A Transition to Natural Gas To Reduce Dependence on Foreign Oil

A proposal to create a widespread natural gas infrastructure through a collaboration of the gas industry, automotive industry, and government involvement.

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Tag Words: Production of natural gas vehicles, expanding natural gas infrastructure, oil, transition, alternative energy

Summary

We currently rely heavily on oil for our energy needs, but it a detrimental product to our society and environment. Natural gas is an effective alternative that will save people money, create jobs, and help the environment. The United States currently lags behind other countries in the use of natural gas vehicles. We have expansive amounts of natural gas within our country, but have not made the transition to effectively utilize it. Other countries such as Thailand, Brazil, and India are expanding their natural gas usage rapidly and in some instances implementing laws forcing their citizens use natural gas cars. The United States can increase their use of natural gas cars if the government creates incentives and policies geared toward promoting the expansion of natural gas cars and refueling stations. This expansion to an alternative fuel source will be a great transition from oil while other technologies are being developed. (VG)

Video link
http://www.youtube.com/watch?v=ni8NnkJgwso&feature=youtu.be

To Create a Widespread Natural Gas Infrastructure

1. Introduction

(VG/RK/DP)

Harmful Effects of Oil

Natural gas conversion is essential in our current global climate. Our dependence and usage on gasoline is exponentially increasing with no end in sight. America is the third largest
petroleum consumer in the world. In 2010, America consumed 19.1 million barrels per day (MMbpd) of petroleum and 49% of that oil is foreign as shown in figure 1. This increasing demand has lead to soaring prices, which has put an increasing strain on the average consumer.

The economic ramifications of this dependence are extreme as prices approaching $4.00 per gallon, as shown in figure 2, are making it difficult for lower income individuals to travel. These economic troubles pale in comparison to the stress we are placing on the environment. In less than 100 years of oil expansive oil consumption we have caused incompressible damage to the environment and through the consumption of this one product may have caused global warming. If a rapid switch is not made to an alternative energy source our wallets and our environment will reach a tipping point from which there will be no recovery.
Obtaining Natural Gas

(RK) Natural gas is “a mixture of gases containing primarily hydrocarbon gases” (4). There are two ways to obtain natural gas. One is from an oil reservoir. In an oil reservoir method, natural gas is separated from petroleum than contaminates, like water, H2S, CO2, etc, are removed (2, 3). The second method is to acquire natural gas directly from shale, a rock formation rich in natural gas. This method uses horizontal drilling and hydraulic fracturing, or fracking, “a technique in which water, chemicals, and sand are pumped into the well to unlock the hydrocarbons trapped in shale formations by opening cracks (fractures) in the rock and allowing natural gas to flow from the shale into the well” (2, 3). Fracking is the cheapest method and the one commonly used to obtain natural gas. After fracking, the gas is refined demathanized and dethanized (4). So, natural gas is obtained by fracking because it’s cheap and natural gas is more readily available than in conventional oil reservoirs.

However, local drinking water or groundwater contamination from the fracking process is a major health concern. A study conducted at Duke University on contamination of local drinking water found that “methane concentrations were 17-times higher on average in areas with active drilling and extraction than in non-active areas, with some drinking-water wells having concentrations of methane well above the ‘immediate action’ hazard level” (5). Methane is the natural gas being collected, and this study shows fracking isn’t the safest way of obtaining it since it is being leaked into the local water. Furthermore, spills, leaks, or management of hydraulic fracturing fluid, which contains harmful chemicals can also contaminate the water (2). To prevent health risks and ensure safe water for drinking better methodologies to acquire natural gas should be investigated.

Benefits of Using Natural Gas

(DP) Natural gas is an important piece of the puzzle in the energy supply of the world. Compared to many other sources of energy it is clean and safe to use. Because we need reliable clean energy to protect our health and the environment, natural gas could be designated as an essential future energy.
Natural gas is emits much less carbon emissions in comparison to coal. Natural gas also has 80% fewer nitrogen oxides (the primary precursor of smog) emissions and virtually no sulfur dioxide (the primary precursor of acid rain), mercury or particulate pollution (which can affect health and visibility). Natural gas produces very clean byproducts of heat, water vapor, and carbon dioxide. Natural gas offers significant reductions in these pollutants and substantially eases impact on human health and the environment.

- **Convenience**
  
  Natural gas is not only the cleanest fossil fuel, it’s also the most convenient – when we use our appliances. For example, natural gas ranges have better heat control allowing them to cook faster. Moreover, natural gas dryers produce less static cling. When we chop or store wood with a natural gas fireplace, we do not have to worry about hauling.

- **Abundant**
  
  Natural gas is more plentiful and more cost-effective for most people than renewable sources of energy, such as wind, solar and biofuels. Research has shown that the United States has more natural gas supplies than Saudi Arabia has oil. The United States just passed Russia to become the world’s largest producer of natural gas. By using natural gas, it can help society transition to a cleaner future.

