

2013 HOUSE TRANSPORTATION

HCR 3016

2013 HOUSE STANDING COMMITTEE MINUTES

House Transportation Committee Fort Totten Room, State Capitol

HCR 3016
02-08-13
Job # 18615

Conference Committee

Committee Clerk Signature

Janette Cook

Explanation or reason for introduction of bill/resolution:

A concurrent resolution directing Legislative Management to study the use of natural gas as fuel in motor vehicles.

Minutes:

Attachments 1-2

Chairman Ruby introduced HCR 3016.

Representative Kiefert introduced HCR 3016. He read the resolution. He explained that the resolution is about finding more uses for natural gas in our state. He provided an article from the Fargo Forum that explains that this is being done in other states. See attachment #1. In Washington all the buses are being run on natural gas, and in Las Vegas all of the cabs are run on natural gas. He feels that this will speed up the process of using natural gas in vehicles in North Dakota, possibly by five years. He also stated that this study will fit with another bill in the legislature that deals with the flaring of natural gas.

Paul Jensen, President, Greenway Energy, LLC, Fargo, North Dakota, presented a power point "Ideas for North Dakota Natural Gas". See attachment #2. He encourages support on HCR 3016. (37:45)

Representative Kreun: Natural gas is about 87% methane, so the other portions of it are sold off. How are you going to get the gas from the well site to the compressor sites where it is for sale? It will have to be cleaned. In that process what is the comparison of the CO2 to oil or gas?

Paul Jensen: We already have the distribution network. Every household that has natural gas delivered to their house and all the cities. That is the type of gas we are talking about. It has been cleaned and has high methane content. All you have to do is attach to the pipe and compress the gas with a piston compressor. One cubic foot of compressed natural gas would take up 240 cubic feet. The CO2 content is about 30% less in natural gas when it is combusted than gas or oil.

Tim Millburn, Greenway Energy, specialist in combustion: At the well head, depending on the distance that they have to get from the well head to where it is cleaned, they will put in pumps to get the gas from the well to the distribution points.

At that point there is another pumping system. When you look on the street and see a tap that would go to a house or a fuel station there is a certain pressure. Usually, that pressure would be enough to fill up your vehicle.

Representative Kreun: So, the filling station could distribute it, or you could have it at your home?

Tim Millburn: That is correct. At home you would have to use street pressure, and it would have to be boosted to put it into a vehicle in a timely fashion.

Representative Kreun: If people are filling up at home, how do we get the gas tax to fix the roads?

Paul Jensen: Some states are considering a form of tax on the filling device that is installed at home. The utility company will add it onto the bill. You do get the road taxes one way or another.

Tim Millburn: I would also add that at the onset of this market a lot of states are choosing to put on a small tax or none at all, until it gets to a point where there is some momentum.

Representative Becker: If you have a compressing station, does the natural gas run the compressor?

Paul Jensen: That is a possibility. It could run a combustion engine that runs an electrical generator that drives the compressor. You could connect the compressor directly to the gas engine.

Tim Millburn: The vast majority of compressing stations use an electrical motor powered by the utilities, but it is possible.

Representative Heller: Does our existing infrastructure have the capacity to carry the extra gas at this point?

Paul Jensen: Absolutely, yes, for what we are proposing now. We would have to ask the utility companies to identify gas pipelines with the right diameter and pressure where we could connect to and fill up the tanks. If it goes VERY, VERY big, then we may need some expansion to take place. There would be no additional expenses, the utilities would be nothing but happy to sell more gas.

Representative Heller: What does the acronym OEM mean?

Paul Jensen: Original Equipment Manufacturer, the compressor manufacturer is what we call the OEM.

Chairman Ruby: You said that this wouldn't be for someone who drives 5,000 miles or less. What is the reason for that?

Paul Jensen: For the vehicle owner it would be prohibitive because of the cost of the conversion or the addition cost of this type of vehicle. But, the prices are continually going down, so that mileage requirement is shrinking. To make a good return on the investment you typically have to drive 35,000-45,000 miles per year in order to get back the extra that you have paid. A diesel engine would be similar.

Tim Millburn: Other states have helped home owners to install home compressors for the NGV, natural gas vehicle owner, or have helped to pay for the conversion as a jump-start initiative to get more NGV's on the road.

Paul Jensen: We would be delighted to do this study for the state. It would also include the return on investment calculations, so you get a good financial overview of when the investment would start to pay back. We think that would be a very important aspect of it. We encourage this resolution.

Representative Delmore: Are there any safety factors with conversion that we should be aware of?

Paul Jensen: The conversions need to be done by licensed conversion companies. If we start converting existing vehicles, it will create jobs for people in the garage industry. It is not terribly complicated. When it comes to leaks, the gas is lighter than air so it simply seeps out. There are also safety valves on the compressor tanks in case of overfilling. There is a link in the power point presentation about safety with natural gas. There are horror stories in India and Pakistan of things blowing up, but they don't have the same stringent quality control that we have here. This is a regulated industry.

Tim Millburn: When you pull into the fuel stations there are methane sensors. If the system or the vehicle is leaking an alarm goes off, and someone can attend to it. It is another dimension of safety.

Paul Jensen: If you are plugged in with your car and forget and drive off, the actual dispenser has a tear-off on the hose which will then seal the supply of natural gas from the dispenser. We have to follow fire codes as well, and have inspections.

Representative Kreun: You told us that ATT switched to natural gas. Where did they do this?

Paul Jensen: All over the nation, but mainly in the largest cities such as Chicago, for example. There is already a CNG infrastructure there, but they also buy their own CNG stations. They have their own dispensing station that is owned by AT&T.

Representative Kreun: Have you visited with any of the gas stations outlets about getting started with a fleet of this nature?

Paul Jensen: We have visited with fuel marketers who have trucks and distribute the gasoline and diesel themselves. They want to have their own trucks converted to CNG so that their distribution cost is reduced on whatever it is that they deliver. We have also met with Farmer's Union. We haven't gone all over the state yet. This would certainly be part

of the study. We would like to talk to people to see what potential obstacles could be in the way of utilizing the gas in this way.

Representative Gruchella: Boone Pickins had the big plan five or six years ago to convert the interstate's over-the-roads trucks from diesel to natural gas. Why hasn't that taken off?

Paul Jensen: It has actually. Companies like Travel American and Flying J have committed to putting in 110-120 stations each across the United States on the high traffic interstates. There will be no more than a 200 mile distance between them. This is talking about liquid natural gas. It is frozen down 260 degrees because of the space. There is a technical aspect to this. The truck needs to keep moving and use the gas to keep it from warming up and expanding. At that point the tank will start to vent, and that is highly undesirable. Methane as a greenhouse gas is 20 times more potent than CO2. The long-haul trucks are more suitable to this. Garbage trucks are also good candidates for this.

Danette Welsch, OneOak, a member of the North Dakota Petroleum Council, spoke to support HCR 3016. We would like to see liquefied natural gas to diesel included in the study.

There was no further support for HCR 3016.
There was no opposition to HCR 3016.

The hearing was closed on HCR 3016.

2013 HOUSE STANDING COMMITTEE MINUTES

House Transportation Committee
Fort Totten Room, State Capitol

HCR 3016
02-14-13
Job # 18937

Conference Committee

Committee Clerk Signature

Jeanette Cook

Minutes:

Chairman Ruby brought HCR 3016 back before the committee. He explained an amendment which would include in the study turning natural gas into diesel fuel for public consumption.

Representative Vigesaa moved the amendments to HCR 3016.

Representative Becker seconded the motion.

A voice vote was taken. The motion carried.

Representative Oversen moved a DO PASS as amended on HCR 3016.

Representative Gruchella seconded the motion.

A roll call vote was taken. Aye 12 Nay 0 Absent 2

The motion carried.

Representative Vigesaa will carry HB 3016.

(Since this bill is amended it could not be placed on the Consent Calendar.)

February 14, 2013

2/14/13
JSC

PROPOSED AMENDMENTS TO HOUSE CONCURRENT RESOLUTION NO. 3016

Page 1, line 2, after "vehicles" insert ", including the feasibility of turning natural gas into diesel fuel for public consumption"

Page 1, line 11, after the semicolon insert "and

WHEREAS, the retail petroleum distribution system already exists in this state;"

Page 1, line 14, after "vehicles" insert ", including the feasibility of turning natural gas into diesel fuel for public consumption"

Renumber accordingly

Date: 2-14-13
 Roll Call Vote #: 1

**2013 HOUSE STANDING COMMITTEE
 ROLL CALL VOTES
 BILL/RESOLUTION NO. 3016**

House Transportation Committee

Check here for Conference Committee

Legislative Council Amendment Number 13.3069.01001

Action Taken: Do Pass Do Not Pass Amended Adopt
 Amendment

Rerefer to Appropriations Reconsider

Motion Made By Vigesaa Seconded By Becker
Amendment

Representatives	Yes	No	Representatives	Yes	No
Chairman Dan Ruby			Rep. Lois Delmore		
Vice Chairman Mark Owens			Rep. Edmund Gruchalla		
Rep. Rick Becker			Rep. Kylie Oversen		
Rep. David Drovdal					
Rep. Robert Frantsvog					
Rep. Brenda Heller					
Rep. Curtiss Kreun					
Rep. Mike Schatz					
Rep. Gary Sukut					
Rep. Don Vigesaa					
Rep. Robin Weisz					

Total (Yes) _____ No _____

Absent _____

Floor Assignment _____

If the vote is on an amendment, briefly indicate intent:

Date: 2-14-13
Roll Call Vote #: 2

2013 HOUSE STANDING COMMITTEE
ROLL CALL VOTES
BILL/RESOLUTION NO. 3016

House Transportation Committee

Check here for Conference Committee

Legislative Council Amendment Number 13.3069.01001

Action Taken: Do Pass Do Not Pass Amended Adopt
Amendment

Rerefer to Appropriations Reconsider

Motion Made By Oversen Seconded By Gruchalla

Representatives	Yes	No	Representatives	Yes	No
Chairman Dan Ruby	✓		Rep. Lois Delmore	✓	
Vice Chairman Mark Owens	✓		Rep. Edmund Gruchalla	✓	
Rep. Rick Becker	✓		Rep. Kylie Oversen	✓	
Rep. David Drovdal	✓				
Rep. Robert Frantsvog	✓				
Rep. Brenda Heller	✓				
Rep. Curtiss Kreun	A				
Rep. Mike Schatz	✓				
Rep. Gary Sukut	✓				
Rep. Don Vigesaa	✓				
Rep. Robin Weisz	A				

Total (Yes) 12 No 0

Absent 2

Floor Assignment Vigesaa

If the vote is on an amendment, briefly indicate intent:

REPORT OF STANDING COMMITTEE

HCR 3016: Transportation Committee (Rep. Ruby, Chairman) recommends **AMENDMENTS AS FOLLOWS** and when so amended, recommends **DO PASS** (12 YEAS, 0 NAYS, 2 ABSENT AND NOT VOTING). HCR 3016 was placed on the Sixth order on the calendar.

Page 1, line 2, after "vehicles" insert ", including the feasibility of turning natural gas into diesel fuel for public consumption"

Page 1, line 11, after the semicolon insert "and

WHEREAS, the retail petroleum distribution system already exists in this state;"

Page 1, line 14, after "vehicles" insert ", including the feasibility of turning natural gas into diesel fuel for public consumption"

Renumber accordingly

2013 SENATE NATURAL RESOURCES

HCR 3016

2013 SENATE STANDING COMMITTEE MINUTES

Senate Natural Resources Committee Fort Lincoln Room, State Capitol

HCR 3016
March 21, 2013
20304

Conference Committee

Veronica Spaulding

Explanation or reason for introduction of bill/resolution:

A concurrent resolution directing the Legislative Management to study the use of natural gas as fuel in motor vehicles, including the feasibility of turning natural gas into diesel fuel for public consumption

Minutes:

attachments

All committee members were present. Senators Unruh and Triplett arrived just after attendance was taken.

Chairman Lyson opened the hearing for HCR 3016.

Representative Dwight Kiefert, District 24, asked that any questions be held until after the power point presentation. He introduced Paul Jensen from Green Way Energy.

Paul Jensen, President of Green Way Energy, LLC in Fargo, presented a power point presentation. See attachment #1. He emphasized that there are almost no particulates when natural gas is burned. (Ends at 20:00)

Senator Murphy asked about the composition of the natural gas being produced in North Dakota, the size of the conversion plants, and the stripping of the gas.

