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Energy & Utility Infrastructure • Renewables • LNG • EPC Risks

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**Uncommon Detail. Unparalleled Insight.**

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**Comprehensive Research & Insights:** Immediate access to our **Top-Ranked LNG, Energy & Utility, and Renewables** research, curated data & updates, distributed via email with secure, individualized links, including:

- Renewable Energy Weekly
- [Webber Research Hydrogen Tracker](#)
- LNG & Energy Infrastructure Weekly
- Marine & Equipment Leasing

### **Energy & Utility Project Research:**

- Satellite & drone imagery, analysis of key updates and market changes – *differentiated depth*.
- **W|EPC Project Database:** key cost, timeline, & regularly data - *cutting through the clutter*.
- Independent project timeline & budget analysis - *identifying issues before the market*.
- Highlighted variance between *company guidance* and *EPC reality* – *before the surprise*.

### **Full Research Library Access:**

- Access to our full **Research Library**
- Updated models, industry data & satellite imagery
- Our *multi-factor* LNG S/D model – which probability weights +100 projects

### **On-Demand Analyst Access:**

- On-demand access to our analyst teams, EPC experts & engineers in New York & Houston
- Bespoke sensitivity analysis & project work
- Project reviews, teach-ins, or client calls – *live expertise, whenever or wherever it's needed*.

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## Comprehensive Energy & Utility Infrastructure Coverage

### Renewable Energy:

Hydrogen, Solar, Wind, Biofuels, & Energy Storage

- **Enphase (ENPH)**
- **TPI Composites (TPIC)**
- **Renewable Energy Group (REGI)**
- **EnerSys (ENS)**
- **SolarEdge (SEDG)**
- **Ballard (BLDP)**
- **Plug Power (PLUG)**
- **FuelCell Energy (FCEL)**
- **SunPower (SPWR)**
- **Ameresco (AMRC)**
- **Sunrun (RUN)**
- **First Solar (FSLR)**

### Energy Infrastructure:

LNG Value Chain, Regas & Power, Tankers, Barges

- **Cheniere (LNG/CQP)**
- **NextDecade (NEXT)**
- **Tellurian (TELL)**
- **Golar (GLNG/GMLP)**
- **GasLog (GLOG/GLOP)**
- **Teekay LNG (TGP)**
- **Kirby (KEX)**
- **Euronav (EURN)**
- **Frontline (FRO)**
- **DHT (DHT)**
- **Ardmore (ASC)**
- **Hoegh (HLNG/HMLP)**
- **New Fortress (NFE)**

### LNG Projects

Financial, Commercial, Regulatory, & EPC Coverage

- **LNG Canada**
- **Calcasieu Pass**
- **Plaquemines**
- **Driftwood**
- **Rio Grande LNG**
- **Commonwealth LNG**
- **Golden Pass**
- **Annova LNG**
- **Costa Azul (ECA)**
- **Tortue FLNG**
- **Arctic 2 LNG**
- **Mozambique Area 1**
- *And Many More...*

### Utilities & Energy:

W|EPC Project Level Coverage

- **Southern Company (SO)**
- **Sempra (SRE)**
- **Dominion (D)**
- **American Electric (AEP)**
- **CenterPoint (CNP)**
- **Enterprise (EPD)**
- **Kinder Morgan (KMI)**
- **Energy Transfer (ET)**
- **Methanex (MEOH)**
- **Exxon (XOM)**
- **Shell (RDS)**
- **Total (TOT)**
- *And Many More...*

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**Our Library Includes:**

- Historical reports & presentations (via Blue Matrix)
- Access to our proprietary **W|EPC Project Data Base**
- Relevant company & industry Models
- Industry data, satellite images, & supporting documentation (via secure data room)

