



# Interior Energy Project

## Quarterly Report to the Alaska State Legislature Interior Energy Project

April 5, 2016



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## LIST OF ATTACHMENTS

- Attachment A: Instructions to Finalists for Best and Final Offers  
Attachment B: March 3, 2016 AIDEA Board Meeting Packet  
Attachment C: Final Pentex 2016 Budget and Rates, Resolution No. G16-01  
Attachment D: Heating Oil Price Sensitivity Analysis Report

## ACRONYMS LIST

|       |   |
|-------|---|
| AHFC  | Alaska Housing Finance Corporation                          |
| AIDEA | Alaska Industrial Development and Export Authority          |
| ARRC  | Alaska Railroad Corporation                                 |
| BP    | BP (Alaska)   |
| CDBG  | Community Development Block Grant                           |
| CPAI  | ConocoPhillips Alaska, Inc.                                 |
| DCCED | Department of Commerce, Community, and Economic Development |
| FNG   | Fairbanks Natural Gas                                       |
| FNSB  | Fairbanks North Star Borough                                |
| GVEA  | Golden Valley Electric Association                          |
| IEP   | Interior Energy Project                                     |
| IGU   | Interior Gas Utility  |
| LNG   | liquefied natural gas                                       |
| NLG   | Northern Lights Gas   |
| PACE  | Property Assessed Clean Energy                              |
| RFI   | Request for Information                                     |
| RFP   | Request for Proposals                                       |
| SETS  | Sustainable Energy Transmission and Supply Development Fund |

## INTRODUCTION

HB105 passed the 29<sup>th</sup> Alaska Legislature on April 27, 2015 and was signed by Governor Bill Walker on June 30, 2015. This legislation was enacted to advance the Interior Energy Project (IEP), a project designed to bring low cost energy to as many residents and businesses of Interior Alaska as possible as quickly as possible. The financing package designed by this legislation provides the Alaska Industrial Development and Export Authority (AIDEA) the tools necessary to develop an integrated supply chain bringing low cost natural gas or propane to residents and businesses through local utilities.

HB105 requires AIDEA to provide written quarterly reports to the Alaska State Legislature on the status of the IEP. The specific bill language includes:

*“The Alaska Industrial Development and Export Authority shall submit quarterly to the legislature a written report on the Interior Energy Project. The authority shall deliver the report to the senate secretary and the chief clerk of the House of Representatives and notify the legislature that the report is available. The report must include:*

- (1) a description of project progress on all components;*
- (2) an update on the status of local distribution infrastructure buildout;*
- (3) to-date and anticipated conversions; and*
- (4) a financial accounting of funds expended and funds anticipated to be spent, including loans, grants, and bonds.”*

This is the third quarterly report submitted under the requirements of HB105. Each section of the report will correspond to one of the four items required by HB105. This report provides an update to the information compiled for the first two reports, which covered the period July 1, 2015 through December 31, 2015.

## DESCRIPTION OF PROJECT PROGRESS ON ALL COMPONENTS

The IEP work effort is structured on the following project components: Supply; Liquefaction (or Alternate Supply), Transportation, Distribution (including Storage and Regasification), and Conversions. As required by HB105, the status of each of these components is summarized below.

### Supply

As the IEP team initiated and proceeded through a competitive Request for Proposals (RFP) process to identify a means of lowering Interior Alaska energy costs, proposed options were narrowed to sourcing natural gas from Cook Inlet or the North Slope. As a result, the IEP team continued to negotiate for potential gas supply sourced from the North Slope and Cook Inlet. This location uncertainty remained as the field of potential LNG plant partners was reduced to two finalists as 2015 came to a close.

With the selection of Salix, Inc. as the preferred liquefied natural gas (LNG) plant RFP respondent, the IEP will source gas supply from the Cook Inlet basin. Fairbanks Natural Gas (FNG), through its affiliate Titan LNG, LCC, currently has a gas supply agreement with Hilcorp Alaska to provide natural gas to the existing Titan facility through the beginning of 2018. The IEP team is working on supplanting that contract when it expires and securing additional supply for new LNG capacity. The IEP team and Interior utilities are actively negotiating with Cook Inlet producers for a long term supply agreement starting in 2018. The effort to secure a Cook Inlet gas supply was initiated by a Request for Information (RFI) issued by the Department of Commerce, Community, and Economic Development (DCCED) through AIDEA in 2015. It should be noted that FNG has an existing contract with ConocoPhillips Alaska, Inc. (CPAI) for back-up supplies of LNG from CPAI's plant in Nikiski, Alaska.

The IEP team had been in discussions to access a natural gas supply agreement between Golden Valley Electric Association (GVEA) and BP (Alaska) (BP). GVEA had formed a joint venture with MWH, Northern Lights Gas (NLG), to market the gas from the contract between GVEA and BP. Upon selection of Salix as the preferred RFP respondent, AIDEA discontinued discussions with NLG and other North Slope Producers for natural gas supply.

### Liquefaction

As of December 31, 2015, the RFP process had narrowed the field of possible LNG suppliers to two top ranked proposers: Salix and Spectrum LNG, LLC. Salix offered a Cook Inlet natural gas liquefaction tolling plant with an initial capacity of 3B (3 billion cubic feet) per year. Spectrum offered a North Slope natural gas liquefaction tolling plant with an initial capacity of 6B (6 billion cubic feet) per year. Committee members determined that additional information and clarifications were necessary to differentiate and choose between these two RFP respondents. A "Request for Clarifications" was provided to Spectrum and Salix, with a deadline of January 10, 2016 to submit desired information.



In mid-December 2015, the GVEA Board authorized entry into a long term oil supply contract for their LM 6000 combined cycle turbine in North Pole, Alaska. This contract limits GVEA's future IEP participation to summer-only supply as indicated in the demand profile section of Attachment A. Although the agreement to purchase summer gas assists the project by providing a larger summer load, it does not benefit the project to the degree a year-round baseload purchase would. GVEA participation as a year round anchor customer would help to meet the economic challenges of low early year demand as the distribution system is expanded. Space heating costs may be higher and early year project risk may be greater for homes and businesses as a result of the summer-purchase only scenario.

As 2015 came to a close, work between Salix, Spectrum, AIDEA staff and contractors, and the Interior utilities (Interior Gas Utility [IGU] and FNG) progressed toward the January 10, 2016 target date referred to above.

On February 4, 2016 the RFP Evaluation Committee met to review the clarifications information received from the top two ranked proposers. The Committee reviewed the Best and Final Offers from Salix and Spectrum along with confidential independent third party technical and financial analyses provided by Arcadis U.S., Inc. (redacted Arcadis reports included in Attachment B). In addition, the committee received verbal updates regarding the status of natural gas feedstock, LNG transportation costs, and draft term sheets.

Following the review of clarifications, the Evaluation Committee had a thorough group discussion of the relative strengths and weaknesses of the two proposals. The conversation allowed committee members to express opinions, compare the two proposals on a variety of metrics, and understand the perspectives of the other committee members. The discussion concluded with members providing an indication of which project each considered "most likely to succeed." Then members described their conclusions about the different options and the reasons for their position. The committee adjourned with the following determination:

- The committee unanimously voted to move forward with Salix as the top ranked proposal,
- The committee determined that further negotiations were required to correct deficiencies in the draft Salix term sheets, and
- Revised terms and conditions acceptable to the utilities and AIDEA were necessary to advance a full recommendation to the AIDEA Board.

The recommendation of the RFP Evaluation Committee to proceed with Salix was detailed in a March 3, 2016 memorandum and accompanying documents from IEP Team Lead Gene Therriault to AIDEA Executive Director John Springsteen for distribution at an AIDEA Board meeting held the same day (Attachment B).

## Transportation

### Rail option update

The Alaska Railroad Corporation (ARRC) received notice of condition modifications for transportation of LNG by rail from the Federal Railroad Administration on November 2, 2015. This action provides an opportunity for a Cook Inlet based supply to move LNG by rail and potentially lower the transportation costs for LNG. ARRC continues to engage Salix and the Interior utilities on this possibility. A copy of the ARRC approval letter from the Federal Rail Administration was included as Attachment E to the January 5, 2016 IEP Quarterly Report.

### Trucking option update

LNG trailers currently in use in Alaska have a capacity of approximately 10,500 gallons. In order to improve the economics of LNG transport via truck, AIDEA participated in a pilot study to test a larger capacity LNG trailer provided by Western Cascade. This test involved numerous hauls from Cook Inlet to Fairbanks and from the North Slope to Fairbanks to ascertain deliverability and operability issues with the prototype trailer.

The Western Cascade trailer has capacity of up to 13,000 gallons of LNG. However, due to Maximum Gross Vehicle Weight restrictions on Alaska highways, the net capacity allowed to be hauled in the trailer is approximately 12,300 gallons. Although the trials with the trailer produced punch-list items of requested enhancements, no significant issues were identified that would preclude its use in Alaska.

The lower per unit cost of delivering LNG using larger trailers presents a viable opportunity to reduce a key component of the IEP supply chain. As a result, negotiations are currently underway regarding the potential purchase and use of the Western Cascade trailer. Copies of press coverage of the large capacity trailer and the pilot test were included as Attachment F to the January 5, 2016 IEP Quarterly Report.

## Distribution

### Existing FNG System Rates

Based on AIDEA's 2015 purchase of Pentex Alaska Natural Gas Company, LLC and AIDEA Board action on December 17, 2015, Pentex filed for interim rate reductions for current FNG customers to be effective on January 1, 2016. The budget and rate information provided to the AIDEA Board at their public meetings on December 3 and 17, 2015 were included in the January 5, 2016 IEP Quarterly Report as Attachment G.

Following the approval of the interim FNG rates, public notice was given of the intent to establish permanent rates for 2016, with an opportunity to submit written input and announcement of a public hearing in Fairbanks on January 21, 2016. There was limited attendance at the public hearing with one person providing testimony. One written comment expressing support for lower customer rates was received prior to the close of public comment on February 4, 2016.

On March 3, 2016 the AIDEA Board considered and approved Resolution No. G16-01 implementing the Pentex interim rates as permanent rates effective March 31, 2016. The approved permanent rates achieve AIDEA's policy and financial objectives for the Pentex acquisition and the IEP, and result in a residential customer rate reduction of 13.5 percent and an overall FNG system rate reduction of 10.4 percent (Attachment C).

## Systems Expansion

No changes have been made to the distribution system since the October 1, 2015 IEP Quarterly Report. Detailed maps of the build-out accomplished in 2015 are included in that report, available at [interiorenergyproject.com](http://interiorenergyproject.com).

Although there was no active distribution expansion activity during the past 90-day period, the IEP team continues to discuss ways that future expansion activity can help to facilitate consolidation of FNG and IGU into a single unified system. With advice and insight provided by ENSTAR Natural Gas, unification infrastructure continues to be explored that will lower the cost of operating a unified natural gas distribution system in the combined territory of FNG and IGU.

The following is a summary of the storage and distribution infrastructure options discussed that may facilitate IGU and FNG consolidation:

### Storage:

1. 5M gallon tank is necessary for security supply and distribution expansion.
2. North Pole storage will be necessary if GVEA is to be supplied natural gas.
3. Two storage locations may be necessary to ensure back-pressure support when the two disparate distribution systems are connected.

### Distribution:

1. Minimum capital investment to connect two systems is an 8-inch distribution pipeline (approximately 16 miles).
2. Transmission pipe will be investigated to North Pole from current storage site (to ensure high pressure gas is available at GVEA site). NOTE: This cost will be compared to developing and constructing a high pressure regasification header at storage located at this site.

Additional meetings will be scheduled to complete phased build-out models and capital cost estimates for these phases. Final cost and system pressure models and further refined storage results are expected by June 30, 2016.

## Systems Consolidation

Discussions continue regarding IGU's potential purchase of the existing FNG LNG receipt, storage, gasification, and natural gas distribution system. Such a purchase could also include the existing Pentex LNG plant and LNG transport assets. AIDEA and IGU have set a tentative target



to complete negotiation of terms and conditions for a purchase with a targeted closing of transactions by June 30, 2016.

## Conversion

Discussions within the Fairbanks North Star Borough (FNSB) on how best to assist potential customer conversion to natural gas have taken place under the auspices of a Local Conversion Working Group. This group is composed of representatives from the two gas utilities along with local lenders, mechanical contractors, heating system technicians, staff from the Alaska Housing Finance Corporation (AHFC), and local elected officials. AIDEA IEP Team Leader Gene Therriault participates as a member of this group to provide input and assistance on behalf of AIDEA and the Alaska Energy Authority. The multiple facets of the work undertaken by the Conversion Working Group are outlined below.

### Consumer interest in conversion assistance

The Cardno Entrix *Interior Energy Project Natural Gas Conversion Analysis* finalized in January 2014 identified a high level of interest in converting to natural gas as a lower cost, cleaner source fuel for space heat if the delivered price approached the target of \$15/mcf. At this price, many homeowners indicated a desire to forgo financing conversion and instead expressed a willingness to fund this action from personal savings. For individuals not having personal funds for this purpose, the ability to finance all, or a portion, of the cost over an extended period of time scored high as a necessary tool to support their conversion to gas.

The ability to pass the obligation for repayment of conversion financing to a new owner of a building proved to be very attractive to residential owners. The ability to spread natural gas conversion costs over a 10- to 20-year period of time and using transferable financing are both attributes of two energy efficiency financing mechanism described below that have achieved widespread use across the Lower 48.

The recent decline in the price of home heating fuel oil is adding emphasis to the value of conversion assistance that will incentivize individual property owners in the FNSB to switch to natural gas when it becomes available. The original Cardno Entrix conversion estimates and demand model have been modified to reflect the lower price of fuel oil and expected reduction in natural gas conversions. However, just as the price of home heating oil has declined unexpectedly over the last two years, the future price is also uncertain.

### Property Assessed Clean Energy Financing

Property Assessed Clean Energy (PACE) is a means of financing improvements that increase the energy efficiency of a building. The improvements are financed with repayment accomplished through a voluntary assessment placed on the annual property tax bill. PACE financing is often structured to allow a longer payback period for a business than is possible with a conventional business improvement loan. In addition, the strength of the PACE collection mechanism results in low default/low risk loans which may justify a lower interest rate.

Pending PACE legislation (SB56 and HB118) would empower Alaska municipalities that levy property taxes to offer this mechanism for energy efficiency actions. Interior municipalities have expressed support for the legislation in the anticipation that it could be a tool with particular value to the IEP. SB56 and HB118 are patterned after successful legislation that restructured PACE in Texas. The language authorizes, but does not require, local governments to allow PACE financing for businesses within their municipal boundaries.

On March 14, 2016, SB 56 was heard for the second time in the Senate Finance Committee. During this hearing, the Committee replaced the original bill with a committee substitute containing clarifications previously discussed and adopted into the House version of the legislation. Additional support for the PACE legislation was received from the Alaska Home Builders Association, which has been added to the legislative committee record.

