National Fuel

December 20, 2019

Rosemary Chiavetta, Secretary
Pennsylvania Public Utility Commission
P.O. Box 3265
North Office Building
Harrisburg, Pennsylvania 17105-3265

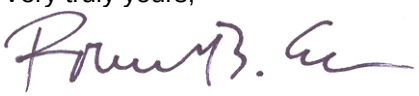
Re: National Fuel Gas Distribution Corporation
Delta Fund for Research and Development Projects Report

Dear Secretary Chiavetta;

Pursuant to R-00061493 Settlement paragraph 18 A.3 “Distribution will file with the Commission and serve upon other Parties on or before December 31 an annual report for the preceding twelve month period ended September 30, setting forth revenues for the Delta Fund for research and development projects and expenditures for such projects. In addition, Distribution will describe in the annual report projects that have been funded”. The enclosed report is submitted under this settlement agreement.

Acknowledgement hereof is desired and duplicate letter is enclosed with a self-addressed, stamped envelope for that purpose.

Very truly yours,



Robert D. Eck
General Manager
Energy Services Department

Encl.

Cc: Office of Special Assistants
Office of Consumer Advocate
Office of Small Business Advocate

The provisions of R-00061493 Settlement paragraph 18 A.3 were adopted on November 30, 2006 and effective January 1, 2007. Paragraph 18 A.3 states:

"3. The Joint Petitioners agree to $526,466 to fund the Delta research and development program pursuant to the Statement of Scott E. Swartzfager No. 14. The deferral treatment and review process outlined in R-00049656 will continue. The company will not expend these dollars on additional customer outreach for enhanced energy efficiency.

Distribution will be permitted to record a regulatory asset or liability for differences between the annual rate allowance and annual expenditures. However, Distribution will not be permitted to retroactively recover in a future proceeding any expenditures in excess of the annual rate allowance and any deferred balance from the previous year's Delta funding. Distribution will provide for review of research projects as described in its testimony. In order to implement this Settlement, the Joint Petitioners request that the Commission's Final Order in this proceeding include the following language to allow Distribution to qualify for deferred accounting under SFAS 71:

> "National Fuel Gas Distribution Corporation's accounting policies conform to the Statement of Financial Accounting Standards No. 71 'Accounting for the Effect of Certain Type of Regulations' which are in accordance with the accounting requirements and ratemaking practices of regulatory authorities. The application of these accounting policies allows the Company to defer expenses and income on the balance sheet as regulatory assets and liabilities when it is probable that those expenses and income will be allowed in the rate-setting process in a period different from the period in which they would have been reflected in the income statement by an unregulated Company.
>
> "Because research and development projects often require a commitment over multiple years and because the expenditures for such projects may not match on an annual basis revenues for funding of research and development projects, deferred accounting is appropriate and is approved. The regulatory deferral treatment sought for the Research and Development expenditures and rate relief requested in the case are in accordance with SFAS No. 71.
>
> "The Company will manage the costs of the Research and Development expenditures to match revenues deferred pursuant to this Order to eliminate any differences between deferred costs and deferred revenues at the end of a five-year period commencing on the day after the R-00049656 Order was entered."

Distribution will file with the Commission and serve upon other Parties on or before December 31 an annual report for the preceding twelve month period ended September 30, setting forth revenues for the Delta Fund for research and development projects and expenditures for such projects. In addition, Distribution will describe in the annual report projects that have been funded."

The provisions of R-00049656 Settlement paragraph 44 were adopted on March 23, 2005 and effective April 15, 2005. Paragraph 44 states:

"44. Distribution's proposal to fund the Delta research and development program pursuant to the Supplemental Statement of Ruth Friedrich-Alf No. 102 S2 is approved. Increased rates in this proceeding provide for recovery of $526,466 in Delta research funds. Distribution will be permitted to record a regulatory asset or liability for differences between the annual rate allowance and annual expenditures. However, Distribution will not be permitted to retroactively recover in a future proceeding any expenditures in excess of the annual rate allowance and any deferred balance from the previous year's Delta funding. Distribution will provide for review of research projects as described in its testimony. In order to implement this agreement, the Parties request that the Commission's Final Order in this proceeding include the following language to allow Distribution to qualify for deferred accounting under SFAS 71:

> 'National Fuel Gas Distribution Corporation's accounting policies conform to the Statement of Financial Accounting Standards No. 71 'Accounting for the Effect of Certain Type of Regulations' which are in accordance with the accounting requirements and ratemaking practices of regulatory authorities. The application of these accounting policies allows the Company to defer expenses and income on the balance sheet as regulatory assets and liabilities when it is probable that those expenses and income will be allowed in the rate-setting process in a period different from the period in which they would have been reflected in the income statement by an unregulated Company.
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> 'Because research and development projects often require a commitment over multiple years and because the expenditures for such projects may not match on an annual basis revenues for funding of research and development projects, deferred accounting is appropriate and is approved. The regulatory deferral treatment sought for the Research and Development expenditures and rate relief requested in the case are in accordance with SFAS No. 71.
>
> 'The Company will manage the costs of the Research and Development expenditures to match revenues deferred pursuant to this Order to eliminate any differences between deferred costs and deferred revenues at the end of a five-year period commencing on the day after this Order is entered.'

Distribution will file with the Commission and serve upon other Parties on or before December 31 an annual report for the preceding twelve month period ended September 30, setting forth revenues for the Delta Fund for research and development projects and expenditures for such projects. In addition, Distribution will describe in the annual report projects that have been funded."

As presented in R-00049656 Statement No. 102 (page 15);

> "On an annual basis coming off of September 30, a reconciliation of revenues and expenditures with a description of projects funded will be on file on or before December 31 with the Office of Trial Staff, Office of Consumer Advocate and the office of Small Business Advocate. At the fifth reconciliation, Distribution will file a five year report."

As presented in R-00049656 Statement No. 102 S2 (page 7)

> "Annual revenues …. will be deferred to offset the costs of the Research and Development expenditures (expenses) to both the Gas Technology Institute ("GTI") fund and local projects.
>
> The Company will manage the cost of the Research and Development expenditures to match revenues deferred pursuant to this Order to eliminate any differences between deferred costs and deferred revenues at the end of a five-year period commencing on the day after this Order is entered."

It is under these guidelines and agreements that Distribution files the following report for the period ended September 30, 2019.

National Fuel Gas Distribution Corporation
Pennsylvania Division

Annual Filing of Delta Fund Revenues and Expenditures
For the period ended September 30, 2019

	Annual		Cumulative		
Year Ended	Expenditures	Revenues	Expenditures	Revenues	Balance
Sept. 2005	$92,300	$113,927	$92,300	$113,927	($21,627)
Sept. 2006	$376,800	$526,466	$469,100	$640,393	($171,293)
Sept. 2007	$596,800	$526,466	$1,065,900	$1,166,859	($100,959)
Sept. 2008	$526,493	$526,466	$1,592,393	$1,693,325	($100,932)
Sept. 2009	$376,368	$526,466	$1,968,761	$2,219,791	($251,030)
Sept. 2010	$455,911	$526,466	$2,424,672	$2,746,257	($321,585)
Sept. 2011	$721,800	$526,466	$3,146,472	$3,272,723	($126,251)
Sept. 2012	$280,300	$526,466	$3,426,772	$3,799,189	($372,417)
Sept. 2013	$626,800	$526,466	$4,053,572	$4,325,655	($272,083)
Sept. 2014	$278,891	$526,466	$4,332,463	$4,852,121	($519,658)
Sept. 2015	$276,800	$526,466	$4,609,263	$5,378,587	($769,325)
Sept. 2016	$458,404	$526,466	$5,067,667	$5,905,053	($837,386)
Sept. 2017	$500,530	$526,466	$5,568,197	$6,431,519	($863,322)
Sept. 2018	$362,547	$526,466	$5,930,744	$6,957,985	($1,027,241)
Sept. 2019	$445,438	$526,466	$6,376,182	$7,484,451	($1,108,269)

Note 1: Rates were effective April 15, 2005 therefore the report ended September 30, 2005 does not represent a 12 month period of revenue collection.

DESCRIPTION OF ACTUAL EXPENDITURES - PERIOD ENDED SEPTEMBER 2019

GTI Utilization Technology Development Program

$129,500 was submitted to Utilization Technology Development, NFP (UTD) for the April 1, 2019 through March 31, 2020 dues. $110,005 has been allocated to specific projects as listed below.

