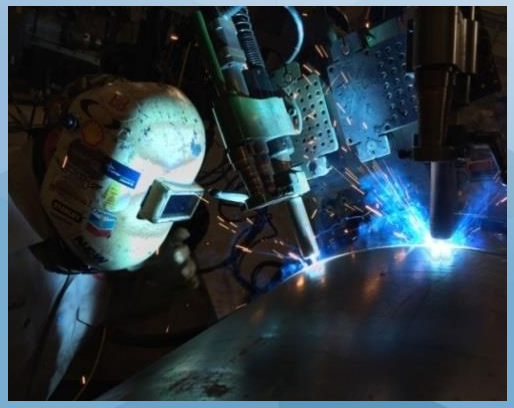
Alaska LNG™

Fueling Alaska's Future



SEPTEMBER 2015

# Project Update

# Alaska LNG – Project Overview

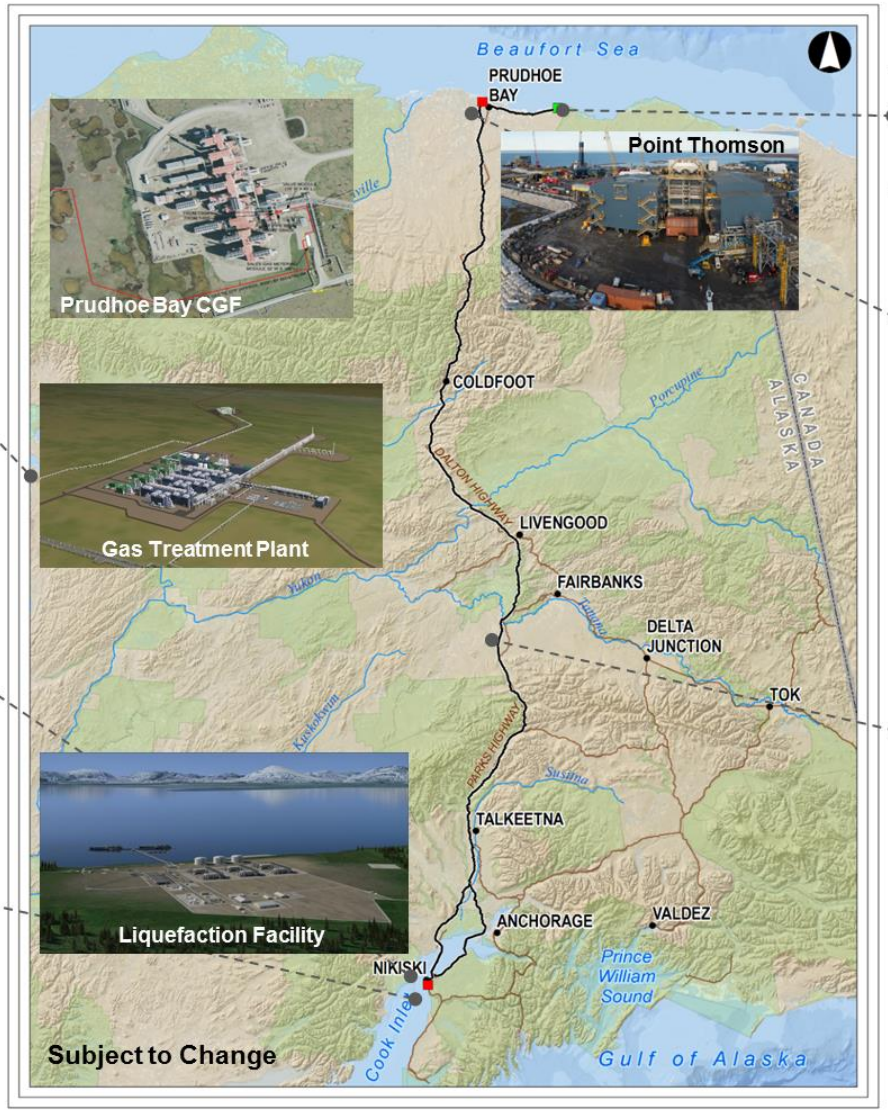
Alaska LNG™

*An integrated liquefied natural gas export project providing access to gas for Alaskans*

**Gas Treatment Plant (GTP)**
- 3.3 BCFD peak winter rate
- Three trains with compression, dehydration and chilling for gas conditioning (remove impurities)
- $CO_2$ removed and compressed for injection at PBU

**LNG Storage & Marine Terminal**
- LNG storage tanks
- Two jetties to accommodate 15-20 LNG carriers per month

**Liquefaction Facility**
- Natural gas is cooled to -260 degrees to condense the volume 600 times
- 3 trains dehydrate, chill and liquefy gas to produce up to 20 million tons of LNG each year




**Point Thomson Gas Expansion***
- New wells
- New gas processing facilities

**Prudhoe Bay Tie-In***
- Gas delivery to new gas treatment plant (GTP)
- Integration with existing CGF
- Injection of $CO_2$ from GTP

**Gas Pipeline**
- 800+ mile 42" diameter gas pipeline from gas treatment plant to liquefaction facility
- 3.3 BCFD capacity
- 8 compressor stations
- ~ 5 in-state off-take points

* Prudhoe Bay and Point Thomson Modifications/New Facilities are managed by Prudhoe Bay Unit and Point Thomson Unit Operators, respectively, and are closely coordinated with the Alaska LNG Project.

