

LNG INDUSTRY

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FROM TEXAS TO THE WORLD

Figure 1. A rendering of the Golden Pass LNG export project showing the future layout of the three liquefaction trains currently under construction at the company's Sabine Pass, Texas, US terminal.



Renwick DeVille, Golden Pass LNG, USA, provides an overview of the history of the Golden Pass LNG project and its impact on the LNG industry, the US, and the world.

Bringing clean energy from Texas to power the world is Golden Pass LNG's mission, and the company is on track to achieve it. When its first liquefaction train comes online in 2024, Golden Pass will begin sending clean, affordable LNG from the Texas Gulf Coast to customers around the globe.

Golden Pass LNG is actually a 15-year-old LNG import terminal and pipeline company that became commercially operational in 2010, just when the market

began its incredible transformation from energy shortage to energy abundance.

The US\$10 billion project, currently nearly two years into its five-year construction period, is poised for success. It will use existing storage and pipeline infrastructure constructed for the company's import terminal in Sabine Pass, Texas, approximately 20 miles south of Beaumont on the Sabine-Neches Waterway – one of only a few deepwater ports along the Gulf Coast

suitable for LNG carriers – and a junction of extensive pipeline networks that connect the area to gas fields across the country.

“It is incredibly exciting to bring this massive project to life,” said Sean Ryan, President and CEO. “This is truly a game-changing opportunity that will have a huge impact on the energy market and help the LNG industry reshape the US economy.”

LNG is a cleaner and more cost-effective fuel for consumers across the globe. The abundant supply of natural gas in the US has created an opportunity to boost the country’s economy and help improve its energy security. Companies like Golden Pass are helping to turn that opportunity into reality.

A world-class export facility

As demand for a cleaner, affordable energy source in the US grew in the early 2000s, Golden Pass LNG shareholders saw an opportunity to import clean-burning, environmentally friendly natural gas into the US to help meet that demand. By November 2003, the Golden Pass LNG import project was underway.

The terminal was completed and Golden Pass began importing natural gas in 2010, but soon advances in technology would unlock centuries of previously inaccessible shale gas in the US. This new and abundant supply brought with it a new challenge: converting Golden Pass LNG from an import terminal serving US consumers to an export terminal supporting US businesses. Golden Pass entered into its new phase in 2012: the Golden Pass LNG export project.

After completing engineering and design work and receiving export authorisation, Golden Pass shareholders (affiliates of Qatar Petroleum and ExxonMobil) formally green-lighted the export project with an investment decision in February 2019.

The project includes three liquefaction process trains, each with a nominal output of approximately 5.2 million tpy; associated treatment, power and utility systems; and interconnections to existing import facilities

and controls. Golden Pass and its engineering, procurement, and construction (EPC) contractor CCZ JV – a joint venture between Chiyoda International Corporation, McDermott International, and Zachry Group – broke ground immediately and continue to make progress bringing the new facility to life.

Under construction

Golden Pass is currently in the midst of a massive earthworks operation preparing its site for construction of its new liquefaction trains. The company is enhancing the facility’s storm protection levee system by raising its existing levee and adding five miles of new 20 ft levees – a process that is nearly complete. To support the facility’s foundation, crews are raising the site 5 ft using 100 million ft³ of fill – enough to fill the Houston Astrodome three times over. Piling activities are well underway, with 10 000 of 40 000 piles driven to date. The next steps include building and pouring foundations, structural work, and infrastructure development.

To help alleviate construction traffic on local roads, Golden Pass constructed marine offloading facilities to service the site. Dredging for the facilities provided considerable quantities of fill material that will help restore approximately 720 acres of wetlands across the nearby J.D. Murphree Wildlife Management Area, a home to migratory birds, aquatic wildlife, and thousands of other species. The team planted approximately 445 000 wetland grasses by hand in the area and is now kicking off a five-year monitoring plan to ensure the effectiveness of the marsh restoration efforts.

In spite of a collapse of the energy market, a global pandemic and two hurricanes, the project has kept more than 700 people working all year and is on track to bring Train 1 into operation in 2024.

In addition, the company has been successful in preventing person-to-person transmission of COVID-19 on site, as a result of early and rigorous safety protocols.