Tim Milburn, Technical Team Leader of Green Way Energy, explained the process. (20:45 to 21:10)

Senator Triplett said this is literally turning natural gas into diesel fuel.

Mr. Milburn said that is correct.

Senator Triplett questioned why they feel legislative management should do a study on such a narrow topic.

There was some discussion about the proposed scope of the study and the amendments that have changed the scope of it.

Senator Triplett questioned whether the legislature is the best entity to be doing a study of this nature. She feels the marketplace is already studying this.

Mr. Jensen said they are studying some of it, but they are not studying the compressed natural gas for transportation. They have the chicken and the egg syndrome and want the legislature to kick start the process.

Senator Triplett pointed out there is no money attached to this. Without money it would just be committee members studying it. They would not have the expertise needed to find solutions. Would Mr. Jensen expect some money to be attached to it?

Mr. Jensen said it would need money attached to it. He did not know how much.

Mr. Milburn said it was presented to the transportation committee and that is why it is written as it is with the emphasis on transportation.

Senator Triplett mentioned the studies that industry and research universities already have going in the state to move us in this direction. Why do they think a legislative management study would add anything?

There was discussion about this and about being able to tax the gas if it were captured rather than flared. (Ends at 26:30)

Ron Ness, President of the ND Petroleum Council, stood in support of the resolution. This resolution is similar to what EmPower ND wanted to look at, the value added aspects of natural gas. (27:00 to 29:21) Mr. Ness talked about leaving the focus of the proposed study as broad as possible. We don't know what the opportunities are yet and which ones will work.

Senator Triplett mentioned that a bill has already been passed for 10 million dollars for oil and gas research. She feels the study should be as broad as possible and is hopeful that when it is presented to the legislature it is presented more broadly rather than with such a narrow scope.

Mr. Ness agreed that to fund it here is not necessary. He also pointed out that it is important to keep it as broad as possible.

Senator Laffen asked about our gas extraction tax.

Mr. Ness said we do have an extraction tax and it is based on volume and it fluctuates with the price of natural gas. Right now it is about 11.5 cents per million cubic feet.

Shane Goettle, representing MDU Resources, stood in support of the resolution. He feels a study should be as broad as possible. MDU is interested in using Liquid Natural Gas (LNG) in their engines. They are developing the technology to do that on a dual basis with diesel for their vehicles. They are in favor of incentivizing to move the use of natural gas forward. This resolution is not important for the money, it is important to educate the policy makers about what is coming, first to locomotives, then to large diesel engines and then down into

the rest of our transportation system. What infrastructure will be needed? Who will provide the oversight? What do we need to do to incentivize this? How do we provide for the safety concerns? A legislative management study could be very valuable to address all of those questions very broadly.

Representative Keifert mentioned that Honda has been making a natural gas burning Civic since 1997. In Oklahoma City right now natural gas is 98 cents per gallon. In North Dakota we are flaring off enough gas to power every car in North Dakota. There is a pump being made that you can hook up to your furnace line that will fill up your car with compressed natural gas. In a few years the price of that pump may be down to \$500.00. With a 10 million dollar investment we could have the stations so the cars could fuel up. We could be utilizing the fuel rather than burning it up.

Senator Burckhard asked if a compressed gallon of gas will get the same mileage as a gallon of gas.

Rep. Keifert said it would. Some states are providing incentives to buy the natural gas vehicles. The federal government will provide 75% of the funds to replace buses with compressed natural gas buses. The incentives are out there. We just need to take advantage of them and get this going.

Opposition: None

Neutral: None

Chairman Lyson closed the hearing for HCR 3016.

2013 SENATE STANDING COMMITTEE MINUTES

Senate Natural Resources Committee Fort Lincoln Room, State Capitol

HCR 3016
March 29, 2013
Job Number 20689

Conference Committee

Veronica Spaulding

Explanation or reason for introduction of bill/resolution:

A concurrent resolution directing the Legislative Management to study the use of natural gas as fuel in motor vehicles, including the feasibility of turning natural gas into diesel fuel for public consumption

Minutes:

attachment

Chairman Lyson opened the discussion of HCR 3016.

Senator Murphy presented an amendment suggested by Ron Ness. See attachment #1.

Senator Triplett explained the amendment. By putting a particular project in there focused the attention on that. The committee preferred that the study be more wide open. The amendment will remove the words on lines 2 and 3 and will broaden the study possibilities. Making it more generic will give legislative management more flexibility.

Senator Laffen: Motion to adopt amendment 13.3069.02001.

Senator Triplett: Second

Motion Carried by Voice Vote

Senator Murphy: Do Pass as Amended Motion

Senator Laffen: Second

Roll Call Vote: 6, 0, 1

Carrier: Senator Murphy

13.3069.02001
Title.03000

Prepared by the Legislative Council staff for
Senator Murphy

March 27, 2013

3/29/13
TD

PROPOSED AMENDMENTS TO ENGROSSED
HOUSE CONCURRENT RESOLUTION NO. 3016

Page 1, line 2, remove ", including the feasibility of turning natural gas into diesel fuel for public"

Page 1, line 3, remove "consumption"

Page 1, line 16, remove the comma

Page 1, line 17, remove "including the feasibility of turning natural gas into diesel fuel for public
consumption"

Renumber accordingly

Date: 3-29-13
Roll Call Vote #: 1

2013 SENATE STANDING COMMITTEE
ROLL CALL VOTES *eng.*
BILL/RESOLUTION NO. 3016

Senate Natural Resources Committee

Check here for Conference Committee

Legislative Council Amendment Number _____

Action Taken: Do Pass Do Not Pass Amended Adopt Amendment

Rerefer to Appropriations Reconsider 13.3069.02001

Motion Made By Laffen Seconded By Triplett

Senators	Yes	No	Senators	Yes	No
Senator Lyson			Senator Triplett		
Senator Burckhard			Senator Murphy		
Senator Hogue					
Senator Laffen					
Senator Unruh					

Total (Yes) _____ No _____

Absent _____

Floor Assignment _____

If the vote is on an amendment, briefly indicate intent:

*carried by
voice vote*

Date: 3-29-13
Roll Call Vote #: 2

2013 SENATE STANDING COMMITTEE
ROLL CALL VOTES ^{eng.}
BILL/RESOLUTION NO. 3016

Senate Natural Resources Committee

Check here for Conference Committee

Legislative Council Amendment Number _____

Action Taken: Do Pass Do Not Pass Amended ^{as} Adopt Amendment
 Rerefer to Appropriations Reconsider

Motion Made By Murphy Seconded By Laffen

Senators	Yes	No	Senators	Yes	No
Senator Lyson	✓		Senator Triplett	✓	
Senator Burckhard			Senator Murphy	✓	
Senator Hogue	✓				
Senator Laffen	✓				
Senator Unruh	✓				

Total (Yes) 6 No 0

Absent 1

Floor Assignment Murphy

If the vote is on an amendment, briefly indicate intent:

REPORT OF STANDING COMMITTEE

HCR 3016, as engrossed: Natural Resources Committee (Sen. Lyson, Chairman) recommends **AMENDMENTS AS FOLLOWS** and when so amended, recommends **DO PASS** (6 YEAS, 0 NAYS, 1 ABSENT AND NOT VOTING). Engrossed HCR 3016 was placed on the Sixth order on the calendar.

Page 1, line 2, remove ", including the feasibility of turning natural gas into diesel fuel for public"

Page 1, line 3, remove "consumption"

Page 1, line 16, remove the comma

Page 1, line 17, remove "including the feasibility of turning natural gas into diesel fuel for public consumption"

Renumber accordingly

2013 CONFERENCE COMMITTEE

HCR 3016

2013 HOUSE STANDING COMMITTEE MINUTES

House Transportation Committee
Fort Totten Room, State Capitol

HCR 3016
04-09-13
Job # 21015

Conference Committee

Committee Clerk Signature

Jeanette Cook

Explanation or reason for introduction of bill/resolution:

A concurrent resolution directing the Legislative Management to study the use of natural gas as fuel in motor vehicle, including the feasibility of turning natural gas into diesel fuel for public consumption.

Minutes:

Representative Vigesaa brought HCR 3016 before the committee.

Senator Murphy: I carried the bill and was approached by the industry before our hearing. They presented me with the amendments that did strike out the specification of using natural gas to create diesel fuel. The feeling of the industry was that it actually created another focus that they didn't need. It seemed to be redundant. Using natural gas as fuel in motor vehicles could include converting it into diesel. It seems more open without it.

Senator Laffen: We liked the idea of this study. We didn't want the focus to be just on turning natural gas into diesel. We would like them to be creative whatever direction they could.

Representative Vigesaa: The hearing was primarily focused on fuel in gasoline vehicles. I think our committee just didn't want diesel left out, so we added it in. Now that I have looked at it, and it says natural gas as fuel, I see that obviously that would include diesel or gasoline. It looks like we are both trying to accomplish the same thing. We wanted to broaden it by including language on diesel fuel; you were seeking to broaden it by taking it out. Mike Rud of the retailers had visited with us to make sure that diesel was included.

Representative Drovdal: It appears that diesel is included in the study. I think that is acceptable.

**Representative Drovdal moved the House accede to the Senate amendments.
Representative Delmore seconded the motion. Yea 6 Nay 0 Absent 0
The motion carried.**

2013 HOUSE CONFERENCE COMMITTEE ROLL CALL VOTES

Committee: TRANSPORTATION

Bill/Resolution No. HCR 3016 as (re) engrossed

Date: 04-09-13

Roll Call Vote #: _____

- Action Taken**
- HOUSE accede to Senate amendments
 - HOUSE accede to Senate amendments and further amend
 - SENATE recede from Senate amendments
 - SENATE recede from Senate amendments and amend as follows

House/Senate Amendments on HJ/SJ page(s) 1202 -- 1202

- Unable to agree, recommends that the committee be discharged and a new committee be appointed

((Re) Engrossed) _____ was placed on the Seventh order of business on the calendar

Motion Made by: Representative Drovdal Seconded by: Representative Delmore

Representatives				Yes	No		Senators				Yes	No
VIGESAA	X			X			LAFFEN	X			X	
DROVDAL	X			X			BURCKHARD	X			X	
DELMORE	X			X			MURPHY	X			X	

Vote Count Yes: 6 No: 0 Absent: 0

House Carrier _____ Senate Carrier _____

LC Number 13.3069 . 02001 of amendment

LC Number 13.3069 . 02000 of engrossment

Emergency clause added or deleted

Statement of purpose of amendment

REPORT OF CONFERENCE COMMITTEE

HCR 3016, as engrossed: Your conference committee (Sens. Laffen, Burckhard, Murphy and Reps. Vigesaa, Drovdal, Delmore) recommends that the **HOUSE ACCEDE** to the Senate amendments as printed on HJ page 1202 and place HCR 3016 on the Seventh order.

Engrossed HCR 3016 was placed on the Seventh order of business on the calendar.

2013 TESTIMONY

HCR 3016

1



The Forum of Fargo-Moorhead

Published February 03, 2013, 11:30 PM

Letter: CNG good option for North Dakota

I read that New Mexico was participating in a joint venture with private enterprise to build compressed natural gas compressors for state and private commercial vehicles. North Dakota could use a similar joint venture, running state vehicles with local cities or even school districts.

By: Joa Blurton, Fargo, INFORUM

I read that New Mexico was participating in a joint venture with private enterprise to build compressed natural gas compressors for state and private commercial vehicles. North Dakota could use a similar joint venture, running state vehicles (snowplows, maintenance vehicles, etc.) with local cities (bus, garbage trucks etc.) or even school districts.

The benefits are multi-fold, from lower operating cost to increased natural gas tax revenues. And, making CNG stations available to farmers (tractors, trucks, combines) would give North Dakota farmers an economic operating advantage.

Natural gas operating costs are equal to around \$1 per gallon gasoline. Emissions are lower, and discounting the now-spent carbons from flare gas at the well head makes environmental sense. This is a win-win-win-win situation for the state and its residents.