UTD Payments, Fees, Credits, Carryover

Payments to UTD	129,500.00
Administration Fees	-12,950.00
Carryover of Unallocated Funds from Prior Year	4,022.01
Funds Available for Allocation	120,572.01

Allocations to Projects

Residential/Commercial Space Conditioning	
1.12.U.3 Gas HP Modeling - Phase 3	-3,996.00
1.13.D.6 RCSC Codes and Standards Support for Advanced Gas Technologies - Phase 6	-1,184.00
1.13.D.7 RCSC Codes and Standards for Advanced Gas Technologies – Phase 7	-4,255.00
1.15.C.2 Next Generation Residential Gas Clothes Dryers - Phase 2	-2,829.39

1.15.E.2 Gas-fired High-Efficient Liquid Desiccant Air Cond. and Humidity Control – Phase 2	-2,960.00
1.16.C.3 High Performance Building Initiative - Phase 3	-1,345.32
1.17.C.2 Gas Heat Pump Combi Space/Water Htg. Sys. Des. – Phase 2: Smart Combi Controller	-1,110.00
1.17.F.2 Thermolift Combined Heating/Cooling System Technical Support – Phase 2	-2,220.00
1.18.G Integrating Gas Heating and Cooling in Advanced Gas/Renewable Homes	-1,973.21
1.18.H Economical High-Efficiency Res. Gas Absorption Heat Pump with Integrated Cooling	-1,110.00
1.18.H.2 Economical High-Efficiency Res. Gas Abs. Heat Pump with Int. Cooling – Phase 2	-1,702.00
1.19.F Yanmar 3-Pipe GHP Cold Climate Case Study	-1,739.00
1.19.G Enhanced Gas Space Conditioning for Greenhouse and Vertical Farming	-1,739.00
1.19.I Comparitive Assessment of Space Heating Systems in Virtual Test Home	-962.00
Residential/Commercial Water Heating	
1.10.C Refund	24.72
1.11.H.4 Residential Gas Absorption Heat Pump Water Heater - Six 4th Gen. Field Demos	-307.29
1.11.H.5 Residential Gas Absorption Heat Pump WH - Phase 5: Component Enhancements	-481.00
1.14.K.3 Advanced Systems for Self-Powered Water Heating – Phase 3: Prototype	-3,737.00
1.16.I.2 Commercial Gas-Fired Heat Pump Water Heater - Phase 2	-718.54
1.16.I.3 Commercial Gas-Fired Heat Pump Water Heater - Phase 3	-2,183.00
1.17.B Refund	2.79
1.17.B.3 Thermoelectric Generator for Self-Powered Water Heater - Phase 3	-1,110.00
1.18.C Advanced Nozzle Burner for Commercial Water Heaters	-4,440.00
1.18.D Integrating Thermal Energy Storage in Advanced Gas/Renewable Homes	-2,354.68
1.19.C Integrated, Self-Powered, High-Efficiency Burner System	-407.00
1.19.D Comparative Assessment of Heat Pump Water Heaters in Virtual Test Home	-629.00
1.19.E Sequestering Non-Condensable Gases for Enhanced Gas Abs. Heat Pump Reliability	-2,553.00
Commercial Food Service	
1.13.B.7 CFS Tools and Calculators - Phase 7	-407.00
1.14.A.5 Next Generation of CFS Burners - Phase 5	-1,246.16
1.15.G.2 Residential Kitchen Cooking Ventilation Effectiveness - Phase 2	-407.00
1.16.B.4 CFS Codes and Standards - Phase 4	-1,332.00
1.18.B Refund	2.43
1.19.A High Efficiency Smart Convection Oven	-481.00
1.19.B Gas Fired Warewasher	-1,591.00
Distributed Generation/Combined Cooling Heating and Power	
2.16.H.2 Test and Demonstrate M-Trigen Micro-CHP System – Phase 2	-3,515.00
2.17.F Refund	115.01
2.18.E Capstone C200S Microturbine Lab Evaluation	-2,220.00
2.18.F Ultra-High Efficiency Natural Gas-fired Combustion Systems for mCHP	-1,122.58
2.18.G Integrating Micro-CHP and PV in Advanced Gas/Renewable Homes	-2,960.00
2.18.H MicroCHP Characterization and Demonstration	-1,363.08
2.19.C Distributed Generation/CHP for Electric Demand Response	-1,739.00

