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## The Feasibility of Transporting Natural Gas Around the Caribbean in the Form of Hydrates

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Trinidad has substantial natural gas (over 28 Tscf) but getting it to market is expensive. Pipeline and increasingly LNG are the accepted methods, with LNG becoming more viable with distance. Costs are commonly supposed to be reduced with size of LNG facilities. At the consumer end the infrastructure for handling such vast quantities of natural gas are also required. The Caribbean Islands may not have needs for such quantities of gas nor the capital to build the facilities, but there is a wish to generate their electricity by environmentally friendlier natural gas if at all possible.

A possible alternative is to use natural gas hydrate as the transport medium. Hydrate is the product of mixing liquid water with natural gas, particularly methane and ethane to form a stable snow-like substance. Mostly in the industry hydrates are a pipeline nuisance and safety hazard, and require considerable vigilance by the operators to ensure that they do not form. In this poster study we consider a potential beneficial use of hydrates developed by Professor J Gudmundsson of the Norwegian University of Science and Technology ([www.ipt.ntntu.no/~ngh](http://www.ipt.ntntu.no/~ngh)). Hydrate slurry can be formed by mixing natural gas and water at 80-100 bar and 2-10 °C. Here the natural gas hydrates (gas plus water) are refrigerated to around -15 °C and then kept in a 'thermos flask' i.e. at near adiabatic conditions where they will decompose only very slowly. The hydrate therefore remains stable making it possible to transport natural gas in insulated bulk carriers to

market. They yield about 180m<sup>3</sup> of gas at standard conditions from 1m<sup>3</sup> of hydrate. At the market, in this case some Caribbean island, the hydrate slurry is decomposed back to gas and water by controlled warming. This hydrate transport process is likely to be far cheaper for the islands than transport by pipeline or LNG.

The general process and relevant feasibility studies will be presented and discussed for a possible case in Jamaica.

### Key words

Hydrates, Natural gas transport, economics, Caribbean