Artists renditions of LNG and GTP

Alaska Gasline Development Corp. | BP | ConocoPhillips | ExxonMobil | TransCanada

# Alaska LNG – Project Overview

Alaska LNG™

**Safety, Health and Environment Report:**

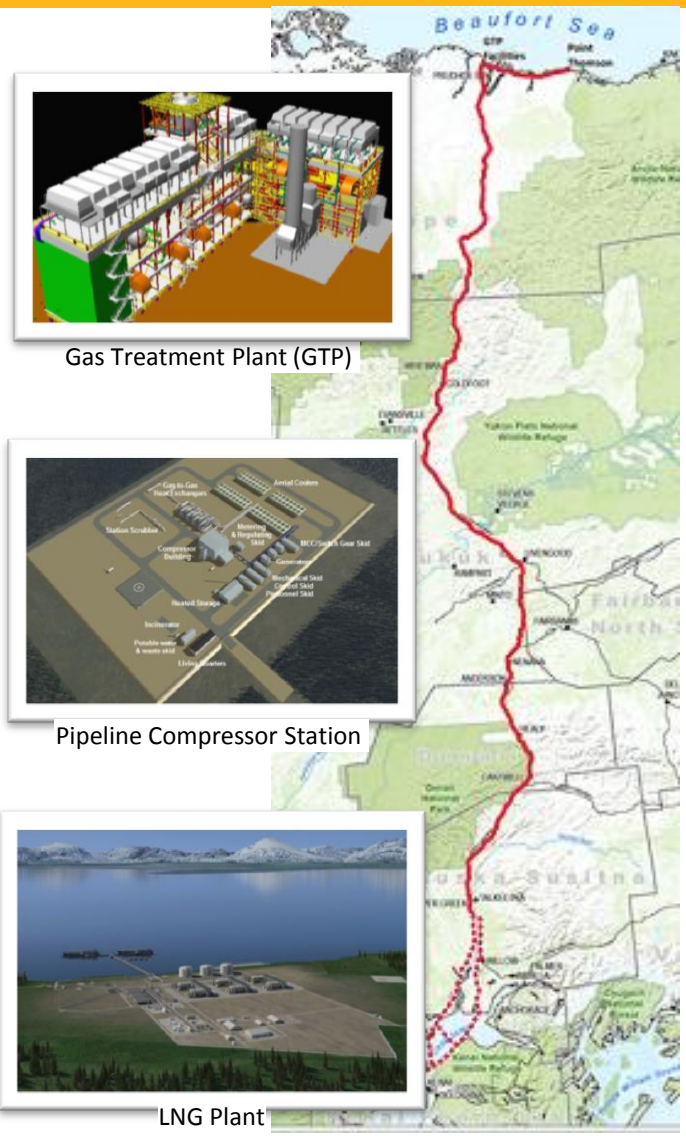
- Building culture of caring – tracking near misses and first aids

**Executive Summary:**

- Spend: $243M on pre-FEED through July 2015
- Initial design scope ~75% complete, 2015 field work ~50% complete
- Finalizing project design/execution basis (cost and schedule estimates)
- Ongoing collaboration with regulators at local, State and Federal levels
- Community open-house sessions continuing with FERC participation
- Progressing work to evaluate SoA request for a 48” pipeline system
- Developing 2016 Work Program and Budget

**Key Messages:**

- Alaska LNG is an integrated LNG project – *plants plus pipeline*
  - Regulated under FERC Section 3; allows design integration
  - Integrated design includes ~ 5 off-take points for in-state supply
- Focus on lowest cost of supply to compete in a global market
- Alignment, risk and cost reduction (ARC) remain key to success






Gas Treatment Plant (GTP)



Pipeline Compressor Station



LNG Plant

# LNG Plant and Marine Terminal Update

Alaska LNG™

**Initial design scope 72% complete through end of July**

**Actively acquiring land, purchased ~600 acres in Nikiski**

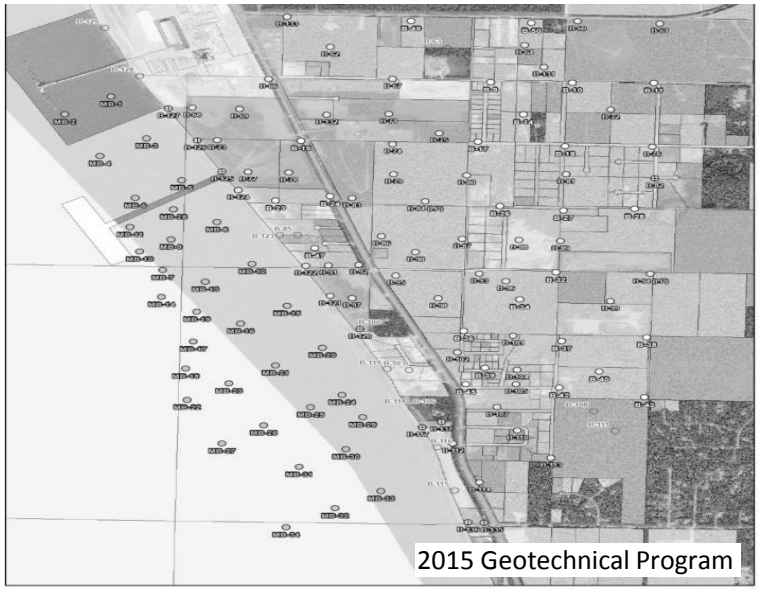
**Evaluating alternative layouts, driver selection complete**