2.19.D Triathalon 2030 5-ton Cold Climate GHP - Lab Test	-629.00
2.19.F CYSORE 24kW mCHP and Chiller System - Lab Test	-814.00
Industrial Commercial Solutions	
2.12.M.3 Low NOx Ribbon Burner - Phase 3: Technology Transfer Activities	-1,110.00
2.14.A Refund	22.84
2.15.A.2 On-site Electrical Generation - Phase 2	-2,960.00
2.16.A Refund	26.33
2.16.A.2 Next Generation Infrared Burner - Phase 2	-4,070.00
2.16.G.2 Energy Recovery Heat Exchanger - Phase 2	-888.00
2.17.A.3 Water Recovery From Humid Exhaust Gas Field Demonstration – Phase 3	-1,984.31
2.17.B Refund	73.35
2.17.C.2 High Efficiency Commercial Clothes Dryer - Phase 2	-3,737.00
2.18.A Cost Optimization of 3D Printing of Advanced Burners for CHP and DG	-1,233.21
2.18.B Advanced Immersion Tube Burner	-2,960.00
2.18.C Sheet Metal Surface Burner Evaluation	-1,480.00
2.19.A Direct Contact Flue Gas Heat Exchange with Innovative Particle Thermal Storage	-2,035.00
2.19.B Zero CO2-Emission Combustion at Commercial or Industrial Scale	-2,590.00
Transportation	
2.16.N.4 NGV Codes and Standards Monitoring, Development and Support - Phase 4	-1,850.00
2.16.O.4 NGV America Technical Committee Participation and Representation - Phase 4	-1,110.00
2.16.P Test and Validate Small-Scale Compressor Fill Devices	-1,175.12
2.18.I Cost Effective CNG Pre-Cooling Technologies	-1,480.00
2.18.I.2 Cost Effective CNG Pre-Cooling Technologies - Phase 2: Free Piston Gas Expander	-2,442.00
2.19.G CNG Dispenser-Tank Communication	-3,885.00
2.19.H Distributed Generation for EV Charging	-888.00
Memberships/Other	
1.10.A Web Program Upkeep	-74.00
6.GHPR Gas Heat Pump Roadmap Collaborative	-8,140.00
Adjustments and Miscellaneous Refunds	
Board Designated Net Assets 2019	2,876.24
G&A Refund 2019	814.72
Funds Allocated to Projects	-110,005.46
Unallocated Funds	10,566.55

GTI Operations Technology Development Program

$184,500 was submitted to Operations Technology Development, NFP (OTD) for the 2019 membership fee. $156,533 has been allocated to specific projects as listed below.

Payments to OTD, Fees, Carryover	
Payments to OTD	185,000.00
Administration Fees	-13,875.00
Carryover of Unallocated Funds from Prior Year	43,079.67
Funds Available for Allocation	214,204.67
Allocations to Projects	
(1) Pipe and Leak Location	
1.08.a.3 GPS EEN: Black Box Reference Device Enhancements, Phase 3	-1,850.00
(4) Inspection and Verification	
4.13.c.2a PHMSA EMAT Sensor for Small Diameter and Unpiggable Pipe Phase 3 - Prototype and Testing	-23.68
4.13.c.3a EMAT Sensor - Measure Remaining Wall Thickness, Phase 2	-1,621.34
4.14.c.2 Validating Non-Destructive Tools for Surface to Bulk Correlations of Yield Strength, Toughness, and Chemistry, Phase 2	-2,327.30
(5) Construction/ Infrastructure Techniques	
5.07.p (GTI) GNSS (GPS) Consortium	-5,550.00
5.13.b.3 GPS-based GIS Conflation System, Phase 3 - Pilot Project	-5,512.26
5.14.d.2a Refund	6.29
5.14.d.2b Refund	25.73
5.14.d.4c Steel Material Traceability JIP, Phase 2: Components	-3,783.99
5.14.d.5 Refund	123.49
5.14.p Refund	2,559.08
5.15.a.2 Cybersecurity Collaborative - Phase 2	-3,700.00
5.15.f.2 No Stub Service Lateral Retirement Phase 2	370.00
5.15.g Refund	2.49
5.16.d.2 Remote Emergency Main Shutoff, Phase 2: Stopping Off L.P. Mains with No Excavation (No Access Points)	-2,114.28
5.16.k.2 ORFEUS Obstacle Detection Technology for Horizontal Directional Drilling, Phase 2	-1,934.36
5.16.r.2 JIP Plastic Program - Continuation	-1,850.00
5.17.g Material-Supplier Quality Assurance Program	-2,931.14
5.18.a Spray-On Leak Seal for Meter Set Joints	-404.78

