Total Divestment:

Divesting in the Fossil Fuel Industry - Re-investing in Sustainable Energy

Milt Hetrick, Oct 2014

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PREFACE

Moving to a New Meadow – Away from the Monster

Let's begin with a metaphor involving a dangerous fire-breathing dragon that guarded the "Cave of Fire" in the meadow over yonder.

Overlooking the cave, an elder explains to a grandchild, "To get a piece of the Fire stored in the cave, the people go to the dragon and feed it their money."

The once friendly dragon that guarded the cave had an ever growing appetite. The people liked its Fire and feed it more. It continued to grow in size. Then it grew tentacles. It transformed into a dreaded monster that could now reach across the oceans and touch all continents. Where its tentacles touch the meadow, the bees die, the flowers shrivel, plants wilt and animals get sick. Using its cunning and creativity, without empathy or ethics, the monster created many different sizes, shapes and colors of its addictive Fire. As a result, the monster continued to entice people to come under its spell. While under the evil monster's influence, people were told there is no other Fire than this and they must pay its ever increasing price. To make matters worse, without fully realizing it, many who come too close to the monster with its poisonous breath, themselves became ill years later and died.

The elder goes on to explain, "When we attack this monster and cut off its head, it grows back two heads." The child can see this approach was not working well. The elder went on to say that people just want to live productive lives, raise children and nurture grandchildren without fear of becoming poisoned by the monster.

The young one asks, "Why do we keep feeding the monster?" The child continues, "Surely it will die or turn back into a friendly dragon if it does not get so much food. And is there no other way to get the Fire?"

"Come child, wise beyond your years," said the elder. "Let's see if we can talk to your parents about moving to a different meadow. I'm told such a meadow exists. One rich in flowers, trees and sunshine where the Sun, Wind, Water and Earth provide the Fire without a fee – to a meadow where you can be free from the spell and the smell of the monster – to where you can play and grow to be the best you can be in harmony with the flowers, trees, and all creatures on the land and in the sea."

So Who Is Feeding The Fossil Fuel Monster? And by What Means?

Using the metaphor that the fossil fuel industry has evolved from a friendly dragon to a deadly monster of today, who is still feeding it?

We as a society feed the monster directly by buying its products and services daily. We as investors feed the monster directly by purchasing its stocks and bonds that provide the capital for further expansion.

We as a society feed the monster indirectly in many ways including tax relief, tax deductions, subsidies, loans. We feed the monster indirectly by allowing it to spew out misinformation in its advertising.

We feed the monster by tolerating its externalities.

> We feed the monster by failing to hold it responsible for social costs – for the harm it does to humans and non-humans in the extraction, transport, refinement and use of its fossil energy related products and services. We feed the monster by allowing it to do harm in foreign countries with its overseas tentacles – outside our legal jurisdiction, but not outside our moral obligation. We feed the monster by failing to prosecute its violations of our clean air, water, and soil laws when they dispose of their toxic materials in our common atmosphere, waterways, and land-based dumps/boreholes. We feed the monster when we allow it to dispose of hazardous waste deep underground that contaminate our aquifers under the disguise of hydraulic fracking with "proprietary chemicals." In other words, when we tolerate its externalities, we ignore the fossil fuel extraction industry's social costs in the market price of its products. We sheepishly pay these external social costs ourselves as if they are unrelated to the fossil fuel processes, products or services. Examples of these externalized social costs include asthma, various forms of cancer, neurological disorders, miner's lung, etc. and then there is climate change, global warming, ocean acidification, contaminated aquifers and streams, etc.

We feed the monster by allowing its monopolistic behavior to extract obscene profits from our society. Yes, we continue to feed the monster that does us harm.

But when we stop listening to the monster's propaganda, we realize we really don't have to feed it because there are viable (and inexhaustible) energy alternatives.

So let's move from the monster metaphor to the human-created "real world of economics" (where the actual monster lives) and introduce some new terminology.

PART I DIVESTING

WHAT IS DIVESTING?

Traditional Definition of 'Divestment' for Financial Objectives

The traditional definition of Divestment is "**The process of selling an asset**." Divestment is the opposite of investment.

New Definition of 'Divestment' for Social Change: 'Total Divestment'

We would like to extend that definition of divestment specifically for bringing about social change. Social Divestment then becomes "**The process of selling an asset (e.g. stock) AND/OR no longer purchasing the product or service**." We might call this extended definition 'Total Divestment' or 'Social Divestment.'

When "customers" stop buying the products of a for-profit company, the company's revenue and profit decline and the company will soon stop producing that product. Economists would say, when the demand decreases, the supply decreases appropriately.

Each of us has tremendous power should we choose to exercise it. Our buying power is a major force in a market-based economy. Collectively we the buyers determine which companies thrive and which companies wither and die.

