technologies into one concept.

However, GL does not have any ambition or intention to develop designs. We will concentrate on concepts and improvements only.

ISSC also focuses on other topics through specialist committees, three of which are also addressed by GL: Damage stability of ships, LNG technologies and novel materials.

Additionally, GL pursues joint R&D projects addressing topics beyond ISSC's targets.

For example: Ship systems, which are of increasing importance to the performance of a ship, risk-based approaches including structural reliability assessments and onboard tools.

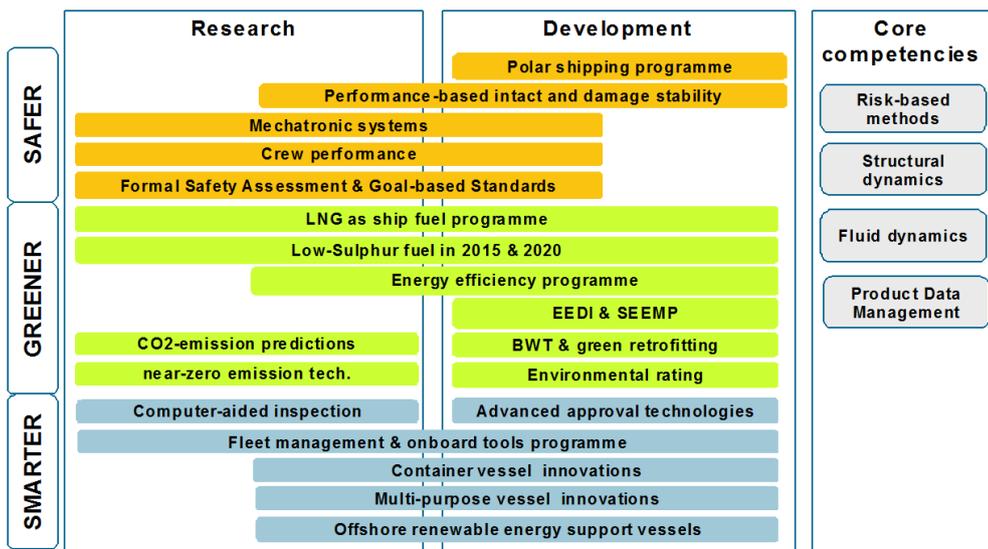


Figure 5: Maritime Service Innovation Map

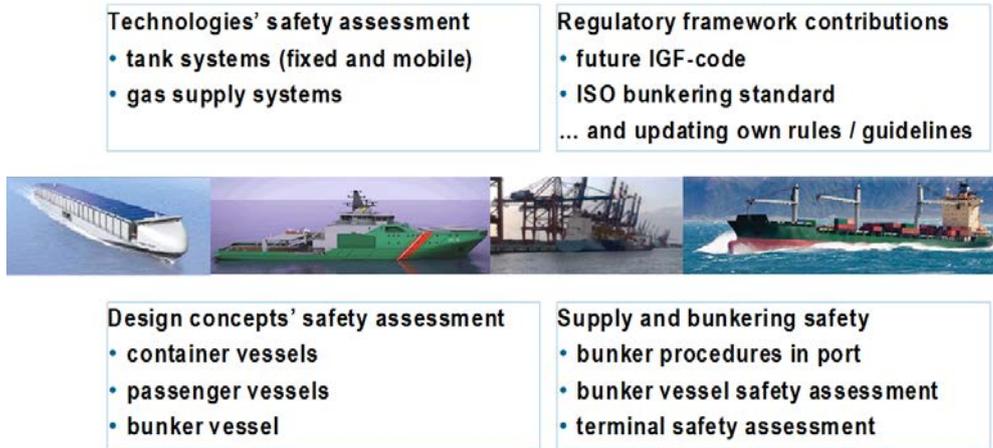


Figure 6: LNG as ship fuel – priority R&D programme at GL

LNG as ship fuel has priority at GL (Figure 6) since we consider this development one of the more important ones in this decade.

GL is actively engaged in advancing this technology in the following areas:

- Perform safety assessments of technologies for tank systems
- Contribute to the development of regulatory frameworks
- Assess the safety of new design concepts in cooperation with shipyards or designers
- Ensure the safety of the LNG supply and bunkering chain

As leading classification society for container vessels, our recent focus on LNG as ship fuel was dedicated to container vessel design concepts of various sizes (Figure 7).