Latest Research						
Show	25	entries	Search: <input type="text"/>			
Title	Symbol	Author	Type	Date		☑
Golar: HYGO CEO Entangled In New Phase Of Operation Car Wash - Bribery Investigation Complicates IPO	GLNG	Michael Webber, CFA	Company Note	Sep 24 2020 10:18AM		<input type="checkbox"/>
W EPC: Renewable Biofuels – Refinery Conversions, Spreads, & Risks – Q420	EPC	Michael Webber, CFA	Industry Note	Sep 22 2020 05:36PM		<input type="checkbox"/>
GLNG: HYGO Opens The KIMONO - IPO Kicks Off, Mid-Point Adds Another ~\$3 To Our SOTP	GLNG	Michael Webber, CFA	Company Note	Sep 17 2020 09:12PM		<input type="checkbox"/>
Webber Research: LNG Weekly	EXP	Michael Webber, CFA	Industry Note	Sep 11 2020 10:40AM		<input type="checkbox"/>
Webber Research: Hydrogen Tracker	RNW	Michael Webber, CFA	Industry Note	Sep 09 2020 12:36PM		<input type="checkbox"/>
W EPC: Renewable Methanol & Hydrogen. Analyzing Methanex's (MEOH) Geismar Facilities (Sept 2020)	EPC	Michael Webber, CFA	Industry Note	Sep 09 2020 08:30AM		<input type="checkbox"/>
W EPC: Golden Pass LNG (XOM, QP) Construction Update & On-Site Satellite Image Analysis Q320 Update	EPC	Michael Webber, CFA	Industry Note	Sep 03 2020 03:12PM		<input type="checkbox"/>
Golar: HELLO HYGO. GLNG Kicks Off Reorg With Golar Power IPO	GLNG	Michael Webber, CFA	Company Note	Sep 02 2020 02:22PM		<input type="checkbox"/>
FRO: Decent Q3 Guide Moving Through Difficult H2	FRO	Michael Webber, CFA	Company Note	Aug 28 2020 08:40AM		<input type="checkbox"/>
Webber Research: LNG Weekly	EXP	Michael Webber, CFA	Industry Note	Aug 27 2020 12:06PM		<input type="checkbox"/>
W EPC: Assessing Force Majeure Impact on Calcasieu Pass, Golden Pass (XOM, QP) & Sabine Pass (LNG)	EPC	Michael Webber, CFA	Industry Note	Aug 25 2020 07:29AM		<input type="checkbox"/>
W EPC: Gorgon LNG - Operational Breakdown Could Have Contributed To Kettle Cracks	EPC	Michael Webber, CFA	Industry Note	Aug 24 2020 07:30AM		<input type="checkbox"/>
Teekay LNG: Modest Q2 Upside	TGP	Michael Webber, CFA	Company Note	Aug 17 2020 02:29PM		<input type="checkbox"/>
Golar: Reorg Eyeroll – Engaged To Be Engaged, Could See Itself Committing, But Still Needs Some Time	EXP	Michael Webber, CFA	Industry Note	Aug 17 2020 02:04PM		<input type="checkbox"/>
ENS: Resilient FQ1 With Mostly Positive Outlook But Guidance Remains Suspended	ENS	Michael Webber, CFA	Company Note	Aug 13 2020 06:33PM		<input type="checkbox"/>
ENS: Resilient FQ1 Despite COVID Headwinds, Guidance Remains Suspended	ENS	Michael Webber, CFA	Company Note	Aug 12 2020 08:02PM		<input type="checkbox"/>
Cheniere: Groundhog Day - Blackstone, Brookfield, & CQP	EXP	Michael Webber, CFA	Industry Note	Aug 12 2020 04:48PM		<input type="checkbox"/>
Q2 Earnings Round Up: GLOG, GLOP, EURN, & DHT	EXP	Michael Webber, CFA	Industry Note	Aug 11 2020 11:16PM		<input type="checkbox"/>
W EPC: Calcasieu Pass August 2020 Update - ICA Fluor Module Yard Analysis & Engineering Changes	EPC	Michael Webber, CFA	Industry Note	Aug 11 2020 11:03AM		<input type="checkbox"/>
Cheniere: Boring, Beautiful, Relentless Stability - Accelerates SPL T6, Continues Deleveraging	EXP	Michael Webber, CFA	Industry Note	Aug 07 2020 07:49PM		<input type="checkbox"/>
TPIC: Positive Momentum Marred By COVID Overhang & 2021 Line Transitions	TPIC	Michael Webber, CFA	Company Note	Aug 07 2020 07:29AM		<input type="checkbox"/>
Cheniere: Q2 Beat On Cancelled Cargo Margin Boost, Reconfirms FY20 Guidance	EXP	Michael Webber, CFA	Industry Note	Aug 06 2020 10:35AM		<input type="checkbox"/>
W EPC: LNG Canada Q320 Monitor – Labor Dynamics & Satellite Impact Baseline	EPC	Michael Webber, CFA	Industry Note	Aug 06 2020 09:00AM		<input type="checkbox"/>
Q2 Earnings Roundup: ENPH & REGI	RNW	Michael Webber, CFA	Industry Note	Aug 06 2020 08:27AM		<input type="checkbox"/>
ENPH: Q2 Adjusted Beat, Ramping Encharge Shipments In North America	ENPH	Michael Webber, CFA	Company Note	Aug 04 2020 08:35PM		<input type="checkbox"/>

Showing 1 to 25 of 180 entries

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## Webber Research: Renewable Energy Coverage & Hydrogen Focus



ENPHASE ENERGY, INC. (ENPH)  
ENPH: Q2 Adjusted Beat, Ramping  
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ENPH: Q2  
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5% below



TPI COMPOSITES, INC. (TPIC)  
TPIC: Positive Momentum Marred By  
COVID Overhang & 2021 Line Transitions

TPIC: Q2  
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estimate  
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COVID



Renewable Energy  
Webber Research: Renewables Weekly

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Renewable Energy  
Webber Research: Hydrogen Tracker

Highlights:

- Recent News (page 2)
- MBA Tracker (page 3)

