Challenges of Sustainable Energy Policy and Recommendations: KAM V

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SBSF 8510: Theories of Democratic Governance

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24 May 2009

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Breadth Abstract

The development of energy policy over the past few decades has been upon the premise that securing resources is paramount to the national security and the economic affluence of the United States. Further, the government has employed various interventions in the energy sector claiming a state interest in regulating the sector. That intervention has varied over the administrations and the crises that affected those generations. Specifically, government has supported monopoly enterprises to help control the flow of energy and the price of energy where other industries have not seen such toleration or logic applied due to the intrinsic nature that energy plays with the whole economy. In this respect, we have to analyze theories of government intervention with respect to economic issues. With respect to overall energy issues, we have to consider the physical properties of energy supply and use. This analysis of historical context helps to understand the theories and the feasibility of the current ideas presented with respect to energy policy alternatives.

SBSF 8510: Theories of Democratic Governance

Breadth: A Brief Historical Context of Energy Economics and Government Intervention

Democratic governance in terms of energy policy has been a complicated effort over the past century to manage supplies and price systems of energy generation and distribution. Joskow (2008) argues that energy is the most regulated sector of our economy primarily because the sector has such far reaching impacts upon the rest of the economy. Each power input (coal, natural gas, oil, nuclear and renewable sources) have had different levels of regulation changes, political fortunes and subsidies that have impacted the production, supply and market value for the power generation. If we can understand how we managed capacity and supply in the past, we can better understand our current markets for power as well as the markets in the future.

As well, one needs to gain an understanding of natural laws of physics that govern the actual properties of energy as well as the progress of energy policy over the past century through today. These properties and limitations will frame the use, efficiency and capacity of generation systems, transmission systems and ultimate demand consumption since the physical supply and properties of energy have influenced the consumption.

With respect to energy policy, one has to consider theories of government intervention in economics or industry of which the focus will be upon models of government intervention or stimulus advocated by John Maynard Keynes (1936) and Milton Friedman (1962). These different models describe the effects of government intervention upon industry in different ways. Using these models, we can realize why policy has been formed in particular ways since these are underlying mechanisms and

theories for the types of interventions. These theories will help to build foundations for discovering or building policy alternatives in the current as well as future energy markets.

Using the past policy alternatives and their progress along with the theories of government industrial interventions, we will have a deep understanding of the tremendous forces and influences of energy policy and prospects for the future. Therefore, this paper will scrutinize the policy alternatives through the theories as they have related to the energy industry production, supply and prices for the past century. This scrutiny will reveal missed opportunities and potential alternatives to current policy mechanisms. The examination will also reveal the various viewpoints and roles that industry, industry structure and governments have had in the policy decisions.

This historical context will provide a sense of the governance (regulations and taxes) around energy policy development up to current times. Understanding the natural laws of physics with respect to energy will help to understand efficiencies and effects of policy alternatives. In addition, the economic theories of government intervention, as they have been implemented for power generation and utility transmission, will have to be examined in order to assert any new recommendations and to understand proposed ramifications of sustaining current policy or changing the policy.

The Physical Laws of Energy

In order to appreciate many of the issues surrounding and involved with energy, we have to understand basic laws of nature that apply to energy (Bent, Bacher and Thomas, 2002). Energy consumption is a result of transformation of stored potential energy to kinetic energy through heat and motion. The laws of thermodynamics suggest

that we can not make a purely 100% efficient heat engine and in fact, most engines in use today can muster an efficiency of 20-30% or diesel engines at a rate of 40%.

Further, the law of conservation of energy tells us that we can not destroy or create energy where energy in an isolated system is transformed from one form to another. The total energy output of the system must equal the total energy input similar to the Newton law of physics that defines a reaction for every action. One can question the effect of using energy if energy does not get created or destroyed. Knowing conservation of energy, we still have irreversible degradation of energy as noted by thermodynamics. Every transfer of energy converted into heat yields a permanent loss of *useful energy*. Friction and other externalities help to dilute energy efficiency away from the concentrated form. Thus, energy flows from a concentrated form to diluted and distributed forms (Bent, Bacher & Thomas, 2002).