The Local Conversion Working Group supports the passage of PACE legislation in Alaska and has encouraged the FNSB to begin considering contractual agreements that will be required for local lenders and property owners to use this method of financing.

## On-bill Financing

On-bill financing allows utility customers to borrow funds that are repaid by a voluntary line item added to their standard utility bill. This financing mechanism is often used by utilities to assist new customers in overcoming the initial cost of accessing a utility service.

The current ownership and governance structure of IGU and the purchase of FNG by AIDEA allow these local utilities the flexibility to offer an on-bill financing mechanism capable of assisting customers with the expense of converting to natural gas. Although previous conversion surveys and focus groups indicated the mere availability of a transferable financing mechanism would prompt a higher rate of conversion to natural gas, coupling this tool with a lower cost source of capital would be helpful.

## Identified funding sources for conversion assistance

The Local Conversion Working Group has identified the following possible funding sources for conversion assistance:

- I. Commercial lenders
  - a. Commercial Loans as part of a community-wide conversion program
- II. Local Government
  - a. PACE-enabled conversion loans
  - b. Possible local government back-stop funding for PACE loans
- III. State Sources
  - a. Air quality programs
  - b. Community Development Block Grants (CDBG)
- IV. Federal Sources

- a. USDA RUS Energy Efficiency and Conservation Loan Program
- b. USDA RUS Rural Energy Savings Program loans
- c. Clean Water Fund
- d. Environmental Protection Agency Targeted Airshed Grants

The previously referenced AHFC Home Energy Rebate Program (HERP) has been removed from this list as a result of AHFC announcing that no new applications would be accepted by the HERP after March 25, 2016.

CDBGs have been added as a potential funding source based on work performed by IGU staff, David Carlisle. David's work has identified specific areas within the combined FNG and IGU service territory with income characteristics that would support access to CDBG funds through a competitive grant application.

## UPDATE ON THE STATUS OF LOCAL DISTRIBUTION INFRASTRUCTURE BUILD-OUT

No changes have been made to the distribution system in the last quarter. Detailed maps of the build-out accomplished in 2015 were included in the October 1, 2015 IEP Quarterly Report.

## TO-DATE AND ANTICIPATED CONVERSIONS

### To-Date Conversions

No conversions are currently occurring due to limited gas supply. Until the supply is increased there is not sufficient gas in the winter to ensure uninterrupted service to additional customers. Expanded distributions lines installed in 2015 have been pressurized and are available to supply gas to additional homes and businesses when additional natural gas is available.

### Anticipated Conversions

Additional work was undertaken during the current reporting period on anticipated conversions to natural gas. The number of anticipated conversions provided in the October 1, 2015 IEP Quarterly Report was based on the analysis undertaken by Cardno Entrix, detailed above. The work on that analysis and the underlying detail is substantial. The report assessed "willingness to convert" based on a number of factors related to conversion costs, prior conversion history, survey data, and potential savings. A copy of that report can be found at

[http://www.interiorenergyproject.com/Resources%20and%20Documents/IEP\\_Conversion\\_Analysis\\_Final.pdf](http://www.interiorenergyproject.com/Resources%20and%20Documents/IEP_Conversion_Analysis_Final.pdf).

The significant change in the price of heating fuel required a fresh look at the "willingness to convert" with specific attention paid to the closing of the cost gap between heating fuel and the IEP natural gas price targets. Cardno Entrix was engaged to update the analysis of "willingness to convert" based on a range of scenarios of lowered heating oil prices. In the most conservative scenario, expected conversions were projected to drop by approximately one-third from the original analysis. A copy of that revised analysis is included as Attachment D of this report.

The change in projected willingness to convert, combined with an extension of the time needed to reach conversions from six years to eight years, results in a revision to the number of anticipated conversions and the anticipated demand for the project. Table 1 depicts the anticipated number of conversions, by year, based upon the revised Cardno Entrix analysis. Additional customers are not expected to convert until new volumes of natural gas become available with the construction of new LNG supply or storage capacity.

Table 1: Natural Gas Customer Projection

|     | 2015 | 2016 | 2017  | 2018  | 2019  | 2020  | 2021  | 2022  | 2023  |
|-----|------|------|-------|-------|-------|-------|-------|-------|-------|
| FNG | 959  | 959  | 1,506 | 2,183 | 3,031 | 3,732 | 4,362 | 4,635 | 4,807 |
| IGU | -    | -    | 167   | 576   | 1,285 | 2,255 | 3,502 | 4,818 | 5,998 |

## FINANCIAL ACCOUNTING OF FUNDS EXPENDED AND FUNDS ANTICIPATED TO BE SPENT, INCLUDING LOANS, GRANTS, AND BONDS

Table 2 outlines the IEP expenditures related to the \$57.5 million capital appropriation, the \$125 million of Sustainable Energy Transmission and Supply (SETS) fund capitalization, and the \$150 million of SETS bond authorization.

Table 2: Expenditures from and Remaining Funds of Legislative Appropriation & Authorization(s)

| <b>Expenditures* from and Remaining Funds<br/>of Legislative Appropriation &amp; Authorization(s):</b>  |  |                                      |                                       |                    |
|---|--|--------------------------------------|---------------------------------------|--------------------|
|   | HCS CSSB 18<br>\$57.5 mill<br>Cap Approp | SB 23 SLA 2013<br>\$125 mill<br>SETS | SB 23 SLA 2013<br>\$150 mill<br>Bonds | Total              |
| <b>Development Costs</b>  | <b>IEP Phase 1 (Pre HB 105)</b>          |                                      |                                       |                    |
|   | LNG Plant                                | 7,665,405                            | -                                     | 7,665,405          |
|   | North Slope Pad                          | 6,003,418                            | -                                     | 6,003,418          |
|   | Distribution                             | 500,005                              | -                                     | 500,005            |
|   | <b>Total</b>                             | <b>14,168,828</b>                    | <b>-</b>                              | <b>14,168,828</b>  |
|   | <b>IEP Phase 2 (Post HB 105)</b>         |                                      |                                       |                    |
|   | Commodity                                | 33,945                               | -                                     | 33,945             |
|   | LNG Plant                                | 110,822                              | -                                     | 110,822            |
|   | Trucking                                 | 14,075                               | -                                     | 14,075             |
|   | Storage                                  | 912                                  | -                                     | 912                |
|   | Distribution                             | 8,041                                | -                                     | 8,041              |
|   | Project Management                       | 227,594                              | -                                     | 227,594            |
|   | <b>Total</b>                             | <b>395,389</b>                       | <b>-</b>                              | <b>395,389</b>     |
|   | <b>Total</b>                             | <b>14,564,217</b>                    | <b>-</b>                              | <b>14,564,217</b>  |
| <b>Loans &amp; Investments</b>  | LNG Plant                                | -                                    | -                                     | -                  |
|   | Trucking                                 | -                                    | -                                     | -                  |
|   | Storage                                  | -                                    | -                                     | -                  |
|   | Distribution                             | -                                    | -                                     | -                  |
|   | FNG Loan                                 | -                                    | 15,000,000                            | 15,000,000         |
|   | IGU Loan                                 | -                                    | 37,780,000                            | 37,780,000         |
|   | <b>Total</b>                             | <b>-</b>                             | <b>52,780,000</b>                     | <b>52,780,000</b>  |
| <b>Total</b>  | <b>Total Expenditure</b>                 | <b>14,564,217</b>                    | <b>52,780,000</b>                     | <b>67,328,283</b>  |
|   | <b>Remaining Funds</b>                   | <b>42,951,717</b>                    | <b>72,220,000</b>                     | <b>150,000,000</b> |
| <b>Notes</b>  |  |                                      |                                       |                    |
| <i>Financial data per unaudited accounting system records as of 3/24/2016</i>   |  |                                      |                                       |                    |
| <i>*Expenditures include Actuals, Encumbrances, and Commitments as of 3/24/2016</i>   |  |                                      |                                       |                    |
| <i>Legislative Appropriation &amp; Authorization(s) only include those identified above and do not include AIDEA operating, Economic Development Fund, or other sources</i> |  |                                      |                                       |                    |

## **SUMMARY**

This status report provides the third quarterly report specified in HB105 on the status and progress of the IEP. Actions since the first quarterly report have resulted in the identification of finalist offering to provide LNG to the IEP. The process to identify and select the top ranked respondent, collect information to clarify proposals, and to recommend a single project approach to be considered by the AIDEA Board is consistent with the presentations made during the 2015 Legislative session, and with the intent language included in HB105 guiding use of an open and competitive selection process.

AIDEA will continue to work with Interior utilities, Salix and Interior community leaders to bring a project recommendation to the AIDEA Board for consideration. The plan brought to the Board will be consistent with HB 105 requirements.

The next quarterly report is due in July 2016.





# **Attachment A: Instructions to Finalists for Best and Final Offers**



## ADDENDUM FOUR

### Request for Proposal 15-142

### INTERIOR ENERGY PROJECT (IEP)

October 16, 2015

The following is intended for informational purposes. Offerors are not required to acknowledge this addendum with their Best and Final Offer.

RFP 15142 Interior Energy Project (IEP) established the first step of a two-step public process. Step one culminated with the selection of five vendors to submit Best and Final Offers (BAFO).

RFP 15124 reads “Step Two will culminate with a call for final project offers [Best and Final Offers] from each proposer and evaluated by committee as most likely to succeed. Selection criteria used in step one will not be used. The Evaluation Committee will review final project offers, evaluating and ranking as a group with the intent of coming to a consensus of their selection. The Evaluation Committee may, at its option, vote on the final ranking. The Evaluation Committee shall provide a narrative justification for their selection.”

This addendum further defines the RFP’s Step-Two process for the final selection of a “preferred respondent” to act as an IEP partner.

Finalists shall submit one **signed** original, eight copies, and one electronic copy of their BAFO by 2:00 PM, October 30, 2015 local Alaska Time addressed to:

Tom Erickson  
Chief Procurement Officer  
Alaska Industrial Development and Export Authority  
813 West Northern Lights Blvd  
Anchorage, AK 99503

BAFOs must be submitted in a sealed envelope and clearly marked with the “Best and Final Offer RFP 15142 Interior Energy Project (IEP).” Failure to submit your BAFO by the date and time stated above may cause your BAFO to be considered non-responsive. Questions on the content of this addendum in preparation of BAFO’s shall be directed in writing to the same address or to [terickson@aidea.org](mailto:terickson@aidea.org)

BAFOs must be signed and include the following certification:

I certify that I am a duly authorized representative of the Contractor; that this Submittal accurately represents capabilities of the Contractor and Subcontractors identified herein for providing the services indicated; and, that the requirements of the Certifications in RFP 15142, Interior Energy Project (IEP) will be complied with in full.

BAFOs may be open for public inspection after a Notice of Intent is issued. Any propriety and confidential information shall be submitted under a separate cover and so marked if such information should not be disclosed to the public.

The Offer shall include to the extent available and applicable:

- Technical Project description
  - Current status of project design, including engineering, cost estimates, and contractor/vendor quotes and estimates
  - Detailed description of strategies to prevent current costs estimates from increasing between submission of final project offer and project sanction (capital and operating)
- Detailed Project Costs
  - All capitalized costs, including any capitalized financing or management fees
  - All fixed operating costs, including any taxes and management fees
  - All variable operating costs
- Commercial Terms
  - Structure and term of proposed pricing
  - Utility commitment expectation (all requirements, take or pay volumes, capacity reservation fee, or other)
  - Other commercial terms
- Project Financing
  - Sources and uses table for capital costs
  - Financing assumptions (term, rate, repayment priority) for all sources of capital financing
  - Method for financing development costs
- Risk Identification and Allocation (please include a brief narrative on each)
  - Allocation of construction risk between contractors, developer, utilities, and AIDEA
  - Allocation of operating risk between operator, developer, utilities, and AIDEA
  - Allocation of demand risk between developer, utilities, and AIDEA
- Detail on Ability to meet IEP project Goals
  - \$15 per Mcf delivered to meter (assume \$4-5 per Mcf for storage and distribution)
  - Detail any cost components within proposal (gas supply, transportation, etc)
- An electronic version of financial model, available for use by IEP team

Information on the proposing firms' experience, qualifications, and project team is not required for this submittal unless there have been changes to the project team from the original proposal submission.

Guidance for proposers to use in preparing Best and Final Offers is attached in "1 Supplemental Information." Information includes Demand Profile, AIDEA Financing Assumptions and Gas Price Assumptions

Finalists are expected to participate in a public forum on November 4, 2015 in Fairbanks, Alaska. Providing information to the public on their Best and Final Offer. Attached is an “invitation and agenda for the public forum.” Proposers should expect direct public interaction/feedback at this event.

Evaluation process:

1. Each member of the Evaluation Committee (EC) will independently score the BAFO’s based on the attached document “Most Likely to Succeed”
2. Committee members will rank 3 of the 5 proposals with a score of 5, 3, and 1. Their top proposal will receive a score of 5 and no duplicate numbers will be used. Proposals not in the top 3 will receive a score of zero.
3. The EC will meet to discuss their rankings and committee members will have an opportunity to change their ranking based on committee discussions.
4. EC will select the top BAFOs based on ranking as those most likely to succeed as the preferred respondent. The EC will select a minimum of 2 respondents; however, may increase the number of respondents based on the scoring.
5. Final selection will be through discussion by the EC. The EC will list the pros and cons of the remaining respondents evaluating and ranking as a group coming to a consensus on their selection.
6. After step 5, the evaluation committee may, at the option of the Chief Procurement Officer, vote to confirm the final selection.
7. The evaluation committee shall provide a narrative justification for their final selection.

All other terms and conditions of RFP 15142 Interior Energy Project (IEP) remain the same.

