THE NATURAL GAS QUANDARY

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But as population became denser, the natural chemical and biological recycling processes became overloaded, calling for a redefinition of property rights.
Garrett Hardin

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The world is facing catastrophic consequences that unfortunately cannot be proven till it's too late. Land around the world is becoming useless: The worlds aquifers are depleting due to unregulated over-pumping to cultivate crops for overpopulated regions. Overpopulation of humans is driving the rate of consumption, increasing water and air pollution, and decreasing the amount of natural resources available to all biotic organisms. Hardin

Before nations became civilized and developed, humans used biomass to create the energy they needed. For example cavemen slapped rocks together to create the fire they needed to burn wood to cook meals they had hunted or heat themselves. Later humans began to use oils contained within wildlife, such as palm and olive trees, to supply the fuel they needed to create light. According to anthropologist, after millions of years of living that way human ingenuity created advancements in technology that led to using a new natural resource to generate energy which was coal. Coal was burnt to power steam engines for transportation and to create, and distribute, electric for the growing population. Since coal as a higher quality source of energy and its environmental effects were unknown, it was widely embraced by the human population. Today coal still provides almost half of the world's energy. The other half of energy that humans use today is created by other fossil fuels such as natural gas (along with its by-products) and oil.

The cheaper energy is, the more humans will use it. In Robert Bryce's book, *Power Hungry*, he states perfectly "power is like sex, the more we have, the more we want." Bryce provides 54 pages of references, but he merely skims the top of each issue failing to dive below its surface. For example, he briefly mentions a number of his own beliefs by presenting selected facts such as how many total kilowatt hours Americans use daily and which he uses to justify why Americans need power density. First most already know that Americans love to use power regardless of what form or state it is provided. Bryce, in a round-about-way, said that he would use skittles if they provided the power density he needed to supply his lifestyle. Second, most already know that many Americans strive to live affluently, like the rich and famous, trying to emulate the lifestyles of those who live in the mansions shown on MTV cribs and The Million Dollar Listing. Ultimately many Americans live beyond their financial capability. The estimated numbers on how much non-renewable energy exist is useful when considering how to revert our destructive human ways, but the grey areas must also be considered.

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"Ruin is the destination toward which all me rush, each pursuing his own best interest in a society that believes in the freedom of the commons. Freedom in a commons brings ruin to all."
Garrett Hardin

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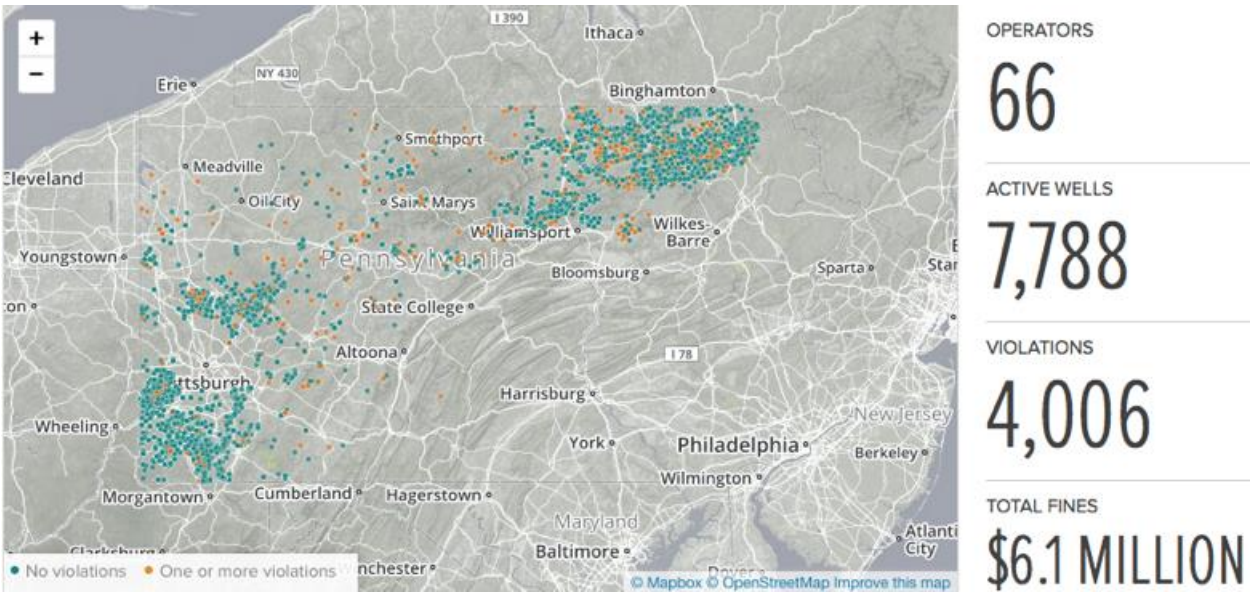
In 2015 the Pennsylvanian workforce and residents have collectively, or maybe unknowingly, accepted the environmental violations of 7,788 active wells drilled and operated by oil and gas companies such as Cabot, Chief, WPX, Carrizo (Marcellus), Chesapeake Appalachia, and Southwestern Energy Production. The reason why the violations are not genuinely brought to the public's knowledge is because these are the same companies driving Pennsylvania's economic stimulation. Prior to Governor Tom Wolf's election, Governor Corbett forced oil and gas companies to pay an 'impact fee' in exchange for allowing these companies to reign over the land. Coincidentally, the impact fee was a tax that was charged due to the increased commercial traffic, noise pollution, and some water problem. The Impact Act 13, currently being pushed by Wolf, benefits 200,000 community members, and provides improved infrastructure for the children of its future. In addition, this Act 13 supports the preservation of farmlands, and provides the funds that conserve Pennsylvania's public-land and its non-



renewable resources. The Impact Act generated 33% of the Pennsylvania's 2013-2014 Department of Conservation and Natural Resource's (DCNR) annual budget $315 million dollar budget from natural gas royalties that were inappropriately channeled through the general fund. (Shepstone— Natural Gas NOW)

Many Pennsylvanians feel Pennsylvania's current governor Tom Wolf is the person that will consider each individual that brings a petition to his desk in order to instigate much-needed change. Since Wolf took office on January 21, 2015, his main goal is to foster a state with improved education, job growth, and an efficient government. One of the first bills that he had passed was the Reinvestment Education Act— which forces oil and gas companies to invest into the states youth, which

is the future. Wolf's Education Act, designed to use revenues from natural gas, will not only inflate Pennsylvania's economy, but it will also decrease school-property-taxes state wide, increase the flow of funds into education systems by an estimated $675 million, and will forward $10 million dollars to the Department of Environmental Protection (DEP) to "enforce" regulations. Although these objectives are admirable, in order for Wolf's plan to function as intended, natural gas drilling will have to increase by 28% in Pennsylvania. There may be other obstacles. Will the Marcellus Shale Coalition oppose these large amounts of severance taxes? Furthermore, since oil and gas companies are merely worried about the bottom line, I feel that this act will worsen their drilling practices. On the surface, you may think Wolf's Educational Act is great!' But what is the point in helping the children that you are robbing of clean drinking water and a healthy environment? (Esack)

Nonetheless many people that have embraced this natural gas land grab are mainly focused on the economic benefits and not considering the long-term affects of their actions. Some people of Pennsylvania are only focused on the external aspects of their well-being such as the jobs, sales revenue, and hotel occupancies. The health of their fellow habitants and the environment that we all live in should be paramount. Although Lou D'Amico, the Pennsylvania Independent Oil and Gas Association's President, strongly believes that Governor Wolf's goals will ultimately lead to significant job loss, D'Amico continues with a comment that makes my teeth cringe:

> "If you're not seeing your hotels full, if you're not seeing the local Ford dealer selling trucks to drillers, then you're not concerned as much in Philadelphia [with the potential slow-down of gas drilling] as you are in Bradford, Tioga, or Susquehanna counties where they are benefiting from us being here."

The problem has been pinpointed over and over by people like Cindy Dunn, a representative from PennFuture. Dunn stated that Pennsylvania's previous Senator Corbett "was very lax with the regulations, relied on self-policing, and did not promote renewables." She also pointed out that Corbett has rejected the Environmental Protection Agency's (EPA) new regulations on carbon emissions. Companies from the oil and gas industry have neglected and trampled the local zoning officers' authority. But how many of these zoning officials are heating their homes with inexpensive natural gas? Which leads me to ask, how many of these zoning officers were genuinely interested in enforcing these new regulations?

In addition, Dunn raises another valid point that the methane leaks within the companies' distribution systems need to be sealed immediately. But the only way is through enforcing the strict regulations that are already in place and by constantly revising them by constantly researching environmental issues before they arise. (Phillips)

The problem is that society is riddled with pro-fracking landowners like Char Myrick that yearn for the economic up-side of leasing their own land to be drilled. Myrick, a resident of Dimock, speaks in a YouTube video that seems like it was produced by Cabot and is linked to Cabot's Oil & Gas Blog. On that video he stated that

"Cabot's [Oil & Gas Company] willing to come in and fix the water… no cost to the homeowner, no cost to the tax payer… it's like, why don't you want good water? I don't understand that." I believe that Myrick fails to realize that his water was already "good" before the industry polluted it. If the water is not being damaged then why is there a need for Cabot to fix the water? Myrick also fails to realize that even though he believes it is free, habitants, animal and human pay a large invaluable price by allowing oil and gas companies to pollute and waste water. (Later in this paper I will address why contamination is sporadically evident and difficult to prove.)

