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**UNITED STATES OF AMERICA**
**DEPARTMENTOF ENERGY**

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| **Jordan Cove Energy Project, L.P.** | ) | **FE Docket No. 12–32–LNG** |
| | ) | |
| **Amendment Application** | ) | **Jordan Cove Energy Project, L.P.; Application for Long-Term Authorization to Export 350 Bcf/yr of Liquefied Natural Gas Produced from Domestic and Canadian Natural Gas Resources to Non-Free Trade Agreement Countries for a 25-Year Period** |
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## WIM DE VRIEND
## NOTICE OF INTERVENTION, PROTEST AND COMMENTS

On June 6, 2012, the Office of Fossil Energy at the Department of Energy posted in the Federal Register a Notice of Receipt of an application, filed on March 23, 2012, by Jordan Cove Energy Project, L.P. (Jordan Cove), requesting long-term, multi-contract authorization to export as liquefied natural gas (LNG) both natural gas produced domestically in the U.S. and natural gas produced in Canada and imported into the U.S., in an amount up to 292 billion cubic feet (Bcf) of natural gas per year over a 25-year period, commencing on the earlier of the date of first export or seven years from the date authorization is granted. The LNG would be exported from an LNG liquefaction terminal popularly or unpopularly known as Jordan Cove, to be located on the North Spit of Coos Bay in Coos County, Oregon, to any country (1) with which the U.S. does not have a free trade agreement (FTA) concerning natural gas, (2) which has or develops the capacity to import LNG via ocean-going carrier, and (3) with which trade is not prohibited by U.S. law or policy.

On March 24, 2014, the Department of Energy issued DOE/FE Order No. 3413, conditionally granting Jordan Cove's Application. DOE/FE has not yet issued a final order on the pending Application

On October 5, 2015, Jordan Cove Energy Project, L.P. (Jordan Cove) filed an Amendment to its pending U.S. Department of Energy Application that had been filed on March 23, 2012. This Amendment sought to increase the volume of LNG for which Jordan Cove seeks export authorization, from 292 Bcf/yr to 350 Bcf/yr of natural gas. This would represent an increase of about 20% over the original application.

I, Wim de Vriend, have a substantial personal interest in the outcome of this proceeding because I own property, live, work, socialize and recreate within 3 miles of the proposed LNG export facility, thus within its projected hazardous burn zones. All of this means that I could be negatively impacted by its operations – to put it mildly. The same could be said of approximately 30,000 other people living within that hazard zone, when industry experts recommend LNG terminals be built in remote, lightly populated areas. In addition, the Jordan Cove facility is to be built in a tsunami inundation zone identified as such by the State of Oregon, less than a mile from the Pacific Ocean, in which an earthquake/tsunami similar to the disastrous 2011 Tohoku earthquake/tsunami in Japan is mathematically overdue. Jordan Cove's location, and the shipping channel through which its LNG carriers must pass, are within a mile from the local airport, from schools and other public facilities, and from thousands of homes. By Jordan Cove's

own admission it would take those LNG carriers at least 90 minutes to travel between its terminal and the ocean (due to draft limitations, passage would be at high tide only), through a channel that would not allow passage of other vessels except small ones, and only by special permission. Besides obstructing other navigation and recreation during their near-daily passages (at certain times of the year there can be a hundred small recreational vessels in that part of the bay), the LNG carriers would be at risk of grounding during the customary draining of the bay just prior to a tsunami's arrival, thus incurring damage which could spill their cargoes on the water. This spillage could cause a catastrophic chain reaction, in which first the LNG is warmed and regasified by the water, at which point all it takes is a spark at the edge of the gas cloud to create a catastrophic fire, as demonstrated by Sandia Laboratories' experiments. The tsunami itself would arrive within 15 or 20 minutes after the offshore earthquake of 9.0 or more, with repeated massive waves returning for many hours, very likely inflicting further damage to the grounded LNG carrier. Further, their potential for incinerating local communities has caused the U.S. Congress to identify LNG facilities as potential terrorist targets. From its inception the proposed Jordan Cove LNG facility has posed multiple risks to life, health and property, in exchange for negligible benefits to Coos Bay and indeed to the United States.

In addition to posing an extreme fire hazard, the Jordan Cove terminal will be a prodigious source of air pollution, while endangering air traffic around the airport and hence itself.

We also face the loss of recreational and commercial opportunities in oyster farming, fishing, clamming, crabbing, and wildlife watching. The plan will harm wildlife habitat and timber production through the creation, by eminent domain, of a 232-mile pipeline corridor kept free of vegetation. Given previous local experiences with pipelines and road building, this pipeline will be destructive to the Oregon Coast Range with its many streams and rivers, heavy rains and steep slopes subject to landslides, while the eminent domain process will harm numerous private land owners; and that's without considering what kind of damage a broken gas pipeline could cause to them and the surrounding forests – or vice versa, since this is the nation's prime forest fire territory. Both facilities, the export terminal and the pipeline, will continuously reduce the local residents' peace of mind and prosperity through the widespread fear factor which has already kept the Coos Bay/North Bend area in a state of stagnation and decay for over twelve years, ever since Jordan Cove was first proposed as an import terminal. Finally, none of the electricity produced by the facility's power plant will be available for use by the local community, and Jordan Cove's predictions that the availability of natural gas through its new pipeline will attract other new industries have already been disproved by history. This very low-employment-project is not in the public interest, and its many detriments would only be magnified by the proposed 20% expansion. All this when no case exists for its public need.

On March 11, 2016, the FERC (Federal Energy Regulatory Commission) issued a decision denying applications for approval and Section 3 authorization for both the Jordan Cove LNG export terminal and its associated 232-mile pipeline known as Pacific Connector, under Docket No. CP13-483-000 and Docket No. CP13-492-000, respectively. In its decision the FERC prioritized considerations of the merits of Pacific Connector, concluding that ". . . the record does not support a finding that the public benefits of the Pacific Connector Pipeline outweigh the adverse effects on landowners . . . " (page 18.) This was because the FERC found that Jordan Cove's apparent inability to come up with sales or liquefaction contracts for most of its facility's capacity had failed to demonstrate a use for Pacific Connector, and hence a lack of public benefits, while the pipeline's detrimental effects (through eminent domain) on the many landowners would be severe. While the FERC's assessment of overseas demand for LNG as a public benefit struck me as peculiar, I have no quarrel with its basic denial. The FERC did not dwell on the many objections to the export terminal itself, declaring them moot since without the pipeline it would not be built.

Since then, Jordan Cove/Pacific Connector and/or its parent company Veresen of Canada have announced they will appeal the FERC's decision and come up with contracts, and they have even announced one agreement for about 20% of the terminal's capacity, although without corroborating evidence.

I have participated in multiple hearings and appeals of decisions that involved the Jordan Cove project, and filed a number of critiques with various agencies. My studies of the global LNG market have convinced me that the likelihood of these two corporations garnering contracts for most of Jordan Cove's production is vanishingly tiny. This is because the developing global LNG oversupply and low LNG spot prices in Asia have removed incentives for Asian gas buyers to sign such contracts. Further, it looks highly likely that it could take until 2030 or even later for the LNG market to balance the mentioned oversupply with demand. I have documented these points in the study I am sending as an appendix to this notice.

I wish to intervene and be made a party to this proceeding, with all the rights attendant to such status, pursuant to 10 C.F.R. § 590.303(b).

Thank you for your consideration.

Wim de Vriend
573 South 12th Street
Coos Bay OR 97420
costacoosta@coosnet.com

# 'A GOLDEN AGE OF GAS'

## . . . the making of the LNG glut – by Wim de Vriend

## Summary


- It seems possible that Cheniere, with the advantages of a solid portfolio of long-term contracts and of being the first to ship out a load of LNG produced in the lower 48 states, will do well. But prospects for more U.S. entries into the global LNG market of more than the five presently under construction are not good.

- Often heard assurances that the global LNG market will have no trouble absorbing more than 100 Mtpa of new production by 2020, and a similar new amount by 2025, require unrealistically high demand growth. This is due to the static level of shipments of recent years, LNG's continuing cost disadvantage vis-à-vis other fuels, and the poor outlook for economic growth worldwide.

- At this time the addition to U.S. liquefaction capacity by means of any of the greenfield projects proposed for the west coast seems unlikely as well as imprudent, given that prices in Asia have crashed and because of those proposals' difficulties in obtaining quality long-term liquefaction or sales contracts, which are requirements for financing and licensing.