Tags:opinion, letters

More from around the web

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- 5 Dog Breeds That Are Sadly Losing Popularity (Vetstreet)
- Avoid Getting Sick: Top 8 Germiest Public Places Exposed (Lifescript.com)
- The Secret to Warming Your Car in the Winter (Consumer Car Reviews)
- 15 Signs Your Employees Are Having an Office Romance (All Business)

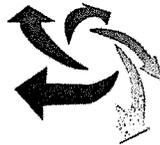
Ideas for North Dakota Natural Gas

February 9, 2013
Presented to the
State of North Dakota
House Transportation Committee



Presenter

Paul N. Jensen
President
Green Way Energy, LLC
Consulting Services
Fargo, North Dakota



Individual Experience

- Paul Jensen** is the *Business Team Leader* for the Business Development, Marketing, Sales & PR aspects of the projects. During the past 10 years Paul has been an active member in the American and Canadian Wind Energy Association, where he was engaged in the energy debate in North America. In addition Paul has worked with Power Equipment and Projects throughout the world based on his 25 years of executive management position with ABB of Switzerland. Paul has started business units in 8 different countries on 4 continents for ABB while residing in each country. Paul's educational background is an International Export Education acquired in Denmark at the Tietgen School of Business, and through other Business and Trade Schools in Denmark.
- Tim Milburn** is the *Technical Team Leader* related to power, Industrial and biological projects. His extensive experience (20 years with ABB) with large scale project management in a wide spectrum of applications guarantees cost efficient and timely execution of process-related projects. Tim has worked with all forms of solid, liquid and semi-solid material handling, size reduction and classification, mixing, thermal treatment, chemical reactions, energy recovery and flue gas treatment - from the component design through turnkey systems installation and successful startup. Tim is a graduate of the Illinois Institute of Technology Chicago, with a BS in Mechanical Engineering (High Honors, Economics Minor) and a BA Biology (Environmental Focus, Chemistry/Physics Minor) from University of Illinois, Urbana.
- Peder Hansen** is the *Technical Team Leader* in particular for wind energy projects and NH₃ products. Peder is well known in the global wind industry with family roots going back to his grandparents, the founders of Vestas and later the very first serially manufactured utility scale wind turbines. Peder has a deep hands-on business knowledge, and brings a wealth of experience to the team based on employment with GE, Zond, Enron, Valmont, Davi and Northstar towers of Nebraska.
- Ryan Meyer** is the *Financial Team Leader* for managing and analyzing business processes. He has a deep academic and hands-on business knowledge, and brings a wealth of experience to the team based on his MBA educational background from University of North Dakota and his Financial Advisor Education. Ryan has in the last 4 years acquired a significant insight into the planning of renewable energy installations in North America and studied the import / export flows of wind energy. In addition Ryan teaches Corporate Finance at the University of Mary, Fargo, ND to post-graduate students.



GWE

Considerations (i)

- North Dakota natural gas production has risen significantly in the last few years and new natural gas reserves are regularly being discovered
- North Dakota is in a unique position:
 - Access to large quantities of ND natural gas
 - Able to develop new energy markets with this fuel
- To reduce dependence on foreign oil and to mitigate environmental issues, US policies are moving to support alternatives to traditional liquid-based fuels
- ND natural gas can be used in state, be sold to other states or be exported globally



GWE

Considerations (ii)

- North Dakota flares between 100 and up to 200 million cubic feet of natural gas daily*
 - Wasted energy, never to benefit society
 - Gas is flared because of insufficient infrastructure capacity to get to points of use
- ND flared gas adds at least 0.6 to 1.3 million tons of CO₂ into the atmosphere every year**

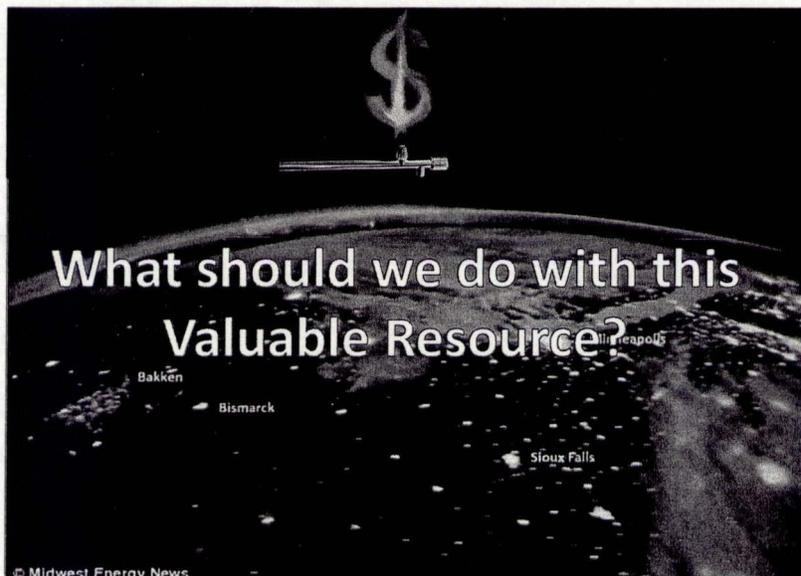


- Source: NY Times 9/26/2011. data basis: 11/2011 – 12/2012, flaring 30% of gas production volume i.e. 314 to 700 MM ft³ natural gas daily
- ** Source, EIA 2012



GWE

5



GWE

Decision Criteria

Capacity of Underground Reserves

- Number of known and prospective finds
- Well output performance
 - Volume of supply (cubic feet/year)
 - Years of well life

Location: Well to Point of Use

- Costs of new infrastructure
- Costs of transportation
- Transmission losses w. power generation

Use and Delivery Choices

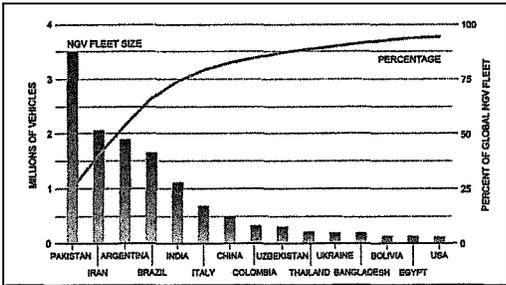
- Use near well head (e.g. local heat and power)
- Pipeline
- Transport (e.g. truck, rail)
- Convert to liquid fuel
- Which Energy Sector(s)?

Infrastructure Needs

- Extendable?
- How far?
- Risk?
- Permanent vs. temporary?
- How much: ROI?



NG Use Worldwide



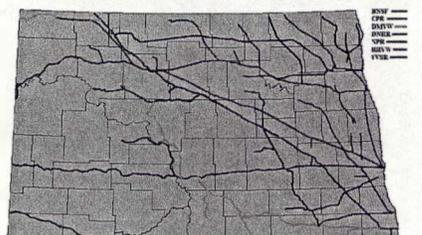
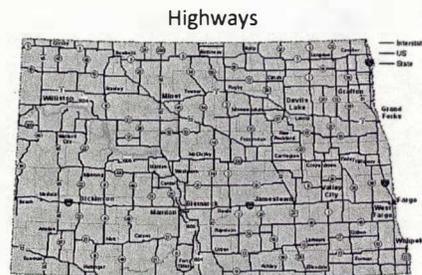
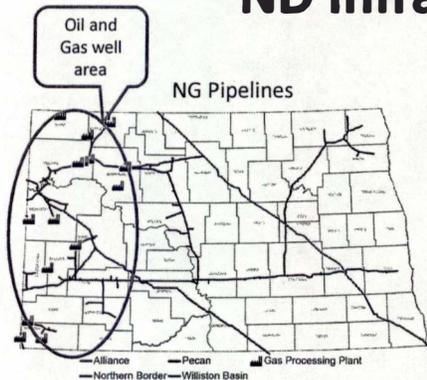
Source:
 • Natl. Petroleum Council - August 2012 "NPC Future Transportation Fuel Study"

- NG has been available as a transportation fuel for many decades!
- Globally: 15 % avg. annual growth over last 3 years
- 15 million NGV's on the roads globally in 2011!
- 190,000 NGV's in US in 2012
- OEMs launching many new NGVs
- Over 4 million more NGVs predicted by 2018



Sources:
 US Energy Administration Agency
 Pike Research

ND Infrastructure

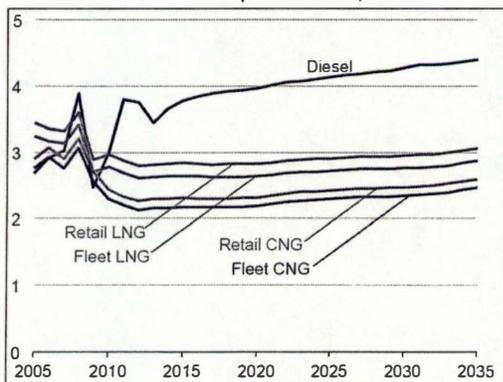


How to best leverage existing infrastructure to reduce investment required to get fuel to end users?



Fuel Markets

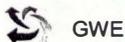
- US Energy Information Agency (EIA) forecasts NG supply to be very predictable
- Natural gas prices are expected to be stable for the foreseeable future both from oil based production, shale and and coalbed sources

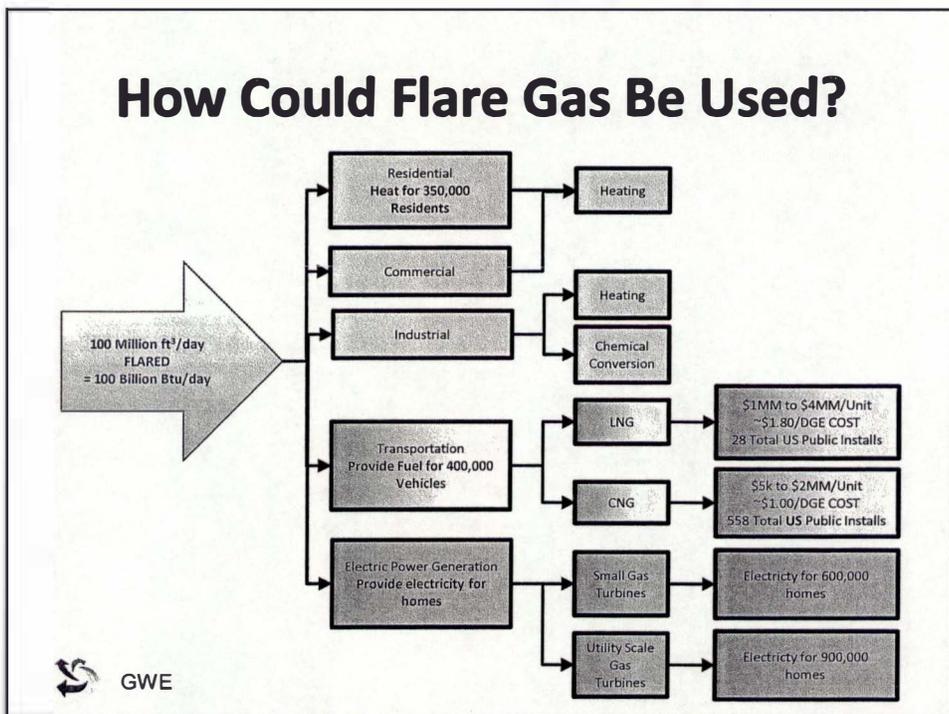
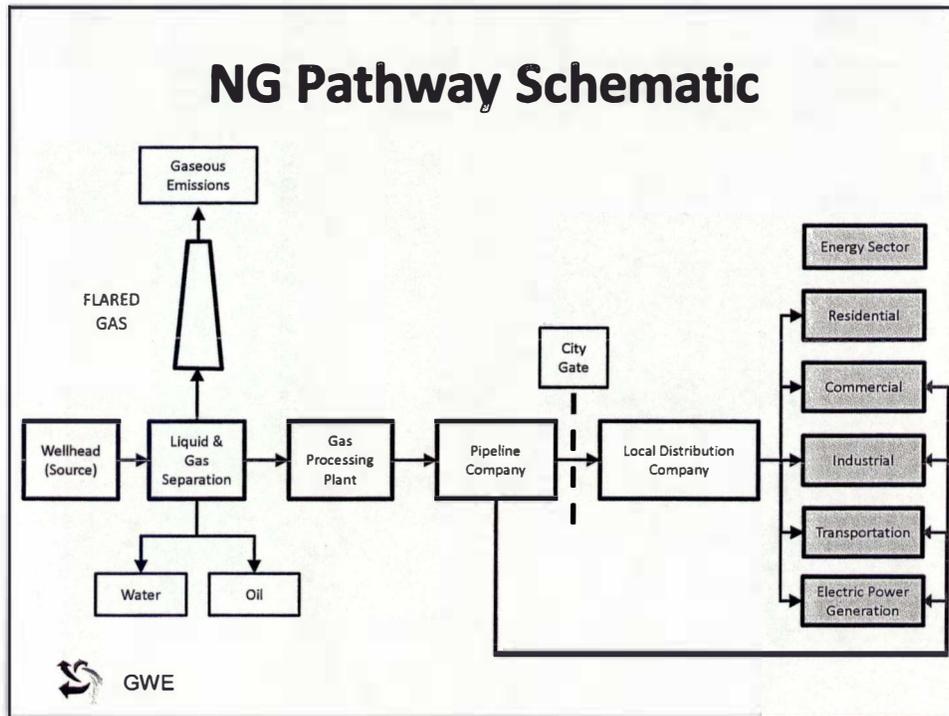


