

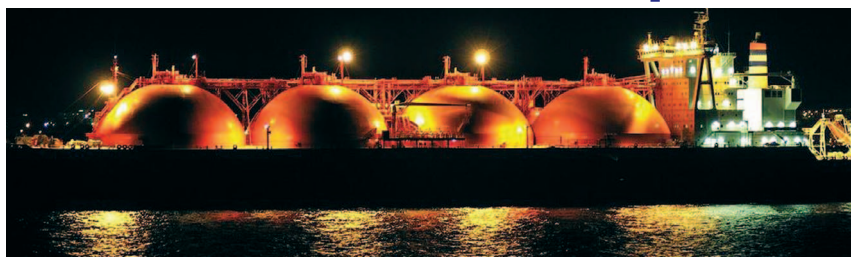
LNG *North America*

A MONTHLY LNG JOURNAL PUBLICATION

June 2014

How much room is left for U.S. LNG exports?

With a flurry of liquefaction projects coming to market in Australia and ample supply from Qatar, global gas markets are expected to accommodate only up to 7 billion cubic feet per day (Bcf/d) of LNG exports from the United States. Analysts call the situation “a classic overbuild on the part of the industry.”



Added liquefaction capacity throughout the globe could have a dramatic effect on prices in the Pacific Basin and help break the predominant link to oil prices in Asian LNG contracts.

“With all of those volumes, there will have to be downwards pressure on price to probably get



sufficient demand to buy up all of those volumes. The US is likely to be swing producer - as the exports are going to be sensitive to the Henry Hub price and the level of exports will in itself have a big impact on Henry,” Tevor Sikorski, lead analyst at Energy Aspects told

LNG North America.

Around 10 Bcf/day of proposed U.S. liquefaction projects have government approval to export to non-free trade agreement countries, such as Japan and China.

Demand for up to 10 Bcf/d of North American LNG

The start-up of the Sabine Pass terminal has been pushed back to Q1 2016 so the 10 Bcf/d of U.S. LNG is expected to come to market after 2020, but Bernstein Research forecasts there will merely be demand for 7 Bcf/d of U.S. export capacity and 2 to 3 Bcf/d for Canada, particularly as the U.S. gas' price advantage dissipates when liquefaction and ship-

ping costs are added.

“Currently approved capacity exceeds our forecast, and timely start-up of projects would provide upside potential to export volumes,” Bernstein analysts said in a report. Members of the House Energy and Commerce Committee just passed a bill that speeds up the approval process for U.S. LNG exports.

Though Energy Aspects' Sikorski also expects “an oversupply of LNG relative to demand” in the near future which will lead to “some price reductions and some supply cuts”, he is more upbeat for the mid-term future, suggesting “more investment in regas-supply will eventually create its own demand.”

U.S. LNG at \$12/MMBtu - “a bargain for Asian buyers”

Gas exported from the United States is forecast to price into Asia around \$12/MMBtu - assuming Henry Hub reaching \$6 when the U.S. starts exporting in earnest, + \$3.5 liquefaction charge + \$3 shipping costs – “Seems like a bargain to most Asians,” Sikorski commented.

Competition for U.S. exports comes from down-under: “Australian LNG projects are high in Capex but relatively lower variable cost so they could try and price U.S. projects out, but they want high oil-indexed prices to pay for all that Capex,” he said.

continued on page 2

Cutting costs through floating projects – Excelerate's Lavaca Bay LNG

Floating liquefaction can outcompete land-based structures on cost. Lavaca Bay LNG – the first floating liquefaction, storage and offloading units (FLSO) facility in the United States – will come in between \$600 and \$650 per tonne of LNG production, according to Excelerate Energy CEO Rob Bryngelson, which compares favourably to costs for onshore liquefaction units of up to \$2,000 per tonne.

Speaking to *LNG North America*, Bryngelson stressed the cost estimate for the Lavaca FLNG project would include all onshore work, dredging activities, and related costs.



Rob Bryngelson

Onshore liquefaction projects vary greatly in costs - contrary to more standardized

FLNG projects - depending on location and whether it is a greenfield or brownfield project. Australia's Gorgon LNG projects particularly suffered from cost overruns and will now cost around \$54 billion, up from \$37 billion when the project was first sanctioned.

Waiting for non-FTA authorization

Though Excelerate already got ap-

proval from the Department of Energy (DoE) to export LNG to countries with which the U.S. has a Free Trade Agreement (e.g. South Korea), project partners are still waiting for non-FTA authorization which would allow exports to lucrative Asian markets such as Japan, China and India.

“At present, we are third on the DOE review list with Oregon LNG and Cheniere's Corpus Christi

continued on page 2

AGENDA

POLICY & REGULATION

Congress backs bill to speed-up approval process **3**

PROJECT FINANCE

ArcLight's funding helps Louisiana LNG stay on track **4**

TERMINAL CONVERSION

Cameron LNG – seamless switch from import to export **5**

MARKETS

South Korean buyers keen on Henry Hub-indexed LNG **6**

U.S. LNG exports help ease Gazprom's grip on Ukraine **7**

SPOTLIGHT ON CANADA

Race between Shell and Petronas to take FID on BC's first project in 2014 **10**

continued from page 1, top story

Qatari volumes coming to market are well placed to “survive any coming over-supply”, according to Sikorski as these projects have a significantly lower Capex than Australian projects and very low-cost feedstock. “They could probably make money below \$10/MMBtu and should find a market either in Europe or Asia if sellers are ready to compete,” he said.

For U.S. LNG supply to find a home in Europe, sellers would need to be ready to accept a price around \$11/MMBtu, assuming shipping costs of about \$1.5/MMBtu. “Russia could price them out but the Russians tend to think about price first and market share second,” Sikorski said forecasting Russia will ultimately become a swing producer for gas supply to

Europe though Gazprom aims to continue export gas at oil-indexed long term contracts.

Weak margins for U.S. Gulf Coast exports

Starting from 2025 the gas price differentials between the North America and Asia will be comparable to the cost of trade, undermining the economics of U.S. LNG exports, forecast Kenneth Medlock, researcher at Rice University, suggesting operators might slow down the pace of adding liquefaction capacity. “The capacity that’s added will result in a price impact in the Asian market that’s pretty dramatic,” said Medlock said in a conference call. “Not until a decade later will prices settle in.”

New export projects in the U.S., Australia and North Africa are expected to increase global LNG supply by 30% over the next three years. However, weak margins for supply from the U.S. Gulf coast are forecast to put a lid on growth.

“We do not believe the landed price of long-term US LNG will be significantly lower than \$14/mscf in Asia, which is not substantially cheaper than the long-term oil-linked contract prices,” analysts at Bernstein Research said. All-in, U.S. gas is seen having a \$1/mscf price advantage in Asia, \$2.50/mscf advantage for European destinations, and roughly \$3/mscf advantage if shipped to South America.