Another resident, Harold Lewis, feels that "it's foolish… I don't want that [water] pipeline," and argues that bringing a pipeline down from Montrose, PA is a waste of 12 billion dollars. Lewis's attitude demonstrates a character of stubbornness, although I do agree with him, nonetheless he fails to realize the root of the problem.

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"Generations come and generations go, but the earth never changes. The sun rises and the sun sets, then hurries around to rise again. The wind blows south, ant then turns north. Around and around it goes, blowing in circles. Rivers run into the sea, but the sea is never full. Then the water returns again to the rivers and flows out again to the sea."
Ecclesiastes 1:4-8

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Everything in nature has a perfect balance or has evolved over hundreds to millions of years. Sudden changes in the chemical composition of the atmosphere, drastic temperature imbalances of the ocean water, constant water pollution altering the PH balances of precious fresh water, and the emissions of GHGs polluting the air eventually lead to an extermination of life caused by human activity:

> "Too much or too little of any abiotic factors [non-living components' affect on living species' range of tolerance] can limit or prevent growth of a population, even if all other factors are at or near the optimal range of tolerance." (Miller, Scott E.)

The Limiting Factor Principle succinctly explains why injecting over 600 chemicals that do NOT belong inside the earth's aquifers should be a crime. Many people believe that earth has a never-ending supply of water since rain comes from the sky, but that is not true. The sun's radiant heat evaporates surface water from rivers, ponds, lakes, seas, and the oceans into the sky. In the sky, the gaseous form of water blends with the GHGs and can either transform into photochemical smog at lower elevations, or fall back onto earth as acid rain.

Hydraulic fracturing is considered by many scholars, anti-fracking activists, and scientists to be the most egregious step in the entire process. Most of the public refers to this stage in the process as "fracking," the process that is used to extract natural gas from the earth by injecting a "fracking-fluid"— a mixture of water, sands, and more than 600 chemicals that include unknown carcinogens and toxins such as: lead, uranium, mercury, ethylene glycol, radium, methanol, hydrochloric acid, and formaldehyde. The extreme amounts of polluted fresh surface water, the water tables that lie beneath it, the out-of-sight underground aquifers, and the uncontrolled methane leaks are among the greatest concerns. (National Geographic)

To understand the issues related to hydraulic-fracturing, I will provide an overview of the entire drilling process. Beforehand it should be understood that hydraulic-fracturing, hydro-fracking, or as most people call it "fracking" is only one step in the entire process. For this reason many other problems such as the storage and disposal of polluted waste water are overlooked, or left in the fracking shadows.

In total there are eight general steps in the setup of an oil and gas well before any exploration and exploitation of the land commences. First, the land owner has to convey his mineral rights to the oil/gas company's representative. All drilling is insured and executed at the expense of the gas company. As a result, the land owner is usually offered a signing bonus and gets paid a monthly royalty—one of my sources shared with me that he gets paid $6000 an acre.

Second, the oil/gas company will set up the drilling stand, also known as the drilling derrick (which I believe is named after the manufacturer.) These stands come in a multitude of sizes and depend on the resource being mined or extracted.

Third, the power source connected, and the top drive (shaft) is installed. The power source is usually a diesel generator, but in some cases the resource being extracted serves as the fuel.

Fourth, the drill bit is then connected to the top drive by inserting a string of shafts interconnected. By continuously adding shafts the drill depth can be increased. In addition, high-tech drill bits collect core samples and file the progress by logging the data.

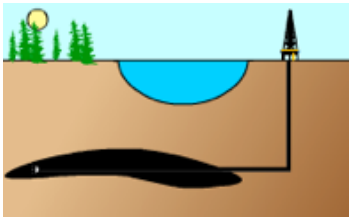
Fifth, the mud system is then set in place. It serves three purposes; the mud cools the drill bit, it brings debris to the surface, and it regulates the well's pressure.

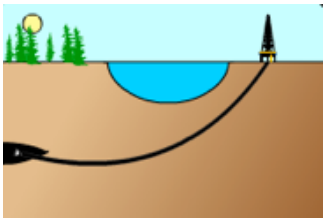
Sixth, a casing is installed. It is made of either steel or high tech alloys which are then inserted inside the drilled well to protect surrounding water sources from contamination. Here is a step-by-step break down of the process: The Casing is inserted into the drilled well and then cement is injected between the casing and the drilled well's walls. Then a tubing is inserted to extract the natural gases. At the location of the well's reservoir, explosives or extremely high pressures are applied to create the fractures necessary to extract the resource from the rock beds— FRACKING. The last step of the process is installing a distribution Center that is constructed of multiple pipes and valves, which is called a "Christmas tree." Oil and gas companies assure that "protecting the aquifer[s] from contamination is a major concern of the oil and natural gas industry."

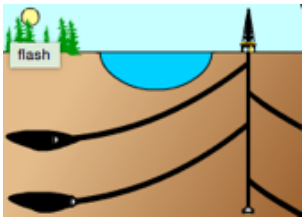
The seventh step is the sieve—mudding system. It recycles the mud by removing unwanted particles and then injecting it back into the mudding system.

In the eighth step, the dirt and rock are removed— from the previous steps— and the mixture is stored on site in the holding area that is supposedly lined and shielded from wildlife. Sometimes, "in Pennsylvania, sediment that collects at the bottom of oil storage tanks is used as a component in paving mix on local roads. This saves costs for the producers and reduces landfill requirements. Drill cuttings from drilling operations can be mixed with cement to produce bricks The cuttings produced from just one well can make up to 700,000 new bricks!" It should also be pointed out that efficient drilling and safety are paramount: "If a problem is detected, the rig can be safely and quickly shutdown."

There are 5 different types of drilling rigs, but the slim-hole drilling rig is used here in Northeastern Pennsylvania. It can drill to depths of 14,760 feet and has a well diameter of approximately 6 inches. Advanced drilling techniques supposedly reduce environmental impact. Horizontal multilateral, extended reach, and complex path drilling all pose environmental danger since these types of drilling provide availability to create disturbances underneath water







sources.

The two-mile drilling depths are incomparable to the twenty-seven foot deep wells that existed during the colonial explorations of the 19th century. During that time only natural gas and methane that was naturally excreted by the earth was harnessed. In the beginning wells, like the one at the Wheaton house, were only drilled to depths of 20 feet (primary recovery). Advanced technology has played a significant role on the efficiency of how much of a given resource— in this case natural gas— is extracted. (Efficiency in the minds of the oil and gas industry merely means that it cost less and requires less labor to extract.)

There are three different levels of recovery-- primary, secondary, and enhanced recovery (from surface to the depths of the earth's core.) Enhanced recovery is the most commonly used when extracting natural gas—per well, it uses hundreds of chemical agents added millions of gallons of fresh water. Technological advances have increased the extraction of the potential resource by approximately 60%, compared to the previous 10%. We cannot harness a resource naturally, and maybe another resource should be used.)

When a well for natural gas reservoir is first discovered, drilled, and fracked its pressure momentarily increased. Once the pressure wears off, or begins to decrease, the amounts of pollutants and underground sediment are less evident. This may be the reason why the residents of Dimock County could not always reproduce their flaming water. In addition this may explain why the cloudiness of their water gradually resided.

In addition, the water used to extract natural gas can no longer be considered a potable resource, so it is reused over and over in this process (or less likely recycled through extensively complicated and expensive procedures.) Then it is re-injected under the subsurface to create more pressure and force more natural gas up the well. The deeper the well the saltier the water becomes. That makes me ponder the affect that the depths of currently drilled wells of 2 miles have on water resources.

New drilling technologies allow explorers in search of natural gas to drill to impressive depths of 2 miles while twisting and guiding the bit horizontally which is a much more economic way of searching for natural gas. Although horizontal drilling has reduced the amount of surface damage visible, unfortunately it has increased the amount of invisibly disturbed subsurface area. What kind of affect does that have on the surrounding areas?

"Since oil and natural gas are less dense than water, they will float upward toward the surface. If nothing stops its ascent, the oil and natural gas may reach daylight through what is called a surface seep. In Northeastern Pennsylvania the only Barrier stopping natural gas is the Marcellus shale. Once this shale has man-made fractures, there is no controlling where this surface seep is directed. The direction of these drilled wells are ambiguous. Since gas companies do not know where these wells lead, what is to stop them from believing that they are drilling under fresh water sources? And if they are drilling under fresh water sources, what is to stop them from accepting the possibility that natural gases and methane are surface seeping into the residents' wells?

