INTRODUCTION

This presentation will describe the way that Bureau Veritas (BV) is addressing innovative small-scale LNG projects, the process to assess them, and the regulatory framework as the base for the approval of new small scale gas distribution concepts.

The small-scale LNG carrier segment is evolving rapidly, driven by air pollution prevention regulations and agreements at international level (IMO, COP, etc.) and a variety of local regulatory policies. As a consequence LNG is increasingly taking a strong position as one of the more interesting environmental friendly solutions for power generation, industrial energy requirements and sea/road/rail transportation.

Innovative small scale LNG carriers are being designed with the ability to perform LNG bunker operations to meet demand for the delivery of LNG bunkers to ships. BV has been closely involved in providing technical support to help meet the demand for these small-scale LNG carriers for bunker use. BV has been involved with small-scale LNG carriers for cargo operations a decade or more and is leveraging this cargo experience for both bunkering and multi-purpose concepts. BV now finds itself in the position of class leader in the certification of LNG bunkering ships having developed specific requirements and having now classed several units of this type.

The option of multi-purpose gas ships to carry other gas or chemical products, including ethylene, ethane or LPG, in these LNG carriers provides additional operational and commercial flexibility to shipowners although this flexibility does require more complex cargo systems. Furthermore, the possibility to use LNG, LPG or LEG as a fuel on board of liquefied gas carriers will be feasible as the technology and regulations mature. Additional safety aspects for small-scale multipurpose gas carriers design should be obviously considered.

In addition, new revolutionary concepts for small scale LNG transportation by sea are being developed for containerized solutions and for multipurpose bunker fuel tankers - both in new build and conversion concepts. The containerized transportation of LNG is already well covered by international and classification regulations (e.g. IMO IMDG Code) and is already a reality for containerships involved in short sea shipping trades in Portugal and the United States, among other countries. Containerized LNG distribution has been used to create virtual gas ‘pipelines’ between the mainland and islands such as Madeira and Puerto Rico and there is a huge potential for this kind of transportation in the future in, for example, archipelagos - as in the Caribbean or in Indonesia. New hybrid concepts combining containerized and bulk LNG are being developed, introducing additional complexity to the design requirements and assessments. These brand new ship designs combine the transportation of LNG containers which are loaded on and off like any standard container, with the possibility to connect container racks into manifolds and load/offload the containers from shore.

Overall, this is an exciting area of development as the world seeks to efficiently distribute gas to meet the growing demand for gas with flexible solutions. BV will demonstrate how safety requirements have been addressed to date as well as introducing future approaches.

THE MODERN SMALL SCALE LNG CARRIER DESIGNS

Let’s first describe some trends and facts with regards to small scale LNG carriers and the status of class approvals.

Ships size

The LNG bunkering ship segment seems to follow the path of the heavy fuel oil (HFO) bunker maritime industry. For instance a typical size for an oil bunkering tanker is in the range of 5,000 dwt representing approximately a cargo volume of 5,000 m3. In case of switching into LNG as fuel we will need approximately to double this cargo volume to provide the same fuel autonomy.