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KEYNOTE LECTURE

Prof. Giorgio TRINCAS

University of Trieste, Italy



Title:

Alternative Methods of Maritime Transport of Natural Gas in the Mediterranean Sea

Abstract:

In the last decade, natural gas markets have attracted the attention of policy makers in the wake of the North American shale gas boom, the enormous growth in gas imports by China and, today, the effects of the war between Russia and Ukraine. All these factors confirm that natural gas plays an important role in current energy systems, covering more than 25% of global energy production.

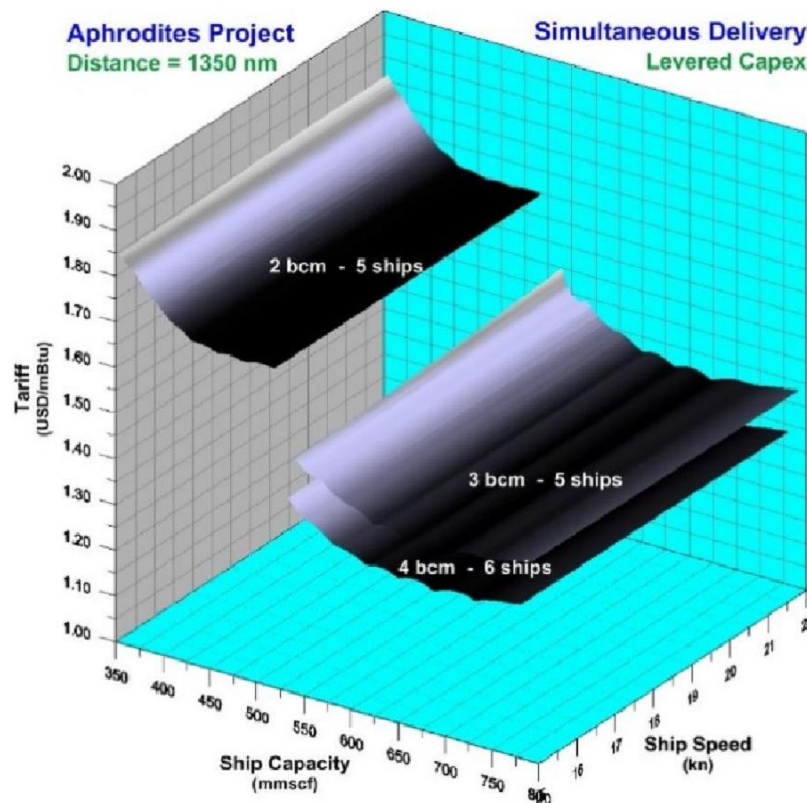
Liquefied natural gas (LNG) ships, although they appeared over 60 years ago, did not constitute a reason for big business until 20 years ago. It was gas take-off as a source of alternative energy to other more polluting hydrocarbons to push towards fleets of standardized LNG ships, with continuously increased capability and innovation in prime movers. It has been already demonstrated that the expected domain of the LNG market worldwide can only be challenged on the medium distances by the entry of the maritime transport of compressed natural gas (CNG). Nevertheless, when today the Russian taps to the west are closing, we wonder whether the import in Italy of natural gas available in the South-Eastern Mediterranean and Algeria can be economically convenient if performed with fleets of CNG ships as an alternative to LNG transport chains and/or submarine pipelines.



The strategical driver that makes it possible to integrate the conceptual design of CNG ships of different capacity with the optimal composition of the fleets which in turn depends on requirements from logistics, is presented. It consists in the total integration between the needs of logistics in given scenarios and the a priori availability of databases of CNG ships' conceptual designs optimized for different deadweight values.

Two Mediterranean scenarios of imports of natural gas to Italy are considered, namely, 8 billion cubic metres from Algeria to Tuscany and 10 billion cubic meters from East Mediterranean zones to Brindisi each year. Alternative modes of transport (LNG, CNG, partially submarine pipeline) are placed in competition, to confirm whether the statement made by most analysts is true, that is, LNG transport mode is successful over long distances (over 2500 nautical miles) and large volumes of gas; the submarine pipeline mode is successful over short distances (within 350-400 nautical miles); in the intermediate distances between 400 and 1000 nautical miles only the comparison between CNG fleets and marine pipelines makes sense.

This paper shows that the required freight rate in the transport chain and the total unit cost in the production/transport chain is lower for CNG trains than for LNG trains and submarine pipelines (Galsi from Algeria and EastMed from Israeli-Lebanon fields).



Bio:

Giorgio Trincas holds the Chair of Ship Propulsion and Ship Design at the Department of Engineering and Architecture, University of Trieste. He worked in Italcantieri (now Fincantieri) and Maierform (Geneva, Switzerland) in both as head of Software Development Department until he reached as a senior researcher the former Institute of Naval Architecture at the University of Trieste. In the 80s and 90s he established long-term research cooperation in ship hydrodynamics and ship design with many scientific institutions; among others University of Zagreb (Croatia), KSRC (Russia) and ICEPRONAV (Romania). He has received different honors, awards and appointments in France (ATMA), Russia (KSRC), Italy (University of Palermo), etc. As a professor, he has coordinated the final studies of hundreds of students and in recent years has participated in the initial design studies of hybrid vessels together with electrical engineering experts. His fields of interest can be summarized in offshore engineering, conceptual ship design, multicriterial decision-making methods, theoretical and experimental ship hydrodynamics (resistance and powering performance, seakeeping), ship resistance in level and broken ice. He is author/co-author of over 140 conference and journal publications. Finally, he has carried out and carries out professional activities as a consultant for design companies, offshore companies and shipowning companies.