Natural gas does not emerge as a pure resource. It is usually extracted or surface seeps in two forms; wet gas or sour gas. Wet gas is methane mixed with water vapors. Sour gas is a blend of natural gas and an over abundance of sulfur—the sulfur is toxic when inhaled and is highly corrosive. Since the oil and gas companies don't want the water or sulfur to contaminate the natural gas, it is separated by either glycol dehydration (boiling) or solid desiccant dehydration (high pressure that is used with a drying agent.) Both of these processes of separation require changing and varying the states of these natural gases to remove the NGLs, natural gas liquids, which can be used in other applications. The problem with this is that every time you change the state of a resource you're wasting energy and decreasing its power density. The refinement process, although it sounds efficient, waste an extreme amount of energy. Expelled energy merely transfers from high-quality resource to a low-quality form of matter that will no longer be useful to us, nor to the earth. It will have been stripped from its earthly purpose…

Without a doubt, technology has improved the oil and gas companies' ability to exploit the deeply hidden dense energy resources-- oil, coal, and natural gas. Without a doubt, technology has fed our appetite for power. Without a doubt, technology has led us to over-consumption. I can't stop but to wonder… Why have we not used this technology to push ourselves away from over-consumption? There is promising technology being developed by few. Why isn't renewable technology embraced the same way that the advanced non-renewable technology is being used to exploit our natural capital?

"…tribal wars, poaching, and disease [kept] the numbers of both man and beast well below the carrying capacity of the land."

Garrett Hardin

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Every morning I walk out of my garage I take a deep breath of the wildly fresh air. I greet my friend, and co-worker, that I commute 20-25 minutes with each way.

During our drive, we usually occupy time with a wide variety of conservational topics. But even though we may be talking, I cannot resist as the sun rises but to appreciate how the gases of atmosphere artistically disperse amazingly vivid colors for our viewing pleasure. As I drive through the mountains I enjoy observing the trees even though at this point most of them are still naked. As always the evergreens are standing tall and pop out of the landscape. I see the grass starting to show hints of green. And as I soak in all of the landscape driving through the winding mountainous roads in a modified-four-cylinder-turbo'ed sports car— then it reminds me that I am part of the problem.

Everything I do is somehow attached to the environmental issues that affect the world— from the alarm on my iPhone that wakes me up, until the moment I flip the light switch off to go to sleep after studying late into the post midnight hours. My life is driven by power. Everyday I do my best to minimize my usage and efficiency of everything such as how much water I use in the morning to brush my teeth, wash my hands, shower, and wash my dishes, clothes, and car. Energy efficiency comes as second nature to me, but there comes a point where I hit a barrier that I cannot surpass without technology. Luckily, in 2015 advancements in technology have given society the ability to manage energy usage more closely. My electric company, PPL, allows its users to select non-renewable and renewable sources of power, and generates monthly reports that illustrate my usage so that I can analyze, adjust, and make improvements to my energy consumption. About a year previous, I installed a Nest thermostat that automatically learns my preferences, and at the beginning of fall I installed an electric heat-pump water heater that is extremely efficient. My household consists of 3 to 4 people with family passing by at any given time of the year, and we use about 5000kW annually. My minimalistic lifestyle may seem troublesome to many, but for me it is truly a way of life. My wife and I do our best to live environmentally and economically frugal because we believe in using only what we need. Although our consumption has dropped considerably since last year we still have an issue even though the central heating system is 93% efficient,powered by propane, but 12% of the GHGs that are emitted come from commercial and residential real estate activities such as; cooking, heating, organic trash sent to the dump, and hydro fluorocarbons (HFCs) used in older heating ventilation and air conditioning (HVAC) systems when they are leaked into the atmosphere. Startlingly, an 81% of that 12% was derived by natural gas emissions (EPA). Nonetheless I would like nothing better than to live a completely sustainable life. But it is extremely difficult since I cannot take a time machine or turn the time back to the simple but chaotic era when everyone lived as nomadic herdsmen roaming from one pasture to the next. Those herdsmen lived under constant social conflict such as the ones in the Bible or those referred to in Garrett Hardin's article, "The Tragedy of the Commons": I have been trying to solve this tragedy in my own life for the last few years.

Hardin wrote "The Tragedy of the Commons" from his own perspective as a genetic biologist who focuses on how the world's uncontrollable population is led by what he calls an "invisible hand." He believed that the more freedom each individual has on the common areas of the land, the more that each individual will consume, because each individual is looking for his own success and survival. A man's value is measured according to his neighbors. The time has long past since "…tribal wars, poaching, and

disease kept] the numbers of both man and beast well below the carrying capacity of the land." Since the industrial revolution up until the present day, all of the renewable and non-renewable resources have been available for unlimited access, open to the best manipulators and opportunist walking this earth. Why does man take more than he needs? Why does man feel the need to exploit every opportunity that presents itself? Is it because it is within our human nature, as Hardin expressed: "As a rational being, each herdsman seeks to maximize his gain. Explicitly or implicitly, more or less consciously, he asks, "What is the utility to me of adding one more animal to my herd?" This way of considering one's interest above the needs of others is extremely beneficial to the person making the decision, while minimally affecting others in the short term. On the other hand, if all the herdsman were to think and act in such a manner then at some point in the future the pastureland would no longer be able to support the herdsmen or their flocks. The invisible hand has led many herdsmen astray by ensnaring them into self-indulgence: Deceiving rhetoric can con even most clever. (Hardin)

There are many tree huggers out there that have told me that natural gas expels hazardous amounts of greenhouse gases (GHGs) into "our" environment, but what they fail to explain is that earth emits its own GHGs through natural chemical cycling and it is in continual flux. The evidence clearly shows that our atmosphere has always been filled with the GHGs that the tree huggers have shunned. (OSS Foundation)

On the other hand, how much of these gases can be released into the air without it affecting the humans and animals that inhabit the land? According to the U.S. Energy Information Administration (EIA) once our atmosphere reaches 450 ppm of CO_2 there is no chance in reversing the human influence on global warming. The world's CO_2 level is currently at 400ppm, which is why grassroots activists have started an initiative to lower the CO_2 level to at least 350ppm by the year 2200. (350.org)

So humans know that their actions on the earth are catastrophic, but somehow here in Pennsylvania we continue with business as usual. Why do we, as consumers, continue to contribute to what could be the next collapse of our civilization? Cheap energy, natural gas, is widely used all around the world. But for those who reside over, or close to, the Marcellus Shale —this reservoir of natural capital— I feel that it is our duty to care for what is here in our land by leaving it as undisturbed as possible. As those who live within the Chesapeake watershed, it is each individual's best interest to live sustainably. Deeply consider how each individual decision and each decision made by the state of Pennsylvania has an amplified affect on the entire tristate area, the whole nation, and holistically the world population.

The tragedy of the commons is a serious global problem that does not have a logical solution. In my mind, this situation is easily whittled down to morals and ethics. By no means will I begin to point the finger at anyone. I do not consider myself a perfect person, an environmentalist, or a "tree hugger", but I do consider myself a conscious man thinking about how my actions fall into the greater scheme of things. But sometimes our

culture and dependency on certain things in life get in the way of how I feel I should be living.

There are many comforts that I cannot imagine living without. I cannot imagine living in a cave or a hut without heat, because at this point mankind as depleted so much of the forest and the population is so immense that the biomass would run out if we all tried to revert to that style of living. I cannot imagine not owning a car because developed countries, like the United States, almost force people to either live within the thriving economic cities, or commute into them from the rural areas, to survive or be exiled into a life of poverty. Living off the land has been made almost impossible by real estate zoning ordinances. On a wider scope it is evident how dependent developed countries are accustomed to electricity, gasoline, and an overabundance of food. On the other hand, there are people struggling with poverty and unhealthy living conditions in the rest of the world.

Supposedly America's national reserves of high quality energy such as oil, propane, coal, and natural gas could bring energy independence that subsequently equals prosperity. So commercials, newspaper articles, and passive media convince society to embrace the power of natural gas so that we will all prosper: The claims that support hydrocarbon based energy stand behind concepts that believe that fracking is great because it created jobs for 600,000 national residents, and that having our own natural gas reservoir will make America energy independent. It is a common belief that a fortified natural gas industry on our homeland will also be reducing terrorist activity funded by foreign oil interests. The world is not running out of oil anytime soon, there is oil all over the place, for example in Venezuela alone we still have 42 years of peak power.