Here, the laws of probability assure a "certainty" of equal distribution and propensity towards average behavior. The general direction of spontaneous change as a result of random influence or affect flows from low probability eccentricity towards higher probability of average occurrence. With respect to probability, the laws of entropy tell us that disorder is more probable than order. These laws characterize help to understand that energy dissipation via irreversible degradation means we can not get usable energy back once the energy has been consumed (Bent, Bacher & Thomas, 2002). Thus, fuel use is only useful as long as there is available supply to sustain the use of that fuel where nonrenewable supply correlates with inevitable diminishing remaining useful energy supply.

Since coal, natural gas and oil have a higher density of energy by volume as compared to other forms, they are preferred methods for generating power, but their usefulness is used in the first cycle of burning. Wind and solar have a lower density of energy by volume than the fossil fuels, but the cycle of degradation does not necessarily apply since they can be replenished as long as there is wind and sunshine. Yet, our efficiency of fossil fuel energy production is far greater than wind and solar due to the higher density of the fossil fuel (as fossil fuel is form of densely packed solar energy stored over centuries). Conversely, the cost to produce the energy is lower for fossil fuels than for renewable forms like wind and solar.

Given the use and demand growth curves, we also have to understand exponential growth is applied to population and corresponding energy demands. Bent, Bacher & Thomas (2002) suggest to use the rule of 70 to help explain how seemingly insignificant growth (of perhaps 1%) over a period of time will yield doubling of original values on multiples of 7. They provide the example of population growth from 4 billion people in 1975 to almost 8 billion in 2010 and thus they project 16 billion by 2045. Exponential growth appears minor in the beginning cycles but becomes overwhelming in latter part of long periods of time (Figure 1). Global population growth will have a parallel energy demand growth as more countries become energy consumers. In this fashion, we can calculate approximate energy demands as population grows (especially with respect to growth of developing nations and their increasing energy demands). We can also calculate potential savings via conservation if measures are implemented to increase efficiency 1-2% every year. The margin of conservation increase may however be far offset by the burgeoning increase in global demand for energy.

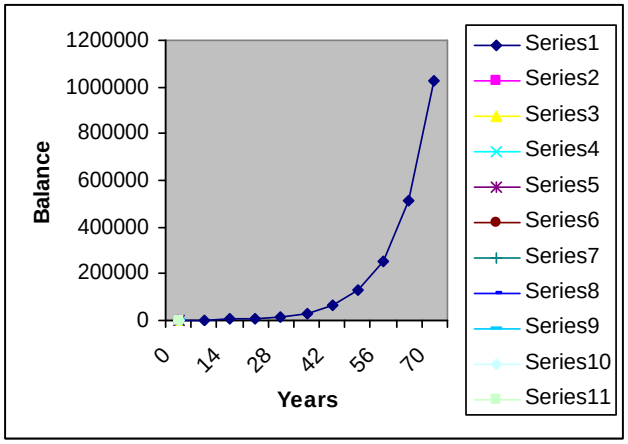

Figure 1: Exponential Growth

Historical Context of Energy Policy

To understand energy policy, we must review the historical context of the policy and the influences to those policies. Over the years, our system has seen dramatic shifts in supply, regulation, and subsequent policy. Using the analysis from Vietor (1984) and Laird (2001), we can gauge the scope and breadth of policy progress over the years. This will help to give a perspective about the players, the interests, and the pertinent issues that surround energy policy over the years. Using this context, one can then have a true appreciation of any future or current efforts to implement any sort of policy alternative that affects production, transmission and conservation efforts. This section will concentrate upon critical analysis literature from Vietor and Laird in order to get different perspectives of the policy landscape that has affected energy policy over the years.