- The worldwide rush to build liquefaction capacity has the characteristics of speculative bubbles and gold rushes of past centuries. In the case of the developing LNG glut, some of the blame seems deserved by prestigious but imprudent energy experts.


### 'Steady LNG Growth Projected'

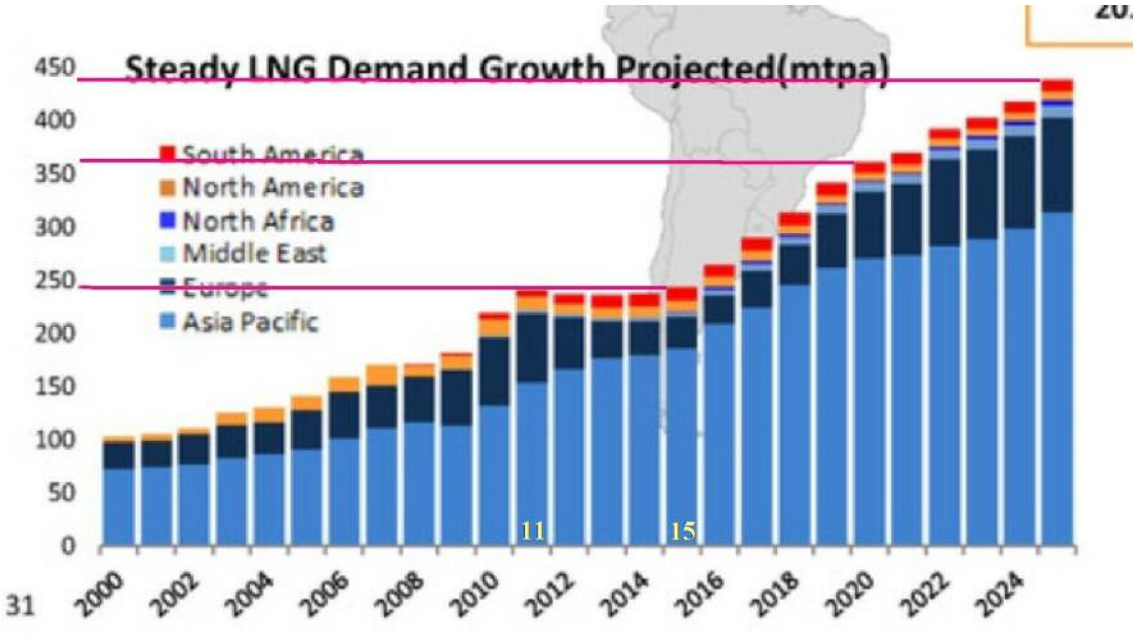
In recent months we have seen a number of articles in SeekingAlpha, praising Cheniere's business prospects on the global LNG market, and the prospects of that market itself. In some of those articles, all the information including the visuals came from Cheniere. One of those visuals was a bar graph showing global LNG shipments, past and projected, and reproduced on the next page, which caused me to ask:

> I have wondered for some time, why do the global LNG demand graphs put out by Cheniere show a steep rise in future demand when demand in the most recent five or six years has been stagnant or declining?

Fortunately a kind and knowledgeable SeekingAlpha reader, Paul Sullivan, responded to my puzzlement:

> Wim - The market for LNG only flattened last year, primarily due to mild winter weather, nuclear restarts in Japan and the dumping of US coal in Europe. Over the last 15 years the average annualised increase in consumption of LNG has been between 4% and 5%. However with flat demand in the last year or so and with the overhang of about 50% of

current production coming on line between now and 2020, it is certainly likely to be a buyers market.
On the plus side though, low cost LNG over an extended period is already stimulating new players to enter the field. Opportunities in new markets for gas to power are seeing a considerable increase. How quickly this will absorb the production overhang is difficult to predict, given the uncertainty of world economic growth. However bearing in mind that over the last 15 years of variable economic growth the average 4% to 5% growth has been relatively steady, that represents somewhere between 12 MTPA and 15 MTPA of new consumption each year.




While most of those market factors I knew to be correct, I still could not shake my impression that the pause I had mentioned was much longer than one year. And this made me wonder if Paul's prediction of 'average 4% to 5% growth' of future LNG sales was not unduly optimistic. The source of the bar graph was a presentation by Cheniere dated July 2015, well before Charif Souki's ouster as CEO in December, and obviously designed to create enthusiasm for Souki's ambitious plans – which Cheniere's new board quashed. The bar graph seemed to show the reality of four or five years of stagnant demand. Depending on one's definitions they were either 2011-2015 or 2012-2015. Incidentally, Cheniere's presentation stated that the origin of its data was Wood Mackenzie, one of the world's most prominent consultants for the oil & gas business.

Starting on the left with 2000, numbered even years mark the first, third, and fifth 'Demand' bar, continuing that way on to the right. (I have some trouble with the term 'Demand' in this context; what I believe the bars show is LNG shipments, actual through 2015 and projected from 2016 on). Because two recent odd years, 2011 and 2015, are key to our discussion, I made a point of marking them on the bar graph.

This done, the graph shows that while from 2000 through 2007 global LNG shipments did rise at a steady pace, 2008/9 saw that trend slow down, most likely due to the

recession. Next, in 2010 global LNG shipments rose sharply, driven by Asia-Pacific, and that upward trend continued in 2011, with 242 Mtpa. But then there was a pause, when shipments dropped slightly, not reaching 2011's level until 2015, with 241 Mtpa which was an estimate by Cedigaz, made partway through the year; but it seems confirmed by the graph. What all this boils down to is that with an average 240 Mtpa of LNG, give or take a couple, from 2011 through 2015, the market saw no growth. For convenience I will call 2011-2015 *'the 5 flat years'*. The Mtpa numbers are rounded.

| Annual World LNG trade | | | | | |
|---|---|---|---|---|---|
| Year | 2011 | 2012 | 2013 | 2014 | 2015 |
| **Mtpa** | **242** | **236** | **237** | **239** | **241** |

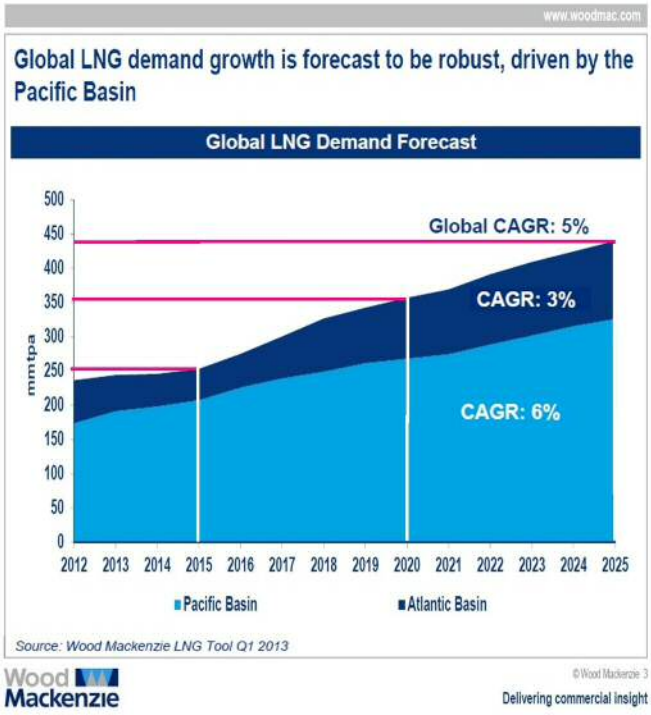
Because of those 5 flat years it seems incorrect that the global LNG trade only went flat '. . . in the last year or so', which would be 2015. Instead it stagnated for at least 4 years, and I have found no substantial evidence that supply shortages caused much of that stagnation. Which validates my original question why, in view of those 5 flat years, we should believe that starting this year, 2016, we will see another growth spurt in LNG shipments, and a steep one at that, to make up for the recent pause. It seems counterintuitive, like shifting a manual transmission directly into third gear while standing still. I do realize that can be done while your car is parked on a steep hill facing down, but that's a unique situation. In this case the current low LNG prices may give a hill-effect, stimulating some demand, but as we will see there are other market conditions that may work against that, too.

> "It is a known fact that the Fed has never forecasted a recession (in spite of employing hundreds of nerd economists whose job it is to do precisely that). They don't even react to them very well."
>
> *Jared Dillian, investment adviser*

In the end, what it boils down to is uncertainty: nobody knows. Nobody knew either about the impending interruption of global LNG's growth, and all were slow to acknowledge it. For instance, there was no hint of the 5 flat years in 'Changing Asian Gas Markets', a 2013 report by Wood Mackenzie. Instead a line graph from that report, reproduced below, predicted steady growth in global LNG, with shipments reaching 250 Mtpa in 2015, which turned out to be 9 or 10 Mtpa too high.