#### **END OF ADDENDUM**

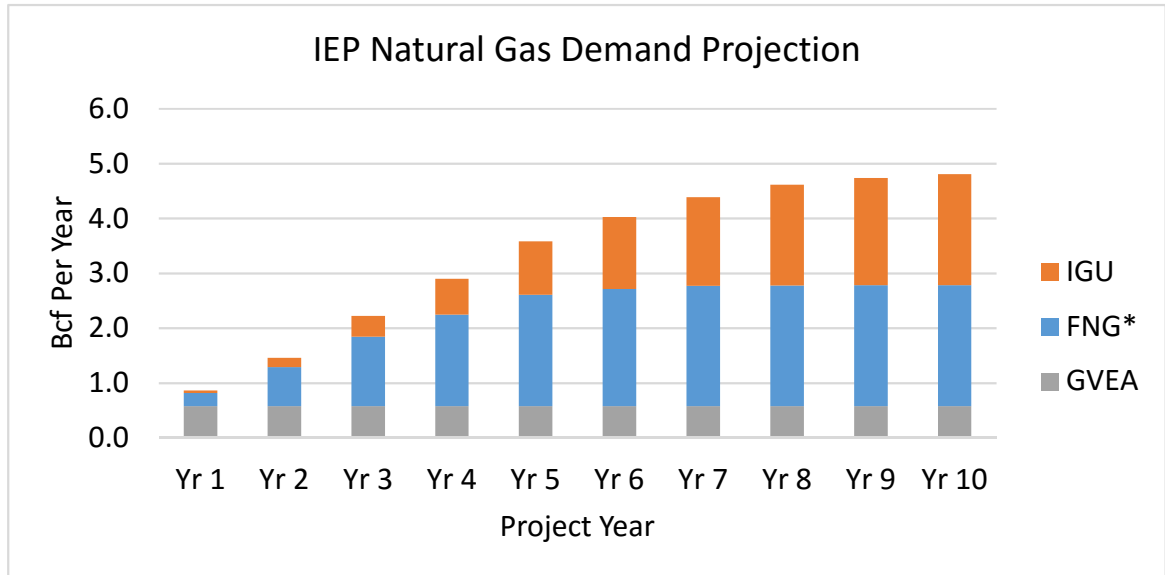
Sincerely,

Tom Erickson  
Chief Procurement Officer  
[terickson@aidea.org](mailto:terickson@aidea.org), 907-771-3951

Attachments:

- 1 Supplemental Information
- 2 Most Likely to Succeed
- 3 Demand Profile
- 4 SETS Schedule
- 5 Invitation and agenda for the public forum

|              | Natural Gas Demand by Year (Bcf) |             |             |             |             |             |             |             |             |              |
|--------------|----------------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|--------------|
|              | <u>Yr 1</u>                      | <u>Yr 2</u> | <u>Yr 3</u> | <u>Yr 4</u> | <u>Yr 5</u> | <u>Yr 6</u> | <u>Yr 7</u> | <u>Yr 8</u> | <u>Yr 9</u> | <u>Yr 10</u> |
| <b>FNG*</b>  | 0.24                             | 0.71        | 1.27        | 1.67        | 2.03        | 2.14        | 2.19        | 2.20        | 2.20        | 2.20         |
| <b>IGU</b>   | 0.05                             | 0.17        | 0.38        | 0.65        | 0.98        | 1.31        | 1.62        | 1.84        | 1.96        | 2.03         |
| <b>GVEA</b>  | 0.58                             | 0.58        | 0.58        | 0.58        | 0.58        | 0.58        | 0.58        | 0.58        | 0.58        | 0.58         |
| <b>Total</b> | <b>0.87</b>                      | <b>1.46</b> | <b>2.22</b> | <b>2.90</b> | <b>3.58</b> | <b>4.02</b> | <b>4.39</b> | <b>4.61</b> | <b>4.74</b> | <b>4.81</b>  |



*\*FNG demand does not include existing 0.95 Bcf provided under existing agreements*

| <b>Month</b> | <b>Days</b> | <b>HDD</b>    | <b>Percent<br/>of LDC<br/>Demand</b> |
|--------------|-------------|---------------|--------------------------------------|
| Jan          | 31          | 2,181         | 15%                                  |
| Feb          | 28          | 1,830         | 12%                                  |
| Mar          | 31          | 1,616         | 11%                                  |
| Apr          | 30          | 958           | 7%                                   |
| May          | 31          | 475           | 5%                                   |
| Jun          | 30          | 196           | 3%                                   |
| Jul          | 31          | 149           | 3%                                   |
| Aug          | 31          | 301           | 4%                                   |
| Sep          | 30          | 605           | 5%                                   |
| Oct          | 31          | 1,220         | 9%                                   |
| Nov          | 30          | 1,804         | 12%                                  |
| Dec          | 31          | 2,089         | 14%                                  |
| <b>Total</b> | <b>365</b>  | <b>13,423</b> | <b>100%</b>                          |



## GVEA Demand Profile

|          | Average | Total Mcf | Total Bcf |
|----------|---------|-----------|-----------|
| 12 Month | 166,435 | 1,997,225 | 2.00      |
| 4 Month  | 144,314 | 577,254   | 0.58      |
| 5 Month  | 149,828 | 749,142   | 0.75      |
| 6 Month  | 150,724 | 904,343   | 0.90      |

| Day      | Jan     | Feb     | Mar     | Apr     | May     | Jun     | Jul     | Aug     | Sep     | Oct     | Nov     | Dec     |
|----------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 1        | 5,878   | 6,437   | -       | 5,864   | 4,978   | 4,052   | 8,017   | -       | 4,021   | 5,851   | -       | 6,205   |
| 2        | 6,527   | 6,583   | -       | 5,786   | 4,097   | 4,127   | 7,989   | -       | 4,332   | 5,795   | -       | 7,198   |
| 3        | 6,324   | 6,127   | -       | 5,784   | 3,791   | 4,335   | 7,993   | 3,597   | 4,258   | 5,696   | 5,762   | 6,289   |
| 4        | 7,372   | 8,704   | -       | 5,718   | 4,258   | 4,551   | 7,415   | 3,868   | 4,760   | 5,744   | 8,934   | 5,947   |
| 5        | 6,817   | 6,722   | -       | 5,785   | 5,677   | 4,576   | 7,979   | 4,336   | 3,863   | 5,900   | 8,771   | 5,863   |
| 6        | 7,620   | 5,677   | -       | 5,677   | 5,677   | 4,317   | 7,634   | 4,496   | 3,551   | 6,173   | 8,549   | 5,813   |
| 7        | 7,627   | 5,705   | -       | 5,685   | 5,782   | 4,258   | 7,535   | 4,028   | 3,617   | 5,923   | 8,574   | 6,012   |
| 8        | 7,572   | 6,133   | 5,684   | 5,681   | 5,756   | 3,787   | 7,849   | 716     | 5,469   | 5,746   | 8,520   | 5,692   |
| 9        | 7,273   | 6,450   | 5,807   | 5,732   | 5,713   | 4,357   | 6,978   | -       | 8,339   | 5,918   | 7,133   | 7,088   |
| 10       | 7,998   | 7,481   | 5,683   | 5,737   | 5,016   | 4,355   | 5,743   | 3,644   | 8,156   | 5,910   | 5,729   | 5,914   |
| 11       | 8,320   | 5,765   | 5,677   | 3,591   | 5,744   | 4,021   | 5,880   | 3,584   | 8,210   | 5,911   | 6,486   | 5,677   |
| 12       | 8,739   | 5,850   | 6,045   | 3,939   | 4,758   | 4,100   | 6,145   | 2,365   | 7,559   | 5,787   | 6,767   | 6,341   |
| 13       | 7,559   | 5,832   | 7,428   | 4,750   | 4,498   | 4,120   | 8,164   | 3,808   | 8,072   | 4,731   | 7,124   | 6,607   |
| 14       | 5,785   | 5,677   | 8,337   | 5,049   | 4,738   | 4,021   | 7,830   | 4,021   | 7,639   | 4,510   | 5,747   | 6,527   |
| 15       | 7,572   | 5,845   | 6,397   | 5,932   | 5,217   | 4,534   | 7,543   | 4,100   | 4,494   | 4,497   | 6,395   | 6,872   |
| 16       | 7,264   | 5,677   | 6,490   | 6,200   | 4,791   | 4,055   | 6,813   | 3,429   | 4,258   | 5,813   | 5,708   | 7,169   |
| 17       | 8,216   | 5,883   | 6,129   | 6,240   | 4,285   | 3,863   | 7,547   | 4,083   | 4,731   | 4,283   | 5,715   | 6,022   |
| 18       | 8,103   | 6,014   | 6,787   | 7,352   | 4,285   | 3,785   | 7,074   | 3,785   | 4,508   | 5,698   | 5,837   | 6,936   |
| 19       | 8,509   | 5,994   | 6,119   | 5,931   | 4,518   | 4,027   | 8,040   | 4,321   | 4,021   | 5,677   | 5,681   | 7,061   |
| 20       | 7,482   | 5,484   | 5,677   | 5,765   | 4,863   | 237     | 6,494   | 4,258   | 4,053   | 5,677   | 5,773   | 5,842   |
| 21       | 9,742   | 5,717   | 5,677   | 5,784   | 4,825   | 1,197   | 6,143   | 3,812   | 4,757   | 6,085   | 6,632   | 5,765   |
| 22       | 6,607   | 5,818   | 5,691   | 5,918   | 4,637   | 4,579   | 7,733   | 2,602   | 4,494   | 6,138   | 5,677   | 6,273   |
| 23       | 6,380   | 5,690   | 5,717   | 5,917   | 3,853   | 4,629   | 7,936   | 2,839   | 4,258   | 5,677   | 6,128   | 6,140   |
| 24       | 5,783   | 5,902   | 5,677   | 5,927   | 3,548   | 4,389   | 7,810   | 3,788   | 4,259   | 6,226   | 5,940   | 7,281   |
| 25       | 6,632   | 5,677   | 5,709   | 6,309   | 3,597   | 3,918   | 6,623   | 3,884   | 4,816   | 6,191   | 5,959   | 5,978   |
| 26       | 5,916   | 5,945   | 5,783   | 6,410   | 3,786   | 3,860   | 7,219   | 3,818   | 4,021   | 5,983   | 6,120   | 6,501   |
| 27       | 5,677   | 6,247   | 5,784   | 6,004   | 3,785   | 3,312   | 7,940   | 4,135   | 4,028   | 5,869   | 5,677   | 6,478   |
| 28       | 6,669   | 5,700   | 5,677   | 5,682   | 4,021   | 2,841   | 7,799   | 4,258   | 4,632   | 4,782   | 6,352   | 6,356   |
| 29       | 5,787   | -       | 5,754   | 5,990   | 4,494   | -       | 7,921   | 3,611   | 6,264   | 5,150   | 5,773   | 6,982   |
| 30       | 6,693   | -       | 4,264   | 5,749   | 3,564   | -       | 7,692   | 3,358   | 5,761   | 5,677   | 5,677   | 7,335   |
| 31       | 7,062   | -       | 5,719   | -       | 3,593   | -       | 2,853   | 4,034   | -       | 5,677   | -       | 6,927   |
| 12 Month | 221,503 | 170,738 | 143,711 | 171,888 | 142,146 | 108,201 | 224,331 | 102,576 | 155,201 | 174,695 | 183,141 | 199,093 |
| 4 Month  |         |         |         |         | 142,146 | 108,201 | 224,331 | 102,576 |         |         |         |         |
| 5 Month  |         |         |         | 171,888 | 142,146 | 108,201 | 224,331 | 102,576 |         |         |         |         |
| 6 Month  |         |         |         | 171,888 | 142,146 | 108,201 | 224,331 | 102,576 | 155,201 |         |         |         |

## **MOST LIKELY TO SUCCEED:**

This information, along with the information provided with the original proposal on qualifications and experience, will be used by the evaluation committee in determining “most likely to succeed.” The committee will weigh:

- **Technical Approach**  
Proposals with a more advanced project approach and more certainty on project development and timeline will be preferred over projects less advanced and with more uncertainty on timeline. This includes project approach for operations and utility integration.
- **Detailed Costs**  
Proposals judged to have more certainty and documentation of accuracy relative to cost detail will be preferred over projects with less certainty or less documentation. Proposals with credible lower fixed annual revenue requirements will be preferred over projects with higher fixed annual revenue requirements. Proposals with credible lower capital requirements will be preferred over projects with equally credible but higher capital requirements. Proposals that demonstrate full understanding and inclusion of all operating costs and verifiable and supported capital costs will be preferred over projects with less complete or less well documented costs.
- **Commercial terms**  
Proposals that provide more certainty in pricing (price being equal) will be preferred over projects with more uncertainty in pricing. Pricing structures that minimize long-term financial commitments by the utilities will be preferred over projects requiring increased long-term financial commitments by the utilities.
- **Project Financing**  
Proposals that specify project financing details in a manner that clearly identify source and uses of funds, the impact of financing structures on rates and that share project development costs between the parties will be preferred over proposals that lack clarity or allocate early project costs away from the proposer.
- **Risk Allocation**  
Proposals that clearly delineate risk allocations between plant owners and purchasers will be preferred over proposals with unclear risk allocations. Proposals that provide a rational basis for sharing risk between the parties to reduce overall project costs will be preferred to proposals that simply allocate significant risk away from the owners. Pricing structures that shift risk (construction cost, operating costs, demand, etc.) on the plant owner will be preferred over proposals that shift cost overrun risks to the purchaser.
- **Ability to Meet IEP Goals**  
Proposals that demonstrate the opportunity to meet IEP goals will be preferred over proposals that do not demonstrate that ability. Project risk will be considered to identify proposals that offer a higher probability of meeting the IEP goals over proposals that require significant contingencies to meet the goals.
- **Experience and Qualifications**  
Proposers who demonstrate the economic and technical capacity, have prior experience in LNG and/or similar plant construction will be preferred over proposers who demonstrate less capacity or experience.

## **Supplemental Information**

This information is being provided to assist in work that is being undertaken in preparation for the call for BAFO's.

### **Gas Price**

North Slope: Assume the use of the GVEA contract with a price of \$2.10 per MMBtu. Any North Slope proposal is expected to have access to the GVEA/BP agreement. Actual contract price is based on the price of oil.

Cook Inlet: Assume \$6.00 per MMBtu. This price was originally assumed in the RFP.

### **AIDEA Financing**

Capital Appropriation: Do not exceed \$30 million of AIDEA capital appropriation. This investment will not be recovered by AIDEA during the initial term of any agreement and will have no impact on price. AIDEA will retain a proportional equity position in the project throughout the term of the project.

SETS: Do not exceed \$50 million of AIDEA SETS. Assume 1% interest, 30 year term with a 5 year deferment of payment with no interest capitalization. A spreadsheet with SETS payment schedules is attached.

AIDEA SETS bonds: Assume SETS bonds are available as commercially marketed revenue bonds and will be underwritten by sales from the project. Assume they are issued as taxable bonds with an interest rate of 5% and have the same term as the project agreement. AIDEA does not expect these bonds will take non-commercial project risk.

Private Financing: Assume a minimum of \$5 million of private financing. The expected terms of private financing are left to the proposer.

### **Demand**

A spreadsheet is attached with updated demand for IGU, FNG, and GVEA. For the LDCs (IGU and FNG), monthly demand is presented as a percent of total annual demand. Assume four months of GVEA demand in the summer.

