

## New-age Gas Infrastructure Will Help India Achieve Its Clean Energy Ambitions

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The future of India's energy sector and a large part of its economic development will be dominated by energy transition in the coming years, where conventional fossil fuels such as diesel and oil will take a backseat. Global environmental commitments and domestic regulations are pushing India to switch to cleaner and more efficient energy sources sooner rather than later, forcing us to put energy infrastructure at the top of the agenda.

Worldwide, natural gas has emerged as the fuel of choice to support the transition to a lower carbon future. Liquefied natural gas (LNG) is cleaner than other fossil fuels, competitively priced, available in abundance with commercially attractive terms and importantly, it is a suitable complement to renewable energies. Consequently, India, is actively pursuing opportunities to increase the share of LNG in its energy mix to meet rising power and other industrial demands across the country.

To meet the demand for natural gas, which is expected to grow at CAGR of 4.6%, India will need to ramp up imports. This necessitates the development of import and distribution infrastructure including new import terminals, adequate storage and regasification facilities, and distribution networks to deliver gas to the end-customer. But building this infrastructure is neither affordable, sustainable nor achievable in the short or medium term if a traditional approach to large-scale terminal development is taken. It is imperative for India to rethink its LNG supply chain, with an emphasis on building and operating more small- to mid-scale LNG import terminals and the associated onshore and floating supply chain infrastructure to provide off-grid, energy-hungry end-users with access to reliable gas supply.

### **Scaling energy infrastructure**

Technology will play a key role in designing the right LNG import and distribution infrastructure. For example, the design for the LNG terminal to be built inside the breakwater at Karaikal Port in southeast India has a unique, technology-driven configuration that uses standardized designs which eliminates costly bespoke engineering while allowing for scalable infrastructure that can be built modularly. This approach makes it significantly faster and cheaper to construct. The regasification terminal also has the flexibility to increase capacity on a fast-track basis and grow in line with the region's rising demand for gas supply. Further, the design incorporates offshore and onshore infrastructure, making best use of the deep-water location within Karaikal Port which provides all-weather operations, 99% availability and night navigation.

### **Reaching a wider base of customers**

A key part of developing the LNG market in India includes reducing the size of the equipment traditionally used in the baseload market. Building highly cost-efficient receiving terminals and break-bulk facilities, such as those proposed at the Karaikal terminal, is just the first step. Having smaller carrier vessels and LNG delivery trucks operating from these terminals to serve smaller customers in distant demand centers is the next critical step in bridging the supply-demand gap.

The carrier vessels of the future will need to be appropriately scaled to reach sites that are currently not accessible with traditional LNG carriers because it is physically impossible for traditional LNGCs to navigate through shallow waters. Similarly, fleets of efficient LNG trucks offer a fast, flexible and affordable way of delivering LNG to customers located hundreds of kilometers away from the import terminal. In the future, it is expected that fueling infrastructure, such as Truck Loading Facilities, will be installed at the Karaikal terminal, with trucks to be used to deliver gas quickly and cost-efficiently to customers within ~500 km radius of the terminal.

The benefit of innovative designs such as those outlined, is that they are entirely flexible, so they can be adapted to suit the site and customers' needs. From utilization of different regasification and storage technologies, to fleets of cost-optimized delivery vessels and trucks, the key is to be able to serve many clients with these site-specific, but at the same time standardized solutions. This enables costs to be reduced at every single point in the supply chain, which will reduce the final delivered price of tolled gas for the customer.

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