- **Savings**
  
  Natural gas costs less to use in your home than electricity, heating oil, propane or kerosene. On average, electricity costs almost four times more than natural gas. On average, natural gas costs less than purchasing wood for a wood stove. Historically, natural gas has enjoyed more stable prices than oil.

- **Domestic Supply**
  
  Nearly 85% of the natural gas consumed in the United States is produced within U.S. borders. The remaining supply comes from Canada. Because of our vast domestic abundance of natural gas, our nation is the envy of the world. Moreover, United States is leading production of this clean energy source.

- **Jobs**
  
  The natural gas abundance in the United States is leading to expanded economic opportunities in the United States. In the United States, natural gas contributed $385 billion to the U.S. economy in 2008 and supported more than 2.8 million American jobs.


**Current United State Natural Gas infrastructure**

(VG) Establishing a proper infrastructure for natural gas distribution is essential because without it price volatility can occur, economic growth will sputter, and those who need natural gas the most will not be able to receive it.
When considering the current natural gas infrastructure of the United States one must take into account the pipelines that run across the country providing the natural gas to various parts of the country and then look at the liquid and compressed natural gas stations which are providing the fuel to the vehicles themselves. The one thing that makes natural gas better than regular gas is that it reduces our nation’s dependency foreign fuel. Currently we receive about 85 percent of our natural gas from the United States alone, while over half of the oil we use is imported from other regions such as the Middle East. Most of the natural gas comes from the waters in the Gulf of Mexico, where production is now going on off the coast of Louisiana, Texas, Alabama and Mississippi. Now more recently companies are beginning to tap into shale, which allows companies to find the natural gas pockets and bring them to the surface. There are large shale deposits in Louisiana, Texas, Rocky Mountains, and the Appalachians\(^8\).

The natural gas pipelines were originally planned out to deliver natural gas from the abundant gas region of the Southwest to the consuming regions of the Northeast and Midwest. About half of the largest natural gas pipelines therefore begin in the Southwest. This model should change overtime as natural shale resources are tapped in the Midwest and Northeast\(^9\). Furthermore this model is affected by regional differences in gas prices. The cost of gas in a region will determine how much natural gas in used in an area and weather or not future infrastructure should be built in the region.

Next, after establishing that natural gas pipelines run throughout the country we must focus on the distribution of natural gas fueling stations within the country. Currently natural gas stations are sparsely dispersed throughout the country. Five states do not even have natural gas stations and the Midwest portion of the country has many states with fewer than 10 stations\(^10\). There are a few states containing between 21-50 stations within their state, with California being the largest carrier of natural gas stations containing over 200. According to the current distribution most of the natural gas stations located in the country are focused on the Northeast and Southwest. Currently, though most of these stations are private, meaning they only exist for a company to use to refuel their fleets. Until the public has access to natural gas stations they will not be enticed to buy natural gas cars. From discussions with Honda of Princeton associate Tom Connelly, the main issue behind the lack of natural gas cars is there are few stations for people to fuel their vehicles at.

Obvious expansion is necessary, but the onerous task is placed on smaller companies, as none of the major oil players are interested in expansion. These small companies are not doing a bad job despite limited resources and funding. For example in July Piedmont Natural Gas Co. Announced it was planning to build 12 natural gas stations across South Carolina that would be accessible by the public. Another Company Zarco convenience stores in Iowa announced they were planning on a major expansion to their refilling stations and would be including natural gas stations in the expansion. Their hope with this expansion is to make the nearby town of Lawrence to consider switching fleets of trucks to natural gas and possibly the public\(^11\).

Natural Gas Infrastructure Development In Other Countries

(RK) Developing a natural gas infrastructure in Thailand, India, and Brazil was not easy, but they were successful in increasing natural gas usage. It was the collaboration between the gas company providers and the government that really pushed natural gas to be a source of energy for these countries.

Brazil

Brazil faced several problems while developing the natural gas infrastructure. It was mostly due to having a cheaper energy alternative to oil already in place and poor government commitment and regulation. However, with new policies and renewed government involvement the natural gas infrastructure was able to advance.

Brazil’s main alternative energy source for oil is hydroelectric power, but because of droughts that caused the water wells to dry up, Brazil planned to develop a natural gas infrastructure. Their plan was to have “55 new gas-fired power plants over an eight-year period with a combined capacity of 23,000 MW” (13). But, only 15 gas-fired power-plants were made while the development of pipelines was canceled or placed on hold (13). This happened because demand for natural gas decreased after the wells filled up and the government leader Luiz Inacio Lula da Silva, who preferred hydro-power, did not push for a natural gas infrastructure (13). There was also the problem of cutting public spending in infrastructure development, which slowed natural gas development (15).