“Keeping a project on schedule is always important, but safety is Golden Pass LNG’s core value,” said Jacinta

Williams, Senior Project Manager responsible for the export project. “This year, that took on new meaning. Together, Golden Pass and CCZ JV have worked tirelessly and remain vigilant to do all we can to protect our workforce and our community from the impacts of the virus.”

There is still a great deal of work – and even more opportunity – ahead for Golden Pass. The next milestones in the construction process include piling and concrete work. In 2021, with foundation work in place, Golden Pass will start to erect structural steel, followed by piping, equipment installation, and electrical work. The final stages of the project will include



Figure 2. Crews lay foundation pads for the liquefaction trains and associated infrastructure under construction as part of the Golden Pass LNG export project.



Figure 3. The Golden Pass LNG terminal in Sabine Pass, Texas, seen from above. The existing site includes five LNG storage tanks with associated infrastructure for the company's original LNG import terminal. The company is now working to prepare the rest of its site and complete foundation work to begin constructing three liquefaction trains as part of the Golden Pass LNG export project.

instrumentation, painting, and insulation of process units and technology.

By the time Golden Pass reaches the commissioning phase, the project will have hired 200 new permanent employees, generated approximately 19 000 construction jobs, and created billions in economic benefits across the US.

A premier LNG exporter in North America

All of the hours worked and dollars spent – not just during construction but in the many years of planning that led up to it – will soon achieve their purpose when Golden Pass begins exporting natural gas, the cleanest fossil fuel, to growing markets across the world.

"When we are fully operational, we'll go from zero to 2.6 billion ft³/d in natural gas purchases and vault right up toward the top of the list of buyers of natural gas in the US for decades to come," Jeff Hammad, VP Commercial of Golden Pass LNG, said. "Securing those gas supplies is one of the major tasks being performed now by our commercial team."

Because Golden Pass has presold its entire future production to Ocean LNG, the company is focused on front-end gas purchases, the transportation of that gas to its facility, and the safe and efficient production of LNG.

A win for the community and the country

Golden Pass values its community, and it has had ample opportunity to prove it. While constructing the import terminal in 2005, the fledgling facility was struck by Hurricane Rita, which wreaked destruction across Southeast Texas, flooding homes and displacing thousands. It was then that employees say their co-workers became family: many rescued, assisted, or took in victims of the storm and many others were impacted themselves.

In the years since, Southeast Texas would be the stage for more disasters, and the company's resilience would continue

to be tested. Sabine Pass weathered Hurricane Ike in 2008 and Hurricane Harvey in 2017, and the company and its employees continue to help their community rebuild.

Community has always been and will always be a core value for Golden Pass LNG.

As part of its commitment, Golden Pass is working to ensure local businesses and residents share in the growth as much as possible. The project is expected to employ thousands during the construction process – over 7000 at peak – and generate thousands more in supporting industries. Once operational, Golden Pass will maintain more than 200 permanent jobs and support thousands of indirect jobs.

Golden Pass continues to work with its community and local leaders to prepare residents for that growth. Job readiness skills trainings, small business workshops, and partnerships with high schools are just some of the ways the company is working to maximise local access to project opportunities.

Most recently, the company committed US\$150 000 in process technology scholarships for high school graduates pursuing certificates at Lamar Institute of Technology and Lamar State College - Port Arthur. Golden Pass has also compiled a list of over 400 local businesses receiving priority consideration for work and initiated scholarship and workforce development programmes to help local business owners and residents prepare and qualify for work with the project.

Less than two years into the five-year construction phase, nearly 500 local residents working on project construction have earned a payroll of over US\$42 million, and the project has clocked over 5 million hours without a lost-time incident. The project has also awarded over US\$260 million to more than 155 local businesses for materials including aggregate, survey equipment, office furniture, trailers, safety gear and rebar, as well as services including: electrical work, equipment rentals, piping, and rigging.

According to a 2019 study, the project is also generating billions of dollars of economic growth and millions of dollars in taxes to local, state, and federal governments annually. Over the life of the project, Golden Pass LNG's investment will continue to drive billions in economic gains across the US and generate US\$5 billion in taxes for local, state, and national governments.

The Golden Pass LNG export project offers something for everyone: consumers across the globe get a reliable, cleaner fuel source; US businesses and citizens enjoy a stronger, more diversified economy and significant tax revenues; and the community of Southeast Texas continues to grow alongside its neighbour, Golden Pass LNG. **LNG**