Rate 1%  
Term 30  
Deferment 5

Rate 1%  
Term 30  
Deferment 5

| <u>10,000,000</u> |              |              |               |           |
|-------------------|--------------|--------------|---------------|-----------|
| Year              | Principle    | Interest Pmt | Principle Pmt | Total Pmt |
| 1                 | \$10,000,000 |              |               | \$0       |
| 2                 | \$10,000,000 |              |               | \$0       |
| 3                 | \$10,000,000 |              |               | \$0       |
| 4                 | \$10,000,000 |              |               | \$0       |
| 5                 | \$10,000,000 |              |               | \$0       |
| 6                 | \$10,000,000 | \$100,000    | \$354,068     | \$454,068 |
| 7                 | \$9,645,932  | \$96,459     | \$357,608     | \$454,068 |
| 8                 | \$9,288,324  | \$92,883     | \$361,184     | \$454,068 |
| 9                 | \$8,927,140  | \$89,271     | \$364,796     | \$454,068 |
| 10                | \$8,562,344  | \$85,623     | \$368,444     | \$454,068 |
| 11                | \$8,193,900  | \$81,939     | \$372,129     | \$454,068 |
| 12                | \$7,821,771  | \$78,218     | \$375,850     | \$454,068 |
| 13                | \$7,445,921  | \$74,459     | \$379,608     | \$454,068 |
| 14                | \$7,066,313  | \$70,663     | \$383,404     | \$454,068 |
| 15                | \$6,682,909  | \$66,829     | \$387,238     | \$454,068 |
| 16                | \$6,295,670  | \$62,957     | \$391,111     | \$454,068 |
| 17                | \$5,904,559  | \$59,046     | \$395,022     | \$454,068 |
| 18                | \$5,509,537  | \$55,095     | \$398,972     | \$454,068 |
| 19                | \$5,110,565  | \$51,106     | \$402,962     | \$454,068 |
| 20                | \$4,707,603  | \$47,076     | \$406,992     | \$454,068 |
| 21                | \$4,300,612  | \$43,006     | \$411,061     | \$454,068 |
| 22                | \$3,889,550  | \$38,896     | \$415,172     | \$454,068 |
| 23                | \$3,474,378  | \$34,744     | \$419,324     | \$454,068 |
| 24                | \$3,055,055  | \$30,551     | \$423,517     | \$454,068 |
| 25                | \$2,631,538  | \$26,315     | \$427,752     | \$454,068 |
| 26                | \$2,203,786  | \$22,038     | \$432,030     | \$454,068 |
| 27                | \$1,771,756  | \$17,718     | \$436,350     | \$454,068 |
| 28                | \$1,335,406  | \$13,354     | \$440,713     | \$454,068 |
| 29                | \$894,692    | \$8,947      | \$445,121     | \$454,068 |
| 30                | \$449,572    | \$4,496      | \$449,572     | \$454,068 |

| <u>20,000,000</u> |              |              |               |           |
|-------------------|--------------|--------------|---------------|-----------|
| Year              | Principle    | Interest Pmt | Principle Pmt | Total Pmt |
| 1                 | \$20,000,000 |              |               | \$0       |
| 2                 | \$20,000,000 |              |               | \$0       |
| 3                 | \$20,000,000 |              |               | \$0       |
| 4                 | \$20,000,000 |              |               | \$0       |
| 5                 | \$20,000,000 |              |               | \$0       |
| 6                 | \$20,000,000 | \$200,000    | \$708,135     | \$908,135 |
| 7                 | \$19,291,865 | \$192,919    | \$715,216     | \$908,135 |
| 8                 | \$18,576,649 | \$185,766    | \$722,369     | \$908,135 |
| 9                 | \$17,854,280 | \$178,543    | \$729,592     | \$908,135 |
| 10                | \$17,124,688 | \$171,247    | \$736,888     | \$908,135 |
| 11                | \$16,387,799 | \$163,878    | \$744,257     | \$908,135 |
| 12                | \$15,643,542 | \$156,435    | \$751,700     | \$908,135 |
| 13                | \$14,891,843 | \$148,918    | \$759,217     | \$908,135 |
| 14                | \$14,132,626 | \$141,326    | \$766,809     | \$908,135 |
| 15                | \$13,365,817 | \$133,658    | \$774,477     | \$908,135 |
| 16                | \$12,591,340 | \$125,913    | \$782,222     | \$908,135 |
| 17                | \$11,809,119 | \$118,091    | \$790,044     | \$908,135 |
| 18                | \$11,019,075 | \$110,191    | \$797,944     | \$908,135 |
| 19                | \$10,221,131 | \$102,211    | \$805,924     | \$908,135 |
| 20                | \$9,415,207  | \$94,152     | \$813,983     | \$908,135 |
| 21                | \$8,601,224  | \$86,012     | \$822,123     | \$908,135 |
| 22                | \$7,779,101  | \$77,791     | \$830,344     | \$908,135 |
| 23                | \$6,948,757  | \$69,488     | \$838,647     | \$908,135 |
| 24                | \$6,110,109  | \$61,101     | \$847,034     | \$908,135 |
| 25                | \$5,263,075  | \$52,631     | \$855,504     | \$908,135 |
| 26                | \$4,407,571  | \$44,076     | \$864,059     | \$908,135 |
| 27                | \$3,543,512  | \$35,435     | \$872,700     | \$908,135 |
| 28                | \$2,670,812  | \$26,708     | \$881,427     | \$908,135 |
| 29                | \$1,789,385  | \$17,894     | \$890,241     | \$908,135 |
| 30                | \$899,144    | \$8,991      | \$899,144     | \$908,135 |

Rate  
Term  
Deferment

1%  
30  
5

Rate  
Term  
Deferment

1%  
30  
5

Rate  
Term  
Deferment

1%  
30  
5

30,000,000

| Year | Principle    | Interest Pmt | Principle Pmt | Total Pmt   |
|------|--------------|--------------|---------------|-------------|
| 1    | \$30,000,000 |              |               | \$0         |
| 2    | \$30,000,000 |              |               | \$0         |
| 3    | \$30,000,000 |              |               | \$0         |
| 4    | \$30,000,000 |              |               | \$0         |
| 5    | \$30,000,000 |              |               | \$0         |
| 6    | \$30,000,000 | \$300,000    | \$1,062,203   | \$1,362,203 |
| 7    | \$28,937,797 | \$289,378    | \$1,072,825   | \$1,362,203 |
| 8    | \$27,864,973 | \$278,650    | \$1,083,553   | \$1,362,203 |
| 9    | \$26,781,420 | \$267,814    | \$1,094,388   | \$1,362,203 |
| 10   | \$25,687,031 | \$256,870    | \$1,105,332   | \$1,362,203 |
| 11   | \$24,581,699 | \$245,817    | \$1,116,386   | \$1,362,203 |
| 12   | \$23,465,314 | \$234,653    | \$1,127,549   | \$1,362,203 |
| 13   | \$22,337,764 | \$223,378    | \$1,138,825   | \$1,362,203 |
| 14   | \$21,198,939 | \$211,989    | \$1,150,213   | \$1,362,203 |
| 15   | \$20,048,726 | \$200,487    | \$1,161,715   | \$1,362,203 |
| 16   | \$18,887,011 | \$188,870    | \$1,173,332   | \$1,362,203 |
| 17   | \$17,713,678 | \$177,137    | \$1,185,066   | \$1,362,203 |
| 18   | \$16,528,612 | \$165,286    | \$1,196,916   | \$1,362,203 |
| 19   | \$15,331,696 | \$153,317    | \$1,208,886   | \$1,362,203 |
| 20   | \$14,122,810 | \$141,228    | \$1,220,975   | \$1,362,203 |
| 21   | \$12,901,836 | \$129,018    | \$1,233,184   | \$1,362,203 |
| 22   | \$11,668,651 | \$116,687    | \$1,245,516   | \$1,362,203 |
| 23   | \$10,423,135 | \$104,231    | \$1,257,971   | \$1,362,203 |
| 24   | \$9,165,164  | \$91,652     | \$1,270,551   | \$1,362,203 |
| 25   | \$7,894,613  | \$78,946     | \$1,283,256   | \$1,362,203 |
| 26   | \$6,611,357  | \$66,114     | \$1,296,089   | \$1,362,203 |
| 27   | \$5,315,268  | \$53,153     | \$1,309,050   | \$1,362,203 |
| 28   | \$4,006,218  | \$40,062     | \$1,322,140   | \$1,362,203 |
| 29   | \$2,684,077  | \$26,841     | \$1,335,362   | \$1,362,203 |
| 30   | \$1,348,715  | \$13,487     | \$1,348,715   | \$1,362,203 |

40,000,000

| Year | Principle    | Interest Pmt | Principle Pmt | Total Pmt   |
|------|--------------|--------------|---------------|-------------|
| 1    | \$40,000,000 |              |               | \$0         |
| 2    | \$40,000,000 |              |               | \$0         |
| 3    | \$40,000,000 |              |               | \$0         |
| 4    | \$40,000,000 |              |               | \$0         |
| 5    | \$40,000,000 |              |               | \$0         |
| 6    | \$40,000,000 | \$400,000    | \$1,416,270   | \$1,816,270 |
| 7    | \$38,583,730 | \$385,837    | \$1,430,433   | \$1,816,270 |
| 8    | \$37,153,297 | \$371,533    | \$1,444,737   | \$1,816,270 |
| 9    | \$35,708,560 | \$357,086    | \$1,459,185   | \$1,816,270 |
| 10   | \$34,249,375 | \$342,494    | \$1,473,776   | \$1,816,270 |
| 11   | \$32,775,599 | \$327,756    | \$1,488,514   | \$1,816,270 |
| 12   | \$31,287,085 | \$312,871    | \$1,503,399   | \$1,816,270 |
| 13   | \$29,783,686 | \$297,837    | \$1,518,433   | \$1,816,270 |
| 14   | \$28,265,252 | \$282,653    | \$1,533,618   | \$1,816,270 |
| 15   | \$26,731,635 | \$267,316    | \$1,548,954   | \$1,816,270 |
| 16   | \$25,182,681 | \$251,827    | \$1,564,443   | \$1,816,270 |
| 17   | \$23,618,237 | \$236,182    | \$1,580,088   | \$1,816,270 |
| 18   | \$22,038,150 | \$220,381    | \$1,595,889   | \$1,816,270 |
| 19   | \$20,442,261 | \$204,423    | \$1,611,848   | \$1,816,270 |
| 20   | \$18,830,414 | \$188,304    | \$1,627,966   | \$1,816,270 |
| 21   | \$17,202,448 | \$172,024    | \$1,644,246   | \$1,816,270 |
| 22   | \$15,558,202 | \$155,582    | \$1,660,688   | \$1,816,270 |
| 23   | \$13,897,514 | \$138,975    | \$1,677,295   | \$1,816,270 |
| 24   | \$12,220,219 | \$122,202    | \$1,694,068   | \$1,816,270 |
| 25   | \$10,526,151 | \$105,262    | \$1,711,009   | \$1,816,270 |
| 26   | \$8,815,142  | \$88,151     | \$1,728,119   | \$1,816,270 |
| 27   | \$7,087,024  | \$70,870     | \$1,745,400   | \$1,816,270 |
| 28   | \$5,341,624  | \$53,416     | \$1,762,854   | \$1,816,270 |
| 29   | \$3,578,770  | \$35,788     | \$1,780,482   | \$1,816,270 |
| 30   | \$1,798,287  | \$17,983     | \$1,798,287   | \$1,816,270 |

50,000,000

| Year | Principle    | Interest Pmt | Principle Pmt | Total Pmt   |
|------|--------------|--------------|---------------|-------------|
| 1    | \$50,000,000 |              |               | \$0         |
| 2    | \$50,000,000 |              |               | \$0         |
| 3    | \$50,000,000 |              |               | \$0         |
| 4    | \$50,000,000 |              |               | \$0         |
| 5    | \$50,000,000 |              |               | \$0         |
| 6    | \$50,000,000 | \$500,000    | \$1,770,338   | \$2,270,338 |
| 7    | \$48,229,662 | \$482,297    | \$1,788,041   | \$2,270,338 |
| 8    | \$46,441,621 | \$464,416    | \$1,805,921   | \$2,270,338 |
| 9    | \$44,635,700 | \$446,357    | \$1,823,981   | \$2,270,338 |
| 10   | \$42,811,719 | \$428,117    | \$1,842,220   | \$2,270,338 |
| 11   | \$40,969,499 | \$409,695    | \$1,860,643   | \$2,270,338 |
| 12   | \$39,108,856 | \$391,089    | \$1,879,249   | \$2,270,338 |
| 13   | \$37,229,607 | \$372,296    | \$1,898,042   | \$2,270,338 |
| 14   | \$35,331,565 | \$353,316    | \$1,917,022   | \$2,270,338 |
| 15   | \$33,414,543 | \$334,145    | \$1,936,192   | \$2,270,338 |
| 16   | \$31,478,351 | \$314,784    | \$1,955,554   | \$2,270,338 |
| 17   | \$29,522,797 | \$295,228    | \$1,975,110   | \$2,270,338 |
| 18   | \$27,547,687 | \$275,477    | \$1,994,861   | \$2,270,338 |
| 19   | \$25,552,826 | \$255,528    | \$2,014,809   | \$2,270,338 |
| 20   | \$23,538,017 | \$235,380    | \$2,034,958   | \$2,270,338 |
| 21   | \$21,503,059 | \$215,031    | \$2,055,307   | \$2,270,338 |
| 22   | \$19,447,752 | \$194,478    | \$2,075,860   | \$2,270,338 |
| 23   | \$17,371,892 | \$173,719    | \$2,096,619   | \$2,270,338 |
| 24   | \$15,275,273 | \$152,753    | \$2,117,585   | \$2,270,338 |
| 25   | \$13,157,689 | \$131,577    | \$2,138,761   | \$2,270,338 |
| 26   | \$11,018,928 | \$110,189    | \$2,160,148   | \$2,270,338 |
| 27   | \$8,858,779  | \$88,588     | \$2,181,750   | \$2,270,338 |
| 28   | \$6,677,030  | \$66,770     | \$2,203,567   | \$2,270,338 |
| 29   | \$4,473,462  | \$44,735     | \$2,225,603   | \$2,270,338 |
| 30   | \$2,247,859  | \$22,479     | \$2,247,859   | \$2,270,338 |



## Town Hall Meeting

**November 4, 2015**

**5:30 pm to 8:30 pm**

**Pioneer Park Civic Center**

This Town Hall Meeting is hosted by Fairbanks North Star Borough, City of Fairbanks, City of North Pole, the Fairbanks Chamber of Commerce and Fairbanks Economic Development at the request of Alaska Industrial Development and Export Authority (AIDEA) in their continuing effort to keep Fairbanks' residents informed on the status and progress of the Interior Energy Project (IEP).

In June of 2015 AIDEA issued an RFP for project partners. The RFP solicited for a wide range of IEP options including Cook Inlet, North Slope, pipeline and propane. Responses to the RFP were received by AIDEA on August 3, an evaluation committee reviewed the proposals, and finalists were announced on August 27. The following proposers are the selected finalists:

- Harvest Alaska, LLC (Hilcorp Alaska, LLC)
- Phoenix Clean Fuels, LLC
- Salix, Inc. (Avista Corporation)
- Spectrum LNG, LLC
- WesPac Midstream, LLC

AIDEA has requested these five finalists come to Fairbanks on November 4<sup>th</sup> and present public summaries of their best and final proposal to the Fairbanks Community. Each finalist will have an opportunity to interact with community members between 5:30 pm and 6:10 during an Open House. Starting at 6:30 each finalist will have 20 minutes to present their proposal to the audience.

