Ohio Local Government Innovation Fund

Collaborative Measures → Success Measures → Significance Measures → Financial Measures

Round 5: Application Form

Step One: Fill out this Application Form in its entirety.

Step Two: Fill out the online submission form and submit your application materials. All supplemental application materials should be combined into one file for submission.

LGIF: Applicant Profile

Lead Agency	North Central Ohio Educational Service Center
Project Name	CNG Conversion/Shared Fueling Station Study
Type of Request	Grant
Request Amount	$100,000.00
JobsOhio Region	Northwest
Number of Collaborative Partners (including lead agency)	10
Project Approach	Efficiency
Project Type	Fleet Management

Ohio Development Services Agency

Website: http://development.ohio.gov/cs/cs_localgovfund.htm

E-mail: LGIF@development.ohio.gov

Phone: 614 | 995 2292

Lead Applicant	North Central Ohio Educational Serv	Round 5	
Project Name	CNG Conversion/Shared Fueling Sta	Type of Request	Grant

Instructions
• Make sure to answer each question appropriately in the space provided, not exceeding the space allowed by the answer box.
• Examples of completed applications are available on the LGIF website, found here: http://development.ohio.gov/cs/cs_localgovfund.htm

Section 1

Contacts

Lead Agency		
Mailing Address:	Name: North Central Ohio Educational Service Center	
	Street Address: 928 West Market Street, Suite A	
	City: Tiffin	
	Zip: 44883	
In what county is the lead agency located? Seneca		
Ohio House District: 88	Ohio Senate District: 26	

Project Contact		
Please provide information about the individual who should be contacted regarding this application.		
Mailing Address:	Name: John Davoli	Title: Director
	Street Address: 928 West Market Street, Suite A	
	City: Tiffin	
	Zip: 44883	
Email Address: jdavoli@ncoesc.org		Phone Number: (419) 447-2927

Fiscal Agency:		
Please provide information for the entity and individual serving as the fiscal agent for the project.		
Mailing Address:	Fiscal Agency: North Central Ohio Educational Service Center	
	Fiscal Officer: Rhonda Feasel	Title: Treasurer
	Street Address: 928 West Market Street, Suite A	
	City: Tiffin	
	Zip: 44883	

Population		
Does the applicant (or collaborative partner) represent a city, township, or village with a population of less than 20,000 residents?	☑ Yes	☐ No
	List Entity	
	Tiffin, Ohio	
Does the applicant (or collaborative partner) represent a county with a population of less than 235,000 residents?	☑ Yes	☐ No
	List Entity	
	Seneca County, Ohio	

Single Applicant		
Is your organization applying as a single entity?	☐ Yes	☑ No

Lead Applicant	North Central Ohio Educational Serv	Round 5	
Project Name	CNG Conversion/Shared Fueling Sta	Type of Request	Grant

Collaborative Partners		
Does the proposal include collaborative partners?	✔ Yes	No

Applicants applying with collaborative partners are required to show proof of the partnership with a signed partnership agreement and a resolution of support from each of the partner's governing entities. If the collaborative partner does not have a governing entity, a letter of support from the partnering organization is sufficient. These documents must be received by the end of the cure period in order for each entity to count as a collaborative partner for the purposes of this application.

Nature of the Partnership

As agreed upon in the signed partnership agreement, please identify the nature of the partnership with an explanation of how the lead agency and collaborative partners will work toegether on the proposed project.

The Parties agree to participate in a feasibility study to use Local Government Innovation Fund (LGIF) dollars to analyze and chart the feasibility and potential of converting local government, school district fleets and several local businesses to a Natural Gas Vehicle (NGV) fleet. The study will also map out a “Shared Service” distribution network, reducing storage, transportation, and purchasing costs. It is agreed that the NCOESC shall bear the costs associated with the LGIF grant application, take responsibility for administering the grant award, and will coordinate data collection during the study.

Lead Applicant	North Central Ohio Educational Serv	Round 5	
Project Name	CNG Conversion/Shared Fueling Sta	Type of Request	Grant

List of Partners
Please use the following space to list each collaborative partner who is participating in the project and is providing BOTH a resolution of support for the Local Government Innovation Fund application and has signed the partnership agreement.

Collaborative Partner # 1	
Mailing Address:	Name: City of Tiffin
	Street Address: 51 East Market Street
	City: Tiffin
	Zip: 44883

Collaborative Partner # 2	
Mailing Address:	Name: Seneca County
	Street Address: 111 Madison Street
	City: Tiffin
	Zip: 44883

Collaborative Partner # 3	
Mailing Address:	Name: Tiffin City Schools
	Street Address: 244 South Monroe Street
	City: Tiffin
	Zip: 44883

Collaborative Partner # 4	
Mailing Address:	Name: Seneca East Local Schools
	Street Address: 13343 East US Hwy 224
	City: Attica
	Zip: 44807

Collaborative Partner # 5	
Mailing Address:	Name: Seneca County Agency Transportation (SCAT)
	Street Address: 3140 S St Rt 100, Suite F
	City: Tiffin
	Zip: 44883

Collaborative Partner # 6	
Mailing Address:	Name: North Central Academy (NCA)
	Street Address: 928 West Market Street, Suite B
	City: Tiffin
	Zip: 44883

Lead Applicant	North Central Ohio Educational Serv	Round 5	
Project Name	CNG Conversion/Shared Fueling Sta	Type of Request	Grant

Collaborative Partner # 7	
Mailing Address:	Name: Arnold Vending
	Street Address: 646 Miami Street
	City: Tiffin
	Zip: 44883

Collaborative Partner # 8	
Mailing Address:	Name: Seneca Medical, Inc
	Street Address: 85 Shaffer Park Drive
	City: Tiffin
	Zip: 44883

Collaborative Partner # 9	
Mailing Address:	Name: TPC Food Service
	Street Address: 265 Sixth Avenue
	City: Tiffin
	Zip: 44883

Collaborative Partner # 10	
Mailing Address:	Name:
	Street Address:
	City:
	Zip:

Collaborative Partner # 11	
Mailing Address:	Name:
	Street Address:
	City:
	Zip:

Collaborative Partner # 12	
Mailing Address:	Name:
	Street Address:
	City:
	Zip:

Collaborative Partner # 13	
Mailing Address:	Name:
	Street Address:
	City:
	Zip:

Lead Applicant	North Central Ohio Educational Serv	Round 5	
Project Name	CNG Conversion/Shared Fueling St	Type of Request	Grant

Project Information

Provide a general description of the project, including a description of the final work product derived from the grant study or loan implementation project. This information may be used for council briefings, program and marketing materials.

The North Central Educational Service Center (NCOESC), and its team of collaborative partners, proposes to use Local Government Innovation Fund (LGIF) dollars to analyze and chart the feasibility and potential of converting local government, school districts and business fleets to a Natural Gas Vehicle (NGV) fleet. The study will also map out a “Shared Service” distribution network, reducing storage, transportation, and purchasing costs. Natural gas powered vehicles are paving the way to significant savings over standard gasoline and diesel vehicles and allows more efficiency in terms of fuel standards and overall cost. The environmental impact will be base lined to determine current emissions of toxins compared to Natural Gas (NG) emissions.
The study will indicate NG conversion opportunities that each entity, and together in a partnership, has available separately and as a whole. The objective is to implement a renewable energy source to fuel government vehicles at a considerably cheaper fuel cost.
The average price of gasoline in 2010 and 2011 was $2.78 and $3.53 respectively and are projected to continue to rise. Because of advancement in drilling technologies, the reduction of cost for NG conversion technology, the US Department of Energy predicts NG to remain lower than gasoline and diesel. (DOE/EIA-0383 (2012) | June 2012)
As one of Ohio’s K-12 educational service centers, the NCOESC has proven experience in providing shared services that enhance operational efficiencies and cost reduction for member districts. The NCOESC is a scalable organization that is well positioned to encourage shared services among local governments and local school districts.

NCOESC services have proven scalable to various sized government agencies, and its organizational expertise is transferable. Other projects in Ohio and throughout the nation have shown NG systems can be shared across jurisdictional boundaries and scaled to meet the needs, functions and reporting requirements of several types of government entities including educational, city, county, and township.

The feasibility assessment will determine the best approaches to make eventual solutions scalable. After the initial phase of implementation, extensions of the NG infrastructure could be made available to other villages, townships, schools, community colleges, counties, other political subdivisions and other businesses.

Lead Applicant	North Central Ohio Educational Serv	Round 5	
Project Name	CNG Conversion/Shared Fueling Sta	Type of Request	Grant

Project Information		
Has this project been submitted for consideration in previous LGIF Rounds?	✔ Yes	No
If yes, in which Round(s)? Round 3		
What was the project name? Natural Gas Conversion/Shared Fueling Station Study		
What entity was the lead applicant? North Central Ohio Educational Service Center (NCOESC)		

Past Success

Provide a summary of past efforts to implement a project to improve efficiency, implement shared services, coproduction, or a merger (5 points).

In the recent past, the North Central Ohio ESC has successfully implemented projects that promote efficiencies and shared services among the school districts it serves. Among these projects are: shared IT networking, web-site posting, shared IT services, web-based learning management system, Individual Education Plan (IEP) records management system, administrative collaboration and network program, cooperative purchasing-technology office commodities, and bus driver services.

Applicant demonstrates Past Success	✔ Yes	No

Scalable

Provide a summary of how the applicant's proposal can be scaled for the inclusion of other entities (5 points).

The project requirements will focus on NG platform solutions that are scalable and pose the greatest prospect for efficiencies to assist local government, school districts and business fleets. Although five political subdivisions will serve as the collaborative partners for this initiative, the feasibility study is expected to result in mapping and business planning that will permit the expansion of this shared services approach to other political subdivisions and private businesses in the region.

Applicant demonstrates a Scalable project	✔ Yes	No

Lead Applicant	North Central Ohio Educational Serv	Round 5	
Project Name	CNG Conversion/Shared Fueling Sta	Type of Request	Grant

Replicable

Provide a summary of how the applicant's proposal can be replicated by other entities. A replicable project should include a component that another entity could use as a tool to implement a similar project (5 points).

The initial partners are also charter members of the North Central Ohio Regional Council of Governments (NCORcog) that will ultimately serve a multi-county area. While not the lead applicant for this grant, NCORcog will ultimately serve as a valuable mechanism for recruiting additional regional partners for this solution. This COG partnership is a replicated process studied and implemented by other entities around Ohio and the country. The conversion and shared fueling station plan will be a readily available tool for other public-private endeavors.

Applicant demonstrates a Replicable project ☑ Yes ☐ No

Probability of Success

Provide a summary of the likelihood of the grant study recommendations being implemented. Applicants requesting an implementation loan should provide a summary of the probability of savings from the loan request (5 points).

As a classic shared service provider, NCOESC is the logical entity to take the lead on this project. The organization has developed a successful track record in providing vital services to political subdivisions. NCOESC organizational expertise will be essential in identifying the capacities of the partner entities, and how NG conversion will be beneficial to our partners.

The City of Tiffin has publicly declared it's strong interest in fleet management moving to NG fuels after looking at entities around the state such as Central Ohio Transit Authority are switching their fleet of 310 buses to CNG over the next 13 years to capitalize on a cleaner and cheaper fuel.

To increase the chances of success, NCOESC will contract Public Performance Partners (P3), an experienced
501(c) 3 non-profit consulting entity, to conduct the feasibility study and serve as project manager. P3 is a non-profit organization that brings together subject matter experts to help counties, cities, townships, school districts or institutions of higher learning plan and execute cost-saving strategies and continue to provide valuable public service. P3 also will engage an experienced, Ohio-based energy service company (ESCO) as a subject matter expert in NG technology and systems expertise.

Applicant demonstrates Probability of Success ☑ Yes ☐ No

Lead Applicant	North Central Ohio Educational Serv	Round 5	
Project Name	CNG Conversion/Shared Fueling St	Type of Request	Grant

Performance Audit/Cost Benchmarking

If the project is the result of recommendations from a prior performance audit provided by the Auditor of State under Chapter 117 of the Ohio Revised Code, or is informed by a previous cost benchmarking study, please attach a copy with the supporting documents. In the section below, provide a summary of the performance audit findings or cost bench marking study results (5 points).

N/A

Prior Performance Audit or Cost Benchmarking ☐ Yes ☑ No

Economic Impact

Provide a summary of how the proposal will promote a business environment through a private sector parter (5 points) and/or provide for community attraction (3 points).

As private businesses become increasingly cost aware, the parties know there must be more sophistication in government provided services in order for a geographic area to remain enticing to small businesses and larger companies. By introducing a new and alternative energy source the county and region become more attractive to the business community. Public entities, which are more efficient and approachable, are more likely to develop public-private partnerships, and offer additional services, programs and funding for the community. Rural and small-town areas such as Seneca County must compete with larger urban areas. A local region where entities are working collaboratively, and where NG infrastructure is efficient and up-to-date, will increase its attractiveness to business.

Private businesses such as Arnold Vending, Seneca Medical, Inc., and TPC Food Service have stated interest (See Attachment K) in converting their fleets to NG fuels and using the fueling station.

Community attraction will occur if local governments are spending money wisely, and allowing government services to become more accessible to businesses as well as all residents of the municipalities.

Applicant demonstrates Economic Impact ☑ Yes ☐ No

Lead Applicant	North Central Ohio Educational Serv	Round 5	
Project Name	CNG Conversion/Shared Fueling Sta	Type of Request	Grant

Response to Economic Demand
Provide a summary of how the project responds to substantial changes in economic demand for local or regional government services. The narrative should include a description of the current and future expected servce level needs (5 points).
The way local governments work is changing. A more dynamic fuel market is causing even local jurisdictions such as educational institutions (schools/colleges) and county, city, village and township governments to be more adaptable. Taxpayers, including residents and businesses, also are becoming more aware of the benefits of NG and are seeking more accessible and efficient government services based on a cheaper fuel source. Innovative strategies will be key to responding to the diminishing revenue environment in Ohio. The Tiffin/Seneca County/north-central Ohio area faces some of the tightest budget constraints in decades. In addition to declines in local tax revenue due to the recent recession, HB 153 reduces funding through the State and Local Government Fund to local governments by 50% in fiscal year 2013, and in 2013 the sunset of estate tax revenue creates motivation to seek greater efficiencies to protect vital public services.
Applicant demonstrates Response to Economic Demand ☑ Yes ☐ No

Section 3 Project Information

Budget Information

General Instructions

• Both the Project Budget and Program Budgets are required to be filled out in this form.

•Consolidate budget information to fit in the form. Additional budget detail may be provided in the budget narrative or in an attachment

Project Budget:

- The Project Budget should detail expenses related to the grant or loan project.
- The Project Budget justification must be explained in the Project Budget Narrative section of the application. This section is also used to explain the reasoning behind any items on the budget that are not self explanatory, and provide additonal detail about project expenses.
- The Project Budget should be for the period that covers the entire project. The look-back period for in-kind contributions is two years. These contributions are considered a part of the total project costs.
- For the Project Budget, indicate which entity and revenue source will be used to fund each expense. This information will be used to help determine eligible project expenses.
- Total Sources must equal Total Uses. Include staff time and other in-kind matches in the Total Uses section of the budget.

Program Budget

- Use the Program Budget to outline the costs associated with the implementation of the program in your community.
- Six (6) years of Program Budgets should be provided. The standard submission should include three years previous budgets (actual), and three years of projections including implementation of the proposed project. A second set of three years of projections (one set including implementation of this program, and one set where no shared services occurred) may be provided in lieu of three years previous if this does not apply to the proposed project.
- Please use the Program Budget Narrative section to explain changes in expenses and revenues, and to defend the budget projections. If the budget requires the combining of costs on the budget template, please explain this in the narrative.

Return on Investment:

- A Return on Investment calculation is required, and should reference cost savings, cost avoidance and/or increased revenues indicated in Program Budget sections of the application. Use the space designated for narrative to justify this calculation, using references when appropriate.

For Loan Applications only:

- Using the space provided, outline a loan repayment structure.
- Attach three years prior financial documents related to the financial health of the lead applicant (balance sheet, income statement and a statement of cash flows).

Lead Applicant	North Central Ohio Educatio	Round 5	
Project Name	CNG Conversion/Shared Fu	Type of Request	Grant

Project Budget

Use this space to outline all sources of funds and the uses of those funds. Both sections should include all funds related to the project, including in-kind match contributions. Use the project budget narrative on the next page to justify the project budget, and indicate the line items for which the grant will be used.

Sources of Funds

LGIF Request:		$100,000
Cash Match (List Sources Below):		
Source:		
Source:		
Source:		
Source:		
In-Kind Match (List Sources Below):		
Source:	Hugh Quill/Public Performan	$7,140
Source:	NCOESC	$7,115
Source:	Other Collaborative Partners	$18,538
Total Match:		$32,793
Total Sources:		$132,793

Uses of Funds

	Amount	Revenue Source
Consultant Fees:	$60,000	Grant
Legal Fees:	$10,000	Grant
Other: Project Manageme	$12,000	Grant
Other: Grant Administratic	$18,000	Grant
Other: Public Performance	$7,140	In-kind
Other: NCOESC Staff Tim	$7,115	In-kind
Other: Other Collaborative	$18,538	In-kind
Other:		
Other:		
Other:		
Total Uses:	$132,793	
Local Match Percentage:	25%	

* Please note that this match percentage will be included in your grant/loan agreement and cannot be changed after awards are made.

Local Match Percentage = (Match Amount/Project Cost) * 100 (10% match required)

✔ 10-39.99% (1 point) ☐ 40-69.99% (3 points) ☐ 70% or greater (5 points)

Section 4 Financial Information

Lead Applicant	North Central Ohio Educatio	Round 5	
Project Name	CNG Conversion/Shared Fu	Type of Request	Grant

Project Budget Narrative: Use this space to justify any expenses that are not self-explanatory.

The consultant will perform three analyses in preparing the feasibility study. First they will analyze the cost benefit of constructing a natural gas fueling station. The second analysis will consider the cost benefit of converting the partners' fleet. The final analysis will consider the leverage of shared natural gas purchasing power. NCOESC will provide grant administration services; assist with data collection, interviews and coordination. A Project Manager will be hired to oversee the entire project to make sure all objectives are met and performed effectively.

Lead Applicant	North Central Ohio Educational S	Round 5	
Project Name	CNG Conversion/Shared Fueling	Type of Request	Grant

Program Budget

Actual ✔ Projected	FY 2010	FY 2011	FY 2012
Expenses	**Total Program Expenses**	**Total Program Expenses**	**Total Program Expenses**
Salary and Benefits			
Contract Services	$321,304	$329,976	$386,183
Occupancy (rent, utilities, maintenance)			
Training & Professional Development			
Insurance			
Travel			
Capital & Equipment Expenses			
Supplies, Printing, Copying & Postage	$881,872	$1,027,650	$1,344,829
Evaluation			
Marketing			
Conferences, meetings, etc.			
Administration			
*Other -			
*Other -			
*Other -			
TOTAL EXPENSES	$1,203,176	$1,357,626	$1,731,012
	Revenues	**Revenues**	**Revenues**
Contributions, Gifts, Grants, & Earned Revenue			
Local Government: Seneca County	$112,047	$109,524	$128,061
Local Government: City of Tiffin	$212,887	$226,324	$271,333
Local Government: Seneca County Gas Tax	$412,507	$505,762	$669,169
State Government			
Federal Government			
*Other -		$4,460	$15,920
Other - Tiffin City Schools	$164,593	$194,492	$202,587
Other - Seneca East Schools	$148,172	$126,716	$207,098
Membership Income			
Program Service Fees	$152,970	$190,348	$236,844
Investment Income			
TOTAL REVENUES	$1,203,176	$1,357,626	$1,731,012

Lead Applicant	North Central Ohio Educational S	Round 5	
Project Name	CNG Conversion/Shared Fueling	Type of Request	Grant

Program Budget

Actual ☐ Projected ✔	FY 2013	FY 2014	FY 2015
Expenses	**Total Program Expenses**	**Total Program Expenses**	**Total Program Expenses**
Salary and Benefits			
Contract Services	$321,391	$348,110	$352,435
Occupancy (rent, utilities, maintenance)			
Training & Professional Development			
Insurance			
Travel			
Capital & Equipment Expenses			
Supplies, Printing, Copying & Postage	$542,759	$623,272	$643,469
Evaluation			
Marketing			
Conferences, meetings, etc.			
Administration			
*Other -			
*Other -			
*Other -			
TOTAL EXPENSES	$864,150	$971,382	$995,904
	Revenues	**Revenues**	**Revenues**
Contributions, Gifts, Grants, & Earned Revenue			
Local Government: Seneca County	$96,652	$110,211	$106,090
Local Government: City of Tiffin	$172,353	$190,423	$188,710
Local Government: Seneca County Gas Tax	$301,024	$351,044	$368,150
State Government			
Federal Government			
**Other -*	$13,134	$14,447	$15,892
**Other -* Tiffin City Schools	$100,731	$105,191	$106,533
**Other -* Seneca East Schools	$58,546	$59,737	$58,615
Membership Income			
Program Service Fees	$121,710	$140,329	$151,914
Investment Income			
TOTAL REVENUES	$864,150	$971,382	$995,904

Lead Applicant	North Central Ohio Educational S	Round 5	
Project Name	CNG Conversion/Shared Fueling	Type of Request	Grant

Program Budget

Use this space to justify your program budget and/or explain any assumptions used for the budget projections. These projections should be based on research, case studies, or industry standards and include a thoughtful justification.

As the cost per gallon of gas/diesel has increased annually this logically translates to higher costs for entities that are dependent on transportation as part of their function. Expenses for school buses, police and sheriff cars are a large burden on budgets of school districts, cities and counties. By reducing fuel and maintenance costs significantly to these vehicles, by making them more efficient, the entities will be able to show their constituents that they are trying to be fiscally responsible with their tax money. The feasibility study will measure up front conversion costs against expected vehicle longevity to determine eligible fleet candidates for this program. The program budget is the cost of fuel that the partners consume yearly. The projected budget is the savings realized from the GGE (gallon gas equivalent) cost of natural gas which is currently averaged at $1.30 from the cost of diesel/regular gas at $3.88. Shown in The Hamilton Projects June 2012 study "Leveling The Playing Field for Natural Gas in Transportation (Attachment G)", the price of diesel and gasoline is increasingly volatile while natural gas is domestically abundant and steady.

Section 4: Financial Information Scoring

- [x] (5 points) Applicant provided complete and accurate budget information and narrative justification for a total of six fiscal years.
- [ ] (3 points) Applicant provided complete and accurate budget information and for at least three fiscal years.
- [ ] (1 point) Applicant provided complete and accurate budget information for less than three fiscal years.

Lead Applicant	North Central Ohio Educational Service Cent	Round 5	
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Return On Investment

Return on Investment is a performance measure used to evaluate the efficiency of an investment. To derive the expected return on investment, divide the net gains of the project by the net costs. For these calculations, please use the implementation gains and costs, NOT the project costs (the cost of the feasibility, planning, or management study)--unless the results of this study will lead to direct savings without additional implementation costs. The gains from this project should be derived from the prior and future program budgets provided, and should be justified in the return on investment narrative.

Return on Investment Formulas:

Consider the following questions when determining the appropriate ROI formula for your project. Check the box of the formula that you are using to determine your ROI. These numbers should refer to savings/revenues illustrated in projected budgets.

Do you expect cost savings from efficiency from your project?

(●) Use this formula: $\frac{\text{Total \$ Saved}}{\text{Total Program Costs}}$ * 100 = ROI

Do you expect cost avoidance from the implementation of your project/program?