With the government and Petrobras, Brazil’s largest energy and natural gas producer, working together the natural gas infrastructure was able to develop.

They began by first investing money to build the infrastructure. Between 1994 to 2004, “More than $164 billion was invested in infrastructure projects that involved private participation” (15). Some of that money went to create the pipeline grid while some went into importing liquid natural gas (13). Liquid natural gas was used to fuel new plants because “the lack of indigenous gas production and pipeline infrastructure” (13) made it a good alternative to compressed natural gas.

To increase natural gas usage it had to be cheaper than the alternative fuel sources. The government created public incentive by cutting purchasing price of imported gas exceeding normal consumption and making natural gas a cost saver for consumers who used domestic gas (13). The government also created policies that “partially deregulated wholesale gas markets, promoted gas as a future source for power generation, and created a favorable environment for the development of gas infrastructure” (13).
The government made some policy changes to make the transition. The Brazilian Petroleum Investment law was an energy reform law its objectives were:
· The Creation of the National Council for Energy Policy (CNPE) to set energy industry policy.
· Creation of the Agencia Nacional do Petroleo (ANP) to oversee deregulation and restructuring.
· Increased use of natural gas
· Free competition in the energy industry
· Domestic and foreign investment in power generation (13)
This law was implemented in July 1997.

India

Compared to Brazil, India had followed through with their plan much quicker because of a well organized plan and committed government. Unlike Brazil who worked together with a natural gas company (Petrobra), India had hired GAIL, a natural gas transmission and distribution company, to implement and help develop the CNG infrastructure.

The natural gas grid was developed first in cities and it connected natural gas to new and existing markets. Cities were first to experience natural gas distribution, which was provided by partnerships between local and foreign gas companies. Foreign partnerships were with the British Gas company (16). In Delhi, the leading petroleum company Bharat Petroleum Corporation Ltd partnered with GAIL to provide natural gas. Within 5 years, Delhi went from 68 to 142 stations, which provided 2,450,666 Kgs/day of natural gas (16). In Mumbai, natural gas providers and demand grew even more quickly. Within three years, Mumbai went from 78 natural gas fill points and 25 stations to 581 fill points and 117 stations, which provided 1,669,080 Kgs/day of natural gas (16). Mumbai had more places to fill up with natural gas because local stations provided a fuel choice of natural gas, petroleum, or diesel. So, with the creation of natural gas companies, partnerships, and choice of fuel source natural gas was able to be distributed more quickly.

Vehicles were converted to CNG or LPG in a timely fashion that reflected the urgency of implementing the CNG infrastructure (16). In a five year period, within Delhi, Mumbai, and other cities that were the first to acquire natural gas 300,000 vehicles were powered by natural gas (16). This was because the government pushed for natural gas.

The government supported and helped regulate development. The government created incentive by using soaps on sales tax, gave land to create the CNG infrastructure (like pipeline and oil wells), and “required legislation and standards to ensure checks and balances in the system” (16). The legislation of checks and balances was done by setting up a separate group, called the judiciary. Their job was “to take stock of progress being made in other cities which were identified as high pollution cities [while their] findings [were] being regularly monitored by the Courts” (16). This system really helped keep the plan going on track because progress was constantly monitored, which reduced problems. Finally, to drive demand for CNG, India created strong public awareness showcasing the benefits of natural gas.
It was the strong government role, the plan and execution with the help of the judiciary, and the collaboration of gas companies that allowed a smooth transition into natural gas. It is also why India experienced less problem’s than Brazil.

**Asia and Thailand**

Asian nations came together to form a massive and widespread pipeline grid that ran through each country. They were all working for a common goal which was “to cut down their high reliance on oil and oil products” (12). They chose to distribute natural gas because they had a “strong awareness and concern regarding the environmental impacts of energy use” (12). With the pipeline network between all Asian countries natural gas could easily be distributed and shared amongst Asian nations.

There were only two problems effecting natural gas vehicle development. The first was the cost of installing conversions kits, which allowed existing vehicles to run on natural gas instead of petroleum. The second problem was the “lack of comprehensive gas pipeline reticulation networks to allow dissemination of fuelling stations” (12).

To allow natural gas vehicles to be used by the public before pipelines were built, the Asian nations used liquid natural gas (LNG). LNG was used because it was a mature industry and three countries could already export it (12).

For the development of the pipelines across borders, which were first put near capital cities and gas processing areas, each government had their own role to play. The government’s roles were to regulate the natural gas sector and ensure private and public fairness. The Governments job was to “establish an autonomous regulator with technical capacity, independent decision-making powers and power to enforce regulations to regulate the natural gas sector and ensure the private and public participants [were] treated on a fair basis” (12).

