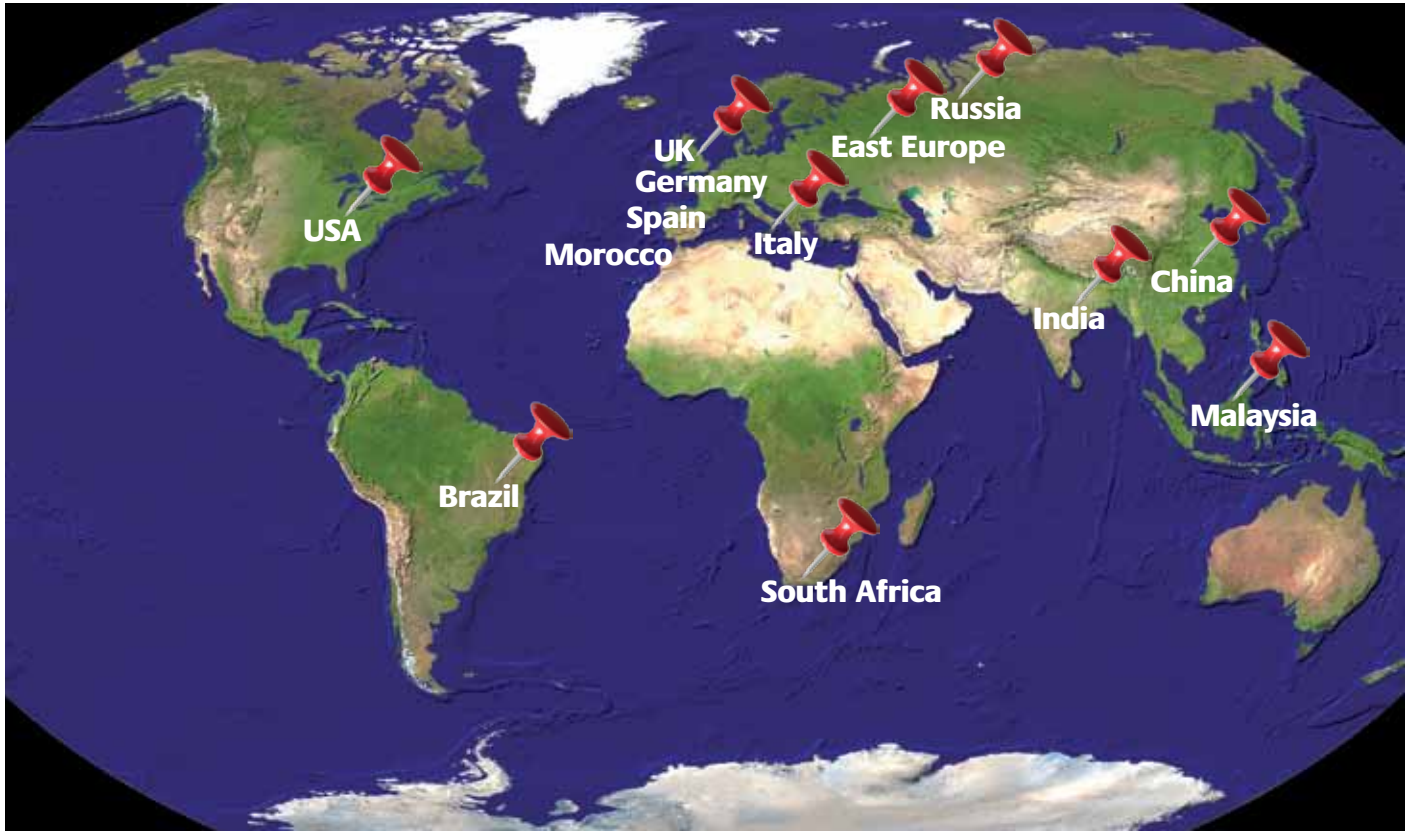




**BLG WINDENERGY LOGISTICS –  
YOUR INTERNATIONAL OPERATING PARTNER FOR  
LOGISTICS IN THE OFFSHORE WIND INDUSTRY**





## BLG LOGISTICS GROUP

BLG was established by Bremen merchants as “Bremer Lagerhaus Gesellschaft” in 1877. The company initially focused on handling and storage of goods.

Over a hundred years later the company developed from a local port operator into the international BLG LOGISTICS GROUP. Today around 16,000 employees work in the **Automobile, Contract and Container Logistics Divisions** at more than 100 locations in Europe, Asia, Africa, North and South America.

BLG’s Automobile Logistics offers many a superlative: with a volume of 7.5 million vehicles moved from the manufacturers to the dealers and processed at technical centers BLG is the market leader.