As an indicator of what the future may bring, the past is often the best we have. Hence it is not always wrong to extend recent trend lines into the future, but trend extenders must keep in mind that – except for death and taxes - nothing goes on forever, and unexpected events will happen. The question in this case is: which trend line do you extend, or rather which CAGR (Compound Annual Growth Rate) ? The one that showed steady growth until 2008, or the flat line from 2011 through 2015? Or do you pick something in-between, splitting the difference? If you do the latter, you will quickly demonstrate the impossibility of the developing glut of new LNG being absorbed by 2020. When all is said and done, will the world wonder what caused the spending of hundreds of billions on new, underused LNG liquefaction terminals, particularly in Australia and the U.S.?

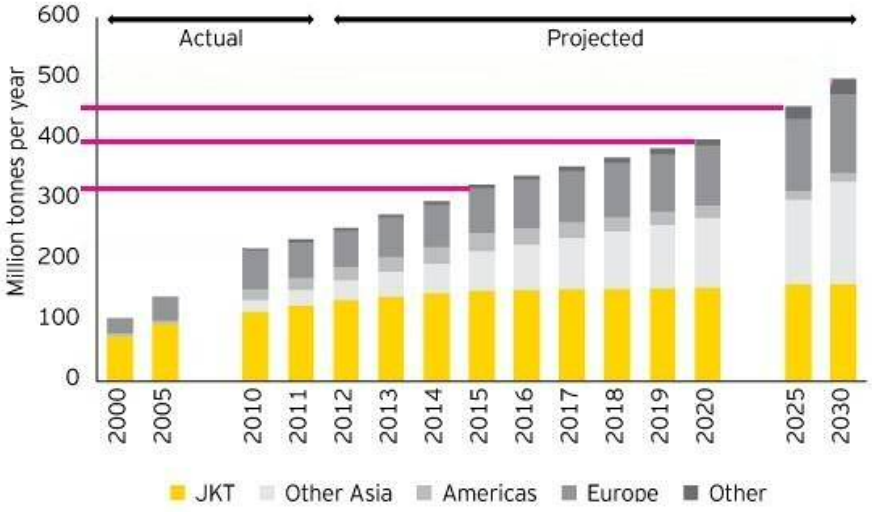
## Dueling Projections




In the Wood Mackenzie line graph on this page and in a bar graph from Ernst & Young on the next, I have drawn red lines to clarify each graph's Mtpa predictions for three key years, 2015, 2020 and 2025. I did the same for 2020 and 2025 on the Cheniere-Wood Mackenzie bar graph we started with, but I should remind you that the 2015 line on that one shows actual LNG shipments that year, not projected ones.

For its growth projections in the line graph, Wood Mackenzie assumed a CAGR of 6% in the 'Pacific Basin', driven by demand described as 'robust', which may have been inspired by the sudden boost in Japanese demand starting in 2011. For the 'Atlantic Basin', which accounts for only about a quarter of global LNG trade, Wood Mackenzie projected a 3% CAGR. And then they combined the two in order to obtain a worldwide CAGR of 5%. This is how that graph predicted worldwide LNG trade of 250 Mtpa by 2015, of 360 Mtpa by 2020, and about 440 Mtpa by 2025. Now as you can see when you return to Cheniere's bar graph, on page 2, its numbers for 2020 and 2025 are the same as on Wood Mackenzie's line graph, which figures because Cheniere credited Wood Mackenzie for those forecasts. What should give us pause, though, is that despite that first bar graph's inclusion of the 5 (actual) flat years which by 2015 caused global LNG trade to fall short of Wood Mackenzie's forecast, the forecasts for 2020 and 2025 remained as they were. Maybe I'm missing something, and somebody will set me straight. But that obvious pause should have bothered anybody thinking of getting into the LNG export business. It also should have bothered anybody who re-used Wood Mackenzie's 2020 and 2025 predictions without regard for the stagnant actual shipments in 2011-2015.

Wood Mackenzie was not the only consulting firm to make upbeat predictions that did not materialize, and to miss the 5 flat years. In 2012 Ernst & Young combined 'data from multiple sources' to publish it own projections of global LNG trade. Those are shown in the bar graph below. Notice Ernst & Young's black lines at the top, indicating 'Actual' and 'Projected', which designate as 'Actual' the years through 2011, and as 'Projected' the years starting with 2012. Also notice that a number of years were left out, probably for simplicity's sake. As with the other graphs, I added the red lines. Citing the IEA (International Energy Agency), Ernst & Young said:



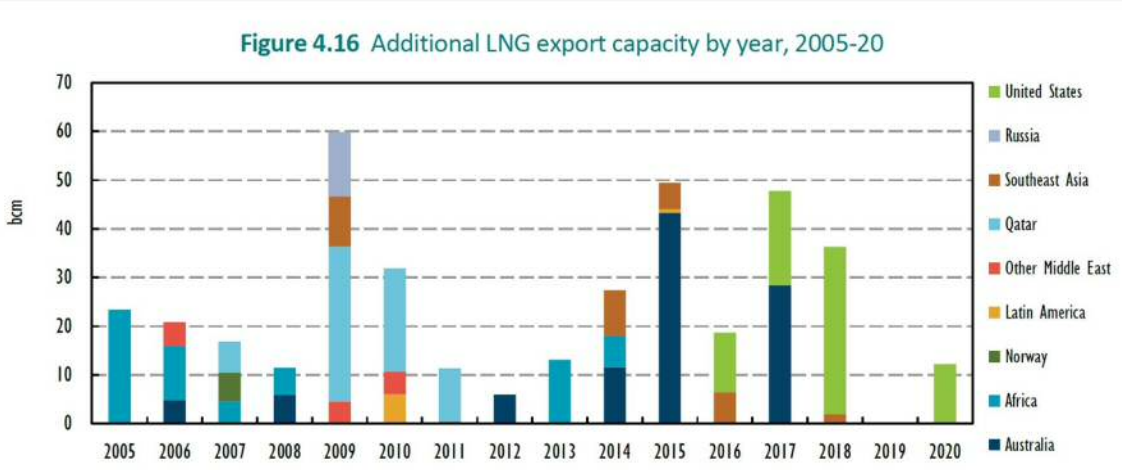

Global LNG demand by 2030 could . . . be almost double that of the estimated 2012 level of about 250 million metric tonnes. Japan, South Korea and Taiwan (collectively, JKT) have been and are expected to remain the backbone of the global LNG market, while China and India are expected to be the biggest sources of additional LNG demand.[1]

Notice that Ernst & Young's estimated 2012 trade of 250 Mtpa was wrong, which is not serious by itself but that 2012 estimate was part of a projected, continuing future growth trend that never materialized, which caused Ernst & Young to predict global LNG trade by 2015 of about 310 Mtpa, about 70 Mtpa or 29% more than what transpired.

Instead of rising according to Ernst & Young's scenario, the 242 Mtpa of global trade in 2011 was a high point that by 2016 had not yet been exceeded. In their defense, a little of the trade stagnation may have been due to supply problems, according to a 2014 study by Leidos, commissioned by the IEA:

> The 2012 decrease in LNG trade was largely driven by supply-side issues in Southeast Asia (Indonesia and Malaysia) and domestic and political challenges in Egypt, Libya, and Yemen (e.g., the Libyan Marsa el Braga facility has made no deliveries since the 2011 civil war, and is assumed to be decommissioned). Increased production in Qatar and Nigeria partially offset these losses. Despite this year-on-year decline in 2012, LNG trade has increased by 36% over the last 5 years. [2]

Those 'last 5 years' would have been 2009-2013. Those years would have included the robust increases of 2010 and 2011, preceded by the lackluster demand during 2009; so it is not surprising that there would have been a 36% increase over 5 years. Which should remind us that in statistics you can often get what you want by cherry-picking your interval. What is most important about this 2014 study, though, is that the professionals continued to be unaware of the changing LNG landscape.




With regard to 'supply-side issues' reducing trade, at least in 2012 that seems possible. Global liquefaction capacity has averaged about 20% more than trade, but there are events that can shut down plants, as the study noted. Moreover, according to this recent IEA graph of global LNG export additions, 2012 saw the smallest addition to global liquefaction in many years, the Pluto terminal in western Australia, with 4.3 Mtpa. But new capacity shot back up in succeeding years. Moreover, despite the Asian supply problems cited in the IEA report, LNG shipments to Asian destinations increased in 2012, and kept increasing through last year. I will come back to that.