Thailand was part of the collaboration of Asian nations, which developed the infrastructure in that country as well as other Asian countries. However, one major accomplishment Thailand made was creating the world’s largest private natural gas mother station. The facility had a 720,000 Sm3/day maximum fuel capacity and 12 filling points in rotation, which allowed it to serve up to 12 trailers per hour (14). But, its most special feature was the skid mounted turnkey compressor developed by G.E.T. and Italian engineering (14). According to Pietro De Faveri Tron, G.E.T.’s Worldwide General Manger, “The advantage of fully load tested skid mounted turnkey compressor is to ensure the shortest installation time once the unit is properly grouted and connected with gas” (14). This advancement in technology could speed up the installation of natural gas stations in other countries.

Therefore it was the collaboration of government and natural gas companies, a plan, and commitment to the plan that enabled development of natural gas infrastructure in India, Thailand, Asia and Brazil.

Further Implementation of Natural Gas

As mentioned earlier the United States already has an expansive system of natural gas in place, but is still far behind the world in the amount of natural gas cars on the market. As demand increases for natural gas cars, many factors have to be looked at. First, one has to take incorporate a growth in infrastructure to meet the growing needs. The pipeline infrastructure is going to have to expand to meet the growth in power generation. To keep up with the growing demand of natural gas, the U.S will need about 28,900 to 61,900 miles of new natural gas pipelines by 2030. This additional growth will mean require an investment of almost 210 billion dollars or 10 billion dollars a year on infrastructure to meet the demand. The problem with all this expansion is the enormous price tag associated with it. This is only the cost needed to build additional pipelines across the country; approximately 1 million dollars will be needed to build each additional public natural gas station. The issue is that those companies with money are not willing to back such a large expansion. The CEO of Exxon, the largest and most profitable company in America, has gone on record saying he does not support a transition to natural gas vehicles. Due to this lack of support, it will be up to heavy government intervention to properly implement a large-scale expansion. Below are some ideas the government could use based on other countries current proposals, and ideas from NGVAmerica. We believe the top two priorities in trying to create policies to expand natural gas usage is to encourage more the public to buy natural gas cars, and simultaneously build new fueling stations.

When looking at trying to expand the usage of natural gas cars, the first policy the government should implement is to make sure a certain percentage of vehicles are running on natural gas. So by 2020 it should be mandated that 10% of all vehicles in the United States run on natural gas and increase that number by 5% every five years after that. Aside from mandating the purchase of natural gas cars, the government should offer larger tax cuts to those who do purchase the vehicles. Another option is to create a large tax on regularly fueled cars. The theory behind this maneuver would be to drive the prices of regular vehicles so high that people would have no alternative, but to buy natural gas cars.

The government should give funds to natural gas vehicle and development, NGVAmerica suggested, to appropriate $30 million per year. Specifically NGVAmerica gives a variety of ideas for research that can be done. They want to set up a research program with universities, manufacturers, and other organizations to help reduce emissions and improve the performance, efficiency and lower the cost of natural gas engines. An issue that is holding back natural gas cars is their higher price tag compared to normal cars. With more research being done to improve the technology this should eventually help lower the price tag of the vehicles.
Furthermore, the school system should be considered and funding should be provided to schools to convert school buses to natural gas. This would be a long-term benefit in terms of saving money especially for those districts that have a private fee for busses to be fueled. If money can be saved on fueling up busses, it can be transferred back to the schools to provide children with better education. Another benefit is that young children would be exposed to the technology at an early age and would hopefully recognize the benefits that the vehicles provided at a later stage in life. Along with school buses, another sector that would benefit to conversion to natural gas is the airline industry. A plane can consume an enormous amount of gasoline in one trip. The usage of planes is increasing and they are placing a greater strain on the gas supply. If the airline industries were provided some subsidizes to help transition their engines to natural gas it would greatly help with the amount of oil used and help the economy by lowering ticket prices for the general public.

While simultaneously promoting, funding, and creating new laws for the expansion of natural gas vehicles, the government must find a way to expand the natural gas refilling stations to truly make an effective transition. The first step would be to provide incentives to those small and large companies who open domestic natural gas refilling stations. Then as mentioned by NGVAmerica the government needs to authorize about $5 billion in Energy Tax Credit to “provide no- or low-interest loans to service stations (up to $200,000 per service station) to install natural gas fuel pumps.” Finally, coupled with these measures, increase the property tax on regular fueling stations, forcing them to switch to natural gas.

These methods will not guarantee the transition to natural gas, but they will definitely increase the odds. The difficulty faced by our government compared to others is the fact that we have a free market. The government cannot force a transition to natural gas, but can play a pivotal role in encouraging it. We are currently so entrenched in using regular gas that the transition will take years to smoothly implement. It will take the right policies promoting expansion of fueling stations, coupled with public interest in the vehicles, for a proper transition to occur.

