Loan # 1313
Solicitation #: DE-SOL-000603

Northwest Innovation Works Kalama

Presentation on Proposed Loan Guarantee

______ __, 2016

DRAFT

U.S. DEPARTMENT OF ENERGY | LOAN PROGRAMS OFFICE

Overview of the NWIW Kalama Project

Project Description: Natural Gas to Methanol Facility located in Kalama, WA

Technology: Johnson Matthew PLC – Ultra Low Emissions (ULE) natural gas heated reformer technology

Methanol Production: Designed to produce 10,000 MTPD (3.65 million MTPA) of methanol that will primarily be sold to China for production of olefins

Total Project Cost: (b) (5) project cost of (b) (4). Projected substantial completion in May 2020

Overview of Proposed NWIW Kalama Loan Guarantee

Loan Guarantee: Proposed [$2.017] billion loan (b) (5) Northwest Innovation Works Kalama, LLC with a term of project completion (b) (5)
(b) (5)

Eligibility: Project is eligible under Section 1703 loan guarantee program: innovative technology, greenhouse gas reductions, located in the U.S., and reasonable prospect of repayment.

Current State of the Review Process

Conditional Commitment

Equity and Debt Raise, Documentation, Due Diligence

Closing Process

Financial Close

(b) (5)

Off-Take Agreements, Construction, and Operation

(b) (4)

Natural Gas Feedstock

Electricity Feedstock

Off-Take Contracts

Construction Timeline

- Construction Duration – 33 Months
- Commissioning Duration – 3 months
- Substantial Completion – May 2020

Proposed NWIW Kalama Project Financing

Total Eligible Project Cost – (b) (4)

- Total Eligible and Ineligible Project Cost – (b) (4)

Equity – (b) (4)

- Stonepeak Infrastructure Partners

Debt Capital – (b) (5)

(b) (5)

Proposed NWIW Kalama Ownership Structure

(b) (4)

[redacted]

Summary of Risk Factors and Credit Assessment

Ranking Summary

(b) (5)

Recommendation to the Credit Review Board

[redacted]

(b) (5)

3.5 Construction

(b) (5)

(b) (5)

3.6 Operations

(b) (5)

(b) (5) (b) (4) (b) (5)

(b) (5)

(b) (4)

(b) (4) (b) (5)

(b) (5)

(b) (5) (b) (4)

(b) (4) (b) (5)

(b) (5)

(b) (4)

(b) (4) (b) (5)

(b) (5)

3.4 Technology

NWIWK has selected JM Davy's Ultra Low Emissions (ULE) process technology to produce 10,000 metric tons per day of AA/GB grade methanol from natural gas utilizing two equivalent production trains. (b) (5)
(b) (5)

(b) (5)

3.5 Construction

(b) (5)

(b) (5)

JM Davy is a major global technology licensor with significant experience in methanol production technology, primarily with steam methane reforming processes. The EPC contract is expected to be awarded to a consortium of Technip USA, Inc. (Technip), HQC USA LLC (HQC), and URS Energy & Construction, Inc. (AECOM). Technip has extensive experience with world-scale methanol plants globally, including a 5,000 MTPD methanol project in Louisiana, as well as a proven track record of successful modularization projects. (b) (5)

(b) (5)

(b) (5)

(b) (5)

(b) (5)

3.6 Operations

(b) (5)

(b) (5)

Document 3

OMB/Treasury/FFB Presentation

[Date]

Northwest Innovation Works Kalama

(b) (4) *Loan Guarantee for the construction of a natural gas to methanol facility producing 10,000 MTPD*.

Loan # 1313
Solicitation #: DE-SOL-000603

Transaction Summary

Project Description

- The Project will be the first project in the U.S. to utilize the Johnson Matthey PLC – Ultra Low Emission ("ULE") reforming technology to process the natural gas.
- The ULE reforming technology consist of a Gas Heated Reformer ("GHR") in series with a Autothermal Reformer ("ATR").
- (b) (5)
- The Project will consist of two x 5,000 MTPD (3,650,000 MTPA) grade AA methanol manufacturing trains.
- The Project is located in an industrial Park in Kalama, Washington (b) (5)
  (b) (5)
  (b) (5)
- The Applicant/Borrower is Northwest Innovation Works, Kalama LLC
  - Project has two Sponsors: Pan-Pacific Energy Corp., a Delaware corporation. ("PPE") and Stonepeak Partners LP, a limited liability partnership under the laws of the State of Delaware.
- EPC consists of a joint venture between Technip USA, Inc., URS Energy & Construction, Inc. and HQC USA LLC

Key Metrics

- (b) (5)
-

Project	Face Value	Capitalized Interest	Total Exposure	Tenor (from Financial Close to Final Maturity)
Northwest Innovation Works Kalama	(b) (5)			

Policy Considerations

Eligibility

- Eligible under the Energy Policy Act of 2005:

✓ 1703(a)(1) as an advanced fossil energy technology that avoids, reduces, or sequesters air pollutants or anthropogenic emissions of greenhouse gases.

  ✓ An independent greenhouse gas ("GHG") life cycle analysis concluded that the project can be expected to reduce GHG emissions by 41% when compared to the production of methanol as it is traditionally produced.

✓ 1703(a)(2) in that it will employ new or significantly improved technologies as compared to commercial technologies in service in the United States at the time the guarantee is issued.

  ✓ The Project will be the first project in the U.S. to utilize the Johnson Matthey PLC – Ultra Low Emission ("ULE") reforming technology to process the natural gas.

Portfolio Impact

- (b) (5)

Utilization of Budget Authority and Loan Authority

- (b) (5)

Jobs

- Expected to provide up to approximately 1,000 construction jobs and 200 permanent operations jobs.