WJEP: Renewable Biofuels Analysis – Q420

Key Takeaways

- Renewable Fuel Production... Just In Time Or Too Late?
  - California & Oregon have mandated Carbon Intensity (CI) reductions in transportation fuels, which could increase demand by ~350%, from ~400MM gallons/year to 1,400MM by 2025. Ten other states are evaluating similar LCFS programs, which could potentially push U.S. demand toward 2,400MM gallons/year, up ~600%. (page 7 & 8)
  - Biogas crack spreads, based on feedstocks ratios of oil, grease, fat & hydrogen costs, have been comparable, if not more profitable, than recent trends in traditional refining. (page 4 & 7)

- DOE Announce distribut projects v (EERE) H EERE's Ad selected a

- ENPH Pr announce Solar Tec be Factory with Q2 internatio Global wi residencia

- Siem Siem electr opera green power is ext hydro

- Manufac

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- Siem Siem electr opera green power is ext hydro

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AUGUST 4, 2020

Stock Rating	Market Perform
Price Target	\$43.00
Current Price	\$68.95
Upside/Downside	-37%
52 Week Range	\$17.18-\$70.36

AUGUST 7, 2020

Stock Rating	Market Perform
Price Target	\$28.00
Current Price	\$28.39
Upside/Downside	-1%
52 Week Range	\$9.19-\$29.44

July 22, 2020  
Renewable Energy  
Michael Webber, CFA  
646-993-0693  
michael.webber@webberresearch.com  
Greg Wasikowski, CFA

September 9, 2020  
Renewable Energy  
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greg.wasikowski@webberresearch.com  
Chris Tsung, CFA



### Renewable Biofuel Analysis Refinery Conversions, Crack Spreads, & Risks Q420

Michael Webber, CFA Managing Partner  
Greg Wasikowski, CFA Associate Partner  
Chris Tsung, CFA Associate Analyst  
Eric Smith Managing Partner, EPC Risks  
Robert Meaney Managing Director, EPC Risks

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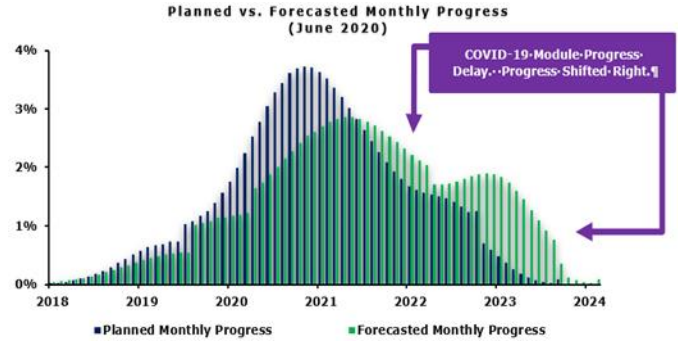
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## Project Tracking: Digging Deeper Into Large-Scale Capital Projects

Webber Research identifies potential schedule issues, significant cost overruns, and material deviations from expectations or guidance – **before the surprise.**



## High Resolution Satellite Imagery: A More Accurate Picture of Project Progress

We use high-res satellite imagery to support our core research reports to show actual project sites, temporary locations, module yards, parking facilities, storage and laydown facilities – all in an effort to assess actual progress and evolving dynamics.



## Capital Project Analysis: Unique Perspective & Analysis of Utility & Energy CAPEX Backlogs

We blend our decades of energy infrastructure, finance, EPC, and commercial experience with deep and thorough analysis of federal and local databases, economic models, and industry expertise to add unparalleled context and value.

### EPD Capital Project Analysis



#### Existing Projects: PDH #2 Cost Analysis

- **PDH #2** is designed to consume up to 35 MBPD of propane and produce 25 MBPD (or 1.65 billion lbs/yr) of polymer grade propylene ("PGP").
- EPD is forecasting the global demand for PGP to continue increasing.
- EPD has provided the following public data:
- **PDH #2** will integrate with existing propane and propylene network.
  - **FID:** October 2019
  - **COD:** 1H23
  - **Total Construction Hours:** 11.7MM
  - **EPD's total investment:** >\$1.2B
- **WIEPC estimates:**
  - **EPC total cost:** \$1.32B
  - **Construction wage rate:** \$54.44/hour (bare rate + burdens & benefits).

WIEPC Estimated Cost Breakdown** (\$MM)		
Description	% of Total Cost	Total Cost
Home Office PMT & Engineering	5.1%	\$67.6
Procurement - Equipment	14.9%	\$196.6
Procurement - Bulk Materials	14.9%	\$196.6
Construction - Directs	48.2%	\$637.0
Construction - Indirects	7.6%	\$100.5
Risk/ Contingency/ Profit	9.3%	\$122.9
<b>WIEPC Total Estimated Cost</b>	<b>100%</b>	<b>\$1,321.2</b>

- #### Key Points
- The total estimated construction craft labor costs is forecasted (**55%**) to be above standard percentage allocations (~40%).
  - Why is EPD's estimated construction hours on PDH #2 (11.7MM) less than their proposed PDH #3 (15.6MM)? If it's essentially the same project; will the additional construction labor costs from PDH #3 need to be added to PDH #2?