5.18.a.2 Leak Seal for Meter Set Joints Under Pressure, Commercialization Phase	-1,850.00
5.18.b Advanced Cross-Bore Detection Using Visual and Sensing Technologies	-1,850.00
5.18.c Refund	2.45
5.18.e In-Service Welding Qualification Test Rig Guidelines	-1,011.21
5.18.f Compact Gas Meters	-2,005.03
5.18.h Low Cost Non-Corrosive Anodeless Risers	-973.10
5.18.k Improved Tools to Locate Buried Pipelines in a Congested Underground	-1,863.69
5.18.m Uniform Frequency Code	-1,431.90
5.18.n Performance, Durability, and Service Life of Residential Gas Regulators	-1,725.31
5.18.p Noncamera-Based Technology to Detect Cross Bores	-563.88
5.18.s Thermally Activated Gas Shut-Off Devices	-956.45
5.18.t Virtual Reality (VR) Training: Emergency Response Situations	-1,477.78
5.18.t.2 Virtual Reality (VR) Training Library Development	-1,850.00
5.19.a PE Squeeze Tool Gap Stop Validation	-1,156.25
5.19.f Purging Gas Pipes into Service without Venting Gas to Atmosphere	-1,110.00
5.19.g Design Day/Gas Modeling Workshop	-370.00
5.19.h Single Path Meter Testing (Sensus and Itron)	-740.00
5.19.k Evaluation and Demonstrations of the Utonomy Smart Regulator	-1,850.00
(6) Memberships/Other	
6.08.a (GTI) Carbon Management Information Center	-9,250.00
6.11.a PRCI Membership	-1,679.80
6.14.a Quality Audit Program	-7,400.00
6.19.a Underground Natural Gas Storage Collaborative - Workshop	-370.00
6.a (GTI) SMP	-37,000.00
(7) Methane Emissions/Detection and Gas Quality	
7.15.b.4 Remote Gas Sending for First Responders, Phase 4: Commercialization	-3,700.00
7.16.a.2 Leak Repair Prioritization - Ph 2	-1,850.00
7.16.e.2 On-Line Biomethane Gas Quality Monitoring, Phase II: Trace Sensors	-823.25
7.18.b Biomethane Justification Study for Improved/ Accepted Gas Quality Standards	-1,696.45
7.18.c Robot for Remote Methane Detection, Phase 1	-3,700.00
7.18.g Impact of RNG on End Use Applications	-1,850.00
7.19.c OptoMole Leak Detection System	-1,110.00
(8) Intelligent Utilities	
8.16.b Remote QA/QC: Fusion Inspection and Reporting	-223.50
8.16.b.1.5 Remote QA/QC: Fusions, Phase 1.5: AI	-3,700.00
8.16.b.2 Remote Qa/QC Fusions, Phase 2	-1,850.00
8.17.b Tracking and Traceability Marking Standard for Natural Gas Transmission Components	-2,145.44

8.17.b.2 Transmission Tracking and Traceability Marking Standard, Phase 2	-5,550.00
8.17.c GNSS Smart Automations for Field Data Collection	-240.50
8.17.c Refund	0.18
8.17.c.2 GNSS Smart Automations for Field Data Collection, Phase 2	-1,850.00
8.18.a Component Marking and Laser Etching Development	-1,651.68
8.18.a.2 Component Marking & Laser Etching, Phase 2	-1,982.14
8.18.c Microsoft HoloLens Platform Enhancement	-3,700.00
8.19.c Wearable Computing Technology	-1,850.00
8.19.k Augmented Reality (AR) O&M Procedures, Checklists and SME Contact	-1,850.00
(9) Risk and Decision Analysis/Models	
9.16.a.2 Determining Data Quality Implications, Phase 2	-3,071.74
9.18.a Knowledge Management System, Phase 1	-1,850.00
9.18.a Refund	3.73
9.18.b Modernize Tools to Assess Third-Party Damage Risk	-5,488.58
9.18.c Risk Model for Locates	-1,299.07
Adjustments and Miscellaneous Refunds	
Board Designated Net Assets 2019	4,671.20
G&A Refund	821.87
Funds Allocated to Projects	-156,533.37
Unallocated Funds	57,671.30

Local Opportunity Projects

$122,208 was expended for Local Opportunity Projects in 2019.

