



Qilak LNG

Frequently Asked Questions (FAQs)
(updated July 2020)

Company Information

1. Who is Qilak LNG?

Qilak LNG is a 100% owned subsidiary of Lloyds Energy, an LNG portfolio developer headquartered in Dubai. Qilak LNG formed in 2019 with the support of seasoned executive and former Alaska Lt. Governor Mead Treadwell, former BP Executive David Clarke, both Alaskans, and Stephen Payne, a Houston, Texas-based LNG industry expert. Qilak's goal is to develop LNG direct export opportunities in the American Arctic, beginning with the North Slope of Alaska and the Mackenzie Delta of the Northwest Territories.

The name Qilak, suggested by a North Slope whaler, is an Inupiaq word meaning “sky, ceiling, or firmament.”

2. Who is Lloyds Energy?

Lloyds Energy is a Dubai based LNG developer, established in April 2013, which operates in three distinct business divisions: near-shore LNG with gas sources on several continents; floating receiving and regasification terminals in Europe and the Indo-Pacific region; and global sales and trading.

3. What are Lloyds Energy's qualifications to develop Arctic LNG?

Lloyds Energy has extensive experience in all aspects of the LNG value chain, from LNG project development and construction to finance and LNG trading. Many of the staff have had long careers with major O&G companies, including Shell, ExxonMobil, ConocoPhillips, Chevron, BP, and Rosneft, and with trading and finance companies such as Gunvor and Deutsche Bank.

The Alaska team has been involved in Arctic oil and gas development and have extensive experience supporting Alaska's trade and US security relations in Asia, infrastructure finance, Arctic cooperation and development of safe Arctic shipping.



Gas Liquefaction

4. What is liquefied natural gas (LNG)?

Liquefied natural gas (LNG) is natural gas that has been cooled to a liquid state at about -260°F (-162°C). This reduces natural gas to $1/600^{\text{th}}$ of its volume in its gaseous state, allowing it to be transported and stored much more easily.

5. What development concepts are being considered?

Qilak is currently considering three distinct development concepts for a near-shore liquefaction plant (NSLNG). The first option would place a large Gravity Based Structure (GBS), at a location offshore Point Thomson, that will accommodate liquefaction, storage and offloading (similar to the recently sanctioned Arctic LNG 2 project in Russia). The second option would build an ice resistant harbor located about 6 miles offshore that accommodates the NSLNG plant and will provide sheltered LNG loading. The third alternative under consideration is to mount a liquefaction plant on a grounded barge next to an offshore barrier island (similar to the Snohvit LNG project in Norway and the Seawater Treatment Plant at Prudhoe Bay). The final concept may well be a hybrid of these 3 basic concepts that takes the best features from each. The location for each of these options would be chosen after extensive review of ice conditions, water depth, cultural resources, sea bottom conditions, wildlife habitat, and consultation with North Slope residents, including subsistence hunters.

6. What is NSLNG?

A Near-Shore Liquefied Natural Gas (NSLNG) plant is a gas liquefaction facility that is built under controlled conditions in a shipyard and floated to a location offshore that has sufficiently deep water to allow loading of deep draft LNG carriers. It is differentiated from a Floating LNG (FLNG) facility in that it is located in relatively shallow water near to shore, rather than in deep water many miles from shore.

It is not a new concept: ARCO did an extensive study of the concept for Prudhoe Bay in 1984. Since then LNG carrier technology has advanced considerably and the ice conditions are now much less severe.



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7. What advantages does NSLNG have over the Alaska LNG concept?

The Qilak NSLNG project has a number of advantages compared to the Alaska LNG project;

- a long and expensive overland pipeline is not required to get the gas to an export port
- the NSLNG facility can be built in a shipyard under controlled conditions, minimizing the risk of cost overruns and construction delays
- the liquefaction process will be much more energy efficient due to the colder ambient temperatures in the Arctic
- as a long-distance overland pipeline is not required, the project will have a smaller environmental footprint and hence a less complicated permitting process.

8. What LNG capacity does the project have?

The project will have a minimum capacity of 4 mtpa. Gas that is available from the Point Thomson owners and from other fields in the area could allow capacity to be increased up to 8 mtpa. Once the concept is proven to be both technically and economically feasible, there is an opportunity to use an identical concept in the waters off Prudhoe Bay and the Mackenzie Delta. Lloyds Energy's philosophy is "design one, build many."