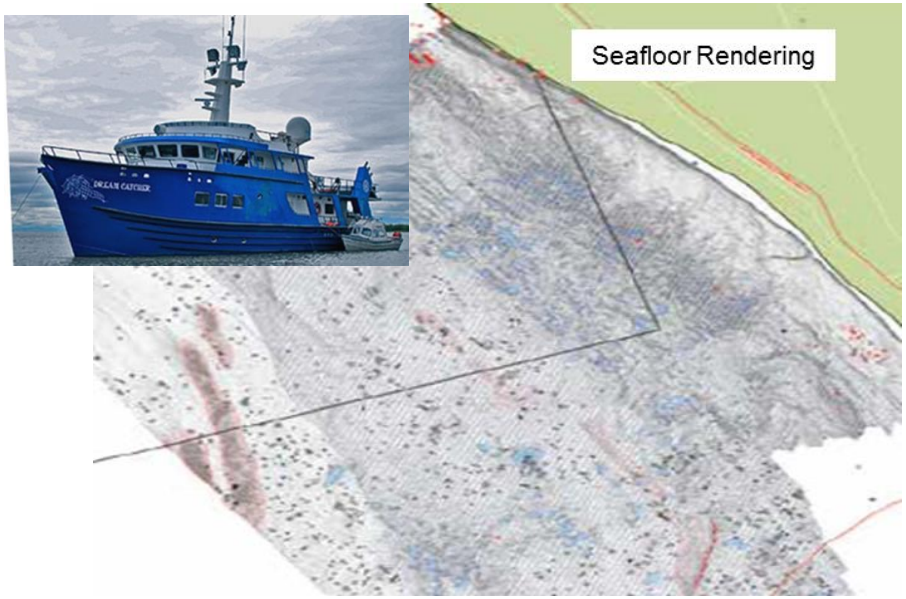
**Continuing to improve marine facility design and operations**

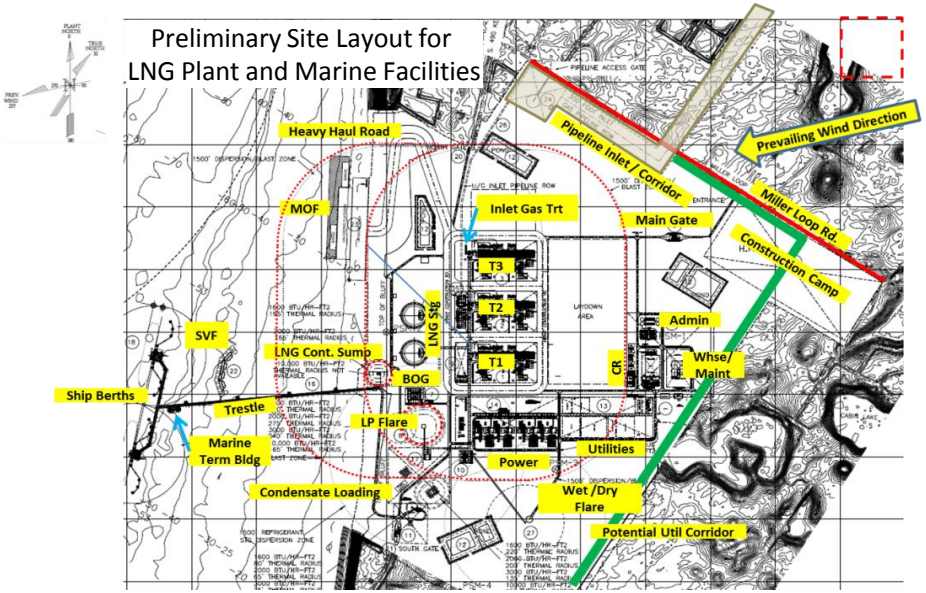
- Collecting sea floor and metocean data
- Incorporating findings from navigation simulation

**Continuing geotechnical assessment onshore and offshore**

**Focusing on fabrication / modularization to reduce costs**



# Pipeline Update

Alaska LNG™

**Initial design scope 78% complete through end of July**

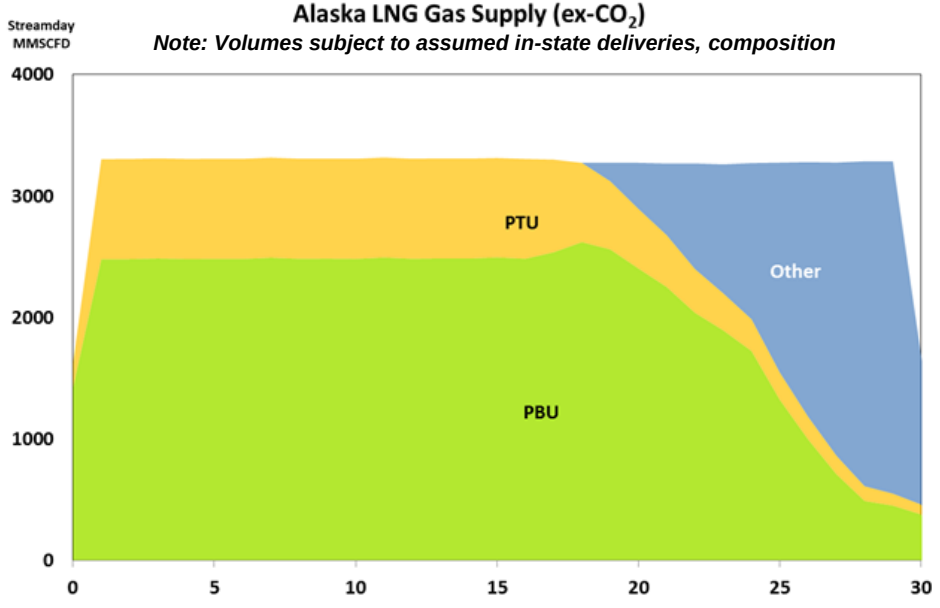
**Pipeline materials design and testing in progress**

