EXHIBIT NO. ___(HSY-4HC)
DOCKET NO. UG-15____
WITNESS: HAROLD "SKIP" YORK

BEFORE THE
WASHINGTON UTILITIES AND TRANSPORTATION COMMISSION

In the Matter of the Petition of **PUGET SOUND ENERGY, INC.** **for (i) Approval of a Special Contract for Liquefied Natural Gas Fuel Service with Totem Ocean Trailer Express, Inc. and (ii) a Declaratory Order Approving the Methodology for Allocating Costs Between Regulated and Non-regulated Liquefied Natural Gas Services**	**DOCKET NO. UG-15____**

THIRD EXHIBIT (HIGHLY CONFIDENTIAL) TO THE PREFILED DIRECT TESTIMONY OF HAROLD "SKIP" YORK ON BEHALF OF PUGET SOUND ENERGY, INC.

HIGHLY CONFIDENTIAL PER
WAC 480-07-160

AUGUST 11, 2015

Wood Mackenzie

Jan 2015

Natural Gas, ULSD and Fuel Oil Dynamics Update

Background

Puget Sound Energy (PSE) is requesting a follow-up to Wood Mackenzie's previous study on the price spreads of ULSD and IFO-380 to Sumas natural gas. The intent is to provide analysis under the current oil price scenario as well as to update the figures provided in the previous study. In particular, PSE has asked for updated commodity price projections (Sumas natural gas, Brent crude, PNW ULSD, IFO-380 PNW) with comparison to LNG prices out of the Tacoma LNG facility, as well as an analysis of the macroeconomic and industry phenomena driving Brent price dynamics.

ULSD and IFO-380 prices are currently being driven by Brent crude price, which is underpinned by global crude supply/demand dynamics, while Sumas natural gas price is dependent on regional supply/demand dynamics in US PADD V and Western Canada (Figure 1: Map of US PADD V and Western Canada). PADD V covers the US West Coast and consists of Alaska, Arizona, California, Hawaii, Nevada, Oregon, and Washington. Western Canada is defined as the provinces of British Columbia and Alberta for the purposes of this study.

All prices used in this study are in nominal terms, with an inflation assumption range of 2%-2.5%.

Figure 1: Map of US PADD V and Western Canada

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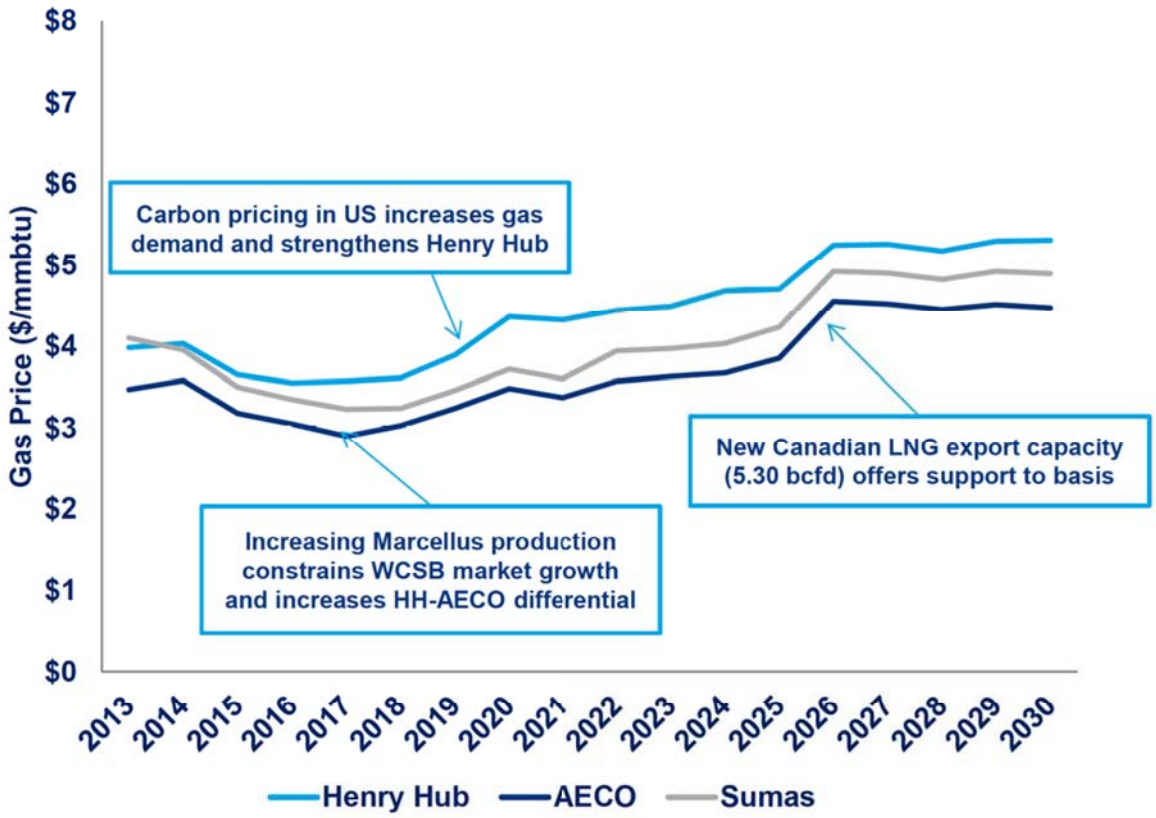
Sumas Gas Price Dynamics