17. http://docs.google.com/viewer?a=v&q=cache:Ft9CKyzF8DwJ:www.ngvc.org/pdfs/Summary NGVAlegPriorities09.pdf+natural+gas+stations+expansion&hl=en&gl=us&pid=bl&srcid=AD GEESgzzU2zLg7j_5XUdhoAljjCYMSYR4z5X_8WMtW04tqNGsN9W7vQ_5omLqepuB6kz7y SEDTU2 _xAtpl5KYoNae7OciXkwomddY5qLLSrI8dnQx5uZW-6sb_pqx1R9DBH49L0w&sig=AHIEtbR2aFnoobuuxwAMQ4Ltqz3rvhx66w (NGVamerica, 2009)

**Future Long-term Energy Source**

(RK) While natural gas is a cleaner burning fuel than petroleum, it does have disadvantages. One disadvantage is the need for wells to extract natural gas from shale rock. This means it’s a limited source of fuel. In addition, the fracturing process—the fracturing of shale rock by injecting a
large amount of water and other fluids- could leak methane into drinking water, making it a health hazard (21). Also, it still produces CO2 emission at 117,000 pounds/billion Btu (19). This is less than Oil’s CO2 emission of 164,000 pounds/Billion Btu (19), but natural gas just like oil still produces CO2 emissions, which contributes to global warming. So, natural gas is good as a transition fuel source to a better alternative.

The future fuel source should be the hydrogen fuel cell. It has many benefits and few disadvantages. One benefit is that it’s a renewable source of energy. Hydrogen is obtained by breaking water molecules into oxygen and hydrogen. Energy is obtained in the fuel cell when the hydrogen and oxygen recombine to form water (20). This makes the hydrogen fuel cell the cleanest energy source since its only byproduct is water and heat. It is also a much more efficient energy source than oil and natural gas. In a conventional car the engine is “less than 20% efficient in converting chemical energy in gasoline into power… while Hydrogen fuel cell vehicles, which use electric motors, are much more energy efficient and use 40-60% of the fuel’s energy” (18). No pollution and energy efficiency make the Hydrogen fuel cell an excellent future fuel source.

The current disadvantages to the hydrogen fuel cell are due to high costs and lack of technology and development. Making the fuel now is pricey, “the projected high-volume production price is $73 per kilowatt” when it should cost $35 per kilowatt in order to be competitively priced with gasoline (20). Another problem with the fuel cell is material. The membranes in the fuel cell degrade when the cells cycle on and off when the car starts and stops (20). Delivery of hydrogen is also a problem, the “technical plan for fuel cells states that the air compressor technologies currently available are not suitable for vehicle use” (20). So, to make hydrogen the future fuel source strives have to be made in research and development of the Hydrogen fuel cell.


How Others Increased Public Awareness on Natural Gas Vehicles

(DP) As we saw many benefits in the beginning of this paper, natural gas is one of the cleanest forms of alternative fuel for vehicles currently available. Not only are they clean, but NGVs meet the most demanding environmental standards that have been put in place.

Our goal is to make people aware of the efficiency and affordability of natural gas, which will increase the number of people owning natural gas vehicles as their vehicle of choice. The California Natural Gas Vehicle Education Campaign launched its public awareness event by speaking about the benefits of natural gas vehicles (NGVs). This campaign formed around the same time that Ford halted production of NGVs in the United States in order to focus their production in Europe. This occurs at a time when California is desperately searching for alternative sources of energy to control their rising smog problem. “Ford’s decision to expand its natural gas vehicle market in Europe, while Americans are stuck with the bill for skyrocketing
gasoline prices, has moved us as a group of statewide organizations to raise our voice and the profile of this very important issue,” said Mike Eaves, president of the California Natural Gas Vehicle Coalition.

Also, we can see those who have switched from gasoline vehicles to NGVs had saved significantly on fuel costs. “We live in a country addicted to gasoline and this dependency is bad for health,” said Andrew Weisser of the American Lung Association of California. “Fortunately, there are cleaner transportation options that include natural gas, electric, hybrid-electric and fuel cell vehicles. Natural gas vehicles are already developed, on the road and pollute much less than gasoline and diesel-powered vehicles.24”

Here is great news for quickly increasing natural gas vehicle production for consumers. The governors of Colorado, Oklahoma, Pennsylvania and Wyoming are teaming up to encourage automakers to develop natural gas vehicles, as it commodity in these states. Their plan is to start replacing thousands of vehicles in their state fleets with ones that run on natural gas, in turn driving demand for more filling stations and cars that run on alternative fuel. Colorado Gov. John Hickenlooper touted the idea as a market-driven way to build demand for natural gas-driven school buses, pickup trucks and vans while also supporting jobs, reducing U.S. reliance on foreign oil, cutting emissions, and providing fuel that is the equivalent of $1.25 per gallon cheaper than gasoline23.