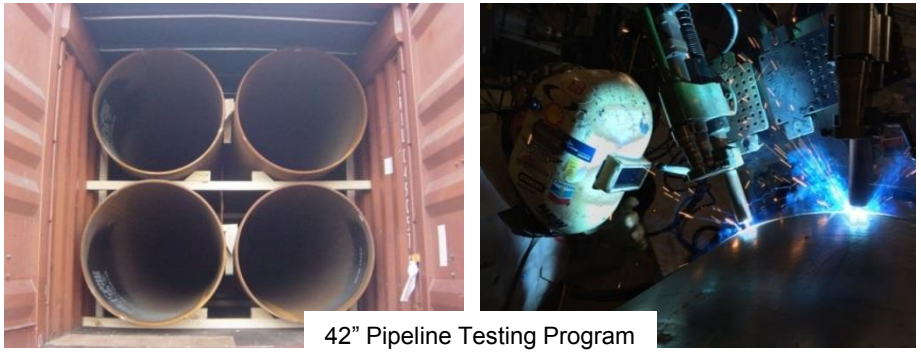
- Evaluating weld development / procedures
- Evaluating alternative coating designs / applications
- Ordering 48” test materials (targeted 1st arrival 1Q16)

**Working with federal pipeline regulator (PHMSA) to confirm design basis and align on special permit conditions**

**Continued data exchange / collaboration with AGDC on route, design, execution planning and in-state offtakes**

**Evaluating cost / schedule impacts of a 48” pipeline system**



42” Pipeline Testing Program

| | 42” PIPELINE | 48” PIPELINE |
|---|---|---|
| Design Peak Capacity from GTP | 3.3 BCFD | 3.3 BCFD |
| Peak to LNG (Annual Average) | 2.8 BCFD (2.7 BCFD) *(Net of fuel and in-state gas)* | 2.8 BCFD (2.7 BCFD) *(Net of fuel and in-state gas)* |
| Capex / Opex | Lowest capex | Higher capex, lower opex |
| Compression | Base: 8 stations<br>- Operating redundancy | Base: 4 - 5 stations<br>- Less fuel |
| Expansion | Single train expansion with 10 additional stations | Single train expansion with 5 additional stations |
| Construction Risk | More construction risk than typical pipelines in U.S.<br>– pipe 22% heavier than other NA gas pipelines | More construction risk than 42”, 59% heavier than typical<br>- more equipment, gravel, truckloads<br>- CI crossing complexity |
| N American Content | Available for non-strain based design sections (~ 80 - 90%) | No relevant experience suitable for Alaska today |
| Schedule | Base Case | Potential 6-8 month impact to FEED decision |

# Gas Treatment Plant Update

Alaska LNG™

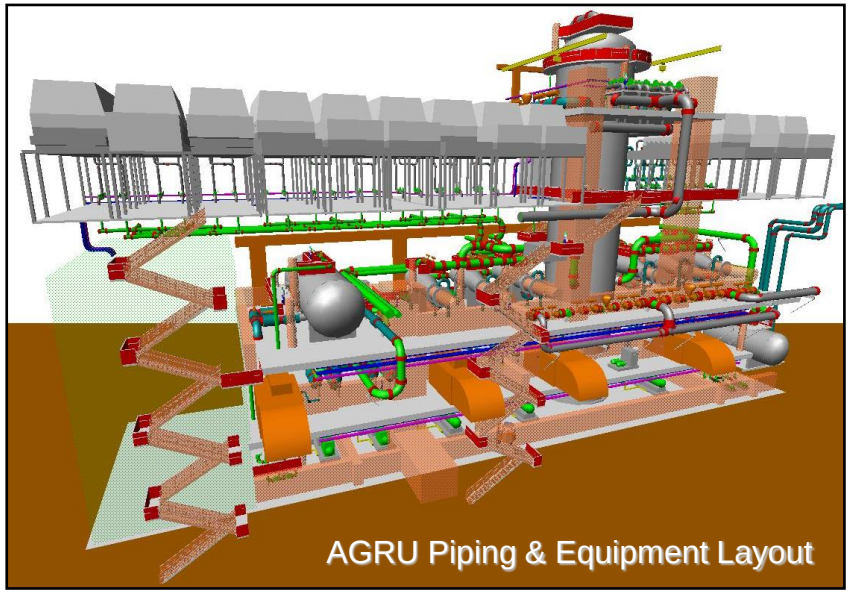
**Initial design scope 86% complete through end of July**