Total or Social Divestment (e.g. in the fossil fuel industry) is in effect saying we as a civil society no longer wish to assist that particular enterprise. Having divested, we are then able to re-invest in an alternative product or service.

But let's be clear about Total Divesting. Selling off my ExxonMobil stock and then filling up my gas tank with Shell gasoline is not really divesting in fossil fuel. Selling my ExxonMobil stock, investing in a plug-in hybrid or electric vehicle that uses electrical power generated by wind or solar PV is divesting in fossil fuel.

Adding solar panels to my rooftop but still heating my home and water by burning natural gas is not really divesting in fossil fuel. Adding solar panels to my rooftop and using some of that electrical power to operate a GeoThermal / GeoExchange heat pump for heating and cooling (where no burning is required) is divesting in fossil fuel.

Selling off my oil and natural gas investment portfolio is a start in divesting, but it is like changing my light bulbs. Reducing usage (i.e. conservation) is good, but it is not sufficient – my unsustainable behavior continues, just a slower pace and longer time.

So what would 'Total Divestment' look like? From a personal perspective, I would no longer buy electrical power generated by burning coal. I would stop buying natural gas to heat my home. I would stop buying gasoline for transportation. I would fly on planes that utilize biofuels or hydrogen generated from solar power. I would eat food that was not produced with fossil fuel. I would buy products produced locally or transported sustainably.

WHAT IS THE MOTIVATION TO DIVEST?

Why would I even think about divesting from the fossil fuel industry? Record profits are being made in fossil fuel industry today. Why would anyone choose to divest and miss out on these obscene earnings? And furthermore, fossil fuel based energy products appear to be the least expensive options in today's marketplace. Why would I stop buying the cheapest option?

According to one financial investment company, Green Century, the top five reasons people have for divesting (in the traditional context) from fossil fuel companies are in response to the perceived climate change concern:

1. Wanting to Get Your Investments in Line with Your Values.

Global warming / climate change is a serious threat to our society, and burning fossil fuels is a main cause of worsening floods, droughts, weather extremes, wildfires, ocean acidification, glacial melting, ocean warming and sea level rise. Many investors want to keep their investments away from the industry that is principally responsible for causing a changing climate. Divesting in fossil fuels allows you to begin to align your values with your investment decisions.

2. Reducing Corporate Influence on Energy Policy.

Fossil fuel companies have tremendous influence over legislation and regulations, through lobbying in state capitols and Congress and

contributing large sums of money to election campaigns. For years, this power has helped thwart progress on the policy solutions to climate change.

3. Strengthening the Climate Movement. Climate change is very complex, and the solutions so wide-ranging, that it is often a challenge for people to find a way to make a powerful difference. The divestment strategy (in its broadest context described below) is successfully engaging the public.

4. Reducing Exposure to "Stranded Carbon Assets." With our current understanding of climate change, we must prevent the average temperature from increasing more than 2 degrees centigrade/Celsius (3.6 degrees Fahrenheit). The fossil fuel industry now controls reserves of coal, oil, and gas that – if extracted and burned – will release five times more carbon dioxide than scientists agree is safe. This translates to leaving 80% of the known reserves of ancient hydrocarbon in the ground. This fact sends chills through the fossil fuel industry and its investors. Although the industry knew this (or at least suspected this) for decades, somehow the information has remained a secret from most people outside the industry because it conjures up the unmentionable phrase "**stranded carbon assets**."

If 80% of the assets of these fossil fuel enterprises must be "written off," the result is a dramatic reduction in their current net worth (and stock price). So the industry is obviously going to do everything in its power to continue to legally deny or at least obscure this fact from their investors/stockholders.

If governments restrict carbon emissions, or correct the economic system to eliminate the externalities associated with burning ancient hydrocarbons and people transition to inexhaustible sources of energy, companies owning those fossil fuel reserves may not be able to extract and sell them. The reserves may become stranded assets, and investors will be left with devalued assets. Watchdog groups such as Carbon Tracker Initiative (CTI) continue to report on this concern. Here's a recent report:

> **Carbon Tracker Report Debunks ExxonMobil's Denial of Carbon Asset Risks**
>
> OAKLAND – September 10, 2014 – Today, the **Carbon Tracker Initiative (CTI)** issued a report finding that ExxonMobil (XOM) – the largest U.S. energy company – is significantly underestimating the risks to its business model from investments in higher cost, higher carbon reserves; increasing national and subnational climate regulation; competition from renewables; and demand stagnation, among other factors.

Investors/shareholders are asking the fossil fuel companies difficult questions about the ever increasing costs of exploration and finding new fossil fuel reserves.