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## LNG & Utility Project Coverage: Unparalleled Detail & Depth



### Southern Company (SO) Vogtle Nuclear Project Quarterly Monitor - Q220

Michael Webber, CFA Managing Partner  
Greg Waskowski, CFA Associate Partner  
Chris Tsung, CFA Associate Analyst  
Eric Smith Managing Partner, EPC Risks

#### W|EPC: Vogtle Quarterly Project Monitor

##### Georgia Power's Potential Cost Exposure

**Project Costs**

- Vogtle expansion costs have escalated from the original \$14B (2008) to ~\$27B (2020). After Washington's bankruptcy in 2017, project costs/benchmarks were effectively reset - hence why they focused primarily on post-2017 changes.
- We've focused on Georgia Power's share of the Vogtle Expansion costs in the adjacent table.
- In Dec 2017, GPSC approved \$7.2B as reasonable total construction costs for GP's share of the Project, above which GP allocated contingency.
- After factoring in GP's portion of the Toshiba PCS credit (\$1,492B), GP's voluntary cost allocation from 2018 (\$994MM), GP has already burned through \$2.05B (32%) of its allocated contingency, which may ultimately prove insufficient.
- Including the contingency (\$2.05B), we believe Georgia Power is already looking at \$1.8B of potential cost overruns, pending eventual review by the GPSC.

Cost Category	2018	2019	2020	2021	2022	2023
Total Construction & Capital Costs	\$8,771	\$9,706	\$9,489	\$8,446	\$8,624	\$8,482
Toshiba PCS Cost Credit				(\$1,492)	(\$1,492)	(\$1,492)
GP Voluntary Allocation (GPSC)						(\$994)
GP Allocated Contingency (GPSC) (30%)						(\$2,050)
Net Construction & Capital Costs	\$8,771	\$9,706	\$9,489	\$6,954	\$7,152	\$6,990
Contingency Cost Not Burnt						146
Net Allocated Construction & Capital Costs	\$8,771	\$9,706	\$9,489	\$6,954	\$7,152	\$7,136
Effective (Projected for 2020) Cost Recovery (GPSC)	\$5,585	\$5,585	\$5,585	\$5,585	\$5,585	\$5,585
Potential Cost Overrun Exposure	\$3,186	\$4,121	\$3,904	\$1,369	\$1,567	\$1,405
GP's Paid Project Financing Costs	\$3,380	\$3,380	\$3,380	\$3,380	\$3,380	\$3,380
GP's Total Cost of Construction	\$6,760	\$6,760	\$6,760	\$5,014	\$5,014	\$5,014

**GP's updated cost overruns already total ~\$2B, before moving into the more difficult commissioning phase**

#### W|EPC: Vogtle Quarterly Project Monitor

##### Construction Progress and Cost Analysis

**Construction Costs Continue Increasing**

- The project made ~25.6% construction progress in 2018 and 2019 (24 months), while having to spend \$721MM more than initial budget.
- Between Dec19 and Sep20 (21 months), Vogtle needs to complete all remaining construction activities (~23%) prior to the Unit 4 "fuel load" milestone (mid-Sep 2021).

**W|EPC Observations**

- Using 2018/19 as a simplified, straight-line comp, the project would get through the remaining \$160MM of allocated contingency and incur another \$420MM of overages.
- While that's not necessarily an apples to apples comparison as late stage costs can vary, it gives some context.
- It's also worth mentioning that the road gets harder from here, as projects typically have a harder time maintaining schedule near the ~70% completion threshold, which typically signifies the transition from bulk construction to commissioning.

Item	Jan-18	Jul-18	Jan-19	Dec-19	Sept-2021 (Unit 4 Fuel Load Test)
Construction Progress Completed	46.5%	55.3%	66.6%	77.1%	100%

**Total Site Construction Management Costs (Millions)**

Item	Jan-18	Jul-18	Jan-19	Dec-19
Construction Cost Forecasts	\$3,825	\$4,375	\$4,375	\$4,506

**\$721MM Increase**

**The project could be challenged finishing construction by Sept 21 without increasing costs.**

#### W|EPC: Vogtle Quarterly Project Monitor

##### February 2020 Re-Baselined Schedule

**Status**

- The Feb 2020 site work plan is behind the April 2019 baseline plan, which delayed the Cold Hydro Test (CHT) and the Hot Functional Test (HFT) 6 weeks each.
- However, Vogtle Units 3 (May 2021) & 4 (Mar 2022) forecasted in-service dates remain the same and are ~6 to ~8 months ahead of their respective regulatory approved COD dates (Nov 2021 and Nov 2022).