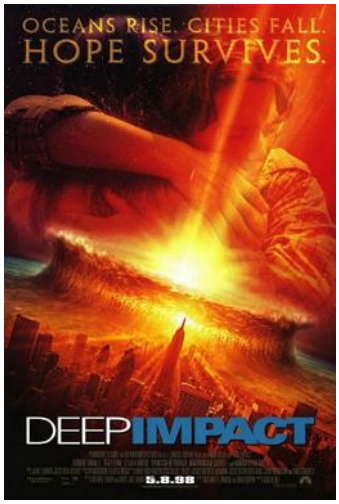
Ecuador's fuel prices are extremely low, its agricultural sector provides food and jobs, and its residents have to live minimalistic lives because the country is underdeveloped and import taxes are extremely high. When I visited the high elevations of Riobamba, Ecuador, I was impressed to see how families live in large, concrete homes, without heat, that trap the cold within their walls. Their homes have electricity but it is not used to heat the home. Electricity is only used for lighting, entertainment, and cooking. Agriculture is widely practiced; without the latest technology that American farmers have; Ecuadorian farmers are under less regulation than American farmers; and Ecuador's abundance of natural resources is evident and feeds its population; and the Ecuadorian farms provide low-paying wages for locals. Their farming techniques could be more sustainable by using strip cropping instead of leveling the step terrain, because eventually this will degrade the soil and lead to land slides which are always occurring. The Ecuadorian economy is not great and lacks environmental regulation which leads to water and air pollution, but Ecuador has an abundance of non-renewable resources. Last year, in 2014, their fuel prices were only ninety-eight cents a gallon for premium gasoline. They have oil, but automobile import taxes are three times the cars retail price. Upon reflection, I realize that energy independence does not bring prosperity.

Energy consumers who feel they deserve cheap energy believe that there is no need to transition to renewables, especially since it is not cheap, easy, quick, and economically feasible. Some feel environmentalists are extreme "energy posers" driven by "guilt, fear, and ignorance"

which are referred to as "the deadly trio." If this is true than why have oil and gas corporations such as Chevron produced commercials that promoted energy efficiency? Are these non-renewable resource retailers really concerned? In Bryce's book, *Power Hungry*, he states that the only reason an oil company would "support less consumption" is because it wants to "soften" its image. So in reality Chevron, a company with 45.2 million dollars in profit, was merely worried about losing customers.

Natural gas is only one of the major issues that is degrading natural capital. The land is devaluating as all of us suck it dry. How do humans know that it is affecting the land? How do we know that humans are causing the damage? Is it really that hard to see? If Hollywood producers have the foresight to envision a depleted life style then why can the viewers not assimilate these visions?

Apocalyptic movies produced here in the United States illustrate how the entertainment industry's perspective has evolved. It is evident that humans have been pondering and even fear the coming of the end of the world. So we do know that our consumer habits affect the world, or at least humans entertain a fictional awareness. In the past, the global population's knowledge and awareness of the environmental issues and how those issues affect on our existence has been scarce. That is okay though, because through movies and documentaries our societies education has been slowly improving.



Entertainment has always been a large part of human life— for example the Greeks had wine, theatre, and the Olympic Games. And in America one of our forms of entertainment is watching movies such as The Thing from Another World (1951), The Planet of the Apes (1968), The Terminator (1987), In Deep Impact (1998), and War of the Worlds (2005). The latest box office hit is always a popular topic to discuss. We can educate, or numb our brains, by watching anything we want at the theatre. The movie industry portrays a mirror of the America's public knowledge of how our human interactions with earth are increasingly damaging. So why are more people not increasingly concerned with our impact? How is it possible that issues like global climate change, water contamination, catastrophic flooding, and drought are taken so lightly. Could it be because these movies have been fictitiously classified along with the alien invasions? Then again, alien invasions have been one the biggest wonders of human kind. Sometimes I hear people ask "do you think there is really life out there?" But I do not hear many people asking the questions, "is global warming real", or "does natural gas really pollute our environment?"

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'Go and say to this people: When you hear what I say, you will not understand. When you see what I do, you will not comprehend. For the hearts of these people are hardened, and their ears cannot hear, and they have closed their eyes— so their eyes cannot see, and their ears cannot hear, and their hearts cannot understand, and they cannot turn to me and let me heal them.'
Acts 28:26-27

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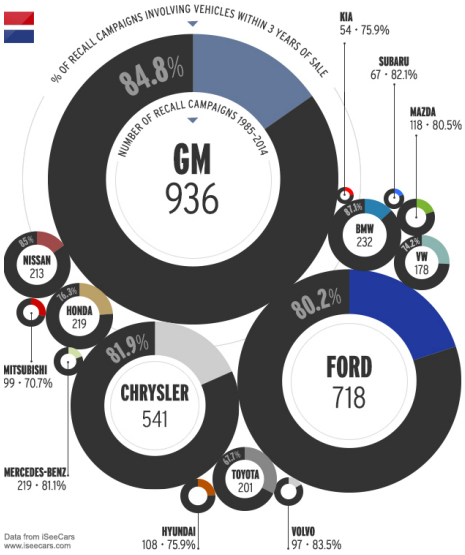

Living in Japan for eleven years and learning their cultural behavior was a great experience. The culinary craft is taken seriously and each region has its own specialty; Okinawa is known for the flavor of their yakisoba (fried noodles), habu sake (rice-wine made blended with the poison of a venomous snake); Osaka is known for its Ramen and Okonomiyaki (seafood/beef/chicken/vegetable stuffed pancake); and Hokkaido is well known for its crustacean cuisine. One of the main reasons their food is so delicious is because they try to live sustainably off their own land. They grow kobe and wagyu beef on their own land. They prepare dishes that are grown in their own country and they import very little (although there has been an increase in cheaper Chinese products). Japan is one of the few countries that tries to live solely on what it produces before expanding their sales overseas. Yes, Japan does have its five percent that makes the country seem horrific like the illegal whalers. And sometimes nature steps in and causes unpredictable damage such as the 2011 nuclear disaster that was caused by both an earthquake and a tsunami. Regardless, we can still learn from them (as well as some European nations like Germany) and adopt positive aspects of their efficient lifestyles to improve our own, rather than being entirely close minded.

Sometimes it almost feels like Americans live their lives based basic philosophies such as "bigger is better" and "use it or lose it" among many others. But when it "gets down to the brass tacks" what really matters is avoiding paying "an arm and a leg" for basic physiological needs and services. Unfortunately, many Pennsylvanians are allowing the oil and gas industry to "pull the wool over their eyes."

"Get 'er done!" Is that not the quickest way to summarize our economic, social, political, and environmental policies? America is infamous for placing policies into place then dealing with the math afterwards, and rushing products out into the market then shortly after, recalling them. In April of 2014, Car and Driver published a short article that compared the recall history of US automobile sales from 1980 until 2013. Not to my surprise, GM, Chrysler, and Ford had the highest rate of recall within 3 years of the initial sale. Of course everyone remembers the exaggerated Toyota recall because of the possible leakage on the master cylinder's seal that made headlines back in 2009/2010. What media fails to mention is that both GM and Toyota are both assembled in American

plants, according to an article in Autoweek that was released on their website on April 10, 2014. (Atiyeh)

Returning to the environmental issues that plague America, here is a quote that provides an example of how reactive our American-culture is. The following article covers the debate on internationally banning pesticides: "Generally speaking, the European approach incorporates the so-called precautionary principle and requires companies to establish that new chemicals are safe before they are put on the market. The American approach puts the onus on regulators to show some evidence of danger before taking action against new chemicals." By no means am I suggesting that the Europeans or the Japanese have the answers to our environmental issues, but if we were to switch countries with them, they would surpass our "efficient" consumption because of their culture.

The pro-frackers (supporting the extraction of natural gas) in Susquehanna County, Pennsylvania have embraced the fact that our earliest settlers discovered natural methane leaks and captured them safely to fuel their household needs—mostly heating and cooking. The Wheaton family drilled twenty-seven feet into the earth to do so. But is drilling twenty-seven feet down into an area that already has methane leaks comparable to the concept of drilling two miles into the earth's crust to extract natural gases that are believed to be "needed?" There are also arguments stating the methane gas levels leaking into homes, even at the highest levels, are not lethal enough to cause significant water pollution, asphyxiation, and that "the lower explosive limit for methane is five percent, which means the air needs to be five percent methane before any explosions can occur." (Berezow)

Some scientists do not consider indoor methane gases, caused by fracking, to be hazardous to homes. There are constant methane leaks visible only under infrared cameras billowing from the tops of natural gas distribution systems and reservoirs. Most of the damage is unseen, and is based on theory, but how about the immediate affects that take lives, and put extreme amounts of greenhouse gases (GHG) into the atmosphere? Wild methane fires can ignite and roar in the sky showing the impact of all the loosely regulated natural gas consumption. In an instant, those who stand in the heat can feel a demonstration of what natural gas is doing to the environment— our home. (McKibben)

Major explosions at fracking sites have caused extreme damage in Green County, Pennsylvania and Sissonville, West Virginia explosions created what appeared to be

mountains of blazing fires that no amount of firemen or water could stop. In Green County, one onsite employee went "missing," the Sissonville explosion destroyed the entire site, and the flames engulfed five homes. Scientists and activists have been fighting for humans to respect the environment since Frank Lloyd Wright's time. (Wright is one of the pioneers behind sustainable architecture.) But after realizing that there are a multitude of natural gas bombs putting humans and the environment in danger, scientists and activists had one more motive to continue their national protest.

Even the currently loose regulations in place are not respected by the industry. And worse, on an individual level there is nothing to stop residents from contributing to the tragedy of commons— the term that refers to the overexploitation of the world's shared renewable resources because— the misconception that actions on the individual level do not affect the depletion of natural resources (Miller).

