

THE ROLE OF HAZIRA TERMINAL IN NATURAL GAS DEVELOPMENT IN INDIA

**Nitin Shukla (Hazira), Sandeep Singla
(Shell) & Laurent Chaveron (Total)**



Table of Contents

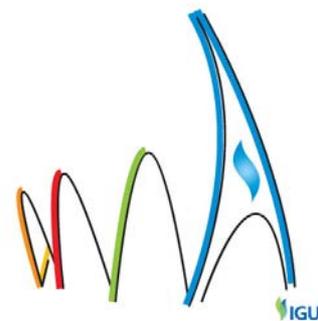
Table of Contents	1
Background	1
Aim & Methods	2
SAFETY	2
Road Safety.....	3
Process Safety.....	3
COMMUNITY WELFARE	4
Drinking Water	4
Environment Benefits.....	5
Polio Initiative	5
Conclusions.....	6

Background

We will like to start the paper with a story from India.

At 6.30 in the morning, the first rays of the new dawn are just breaking over the village of Hazira in the State of Gujarat on the Indian west coast, KantaBen wakes up paying her respect to the Sun God. After her daily customary offerings to the Sun God, she fires up the stove in her little kitchen and prepares the morning cup of tea for her family. Pouring warm milk to her cup full of boiling tea, she joins her husband, Satish Bhai, in the little porch of their newly built house. Settling into the chair, both KantaBen and Satish Bhai peer out to shores of river Tapti and feel proud of the journey their lives have taken.

Satish Bhai and KantaBen moved with their son, Kamlesh, to Hazira in 2002 looking for new means of earnings. Satish Bhai quickly found a job as a driver ferrying around construction materials to the port development site. Little did they know this little town and this port will become center of their lives. Satish Bhai retired a year ago and every time Kamlesh touches his feet to go for work as Senior Engineer at Hazira village, he cannot stop feeling proud of making the right choice in his life. This story is fictional but representative of a middle class family of India who has benefitted from the import of natural gas and infrastructure development in India.



Right from depending on the gas molecules that help make tea in the morning rituals to the number of jobs & capacity to increase employability that the liquefied natural gas (LNG) industry has created; such families are witnessing vast economic development first-hand.

The story of this economic development from LNG industry began with Shell Gas B.V (Shell) deciding to develop Hazira Port and build the Hazira LNG Terminal in the state of Gujarat. The terminal includes a liquefied natural gas (LNG) storage and re-gasification terminal within a fully functional port. The Hazira LNG Terminal and Port facilities, in Surat district of Gujarat, is regarded as a key foreign direct investment (FDI) project and represents one of the largest international investments in India in the green field energy sector.

The Hazira LNG terminal was the first to introduce spot LNG supplies into India. The Hazira LNG terminal operates and supplies LNG to a large number of customers in different industrial segments ranging from power to fertilizer, ceramic and steel, refineries to petrochemicals in large, small and medium industries.

The Hazira LNG and Port Terminal is now interconnected with the Hazira-Vijaypur-Jagdishpur line (HVJ), Dahej-Uran pipeline (DUPL), state-wide gas pipeline network of Gujarat State Petronet Limited (GSPL) and East West pipelines of Reliance, enabling energy access to millions of people across the whole of India. Currently, the Hazira LNG facility is a joint venture between Shell (74%) and the French major Total (26%) and is designed to provide up to 5 million tonnes per annum (mtpa) of LNG to millions of people in the state of Gujarat and beyond.

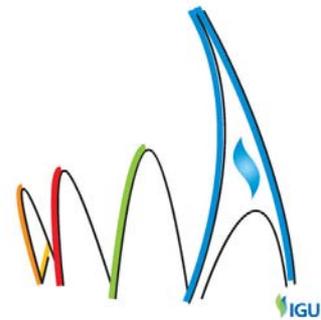
Aim & Methods

Safety and Community Welfare continue to be a core part of business principles which Hazira terminal operate by. It commits to contribute to Sustainable Development and the Sustainable Development Programme has a special focus on Hazira and its surrounding villages. Under the Sustainable Development Programme, the various activities are implemented in partnership with village institutions (Gram Panchayats and various village committees), non-governmental organisations (NGOs) and Government Departments.

With campaigns ranging from road safety awareness, , mangrove plantation, sponsoring local youth to premier training and capacity building centres, providing access to medical care via dispensaries to other social investment programs, deepening ponds and help providing potable water, Hazira terminal is a front runner in collaborating closely with the society it operates in.

SAFETY

The safety of its employees, contractors and neighbors is of paramount importance to Hazira. Hazira LNG and Port operations have clocked more than 16 million hours of operations without an accident in last over eight years. Hazira has been managing process as well as personal safety in a systematic way and introducing simpler and clearer requirements that are easier for people to understand and follow.



Road Safety

Hazira LNG and Port have been running multiple programmes on safety including road safety. Recently it launched a social investment project on road safety, collaboration among public, private and civil partners. The campaign aims to create awareness of the risks which lead to road accidents and how to stay safe on the roads among the local community, private vehicle owners and drivers.