**W|EPC Observations**

- Construction delays have increased the backend loaded progress needed to meet the Unit 4 fuel load date, monthly progress needed is as follows:
  - April 2019 Baseline Plan: 3.4%
  - Feb 2020 Site Work Plan: 6.9%

**The remaining shoehorned, backend-loaded schedule will likely be an ongoing problem**

#### W|EPC: Golden Pass LNG Cost Forecast - August 2020

##### Golden Pass LNG (XOM, QP) Construction Update & On-Site Satellite Image Analysis Q320 Update

**W|EPC RISKS**

Michael Webber, CFA Managing Partner  
Greg Waskowski, CFA Associate Partner  
Chris Tsung, CFA Associate Analyst  
Eric Smith Managing Partner, EPC Risks

#### W|EPC: Golden Pass LNG Cost Forecast - August 2020

##### W|EPC Golden Pass LNG Cost Forecast (in MM\$) - August 2020

**We are forecasting a 6-month delay, liquidated damages, and ~\$1B of JV contingency gone.**

#### W|EPC: Golden Pass LNG Satellite Image Overview

##### Golden Pass LNG Satellite Image Overview

The satellite image represents the Golden Pass LNG project site and key construction areas from August 2020.

On-going construction activities include:

- soil stabilization
- piling
- storm water protection
- dredging
- shoreline protection installation

**Golden Pass LNG Project Site Design Overlay.**

#### W|EPC: Golden Pass LNG Satellite Image Comparison

##### April vs. August 2020 - Golden Pass On-Site Satellite Image Comparison

**The lack of piling progress is stalling other construction activities.**

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## Webber Research: LNG Weekly & Detailed LNG Project Coverage



Export Infrastructure  
Webber Research: LNG Weekly

Highlights:

- Aftermath of
- Saudi Aramco
- Arctic LNG 2
- Global LNG supply
- China
- Shell
- Eagle LNG F
- Shell
- LNG C
- Petro
- Qatar
- \$12B

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GOLAR LNG LIMITED (GLNG)  
Golar: HELLO HYGO  
GLNG Kicks Off Reorg With Golar Power IPO

Golar Kicks O up ~11% Mon with Stonepeal IPO under the from the IPO t by Stonepeal

Long-Anticip (HYGO) is a s cleaner and r positively leve a couple year valuations hav significant val valuation, shat current comps (Figure 7), whi development i terminals coul

Background: Stonepeal in contract tied to exchange for + 50% of the ne preference sha up to 11.5% (2021). Golar P scale LNG sup following part:

- 1.5G March for a
- 605M comm

Price Targets  
GLNG: \$18/sh  
GMNG: \$3/sh

Please see impo



Export Infrastructure  
Gorgon LNG: Operational Breakdown Could Have Contributed To Kettle Cracks  
Mid-October May Be A More Likely Restart Timeline

Key Takeaways  
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Energy EPC  
W|EPC: Assessing Early Force Majeure Impact on Calcasieu Pass, Golden Pass (XOM, QP) & Sabine Pass (LNG)  
Marco & Laura Impact Could Last 7 to 14 Days... Depending on Damage & Craft Labor Rejection

Key Takeaways

- EPC contractors receive schedule relief for Force Majeure (FM) events (i.e. named storms such as Marco & Laura) in industry standard EPC contracts, which typically provides EPC contractors schedule relief but not cost relief.
- EPC contractor FM claims on Calcasieu Pass, Golden Pass, and Sabine Pass LNG likely started yesterday August 24th, 2020 (due to mandatory evacuations & closures).
- Something to watch...construction workers tend to scatter and chase higher paying (wages & per-diem) jobs post hurricanes/natural disasters, which creates headaches for on-going/planned projects and complicates FM claims.
- Based on current Marco & Laura forecasts and expected rain/storm surge, we are forecasting a 7 to 14-day construction schedule delay on Calcasieu Pass LNG (CPLNG), Golden Pass LNG, & Sabine Pass LNG Train #6 (SPLNG6).

Impacts & Timeline Implications

Often, impacts due to hurricanes occur well beyond the actual storm itself due to lost productivity and challenges restarting/staffing the project.

1. Flooding – enough drainage pumps installed and site drainage working sufficient to mitigate additional rain fall.
2. Storm Surge – levees/walls high enough to protect rising levels and all equipment moved to the highest elevation on the site (if practical).
3. Wind – cranes must be placed horizontally and structures secured to reduce/prevent damage.
4. Temporary Construction Facilities – if levees and/or drainage are not in place at temporary construction facilities, equipment and material stored in laydown yards/facilities could be damaged by water and cause unplanned long-term issues.

EPC contractors have a reputation for trying to use FM impacts to absorb existing self-inflicted schedule delays. Based on the current/expected forecast, we believe the following FM timeline is realistic.

1. Prep time for storms – 1 to 3 days
2. Marco & Laura storm duration – 2 to 4 days
3. Restart & productivity losses – 4 to 7 days

Please see important disclosures at the end of this report.