Drawing a horizontal line from the top of Ernst & Young's 2030 bar for global LNG shipments would have revealed a prediction of close to 500 Mtpa by that year, which they confirmed by stating 2030 would be '. . . almost double that of the estimated 2012 level of about 250 million metric tonnes.' But I did not draw a line for 2030, figuring that in view of the market's proven volatility, fifteen years out is awfully remote for making predictions. Besides, Wood Mackenzie's predictions only went out to 2025. So in the table below I compare the two consultants' estimates for 2015, 2020 and 2025 while ignoring 2030. Keep in mind that since all Mtpa predictions were identified by the red line method, they may be less than 100% exact:

| **Global LNG Predictions** | **2015** (Mtpa) | **2020** (Mtpa) | **2025** (Mtpa) |
|---|---|---|---|
| Wood Mackenzie | 250 | 350 | 425 |
| Ernst & Young | 310 | 390 | 450 |
| Actual | 241 | | |

These numbers suggest that both sources had a tendency to overestimate future demand, with Ernst & Young's tendency a bit greater than Wood Mackenzie's. By its own admission Wood Mackenzie estimated global demand by applying an average 5% CAGR, while Ernst & Young's CAGR must have started out higher to come up with a 2015 prediction much higher than Wood Mackenzie's. Later on Ernst & Young's CAGR seems to have slacked off, so by 2025 the two consultants were almost on the same page.

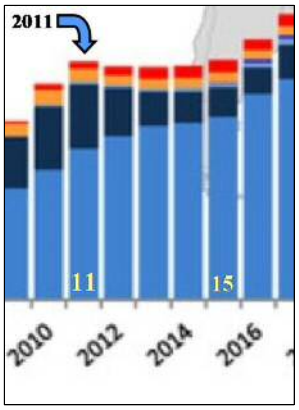
We do know that Ernst & Young did not just sit around gazing into space while drawing lines to project LNG demand, but they used, in their own words, 'data from multiple sources'. I assume Wood Mackenzie did the same thing, which means that both consultants had the benefit of opinions and data on sales and supply contracts and shipments from people in the LNG trade. That is not an unusual process in the consulting business, and sound up to a point. That point is passed when you start relying too much on conventional opinion. Most people, and most businessmen, get comfortable with the way things are, start assuming they will continue, and may transmit their complacency to visiting consultants. Result: when surprises come they are ill-prepared, and for as long as possible they will deny that a new reality may have dawned.

> "The great mass of people are incapable of realizing that in economic life nothing is permanent except change. They regard the existing state of affairs as eternal; as it has been so shall it always be."
>
> *Ludwig von Mises*

## What about Japan?

I mentioned being puzzled at how Cheniere (and Wood Mackenzie) could continue predicting a steep rise in global LNG demand immediately following the 5 flat years. But a brief look at the internal composition of LNG shipments during those flat years makes the predictions even more puzzling. In the Cheniere-Wood Mackenzie bar graph of page 2, a slice of which is shown nearby, the 'Asia-Pacific' trade is represented by the light blue part. The dark blue above 'Asia-Pacific' was the European LNG trade. We see that in 2011/12 Asia-Pacific got quite a boost, with its share of global trade rising to three quarters by 2013. But during that same time the European trade shrank, essentially making up for the Asia-Pacific increase. I assume that supply restrictions did not play much of a part, except perhaps in 2012; and I take Paul Sullivan's word that European demand was depressed due to mild winters and the dumping of cheap US coal. But then the next question must be: how would the 5 flat years of global LNG trade have looked if Asia-Pacific demand had not exploded?

In the 'Asia-Pacific' LNG trade the main players have been Japan, the world's biggest LNG consumer with between 70 and 90 Mtpa, with South Korea second and Taiwan third, all island nations, if not geographically then politically, and all without sizable domestic sources of natural gas. Most of us know that the recent boom in Asia-Pacific LNG trade mainly occurred in Japan. The government's order to close some four dozen nuclear power plants after the Fukushima meltdown of March 2011 sharply boosted demand for imported fuel of all kinds: coal, oil and LNG, to make up for the lost nuclear generating capacity. As a result Japanese LNG prices rose to $20 per Mbtu, causing every ambitious LNG exporter to drool all over his boardroom while arguing for the construction of new LNG terminals. But recently the Japanese government has started bringing back on line those nuclear plants that have passed muster. The first restarts happened in the fall of 2015; recently it was announced that by 2017, 21 of the reactors could



be brought back on line, and few people doubt that will reduce Japanese demand. [3] The key point is that without the Fukushima LNG boom, an anomaly, the 5 flat years for global LNG could well have been declining years because European shipments shrank so much. And except for that one-time nuclear event, for a long time Japanese GDP growth has been puny and is likely to remain so, which bodes ill for the LNG business. Moreover coal and oil are cheaper power plant fuels, and there seems to be a serious Japanese push for renewable energy. Conclusion: rather than providing support for a sharply higher global trend for LNG, a look at the internal composition of the 5 flat years seems to provide more support for a trend that is **lower** or flat.

## What about China?

> To prophesy is extremely difficult — especially with respect to the future."
>
> Old Chinese Proverb

But of course we must consider more LNG customers than just Japan, Korea and Taiwan, whose consumption, in some people's opinion, may yet be overshadowed by other Asian countries, especially China and India.

Hence the question: 'Where are the Sources of New LNG Demand?' posed by a recent, well-documented article in King & Spalding Energy Law Exchange, which warned:

> The traditional prime Asian LNG buyers have all cut back their demand forecasts. With the optimistically predicted restart of numerous nuclear reactors in Japan and continuation of lower consumption levels, Japan predicts its LNG demand is [to] decline – in one estimate, to 77 MTPA in 2020 as compared to 86 MTPA in 2014.[4] Kogas, the second largest LNG buyer in the world after Jera, has also revised its demand forecast downwards. Likewise, demand growth for China has dampened with recently lowered forecasts – in one forecast, by 15% for the upcoming few years. [5]

Japan's Jera and Korea's Kogas are the world's largest importers of LNG; Cheniere's long-term contracts, most of which are with European buyers, include one with Kogas. In October 2015 JP Morgan announced that both entities were:

> . . . emboldened by surging supply to demand concessions from producers facing a decade of pain.
>
> These include breaking away from oil-indexed LNG supply deals, which tend to be costly, and abolishing restrictions that currently bar buyers from diverting or re-selling cargoes. 'Sellers may be forced to offer buyers contract offtake flexibility as demand growth slows, providing continued challenges to producer profitability especially those exposed to lower-tier buyers,' JPM's head of Asia oil and gas equity research, Scott Darling, wrote in the Oct. 1 report. [6]

The problems with 'lower-tier buyers' are that many are less creditworthy and more likely to default on their long-term contracts, which will reduce investors' appetite for proposed LNG export terminals that rely on such contracts. Prime buyers like Jera and Kogas won't default unless they or the seller go bankrupt, but in a buyer's market they will expect contract adjustments, mainly price concessions and the waiving of prohibitions on 'diverting or re-selling cargoes'. Both these notions will be unwelcome to an LNG exporter who had planned to sell his uncontracted capacity on the spot market – a spot market where prices already have dropped way below his expectations, so he

doesn't want customers to compete with him by becoming traders. Speaking strictly legally, an LNG exporter can refuse to make contract concessions, but he knows that in doing so he may hurt himself in the long run. Should the market improve in a few years, he will need his contract buyer's goodwill to raise prices.