( ) Use this formula: $\frac{\text{Total Cost Avoided}}{\text{Total Program Costs}}$ * 100 = ROI

Do you expect increased revenues as a result of your project/program?

( ) Use this formula: $\frac{\text{Total New Revenue}}{\text{Total Program Costs}}$ * 100 = ROI

Do you expect some combination of savings, cost avoidance, or increased revenue as a result of your project/program? (Total Gains combines $ Saved, Costs Avoided, and New Revenue)

( ) Use this formula: $\frac{\text{Total Gains}}{\text{Total Program Costs}}$ * 100 = ROI

Expected Return on Investment = $\frac{\$3,409,223}{\$6,240,658}$ * 100 = 55%

Expected Return on Investment is:

[ ] Less than 25% (10 points)	[✔] 25%-75% (20 points)	[ ] Greater than 75% (30 points)

Questions about how to calculate ROI? Please contact the Office of Redevelopment at 614-995-2292 or lgif@development.ohio.gov

Section 4

Financial Information

Lead Applicant	North Central Ohio Educational Service Cent	Round 5	
Project Name	CNG Conversion/Shared Fueling Station Stu	Type of Request	Grant

Return on Investment Justification Narrative: In the space below, describe the nature of the expected return on investment, providing justification for the numbers presented in the ROI calculation. This calculation should be based on the savings, cost avoidance, or increased revenues shown in the program budgets on the preceeding pages. Use references when appropriate to justify assumptions used for cost projections.

We anticipated for our partners to save at least 40-60% on their fuel purchases based on current market trends. With uncertainty in the Middle East, demand around the world, and a host of market factors including the hedging of commodity prices gasoline and diesel prices have been forecasted by most economist to continually rise. NG is predicted by most analyst to maintain its low cost for a long duration.

The partners feel that with the accessibility of multiple high pressure gas lines and logically placed fueling stations, they could realize a significant and continually increased savings based off of real time fuel prices. Many government organizations have realized the benefits of fuel switching. Government entities throughout the United States have implemented NG vehicles for their fleets and are seeing significant savings.

There are opportunities for savings beyond fuel purchasing consolidation. The additional benefits of consolidation can include increased simplicity of maintenance, duel fuel technology, a reduced environmental impact, and the potential for consolidated shared servicing of fleets.
The feasibility assessment will mine the current investments and identify those areas where a Return on Investment (ROI) exists.

The return on investment has been determined from research conducted by the U.S. Department of Energy's National Renewable Energy Laboratory study, "Business Case for Compressed Natural Gas in Municipal Fleets Technical Report NREL/TP-7A2-47919 June 2010 (Attachment H)", and the National Energy Policy Institute's study, "What Set of Conditions Would Make the Business Case to Convert Heavy Trucks to Natural Gas May 2012 (Attachment J)". These studies show the percentage reduction in costs yet they do not show the infrastructure implementation necessary. They also do not provide specific information on the partners fleets for conversion, which is what our feasibility study will discover.

Lead Applicant	North Central Ohio Educational Service Ce	Round 5	
Project Name	CNG Conversion/Shared Fueling Station S	Type of Request	Grant

Loan Repayment Structure

Please outline your preferred loan repayment structure. At a minimum, please include the following: the entities responsible for repayment of the loan, all parties responsible for providing match amounts and an alternative funding source (in lieu of collateral). Applicants will have two years to complete their project upon execution of the loan agreement, and the repayment period will begin upon the final disbursement of the loan funds. A description of expected savings over the term of the loan may be used as a repayment source.

N/A

Applicant demonstrates a viable repayment source to support loan award. Secondary source can be in the form of a debt reserve, bank participation, a guarantee from a local entity, or other collateral (i.e. emergency, rainy day, or contingency fund, etc).

☐	Applicant clearly demonstrates a secondary repayment source (5 points)	✔	Applicant does not have a secondary repayment source (0 points)

Lead Applicant	North Central Ohio Educational Service Center	Round 5	
Project Name	CNG Conversion/Shared Fueling Station Study	Type of Request	Grant

Scoring Overview

Collaborative Measures	Description	Max Points		Applicant Self Score
Section 1: Collaborative Measures				
Population	Applicant's population (or the population of the area(s) served) falls within one of the listed categories as determined by the U.S. Census Bureau. Population scoring will be determined by the **smallest** population listed in the application. Applications from (or collaborating with) small communities are preferred.	5		5
Participating Entities	Applicant has executed partnership agreements outlining all collaborative partners and participation agreements and has resolutions of support. (Note: Sole applicants only need to provide a resolution of support from its governing entity.	5		5
Section 2: Success Measures				
Past Success	Applicant has successfully implemented, or is following project guidance from a shared services model, for an efficiency, shared service, coproduction or merger project in the past.	5		5
Scalable	Applicant's proposal can be scaled for the inclusion of other entities.	5		5
Replicable	Applicant's proposal can be replicated by other local governments.	5		5
Probability of Success	Applicant provides a documented need for the project and clearly outlines the likelihood of the need being met.	5		5
Section 3: Significance Measures				
Performance Audit Implementation/Cost Benchmarking	The project implements a single recommendation from a performance audit provided by the Auditor of State under Chapter 117 of the Ohio Revised Code or is informed by cost benchmarking.	5		0
Economic Impact	Applicant demonstrates the project will promote a business environment (i.e., demonstrates a business relationship resulting from the project) and will provide for community attraction (i.e., cost avoidance with respect to taxes).	5		5
Response to Economic Demand	The project responds to current substantial changes in economic demand for local or regional government services.	5		5
Section 4: Financial Measures				
Financial Information	Applicant includes financial information (i.e., service related operating budgets) for the most recent three years and the three year period following the project. The financial information must be directly related to the scope of the project and will be used as the cost basis for determining any savings resulting from the project.	5		5
Local Match	Percentage of local matching funds being contributed to the project. This may include in-kind contributions.	5		1
Expected Return	Applicant demonstrates as a percentage of savings (i.e., actual savings, increased revenue, or cost avoidance) an expected return. The return must be derived from the applicant's cost basis.	30		20
Repayment Structure (Loan Only)	Applicant demonstrates a viable repayment source to support loan award. Secondary source can be in the form of a debt reserve, bank participation, a guarantee from a local entity, or other collateral (i.e., emergency fund, rainy day fund, contingency fund, etc.).	5		0
			Total Points	66

North Central Ohio
Educational Service Center

Tiffin Campus
928 W. Market Street - Suite A
Tiffin, Ohio 44883
419-447-2927
419-447-2825 Fax

Mansfield Campus
State Support Team Region 7
1495 West Longview Ave. - Suite 200
Mansfield, Ohio 44906
419-747-4808

Marion Campus
333 East Center Street
Marion, Ohio 43302
740-387-6625
740-383-4804 Fax

ATTACHMENTS FOR CNG CONVERSION/SHARED FUELING STATION STUDY

A. 1-10 RESOLUTIONS

B. 1-4 LETTER OF INTENT

C. 1-3 MEMORANDUM OF UNDERSTANDING

D. 1-8 CENSUS DATA

E. 1-13 PROJECT AND PROGRAM BUDGETS

F. 1-2 ESTIMATED FUTURE DATA COLLECTION HOURS

G. 1-28 "LEVELING THE PLAYING FIELD FOR NATURAL GAS IN TRANSPORTATION" STUDY

H. 1-40 "BUSINESS CASE FOR COMPRESSED NATURAL GAS IN MUNICIPAL FLEETS" STUDY

I. US ENERGY INFORMATION ADMINISTRATION DATA

J. 1-56 "WHAT SET OF CONDITIONS WOULD MAKE THE BUSINESS CASE TO CONVERT HEAVY TRUCK TO NATURAL GAS? – A CASE STUDY"

K. 1-3 NEW COLLABORATIVE BUSINESS PARTNERS

L. 1-2 RESUBMITTED RESOLUTION (TWO NEW COMMISSIONERS) AND RESUBMITTED LETTER (NEW DIRECTOR OF SCAT)

Dr. Jim Lahoski, Superintendent • Mrs. Rhonda Feasel, Treasurer
Mr. Terry Conley, Deputy Superintendent • Mrs. Brenda Luhring, Deputy Superintendent

Attachment A-1

RESOLUTION NO. NCO-12-48

A RESOLUTION OF SUPPORT APPROVING AND AUTHORIZING THE NORTH CENTRAL OHIO EDUCATIONAL SERVICE CENTER TO PARTICIPATE IN AN APPLICATION FOR A LOCAL GOVERNMENT INNOVATION FUND GRANT THROUGH THE STATE OF OHIO FOR A NATURAL GAS CONVERSION/SHARED FUELING STATION STUDY

WHEREAS, the Board of Governors of the North Central Ohio Educational Service Center ("NCOESC") has expressed an interest in collaboratively partnering with other Ohio municipalities, townships, school districts and counties in order to participate as an applicant for a Local Government Innovation Fund Grant (the "LGIF Grant") through the State of Ohio, with the North Central Ohio Educational Service Center being the main applicant;

WHEREAS, the NCOESC believes that it is in its best interest to join the application for the LGIF Grant.

NOW, THEREFORE, BE IT RESOLVED by the Board of Governors of the North Central Ohio Educational Service Center of Tiffin, Ohio, that:

Section 1. It is in the best interests of the Board of Governors of the North Central Ohio Educational Service Center for it, to authorize and approve the NCOESC to join the application for the LGIF Grant.

Section 2. The Board of Governors of the North Central Ohio Educational Service Center hereby authorizes and approves the Council to join the application for the LGIF Grant and hereby promises to provide the resources necessary for the Board of Governors of the North Central Ohio Educational Service Center to join the LGIF Grant.

Section 3. The Board of Governors of the North Central Ohio Educational Service Center hereby authorizes and approves the superintendent of the NCOESC to join the LGIF Grant as a collaborative partner and an applicant by executing that certain Letter of Intent substantially in the form as attached to this Resolution.

Section 4. The Board of Governors of the North Central Ohio Educational Service Center hereby authorizes and approves the superintendent of the NCOESC to join the LGIF Grant as a collaborative partner and an applicant by executing and entering into that certain Memorandum of Understanding between the partners substantially in the form as attached to this Resolution.

Section 5. This Board of Governors finds and determines that all formal actions of the NCOESC Board of Governors and any of its committees concerning and relating to the adoption of this resolution, and that all deliberations of this Board of Governors or any of its committees that resulted in those formal actions, occurred in meetings open to the public in compliance with the laws of the State.

Passed: August 21, 2012

Superintendent

Treasurer

Approved

Attachment A-2

RESOLUTION NO. 12-38

INTRODUCED BY: _____ **DATE:** 8/6/12

RESOLUTION OF SUPPORT APPROVING AND AUTHORIZING THE CITY OF TIFFIN, OHIO TO PARTICIPATE IN AN APPLICATION FOR A LOCAL GOVERNMENT INNOVATION FUND GRANT THROUGH THE STATE OF OHIO FOR A NATURAL GAS CONVERSION/SHARED FUELING STATION STUDY, AND DECLARING AN EMERGENCY.

WHEREAS, the City Council of Tiffin, Ohio has expressed an interest in collaboratively partnering with other Ohio municipalities, townships, school districts and counties in order to participate as an applicant for a Local Government Innovation Fund Grant (the "LGIF Grant") for a natural gas conversion/shared feeling station study through the State of Ohio, with the North Central Ohio Educational Service Center ("NCOESC") being the main applicant and conducting a Natural Gas Conversion/Shared Fueling Station Study; and

WHEREAS, the City Council of the City of Tiffin, Ohio believes that it is in its best interest to join the application for the LGIF Grant.

THE COUNCIL OF THE CITY OF TIFFIN, OHIO THEREFORE RESOLVES:

Section 1: It is in the best interests of the City Council to authorize and approve the City of Tiffin to join the application for the LGIF Grant described above.

Section 2: The City Council hereby authorizes and approves the Council to join the application for the LGIF Grant and hereby promises to provide the resources necessary for City Council to join the LGIF Grant.

Section 3: The City Council hereby authorizes and approves the Mayor of the City of Tiffin to join the LGIF Grant as a collaborative partner and an applicant by executing a Letter of Intent.

Section 4: This City Council hereby authorizes and approves of the City to join the LGIF Grant as a collaborative partner and an applicant by executing and entering into a Memorandum of Understanding between the partners.

Section 5: This City Council finds and determines that all formal actions of this City Council and any of its committees concerning and relating to the adoption of this resolution, and that all deliberations of this City Council or any of its committees that

resulted in those formal actions, occurred in meetings open to the public in compliance with the laws of the State.

Section 6: Council declares this to be an emergency because the public peace, health, welfare and safety require this Resolution take effect at the earliest time allowed by Sec. 4.07(A), Tiffin Charter, and reason being: Grant funds, received at no cost to the City, may give the City money, to save tax dollars using a natural gas conversion/shared fueling station study.

Authenticated:

Paul L Eckert Jr and Ann E Forrest

President of Council — Clerk of Council

Aug 20 2012 — Aug. 20, 2012

Date — Date

Approved by:

Mayor — August 20, 2012

Date

Effective date: 8/20/2012

12-38.res

STATE OF OHIO
City of Tiffin)
Seneca County) ss
I, Ann E. Forrest, Clerk of Tiffin City Council
Certify that the following is a true & accurate copy
of Resolution 12-38 adopted by Council on the 20th day
August, 2012. IN WITNESS WHEREOF, I have
Subscribed my name & affixed my seal this 20th day of
August, 2012.

Ann E. Forrest

Ann E. Forrest, Clerk of Tiffin City Council

A RESOLUTION OF SUPPORT APPROVING AND AUTHORIZING THE SENECA EAST LOCAL SCHOOL DISTRICT TO PARTICIPATE IN AN APPLICATION FOR A LOCAL GOVERNMENT INNOVATION FUND GRANT THROUGH THE STATE OF OHIO FOR A NATURAL GAS CONVERSION/SHARED FUELING STATION STUDY

WHEREAS, the Seneca East Board of Education of Attica, Ohio (the "Board") has expressed an interest in collaboratively partnering with other Ohio municipalities, townships, school districts and counties in order to participate as an applicant for a Local Government Innovation Fund Grant (the "LGIF Grant") through the State of Ohio, with the North Central Ohio Educational Service Center ("NCOESC") being the main applicant;

WHEREAS, the Board believes that it is in its best interest to join the application for the LGIF Grant.

NOW, THEREFORE, BE IT RESOLVED by the Seneca East Board of Education of Attica, Ohio, that:

Section 1. It is in the best interests of the Seneca East Local School District for it to authorize and approve the district to join the application for the LGIF Grant.

Section 2. The Board hereby authorizes and approves the Council to join the application for the LGIF Grant and hereby agrees that NCOESC will provide the resources necessary for the Board to join the LGIF Grant.

Section 3. The Board hereby authorizes and approves a certified officer of the school district to join the LGIF Grant as a collaborative partner and an applicant by executing that certain Letter of Intent substantially in the form as attached to this Resolution.

Section 4. The Board hereby authorizes and approves a certified officer of the school district to join the LGIF Grant as a collaborative partner and an applicant by executing and entering into that certain Memorandum of Understanding between the partners substantially in the form as attached to this Resolution.

Section 5. This Council finds and determines that all formal actions of this Council and any of its committees concerning and relating to the adoption of this resolution, and that all deliberations of this Council or any of its committees that resulted in those formal actions, occurred in meetings open to the public in compliance with the laws of the State.

Passed: August 27, 2012

[Board President]

[Treasurer]

Attachment A-5

RESOLUTION NO. 13-03

A RESOLUTION OF SUPPORT APPROVING AND AUTHORIZING THE SENECA COUNTY AGENCY TRANSPORTATION ("SCAT") TO PARTICIPATE IN AN APPLICATION FOR A LOCAL GOVERNMENT INNOVATION FUND GRANT THROUGH THE STATE OF OHIO FOR A NATURAL GAS CONVERSION/SHARED FUELING STATION STUDY

WHEREAS, the Board of SCAT of Seneca County, Ohio has expressed an interest in collaboratively partnering with other Ohio municipalities, school districts and counties in order to participate as an applicant for a Local Government Innovation Fund Grant (the "LGIF Grant") through the State of Ohio, with the North Central Ohio Educational Service Center ("NCOESC") being the main applicant;

WHEREAS, SCAT believes that it is in its best interest to join the application for the LGIF Grant.

NOW, THEREFORE, BE IT RESOLVED by the Board of SCAT of Seneca, Ohio, that:

Section 1. It is in the best interests of SCAT for it, to authorize and approve SCAT to join the application for the LGIF Grant.

Section 2. SCAT hereby authorizes and approves SCAT to join the application for the LGIF Grant and hereby agrees that NCOESC will provide the resources necessary for SCAT to join the LGIF Grant.

Section 3. SCAT hereby authorizes and approves a certified officer of SCAT to join the LGIF Grant as a collaborative partner and an applicant by executing that certain Letter of Intent substantially in the form as attached to this Resolution.

Section 4. SCAT hereby authorizes and approves a certified officer of SCAT to join the LGIF Grant as a collaborative partner and an applicant by executing and entering into that certain Memorandum of Understanding between the partners substantially in the form as attached to this Resolution.

Section 5. This Council finds and determines that all formal actions of this Council and any of its committees concerning and relating to the adoption of this resolution, and that all deliberations of this Council or any of its committees that resulted in those formal actions, occurred in meetings open to the public in compliance with the laws of the State.

Passed: August 21, 2012

Linda S. Hood, Exec. Dir
[Executive Director]

Denesit M Manning Board Pres.
[Board Chair]

Attachment A-6

RESOLUTION NO. Vol 88 516 & 517

A RESOLUTION OF SUPPORT APPROVING AND AUTHORIZING THE SENECA COUNTY COMMISSIONERS TO PARTICIPATE IN AN APPLICATION FOR A LOCAL GOVERNMENT INNOVATION FUND GRANT THROUGH THE STATE OF OHIO FOR A NATURAL GAS CONVERSION/SHARED FUELING STATION STUDY

WHEREAS, the Seneca County Board of Commissioners, of Seneca County, Ohio has expressed an interest in collaboratively partnering with other Ohio municipalities, townships, school districts and counties in order to participate as an applicant for a Local Government Innovation Fund Grant (the "LGIF Grant") through the State of Ohio, with the North Central Ohio Educational Service Center ("NCOESC") being the main applicant;

WHEREAS, the this Board believes that it is in its best interest to join the application for the LGIF Grant.

NOW, THEREFORE, BE IT RESOLVED by the Seneca County Board of Commissioners of Seneca County, Ohio, that:

Section 1. It is in the best interests of the Seneca County Board of Commissioners for it, to authorize and approve to join the application for the LGIF Grant.

Section 2. The Seneca County Board of Commissioners hereby authorizes and approves the Council to join the application for the LGIF Grant and hereby promises to provide the resources necessary for Seneca County Board of Commissioners to join the LGIF Grant.

Section 3. The Seneca County Board of Commissioners hereby authorizes and approves a certified officer of the Board of Commissioners to join the LGIF Grant as a collaborative partner and an applicant by executing that certain Letter of Intent substantially in the form as attached to this Resolution.

Section 4. The Seneca County Board of Commissioners hereby authorizes and approves a certified officer of the Board of Commissioners to join the LGIF Grant as a collaborative partner and an applicant by executing and entering into that certain Memorandum of Understanding between the partners substantially in the form as attached to this Resolution.

Section 5. This Seneca County Board of Commissioners finds and determines that all formal actions of this [Seneca County Board of Commissioners and any of its committees concerning and relating to the adoption of this resolution, and that all deliberations of this Seneca County Board of Commissioners or any of its committees that resulted in those formal actions, occurred in meetings open to the public in compliance with the laws of the State.

Passed: August 14, 2012

Benjamin E. Nutter

Jeffrey D. Wagner

David G. Sauber yes

I, [illegible] Clerk of the [illegible] County Commissioners [illegible] Ohio, do hereby certify that the foregoing is a true and correct copy of the [illegible] adopted by the Board of County Commissioners as recorded in Journal No. 88 Page 514-515

Nicole Smith
Recording Clerk, Board of County Commissioners
Seneca County, Ohio

Attachment A-8

RESOLUTION NO. 12-160

A RESOLUTION OF SUPPORT APPROVING AND AUTHORIZING THE TIFFIN CITY SCHOOLS TO PARTICIPATE IN AN APPLICATION FOR A LOCAL GOVERNMENT INNOVATION FUND GRANT THROUGH THE STATE OF OHIO FOR A NATURAL GAS CONVERSION/SHARED FUELING STATION STUDY

WHEREAS, the Board of Education for Tiffin City Schools of Tiffin, Ohio has expressed an interest in collaboratively partnering with other Ohio municipalities, townships, school districts and counties in order to participate as an applicant for a Local Government Innovation Fund Grant (the "LGIF Grant") through the State of Ohio, with the North Central Ohio Educational Service Center ("NCOESC") being the main applicant;

WHEREAS, the Tiffin City Schools believes that it is in its best interest to join the application for the LGIF Grant.

NOW, THEREFORE, BE IT RESOLVED by the Board of Education for Tiffin City Schools of Tiffin, Ohio, that:

Section 1. It is in the best interests of the Board of Education for Tiffin City Schools for it to authorize and approve the Tiffin City Schools to join the application for the LGIF Grant.

Section 2. The Board of Education for Tiffin City Schools hereby authorizes and approves the Council to join the application for the LGIF Grant and hereby agrees that NCOESC will provide the resources necessary for the Board of Education for Tiffin City Schools to join the LGIF Grant.

Section 3. The Board of Education for Tiffin City Schools hereby authorizes and approves a certified officer of the Tiffin City Schools to join the LGIF Grant as a collaborative partner and an applicant by executing that certain Letter of Intent substantially in the form as attached to this Resolution.

Section 4. The Board of Education for Tiffin City Schools hereby authorizes and approves a certified officer of the Tiffin City Schools to join the LGIF Grant as a collaborative partner and an applicant by executing and entering into that certain Memorandum of Understanding between the partners substantially in the form as attached to this Resolution.

Section 5. This Council finds and determines that all formal actions of this Council and any of its committees concerning and relating to the adoption of this resolution, and that all deliberations of this Council or any of its committees that resulted in those formal actions, occurred in meetings open to the public in compliance with the laws of the State.

Passed: August 28, 2012

Donald E. Coletta, Superintendent

Sharon S. Perry, Treasurer

RESOLUTION NO. NCA-12-27

A RESOLUTION OF SUPPORT APPROVING AND AUTHORIZING THE NORTH CENTRAL ACADEMY-FREMONT, TO PARTICIPATE IN AN APPLICATION FOR A LOCAL GOVERNMENT INNOVATION FUND GRANT THROUGH THE STATE OF OHIO FOR A NATURAL GAS CONVERSION/SHARED FUELING STATION STUDY.

WHEREAS, the North Central Academy- Fremont ("**NCA**") Board of Education has expressed an interest in collaboratively partnering with other Ohio municipalities, townships, school districts and counties in order to participate as an applicant for a Local Government Innovation Fund Grant (the "LGIF Grant") through the State of Ohio, with the North Central Ohio Educational Service Center ("NCOESC") being the main applicant;

WHEREAS, the NCA believes that it is in its best interest to join the application for the LGIF Grant.

NOW, THEREFORE, BE IT RESOLVED by the NCA Board of Education for the NCA of Tiffin, Ohio, that:

Section 1. It is in the best interests of the NCA Board of Education for NCA for it, to authorize and approve the NCA to join the application for the LGIF Grant.

Section 2. The NCA Board of Education hereby authorizes and approves the board to join the application for the LGIF Grant and hereby promises to provide the resources necessary for NCA Board of Education to join the LGIF Grant.