**Completed geotechnical assessment, confirmed soils, access to gravel, water resources**

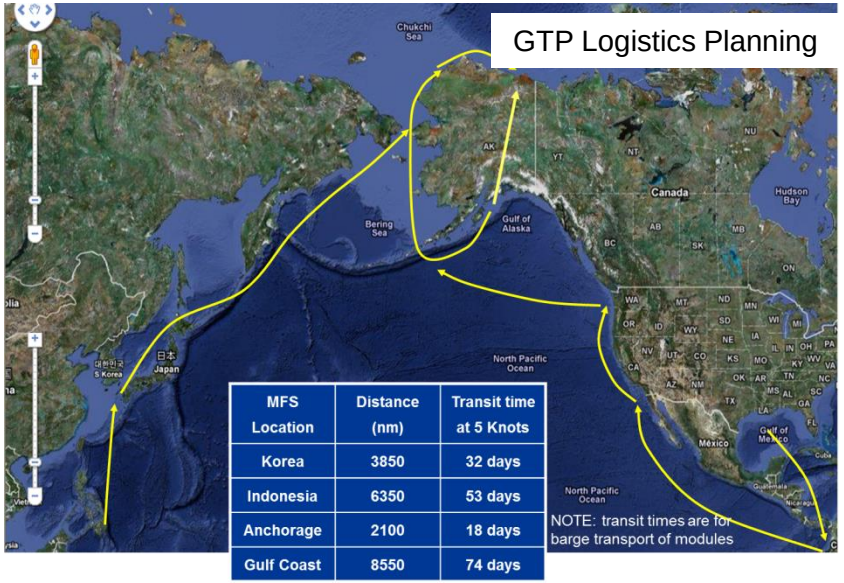
**Using 3D modeling of Acid Gas Rejection Unit (AGRU), $CO_2$ compression piping and equipment layout for cost estimates and constructability.**

**Working integrated design issues with PBU**

**Working with FERC to define engineering information required to complete NEPA process**

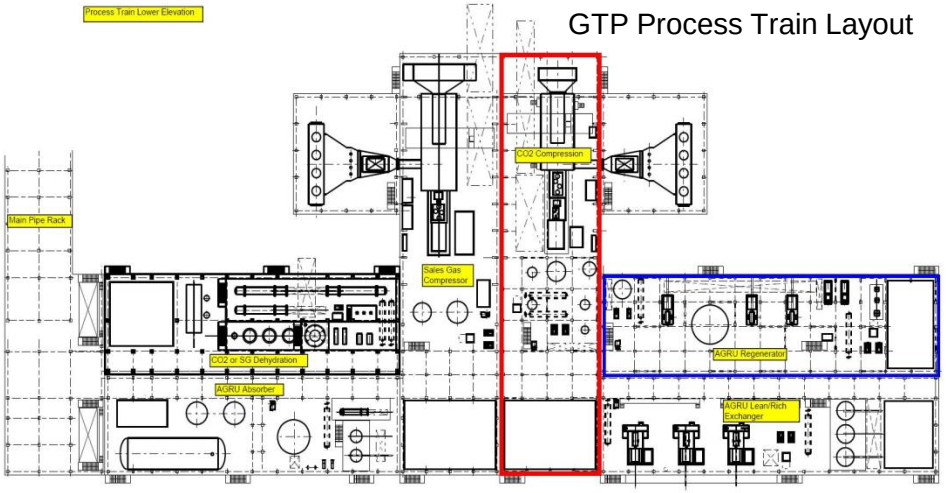



GTP Logistics Planning




| MFS Location | Distance (nm) | Transit time at 5 Knots |
|---|---|---|
| Korea | 3850 | 32 days |
| Indonesia | 6350 | 53 days |
| Anchorage | 2100 | 18 days |
| Gulf Coast | 8550 | 74 days |