5:30 to 6:10 Open House  
6:10 to 6:30 Project Overview and Updates AIDEA  
6:30 to 6:50 Harvest Alaska, LLC (Hilcorp Alaska, LLC)  
6:50 to 7:10 Phoenix Clean Fuels, LLC  
7:10 to 7:30 Salix, Inc. (Avista Corporation)  
7:30 to 7:50 Spectrum LNG, LLC  
7:50 to 8:10 WesPac Midstream, LLC  
8:10 to 8:30 Open House and questions  
8:30 Adjourn

Public comment will be solicited during the Open House and again at the conclusion of the presentations.








**Attachment B:  
March 3, 2016 AIDEA Board  
Meeting Packet**



## Memorandum

To: John Springsteen, Executive Director

From: Gene Therriault, IEP Team Lead 

Date: March 3, 2016

RE: Interior Energy Project – Liquefaction RFP

This memorandum provides an update on the status of RFP 15142, Interior Energy Project.

The RFP Evaluation Committee met on February 4, 2016. At that meeting the committee reviewed the final submittals on the Best and Final Offers from the two top ranked respondents, Spectrum LLC and Salix Inc. The committee unanimously determined Salix Inc. as the top ranked project from this process. Attached is the report that details the proceedings and results from the February 4<sup>th</sup> meeting.

Also attached are redacted reports submitted by Arcadis, the engineering firm contracted to conduct the third party review of the cost components of the two offers. These reports offer concise summaries of the “Best and Final Offers” from each respondent and provide information on capital and operating costs presented in the offers.

With this action, the Evaluation Committee for RFP 15142 concluded its work. As noted in the report, several items on the term sheet remained unresolved in order for the offer to move forward to the AIDEA Board for action. Representatives from the two utilities and AIDEA are in discussions with Salix to resolve those issues to the satisfaction of the utilities and AIDEA. It is expected the issues will be resolved in time to bring a project recommendation to the AIDEA Board at its regularly scheduled meeting on March 31, 2016.

Bob Shefchik, Nick Szymoniak, Tom Erickson, and I will be available at the March 3rd Board meeting to present this information to the AIDEA Board and respond to questions.

Attachments: IEP RFP Review Committee Notes and Results 2-4-16  
Arcadis Report on Spectrum LLC  
Arcadis Report on Salix INC  
Proposed Timeline for IEP Actions to AIDEA Board



**IEP RFP Review Committee  
Notes and Results  
2-4-16**

The Procurement Evaluation Committee met on Thursday, February 4<sup>th</sup> to review information collected on the top two rated finalists, Spectrum LGN, LLC and Salix, Inc.

The Committee reviewed the Best and Final Offers from Salix and Spectrum along with independent third party technical and financial analysis of the same. In addition, they received updated information regarding natural gas feedstock and LNG transportation costs as well as draft term sheets.

Documents were reviewed in hard copy and electronically on the conference room display. Spreadsheets were reviewed on the conference room display and on individual member computers. In addition to the documents listed, oral presentations were made regarding the impact low demand will have on liquefaction costs, gas supply contract status, and the large capacity trailer pilot project.

Following the document review, the Evaluation Committee had a thorough group discussion of the relative strengths and weaknesses of the two proposals. The discussion allowed committee members to express opinions, compare the two proposals on a variety of metrics and understand the perspectives of the other committee members. The major topic areas covered in the group discussion included:

- Gas Supply
- Sources and Uses
- 3rd Party Review of CAPEX and OPEX
- 3rd Party Review of Financials
- Plant
- Pricing FOB Fairbanks – at projected demand
- Pricing at Low Demand Stress Test
- CAPEX risk
- OPEX risk
- Termination
- Payments to Partner for equity and Management Fees across 20-year period.
- Ownership at end of period
- Transportation
- Risk Identification

The discussion concluded with members providing an indication of the project each considered “most likely to succeed.” Then members described their conclusions about the different options and the reasons for their position.

Salix was unanimously determined to be the top ranked project from this process. Reasons offered for this determination included:

- Lower Annual Revenue Requirement of the two proposals
- Lower payments to owner/operator of the two proposals
  - Salix: \$39.73 million across 20 years in combined owner payments, net of tax payments made to utilities, in exchange for a \$10M investment and plant operation
  - Spectrum: \$54.42 million across 20 years in combined owner payments in exchange for a \$5 million investment and plant operations
- Higher risks of excessive LNG prices or cash deficiencies in low demand scenarios for North Slope option
- Transportation costs lower and less risk of cost variability than North Slope option
- Term Sheet as presented by Salix more acceptable to utilities than term sheet presented by Spectrum
- Salix was perceived as a partner more willing to adapt their project/approach to meet utility/project needs
- Lower Capital costs for Salix Proposal made more funding available for other components of the supply chain
- 3<sup>rd</sup> party financial review indicated stronger financial position of Salix parent company as project partner
- GVEA unwillingness to participate as year-round customer created significant early year demand risk for North Slope project with higher fixed costs
- Changing economic conditions with low oil prices creates risks that demand will not materialize as quickly as projected – and the Salix approach handled low demand scenarios better than the Spectrum approach
- Build-out of the distribution, storage and liquefaction components of the project will all be constrained by low oil prices – leading to a need to limit capital costs as much as possible to ensure success throughout the supply chain



- Ownership of the plant at the end of the 30-year term reverted to utilities in the Salix approach
- Ownership of the plant at the end of 30-year term would be held by Spectrum under their approach

This synopsis includes the items generally agreed upon as part of the discussion.

The committee vote was 7-0 in favor of Salix as the top rated project.

The committee adjourned with the following determination:

- The committee unanimously voted to move forward with Salix as the top ranked proposal
- The committee determined that further negotiations are required to correct deficiencies in the term sheets
- Revised terms and conditions acceptable to the utilities and AIDEA are necessary to advance a recommendation to the AIDEA Board

The following is the agenda followed at the February 4<sup>th</sup> evaluation committee meeting.

|       |  |     |  |
|-------|--|-----|--|
| 9:00  | Introduction   | Tom |  |
| 9:10  | Review of Packet   | Bob | <ul style="list-style-type: none"> <li>• Review of each document provided committee; summarized by staff responsible for document.</li> <li>• Focus on understanding of information - not debate of value/impact</li> </ul>  |
| 11:00 | <b>Break</b>   |     |  |
| 11:15 | <ul style="list-style-type: none"> <li>• Review of "Most Likely to Succeed"</li> <li>• Detailed discussion of Items of interest</li> </ul> | Bob | <ul style="list-style-type: none"> <li>• Committee discussion of "Most likely to succeed" as defined to finalists</li> <li>• Review of major items: <ul style="list-style-type: none"> <li>○ Gas Supply</li> <li>○ Risks</li> <li>○ Low Demand</li> <li>○ Commercial Terms</li> <li>○ Document List</li> </ul> </li> </ul> |
| 12:00 | <b>Working Lunch</b>   |     |  |
| 1:00  | Recommendations by Individual members  | Tom | <ul style="list-style-type: none"> <li>• Collect written indications of top offer "most likely to succeed"</li> <li>• Display to group</li> </ul>  |
| 1:15  | Discussion of Results  | Bob | <ul style="list-style-type: none"> <li>• Have each person explain choice, rationale, and major factors underpinning choice</li> <li>• Interaction with other members</li> <li>• Review of data elements as needed</li> </ul>   |
| 3:00  | Opportunity to revise  | Tom | <ul style="list-style-type: none"> <li>• Offer opportunity to members to change "most likely to succeed"</li> <li>• If not consensus, offer opportunity to vote</li> </ul>   |
| 3:30  | Wrap Up  | Bob | <ul style="list-style-type: none"> <li>• Identification of Items of Agreement</li> <li>• Recommendations to AIDEA for selection of private partner</li> <li>• Collection of Notes</li> </ul>   |
| 4:00  | <b>Final Thoughts</b>  |     |  |



**ARCADIS**  
**Report on Salix INC**  
**2/26/16**

February 26, 2016

Kirk H. Warren, P.E. PMP  
Interim COO/Director, Project Implementation  
AEA/AIDEA

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**Subject: Interior Energy Project, Reasonableness Review of BAFO CAPEX & OPEX: Salix Proposal**

Dear Mr. Warren:

Arcadis has reviewed the best and final proposal (BAFO) submitted by Salix in response to AIDEA's Request for Proposal 15-142, Addendum Four. Salix's submittal consisted of a non-confidential proposal and a confidential appendix. This memorandum summarizes our independent review, in terms of the overall reasonableness and completeness, of the capital expenditure (CAPEX) and operational expenditure (OPEX) budget estimates presented by Salix.

The methodology applied to this review of CAPEX and OPEX budgets proceeded through 1) an evaluation against global industry benchmarks and unit cost indexes; 2) consideration of LNG industry specific development processes and costs; and 3) an internal assessment based on Arcadis' knowledge and experiences with LNG and large-scale project development processes and costs particular to Alaska. In the course of this review, Arcadis spoke with the proponent, as well as the liquefaction equipment vendor and general contractor associated with the proponent. Discussions with the proponent and participants of their team focused on key issues of concern and particular questions identified through an initial review of the proposal materials. As appropriate to an overall assessment of reasonableness and completeness of the CAPEX and OPEX estimates provides, the issues identified and specific questions concentrated at high-level issues and items with the potential to substantially affect CAPEX and OPEX.

This memorandum summarizes our evaluation of Salix's proposal, and Attachment A (confidential) provides a summary of the cost estimate review against global and national cost indexes. The review of this proposal is arranged through a discussion of the required proposal components as identified in Addendum Four of RFP 15-142; namely, Technical Project Description; Detailed Project Costs; Commercial Terms; Project Financing; Risk Identification and

In terms of overall completeness of the proposal at a pre-FEED stage of development, the development scheme presents a well-formed and readily implementable development plan to accomplish the construction and operation of an LNG liquefaction plant in line with development costs and schedules presented.

**Salix**

**Technical Project Description:** Salix proposes the development of a LNG liquefaction plant producing 100,000 gallon per day at a site in the Cook Inlet region. The LNG plant would be expandable to 200,000gpd with additional CAPEX and OPEX expenditures. CAPEX for the proposed LNG plant is estimated at \$68,034,527, and OPEX is budgeted at \$7,697,000 per year—\$3.1M of which is for energy costs. These costs reflect non-binding budgetary estimates at this stage of development.

**Gas Treatment, LNG Liquefaction Plant and Storage Tanks:** Salix's develop plan calls for the fabrication and installation of a C100N nitrogen cycle liquefaction unit manufactured by Chart. Gas treatment capabilities are integrated with the Chart C100N unit. LNG storage at the liquefaction plant site is accomplished with four (4)-75K gallon tanks. In addition to the on-site storage capacity, Salix assumed that a LNG storage facility of up to 5 million gallons will be developed in Fairbanks by the utilities participating in the IEP.

Discussions with Chart confirmed their recent fabrication of three LNG liquefaction plants that were either identical or mostly similar to the LNG plant proposed by Salix. Of these, one is complete and in commercial operation (George West), another is in the start-up process (Miami), and the third has been shipped for installation (Keota). Major components of LNG plants fabricated by Chart are manufactured

by Chart in the U.S., including the cold box, heat exchangers, and air coolers; and other components are procured in the U.S., such as the compressors and turbo expander. Fabrication of the George West LNG plant, which is essentially identical to the liquefaction plant proposed Salix, was completed on schedule over a 12-month period, and installed successfully on-site in roughly 5 months. Fabrication and shipping of the other two plants also met all production milestones and shipment dates. Chart has standardized production of the C100N LNG unit, which is sold world-wide as a standard plant with modifications as required by the specific site and the quality of natural gas received for any particular plant. As such, basic engineering of the plant has been completed and vetted, and with production experience Chart is realizing efficiencies in the overall production time of the C100N unit, reducing fabrication time from 12 to 10 months. Chart states that they have adequate domestic production capacity to readily fabricate and ship the Salix plant as presently scheduled, and noted that they have production plants in China and Czechoslovakia that also produce the C100N unit. Though not anticipated, production of the Salix plant could be moved to either of these plants if there were to be some unexpected constraint on domestic production. As planned, all major components of the Salix plant will be manufactured or procured domestically, with the primary compressor representing a long-lead item.

**Power Plant:** The Salix LNG unit will be powered by a 5,000 HP Gas Turbine Compressor, and a 1MW emergency generator for backup power. The generator has heat trace and insulation, and is protected by a shelter. With the gas compressor and emergency generator, the Salix plant would be self-sufficient in terms of power generation, and incidental electricity would be purchased from MEA at existing tariff rates.

**Balance of Plant:** The Chart scope of work for the project accounts for roughly 40% of total CAPEX, which includes site installation and shipping. The remainder is considered balance of plant. Water requirements of 500 gallons per day could be acquired with an on-site well, or possibly drawn from existing wells. Haskell's budget estimate of balance of plant works is derived from unit cost estimates based on advanced designs for a larger scale LNG unit that was considered earlier in the proposal cycle. These earlier detailed estimates were factored for the smaller scale plant now proposed. Haskell notes that their recent cost experience in the fabrication and construction of a LNG production plant in North Dakota, their detailed work on a recent estimate of a 200,000 gpd LNG plant on the North Slope, and their 50-plus years of construction experience in Alaska were used in determining costs reflected in their estimate for construction the Salix plant.

**Detailed Project Costs:** CAPEX for the proposed LNG plant is estimated at \$68,034,527, and OPEX is budgeted at \$7,697,000 per year, \$3.1M of which is for energy costs. The LNG package, as described above, provided by Chart represent 40% of CAPEX, and the balance of plant 60%. Pre-development costs are not included; however, Salix proposes to contribute up to \$500,000 for these costs on a shared basis. Given the standard, commercial LNG plant package being provided by Chart, typical pre-development engineering costs for FEED are substantially reduced, and Salix's CAPEX does include amounts for design integration, geotechnical investigations and permitting applications.

Construction budget estimates for on-site installation of the LNG units and balance of plant were discussed above. The potential cost items listed in section 3.1.1 of Attachment A were confirmed to be included. Haskell estimated transportation charges for each of the major components provided by Chart

on the basis of specific skid sizes and shipping weights. Delivery of the LNG tanks received particular attention, and costs associated with the shipping of each tank are included in CAPEX.

Given the cost of service purchase agreements intended for this development, Salix suggests that the addition of an EPC role in the delivery of the project to manage overall project cost and schedule would serve as a means to enhance certainty, from the clients perspective, of project implementation costs. Inclusion of an EPC role in delivery of the project would add 5-8% of total installed cost (TIC) to CAPEX.

The \$3.1 million for energy costs in OPEX cover fuel gas and incidental utility purchases for operating the plant.