The cost of delivery to Asia is expected to reach \$14/MMBtu, de-

livery cost to Europe is estimated at \$12.20/MMBtu and to Latin America at \$11.70/MMBtu.

IOCs in best position to cope with high project costs

Exacerbating the high costs for liquefaction and shipment are upfront capital costs for infrastructure and regulatory hurdles which will likely hamper all but major international oil companies (IOCs) from entering the market.

Despite a growing list of potential North American LNG exporters, only a small number of proposals are likely to come to fruition. “We believe that by 2020 only 3-5 terminal sites will be in operation or about 50 [mt/year],” the Bernstein report said. ■

continued from page 1

project ahead of us. We are hopeful that we will see our authorization come late this summer or early fall,” Bryngelson said, stressing “In spite of this delay, we are progressing the FERC process and advancing the project on all fronts.”

First FSLO should be in service in early 2019

Provided FERC approval for the construction of the terminal will be given in the first half of 2015, Excelsite is scheduling to have the Lavaca Bay LNG project in-service by the first part of 2019 with an initial 4.4 mtpa nominal capacity.

Excelsite Liquefaction Solutions (ELS), a subsidiary of Excelsite Energy, has filed an application to FERC to construct and operate two floating liquefaction, storage and offloading units (FSLO) and related facilities to be located in and around the Port of Lavaca-Point Comfort, Texas. In addition, ELS has filed to construct a 29.5 mile, 42 inch diameter natural gas pipeline, to transport gas from interconnections with existing pipeline systems to the terminal for processing, liquefaction and export.

Once fully operational, the 2-train FSLO facility will have a total peak production capacity of more than double its initial capac-

ity. “We are permitting with FERC and seeking authorization from DoE for up to 10 mtpa of exports to account for our ability to have a second FSLO at the project, and the fact that the vessels are likely to produce over their nominal capacity,” Bryngelson said.

Advancing talks with potential buyers

Keen to market its LNG prior to the operational start-up of the Lavaca Bay FSLO, Excelsite Energy has been in discussion with potential buyers for quite some time. “We have executed heads of agreement with multiple counterparties and are now negotiating

definitive agreements,” he said, outlining “In these negotiations, Excelsite is developing not only tolling structures, but FOB and DES deliveries as well.”

For tolling customers, Excelsite will offer a tolling rate that is fixed over the life of the project with some escalation to account for inflation on operating costs. For FOB and DES LNG deliveries, it is discussing indexation to Henry Hub as well as to other relevant market indices.

Gauging the competitiveness of U.S. LNG exports

As more of North America’s shale gas bounty gets exported, Henry

Hub prices are forecast to rise to \$6/MMBtu.

Asked if US LNG based on a higher Henry Hub price, and considering costs of liquefaction and shipment, will be attractive compared with oil-indexed Australian LNG, Bryngelson said: “Our view is that US-sourced LNG, whether indexed to Henry Hub or other relevant indices, will be a competitive alternative in both the Pacific and Atlantic Basins.

“It also provides much needed diversification to 100% oil indexation for end users.”

Excelsite does not keep all its eggs in one basket. Apart from floating liquefaction project at Lavaca Bay it has more than 25 floating regasification projects under development around the world, for which it sees “a broader demand base”.

“Our potential counterparties are geographically diverse, and in some cases global portfolio players, so we see new regasification projects under development as an excellent opportunity for the Lavaca Bay project and our technology in general,” concluded Bryngelson who will be speaking at the CWC World LNG Series: Americas Summit in San Antonio. ■



Aerial view of Lavaca Bay LNG

Calls to maximise U.S. LNG exports get louder after Congress backs bill to speed-up approval process

Pete Olson, a prominent U.S. congressman and member of the House Energy and Commerce Committee has called to maximise LNG exports and natural gas production, dispersing concerns that exporting America's shale gas bounty risks propelling up power prices by pointing at the abundance of domestic supplies. Members of the House Energy and Commerce Committee earlier this month passed a bill that speeds up the approval process for U.S. LNG exports.

Acknowledging critics' concerns that exporting U.S. shale gas might propel up domestic gas prices which would hit power producers and industries, Olson countered: "The fact is that study after



Pete Olson

study finds that we have so much gas under our feet in America that exports to our allies abroad will have little impact on our prices here at home."

Figures by the U.S. Energy Information Administration (EIA) show that the United States has surpassed Russia as the leading global oil and gas producer. This boom is fuelling the economic recovery in the U.S. while foreign policy might drive gas and particularly LNG exports even further.

"As the top producer of natural gas in the world, we can and should have the opportunity to sell our abundant resources," Republican congressman of James Lankford added.



J. Lankford

Congress passes bill to fast-track LNG export applications

In the vote at the House Energy and Commerce Committee, all

Republicans were joined by five Democrats on the panel to approve a bill detailing measures that limits the length of review time for LNG export application. The bill was passed in a vote of 33-18.

Six U.S. liquefaction projects are in their early stages, and project developers are urging the Obama administration to fast-track more of the pending LNG export proposals. Opposition to the still comes from Democrats like Henry Waxman of California, who has repeatedly warned increased gas exports could trigger an uptick in domestic emissions as it slows down the shift from coal to gas generation.

The bill, an amended version of H.R. 6, the Domestic Prosperity and Global Freedom Act re-establishes the Department of Energy's (DoE) oversight while still expediting the permitting process for U.S. LNG exports to more than 150 countries that are members of the World Trade Organization.

Clearing the DoE's approval backlog

More than half of the more than 20 pending applications have been past their public comment periods for more than three months. The



Members of the House Energy and Commerce Committee

measure sets a deadline for the DoE to issue decision on these projects 90 days after the close of public hearings.

A total of 24 applications for LNG exports to non-FTA countries are pending with DoE, which Oregon LNG first in the processing list, followed by Chierne and Excelerate projects.

"We're pleased with the final version of the bill that passed out of committee. ... Our goal has always been to address the backlog



Gene Green

said after the vote.

However, companies still need approval from the Federal Energy Regulatory Commission (FERC) before they could begin construction of a LNG project.