Section 3. The NCA Board of Education hereby authorizes and approves a certified officer (superintendent) of the NCA to join the LGIF Grant as a collaborative partner and an applicant by executing that certain Letter of Intent substantially in the form as attached to this Resolution.

Section 4. The NCA Board of Education hereby authorizes and approves a certified officer (superintendent) of the NCA to join the LGIF Grant as a collaborative partner and an applicant by executing and entering into that certain Memorandum of Understanding between the partners substantially in the form as attached to this Resolution.

Section 5. This NCA Board of Education finds and determines that all formal actions of this NCA Board of Education and any of its committees concerning and relating to the adoption of this resolution, and that all deliberations of this NCA Board of Education or any of its committees that resulted in those formal actions, occurred in meetings open to the public in compliance with the laws of the State.

PASSED ON: August 7th, 2012

Treasurer

President of the board of education

North Central Ohio Educational Service Center

Tiffin Campus
928 W. Market Street - Suite A
Tiffin, Ohio 44883
419-447-2927
419-447-2825 Fax

Mansfield Campus
State Support Team Region 7
1495 West Longview Ave. – Suite 200
Mansfield, Ohio 44906
419-747-4808

Marion Campus
333 East Center Street
Marion, Ohio 43302
740-387-6625
740-383-4804 Fax

LETTER OF INTENT

August 9, 2012

North Central Ohio Educational Service Center
928 West Market Street, Suite A
Tiffin, Ohio 44883

City of Tiffin
51 E. Market St.
Tiffin, Ohio 44883

Seneca County
111 Madison St.
Tiffin, Ohio 44883

Seneca County Agency Transportation
3140 South SR 100, Suite F- P.O. Box 922
Tiffin, Ohio 44883

Tiffin City Schools
244 S. Monroe St.
Tiffin, Ohio 44883

Seneca East Local Schools
13343 E. US 224
Attica, Ohio 44807

North Central Academy- Fremont
928 West Market Street, Suite B
Tiffin, Ohio 44883

Subject: Local Government Innovation Fund – Grant Application for a
Natural Gas Conversion/Shared Fueling Station Study

Dear Fellow Applicants:

This letter of intent (this "***Letter***") sets forth the terms and conditions of the proposed partnership and application relationship by and among North Central Ohio Educational Service Center, an Ohio educational service center ("***NCOESC***"), the City of Tiffin ("**CITY OF TIFFIN**"), a municipal corporation; County of Seneca ("**SENECA COUNTY**"), an Ohio county; North Central Academy- Fremont ("**NCA**"), a community board of education; Tiffin City Schools ("**TIFFIN CITY SCHOOLS**"), a city board of education; Seneca East Local Schools ("**SENECA EAST LOCAL**"), a local board of education; and Seneca County Agency Transportation ("**SCAT**"), a non-profit corporation. In this Letter, the term "Party" is used to refer to each party individually and the term "Parties" is used to refer to them collectively.

This Letter confirms that it is the Parties' intention to enter into an application to receive grant money from the Local Government Innovation Fund (the "***LGIF Funding***") and, if applicable, other related agreements with respect to the relationship outlined in this Letter as soon as possible, but in no event later than thirty (30) days after the date hereof. For the purposes of the LGIF Funding, NCOESC will serve as the main applicant on the LGIF Funding application and this Letter will serve as an agreement of partnership between the Parties.

1. Overall Nature of the Partnership. The Parties agree to participate in a feasibility study to use Local Government Innovation Fund (LGIF) dollars to analyze and chart the feasibility and potential of converting local government and school district fleets to a Natural Gas Vehicle (NGV) fleet. The study will also map out a "Shared Service" distribution network, reducing storage, transportation, and purchasing costs. It is agreed that the NCOESC shall bear the costs associated with the LGIF grant application, take responsibility for administering the grant award, and will coordinate data collection during the study.

2. Collaborative Effort between the Parties. The NCOESC, as lead applicant, shall coordinate and facilitate data collection, drafting of grant application and submission to the Ohio Department of Development. The City of Tiffin, Seneca County, Tiffin City Schools, Seneca East Local, NCA and SCAT agree to commit staff resources necessary to data collection. They agree to consider modifications to operational protocols related to the functions and plans for this shared facility.

3. Expenses. The main applicant, NCOESC, shall pay respective fees and expenses, including, but not limited to, all such application fees, legal fees and expenses, incurred in connection with the LGIF Funding.

4. Non-Compete Restrictions. Each Party agrees that it is only a party to the application for LGIF Funding as set forth in this Letter. Each Party may not be a party to any other application for LGIF Funding.

5. Public Announcements. No Party shall make any press release or other public statement concerning the matters covered by this Letter unless each Party has agreed upon the form and the contents of the release or statement prior to dissemination.

6. Confidentiality. The Parties acknowledge that they shall not share any proprietary or trade secret information of any other Party, unless required by law or a court order.

7. Binding Provisions. Upon the execution of this Letter, if the LGIF Funding application is denied, then this Letter and all of its provisions shall be non-binding upon the Parties. It is understood between the Parties that the provisions of this

Letter are not intended to create or constitute any legally binding obligation of any Party should the LGIF Funding application be denied, and no Party shall have any liability to any other Party with respect to such provisions except for Section 6. Upon execution of this Letter, if the LGIF Funding application is accepted, then Sections 1-6 of this Letter (collectively, the "***Binding Provisions***") shall constitute a legally binding and enforceable partnership agreement between the Parties. The Binding Provisions may be terminated by the mutual written consent of all of the Parties; provided, however, that the termination of the Binding Provisions shall not affect the liability of a Party for breach of any of the Binding Provisions prior to termination. Upon termination of the Binding Provisions, the Parties shall have no further obligations under the Binding Provisions, except for Section 6, which shall survive the termination of this Letter.

8. Miscellaneous. This Letter may be executed in one or more counterparts, each of which will be deemed to be an original copy of this Letter, and all of which, when taken together, shall be deemed to constitute one and the same. The exchange of copies of this Letter and of signature pages by facsimile transmission (or in PDF copies transmitted via e-mail) shall constitute effective execution and delivery of this Letter as to the Parties and may be used in lieu of the original Letter for all purposes. Signatures of the Parties transmitted by facsimile or in PDF copies transmitted via e-mail shall be deemed to be their original signatures for any purpose whatsoever. The Binding Provisions shall be interpreted and enforced in accordance with the laws of the State of Ohio, United States of America, without regard to conflict of laws principles. The Parties irrevocably submit to the exclusive jurisdiction of the state courts of Seneca County, Ohio, United States of America, to resolve any dispute arising out of or relating to the Binding Provisions and irrevocably waive, to the fullest extent permitted by applicable law, any objection that they may now or hereafter have to the laying of venue in such court or any defense of inconvenient forum. The Binding Provisions contain the entire agreement of the Parties and are the only agreements between the Parties with respect to the subject matter thereof and the Binding Provisions supersede all prior agreements and understandings between the Parties. This Letter shall not be amended or modified except by a writing signed by all of the Parties.

[The remainder of this page has been intentionally left blank.]

If the foregoing correctly sets forth our mutual understanding, please so indicate by signing in the spaces provided below and returning one fully executed copy to the undersigned.

Very truly yours,

NORTH CENTRAL OHIO EDUCATIONAL SERVICE CENTER

By: _____
Name: Dr. James Lahoski
Its: Superintendent
Date: 8/22/12

Agreed and Acknowledged:

CITY OF TIFFIN

By: _____
Name: Aaron Montz
Its: Mayor
Date: 8/20/2012

SENECA EAST LOCAL

By: _____
Name: Michael Wank
Its: Superintendent
Date: 8/27/12

SENECA COUNTY

By: _____
Name: Benjamin E. Nutter
Its: President of Commissioners
Date: 8-14-12

TIFFIN CITY SCHOOLS

By: _____
Name: Donald Coletta
Its: Superintendent
Date: 8/29/12

SCAT

By: _____
Name: Linda Good
Its: Executive Director
Date: 8-21-2012

NORTH CENTRAL ACADEMY

By: _____
Name: Brenda Luhring
Its: Superintendent
Date: 8-13-12

North Central Ohio
Educational Service Center

Tiffin Campus
928 W. Market Street - Suite A
Tiffin, Ohio 44883
419-447-2927
419-447-2825 Fax

Mansfield Campus
State Support Team Region 7
1495 West Longview Ave. – Suite 200
Mansfield, Ohio 44906
419-747-4808

Marion Campus
333 East Center Street
Marion, Ohio 43302
740-387-6625
740-383-4804 Fax

MEMORANDUM OF UNDERSTANDING

August 10, 2012

Subject: Local Government Innovation Fund – Grant Application for a
Natural Gas Conversion/Shared Fueling Station Study

MEMORANDUM OF UNDERSTANDING

This Memorandum of Understanding is entered as of the 10th day of August, 2012, by and among North Central Ohio Educational Service Center ("**NCOESC**"), an Ohio educational service center; the City of Tiffin ("**CITY OF TIFFIN**"), a municipal corporation; County of Seneca ("**SENECA COUNTY**"), an Ohio county; Tiffin City Schools ("**TIFFIN CITY SCHOOLS**"), a city board of education; Seneca East Local ("**SENECA EAST LOCAL**"), a local board of education; North Central Academy-Fremont ("**NCA**") a community board of education; and Seneca County Agency Transportation ("**SCAT**"), a non-profit corporation. In this Memorandum of Understanding, the term "Party" is used to refer to each party individually and the term "Parties" is used to refer to them collectively.

WHEREAS, in August 2012, each Party adopted, approved and authorized a Resolution showing support to become an applicant to an application for a grant through the Local Government Innovation Project (the "*LGIF Funding*"), with the NCOESC being the main applicant;

WHEREAS, the Parties have had the opportunity to discuss their roles as applicants for the LGIF Funding; and

WHEREAS, the parties have determined that they desire to enter into this Memorandum of Understanding.

NOW, THEREFORE, in consideration of the promises and covenants set forth below, the Parties agree as follows:

1. The Parties agree to participate in a feasibility study to use Local Government Innovation Fund (LGIF) dollars to analyze and chart the feasibility and potential of converting local government and school district fleets to a Natural Gas Vehicle (NGV) fleet. The study will also map out a "Shared Service" distribution network, reducing storage, transportation, and purchasing costs. It is agreed that the NCOESC shall bear the costs associated with the LGIF grant application, take responsibility for administering the grant award, and will coordinate data collection during the study.

2. The NCOESC, as lead applicant, shall coordinate and facilitate data collection, drafting of grant application and submission to the Ohio Department of Development. The City of Tiffin, Seneca County, Tiffin City Schools, Seneca East Local, NCA and SCAT agree to commit staff resources necessary to data collection. They agree to consider modifications to operational protocols related to the functions and plans for this shared facility.

3. That this Memorandum of Understanding contains the entire understanding of the Parties, with respect to the subjects contained herein, and there are no representations, promises, warranties, covenants, agreements or undertakings other than those expressly set forth or provided for in this Memorandum of Understanding; it being understood that this Memorandum of Understanding supersedes all prior agreements and understandings between the Parties, except for those set forth in that certain Letter of Intent, dated August 9th, 2012, which was required for the LGIF Funding.

4. That should any provision or provisions of this Memorandum of Understanding be determined to be unlawful or unenforceable by any arbitrator, any court or any agency having competent jurisdiction, said provision or provisions shall be null and void, the remaining provisions hereof remaining in full force and effect.

5. That the Parties hereby warrant and represent to each other that they understand and agree to each and every term hereof and that they enter into this Memorandum of Understanding of their own free will, without duress or coercion.

6. That the Parties have had a full opportunity to discuss the matters contained in this Memorandum of Understanding, but they do not intend to create any precedent on whether the parties were obligated to discuss these matters or to discuss these matters any more than they already had, and they do not intend to create any new mandatory subjects of bargaining.

7. That it is agreed that this Memorandum of Understanding is made on a non-precedential basis and shall not be utilized by any party hereto in connection with any matter or proceeding among the parties, except with respect to the matter of enforcing and/or interpreting its express terms.

[Signature Page to Follow]

IN WITNESS WHEREOF, the Parties have executed copies of this Memorandum of Understanding, each of which constitutes an original, but each of which, when taken together, will constitute the same document.

AGREED:

CITY OF TIFFIN

By:
Name: Aaron Montz
Its: Mayor
Date: 8/20/2012

SENECA EAST LOCAL

By:
Name: Michael Wank
Its: Superintendent
Date: 8/27/12

SENECA COUNTY

By:
Name: Benjamin E. Nutter
Its: President of Commissioners
Date: 8-14-12

TIFFIN CITY SCHOOLS

By:
Name: Donald Coletta
Its: Superintendent
Date: 8/29/12

SCAT

By:
Name: Linda Good
Its: Executive Director
Date: 8-21-2012

NCOESC

By:
Name: Dr. James Lahoski
Its: Superintendent
Date: 8/22/12

NORTH CENTRAL ACADEMY

By:
Name: Brenda Luhring
Its: Superintendent
Date: 8-13-12

DP-1

Profile of General Population and Housing Characteristics: 2010

2010 Demographic Profile Data

NOTE: For more information on confidentiality protection, nonsampling error, and definitions, see http://www.census.gov/prod/cen2010/doc/dpsf.pdf.

Geography: Tiffin city, Seneca County, Ohio

Subject	Number	Percent
SEX AND AGE		
Total population	17,963	100.0
Under 5 years	1,065	5.9
5 to 9 years	1,089	6.1
10 to 14 years	998	5.6
15 to 19 years	1,727	9.6
20 to 24 years	1,954	10.9
25 to 29 years	1,048	5.8
30 to 34 years	1,056	5.9
35 to 39 years	915	5.1
40 to 44 years	839	4.7
45 to 49 years	1,112	6.2
50 to 54 years	1,189	6.6
55 to 59 years	1,155	6.4
60 to 64 years	970	5.4
65 to 69 years	685	3.8
70 to 74 years	524	2.9
75 to 79 years	558	3.1
80 to 84 years	524	2.9
85 years and over	555	3.1
Median age (years)	35.2	(X)
16 years and over	14,623	81.4
18 years and over	14,239	79.3
21 years and over	12,491	69.5
62 years and over	3,363	18.7
65 years and over	2,846	15.8
Male population	8,790	48.9
Under 5 years	570	3.2
5 to 9 years	563	3.1
10 to 14 years	519	2.9
15 to 19 years	883	4.9
20 to 24 years	1,056	5.9
25 to 29 years	540	3.0
30 to 34 years	530	3.0
35 to 39 years	452	2.5
40 to 44 years	436	2.4
45 to 49 years	548	3.1
50 to 54 years	585	3.3
55 to 59 years	578	3.2
60 to 64 years	447	2.5
65 to 69 years	311	1.7
70 to 74 years	212	1.2
75 to 79 years	214	1.2
80 to 84 years	193	1.1
85 years and over	153	0.9

Subject	Number	Percent
Median age (years)	32.2	(X)
16 years and over	7,046	39.2
18 years and over	6,854	38.2
21 years and over	5,947	33.1
62 years and over	1,323	7.4
65 years and over	1,083	6.0
Female population	9,173	51.1
Under 5 years	495	2.8
5 to 9 years	526	2.9
10 to 14 years	479	2.7
15 to 19 years	844	4.7
20 to 24 years	898	5.0
25 to 29 years	508	2.8
30 to 34 years	526	2.9
35 to 39 years	463	2.6
40 to 44 years	403	2.2
45 to 49 years	564	3.1
50 to 54 years	604	3.4
55 to 59 years	577	3.2
60 to 64 years	523	2.9
65 to 69 years	374	2.1
70 to 74 years	312	1.7
75 to 79 years	344	1.9
80 to 84 years	331	1.8
85 years and over	402	2.2
Median age (years)	38.4	(X)
16 years and over	7,577	42.2
18 years and over	7,385	41.1
21 years and over	6,544	36.4
62 years and over	2,040	11.4
65 years and over	1,763	9.8
RACE		
Total population	17,963	100.0
One Race	17,682	98.4
White	16,871	93.9
Black or African American	467	2.6
American Indian and Alaska Native	31	0.2
Asian	175	1.0
Asian Indian	20	0.1
Chinese	98	0.5
Filipino	22	0.1
Japanese	24	0.1
Korean	5	0.0
Vietnamese	2	0.0
Other Asian [1]	4	0.0
Native Hawaiian and Other Pacific Islander	7	0.0
Native Hawaiian	2	0.0
Guamanian or Chamorro	2	0.0
Samoan	2	0.0
Other Pacific Islander [2]	1	0.0
Some Other Race	131	0.7
Two or More Races	281	1.6
White; American Indian and Alaska Native [3]	44	0.2
White; Asian [3]	17	0.1
White; Black or African American [3]	135	0.8
White; Some Other Race [3]	52	0.3
Race alone or in combination with one or more other races: [4]		
White	17,138	95.4
Black or African American	624	3.5
American Indian and Alaska Native	87	0.5

Subject	Number	Percent
Asian	206	1.1
Native Hawaiian and Other Pacific Islander	17	0.1
Some Other Race	188	1.0
HISPANIC OR LATINO		
Total population	17,963	100.0
Hispanic or Latino (of any race)	551	3.1
Mexican	460	2.6
Puerto Rican	31	0.2
Cuban	2	0.0
Other Hispanic or Latino [5]	58	0.3
Not Hispanic or Latino	17,412	96.9
HISPANIC OR LATINO AND RACE		
Total population	17,963	100.0
Hispanic or Latino	551	3.1
White alone	349	1.9
Black or African American alone	14	0.1
American Indian and Alaska Native alone	10	0.1
Asian alone	0	0.0
Native Hawaiian and Other Pacific Islander alone	2	0.0
Some Other Race alone	110	0.6
Two or More Races	66	0.4
Not Hispanic or Latino	17,412	96.9
White alone	16,522	92.0
Black or African American alone	453	2.5
American Indian and Alaska Native alone	21	0.1
Asian alone	175	1.0
Native Hawaiian and Other Pacific Islander alone	5	0.0
Some Other Race alone	21	0.1
Two or More Races	215	1.2
RELATIONSHIP		
Total population	17,963	100.0
In households	16,243	90.4
Householder	7,086	39.4
Spouse [6]	2,903	16.2
Child	4,361	24.3
Own child under 18 years	3,353	18.7
Other relatives	591	3.3
Under 18 years	247	1.4
65 years and over	70	0.4
Nonrelatives	1,302	7.2
Under 18 years	117	0.7
65 years and over	46	0.3
Unmarried partner	546	3.0
In group quarters	1,720	9.6
Institutionalized population	136	0.8
Male	33	0.2
Female	103	0.6
Noninstitutionalized population	1,584	8.8
Male	878	4.9
Female	706	3.9
HOUSEHOLDS BY TYPE		
Total households	7,086	100.0
Family households (families) [7]	4,115	58.1
With own children under 18 years	1,781	25.1
Husband-wife family	2,903	41.0
With own children under 18 years	1,024	14.5
Male householder, no wife present	346	4.9
With own children under 18 years	212	3.0
Female householder, no husband present	866	12.2
With own children under 18 years	545	7.7

Subject	Number	Percent
Nonfamily households [7]	2,971	41.9
Householder living alone	2,429	34.3
Male	1,009	14.2
65 years and over	250	3.5
Female	1,420	20.0
65 years and over	844	11.9
Households with individuals under 18 years	1,941	27.4
Households with individuals 65 years and over	2,085	29.4
Average household size	2.29	(X)
Average family size [7]	2.91	(X)
HOUSING OCCUPANCY		
Total housing units	8,007	100.0
Occupied housing units	7,086	88.5
Vacant housing units	921	11.5
For rent	433	5.4
Rented, not occupied	28	0.3
For sale only	178	2.2
Sold, not occupied	21	0.3
For seasonal, recreational, or occasional use	38	0.5
All other vacants	223	2.8
Homeowner vacancy rate (percent) [8]	3.8	(X)
Rental vacancy rate (percent) [9]	13.9	(X)
HOUSING TENURE		
Occupied housing units	7,086	100.0
Owner-occupied housing units	4,440	62.7
Population in owner-occupied housing units	10,460	(X)
Average household size of owner-occupied units	2.36	(X)
Renter-occupied housing units	2,646	37.3
Population in renter-occupied housing units	5,783	(X)
Average household size of renter-occupied units	2.19	(X)

X Not applicable.

[1] Other Asian alone, or two or more Asian categories.

[2] Other Pacific Islander alone, or two or more Native Hawaiian and Other Pacific Islander categories.

[3] One of the four most commonly reported multiple-race combinations nationwide in Census 2000.

[4] In combination with one or more of the other races listed. The six numbers may add to more than the total population, and the six percentages may add to more than 100 percent because individuals may report more than one race.

[5] This category is composed of people whose origins are from the Dominican Republic, Spain, and Spanish-speaking Central or South American countries. It also includes general origin responses such as "Latino" or "Hispanic."

[6] "Spouse" represents spouse of the householder. It does not reflect all spouses in a household. Responses of "same-sex spouse" were edited during processing to "unmarried partner."

[7] "Family households" consist of a householder and one or more other people related to the householder by birth, marriage, or adoption. They do not include same-sex married couples even if the marriage was performed in a state issuing marriage certificates for same-sex couples. Same-sex couple households are included in the family households category if there is at least one additional person related to the householder by birth or adoption. Same-sex couple households with no relatives of the householder present are tabulated in nonfamily households. "Nonfamily households" consist of people living alone and households which do not have any members related to the householder.

[8] The homeowner vacancy rate is the proportion of the homeowner inventory that is vacant "for sale." It is computed by dividing the total number of vacant units "for sale only" by the sum of owner-occupied units, vacant units that are "for sale only," and vacant units that have been sold but not yet occupied; and then multiplying by 100.

[9] The rental vacancy rate is the proportion of the rental inventory that is vacant "for rent." It is computed by dividing the total number of vacant units "for rent" by the sum of the renter-occupied units, vacant units that are "for rent," and vacant units that have been rented but not yet occupied; and then multiplying by 100.

Source: U.S. Census Bureau, 2010 Census.

DP-1

Profile of General Population and Housing Characteristics: 2010

2010 Demographic Profile Data

NOTE: For more information on confidentiality protection, nonsampling error, and definitions, see http://www.census.gov/prod/cen2010/doc/dpsf.pdf.