SUMMARY OF EXPENDITURES - 2019

Utilization Technology Development Program - GTI	$ 129,500
Operations Technology Development Program - GTI	$ 184,500
Emerging Technology Program - GTI	$ 9,230
Local Opportunity Projects	$ 122,208
Total Pennsylvania Delta Funds Program Expenditures	$ 445,438

PROJECTED EXPENDITURES - PERIOD ENDING SEPTEMBER 2020

Expenditures for National Fuel Gas Distribution Corporation's Pennsylvania Delta Funds RD&D Program are projected to be $514,878 in 2020 consisting of the following planned charges:

1. **Utilization Technology Development** (UTD) membership fees of approximately $129,500. Specific projects to be determined.

2. **Operations Technology Development** (OTD) membership fees of approximately $184,500. Specific projects to be determined.

3. **Emerging Technology Program** (ETP) membership fees of approximately $9,230.

4. **Local Opportunity Projects** spending estimate of $191,648 (see below). Funds not used for the development of qualified local technology projects in National Fuel territory may be allocated to the national Gas Technology Institute programs described above.

    1) $4,975 – Contribution to a CHP engineering study for an industrial laundry company
    2) $45,000 – CHP Preliminary Assessments (5 @ $9,000 each)
    3) $50,000 – Small Scale LNG Project
    4) $4,173 – Hotel Technology Study (balance of payment due)
    5) $87,500 – Prospective CHP Incentive Program award

STATUS UPDATE OF LOCAL OPPORTUNITY PROJECTS - 2019

Funding of gas industry research through the Gas Technology Institute (GTI), as an example, returns many benefits, including insuring continued improvement and availability of energy-efficient, low emissions and cost-effective gas technologies; while leveraging the funding resources of gas utilities across North America. The Local Opportunity Projects portion of this program intends to identify projects for direct local support offering equal, or better, benefits than GTI. This is challenging but National Fuel endeavors to identify and develop these opportunities. Funds available through this portion of the program, beyond the minimum commitments to GTI, may be used for qualified local projects. Funds not used locally are sent to GTI to be allocated to suitable projects, as shown in the previous supported project listings.

Summaries for Local Opportunity Projects active or completed in 2019 are provided below.

1. **Multi-Family Gas Retrofit – Phase I.** This project is intended to serve as a case study demonstrating the relative ease, and cost-effectiveness of converting all-electric multi-family residences to natural gas heating. A belief exists among many building owners that the cost of

natural gas infrastructure, equipment, and ducting/venting outweighs the many benefits of natural gas heating. This project will document the costs, and modifications required to convert thirty two three bedroom townhouses from all-electric, to natural gas forced air heating. A successful project will prove to other multi-family building owners in National Fuel's territory that converting to gas heating can be done at a reasonable cost, lowering energy bills and increasing both tenant satisfaction, and unit occupancy rates. All thirty two units were converted successfully. Existing PTAC units were removed, new gas furnaces and ducting were installed, and all necessary carpentry was able to be completed at a rate of two units per week. Additionally, work was able to be completed in occupied units, with only minimal disruption. Utility bills for past heating seasons have been gathered and will be compared with gas bills from the post-conversion heating seasons as part of a final project report. Other factors such as occupancy rate impacts and design/construction hurdles will also be considered.

2. **Multi-Family Gas Retrofit – Phase II.** This project supports a similar retrofit of an all-electric apartment multi-tenant building to natural gas forced air heating. In this second phase however, an identical building was recently upgraded from electric resistance heat to ductless mini-split heat pumps. This situation provides the opportunity for a case study directly comparing installed cost, operating cost, energy use, and tenant satisfaction between ductless mini-splits and natural gas heating. It is expected that a successful case study will capture the necessary data and information to evaluate the two competitive technologies under identical conditions and in identical building design and construction. One specific element of interest will be evaluating the performance of the heat pump system in real-world operation and whether there is significant performance degradation in our comparatively colder climate in comparison to a natural gas forced air system.