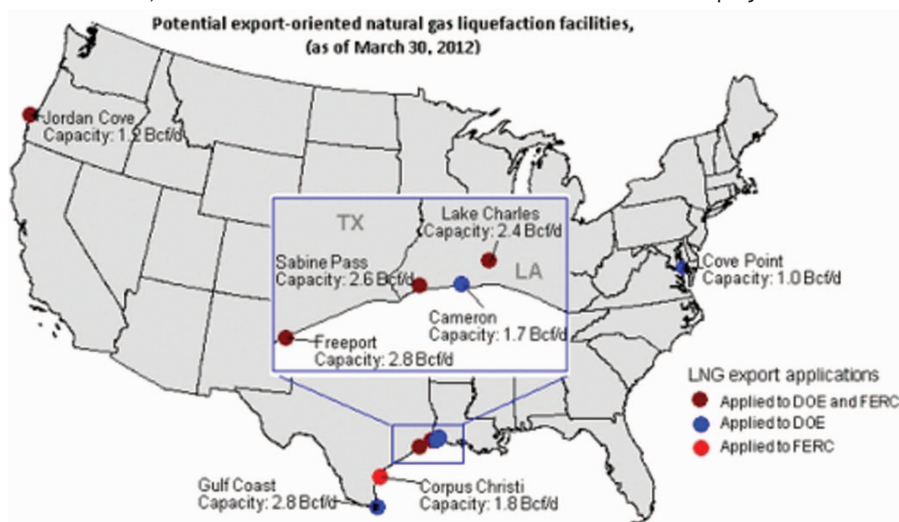
Weakening Gazprom's stronghold in Europe

The bill to speed up U.S. LNG approvals is ultimately designed to prevent Russia from disrupting gas supplies in Europe but opening up and fast-tracking the availability of cargoes carrying LNG from North America.

"Ukraine and most of our European allies have long been held hostage by the fact that Russia remains their largest source of vital gas used to power their economies," Olson said, suggesting U.S. LNG exports might help these countries to diversify their sources of gas imports. Stressing the U.S. is a "strong supporter of open markets and free trade politics," he suggested North American LNG exports create a "win-win for democracy and energy security."

Republican congressman Cory Gardner mirrored his view by saying "The near monopolistic control Russia has on the LNG market in Europe has given them immense power. Reforming the LNG export process would send an immediate signal to the rest of the world that would help check Russia's aggression."

Though U.S. LNG exports will most likely head to higher-priced Asian markets, analysts suggest the additional volumes in the market would free up LNG cargoes from Qatar or African projects to head to Ukraine, which is facing souring gas prices for Russian gas imports.



ArcLight's funding helps Louisiana LNG keep to project schedule

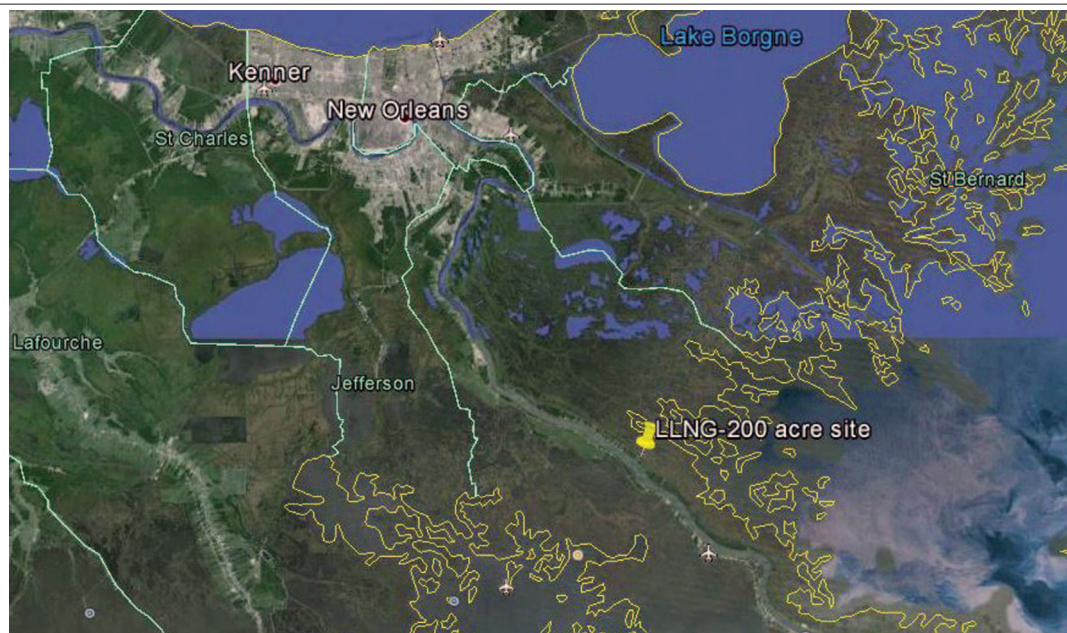
Houston-based Louisiana LNG Energy (LLNG) has obtained funding from an affiliate of ArcLight Capital Partners for its mid-scale LNG export terminal currently under development along the Mississippi River just south of New Orleans. The financing helps to advance the project which is due to come onstream in late 2017.

"The ArcLight funding agreement is a significant step in advancing the LLNG project," said Jim Lindsay, chief executive officer of Louisiana LNG Energy.

Though ArcLight Capital Partners did not disclose the value of its funding, the support is understood to allow project developers stick to their schedule and start-up the terminal in the third quarter of 2017. Once fully operational Louisiana LNG will consist of four 74,380 Mcf/d liquefaction trains with a planned capacity of approximately 100 Bcf/year (2 mtpa).

LLNG filed with the DoE on February 18, 2014 (Docket No. 14-29-LNG) seeking authorization to export 97.4 Bcf/year (0.27 Bcf/d) of LNG to countries that do not have a Free Trade Agreement ("Non-FTA") with the United States. Project partners earlier filed an application to export 97.4 Bcf/year to FTA countries.

The mid-size liquefaction project will be developed on a 200-acre site on the Mississippi River downstream from the Port of New Orleans. Vessel transit time to the site is approximately 6 hours from open water in the Gulf of Mexico.



Location of Louisiana LNG Energy project near New Orleans

The site provides deep water access for LNG tankers in the 125,000-175,000 cubic meters vessel class.

Chart Energy to carry out project engineering

Chart Energy & Chemicals has been commissioned to immediately start project engineering, which will feature its proprietary liquefaction technology with in-house design and manufacture of

all mission critical equipment. Advanced engineering will commence immediately as the project has procured four manufacturing space reservations with Chart.

LLNG said it has started to "actively market LNG tolling capacity to interested parties" and is looking for a "varied customer base".