Sourced Components

- (b) (5)
-

Other Government Assistance

- (b) (5)

Foreign Participation

- Shanghai Bi Ke Clean Energy Technology Co., Ltd., a Chinese company and majority owner of Pan-Pacific Energy Corp., primary sponsor to the Project.
  - (b) (4)

- EPC Joint Venture includes a French and Chinese engineering company, Technip and HQC
- Majority of the methanol off-takers are Chinese companies
- Technology provider, Johnson Matthey, is a UK based company

Ownership Structure

(b) (4)

Equity Investors

<u>Equity Investors</u>

- Pan-Pacific Energy Corp.,
  - A Delaware corporation, owned by Shanghai Bi Ke Clean Energy Technology Co., Ltd. ("CECC"), a Chinese Company
- Stonepeak Partners
  - (b) (4)
  -
  -

Equity Investors: Expertise and Capabilities

Pan-Pacific Energy Corp. ("PPE")

- Established by Shanghai Bi Ke Clean Energy Technology Co., Ltd. ("CECC") in 2013, as a U.S. Delaware Corporation, to develop projects focusing on an integrated gas value chain in the US Pacific Northwest. CECC's shareholders include the following:
  - **Chinese Academy of Science Holdings Co. Ltd** ("CAS Holdings") - wholly owned state company and private equity arm of the Chinese Academy of Sciences, China's leading academic and research organization. (b) (4)
    (b) (4)
  - **Double Green Bridge Hong Kong Limited** ("DGB") - (b) (4)
    (b) (4)
  - **Johnson Matthey Public Limited Company** ("JM") – a British multinational chemicals and sustainable technologies company with operations in over 30 countries. JM's primary industries include environmental, automotive, chemical, pharmaceutical / medical, recycling, and oil, gas and refineries. According to JM's 2015 financials, the company generated over £3,125 million in revenue, with £591 million from its Process Technologies Division, which serves as a global supplier of catalysts, licensing, technologies and other services to the syngas, biochemical, petrochemical, oil refining and gas processing industries. In 2015, the Division had an underlying operating profit of £106 million. (b) (4)

Equity Investors: Expertise and Capabilities

Stonepeak Partners, LP

- DBA – Stonepeak Infrastructure Partners (“Stonepeak”): Formed as a limited liability partnership under the laws of the State of Delaware on March 23, 2011. The General Partner of Stonepeak Partners LP is Stonepeak Partners LLC. Stonepeak Partners LLC is a Delaware limited liability company and was formed on March 23, 2011.
- Stonepeak is a North America focused private equity firm investing in businesses involved in the following industries: energy, power and renewables, transportation, utilities, water and communications.
- Stonepeak manages $5.7 billion of capital for its investors.
  - In January, 2016, Stonepeak announced that it had completed fundraising for its second fund, Stonepeak Infrastructure Fund II at its $3.5 billion market hard cap.
- Founded by Michael Dorrell and Trent Vichie
  - Michael Dorrell – formerly worked as a Senior Managing Director in Private Equity and co-head of the infrastructure investment group at Blackstone. Prior to Blackstone, Mr. Dorrell worked for over a decade at Macquarie and has been investing in infrastructure for over 15 years.
  - Trent Vichie – before joining Blackstone in 2008 as co-head of the infrastructure division, Mr. Vichie was a Managing Director with Macquarie Group in New York. He has 20 years’ experience and has been involved in a wide range of infrastructure equity investments and transactions in the rail, airports, communications and utilities sector totaling over $10 billion.

(b) (5)

Contractual Structure

(b) (5)

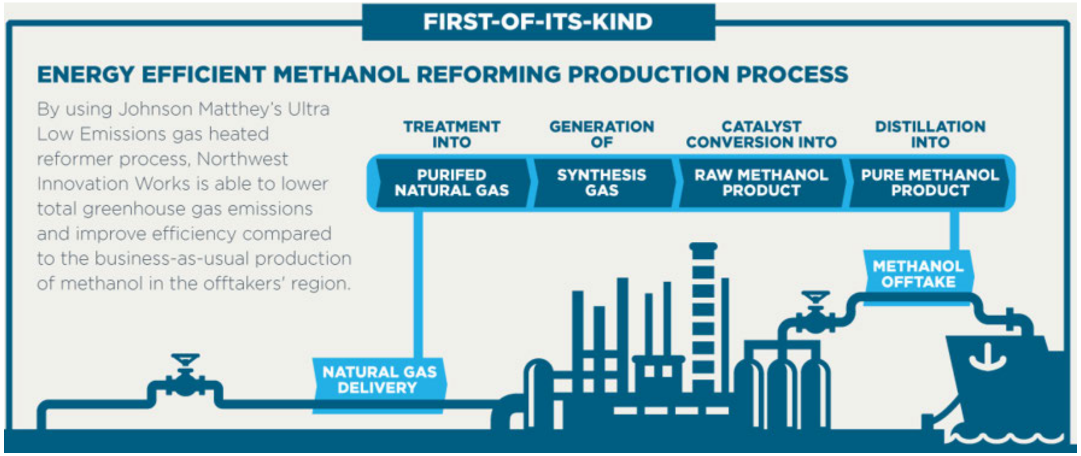
Description of Technology

Technology

- The Project consists of two trains producing 5,000 MTPD each and utilizing Johnson Matthey's ultralow emission ("ULE") reforming technology to convert natural gas to synthesis gas and then the synthesis gas to methanol.

Features

- The Project will be the first natural gas to methanol commercial operation in the U.S. to utilize the ULE technology, a proprietary process developed by Johnson Matthey Davy Technologies ("JM Davy") that utilizes a Gas Heated Reformer ("GHR") in series with an oxygen blown Auto Thermal Reformer ("ATR") to create a synthesis gas. The synthesis gas then goes through a methanol synthesis and distillation process.
- The advantages of ULE over other combined reforming technologies typically utilized in natural gas to methanol production operations are improved efficiencies of operation, lower operating costs, less land area requirements, and reductions in GHG emissions.



Project Construction

- Consists of 36 months of Construction (estimate) and 1,000 workers
  - 33 months construction and 3 months commissioning and start-up testing
  - High level milestones (estimating construction start-up in June 2017)
    - June 2017 – November 2017: Site preparation and piling (5 months)
    - June 2017 – February 2020: Construction (33 months)
    - February 2020 – March 2020: System turnover (1 month)
    - March 2020 – May 2020: Commissioning (3 months)
    - April 2010 – May 2020: Performance Testing (1 month)
    - May 2020: Substantial Completion
  - Approximately 40% of the entire facility will incorporate prefabricated modular system components (i.e. major components, piping, electrical, other vessels, etc.)
  - Site essentially ready for start of construction (cleared, leveled, etc.)