Process Safety

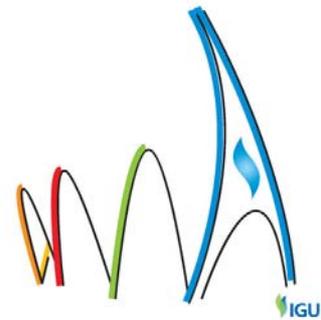
In addition to personnel safety, Hazira has been constantly improving in process safety. An example of this focus is a new system called Pipeline Intrusion Detection System (PIDS) which has recently been set up with worldwide experience sharing from shareholders. Hazira has a 14-kilometre high-pressure natural gas underground pipeline. The pipeline transports regasified LNG from the terminal to the metering station located in Mora. A major section of the pipeline passes through open land and is also very close to several industries en-route to Mora.

Catastrophic incidents can damage pipelines. The main risk is related to excavation on the pipeline by third parties. Hazira LNG & Port also faced similar risks when a third party initiated construction activity around the pipeline and drove piles into the ground. The team intervened at the right moment but recognized that pipeline damage due to unauthorized excavation remains a significant risk for the terminal.

This third party risk has been partly mitigated by setting up dedicated Pipeline Surveillance Team (PST) who conducts regular patrolling several times in a day. Other efforts were organizing awareness sessions for stakeholders and preparing a recovery plan with the local authorities. However, the "chronic unease" mind-set and its continuous focus on safety as a value, led Hazira to implement this PIDS technology.

A PIDS detects manual excavation, mechanical excavation, and personnel movement, heavy or light vehicle movement over and around the pipeline. The technology converts the fibre-optic cables, running along with the pipeline, into several thousands of microphones that detect activities happening on the ground above the pipeline. This detection is further processed based on requirements and to eliminate unwanted signals. Then the system sounds an alarm to the operator with the exact location of intrusion immediately and is routed to the control room. The control room deploys the PST who physically visits the incident location for inspection within 30 minutes. Thus, the activities on the pipeline can be monitored 24 hours a day, providing drastic improvement in the speed of detection and intervention.

A resident from Hazira village, who is very proud to see the technology working and keeping the villagers safe said, "Hazira terminal is one of the first sites in India to install this technology. Installation of PIDS system has helped Hazira in moving a step forward in managing the process safety."



COMMUNITY WELFARE

Hazira LNG & Port has also successfully launched and implemented various initiatives related to community welfare since its inception in 2005. Some of the key initiatives include:

Drinking Water

India's growing population is putting a strain on available water resources and many water sources are contaminated by sewage and agricultural run-off. Addressing the community's need for safe drinking water, Hazira LNG Terminal and Port supported the building of a Reverse Osmosis (RO) Drinking Water Plant for communities in Hazira village and other nearby villages.

According to the Sarpanch (Head of the Village Panchayat), this project has helped the village community by addressing a genuine problem by providing clean water at just four to six rupees (approximately 6-10 cents) per 20 litres.

In and around the Hazira village, there are large industries sharing space with rural clusters. The Hazira village has benefited from the surrounding industries in many ways, particularly in terms of access to better infrastructure. At the same time, there are also village issues to deal with, for example, inadequate sanitation facilities which subject people to various health risks such as malaria and diarrhoea. The drinking water supply comes generally through regional water supply schemes, wells, canals and tanks.

Hazira village does not have a local fresh water source, and the majority of the ground water sources have become saline due to the influx of saline water as it is located at the coast. Recognizing the community's need for safe drinking water, the Hazira LNG and Port supported the Village Panchayat (the local self-governance institution), to build the RO Drinking Water Plant, providing over 500 families in Hazira Village with safe drinking water every day.

The team at Hazira LNG and Port studied the issue and identified the community RO plant model as a solution. Hazira Village has a historic well, which is the source of raw water. The RO Plant was installed in a room, with RO water storage capacity of 4,000 litres. Each family is given a standard 20-liter water bottle which is exclusively used for collecting water from the RO Plant. Hazira LNG has replicated this successful model to three more nearby villages.

From other community projects in India, the team learned that programmes or facilities that were provided for free to communities were unable to continue in a sustainable manner and did not last very long. From the very start, they were clear that the solution had to be sustainable. Thinking through this challenge, Hazira LNG and Port took the lead to create a sustainable project design, strategy and execution. They initiated a "Pay and Use" model and drew up a "Water Distribution Norms and Framework." To ensure sustainability of the RO Plant, they designed it as a social enterprise, with a cost-recovery model. Hazira LNG



supported the infrastructure development, while the operation and maintenance is managed by the community. The villagers pay six rupees to fill one 20-litre water bottle, and an operator keeps track of the daily collection by the households.

Although this "Pay and Use" practice is not common in the rural communities, the Hazira LNG and Port team believed that if the need was genuine and the service truly benefited the community, they would accept such a model. Prior to implementing the norms, the team consulted and engaged the community to convince them of the benefits of the "Pay and Use" model. The Hazira LNG & Port team also received active support from a local NGO, Kantha Vistar Satatyapurna Vikas Samiti (KVSVS) and the Hazira Gram Panchayat (GP), the village-level institution, resulting in effective consultation with, and acceptance from the community.