Vietor (1984) traces the energy industry over the course of the twentieth century up to President Reagan's administration. In this account, he describes various attempts to regulate parts of the industry and discusses some of the surrounding interests in these legislative attempts. There are a couple echoed themes implicit his characterization of the events over the years. First, that political winds shift away from tougher positions,

maintain short-sighted positions with respect to supply and pricing issues. Second, the markets left unchecked eroded excess capacity supply until the United States had a crisis where importation of oil exceeded domestic production. This short-sighted position also favors the maintenance of current production sources as economic drivers and allowed monopoly companies to drive energy policy per their self-interests rather than pursue a coordinated long-term interest.

Vietor (1984) separates his analysis of energy policy by periods of time 1) pre-World War, 2) post world war restructuring of production 3) excess supply of the 1960s and 4) shifting into crisis mode of the 1970s. In each of these periods (except the latter), there were chances for the government to manage supply and prices, but there was significant resistance from generation and transmission companies to any attempts to regulate production. This was most pronounced in Texas when drillers were drilling more wells at astonishing rates without any sort of regard for actual market demands. The result of the excess drilling was large supply, significant drop in oil prices and encouraged a justification for monopoly or oligopoly to control the facilities.

Using Vietor and Laird's discussion, one could argue that serious energy policy regulation did not occur until the United States reached a crisis of supply where the domestic supply of fossil fuel resources were no longer assured of longevity that crisis adversely affected prices which brought the issue to public attention. Although the Reagan administration returned policy focus towards supply maintenance and strengthening private sector role in energy policy development in order to keep prices low. We can also observe fairly ineffective government intervention in directing economic energy planning outside of frames defined by fossil fuel production and supply.

Diverse production and resources of energy were nearly absent in discussions at higher levels of government until small attention was given by Carter, as Laird (2001) discusses.

Laird (2001) aligns with many of the details that Vietor discusses and that the energy policy debate has largely centered upon fossil fuel supplies and pricing structures. Vietor's assessment was primarily upon oil, coal, natural gas and synthetic fuel that left alternative power sources virtually absent from his discussion. Alternatively, Laird discusses that the advocacy of alternative fuels like solar did not gain credibility until Carter Administration. Vietor's assessment seems to address primarily the policy frame that was given by the administrations and legislators rather than discussing the policy frames that would intentionally or unintentionally exclude alternative resources of energy.

Laird (2001), for the most part, appears to agree with Vietor's assessment of policy that ignored supply issues as opposed to maintaining price in order to encourage sustained economic growth and development. They both observe a general reverence for private markets role in the energy sector, but that the government has a substantial role since this affects the economic vitality and security of the state (that is based upon crude oil consumption).

Laird, similarly, observes that the shortages or perceptions of shortages under Truman vanished through the Johnson administration. Focus of regulations moved as perceptions of supply changed from shortages to abundance in order to properly exploit resources more efficiently instead of avoiding depletion of those resources. The idea of limited quantities of finite resources was all but dismissed by governments in the 1950s

and 1960s while overall subsequent energy prices fell which encouraged significant increases of demand for power.

This belief gave administrations the justification to allow rapid growth of production facilities where prices in 1968 were less than a third of the prices in 1950s. Any long-term alternatives (e.g. solar or wind) as well as environmental concerns were considered less urgent to meeting the security challenge surrounding the Cold War and economic growth demands of the times. Minimal interference by government allowed industry to maintain controls over the production and distribution.

The belief in complete industry control and monopoly direction of power production and distribution was severely challenged by the energy crisis of the 1970s as shortages and embargos changed the pricing schemes. As well, resource supply issues became prominent in mainstream as well as political spectrum. One could argue that government and industry sustained the problems for years since there was little change in official government position. Thus, Nixon and Carter attempted to provide a clearer direction for energy policy where Nixon and Carter drafted specific plans to reduce foreign resource dependency. Carter's administration was considered innovative and comprehensive by including alternative sources of power as part of a strategy to remove foreign dependencies by 2000, but the attempts were still insignificant in attempting to change the frame of energy policy away from price control and supply assurance (Laird, 2001).