- EPC Joint Venture Consortium (specific details for each member TBD)
  - Technip – Outside Boundary Limits (OSBL) and Inside Boundary Limits (ISBL) Engineering and Procurement
  - HQC – ISBL Engineering and Procurement
  - Aecom – Construction and In-house Power Generation

- EPC Final Price – TBD December 2016
- Project Development Personnel
  - Project steadily adding staff with 20+ years of relevant experience
  - Experience developing and constructing similar projects with global supply chain
  - Project Management Contractor (PMC) – 50 person team to be selected by September 30, 2016
    - PMC will provide day to day construction management of the project

Project Operations

- O&M provided by a third party
  - Selection by September 30, 2016 and signed contract by October 31, 2016
  - O&M contract length and details TBD
- (b) (5)
-
-
-
-

Technical Assessment

Technology Risk – TBD
(b) (5)

- Execution Risk - TBD
- Construction Risk: TBD
(b) (5)

- Schedule Risk – TBD - (b) (5)

Feedstock Agreements

Electricity

(b) (4)

Based on (b) (4), the Project will consume just over (b) (4) of electrical power. Contracts above, including (b) (4), total (b) (4).

Feedstock Agreements

Natural Gas

(b) (4)

Based on(b) (4) , the NWIW-Kalama Project will need approximately (b) (4) of natural gas. Contracts listed above have a total quantity of (b) (4) representing (b) (4) of the gross natural gas requirement of the facility.

Off-Take Agreements

(b) (4)

Project Timeline

(b) (5)

Sources and Uses

Uses	%	$ millions	Sources	%	$ millions
Construction Costs	(b) (5)		**Senior Debt**	(b) (5)	
Fixed Investments			(b) (5)		
Contingency Costs					
Power Plant / Water Capex					
Financing and Transaction Costs			**Equity**		
IDC			Stonepeak Infrastructure		
Other					
Advisory Fee					
Debt Service Reserve Account					
Initial Working Capital					
Upfront Fee					
Uses of Funds	**100.0%**	(b) (5)	**Sources of Funds**	**100.0%**	(b) (5)

Debt Tenor and Amortization

Tenor and Amortization

- (b) (5)

Debt Sizing Criteria

- (b) (5)

Northwest Innovation Works Project Part 1 Application Eligibility and Lifecycle Assessment

TPMD Analysis and Recommendations

Aug 2015

ROUGH DRAFT ONLY, NEVER USED

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Overview

Analysis

- 2015 Part 1 Application and GHG Review Conclusions
- Project Part 1 Eligibility and LCA Conclusions
- Policy Impact Metric Considerations

Northwest Innovation Works

- Proposed Innovative Technology:

Ultra Low Emissions combined reforming technology.

Natural gas to methanol plants currently under construction use steam methane reforming (SMR).

The “Ultra Low Emissions combined reforming technology” proposed by the applicant replaces the SMR with a Gas Heated Reformer. The process is unique in that no high pressure steam is produced in the plant. This allows the use of available low-cost, low-emissions grid electricity to drive the compressors in the Air Separation Units and the syngas compression needed in the process. Replacing generated electricity with grid electricity to drive electrical power compressors also increases overall system efficiency and product output, while reducing overall project costs

Northwest Innovative Works Facility

The Northwest GTM Project, sponsored by Pan-Pacific Energy Corporation (PPE), intends to develop, build and operate the largest Gas-to-Methanol (GTM) project in the U.S. Northwest GTM will employ GTM technologies to economically develop traditional fossil energy resources with reduced greenhouse gas emissions. Specifically, Northwest GTM will utilize combined reforming of gas-to-methanol (combining steam methane reforming and an auto-thermal reformer) to produce 10.95 million tons of methanol per year (more than ten times the largest operating methanol plant in the US today). The technology provider is UK-based Johnson Matthey. On average, it takes 32 Bcf of gas to produce 1 mmty of methanol.

The Project is designed to produce 6 x 5000 metric tons of methanol per day in six lines or “trains.” Each train has the same combined reforming methanol process unit while each two trains share integrated auxiliary facilities, utility facilities and transportation facilities.

PPE has control of three sites (Kalama and Tacoma in Washington, and Port Westward in Oregon) to be the foundation of Northwest GTM.

Kalama (Phase I): a 30-year lease agreement with five 10-year extensions on April 10, 2014.

Tacoma (Phase II): a 30-year lease agreement with a 25-year renewal option on May 1, 2014.

Port Westward (Phase III): Applicant indicates that the site has been “secured”

Northwest Process Flow Diagram

NIW plans to construct a facility.

LPO System Boundary for LCA Analysis

The LPO Methodology

- (b) (5)

NIW Project Part 1 Application Claims

2015 NIW Application Claims

NIW Innovative Technology

Goal and Scope of Analysis

Goal and Scope

Sec. 1703 (a) (1) avoid, reduce, or sequester air pollutants or anthropogenic emissions of greenhouse gases: TPMD has reviewed the information provided by the applicant, and conducted an independent greenhouse gas (GHG) life cycle analysis (LCA). The LCA concluded that the project can be expected to reduce GHG emissions by 41% when compared to the production of methanol as it is traditionally produced

Sec. 1703 (a) (2) employ new or significantly improved technologies as compared to commercial technologies in service in the United States at the time the guarantee is issued. According to the 10 CFR Part 609 definition of "New or Significantly Improved Technology," the Project must employ technology that:

> <u>Is concerned with the production, consumption or transportation of energy and that is not a Commercial Technology.</u>
> "Commercial Technology" is defined further as "a technology in general use in the commercial marketplace in the United States at the time the Term Sheet is issued by DOE. A technology is in general use if it has been installed and is being used in three or more commercial projects in the United States in the same general application as in the proposed project…"

NIW LCA Claims

- .