Our first study was published in 2009 and it addressed a 1200 TEU feeder vessel.

Our latest joint development project resulted in an 'Approval in Principle' for a 13000 TEU vessel designed by IHIMU of Japan.

An 'Approval in Principle' documents technical feasibility for the addressed systems and outlines additional requirements which need to be addressed to achieve a final approval.

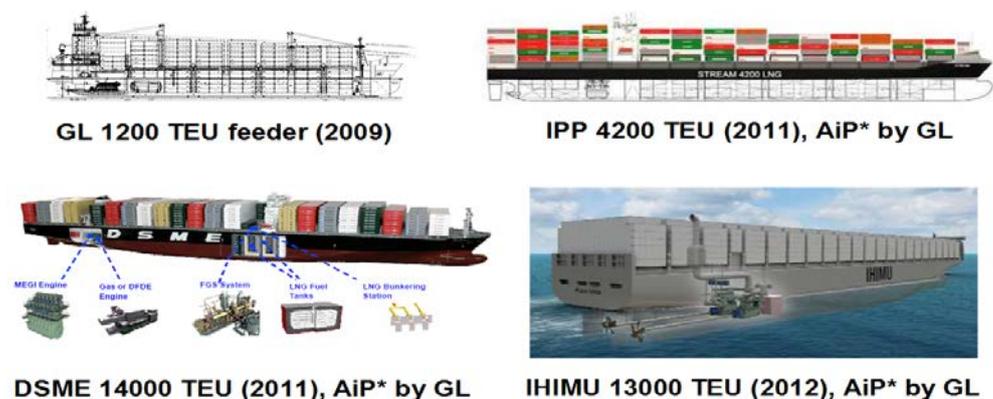


Figure 7: Projects exploring LNG as ship fuel for container vessels

Ship and system design	Ship operation
<ul style="list-style-type: none"> • energy-optimal hull forms accounting for real sea states • performance of air lubrication and wind-power systems • energy-optimal ship system configurations • energy management systems accounting for multiple energy sources ("hybrid ships") • advancing the EEDI of IMO 	<ul style="list-style-type: none"> • integrating real sea states into onboard decision-support tools • simulation of real-time energy consumption • collection and advanced analysis of voyage data

Figure 8: Ship efficiency - priority R&D programme at GL

In 2011, we participated in the conversion of the product tanker Bit Viking.

Delivered in 2007 by China's Shanghai Edwards shipyard, Bit Viking was built with double engine rooms, propellers, steering gears, rudders and control systems.

Having previously been powered by two 6-cylinder in-line Wärtsilä 46 engines running on heavy fuel oil, the conversion has changed these engines to Wärtsilä 50 DF dual-fuel engines capable of operating on LNG supplied from two 500-cubic-meter LNG storage tanks on the fore deck. The two LNG tanks enable the vessel to sail on LNG for 12 days.

The Bit Viking is the world's first vessel converted to run on LNG while in service.

After successful sea trials under GL supervision, the vessel has resumed commercial trading.

Another very interesting project is the newbuilding of an OSV at STX Finland for the Finnish Ministry of the Interior which will be launched in 2013.

This highly sophisticated vessel is incorporating three LNG-fuelled main engines as well as LNG-fuelled auxiliary engines.

Focus on ship work spaces and stakeholders

- making advanced tools available
- applying innovative ergonomic concepts
- creating modern qualification concepts






shipping companies

ship designers

class societies






ship work spaces

Figure 9: New EU-funded R&D project CyClaDes – Crew-centred design and operation of ships and ship systems

Increasing the efficiency of ships is another priority of our R&D, Figure 8. We are successfully advising our clients in optimising ship designs and running their vessels with optimal trim.

Our R&D department focuses on next generation technologies such as including real sea conditions in the optimisation; designing and running complex ship systems in an energy-efficient way; and looking at technologies to reduce required power or deliver additional power.

At the same time, we actively engage with IMO to advance the EEDI for other ship types and to have new technologies included.

With an increasing number of vessels sailing in ever more confined waters, performance of the crew is high on the agenda.

At the same time, new navigational aids are introduced and ship systems in general become more complex.

Under the EU-funded project Cyclades, GL teamed up with a large group of designers, suppliers, institutes and universities to explore, which technologies could support crews in reducing human failure (Figure 9).