EIA Annual Energy Outlook 2012 Graph

- Forecast diesel and natural gas transportation fuel prices - \$/gallon diesel equivalent
- Heavy duty vehicle analysis basis
- 2010 dollars per diesel gallon equivalent

LNG = Liquefied Natural Gas
CNG = Compressed Natural Gas





NG Infrastructure Challenges

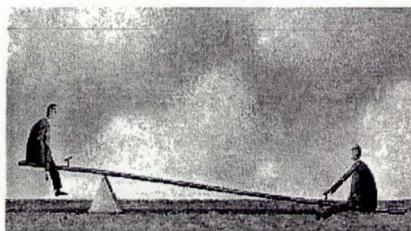
- Consumers unwilling to buy NG vehicles before infrastructure is built
- Businesses will not invest in NG fueling stations until there is consumer demand
- Neither is willing to move without the other (chicken-and-egg)
- This challenges a good and efficient product to get to market
- There is a need for ND government policies and incentives to drive the success forward



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Need: Leveling the Playing Field

- NG fuel use has lower un-priced social costs
 - Emissions
- Petroleum fuels have existing market advantages
 - Social costs are not included in the price
 - Negative externality costs are not included
 - Infrastructure investments are already in place



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Drill-Down Example for Transportation Uses of North Dakota Natural Gas



Fueling Assumptions

	Time Fill	Medium Fill	Single Fast Fill	Double Fast Fill
CNG FACILITY	CASE 1	CASE 2	CASE 3	CASE 4
Operating Costs (First Year)				
Hours per day fueling (annual average)	12.0	16.0	16.0	24.0
Days per Week Operation	5.0	7.0	7.0	7.0
Other Days per Year Closed	10.0	10.0	10.0	5.0
Days Per Year Open	250.0	355.0	355.0	360.0
Hours per Week Operation	60.0	112.0	112.0	168.0
Hours per Year Operation: MAXIMUM	3,000	5,680	5,680	8,640
Fueling Rates				
SELECT FUEL (D (Diesel) OR G (Gasoline))	D	D	G	G
Design Max. Fueling Rate - (D OR G) Gallon				
Equivalent per minute- from all hoses	1.00	4.00	7.00	10.00
Number of Hoses	2.00	2.00	2.00	4.00
Design Rate Per Hose, GE per minute	0.50	2.00	3.50	2.50



Four different CNG Station sizes to be used in the calculations i.e. Case 1 to 4

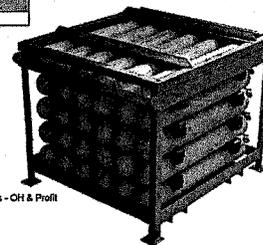


Benefits of Using Flared Gas

Relative Evaluation of Benefits of Using Flared Gas

Region		North Dakota	
Amount of Natural Gas Being Flared, \$/Day			
Quantification of Regional Flaring		Minimum Flare Rate	Maximum Flare Rate
Daily, \$/Day		100,000,000	200,000,000
% Acceptable as Usable Natural Gas		80%	80%
Annual, \$/Year		29,200,000,000	58,400,000,000
Current Market Prices of Natural Gas:		\$/1000 SFG	\$/GGE
Wellhead	\$ 3.25	0.40	0.45
Citygate	\$ 4.61	0.58	0.62
Industrial	\$ 4.49	0.58	0.62
Electric Power	\$ 4.42	0.55	0.61
Commercial	\$ 5.81	0.68	0.78
Residential	\$ 9.55	0.81	0.90
Transportation Fueling	\$ 9.81	0.68	0.78
Markup and Overhead factor on cost for transportation price incl. Compression		2.10	
Transportation Retail Price	\$ 11.85	1.47	1.63
Pricing Source: US or State		EIA NG Pricing	
Price Data			
			Nov. 2012 US Ave.
			Nov. 2012 ND
			Nov. 2012 US Ave.
			Oct. 2012 ND
			Nov. 2012 ND
Value of Regional Natural Gas, \$/Year		Minimum Flare Rate	Maximum Flare Rate
Wellhead	\$ 84,900,000	\$ 180,800,000	
Citygate	\$ 131,682,000	\$ 263,384,000	
Industrial	\$ 131,108,000	\$ 262,216,000	
Electric Power	\$ 129,064,000	\$ 258,128,000	
Commercial	\$ 160,892,000	\$ 321,784,000	
Residential	\$ 191,280,000	\$ 382,520,000	
Transportation Fueling Cost	\$ 160,892,000	\$ 321,784,000	
Transportation Retail Value	\$ 345,917,800	\$ 691,835,600	
Transportation CH & Profit Value	\$ 185,025,800	\$ 370,051,600	
		includes markups - CH & Profit	
*Assumes 100% of fuel goes to each vehicle type			

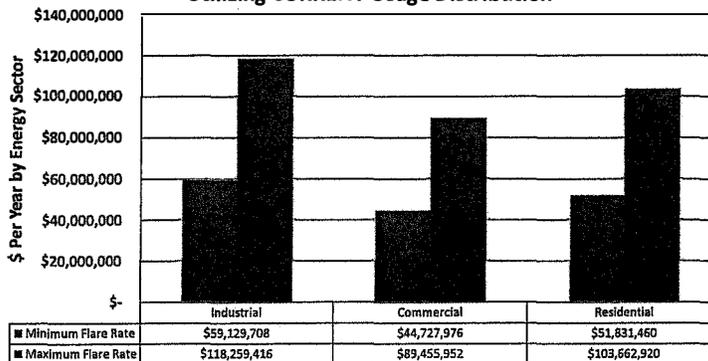
ND Data sets for volumes and prices.



Flare Value If All Consumed by 3 Energy Sectors

Source for ND % distribution: [US EIA](#)

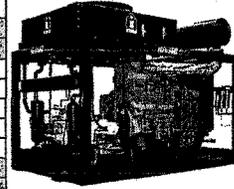
North Dakota Annual Natural Gas Flare Value Utilizing CURRENT Usage Distribution



Example of CNG Installations

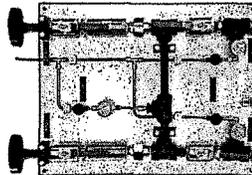
Region Wide Planned Quantities	Number of Installations	
	Minimum Flare Rate	Maximum Flare Rate
Number of Level 1 Stations Deployed	-	-
Number of Level 2 Stations Deployed	2	2
Number of Level 3 Stations Deployed	3	3
Number of Level 4 Stations Deployed	3	3
Standard Cubic Feet/Year per Region		
Region-wide Level 1 Annual Capacity	-	-
Region-wide Level 2 Annual Capacity	226,851,049	
Region-wide Level 3 Annual Capacity	537,766,791	
Region-wide Level 4 Annual Capacity	983,986,565	
Region Wide Total Annual Capacity	1,728,604,404	
Ratio: To-be Installed Capacity/Annual Flaring Amount	5.92%	2.98%

Equivalent Number of Stations if ALL Flared Gas Went to Transportation	Minimum Flare Rate	Maximum Flare Rate
Level 1	1,576	3,151
Level 2	257	515
Level 3	163	326
Level 4	91	182



CNG Technology and Installation Cost Example

State-Wide Investment Quantities	\$ Investment	
Unit Costs		
Unit Cost of Level 1 Stations Deployed	\$ 545,000	
Unit Cost of Level 2 Stations Deployed	\$ 969,000	
Unit Cost of Level 3 Stations Deployed	\$ 1,162,464	
Unit Cost of Level 4 Stations Deployed	\$ 1,703,145	
Total Costs		
Total Cost of Level 1 Stations Deployed	\$ -	-
Total Cost of Level 2 Stations Deployed	\$ 1,938,000	2
Total Cost of Level 3 Stations Deployed	\$ 3,487,392	3
Total Cost of Level 4 Stations Deployed	\$ 5,109,435	3
Total Regional Cost of All Stations Deployed	\$ 10,534,828	-



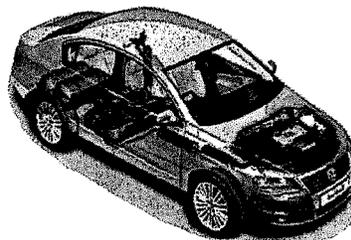
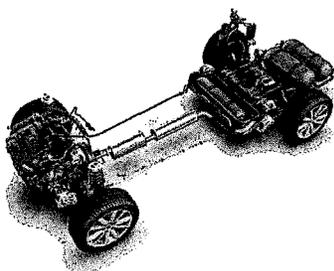
Volumetric Capacity Assumptions

Vehicle Type	Est. Miles/Gallon ICE	Physical Size of Tank in Gallons		Max. Miles per Tank (Full to Bone Dry)		Max. Miles per Tank @ Fill-up	
		Typ. Minimum	Typ. Maximum	Typ. Minimum	Typ. Maximum	Typ. Minimum	Typ. Maximum
Passenger Vehicles	25	12	20	300	500	255	425
Pick-ups/Vans	20	20	30	400	600	340	510
Medium Sized Trucks	13	30	50	390	650	332	553
Buses	12	50	75	600	900	510	765
Refuse Trucks	5	50	80	250	400	213	340
Snow Plows	4	50	80	200	320	170	272
Tractor Trailers (Class 3 to 8)	5	75	200	375	1,000	319	850



Vehicle Usage Profile

Vehicle Type	Estimation of Annual Mileage, Based on Daily Usage					
	Hours/day	Days/Week	Weeks/Year	Total Days/Year	Miles/Hour Average	Miles/year
Passenger Vehicles	2	7	52	364	30	16,380
Pick-ups/Vans	2	7	52	364	30	16,380
Medium Sized Trucks	5	5	50	250	35	43,750
Buses	3	5	40	200	30	18,000
Refuse Trucks	4	5	52	260	25	26,000
Snow Plows	6	3	10	30	25	4,500
Tractor Trailers (Class 3 to 8)	8	5	52	260	45	93,600



NG Vehicle Choices

- Buy new or convert existing vehicles
 - Conversion costs vary by vehicle type, age and level of non- conversion rework

VEHICLE TYPE	COST PER VEHICLE TO CONVERT FROM LIQUID FUEL TO NG	
	Engine/Fuel Train Only	Reman
	LOW	HIGH
Passenger Vehicles	\$4,000	\$8,000
Pick-ups/Vans	\$7,000	\$12,000
Medium Sized Trucks	\$30,000	\$60,000
Buses	\$35,000	\$65,000
Heavy Duty Trucks	\$35,000	\$70,000

- New vehicles roughly same as traditional liquid fuel plus low numbers in chart above
 - Example: new diesel truck: \$150,000, with NG \$185,000
 - Cost expected to decrease w/ volume production

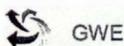


AT&T

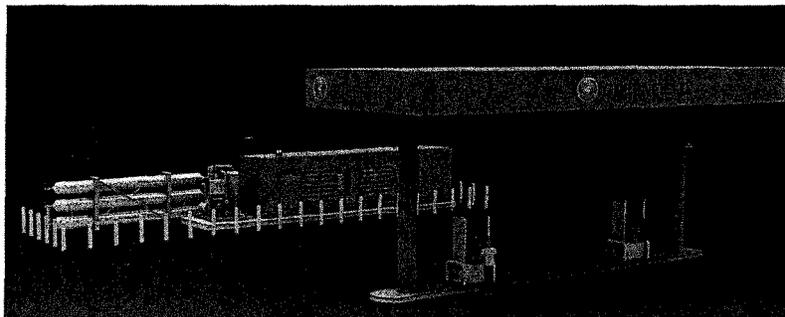
- **Saving Big Money on Switch to CNG Vehicles**
- The company reports that it saved 2.5 million gallons of gasoline in 2011 by outfitting many of its vehicles with Compressed Natural Gas tanks.
- Its 10-year plan to replace 15,000 vehicles from its fleet with CNG vehicles is well under way.
- > 5,000 alternative fuel trucks and vans already on the road
- Part of that greater plan is a five-year, \$350 million program to purchase 8,000 CNG vehicles.