During the embargo crisis, the governments and the public realized that shortages deprive future generations of a chance to live the affluence as experienced by Americans during the mid to late 20th century. Further, the affluence of a high-consumption society

was considered a well-developed society where there would be a constant upward spiral of production and subsequent standard of living for all of society that is part of the mantra of capitalistic ideas (Friedman, 1962; Laird, 2001). Some attention was given to the idea that the depletion of supplies would eliminate the possibility of less-developed countries to achieve a better standard of living furthering energy poverty concerns (Laird, 2001; Birol, 2007). Even with these ideas during the crisis, the crisis was blamed upon government mismanagement where industry had to compete with demand growth and prohibitive policy constraints rather than inadequate planned contingencies, poor risk management, physical shortages or inadequate supply.

The imminent crisis pushed the concern of government to secure critical supply for current growth interests with little concern for renewable or cleaner technologies. The 1948 shortages, the 1970s embargo, the gulf wars and oil price hikes of 2008 further emphasized energy as a national security issue where supply controls were vital to military efforts as well as economic interests (Veitor, 1984; DOE 2009; Laird, 2001). Nixon pointed out that the United States "…once considered luxuries are now considered necessities…" (as cited by Laird, 2001:104) and launched the so-called Project Independence to eliminate foreign oil dependency. Those possible long-term changes to energy policy resources were stalled under Nixon and Ford because of political problems of Watergate (Veitor, 1984; Laird, 2001). Then, Ford vetoed legislation due to what he determined to be too much interference in private sector by the government.

In contrast, Carter attempted to coordinate efforts for a similar proposed independence that included some alternative sources as mentioned through the establishment of the Department of Energy (DOE). Yet, the projects from Nixon and

Carter emphasized cheap energy, emphasized growing affluence and paid little attention to unintended consequences. The political definitions of independence varied between completely free of oil imports to an acceptable level. Support for renewable energy varied because of imprecise estimates of bringing systems online and their affect to electricity costs as compared to continued fossil fuel generation (Laird, 2001).

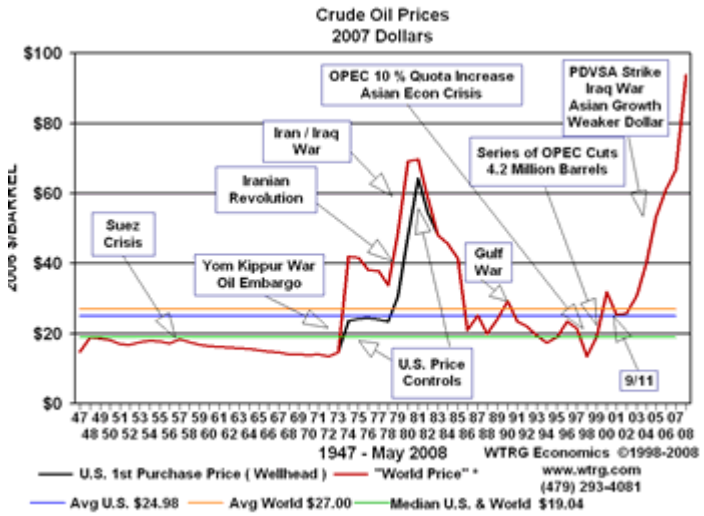

Figure 2: Crude Oil prices with world events (Williams, 2007)

The energy policy moved electric power production away from crude oil to other fossil fuels, but oil imports still increased while the mileage cost to drive lowered since oil is the primary transportation fuel (DOE, 2009; Williams, 2009; Bent, 2002; Sheffeld, 2002). Carter's attempts to manage a coordinated energy policy and include more renewable energy managed to encourage a small fraction of wind and solar production. Policy directions for the DOE from the following administrations of Reagan through the second Bush's emphasized private sector's role in managing the energy markets. Price fluctuations of oil due to Iraqi aggression in the 1980s and early 1990s provoked strategic defense responses by Reagan and G H Bush to secure the Middle East oil supplies while

expanding coal and natural gas power production to alleviate crude oil-based electric power production.