In Contract Logistics BLG manages complex material and data flows for such key accounts as BMW, Mercedes, Siemens, IKEA, Konica Minolta and Tchibo.

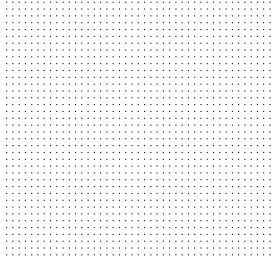
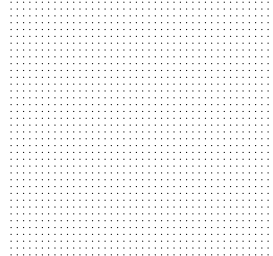
By virtue of 14.2 million standard containers handled in 2013, the Container Logistics Division is the market leader in Europe. The biggest site is in Bremerhaven while other terminals are located in Hamburg and Wilhelmshaven as well as in Italy, Portugal, Morocco and Russia.





## BLG WINDENERGY LOGISTICS

The new WindEnergy Logistics segment benefits from BLG's decades of experience as an international seaport-oriented logistics provider. Our team develops innovative transport, cargo handling and warehousing solutions for all logistics processes along the entire value chain of the (offshore) wind industry. The HSE (Health, Safety, Environment) management system developed by the BLG LOGISTICS GROUP is an integral part of our business processes. Together with the personal commitment of our employees, this ensures that a high degree of attention is devoted to the needs of occupational safety as well as health and environmental protection in our company. We have successfully carried out initial reference projects for offshore wind farms in the German North Sea, such as Global Tech I, Trianel Windpark Borkum, Nordsee Ost and Meerwind Süd/Ost, at the Bremerhaven, Emden and Wilhelmshaven locations.





## OUR SERVICES: INSTALLATION, ORGANIZATION AND OPERATION OF A TERMINAL

At the Bremerhaven Auto Terminal we have set up the Offshore Terminal ABC-Halbinsel on an area of around 100,000 m<sup>2</sup>, built up terminal operations and, jointly with further training partners, developed and implemented customized training programs for our blue-collar workers. Thanks to the terminal, Bremerhaven has solidly established itself as a starting point for the shipment of wind turbine components for the offshore wind energy sector. A number of wind farms have now been set up from our terminal. In the meantime we also operate at the JadeWeser Port in Wilhelmshaven and ensure smooth running of terminal operations for further installation of the Global Tech I wind farm.

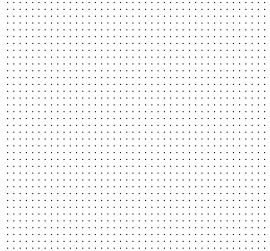
We would be glad to advise you in the event you wish to plan a port terminal, set up terminal operations for handling wind turbine components for the offshore wind energy sector or are looking for infrastructure for temporary storage of heavy-lift components.





### ★ Load Carrier System “Sleeper”

We want to lower costs on a long-term basis. For this reason it is necessary to minimize the expenses for setting up suitable port infrastructure. Since areas with a loadbearing capacity of up to 3,800 tons are usually required for the large components to be stored, BLG developed a bearing support system (“sleepers”) that provides for effective load distribution to the ground. In this way it is possible to do without extensive upgrading measures and at the same time ensure highly flexible handling of the components, for instance when new arrangements have to be made for use of the storage areas. Specially designed adapter plates based on modular principles make the sleepers universally applicable so that all components can be transported and stored safely and reliably with one system. Installation of the sleepers is an integral part of the optimized process chain.