In South Korea, their government revised its Clean Air Conservation Act to replace buses with the most frequent circulation within the city limits with low-emission CNG(Compressed Natural Gas) buses that have no exhaust emissions, release 65% less gases such as NOx, and have a noise level that is 2-3dB lower. South Korea has been systematically supplying CNG buses since 200025.

As seen in several good examples in other countries, the government should plan to actively work to popularize CNG automobiles. Production of natural gas vehicles today remains low. Presently, Honda makes a Civic that runs on natural gas, but it’s more expensive than a standard Civic. Through improved and efficient development of technology in the production of natural gas vehicle, the price of the car can decrease and more people would feel it’s affordable to buy NGVs. Moreover, the government should encourage automakers to make and develop various natural gas vehicles. Also, the government should intensively provide CNG buses in metropolitan cities like Manhattan, Boston, and Washington D.C. as well, and they should replace diesel buses that have reached their end-of-life with CNG buses progressively. To popularize CNG automobiles, the government should provide financial assistance for the purchase of natural gas vehicles and partly support fuel costs.

In conclusion, through continual promotion of natural gas vehicles it can become the future car of choice. This can only be done by continuous efforts to promote natural gas vehicles. Increasing car production so that every auto dealer offers the car to the public will increase awareness, since people will see the vehicle, and the benefits of owning the vehicle, since salesmen will be speak about the benefits in order to sell the car. This would lead to an increase in natural gas vehicles purchases and more consumers owning natural gas vehicles.


Resources

17. http://docs.google.com/viewer?a=v&q=cache:Fl9CKyzF8DwJ:www.ngvc.org/pdfs/Summary_NGVALegPriorities09.pdf+natural+gas+stations+expansion&hl=en&gl=us&pid=bl&srcid=ADGEESgzUzrElpQjzXG3KmZ5i5qWtW04tqNGsN9W7vQ_5omLqepuB6kz2vSEDUU2_xAtpl5KYoNae7OciXkwomddY5qLLSrF18dnQxD5uZW-6sb_pqX1R9DBH49L0w&sig=AHIEtbR2aFnoobuxwAMQ4Ltqz3rvhx66w (NGVamerica, 2009)  
Service Project Idea To Promote Natural Gas

(VG/RK/DP) Our proposal revolves around trying to create a feasible plan for expansion of natural gas within the United States. We aim to look at the steps taken by other countries in implementing their natural gas infrastructure to help understand how we can create policies in the United States to create public natural gas stations nationwide.

To promote natural gas we targeted gas companies, the government, and the public through letters and a video placed on YouTube. We sent letters to five different gas companies suggesting they pool together a small percent of their profits into a fund to create a public natural gas infrastructure. Also we hoped they would be able lobby the government to give them more subsidies in order to implement more natural gas stations. A letter was sent to Dr. Steven Chu, Secretary of US Energy, asking the government to collaborate with the gas companies and automakers, and to create policies and consumer incentives to promote natural gas vehicle production and demand. Finally, we interviewed a representative of Princeton Honda, a dealership that sells regular and natural gas cars, asking about the benefits of natural gas cars and its market. This interview was placed on YouTube to increase public awareness on natural gas.

Letter to the Gas Companies

(VG) From: Varun Gupta, Rotem Kahan, and Dogmin Park:
Students of Dr. Julie Fagan

To: Natural Gas Executives

The oil industry has a monopoly on the energy market with gas stations all over the country. A vast supply of natural gas exists within our country. This supply can feasibly allow natural gas cars to effectively compete with oil-based cars. The infrastructure (natural gas fueling station) is the rate-limiting step, impeding the transition from occurring.

We believe developing a nationwide public natural gas fueling infrastructure is a task that will require cooperation from the government and private natural gas companies. With general disdain mounting against the oil industry it is time for the natural gas companies to rise together and pool small percentages of their profits in an attempt to jump start putting public natural gas stations across the country. This will have a huge impact on the car industry as people are looking for a reliable and effective means to transition from oil. Many people are turning to electric powered cars, which run on coal, which is still not as environmentally friendly as natural gas. By even pooling enough money to start building natural gas stations in a small region of the country, the profits that arise from the region should hopefully help fund development across the country.
Furthermore, our government has subsidized the energy sector for many years, with an emphasis on helping the oil industry. Cooperation among the natural gas companies showing the government that a legitimate push is being made to build natural gas stations may shift the focus of whom they subsidize.

This idea does go against free market ideas, but if we are to truly become independent from oil it will take some initial sacrifice and cooperation. In the end though if able to build up an astute enough infrastructure the companies will be able to profit and our society will be better off. This is a simple idea, but please consider it an option in an attempt to help our planet.