GTP Process Train Layout



# Integrated Logistics Update

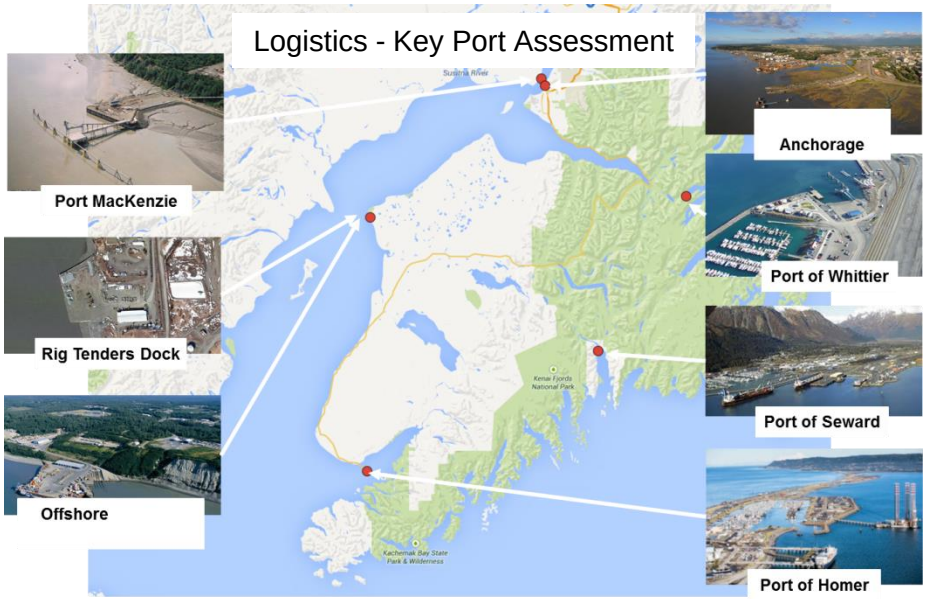
Alaska LNG™

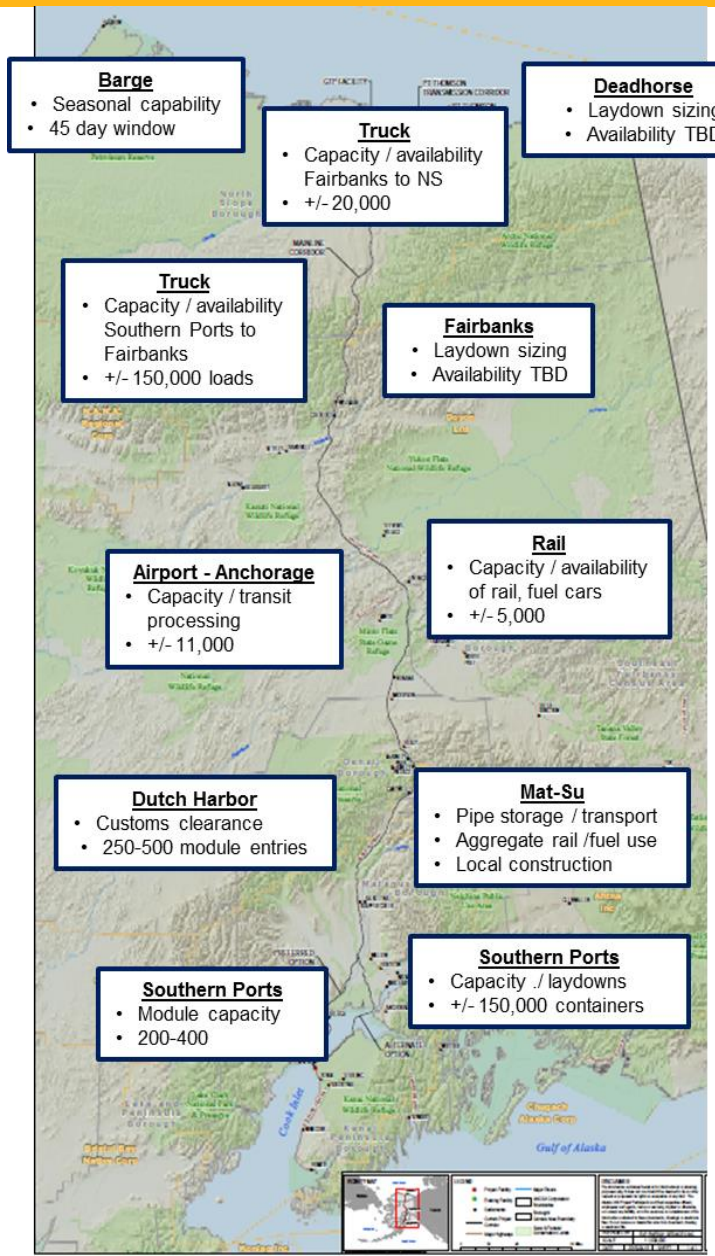
**Initial logistics and infrastructure analysis complete (roads, trucks, ports, marine vessels, airports, rails, fuel, etc.)**

**Preliminary findings include:**

- Sufficient capacity in key ports with some modernization already planned
- Potential pinch points identified with Alaska based trucking, railroad pipe cars, air transport capacity for personnel, camp infrastructure and the Alaska Marine Highway – developing plans to resolve
- Jones Act compliant vessels for pipe, break-bulk cargo are limited

**Modeling costs / schedule implications of existing infrastructure**



# Integrated Labor Update

Alaska LNG™

**Progressing labor analysis with key stakeholders:**

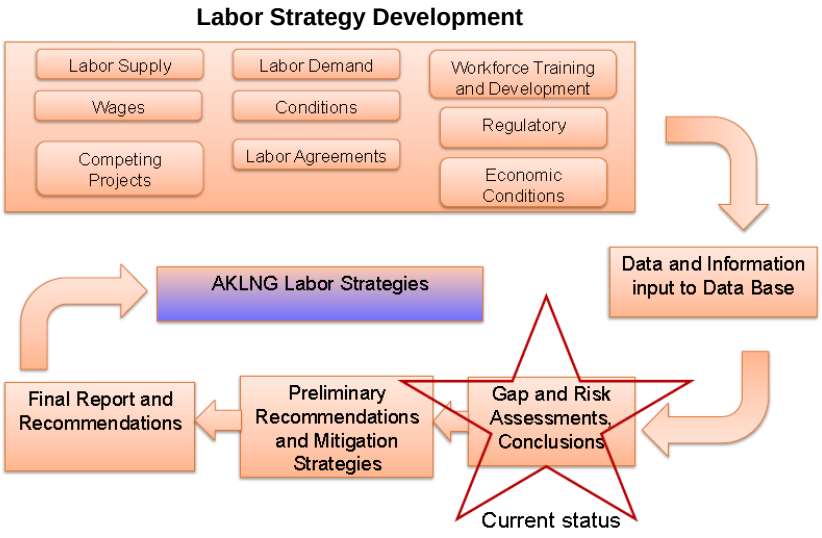
- Labor unions and merit based associations,
- Alaska Department of Labor, State representatives
- Alaska Native regional and village corporations
- Federal officials, national databases