Escalation of costs may occur at the rate of economic inflation; however, in light of the recessionary pressures prevailing in the oil and construction industries, it is likely that cost savings will be realized in the delivery of the project as currently scheduled.

Additional operational efficiencies in terms of overhead costs are possible with the further consideration leveraging existing utilities and logistics facilities.

**Commercial Terms and Project Financing:** Salix proposes that long-term cost of service purchasing agreements be structured to compensate Salix for fixed and variable costs, and a rate of return. Salix suggests that these purchase agreements, or tolling fee arrangements, may include specific terms for an early buyout by the Contracting Interior Utilities (CIUs), and that potential benefits derived through the third-party sale of excess LNG be shared in some manner. The tolling fee would be adjusted annually to cover all fixed and variable costs, including a management fee. Additional adjustments would be made to cover major repairs and maintenance, along with efficiency upgrades or plant expansions.

Capitalization of LNG liquefaction plant would comprise a \$10M equity investment by Salix, with a rate of return (RoR) of 11.78%; a \$30M equity position by AIDEA, with a 0.0% RoR; and \$28M of AIDEA SETS financing for 30 years at 1%, with a 5-year deferment of payment with no interest capitalization.

**Risk Identification and Allocation:** In terms of CAPEX and OPEX estimates, the 'cost of service' structuring of commercial terms works to remove revenue risk from development of the liquefaction plant and place this risk at the larger IEP program level. At the project level, all capital and operating costs would be remunerated. With the revenue risk shifted to the program level, project level risk for the scheduling of procurement and construction remain.

Salix, operating as an unregulated LNG project development subsidiary of an established producer and distributor of electric power and natural gas, brings industry experience in building and operating energy projects, and is confident that the schedule proposed is achievable.

Chart has specific and recent experience in costing, fabricating, shipping and commissioning nearly identical liquefaction units to those proposed for this project. Chart manufactures major components of its LNG units domestically, and, as a standard projection unit, the proposed C100N plant demonstrates proven engineering and operating performance. Chart's manufacturing processes also demonstrate sufficient capacity to fabricate the proposed Salix liquefaction unit as scheduled.



Haskell's estimate of construction costs is based on recent experience in the construction of LNG facilities and Alaska operations. Haskell has operated in Alaska for more than 50 years, and has performed similar project works for major energy corporations.

In addition to the CAPEX estimate, Salix suggests that the inclusion of an EPC(M) role in the implementation of the project work would provide net potential value to the client by increasing the certainty of project meeting budget and schedule. The additional cost of an EPC(M) role is identified as being from 5-8% of TIC, or roughly \$3.4M to \$5.4M against the current CAPEX estimate.

Salix proposes that project pre-development work expenses be shared with Interior utilities up to \$500,000, and that pre-development work in excess of \$500,000 be funded by the utilities.

At the overall IEP program level, Salix's intends an initial LNG production capacity of 100,000gpd, which would minimize front-end capitalization and work to lessen the IEP program risks associated with end user conversion and market demand. In reducing initial capitalization, the Salix LNG plant development plan would require additional capital investment when the distribution network in Fairbanks materializes and overall market demand reaches IEP forecast levels.

**Detail on Ability to meet IEP project Goals:** With the CAPEX and OPEX expenditures identified for the development of a 100,000gpd liquefaction plant, Salix identifies a \$3.24/mcf liquefaction fee. Adding feed stock gas purchase, and transportation and distribution provided by others, the delivered price of gas for the IEP is put at \$15.74/mcf. This is close to meeting the IEP goal of \$15/mcf. Cook Inlet feed stock gas supply is priced at \$6.00/mcf as part of the delivered price total; however, current market conditions for Cook Inlet gas supply suggest that there is downward potential for the pricing of this feed stock gas. Salix also identifies that a LNG storage tank of up to 5M gallons would be required in Fairbanks to meet distribution needs. Salix has discussed the possibility of ARRC hauling LNG to the Fairbanks region, which could potentially result in transportation cost savings at some point in the future.

At an average daily production capacity of 100,000 gallons, the state's capital participation in the project equates with \$580.00 per gallon of developed production capacity (\$58M/100,000).

#### **Overall Reasonableness and Completeness of Development Plan**

Salix's budgetary estimates of CAPEX and OPEX are reasonable within a range of +/-30% given the level of project development demonstrated. This range is consistent with the AACE expected range of accuracy for projects at comparable levels of development. As a LNG developer formed by an established energy producer and distributor, Avista, Salix brings decades of energy project development and operations experience to this project. Chart has priced, fabricated, shipped and commissioned LNG liquefaction plants essentially identical to the liquefaction units that would be part of the Salix development plan, and the contractor, Haskell Construction, has also fabricated and installed LNG and other energy projects of a similar nature and scale to the Salix plant.

In terms of a CAPEX to LNG production ratio, Salix's development plan demonstrates a ratio of \$1,242/tonne. At this, Salix's capital/production ration equates with 105% of the world-wide ratio of \$1,185/tonne (IGU World LNG Report 2015). Daily rates represented in Salix's CAPEX and OPEX for

labor, materials and equipment are within the range of rates expected, and are generally applicable to the rates experienced in Alaska.

Overall the Salix development plan demonstrates relative completeness at this stage of development and presents reasonable CAPEX and OPEX estimates within the range noted above.

Sincerely,

A handwritten signature in blue ink, appearing to read "Mark Griffin", with a stylized flourish at the end.

Mark Griffin, AICP  
Senior Project Manager  
Arcadis U.S., Inc.

**Attachments**

1 Attachment A



**ARCADIS**  
**Report on Spectrum LLC**  
**2/26/16**

February 26, 2016

Kirk H. Warren, P.E. PMP  
Interim COO/Director, Project Implementation  
AEA/AIDEA

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**Subject: Interior Energy Project, Reasonableness Review of BAFO CAPEX & OPEX: Spectrum Proposal**

Dear Mr. Warren:

Arcadis has reviewed the best and final proposal (BAFO) submitted by Spectrum LNG in response to AIDEA's Request for Proposal 15-142, Addendum Four. Spectrum's consisted of a non-confidential proposal and a confidential appendix. This memorandum summarizes our independent review, in terms of the overall reasonableness and completeness, of the capital expenditure (CAPEX) and operational expenditure (OPEX) budget estimates presented by Spectrum.

The methodology applied to this review of CAPEX and OPEX budgets proceeded through 1) an evaluation against global industry benchmarks and unit cost indexes; 2) consideration of LNG industry specific development processes and costs; and 3) an internal assessment based on Arcadis' knowledge and experiences with LNG and large-scale project development processes and costs particular to Alaska. In the course of this review, Arcadis spoke with the proponent, as well as the liquefaction equipment vendor and general contractor associated with the proponent. Discussions with the proponent and participants of their team focused on key issues of concern and particular questions identified through an initial review of the proposal materials. As appropriate to an overall assessment of reasonableness and completeness of the CAPEX and OPEX estimates provides, the issues identified and specific questions concentrated at high-level issues and items with the potential to substantially affect CAPEX and OPEX.

This memorandum summarizes our evaluation of Spectrum's proposal, and Attachment A (confidential) provides a summary of the cost estimate review against global and national cost indexes. The review of this proposal is arranged through a discussion of the required proposal components as identified in

Addendum Four of RFP 15-142; namely, Technical Project Description; Detailed Project Costs; Commercial Terms; Project Financing; Risk Identification and Allocation; and Detail on Ability to meet IEP Project Goals. The discussion of these required proposal components is made from the perspective of CAPEX and OPEX reasonableness, and an assessment as to the reasonableness and completeness of the proposal follows the discussion of these proposal components.

In terms of overall completeness of the proposal at a pre-FEED stage of development, the development scheme presents a well-formed and readily implementable development plan to accomplish the construction and operation of an LNG liquefaction plant in line with development costs and schedules presented.

Specific details of the CAPEX and OPEX estimates prepared by Spectrum are presented below in the Commercial Terms section of this memorandum, and an assessment as to the overall reasonableness and completeness of the proposal.

### ***Spectrum***

Spectrum's proposal identifies SST as the LNG liquefaction plant vendor, with Conam as the general contractor. Spectrum provided contacts for each these team members and Arcadis spoke Spectrum as well as each of these team members in the preparation of this memorandum.

**Technical Project Description:** Spectrum, an established LNG project developer and producer, proposes that a liquefaction plant with an average daily production capacity of 260,000 gallons be developed on a gravel pad owned by AIDEA on the North Slope. This LNG plant would incorporate a modularized LNG liquefaction process of two trains and be fabricated by SST JV, a joint-venture of Specialized Mechanical Equipment Co. (SME) and Sancus, LLC.). Major aspects and components of the proposed LNG plant include its location in the Prudhoe Bay area; gas supply off of the Prudhoe Bay Unit gas pipeline (Spectrum has specific experience in tapping this gas pipeline); gas treatment, liquefaction, storage and distribution equipment and facilities; power generators; and balance of plant elements such as the MCC, shop, and camp. Power will be supplied from generators as detailed below, and water is to be purchased initially from NSB. As operations mature, water may be subsequently sourced from a nearby lake if this proves to be more economical. Sewer disposal will be collected by services available in the NSB and processed at an off-site sewer plant. On-site water handling will include an installed grey water disposal system along with water saving devices, as a means to minimize disposal charges.

**Gas Supply:** Spectrum intends to execute a long-term gas supply agreement with a North Slope producer at or below the \$2.10/mmbtu price established by the Royalty Settlement Agreement (RSA). Spectrum identifies multiple alternative providers of gas as backup options to the purchase agreement, and is confident that a gas supply price for less than the RSA price is achievable. At the RSA price, Spectrum's proposal meets the IEP target requirements.

**Gas Treatment, LNG Liquefaction Plant and Storage Tanks:** The SST LNG plant will be fabricated and shipped to the site and incorporates a two-train, mixed refrigerant (MR) process capable of producing 104,000 gallons per day in the summer, 150,000 in the winter, per train, for a combined total average daily production of 260,000 gallons. SST's written quotation for providing the gas treatment and liquefaction units reflects a favorable production timing, and Spectrum believes market circumstances are such that upward movement of this pricing is unlikely. Moreover, Spectrum secured a backup LNG plant quotation from Furuse which is 12% less than the SST price: this will serve as an additional hedge against LNG plant price escalation through the development process. Four (4) Cryogenic Storage tanks of 100K gallons are manufactured by Furuse in China and imported through KCenergi to provide on-site storage for LNG. Speaking with Spectrum, Arcadis discussed the following potential upside cost exposures identified in the Spectrum proposal in terms of CAPEX and OPEX:

- Spectrum affirmed the SST pricing was stable and pointed out that current and foreseeable market conditions in the LNG plant fabrication market favor buyers.
- Spectrum's LNG plant would have an average daily production capacity of 260,000 gpd, which surpasses the stated IEP goal of targeted 200,000 gpd by 30%. Spectrum highlighted several potential benefits that could be derived from this level of production; specifically, that while Fairbanks represents a large potential LNG market, Fairbanks is not the only LNG market in Alaska that can be served by the plant. LNG use in transportation to displace both surface and maritime diesel engines is forecast to increase, and, as discussed below in Commercial Terms, any third party sales of LNG produced by the plant would work to lower eventual unit price of LNG charged to the IEP end users.
- It was confirmed that sales taxes would not apply to the development and operation of the LNG plant, and Spectrum provided a U.S. Harmonized Tariff Schedule demonstrating that customs duties would not apply to the LNG tanks imported from China.
- As presently scheduled, Spectrum's development plan affords ample time for the fabrication and shipping of the LNG storage tanks and liquefaction plant components. Spectrum further noted that several design changes that have occurred during the proposal process offer the potential for a net reduction in CAPEX and OPEX.
- Discussions with SST confirmed their recent fabrication, shipping and commissioning of a LNG plant in North Dakota with a production capacity nameplate rating of 66Kgpd, and that subsequently performance tested at 96Kgpd. This plant was contracted for a site in North Dakota in February 2014, and the plant commenced commercial operations in February 2015. Similar to the plant proposed by Spectrum, this plant is a MR process plant with integrated gas treatment equipment, and is nearly identical in terms of the cold box, compressors and other fixtures. With this recent and similar plant fabrication experience, SST

is confident in the fabrication costs and schedule they provided to Spectrum. In addition, design of the Spectrum plant will incorporate some design modifications to enhance constructability. Considering the two-train design of the proposed Spectrum LNG plant, SST believes the 260,000 gpd average production rate, as presented by Spectrum, is readily achievable. SST provides an Orlof Gold Standard performance guarantee for their LNG plants. For the Spectrum LNG plant, SST would use a cold box and compressor procured from Zhongtai in China. SST notes that Zhongtai is recognized as a world-class manufacture of cold box equipment, and provides cold boxes to Air Products as well as other large scale LNG plant fabricators. This cold box would be the long lead item in the LNG plant fabrication schedule, requiring 36 weeks for delivery. With that, SST is comfortable with a total fabrication schedule for the Spectrum plant of 46 weeks. The SST fabrication facilities are currently operating with a level rate of production, running a single shift at a 75-80% production load. The plant has an established record in fabricating cold train and other LNG components for GE as part of their larger LNG plant production work for Shell Oil, and production capacity could be increased with the addition of a second shift, if necessary.

**Power Plant:** Spectrum identifies that three (3) CAT 3520H gensets will power the LNG liquefaction plant and two (2) 170kw gensets will maintain house operations when the plant is down (tanks are full). With this power generation capacity capitalized in the project, OPEX costs for power are covered by Plant Maintenance. Fuel gas to power the generators, however, is to be purchased by the utilities receiving the LNG produced. The basic configuration calls for one CAT 3520H generator to drive each LNG liquefaction train, with the third generator on standby. However, Spectrum has modelled operating the three generators simultaneously, and this demonstrated LNG production efficiencies.

**Balance of Plant:** Spectrum's CAPEX estimate identifies and includes major components required for the full functioning of the liquefaction plant, including the MCC, Camp, Shop, other buildings, utilities and offsites, and other miscellaneous components. Spectrum relied on their recent relevant project development experience in building cost estimates for these components on the basis of dollars per sq. ft., beds per camp, weight of piping, and etc. Conam is recognized as an experienced pipe welding and fitting contractor and heavy equipment operator with an extensive record of work on North Slope projects. In particular for the camp component, the opportunity to solicit competitive bids offers the potential for a pricing reduction from the current estimate. In addition, the prevailing recessionary pressures in the equipment vendor and general contractor markets suggest a general downward movement in pricing for the procurement of these project components.

**Detailed Project Costs:** Spectrum's CAPEX budget totals \$72,094,002. Eighty two percent (82%) of this CAPEX is supported by written quotations with a 10% contingency factor added, and the balance of CAPEX, or 18%, is based on estimates with a contingency of 25%. SST's quote for the LNG liquefaction unit and gas treatment (amine plant) amounts to \$32,900,000, or roughly 46% of CAPEX. Annual operating costs (OPEX) are at \$8,653,490, and do not include a contingency amount, aside from the



Owners Risk as a part of Management Fee. Spectrum's management fee is \$1,445,000 per year, and is deferred for the first four (4) years of plant operation as a means to lower initial overall cost to market.