Natural Gas Hub Prices

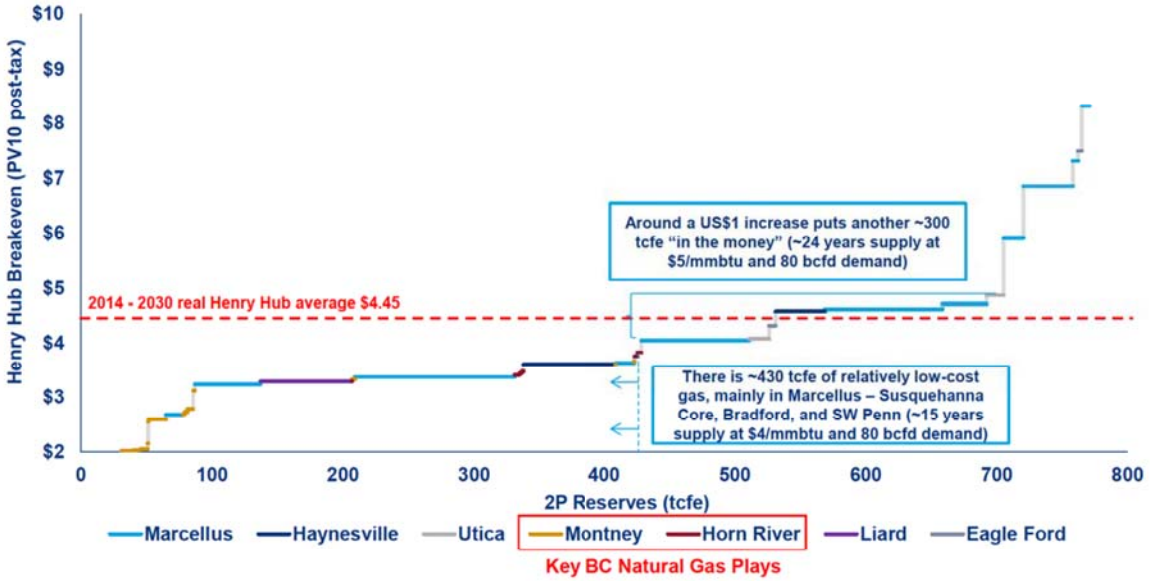
Figure 2: North American Natural Gas Prices



Natural gas prices in the US have remained low since 2009, driven by the advent of shale gas. Wood Mackenzie does not forecast a significant recovery of gas prices and expects Sumas gas price to remain in the $3.20-$4.95/mmbtu range throughout the study period (Figure 2: North American Natural Gas Prices). Despite price support to Henry Hub due to LNG exports coming online in the Gulf Coast as well as robust industrial demand growth, Sumas sources the majority of its natural gas from British Columbia, which prices its volumes off of AECO. At the AECO hub, price increases are constrained due to limited demand access as well as increasing competition from sources of supply in North America flowing into current end markets (i.e. Marcellus). Consequently, upside to Sumas gas price is limited.