- 2013 Express/Savana CNG Cargo Van
 - 6.0 L Vortex V8 Engine
 - 3 or 4 tank system
 - Comprehensive 5 Year 100,000 Mile Warranty
 - Serviced by GM Dealers



Rendering CNG Station



Complete Refueling Station

Can add other services like traditional gas stations – service bays, mini mart, air compressor



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If 20% CNG fuel for Vehicles by 2020

North Dakota imported the following in 2010 for use in a total number of vehicles ~ 980,000 (400,000 passenger vehicles, 362,000 trucks):

- Diesel fuels 419,611,500 Gallons: Retail value \$1.741 Billion @ \$4.15/ Gallon
- Gasoline fuels 291,595,500 Gallons: Retail value \$1.064 Billion @ \$3.85/ Gallon

Current retail Natural Gas price per gallon equivalent:

- Replacing Diesel Fuel \$1.97
- Replacing Gasoline Fuel \$2.07*)

At an annual CNG vehicle growth rate of 2.5% over 8 Years , we can switch 20% of the fleet in 2020 to CNG = ~\$1 Billion less cost (2010 Dollars) by residents and businesses of ND

*) Discounted for 10% power loss



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Planning Ideas



Path Forward: Focus on Transportation

- Big Picture: Identify and quantify potential uses of ND natural gas
 - In state transportation fueling
 - In state electrical power generation
 - In state heating (industrial, residential, commercial)
 - In state chemical production (e.g. Fisher-Tropsch - Gas to Diesel)
 - Export
- Define needs specific to transportation sector
 - Fueling infrastructure (CNG, LNG)
 - New or converted vehicles (OEMs, conversion shops)
- Define infrastructure requirements and investments
 - Gas gathering pipeline systems
 - Processing, distribution, transmission, storage and delivery infrastructure
- Identify potential stakeholders operating in North Dakota
- Assemble subject matter experts to draft plan
- Consider incentive plans to jump-start market



ND State Active Incentives and Laws

- North Dakota
 - Incentives
 - Agriculturally-Based Fuel Production Wage and Salary Tax Credit
 - Wage and Salary Tax Credit. 1% of wages and salaries paid during the tax year for each of the first three years of operation and 0.5% of wages and salaries paid during the tax year for the fourth and fifth years.
 - Laws & Regulations
 - Alternative Fuel Labeling Requirement
 - Alternative Fuel Tax Rates
 - A special excise tax rate of 2% is imposed on the sale of propane (liquefied petroleum gas) a tax of \$0.04 per gallon is imposed on all special fuels sales, including compressed natural gas.



Midwestern State Incentives, Laws & Programs

- Colorado:
 - Incentives
 - Alternative Fuel, Advanced Vehicle, and Idle Reduction Technology Tax Credit
 - CNG: 55% 35% 25% and 25% 1/1-2013 to 12/31 2016 up to max. \$6,000
 - Low Emission Vehicle (LEV) Sales Tax Exemption
 - Vehicles > 10,000 LBS
 - Alternative Fuel Vehicle (AFV) Weight Limit Exemption
 - Gross vehicle weight rating limits for AFVs are 1,000 pounds greater
 - Utility/Private Incentives
 - Natural Gas Fuel Rate Reduction and Infrastructure Maintenance - Clean Energy
 - Compressed natural gas fueling station equipment maintenance, competitive fuel pricing for larger fleet customers, and alternative fuel vehicle financing.
 - Laws
 - Alternative Fuel Resale and Generation Regulations
 - Fuel suppliers not to be regulated as a Utility
 - Alternative Fuel Vehicle (AFV) Registration
 - Adding fuel type to registration of vehicle
 - Clean Energy Development Authority
 - Can issue Bond Financing for state projects
 - State Agency Alternative Fuel Use and Vehicle Acquisition Requirement
 - Departments to purchase NG vehicles if price difference less than 10% of same vehicle with conventional fueled Engine



Midwestern State Incentives, Laws & Programs

• Minnesota

- **Utility/Private Incentives**
 - **Natural Gas Infrastructure Technical Assistance**
 - A designated utility may offer preliminary feasibility studies for natural gas fueling stations, including natural gas availability information.
- **Laws and Regulations**
 - **State Agency Sustainability Plan and Requirements**
 - Using 2005 as a baseline, the state must achieve a 50% reduction in gasoline used to operate state agency-owned on-road vehicles by 2015;
 - Using 2005 as a baseline, the state must achieve a 25% reduction in the use of petroleum-based diesel fuel for state owned on-road vehicles by 2015;
 - When reasonably possible, state agencies must purchase on-road vehicles that use Alternative fuels such as compressed or liquefied natural gas or vehicles that (with the exception of buses, snowplows, and construction vehicles) have a fuel economy rating that exceeds 30 miles per gallon (mpg) in the city and 35 mpg on the highway;
- **Alternative Fuel Tax**
 - The Minnesota Department of Revenue imposes an excise tax on the first licensed distributor that receives E85 fuel products in the state and on distributors, special fuel dealers, or bulk purchasers of other alternative fuels. Liquefied natural gas is taxed at \$0.15 per gallon, and compressed natural gas is taxed at the rate of \$2.174 per thousand cubic feet.



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Midwestern State Incentives, Laws & Programs

• Illinois

• State Incentives

- **Alternative Fuel Vehicle (AFV) and Alternative Fuel Rebates**
 - Once in lifetime Rebate for 80% of the incremental cost of purchasing an AFV (up to \$4,000), 80% of the cost of converting a conventional vehicle to an AFV using a federally certified conversion (up to \$4,000) only from In state Dealer and not for export.
 - Eligible fuels is natural gas, and other AF.
- **Alternative Fuel Vehicle (AFV) Fleet Incentives**
 - The <http://www.illinoisgreenfleets.org/> recognizes and provides additional marketing opportunities for fleets in Illinois that have a significant number of AFVs and use clean, domestically produced fuels.
- **School Bus Retrofit Reimbursement**
 - The Illinois Department of Education will reimburse any qualifying school district for the cost of converting gasoline buses to more fuel-efficient engines or to engines using alternative fuels. Reference 105 <http://www.ilga.gov/legislation/ilcs/ilcs.asp?5/29-5>



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Federal Incentives & Laws

Incentives

- Alternative Fuel Tax Exemption
- Improved Energy Technology Loans
- Loan Guarantees

Laws & Regulations

- Alternative Fuel Definition - IRS Revenue Code
- Vehicle Acquisition and Fuel Use Requirements for Federal Fleets > 20 Vehicles
- Vehicle Acquisition and Fuel Use Requirements for State and Alternative Fuel Provider Fleets > 50 Light Duty
- Vehicle Acquisition and Fuel Use Requirements for Private and Local Government Fleets
- Aftermarket Alternative Fuel Vehicle (AFV) Conversions
- Alternative Fuel and Vehicle Labeling Requirements
- Vehicle Incremental Cost Allocation



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Federal Programs

Programs

- Clean Cities
- State Energy Program (SEP) Funding
- National Clean Diesel Campaign (NCDC)
- Clean Ports USA
- Clean Construction USA
- Clean Agriculture USA
- Smart-Way Transport Partnership
- Clean School Bus Program
- Clean Ports USA
- Clean Construction USA
- Clean Agriculture USA
- Air Pollution Control Program
- Alternative Transportation in Parks and Public Lands Program
- CMAQ (Congestion Mitigation & Air Quality Improvement Program)
- Clean Fuels Grant Program
- Voluntary Airport Low Emission (VALE) Program
- NGV Grants



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**Excerpts from: FEDERAL-AID HIGHWAYS AND HIGHWAY SAFETY CONSTRUCTION
PROGRAMS S. 1813 and HR. 4348 → Move Ahead for Progress
"MAP-21" (Bill Enacted July 6, 2012)**

SEC. 1108

(6) Carpool projects, fringe and corridor parking facilities and programs, including electric vehicle and natural gas vehicle infrastructure in accordance with section 137, bicycle transportation and pedestrian walkways in accordance with section 217

SEC. 1113

(2) Electric vehicle and natural gas vehicle infrastructure. A State may obligate funds apportioned under section 104(b)(4) for a project or program to establish electric vehicle charging stations or natural gas vehicle refueling stations for the use of battery powered or natural gas fueled trucks or other motor vehicles at any location in the State except that such stations may not be established or supported where commercial establishments serving motor vehicle users are prohibited by section 111 of title 23, United States Code.

SEC. 1408

of the Parking for Commercial Vehicles on the National Highway System, which authorizes highway projects to address the shortage of long-term parking for commercial motor vehicles on national highways, can also include charging and CNG refueling.



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SEC. 1513

Miscellaneous parking amendments.

(A) fringe and corridor parking facilities.—Section 137 of title 23, United States Code, is amended— (1) in subsection (f)(1)—(A) by striking "104(b)(4)" and inserting "104(b)(1)"; and (B) by inserting "including the addition of electric vehicle charging stations or natural gas vehicle refueling stations," after "new facilities,"; and (2) by adding at the end the following: "(g) FUNDING.—The addition of electric vehicle charging stations or natural gas vehicle refueling stations to new or previously funded parking facilities shall be eligible for funding under this section."

SEC. 20011

Research, development, demonstration, and deployment projects.

SEC. 1102

Obligation ceiling. (A) General limitation.—Subject to subsection (e), and notwithstanding any other provision of law, the obligations for Federal aid highway and highway safety construction programs shall not exceed—

- (1) \$39,699,000,000 for fiscal year 2013; and
- (2) \$40,256,000,000 for fiscal year 2014.

b) EXCEPTIONS.—The limitations under subsection (a) shall not apply to obligations under or for—Stat. 198;
(6) sections 1103 through 1108 of the Intermodal Surface Transportation Efficiency Act of 1991 (105 Stat. 2027);

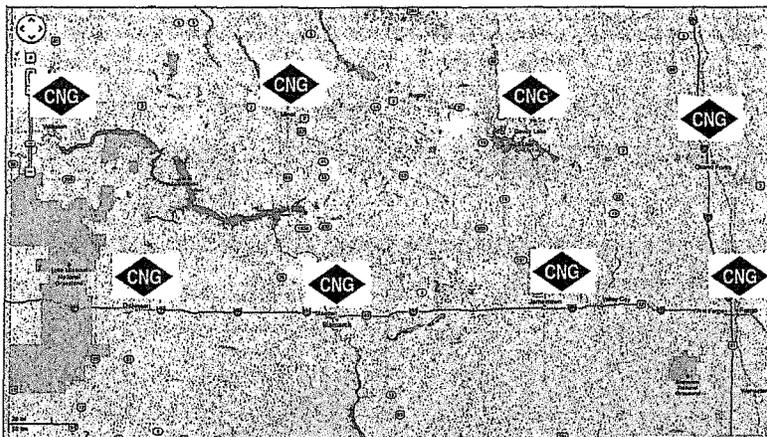
Where to Focus NG use in ND

- The existing uses of natural gas are well established in the industrial, commercial and residential sectors.
- NG use in electrical power generation and transportation sectors is extremely limited but still opens doors for applying ND's NG resources
- Use of NG for electrical power and transportation will provide significant greenhouse gas and other pollution reduction



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>50% State-wide population/fleet coverage with 8 locations



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Next Steps

- Evaluate feasibility of alternative uses for natural gas for State of North Dakota
 - Capture current (“As-Is”) production and consumption patterns
 - Define ideas and recommendations for using ND NG (“To-Be” scenarios)
 - Define alternative uses for energy sectors
 - Define potential allocation of flared NG for energy usage in existing sectors
 - Develop ideas for associated infrastructure requirements
 - Define risks
 - Define financial requirements and justifications (ROIs)
 - Define required and interested participants required to successfully define, develop and launch new usage of NG within and external to North Dakota
 - Recommend pilot and full scale ideas to establish and deploy solutions



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If you build it they will come!