Steps to mitigate the environmental impact

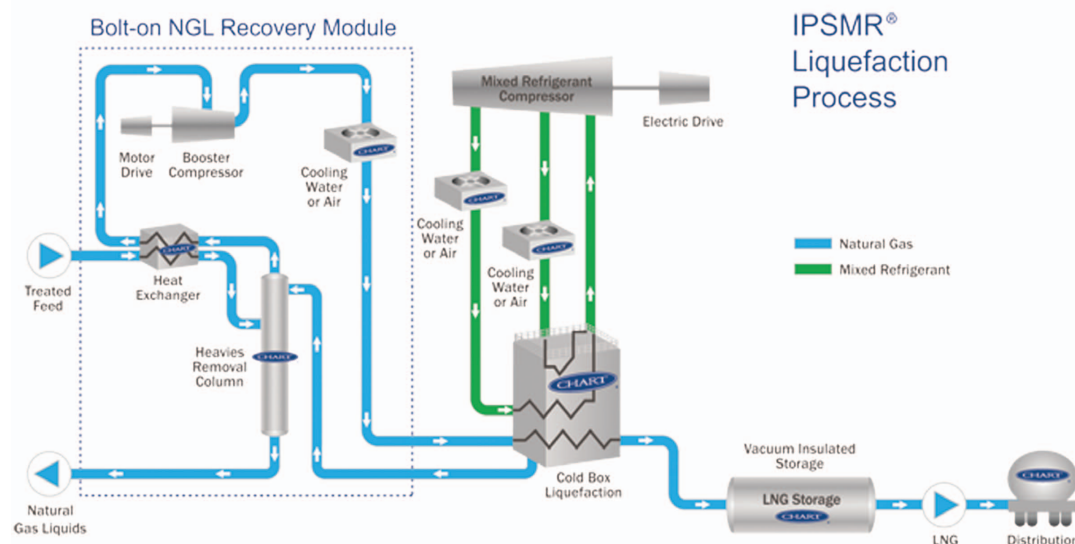
The US Federal Energy Regulatory

Commission (FERC) is in the process of compiling the Environmental Impact Statement (EIS) for LLNG and there is a risk that project partners will have to face additional costs if regulators require measure to mitigate the project's environmental impact.

With the Cameron LNG export project, for example, FERC found the affiliated interstate pipeline would cause "some adverse environmental impacts" and it recommended mitigation measures in the transformation of the existing import terminal into a liquefaction plant.

Cost implications of these mitigation measures are not yet fully assessed.

The state of Louisiana is home to an array of LNG export projects, such as Cheniere's Sabine Pass LNG facility in Cameron Parish, the Magnolia LNG export terminal project at Lake Charles or Sempra-led Cameron LNG, in Hackberry, which will have bi-directional capabilities to export or import LNG based on changing market conditions.



Scheme of Chart Energy & Chemicals liquefaction technology

Cameron LNG – seamless switch from import to export mode

Bi-directional capabilities allow Cameron LNG to swiftly adapt to changing market conditions by either importing or exporting up to 12 mtpa of LNG from the facility located along the Calcasieu Channel in Hackberry, Louisiana.

Commercial operation of the regasification terminal began in July 2009, and projects partners will this year start construction on new adjacent facilities to liquefy natural gas and export it to global markets.

Total project costs are anticipated to come in between \$9 and \$10 billion, and Cameron LNG said it seeks project-financing to cover most of the costs while the balance will be provided by the project partners.

San Diego-based Sempra is financing plant transformation through 20-year tolling agreements signed with GDF Suez, Misui and Mitsubishi. The tolling agreements cover the full nameplate capacity of the three LNG trains to be built with an export capability of 13.5 million tons per annum (mtpa).

The U.S. Department of Energy (DOE) in February issued a conditional authorization that allows Sempra Energy's subsidiary Cameron LNG to export domestically produced LNG for a 20-year period from its proposed liquefaction facilities in Hackberry, La., to countries that do not have a free trade agreement (FTA) with the U.S. such as Japan and China and the countries of Europe.

The Federal Energy Regulatory Commission (FERC) on April 30 issued the Final Environmental Im-

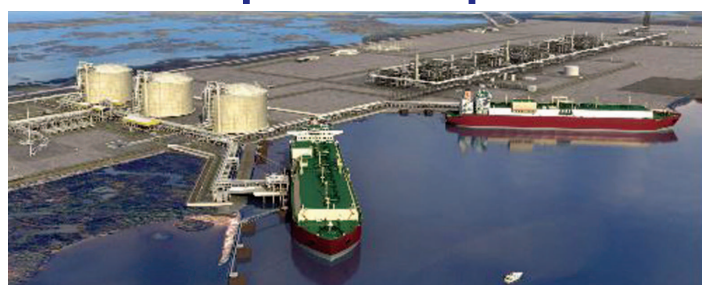
pact Statement for Sempra Energy to build and operate the liquefaction facilities. The Cameron interstate pipeline would be using existing rights of way and the overall project would be "consistent with or in conformance with federal authorizations" including Coastal Zone Management, the Clean Water Act and the Clean Air Act, the regulator said.

The final FERC order approving the project is expected this summer and projects partners are keen to start construction before the end of this year.

Octavio M.C. Simoes, president of Sempra LNG, suggested the progress in project permitting and financing, along with execution of commercial and tolling agreements "puts us on track to be one of the first LNG export projects to be under construction in 2014 and in full commercial operation in 2019."

Tolling agreed for full nameplate capacity

As for prospective buyers of U.S. LNG from the Cameron project, San Diego-based Sempra has already come up with a full \$10 billion plant joint venture deal for the Cameron facility through 20-year liquefaction tolling agreements signed with France's



Project Timeline

November 2011	Commencement of Front End Engineering Design ✓
January 2012	Department of Energy (DOE) awards Free Trade Agreement permit ✓
April 2012	Submitted request to Federal Energy Regulatory Commission (FERC) to initiate pre-filing review process ✓
December 2012	Filed NGA Section 3 application to FERC ✓
May 2013	Signed joint-venture and tolling agreements ✓
January 2014	FERC issued Draft Environmental Impact Statement ✓
February 2014	Received conditional Non-Free Trade Agreement permit from DOE ✓
March 2014	Engineering, Procurement and Construction (EPC) contract awarded to a joint venture between CB&I and Chiyoda ✓
April 2014	Final Environmental Impact Statement from FERC issued ✓
2014	Final Investment Decision expected
2014	Construction planned to begin
2018	Expect first production of LNG
2019	Expect all three trains to achieve commercial operation

GDF-Suez and Japanese trading companies, Mitsubishi Corp. and Mitsui & Co.

The Japanese and French investors have already signed three sales agreements with Asian customers:

- Japanese utility Tohoku Electric

Power in April signed an agreement to buy 300,000 tonnes per annum of LNG for 16 years starting in 2022 from Mitsubishi. Mitsubishi has a 16.6% stake in the Cameron import terminal that is being transformed into a liquefaction plant by Sempra Energy.