Geography: Seneca County, Ohio

Subject	Number	Percent
SEX AND AGE		
Total population	56,745	100.0
Under 5 years	3,553	6.3
5 to 9 years	3,767	6.6
10 to 14 years	3,739	6.6
15 to 19 years	4,432	7.8
20 to 24 years	3,986	7.0
25 to 29 years	3 114	5.5
30 to 34 years	3,305	5.8
35 to 39 years	3,225	5.7
40 to 44 years	3,320	5.9
45 to 49 years	4,021	7.1
50 to 54 years	4,454	7.8
55 to 59 years	4,083	7.2
60 to 64 years	3,321	5.9
65 to 69 years	2,340	4.1
70 to 74 years	1,802	3.2
75 to 79 years	1,590	2.8
80 to 84 years	1,359	2.4
85 years and over	1,334	2.4
Median age (years)	38.8	(X)
16 years and over	44,918	79.2
18 years and over	43,377	76.4
21 years and over	40,267	71.0
62 years and over	10,258	18.1
65 years and over	8,425	14.8
Male population	28,337	49.9
Under 5 years	1,852	3.3
5 to 9 years	1,950	3.4
10 to 14 years	1,943	3.4
15 to 19 years	2,288	4.0
20 to 24 years	2,109	3.7
25 to 29 years	1,601	2.8
30 to 34 years	1,719	3.0
35 to 39 years	1,641	2.9
40 to 44 years	1,704	3.0
45 to 49 years	2,032	3.6
50 to 54 years	2,235	3.9
55 to 59 years	2,062	3.6
60 to 64 years	1,650	2.9
65 to 69 years	1,118	2.0
70 to 74 years	830	1.5
75 to 79 years	663	1.2
80 to 84 years	528	0.9
85 years and over	412	0.7

Subject	Number	Percent
Median age (years)	37.1	(X)
16 years and over	22,206	39.1
18 years and over	21,416	37.7
21 years and over	19,788	34.9
62 years and over	4,437	7.8
65 years and over	3,551	6.3
Female population	28,408	50.1
Under 5 years	1,701	3.0
5 to 9 years	1,817	3.2
10 to 14 years	1,796	3.2
15 to 19 years	2,144	3.8
20 to 24 years	1,877	3.3
25 to 29 years	1,513	2.7
30 to 34 years	1,586	2.8
35 to 39 years	1,584	2.8
40 to 44 years	1,616	2.8
45 to 49 years	1,989	3.5
50 to 54 years	2,219	3.9
55 to 59 years	2,021	3.6
60 to 64 years	1,671	2.9
65 to 69 years	1,222	2.2
70 to 74 years	972	1.7
75 to 79 years	927	1.6
80 to 84 years	831	1.5
85 years and over	922	1.6
Median age (years)	40.6	(X)
16 years and over	22,712	40.0
18 years and over	21,961	38.7
21 years and over	20,479	36.1
62 years and over	5,821	10.3
65 years and over	4,874	8.6
RACE		
Total population	56,745	100.0
One Race	55,678	98.1
White	53,183	93.7
Black or African American	1,305	2.3
American Indian and Alaska Native	109	0.2
Asian	324	0.6
Asian Indian	52	0.1
Chinese	142	0.3
Filipino	43	0.1
Japanese	40	0.1
Korean	15	0.0
Vietnamese	10	0.0
Other Asian [1]	22	0.0
Native Hawaiian and Other Pacific Islander	10	0.0
Native Hawaiian	4	0.0
Guamanian or Chamorro	2	0.0
Samoan	3	0.0
Other Pacific Islander [2]	1	0.0
Some Other Race	747	1.3
Two or More Races	1,067	1.9
White; American Indian and Alaska Native [3]	180	0.3
White; Asian [3]	64	0.1
White; Black or African American [3]	549	1.0
White; Some Other Race [3]	155	0.3
Race alone or in combination with one or more other races: [4]		
White	54,187	95.5
Black or African American	1,945	3.4
American Indian and Alaska Native	345	0.6

Subject	Number	Percent
Asian	410	0.7
Native Hawaiian and Other Pacific Islander	28	0.0
Some Other Race	951	1.7
HISPANIC OR LATINO		
Total population	56,745	100.0
Hispanic or Latino (of any race)	2,524	4.4
Mexican	2,182	3.8
Puerto Rican	82	0.1
Cuban	7	0.0
Other Hispanic or Latino [5]	253	0.4
Not Hispanic or Latino	54,221	95.6
HISPANIC OR LATINO AND RACE		
Total population	56,745	100.0
Hispanic or Latino	2,524	4.4
White alone	1,444	2.5
Black or African American alone	78	0.1
American Indian and Alaska Native alone	25	0.0
Asian alone	3	0.0
Native Hawaiian and Other Pacific Islander alone	4	0.0
Some Other Race alone	696	1.2
Two or More Races	274	0.5
Not Hispanic or Latino	54,221	95.6
White alone	51,739	91.2
Black or African American alone	1,227	2.2
American Indian and Alaska Native alone	84	0.1
Asian alone	321	0.6
Native Hawaiian and Other Pacific Islander alone	6	0.0
Some Other Race alone	51	0.1
Two or More Races	793	1.4
RELATIONSHIP		
Total population	56,745	100.0
In households	54,211	95.5
Householder	21,774	38.4
Spouse [6]	11,235	19.8
Child	15,865	28.0
Own child under 18 years	11,867	20.9
Other relatives	2,156	3.8
Under 18 years	1,077	1.9
65 years and over	245	0.4
Nonrelatives	3,181	5.6
Under 18 years	377	0.7
65 years and over	121	0.2
Unmarried partner	1,667	2.9
In group quarters	2,534	4.5
Institutionalized population	870	1.5
Male	426	0.8
Female	444	0.8
Noninstitutionalized population	1,664	2.9
Male	916	1.6
Female	748	1.3
HOUSEHOLDS BY TYPE		
Total households	21,774	100.0
Family households (families) [7]	14,870	68.3
With own children under 18 years	6,141	28.2
Husband-wife family	11,235	51.6
With own children under 18 years	3,939	18.1
Male householder, no wife present	1,165	5.4
With own children under 18 years	664	3.0
Female householder, no husband present	2,470	11.3
With own children under 18 years	1,538	7.1

Subject	Number	Percent
Nonfamily households [7]	6,904	31.7
Householder living alone	5,720	26.3
Male	2,697	12.4
65 years and over	652	3.0
Female	3,023	13.9
65 years and over	1,793	8.2
Households with individuals under 18 years	6,837	31.4
Households with individuals 65 years and over	5,823	26.7
Average household size	2.49	(X)
Average family size [7]	2.97	(X)
HOUSING OCCUPANCY		
Total housing units	24,122	100.0
Occupied housing units	21,774	90.3
Vacant housing units	2,348	9.7
For rent	810	3.4
Rented, not occupied	82	0.3
For sale only	429	1.8
Sold, not occupied	89	0.4
For seasonal, recreational, or occasional use	121	0.5
All other vacants	817	3.4
Homeowner vacancy rate (percent) [8]	2.6	(X)
Rental vacancy rate (percent) [9]	12.3	(X)
HOUSING TENURE		
Occupied housing units	21,774	100.0
Owner-occupied housing units	16,054	73.7
Population in owner-occupied housing units	40,176	(X)
Average household size of owner-occupied units	2.50	(X)
Renter-occupied housing units	5,720	26.3
Population in renter-occupied housing units	14,035	(X)
Average household size of renter-occupied units	2.45	(X)

X Not applicable.

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[2] Other Pacific Islander alone, or two or more Native Hawaiian and Other Pacific Islander categories.

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[9] The rental vacancy rate is the proportion of the rental inventory that is vacant "for rent." It is computed by dividing the total number of vacant units "for rent" by the sum of the renter-occupied units, vacant units that are "for rent," and vacant units that have been rented but not yet occupied; and then multiplying by 100.

Source: U.S. Census Bureau, 2010 Census.

Attachment E-1

The Brewer-Garrett Company

6800 Eastland Road
Middleburg Heights, Ohio 44130
440/243-3535
Fax: 440/243-9993
OH LIC-28482

August 1, 2012

Proposal for a LGIF Grant for Natural Gas Feasibility Study

- **Cost benefit analysis on constructing NG fueling station**
- **Cost benefit analysis on converting partners fleet**
- **Leverage shared NG purchasing power**
- **Cost benefit analysis on constructing NG fueling station**
    1. Mapping gas lines in contrast to collaborative partners. ($2,500)
    2. Strategic placement of fueling stations ($6,220)
    3. Fueling need of partner ($2,300)
    4. Strategic need of Fast Fuel vs. Slow Fuel stations ($3,000)
    5. Quantity of fueling units ($2,200)
    6. Capacity for expansion of fueling station ($2,300)
- **Cost benefit analysis on converting partners fleet**
    1. Reviewing the make, model, age, fuel consumption, fuel component of partner fleets ($10,300)
    2. Forecasting 3 year vehicle purchasing for partner fleets ($3,000)
    3. Analysis on miles and consumed fuel last 2 years ($18,980)
    4. Analysis on maintenance cost vs. reduction ($3,700)
- **Leverage shared NG purchasing power**
    1. Review partnership contracts with gas suppliers and distributers ($3,000)
    2. Begin negotiating price based off of NG consumption increase ($2,500)

Brewer-Garrett ($60,000)

Grant administration, data collection, interviews, coordination ($18,000)

Project Management, P3 ($12,000)

Legal, Thomas C. Holmes, Pepple & Waggoner, Ltd ($10,000)

Total……$100,000

NAME:	John Davoli
ADDRESS:	928 West Market St. Tiffin, Ohio 44883
PHONE NUMBER:	419-447-2927 ext. 136
OCCUPATION:	NCORcog
TITLE	Director
Natural Gas	

DATE	DESCRIPTION OF IN-KIND SERVICES PROVIDED	TIME	PAY RATE	AMOUNT	MEDICARE	BWC	RETIREMENT	TOTAL IN-KIND
4/16/12	Natural Gas information meeting	3.00	37.19	111.57	1.62	0.71	15.62	129.51
4/24/12	Research/phone calls	4.00	37.19	148.76	2.16	0.94	20.83	172.69
4/27/12	Internet research	3.00	37.19	111.57	1.62	0.71	15.62	129.51
5/8/12	Research/phone calls	2.00	37.19	74.38	1.08	0.47	10.41	86.34
5/11/12	Internet research	3.00	37.19	111.57	1.62	0.71	15.62	129.51
5/17/12	Research/phone calls	2.50	37.19	92.98	1.35	0.59	13.02	107.93
5/22/12	Information gathering/calls	4.00	37.19	148.76	2.16	0.94	20.83	172.69
5/29/12	Meet with Consultant	4.00	37.19	148.76	2.16	0.94	20.83	172.69
				0.00	0.00	0.00	0.00	0.00
				0.00	0.00	0.00	0.00	0.00
				0.00	0.00	0.00	0.00	0.00
				0.00	0.00	0.00	0.00	0.00
				0.00	0.00	0.00	0.00	0.00
				0.00	0.00	0.00	0.00	0.00
				0.00	0.00	0.00	0.00	0.00
				0.00	0.00	0.00	0.00	0.00
				0.00	0.00	0.00	0.00	0.00
				0.00	0.00	0.00	0.00	0.00
				0.00	0.00	0.00	0.00	0.00
		25.50		948.35	13.75	6.00	132.77	1,100.87

*TIME - RECORD HOURS AND MINUTES - 15 MINUTE INCREMENTS	0.25	15 MINUTES
	0.50	30 MINUTES
	0.75	45 MINUTES

SIGNATURE John Davoli DATE 8-31-12

SIGNATURE CERTIFIES AMOUNTS SUBMITTED ARE TRUE AND ACCURATE.

Margaret A Hoey 8/31/12

MARGARET A HOEY, Notary Public
In and for the State of Ohio
My Commission Expires Oct. 23, 2016

Attachment E-2

NAME:	John Davoli
ADDRESS:	928 West Market St. Tiffin, Ohio 44883
PHONE NUMBER:	419-447-2927 ext. 136
OCCUPATION:	NCORcog
TITLE	Director
Natural Gas	

DATE	DESCRIPTION OF IN-KIND SERVICES PROVIDED	TIME	PAY RATE	AMOUNT	MEDICARE	BWC	RETIREMENT	TOTAL IN-KIND
6/5/12	Research/Internet/Phone Calls	4.00	37.19	148.76	2.16	0.94	20.83	172.69
6/7/12	Resolution work	3.00	37.19	111.57	1.62	0.71	15.62	129.51
6/13/12	Project management meeting	4.00	37.19	148.76	2.16	0.94	20.83	172.69
6/15/12	Meeting with consultant	3.50	37.19	130.17	1.89	0.82	18.22	151.10
6/18/12	Columbus visit with consultant	3.50	37.19	130.17	1.89	0.82	18.22	151.10
6/20/12	Planning/Phone calls	3.00	37.19	111.57	1.62	0.71	15.62	129.51
7/9/12	Research/Phone calls/Email	2.50	37.19	92.98	1.35	0.59	13.02	107.93
7/13/12	Emails/Internet Research	3.00	37.19	111.57	1.62	0.71	15.62	129.51
7/17/12	SCAT Board Meeting	2.50	37.19	92.98	1.35	0.59	13.02	107.93
7/20/12	Internet/Emails	2.00	37.19	74.38	1.08	0.47	10.41	86.34
7/26/12	Phone Calls/Resolution work	4.50	37.19	167.36	2.43	1.06	23.43	194.27
				0.00	0.00	0.00	0.00	0.00
				0.00	0.00	0.00	0.00	0.00
				0.00	0.00	0.00	0.00	0.00
				0.00	0.00	0.00	0.00	0.00
				0.00	0.00	0.00	0.00	0.00
				0.00	0.00	0.00	0.00	0.00
				0.00	0.00	0.00	0.00	0.00
				0.00	0.00	0.00	0.00	0.00
				0.00	0.00	0.00	0.00	0.00
		35.50		1,320.25	19.14	8.36	184.83	1,532.58

*TIME - RECORD HOURS AND MINUTES - 15 MINUTE INCREMENTS

0.25	15 MINUTES
0.50	30 MINUTES
0.75	45 MINUTES

SIGNATURE John Davoli DATE 8-31-12

SIGNATURE CERTIFIES AMOUNTS SUBMITTED ARE TRUE AND ACCURATE.

Margaret A Hoerig 8/31/12

MARGARET A HOERIG, Notary Public
In and for the State of Ohio
My Commission Expires Oct. 23, 2016

Attachment E-3

NAME:	John Davoli
ADDRESS:	928 West Market St. Tiffin, Ohio 44883
PHONE NUMBER:	419-447-2927 ext. 136
OCCUPATION:	NCORcog
TITLE	Director
Natural Gas	

DATE	DESCRIPTION OF IN-KIND SERVICES PROVIDED	TIME	PAY RATE	AMOUNT	MEDICARE	BWC	RETIREMENT	TOTAL IN-KIND
8/1/12	Internet research/phone calls	4.00	37.19	148.76	2.16	0.94	20.83	172.69
8/3/12	Emails/phone calls/internet	4.00	37.19	148.76	2.16	0.94	20.83	172.69
8/6/12	LGIF Group meeting	4.00	37.19	148.76	2.16	0.94	20.83	172.69
8/8/12	Work on Narratives	4.00	37.19	148.76	2.16	0.94	20.83	172.69
8/9/12	Work on Narratives	4.00	37.19	148.76	2.16	0.94	20.83	172.69
8/14/12	SCAT Board Meeting/Seneca Co. Commissioners	8.00	37.19	297.52	4.31	1.88	41.65	345.37
8/17/12	Internet research/phone calls	4.00	37.19	148.76	2.16	0.94	20.83	172.69
8/20/12	LGIF Group meeting	4.00	37.19	148.76	2.16	0.94	20.83	172.69
8/20/12	Tiffin City Council	3.00	37.19	111.57	1.62	0.71	15.62	129.51
8/21/12	SCAT Board Meeting/NCOESC Board Meeting/paperwork	8.00	37.19	297.52	4.31	1.88	41.65	345.37
8/22/12	Work on Narratives	3.00	37.19	111.57	1.62	0.71	15.62	129.51
8/24/12	Paperwork/Phone Calls/Emails	3.50	37.19	130.17	1.89	0.82	18.22	151.10
8/25/12	Work on Narratives	2.00	37.19	74.38	1.08	0.47	10.41	86.34
8/27/12	Application work	4.00	37.19	148.76	2.16	0.94	20.83	172.69
8/27/12	Seneca East Board meeting	3.00	37.19	111.57	1.62	0.71	15.62	129.51
8/28/12	Phone calls/inter office work	4.00	37.19	148.76	2.16	0.94	20.83	172.69
8/28/12	Tiffin City Schools Board meeting	3.00	37.19	111.57	1.62	0.71	15.62	129.51
8/29/12	Scan and format application	4.00	37.19	148.76	2.16	0.94	20.83	172.69
8/30/12	Final group meeting	4.00	37.19	148.76	2.16	0.94	20.83	172.69
8/31/12	Final proof and send to ODOD	3.00	37.19	111.57	1.62	0.71	15.62	129.51
		80.50		2,993.80	43.41	18.95	419.13	3,475.29

*TIME - RECORD HOURS AND MINUTES - 15 MINUTE INCREMENTS

0.25	15 MINUTES
0.50	30 MINUTES
0.75	45 MINUTES

SIGNATURE John Davoli DATE 8-31-12

SIGNATURE CERTIFIES AMOUNTS SUBMITTED ARE TRUE AND ACCURATE.

Margaret A Hoerig 8/31/12

MARGARET A HOERIG, Notary Public
In and for the State of Ohio
My Commission Expires Oct. 23, 2016

Attachment E-4

NAME:	Lynette Cameron		LGIF Natural Gas					
ADDRESS:	928 West Market St. Tiffin, Ohio 44883							
PHONE NUMBER:	419-447-2927 ext. 116							
OCCUPATION:	NCOESC							
TITLE	Assistant Treasurer							
DATE	DESCRIPTION OF IN-KIND SERVICES PROVIDED	TIME	PAY RATE	AMOUNT	MEDICARE	BWC	RETIREMENT	TOTAL IN-KIND
8/6/12	Meeting with John & Kim	1.00	25.75	25.75	0.37	0.16	3.61	29.89
8/6/12	Phone calls & emails	1.00	25.75	25.75	0.37	0.16	3.61	29.89
8/13/12	Phone calls & emails	1.00	25.75	25.75	0.37	0.16	3.61	29.89
8/14/12	Meeting with P3, John & Kim	1.50	25.75	38.63	0.56	0.24	5.41	44.84
8/15/12	Phone calls & emails	1.00	25.75	25.75	0.37	0.16	3.61	29.89
8/20/12	Meeting with P3,B G, John & Kim	3.00	25.75	77.25	1.12	0.49	10.82	89.67
8/22/12	Meeting with John, budgets	1.00	25.75	25.75	0.37	0.16	3.61	29.89
8/23/12	Program Budget spreadsheet	2.50	25.75	64.38	0.93	0.41	9.01	74.73
8/24/12	Program Budget spreadsheet	1.00	25.75	25.75	0.37	0.16	3.61	29.89
8/27/12	Program Budget spreadsheet	2.75	25.75	70.81	1.03	0.45	9.91	82.20
8/28/12	Program Budget spreadsheet	4.50	25.75	115.88	1.68	0.73	16.22	134.51
			25.75	0.00	0.00	0.00	0.00	0.00
			25.75	0.00	0.00	0.00	0.00	0.00
			25.75	0.00	0.00	0.00	0.00	0.00
			25.75	0.00	0.00	0.00	0.00	0.00
			25.75	0.00	0.00	0.00	0.00	0.00
			25.75	0.00	0.00	0.00	0.00	0.00
			25.75	0.00	0.00	0.00	0.00	0.00
			25.75	0.00	0.00	0.00	0.00	0.00
			25.75	0.00	0.00	0.00	0.00	0.00
		20.25		521.44	7.56	3.30	73.00	605.30

*TIME - RECORD HOURS AND MINUTES - 15 MINUTE INCREMENTS

0.25	15 MINUTES
0.50	30 MINUTES
0.75	45 MINUTES

SIGNATURE Lynette Cameron DATE 8/31/12

SIGNATURE CERTIFIES AMOUNTS SUBMITTED ARE TRUE AND ACCURATE.

Margaret A Hoerig 8/31/12

MARGARET A HOERIG, Notary Public
In and for the State of Ohio
My Commission Expires Oct. 23, 2016

Attachment E-5

NAME:	Lynette Cameron		**LGIF Natural Gas**					
ADDRESS:	928 West Market 5t. Tiffin, Ohio 44883							
PHONE NUMBER:	419-447-2927 ext. 116							
OCCUPATION:	NCOESC							
TITLE	Assistant Treasurer							
DATE	**DESCRIPTION OF IN-KIND SERVICES PROVIDED**	**TIME**	**PAY RATE**	**AMOUNT**	**MEDICARE**	**BWC**	**RETIREMENT**	**TOTAL IN-KIND**
7/19/12	COG Meeting	1.00	25.75	25.75	0.37	0.16	3.61	29.89
			25.75	0.00	0.00	0.00	0.00	0.00
			25.75	0.00	0.00	0.00	0.00	0.00
			25.75	0.00	0.00	0.00	0.00	0.00
			25.75	0.00	0.00	0.00	0.00	0.00
			25.75	0.00	0.00	0.00	0.00	0.00
			25.75	0.00	0.00	0.00	0.00	0.00
			25.75	0.00	0.00	0.00	0.00	0.00
			25.75	0.00	0.00	0.00	0.00	0.00
			25.75	0.00	0.00	0.00	0.00	0.00
			25.75	0.00	0.00	0.00	0.00	0.00
			25.75	0.00	0.00	0.00	0.00	0.00
			25.75	0.00	0.00	0.00	0.00	0.00
			25.75	0.00	0.00	0.00	0.00	0.00
			25.75	0.00	0.00	0.00	0.00	0.00
			25.75	0.00	0.00	0.00	0.00	0.00
			25.75	0.00	0.00	0.00	0.00	0.00
			25.75	0.00	0.00	0.00	0.00	0.00
			25.75	0.00	0.00	0.00	0.00	0.00
		1.00		25.75	0.37	0.16	3.61	29.89

*TIME - RECORD HOURS AND MINUTES - 15 MINUTE INCREMENTS

0.25	15 MINUTES
0.50	30 MINUTES
0.75	45 MINUTES

SIGNATURE Lynette Cameron DATE 8/31/12

SIGNATURE CERTIFIES AMOUNTS SUBMITTED ARE TRUE AND ACCURATE.

Margaret A Hoerig 8/31/12

MARGARET A HOERIG, Notary Public
In and for the State of Ohio
My Commission Expires Oct. 23, 2016

Attachment E-6

NAME:	Lynette Cameron		**LGIF Natural Gas**					
ADDRESS:	928 West Market St. Tiffin, Ohio 44883							
PHONE NUMBER:	419-447-2927 ext. 116							
OCCUPATION:	NCOESC							
TITLE	Assistant Treasurer							
DATE	**DESCRIPTION OF IN-KIND SERVICES PROVIDED**	**TIME**	**PAY RATE**	**AMOUNT**	**MEDICARE**	**BWC**	**RETIREMENT**	**TOTAL IN-KIND**
6/21/12	COG Meeting	1.00	25.75	25.75	0.37	0.16	3.61	29.89
			25.75	0.00	0.00	0.00	0.00	0.00
			25.75	0.00	0.00	0.00	0.00	0.00
			25.75	0.00	0.00	0.00	0.00	0.00
			25.75	0.00	0.00	0.00	0.00	0.00
			25.75	0.00	0.00	0.00	0.00	0.00
			25.75	0.00	0.00	0.00	0.00	0.00
			25.75	0.00	0.00	0.00	0.00	0.00
			25.75	0.00	0.00	0.00	0.00	0.00
			25.75	0.00	0.00	0.00	0.00	0.00
			25.75	0.00	0.00	0.00	0.00	0.00
			25.75	0.00	0.00	0.00	0.00	0.00
			25.75	0.00	0.00	0.00	0.00	0.00
			25.75	0.00	0.00	0.00	0.00	0.00
			25.75	0.00	0.00	0.00	0.00	0.00
			25.75	0.00	0.00	0.00	0.00	0.00
			25.75	0.00	0.00	0.00	0.00	0.00
			25.75	0.00	0.00	0.00	0.00	0.00
			25.75	0.00	0.00	0.00	0.00	0.00
		1.00		25.75	0.37	0.16	3.61	29.89

*TIME - RECORD HOURS AND MINUTES - 15 MINUTE INCREMENTS

0.25	15 MINUTES
0.50	30 MINUTES
0.75	45 MINUTES

SIGNATURE Lynette Cameron DATE 8/31/12

SIGNATURE CERTIFIES AMOUNTS SUBMITTED ARE TRUE AND ACCURATE.