3. **Public CNG Station Investment.** Construction of a commercial public CNG station was completed during this Delta Fund project year. It is the first to offer public CNG fueling in the vicinity of Erie, Pennsylvania. In addition to serving commercial traffic across Interstate 90, the project is expected to ignite local fleet interest in converting diesel/gasoline vehicles to natural gas to capture the economic and environmental benefits. It is also expected to serve as critical backup fueling for existing fleets with private CNG fueling infrastructure, thus enhancing resiliency in the event of equipment failure. Support from National Fuel's Delta Fund program was a critical factory in the developer's decision to construct a public CNG fueling station at this location.

4. **CHP Preliminary Assessments.** National Fuel continues to implement an active prospecting initiative to identify candidates for CHP project development. Following pre-screening, formal preliminary feasibility assessments were conducted utilizing the services of qualified engineering firms with expertise in CHP technology and project development. Multiple assessments have been completed to date, with more slated as this technology has been targeted for account representative activity. One of the completed assessments has resulted in the customer contracting for detailed engineering and design to make a final determination on whether to move forward with implementation.

5. **Small-Scale LNG Production.** The goal of this project is to develop, test, and demonstrate a small-scale LNG liquefaction plant. If successful, the plant design would allow for cost-effective production of liquefied natural gas using distribution pipelines as the source. Once plant construction and testing is completed, the plant will be relocated and sited permanently at an existing CNG fueling station. The plant design itself is novel in that it would be coupled with existing CNG station equipment. This allows for cost reduction as existing CNG compressor capacity can augment that which would be required for LNG production. Also, existing compressors would see less idle time, as they would be used during off-peak hours for LNG production. The plant, as designed, is estimated to produce 6,000-20,000 LNG gallons per week. To this point, the initial prototype project location was identified and site preparation completed. All necessary permits have been acquired. Construction of the CNG trailer that will feed the LNG system is underway.

PROSPECTIVE LOCAL OPPORTUNITY PROJECTS – 2020

1. **Multi-Family Gas Retrofits – Phases 1 & 2.** Continuing on the work done in prior years, collection of data and information will continue for both Phase I and Phase II facilities. Such data and information shall permit performance analysis, both technical and financial, with the intent of providing comparative information that will inform other potential multi-family conversion opportunities throughout the service territory. Upon completion of data collection and analysis over a period of years, the resulting report will be utilized to educate customers and home builders with regard to the impact of differing equipment selection alternatives.

2. **Hotel Energy Technology Assessment.** Historically, the hotel/motel market has typically specified natural gas systems for common area within facilities and for process loads. However, space heating for individual rooms has generally been electric, despite the significant cost differential per equivalent unit of energy. Lack of knowledge related to natural gas equipment options and performance capabilities in comparison to alternatives is believed to be contributing to the historical under-representation. This project is proposed to develop a hotel building model with which varying alternative systems will be evaluated in multiple system simulations. Conclusions will be utilized to proactively educate and inform project developers and key specifiers regarding the impacts of differing system choices.

3. **Small-Scale LNG Production.** Continuing to build on the prior work toward the development, testing, and demonstration of a small-scale LNG liquefaction plant. Expected progress in FY2020 includes the fabrication of the prototype LNG production equipment with testing and assessment of the operating performance at a remote location. Final step in future years will be the placement of the equipment into commercial operation at a market location.

4. **CHP Feasibility Assessments.** In accordance with the PUC CHP Policy Statement and as an extension of previous initiatives in support of market development for CHP, National Fuel will continue to implement an active prospecting program to identify prospective candidates for siting of CHP technology. Following initial pre-screening activities, it is strongly anticipated that Delta funds will support formal technical and economic feasibility assessment studies for those projects that demonstrate initial attractive deployment opportunities. One of the projects receiving a preliminary assessment has engaged with an engineering company for a more detailed feasibility study, to which the Delta Fund will support with a modest financial contribution.

5. **CHP Incentive Program.** In accordance with the PUC CHP Policy Statement, National Fuel intends to institute an incentive program to promote the implementation of CHP projects in its service territory. Proposed at $100/KW (with project caps), an initial industrial laundry operation has been identified and is expected to pursue the necessary public and private funding for a potential 875 KW CHP project in FY2020. One additional prospect, a health care facility, is currently evaluating potential implementation of a 4 MW CHP facility in FY2020.

National Fuel intends to continue efforts to identify other beneficial Local Opportunity Projects for development which may provide direct benefit to our Pennsylvania consumers, businesses, and industries.