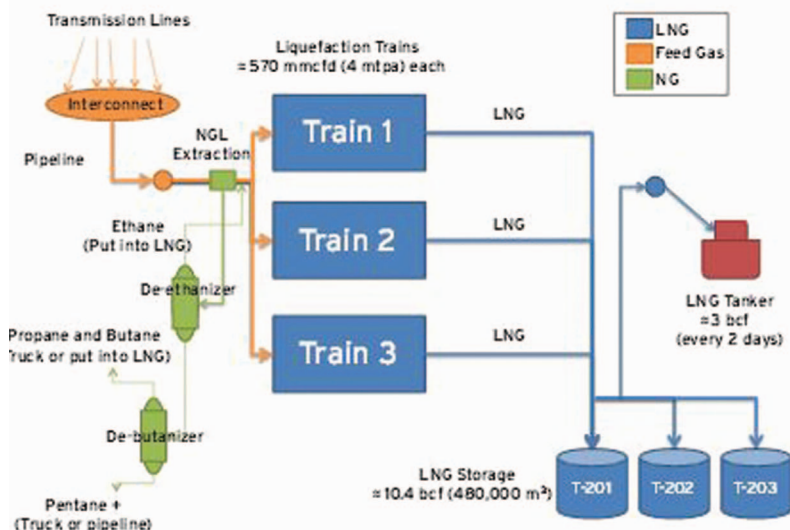
- The Tohoku deal follows an earlier agreement by Kansai Electric of Japan to buy 400,000 tonnes per annum for 20 years

from Mitsui.

- The third tolling agreement holder, GDF-Suez, earlier in 2014 signed a sales agreement with CPC Corp. of Taiwan for 800,000 tonnes per annum of cargoes for 20 years from 2018.

Tohoku said its first purchase of U.S. LNG would be at benchmark Henry Hub prices, but Mitsubishi would be organising the shipping to deliver the cargoes to the Tohoku terminals in Japan at a significant additional cost.

US-based engineering company CB&I and Japan's Chiyoda Corp have been awarded a construction contract, valued at about \$6 billion, to build the liquefaction facilities at the Cameron plant. The scope of works includes engineering, procurement and construction to add processing and export facilities to the existing regasification terminal.



Cameron LNG liquefaction process

Russia-China deal to support LNG prices at \$1/MMBtu – bank

The \$400 billion gas deal signed between Russia's Gazprom and China's CNPC for long-term pipeline gas supplies will set a floor of \$11/MMBtu to global LNG prices, Bank of America Merrill Lynch forecast.

The price of Russian gas exports to China is understood to be around \$11/MMBtu, which will set a floor for Asian LNG import prices and thus the global market, analyst at the investment bank said in a research note.

"If LNG prices were to fall below Russian import parity levels several years into the future, the Chinese market would probably absorb them rather easily," bank analysts said, pointing to gas demand growth estimates of 43 billion cubic feet (bcf) a day by 2020.

Asia-Pacific remains the key price setting region for global LNG markets, with Japanese buyers prepared to pay up to \$16/MMBtu for spot cargoes, as reliance on gas power generation surged due to the shutdown of its nuclear fleet following the Fukushima disaster.

China deal sets gas price floor for Europe

Despite a rise in Chinese demand, European prices will hold up relatively well and will be floored by this new gas pricing structure in China, Merrill analysts said.

"First, the new China deal might set a precedence for future oil-linked contracts between Europe and Russia. Second, although China and Europe don't really compete for the same piped Russian molecules for now, the two markets are linked via global LNG," they said.

Despite the landmark deal with China, Europe collectively is still a much more important market for Russian gas than Asia will be for decades to come. ■

South Korean buyers keen on more LNG from North America

Eager to source low-cost LNG to promote its switch from coal- to gas-fired power generation, South Korea's deputy energy minister Kim Jun-Dong said the country "needs shale gas from North America as much as possible", suggesting costs for importing LNG from the U.S. are likely to be lower than for cargoes from the Middle East.

"The US shale gas boom is expected to bring down South Korea's LNG import costs," he told reporters in Seoul, noting that South Korea is paying higher prices for LNG from the Middle East under the so-called 'Asian premium'.

State-owned Korea Gas plans to import 3.5 mtpa of LNG over 20 years starting in 2017 from Cheniere's Sabine Pass project.

Korea eyes direct investment in U.S. shale gas

Kim revealed that South Korea's state-run energy firms have been investing in the US shale gas developments, without giving evidence. Having a stake in North American shale gas projects would allow Korean buyers to secure long-term LNG import contracts at very competitive prices.

State-owned Korea National Oil Corp is understood to be focussing on upstream gas exploration projects, and the deputy-minister suggested it "needs to become bigger to compete with global majors."

Nuclear and gas seen as clean-energy sources

The Korean government in Seoul is keen to shift away from burning coal to curb air pollution and is promoting new high-efficiency gas-fired plants and existing nuclear capacity as clean energy sources.

LNG currently covers about



Kogas LNG tanks

25% of South Korea's total electricity consumption, while coal and nuclear reactors account for 40% and 30%, respectively, while oil makes up for 3% and the remaining 2% comes from renewable energy sources.

By 2035, gas demand in the energy-hungry and fast-developing Korean nation is forecast to reach 35.3 million tons of oil equivalent (mtoe), up 1.7% annually.

Government reduces tax on LNG

The South Korean government has reduced taxes on LNG to incentivise the use of natural gas for power generation, while simultaneously raising electricity rates to reign in peakload demand in order to alleviate system and the risk of power shortages.

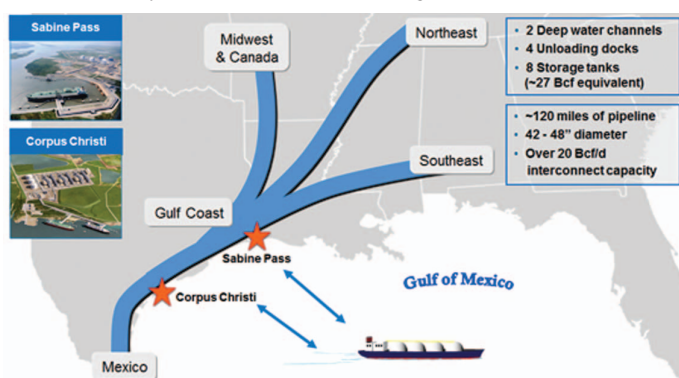
Government-controlled Korea Electric Power Corp has started to increase electricity prices by an average 5.4%, with industrial users

facing the biggest hike, the energy and finance ministries said in a joint statement. The ministries also plan to submit legislation to parliament to impose a new tax on coal imports for power producers starting from next year, which could propel up electricity costs even further. Industrial power rates in South Korea currently reflect only about 80% of the generation cost as the Government had kept them on lower levels than rates for private consumption in a move to stimulate economic growth.

Power price hike meant to curtail peakload demand

Higher electricity prices are hoped to push industrial and household consumers to use other, decentralised energy sources to complement their daily energy needs which would reduce the pressure on power grid operators. The latest rise in electricity rates is intended to help cut the country's peak demand for power by about 800,000 kilowatts, according to projections from the energy ministry.