> Exxon **underperforms** vs. S&P 500 by 8% for past five years due to overspending on risky replenishment of reserves….
>
> …Recognizing that market and regulatory forces are creating a growing risk to fossil fuel companies, and that, collectively, these companies are continuing to spend over $700 billion per year in finding and developing new fossil fuel reserves, shareholders initiated a campaign in 2013 seeking more information on the potential for future stranding of company assets.
> **As You Sow** and **Arjuna Capital** are part of this coordinated investor engagement called *The Carbon Risk Initiative*. This group, supported by CERES and CTI, wrote to the world's 45 largest companies in

the oil and gas, coal, and electric power sectors, asking them to assess their exposure to carbon asset risk.
Like Exxon, the responses received generally indicate that these companies are failing to acknowledge the growing risks of conducting business as usual, including pursuing additional fossil fuel reserves at increasingly high costs.

Ref: http://www.asyousow.org/wp-content/uploads/2014/09/Carbon-Tracker-Report-Debunks-ExxonMobil-Denial-Carbon-Asset-Risks1.pdf

Forward looking oil and gas companies realized this inevitable scenario a decade ago and began to diversify – e.g. BP tried to change its image and become Beyond Petroleum as they invested in solar and wind farms. However, that enthusiasm for alternative sources of energy diminished because oil and gas profits are still very lucrative and the **demand** for these products remains high (as long as the price remains low thanks to externalities enjoyed by the fossil fuel industry).

5. Reinvesting in the Solutions. Once divested from fossil fuels, investors have the opportunity to invest in forward-looking climate solutions, like companies specializing in energy efficiency, inexhaustible sources of energy (e.g. solar, wind, hydro, geothermal, tidal, etc.), or other related climate mitigation strategies. There are viable energy alternatives to burning ancient hydrocarbons.

(Adapted from Ref: http://greencentury.com/wp-content/uploads/2013/10/Five-Reasons-to-Divest-2013.pdf)

More and more financial investment organizations are offering Socially Responsible Investment (SRI) options to their clients. This moment in history offers investors new opportunities to make a difference on climate change, while saving for their future needs.

If mitigating climate change, global warming and extreme weather are not a good enough reasons to divest in fossil fuel, there are several other equally compelling reasons. For example:

6. Reducing Ocean Acidification is linked directly to the increased concentration of CO_2 in our common atmosphere. This changes the habitability of oceans.

7. Curbing Sea Level Rise is linked to global warming, but it directly affects those populations living along the coastlines or on islands who are losing their homes and livelihoods.

8. Treating Fossil Fuel as a Finite Resource.

There are now over 7 billion people alive on our finite planet. According to the World Bank statistics, 2.4 billion people lived on less than US $2 a day in 2010, the average poverty line in developing countries - a common measurement of deep deprivation. [http://www.worldbank.org/en/topic/poverty/overview#1] So it has not been demonstrated that the planet can truly sustain its current population of homo sapiens. Nevertheless, that number of people alive on Earth is expected to exceed 10 billion by the end of this century. The World Bank does not attempt to describe the standard of living or the quality of life of 10 billion humans.

Our planet is finite as are all the resources required to support Life – including the remaining reserves of ancient hydrocarbons we envision as “fossil fuel.” We have passed peak oil (and peak gas and peak coal). This means we are consuming these resources at a rate that is faster than we are discovering new reserves. So the end of these resources is already in sight. The fossil fuel industry

takes care not to openly advertise the end of these resources, because if they did, such information would depress the value of their stock.

If the human population remained at 7 billion and the rate of burning fossil fuels remained the same as it is today, the known and probable reserves of coal, petroleum, and natural gas will be depleted in 150 years – the same span of time since Drake drilled the first petroleum well in Pennsylvania back in 1859. That's the best case scenario.

Now let's consider a more realistic scenario and assume the human population will continue to increase. Let's assume the global rate of consuming ancient hydrocarbons increases 1% per year to initially consider the world's growing population and the continuing industrial development of China & India. Under this scenario, the known and probable reserves of coal, petroleum, and natural gas will depleted in less than 100 years as illustrated in the figure below.