> "In any economic system which is in a process of change all economic activity is based on an uncertain future. It is therefore bound up in risk. It is essentially speculation."
>
> *Ludwig von Mises*

While mentioning the construction of LNG regasification terminals in China and India, along with a half dozen floating ones (FSRUs) being delivered across the middle east, from Egypt to Pakistan, the King & Spalding Law authors cited the IEA (International Energy Agency)'s prediction that China and the Middle East will be the big centers of overall gas (including LNG) demand by 2035.[7] That would be 19 years from now, once again too far away for my taste; besides, this kind of thing reminds me of politicians promising to achieve a certain goal by some remote year when they will be safely out of office. But like the IEA, back in 2010 Wood Mackenzie had also raised its estimate of China's appetite for LNG, from 31 to 46 Mtpa by 2020.[8] That kind of enthusiasm has finally waned, since by November 2015 new forecasts were cutting Chinese natural gas demand predictions between 14 and 28%. This had to do with '. . . the previously runaway Chinese economy . . . decelerating.' [9] It also had to do with alternatives. Historically, LNG has only made up a minority of the world's gas trade because gas delivered by pipeline is usually cheaper, and unlike the 'island' nations of Japan, Taiwan and South Korea, China has arrangements to buy pipeline gas from Russia and Central Asia, plus extensive domestic gas resources whose production is rising. The high in China's LNG imports may have occurred in 2014, with 20 or 21 Mtpa. In 2015 that total was less, though not much less.[10] In 2014 China used only half of its LNG regasification capacity of 42 Mtpa. Some of its 13 receiving terminals have been mothballed, and construction on others has been suspended. [11]

Finally, this month we learned that even China's push to replace coal with natural gas in order to clean up its cities' air may have to be less ambitious than planned. Observers also blame China's move away from manufacturing and towards more services for its reduced appetite for gas generally, and LNG in particular.[12]

## What about India?

About LNG demand in India, there have been breathless predictions similar to those about China. In April 2014 Platts reported that demand for natural gas in India was expected to grow at a CAGR of around 7% until 2030 'due to increases in demand for power generation, fertilizer production and city gas distribution.' [13] Of this, LNG imports were expected to rise as follows:

| Platts Prediction | |
|---|---|
| 2012-13 | 11.8 Mtpa |
| 2016-17 | 37.8 Mtpa |
| 2029-30 | 56.6 Mtpa |

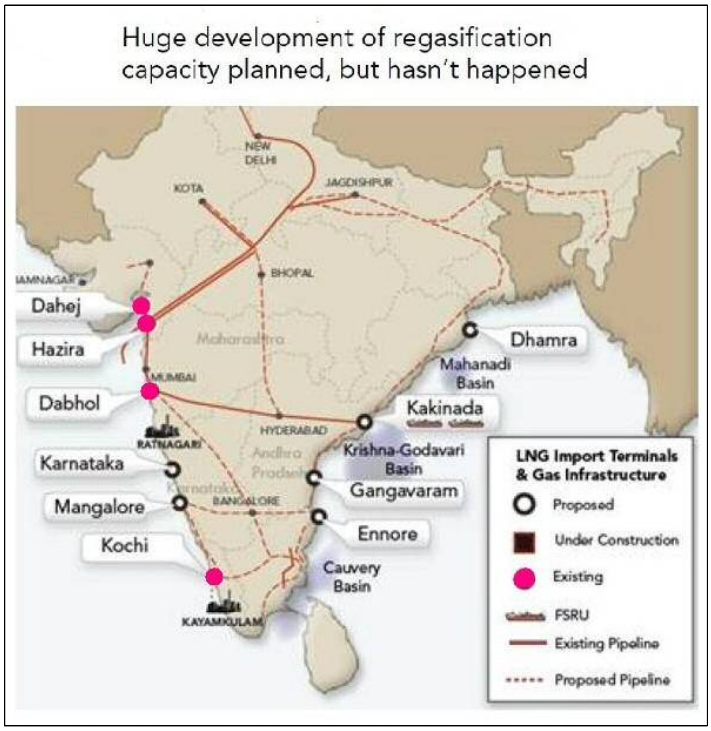
'India LNG Market Forecast and Opportunities, 2025', published in January 2016, reported that Indian LNG imports grew from 8.92 Mtpa in 2010 to 16.9 Mtpa in 2015, 'thereby exhibiting a CAGR of 13.71% during 2010-2015' (See below). That would be an impressive CAGR, except for the fact that high CAGRs are easily achieved when starting from a low base. Besides, the 16.9 Mtpa was about half Platt's 2016-17 forecast. And finally, the 2010 and 2015 figures may well show the difference between one regasification terminal and two, although I don't know this for a fact. In any case, it's not much for a country with over a billion people.

| Actual LNG Imports | | Total % Increase | CAGR |
|---|---|---|---|
| 2010 | 8.9 Mtpa | | |
| 2015 | 16.9 Mtpa | 90 % | 13.7 % |

To some LNG enthusiasts that is no reason to give up; after all, the unfulfilled potential is still huge. True; but the key to success has been elusive. Hence the title of a recent study by Poten & Partners, titled 'Unlocking the Indian Market':

> The development of the Indian LNG market has seen successes, most notably, the Dahej and Hazira import terminals and their associated imports. But efforts to develop the market have been distinguished by their difficulty. The Dabhol terminal is far underutilized, long after it was finally brought on stream. The Kochi terminal was just completed, but cannot deliver as the offtake pipeline was never built—and there is no indication when it will be. Other proposed import ventures could ring the subcontinent like a necklace, but remain on the drawing board. [14]

I marked the four existing regasification terminals in red on the nearby map, which came from Poten's report. Also seen on the map are India's gas pipelines, the two existing ones and a lot of 'planned' nonexistent ones. It is no wonder that the Dahej and Hazira terminals are the only ones doing well; by way of India's longest, largest pipeline they are connected to most of its inland population centers.




There are other strange aspects to India's gas infrastructure. In 2015 it was reported that the country, which is often plagued by power shortages, had more

than 20 gigawatts of installed gas generating capacity, most of it not being used. The reason was the cost of imported LNG, which far exceeded the cost of coal; and the utilities had no prospect of recovering that extra cost from their end-users.[15] And that year had already seen steep drops in LNG prices in Asia.

The outlook for a solution to India's profound infrastructure problem is dismal at worst and murky at best. In an undated paper presumably from 2011, Dr. A. K. Balyan, CEO of Petronet, the Indian government-owned LNG importer, announced that India was 'the 6th largest importer, importing 13.5 Mtpa,' and predicted that by 2020 it would be the world's 3rd largest since regasification capacity was planned to rise from 13.5 Mtpa to 47.5 Mtpa in 2015/16.[16] But as we now know, in 2015 India imported less than 17 Mtpa. Nevertheless, a recent report predicted that to grow to 81.1 Mtpa by 2025.[17] That is far more than Platt's predicted, and so far reality has not even been close to Platt's numbers.

## A Golden Age of Gas?


Originally created in response to the 1973-74 oil crisis, the Paris-based International Energy Agency's assignment was to 'help countries co-ordinate a collective response to major disruptions in oil supply.' But the IEA, according to itself, '. . . has evolved and expanded. It is at the heart of global dialogue on energy, providing reliable and unbiased research, statistics, analysis and recommendations.' [18]

To fulfill its self-assumed responsibility for providing reliable and unbiased research, in 2011 the IEA published a special report titled: '**Are we entering a Golden Age of Gas?**' In this report they announced prospects for the global gas market far more positive than those published only a year earlier, which they called 'our base case'. The new report advanced the 'G.A.S. (Golden Age of Gas) case, and was based on 'new assumptions that underpin a more positive outlook for gas.' By 2035 – 24 years out – global gas demand would grow by 55%, with LNG increasing its share of the booming gas trade:

> China's gas demand rises from about the level of Germany in 2010 to match that of the entire European Union in 2035. Middle East demand almost doubles, to a level similar to China's in 2015, and demand in India in 2035 is four times that of today. . . . An increase in production equivalent to about three times the current production of Russia will be required simply to meet the growth of gas demand in 2035. . . . **In the near term, there is an urgent need to invest in LNG capacity in some regions.** [19] (Bold added)

To support this upbeat vision, the IEA report predicted substantial growth in the use of natural gas for vehicles, and in reducing pollution and greenhouse gases overseas. It also highlighted some negative developments that could be good for LNG sales, such as greatly reduced use of coal and nuclear power for electricity generation.

These predictions and assumptions were spread by press releases, presentations, and the free distribution of the IEA's 2011 report, all of which conspicuously used the slogan 'Golden Age of Gas', and publishing the 'G.A.S.' case. The press briefing was full of statements which, IMHO, should have been more cautious than bold, since they were the opposite:

Gas overtakes coal before 2030 and meets one quarter of global energy demand by 2035 – demand grows by 2% annually, compared with just 1.2% for total energy.

Trade in natural gas between major regions doubles to over 1 tcm by 2035 . . .

In the GAS scenario, demand for gas grows more than 50% by 2035, providing over 25% of world energy . . .

**. . . surely a prospect to designate the Golden Age of Gas**

To be sure, there were a few caveats in the IEG's work. But its jubilant tone could lead one to think the agency's statisticians had flung open their windows on the Rue de la Fédération in order to pelt the astonished pedestrians with their green eyeshades and sharp pencils, all while dancing on their desks and shouting: 'We got gas! GAS! GAS!'

"Since becoming a central banker, I have learned to mumble with great incoherence. If I seem unduly clear to you, you must have misunderstood what I said."