The Chesapeake Bay Foundation (CBF) created a report in 2014 covering the number one deterrence of controlling storm water runoff pollution; Pennsylvania has so many municipalities (as many as 100 townships per county) that it creates an overlap in ordinances which makes it extremely difficult and challenging to tackle the environmental issues that are degrading the diversity and health of our ecosystems. This is also the root of many of the other environmental controls that are lacking. Officials at the state level need to enforce the significance and educate people on these issues so that people will no longer contribute towards the tragedy of commons. Unfortunately in the summer of 2013, our previous Governor Corbett executed a law that gives the option for communities to charge their residents fees for not controlling their runoff pollution— this should be a state mandate. (StateImpact.org)

The Chesapeake Bay's 64,000-square-mile watershed covers parts of six states and is home to more than 17 million people.

POLLUTANTS IN RUNOFF:

1. Trash
2. Soil and sediment
3. Fecal bacteria
4. Nitrogen and phosphorus
5. Oil and other petroleum products
6. Pesticides and herbicides
7. Road salt
8. Toxic metals including copper, lead, and zinc

Source: EPA and Maryland Department of the Environment

Natural gas is currently economically feeding counties— like Montrose, Susquehanna, and Wayne— throughout Pennsylvania, and supporting the states infrastructure, but how long can we be lead-on thinking that our non-renewable resources will remain domestic? How long will we continue to face the plight of water loss, simply because natural gas is providing access to cheaper lifestyles and temporarily creating jobs? The tragedy of commons is leading us to believe that none of these issues matter and that we do not have the ability or the power to change what is going on in the world around us. Nonetheless, our current situation is a global issue whether we (habitants of the Northeastern region of American) want to accept it or not…

"The morality of an act is the state of the system at the time it is performed"
Garrett Hardin

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Each individual's own reverence for the earth and its resources is what seems to be lacking. If reverence for the earth need not be considered then maybe reverence for humanity may strike closer to one's heart. The issues posed by natural gas extraction could be with viewed from a "green" and eco-friendly point of view, but I would rather not take that stance because that perspective has been played-out. What I would like to do is show you the deceiving rhetoric used by choosing key-speakers who are in positions of authority. Winning society over on an ethical level is merely superficial. It is only when people's individual morals become transformed that this world will turn around. Until then environmental issues have to catalyzed through force, by mandating environment impact taxes and stringent regulations that are inescapable, not even by the president.

Before Obama's election in 2008, what was the economic condition of Pennsylvanian farmlands like before the natural gas exploitation began to spread? Why were the farmers in Western & Northeastern Pennsylvania suffering? What barrier kept the farmers from producing sufficient crops or making enough money to get their family heritage in business? In addition why did Pennsylvanian farmers feel the need to preserve their farming business rather then the land that fed them?

When the presidential candidate, Barack Obama, launched his 2008 campaign for "Change" his promises hit a soft spot with the working class citizens of America. He

promised to end gender discrimination and to end the war in Iraq by permanently destroying al Qaida and the Taliban, and to bring troops back to their families. But more importantly he vowed to give ninety-five percent of the lower income families a reduction in taxes, to provide a form of public healthcare, to close loopholes allowing the rich to become richer that do not foster American growth, to end America's oil dependency, and lastly to invest $150 billion towards embracing renewable energy. (Miller Center)

By reading through the impressive list of Obama's top fifty accomplishments within his first term, it is evident that he exerted much of his effort in eliminating the practices that fostered governmentally economic squander, providing funding and support for post 9/11 and disabled American veterans, and even invested $90 billion in renewable technology. The areas of investment that Obama set his sights on were in "research on smart grids, energy efficiency, electric cars, renewable electricity generation, cleaner coal, and biofuels." (Glastris)

Obama had high hopes of change as he asserted in 2008, but was it really effective? In 2009 the Recovery Act was established with two main objectives: to double the amount of renewable energy being generated, and secondly to create and support the fabrication and manufacturing of renewable technology on US soil.

Robert Bryce has posed the counter claim that there are no studies to support the claims of how environmentally sustainable the implementation of renewable technology truly have been. Bryce has pointed out all of the flaws of energy generated by wind turbines. He has done so by shedding light on the facts that wind turbines guzzle gargantuan amounts of water, colossal concrete foundation, foreign dependency on rare metals from China, occupy large tracks of land, and these turbines degrade our ecosystems by killing approximately 75,000 endangered birds annually.

There are many claims stating that renewable energy is not high quality energy or that it is not "high power density" as Bryce refers to renewable energy is true. So does that mean that we should jump on the bandwagon labeled "status quo" and follow what the rest of the world is doing? Maybe the problem is not so much the type of energy we are using, rather the problem is how society uses its power. As Bryce so candidly elaborated:

> "We don't care what energy is. We want what energy does. We would gladly fill our fuel tanks with jelly beans, marbles, or Hostess Twinkies if they could deliver the power needed to propel our Camrys and Suburbans to places like Wasilla or Waxahachie. We aren't after energy, we are after what energy provides. And what energy provides is power. We use energy to make power" (Bryce).

There are many forms of power that we are after as humans. Americans are not only after the literal form of power that Bryce referred to in the previous quote, but we are also after the affluence that natural gas can provide. Political and economic power is what drives our decisions to exploit our land. How can American support such

irresponsible consumerism? Has the public paid attention to the fact that we only have a supply of 100 peak years of natural gas (Obama)? Has America considered what is going to happen when the supply runs dry? Has Pennsylvania thought of the impact of their collective decision to abuse the land that has so long provided for us? What even drove the farmers to such desperation that they felt the need to defile the land that had been passed down from generation to generation?

As I watched fracking documentaries I listened to the presented propaganda and read through all of the rhetoric online, I have noticed how many of the Pennsylvanian farmers, since 2008 until the present day, have stated how attached or sentimentally connected they are to their farms because they want to continue in their ancestor's footsteps. Ironically by embracing the natural gas land grab the same land that the farmers love, the same land that I love, is being destroyed. Natural gas extraction is playing a large role in polluting the water that PA resident's drink, the air that PA residents breathe, the ecosystems that PA residents live within, and the global atmosphere. Unfortunately, these side affects cannot be presented as black-or-white evidence. The evidence lies in the grey areas hiding in the shadows of the facts.

In the past, humans did not even know that energy consumption would create health and environmental hazards. Technology is not the problem. The problem is the consumer, our rate of energy usage has continually increased. Although some goods news is that recently innovative technology such as hybrid water heat pumps, wind farms, solar panels, and nuclear power have somewhat stabilized American consumption. This new technology should have assisted in reducing consumption. So what happened? (Miller)

Sadly, some people do not have to care about what happens in the future. An ethical epidemic spreads the belief that until it is proven that our actions have negative consequences then we will continue walking on the same path. The ethical epidemic will slowly eat away at the morals that once existed within each individual. But that will no longer matter because we are all stuck living by the same ethics in the same conditions. In the end our morals will be snuffed out.

Garrett Hardin refers to Adam Smith's concept of the 'invisible hand' that guides and controls the morals of an individual in the example of the herdsmen sharing the common pastureland:

> "The tragedy of the commons develops in this way. Picture a pasture open to all…each herdsman will try to keep as many cattle as possible on the commons. Such an arrangement may work reasonably satisfactorily for centuries because tribal wars, poaching, and disease keep the numbers of both man and beast well below the carrying capacity of the land. Finally, however, comes the day of reckoning, that is, the day when the long-desired goal of social stability becomes a reality. At this point, the inherent logic of the commons remorselessly generates tragedy.

> As a rational being, each herdsman seeks to maximize his gain. Explicitly or implicitly, more or less consciously, he asks, "What is the utility to me of adding one more animal to my herd?" This utility has one negative and one positive component.
> 1)The positive component is a function of the increment of one animal. Since the herdsman receives all the proceeds from the sale of the additional animal, the positive utility is nearly +1.
> 2)The negative component is a function of the additional overgrazing created by one more animal. Since, however, all the herdsmen, the negative utility, share the effects of overgrazing for any particular decision making herdsman is only a fraction of -1.
>
> Adding together the component partial utilities, the rational herdsman concludes that the only sensible course for him to pursue is to add another animal to his herd; And another.; And another. But this is the conclusion reached by each and every rational herdsman sharing a commons. Therein is the tragedy. Each man is locked into a system that compels him to increase his herd without limit—in a world that is limited." (Hardin)

Our world is composed of a restricted amount of resources and the 'invisible hand' cannot be allowed to snatch whatever it pleases. If each individual does not have the will power to mentally deny his/her most inner desires to enter a lucrative lease for the greatest well being of his/her community then maybe it is time that taxes be issued to govern consumption of our natural resources, which could also fund the Reinvestment Education Act 13 that Governor Wolf wants to impose on the oil and gas companies. The commons cannot be left to their own devices, because society is never satisfied. Why do humans always want more?