September 11, 2020  
Export Infrastructure  
Michael Webber, CFA  
646-993-0693  
michael.webber@webberresearch.com  
Greg Wasikowski, CFA

SEPTEMBER 2, 2020

Stock Rating	Out Perform
Price Target	\$18.00
Current Price	\$10.37
Upside/Downside	74%
52 Week Range	\$4.54-\$15.86

August 24, 2020

Export Infrastructure



Michael Webber, CFA

August 25, 2020

Energy EPC



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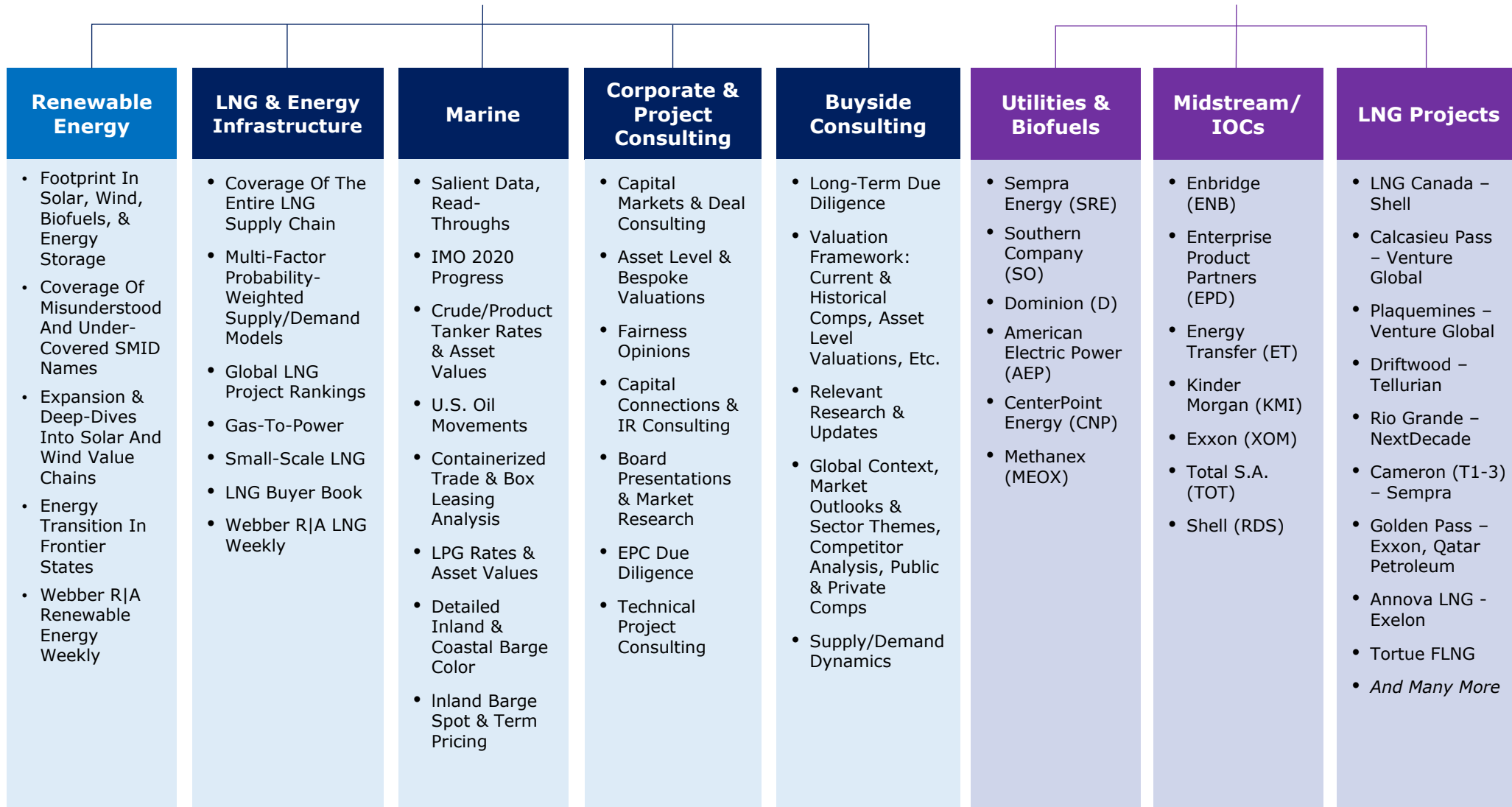
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## Webber Research: Multi-Factor LNG Supply & Demand Model



# WEBBER

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### Vertical LNG

Updated Thesis & Global Project Rankings  
October 2019

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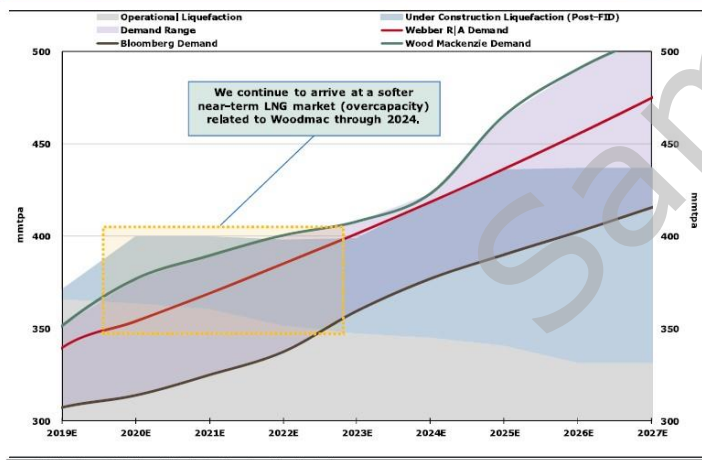
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### Webber R|A: Vertical LNG – Supply & Demand Model