9. Are there any similar projects?

In many ways this project will be very similar to Novatek's Arctic LNG Project on Russia's Yamal Peninsula in that it will use the same type of ice breaking LNG carriers. The main difference is that Qilak will have a much shorter distance to travel through ice to get to ice-free waters in the lower Bering Sea and North Pacific Ocean (approximately 600 nautical miles compared to 2,600 nautical miles). A second Novatek project, Arctic LNG 2, will use large gravity-based structures located near shore to support the gas liquefaction plants. While Russian gas has beaten Alaska North Slope gas to the market, sailing right past Alaska, Qilak has the opportunity to learn from Russia's experience on what works and what doesn't.

10. Where will the LNG facilities and LNG carriers be built?

It is most likely that both the LNG facilities and carriers will be built in South Korean, Japanese, or Chinese shipyards, which have experience with similar projects and where costs are competitive. The Maritime Administration (MARAD) currently estimates that the



capital cost of building the LNG carriers in a U.S. shipyard is 4 times higher than in a foreign shipyard.

11. When is first production?

The first step is for Qilak to complete a more comprehensive series of feasibility studies which will start in the third quarter of 2020. This will be followed by Front End Engineering Design (FEED) achieving a Final Investment Decision (FID) targeted for 2023. Construction is expected to take 42 to 48 months achieving startup in 2027.

Social

12. Will the project supply gas to Alaskans?

The Qilak team is investigating methods to deliver LNG to Alaskan coastal communities, perhaps in ISO containers or brought ashore by barge. The increasing need for marine vessels for LNG bunkering fuel has caused many worldwide ports to take on LNG receiving and storage capability to allow LNG to replace diesel and heavy fuel oil in powering ships. That trend many expand demand for and availability of LNG throughout Alaska. LPGs (propane and butane) may also be available for delivery by truck directly from the North Slope. The Qilak team will work closely with the State of Alaska as well as local communities on these and other potential in-state uses.

13. How many jobs will be generated for Alaskans?

Qilak LNG will generate both direct and indirect construction and operating jobs. Offshore construction could be expected to provide 200 or more Alaska jobs in laying subsea pipelines and installing the NSLNG facilities. Operationally, approximately 200 new Alaska jobs will be created either on the North Slope or in Southcentral Alaska. Workers will also be employed indirectly for construction of the Point Thomson gas handling expansion project and the gas treatment facilities which will most likely be onshore.

14. How will the project benefit Alaskans?

The project will benefit Alaskans in multiple ways. First, the State of Alaska will be able to sell its share of royalty gas, at least 70 million feet per day, which could net the Treasury



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and the Permanent Fund an estimated \$25-50 million per year. Second, the project will allow the condensate production from the Point Thomson field to be increased 3-fold which will bring additional royalty income from an additional 2,500 barrels of royalty condensate daily, perhaps \$50 million annually estimated receipts after transport costs. The condensate from Point Thomson is much lighter than the typical oil produced from the Prudhoe Bay Area and is thus beneficial to the flow of oil through the Trans Alaska Pipeline (TAPS). Additionally, this incremental 20,000 barrels of condensate will help prolong the overall life of the TAPS pipeline. The overall development onshore and offshore will produce additional corporate and ad valorem tax revenue to benefit both the State of Alaska and the North Slope Borough.

Shipping

15. Will the project be able to export LNG year-round?

Qilak plans to export LNG year-round using ice breaking LNG carriers, specialized vessels with an ice breaking stern and a more conventional bow. The Russian company Novatek has contracted 15 of these vessels for their Yamal LNG project and will be ordering an additional 15 or so vessels to support the development of their Arctic LNG 2 project.

16. How often will LNG carriers transit the route?

With an LNG production rate of 4 mtpa, LNG carriers, each with a capacity of 172,600 m³, would be expected to load a cargo every 6.5 days. At higher LNG production rates, the cargo frequency will increase accordingly.

17. How many ice breaking LNG carriers will be required?

The number of required vessels will depend on three factors: first, the LNG production rate; second, the distance to the market (Tokyo, at 3350 nm, will need fewer vessels than a more distant port, such as Manila); and third, for longer transit distances Qilak will consider the option of transshipment, where the cargo is transferred into non ice-class LNG carriers for the ice-free portion of the journey as they are less expensive to operate.

Potential transshipment locations have not yet been identified, but Russia has announced plans for a transshipment site at Petropavlovsk in Kamchatka. A location in the US, such as Dutch Harbor, would be optimal, but may not be allowed to receive gas from vessels



that are not compliant with the Jones Act. This project will likely require four to ten new icebreaking LNG carriers.