Maslow's theory, hierarchy of needs, has five basic needs that are divided into lower-order needs and higher-order needs. The lower-order needs have three progressive steps; physiological, safety, and social needs. Once those lower-needs are met the individual moves on to fulfill his/her own higher-order needs; esteem and self-actualization needs. Four of these five levels of progression motivate, entice, and influence ones behavior and actions required to fulfill that need. The only need that does fall under this category is the need for self-actualization (self-achievement, or self-development).

Maslow describes these levels as progression but they do not always follow a certain order. For example if I would have been born into a rich family, my home would most likely be an oversized house sitting inside a large gated complex hidden behind trees (safety needs; financial security and protection). My family's refrigerator would always be stocked with bottled water, fresh meats, and produce of the highest quality and imported from halfway around the world (physiological needs; biological maintenance such as food and water). My self-esteem would be sky-high because of my economic success and people would show me a false form of respect because many would want to have what I was born with (esteem needs; esteem in eyes of others). But in this situation the social needs such as love, affection, and a sense of belongingness may not be fulfilled. Unfortunately, the desire to fit in within society and to be feel loved can lead to ethical behavior that may be destructive to myself and those around me. (Schermerhorn)

Maslow's hierarchy is more complicated than it seems and that may be why the amount of failing states around the world are increasing in probability. The failing states are dealing with the issues that have not yet reached the US, but if we continue walking with business as usual, we will eventually encounter the same issues (Brown).

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"Everything we think we have thrown away remains here with us in some form."
Tyler Miller

Just look around what do you see? As I drive throughout my community, I see large tracts of scattered and developed real estate with an arrangement of ranch-style, bi-level, colonial, and contemporary homes throughout cold and naked mountainous terrain. As I drive through the mountains, I see the cleared parcels and thoughts of the natural-gas-land-grab-resource-rush flood my mind.

Technology has facilitated the exploitation of nature and our well-being. Hearing that "we don't give a damn about energy, what we want is power" is something that I hear over and over. Yes, I understand that most Americans have are interested in potential power versus energy consumption. In the past population levels, agricultural practices, and technologies were not available to catalyze the overconsumption practiced by so many today. Prior to the 19th century, the energy spent from living off the biomass

of the land. Generations before us, used animals to gain the power they needed to work

the fields, transport themselves, and to eat. The lack of technology limited their human ability of destruction.

The current rate of pompous power devouring and insatiably squandering nonrenewable resources is extremely outdated, especially considering the technology available. Ninety percent of our life-styles are driven by power fueled by oil, natural gas, and coal. Reducing the human consumption of hydrocarbons to minimal amounts may be acceptably sustainable if consumers slowly begin to make the transition to all-around cleaner energy sources (although I do not have the data to back that concept, yet.) There may be an "acceptable amount of pollution." Now that present generations have hold advanced technology in the palm of their hands, it be should be used to educate the masses. Technology should be used to interact more efficiently with our ecosystems. Technology should be used to gain deeper understandings of how we should be interacting with matter and energy.

Facing this power crisis responsibly is possible if modern technology is used as a tool to spark the awareness and increase the intelligence of earth's inhabitants. By embracing awareness and intelligence through technology, I believe that would force the world see the truth of our actions. Subsequently, the truth would stress the imperative to act responsibly for surrounding environments. Action is required. No more studies. No more talk. Irresponsible and thoughtless consumption should be a downtrend that stays in the past. It's time to make a change by starting at individual levels here in our own country, since Americans consume twenty percent of the world's energy. Once that happens, eventually our communities will grow in strength, slowly gaining the opportunity to serve as an example for the rest of the nation. Who knows, maybe it could spread even further.

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The Good Shepherd

"For this is what the Sovereign Lord says: I myself will search and find my sheep. I will be like a shepherd looking for his scattered flock. I will find my sheep and rescue them from all the places where they were scattered on that dark and cloudy day. I will bring them back home to their own land of Israel from among the peoples and nations. I will feed them on the mountains of Israel and by the rivers and in all the places where people live. Yes, I will give them good pastureland on the high hills of Israel. There they will lie down in pleasant places and feed in the lush pastures of the hills. I myself will tend my sheep and give them a place to lie down in peace, says the Sovereign Lord. I will search for my lost ones who strayed away, and I will bring them safely home again. I will bandage the injured and strengthen the weak. But I will destroy those who are fat and powerful. I will feed them, yes—feed them justice!"And as for you, my flock, this is what the Sovereign Lord says to his people: I will judge between one animal of the flock and another, separating the sheep from the goats. Isn't it enough for you to keep the best of the pastures for yourselves? Must you also trample down the rest? Isn't it enough for you to drink clear water for yourselves? Must you also muddy the rest with your

feet? Why must my flock eat what you have trampled down and drink water you have fouled?

Therefore, this is what the Sovereign Lord says: I will surely judge between the fat sheep and the scrawny sheep. For you fat sheep pushed and butted and crowded my sick and hungry flock until you scattered them to distant lands. So I will rescue my flock, and they will no longer be abused. I will judge between one animal of the flock and another."

Ezekiel 34: 11-22

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Our Pennsylvanian mountainous pasturelands are increasingly becoming tainted. Our freshwaters are diminishing in purity. The fat sheep have gathered in multitudes, stampeded, and defiled our sanctuary— the only one available. 12,500 years ago, there was a time when everything was in perfect balance, but first came agriculture, second an industrial-medical revolution, and finally an informational-globalization revolution: These three revolutions have provided the world with great benefits, but lead me to ask; have we properly managed these benefits, could it be that greed has possessed the sheep leading to rapacity and obesity, and will the result be a complete eradication of all that gives life?

Many of the powerful oil & gas related businessmen, corporations, politicians, and regulatory government officials enticed by money-driven opportunities to satisfy their gluttonous hunger for economic-power have taken advantage of the weak and scrawny too long. These fat-fracking sheep have "pushed and butted" the weak and injured out of the land long enough.

Now that the water is murky by the trampling of their hooves, will the fat sheep drink the water with us? Now that the air is clouded by their frantic movement, will the powerful sheep breathe next to us? Not that it is of any reward to us, but I believe that they don't have a choice. These power-hungry sheep may be entirely blinded by their crazed behavior.

Although I may be among the sick and weak sheep, I do not wish the powerful sheep harm, because our land is shared. The activities of the herd affect the land, and the herd needs the land to graze, the water to drink, and the air to breathe.

Have you ever thought of where the oil and gas companies acquire these outrageous amounts of water for hydro-fracking? The numbers vary depending on how many wells on the site are being "fracked." Although it is known that each site requires approximately 1-9 million gallons of water (that is later polluted by chemicals and mixed with sand before being injected and then exploded beneath the earth surface.) Without dragging you through the math, the amount of

existing wells have already been polluted with 360 billion gallons of chemicals, and as a result an extremely sickening 72 trillion gallons of polluted water.

The water-damage is one of the many issues caused by hydro-fracking. There is also significant damage caused by the methane leaks spread through the fissures, a result of sub-surface explosions that can be released into earth's atmosphere. It should be mentioned that nature expels natural gases into the atmosphere, but earth's greenhouse gases rise and fall sustainably, until we provide our contribution. There are also claims of a highly contaminated blends of methane and water being light on fire, in peoples homes; from their faucets, from their wells, from their garden hoses, etc. Residents of the surrounding areas of these drilling-sites have reported all sorts of skin irritation, respiratory problems, bleeding from the nose and mouth, and in the worst cases, death.

One day, the fat and powerful, will get a taste of justice: Justice will be shoved down their mouths and they suffer the same excruciating pain caused by drinking from defiled water. Until then, I will continue searching for the truth.

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"Life always rides in strength to victory, not through internationalism... but only through the direct responsibility of the individual."
Frank Lloyd Wright

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The rhetoric used to convince Americans that we are one step away from independence is nothing new, but people believe it now because of the hope many have that America's economy will turn around. Who knows maybe the United States will become like the United Emirates. As Obama has be caught saying, "…if extracted safely, it's the bridge fuel that can power our economy… And today, we produce more natural gas than anybody else. So we're producing energy. And these advances have grown our economy, they've created new jobs, they can't be shipped overseas." That is just great! Honestly who cares if federal lands such as state parks have decrease by 6% and private land exploitation increase by 61% on land controlled by private and state entities. None of that matters as long as the economy grows, right?

Once again, Obama has been ensarred by his own empty words. He has stated over and over that he supports drilling for natural gas, but then deters the industry from touching federal lands, managed by the Bureau of Land Management (BLM). I think it's great that "oil production on federal lands actually fell 6 percent between 2009 and 2013." Regardless of Obamas spineless stance, at least the government land exploitation has marginally decreased, unfortunately that is not due to any act of congress or the

president. I understand that he has been a longtime supporter of using "our" resources to catapult the US economy, and that a battle between political parties is what clouds our vision of what is really going on. Let me real clear about this, President Obama does not have the political strength or will-power make a genuine stand on his own beliefs. Obama desired need for acceptance and love is allowing the oil and gas industrial economy to violate, rape, and ransack sanctuary under his authority, and he allows it with a smug smile. Although Obama may have tried to win the state of New York over with his rhetoric and friendly smile, it did NOT work. (Pradoni)

One of the main reasons Obama allows the oil and gas industry to trample the land is because he is competing for global economic power with countries such as China and India that are rapidly catching up regarding their development and stature within the global market.