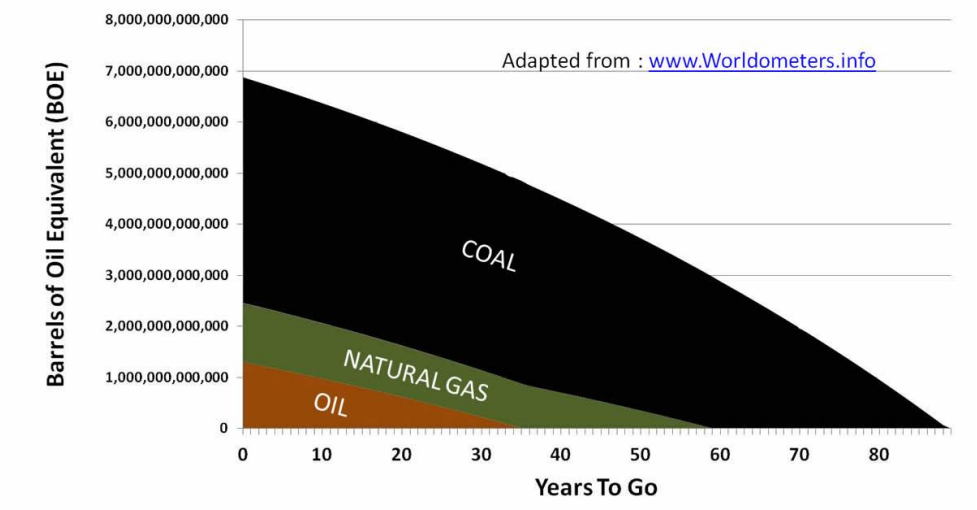

Figure 1 Consumption of One-Time-Only Ancient Hydrocarbons (Fossil Fuel) Reserves

In other words, my two great granddaughters born in 2013 will likely live long enough to see the practical end of coal, oil and natural gas – unless my generation, my children's generation, and my grandchildren's generation change their behavior starting now.

Incidentally this practical "end-of-fossil fuel" scenario has nothing to do with science. It occurs whether or not you believe in climate change or global warming. This depletion of the finite reserves of one-time-only ancient hydrocarbon is going to occur even if stick your head in the sand and deny environmental issues associated with the burning of fossil fuels. It doesn't even matter what political ideology you worship. This scenario just uses first grade arithmetic – i.e. subtraction.

In other words, for Addison and Isabella to inherit a planet that is as good as that of their parents, grandparents, and great grandparents, one or more of their preceding generations must transition away from burning ancient hydrocarbons (fossil fuel) and begin using the many available sources of inexhaustible energy (erroneously called renewable energy) such as solar, wind, hydro, geothermal, etc. So it begins with me.

Since the transition away from fossil fuel is inevitable and there are viable alternatives available today, I had to ask myself, why not transition now before I cause even more damage to our finite planet? I couldn't think of a good reason not to, because I could.

9. Using Valuable Ancient Hydrocarbons Sustainably.

Burning this one-time-only finite resource of ancient hydrocarbon is like fueling your kitchen stove with $1000 dollar bills. These ancient hydrocarbons have many valuable (and recyclable) uses; it is foolish, if not a crime, to only view these resources as a fuel to be burned/consumed for the sole purpose of generating low quality energy (heat).

We will always need carbon to transform iron into steel. Steel (with embedded carbon) can be (and is) recycled indefinitely. We have learned how to transform hydrocarbons into high strength carbon fibers that in turn are used to make lightweight materials including wind turbine blades, airplane structure, golf clubs, tennis rackets, etc. We have learned that petroleum is an excellent feedstock for making numerous types of plastics – that if properly produced, deployed and returned can be recycled indefinitely. Granted there is much effort required yet to make the process of transforming hydrocarbons into recyclable products safe, non-polluting and truly sustainable.

To transition to sustainable living, the frame that refers to ancient hydrocarbons as a "fossil fuel" to be burned must be eliminated. We need a new sustainable living frame that views ancient hydrocarbons as a precious source of sequestered carbon from which humans can fashion numerous recyclable sustainable products. In this new frame, the thought of burning ancient hydrocarbons would be considered insanity. Actually burning these resources would be considered "cidal" behavior because it is.

10. Growing up to Become Energy Adults

To live sustainably, homo sapiens must return to a behavior where their life sustaining energy (food) is derived from recent sunlight as do the nearly 2 million other living species that have successfully evolved on this planet.

Today the food I take into my body is a combination of recent sunlight and stored reserves of ancient sunlight (ancient hydrocarbons in the form of coal, petroleum, natural gas, etc.). This behavior is not sustainable because the reserves of ancient sunlight are finite/limited and will be depleted within 100 years. Our current food production (agribusiness) is totally unsustainable as the U.S. pretends to be the "bread basket" of the world by consuming these enormous amounts of fossil fuel to increase agricultural productivity/quantity (and profit) generally at the expense of nutritional quality as well as right relations with non-human living systems and the planet itself.

> According to the Intergovernmental Panel on Climate Change (IPCC), agriculture, forestry and land use (AFOLU) is an important driver of climate change, accounting for almost a quarter (25%) of total GHG emissions.
>
> Ref: IPCC, 2014: Climate Change 2014: Mitigation of Climate Change. *Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* Chapter 1 pg 20.

