Case Study
LNG #25

Hub & Spoke
Virtual Pipeline

Highlights: Seven cities operate in a hub and spoke system. Single LNG liquefaction facility provides liquefied natural gas. LNG transport trailers deliver 18 loads for a total of 1,000cm (20 million SCFH) per day. Converting to natural gas is expected to significantly reduce overall GHG emissions of CO^2 per year.

Location — Northern Peru

Scope of Project:

- Site walks and recommendation feasibility of each remote location.
- Design, engineering and project management, overall and per site.
- Equipment supply for 7 regasification systems sourced from Chart's multiple global facilities.
- LNG transport trailers.
- Classroom and hands-on training for on-site personnel.

Application:

Providing natural gas to remote areas in Peru to supply 200,000+ homes and businesses. Peru is the site for South America's first LNG liquefaction plant. The production facility, exporting the cryogenic liquid for many years, now turned attention to using the virtual pipeline solution to provide access to natural gas where it wasn't previously available.

Project Background:

The Peruvian customer approached Chart as the LNG OEM single source supplier to provide equipment packages, commissioning and integrated customized solutions for 7 cities nominated for LNG regasification sites. Previous challenges to bring natural gas to these cities included inability to lay pipeline through mountains, jungles, deserts and distances. Each city required different flow and storage requirements. The parties agreed Chart would provide a base option per the specification document, as well as provide an alternative solution based on Chart's engineering know-how and long history of LNG.

System Configuration:

Each of the regasification equipment packages were individually designed for the 7 specifically chosen cities: Chimbote, Chiclayo, Trujillo, Huaraz, Cajamarca, Lambayeque and Pacasmayo.

- The storage ranged from $30m^3$ on site to $400m^3$ on site.
- Continuous average flow rate requirements ranged from 70 Nm^3 to 6,306 Nm^3.
- Each system designed and manufactured to support a 4-hour continuous maximum flowrate requirement, ranging from 257 Nm^3 to 13,500 Nm^3.
- Each location included LNG offload modules, pump skid modules, ambient vaporizers and final line pressure control assemblies.
- Sites meet NFPA59A code requirements.

Significant Accomplishments:

- Project completion for 7 remote sites was Q1 2018 through Q1 2019
- The access to natural gas providing significant economic and environmental benefits for Northern Peru cities and towns.
- The virtual pipeline network is a significant policy achievement for the broader issue of energy security and infrastructure diversity in Peru.