18. Will the LNG carriers need heavy ice breaker support?

Operating experience from the Yamal project's icebreaking LNG carriers has exceeded expectations and they have successfully broken through thick ice ridges unassisted. The most severe ice conditions along the route from the North Slope are expected to be off Point Barrow, where two sea currents collide causing ice ridges to build up. Qilak has taken a conservative approach and assumed that, if required, a USCG or commercial heavy-duty ice breaker, will be on location to assist the vessels transit Pt. Barrow. Additional ice breaking vessel support will be needed at and around the Qilak LNG offloading terminal to assist with vessel approach and docking operations.

19. Will the new USGC Polar Security Cutters be available to assist the LNG carriers?

This is an excellent question. The USGC has under order the first of six new \$675 million-dollar heavy-duty ice breaking polar security cutters, which will replace the forty-year-old Polar Star and Polar Sea. The first polar security cutter is scheduled for delivery in 2024, with the second and third vessels scheduled for delivery in 2025 and 2026.

Under the USCG charter, the USCG is mandated to assist commercial shipping. However, to date there has not been a need to test this mandate. Senator Murkowski (AK), Senator Dan Sullivan (AK), and Senator Angus King (ME) have introduced the Shipping and Environmental Arctic Leadership (SEAL) Act, which develops a concept dubbed "Uber for icebreakers." It would create a development corporation that would set up a system for contracting with the USCG and private US fleets and working with foreign icebreakers. The idea is similar to the St Lawrence Seaway System. If enacted, the SEAL Act would establish an Arctic seaway development corporation that would help provide additional icebreaking capability in the Arctic Ocean.

20. What are the pollution risks from LNG transport?

The risk of pollution is small. LNG carriers are dual fuel and are primarily powered by the gas that boils off (BOG) from the LNG in the storage tanks. They carry limited quantities of diesel for pilot fuel and emergency operations, but no heavy oil. The LNG cargo will vaporize in the event of a spill and have no impact on the marine environment.



21. Is transporting LNG dangerous?

LNG has been safely transported around the world by ship and truck for more than fifty years with an outstanding safety record. Over 300 million tons of LNG was delivered worldwide last year. Highly regulated safety systems are mandated by maritime law and insurers. LNG itself is actually safer to handle than many other fuels. It is colorless, odorless, and non-toxic. In its liquid state, it is not flammable; when released as vapor, it dissipates in the air, and cannot explode as readily as propane vapor can. While the vapor is flammable, it requires high heat (approximately 1000°C to ignite, compared to 550°C for propane and 300°C for diesel). Even when it does burn, it produces what is known as a “lazy flame,” burning more like a candle than an explosive gasoline flame.

Ecological and Environment

22. How will the project be permitted and how long will it take?

The project will require permits from the North Slope Borough and multiple state and federal agencies. An Environmental Impact Statement (EIS) will be written for the project by a federal lead agency with participation from local, state and federal agencies, state and local governments, tribal governments, and the public. As the project proceeds to complete its proposed siting and optimized configuration, an EIS schedule will be announced. Depending on location and gas sources, FERC, MARAD, and BOEM all have potential oversight for this project.

23. Why not leave the gas in the ground to avoid global warming?

Qilak is targeting niche markets in Asia which are interested in switching from coal to gas for heating and power generation. Natural gas reduces the carbon footprint by 50% compared to coal. It is also much cleaner allowing Asian countries to reduce particulate pollution and clean up their air. New technologies in development are also allowing carbon capture and sequestration at the point of gas consumption. The Alaskan North Slope is much closer to Asian markets than other North American or Middle Eastern LNG suppliers and consequently the carbon footprint from shipping will be lower.



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24. What about Subsistence Activities?

Qilak will work closely with the North Slope Borough, local communities, the Alaska Eskimo Whaling Commission (AEWC), the Marine Mammal Commission, and marine mammal co-management groups to ensure that the Qilak LNG 1 development is done in an environmentally sensitive and safe manner that also minimizes disruption to marine mammals and subsistence activities. Qilak will select an offshore location for the gas liquefaction facilities and also plot the shipping routes of the LNG carriers to avoid interference with subsistence activities. It is likely that the LNG carriers, after they load up, will travel north away from Point Thomson before turning west keeping them well away from the Northern coast of Alaska. Ship tracks and speeds will be carefully chosen to avoid interference with seasonal migration and hunting in the Beaufort and Chukchi Seas and in the Bering Strait.