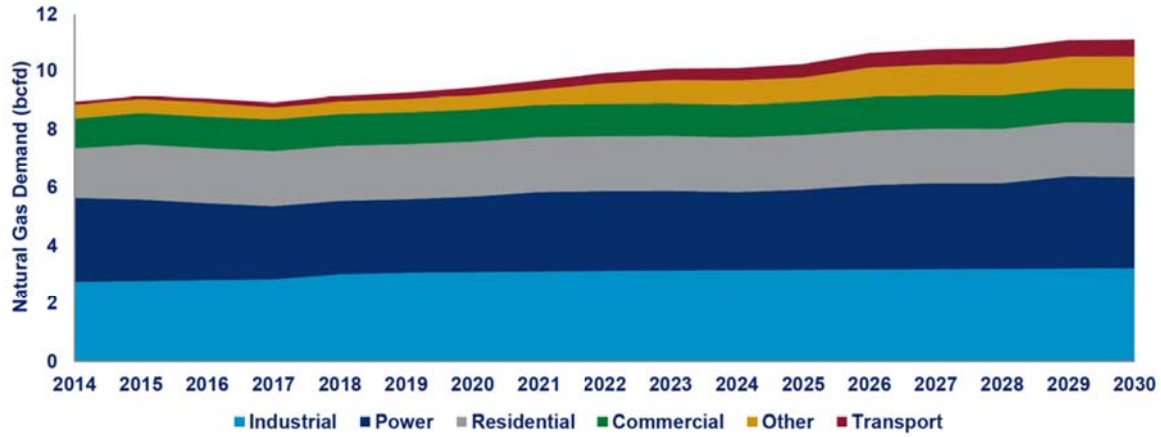
Natural Gas Supply/Demand Dynamics

Figure 3: PV10 Breakeven Gas Price by Sub-Play



Natural gas price dynamics continue to be driven by the rise of North American unconventionals and the associated increase in volumes of relatively low-cost gas. At prices of $4/mmbtu, there is ~430 tcf of economic reserves in unconventional plays alone with another ~300 tcf of gas available with just a $1/mmbtu increase, enough to supply North America for another 24 years at 2014 demand levels (Figure 3).

Figure 4: North American Pacific Coast Natural Gas Demand



North American gas demand is expected to grow through the study period, driven by increases in the power generation sector and LNG export facilities coming online. However, the North American Pacific Coast is expected to contribute very little of this growth, with only an increase of ~2 bcfd of demand by 2030 (Figure 4). Industrial growth demand is forecast to be negligible due to a dearth of established industrial projects in the pipeline. NGV penetration is also expected to have little effect as the lack of re-fuelling infrastructure has constrained NGV uptake and competition with hybrid / electric vehicles has further eroded their market share. Opportunity for long-term upside in British Columbia LNG (BCLNG) exists, but high deliverability risk makes the timing and cost of these projects very uncertain. A number of issues must be resolved on technical, political, and fiscal aspects for these projects to move forward. Most tellingly, a large number of these concerns are dependent on regulation and thus can be considered high-risk projects.