Sincerely,

Rotem Kahan
Varun Gupta
Dongmin Park

Julie M. Fagan, PH.D
Associate professor at Rutgers University
84 Lipman Dr.
New Brunswick, NJ 08903

Letter to the Government

(RK)

To:

Dr. Steven Chu, Secretary of US Energy

A group of Rutgers University students with Dr. Julie Fagan think that natural gas is the perfect solution to reduce our dependence on foreign oil. It burns clean, is in large supply within the US, and energy efficient. There is a lot to be gained if natural gas is used as an alternative to petroleum, but it requires the assistance of the government.

The government is essential in promoting natural gas as an alternative fuel source. This can be seen in India’s government supporting natural gas, they were able to increase the number of gas stations within a short amount of time. Meanwhile, the Brazilian government’s lack of commitment caused a hold on an 8-year plan to develop the infrastructure. So, the government should be committed to developing the natural gas infrastructure.

The government should work with natural gas companies to build the infrastructure in a timely manner and with the automotive industry to produce natural gas or biofuel (CNG + oil) vehicles. First, would be creating a plan with deadlines for each step of development of the natural gas infrastructure that would be monitored by a committee to ensure that these deadlines
are met. Second, would be allocating land with natural gas reserves to gas companies. Third, to have gas companies begin building natural gas pipelines in cities lacking natural gas pipelines and then expand to rural areas, and while development is in progress the government should create policies that would: stimulate gas stations to carry liquid natural gas tanks so that natural gas vehicles could be on the market, and to limit the amount of foreign oil allowed to be imported into the country in order to slowly reduce dependence on foreign oil. These are suggestions that the government should do with gas companies.

The government should also work with automakers to produce natural gas vehicles for consumers. The automakers should create a biofuel vehicle that runs on oil and natural gas until availability of natural gas stations become more extensive. Having natural gas vehicles able to run on both petroleum and natural gas would be similar to the diesel and petroleum cars, trucks, and fleet vehicles currently on the market. Having the natural gas vehicles available to the public will also require a pump or tank with liquid natural gas, if the gas station doesn’t have a natural gas pipeline, in order to distribute natural gas at gas stations. Also, the government needs to create policies that would stimulate automakers to produce natural gas cars and consumer incentives to purchase natural gas cars.

Taking these measures will speed up and ensure the natural gas infrastructure will be put in place.

Sincerely,
Rotem Kahan
Varun Gupta
Dongmin Park

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Editorials

(RK)
Sent to Car and Driver (11/16/2011)

Why natural gas

Gas powered cars has been the fuel of choice for years. But, with current gas prices most of us think twice before revving that engine.

You know how it is. We drive to work, home, school, all the places on our list of errands, and then you glance at the gas needle seeing it dreadfully close to empty. Stopping at the nearest
station, we dish out 20 bucks and the needle grudgingly moves just a little further away from empty.

This story has happened to all of us. We are a society that depends on motor vehicles to get us from one place to another. But, at $4 per gallon and an average 24 mile per gallon for a sedan it becomes costly to do our daily tasks.

Why should we pay $4? Other than we have no choice. According to the energy information administration (eia) 63% of the money we pay goes into crude oil. This is of course purchasing foreign oil since 56% of it is found in the Middle East. It’s because America doesn’t have enough domestic reservoirs to supply our very demanding needs that we are so dependent on the middle east for our fuel, and of course when you import its always more expensive than local goods.

Other than gas prices, oil hurts the environment. In recent years we have experienced the effects of global warming in the form of temperature increase and the rise in sea level. The rise in CO2 levels comes from the black smog coming out of our car or truck’s exhaust. In 2005, CO2 from motor vehicles released about 1,800 teragrams (or 1,800 x 10^12 grams) of CO2, according to the environmental protection agency (epa). Then there are the accidents. Just last year at the Gulf of Mexico the most recent and disastrous accident occurred. The oil spill killed much of the marine wildlife and hurt many businesses and tourism to the area. We have all heard of press and BPs efforts to compensate others and clean up the mess. But, the damage to the environment will take years to heal. We have many reasons why we want an alternative fuel source and some strides have been made to make it a reality.

Toyota’s hybrid Prius is a good example of a car manufacturing company willing to accommodate our need to drive at a cheaper cost. While not an alternative fuel source, the Prius can give us better gas mileage, which would make most people happy. However, it’s reliance on oil is still troublesome since oil prices will continue to increase in the future as oil sources become more scarce.

What we need for today is natural gas vehicles. The technology is already available to do this. We currently consume natural gas in our appliances like stoves, power plants, fire places, etc.. Within the US there are already some natural gas stations, and the price for natural gas per gallon is much cheaper at $2 per gallon. That’s half of what we pay for oil. This is because the US is abundant in natural gas reservoirs. America is the middle east of natural gas. Furthermore, it produces less CO2 than oil, making it better for the environment.