In each of the energy crisis, significant calls for alternative fuels and changes in energy policy would ensue. Yet, as seen in Figure 1, the price of oil would subside in the face of pressure each time or a subsequent unrelated policy issue (e.g. communist aggression, Watergate, 1981 recession, Dot-com bubble affluence, or terrorist attacks) would arise that shifted the mainstream focus and public pressure away from price of oil. Additionally, the subsequent calls for alternative fuels and policy would also reduce. This may indicate a fickleness of the masses towards fluctuations in price, but this also suggests a striking coincidence that public pressure for alternative energy appears to subside as fuel prices and crisis were apparently resolved.

The fickleness would be revealed through changing government administrations that sought to change regulations, or to deregulate through the federal energy commissions and the DOE. At the same time, the industry players would continue to control larger sections of production and distribution in the global and domestic energy markets, and those companies revenues would continue to grow.

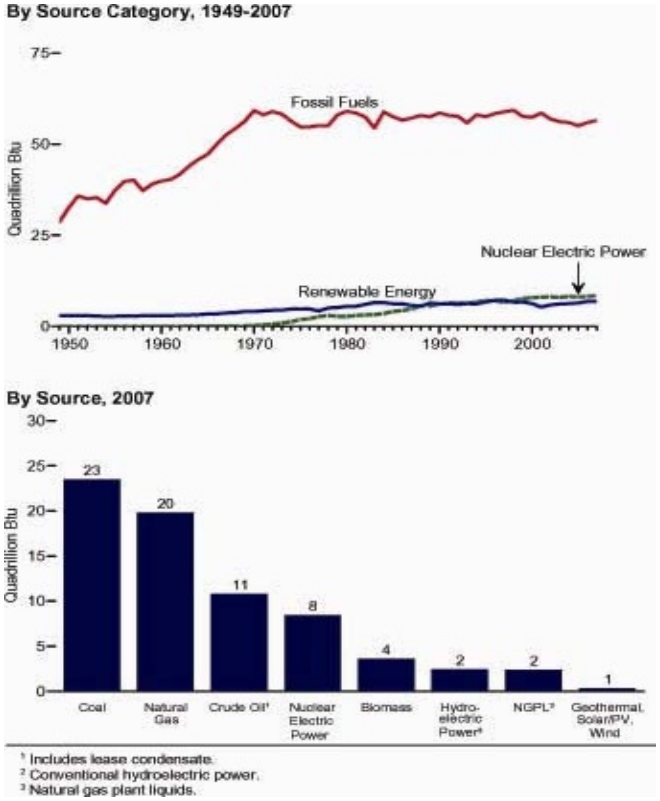

Figure 3: Energy Production By Source (DOE, 2009)

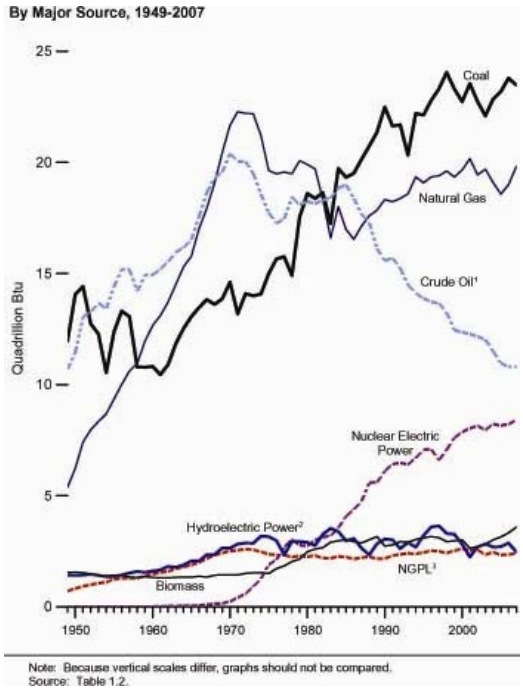

Figure 4: U.S. Energy Production by Source (DOE, 2009)