Supply/Demand Model		Our Regional and Facility Assumptions																																																																																																					
Our Vertical LNG Supply/Demand Model utilizes 3-stage growth rates for 4 global LNG sinks, and builds up Emerging Market (EM) demand by probability-weighting 111 separate Regas/FSRU projects.																																																																																																							
<b>Assumptions/Changes</b>																																																																																																							
<ul style="list-style-type: none"> <li>Avg global demand growth of ~4.9%/year through 2025, driven primarily by China (9%) and Europe (4%)</li> <li>EM: Avg probability-weighted completion of ~2.4 FSRU projects/year (below Consensus)</li> <li>Forward LNG production ests limited to facilities under construction of post-FID.</li> </ul>																																																																																																							
<b>Process &amp; Functionality</b>																																																																																																							
<ul style="list-style-type: none"> <li>Timing, slippage, and probability weightings for:                             <ul style="list-style-type: none"> <li>23 liquefaction projects under construction</li> <li>18 regas projects under construction</li> <li>93 regas projects proposed</li> </ul> </li> <li>Dynamic regasification throughout estimates (by geography)</li> <li>Cross referenced against Woodmac &amp; Bloomberg</li> </ul>																																																																																																							
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### Webber R|A: Vertical LNG – Supply/Demand Model



### Webber R|A: Vertical LNG – New Project Focal Points



- #### How Do We Look At LNG Projects?
- Scalability & Speed-To-Market.** Can you get a reasonable (6-10mtpa) footprint FID'd and on the ground before larger/sponsored projects start slamming the window shut? The longer we look at the project list and our supply/demand model, the more important this seems.
  - Security Of Supply & Location.** While both of these factors impact price, we believe the majority of long-term LNG buyers are less price sensitive than the market thinks. For buyers replacing/suppling baseload energy demand – security of supply is worth quite a bit – hence a general preference for Cheniere, Qatar, etc.. History, credit quality, geographical diversity – it all matters.
  - Price/Cost.** The further down the project list you go, we'd expect a higher proportion of more price sensitive buyers (trading houses, etc.), particularly for lower cost US Gulf LNG. That said, true economic comparisons across the entire project curve remain difficult and open ended, and we think there's still a relatively wide band of costs/LNG price points that keep projects in play.
  - Regulatory Process.** Most 2nd Wave projects are still involved in some aspect of permitting. FERC approval/timing has taken a back seat to pricing dynamics in the market narrative over the past 12 months (due in part to the faster pace of approvals compared to FIDs). It certainly still matters, but worth noting that Lake Charles, Magnolia, Delfin, etc.. are fully approved and still not done.
  - Strategic Value.** The closer we look at the project list, the more we think about consolidation. Most independent projects tend to run tight on liquidity runway (9-18 months) which potentially creates a helpful dynamic for someone looking to roll up the space.

For access information, please email us at [info@webberresearch.com](mailto:info@webberresearch.com)

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## Cheniere (LNG) Sum Of The Parts Analysis