In Plumer's article in the Washington post, he effectively sheds light on the fact that:

> "…energy issues and trade have become increasingly intertwined in recent years. It's not just natural gas or rare earths. The United States is also challenging India's attempts to protect its domestic solar industry. The Commerce Department is putting up new tariffs against subsidized Chinese solar panel imports. Meanwhile, Congress and Europe are at odds over how to levy a carbon fee on international flights. These aren't all necessarily related. But it's a reminder that trade considerations are far from minor."

In addition, China's control over the ninety-five percent of the global supply of rare-earth metals is needed to manufacture the sustainable technology of the future for the US. America's official have attempt to requesting that the World Trade Organization (WTO) appeal China's calculated export restrictions on several different occasions. Ironically, if the Department of Energy (DOE) has looked in the mirror lately, I am sure that they would realize how hypocritical they were. (Plumer)

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"Study nature, love nature, stay close to nature. It will never fail you."
Frank Lloyd Wright

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The toll that Pennsylvania's environment and habitants will eventually pay is not evident at the moment, although scientists have provided the world with sufficient evidence that overconsumption and weak governance on how the world's population uses its energy.

Focusing on whose fault it is once our polluted water can no longer yield crops and causes famine like it has in the shrinking savannas of Africa and the over pumped aquifers of the Middle East. But if my audience feels that Global events are too far fetched, then maybe we can learn from our local past.

Here in Pennsylvania Coal mining has been practiced since the 19th century. The coal-mining region reaped some of the same benefits as those currently living on top of the Marcellus Shale. Coal is still being mined, but all of the argumentative passion is being directed towards natural gas, in the meanwhile coal is still producing almost half of Americas energy— this fact is hiding in the towering shadows of our most recent issue, fracking for natural gas. We know that coal is the dirtiest form of energy available, in fact Bryce refers to coal as "China's dirty little secret." But that is beside the point, let us stay focused on Pennsylvania. I sometimes ask myself why Pennsylvanians have not learned from the past.

Coal mining's toxic fumes were carried from one mountain top to another killing all of the vegetation it landed on. Drilling coal mines weakened the bedrock which lead to widespread occurrence of sinkholes. Coal mines polluted water, which intoxicated pregnant women causing birth defects. Workers in the coal mines were diagnosed with cancer after long-term exposure. This may be the biggest reason why Bryce starts his book by explaining how automated coal mining is. Regardless, that does not mean that coal mining is safer than it used to be. Although the counterclaim of many when this argument presents itself is always that everything causes cancer; food packed with preservatives, food injected with growth supplements, food sprayed by pesticides, cigarettes, marijuana, and the list goes on and on. But the point is that they all cause serious long-term sickness.

So what is the difference between the acceptable risk eating food filled with carcinogens and smoking cancer-sticks? The answer is simple. All of the above are left up to the individual to decide. But with natural gas extraction, the effect begins locally but eventually will become a global problem. (NASA)

The federal governments Mercury and Air Toxic Standards minimized soil erosion, land degradation, water pollution and change is the waters composition (such as Acid Mine Drainage), and dust and noise pollution. Sadly these problems were only addressed after numerous people in the surrounding area had to deal with the health consequences.

If our state continues to think only of itself, the "Commonwealth", rather than how it effects the individual residents and their children in the long-term, it may be impossible to erase or revert the damage that has already been performed.

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"A technical solution may be defined as one that requires a change only in the techniques of the natural sciences, demanding little or nothing in the way of change in human values or ideas of morality."
Garrett Hardin

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Solar has its problems. Solar panels are made of rare metals called lanthanides and ninety-five percent of these metals are located in China. As Bryce has asserted, most renewable energy require large amounts of lanthanides since they have such great conductive and magnetic properties. Many of those whom chose to support the oil, gas, and even nuclear power use this previous argument. (Bryce)
While many of the opposing arguments make logical sense, although there is one large factor that is always neglect. Once the lanthanides are extracted and installed into the solar panels, wind turbines, and hybrid vehicles they no longer degrade from their physical state. On the other hand, this is the driving cause for the increase in greenhouse gas emission that are trapping heat within our atmosphere.

I have hear it time after time, 'there is no evidence that solar and wind is beneficial…. Solar and wind are low quality sources of energy, there are no studies showing that renewable energy is capable to provide power for all of America power consumption. The later half of this sentence is the problem, not the previous. America's power consumption needs to decrease. As soon as the energy we use —to talk on our iPhones, browse the internet, or stream a movie a our smart televisions— is threatened some people tend to react defensively by blurting out an inaccurate counterclaim such as, "there are no studies proving that the energy I use is negatively affecting the world," or maybe just a blatant lashing of the tongue saying "who cares anyway, what is the difference?"

It is ironic how those who strongly support their 'right' to use whatever energy they please do not demand any studies showing providing the possible risks of using coal or natural gas derived energy. Could it be that the luxurious and convenient lifestyle that high quality energy provides places a blindfold over their eyes? Or could it be possible that this demographic just does not care? Unfortunately, I believe that answer is: Both!

Why is it okay to use inexpensive non-renewable oil & gas without worrying about the immediate hazards and long-term effects it is acceptable, but on the other hand when the more costly option, renewable energy, is proposed people fight viciously against it? In the end, the most important aspect is how it impacts our bank accounts and lifestyles.

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"Indeed, our particular concept of private property, which deters us from exhausting the positive resources of the earth, favors pollution."
Garrett Hardin

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The solution that Pennsylvania needs can only come from nature. The answer will only arise by learning to love nature. But unfortunately money is more important. Why is

money always the first priority? Sadly, the answer is highly attached to the financial bottom line: The right thing to do cost much more than living under ethical conformity.

Before I present any of my proposed solutions, I would like to make a clear statement to whomever reads this article: I am not an economist, psychologist, geologist, chemist, nor a medicinal doctor. The knowledge that I have obtained regarding natural gas, its impact on earth's resources, and the toll that earths habitants will some day pay have become clearly evident through due to a combination of watching documentaries; and reading scholarly research papers, scientific publications, literature, and activist blogs from both sides of the argument. I also must add that the main reason I have done the research is because I believe in living a life that does not leave any trace of my existence after I am gone. The only remnant that I would like to leave behind is life— a son or daughter that could someday contribute towards the same goal. That is when I start to wonder; if we keep going about business as usual will the earth habitable for my grandchildren and great-grandchildren. If earth is not going to habitable what is the point in bringing them into an unsustainable world that will torture them by leaving them with dealing the aftermath of our present generation's environmental irresponsibility; drought, sandstorms, food insecurity, and global climate change?

Morality, whether its related to one's religious beliefs or environmental issues, is always up against science, so it is extremely for people to accept. Even if there is enough tangible scientific evidence to support an argument, it is still not likely to be accepted as the truth on an ethical level. As long as there is nothing to prove otherwise, we [humans] tend to strive to fulfill our pleasures first (food, energy, convenience, and money) neglecting what the consequences may be later is much easier than consider all of the possible outcomes before hand. Since getting everyone to embrace renewables and change their lifestyles the way to do that is to agree to "…mutual coercion, mutually agreed upon by the majority of the people affected." (Hardin)

The ethics behind hydraulic-fracturing are flexible and manipulated by playing on pleasures and needs of Pennsylvania's residents and industry. Many families are attached to land that has been passed down from their ancestors, so the fear of possibly losing the lands desperate families turn to the lucrative gas industry to bail them out. Some farmers believe that their wide open country farmlands are bucolic and that extracting natural gas is the only way to preserve the land. Some farmers are dependent on the monthly stipend that they receive from gas companies because it offsets for their dwindling farms, and some are just "riding the gravy-train."

Since money controls our daily purchases and our consumption, I believe that the only true strategy to address the tragedy of the commons is to
1. Impose limits on consumption,
2. Give tax incentives to those whom use less energy (coal, natural gas, propane, kerosene, and the electricity that is produce by these same products), and
3. Enforce strict penalty taxes for those whom use more than their allotted amount. Unfortunately the only way to entice a population into living sustainably is to give them no other choice.

We live in a democracy, but the laws that we live by in Pennsylvania are presented as double standards. So mutual coercion should be set in place through the means of taxes and fees

on such aspects; on the land, water management, oil and gas companies, the population, energy efficiency, and the carbon tax across the board from everyone on the hierarchy of command from the jobless to the richest, and those whom own national and global businesses should be accountable proportionate to the amount that person or corporation generates in revenue— the more one makes the more one pays access and excessive waste. That may keep jobs in local areas of Braden, Toiga, and Susquehanna counties, rather than participating and depending on the exploitation of natural gas and water. Setting a limitations on energy usage and making residents pay "an arm and a leg" in taxes and for their overages will not be easy, but based on our prodigal American ways it is the only way to revert the previous damage done to the commons. "The worshipers of the status quo" prefer to live in inactivity, rather than learning through trial and error. Those who blindly follow the status quo will eventually get left behind through the process of natural selection, or either change out of a guilt.