GHG LCA Results

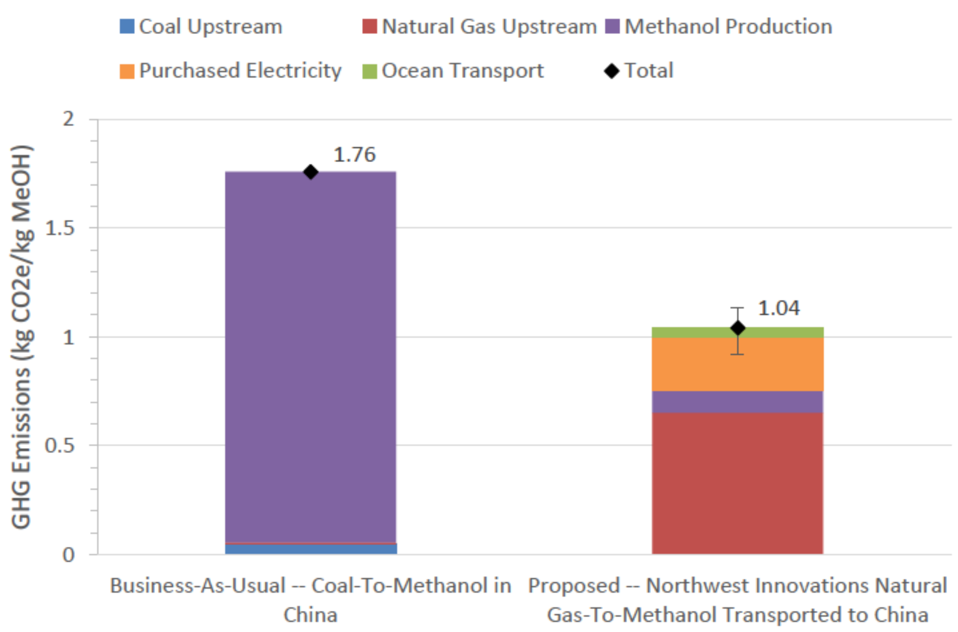
Business as Usual (BAU) – Coal-To-Methanol in China

Currently, China produces its own methanol via coal-to-methanol processes, which represents the BAU case. The coal-to-methanol unit process is based on an NETL report that models the coal-to-methanol process (NETL, 2014). PRB coal mining is used as a proxy for Chinese coal mining. PRB has low methane emissions, so it is unlikely that coal mined in China has lower GHG emissions. No transport is modeled in the BAU case, because it is assumed that any transport within China is negligible compared to the transport of methanol from the U.S. in the proposed case.

Life cycle GHG emissions for the BAU case and proposed Northwest Innovations project are included below in **Figure 1**. The results are based on the production of one kg of methanol. The results show that the modeled emissions in the proposed case are 41 percent lower than in the BAU.

Factors considered in GHG analysis

Figure 1. Life Cycle GHG Emissions for the Northwest Innovations Project



Conclusions of the LCA

(b) (5)

Further Considerations for NIW – Policy Metrics

Summary and Conclusions

This analysis evaluated the life cycle GHG emissions from the production of methanol from the proposed Northwest Innovation Works facility The key conclusions of this analysis are:

- The expected life cycle GHG emissions for the production of

- TPMD has examined the Part I application to ensure technical eligibility under EPAct 2005 Section 1703 requirements, specifically sub-sections (a) (1), (a) (2), (b) (2) and (d). TPMD has determined that the Northwest Innovation Works Project is technically eligible under Section 1703

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U.S. Department of Energy - Loan Programs Office

CREDIT PAPER
REQUEST FOR LOAN GUARANTEE APPROVAL

PROJECT:	**Northwest Innovation Works – Kalama Gas to Methanol Manufacturing Project**
LOAN NUMBER:	**1313**
DATE:	**October XX, 2016**

CLEARANCE

(b) (5)

Date

Date

Date

Date

Date

Date

Date

(b) (5)

TABLE OF CONTENTS **Page**

Acronym Table

AECO	Alberta Energy Company
AECO/NIT	Alberta Energy Company/NOVA Inventory Transfer
CTO	Coal-to-olefins
DME	Di methyl ether
DOE	U.S. Department of Energy
dwt	Deadweight tonnage
EIS	Environmental Impact Statement
EPC JV	Engineering, Procurement and Construction Joint Venture
FFB	Federal Financing Bank
IMPCA	International Methanol Producers and Consumers Association
ISBL	Inside boundary limits
JM	Johnson Matthey Plc
LPG	Liquid petroleum gas
LPO	Loan Programs Office
MeOH	Methanol
mmBtu	One Million British Thermal Units
MMSA	Methanol Market Services Asia
MTBE	Methyl tertiary butyl ether
MTO	Methanol-to-olefins
MTPD	Metric tons per day
NWIW	Northwest Innovation Works Kalama, LLC
OBE	Open book estimate
OSBL	Outside boundary limits
PUD	Public Utility District
Treasury	U.S. Department of the Treasury
ULE	Ultra-Low Emissions technology licensed from Johnson Matthey Plc

Section 1 Recommendation

(b) (5)

1.1.1 Innovative

The Project meets the innovative criterion by employing new or significantly improved technology, as compared to commercial technology, through its proprietary use of the Ultra Low Emissions process ("ULE") licensed from Johnson Matthey Davy Technology which includes a gas heated reformer in series with an auto-thermal reformer. The Project will be the first natural gas to methanol commercial operation in the United States to utilize the ULE technology.

1.1.2 Greenhouse Gas Reductions

(b) (5)

1.1.3 Prospects of Repayment

(b) (5)

1.1.4 Located in the United States

The Project is located in Kalama, Cowlitz County, Washington.

Section 2 Project and Loan Summary Sheet

Borrower: Northwest Innovation Works Kalama, LLC

Loan Number: 1313

Technology: Johnson Matthey PLC - Ultra Low Emissions (ULE) natural gas heated reformer technology

Project Type: Advanced Fossil; Natural Gas to Petrochemicals (Methanol) manufacturing facility

Description: Two x 5,000 MTPD (3,650,000 MTPY) grade AA methanol manufacturing trains using North American natural gas (300,000 mmBtu/day) as feedstock. Methanol output sales to highly-rated offtakers (methanol-to-olefins producers located in China) under long-term, price certain contracts.

Location: Kalama, Washington (adj. Columbia River)

Innovation: Johnson Matthey PLC - Ultra Low Emissions system. Includes a gas heated reformer in series with an auto-thermal reformer which satisfies LPO's innovation requirement. First project with this technology in the US. (b) (5)
(b) (5)

Title XVII Justification: The Project employs new or significantly improved technologies as compared to commercial technologies in service in the US and will avoid emissions of greenhouse gases.