Spectrum will be delivering and operating the plant as an owner; accordingly, no markups are added to the vendor and contractor quotes supporting their CAPEX. Spectrum eventually envisions operating the plant with four shifts—two day and night shifts alternating on/off every two weeks. Spectrum believes that there will be opportunities to minimize operational expenses through the initial years of operation as the market demand for LNG continues to grow.

The enumerated line items shown in section 3.2.1 of Attachment A were reviewed in discussions with Spectrum and confirmed to be included in the CAPEX cost or not applicable to the project.

As noted above, SST's quote for the LNG process units reflects recent production cost experience and incorporates lessons learned in the fabrication, installation and commissioning of similar LNG plants. In terms of the construction cost estimates, Conam Construction confirmed their recent and continuing works of a similar nature on the North Slope for ConocoPhillips and BP, as well as others. These works have included a modularized plant with components of a similar scale and weight to the Spectrum LNG plant which Conam off-loaded, set foundations, and fabricated and made piping connections in the field. Other works involved the exchanging of plant compressors and installation of modular units and piping components at active drill sites. As such, Conam is confident that their construction estimates accurately reflect construction costs on the North Slope for the Spectrum LNG plant. In addition, and based on these recent and relevant project experiences, Conam has conducted a constructability review of the Spectrum development plan. This review confirmed that the construction of the proposed LNG plant would be relatively straight forward in terms of construction methods and resources, and could be readily constructed in the time frame spanning two construction seasons. Conam maintains a continuous level of construction work activity on the North Slope, so providing resources for the Spectrum LNG plant is not seen as a particular challenge. Moreover, Conam worked with Spectrum senior management previously on the Port Mackenzie LNG plant, demonstrating an experienced developer/contractor team with a record of working together on opportunities to optimize constructability and schedule of the planned Spectrum LNG plant. Specifically for this LNG plant, these constructability reviews eventuated in modifications to the delivery plan, with some fabrication of piping works being moved off-site, thereby reducing the amount of costly on-site works and providing scheduling advantages. These modifications are yet to be reflected in the CAPEX estimates of the plant and, as such, offer the potential for lower construction costs.

As noted previously, Spectrum's CAPEX budget is supported in large part with written quotations. A number of these have or will expire; however, Spectrum, as well as their contractor and LNG vendor, noted that given the prevailing recessionary pressures in the market place for these products and services, any escalation of pricing, other than at the overall economic rate of inflation, would be a remote possibility. In light of the near-term market conditions, as the project progresses towards implementation, there will likely be opportunities to optimize CAPEX expenditures.

Spectrum's CAPEX includes amounts for detailed design and permitting of the project. Spectrum previously developed the intended site and understands that all necessary permits, aside from an air emissions permit from ADEC, are in place. ADEC has been consulted on the project, and, given the air quality benefits that the IEP would generate through a reduction of higher emitting fuel sources in Fairbanks, the project is expected to demonstrate positive environmental and public health benefits.

**Commercial Terms and Project Financing:** Spectrum has proposed the formation of an ownership company (Newco) capitalized with \$5,000,000 in preferred equity held by Spectrum; \$30,000,000 in common equity held by AIDEA; and a \$50,000,000 AIDEA SETS loan at 1% for a 30-year term. The target rate of return on preferred equity would be 12.5%, and 0.0% for common equity. Total capitalization would fund CAPEX of roughly \$75,000,000, including contingencies as a construction reserve. The balance of \$10,000,000 would be used to offset negative cash flows anticipated through the first four (4) years of operations. Newco governance would be determined through an operating agreement between AIDEA and Spectrum, and Spectrum would execute a 30-year, fixed fee operating and maintenance agreement with Newco. In addition, AIDEA would provide Newco with a 30-year, no charge lease of the plant site, with options for three (3) 5-year extensions. Any other financing costs that arise would be additive to the basic commercial terms.

Purchases of LNG would be made by GVEA and local distribution companies (LDCs), paying for LNG on a Revenue Requirements basis. GVEA would be asked to commit to an annual offtake volume of up to 0.58 Bcfy. Spectrum suggests that Revenue Requirements pricing be established through forward rolling 3-year adjustment to account for variance in pricing for any particular subject year relative to the AIDEA demand forecast.

The initial four (4) years of Management Fees would be deferred and recouped in pricing adjustments through subsequent years at a to be determined schedule. Spectrum's revenue forecast presently identifies these deferred Management Fees being recouped by year 15, accounting for a price reduction at that point.

Purchase agreements for LNG would also include an “all requirements” provision for LNG purchases up to a certain level, with certain exceptions for pre-existing FNG purchases of Port Mackenzie LNG. These provisions would work to secure forward revenue streams essential to the sustained financial performance of the IEP.

**Risk Identification and Allocation:** In terms of CAPEX, Spectrum's estimate is supported by a substantial number of quotations, which serve to enhance the overall reasonableness and substantiate the completeness of their budget estimates. In the initial years of startup and building of the distribution network(s) in Fairbanks, revenue shortfalls are capitalized. This arrangement helps to ameliorate the overall market demand risk exposure inherent in the IEP initiative as distribution capacities in Fairbanks are established. With the revenue risk mitigated through long-term purchase agreements, CAPEX and OPEX risk exposure remains primarily with the project scheduling risk for procurement and construction.

For fabrication and delivery of the LNG liquefaction plant, SST has demonstrated its pricing and performance capabilities in the recent fabrication and delivery of a similar project, and their production capacities are capable of accommodating the intended schedule for fabricating the Spectrum LNG plant. As presented by Conam, construction of the Spectrum LNG plant would be relatively routine and readily accomplished as scheduled. Procurement of the storage tanks would be made from a recognized provider in China, and the fabrication and delivery times fit comfortably in the overall project schedule. Spectrum has proposed a sharing of CAPEX savings realized through development of the plan in proportion with equity shares. Through final design and implementation of the development plan, given the anticipated competitive nature of the market segments involved in the project, it is likely that savings in CAPEX for the project can be realized.

In terms of the overall development plan, capitalizing a production plant with a capacity of 260,000 gpd presents a front-end pricing risk given the revenue requirements pricing scheme, as the greater amount of capitalization would be reflected eventually in purchase agreement prices. The potential upside to greater production, however, would be in potential third party sales that would work to lower the IEP distributed LNG price. Additionally, capitalizing sufficient capacity initially would eliminate the need for expanding capacity in the future when the market demand matures and state resources may not be as readily available.

**Detail on Ability to Meet IEP Project Goals:** For the CAPEX and OPEX estimates presented, Spectrum shows a price of \$10/mcf price for LNG delivered to the City Gate. Distribution and storage from that point has been identified in the range of \$4-5/mcf. Accordingly, Spectrum's proposed development meets the end user pricing target of \$15/mcf.

At an average daily production capacity of 260,000 gallons, the state's capital participation in the project equates with \$307.69 per gallon of developed production capacity (\$80M/260,000).

#### **Overall Reasonableness and Completeness of CAPEX and OPEX**

In terms of overall reasonableness and completeness, the CAPEX and OPEX estimates presented in Spectrum's BAFO are reasonable within a range of +/-30% for the level of development demonstrated. This range is consistent with the AACE expected range of accuracy for projects at comparable levels of development. Spectrum is an established developer and distributor of LNG liquefaction operations. SST, as the preferred vendor of the LNG liquefaction plant, has successfully quoted, fabricated, shipped and commissioned LNG plants of similar scale in northern climates, and demonstrates sufficient manufacturing capabilities to undertake fabrication of the Spectrum plant as scheduled. Conam has constructed projects of this scale and complexity on the North Slope, and has experience working with Spectrum.

In terms of a CAPEX to LNG production ratio, Spectrum's development plan demonstrates a ratio of \$563.94/tonne. At this, Spectrum's capital/production ration equates with 48% of the world-wide ratio of \$1,185/tonne (IGU World LNG Report 2015). Daily rates represented in Spectrum's CAPEX and OPEX for labor, materials and equipment are within the range of rates expected, and are generally applicable to the rates experienced in Alaska. For OPEX, in terms of OPEX/gallon of LNG produced annually, Spectrum's ratio of \$0.09/gallon is relatively low compared to a similar ratio for other LNG liquefaction plants at a similar stage of development in Alaska, that ratio being \$0.48/gallon.

Taken together, these factors support an overall assessment that the development plan as presented by Spectrum is reasonable and essentially complete for this stage of development.

Sincerely,

A handwritten signature in blue ink, appearing to read 'Mark S', with a stylized flourish at the end.

Mark Griffin, AICP  
Senior Project Manager  
Arcadis U.S., Inc.

**Attachments**

1 Attachment A



# RFP Timeline

## 10/15 through 6/16

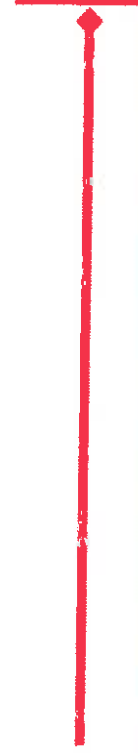
# IEP PROJECT MILESTONES

REVISED MARCH 2016



| Milestone   | <u>Oct 30</u><br>BAFO's Due                        | <u>Dec 3</u><br>AIDEA Board meeting  | <u>March 3</u><br>Top Ranked Proposal   | <u>March 31*</u><br>Project Authorization   | <u>June 23*</u><br>Final Investment Decision   |
|-------------|--|--|---|---|--|
| RFP Process | Evaluate BAFO's<br>Announce 2 Top-Ranked Finalists | Top Two Ranked Finalists Identified<br>BAFO Clarification and Information requested from Top Two Finalists<br>Committee to Reconvene when Information complete | Top Ranked Proposal Identified<br>Final Term Sheet and Finance Terms to be Negotiated | Project Plan Presented to Board<br>If Project Authorized, FEED work to proceed to FID | Commercial Terms<br>Final Design and Construction Cost Estimates<br>Equipment and Construction Contracts |

Progress to Date



\*Tentative Dates

3/3/16





**Attachment C:  
Final Pentex 2016 Budget and  
Rates, Resolution No. G16-01**



# **Pentex Alaska Natural Gas Company, LLC**

## **2016 Year to Date Operations Report – As of 2/29/2016**

Prepared for: AIDEA Board of Directors

Prepared by: Dan Britton, President

### **Operations**

Pentex operating companies provided continuous LNG and natural gas deliveries to its customers without disruption or interruption. No significant equipment failures or damages to assets were reported.

There have been 0 lost time injuries and 0 at-fault vehicle accidents reported in 2016.

On January 20, 2016, FNG received notice from the National Labor Relations Board (NLRB) that a petition had been filed by the IBEW, Local Union 1547 to represent “All natural gas operators and natural gas operator leads”. Ballots were counted by the NLRB on February 25, 2016, at which time FNG operators voted in favor of being represented by the IBEW. A time frame for negotiations regarding a collective bargaining agreement has not yet been set.

Pentex has continued to test the HEIL trailer for compatibility and enhanced transportation efficiency, through increased LNG capacity. To date 21 roundtrip deliveries between Pt. Mackenzie and Fairbanks have been completed with an average payload of 41,358 lbs. or 12,165 gallons. In addition, two roundtrip test runs were completed between Fairbanks and Prudhoe Bay, one with the trailer full and one empty. No major areas of concern were noted by the Driver with an overall impression that the unit was suitable for hauling product on the haul road.

### **Financial**

Pentex implemented the interim approved rate reductions approved by the AIDEA Board of Directors effective January 1, 2016 resulting in an average rate reduction of 10.4%. Fairbanks has experienced unseasonably warm weather, resulting in a significant reduction in Heating Degree Days (HDD's) in the first part of 2016. HDD's for January and February were 1,844 and 1,599 respectively compared to a budget for January and February of 2,321 and 1,828 respectively. Year to date HDD's are 706 HDD's or 17% lower than budgeted.

Overall gas sales for the month of January and February were 93,100 and approximately 78,600 Mcf respectively. The budgeted sales for January and February were 112,854 and 93,712 respectively. The combined budget deficit for sales volume to date of this report is 34,866 Mcf, approximately 17% or \$700K in sales dollars. The sales deficit is consistent with a warmer winter, but further hindering sales is small commercial interruptible customers that have switched to their respective alternate fuel, heating oil. In the development of the 2016 budget it was anticipated that the Fairbanks North Star School District would remain using natural gas as the cost of heating oil had yet resulted in significant savings. The School district has 14 facilities that generally use natural gas. Of those 14 facilities only 2 facilities were using natural gas in January and February. In addition to those lost sales, State of Alaska - Department of Fish and Game has chosen to switch to heating oil in its Ruth Burnett Hatchery. We have also identified three firm customers that have switched to alternate fuels, of which two are small commercial and one large commercial facility.

In response to below budget sales, management will scrutinize expenses and capital investment so as to minimize the overall negative impact resulting from reduced sales.



# **Attachment D: Heating Oil Price Sensitivity Analysis Report**

# Final IEP Single-Family Residential Willingness to Convert Heating Oil Price Sensitivity Analysis





## Document Information

Prepared for Alaska Industrial Export Development Authority and Alaska Energy Authority

Project Name IEP Conversion Rate Heating Oil Price Sensitivity Analysis

Project Number E515018001

Project Manager Lee Elder

Date October 13, 2015

Prepared for:



813 West Northern Lights Boulevard, Anchorage, AK, 99503

Prepared by:



Cardno  
5415 SW Westgate Dr. #100, Portland, OR 97221

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## Acronyms

|       |  |
|-------|--|
| AEA   | Alaska Energy Authority                            |
| AIDEA | Alaska Industrial Development and Export Authority |
| FNG   | Fairbanks Natural Gas                              |
| FNSB  | Fairbanks North Star Borough                       |
| IEP   | Interior Energy Project                            |
| IGU   | Interior Gas Utility                               |
| Mcf   | thousand cubic feet                                |

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# 1 Introduction

In January 2014, Cardno completed the *Interior Energy Project (IEP) Natural Gas Conversion Analysis*, which estimated the demand for natural gas from the IEP and the associated economic benefits of natural gas conversion.<sup>1</sup> As part of that analysis, Cardno estimated study area residential willingness to convert, which relied upon the cost of converting to natural gas and the estimated savings obtained from converting to natural gas. The saving estimates relied on a natural gas price of \$15 per thousand cubic feet (Mcf) and a heating oil price of \$4 per gallon, or the equivalent of \$29.85 per Mcf.<sup>2</sup>

The Alaska Industrial Development Export Authority (AIDEA) and Alaska Energy Authority (AEA) wish to better understand heating oil price effects upon residential willingness-to-convert estimates. Therefore, the following sensitivity analysis builds upon the previously completed *IEP Natural Gas Conversion Analysis* to estimate single-family residential willingness to convert under various heating oil prices.