Another metaphor from the realm of mammals might be useful. A newborn infant receives energy needed to sustain its early life by nursing on the breast of its mother. This is a naturally evolved behavior and considered a normal healthy feeding practice for mammals. After a period of months of

maturation, infants are weaned from this source of sustenance and transition to other forms of food perhaps acquired and prepared by the infant's mother but not extracted from the finite supply of its mother but rather from a wide range of independent external sources. So as the infant mammal matures, its relationship to life sustaining energy (food) changes over time. A normal adult mammal no longer extracts the energy it needs to survive and thrive (its food) from its mother. Instead it assumes responsibility for hunting or gathering its own energy /food.

Although I've considered myself a self-supporting adult for the past 50 years, a closer examination of my life style indicates otherwise.

When it comes to the food I eat, much of the energy I take in daily has been extracted from within the breast of Mother Earth. Truth be told, the food I am putting in my mouth these days is part recent sunlight as it should be for sustainable living. However, part of the food/energy I take in is derived from ancient hydrocarbons (ancient, stored sunlight) aka fossil fuel - Mother Earth's stored finite reserves of energy. Yes, human ingenuity has devised a technique to convert these one-time-only reserves of "fossil fuel" to food so we can not only burn ancient hydrocarbons to operate our technology but now we also have found a way to eat it.

Based on the increased yield possible these days with the intense application of fossil fuel derived fertilizers, pesticides, herbicides, perhaps half to three fourths of the corn I eat is the result of these production aids made from fossil fuel.

In addition, a significant amount of fossil fuel is consumed to harvest, process, and transport today's foods to the retailer so I can pick it up at our local grocery store. Quite a difference from my grandparent's generation. They used natural fertilizer (manure), few if any pesticides or herbicides, farmed using draft horses, and ate food grown locally. Buying blue berries from Chile or strawberries from Mexico was not an option.

To be blunt, although I live in a so called developed country and consider myself an adult, I have regressed to a suckling infant, feeding off the breast milk (reserves of ancient hydrocarbons) of Mother Earth. My behavior supports the extraction of her one-time-only ancient hydrocarbons (energy) and the conversion of these resources into a form I can eat. If I behaved as an adult, I would insist on sustaining myself by harvesting the daily energy delivered free each day from Father Sun – just as all non-human forms of life on this planet do. Converting one-time-only fossil fuel into food is hardly the behavior of a responsible adult nor is sustainable behavior. Because fossil fuel is a finite resource, this behavior will come to end within several more generations – one way or another. The easiest way is to voluntarily make the transition to inexhaustible energy sources. The hard way is to deplete all the fossil fuel reserves and then attempt to make the transition to sustainable energy sources 100 years from now. When humans make the transition is our choice. But transitioning away from fossil fuel is not a choice – it's inevitable.

11. Applying EcoMorality – Ethics of Sustainable Living

Burning this one-time-only finite resource means it is no longer available to future generations. This behavior is not sustainable. Because there are viable alternative sources of energy that are essentially inexhaustible (solar, wind, water and geothermal), the continuation of this burning/consumptive behavior is at best unethical for the uninformed – and immoral for those of know better.

Remaining fossil fuel is needed as seed energy to allow the transition to alternative inexhaustible energy sources. To consume all of this "easy" energy without transitioning to long term / inexhaustible energy sources is the ultimate in irresponsibility. Question: Are we as a species incapable of delayed gratification?

There are more reasons to divest completely from fossil fuel, but 11 can be a place to start.

REASONS OFTEN GIVEN FOR NOT DIVESTING TOTALLY IN FOSSIL FUEL?

There are many reasons/excuses why I might choose not to change my behavior and continue to live as I have for 70 years and leave the transition to the younger generations.

Generally speaking I am living a comfortable life style. I have worked hard (in my own mind) to get where I am. I am where I planned to be in retirement. I put a lot of thought into being in the home I live in and living the life style I now live.

1. I have been burning ancient hydrocarbons all my life – why change now?
2. My home has the appliances, furniture and features I enjoy and I am not interested in going backward and living in a cave.
3. I don't want to move to another home.
4. I don't want to change my energy usage. I have no interest in freezing during the chill of winter or sweltering during the heat of summer.
5. If "divesting" in fossil fuels means I have to change my life style significantly, I'm not interested.
6. Also why should I change if others around me don't change?
7. And most importantly, the cheapest options involve burning fossil fuel

We will try to address some of these reasons/excuses for not divesting in the sections below.

WHO IS DIVESTING IN FOSSIL FUEL?

Divesting in the Fossil Fuel industry may seem like an insignificant if not irrelevant action to take for someone who is concerned about global warming or climate change. But a number of concerned people around the world are doing just that. Here in the U.S. we see divestment occurring in many areas ranging from 50 major investment foundations including the Rockefeller Foundation; to a growing number of religious organizations; to over 400 colleges and universities; and to more and more individual investors (including my partner and myself).