	Liquefaction Volumes																Cheniere Marketing <sup>1</sup>	
	Corpus Christi Contracts									CC-Stage 3								
	Train 1			Train 2			Train 3			Stage 3	CMI							
Counterparty	Endesa S.A.	Pertamina	Iberdola	Pertamina	Iberdola	Gas Natural Fenosa	Woodside Energy	Electricite de France	EDP SA	Trafigura	CNPC	TBD / Mix	Utilization: 85%	Utilization	85%	100%		
Contracted Annual Capacity (MMBtu)	120.1	48.0	48.0	33.1	40.6	80.1	45.4	41.1	41.1	53.4	64.1	405.7	101.4	Available Annual Capacity	161.7	325.6		
% Of Total Capacity	46%	19%	19%	13%	16%	31%	18%	16%	16%	21%	25%	80%	20%	% Of Total Capacity	21%	21%		
Fixed Fee (\$/MMBtu)	\$3.50	\$3.50	\$3.50	\$3.50	\$3.50	\$3.50	\$3.50	\$3.50	\$3.50	\$2.75	\$2.75	\$2.45	\$1.38	Net Revenue (\$/MMBtu)	\$1.38	-\$0.33		
Annual Cash Flows	\$420.4	\$168.0	\$168.0	\$115.9	\$142.1	\$280.4	\$158.9	\$143.9	\$143.9	\$146.8	\$176.2	\$993.9	\$118.54	Annual Cash Flows	\$189.03	-\$105.83		
Maintenance & Opex <sup>2</sup>	(37.5)	(15.0)	(15.0)	(10.3)	(12.7)	(25.0)	(14.2)	(12.8)	(12.8)	(16.7)	(20.0)	(102.4)	(25.6)	Allocated Maintenance & Opex <sup>2</sup>	(40.0)	(80.5)		
Pipeline Expense <sup>2</sup>	(27.8)	(11.1)	(11.1)	(6.9)	(8.4)	(16.7)	(9.4)	(8.6)	(13.0)	(16.8)	(20.2)	(40.0)	(10.0)	Allocated Pipeline Expense <sup>2</sup>				
Maintenance Capex <sup>2</sup>	(18.3)	(7.3)	(7.3)	(4.5)	(5.6)	(11.0)	(6.2)	(5.6)	(8.6)	(11.1)	(13.3)	(52.8)	(13.2)	Allocated Maintenance Capex <sup>2</sup>				
<b>EBITDA (\$MM)</b>	<b>\$336.7</b>	<b>\$134.6</b>	<b>\$134.6</b>	<b>\$94.1</b>	<b>\$115.4</b>	<b>\$227.7</b>	<b>\$129.0</b>	<b>\$116.8</b>	<b>\$109.5</b>	<b>\$102.2</b>	<b>\$122.6</b>	<b>\$798.7</b>	<b>\$69.7</b>	<b>EBITDA (\$MM)</b>	<b>\$149.1</b>	<b>-\$186.3</b>		
EBITDA Multiple <sup>3</sup>	10.0x											8.0x		EBITDA Multiple <sup>3</sup>	5.0x			
Enterprise Value (\$MM)	\$3,367.2	\$1,345.8	\$1,345.8	\$940.8	\$1,154.0	\$2,276.7	\$1,290.4	\$1,168.2	\$1,095.1	\$1,021.8	\$1,226.2	\$6,389.9	\$557.9	Enterprise Value (\$MM)	\$745.3	\$0.0		
Less: Est Allocated Net Debt <sup>2</sup>	(1,754.2)	(701.1)	(701.1)	(490.1)	(601.2)	(1,186.1)	(672.3)	(608.6)	(777.8)	(1,010.1)	(1,212.1)	(3,466)		Less: 2024E Net Debt (\$MM) <sup>2</sup>				
Equity Value (\$MM)	\$1,613.0	\$644.7	\$644.7	\$450.7	\$552.8	\$1,090.6	\$618.2	\$559.6	\$317.3	\$11.7	\$14.1	\$2,924.4	\$557.9	Equity Value (\$MM)	\$745.3	\$0.0		
/ LNG Shares Outstanding (MM)	299.8									299.8		299.8		/ LNG Shares Outstanding (MM)				
Equity Value/Share	\$5.38	\$2.15	\$2.15	\$1.50	\$1.84	\$3.64	\$2.06	\$1.87		\$1.14		\$9.75	\$1.86	Equity Value/Share	\$2.49	\$0.00		
Weighted Average Cost Of Capital <sup>4</sup>	6.9%									6.9%		6.9%		Weighted Average Cost Of Capital <sup>4</sup>				
<b>Corpus Christi CF/Share (PV)</b>	<b>\$5.03</b>	<b>\$2.01</b>	<b>\$2.01</b>	<b>\$1.36</b>	<b>\$1.67</b>	<b>\$3.29</b>	<b>\$1.87</b>	<b>\$1.69</b>		<b>\$0.92</b>		<b>\$6.99</b>	<b>\$1.33</b>	<b>CMI CF/Share (PV)</b>	<b>\$2.10</b>	<b>\$0.00</b>		
<b>Total CF/Share (PV)</b>	<b>\$21.96</b>																	
Current CQP Unit Price (\$/unit)	\$34.18																	
x CQP Units Owned (MM) <sup>6</sup>	249.8																	
CQP Equity Stake (\$MM)	\$8,538																	
CQP GP IDRs (\$MM, at 12x)	\$299																	
Total CQP GP/Equity Ownership Value	\$8,837																	
/ LNG Shares Outstanding	299.8																	
<b>CQP Equity Stake (\$/share)</b>	<b>\$29.48</b>																	
<b>Plus: PV Of Corpus Christi Volumes</b>	<b>\$21.96</b>																	
<b>Plus: Probability Weighted CC-Stage 3</b>	<b>\$4.16</b>																	
<b>Total Implied Value - LNG/Share</b>	<b>\$56</b>																	

(1) Assumes excess uncontracted volumes sold by Cheniere Marketing at a \$5.50/MMBtu less relevant input costs. For SPL's CMI volumes: HHub + premium, Toll, Transport. For CCL's, HHub + Transport. A 80% utilization rate applied evenly.  
(2) Assumes proportionate allocation of maintenance, operating, and pipeline expenses based on nominal contracted capacity amounts, and proportionate allocation of net debt based on EBITDA contribution  
(3) 11x EBITDA multiple represents discount to recent private market transactions (Cove Point - 12x)  
(4) Utilizes current 20-year U.S. Treasury note yield as proxy for risk-free rate, 6% cost of debt, 1.0x debt/equity ratio, 7% expected market return, and 5-year historical beta  
(5) Until contract details disclosed at FID, unsold CC3 volumes sold through CMI, using existing CMI utilization, margin estimates  
(6) Includes GP units

Source: Webber Research, LLC, FactSet, Company filings

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