Electricity consumption in South Korea surged 40% in the period between 2005 and 2012, growing faster than anticipated and exceeding demand levels of similar economies. "This is because electricity rates have been kept at minimum, compared to the price of other energy sources," the ministry said. ■



Korea eyes LNG cargoes from Cheniere's liquefaction projects at Sabine Pass and Corpus Christi

Ukraine crisis could see Europe compete with Asia for LNG

Cuts or disruptions in the volume of Russian gas transited through Ukraine could leave Europe struggling to compete with Asia for LNG. Turkey and Greece would be the first countries to require additional LNG for industrial use and power generation, research from Wood Mackenzie shows, suggesting Europe's extra LNG demand could amount to up to 5 million tons.

Europe imported 155 billion cubic metres (bcm) of gas from Russia in 2013, some 30% of its overall gas demand, with Ukraine transiting 82 bcm, or about 50%, of Russian gas exports to Europe. Southern and eastern European countries would be first hit by any supply disruptions.

"Based on our analysis, if there is a two-month disruption to the Ukrainian transit route in spring 2014, the Southern European countries of Turkey and Greece will require additional LNG, but this should be less than two million tonnes," said Noel Tomnay, Head of Global Gas Research at Wood Mackenzie.

Europe's extra LNG demand could amount to 5mtpa

"If the disruption is more severe, for example of six-month duration over the 2014/15 winter we expect further Southern European countries, including Spain, to call on extra LNG," he added but cautioned that robust European storage volumes going into the winter "should limit overall additional LNG demand to less than five million tonnes."

Moreover, cargoes might not be easy to come by as the combination of rising demand for LNG in Asia Pacific and Latin America combined with recent stagnant LNG supply availability has been making the global LNG market tighter. ■

U.S. LNG exports may help ease Gazprom's grip on Ukraine

Even if U.S. LNG exports will most likely head to higher-priced Asian markets, analysts suggest the additional volumes in the market would free up LNG cargoes from Qatar or African projects to head to Ukraine, which is facing souring gas prices for Russian gas imports.

Six U.S. liquefaction projects are in their early stages, and project developers are urging the Obama administration to fast-track more of the pending LNG export proposals.

Cheniere Energy started shipping LNG from its Sabine Pass venture late last year. Five other U.S. projects have received export licences from the U.S. Department of Energy but are still awaiting approval from the U.S. Federal Energy Regulatory Commission (FERC).

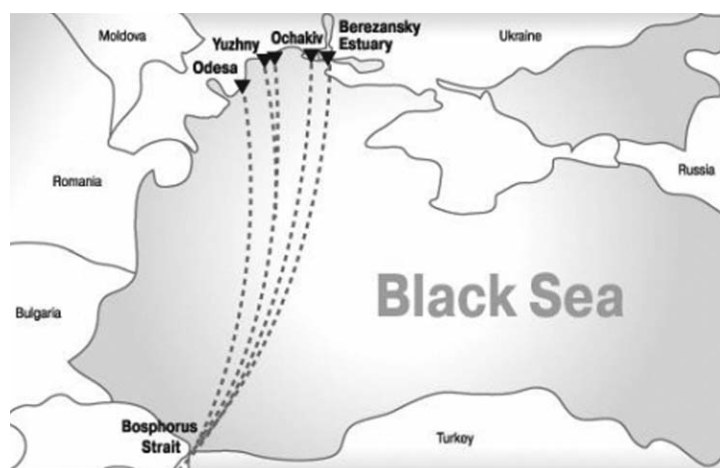
As Australia and the United States are targeting Asia, LNG exporters such as Qatar and Nigeria will strategically direct larger supplies to Europe and particularly Ukraine, analysts at the National Bureau of Asian Research said.

Ukraine revives plans to build LNG regas terminal

The Ukrainian government has singled out the project to build an LNG regasification terminal on the Black Sea coast as "one of the top five projects of national importance". The proposed LNG import terminal will have a total capacity of 10 billion cubic metres (bcm) of gas a year and is estimated to cost €969m (\$1.3bn).

The entire 10 bcm facility is expected to begin production by 2018, but a 5 bcm loading set for storage and regasification (FSRG) unit is expected to become operational in 2016. Construction of the FSRG set to start in mid-2014.

Five locations were considered for the project, including two at Yuzhnyi port in the Odessa province in south-west Ukraine, two in the Ochakiv district of the Mykolayivska province in south Ukraine as well as an off-



Possible routes of future LNG imports to Ukraine

shore location near Odessa.

Shipping LNG to Eastern Europe will ease constraints for reverse gas flow in the continent's pipeline system. "You can bring LNG into Europe, but you can't transport gas around Europe effectively as you don't have good pipeline connections from the west side of Europe to the east side of Europe," analysts said.

RWE delivers reverse-flow gas to Ukraine

Germany's via its trading and gas midstream arm RWE Supply & Trading - is the first European supplier that has started delivering natural gas to Ukraine's state-owned Naftogaz in a bid to help avert a fuel shortage amid escalating tensions with Russia.

The reverse-flow deliveries via Poland to Ukraine started on April 15 and could reach up to 10 billion cubic metres (bcm) of natural gas, RWE said. The German utility underlined that gas supplies to Naftogaz "are based on European wholesale price levels including delivery costs to the Ukraine." The volumes supplied include gas from

Norway, the EU and Russia.

The supplies are governed by a 5 year framework agreement between Naftogaz and RWE Supply & Trading signed in May 2012. RWE has already delivered about 1 bcm to Naftogaz in 2013. Slovakia and Ukraine in talks on conditions for reverse gas flows of to Ukraine of up to 9 bcm per year.

Reverse gas flows from Europe are, however, unlikely to fully cover Ukraine's gas demand which reached 55 Bcm last year, leaving the country heavily dependent on supplies from Russia's Gazprom.

As eastern Ukraine edges closer to a civil war, Kiev said it would halt gas imports from Russia over alleged "price aggression" as Gazprom imposed an 80% price hike to \$484 per 1000 cubic metres for gas exports to the neighbouring country. The Kiev government claims the price increase is politically motivated, particularly as Russia's traditional European buyers have to pay between \$370 and \$380 per 1000 cubic metres - far less than the new higher prices for Ukraine. ■

Two new US LNG export projects apply for DoE permit

Developers of two new US LNG export projects for near Tampa, Florida, and Port Arthur in Texas have filed applications to the Department of Energy (DoE) for permits to ship cargoes to nations in the Caribbean as well as Asia and Europe.

The companies involved were named as Strom Inc. of Tampa, Florida, and Alturus of California in a venture including WesPac Midstream.

Strom has requested authority to export up to 7 Bcf/year of LNG over a 25-year period from a proposed LNG facility in the town of Starke, Florida, to primarily Caribbean nations, and also to non-specific countries without a Free Trade Agreement with the US. Strom's applications can be found on DOE's website under Docket Nos. 14-56-LNG, 14-57-LNG, and 14-58-LNG.