Alan Greenspan, *chief of the Federal Reserve (1987-2006)*

Many years ago I learned, through a less than pleasant experience, that writers of economic predictions have to be extremely reserved, to the point of weighing their every word so they cannot be misunderstood; and for heaven's sakes, don't get carried away with your rhetoric. Back then I had been commissioned by a local health care planning agency to study the need for additional nursing home beds in its area. I conducted a thorough survey and wrote a dispassionate report with a boring title, revealing a moderate need for more beds in the not too distant future. The report was well received by the agency and its master, the federal government. But not long afterwards I was surprised to learn that the operator of one of the local nursing homes was building a large expansion, far larger than I had thought advisable. It did not work out well for him, and the next thing I knew, he accused me of having caused his foolish investment, even though he had never asked my opinion. As proof of my guilt he cited a couple of words in my report, which he had taken completely out of context. As an empire-builder, he had obviously been itching to expand. And now he blamed me, because he didn't want to be his board's scapegoat.

Having had that experience, the 'Golden Age of Gas' drumbeat struck me as reckless. On the heels of that 2011 report major energy consultants like Wood Mackenzie and Ernst & Young had been making similar upbeat predictions, which suggests that the enthusiasm was contagious; and we hardly need reminding that for several years and all over the place, plans for new liquefaction plants multiplied like Australian rabbits.

One example, but only one, of the spreading enthusiasm was the BG Group, an international energy conglomerate (in the process of merging with Shell) that also trades LNG; in their business model, rather than filling LNG orders from one liquefaction source they will choose whichever one works best with regard to cost, distance, etc. They explain:

**Why we approach our business as a portfolio**

> Our customers are supplied from our global portfolio of LNG, with multiple production sources around the world, including Egypt, Trinidad and soon in Australia and the US. This means our customers are not tied to the output of a single LNG plant and it gives us the opportunity to maximise the value of the overall portfolio.
>
> We can manage contractual terms such as delivery schedules, optimise logistics, in particular making our fleet of LNG ships run as efficiently as possible, and if the opportunity presents, purchase spot cargoes.

In 2013 BG Group showed definite signs of having caught LNG fever. A presentation they gave that year made multiple assertions clearly based on unreality. One of BG Group's visuals pooh-poohed the 'illusion' of a coming buyer's market, and asserted that 'Substantial demand upside can absorb additional supply', a claim in which a philosopher might find some abstract truth, but in this case no reason to bet the farm. On a second BG Group visual I marked other upbeat claims that will speak for themselves:


To its credit, in 2015 BG Group postponed FID on its Lake Charles LNG export terminal in Louisiana, which by then had all the required permits. I believe I can see their point. Why spend billions for a terminal when there will be new ones all over the place, desperate to sell you their output? But just two years earlier the company was still caught up in the LNG export mania for which the IEA with its 'Golden Age of Gas' may never have to answer. After all, the IEA was a prestigious international government agency! They had a lot of experts! What could go wrong?

The marketplace, for one. Amid an avalanche of LNG terminal construction, and an even bigger avalanche of plans for more, in early 2014 the IEA tried to turn down the volume on its Ode to Joy of 2011:

> QUESTION: In 2011, the IEA predicted what it called 'the golden age of gas,' with gas production rising 50% over the next 25 years. What does this 'golden age' mean for coal, oil and nuclear energy—and for renewables? . . . '
>
> IEA: We didn't predict a golden age of gas in 2011, we merely asked a pertinent question: namely, are we entering a golden age of gas? And we found that the potential for such a golden age certainly exists, especially given the scale of unconventional gas resources and the advances in technology that allow their extraction. But the potential for a golden age of gas hinges on a big 'if', and we elaborated on this in 2012 in a report called 'Golden Rules for a Golden Age of Gas'. Exploiting the world's vast resources of unconventional natural gas holds the key to [a] golden age of gas, we said, but for that to happen, governments, industry and other stakeholders must work together to address legitimate public concerns about the associated environmental and social impacts. [20]

"I really didn't say everything I said."

*Yogi Berra*

Did I just hear a bit of defensiveness? So many fancy words to obliquely confess that they should not have published what they published, but especially the way they published it. Because many people are careless readers, and because many people believe what they hope regardless of the (often carelessly read) facts, the IEA report gave them the ammo to shoot themselves in the foot. What were they thinking, proclaiming a 'Golden Age'? That's the kind of talk that can start a gold rush, with a lot of people trampled underfoot. And then to try and take the high road with pious prattle about 'environmental and social impacts' . . .

Regardless of the IEA's fiasco, its executive director, Maria van der Hoeven, boasted of her agency's dazzling expertise and vast influence:

> . . . the IEA has evolved and expanded over the last 40 years. I like to think of the IEA today as the global energy authority. We are at the heart of global dialogue on energy, providing authoritative statistics, analysis and recommendations. This applies both to our member countries as well as to the key emerging economies that are driving most of the growth in energy demand – and with whom we cooperate on an increasingly active basis.[21]

All this proved was the IEA's incorrigibility because the same verbiage had appeared, word for word, in its 2011 G.A.S. press release: 'The IEA has evolved and expanded . . . Authoritative statistics . . . We are at the heart of . . . increasingly active . . .'

"The advantage of doing one's praising for oneself is that one can lay it on so thick and exactly in the right places."

Samuel Butler *(1835-1902)*

More than a year later, in June 2015 the IEA officially reduced its projections for global use of natural gas:

> The annual report . . . sees global demand rising by 2% per year by the end of the forecast period, compared with 2.3% projected in last year's outlook. A significant reason for the downward revision is weaker gas demand in Asia, where persistently high gas prices until very recently caused consumers to switch to other options.

The IEA had finally realized that gas users did have alternatives:

> One of the key – and largely unexpected – developments of 2014 was weak Asian demand,' said IEA Executive Director Maria van der Hoeven. 'Indeed, the belief that Asia will take whatever quantity of gas at whatever price is no longer a given. The experience of the past two years has opened the gas industry's eyes to a harsh reality: in a world of very cheap coal and falling costs for renewables, it was difficult for gas to compete.' [22]

Added Ms. van der Hoeven, during her announcement speech of the new and improved forecast:

> Ladies and gentlemen, what a difference a year makes. . . . It was only 12 months ago that we were looking at high gas prices . . . There was a perception that demand growth was robust, . . . But that was 2014.
>
> Due to their capital-intensive nature and long lead times, LNG projects are soft targets for investment cuts and several of them are likely to be delayed or even cancelled. . . .
>
> Global LNG additions throughout 2020 will amount to 40% of today's existing infrastructure. As long as prices are high enough to cover operating and transportation costs, LNG plants will run at full capacity as operators try to recover as much as possible of the large upfront sunk cost. . . . there are 17 new LNG projects under construction in the world. According to our forecast, global LNG capacity additions will amount to an impressive 164 bcm between 2014 and 2020, 90% of which will originate from the United States and Australia. . . .
>
> Ladies and gentlemen, markets are not always predictable, and times change. . . .
>
> The only way to ensure that gas continues to play an important role is if it can maintain its competitiveness. This will not happen by standing idly by, but will rather require governments and industry to adapt to a new reality, and accept prices that better reflect market fundamentals.
>
> The energy transition is well underway, and gas markets must adapt if they seek to continue to play a meaningful role. [23]

"When speculation has done its worst, two and two still make four."

*Samuel Johnson*

The 164 bcm of additions to global liquefaction capacity coming on stream in the next few years is equal to some 121 Mtpa, although these figures can be fuzzy, depending on which year the calculation was done, by whom, and the accuracy and timeliness of their information. Wood Mackenzie says it's 130 Mtpa. According to the latest US government data (from FERC), it is 145 Mtpa, consisting of the capacity of the six US LNG export terminals now under construction, 83 Mtpa, plus the growth of Australian LNG export capacity from 24 to 86 Mtpa, an increase of 62 Mtpa.[24] Between the US and Australia, 83 + 62 = 145 Mtpa of new capacity. And that's without counting any other, mostly smaller, players entering the market, although those may replace some inactive terminals elsewhere.

By 2018, when Australia's capacity reaches 86 Mtpa, that country will be the world's biggest LNG supplier, replacing Qatar which despite – or because of – its huge gas reserves has made a political decision to impose a moratorium on expanding liquefaction capacity beyond its current 77 Mtpa.[25] What I don't know is if the recent FERC data, of 83 Mtpa 'approved and under construction' at 6 terminals in Maryland, Louisiana and Texas, includes any production trains on which its sponsor, Cheniere, has changed its mind since the new régime took over the company. According to the FERC list, however, the 83 Mtpa does NOT include the Lake Charles terminal in Louisiana, which is listed as 'approved – not under construction'. That's the one which the BG Group postponed, likely for good.