There are so many benefits to natural gas. Currently, only Honda makes a natural gas vehicle for consumers. But, it’s not like we could go to our local pump to refuel. It might take a while to get to a station that offers natural gas. However, it is possible in the very near future to have natural gas as an alternative fuel that could replace oil. All we need is to have more natural gas fueling stations and cars.

(VG)
Sent to Times Magazine (11/16/2011)
One natural resource has come to dominate our society: oil. We cannot live without it, but loathe the mention of it. It costs an exorbitant amount for consumers to use, depriving families of needed income and in turn it lines the pockets of greedy oil executives with an unfathomable amount of money. Wars have been fought over it and have given evil dictators power and money. Finally, it has caused irrevocable damage to the earth on which we live. Yet almost nothing is done to stop its use. We will complain when the prices of oil skyrocket and demand an alternate source, but nothing happens. The government assures us change is coming saying they will implement new laws to reduce the amount of gas that is used and promote alternative energy sources, but when the prices drop a few pennies and stabilize all the squabbling stops and we return to the status quo. We need to change the status quo we need to reduce our dependence on gasoline one way to do so is to focus our attention to natural gas vehicles.

Though natural gas may not be a long-term solution, it is good starting points to transition us to other types of alternative fuels in the future, which still need a few years of research and development before they become feasible for mass use. Natural gas is widely available in the United States and would help reduce our dependency on other countries for sources of fuel. Furthermore, it would be 1 to 2 dollars cheaper for consumers per gallon used, which adds up over the course of a year. The natural gas cars are already being made and cost only a few more thousand dollars then regular gas cars. If natural gas cars go into mass production the cost for the car would dramatically decrease. The main barrier faced with natural gas cars is building the infrastructure (gas stations) to provide the cars with fuel wherever they are in the country. It is a costly endeavor that gas companies would need to undergo to build the infrastructure, but after years of heaping profits can they not be asked to make a small short-term sacrifice for even more profits in the long haul.

Natural gas may not be the best alternative out there, but it is currently the only one that would work on a mass scale. We need to as a society stop being complacent and stand up to this injustice that is oil. If we stand up together and do not back down the government and oil industry will have to listen and change can occur.

(DP)
Sent to USA today (11/16/2011)

Natural gas has become a vital component of the world’s supply of energy. Many studies prove that it is one of the cleanest, safest, and most useful of all energy sources. Unlike other fossil fuels, natural gas is clean burning and emits lower levels of potentially harmful byproducts into the air than other energy sources. Moreover, government has been working to pass the New Alternative Transportation to Give Americans Solutions Act (NAT GAS Act) to subsidize the deployment of vehicles fueled by compressed natural gas and associated infrastructure. This could help promote natural gas, but more needs to be done. We need to change our energy source and transition from gasoline to natural gas. This can start by using natural gas vehicles.

The number and variety of factory-ready compressed natural gas vehicles and conversion-eligible CNG vehicles is increasing. Some people think that natural gas may not be an appropriate future fuel resource, but the fuel is a good source of energy, has many benefits,
and is good for our environment. It is an ideal alternative fuel source to oil. Some benefits of Natural gas are: it’s domestic supply in the US, which significantly reduce U.S. demand for foreign oil. It’s cheaper than gasoline and is twice as clean as other fossil fuels. Based on these facts, natural gas is already used for power generation in power plants, and in our daily life as appliances like the gas stove. We now need to bring natural gas into the car manufacturing industry so that we can have natural gas vehicles.

But, first we must have wide spread natural gas infrastructure so that we can refuel our natural gas vehicles. We need to provide massive infrastructure, such as natural gas companies and natural gas stations. In order to transition to natural gas as a future fuel resource, gas companies would have to spend money to build the infrastructure. But, the investment in long-term is rewarding. Once the infrastructure is set, gas companies would earn even more profit both domestically and internationally by selling local natural gas to other countries. Therefore, gas companies should deploy natural gas on a commercial scale.

Once that is done we will need more major automakers to manufacture new CNG vehicles for public consumers and to convert existing vehicles to natural gas. If the public had access to more natural gas vehicles and a wide spread natural gas fueling stations to refuel demand would sky rocket.

Demand for natural gas vehicles right now is already high and is currently being supplied by Honda. The factory-produced CNG vehicles, the Honda Civic GX, are selling out faster than they are made. But, production needs to expand. Other than Honda, there are no other automakers currently manufacturing CNG vehicles in the United States. This could be remedied if other auto manufacturers noticed the profits that could be made from natural gas vehicle production.

So, through encouragement by the government to gas companies and natural gas automakers and public awareness, we could progressively change our vehicle fuel source from gasoline to natural gas.