- National Interest is growing fast to develop NG fueling infrastructure and purchase NGVs and conversions
- Consensus: if investments are made in infrastructure, business owners will purchase NGVs
- Unique opportunity for ND to request Federal grant funding for installations
- Utilize State opportunity to promote and establish Development Zones in major cities in ND for CNG
- Local businesses will follow your lead and make the investments when supported by States/Cities/Federal government.
- Unique opportunity to move forward with model installations for North Dakota



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Useful Links

Green Way Energy, LLC : www.greenwayenergy.us

Video for safety information: [CNGnow Safety link](#)

Gun test:

http://www.youtube.com/watch?feature=player_detailpage&v=irvktfQvu4M

Dynamite test:

http://www.youtube.com/watch?feature=player_detailpage&v=5ZUK-HJOfvU

Severe abuse:

http://www.youtube.com/watch?feature=player_detailpage&v=M-ExcJ7PaRc

Links for Federal and State legislation related to Alternative Fuels:

Federal Laws: <http://www.afdc.energy.gov/laws/>

Natural Gas Vehicle links:

http://www.afdc.energy.gov/vehicles/natural_gas.html



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THANK YOU
Green Way Energy, LLC



Ideas for North Dakota Natural Gas

March 21, 2013
Presented to the
State of North Dakota
Senate Natural Resources Committee



Presenter

Paul N. Jensen
President
Green Way Energy, LLC
Consulting Services
Fargo, North Dakota



Individual Experience

- Paul Jensen is the *Business Team Leader* for the Business Development, Marketing, Sales & PR aspects of the projects. Paul has worked with Power Equipment and Projects throughout the world, based on his 25 years of executive management position with the Fortune 500 company ABB of Switzerland. Paul has started business units in 8 different countries on 4 continents for ABB while residing in each country. Paul's educational background is an International Export Education acquired in Denmark at the Tietgen School of Business, and through other Business and Trade Schools in Denmark and United States.
- Tim Milburn is the *Technical Team Leader* related to power, industrial and biological projects. His extensive experience (20 years with ABB) with large scale project management in a wide spectrum of applications guarantees cost efficient and timely execution of process-related projects. Tim has worked with all forms of solid, liquid and semi-solid material handling, size reduction and classification, mixing, thermal treatment, chemical reactions, energy recovery and flue gas treatment - from the component design through turnkey systems installation and successful startup. Tim is a graduate of the Illinois Institute of Technology Chicago, with a BS in Mechanical Engineering (High Honors, Economics Minor) and a BA Biology (Environmental Focus, Chemistry/Physics Minor) from University of Illinois, Urbana.
- Ryan Meyer is the *Financial Team Leader* for managing and analyzing business processes. He has a deep academic and hands-on business knowledge, and brings a wealth of experience to the team based on his MBA educational background from University of North Dakota and his Financial Advisor Education. Ryan has in the last 4 years acquired a significant insight into the planning of renewable energy installations in North America and studied the import / export flows of wind energy. In addition Ryan teaches Corporate Finance at the University of Mary, Fargo, ND to post-graduate students.



Considerations (i)

- North Dakota natural gas production has risen significantly in the last few years and new natural gas reserves are regularly being discovered
- North Dakota is in a unique position:
 - Access to large quantities of ND natural gas
 - Able to develop new energy markets with this fuel
- North Dakota has the opportunity to reduce dependence on foreign oil and to mitigate environmental issues
- US policies are moving to support alternatives to traditional liquid-based fuels
- ND natural gas can be used in-state, be sold to other states or be exported globally



Considerations (ii)

- North Dakota flares between 100 and up to 200 million cubic feet of natural gas daily*
 - Wasted energy, never to benefit society
 - Gas is flared because of insufficient infrastructure capacity to get from wells to points of use
- ND flared gas adds at least 0.6 to 1.3 million tons of CO₂ into the atmosphere every year**



- *Source: Constellation Energy Nov. 30 - 2012
- ** Source, EIA 2012



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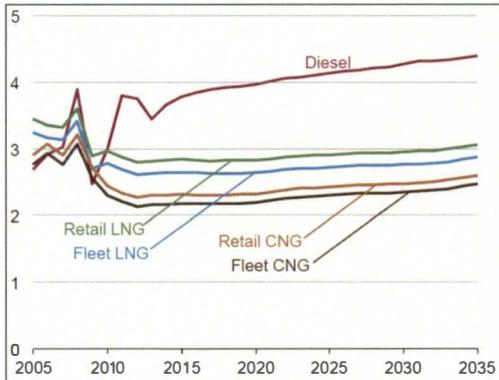


Source: NASA 2012



Fuel Market Future

- US Energy Information Agency (EIA) forecasts NG supply to be very predictable for the next 3 decades
- Natural gas prices are expected to be stable for the foreseeable future both from oil based production, shale and coal-bed sources



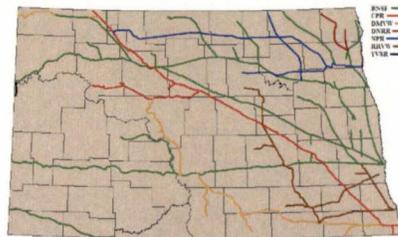
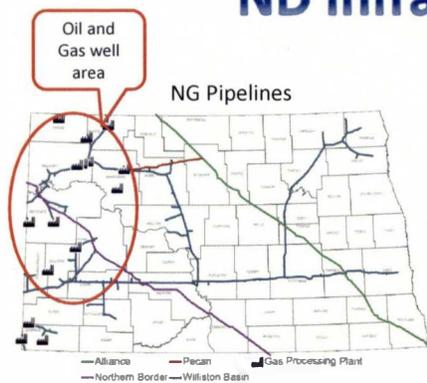
EIA Annual Energy Outlook 2012 Graph

- Forecast diesel and natural gas transportation fuel prices - \$/gallon diesel equivalent
- Heavy duty vehicle analysis basis
- 2010 dollars per diesel gallon equivalent

LNG = Liquefied Natural Gas
CNG = Compressed Natural Gas

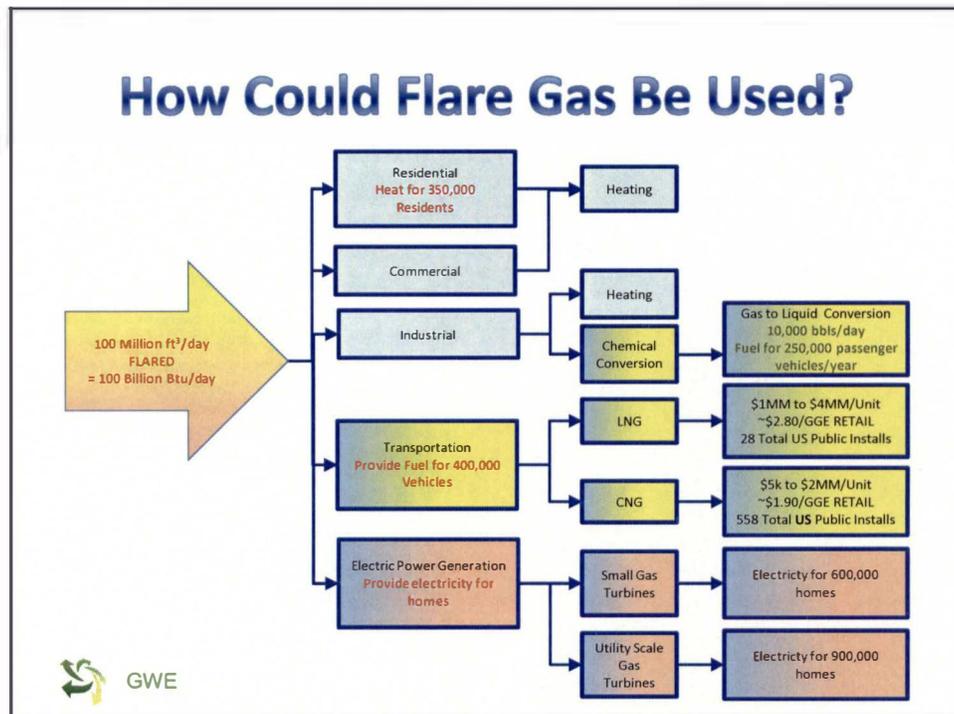
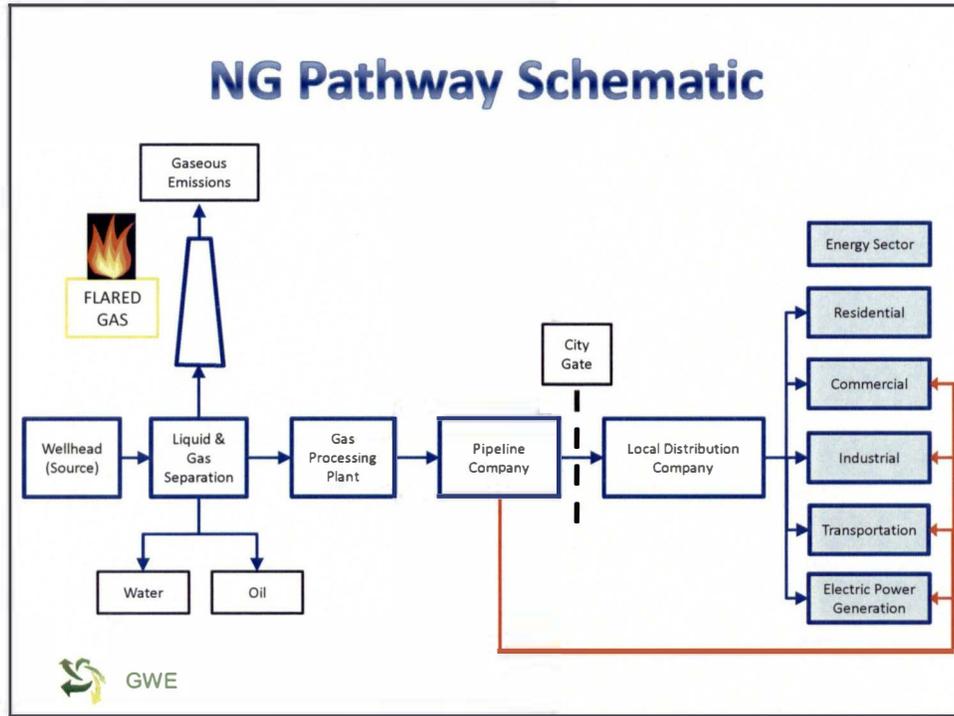


ND Infrastructure



How to best leverage existing infrastructure to reduce investment required to get fuel to end users?





NG Flaring Alternatives Choice Criteria

Capacity of Underground Reserves

- Number of known and prospective finds
- Well output performance
 - Volume of supply (cubic feet/year)
 - Years of well life

Location: Well to Point of Use

- Costs of new infrastructure
- Costs of transportation
- Losses with power generation

Use and Delivery Choices

- Use near well head (e.g. local heat and power)
- Pipeline
- Transport (e.g. truck, rail)
- Convert to liquid fuel

Infrastructure Needs

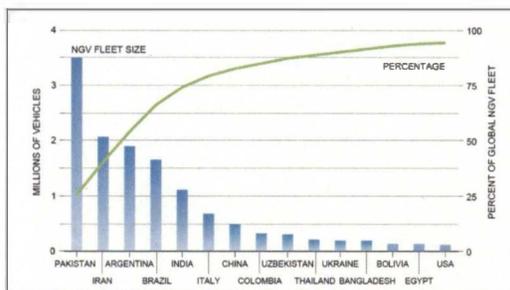
- Extendable?
- How far?
- Risk?
- Permanent vs. temporary?
- How much: ROI?