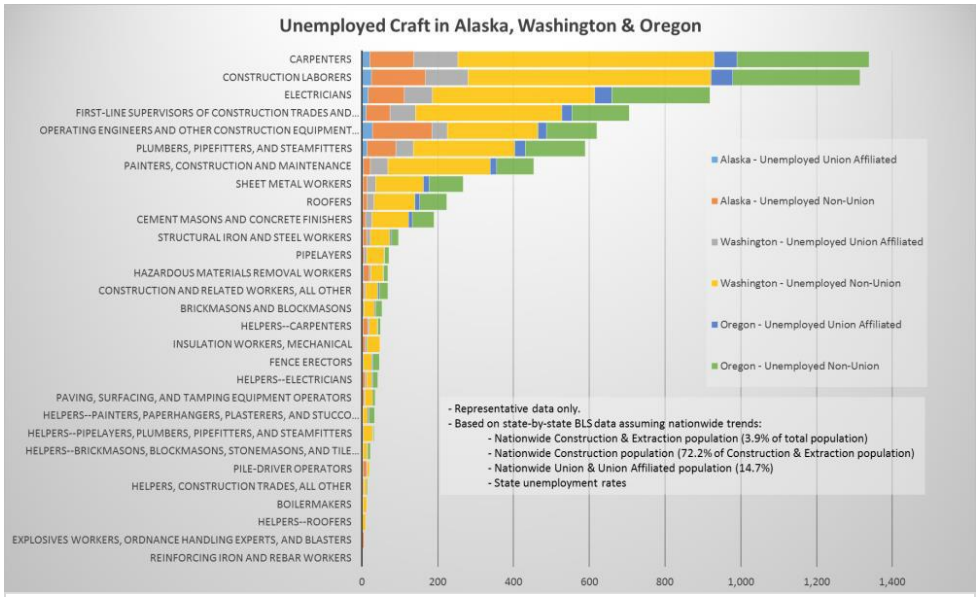
**Initial Focus on 9 Key Craft Types:** Boilermakers, Carpenters, Electricians, Insulators, Iron Workers, Laborers, Operating Engineers, Pipefitters, Teamsters

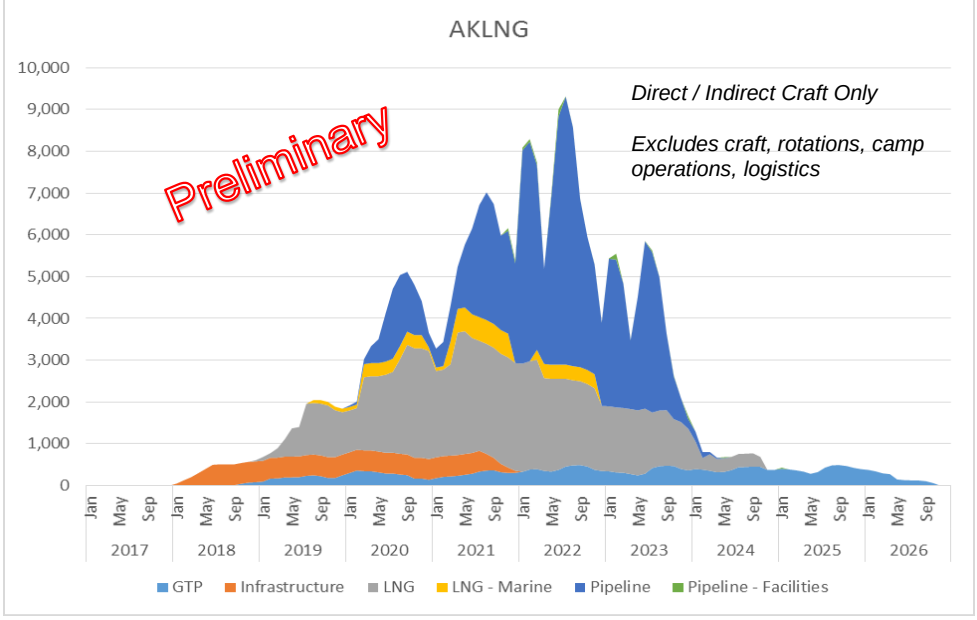
**Maximize use of qualified Alaska Hires**

**Work in progress (complete by YE15), early findings:**

- Construction demand significantly greater than currently available Alaskan workforce
- Access to all sources of Alaskan labor required
- Risk from competing industrial demand to be mitigated



# Summer Field Season / Regulatory Work

Alaska LNG™

**200+ people / 225,000+ hours in the field**

- Collected engineering, environmental, social, and cultural data to support regulatory filings and permitting
- Supported the routing and siting of Project facilities

**Engineering and Field Work to support National Environmental Policy Act (NEPA) underway**

- Developing second draft Resource Reports 1-12 with updated analysis of project impacts (1Q2016 submittal)
- Timing allows stakeholder input for October 2016 filing

**Pre-Filing**

**Draft Resource Reports**

1. Project Description
2. Water Use & Quality
3. Vegetation & Wildlife
4. Cultural Resources
5. Socioeconomics
6. Geological Resources
7. Soils
8. Land Use, Recreation & Aesthetics
9. Air & Noise Quality
10. Alternatives
11. Reliability & Safety
12. PCB Contamination
13. LNG Information

**Filing – *planned October 2016***

**Natural Gas Act Section 3 Application**

| | |
|---|---|
| Exhibit A -- | Articles of incorporation and bylaws |
| Exhibit B -- | Statement of corporate and financial relationships |
| Exhibit C -- | State authorization |
| Exhibit D -- | Agreement between the applicant and border facilities |
| Exhibit E -- | Safety and reliability statement |
| Exhibit E-1 -- | Earthquake hazards and engineering |
| Exhibit F -- | "Final" Resource Reports |
| Exhibit G -- | Location of facilities |
| Exhibit H -- | Statement regarding additional federal authorizations |

Immersive Video Solutions
ABR
Fairweather Science
RC Goodwin
AMS Tech
Quantum Spatial
Canyon Creek Consulting
Owl Ridge
AcuTech
Cardno
CH-IV Int'l
UMIAQ
Nuka
PND Engineers
SLR Int'l
Purcell Security
Kinnetic Laboratories

Worely Parsons
Wild North Resources
Tucker Contracting
Soloy

exp.