Project Status: (b) (5)
(b) (5)

Project cost: (b) (5)
(b) (5)

Sources and Uses ($mm)

Uses of Funds	
Construction and Financing	(b) (5)
DSRA	
Eligible Subtotal	
Ineligible Subtotal	
Total	

Sources of Funds	
FFB Senior Debt	
Equity	
Total	

FFB Debt as % of Eligible Costs

Loan Terms

Sponsors: Pan-Pacific Energy Corp.
Stonepeak Infrastructure Partners, LP

Borrower: Northwest Innovation Works Kalama, LLC

Tenor: (b) (5)

Interest Rate:

Availability:

Repayment:

Security:

LPO Fees

Application fee: $400,000

Facility fee: (b) (5)
(b) (5)

Maintenance fee: $500,000 per calendar year

LPO Credit Rating: (b) (5)

LPO Recovery: (b) (5)

Credit Agency Rating: (b) (5)

Credit Subsidy Cost: (b) (5)

Last Site Visit: (b) (5)

Section 3 Project Overview

3.1 Project Description

Northwest Innovation Works Kalama, LLC ("NWIW" or "Borrower") proposes to construct and operate a 3.65 million metric tons-per-year natural gas to methanol manufacturing facility. The Project will have production capacity of 10,000 metric tons per day ("MTPD") of AA-grade methanol and will consist of two trains, each with capacity of 5,000 MTPD. The Project will utilize approximately 300,000 mmBtu/day of natural gas as feedstock.

The Project is located on 90 acres adjacent to the Columbia River in Kalama, WA (Cowlitz County), approximately 40 miles north of Portland, OR, 65 miles east of the Pacific Ocean and 250 miles south of the Canadian border (at British Columbia). The site includes a deep-water port that will be able to accommodate Aframax-size ships which will transport the Project's methanol to contracted offtakers who are industrial olefins producers and distributors located in coastal China. Figure 3.1 below shows the geographical location of Kalama, WA.

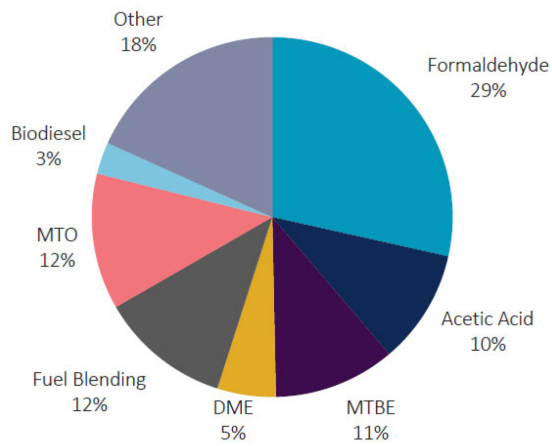
Figure 3.1: Map of Kalama, WA

(b) (5)

The Project will employ Johnson Matthey Plc's Ultra Low Emissions ("ULE") technology which includes a gas heated reformer in series with an auto-thermal reformer, and will be constructed under a turnkey, full-wrap Engineering, Procurement and Construction ("EPC") contract led by Technip USA, Inc. ("Technip"). (b) (5)
(b) (5)

Figure 3.3 below shows the 2015 global allocation of methanol applications.

Figure 3.3: Methanol Applications



Source: Methanex Corp., September 2016 Investor Presentation

The methanol industry is most often described in three major segments: (i) core-GDP products; (ii) fuel applications; and (iii) methanol-to-olefins.

Methanol - Core-GDP Products

Historically demand for methanol focused on the production of formaldehyde, acetic acid, methyl methacrylate and solvents which are referred to as "core-GDP" products given their close demand correlation to global economic activity and industrial production. Core-GDP products are used to manufacture a wide range of products, including plywood, particleboard, foams, resins and plastics. Because these derivatives are used extensively in the construction industry, demand for these derivatives has tended to rise and fall with building and construction cycles, and also in correlation with the level of production of wood products, housing starts, refurbishments and related consumer spending. Historically, methanol pricing has been driven by the cost of production and/or affordability into these major downstream sectors. Accordingly, the methanol industry has been driven by GDP growth, based on demand for core-GDP products which even in times of economic downturn, have shown demand resilience.

Methanol - Fuel Applications

In the past 15 years methanol use has grown significantly in connection with two primary energy-related fuel applications: (i) Methyl tertiary butyl ether ("MTBE") which is a methanol derivative used as a gasoline oxygenate blend to create higher octane, cleaner burning gasoline; and (ii) Di methyl ether ("DME") which is a cleaner burning fuel alternative to liquid petroleum gas ("LPG").

In the early 2000's the MTBE market grew exponentially due to US government mandated gasoline oxygenate requirements. During this period, MTBE demand accounted for 20% - 25% of global methanol consumption and this period marked the beginning of methanol establishing a fuel-value price relationship to crude oil and gasoline. Unfortunately by the mid-2000's, MTBE lost favor as a gasoline blending component in the US due to leaking underground storage tanks ("LUST") and subsequent groundwater contamination. MTBE found its way into underground water tables and is a suspected carcinogen. Lawsuits filed by city municipalities (for fouling underground water aquifers) against major oil companies quickly resulted in the abandonment of MTBE blending in the US. Methanol consumption for MTBE production in the US went from as much as 4 million tons/year to less than 1 million tons/year in a five-year period. Although not specifically banned on a federal level, US refiners and blenders have abandoned MTBE production due to the risk of contamination and liability. The rest of the world continues to blend MTBE, and this oxygenate still contributes significantly to consumption today. While MTBE is produced in the US, the product is exported to other countries, mainly to Latin America.

By 2005, China began an aggressive program of blending domestically-produced methanol into its gasoline pool as a way of reducing dependence on imports of energy (crude oil and gasoline). Methanol demand into the Chinese gasoline pool has grown by nearly 30% through the 2005-2015 periods and according to Argus, is expected to see continued strong growth as one of the world's largest consumers of gasoline.

Likewise, the Chinese government has supported the production of DME as a LPG blendstock and substitute for the reducing dependence on energy imports. During the 2005-2015 period, methanol demand for DME production grew at an annualized rate of more than 34% and today represents almost 10% of total industry demand. Global MTBE and DME applications have quickly overcome the loss in US MTBE market, and the methanol industry has become much more evenly split between core-GDP products and these energy-use applications. Methanol into energy applications approaches 40% of total methanol consumption, and accordingly pricing continues to have a significant link to crude oil markets.

