Background
A successful introduction of alternative energies in combination with a reduction of emissions in the transport sector is associated with a number of special challenges. These include calls for innovations in propulsion technology, infrastructure solutions as well as primary energy diversification for ship traffic within the trans-European transport network (TEN-V). Therefore, the focus of the Rivercell and BinGas projects is not solely on engine technology and the combination of energy, heat or cooling requirements but also on alternative fuels.

DNV GL contribution – Rivercell and BinGas projects launched
Rivercell is a project designed to meet the challenge of developing a fuel concept for power generation while reducing emissions through advanced technologies. The project identifies obstacles of potential users and barriers to creating first markets.

Furthermore, the joint project BinGas promotes innovative propulsion concepts through the development of technologies for the transportation of LNG on inland waterway vessels. The transportation of LNG at atmospheric pressure is conducted at temperatures below -161°C. This characteristic requires special technologies for the transportation of LNG on-board inland waterway vessels.
**Project results**
The Rivercell project, scheduled to complete in 2016, will develop a hybrid energy system concept consisting of fuel cells, gas engines, batteries and photovoltaic for inland waterway vessels. For the first time, a holistic energy concept is being developed and implemented which also integrates the power supply for propulsion. The fuel cell contributes in an innovative concept to the hybridization.

The construction of LNG-fuelled inland waterway vessels for the carriage of liquefied gases depends closely on the tank systems, which have been evaluated in detail within the BinGas project. For this new ship type, special attention is being paid to safety. In order to ensure a high safety level, potential hazards are investigated which might occur during transport or transshipment. The results of the safety analysis will be considered within the detailed development of the transport systems.

**DNV GL – a trusted project partner**

**Additional alternative energy services**
Backed by our expertise, particularly in LNG matters, we help companies and authorities to safely transport and utilize alternative energies as a source of clean, reliable energy in the maritime industry through a complete set of services:

- Qualitative and quantitative risk assessments for the use of alternative energies
- Assessment of regulations, rules and standards affecting the use of alternative energies
- Evaluation of alternative energy containment and distribution systems

We also serve the alternative energy industry by offering:

- Design review
- Approval in Principle
- Certification of materials and components
- Plan approval
- Newbuilding surveys
- Fleet-in-operation surveys
- LNG fuel supply chain and distribution assessments
- Development of site-specific LNG bunkering policies, practice procedures and recommendations
- Development of functional requirements for components and systems

**Transporting dangerous goods**
The European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways (ADN) covers the transport of dangerous goods on-board inland waterway vessels. The objective of the ADN is to:

- Ensure a high level of safety for the international carriage of dangerous goods by inland waterways
- Contribute effectively to the protection of the environment by preventing any pollution resulting from accidents or incidents during carriage
- Facilitate transport operations and promote international trade of dangerous goods

Currently, Table A of the ADN has been extended to enable the transport of LNG on European inland waterways.

In addition, a working group has been established to draft a guideline for the use of gas as fuel on-board inland waterway vessels. This guideline will be published as Annex T of the Rhine Vessel Inspection Regulations, most likely in 2016. DNV GL has actively participated in the revision of both regulations.

**FOR MORE INFORMATION, PLEASE CONTACT**

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