In summary, we seem to be looking at between 121 and 145 Mtpa or so of new liquefaction capacity coming on stream very soon – by or before 2020. Let's take the average, which is 133.

### Where do we put it all ?

By the end of 2014, a year when 239 Mtpa of LNG changed hands, the world's total liquefaction capacity stood at 298 Mtpa.[26] This confirms a rule of thumb that the production of the world's LNG plants is about 80% of their capacity. This may be due to various causes: maintenance and supply problems, political upheavals or other unpredictable disasters like terrorists blowing up terminals or pipelines. 20% idleness means that instead of absorbing 133 Mtpa of new LNG by 2020 in order to balance demand and supply, the world market would only have to absorb 106 Mtpa more than in 2015, when sales were about 240. I may be overoptimistic in ignoring the possibility that terminal idleness may go down as more terminals are built in more places, which could make the market process more nimble, enabling higher use of some capacity. But if the world has to absorb 'only' 106 Mtpa of new supply by 2020, demand would still have to grow from 240 Mtpa in 2015 to 346 in 2020, which would require a CAGR of 7.6 %:

| **HOW TO ABSORB a 106 Mtpa LNG SUPPLY ADDITION –** at various CAGRs – in Million Metric Tons per Annum (Mtpa) | | | | | | |
|---|---|---|---|---|---|---|
| YEAR | **7.6%** | **6%** | **5%** | **4%** | **3%** | **2%** |
| **2015** | 240 | 240 | 240 | 240 | 240 | 240 |
| **2016** | 258 | 254 | 252 | 250 | 247 | 245 |
| **2017** | 278 | 270 | 265 | 260 | 255 | 250 |
| **2018** | 299 | 286 | 278 | 270 | 262 | 255 |
| **2019** | 322 | 303 | 292 | 281 | 270 | 260 |
| **2020** | **346** | 321 | 306 | 292 | 278 | 265 |
| | | | | | | |
| **2025** | 499 | 430 | 391 | **355** | **322** | **293** |

Remember that Wood Mackenzie's prediction of LNG trading volume by 2020 was 350 Mtpa, while Ernst & Young's was 390 Mtpa, so both had overestimated 2015's actual volume. For the reader's convenience I repeat those predictions below:

| **Global LNG Predictions** | **2015** (Mtpa) | **2020** (Mtpa) | **2025** (Mtpa) |
|---|---|---|---|
| Wood Mackenzie | 250 | 350 | 425 |
| Ernst & Young | 310 | 390 | 450 |
| Actual | **241** | | |

During ten years of actual, not projected growth, from 2000 to 2010, the LNG trade grew from roughly 100 Mtpa to 200 Mtpa, which made a CAGR of 7.2%. If we take fifteen years of growth instead of ten, from 2000 to 2015, when tonnage reached 240 Mtpa, we get a CAGR of 6.1%. Not bad, but neither CAGR reached 7.6%; and it is common for

economic growth rates to be highest in the early years, when starting from a low level; for an example look at the history of iPad sales, or at the Chinese economy once they threw away Mao's red book. I assume this is why Wood Mackenzie for its projections starting in 2012 assumed a 5% global growth rate, not 6 or 7.6%. Ernst & Young applied a CAGR slightly higher, but not much.

Wood Mackenzie's projections from 2020 to 2025, which predicted growth from 350 to 425 Mtpa, come to a 3.94% CAGR between those years. Ernst & Young, which predicted growth from 390 to 450 Mtpa during that same interval, used a 2.9% CAGR. I'm going to assume that both consultants' much smaller Mtpa predictions for that later five-year period were due to their awareness of the diminishing returns of all growth curves, which seems reasonable if perhaps a bit late. Listed below are all these assumed CAGRs:

| **Global LNG Predictions:** | **2015** (Mtpa) | **2020** (Mtpa) | **2025** (Mtpa) |
|---|---|---|---|
| Wood Mackenzie | **250** | **350** | **425** |
| **5-year CAGR,** Wood Mackenzie: | | 6.96 % | 3.94 % |
| Ernst & Young | **310** | **390** | **450** |
| **5-year CAGR,** Ernst & Young: | | 4.70 % | 2.90 % |

In this table, the percentages in the 2020 column express the projected CAGR during the five years 2016-2020, which were 6.96% for Wood Mackenzie and 4.7% for Ernst & Young. In the same way, the percentages in the 2025 column reflect the CAGR for predicted LNG sales growth during the years 2021-2025.

So now the $100 billion question is whether in 5 years, by 2020, the world will not only have balanced its LNG supply and demand, but will also be ready to build another big supply addition, usually cited as of similar size as the one soon to hit the market at full force. To determine the latter, we first need to decide the former, i.e. what kind of CAGR we can reasonably expect between now and 2020. Without knowing that, we cannot say anything sensible about the probable fate of a second wave of 100 Mtpa of LNG.

To answer the first question, we need to start by assessing the probability of the best-case scenario, which is a CAGR of 7.6% between now and 2020, the solution to everyone's problems. To put it plainly, such a CAGR is not bloody likely because:

1. We know that during its growth period, whether that is defined as 2000-2010 or 2000-2015, the global LNG market never achieved a 7.6% CAGR.
2. To achieve it now, the market would have to shift from a standstill into high gear.
3. Predictions by the IEA, Wood Mackenzie and Ernst & Young for recent years have already proved overoptimistic.
4. The prevailing theme of recent global economic forecasts has been depressed, with many analysts predicting another worldwide financial crisis and/or recession. China has seriously slowed down and there is very little growth anywhere else, commodities have crashed, central bank manipulations have caused bubbles in stocks and real estate without stimulating much real economic growth; there is even more debt than in 2007;

in short, instead of confidence in the future there is a great deal of apprehension. None of that is positive for a commodity which, despite recent price cuts, in terms of Mbtu per dollar is still more expensive than other fuels.

> "China is certainly one of the biggest worries for the market because the reality is that nobody believes in any number that China authorities put forward."
>
> Paolo Scaroni, *Rothschild Deputy Chairman, on Bloomberg, February 2016*

On the positive side, there is a lot of regasification capacity. At the end of 2014 there were 110 receiving LNG terminals worldwide, with a total capacity of 751 Mtpa. That was three times that year's global LNG trade, and far more than global liquefaction capacity, which stood at 298.[27] Assuming those 110 receiving terminals are in the right places and connected to pipelines, new buyers might be accommodated faster.

Unlike people who get paid to do so, I am not willing to stick my neck out to predict a specific CAGR for 2016-2020 or beyond; all I can do is suggest a range of CAGRs and their probabilities.

We have already seen that a 7.6% CAGR, one that would balance the market by 2020, is highly improbably even if not totally impossible. The same can probably be said of a CAGR of 0%, meaning a continuation of the 5 flat years. I will make 0% the low end of the range, with the proviso that if a serious crisis occurs – a major war, for example – the CAGR could well fall below 0. But both ends of the scale have low probabilities.

Now take another look at the table '*How to Absorb a 106 Mtpa LNG Supply Addition'* on page 15, the one that shows that balancing the market by 2020 with the first 106 Mtpa now being built would require the improbable CAGR of 7.6%. It also shows that if we apply a CAGR of 3% or 4%, halfway between the two extremes, it would take all the way until 2025 to work off that first 106 Mtpa of new capacity. That may seem a more likely scenario. However – and this is a big 'however' – with current estimates of future global economic growth at rates of less than 2 percent annually, CAGRs of 3% or 4 % may be overoptimistic too. Remember: our shipment goal is 240 + 106 Mtpa = **346 Mtpa**. If the LNG market grows at the same rate as the global economy, i.e. at not more than a 2% CAGR, demand and supply would not balance by 2020 or even by 2025. The table does not include 2030, but a quick calculation shows that at a 2% CAGR, 2030's shipments would only reach 323 Mtpa.