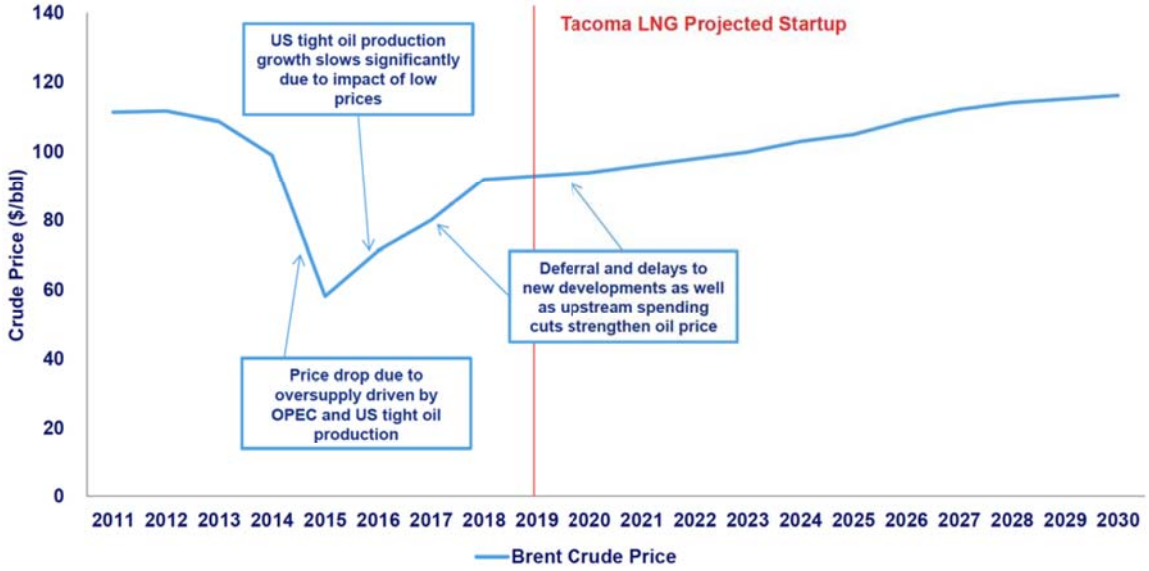
ULSD and IFO-380 Price Dynamics

ULSD and IFO-380 prices reflect an extremely liquid and global market for these fuels. As such, prices in the Pacific North West simply reflect the price that local refiners charge for their supply, which is ultimately constrained by competition from other refiners. If they price their production too high, it will encourage imports to the region from slightly more distant refiners. If they price too low, they will forgo some margin on the crude that they refine. This competitive pricing environment ensures that all refined product prices ultimately reflect the marginal cost of global supply and hence are very strongly correlated to crude prices.

We therefore first consider the outlook for global crude oil prices (i.e. Brent) before then assessing the corresponding prices for USLD and IFO-380.

Brent Crude Price Dynamics

Figure 5: Brent Crude Average Annual Price Forecast



The recent drop in Brent crude price, which currently sits around ~$50/bbl, underpins lower petroleum product prices. This drastic decrease has been caused by a combination of factors:

- World oil demand growth has slowed markedly in the last year, making it difficult to absorb non-OPEC production gains. Lower than expected Chinese demand combined with sluggish economies and recessions in Europe and Japan as well as slow US demand growth have all contributed to the problem, making it difficult to support oil prices

- In an effort to protect their market share, the Gulf Arab nations have not scaled back their output in the hopes of forcing other producers to scale back their output and letting the market rebalance through stimulation of demand growth and slowing of supply from high-cost producers. Saudi Arabia oil minister has said recently that output will not be cut no matter how low prices fall

- US crude production has been driven by onshore tight oil and is expected to continue increasing into mid-2015, reflecting the strong pace of recent drilling and the backlog of well completions as well as additional growth in the Mid-Continent, Permian Basin, and Rockies combined with continued output from the key Eagle Ford and Bakken plays

Consequently, Brent crude price is expected to remain low in 2015; however, Wood Mackenzie expects crude price to begin recovering and reach ~$92/bbl by 2018 (Figure 5). This recovery is caused by a number of developments:

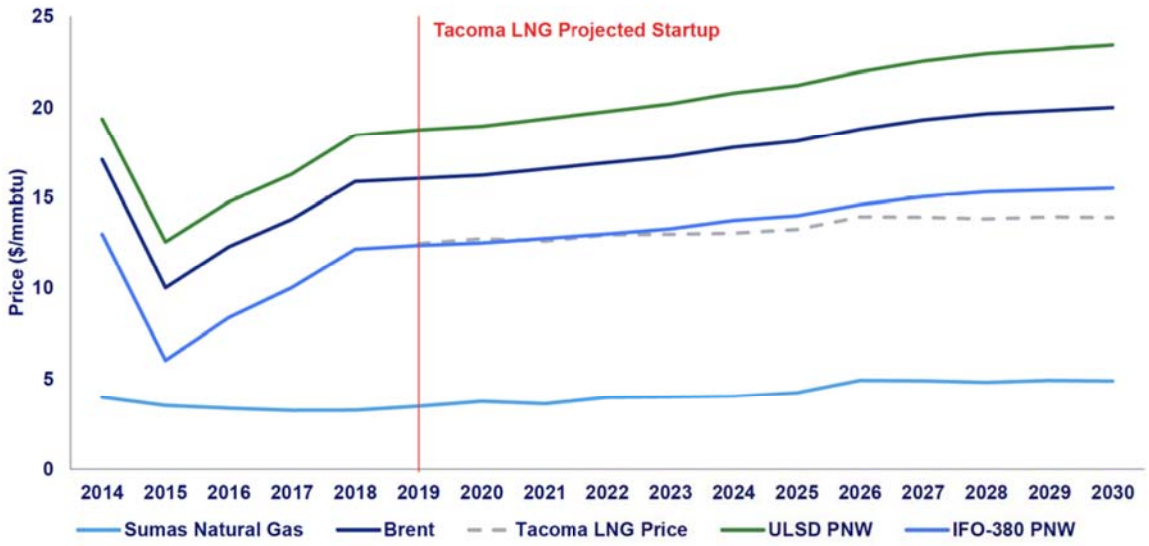
- US tight oil production growth slows significantly due to the impact of low prices as activity levels drop and rigs are idled; producers are likely to retrench and refocus only on core assets that are still economic while slowing or ceasing activity in higher cost areas
- Deferrals and delays to new developments are expected during 2015 and 2016 under lower prices, as higher cost sources of supply such as in deepwater are now deemed to be uneconomic
- Although world oil demand has slowed recently, it is still expected to continue increasing driven by robust annual GDP gains, especially in non-OECD countries still undergoing development (5% GDP growth in the long-term). Even at this slowed pace, demand growth is expected to keep pace with non-OPEC production (especially US tight oil) The Brent forecast considers a global slowdown in the near-term driven by weaker than expected Asian economies, but global output is expected to increase in the medium term, reaching 3.2% real GDP growth by 2020.
- Lower oil prices will present significant upside in demand, helping to tighten the global supply/demand balance