Drill-Down Example for Transportation Uses of North Dakota Natural Gas



Perspective NG Use for Transportation Worldwide



Source:
• Natl. Petroleum Council - August 2012 "NPC Future Transportation Fuel Study"

- NG has been available as a transportation fuel for many decades!
- Globally: 15 % avg. annual growth over last 3 years
- 15 million NGV's on the roads globally in 2011!
- 190,000 NGV's in US in 2012
- OEMs launching many new NGVs
- Over 4 million more NGVs predicted by 2018



Sources:
US Energy Administration Agency
Pike Research

NG Infrastructure Challenges to the Transportation Customers

- Consumers unwilling to buy NG vehicles before infrastructure is built
- Businesses will not invest in NG fueling stations until there is consumer demand
- Neither is willing to move without the other (chicken-and-egg)
- This challenges a good and efficient product to get to market
- There is a need for ND government policies and incentives to drive the success forward



CNG Fueling Assumptions

CNG FACILITY	Time Fill	Medium Fill	Single Fast Fill	Double Fast Fill
	CASE 1	CASE 2	CASE 3	CASE 4
Operating Costs (First Year)				
Hours per day fueling (annual average)	12.0	16.0	16.0	24.0
Days per Week Operation	5.0	7.0	7.0	7.0
Other Days per Year Closed	10.0	10.0	10.0	5.0
Days Per Year Open	250.0	355.0	355.0	360.0
Hours per Week Operation	60.0	112.0	112.0	168.0
Hours per Year Operation: MAXIMUM	3,000	5,680	5,680	8,640
Fueling Rates				
SELECT FUEL (D (Diesel) OR G (Gasoline))	D	D	G	G
Design Max. Fueling Rate - (D OR G) Gallon				
Equivalent per minute- from all hoses	1.00	4.00	7.00	10.00
Number of Hoses	2.00	2.00	2.00	4.00
Design Rate Per Hose, GE per minute	0.50	2.00	3.50	2.50



Four different CNG Station sizes to be used in the calculations i.e. Case 1 to 4



Benefits of Using Flared Gas

Relative Evaluation of Benefits of Using Flared Gas

Region	North Dakota [^]		
	Amount of Natural Gas Being Flared, Sft ³ /day		
Quantification of Regional Flaring	Minimum Flare Rate	Maximum Flare Rate	
Daily, Sft ³ /day	100,000,000	200,000,000	
Current Market Prices of Natural Gas			
	\$/ 1000 Sft ³	\$/GGE*	\$/DGE*
Wellhead	\$ 3.25	0.40	0.45
Citygate	\$ 4.51	0.56	0.62
Industrial	\$ 4.49	0.56	0.62
Electric Power	\$ 4.42	0.55	0.61
Commercial	\$ 5.51	0.68	0.76
Residential	\$ 6.55	0.81	0.90
Transportation Fueling	\$ 5.51	0.68	0.76
Markup and Overhead factor on cost for transportation price incl. Compression	2.15		
Transportation Retail Price	\$ 11.85	1.47	1.63

*GGE = Gasoline Gallon Equivalent
DGE = Diesel Gallon Equivalent

[^]Data from US EIA for North Dakota, end of 2012



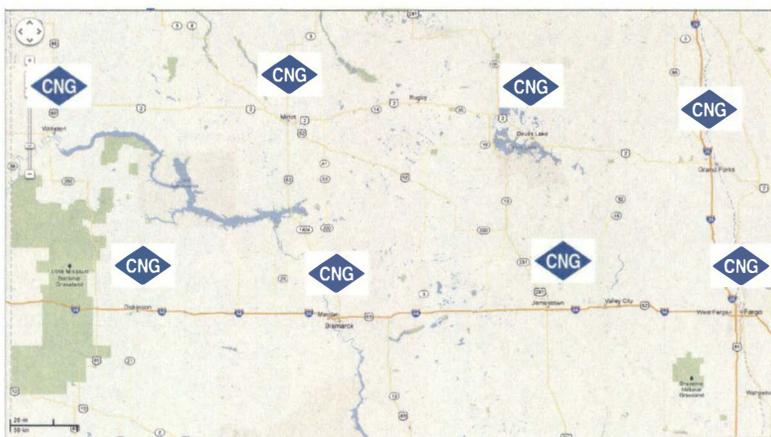
Example of CNG Installations

Region Wide Planned Quantities	Number of Installations	
	Minimum Flare Rate	Maximum Flare Rate
Number of Level 1 Stations Deployed	-	-
Number of Level 2 Stations Deployed	2	2
Number of Level 3 Stations Deployed	3	3
Number of Level 4 Stations Deployed	3	3
Standard Cubic Feet/Year per Region	Region Sft ³ /Year	
Region-wide Level 1 Annual Capacity	-	-
Region-wide Level 2 Annual Capacity	228,851,049	
Region-wide Level 3 Annual Capacity	537,786,791	
Region-wide Level 4 Annual Capacity	963,986,565	
Region Wide Total Annual Capacity	1,728,604,404	
Ratio: To-be Installed Capacity/Annual Flaring Amount	5.92%	2.96%

Equivalent Number of Stations if ALL Flared Gas Went to Transportation	Minimum Flare Rate	Maximum Flare Rate
Level 1	1,576	3,151
Level 2	257	515
Level 3	163	326
Level 4	91	182

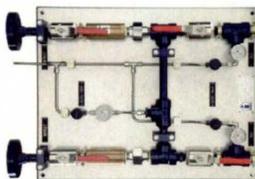


>50% State-wide populations coverage through 8 locations



CNG Technology and Installation Cost Example

Region Wide Investment Quantities		\$ Investment	
Unit Costs			
Unit Cost of Level 1 Stations Deployed		\$ 545,000	
Unit Cost of Level 2 Stations Deployed		\$ 969,000	
Unit Cost of Level 3 Stations Deployed		\$ 1,162,464	
Unit Cost of Level 4 Stations Deployed		\$ 1,703,145	
Total Costs			No. of Installs
All Level 1 Stations Deployed		\$ -	-
All Level 2 Stations Deployed		\$ 1,938,000	2
All Level 3 Stations Deployed		\$ 3,487,392	3
All Level 4 Stations Deployed		\$ 5,109,435	3
Total Regional Cost of All Stations Deployed		\$ 10,534,828	-



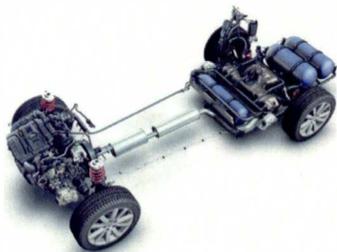
Volumetric Capacity Assumptions

Vehicle Type	Est. Miles/Gallon ICE	Physical Size of Tank in Gallons		Max. Miles per Tank (Full to Bone Dry)		Max. Miles per Tank @ Fill-up	
		Typ. Minimum	Typ. Maximum	Typ. Minimum	Typ. Maximum	Typ. Minimum	Typ. Maximum
Passenger Vehicles	25	12	20	300	500	255	425
Pick-ups/Vans	20	20	30	400	600	340	510
Medium Sized Trucks	13	30	50	390	650	332	553
Buses	12	50	75	600	900	510	765
Refuse Trucks	5	50	80	250	400	213	340
Snow Plows	4	50	80	200	320	170	272
Tractor Trailers (Class 3 to 8)	5	75	200	375	1,000	319	850



Vehicle Usage Profile

Vehicle Type	Number of Miles Estimation Tool for Above Table			Estimation of Annual Mileage, Based on Daily Usage		
	Hours/day	Days/Week	Weeks/Year	Total Days/Year	Miles/Hour Average	Miles/year
Passenger Vehicles	2	7	52	364	30	16,380
Pick-ups/Vans	2	7	52	364	30	16,380
Medium Sized Trucks	5	5	50	250	35	43,750
Buses	3	5	40	200	30	18,000
Refuse Trucks	4	5	52	260	25	26,000
Snow Plows	6	3	10	30	25	4,500
Tractor Trailers (Class 3 to 8)	8	5	52	260	45	93,600



NG Vehicle Choices

- Buy new or convert existing vehicles
 - Conversion costs vary by vehicle type, age and level of non- conversion rework

VEHICLE TYPE	COST PER VEHICLE TO CONVERT FROM LIQUID FUEL TO NG	
	Engine/Fuel Train Only	Reman
Passenger Vehicles	LOW \$4,000	HIGH \$8,000
Pick-ups/Vans	\$7,000	\$12,000
Medium Sized Trucks	\$30,000	\$60,000
Buses	\$35,000	\$65,000
Heavy Duty Trucks	\$35,000	\$70,000

- New vehicles roughly same as traditional liquid fuel plus low numbers in chart above
 - Example: new diesel truck: \$150,000, with NG \$185,000
 - Cost expected to decrease w/ volume production



Transportation User Segments

The diagram illustrates four transportation user segments: Light Trucks, Heavy Trucks, Rail, and Passenger vehicles. Each segment is represented by a blue box in a circular arrangement. Surrounding the diagram are images of vehicles and logos for various manufacturers:

- Light Trucks:** Includes a white GM van and a silver Ford pickup truck.
- Heavy Trucks:** Includes a blue Mack garbage truck and an orange Volvo truck.
- Rail:** Includes a black and orange CN freight train and a GE logo.
- Passenger vehicles:** Includes a silver Opel Astra and a blue Ford Focus.

Logos for GM, Ford, Mack, Volvo, GE, and GWE are also present.

Ford Products available today!

CNG/LPG models on the way

2013 CNG/LPG-prepped lineup

The following Ford products are available today:

- Transit
- Transit Connect
- Transit Connect Van/Wagon
- E-150/250/350 Cargo Van/Wagon
- E-350/450 Cutaway Chassis
- E-350/450 Stripped Chassis
- F-250/350/450 Super Duty Pickup
- F-350/450/550 Super Duty Chassis Cab
- F-650 Medium-Duty Chassis Cab
- F-59 Commercial Stripped Chassis

FOR MORE INFORMATION, GO TO MEDIA.FORD.COM

Logos for GWE and Ford are also present.

GM Products available today!



Passenger vehicles available today!



New models introduced in 2013. Availability still limited. Most new models dual fuel gasoline/gas.



Chrysler products available!



Refuse Trucks in Operation



NG Buses in Operation



Washington DC



Bakersfield, CA



St. Cloud, MN



Atlanta, GA



AT&T

- **Saving Big Money on Switch to CNG Vehicles**
- The company reports that it saved 2.5 million gallons of gasoline in 2011 by outfitting many of its vehicles with Compressed Natural Gas tanks.
- Its 10-year plan to replace 15,000 vehicles from its fleet with CNG vehicles is well under way.
- > 5,000 alternative fuel trucks and vans already on the road
- Part of that greater plan is a five-year, \$350 million program to purchase 8,000 CNG vehicles.

- 2013 Express/Savana CNG Cargo Van



- 6.0 L Vortex V8 Engine
- 3 or 4 tank system
- Comprehensive 5 Year 100,000 Mile Warranty
- Serviced by GM Dealers



Rendering CNG Station



Complete Refueling Station

Can add other services like traditional gas stations – service bays, mini mart, air compressor



20% CNG Vehicles by 2020

North Dakota imported the following in 2010 for use in a total number of vehicles ~ 980,000 (400,000 passenger vehicles, 362,000 trucks):

- Diesel fuels 419,611,500 Gallons: Retail value \$1.741 Billion @ \$4:15/ Gallon
- Gasoline fuels 291,595,500 Gallons: Retail value \$1.064 Billion @ \$3.85/ Gallon

Current retail Natural Gas price per gallon equivalent:

- Replacing Gasoline Fuel (\$ / GGE):
 - \$1.95 - North Dakota
 - Multi-state region- \$1.85 to \$2.60
- Replacing Diesel Fuel (\$ / DGE):
 - \$1.75 - North Dakota
 - Multi-state region - \$1.60 to \$2.30

At an annual CNG vehicle growth rate of 2.5% over 8 Years, we can switch 20% of the fleet in 2020 to CNG = ~\$1 Billion less cost (2010 Dollars) by residents and businesses of ND