Alturus has asked for a permit to export 1.5 million tonnes per annum of LNG over a 20-year period from a proposed LNG terminal near Port Arthur to FTA nations of the Caribbean and Latin America. Alturus's application is listed on DOE's website under Docket Nos. 14-55-LNG.

LNG to be shipped on via ISO containers

Both Alturus and Strom said they would ship their LNG by conventional carriers or via International Standards Organization (ISO) containers loaded onto ocean-going container vessels or bulk carriers.

The shipping of LNG from the US by the ISO method began in April 2014 for deliveries of the fuel to Hawaii from California.

The Strom Chief Executive is

named in the DoE application as Michael Lokey. The shares in the company are held equally between Lokey, a person called Dean Wallace and a firm called Atlantic Development.

The Alturus application is signed by a Houston-based law firm on behalf of Alturus President David P. Smith of Irvine, California.

Strom to set-up modular LNG systems in 3 months

Strom said it was developing its LNG plant on a proposed 70-acre site located in Starke and would use Modular LNG (MLNG) systems "such as those marketed by such companies as General Electric, Cryostar, Hamworthy, Chart, Linde, Air Products, Siemens or Stirling Cryogenics."

"Some of these MLNG systems can be mobilized in less than three months. Each of these MLNG can produce from 500 to 50,000 gallons of LNG per day.

"As demand increases, Strom intends to continuously add MLNG units to increase production and has begun the process of securing the Federal Energy Regulatory Commission's authority for use of MLNG for such a purpose," the Florida company said in its application.

Strom said its subsidiary Atlantic Renewable Resources is currently under contract with a client in the Caribbean to provide power using LNG.

"Strom continues to develop relationships with a large portfolio of commercial entities in the Caribbean and Latin America to provide LNG for transportation, power generation and other purposes.

"Strom's primary geographic business focus is Central and South America, the Caribbean and the US regions where use of diesel is the primary source of energy production and access to LNG is limited.

"To demonstrate Strom's involvement in these locations, Strom points out it was one of the first companies to execute a long-term agreement with a major commercial client in the Caribbean for power generation using LNG," it added.

Strom said it would have access to feed-gas from the Florida Gas Transmission Co. and Gulfstream National Gas Systems.

"Additionally, the Florida Public Service Commission recently approves the Sabal Trail Transmission (STT) pipeline to provide natural gas through southwest Alabama, through Georgia and down to central and south Florida," Strom stated.

Alturus LNG backed by investment firms

The Alturus LNG export facility at Port Arthur will be owned and operated by a company called WesPac Midstream, which is the

successor to WesPac Energy, an energy infrastructure development entity formed in 1998 to originate, finance, construct and initiate operations for midstream systems.

"WesPac Midstream's ownership includes investment funds sponsored and managed by Highstar Capital, an independent infrastructure investment firm with over \$7 billion invested in energy infrastructure entities, and Primoris Services Corp., one of the largest construction services enterprises in the US, with affiliates such as ARB and James Construction that engineer and construct large-scale energy infrastructure projects," Alturus said.

"WesPac has a long-standing relationship with the Port of Port Arthur and has been actively engaged with the Port since 2010 regarding the development of a marine terminal facility.

"WesPac has maintained an exclusive arrangement with Port Arthur to enter into a 30-year lease of about 40 acres of land located on the Sabine-Neches Waterway.

"Through its wholly-owned subsidiary, Gulfgate Terminal, WesPac has obtained permits from the US Army Corps of Engineers to construct marine facilities capable of handling Suezmax-sized vessels.

"The LNG project contemplated by WesPac would consist of liquefaction, storage and a processing, pipeline," Alturus stated. ■



Strom exports LNG via intermodal containers to a U.S. company in the Caribbean.

LNG North America

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Cove Point LNG export project enters key permitting phase

Cheasapeake Bay's Cove Point LNG export project has been given a boost as a federal environmental assessment found the liquefaction plant can be built and operated safely with "no significant impact on the environment". The release of the FERC report begins a key month for the project's permitting process. It has started a 30-day public comment period running into June.

Diane Leopold, President of Dominion Energy unit, said: "The 241-page report represents nearly two years of study, tens of thousands of pages of documentation and many thousands of hours of work.

"The Cove Point LNG facility has been in existence for nearly 40 years and this makes the most of existing facilities. This project will be built within the existing footprint and fence line of an industrial site", she said, underlining "There is no need for additional pipelines, storage tanks or permanent piers, thus limiting its impact and making an environmental assessment appropriate."

Cove Point is the fourth US LNG export project to receive an environmental document from the FERC and is set to be developed at the existing Cove Point terminal at Chesapeake Bay in the state of Maryland.

Sumitomo, GAIL will each off-

take half of Cove Point's marketed capacity

Dominion has fully subscribed the marketed capacity of the project with 20-year service agreements. Japanese company Sumitomo Corp. and GAIL of India have each contracted for half of the marketed capacity.

"This one project could reduce the nation's trade deficit by up to \$7 billion annually while helping two important allies, Japan and India, meet urgent clean-energy needs," Dominion's Leopold said.

"At the same time, the United States can continue to have ample natural gas supplies to meet domestic needs, and US industry can maintain a significant energy price advantage over international competitors," she added.

Dominion said the construction of the export project, which is estimated to cost between \$3.4 billion and \$3.8 billion, will create thousands of skilled construction

jobs. A joint venture has been contracted to build the plant, comprising IHI E&C International Corp. of Houston, Texas, and Kiewit Corporation of Omaha, Nebraska.

FERC finds no adverse impact on environment

The Environmental Assessment (EA) examined the potential impacts of the proposed project, including a thorough evaluation of the project's impact on public safety, air quality, water resources, geology and other issues.

"Based upon the analysis in this EA, we have determined that if Dominion constructs and operates the proposed facilities in accordance with its application, supplements, and our mitigation measures below, approval of this project would not constitute a major federal action significantly affecting the quality of the human environment," the FERC report stated. ■

Oregon LNG revises planning application for export permit

Developers of Oregon LNG, which along with Jordan Cove LNG is one of two export projects for Asia in the US Northwest, have filed five major revisions to its Federal Energy Regulatory Commission planning application.

The Oregon LNG project is much-watched as it is now top of the Department of Energy order of precedence, comprising 24 applications, for a decision on exporting LNG to Non-Free Trade Agreement countries such as Japan and China.

The project is listed with the DoE under the name LNG Development Co. LLC. However, Oregon LNG is owned by Leucadia National Corp., a New York Stock Exchange-listed company engaged in energy, mining, forest products, manufacturing and financial services, with assets under management of over \$40 billion.

Oregon LNG has an application with the FERC for constructing a bidirectional LNG terminal facility on the Skipanon Peninsula at Warrenton and an interconnected pipeline.