## 1.1 Purpose and Scope

This study estimates single-family residential willingness to convert under a range of heating oil price scenarios. The analysis assumes the same rate of conversion, or the speed in which residences will convert to a natural gas system, as was assumed for the *IEP Natural Gas Conversion Analysis (Table 2)*. This sensitivity analysis differs from the *IEP Natural Gas Conversion Analysis* in that it does not estimate multi-family, industrial, or commercial users' willingness to convert under various heating oil prices. Finally, this sensitivity analysis does not quantify single-family households' natural gas demand for different heating oil price points.

The study area for this analysis is the proposed natural gas service area surrounding and encompassing Fairbanks and North Pole and includes both the Interior Gas Utility (IGU) and Fairbanks Natural Gas (FNG) service areas. The study area is based on a mock 6-year build-out developed by AEA based on personal communication with the IGU and FNG. Within the study area there are an estimated 20,077 single-family residential households.<sup>3</sup>

## 1.2 Data Sources

This analysis relied on several key sources of data to estimate the total number of single-family households expected to convert to natural gas. The following key model components and parameters were used in the *IEP Natural Gas Conversion Analysis*, and subsequently in this sensitivity analysis, to estimate study area single-family residential willingness to convert.

- **Willingness-to-convert predictive model** – A survey of 800 Fairbanks North Star Borough (FNSB) residents was conducted as part of the IGU study titled *Natural Gas in the Fairbanks North Star Borough: Results from a Residential Household Survey (IGU study)*.<sup>4</sup> The survey elicited respondents' willingness to convert based on different combinations of conversion costs

<sup>1</sup> AIDEA and AEA, January 2014, IEP Natural Gas Conversion Analysis, Website ([http://www.interiorenergyproject.com/Resources%20and%20Documents/IEP\\_Conversion\\_Analysis\\_Final.pdf](http://www.interiorenergyproject.com/Resources%20and%20Documents/IEP_Conversion_Analysis_Final.pdf)) accessed October 22, 2014.

<sup>2</sup> AIDEA and AEA, July 2013, Interior Energy Project Feasibility Report, Website ([http://www.interiorenergyproject.com/Resources%20and%20Documents/Feasibility\\_Report\\_72013.pdf](http://www.interiorenergyproject.com/Resources%20and%20Documents/Feasibility_Report_72013.pdf)) accessed October 20, 2014.

<sup>3</sup> AIDEA and AEA, Personal communication with Lee Elder, Cardno, September 17, 2013.

<sup>4</sup> Interior Gas Utility, November 2013, Natural Gas in the Fairbanks North Star Borough: Results from a Residential Household Survey, Prepared by Northern Economics.

and fuel savings. Responses were statistically analyzed to generate a predictive model for FNSB residents' willingness to convert to natural gas.

- **Primary/secondary heating systems** – The IGU study also solicited survey respondents regarding the number of household heating systems, the types of fuel used for each heating system, and the age of heating systems.
- **Home energy consumption estimates** – To estimate the existing and post-conversion single-family residential unit heating expenditures (and the associated savings) within the study area, this analysis relied on primary and secondary heating system energy consumption estimates provided by the IGU study. These estimates were modified for those households with furnaces to account for hot water energy consumption since it is assumed the conversion to a natural gas boiler or furnace would also include the installation of a natural gas water heater. Energy consumption estimates used in the sensitivity analysis relied on primary/secondary heating system energy consumption as determined by the IGU study. Across all primary/secondary heating systems, the average annual energy consumption for each residential property within the study area was estimated at 161 Mcf.
- **Conversion costs** – Interviews with six regional heating system experts were relied on to develop a range of equipment and installation costs for natural gas conversion. Conversion costs for the study area are defined as the purchase price for a boiler, furnace, space heater, or burner. Conversion costs estimates also include the cost of piping, valves, and labor for full installation of each of these heating systems.
- **Natural gas price** – As provided by the AIDEA and AEA *IEP Natural Gas Conversion Analysis*, the price of natural gas within the study area was assumed to be \$15 per Mcf.
- **Case-study analysis and focus groups** – Case studies and focus group input were used to ground-truth willingness-to-convert estimates generated by the IGU study and natural gas predictive model. These case studies assessed willingness to convert in other Alaska communities where natural gas distribution system expansion has recently occurred (e.g., Homer and Kachemak City). Additionally, ENSTAR representatives provided further input on community willingness to convert to natural gas. Finally, a series of four focus groups were conducted in Fairbanks and North Pole to better understand focus group participants' willingness to convert.

## 2 Methodology

All model parameters, with the exception of heating oil prices, previously used in the *IEP Natural Gas Conversion Analysis* (i.e., primary/secondary heating systems, conversion costs, home energy consumption estimates, heating oil prices, etc.) were held constant for the sensitivity analysis.

The model assumes that heating oil prices for the first year of analysis will equal current heating oil prices for each scenario (\$2.75 per gallon).<sup>5</sup> Each of the following scenarios assumed prices in the second and third years would be 10 percent greater or less than current prices (either \$2.48 or \$3.03 per gallon), while the fourth year would either be current heating oil prices (\$2.75 per gallon) or \$4.00 per gallon.

**Table 1** below illustrates the eight heating oil price scenarios considered within the sensitivity analysis as well as the baseline heating oil price scenario (\$4.00 per gallon) evaluated previously in the IEP analysis.

**Table 1 FNSB Heating Oil Price Scenarios, dollars per gallon**

| Scenario | Year 1 | Year 2 | Year 3 | Year 4 and Beyond |
|----------|--------|--------|--------|-------------------|
| #1       | \$2.75 | \$2.48 | \$2.48 | \$2.75            |
| #2       | \$2.75 | \$2.48 | \$2.48 | \$4.00            |
| #3       | \$2.75 | \$2.48 | \$3.03 | \$2.75            |
| #4       | \$2.75 | \$2.48 | \$3.03 | \$4.00            |
| #5       | \$2.75 | \$3.03 | \$2.48 | \$2.75            |
| #6       | \$2.75 | \$3.03 | \$2.48 | \$4.00            |
| #7       | \$2.75 | \$3.03 | \$3.03 | \$2.75            |
| #8       | \$2.75 | \$3.03 | \$3.03 | \$4.00            |
| Baseline | \$4.00 | \$4.00 | \$4.00 | \$4.00            |

Research on conversions in Homer indicates that the rate of conversion will be influenced by the construction season, which will affect when natural gas will be available to households and businesses alike. The timing of residential conversions within the study area relies on conversion rate estimates provided by ENSTAR. As illustrated in **Table 2**, ENSTAR expects 60 percent of the total customer base to convert within the first year of a system build-out and approximately 75 percent of the customer base to have converted by the end of the second year. Within 3 years of providing natural gas service to an area, ENSTAR expects approximately 90 percent of the residential housing units to convert, and 95 percent to convert by the seventh year, with no additional conversions thereafter.<sup>6</sup> Stated differently, of those single-family residential properties that are going to convert, all will have done so 7 years following build-out or by year 8.

This analysis assumes that owners of single-family rental properties will be as willing to convert to a natural gas system as owner-occupied single-family properties, but at a slower rate. Therefore, we assume single-family rental owners will take an additional year compared with property owners to fully convert.

<sup>5</sup> Sourdough Fuel, Personal communication with Lee Elder, Cardno, September 9, 2015.

<sup>6</sup> Pierce, Charlie, ENSTAR, Southern Division Manager, Personal communication with Lee Elder, Cardno, September 23, 2013.

**Table 2**      **Estimated Cumulative Residential Rate of Conversion by Year**

|  | Construction<br>(Year 1) <sup>1</sup> | Year 2 | Year 3 | Year 4           | Year 5 | Year 6 | Year 7 | Year 8 | Year 9 |
|--|---------------------------------------|--------|--------|------------------|--------|--------|--------|--------|--------|
| <b>Single-family residential<sup>2</sup></b> | 15%                                   | 60%    | 75%    | 90% <sup>3</sup> | 93%    | 95%    | 98%    | 100%   | 100%   |
| <b>Single-family renter-occupied</b>         | 15%                                   | 45%    | 60%    | 75%              | 90%    | 93%    | 95%    | 98%    | 100%   |

1 Assumed existing Homer construction year rate of conversion for study area

2 Source (unless noted): Pierce, Charlie, ENSTAR, Southern Division Manager, Personal communication with Lee Elder, Cardno, September 23, 2013.

3 Source: Starring, Coleen, Personal communication with Lee Elder, Cardno, Shanna Zuspan, Agnew::Beck, and Tanya Iden, Agnew::Beck, September 18, 2013.

This analysis assumes that only those households currently using heating oil (92 percent of all study area households) would consider converting to natural gas (i.e., that conversion among those who exclusively use wood or other non-oil sources would be zero percent).<sup>7</sup>

Willingness to convert is a function of conversion costs and estimated annual savings. Willingness-to-convert estimates are generated when applying the heating system conversion cost along with the associated annual savings within the predictive model developed by the IGU study:

$$P_c = 2.43 + (-0.41) \ln \text{Conversion Cost} + (0.24) \ln \text{Annual Savings}^8$$

$P_c$  represents the portion of respondents that would be willing to convert to a natural gas system from their current heating system and “ln” represents the natural logarithm. The price of heating oil is modified within this sensitivity analysis to calculate different annual saving estimates for each of the heating systems, which then feeds into the predictive model function to generate willingness-to-convert estimates.

<sup>7</sup> This assumption is supported by recent survey data (Sierra Research, 2013, Wood Tag Survey) indicating that approximately 11 percent of households would continue burning wood, even if natural gas were available at prices less than \$1 per gallon equivalent of heating oil, and 26 percent would continue burning wood if natural gas were available at prices below \$2 per gallon equivalent of heating oil (projected natural gas prices are approximately \$2.15 per gallon equivalent of heating oil).

<sup>8</sup> Interior Gas Utility, November 2013, Natural Gas in the Fairbanks North Star Borough: Results from a Residential Household Survey, Prepared by Northern Economics.

### 3 Results

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As illustrated in **Table 3** below, heating oil prices in the FNSB affect residential conversion rates. Scenarios in which heating oil price increases to \$4.00 per gallon by the fourth year and remains at that level from that time on (Scenarios 2, 4, 6, and 8) achieve the same residential conversion rates as the baseline scenario. However, up until year 3, heating oil prices of \$2.48 and \$3.03 per gallon support residential conversion rates of 14 percent and 21 percent, respectively, whereas, a price of \$4.00 per gallon supports a residential conversion rate of 25 percent. For those scenarios in which heating oil price remains \$2.75 per gallon from year 4 and on (Scenarios 1, 3, 5, and 7) residential conversion rates are expected to be 54 percent by year 13. **Table 4** provides the total cumulative number of residences expected to convert each year for each heating oil price scenario.

**Table 3 Cumulative Rates of Residential Conversation (Across All Phases)**

| Scenario | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 | Year 7 | Year 8 | Year 9 | Year 10 | Year 11 | Year 12 | Year 13 |
|----------|--------|--------|--------|--------|--------|--------|--------|--------|--------|---------|---------|---------|---------|
| #1       | 2%     | 8%     | 14%    | 25%    | 33%    | 40%    | 46%    | 49%    | 52%    | 52%     | 53%     | 53%     | 54%     |
| #2       | 2%     | 8%     | 14%    | 36%    | 46%    | 56%    | 65%    | 70%    | 72%    | 74%     | 75%     | 75%     | 75%     |
| #3       | 2%     | 8%     | 21%    | 25%    | 33%    | 40%    | 46%    | 49%    | 52%    | 52%     | 53%     | 53%     | 54%     |
| #4       | 2%     | 8%     | 21%    | 36%    | 46%    | 56%    | 65%    | 70%    | 72%    | 74%     | 75%     | 75%     | 75%     |
| #5       | 2%     | 12%    | 14%    | 25%    | 33%    | 40%    | 46%    | 49%    | 52%    | 52%     | 53%     | 53%     | 54%     |
| #6       | 2%     | 12%    | 14%    | 36%    | 46%    | 56%    | 65%    | 70%    | 72%    | 74%     | 75%     | 75%     | 75%     |
| #7       | 2%     | 12%    | 21%    | 25%    | 33%    | 40%    | 46%    | 49%    | 52%    | 52%     | 53%     | 53%     | 54%     |
| #8       | 2%     | 12%    | 21%    | 36%    | 46%    | 56%    | 65%    | 70%    | 72%    | 74%     | 75%     | 75%     | 75%     |
| Baseline | 3%     | 14%    | 25%    | 36%    | 46%    | 56%    | 65%    | 70%    | 72%    | 74%     | 75%     | 75%     | 75%     |

**Table 4 Cumulative Number of Residential Conversation (Across All Phases)**

| Scenario | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 | Year 7 | Year 8 | Year 9 | Year 10 | Year 11 | Year 12 | Year 13 |
|----------|--------|--------|--------|--------|--------|--------|--------|--------|--------|---------|---------|---------|---------|
| #1       | 460    | 1,640  | 2,840  | 5,110  | 6,580  | 8,050  | 9,270  | 9,930  | 10,340 | 10,510  | 10,630  | 10,710  | 10,750  |
| #2       | 460    | 1,640  | 2,840  | 7,180  | 9,250  | 11,320 | 13,040 | 13,980 | 14,550 | 14,790  | 14,960  | 15,070  | 15,120  |
| #3       | 460    | 1,640  | 4,130  | 5,110  | 6,580  | 8,050  | 9,270  | 9,930  | 10,340 | 10,510  | 10,630  | 10,710  | 10,750  |
| #4       | 460    | 1,640  | 4,130  | 7,180  | 9,250  | 11,320 | 13,040 | 13,980 | 14,550 | 14,790  | 14,960  | 15,070  | 15,120  |
| #5       | 460    | 2,380  | 2,840  | 5,110  | 6,580  | 8,050  | 9,270  | 9,930  | 10,340 | 10,510  | 10,630  | 10,710  | 10,750  |
| #6       | 460    | 2,380  | 2,840  | 7,180  | 9,250  | 11,320 | 13,040 | 13,980 | 14,550 | 14,790  | 14,960  | 15,070  | 15,120  |
| #7       | 460    | 2,380  | 4,130  | 5,110  | 6,580  | 8,050  | 9,270  | 9,930  | 10,340 | 10,510  | 10,630  | 10,710  | 10,750  |
| #8       | 460    | 2,380  | 4,130  | 7,180  | 9,250  | 11,320 | 13,040 | 13,980 | 14,550 | 14,790  | 14,960  | 15,070  | 15,120  |
| Baseline | 640    | 2,880  | 5,010  | 7,180  | 9,250  | 11,320 | 13,040 | 13,980 | 14,550 | 14,790  | 14,960  | 15,070  | 15,120  |