More recently, there has been growing demand for the use of methanol in the shipping industry as an alternative to traditional bunker fuel which is known to be a major pollutant, specifically with regards to sulfur emissions. Argus estimates that many ships (both commercial and passenger) will convert in coming years to meet the more restrictive sulfur emissions regulations on ocean going vessels. (b) (5)

(b) (5) [redacted]

Another developing market for methanol is its use as a potential hydrogen carrier for many developing fuel cell applications.

Methanol-to-olefins

The term 'olefins', also known as alkenes, refers to a large number of compounds that contain carbon and hydrogen and have at least one double bond in their chemical structure. The primary olefins are ethylene and propylene and are commonly used as a feedstock in the production of polymers (i.e., polypropylene and polyethylene) which are building block of plastics. Polypropylene is used in films, packaging, caps and closures as well as other applications. Polyethylene is commonly used in rigid containers and plastic film applications such as plastic bags and film wrap.

The methanol-to-olefins ("MTO") market has emerged in recent years as a rapidly growing application for methanol. The Project will sell its methanol to producers in coastal China who will use the methanol as an intermediary feedstock for olefins production. MTO demand growth has come primarily from Chinese producers who have historically relied on either the coal-to-olefins ("CTO") process or naptha-based olefins supply. However the use of both of these processes has come under severe scrutiny due to anthropogenic emissions and air and water quality issues which the national government of China is aggressively trying to curtail. MTO is an attractive alternative for the Chinese market due to naphtha-based olefins production generally being the most costly approach, and due to the logistical challenges associated with CTO production in China where the majority of the coal supply is located in the

mountainous inner regions where transportation and water options are limited. Furthermore, coal and oil supplies are subject to curtailment in China, particularly during the winter months, when they are needed first for heating purposes. (b) (5)
(b) (5)

Today, the MTO market relies completely on the merchant methanol industry for raw material supply, which like any commodity in a merchant market, is subject to price volatility and supply fluctuations.
(b) (5)
(b) (5)
(b) (5) For the 2015-2020 period alone, MTO-based methanol demand is expected to grow in excess of 6 million tons -- the equivalent of three world scale methanol units (sized at 1.8 million tons/year). Even in today's low crude oil price environment which would conceivably make naptha-based olefins production attractive, MTO units are expected to operate and consume as much as three tons of methanol for each one ton of olefins produced. By example, a small 600,000 tons/year olefins unit requires 1.8 million tons/year of methanol (which is the size of the largest existing methanol unit in the world today), approximately 3% of total methanol demand (excluding CTO).

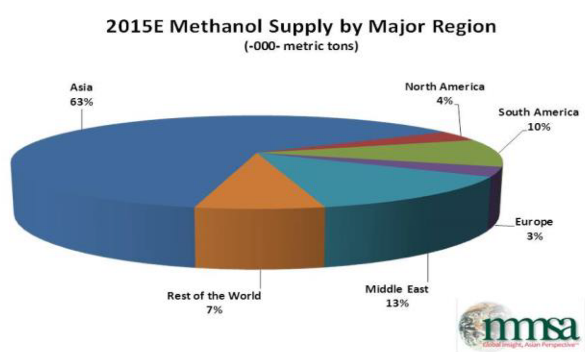
Global methanol demand for MTO production totaled about 400,000 tons in 2011—its inception year. In 2015 methanol consumption into MTO approached 7 million tons (which represents 16% of China merchant methanol demand and 9% of world demand, excluding CTO).

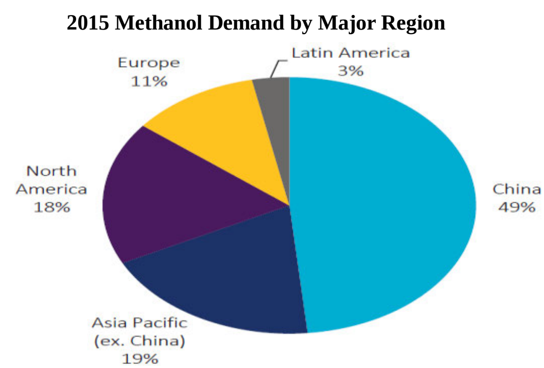
Global methanol supply and demand

The methanol industry spans the entire globe, with production in Asia, North and South America, Europe, Africa and the Middle East. Worldwide over 350 methanol plants have combined annual production capacity in excess of 100 million metric tons (almost 40 billion US gallons), and each day more than 100,000 tons of methanol is used as a chemical feedstock or as a transportation fuel. Methanol is one of the top five widely traded bulk chemical commodities with over 80,000 metric tons shipped daily from one continent to another. According to the Methanol Institute, the global methanol industry generates $36 billion in economic activity each year and creates 100,000 jobs around the world.

Figure 3.4 shows 2015 methanol demand and supply by region.

Figure 3.4: Methanol Demand and Supply (2015)





(b) (5)

The supply dynamics of the global methanol industry are undergoing a significant transition. For decades, methanol industry supply was dominated by the US, South America and Europe's production base. China methanol production was small—as was its consumption—and the large quantities of natural gas ultimately discovered in the Middle East had yet to be commercialized. In 2000, the North and South American hubs were the largest producing regions, supplying 44% of the global market.

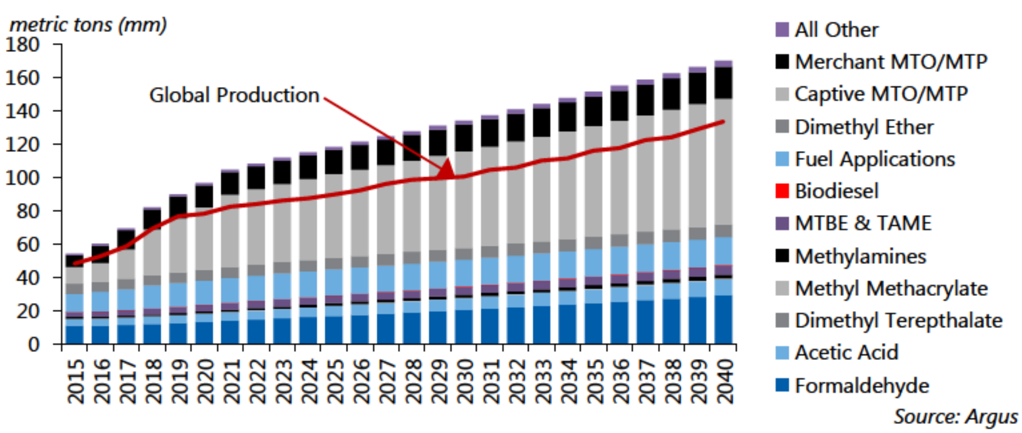
In the early 2000's, the Middle East began converting low-cost "stranded" natural gas to methanol, leading to the diminishing of US and European production. After 2007, the Middle East and South American production blocks began gaining market share, and the Atlantic Basin became the largest importer of methanol in the world.