In addition, oil industry players were announcing upstream spending cuts well before the oil price drop, laying the groundwork for less supply growth in the medium term to 2020.

ULSD and IFO-380 Price Dynamics

Pricing relationships for ULSD and IFO-380 relative to Brent in the Pacific North West are developed based on an extrapolation of historic trends. Tacoma LNG price has been assumed as a $9.25/mmbtu adder to the Sumas gas price, accounting for transport, liquefaction, storage, and delivery costs.

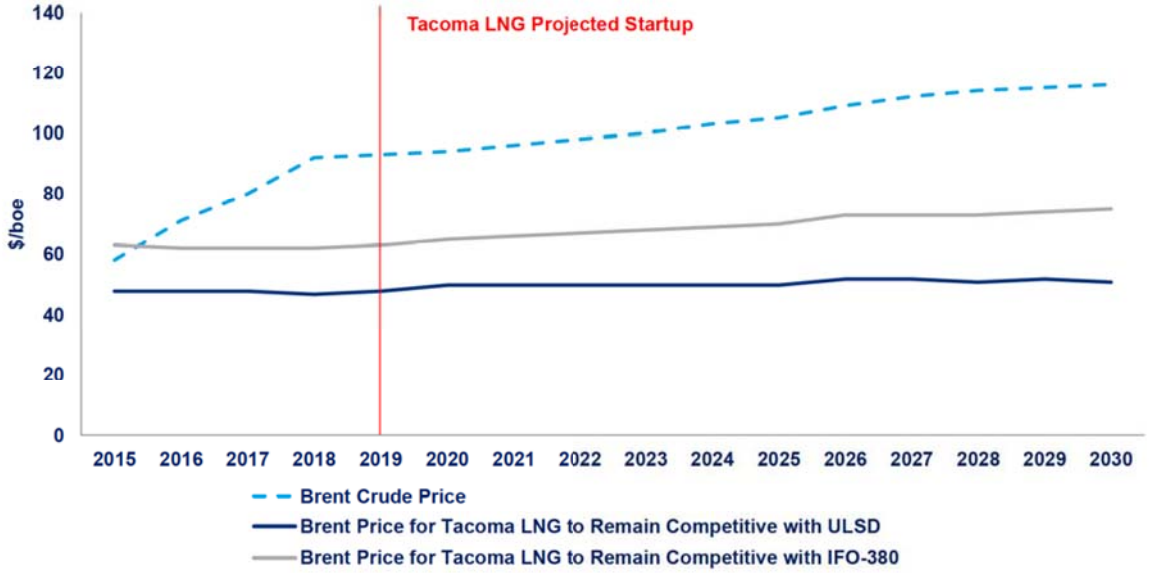
Figure 6: PNW Price Forecast for Sumas Natural Gas, ULSD and IFO-380



Under the current oil price environment, Wood Mackenzie now expects the basis spreads between natural gas to ULSD and IFO-380 to remain low before recovering in 2018 (Pricing relationships for ULSD and IFO-380 relative to Brent in the Pacific North West are developed based on an extrapolation of historic trends. Tacoma LNG price has been assumed as a $9.25/mmbtu adder to the Sumas gas price, accounting for transport, liquefaction, storage, and delivery costs. Figure 6). ULSD and IFO-380 prices are especially low in 2015 and 2016, with IFO-380 at discounts of $6.47/mmbtu and $3.98/mmbtu, and ULSD at slight premiums of $0.04/mmbtu and $2.39/mmbtu, respectively.