Divesting in fossil fuel is one of the key strategies of 350.org, a grass roots organization devoted to educating the public that CO_2 concentrations in the atmosphere are currently at 400 ppm. Climate scientists indicate that this greenhouse gas should not exceed 350 ppm to avoid weather extremes and further climate change. 350.org has been working with students on campuses around the world to encourage their Universities to divest in fossil fuel. See: http://gofossilfree.org/what-is-fossil-fuel-divestment/

We can draw inspiration from student movements, for example: Students Escalate Divestment Campaign After Universities Refuse to Sell Fossil Fuel Stocks Ref: ecowatch.com

In Boston, more than 150 students from 10 area universities gathered on a footbridge crossing the Charles River for a divestment demonstration.

DIVEST NOW FOSSIL FREE

Within the last year or so we hear of numerous religious organization that are initiating divestment in fossil fuels on moral grounds. Even some cities have begun to divest their holdings in the fossil fuel industry because of the impact extracting/burning ancient hydrocarbons is having on the global climate. In is now possible to find a growing of Socially Responsible Investment (SRI) financial organizations who will help individuals find ways to invest their money in green / sustainable enterprises rather than the fossil fuel industry.

Religious communities are also beginning to withdraw their investments from the hydrocarbon industry based on religious and moral principles. A brief overview of divestment by the larger religious community can be found in a Washington Post article by Lauren Markoe,"Faith Communities are Dumping Their Fossil Fuel Investments." July 2014. See: http://m.washingtonpost.com/national/religion/faith-communities-are-dumping-their-fossil-fuel-investments/2014/07/16/5d195304-0d30-11e4-bd4e-462c357f0998_story.html

The Central Committee of the World Council of Churches (WCC), a fellowship of over 300 churches, which represent some 590 million people in 150 countries, endorsed fossil fuel divestment in July. The WCC agreed to phase out its own fossil fuel holdings and encourage its members to do the same. See: http://gofossilfree.org/world-council-of-churches-divests-from-fossil-fuels-and-encourages-its-members-to-do-the-same/ .

In June 2014, the Unitarian Universalist General Assembly delegates meeting in Providence Rhode Island overwhelmingly approved divesting the Unitarian Universalist Association of most of its investments in companies that produce or process ancient hydrocarbons (oil, natural gas, and coal). This includes 200 major fossil fuel companies listed by the Carbon Tracker Initiative (referred to as the CT200), that together control 26% of known reserves. See: http://www.socialfunds.com/news/article.cgi?sfArticleId=4011 for more details. The full Resolution can be found at http://divestfossilfuels.files.wordpress.com/2013/11/fossil-fuel-divestment-

resolution.pdf. For a transcript of the 2014 General Assembly debate preceding the vote on this Resolution, please see: http://www.uua.org/ga/virtual/2014/business/vi/296143.shtml

Internet searches on socially responsible investment will identify numerous financial investment organizations that focus on environmentally sound investing. But due diligence is required before selecting any financial advisor.

WHAT MIGHT MOTIVATE THE PUBLIC TO TRANSITION AWAY FROM FOSSIL FUEL?

We are most interested in taming the monster and turning it into a friendly (but toothless and non-fire breathing) dragon. We are not interested in killing the monster because corporations (as a group of people devoted to a specific goal) serve a useful purpose in a civil society. Even though five conservative catholic elderly men may "believe" corporations are people in the eyes of the law, this belief is not an indication "the five" are in touch with reality. Anyone who has been a part of a group – be it a family, a cliché at school, a club, a religious organization, a fan club, a mob, a political party, a union, a corporation, a country, etc. knows in their heart (and from personal observation) that the group behavior is not necessarily what members of that group would do as responsible individuals.

> Nevertheless, group efforts are a significant capability of the human species. We are very capable of working together toward a common cause – whether it's to put a person on the moon or eradicate small pox globally or sequence the human genome. When we work together, humans can perform some amazing feats, and be extremely creative.
>
> However we also know from recorded history that groups of people are capable of unimaginable atrocities and can cause enormous devastation to our planet – whether the group is in the form of an imperial army trying to conquer the world or an unconscious faction of society motivated by self-centered greed and selfishness and ignorance.

So in a civil society it is important to have a social system that influences its citizens to make life supporting choices. The social system created by the society assures freedoms, declares boundaries on that freedom and asserts individual and collective responsibilities. Unfortunately, our current economic / political / legal / informational / educational / agricultural / public safety / national security / religious / ethical social system is not influencing us (individually or collectively) to make choices that are sustainable. Portions of our social system are broken and need to be repaired.