Today, new methanol capacity has been announced globally but limited projects have reached final investment decision ("FID") or start of construction. Some new methanol capacity is anticipated in China, but this capacity is expected to face many issues, including environmental, water supply and high natural gas costs. Russia, Canada, Israel, Iran, Australia and Trinidad & Tobago have planned new capacity but US capacity, primarily in the Gulf of Mexico, is far more advanced in planning and construction.

The methanol industry has a concentrated consumer demand base with 30% of demand coming from the top 20 consumers worldwide. Among these are large chemical companies including: Methanex Corp., BP plc, Dow Corning, Celanese Corp., Momentive Performance Materials, Inc. and Saudi Arabia Basic Industries Corp. ("SABIC").

China's demand for methanol dominates global markets. China represented nearly 54% of total methanol industry production and 62% of demand in 2015 (excluding CTO). Given China's massive population, and its transition from a production to a consumption economy, the derivative slate for methanol is more diverse than any other country in the world. While Chinese GDP growth is expected to be conservative, China's economy is still expected to grow faster than the rest of the world and continue to support methanol demand growth (even at lower GDP growth rates in the mid-single digits). China's 62% of world methanol demand is forecast to remain mostly stable through 2040 as other world fuel applications increase proportionately (excluding CTO). Figure 3.5 shows China's methanol demand forecast, as estimated by Argus.

Figure 3.5: China methanol demand forecast



In 2015, global methanol capacity totaled 109 million metric tons (excluding CTO), with a total production of 76 million metric tons, implying a global utilization rate of 70%.

China methanol industry operating rates are relatively low for many reasons. First, the country has overbuilt capacity in the last decade—much of which has been at the high end of the industry cash-cost structure. Also, about 20% of China's methanol capacity uses by-product coking gas as feedstock. This coking gas is the by-product of steel coking. As steel demand and production fluctuates, so does the availability of coking gas. In 2015, the steel industry operated near 50% capacity and China is currently rationalizing its overbuilt steel industry. This may result in some methanol capacity losing its feedstock and ceasing operations.

China's remaining methanol capacity is split between 60% coal feedstock and 20% natural gas feedstock. During the winter, both are subject to feedstock curtailments, as the government will preferentially allocate coal and/or natural gas to heating needs—regardless of industry needs.

After the long northwestern region winter, many of the large coal-based methanol units take month-long outages. The increased mechanical complexity of coal-based technology also takes a toll on operating performance.

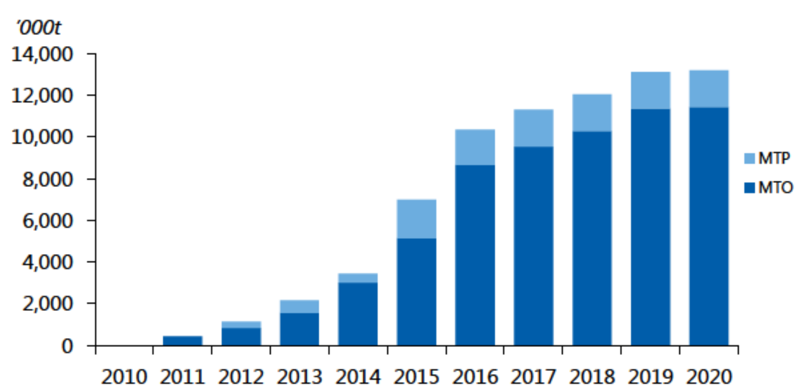
Global demand for MTO

Global methanol demand for MTO and methanol-to-propylene ("MTP") production totaled about 400,000 metric tons in 2011 (its inception year). Methanol consumption into MTO in 2015 approached 7 million tons (16% of China merchant methanol demand and 9% of world demand, excluding CTO).

Across 2016-2020, Argus estimates that China will add approximately 4 million tons/year of MTO/MTP capacity— potentially consuming 12 million tons/year of methanol as a raw material sourced from the merchant market. Based on current Argus estimates, MTO methanol demand will grow from 7.8 million tons in 2015 to 19.5 million tons in 2040 (nearly 21% of total industry demand, excluding CTO).

Argus estimates as many as seven new MTO/MTP units will be built and operational in China during the 2016 -2020 period. Many of these new complexes are under construction and/or have received government approval to proceed. Many more plans to build new units have been announced, but these have not started construction and could be delayed until oil prices rise. Argus expects the current spate of new builds (including the Project) to satisfy olefin industry demand until the 2025 timeframe. Figure 3.6 below shows Argus projections for growth in the MTO/MTP industry.

Figure 3.6: Methanol-to-olefins (MTO)/methanol-to-propylene (MTP) industry



Source: Argus

Offtake and Shipping

(b) (5)

(b) (4)

(b) (5)

See Section 3.8 below for a detailed discussion on the Project's offtake and shipping plans.

Feedstock

The Project will utilize approximately 300,000 mmBtu/day of natural gas (10,000 tons per day) as feedstock. (b) (5)
(b) (5)

(b) (5)

Technology

The Project will employ Johnson Matthey's ultralow emissions ("ULE") reforming technology to process natural gas. The ULE reforming technology is significantly more efficient and produces fewer air emissions, including CO_2, than conventional reforming technologies (b) (5)
(b) (5)

The ULE reforming technology comprises a Gas Heated Reformer ("GHR") and Autothermal Reformer ("ATR") in combination. (b) (5)
(b) (5)

See Section 3.4 below for a detailed discussion of the Project's technology.