Other aspects of my plan would have to include a plan to the modify ethics on all levels by recreating and enforcing all federal, state, county, municipal, and township zoning regulations and holding everyone accountable for their actions. Pollution limits and tariffs will be imposed on those whom over consume, on the other hand those who live efficiently will receive tax incentives living minimally. Gluttonous energy consumers will be punished for wasted energy non-compliance would be verified by software that monitor the amount of energy used on a constant basis. We will redefine the American Dream by redefining American culture, philosophy, psychology, morals, ethics, patriotism, overconsumption of everything, and Obesity. And lastly we will revive and revise recycling in Pennsylvania by mandating that everyone in the state of Pennsylvania recycle or be reprimanded.

If Germany, Japan, and San Francisco can recycle seventy-five percent of their paper used in the entire year so can America. The Pennsylvania population could also be given the choice to pay for disposing of its waste or recycling for free. Recycling could generate funds for education and state services, rather than continuing to impose severance taxes on oil and gas companies use the recycling fund educational systems, invest into local infrastructure and generate self sustainable income. My last recommendations would be to shut down all distribution sites of natural gas and embrace solar renewable energy.

Some countries are already heavily dependent on imports from outside regions due to over pumping of aquifers, overconsumption, overpopulation, and lack of food supplies. Many developing countries are practicing wasteful life-styles and steering the world's climate in a catastrophically unknown direction. Global markets yearn for economic power, so if they are presented that opportunity to export, it is usually seized. Countries are abusing non-renewable water resources and the land, by hiding behind the laws or evading them. There are many revolutionary ideas that could force our global population back towards sustainable life on earth, although we all have to be on the same page.

Bibliography:

Atiyeh, Clifford. Car and Driver, Blog. 24 April 2014. May 2015. <http://blog.caranddriver.com/recall-throwdown-analyzing-automakers-recall-history-in-the-past-30-years-who-is-worst/.>

Berezow, Alex B. "There's Methane In Your Drinking Water, So What." Real Clear Science. 29 June 2013. 15 Feb.2015. <http://www.realclearscience.com/blog/2013/06/theres-methane-in-your-drinking-water-so-what.html>.

Boyer, Dave and Wolfgang. The Washington Times. Feb. 22, 2015. March 8, 2015. <http://www.washingtontimes.com/news/2015/feb/22/obama-embraces-natural-gas-exports-to-drive-job-gr/?page=all>.

Bryce, Robert. Power Hungry: The Myths of "Green" Energy and the Real Fuels of the Future. New York: BBS Public Affairs, 2010.

Dell. Design for Environment, Closed Loop Recycled Content. 2015. February 29, 2015. <http://www.dell.com/learn/us/en/uscorp1/corp-comm/closed-loop-recycled-content>.

Drajem, Mark. Bloomberg Business. 2009. March 8, 2015. <http://www.bloomberg.com/news/articles/2012-05-09/obama-warms-to-energy-industry-by-supporting-natural-gas>.

Dumé, Belle (editor). Physics World. Making better solar cells with polychiral carbon nanotubes August 2014. February 28 2015. <http://physicsworld.com/cws/article/news/2014/aug/15/making-better-solar-cells-with-polychiral-carbon-nanotubes>.

Earth911. What Does 'Close the loop' Really Mean? 2014. February 28 2015. <http://www.earth911.com/general/close-the-loop-primer/>.

EPA. 2015, April 11, 2015. <http://epa.gov/climatechange/ghgemissions/sources/commercialresidential.html>.

Esack, Steve. Wolf's Jenga-like budget makes each piece key. The Morning Call. March 7, 2015, 8:39PM. Harrisburg. March 8, 2015. <http://www.mcall.com/news/nationworld/pennsylvania/mc-pa-wolf-budget-puzzle-20150307-story.html#page=2>.

FrackNation. Directors; Phelim McAleer, Ann McElhinney, and Magdalena Segieda. Hard Boiled Films, 2013.

Glastris, Ryan & Cooper, and Siyu Hu. Washington Monthly. <http://www.washingtonmonthly.com/magazine/march_april_2012/features/obamas_top_50_accomplishments035755.php?page=all>)

Goodman, Amy and González, Juan. Interview with Josh Fox. July 12, 2013 <http://www.democracynow.org/2013/7/12/josh_fox_on_gasland_part_2>.

Holy Bible, New Living Translation. Tyndale House Publishers Inc.: Carol Stream, 2013.

Humanity Now Demanding 1.4 Earths. 2009. Footprint Network News. 9 Feb. 2015. <http://www.footprintnetwork.org/en/index.php/newsletter/bv/humanity_now_demanding_1.4_earths>.

McKibben, Bill. Mother Jones. "Bad News for Obama: Fracking May Be Worse Than Burning Coal". Sep. 8, 2015. March, 2015. <http://www.motherjones.com/environment/2014/09/methane-fracking-obama-climate-change-bill-mckibben>. (Oreskes, Naomi (Harvard professor) explained that "all wells leak. Water wells leak. We've drilled millions of wells in North America, and all that time we've never figured it out.")

Mikolajczakj, Claire. Indium Corporation. The question Indium Corporation is confident of the sustained indium metal supply. 2015. February 29 2015. <http://www.indium.com/metals/indium/supply/>.

Miller, Tyler & Spoolman, Scott. Sustaining The Earth, 10th Edition. 2009 Brooks' Cole. Cengage Learning. Belmont, CA. 2012 copyright.

Morris, Amanda. McCormick Northwestern Engineering. Breakthrough for Carbon Nanotubes Solar Cells. August 29 2014. <http://www.mccormick.northwestern.edu/news/articles/2014/08/breakthrough-for-carbon-nanotube-solar-cells.html>.

Natural Gas Drilling in Pennsylvania. 2014. State Impact Pennsylvania. 30 Jan. 2015 <http://stateimpact.npr.org/pennsylvania/drilling/>.

Overweight and Obesity in the U.S. FRAC, Food Research and Action Center. 2010. March 9, 2015. <http://frac.org/initiatives/hunger-and-obesity/obesity-in-the-us/>.

OSS Foundation. 2015. 6 April, 2015. <http://ossfoundation.us/projects/environment/global-warming/natural-cycle>.

Pitts, Peitro. Bloomberg Business. Cuba.. $2.7 Billion LNG, Ammonia Projects. April 28, 2014. <http://www.bloomberg.com/news/articles/2014-04-28/cuba-moves-ahead-with-2-7-billion-lng-ammonia-projects>.

Phillips, Susan. State Impact. November 4, 2014. March 6, 2015. <https://stateimpact.npr.org/pennsylvania/2014/11/04/what-wolfs-win-means-for-energy-and-the-environment/>.

Piñon, Jorge. CubaStandard.com, Cuban Business and Economic News. "Liquid natural gas is key to Cuba's energy plans." Oct. 29, 2010. <https://www.cubastandard.com/?p=3048>.

Plumer, Brad. The Washington Post. May 6, 2013. March 8, 2015. <http://www.washingtonpost.com/blogs/wonkblog/wp/2013/05/06/the-surprising-reason-why-obama-favors-natural-gas-exports/>.

Pradoni, Chris. Forbes. April 17, 2014. March 9, 2015. <http://www.forbes.com/sites/chrisprandoni/2014/04/17/obama-stymies-oil-and-natural-gas-production-on-federal-lands/>.

Ranker, Luke. The Times Tribune. UGI tell customers to conserve gas. February 19, 2015. February 28, 2015.<http://thetimes-tribune.com/news/ugi-tells-customers-to-conserve-gas-1.1835329>.

Sandler, Travis & Rosenburg, P.A. New Legislation: Trade Agreements, GSP, Cuba. Feb. 10, 2015. <http://www.strtrade.com/news-publications-trade-agreements-GSP-Cuba-legislation-021015.html>.

Shepstone, Tom. NaturalGasNOW. "For our nation, our economy, and our environment. Taking Shell Gas to School at SCCTC." posted February 25th 2015. February 28, 2015.<http://naturalgasnow.org/taking-shale-gas-school-scctc/#more-9624>.

Shepstone, Tom. Natural Gas NOW. [Impact Act 13]. posted March 3, 2015. <http://naturalgasnow.org/the-impact-of-pa-act-13-on-susquehanna-county/#more-9779>.

Skrapits, Elizabeth. The Times Tribune. Time to turn off the gas. February 23, 2015. February 28, 2015. <http://thetimes-tribune.com/news/time-to-turn-off-the-gas-1.1837559>.

Tucker, Chris. "Flammable Water in Susquehanna Co.-In the 18th Century!" Energy In Depth. 26 May 2011. 15 Feb. 2015. <http://energyindepth.org/marcellus/salt-springs/>.

University of Wisconsin-Madison News. Future looks bright for carbon nanotubes solar cells. June 2013. February 28 2015. <http://www.news.wisc.edu/21890>.

Well Said, A Cabot Community Blog. 2015. Word Press. 16 Feb. 2015 <http://wellsaidcabot.com/methane-in-water/>.