The head of village said safe RO water helps in his digestion, as before that, he, like several others, was facing stomach problems due to the quality of drinking water.

Environment Benefits

The coastline – along the Hazira peninsula now – thrives with mangrove plantations. Mudskippers and crabs have flourished, and locals go there for their daily catch. Several thousand local residents benefit from the coastline restoration project. During construction of the terminal, the Hazira terminal decided to also help regenerate an area of 1,200 hectares in the peninsula. They worked with the government and local residents, as well as a local NGO.

Local residents were mobilised to help develop nursery for mangroves and then plant mangrove saplings, providing them with extra income. Since then, a green belt has grown around their village. The region has also experienced an increase in marine biodiversity, as fish, flora and fauna, have multiplied. Another 35,000 non-mangrove saplings and fruit-bearing trees were planted at the backyards of villagers' houses and in common areas like schools and cemeteries. Shrubs and plants were planted as fodder near mangroves to prevent cattle from grazing and destroying the vegetation.

"I am very pleased with the transformation which has been brought to my village," quotes a fisherman from the village that often goes out fishing along Hazira's coast. "There is more greenery and more livelihood opportunities. I am very satisfied with what has happened."

Polio Initiative

Hazira LNG and Port believes that it is vital to involve all stakeholders and work together with communities, in our stride toward a sustainable society and a better future for coming generations. Our aim for Hazira is to have a positive commercial, environmental and social impact.

Traditionally, India has been one of the global hotspots of polio. Polio is transmitted from human to human without an intermediary host and can be prevented by mass vaccinations.



The Government of India puts a lot of resources into polio prevention. As a private company, Hazira continues to support the immunization programme by helping to overcome challenges on the ground. For example, children are often missed during the vaccinations.

As part of this campaign, the India government has declared a dedicated day for polio vaccination which is called "Polio Sunday". During each round of polio vaccination day, Hazira helps to give polio vaccinations to all children under the age of five. On each "Polio Sunday", company staff stations themselves at each of the 20 to 25 booths to ensure children are not missed during the vaccination. Children are also mobilised from their respective homes/slums to the polio booth to ensure 100% coverage. Hazira LNG and Port supports every round of this campaign since last 13 years with the objective of immunizing the maximum number of children.

Before the day of the actual vaccination camp, staff volunteers go to shanties and residential areas asking people to come to the camp on the actual day. On the day of the camp, staff help to set up booths in remote corners, assist house-to-house administration of vaccine to reach out to all those who are missed. They also provide vehicles to ensure timely vaccine delivery and help attract children to the booths.

During the polio immunization camp, the team gives each child a small gift such as a packet of biscuits. The "Polio drop with Biscuit" approach attracted the children and generated awareness among the community. This has helped target most of the eligible children in a small window of time. Due to constrained manpower from the government and large migrant population, Hazira LNG has taken the initiative to add five more booths to include the entire project area.

Initially, there was lack of awareness on such vaccinations and there was low coverage. Parents and their children did not take this seriously and as a result around half of the eligible children were not immunized.

The Hazira LNG and Port team has taken the initiative to get more coverage by complementing the delivery system and has reached out to almost 100% eligible residents to be immunized in every round. In the last 13 years, more than 30 rounds of such vaccinations have taken place and they have covered approximately 90,000 children. No new case has been reported in last 5 [tbc] years. Hazira LNG has helped Gujarat to be one of the first Polio Free states.

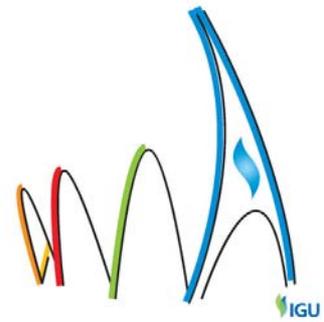
Conclusions

Natural gas has proven to be a cheaper, clean and efficient replacement to liquid fuels being deployed by many industries for their power requirements in India. The Hazira model has also demonstrated that fuel costs in various sectors such as power, industrial & transport can be reduced substantially when natural gas replaces liquid fuels such as naphtha and diesel. Furthermore, this helps India save billions of foreign exchange, contributing to a healthier economy.

WGCPARIS2015

WORLD GAS CONFERENCE

"GROWING TOGETHER TOWARDS A FRIENDLY PLANET"



26th World Gas Conference | 1-5 June 2015 | Paris, France

With increasing population, India requires increased access to natural gas. International Oil Companies (IOCs) like Shell and Total help connect India to the world for access to natural gas. With Hazira LNG and Port terminal as the gateway of natural gas in India, Shell and Total are enabling natural gas produced globally to find its way to stoves of millions.

However, this integration of energy demand and supply involves collaboration at various levels with consumers and communities. The Hazira terminal has demonstrated that challenges of diversity, multiple interests, and public acceptance can be resolved if stakeholders learn to respect and honor mutual interests. Hopefully, the paper has inspired more hands to join our movement of connecting the demand and supply globally.