But the march of the human mind is slow, because besides the present first wave of terminals recently finished or still under construction, there are many more still in the permitting stage. That's why early last September Wood Mackenzie rang the alarm bell: 'Where are all the LNG postponements?' If there weren't any soon, Wood Mackenzie warned, '. . . the market could see an additional 100 Mtpa of LNG sanctioned in the next six to 18 months, expanding the likelihood of an oversupply of LNG in Asia to 2025.' So far that year the only postponement in the U.S. had been BG Group's Lake Charles terminal, that already had all its permits.[28] Then in December Woodside Petroleum's Browse project off the coast of Australia was postponed too.[29] As some observers noted: '. . . project postponement, whether officially announced or simply the reality, may be tantamount to a cancellation in due course.'[30] Or as C. Northcote Parkinson once put it

more tersely: 'Delay is the deadliest form of denial.' But I do wonder if in asking its urgent question about postponements or cancellations, Wood Mackenzie wasn't being overoptimistic again. Its question clearly implied that a second wave of LNG terminals would prolong the oversupply that is now developing by several more years, but could still lead to a balance by 2025. So Wood Mackenzie assumed that the global LNG market, which has never traded more than about 240 Mtpa, could absorb new production of over 200 Mtpa in ten years. Maybe they are right. I just don't think so, one reason being that the experts have amply shown not to be infallible.

> "Men, it has been well said, think in herds; it will be seen they go mad in herds, while they only recover their senses slowly, one by one."
>
> *Charles Mackay: "Extraordinary Popular Delusions and the Madness of Crowds"*

To be sure, I don't in the least disagree with the essence of Wood Mackenzie's question. Those aspiring LNG operators still pursuing their permits might be well advised to put their plans on ice for five years, or until the market settles into a more predictable pattern. By then too, they may be glad they waited because we may have a very different business environment due to changes in terminal technology. Already, FSRUs (Floating Storage & Regasification Units) are proving to be good alternatives to land-based regasification terminals, and are seeing increasing use. Their advantages include less complicated permitting, lower construction costs and flexibility, since unlike land-based terminals they can be moved where needed, thus prolonging their useful lives. At the liquefaction end of LNG, changes will come more slowly due to higher costs, but this year or next the Prelude FLNG (Floating Liquefied Natural Gas) vessel, offshore western Australia, should clarify the future of floating liquefaction. In American terms, at a cost between $11 and $13 billion, Prelude is not cheap for a production capacity of 3.6 Mtpa, although in the high-cost Australian LNG environment it doesn't look so bad, and in addition to the 3.6 Mtpa of LNG it will also produce large volumes of condensate and LPG.

## A Dark, not a Golden Age

In December 2015 we were told: 'The 'Golden Age of Gas' Flames Out'. Noel Tomnay, head of global gas research at Wood Mackenzie, was describing LNG prices as 'a train wreck happening in slow motion':

> Part of the reason is that Asians are turning to another, cheaper fuel source: coal.
>
> Power companies in India and elsewhere in Asia are turning back to coal because it's cheap and domestically sourced. With local coal, there are no huge import bills [for LNG]. Asian power companies are building more than 500 coal-fired power plants this year alone. And more than a thousand are on the drawing board. . . .
>
> Many energy forecasters, including Wood Mackenzie, see LNG prices falling below $6 per million Btus, and perhaps as low as $4 per million Btus within a few years.
>
> That would lead to some LNG exporters in both the U.S. and Australia shutting down their operations because the price would be below their cash cost. . . .
>
> Ironic, isn't it? The biggest casualty of the war on coal may be the once up and coming LNG industry in the United States. [31]

I believe Mr. Tomnay put his finger on a classic example of government interference producing unintended consequences. The Obama administration launched a war for LNG

and against coal; listening to their rhetoric, you would have thought coal was Satan and Vlad the Impaler and Jack the Ripper, all rolled into one; but LNG would be our savior by taking care of America's foreign policy problems with Russia. But as the American coal business started circling in the toilet, it threw out a lifeline: lower prices! And overseas energy buyers picked up on it by buying coal, at the expense of LNG. Indeed, in January 2016 Japan's purchases of LNG fell 14% compared to a year ago.[32]

Added Mr. Tomnay, with a smidgen of hope: 'The global LNG market does not need all this LNG at the pace proposed. As companies confront this reality, a raft of project postponements will follow.' [33]

Either that or, as one commentator concluded: 'Some of these investors are going to get burned.'[34] If they let themselves be talked into investing in an export project with low-quality sales contracts or no contracts, yes. But I don't know of such a thing is possible. Most people with millions to invest are not mentally deficient. Moreover, one key criterion applied by the FERC, the federal authority that carries most of the weight in the LNG terminal approval process, is proof of 'public need' for the applicant's project. And proof of 'public need' consists of signed long-term delivery or liquefaction contracts. Speaking for myself, I don't find FERC's logic irresistible, but there it is.

Two recent examples exhibiting an absence of 'public need' are from Australia and the U.S. Australia's Woodside Petroleum took a $1.1 billion (Australian) write-off on its postponed but likely abandoned Browse LNG terminal project. After this, Woodside's net profits were reduced to a mere $26 million, 'with the company consequently reducing its dividend.' [35] Another recent example, but one that keeps throwing good money after bad, is the Jordan Cove terminal proposed for Coos Bay, Oregon.

> The key to the successful developments of these projects will be their ability to attract buyers/customers. For example, Jordan Cove is delaying FID until it contracts the entire project output. Currently it has been in negotiations with a customer who may only take up to half of that output. The need for customers in an LNG buyers' market is one reason that small-to mid-scale projects may lead the next wave of export projects.[36]

Jordan Cove, a $7 billion project, has been promoted by its corporate parent Veresen, a Canadian operator of pipelines, power and gas facilities with a market cap of $2.2 billion. So far Jordan Cove has spent a couple of hundred million on the highly convoluted government approval process, accumulating history of several years of announcements that contracts were just around the corner, or at the end of the tunnel, or some place else; just not in hand. For a while Jordan Cove's sponsor Veresen boasted of having 'Heads of Agreement', which would soon be turned into contracts. But nothing happened, and Heads of Agreement carry no legal obligations. They are similar to letters of intent. Maybe investors seem to have noticed that lately, because after a spurt of market excitement over the approval of some of the Jordan Cove permits, permits, Veresen's stock (TSX:VSN) has not done well.

"Hope is a good breakfast, but it is a bad supper."

*Francis Bacon*

It cannot fortify the confidence of LNG promoters like

Veresen/Jordan Cove that increasingly, new LNG buyers are insisting on short-term contracts, if they want contracts at all. Hence the predictions that the LNG market will increasingly deal in spot cargoes, not long-term obligations; and it's hard to see how that would not increase uncertainty for LNG terminal investors. Last November it was reported that one-third of Qatar's export LNG capacity remained unsold; and Qatar has been the world's biggest exporter. But Petronet, India's biggest LNG importer, had been buying spot cargoes of LNG elsewhere because it was saving so much money that it was willing to risk penalties for breaking its 25-year contracts with Qatar. The company has been buying only 70% of the LNG volumes it had promised to buy by contract.[37] Instead of following Petronet's example, three big Chinese oil companies have switched from buying to selling LNG as they seek customers willing to buy unneeded LNG cargoes they themselves had bought under contract:

> An example is Sinopec, the dominant buyer for Origin Energy's Australia Pacific LNG venture, which is on the cusp of starting production. It is reported to be offering to resell cargoes it has signed up to buy from the Queensland plant.
>
> That means about 70 million tonnes a year of LNG still needs a buyer, which will weigh on the oversupplied Asian market potentially through to the mid-2020s, the consultancy says. [LNG consultant] Dr Fesharaki describes those holding the contracts as 'desperate sellers' that will provide stiff competition for producers seeking customers for new projects.[38]

All this may explain why lately, experts worried about the LNG glut are using language as dramatic as the IEA's back in 2012, about the gas market's 'Golden Age' – but this time to warn of a 'Dark Age'. LNG expert Dr. Fereidun Fesharaki's prediction of '*blood on the battlefield*' make him sound like a true prophet of doom:

> Very bad things will happen in the next two or three years.
> In this market, something has to give.
> Until you get to the late 2020s you won't have any kind of supply issues.[39]

By 'supply issues' I take him to mean that the developing oversupply will last until the 'late 2020s', which means 2028 or 2029. It sounds as if Dr. Fesharaki and I are on the same page.

Although we have continued to be told that most of the output of the new LNG terminals currently being built has been contracted, Dr. Fesharaki also revealed that most of those contracts (including 60 percent of the volume under construction in the U.S.) are not with end users. Instead they are with LNG traders who apply a business model similar to that of the BG group, in which trading companies assemble '. . . production portfolios to deliver to clients, acting as intermediaries, some of which would not have buyers for all of their gas available. That would then be dumped on the spot market, leading to a substantial fall in world prices.' [40]

The other day market analysts at Goldman Sachs put it rather well:

> The struggle to create sufficient demand for LNG shows that energy policies have largely failed to deliver the promised Golden Age of gas. [41]

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