Conclusions and Risk Factors

Figure 7: Competitive Analysis



Wood Mackenzie has also considered project breakevens to further analyze the market opportunity for Tacoma LNG. ULSD and IFO-380 price spreads to Sumas gas are expected to remain low in the short-term but to recover by 2019, the projected startup date for the Tacoma LNG facility. Figure 7 shows the Brent breakeven prices for Tacoma LNG to be priced at a 15% discount to PNW ULSD and IFO-380 (inclusive of capital recovery and operating costs of marine end users installing scrubbers[1]); Brent crude is expected to rise to a premium of $45/bbl and $30/bbl for ULSD and IFO-380, respectively, at project startup. Tacoma LNG remains competitive at a 15% discount to ULSD so long as Brent remains above ~$47/bbl; however, breakevens are higher for IFO-380, for which Brent must remain above ~$62/bbl to remain at a 15% discount.

Natural gas price growth is expected to remain muted due to the ability to access significant volumes of economic reserves; Sumas will grow even less due to AECO-priced volumes struggling to find end market. ULSD and IFO-380 prices are expected to decrease in the short-term due to global crude oversupply driving down oil prices, but as the supply/demand balance tightens through muted supply growth and continuing demand growth, prices are expected to recover in the medium to long-term.

Wood Mackenzie has identified a number of risk factors to the study. On the gas side, prices are likely to remain low. Wood Mackenzie's forecast currently includes four BCLNG facilities coming online; even if all projects proposed in the queue were to be constructed, price upside to Sumas natural gas is limited. Therefore, NGV demand would need to increase by an extreme amount (greater than current North American diesel demand) before prices begin to approach trigger prices due to substitution for long-haul trucks and potentially rail. However, the narrowing of the ULSD-Sumas gas spread would impair substitution economics, since increased gas price increases cost of NGV use, making it unlikely a large enough volume swap will occur to drive prices towards each other.

On the refined products side, risk factors revolve around the global crude supply/demand balance and its subsequent impact on the price of Brent. Thus, these risks fall mainly into one of two categories: supply risks, such as:

[1] A $22/boe adder to IFO-380 captures the capital recovery and operating costs of marine end users installing scrubbers. The $22/boe is an estimate contractually agreed to by TOTE and PSE.

- Higher than expected production from OPEC as it strives to protect its market share and curtail production from non-OPEC sources; current Wood Mackenzie forecasts project a rise from 29.58 mmbl/d in 2014 to 30.00 mmbl/d in 2016 of OPEC crude production

- Slower decrease of US tight oil production growth; activity immediately prior to the oil price drop were at record levels and the recent growth may be maintained longer than forecast. The low price environment is expected to curtail growth, but it is possible that some companies may choose to keep producing from high-cost assets if they have no alternative. Wood Mackenzie currently forecasts an increase of 540 kb/d from December 2014 to July 2015 (to >9 mmbl/d), reflecting the strong pace of recent drilling and the backlog of completions

- Higher than expected production growth from Brazil as the Campos Basin and Santos Basin continue to be developed; Wood Mackenzie projects an increase from 2.34 mmbl/d in 2014 to 2.5 mmbl/d in 2015 of liquids production

And demand risks, which include:

- Lower Russian oil demand due to economic sanctions and falling oil prices. A large proportion of the economy is dependent upon the oil and gas industry; continued low oil prices could have a considerable detrimental effect on the country. In addition, the Rouble has declined sharply against the Dollar and the Euro, while inflation has gathered pace. Oil demand has remained high throughout 2014, but it is unclear whether this is sustainable in the future

- Lower Chinese oil demand due to manufacturing slowdown as well as a sustained downturn in housing prices; a weaker Chinese GDP would have considerable negative effects on Chinese oil demand growth

- Lower Middle East oil demand as the regional economy takes a hit under the low oil price environment

- Lower European oil demand as the region undergoes a weakening industrial outlook. The demand profile for heating oil across residential and commercial oil markets in Northwest Europe is shrinking, and the petrochemical sector has also seen losses due to reductions in ethylene cracker capacity in Italy and France

While a recovery in oil price is expected, the above risk factors may serve to delay the recovery process and lower the price forecast, which may have adverse effects on Tacoma LNG startup in early 2019. However, in the long-term, oil supply cost fundamentals ultimately will support project economics for Tacoma LNG.