Margaret A Hoerig 8/31/12

MARGARET A HOERIG, Notary Public
In and for the State of Ohio
My Commission Expires Oct. 23, 2016

Attachment E-7

NAME:	Kim Fisher		Natural Gas					
ADDRESS:	928 West Market St. Tiffin, Ohio 44883							
PHONE NUMBER:	419-447-2927 ext. 174							
OCCUPATION:	NCORcog							
TITLE	Secretary							
DATE	DESCRIPTION OF IN-KIND SERVICES PROVIDED	TIME	PAY RATE	AMOUNT	MEDICARE	BWC	RETIREMENT	TOTAL IN-KIND
6/27/12	Internet research	1.00	17.30	17.30	0.25	0.11	2.42	20.08
				0.00	0.00	0.00	0.00	0.00
				0.00	0.00	0.00	0.00	0.00
				0.00	0.00	0.00	0.00	0.00
				0.00	0.00	0.00	0.00	0.00
				0.00	0.00	0.00	0.00	0.00
				0.00	0.00	0.00	0.00	0.00
				0.00	0.00	0.00	0.00	0.00
				0.00	0.00	0.00	0.00	0.00
				0.00	0.00	0.00	0.00	0.00
				0.00	0.00	0.00	0.00	0.00
				0.00	0.00	0.00	0.00	0.00
				0.00	0.00	0.00	0.00	0.00
				0.00	0.00	0.00	0.00	0.00
				0.00	0.00	0.00	0.00	0.00
				0.00	0.00	0.00	0.00	0.00
				0.00	0.00	0.00	0.00	0.00
				0.00	0.00	0.00	0.00	0.00
				0.00	0.00	0.00	0.00	0.00
				0.00	0.00	0.00	0.00	0.00
		1.00		17.30	0.25	0.11	2.42	20.08

*TIME - RECORD HOURS AND MINUTES - 15 MINUTE INCREMENTS

0.25	15 MINUTES
0.50	30 MINUTES
0.75	45 MINUTES

SIGNATURE Kimberly Fisher DATE 8/31/12

SIGNATURE CERTIFIES AMOUNTS SUBMITTED ARE TRUE AND ACCURATE.

Margaret A Hoerig 8/31/12

MARGARET A HOERIG, Notary Public
In and for the State of Ohio
My Commission Expires Oct. 23, 2016

Attachment E-8

NAME:	Kim Fisher		Natural Gas					
ADDRESS:	928 West Market St. Tiffin, Ohio 44883							
PHONE NUMBER:	419-447-2927 ext. 174							
OCCUPATION:	NCORcog							
TITLE	Secretary							
DATE	DESCRIPTION OF IN-KIND SERVICES PROVIDED	TIME	PAY RATE	AMOUNT	MEDICARE	BWC	RETIREMENT	TOTAL IN-KIND
8/6/12	Meeting - Grant	2.00	17.30	34.60	0.50	0.22	4.84	40.16
8/14/12	Meeting - Grant	3.00	17.30	51.90	0.75	0.33	7.27	60.25
8/20/12	Meeting - Grant	3.00	17.30	51.90	0.75	0.33	7.27	60.25
8/23/12	Typing Grant	2.00	17.30	34.60	0.50	0.22	4.84	40.16
8/27/12	Input Info - Grant	1.00	17.30	17.30	0.25	0.11	2.42	20.08
8/28/12	Input Info - Grant	2.00	17.30	34.60	0.50	0.22	4.84	40.16
8/29/12	Prepare PDFs - Grant	2.00	17.30	34.60	0.50	0.22	4.84	40.16
8/30/12	Submit Grant email	1.00	17.30	17.30	0.25	0.11	2.42	20.08
				0.00	0.00	0.00	0.00	0.00
				0.00	0.00	0.00	0.00	0.00
				0.00	0.00	0.00	0.00	0.00
				0.00	0.00	0.00	0.00	0.00
				0.00	0.00	0.00	0.00	0.00
				0.00	0.00	0.00	0.00	0.00
				0.00	0.00	0.00	0.00	0.00
				0.00	0.00	0.00	0.00	0.00
				0.00	0.00	0.00	0.00	0.00
				0.00	0.00	0.00	0.00	0.00
				0.00	0.00	0.00	0.00	0.00
				0.00	0.00	0.00	0.00	0.00
		16.00		276.80	4.01	1.75	38.75	321.32

*TIME - RECORD HOURS AND MINUTES - 15 MINUTE INCREMENTS

0.25	15 MINUTES
0.50	30 MINUTES
0.75	45 MINUTES

SIGNATURE Kimberly Fisher DATE 8/31/12

SIGNATURE CERTIFIES AMOUNTS SUBMITTED ARE TRUE AND ACCURATE.

Margaret A Hoerig 8/31/12

MARGARET A HOERIG, Notary Public
In and for the State of Ohio
My Commission Expires Oct. 23, 2016

Attachment E-9

ESTIMATED FUTURE DATA COLLECTION HOURS

Project Budget Narrative:

1. We will seek information from our partners for the following information:
   a. Make of vehicle
   b. Model of vehicle
   c. Age of vehicle
   d. Fuel spend per vehicle
   e. Miles driven per vehicle
   f. Maintenance per vehicle

Hours per partner: ~~72~~ 36 x 6 partners = 216 hrs x Estimated Average salary rate $75 = $16,200.00

2. We will conduct interviews with partners:
   a. Treasurer/CFO to determine 5 year forecast of fleet purchases
   b. Treasurer/CFO to determine future operational changes
   c. Treasurer/CFO regarding financing mechanisms for conversions
   d. Transportation Director regarding maintenance aptitude
   e. Transportation Director regarding fleet housing capacity

Hours per partner: 5 x 6 partners = 30 hrs x Estimated Average salary rate $75 = $2,250.00

Attachment E-11

NAME:	Gwynn Reinhart							
ADDRESS:	53 E. Market St.							
PHONE NUMBER:	419-448-5403, Ext. 1400							
OCCUPATION:	City of Tiffin							
TITLE	Director of Finance							
	LGIF Natural Gas							
DATE	DESCRIPTION OF IN-KIND SERVICES PROVIDED	TIME	PAY RATE	AMOUNT	MEDICARE	BWC	RETIREMENT	TOTAL IN-KIND
8/14/12	Preparation of Spreadsheet-	2.00	30.31	60.62	0.88	0.18	8.49	70.16
	Fuel & Vehicle Costs			0.00	0.00	0.00	0.00	0.00
8/13-8/14/12	E-mail & Phone Calls	0.50	30.31	15.16	0.22	0.05	2.12	17.54
				0.00	0.00	0.00	0.00	0.00
				0.00	0.00	0.00	0.00	0.00
				0.00	0.00	0.00	0.00	0.00
				0.00	0.00	0.00	0.00	0.00
				0.00	0.00	0.00	0.00	0.00
				0.00	0.00	0.00	0.00	0.00
				0.00	0.00	0.00	0.00	0.00
				0.00	0.00	0.00	0.00	0.00
				0.00	0.00	0.00	0.00	0.00
				0.00	0.00	0.00	0.00	0.00
				0.00	0.00	0.00	0.00	0.00
				0.00	0.00	0.00	0.00	0.00
				0.00	0.00	0.00	0.00	0.00
				0.00	0.00	0.00	0.00	0.00
				0.00	0.00	0.00	0.00	0.00
				0.00	0.00	0.00	0.00	0.00
		2.50		75.77	1.10	0.23	10.61	87.71

*TIME - RECORD HOURS AND MINUTES - 15 MINUTE INCREMENTS	0.25	15 MINUTES
	0.50	30 MINUTES
	0.75	45 MINUTES

SIGNATURE [signature] DATE 8-23-12

SIGNATURE CERTIFIES AMOUNTS SUBMITTED ARE TRUE AND ACCURATE.

Natural Gas Conversion/Shared Fueling Station Study

Attachment E-12

Program Budget

ACTUAL	FY 2009/2010	FY 2010/2011	FY 2011/2012
Supplies - Gasoline, Diesel, Maintenance Supplies			
Seneca County- SCOC	14,586	14,668	15,280
- Job & Family Services	85	94	130
- EMS	8,980	14,441	18,208
- Engineer (Maintenance, SCOC, JFS, Sheriff)	401,212	499,104	656,967
City of Tiffin - Municipal Court	0	0	0
- Engineer/ Street Maintenance	27,872	25,528	22,672
- Police/Fire	61,886	75,836	96,954
- Parks	6,704	7,930	10,312
- Sewer Plant/Maintenance	17,091	25,502	43,162
SCAT	97,636	119,772	164,146
North Central Academy	0	0	0
Tiffin City Schools	99,373	125,140	138,000
Seneca East Local Schools	146,447	119,635	178,998
Total Supplies	*$881,872*	*$1,027,650*	*$1,344,829*
Contract Services - Repairs and Maintenance			
Seneca County - Maintenance	2,483	2,856	3,980
- SCOC	94,978	92,000	108,801
- Job & Family Services	4,267	4,480	3,429
- EMS	10,467	11,153	11,212
- Engineer	11,295	6,658	12,202
City of Tiffin - Municipal Court	0	156	1,011
- Engineer/ Street Maintenance	10,078	22,138	17,285
- Police/Fire	67,697	48,537	53,027
- Parks	6,931	7,454	6,271
- Sewer Plant/Maintenance	14,628	13,243	20,639
SCAT	31,535	40,408	39,719
North Central Academy	0	4,460	15,920
Tiffin City Schools	65,220	69,352	64,587
Seneca East Local Schools	1,725	7,081	28,100
Total Contract Services	*$321,304*	*$329,976*	*$386,183*
Total Expenses	**$1,203,176**	**$1,357,626**	**$1,731,012**
Revenues			
General Fund - Seneca County	112,047	109,524	128,061
- City of Tiffin	212,887	226,324	271,333
- North Central Academy	0	4,460	15,920
- Tiffin City Schools	164,593	194,492	202,587
- Seneca East Local Schools	148,172	126,716	207,098
Subtotal General Fund	*637,699*	*661,516*	*824,999*
Gas Tax - Seneca County	412,507	505,762	669,169
Charges for Services - Seneca County	19,447	25,594	29,420
- Job & Family Services	4,352	4,574	3,559
- SCAT	129,171	160,180	203,865
Subtotal Charges for Services	*152,970*	*190,348*	*236,844*
Total Revenues	**$1,203,176**	**$1,357,626**	**$1,731,012**

Natural Gas Conversion/Shared Fueling Station Study

Attachment E-13

Program Budget

PROJECTED	FY 2012/2013	FY 2013/2014	FY 2014/2015	
Supplies - Gasoline, Diesel, Maintenance Supplies				
Seneca County- SCOC	14,733	15,826	14,447	
- Job & Family Services	711	753	812	
- EMS	6,535	7,545	7,489	
- Engineer (Maintenance, SCOC, JFS, Sheriff)	291,415	340,954	357,555	
City of Tiffin - Municipal Court	0	0	0	
- Engineer/ Street Maintenance	13,269	13,285	12,483	
- Police/Fire	37,067	44,930	45,529	
- Parks	3,791	4,555	4,280	
- Sewer Plant/Maintenance	19,788	21,715	20,480	
SCAT	68,241	83,504	92,730	
North Central Academy	0	0	0	
Tiffin City Schools	50,159	52,394	51,414	
Seneca East Local Schools	37,050	37,811	36,250	
Total Supplies	*$542,759*	*$623,272*	*$643,469*	
Unadjusted Projected Costs	1,431,704	1,641,918	1,804,456	
Cost Savings	(888,945)	(1,018,646)	(1,160,987)	
Contract Services - Repairs and Maintenance				
Seneca County - Maintenance	3,582	4,298	5,159	
- SCOC	78,337	90,087	86,484	
- Job & Family Services	3,476	3,649	3,831	
- EMS	8,998	9,628	10,302	
- Engineer	9,609	10,090	10,595	
City of Tiffin - Municipal Court	338	338	338	
- Engineer/ Street Maintenance	21,600	21,600	21,600	
- Police/Fire	47,625	55,125	55,125	
- Parks	5,625	5,625	5,625	
- Sewer Plant/Maintenance	23,250	23,250	23,250	
SCAT	33,750	35,250	36,750	
North Central Academy	13,134	14,447	15,893	
Tiffin City Schools	50,572	52,797	55,120	
Seneca East Local Schools	21,497	21,926	22,365	
Total Contract Services	*$321,391*	*$348,110*	*$352,435*	
Unadjusted Projected Costs	$428,521	$464,146	$469,913	
Cost Savings	($107,130)	($116,037)	($117,478)	
Total Expenses	**$864,150**	**$971,382**	**$995,904**	
				Total
Unadjusted Projected Expenses	**$1,860,225**	**$2,106,064**	**$2,274,369**	6,240,658
Cost Savings	(996,075)	(1,134,682)	(1,278,465)	(3,409,223)
				0.54629222 ***ROI***
General Fund - Seneca County	96,652	110,211	106,090	
- City of Tiffin	172,353	190,423	188,710	
- North Central Academy	13,134	14,447	15,893	
- Tiffin City Schools	100,731	105,191	106,534	
- Seneca East Local Schools	58,547	59,737	58,615	
Subtotal General Fund	*441,416*	*480,009*	*475,840*	
Gas Tax - Seneca County	301,024	351,044	368,150	
Charges for Services - Seneca County	15,533	17,173	17,791	
- Job & Family Services	4,187	4,402	4,643	
- SCAT	101,991	118,754	129,480	
Subtotal Charges for Services	*121,710*	*140,329*	*151,914*	
Total Revenues	**$864,150**	**$971,382**	**$995,904**	

ESTIMATED FUTURE DATA COLLECTION HOURS

Attachment F-1

Project Budget Narrative:

1. We will seek information from our partners for the following information:
   a. Make of vehicle
   b. Model of vehicle
   c. Age of vehicle
   d. Fuel spend per vehicle
   e. Miles driven per vehicle
   f. Maintenance per vehicle

Hours per partner: ~~72~~ 36 x 6 partners = 216 hrs x Estimated Average salary rate $75 = $16,200.00

2. We will conduct interviews with partners:
   a. Treasurer/CFO to determine 5 year forecast of fleet purchases
   b. Treasurer/CFO to determine future operational changes
   c. Treasurer/CFO regarding financing mechanisms for conversions
   d. Transportation Director regarding maintenance aptitude
   e. Transportation Director regarding fleet housing capacity

Hours per partner: 5 x 6 partners = 30 hrs x Estimated Average salary rate $75 = $2,250.00

NAME:	Gwynn Reinhart
ADDRESS:	53 E. Market St.
PHONE NUMBER:	419-448-5403, Ext. 1400
OCCUPATION:	City of Tiffin
TITLE	Director of Finance
	LGIF Natural Gas

DATE	DESCRIPTION OF IN-KIND SERVICES PROVIDED	TIME	PAY RATE	AMOUNT	MEDICARE	BWC	RETIREMENT	TOTAL IN-KIND
8/14/12	Preparation of Spreadsheet-	2.00	30.31	60.62	0.88	0.18	8.49	70.16
	Fuel & Vehicle Costs			0.00	0.00	0.00	0.00	0.00
8/13-8/14/12	E-mail & Phone Calls	0.50	30.31	15.16	0.22	0.05	2.12	17.54
				0.00	0.00	0.00	0.00	0.00
				0.00	0.00	0.00	0.00	0.00
				0.00	0.00	0.00	0.00	0.00
				0.00	0.00	0.00	0.00	0.00
				0.00	0.00	0.00	0.00	0.00
				0.00	0.00	0.00	0.00	0.00
				0.00	0.00	0.00	0.00	0.00
				0.00	0.00	0.00	0.00	0.00
				0.00	0.00	0.00	0.00	0.00
				0.00	0.00	0.00	0.00	0.00
				0.00	0.00	0.00	0.00	0.00
				0.00	0.00	0.00	0.00	0.00
				0.00	0.00	0.00	0.00	0.00
				0.00	0.00	0.00	0.00	0.00
				0.00	0.00	0.00	0.00	0.00
				0.00	0.00	0.00	0.00	0.00
				0.00	0.00	0.00	0.00	0.00
		2.50		75.77	1.10	0.23	10.61	87.71

*TIME - RECORD HOURS AND MINUTES - 15 MINUTE INCREMENTS	0.25	15 MINUTES
	0.50	30 MINUTES
	0.75	45 MINUTES

SIGNATURE [signature] DATE 8-23-12

SIGNATURE CERTIFIES AMOUNTS SUBMITTED ARE TRUE AND ACCURATE.

Attachment F-2

THE HAMILTON PROJECT

DISCUSSION PAPER 2012-03 JUNE 2012

Attachment G Pgs 1-28

Leveling the Playing Field for Natural Gas in Transportation

Christopher R. Knittel

MISSION STATEMENT

The Hamilton Project seeks to advance America's promise of opportunity, prosperity, and growth.

We believe that today's increasingly competitive global economy demands public policy ideas commensurate with the challenges of the 21st Century. The Project's economic strategy reflects a judgment that long-term prosperity is best achieved by fostering economic growth and broad participation in that growth, by enhancing individual economic security, and by embracing a role for effective government in making needed public investments.

Our strategy calls for combining public investment, a secure social safety net, and fiscal discipline. In that framework, the Project puts forward innovative proposals from leading economic thinkers — based on credible evidence and experience, not ideology or doctrine — to introduce new and effective policy options into the national debate.

The Project is named after Alexander Hamilton, the nation's first Treasury Secretary, who laid the foundation for the modern American economy. Hamilton stood for sound fiscal policy, believed that broad-based opportunity for advancement would drive American economic growth, and recognized that "prudent aids and encouragements on the part of government" are necessary to enhance and guide market forces. The guiding principles of the Project remain consistent with these views.

THE HAMILTON PROJECT

THE HAMILTON PROJECT

Leveling the Playing Field for Natural Gas in Transportation

Christopher R. Knittel
Massachusetts Institute of Technology

JUNE 2012

NOTE: This discussion paper is a proposal from the author. As emphasized in The Hamilton Project's original strategy paper, the Project was designed in part to provide a forum for leading thinkers across the nation to put forward innovative and potentially important economic policy ideas that share the Project's broad goals of promoting economic growth, broad-based participation in growth, and economic security. The authors are invited to express their own ideas in discussion papers, whether or not the Project's staff or advisory council agrees with the specific proposals. This discussion paper is offered in that spirit.

BROOKINGS

Abstract

Technological advances in horizontal drilling deep underground have led to large-scale discoveries of natural gas reserves that are now economical to access. This, along with increases in oil prices, has fundamentally changed the relative price of oil and natural gas in the United States. As of December 2011, oil was trading at a 500 percent premium over natural gas. This ratio has increased over the past few months. The discovery of large, economically accessible natural gas reserves has the potential to aid in a number of policy goals related to energy. Natural gas can replace oil in transportation through a number of channels. However, the field between natural gas as a transportation fuel and petroleum-based fuels is not level. Given this uneven playing field, left to its own devices, the market is unlikely to lead to an efficient mix of petroleum- and natural gas-based fuels. This paper presents a pair of policy proposals designed to increase the nation's energy security, decrease the susceptibility of the U.S. economy to recessions caused by oil-price shocks, and reduce greenhouse gas emissions and other pollutants. First, I propose improving the natural gas fueling infrastructure in homes, at local distribution companies, and along long-haul trucking routes. Second, I offer steps to promote the use of natural gas vehicles and fuels.

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Chapter 1: Introduction

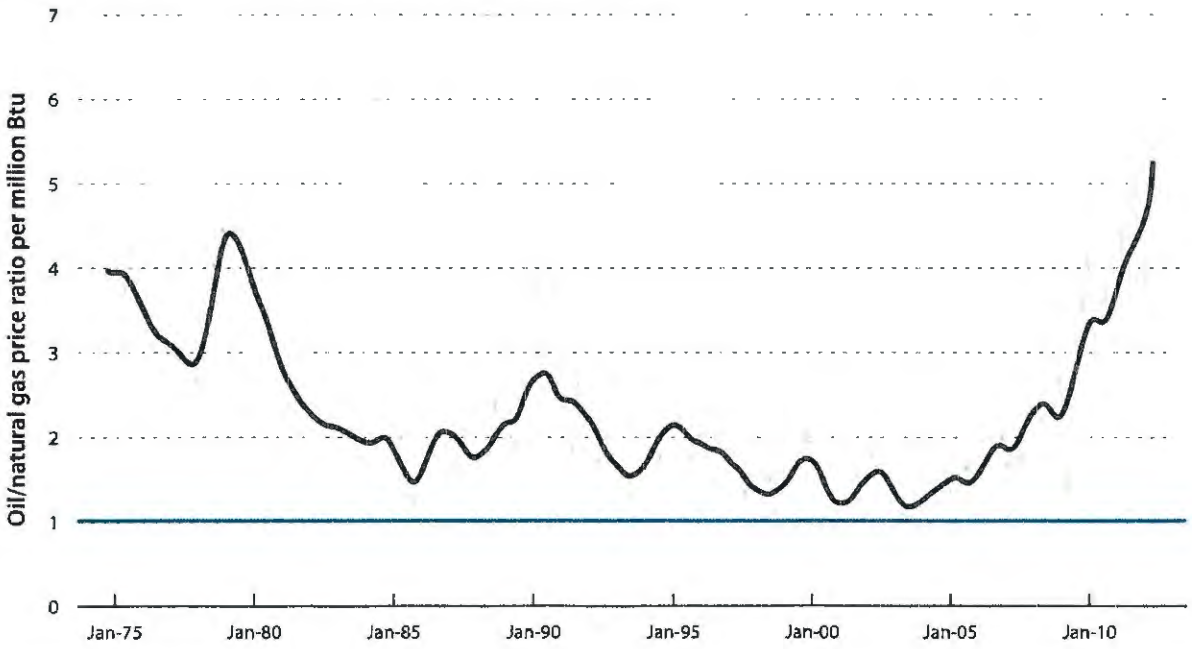
Technological advances in horizontal drilling deep underground have led to large-scale discoveries of natural gas reserves that are now economical to access. This, along with increases in oil prices, has fundamentally changed the relative price of oil and natural gas in the United States. To illustrate this, Figure 1 plots the ratio of the oil prices to natural gas prices on a per-energy basis from 1975 to the end of 2011.[1] As of December 2011, oil was trading at a 500-percent premium over natural gas. This ratio has increased over the past few months.

The discovery of large, economically accessible natural gas reserves has the potential to aid in a number of policy goals related to energy. For one, replacing oil with natural gas can reduce U.S. dependence on oil, thereby reducing the vulnerability of the U.S. economy to macroeconomic downturns caused by oil shocks. Second, because natural gas is cleaner in terms of greenhouse gas emissions and local pollutants compared to both coal and oil, replacing these other fossil fuels with natural gas can reduce U.S. greenhouse gas emissions and health problems associated with local pollution. Third, replacing oil with natural gas can increase U.S. profits associated with fossil fuel production and create excellent opportunities for the U.S. economy.

There are also compelling arguments for policymakers to consider policies designed to promote natural gas. However, we need to level the playing field between natural gas-based and petroleum-based fuels. Natural gas-based fuels carry lower, un-priced social costs than gasoline. For example, local pollution emissions are fewer from an engine burning natural gas compared to the same engine burning gasoline. If prices reflected true social costs, this would make petroleum-based fuels even more expensive than their natural gas counterparts. Petroleum therefore has an artificial advantage over natural gas

FIGURE 1.