Engineering, Procurement and Construction

NWIW indicates that it has selected the Engineering, Procurement and Construction ("EPC") contractor to be a joint venture between Technip USA, Inc. ("Technip"), URS Energy & Construction, Inc. ("AECOM") and HQC USA LLC ("PetroChina") (collectively, the "EPC JV"). (b) (5)
(b) (5)

Technip:	Lead party; basic engineering and a portion of the detailed engineering, as well as procurement services for international supply
AECOM:	Power block engineering and procurement services, construction management and construction labor
PetroChina:	Procurement services for Chinese supply and a portion of the detailed engineering
JV Combined:	Project management, procurement, module fabrication, construction management and site support subcontracts, commissioning and performance testing

See Sections 3.5 and 3.6 below for detailed discussion of construction and operations.

[ ]

3.2 Project Structure

Figure 3.7 below shows the proposed expected Project structure at financial close.

Figure 3.7: Proposed Project Structure

(b) (5)

3.3 Project Sponsors

At Financial Close, the Project is expected to be owned by (b) (5) Pan-Pacific Energy Corp. ("PPE") and (b) (5) Stonepeak Infrastructure Partners, LP ("Stonepeak") (collectively, the "Sponsors"). PPE is a Delaware domiciled corporation majority owned by Shanghai Bi Ke Clean Energy Technology Co., Ltd., (also known as Clean Energy Commercialization Company ("CECC")), a China registered company headquartered in Shanghai, China. Stonepeak is a New York based infrastructure private equity fund with over $5 billion in assets under management. The Borrower is a Delaware corporation formed to develop, construct, own and operate the Project. NWIW will be capitalized by PPE and Stonepeak according to the ownership percentages specified above.

PPE

PPE was established by Shanghai Bi Ke Clean Energy Technology Co., Ltd. ("CECC") in 2013, as a U.S. Delaware Corporation, to develop projects focusing on an integrated gas value chain in the US Pacific Northwest. CECC's shareholders include the following:

- **Chinese Academy of Science Holdings Co. Ltd** ("CAS Holdings") - wholly owned state company and private equity arm of the Chinese Academy of Sciences, China's

leading academic and research organization. (b) (4)
(b) (4)

- **Double Green Bridge Hong Kong Limited** (“DGB”) - (b) (4)
(b) (4)

- **Johnson Matthey Public Limited Company** (“JM”) – a British multinational chemicals and sustainable technologies company with operations in over 30 countries. JM’s primary industries include environmental, automotive, chemical, pharmaceutical / medical, recycling, and oil, gas and refineries. According to JM’s 2015 financials, the company generated over £3,125 million in revenue, with £591 million from its Process Technologies Division, which serves as a global supplier of catalysts, licensing, technologies and other services to the syngas, biochemical, petrochemical, oil refining and gas proces (b) (4) n had an underlying operating profit of £106 million.

Stonepeak Infrastructure Partners, LP

(b) (4)

Stonepeak is a North America focused private equity firm investing in the energy, power and renewables, transportation, utilities, water and communications sectors. Stonepeak manages $5.7 billion of capital for its investors. In January 2016, Stonepeak closed its second fund, Stonepeak Infrastructure Fund II, at a hard cap of $3.5 billion.

3.4 Technology

(b) (5)

3.5 Construction

(b) (5)

3.6 Operations

(b) (5)

3.7 Feedstock

Natural Gas

(b) (5)

Table 3.8 below shows the key terms of the (b) (5)

Table 3.8: Key terms of natural gas supply term sheets

Counterparty	Term	Volume	Capacity	Pricing
(b) (5)				(b) (4)

(b) (5) (b) (4)

Natural Gas Pipeline

(b) (5)

Electricity

NWIW has indicated that the facility will require 200MW of electricity annually (b) (5)
(b) (5)

(b) (5) The terms are summarized in Table 3.9 below.

Table 3.9: Key terms of electricity supply term sheets

Counterparty	Quantity	Cost	Duration

(b) (4)

3.8 Offtake and Shipping

[note: include summary of (b) (5) *]*

(b) (5)

Offtake

(b) (4)

(b) (5)

(b) (5) Table 3.10 below shows a summary of the key terms of the offtake arrangements as conveyed by NWIW.

Table 3.10: Offtake terms summary

(b) (4)

(b) (4)

Shipping

[note: to be updated with (b) (5)

(b) (5)

3.9 Environmental/Land/Regulatory/IP

[note: to include (b) (5)

The final Environmental Impact Statement ("EIS") for the Project was released on September 30, 2016 by the Port of Kalama and Cowlitz County. A 20 day appeal period is underway. The final EIS will form the basis for the project's permits to be issued and for the federal reviews to be completed.]

Section 4 Financial Structure Overview

[to be provided: to include summary of (b) (5)

Section 5 Risks and Mitigants

The following are the main risks and mitigants:

(b) (5)

Section 6 Risk and Recovery Matrix Summary

[note: include summary of (b) (5)

]]]

(b) (5)

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Exhibit 1

(b) (5)

(b) (5)

Draft as of 5/5/2016

Document 7

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FOR INTERNAL DISCUSSION PURPOSES ONLY

Northwest Innovation Works - Kalama

LPO DUE DILIGENCE SCHEDULE

LEGEND
- Milestone
- Deliverable
- Process

2016

JUNE

S	M	T	W	T	F	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30			

JULY

S	M	T	W	T	F	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

AUGUST

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

ACTIVITY	RESPONSIBILITY	START DATE (week of)	DURATION (in weeks)	END DATE (week of)	Week of	5/30/2016	6/6/2016	6/13/2016	6/20/2016	6/27/2016	7/4/2016	7/11/2016	7/18/2016	7/25/2016	8/1/2016	8/8/2016	8/15/2016	8/22/2016	8/29/2
					Week no.	1	2	3	4	5	6	7	8	9	10	11	12	13	14

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NWIW Major Due Diligence Documents Delivery to DOE

Document	NWIW ETA to DOE(date)	Document Received by DOE(date)

EPC

(b) (5)

-

Offtake

(b) (5)

Feedstock

NG Supply

(b) (5)

NG Transport

(b) (5)

Power Supply

(b) (5)

Shipping
(b) (5)

Financial Model

(b) (5)

Equity
(b) (5)