Targeting buyers in India and Indonesia

The DoE in March 2014 awarded Jordan Cove an export permit for Non-FTA nations. The venture is planning to sell LNG cargoes to India and Indonesia.

Located near Coos Bay, Jordan Cove liquefaction terminal will be permitted to ship overseas as much as the 800 million cubic

feet per day gas equivalent for 20 years subject to environmental review and final regulatory approvals.

Jordan Cove was the seventh LNG export project involving non-FTA countries to receive the DoE's approval and Oregon LNG is now awaiting its decision.

Revision to land requirements

The changes in the Oregon LNG FERC filing reflect revisions to the land requirements for the LNG storage tanks and process areas, and the associated revised wet-land impacts. ■

GDF Suez signs 20-year deal to deliver U.S. LNG to Japan

Under its first long-term supply agreement for U.S. LNG exports, GDF Suez will deliver 270,000t/year of LNG to Japan's Tohoku Electric Power for a 20-year period. The long-term contract starts in 2018 but no financial details were revealed.

Volumes will be supplied from the Cameron LNG plant in Louisiana where the Franco-Belgian company has a tolling agreement and is an investor in a project that will see an existing LNG terminal being transformed into a liquefaction plant.

The plant has received conditional approvals from the US Department of Energy and "partial agreement" from the Federal Energy Regulatory Commission and "is likely to be finally sanctioned within the course of this year", GDF Suez said.

First supplier of U.S. LNG into Asia

GDF-Suez said it would be one of the first companies to supply Asia with American LNG, backed by its LNG carrier fleet and a diversified LNG supply portfolio.

Jean-Marie Dauger, Executive Vice-President of GDF-Suez in charge of the Global Gas & LNG business, commented: "This sales agreement seals our first long-term LNG sale with a Japanese partner, as well as the emergence of US LNG contributing to Japan's energy supplies, thanks to the benefits of the shale-gas revolution in America.

"Such a contract shows how the GDF-Suez strategy is right at the heart of the present world energy challenges."

The Cameron LNG project sees GDF-Suez partnering with the developer of the original import terminal, Sempra Energy of California, and two Japanese trading giants, Mitsubishi Corp. and Mitsui & Co. ■

Race between Shell and Petronas to take FID on British Columbia's first LNG export project in 2014

British Columbia Finance Minister Michael de Jong said that either the Pacific Northwest LNG project in the province, led by Malaysian energy company Petronas, or the Kitimat LNG venture of Royal Dutch Shell would be the first to make a final investment decision by year-end on building a Canadian LNG export plant.

"You've got Shell, Petronas all taking steps. Who goes first, we will see," De Jong said at the Bloomberg Canada Economic Summit in Toronto.

More than a dozen natural gas export projects have been proposed in British Columbia (BC), but none has so far announced an FID.

The longest-standing project, Kitimat LNG with U.S. energy companies Chevron Corp. and Apache Corp. as the investors, has been in place for several years. However, a Kitimat FID has been delayed because of lack of movement on crude oil-linked, long-term LNG supply contracts with Asian customers to underpin the venture.

The Petronas Pacific Northwest project and LNG Canada venture of Shell do not have that problem. They already have investors from major LNG buying nations on board, Japan Petroleum Exploration Co., China Petroleum & Chemical Corp. (Sinopec) and Indian Oil Corp. for the Petronas project and in the case of Shell's venture, Korea Gas Corp., Mitsubishi of Japan and PetroChina.

BC plans for two-tier tax on LNG

The province has proposed a maximum tax level of 7 percent



Location of Pacific Northwest LNG

payable once a project has recouped its capital costs, but the law will not be voted in until the autumn.

BC is planning a two-tier tax system on LNG that would apply a "manufacturing" tax on the production at the liquefaction plants. The first level will be at 1.5 percent as soon as production starts and the second level will be 7 percent when investment costs from the building of the export plant and terminal have been recovered.

While the tax levels will win approval from the international LNG players lining up to develop projects in Canada, there will be doubts about the taxation situation among investors until the legislation is actually passed into law, hence the FID delays until the end of 2014, analysts said.

Building one Train costs about C\$10bn

De Jong told the Toronto conference he was "cautiously optimistic" there would be a decision on an LNG investment in the province worth about C\$10 billion (US\$9.5Bn) by the end of 2014, referring to the first phase costs of bringing one liquefaction Train on stream with all other basic infrastructure such as pipeline connections and marine facilities.

The actual costs of multi-Train ventures will be more than \$20 billion. Petronas executives have cited a top figure of \$35 billion for their project.

The Malaysian state-owned company was able to launch the Pacific NorthWest venture after acquiring Canadian company Progress Energy and its natural gas assets in the prolific Montney

Shale located in northeast BC.

Investors wary about wage inflation, taxes

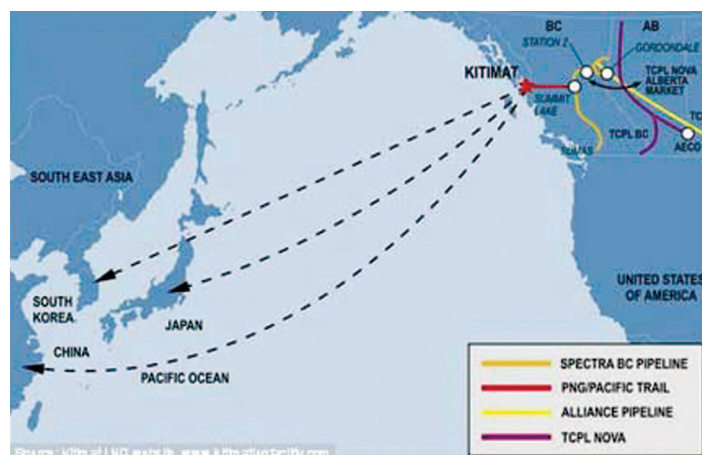
Greg Kist, President of Pacific NorthWest LNG, said during a panel discussion at the Toronto conference that "foreign capital is concerned about wage inflation, the tax environment and about our ability to actually deliver in a timely fashion on environmental assessments."

"We are going through all the factors. We need certainty from government, and not just for today," he said.

"We need certainty on these investment decisions of up to \$9Bn that we are not going to see arbitrary moves. That is an important thing for us and our partners before we come to our final investment decision," Kist stated. ■

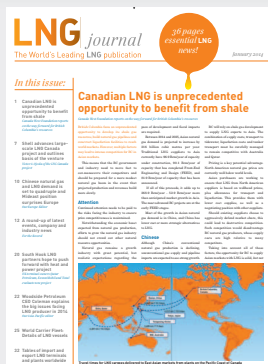


Rendering of Kitimat LNG project



Shipping routes of cargoes from Kitimat LNG to Asia

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