Gregory Mankiw, professor of economics at Harvard and former Chair of the Council of Economic Advisors to President George W. Bush asks, *"…how do we, as a society, ensure that we all make the right decisions, taking into account both the personal impact of our actions and the externalities?"*[i]

Mankiw suggests there are three ways to motivate the general public, change our collective behavior and fix a broken economic system (and tame the monster).

1) "One approach is to appeal to individuals' sense of social responsibility." But then goes on to consider this approach "unrealistic" from his perspective. (Ironically those individuals I know who have

made an effort to transition away from burning ancient hydrocarbons have done so out of their sense of social responsibility).

2) "Use government regulation to change the decisions that people make." But then Mankiw continues by noting this would probably result in a huge bureaucratic nightmare. (The recent effort of the EPA to limit coal fired plant emissions would be considered a government regulation – a huge nightmare? Certainly to the coal industry and the coal burning utility industry.)

3) **"Internalize the externality"** by charging a fee (commensurate of the disservice) for burning carbon - effectively putting a price on carbon. Mankiw indicates *"that fee would be built into the prices of products and lifestyles… people would naturally look at the prices they face and, in effect, take into account the global impact of their choices."* (a **Market-Based** correction)

As an advocate of internalizing the fossil fuel externalities and putting a price on carbon pollution, Mankiw indicates, "*I am confident that the economics profession has it right. The hard part is persuading the public and the politicians.*"[ii]

This fee on carbon pollution is known in economics as a Pigovian Correction. Once the externalities have been internalized and true cost of carbon pollution is added to goods and services that utilize fossil fuel, the market will sort out the most efficient solution.

Once this correction is in place, the market will be influenced to move away from fossil fuels and towards other cleaner (cheaper) sources of energy that conveniently will reduce greenhouse gas emissions and begin to stabilize climate change.

Returning the carbon burning fee revenue to households will enable Americans to make this transition without economic pain. In fact a recent REMI economic analysis indicates a revenue-neutral carbon fee-dividend program would actually boost the U.S. economy and create several million new jobs. To most political conservatives, a market-based approach is preferable to having government agencies impose more EPA regulations on burning ancient hydrocarbons.

But because this issue of transitioning away from burning ancient hydrocarbons is so important, it seems that all approaches to motivating the public must be considered.

PART II RE-INVESTING

HOW DO WE REINVEST?

Each of us has to develop our own plan for divesting in fossil fuel and re-investing in inexhaustible energy sources because everyone's situation is a bit different.

However for illustration purposes, I can use an actual personal experience one example of how to start down this path of Total Divestment.

So how could we stop feeding the monster our generation helped create during our lifetime? Response: Stop providing it the energy (power/capital) it needs to thrive, or even exist. Divest totally in fossil fuel and reinvest in renewable/inexhaustible energy.

1) **Stop buying fossil fuel stock and bonds**. **Re-invest in renewable/inexhaustible Energy**. We talked to our financial advisor and asked about Socially Responsible Investing (SRI) that avoids (shuns) the fossil fuel industry. They did not provide that service. But just asking about it put them on notice this is a service they need to provide. A few days later, the same advisor called back with a number of "green" investment options.

   Suggestion: If your financial investment organization can help you invest responsibly, then over a reasonable time frame move your savings into greener investments. If they don't, begin to move a small amount of your savings to a SRI investment company. If you own stocks or bonds in the fossil fuel industry, consider re-investing in non-fossil fuel companies. If you have investments in annuities or mutual funds that have a diverse portfolio including fossil fuel industry stock, you or your financial advisor will have a bit more work to do to divest.

2) **Stop buying fossil fuel products**. **Re-invest in Renewable Energy**. We developed a plan of action we personally could undertake to stop buying energy derived from ancient hydrocarbons (fossil fuel).
   a. **Stop buying electricity made by burning coal, natural gas, etc**. This did not mean we were going to stop using electrical power. In fact our electrical usage was probably going to increase because we would be replacing our unsustainable natural gas and gasoline usage with sustainable electrical energy.
      i. **Continue to buy electrical energy from local utility company but insist they generate their power using only sustainable energy products.**
      Many states, including Colorado, already have "Renewable Energy Standards" that require utilities to slowly transition away from burning fossil fuel for generating electrical power. The Colorado standard is 30% renewable by 2020; but there is no mention of the time frame when they expect to reach 100% because there is no legal requirement for them to ever do so.

         Most 'for-profit' utilities are reluctant to make this transition, preferring to just continue using their coal-fired power generation plants or convert their existing fossil fuel burning plants over to "clean" (cheaper) natural gas. So the utility companies need a nudge from local and state legislation. There is no uniform national commitment to transitioning away from fossil fuel even though this is global issue.

Because we have no real control over the operation of the regulated for-profit monopoly that provides electrical power in our area, this option was not acceptable at this point in time.