Ratio of Oil and Natural Gas Prices per Unit of Energy



Source: U.S. Energy Information Administration.

because these other social costs are not included in the price that consumers pay. Additionally, the refueling infrastructure for natural gas is significantly less developed than the infrastructure for gasoline and diesel. While the costs of building such an infrastructure are true social costs and must be considered when comparing the merits of the two fuels, the lack of a refueling presence leads to what is known as a network externality, or a chicken-and-egg problem, that can lead to the efficient product not being selected in the market. Petroleum is then given an advantage from being part of the status quo. Given these two artificial advantages that gasoline and diesel have over natural gas-based fuels, left to its own devices, the market is unlikely to lead to an efficient mix of petroleum- and natural gas-based fuels.

Ethanol-based fuel and electric vehicles face many of the same problems as natural gas-based vehicles—they have, or may have, lower greenhouse gas emissions and lower local-pollutant emissions, and are not petroleum based, which could potentially lead to fewer oil-price-shock-induced recessions and military expenditures. Refueling infrastructure for these alternative energy sources is also lacking. Policymakers have already taken steps to address these challenges by adopting policies that encourage the use of ethanol-based fuel and electric vehicles. While these policies might begin to level the playing field between petroleum-based and ethanol- or electricity-based transportation, they distort the playing field between ethanol- and electricity-based transportation and natural gas-based transportation technologies. It is time to level this playing field.

This paper presents two sets of policy proposals designed to increase the nation's energy security, decrease the susceptibility of the U.S. economy to recessions caused by oil-price shocks, and reduce greenhouse gas emissions and other pollutants. First, I propose improving the natural gas fueling infrastructure in homes, at local distribution companies, and along long-haul trucking routes. Second, I offer steps to promote the use of natural gas vehicles and fuels.

Chapter 2: Opportunities for Natural Gas in Transportation

The United States consumes roughly 20 million barrels of oil per day. This is 50 percent more than the European Union, which has 60 percent more people, and is more than twice the rate of consumption in China (CIA n.d.). The United States also produces roughly 10 million barrels of oil per day, representing about 10 percent of global oil production (CIA n.d.).

When combined with the dramatic drop in natural gas prices, the use of natural gas in transportation (see Box 1) provides significant savings to consumers and reductions in external costs associated with petroleum usage. However, in the absence of policy interventions, a lack of refueling infrastructure may prevent consumers from realizing potential cost savings and an unequal playing field will prevent society from experiencing the benefits of lower gasoline consumption. Below, I lay out the potential private and external benefits of natural gas use in transportation.

PRIVATE BENEFITS OF LIGHT- AND MEDIUM-DUTY CNG AND HEAVY-DUTY LNG VEHICLES

At current prices for natural gas and gasoline, switching to CNG or LNG may make sense from a consumer's perspective if we ignore the lack of natural gas fueling stations. I examine private costs, or the costs that consumers pay for their vehicles and at the pump. A comparison of CNG and gasoline models (see Appendix A for details) suggests that the fuel economies of the gasoline version and the CNG version of the vehicle are more or less equal. Therefore there are two key differences between CNG and gasoline vehicles: a higher upfront cost for CNG vehicles, but a lower fuel cost. Table 1 presents the savings in a comparison of natural gas vehicles with four gas-powered vehicles.

The Department of Energy (DOE) reported that nationwide average retail prices for gasoline and CNG in January

BOX 1.

Natural Gas in Transportation

Natural gas can serve as an oil replacement in transportation markets in three ways. First, natural gas can be converted to methanol—an alcohol with similar properties to ethanol—that can be burned in internal combustion engines with slight vehicle modifications.

Second, light- and medium-duty vehicles using existing engine technologies can also burn compressed natural gas (CNG). Here the natural gas is stored at pressure, typically around 3000 psi. Because of the pressure, the CNG storage tanks are larger than existing gasoline storage tanks, so vehicles often have less trunk space and can cover less distance than conventional gasoline cars without refueling. The Honda Civic GX, currently sold in the United States, for example, has a CNG capacity equivalent to eight gallons of gasoline. A number of CNG vehicles sold in Europe are bi-fuel vehicles capable of burning both CNG and gasoline in their engines. When the CNG tank empties, the engine shift to the gasoline tank for fuel. Bi-fuel vehicles will frequently use gasoline first because the cold-start properties of gasoline are better than CNG.

Third, medium- and heavy-duty vehicles can run off of either CNG or liquefied natural gas (LNG), which is stored at very low temperatures (-260 degrees Fahrenheit). The advantage of LNG over CNG is that it requires 30 percent less space (although the tanks are bulkier) allowing for longer driving distances.[2] One disadvantage of LNG is that storing it for long periods is expensive, therefore LNG is often considered as a replacement fuel for vehicles that are in continuous use (e.g., heavy duty). Most industry followers envision LNG technologies as the likely replacement for diesel in the largest classes of heavy-duty vehicles.[3]

TABLE 1.

Lifetime Private Benefits of Switching from a Conventional Gasoline Vehicle to a Natural Gas Vehicle (Dollars)

	Pickup truck (15-MPG)	Sedan (30-MPG)	Heavy-duty truck (5-MPG)	Heavy-duty truck (7-MPG)
Savings on fuel	$15,171	$7,586	$186,828	$133,449
Extra cost of natural gas car	-$11,000	-$5,500	-$70,000	-$70,000
Total private benefits	**$4,171**	**$2,086**	**$116,828**	**$63,449**

NOTE: Costs do not include the inconvenience associated with fewer refueling stations. The table assumes a gasoline price of $3.46/gallon, a diesel price of $3.81/gallon and a CNG/LNG price of $2.09/gge. Calculations for the sedan and the pickup truck assume 15,000 miles driven annually and for a lifetime total of 200,000 miles. The heavy-duty truck is assumed to be driven 100,000 miles a year for a lifetime total of 500,000 miles. Future costs and benefits are discounted at 4 percent.

2012 were $3.46 and $2.09 per gallon of gasoline equivalent (gge), respectively. At these prices, the private incentive for purchasing a CNG vehicle is considerable. After subtracting the price premium associated with buying a CNG vehicle, the net private savings is almost $2,100 for a sedan and almost $4,200 for a pickup truck.

As with light-duty vehicles, there are also private benefits from shifts to natural gas in the heavy-duty industry. While the upfront cost of conversion—about $70,000[4]—is large, the average miles travelled for combination trucks (those that tow trailers) was roughly 70,000 miles in 2010, while the average fuel economy was 5.9 miles per gallon (MPG) (FHWA 2012). Table 1 shows the resulting net savings of almost $117,000 for a 5-MPG, class 8 truck and nearly $64,000 for a 7-MPG, class 8 truck.

EXTERNAL COST BENEFITS FROM CNG AND LNG

Replacing petroleum with natural gas also could reduce many of the costs associated with petroleum use that are borne by society, but are not borne by the individuals making decisions regarding fuel use. These costs, such as the effects of global warming and pollution, are not included in the price at the gas pump. Economists call them negative externalities. Because they are not factored into the decisions of individual consumers, the market over-consumes petroleum. While markets usually lead to the efficient, or nearly efficient, mixture of goods and services, in the presence of a negative externality, basic microeconomic principles tell us that the market will be inefficient. This opens the door for public policy to improve upon market outcomes.

A variety of negative externalities exist in markets for petroleum products. Natural gas as a transportation fuel does not eliminate all of these externalities, but it reduces many of them significantly. The following discussion provides estimates of these externalities and how natural gas use may mitigate their costs.

Military Interventions. U.S. dependence on oil may increase the required size of our military and influences decisions on whether to engage in military conflicts, which lead to loss of life. Natural gas, on the other hand, does not suffer from military-related externalities because its production is domestic or based in Canada. A wide range of estimates exists as to the size of this externality, with some estimates as high as $1.50 per gallon (ICTA 1998). However, it is unclear whether these represent a true *marginal* cost.

Macroeconomic Shocks. As we saw in 2008, dependence on oil increases our economy's susceptibility to oil-price-shock-driven recessions.[5,6] For the Regulatory Impact Analysis associated with corporate average fuel economy (CAFE) standards, the National Highway Traffic Safety Association (NHTSA) estimates that the increased risk of recession costs society between 8 and 27 cents per gallon of gasoline, with a "most likely" value of 17 cents per gallon (NHTSA 2010). Natural gas would not carry this cost.

Greenhouse Gases. Burning petroleum releases greenhouse gases in atmosphere, which has been shown to lead to increased climate temperatures. While they are not without debate, estimates for the cost of greenhouse gas emissions are about 35 cents per gallon of gasoline and 39 cents per gallon of

diesel.[7] Natural gas does not completely eliminate greenhouse gas emissions, but it reduces them relative to petroleum. The U.S. Environmental Protection Agency (EPA) has suggested greenhouse gas emissions from CNG vehicles are roughly 25 percent lower than from equivalent vehicles running on gasoline.[8]

Local Pollution. Finally, consumption of oil also leads to local pollution, which has been shown to lead to increases in health care costs and increased mortality.[9] The health costs associated with local pollution are about 30 cents per gallon for gasoline and 60 cents per gallon for diesel (NRC 2010). The evidence suggests that natural gas light-duty vehicles create significantly less local pollution than their gasoline counterparts on a per-gallon-of-gas equivalent (gge).[10] On the heavy-duty side, natural gas is also likely to reduce the 60 cent externality because local pollution emissions from diesel engines are particularly high.

Combined these suggest that the externalities of CNG are roughly 39 cents less than gasoline per gge.[11] Table 2 reports the savings in external costs associated with switching to a natural gas vehicle and combines these benefits with the private benefits to show the total social benefits of converting. Reductions in external costs are $4,448 over the life of a pickup truck; for the more fuel-efficient sedan, reductions are half of this amount given that it consumes half of the fuel. As with private benefits, external cost reductions are larger for heavy-duty industry vehicles. For these trucks, the reduction in external costs is nearly $60,000.

CNG VERSUS ELECTRIC VEHICLES

There are considerable potential private and social benefits from CNG adoption relative to existing gasoline vehicles. Another natural comparison is between CNG and battery electric vehicles, either hybrid or all-electric (see Appendix B for detailed comparison of models). The hybrid version has 14

TABLE 2.

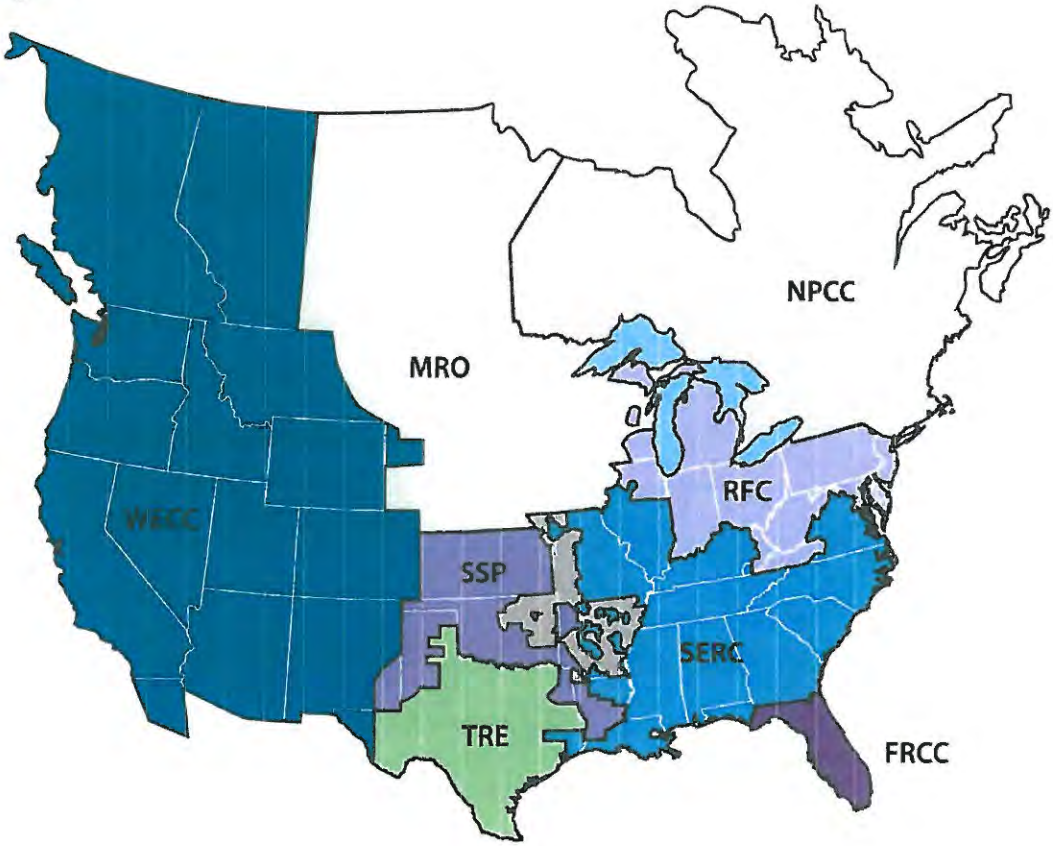
Lifetime Private and External Benefits of Switching from a Conventional Gasoline Vehicle to a Natural Gas Vehicle (Dollars)

	Pickup truck (15-MPG)	Sedan (30-MPG)	Heavy-duty truck (5-MPG)	Heavy-duty truck (7-MPG)
Private Benefits				
Savings on fuel	$15,171	$7,586	$186,828	$133,449
Extra cost of natural gas car	-$11,000	-$5,500	-$70,000	-$70,000
Total private benefits	**$4,171**	**$2,086**	**$116,828**	**$63,449**
External Benefits				
Reduction in external costs				
From lower carbon emissions	$1,093	$546	$8,768	$6,263
From fewer local pollutants	$1,661	$831	$32,586	$23,276
From lower macroeconomic externalities	$1,694	$847	$18,466	$13,190
Total external benefits	**$4,448**	**$2,224**	**$59,820**	**$42,729**
Total social benefit	**$8,620**	**$4,310**	**$176,648**	**$106,177**

Note: Social cost of carbon (SCC) of $35 per ton of carbon dioxide (CO_2), local pollution externality of 30 cents per gallon of gasoline and 60 cents per gallon of diesel, macroeconomic externality of 17 cents per gallon, and a military externality of 0 cents per gallon. The macroeconomic externality is reduced by 10 percent since approximately 10 percent of light-duty fuel is ethanol. Calculations for the sedan and the pickup assume 15,000 miles driven each year and for a lifetime total of 200,000 miles. The heavy-duty truck is assumed to be driven 100,000 miles a year and for a lifetime total of 500,000 miles. Future costs and benefits are discounted at 4 percent.

FIGURE 2.

NERC Regions



percent lower carbon dioxide (CO_2) emissions than the CNG version. If we believe that the social cost of these emissions is 35 cents per gge, then the hybrid version has a 5-cent per gge advantage over the CNG version. However, the hybrid version still suffers from the petroleum-based externalities (military and macroeconomic), so the CNG version has fewer total external costs.

The relative emissions of CNG and all-electric vehicles depend heavily on where the electric vehicles are recharged. Using the marginal greenhouse gas emission rates from Graff Zivin, Kotchen, and Mansur (2012), the per-mile emissions for both vehicles in each of the five electricity regions are shown in Table 3. Both the Nissan Leaf and Chevrolet Volt, two electric vehicles, are dirtier than the Civic CNG and Hybrid versions in two major electrical power system (North American Electric Reliability Corp. [NERC]) regions: the Midwest Reliability Organization (MRO) region and the Reliability First Corp. (RFC) region, which includes Pennsylvania, Ohio, and a large portion of Michigan (Figure 2). Emissions by NERC region and population-weighted average emissions are reported in Table 3.

As a whole, this analysis suggests that CNG vehicles can provide real tailpipe CO_2 emissions reductions compared to traditional gasoline engines and may also provide reductions comparable to all-electric vehicles. Table 4 compares the lifetime private and external benefits of switching from a traditional gasoline sedan to a CNG, hybrid, or all-electric sedan. Given the higher direct social costs of electric vehicles, further analysis suggests that the total social cost for CNG vehicles is lower than that of all-electric vehicles under a wide range of assumptions on the value of externalities.

TABLE 3.

Nissan Leaf and Chevrolet Volt Emissions by NERC Region (Grams of CO_2 per Mile)

NERC Region	Nissan Leaf	Chevy Volt, Electric	Chevy Volt, 50/50	Honda Civic, CNG	V. Passat, CNG*
NPCC	120	124	182	251	192
MRO	344	354	297	251	192
WECC	133	137	188	251	192
ERCOT	171	176	208	251	192
SERC	193	198	219	251	192
SPP	194	200	220	251	192
RFC	275	283	261	251	192
Population-weighted average	**196**	**202**	**221**	**251**	**192**

TABLE 4.

Lifetime Private and External Benefits of Switching from a Conventional Gasoline Vehicle to a Natural Gas, Hybrid, or Electric Vehicle

	CNG	Hybrid	All-Electric, Average	All-Electric in MRO	All-Electric in MPCC
Private Benefits					
Savings on fuel	$7,586	$5,474	$12,298	$12,298	$12,298
Extra cost of car	-$5,500	-$3,500	-$15,500	-$15,500	-$15,500
Total private benefits	**$2,086**	**$1,974**	**-$3,202**	**-$3,202**	**-$3,202**
External Benefits					
Reduction in external costs					
From lower carbon emissions	$546	$625	$696	-$371	$1,246
From fewer local pollutants	$831	$475	$804	$804	$804
From lower macroeconomic externalities	$847	$242	$820	$820	$820
Total external benefits	**$2,224**	**$1,341**	**$2,319**	**$1,253**	**$2,869**
Total social benefit	**$4,310**	**$3,315**	**-$883**	**-$1,949**	**-$333**

Note: Private costs of all-electric calculation assumes average U.S. retail price for electricity and uses a 31-MPG gasoline vehicle for comparison.

Chapter 3: Detailed Policy Proposal

Realizing the benefits of natural gas in transportation for consumers and for society as whole will require policymakers to attack two challenges. The first barrier to adoption of natural gas in transportation—which Table 1 and Table 2 ignore, and which may prevent many consumers from realizing these private savings—is the lack of a refueling infrastructure for both CNG and LNG.[12] As of 2007, there were roughly 120,000 gasoline stations in the United States, according to the U.S. Census Bureau; in contrast there are fewer than 400 public CNG refueling stations—a clear disadvantage for natural gas vehicles. Large-scale adoption of natural gas vehicles requires coordination between vehicle manufacturers, consumers, and refueling stations—either existing gasoline stations or replacements. This creates a chicken-and-egg problem, or a network externality issue. Consumers are unwilling to purchase natural gas vehicles before a refueling infrastructure is built, but businesses will not invest in natural gas refueling stations until there is consumer demand. Each side would be better off if the other side acted first, but neither is willing to move without the other. Left alone, network externalities continue the dominance of the status quo technology when, from society's perspective, it should be replaced with a new technology (Farrell and Saloner 1986).

The second barrier to realizing benefits from natural gas is the costs that petroleum impose on society that are not factored into prices. Because of these costs, people will over-consume petroleum while under-consuming natural gas because natural gas prices understate its advantage relative to gasoline. The ideal starting point for addressing these externalities is for policymakers to set taxes for the externalities associated with consumption of all fuels, known as Pigouvian taxes, so that external costs are included in individual decisions. However, these are unlikely to be implemented, and further policy action would still be justified by the presence of network externalities.

Below are two policy proposals in seven steps. In the first are three steps for creating natural gas fueling infrastructure in the United States. In the second are four steps to promote the use of natural gas vehicles. Each step includes background information and an economic rationale for the policy. These steps do not need to be executed in order, but together, they form parts of a larger whole, pushing on both sides of the network externality problem and creating a more level playing field for natural gas vehicles.

INFRASTRUCTURE-BASED POLICIES

Step 1: Encourage home refueling by pricing natural gas for CNG vehicles at efficient rates.

As with electric vehicles, one of the advantages of CNG over gasoline vehicles is the ability to refuel at home. State utility commissions should require local distribution companies (LDCs) to price natural gas for refueling at marginal cost, or the cost of producing and distributing an additional unit of natural gas. The Federal Energy Regulatory Commission could, perhaps, provide guidance for these changes. Besides the upfront costs, which are roughly $4,000, a second disincentive for consumers to leverage home refueling is that retail rates for natural gas are well above marginal cost.

The high cost of natural gas delivery in homes can overwhelm the price advantage of natural gas, making natural gas artificially more expensive than petroleum. According to the U.S. Energy Information Administration (EIA), natural gas prices at the wellhead were $2.46 per thousand cubic feet in February of 2012, but the average residential price was $9.40 per thousand cubic feet. The average city gate price was $4.75 per thousand cubic feet.

Utilities likely use this pricing structure to help them recover the high costs of building pipelines to distribute gas, but such a price distortion may lead to inefficiently low amounts of adoption of CNG vehicles.[13] The preferential rates recommended are analogous to the preferential electricity rates charged for electric vehicle charging. Gasoline and diesel prices also reflect state and local taxes. To keep the three fuels (gasoline, diesel, and CNG) on an equal footing, natural gas used for CNG and electricity used for recharging electric vehicles should also include these taxes.

Step 2: Encourage local distribution companies to offer CNG stations.

State utility commissions should also allow LDCs to build natural gas fueling stations and to re-coup their investments by including them in their rate hase. Again, the Federal Energy Regulatory Commission could provide guidance for these changes. According to DOE's Alternative Fuels and Advanced Vehicles Data Center (AFDC)[14] a number of CNG stations already exist at natural gas LDC facilities, presumably to refuel

fleets. A rapid way to open up the infrastructure would be to turn these into retail stations.

This would solve a second potential problem with alternative fuels—the potential for market power. Not only does a small refueling network increase inconvenience and costs associated with alternative fuels, it also means that there is little competition in the CNG retail markets. This allows refueling stations to price above marginal costs. Step 2 would guard against this because state utility commissions would regulate retail prices at the LDC stations on a cost-of-service basis.

Step 3: Establish an industry consortium to investigate and coordinate on LNG refueling infrastructure.

One potential advantage of transitions in the heavy-duty industry is that the relevant stakeholders are concentrated and thus an industry consortium with vehicle manufacturers, large vehicle consumers, and fuel providers may be more effective. DOE could create such a consortium to establish so-called blue corridors—networks of refueling stations along widely used interstate routes—with provisions to ensure that LNG is priced fairly.[15]

...although methanol made from natural gas is not a renewable fuel, EISA's preamble states that a major goal of the act is to increase energy security and independence. Methanol produced from natural gas clearly meets these goals. Not only is it a domestic source for energy used in transportation, but it also diversifies our transportation energy sources and thus decreases the susceptibility of the U.S. economy to oil price shocks.

VEHICLE- AND FUEL-BASED POLICIES

Step 4: Include methanol in the Renewable Fuel Standard.

Step 4 is for Congress to expand the Energy Independence and Security Act (EISA), which established the second phase of the federal Renewable Fuel Standard (RFS). The RFS requires certain amounts of biofuels to be sold each year. Biofuels are classified in three groups based on what they are made from and based on their lifecycle greenhouse gas (GHG) emissions. The three groups, in order from highest to lowest GHG emissions, are Conventional Fuels, Advanced Biofuels, and Cellulosic Biofuels.[16] Each has a separate quota. Quotas for the Advanced and Cellulosic groups have been eased. Conventional biofuels are essentially capped at 15 billion gallons, at least as they apply to the RFS.

The goals of the Act are clearly stated in its preamble. EISA begins with the following language:

> To move the United States toward greater energy independence and security, to increase the production of clean renewable fuels, to protect consumers, to increase the efficiency of products, buildings, and vehicles, to promote research on and deploy greenhouse gas capture and storage options, and to improve the energy performance of the Federal Government, and for other purposes.

Besides the quantity requirements for biofuels, EISA included several provisions, ranging from energy efficiency standards for automobiles, buildings, and light bulbs; research and development subsidies; and biofuel infrastructure subsidies.