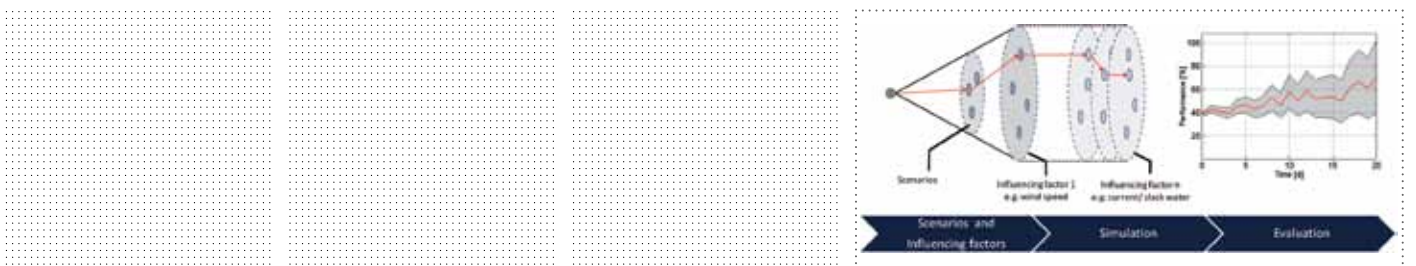


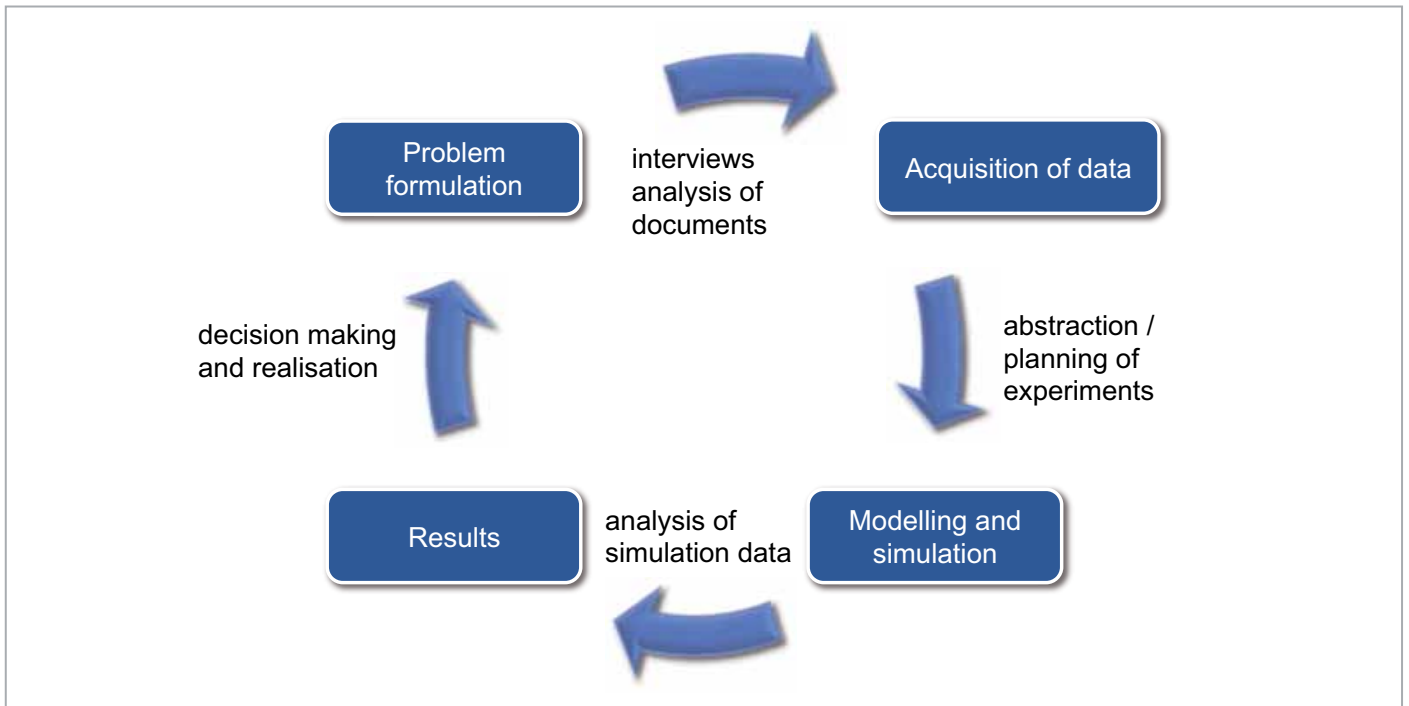
## OUR SERVICE: CONDUCTING SIMULATION STUDIES

Installing offshore wind farms is a highly complex undertaking and involves many risks and high costs. A key problem regards transportation of the components and optimal coordination of the processes, the required personnel and equipment taking into account the specific weather conditions. It must be guaranteed, e.g., that all components required for installation of one or more specific turbines are available for loading on board the vessel on schedule, and the forecast weather windows for installing the loading components can be utilized without risking abortion of the installation.

Innovative logistics concepts can contribute to reducing both risks and costs. To develop these logistics concepts, we employ simulation technology if required. So we can illustratively depict and simulate complex tasks through model generation. By generating different scenarios, it is possible to evaluate alternatives that significantly support decision-making efficiently.

We gathered lots of experiences with the planning of the Offshore Terminal ABC-Halbinsel where the storage capacity needed, the requirements according to heavy load suitability, the demand for the equipment etc. have been analyzed. We also offer to conduct simulation studies to support any port planning to third parties.