More than ~78 % Alaska Content in Summer Field Season

Alaska LNG
*2015 Summer Field Season*

Lounsbury
Bell & Associates
McLane
AW&S
McSwain & Assoc.
Delta Leasing
Guardian Security
Industrial Solutions

PARAGON PARTNERS

LNG Site
Fugro
McLane
Greatlands
Denali Drilling
Wild North Resources
Zephr Marine

AECOM

Geotek AK
Purcell
Coastal
AES
Beacon
Chugach
NEI
NLURA
SRBA
Wild North
Soloy
UMIAQ
PND
AFC
E3

# External Engagement

Alaska LNG™

## Community

- 90+ community sessions in last 12 months
- Community meetings continuing to support summer field program
- FERC scoping meetings planned for fall 2015
- Legislative & media tours: 4
- Communications tools: newsletter, ak-lng.com, toll-free line

## Alaska Businesses

- Using Alaska vendors, equipment, residents provides access to valuable local expertise, can reduce cost
- Business information sessions in Barrow, Fairbanks, Kenai and Anchorage in April with ~ 700 participants
- Over 500 businesses registered at ak-lng.com
- Labor & logistics studies

## Alaska Native Groups

- Village and tribal outreach ongoing
- Engagement with Alaska Native Regional Corporations
- Involvement in 2015 AFN Conference

THE Alaska LNG MONITOR

QUARTERLY NEWSLETTER

Volume 1 | July 2015

FROM THE DESK OF STEVE BUTT

SUMMER FIELD WORK

# Project Development Phases

Alaska LNG™

## Alaska LNG – Phased/Gated Project Management Process (Oct 12)

- ❑ Viable Technical Option(s) Identified
- ❑ Government Support
- ❑ Permits / Land Use Achievable
- ❑ Potential Commercial Viability

- ❑ Viable technical option
- ❑ Key Commercial Agreements
- ❑ Government Support
- ❑ Permits / Land Use Underway
- ❑ Potential Commercial Viability

- ❑ Secure Permits / Land Use / Financing / Commercial Agreements
- ❑ Confirm Commercial Viability
- ❑ Execute EPC contracts

**PTU Settlement, Joint Work Agreements** → GO → **Concept Selection** → **Decision** → GO → **Pre-FEED** → **Decision** → GO → **FEED** (Front-End Engineering & Design) → **Decision to Build the Project** → GO → **EPC** (Engineering, Procurement & Construction)

STOP (Decision) STOP (Decision) STOP (Decision to Build the Project)

(Today)

| | | | | |
|---|---|---|---|---|
| **Peak Staffing:** | ~200 | 400 - 500 | 500 – 1,500 | 9,000 – 15,000 |
| **Cost ($):** | Tens of Millions | Hundreds of Millions | Billions | Tens of Billions |
| **Est. Engineering / Technical Duration*:** | | *12 - 18 Months* | *2 - 3 Years* | *5 - 6 Years* |

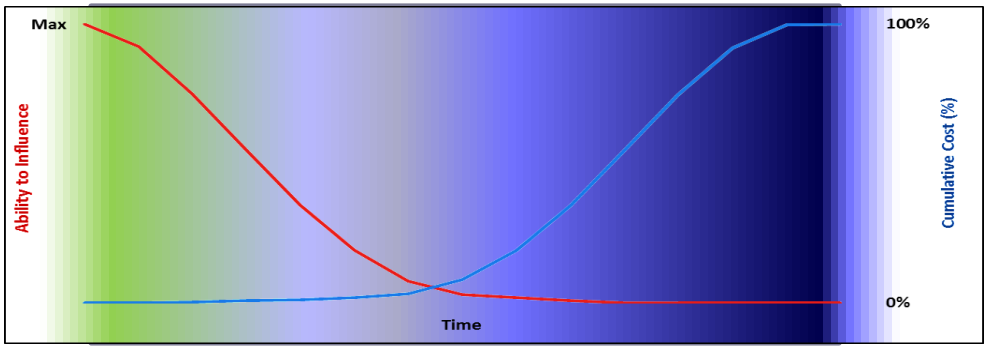
**Concept Select**
- Identify and Rank project concept options with a reasonable likelihood of satisfying market needs
- Recommend a base concept for the project

**Optimize (Pre-FEED)**
- Optimize and finalize selected concept option
- Define the project sufficiently to support major regulatory filings and start of FEED
- Prepare capital cost and schedule estimates

**Define (FEED)**
- Prepare, submit and maintain regulatory filings to final decision
- Advance project definition and data collection to be ready for final investment decision and execution of major contracts
- Prepare a capital cost estimate to support project sanction

**Execution-Startup**
- Engineering, Procurement, and Construction
- Finalize detailed design, procurement and logistics for construction
- Complete construction, commissioning, start-up

## Project Influence Curve



# Alaska LNG by-the-numbers

Alaska LNG™

## Technical and field progress

- $243M + on pre-FEED through August 15
- 570+ acres purchased in Nikiski, Alaska
- 130+ full-time personnel on Alaska LNG Project
- 200+ people in the field (80 scientists)
- 950+ acres of topographic survey
- 15,500+ acres of cultural surveys
- 148,000+ feet of shallow seismic completed
- 250 boreholes drilled
- 100+ environmental site assessments completed
- 2,000+ helicopter flying hours, 87,000+ miles driven
- 1,100+ field check points set/confirmed

## Regulatory

- 2 DoE conditional export licenses (FTA / non-FTA)
- 10,000+ pages of regulatory filings

## Engagement

- 90+ community outreach events
- 100s of Alaska entities involved in logistics and labor studies
- ~700 Alaska businesses – information sessions
- 40+ meetings with Alaska Native regional and village corporations and tribal entities

Alaska LNG

Fueling Alaska's Future

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# Questions