The rationale for this step is that although methanol made from natural gas is not a renewable fuel, EISA's preamble states that a major goal of the act is to increase energy security and independence. Methanol produced from natural gas clearly meets these goals. Not only is it a domestic source for energy used in transportation, but it also diversifies our transportation energy sources and thus decreases the susceptibility of the U.S. economy to oil price shocks.

Another goal of the Act is to reduce greenhouse gas emissions. Otherwise, EISA would not have differentiated fuels by their lifecycle emissions. Delucchi (2003) estimates that the lifecycle greenhouse gas emissions of methanol, made from natural gas, are more than 11 percent lower than gasoline. In contrast, Delucchi estimates that the lifecycle emissions of corn-based ethanol when distilled using the average electricity generation mix in the United States are 10 percent higher than gasoline. Other estimates suggest that the gap between corn-based ethanol and natural gas-based methanol is even larger (Argonne 2011). While it is unlikely that natural gas-based methanol would qualify for the Advanced and Cellulosic categories in terms of its

lifecycle emissions, treating it as a Conventional Biofuel is entirely consistent with the goals of the Act. Furthermore, by expanding the scope of fuels included within the RFS, this recommendation could reduce the costs of compliance.[17]

Step 5: Mandate a significant share of vehicles manufactured to be able to burn gasoline, ethanol, and methanol.

Internal combustion engines are able to burn not only gasoline, but also ethanol and methanol, both of which are alcohols. A number of flex-fuel vehicles that can burn both gasoline and ethanol already exist on the road partly because of a provision in the CAFE standard that treats the fuel economy of these vehicles as much higher than vehicles that cannot burn ethanol.[18] Creating a tri-fuel mandate would require similar Congressional action.

As with ethanol, engines must be modified to burn methanol in large proportions. Some estimates suggest that an open fuel standard would cost, on average, $100 per vehicle for new vehicles (Open Fuel Standard of 2011 Fact Sheet).[19] Other estimates suggest that requiring vehicles to be able to burn both ethanol and methanol would add an additional $200 over vehicles that can burn gasoline and ethanol (MIT 2011).

A flex-fuel mandate is designed to overcome a network externality associated with natural gas fuels. It is conceivable that if the methanol infrastructure were in place, more consumers (and automobile manufacturers) would find it in their interest to purchase (or produce) vehicles that operate on gasoline, ethanol, and methanol. Similarly, if vehicles that could operate on methanol were to exist, it is conceivable to think that firms would find methanol infrastructure investments profitable. However, without the infrastructure, the automobiles do not exist, and without the automobiles, the infrastructure does not exist.

The small investment in each vehicle also has "option value" for the U.S. economy. Such a fuel standard would allow Americans to diversify their fuel sources if gasoline prices continue to rise. While this, by itself, is not a rationale for government intervention, this strengthens the network externality issues discussed above.

I am not the first to suggest policies requiring greater flexibility in fuel uses. Another example is a recent bill introduced by Congressmen John Shimkus (R-IL), Eliot Engel (D-NY), Roscoe Bartlett (R-MD), and Steve Israel (D-NY)—the Open Fuel Standard (OFS) Act (HR 1687). Senators Maria Cantwell (D-WA) and Dick Lugar (R-IN) have recently introduced a similar measure into the Senate (SA 1657). HR 1687 would require 50 percent of new automobiles in 2014 to be able to run on at least one alternative fuel group. This would increase to 80 percent in 2016 and 95 percent in 2017.

A qualified vehicle is defined as

- A vehicle that operates solely on natural gas, hydrogen, or biodiesel
- A flexible fuel vehicle capable of operating on gasoline, E85 (a mix of 85 percent ethanol and 15 percent gasoline), and M85 (a mix of 85 percent methanol and 15 percent gasoline)
- A plug-in electric drive vehicle
- A vehicle propelled solely by fuel cell or by something other than an internal combustion engine

I recommend two changes to the Open Fuel Standard. First, the time frame needs to be adjusted. Given the design cycle of vehicles—namely that manufacturers are often working today on vehicles that will be produced five years in the future—requiring 50 percent of vehicles to be tri-flex fuel within two years is too aggressive. Second, the language of the Act does not provide justification for the 85/15 split. Methanol or ethanol are unlikely to scale up to 85 percent of fuel consumed. A more modest fuel standard may be just as effective and less costly because vehicle costs are increasing in the maximum amount of ethanol or methanol that can be burned. Widening the range of fuels that a vehicle can accept increases the programming required and may increase the costs of other modifications. A more cost-effective implementation strategy would call for a greater number of vehicles capable of burning a lower amount of alternative fuel, rather than a high maximum amount of alternative fuel allowed with fewer vehicles. That is, requiring 80 percent of vehicles to be able to burn up to 40 percent methanol would be more cost-effective than requiring 40 percent of vehicles to be able to burn 80 percent methanol.

I would encourage a timeline that requires 50 percent of new automobiles in 2016 to be able to run on up to 50 percent of both ethanol and methanol, 80 percent of new vehicles by 2018, and 95 percent by 2020.

Step 6: Provide subsidies for natural gas vehicles commensurate with the reduction in external costs associated with their use.

Currently electric vehicles (EVs) with battery packs larger than four kilowatt-hours qualify for a federal income tax credit of $7,500. A recent budget proposed by the Obama administration calls for this to increase to $10,000.[20] The current subsidy for CNG vehicles is $4,000. CNG sedans should qualify for the same level of federal income tax credits as EVs. In addition, medium-duty CNG pickups should receive more federal tax credits than both CNG and EV sedans.

As discussed in the section of this paper on CNG versus all-electric vehicles, both types of vehicles have similar greenhouse gas emissions when comparing the direct emissions of the

TABLE 5.

Lifetime External Benefits of Switching from a Conventional Gasoline Vehicle to a CNG, All Electric, or M85 Vehicle (Dollars)

	CNG Replacement	M85 Replacement	EV Replacement, Average	EV Replacement in MRO	EV Replacement in MPCC
Pickup truck (15-MPG)	$4,448	$612			
Sedan (30-MPG)	$2,224	$306	$2,319	$1,253	$2,869

power plants used to charge electric vehicles and the tailpipe emissions from CNG. Also, neither type of vehicle carries the negative externalities associated with macroeconomic movements and military costs and losses. The savings in greenhouse gases from all-electric vehicles depend heavily on where the electric vehicle is charged. Despite this, the federal tax credit does not differentiate based on the location of the electric vehicle.

Step 6 is part of a larger recommendation regarding tax subsidies for alternative-technology vehicles—policies should not pick winners; tax subsidies should be based on a vehicle's reduction in externalities relative to the vehicle that the consumer would have purchased in the absence of policy action. Even if policy does not differentiate electric vehicles by the source of their electric charges, it is clear that CNG vehicles can lead to larger reductions in externalities if the alternative traditional vehicle is a low-mileage pickup truck; the relative levels of the two vehicles' subsidies does not reflect the relative reduction in externalities.

A more general framework for defining the level of vehicle subsidies based on the savings in externalities allows the policy to be consistent across alternative vehicles. Anything other than this is implicitly, or explicitly, picking winners. For example, such a framework could be applied to vehicles that run on methanol. Table 5 reports the potential savings in external costs for CNG vehicles, electric vehicles, and vehicles running on M85 (again, 85 percent may be an arbitrary percentage).

The current subsidy for electric vehicles is roughly three times the reduction in externalities for an electric vehicle driven 15,000 miles per year and recharged using power plants with average emissions. Based on externalities and this three-times guideline, a 15-MPG vehicle running on M85 would qualify for a subsidy of roughly $1,800. Using the electric-vehicle subsidy as a guide, an argument could be made that a 15-MPG CNG vehicle should receive a subsidy of more than $13,000.

Perhaps, more importantly, such a framework would allow policymakers to apply consistent principles to the heavy-duty industry. Table 2 makes clear the large potential social benefits from the heavy-duty industry adopting LNG vehicles. As a point of reference, the New Alternative Transportation to Give Americans Solutions (NATGAS) Act of 2011 calls for a $7,500 subsidy for CNG light-duty vehicles and up to a $64,000 subsidy for heavy-duty vehicles. Despite the large subsidy for heavy-duty vehicles, the subsidy is a much smaller percentage of the external costs savings compared to the subsidy for all-electric vehicles. In terms of reducing external costs, the $64,000 has a much higher rate of return than both the $7,500 for CNG vehicles and the current subsidy for electric vehicles.

Step 7: Streamline the retrofitting certification process for gasoline vehicle conversion to CNG.

This step would allow consumers to take advantage of the fact that, in principle, existing gasoline-powered vehicles can be retrofitted. Because new vehicles comprise roughly 8 percent of the vehicle stock in any one year, the ability to retrofit existing vehicles can increase the savings in external costs. The EPA and California Air Resource Board (CARB) have certification programs for CNG conversions. According to Natural Gas Vehicles for America,[21] there are thirteen engine families for which certified conversions are offered; all of these are General Motors, Chrysler, or Ford engines. Non-certified conversions also are offered for many more.

One reason offered for why non-certified conversions are common is the claim that the EPA and CARB certification process is unduly expensive. The Web site GreenCar.com suggests that certification for conversion systems costs as much as $200,000 per engine family.[22] These costs might be appropriate, but if not, the EPA and CARB should look at ways to streamline the process.

Chapter 4: Implementation Costs and Benefits

Step 1: Encourage home refueling by pricing natural gas for CNG vehicles at efficient rates.

The benefits of efficient rates will allow consumers to take advantage of the lower costs of natural gas, relative to gasoline, and provide the incentives for consumers to install home refueling infrastructure.

There are potential costs. Because natural gas LDCs are subject to cost-of-service regulations, reductions in retail rates for CNG vehicle consumers may lower the rate-of-return earned on capital. If the return on capital fell, it would require an increase in retail rates for other consumers. Another way to keep LDCs at their current returns on capital is to charge a fixed monthly fee for access to the CNG rates. This is the standard "two-part tariff" that increases the efficiency of the rate structure. The advantage of this is that the rates of other LDC products would not have to increase, and CNG owners would still have the correct incentives on the margin.

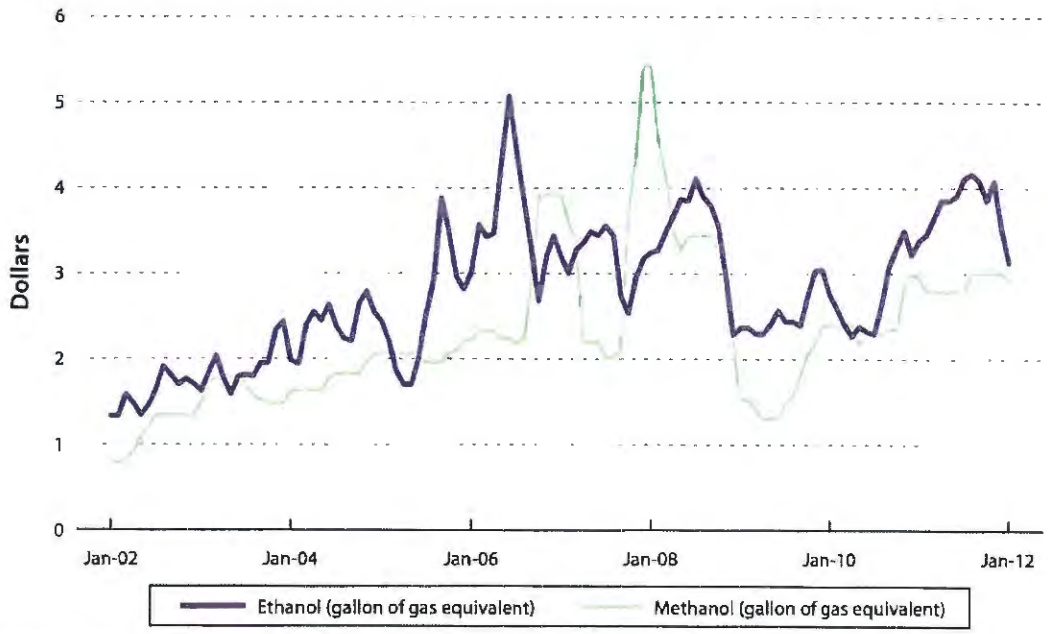
Step 2: Encourage local distribution companies to offer CNG stations.

As noted in the previous section, there are two major benefits from allowing local distribution companies to open CNG refueling stations to the public. It is a step toward solving the network externalities associated with alternative fuels and technologies. The other benefit is that it supplies a set of CNG refueling stations operated via a cost-for-service model to alleviate some of the potential market power that retail CNG stations may enjoy in the early part of the market.

The costs associated with this recommendation are the costs of the refueling centers. Given the regulatory structure of LDCs, it is straightforward to ensure that these costs are borne by the consumers using the service and not all natural gas consumers.

FIGURE 3.

Wholesale Prices of Methanol and Ethanol Over Time



Source: Nebraska Energy Office and Methanex.

TABLE 6.

Lifetime External Benefits of Switching from a Conventional Gasoline Vehicle to a CNG or Methanol Vehicle (Dollars)

	CNG Replacement	M50 Replacement	M85 Replacement
Pick-up truck (15-MPG)	$4,448	$282	$612
Sedan (30-MPG)	$2,224	$141	$306

Step 3: Establish an industry consortium to investigate and coordinate on LNG refueling infrastructure.

Establishing an industry consortium to coordinate the creation of blue corridors is an effective way to solve the network externality issues associated with LNG. Such consortia appear to have been effective in Europe; a number of LNG refueling terminals exist and many more are being proposed.[23] The cost of coordinating efforts among industry stakeholders seems to be minimal.

Step 4: Include methanol in the Renewable Fuel Standard.

There are no direct costs of this recommendation, but there are indirect cost reductions. The benefits will depend on how scalable methanol is from current production levels and how "binding" the RFS regulation is—that is, by how much the RFS incentivizes shifts to ethanol and methanol. Current wholesale ethanol and methanol prices suggest that the benefits may be large. Figure 3 plots wholesale ethanol and methanol prices since 2002 on a gge basis. The average price difference over this time has been 84 cents and $1 since 2009. While it is doubtful such a price difference would continue if we ramped methanol production to the entire RFS level (and ethanol production down to zero), these data suggest that methanol may reduce the compliance costs of the RFS.

Step 5: Mandate a significant share of vehicles manufactured to be able to burn gasoline, ethanol, and methanol.

The social benefits of this recommendation come from both solving the network externality market failure associated with fuel and vehicles, as well as reducing the external costs of driving. Table 6 lists the reduction in external costs from shifting a vehicle from gasoline to M50 or M85. Even if we were to ignore the benefits associated with alleviating the network externality, the social benefits from a reduction in external costs exceed the estimated increase in the cost of the vehicle, especially for a 15-MPG vehicle.

TABLE 7.

Aggregate Benefits of Natural Gas Vehicle Penetration (Billions of Dollars)

	Scenario	Savings in private costs	Savings in external costs
CNG replacement of light-duty vehicles	5 percent	8.4	2.4
	10 percent	16.8	4.8
	25 percent	41.9	12.0
	50 percent	83.8	24.0
CNG/LNG replacement of medium- and heavy-duty vehicles	5 percent	3.9	1.3
	10 percent	7.7	2.6
	25 percent	19.3	6.4
	50 percent	38.7	12.8

Step 6: Provide subsidies for natural gas vehicles commensurate with the reduction in external costs associated with their use.

We can also place bounds on the social benefits from subsidizing CNG by measuring the reduction in externalities over the life of the vehicles. This is a lower bound on the benefits since it ignores the network externality justifications for subsidizing alternative technologies. These are repeated in Table 6. As discussed in the previous section, the reduction in external costs for CNG vehicles with a fuel economy of 30 MPG, relative to the $7,500, is similar in magnitude to today's subsidies for all electric vehicles; the reduction in external costs for CNG vehicles with a fuel economy of 15 MPG is twice as large.

The social benefits from incentivizing shifts from diesel-based, heavy-duty trucks to LNG are even greater. The upfront investment also is greater. However, a more important comparison is the social rate of return, that is, the ratio of the benefits to the subsidy. While a heavy-duty subsidy does not currently exist, for all-electric vehicles the social benefits are roughly one-third the subsidy. For a high fuel economy CNG (say, 30 MPG) vehicle, the social returns are roughly 60 percent of current subsidies; for a low fuel economy CNG (say, 15 MPG) vehicle, the social return of a $4,000 subsidy is 110 percent.

These simple calculations underline the point that the current structure of subsidies is not uniform across technologies, at least when we focus on the social benefits of shifts to the different technologies. The payoffs range from 110 percent of the subsidy for low fuel economy CNG vehicles to 33 percent for electric vehicles. If we were to apply this range to LNG vehicles, the range of subsidies would be roughly $55,000 using current subsidies for CNG medium-duty vehicles ($60k/1.10), to more than $180,000 ($60k/0.33) using current subsidies for electric vehicles, for 5-MPG heavy-duty trucks, and $39,000 to $130,000 for 7-MPG heavy-duty trucks ($43k/1.10 to $43k/0.33).

These calculations suggest that recent proposals to offer subsidies of up to $64,000 for the heavy-duty industry (NATGAS Act) have a high rate of return relative to existing subsidy programs. Therefore, shifts away from low rate-of-return subsidies to high rate-of-return subsidies can actually decrease the aggregate budget associated with subsidy programs, while keeping the reduction in external costs constant. Alternatively, holding fixed the aggregate subsidy budget, we can increase the reduction in external costs by making such shifts.

Step 7: Streamline the retrofitting certification process for gasoline vehicle conversion to CNG.

The direct costs associated with this recommendation are the added manpower required to investigate the certification process. The potential benefits come from reducing the costs of retrofitting the existing fleet. Because, in any given year, only 8 percent of all vehicles are new, reducing costs associated with retrofits can have large benefits.

Combined private and external benefits.

Projections as to how these policies would change the adoption of natural gas vehicles are difficult to make, since the evolution of the fleet depends on many things. One could, however, calculate the savings in private and external costs under different penetration rates of natural gas. Here, I focus on the penetration of CNG and LNG.

Table 7 reports the aggregate savings in private and external costs under penetration levels of 5, 10, 25, and 50 percent. To calculate these, I use gasoline and diesel consumption for 2010 broken down by vehicle type, reported by the Bureau of Transportation Statistics. The table illustrates that even under modest penetration rates, given the sheer size of the transportation sector significant private and external costs savings would occur. A 10 percent penetration rate, alone, would reduce annual private costs by nearly $25 billion and external costs by over $7 billion.

Chapter 5: Questions and Concerns

Recently there has been a focus on so-called fugitive methane emissions—methane leaks along the transportation network. Fugitive emissions undermine the greenhouse gas benefits from shifting to CNG vehicles, and the lifecycle emissions of methanol. Because of the higher radiative force of methane relative to CO_2, methane emissions have a global warming potential that is twenty-five times that of CO_2 over a 100-year period and seventy-two times that of CO_2 over a 20-year period (Shindell et al.). Alvaraz et al. (2011) find that if the EPA's estimate of fugitive emissions is 2.4 percent of total production (and this figure is applied to scaling up natural gas production) shifts to natural gas in the light-duty market increase global warming for the first 80 years and shifts to natural gas in the heavy-duty market increase global warming for the first 280 years. They also find that if fugitive emissions are reduced to roughly 1.5 percent, shifts to CNG lead to immediate global warming benefits in the light-duty market; if fugitive emissions fall to 1 percent, immediate benefits are found for the heavy-duty industry.

Three points are worth noting. First, the current level of emissions may reveal little about the cost of reducing them. It may be relatively costless to do so. The EPA has recently taken steps to reduce fugitive emissions by altering air regulations. Future fugitive emissions and the success of these changes should be monitored.

Second, the EPA's assumption that 2.4 percent of natural gas is leaked into the atmosphere is not without controversy. The natural gas industry, not surprisingly, contends that actual emissions are much lower and noted that the EPA's figure is based on data taken from old natural gas wells; the implication is that newer wells will have a smaller rate of lifetime fugitive emissions.

Finally, greenhouse gas emissions reductions are only one benefit from shifts to natural gas as a transportation fuel. The private benefits discussed above do not depend on greenhouse gas reductions. In addition, there are three additional market failures. If I estimate the reduction in external costs assuming that greenhouse gas benefits are zero, the reduction in external costs is still substantial, falling only 25 percent from the previous external benefits of CNG vehicles. The reduction in external costs for heavy-duty vehicles remains high as well, falling by roughly 15 percent (see Table 8).

A second issue is that the first recommendation (including methanol in the RFS) is likely to shift economic rents or profits from firms inside the corn-based ethanol supply chain to firms inside the methanol supply chain. While this is not a cost to society, such a transfer is likely to lead to resistance of this recommendation from firms involved in the corn-ethanol supply chain.

TABLE 8.

Lifetime External Benefits of Switching from a Conventional Gasoline Vehicle to a CNG Vehicle, Assuming No Greenhouse Gas Benefits (Dollars)

	Pick-up truck (15-MPG)	Sedan (30-MPG)	Heavy-duty truck (5-MPG)	Heavy-duty truck (7-MPG)
Reduction in external costs				
From fewer local pollutants	$1,661	$831	$32,586	$23,276
From lower macroeconomic externalities	$1,694	$847	$18,466	$13,190
Total external benefits	**$3,355**	**$1,678**	**$51,052**	**$36,466**

Chapter 6: Conclusion

Recent advances in natural gas drilling as well as increases in oil prices appear to have made natural gas competitive with oil in the long run. For many reasons, such a change in price may not be enough to cause the United States to substitute natural gas for oil in the transportation sector, even when it is socially beneficial to do so. The playing field across alternative transportation fuels is simply not level. While policy has promoted ethanol and electric vehicles as the future substitute for petroleum-based vehicles, methanol CNG vehicles offer similar, if not greater, benefits at a lower cost. In this paper, I lay out a proposal for leveling the playing field between petroleum, ethanol, electricity, and natural gas.

Appendices

APPENDIX A. COMPARISON OF CNG AND GASOLINE VEHICLES

Currently, while a number of CNG and bi-fuel (vehicles that run on both CNG and gasoline) vehicles are sold in Europe, only one CNG vehicle is sold in the United States—the Honda Civic. Chrysler, Ford, and GM have all recently announced plans to offer CNG pickup trucks and vans in the medium-duty classes. Appendix Table 1 reports the fuel economy of the CNG version Civic (on a gallon-of-gas-equivalent [gge] basis) and the gasoline version. On a combined-fuel-economy basis, they have the same fuel economy.

To calculate the price premium for the Civic CNG and hybrid sedans, I used Honda's on-line comparison tool and compared the CNG version to the EX version with cloth seats. The tool adjusts for differences in standard features. To calculate the price comparisons with the Nissan Leaf and Chevrolet Volt, I used truedelta.com's price comparison tool. This too adjusts for differences in features.

APPENDIX TABLE 1.