We decided to work with local advocates of distribution power generation / rooftop solar including Sierra Club's Beyond Coal group, Vote Solar, Colorado Renewable Energy Society(CRES), Conservation Colorado, and several others to help legislators and the PUC insure our utility company transitions to 100% inexhaustible energy sources as soon as possible.

ii. Stop buying power from an unresponsive for-profit utility company. Re-invest in rooftop Solar PV and generate our own electrical power.

We decided to take ownership of harvesting the energy I needed / wanted for our life style and in effect circumvent the inertia of the for-profit utility companies. There are a number of ways we could have accomplished this:

1. Install rooftop solar PV on our home and generate our own electrical power using an inexhaustible supply of solar energy, or
2. Lease/buy an appropriate number of solar PV modules in a local solar garden.

We chose the first option, called two solar installers, requested two quotes for installing solar and selected one. The actual mechanical/electrical installation process took about three work days. Paper work and wait time for the utility company to install a new net meter was between 1-2 months.

All of electrical power needs are provided by the rooftop solar PV system. We no longer ask our utility company to burn fossil fuel for our electrical power, nor do we buy any power from them.

b. Stop buying natural gas for home heating. Re-invest in a geothermal heat pump furnace that provides heating and cooling without burning.

Before making the decision to divest in fossil fuel and invest in inexhaustible energy, our home used a natural gas force-air furnace for heating, an electric air conditioner for cooling and a natural gas water heater.

We decided to replace the natural gas furnace and traditional air conditioner with a geothermal / geoexchange heat pump that also pre-heats water.

We called two heating and cooling contractors who install geothermal heat pump furnaces and requested two quotes. We selected the contractor who proposed to use a vertical ground loop.

A drilling outfit came out, drilled 2 boreholes 300 feet deep in our front yard, installed and grouted the 1.5" diameter black plastic water circulation tubing in each borehole. A second crew came and dug a 6 foot deep trench from the boreholes to the house, and added tubing from the boreholes through the foundation wall into the basement to complete the closed heat exchange ground loop. The natural gas furnace was then

replaced with a heat pump furnace and connected to the ground loop tubing. The actual installation took about 3-4 days for the ground loop and 2-3 days for replacing the gas furnace with the heat pump.

The geothermal heat pump uses 1 unit of electric energy to exchange about 4-5 units of free thermal energy (typically at 50-55 degrees F year round) between the earth and the house. For cooling, the system essentially runs backwards and moves excess heat from the house back into the earth. The electrical power used to operate the heat pump is generated by the rooftop solar PV modules. As a result, our home heating and cooling is provided by the Sun without burning any fossil fuel. We no longer buy any natural gas from the utility company. The gas line has been capped off for three years now.

c. Stop buying gasoline for local transportation. Re-invest in an electric vehicle.

We decided to stop buying gasoline for local transportation and invested in an electric vehicle that uses energy generated from sunlight. Today's 'plug-in hybrids' work well for urban transportation by using electric power for the first 40 miles before a gasoline engine starts up to recharge the battery. This hybrid approach provides the flexibility for long distance cross country travel (using traditional gasoline) when required.

We do still buy some gasoline for cross country trips. But because 80% of our driving is less than 40 miles per trip, we have effectively reduced our dependence on petroleum (foreign or domestic) and our exhaust pipe emissions by 80%.

CONCLUSIONS

We extend the traditional definition of divestment and suggest a more comprehensive approach that might be called Total or Social Divestment described as "**The process of selling an asset (e.g. stock) AND/OR no longer purchasing the product or service**."

As individuals we all have the power to stop being "investors" in the fossil fuel industry and the power to stop being "customers" that buy fossil fuel products and related services.

Collectively we as "investors/buyers" can determine if fossil fuel companies thrive or wither and die.

Total or Social Divestment in the fossil fuel industry is in effect saying we as a civil society no longer wish to assist that type of enterprise.

Having divested, we are then able to re-invest in sustainable industries that provide renewable / inexhaustible energy (solar, wind, hydro, geothermal, tidal, etc.). These free-market options are available today. Our personal experience was documented and published in "*Living without Fire – just the Sun and Earth: Illustrating a way to retrofit a 1974 home for more sustainable living*," by Milt Hetrick, 2014.

We don't need more research. We don't need bridge fuels. We just need to act. Now. For the sake of all future generations. For the sake of all Life.

What's your plan for Total Divestment?

[i] *"A Carbon Tax That America Could Live With,"* N. Gregory Mankiw, New York Times, August 31, 2013, http://mobile.nytimes.com/2013/09/01/business/a-carbon-tax-that-america-could-live-with.html?emc=edit_tnt_20130831&tntemail0=y&

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