25. Are there any areas that will be avoided along the shipping route?

There are currently no restricted areas along the route from the North Slope to Asia that we know of. However, Qilak will fully comply with any future restrictions that may be designated, for example, the IMO may designate “Particularly Sensitive Sea Areas”(PSSA), which place limits on vessel traffic; and the USCG may identify Areas to be Avoided (ATBAs) in order to reduce ship strikes with marine wildlife.

Markets

26. What is the projected future demand for LNG?

LNG trade grew by 12.5% in 2019, reaching 359 mtpa. A record of 40 mtpa of new supply was added to the market on 2019 and it was also an exceptional year for new projects with some 71 mtpa achieving financial approval. Even with the new projects projected to come online Shell projects a need for additional LNG liquefaction capacity after 2025. Qilak is ideally placed to capture this increased demand.

Shell predicts that global LNG trade will double to 700 mtpa by 2040. Asian markets are expected to account for three-quarters of the growth in LNG demand over this period and China and India are only part of that story.



27. Where are the LNG markets?

Qilak is looking exclusively at Asian markets where the company can operate competitively, given the lower shipping distances from the North Slope. Qilak's parent company Lloyds Energy is currently working on several offtake agreements in China, Japan, Philippines, South Korea, and Vietnam to supply LNG, regasified gas and electric power.

28. How can Qilak contribute to the transition to a lower-carbon energy system?

LNG will continue to play an increasing role in the global transition to lower-carbon energy systems. Over the next few decades renewable energy sources such as solar and wind are likely to gain market share, however, there are likely to be significant sectors of energy demand that cannot be easily electrified. Consequently, natural gas is seen as a bridge fuel from oil and coal as it is significantly more environmentally friendly in terms of emissions of greenhouse gas and particulate matter.

Finance and Costs

29. How does the development cost compare to Alaska LNG?

The development costs are estimated at about two-thirds the cost of Alaska LNG per tonne of LNG produced. The savings are primarily due to not having to build a long-distance pipeline. It is less than 10 miles to get to the near shore location for the gas liquefaction plant offshore Pt Thomson compared to 800 miles for the Alaska LNG pipeline to Nikiski. The unit costs per million standard cubic feet (mmscf) of gas for treatment and the liquefaction are expected to be similar for the two projects. We are estimating a development cost in the range of \$1,200-1,400/t compared to the latest quoted cost of \$1,935/t for Alaska LNG. We expect to build the liquefaction plant in a shipyard where it is possible to get a fixed price; as a result, the costs are likely to be much more predictable than for a long-distance pipeline, with reduced risk of a major cost overrun.

30. Can Alaskans invest in the Project?

Qilak LNG will be structured so that major investors can take a stake in the project. In addition, there may be the opportunity for Alaskan companies and Alaska Native Corporations to own and operate parts of the infrastructure.



31. How will the project be financed?

Qilak is in discussions with infrastructure investors, sovereign lenders and construction and engineering firms conglomerates that are keen to get involved in the project at an early stage to fund it through the Final Investment Decision (FID). Once FID is achieved, Qilak expects global infrastructure capital to provide funding for construction. Qilak does not anticipate and is not requesting any funding from the State of Alaska.

32. Alaskans have seen many attempts to commercialize North Slope gas. Why should they believe it will be different this time?

Past efforts to monetize Alaskan gas have all required construction of a long-distance pipeline to markets in the Lower 48 or to an ice-free port. Large offtake quantities were necessary to cover high capital costs. Ultimately, high cost mega projects are not competitive with projects fortunate enough to be close to markets. Qilak LNG can begin with just 4-8 million metric tons of annual offtake, much less than other projects have required. Furthermore, shipping costs and distances from the North Slope are competitive with other sources of gas headed to the same markets from the Russian Arctic, the Middle East, Australia and the Gulf of Mexico via the Panama Canal.

33. When is the optimum time to export gas from the North Slope?

North Slope oil fields currently recycle any gas that is produced with liquid hydrocarbons. The recycled gas maintains reservoir pressure and allows additional liquids to be produced. When fields reach a certain level of maturity there comes a point where the gas is as, or more valuable, than the remaining liquids, and thus it makes sense to sell it rather than recycle it.

For more information contact:

Porcaro Communications
media@qilaklng.com
+1 907-276-4262