

# ADRIATIC LNG PROJECT

## PROJECT DETAILS

<b>Location:</b>	Adriatic Sea, 15 km off the Italian Coast
<b>Completion Date:</b>	October 2009
<b>Contract Scope:</b>	Engineering, Product-supply
<b>Applications:</b>	LNG Tank Frost Heave Protection
<b>Technology:</b>	Skin-Effect Trace-Heating System



## KEY CHALLENGES

The Adriatic LNG (ALNG) Terminal, located approximately 15 kilometers off the Italian coastline in the Northern Adriatic Sea, is the first offshore Gravity Based Structure (GBS) for unloading, storing and regasifying Liquefied Natural Gas (LNG). The state-of-the-art ALNG Terminal facility was created to provide the gas market with a new safe and reliable source of energy. Inaugurated in October 2009, this facility more than tripled Italy's LNG import capacity with a nominal regasification capacity of 8 billion standard cubic meters per year or 775 million cubic feet per day. This represents approximately 10% of Italy's natural gas consumption, which in turn helps diversify and improve the national security of supply.

## SOLUTION

nVent analyzed all possible heating technologies to provide the 1.8 mw of heat necessary for the Frost Heave Protection required by the two massive LNG tanks aboard the GBS. The challenge was to provide the client with the highest performing and most reliable system at the lowest total installed cost. After all systems including constant wattage, self-regulating and skin-effect trace-heating were analyzed, the nVent RAYCHEM Skin-effect Trace-Heating System proved to be the ideal solution for this project due to its ability to provide the required heat reliably, safely, redundantly and all with the lowest installed cost. A significant factor in achieving all of these goals was STS's ability to provide the required heat with only 16 EHT circuits vs. 376 circuits with alternative technologies, and more efficient (10% kVA load savings while also reducing the required power distribution cabling by 87,400 meters. nVent also provided Fiber Optic Distributed Temperature Sensing (DTS) for precise temperature control, not available otherwise.

## PRODUCTS

To meet the needs of this challenging application, nVent offered a Heat Management System which included:

- Skin-effect Trace-Heating System (STS) Fiber Optic Distributed Temperature Sensing (DTS)

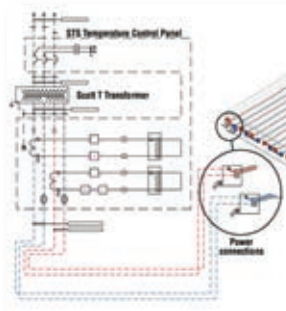
## BENEFITS

The Skin-effect Trace-Heating System establishes the conduit or "heater tube" as the primary heating element which offers the durability and ruggedness expected of a heater that is to be embedded in sand or concrete under or around a tank. Unlike the constant wattage or self-regulating heating cable based systems, the STS system can generate up to 90% of heat in the "heat tube" itself – not in its conductor. Due to having its heat

source in direct contact with a sand or concrete foundation and walls within the GBS, STS offered the most efficient heat transfer. STS was proven, via finite element analysis, to be the only system capable of providing the uniform heat required across all concrete walls to prevent stresses caused by differentials in temperature. Also by using the STS system, wall temperatures were maintained within 2-3°C to prevent boil-off of the refrigerated LNG. nVent was able to provide a 100% redundant system that would not allow any failed circuit to cause any two adjacent heating lines to fail, meeting the project goal of maximum reduction of risk to degradation of the maintain temperature.



Massive 160m x 39m x 33m LNG Tanks aboard the GBS



Engineering STS configuration to tackle the challenges of the Adriatic LNG

With decades of experience in designing, manufacturing and installing heat management systems, nVent was able to provide a comprehensive solution to the Adriatic LNG Project's unique needs, including a more reliable STS trace-heating system paired with fiber optic DTS.

nVent provides unique solutions for various applications and offers a full suite of optimization strategies customized for a given application resulting in the highest reliability and performance at a reduced CAPEX/OPEX for the project.

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