Gas To Liquid Process Synthetic Crude and Diesel

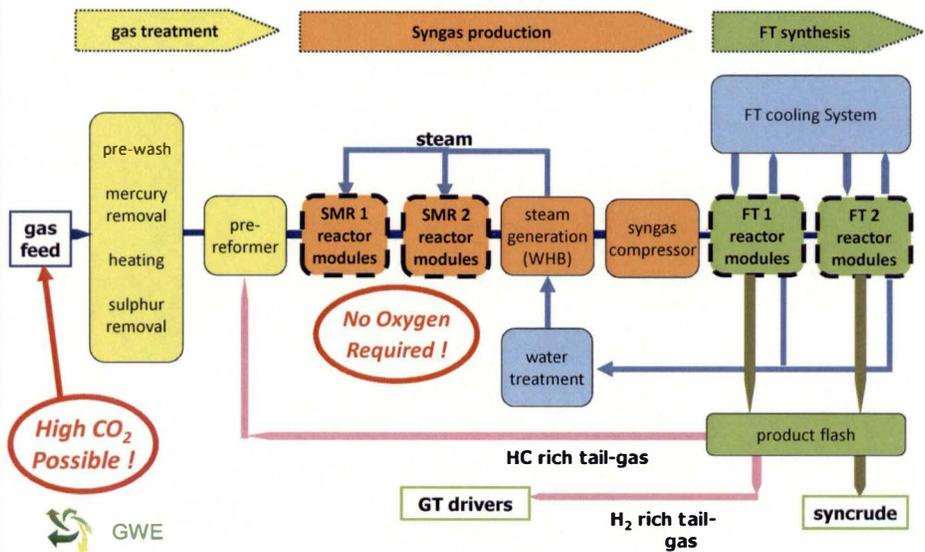


Courtesy of : CompactGTL Plant <= 150MMscf/d

Other market participants



GTL Modular plant - process overview



NG Rail



Federal and State NG Related Incentives



Federal Incentives & Laws

Incentives

- Alternative Fuel Tax Exemption
- Improved Energy Technology Loans
- Loan Guarantees

Laws & Regulations

- Alternative Fuel Definition - IRS Revenue Code
- Vehicle Acquisition and Fuel Use Requirements for Federal Fleets > 20 Vehicles
- Vehicle Acquisition and Fuel Use Requirements for State and Alternative Fuel Provider Fleets >50 Light Duty
- Vehicle Acquisition and Fuel Use Requirements for Private and Local Government Fleets
- Aftermarket Alternative Fuel Vehicle (AFV) Conversions
- Alternative Fuel and Vehicle Labeling Requirements
- Vehicle Incremental Cost Allocation



Federal Programs

Programs

- Clean Cities
- State Energy Program (SEP) Funding
- National Clean Diesel Campaign (NCDC)
- Clean Ports USA
- Clean Construction USA
- Clean Agriculture USA
- Smart-Way Transport Partnership
- **Clean School Bus Program**
- Clean Ports USA
- Clean Construction USA
- Clean Agriculture USA
- Air Pollution Control Program
- Alternative Transportation in Parks and Public Lands Program
- CMAQ (Congestion Mitigation & Air Quality Improvement Program)
- Clean Fuels Grant Program
- Voluntary Airport Low Emission (VALE) Program
- NGV Grants



**Excerpts from: FEDERAL-AID HIGHWAYS AND HIGHWAY SAFETY CONSTRUCTION
PROGRAMS S. 1813 and HR. 4348 → Move Ahead for Progress
“MAP-21” (BII Enacted July 6, 2012)**

SEC. 1108

(6) Carpool projects, fringe and corridor parking facilities and programs, including electric vehicle and natural gas vehicle infrastructure in accordance with section 137, bicycle transportation and pedestrian walkways in accordance with section 217

SEC. 1113

(2) Electric vehicle and natural gas vehicle infrastructure. A State may obligate funds apportioned under section 104(b)(4) for a project or program to establish electric vehicle charging stations or natural gas vehicle refueling stations for the use of battery powered or natural gas fueled trucks or other motor vehicles at any location in the State except that such stations may not be established or supported where commercial establishments serving motor vehicle users are prohibited by section 111 of title 23, United States Code.

SEC. 1408

of the Parking for Commercial Vehicles on the National Highway System, which authorizes highway projects to address the shortage of long-term parking for commercial motor vehicles on national highways, can also include charging and CNG refueling.

SEC. 1513

Miscellaneous parking amendments. (A) fringe and corridor parking facilities.—Section 137 of title 23, United States Code, is amended— (1) in subsection (f)(1)—(A) by striking “104(b)(4)” and inserting “104(b)(1)”; and (B) by inserting “including the addition of electric vehicle charging stations or natural gas vehicle refueling stations,” after “new facilities;”; and (2) by adding at the end the following: “(g) FUNDING.—The addition of electric vehicle charging stations or natural gas vehicle refueling stations to new or previously funded parking facilities shall be eligible for funding under this section.”.

SEC. 20011

Research, development, demonstration, and deployment projects.

SEC. 1102

Obligation ceiling. (A) General limitation.—Subject to subsection (e), and notwithstanding any other provision of law, the obligations for Federal aid highway and highway safety construction programs shall not exceed—
(1) \$39,699,000,000 for fiscal year 2013; and
(2) \$40,256,000,000 for fiscal year 2014.

b) EXCEPTIONS.—The limitations under subsection (a) shall not apply to obligations under or for—Stat. 198); (6) sections 1103 through 1108 of the Intermodal Surface Transportation Efficiency Act of 1991 (105 Stat. 2027);



ND State Active Incentives and Laws

- North Dakota
 - Incentives
 - Agriculturally-Based Fuel Production Wage and Salary Tax Credit
 - Wage and Salary Tax Credit. 1% of wages and salaries paid during the tax year for each of the first three years of operation and 0.5% of wages and salaries paid during the tax year for the fourth and fifth years.
 - Laws & Regulations
 - Alternative Fuel Labeling Requirement
 - Alternative Fuel Tax Rates
 - A special excise tax rate of 2% is imposed on the sale of propane (liquefied petroleum gas) a tax of \$0.04 per gallon is imposed on all special fuels sales, including compressed natural gas.



Midwestern State Incentives, Laws & Programs

• Colorado:

- Incentives
 - Alternative Fuel, Advanced Vehicle, and Idle Reduction Technology Tax Credit
 - CNG: 55% 35% 25% and 25% 1/1-2013 to 12/31 2016 up to max. \$6,000
 - Low Emission Vehicle (LEV) Sales Tax Exemption
 - Vehicles > 10,000 LBS
 - Alternative Fuel Vehicle (AFV) Weight Limit Exemption
 - Gross vehicle weight rating limits for AFVs are 1,000 pounds greater
- Utility/Private Incentives
 - Natural Gas Fuel Rate Reduction and Infrastructure Maintenance - Clean Energy
 - Compressed natural gas fueling station equipment maintenance, competitive fuel pricing for larger fleet customers, and alternative fuel vehicle financing.
- Laws
 - Alternative Fuel Resale and Generation Regulations
 - Fuel suppliers not to be regulated as a Utility
 - Alternative Fuel Vehicle (AFV) Registration
 - Adding fuel type to registration of vehicle
 - Clean Energy Development Authority
 - Can issue Bond Financing for state projects
 - State Agency Alternative Fuel Use and Vehicle Acquisition Requirement
 - Departments to purchase NG vehicles if price difference less than 10% of same vehicle with conventional fueled Engine



Midwestern State Incentives, Laws & Programs

• Minnesota

- Utility/Private Incentives
 - **Natural Gas Infrastructure Technical Assistance**
 - A designated utility may offer preliminary feasibility studies for natural gas fueling stations, including natural gas availability information.
- Laws and Regulations
 - **State Agency Sustainability Plan and Requirements**
 - Using 2005 as a baseline, the state must achieve a 50% reduction in gasoline used to operate state agency-owned on-road vehicles by 2015;
 - Using 2005 as a baseline, the state must achieve a 25% reduction in the use of petroleum-based diesel fuel for state owned on-road vehicles by 2015;
 - When reasonably possible, state agencies must purchase on-road vehicles that use Alternative fuels such as **compressed or liquefied natural gas** or vehicles that (with the exception of buses, snowplows, and construction vehicles) have a fuel economy rating that exceeds 30 miles per gallon (mpg) in the city and 35 mpg on the highway;
 - **Alternative Fuel Tax**
 - The Minnesota Department of Revenue imposes an excise tax on the first licensed distributor that receives E85 fuel products in the state and on distributors, special fuel dealers, or bulk purchasers of other alternative fuels. Liquefied natural gas is taxed at \$0.15 per gallon, and compressed natural gas is taxed at the rate of \$2.174 per thousand cubic feet.



Midwestern State Incentives, Laws & Programs

- Illinois
- State Incentives
 - **Alternative Fuel Vehicle (AFV) and Alternative Fuel Rebates**
 - Once in lifetime Rebate for 80% of the incremental cost of purchasing an AFV (up to \$4,000), 80% of the cost of converting a conventional vehicle to an AFV using a federally certified conversion (up to \$4,000) only from In state Dealer and not for export.
 - Eligible fuels is natural gas, and other AF.
 - **Alternative Fuel Vehicle (AFV) Fleet Incentives**
 - The [Illinois Green Fleets Program](#) recognizes and provides additional marketing opportunities for fleets in Illinois that have a significant number of AFVs and use clean, domestically produced fuels.
 - **School Bus Retrofit Reimbursement**
 - The Illinois Department of Education will reimburse any qualifying school district for the cost of converting gasoline buses to more fuel-efficient engines or to engines using alternative fuels. Restrictions may apply. (Reference 105 [Illinois Compiled Statutes](#) 5/29-5)



The Path Forward!



Transportation Focus Study Concepts (i)

- **Define solution opportunities, constraints and costs as functions of distance from well to solution, method of gathering and distributing fuels, size and estimated well life, chemical properties of well fuels and other factors**
 - Capture current ND well fields flaring and natural gas expectations for future wells and consumption patterns
 - Gas gathering pipeline systems, gas processing, distribution, transmission, storage and delivery infrastructure
 - Define risks
 - Define financial requirements and justifications (ROIs)
- **Identify and quantify potential uses of ND natural gas**
 - In State transportation fueling
 - Heavy and Light Trucks and other high mileage fleet vehicles
 - Gas for Rail transportation
 - Gas to Oil conversion
 - In State electrical power generation
 - Combined cycle natural gas power generation
 - Combined cycle natural gas complimentary with Wind Farm Power Generation
 - In State heating (industrial, residential, commercial)
 - In State chemical production (e.g. Fisher-Tropsch) Ammonia, Hydrogen, Methanol, Olefins
 - Export
- **Define infrastructure requirements and investment needs specific to transportation sector**
 - Fueling infrastructure (CNG, LNG)
 - New or converted vehicles (OEMs, conversion shops)
 - Economy of scale of projects



Transportation Focus Study Concepts (ii)

- **Define stakeholder categories associated with solution categories and identify qualified representative Subject Matter Experts (SME) in each category**
 - Quantify costs, qualify advantages and disadvantages of each solution category
 - Define interested participants required to successfully develop and launch new usage of NG within and external to North Dakota
 - Recommend pilot and full scale ideas to establish and deploy solutions
 - Engage SMEs, as required to support study



Transportation Focus Study Concepts (iii)

- Suggest ideas related to motivating natural gas infrastructure markets
 - Supporting development of gathering, processing and distribution of natural gas
 - Ideas on incentives, favorable lending, penalties and enforcement
 - Promote ND job creation – permanent and part time



Transportation Focus Study Concepts (iv)

- Establish North Dakota target setting plan, including near and long term commercial and economic development and sustainability targets, and associated metrics to measure/track success
- Create cost/price matrices for various natural gas use solutions, including sensitivity to fuel market variables
- Consider incentive plans to jump-start market
- Develop go-forward recommendations as functions of each solution category with focus on transportation



Useful Links

Green Way Energy, LLC : www.greenwayenergy.us

Video for safety information: [CNGnow Safety link](#)

Gun test:

http://www.youtube.com/watch?feature=player_detailpage&v=irvktfQvu4M

Dynamite test:

http://www.youtube.com/watch?feature=player_detailpage&v=5ZUK-HJOfvU

Severe abuse:

http://www.youtube.com/watch?feature=player_detailpage&v=M-ExcJ7PaRc

Links for Federal and State legislation related to Alternative Fuels:

Federal Laws: <http://www.afdc.energy.gov/laws/>

Natural Gas Vehicle links:

http://www.afdc.energy.gov/vehicles/natural_gas.html



THANK YOU!
Green Way Energy, LLC



/

13.3069.02001
Title.

Prepared by the Legislative Council staff for
Senator Murphy
March 27, 2013

PROPOSED AMENDMENTS TO ENGROSSED
HOUSE CONCURRENT RESOLUTION NO. 3016

Page 1, line 2, remove ", including the feasibility of turning natural gas into diesel fuel for public"

Page 1, line 3, remove "consumption"

Page 1, line 16, remove the comma

Page 1, line 17, remove "including the feasibility of turning natural gas into diesel fuel for public
consumption"

Renumber accordingly