Comparison of Honda and Volkswagen CNG Models to Their Closest Gasoline Counterpart

	Honda Civic CNG	Honda Civic Gasoline	Honda Civic HEV	Volkswagen Passat CNG, running on CNG	Volkswagen Passat CNG, running on gasoline
Engine Type	4-Cylinder	4-Cylinder	4-Cylinder	4-Cylinder Turbocharged	4-Cylinder Turbocharged
Displacement (cc)	1798	1798	1497	1390	1390
Horsepower	110	140	110	150	150
Torque (lb.-ft.)	106	128	127	220	220
Transmission	5-Speed Auto	5-Speed Auto	CVT	7-Speed Auto	7-Speed Auto
Weight	2848	2705	2853		
Length (in)	177.3	177.3	177.3	187.8	187.8
Width (in)	69.0	69.0	69.0	71.7	71.7
Wheelbase (in)	105.1	105.1	105.1	106.8	106.8
EPA Mileage Estimate					
City (MPGge)	27	28	44	26	27
Highway (MPGge)	38	36	44	44	42
Combined (MPGge)	31	31	44	36	35
Range (miles)	249	409	581	303	283
CO_2 Emissions (g/mi, electricity/tailpipe)	251	306	217	192	254
Price relative to gasoline version	5,500		3,500		

APPENDIX B: COMPARISON OF CNG AND ELECTRIC VEHICLES

The Honda Civic, Nissan Leaf, and Chevrolet Volt compare favorably to each other. Appendix Table 2 shows specifications for the Nissan Leaf, Chevrolet Volt, and the three versions of the Honda Civic. The three vehicles are similar in length, width, and wheelbase. The weight is difficult to compare because the Leaf's battery and control module weigh approximately 400 pounds, while the Volt has both an internal combustion engine and electric technologies. The Leaf and CNG Civic have identical horsepower, although the Leaf's torque is much higher, a benefit of electric motors. The Volt and Civic gasoline versions have similar horsepower, and again, the Volt has much more torque. The distance range of the CNG Civic is over three times the Leaf's; the range for the Volt is very high considering that it has access to the internal combustion engine to recharge the batteries. The upfront cost of the vehicles is the key difference. Using truedelta.com's comparison tool, which allows the user to control for different features, both the Leaf and the Volt are over $10,000 more expensive than the comparably equipped CNG Civic.

APPENDIX TABLE 2.

Comparison of Nissan Leaf and Chevrolet Volt to Honda Civic CNG, Gasoline, and Hybrid Versions

	Nissan Leaf	Chevrolet Volt	Honda Civic CNG	Honda Civic Gasoline	Honda Civic HEV
Engine Type	—	4-Cylinder	4-Cylinder	4-Cylinder	4-Cylinder
Displacement (cc)	—	1400	1798	1798	1497
Horsepower	110	149	110	140	110
Torque (lb.-ft.)	207	273	106	128	127
Transmission			5-Speed Auto	5-Speed Auto	CVT
Weight	3366	3755	2848	2705	2853
Length (in)	175	177.1	177.3	177.3	177.3
Width (in)	69.7	70.4	69.0	69.0	69.0
Wheelbase (in)	106.3	105.7	105.1	105.1	105.1
EPA Mileage Estimate					
City (MPGge)	106	95/35	27	28	44
Highway (MPGge)	92	93/36	38	36	44
Combined (MPGge)	99	94/35	31	31	44
Range (miles)	73	36/310	249	409	581
CO_2 Emissions (g/mi, electricity/tailpipe)	124-354	127-364/240	251	306	217
Price relative to gasoline version			5,500		3,500
TrueDelta Value Comparison to Volt			-11,240	-16,740	-13,240
TrueDelta Value Comparison to Leaf			-9,625	-15,125	-11,625

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Endnotes

1. The figure also includes a Lowess smoothed line, which is similar in nature to a moving average, but smooths both backwards and forwards.
2. See NGVAmerica.org.
3. Peterbilt and Kenworth both offer LNG versions of class 8 trucks using the Westport LNG fuel system (http://www.westport-hd.com).
4. Personal conversations with Westport suggest that the LNG feature adds roughly $70,000 to the cost of a tractor trailer.
5. See, for example, Hamilton (1983, 2009, and 2011).
6. A common misconception is that if the United States produced enough oil to satisfy its consumption, the country would be insulated completely from oil price shocks. This is not the case. Because oil is easily transported across the world, the oil market is a global market. Imagine that U.S. production matched consumption. If the world price of oil increased either through an increase in world demand or a supply shock, the oil prices faced by the United States would also increase because U.S. producers have the option to sell on the world market. Absent large trade barriers in the form of export taxes, the U.S. economy would still face world oil price shocks. While domestic profits for oil-producing firms would increase and thus reduce the shock to some degree, prices for products based on oil (e.g., gasoline and diesel) would still increase.
7. These estimates include tailpipe emissions but not upstream emissions. Greenstone et al. (2011) have an average social cost of carbon (SCC) at a 3 percent discount rate of $24 per ton of carbon dioxide (CO_2) in 2015 and an average of $35 in 2015 using a 2.5 percent discount rate. A gallon of gasoline generates roughly 20 pounds of CO_2 when burned, while a gallon of diesel generates roughly 22 pounds.
8. This is consistent with several side-by-side comparisons of bi-fuel vehicles—vehicles that are designed to burn and carry both gasoline and CNG—offered in Europe. For example, Volkswagen offers a bi-fuel Passat that carries both 21 kg of CNG (equivalent to 8.5 gallons of gasoline) and 8.3 gallons of gasoline. (Appendix Table 1 describes the details of this vehicle.) Volkswagen reports tailpipe emissions from the Passat are 192 g/mile when burning CNG and 254 g/mile when burning gasoline, a 24.4 percent reduction. In many ways, this is the ideal experiment since every other feature of the vehicle is held constant. Unlike the Passat, the Civic runs only on CNG, but we can compare the Civic CNG and Civic gasoline versions. Appendix Table 1 suggests that the tailpipe emissions from the CNG version are 18 percent lower than the gasoline version. This is somewhat of an overstatement of the emission reductions since the gasoline version has 30 more horsepower than the CNG version (140 HP v. 110 HP).
9. There is a long literature in economics documenting the link between criteria pollutants and health. See, for example, Chay and Greenstone (2003a and 2003b). For studies that directly relate health outcomes to driving, see Currie and Walker (2011) and Knittel, Miller, and Sanders (2011).
10. See, for example, http://www.afdc.energy.gov/afdc/pdfs/epa_cng.pdf, which reports reductions in carbon monoxide emissions of 90 percent to 97 percent, reductions in nitrogen oxide emissions of 35 percent to 60 percent, and potential reductions in non-methane hydrocarbon emissions of 50 percent to 70 percent, as well as other local pollution benefits. The Web site http://www.fueleconomy.gov/feg/bifueltech.shtml reports CNG vehicles have 60 percent to 90 percent less smog-forming emissions.
11. 0 + 17*.9 + 30*.5 + 35*.25. Since roughly 10 of light-duty fuel is ethanol, I reduce the macroeconomic externality by 10 percent. And, if LNG or CNG cuts diesel criteria pollutant emissions to those of gasoline-power vehicles, natural gas has externalities that are $0.55 less than a gallon of diesel.
12. It also ignores any additional maintenance costs associated with CNG vehicles, although a study of CNG taxis in New York suggests that maintenance costs might be lower. See http://www.consumerreports.org/cro/2012/03/the-natural-gas-alternative/index.htm.
13. This markup may also be viewed as a tax that prices some of the externalities associated with natural gas, but a recent paper by Lucas Davis and Erich Muehlegger (2010) suggests that the average residential and commercial markup over marginal costs exceeds 40 percent; this is equivalent to a tax of $50 per ton of CO2 (Davis and Muehlegger 2010). This exceeds the external costs estimates of Greenstone et al. (2011). In the absence of a tax for gasoline of the same size, this will distort the decision to use home refueling.
14. See http://www.afdc.energy.gov.
15. DOE has been active in encouraging fleets of heavy-duty vehicles to convert to natural gas as part of its Clean Cities initiative (http://energy.gov/articles/national-clean-fleets-partnership-moves-forward), and so could be well-placed to do something similar for long-haul trucks.
16. Advanced biofuels can be made from a variety of feed stocks but must have lifecycle greenhouse gas emission at least 50 percent less than the baseline fuel. Cellulosic biofuels must be made from cellulose, hemi-cellulose, or lignin derived from renewable biomass and have lifecycle emissions at least 60 percent less than the baseline fuel. Conventional biofuels are derived from cornstarch.
17. Holland et al. (2011) illustrate that the RFS is an expensive way to reduce greenhouse gas emissions and oil consumption, relative to Pigouvian taxes.
18. These vehicles are capable of burning up to 85 percent ethanol; the EPA recently ruled that non-flex fuel vehicles are able to safely burn fuel with up to 15 percent ethanol.
19. See http://openfuelstandard.blogspot.com/2011/05/ofs-fact-sheet.html.
20. See http://content.usatoday.com/communities/driveon/post/2012/02/president-obama-budget-electric-car-subsidies-chevrolet-volt/1#.T2jM-DVGi5sQ.
21. See NGVAmerica.org.
22. See http://www.greencar.com/articles/can-convert-natural-gas.php.
23. See http://www.gie.eu/maps_data/downloads/2011/GLE_LNG_August2011_MAP.pdf.

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Director

Highlights

Christopher R. Knittel of MIT puts forward policies to support the development of natural gas fueling infrastructure and to encourage the use of natural gas fuels and vehicles. These measures take advantage of the opportunity offered by the shale gas revolution to substitute natural gas for petroleum, increasing U.S. energy security and reducing the environmental and health costs of our energy choices.

The Proposal

A. Support the development of natural gas fueling infrastructure

- Step 1: Encourage home refueling by pricing natural gas for CNG vehicles at efficient rates.
- Step 2: Encourage natural gas local distribution companies to offer CNG stations.
- Step 3: Establish an industry consortium to investigate and coordinate on LNG refueling stations.

B. Encourage the use of natural gas fuels and vehicles

- Step 4: Include methanol in the Renewable Fuel Standard.
- Step 5: Mandate a significant share of vehicles manufactured to be able to burn gasoline, ethanol, and methanol.
- Step 6: Provide subsidies for natural gas vehicles commensurate with the reduction in external costs associated with their use.
- Step 7: Streamline the retrofitting certification process for gasoline vehicle conversion to CNG.

Benefits

These proposals will help overcome obstacles in establishing a critical mass of natural gas fueling stations and generating the initial demand necessary to sustain these stations. The creation of this network of stations allows consumers to realize the cost savings promised by cheap natural gas. An overall shift to natural gas will also benefit society, because natural gas emits fewer greenhouse gases and local pollutants than petroleum. Finally, these proposals will reduce U.S. dependence on oil, increase U.S. energy security, and diversify our energy sources.

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LGIF – Round 5 – Grant
"CURE – CNG Conversion/Shared Fueling Station Study

ISSUES FOR RESPONSE

3. Project Budget – See Attachment A

4. Program Budget – See Attachment B 1-6

5. Return on Investment – See Attachment C

6. Resolutions of Support – N/A (per phone conversation, all three are private businesses, no resolutions required)

7. Partnership Agreements – See Attachment D 1-3

Dr. Jim Lahoski, Superintendent • Mrs. Rhonda Feasel, Treasurer
Mr. Terry Conley, Deputy Superintendent • Mrs. Brenda Luhring, Deputy Superintendent

Attachment A

LGIF Round 5 Grant - CNG Conversion/Shared Fueling Station Study
Issues for Response #3

Natural Gas Conversion/Shared Fueling Station Study

Project Budget

Source of Funds

LGIF Request	$	100,000
In-kind Match (List Sources Below)		
Hugh Quill/Public Performance Partners		7,140
NCORcog Staff Time		7,115
Estimated Data Collection Hours		18,450
City of Tiffin-Staff Time		88
Total Match	$	32,793
Total Sources	$	132,793

Use of Funds

	Amount	Revenue Source
Consultant Fees	$60,000	LGIF Grant
Grant Administration	18,000	LGIF Grant
Project Management	12,000	LGIF Grant
Legal Services	10,000	LGIF Grant
Public Performance Partners	7,140	In-Kind
NCORcog Staff Time	7,115	In-Kind
Estimated Data Collection Hours	18,450	In-Kind
City of Tiffin - Staff Time	88	In-Kind
Total Uses	132,793	
Local Match Percentage	25%	

LGIF Round 5 Grant - CNG Conversion/Shared Fueling Station Study
Issues for Response #4

Fuel Savings Calculations

Attachment B-1

			City of Tiffin		
Gasoline	USEIA Rate		Annual Costs	# Gallons	$1.30/GGE
2009	$2.352	Police	**$43,830**	18,635.204	$24,225.77
		Street Maint.	**$27,872**	11,850.340	$15,405.44
		Parks	**$6,704**	2,850.340	$3,705.44
		Total	$78,406	$33,336	$43,337
2010	$2.756	Police	**$52,556**	19,069.666	$24,790.57
		Street Maint.	**$25,528**	9,262.700	$12,041.51
		Parks	**$7,930**	2,877.358	$3,740.57
		Total	$86,014	$31,210	$40,573
2011	$3.499	Police	**$66,650**	19,048.300	$24,762.79
		Street Maint.	**$22,672**	6,479.566	$8,423.44
		Parks	**$10,312**	2,947.128	$3,831.27
		Total	$99,634	$28,475	$37,017
2012 est	$3.429	Police	$73,000	21,289.006	**$27,675.71**
		Street Maint.	$35,000	10,207.057	**$13,269.17**
		Parks	$10,000	2,916.302	**$3,791.19**
		Total	$118,000	$34,412	$44,736
2013 est	$3.425	Police	$85,000	24,817.518	**$32,262.77**
		Street Maint.	$35,000	10,218.978	**$13,284.67**
		Parks	$12,000	3,503.650	**$4,554.74**
		Total	$132,000	$38,540	$50,102
2014 est	$3.645	Police	$90,000	24,691.358	**$32,098.77**
		Street Maint.	$35,000	9,602.195	**$12,482.85**
		Parks	$12,000	3,292.181	**$4,279.84**
		Total	$137,000	$37,586	$48,861

Attachment B-2

Diesel	USEIA Rate		City of Tiffin Annual Costs	# Gallons	$1.30/GGE
2009	$2.445	Fire	**$18,056**	7,384.867	$9,600.33
		Sewer Plant	**$8,798**	3,598.364	$4,677.87
		Sewer Maint	**$8,293**	3,391.820	$4,409.37
		Total	$35,147	$14,375	$18,688
2010	$2.998	Fire	**$23,280**	7,765.177	$10,094.73
		Sewer Plant	**$8,446**	2,817.211	$3,662.37
		Sewer Maint	**$17,056**	5,689.126	$7,395.86
		Total	$48,782	$16,272	$21,153
2011	$3.879	Fire	**$30,304**	7,812.323	$10,156.02
		Sewer Plant	**$9,251**	2,384.893	$3,100.36
		Sewer Maint	**$33,911**	8,742.202	$11,364.86
		Total	$73,466	$18,939	$24,621
2012	$3.876	Fire	$28,000	7,223.942	**$9,391.12**
		Sewer Plant	$9,000	2,321.981	**$3,018.58**
		Sewer Maint	$50,000	12,899.897	**$16,769.87**
		Total	$87,000	$22,446	$29,180
2013	$3.592	Fire	$35,000	9,743.875	**$12,667.04**
		Sewer Plant	$10,000	2,783.964	**$3,619.15**
		Sewer Maint	$50,000	13,919.822	**$18,095.77**
		Total	$95,000	$26,448	$34,382
2014	$3.872	Fire	$40,000	10,330.579	**$13,429.75**
		Sewer Plant	$11,000	2,840.909	**$3,693.18**
		Sewer Maint	$50,000	12,913.223	**$16,787.19**
		Total	$101,000	$26,085	$33,910

Attachment B-3

Gasoline	USEIA Rate		Seneca County Annual Costs	# Gallons	$1.30/GGE
2009	$2.352	Engineer**	**$143,753**	61,119.473	$79,455.31
		JFS	**$84**	35.714	$46.43
		Total	$143,837	$61,155	$79,502
2010	$2.756	Engineer**	**$203,840**	73,962.264	$96,150.94
		JFS	**$94**	34.107	$44.34
		Total	$203,934	$73,996	$96,195
2011	$3.499	Engineer**	**$262,751**	75,093.169	$97,621.12
		JFS	**$130**	37.153	$48.30
		Total	$262,881	$75,130	$97,669
2012 est	$3.429	Engineer**	$294,262	85,815.690	**$111,560.40**
		JFS	$711	207.349	**$269.55**
		Total	$294,973	$86,023	$111,830
2013 est	$3.425	Engineer**	$338,401	98,803.212	**$128,444.18**
		JFS	$753	219.854	**$285.81**
		Total	$339,154	$99,023	$128,730
2014 est	$3.645	Engineer**	$372,241	102,123.731	**$132,760.85**
		JFS	$812	222.771	**$289.60**
		Total	$373,053	$102,347	$133,050

Attachment B-4

Diesel	USEIA Rate		Seneca County Annual Costs	# Gallons	$1.30/GGE
2009	$2.445	Engineer**	**$203,541**	83,247.853	$108,222.21
		EMS	**$8,980**	3,672.802	$4,774.64
		Total	$212,521	$86,921	$112,997
2010	$2.998	Engineer**	**$248,024**	82,729.820	$107,548.77
		EMS	**$14,441**	4,816.878	$6,261.94
		Total	$262,465	$87,547	$113,811
2011	$3.879	Engineer**	**$335,077**	86,382.315	$112,297.01
		EMS	**$18,208**	4,693.993	$6,102.19
		Total	$353,285	$91,076	$118,399
2012	$3.876	Engineer**	$385,339	99,416.667	**$129,241.67**
		EMS	$19,483	5,026.574	**$6,534.55**
		Total	$404,822	$104,443	$135,776
2013	$3.592	Engineer**	$443,140	123,368.597	**$160,379.18**
		EMS	$20,847	5,803.731	**$7,544.85**
		Total	$463,987	$129,172	$167,924
2014	$3.872	Engineer**	$509,611	131,614.411	**$171,098.73**
		EMS	$22,306	5,760.847	**$7,489.10**
		Total	$531,917	$137,375	$178,588

** Engineer Program Budget for Supplies includes Gasoline, Diesel and Repair Parts. The Repair Part amounts are listed below.

2009	**$53,918**
2010	**$47,240**
2011	**$59,139**
2012	**$50,613**
2013	**$52,131**
2014	**$53,695**

***Seneca County Opportunity Center (SCOC) buys it's fuel from the Engineer. The amounts listed in the Program Budget are for Repair Parts and Tires. The Supplies amounts are listed below.

2009	**$14,586**
2010	**$14,668**
2011	**$15,280**
2012	**$14,733**
2013	**$15,826**
2014	**$14,447**

Attachment B-5

Gasoline	USEIA Rate		Seneca County Agency Transportion		
			Annual Costs	# Gallons	$1.30/GGE
2009	$2.352	Vans	**$97,636**	41,511.905	$53,965.48
2010	$2.756	Vans	**$119,772**	43,458.636	$56,496.23
2011	$3.499	Vans	**$164,146**	46,912.261	$60,985.94
2012 est	$3.429	Vans	$180,000	52,493.438	**$68,241.47**
2013 est	$3.425	Vans	$220,000	64,233.577	**$83,503.65**
2014 est	$3.645	Vans	$260,000	71,330.590	**$92,729.77**

Attachment B-6

Diesel	USEIA Rate**		Seneca East Local School District		
			Annual Costs	# Gallons	$1.30/GGE
2009-2010	$2.722	Buses	**$71,615**	26,314.532	$34,208.89
2010-2011	$3.439	Buses	**$60,480**	17,589.065	$22,865.78
2011-2012	$3.878	Buses	**$104,331**	26,906.770	$34,978.80
2012-2013	$3.734	Buses	$106,418	28,499.732	**$37,049.65**
2013-2014	$3.732	Buses	$108,546	29,085.209	**$37,810.77**
2014-2015	$3.971	Buses	$110,717	27,884.901	**$36,250.37**

**Seneca East LSD fiscal year is July-June therefore the USEIA Rate is based on the average of the fuel costs for those two years.

Diesel	USEIA Rate**		Tiffin City School District		
			Annual Costs	# Gallons	$1.30/GGE
2009-2010	$2.722	Buses	**$99,373**	36,514.055	$47,468.27
2010-2011	$3.439	Buses	**$125,140**	36,393.776	$47,311.91
2011-2012	$3.878	Buses	**$138,000**	35,589.942	$46,266.92
2012-2013	$3.734	Buses	$144,072	38,583.824	**$50,158.97**
2013-2014	$3.732	Buses	$150,411	40,303.055	**$52,393.97**
2014-2015	$3.971	Buses	$157,029	39,548.923	**$51,413.60**

**Tiffin CSD fiscal year is July-June therefore the USEIA Rate is based on the average of the fuel costs for those two years.

Attachment C

LGIF Round 5 Grant - CNG Conversion/Shared Fueling Station Study
Issues for Response #5

Return on Investment is calculated by finding the Cost Savings between the 3 yrs Unadjusted Projected Costs and the Adjusted Projected Cost. Then dividing this by the Unadjusted Projected Costs to calculate the percentage. The Return on Investment represents the percent of savings from the Total Expenses which are adjusted for implementation compared to the Unadjusted Projected Expenses if nothing is done.

North Central Ohio Educational Service Center

Attachment D-1

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740-383-4804 Fax

To: Local Government Innovation Council
From: Dr. Jim Lahoski, Superintendent/CEO
Date: April 8, 2013
RE: Letter of support

It is with pleasure that I write this letter of endorsement and commitment in support of the LGIF funding request for CNG Conversion/Shared Fueling Station study. As submitted in our recent application, we are pleased to bring three (3) new partners to the project - Arnold Vending, Seneca Medical, Inc., and TPC Food service. Consequently, all three (3) new partners have been communicated with regarding this project and are fully aware of the positive purpose and perspective should this request be granted.

As this is the second submittal of this grant, we are pleased to bring new private partners to our program to enhance the public-private partnership program.

Dr. Jim Lahoski
Superintendent/CEO

North Central Ohio
Educational Service Center

Attachment D-2

Tiffin Campus
928 W. Market Street - Suite A
Tiffin, Ohio 44883
419-447-2927
419-447-2825 Fax

Mansfield Campus
State Support Team Region 7
1495 West Longview Ave. - Suite 200
Mansfield, Ohio 44906
419-747-4808

Marion Campus
333 East Center Street
Marion, Ohio 43302
740-387-6625
740-383-4804 Fax

ADDENDUM TO LETTER OF INTENT

Original Letter of Intent dated August 9, 2012
Resubmitted: March 1, 2013

Subject: CNG Conversion/Shared Fueling Station Study
RE: New Partners for the CNG Conversion/Shared Fueling Station Study

This Letter of Intent will serve as an addendum to the original Letter of Intent/Partnership Agreement dated August 9, 2012 and resubmitted March 1, 2013.

In addition to the original partners North Central Ohio Educational Service Center, an Ohio educational service center ("***NCOESC***"); The City of Tiffin, a municipal corporation ("**CITY OF TIFFIN**"); the County of Seneca, an Ohio County ("**SENECA COUNTY**"); North Central Academy – Fremont, a community board of education ("**NCA**"); Tiffin City Schools, a city board of education ("**TIFFIN CITY SCHOOLS**"); Seneca East Local Schools, a local board of education ("**SENECA EAST LOCAL**") and Seneca County Agency Transportation, a non-profit corporation ("**SCAT**"). We, the undersigned, agree to be additional partners to enhance the private/public partnership of the LGIF grant, Arnold Vending, a privately held company ("**ARNOLD VENDING**"); Seneca Medical, Inc., a privately held company ("**SENECA MEDICAL**"); and TPC Food Service, a privately held company ("**TPC**").

It is our mutual understanding so indicated by signing in the spaces provided below.

ARNOLD VENDING

By: Brian Arnold

Name: Brian Arnold

Its: Maintence Manager

Date: 4-16-13

SENECA MEDICAL

By: [illegible]

Name: Patrick M Hoeft

Its: Operations Manager

Date: 4/16/13

TPC

By: Thomas M. Maiberger

Name: THOMAS M. MAIBERGER

Its: President

Date: 4/16/13