#### ★ IT-based planning with SIMTUL

As a rule, large components for offshore wind turbines are produced at different sites and transported to base ports, temporarily stored there as necessary and provided for installation at the wind farms. This results in a great need for transport, cargo handling and storage operations. To enhance the stability of the logistics processes and guarantee efficient use of the necessary resources, BLG uses the IT-based simulation tool “SIMTUL” for planning and managing individual processes. An exceptionally innovative feature of this approach is the consideration given to restrictive conditions like weather influences, tides and mutual dependencies of process steps. With SIMTUL it is not only possible to examine various studies in terms of a cost-optimized design of the logistics chain, but also to depict or plan and manage the complex processes within the logistics chain.





## OUR SERVICE: SYSTEMATIC ENGINEERING

The enormous dimensions of wind turbine components for offshore wind energy pose special challenges for logistics specialists and require a high degree of engineering know-how. Our first successfully implemented reference projects have demonstrated once again that we are able to master these challenges.

Our experienced engineering team also plans and develops tailor-made, holistically geared concepts for your needs.

Aside from technical elaboration of all transport, storage and cargo handling processes, our range of services also encompasses developing and producing warehousing, transport and support systems based on the modular principle as well as preparing method statements.

The services we offer are not only available as a package. You can also choose flexibly from our portfolio, we would be glad to perform the specific tasks for you.

$$S = \frac{863.000\text{kg} \times 9,81 \frac{\text{m}}{\text{s}^2} \times 10,64\text{m}}{\left( 863.000\text{kg} \times 0,1 \times 9,81 \frac{\text{m}}{\text{s}^2} \times 23,832\text{m} \right) + (762,9\text{kN} \times 23,832\text{m})}$$

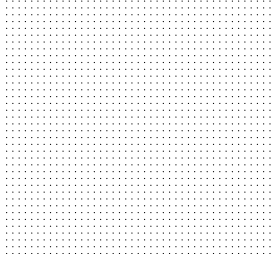
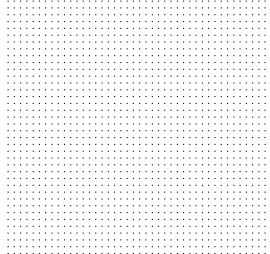
$$S = \frac{90.079\text{kNm}}{20.176\text{kNm} + 18.181\text{kNm}} = \frac{90.079\text{kNm}}{38.357\text{kNm}} = 2,35$$





### ★ Our range of services

- Examination, evaluation and calculation of quay, storage and cargo handling areas
- Development and production of storage, transport and support systems for optimized load transmission
- Development of grillage and sea fastening solutions for maritime shipments
- Trimming, ballast, stability and longitudinal strength calculations
- Preparation of method statements in accordance with GLND guidelines
- 3D motion analyses
- Stability studies
- Salsa 3D calculations for use of modular transporters
- Preparation of stowage plans and mooring plans
- Development of concept solutions for setting up construction sites
- Transport calculations
- Weighing large offshore components of up to 4,800 tons (regardless of location)





## OUR SERVICE: DEVELOPING AND IMPLEMENTING INNOVATIVE LOGISTICS CONCEPTS

Bremerhaven is the headquarters of well-known manufacturers in the offshore wind industry that were involved in setting up the first German offshore wind farms. We have developed individual innovative logistics concepts for them and implemented these concepts with our qualified staff and special equipment.

The first shipments from production to temporary storage all the way to handling on the installation vessel were pioneering achievements. In particular, our project managers found an optimum solution for the problematic interface between overland and maritime transport. The industrial processes created for all components are efficient and reproducible with the same level of quality, minimize risks and reduce costs on a sustained basis. Sample calculations made by BLG showed that the process chains developed with our innovations can achieve cost savings of up to 50% compared to conventional solutions.

You, too, can profit from our know-how. Just give us a call!





### ★ Special Pontoon OFFSHORE BHV 1

To transport heavy-lift components, a special pontoon was developed by BLG. The main characteristics are:

- Rapid loading and unloading
- The pontoon allows diverse uses, in particular transport of further large components for offshore wind farms
- Speedy retrofitting of the pontoon for different loading cases and operations at short notice
- An efficient ballasting system controls both the inclination of the pontoon and the load on the quay
- Operation in the entire North Sea / Baltic Sea is possible.

In addition, the offshore ports along the coasts of Great Britain, Ireland, France, the Netherlands, Denmark, Germany and other countries bordering the Baltic Sea can be served.

Among other things, the pontoon has a load securing system that eliminates the need for welding work, thus contributing to cost savings and at the same time protecting the environment.





## WINDENERGY LOGISTICS – OUR WORLDWIDE SERVICES

- ★ Setting up, organizing and operating terminals
- ★ IT-based port and logistics planning
- ★ Engineering
- ★ Developing and implementing logistics concepts

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Druck | ID: 11281-1405-1003