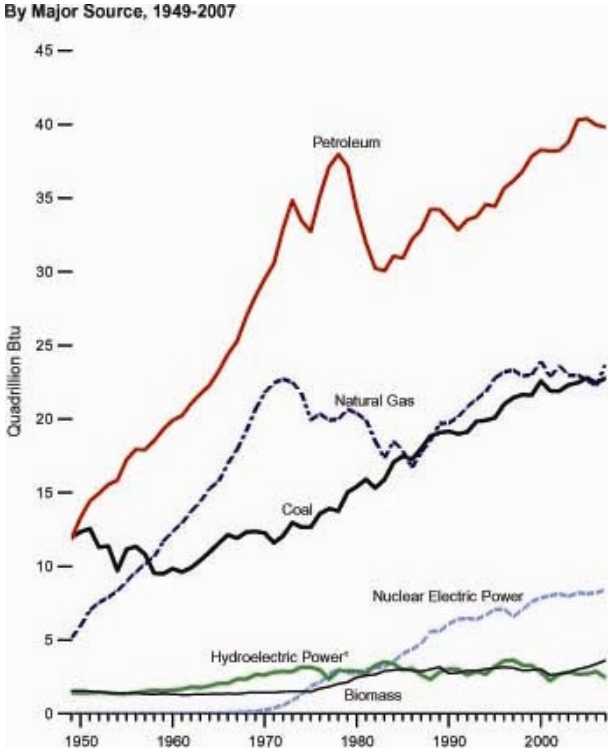

Figure 5: Energy Consumption by Source (DOE, 2009)

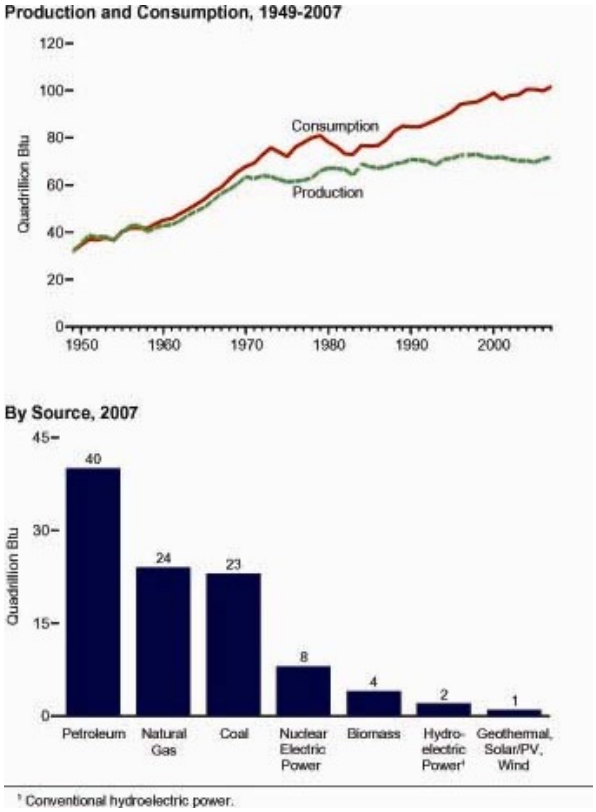

Figure 6: Energy Consumption (DOE, 2009)

We can observe in the Department of Energy (DOE) statistics that power production from fossil fuels has stagnated since 1970and renewable energy (wood, hydroelectric, wind, biomass and solar) have made only minor increases. Nuclear energy not seen any additional power plants brought online since the 1970s and thus, the power production using nuclear has effectively capped. Komor (2004) suggests out that renewable power production using wind, biomass and solar effectively began in 1993 despite the calls in the 1970s for a more diversified energy policy. Some of this can be attributed to the Public Utility Regulatory Policies Act of 1978 (PURPA) that created credits for renewable energy that helped to stimulate some production with additional credits in the 2005 Energy Policy Act. Yet, total renewable production has not achieved more than 6.8% of total energy consumption (DOE, 2009). Both acts also provided large incentives for nuclear, coal, oil, oil shale, and biomass production.

Pathways to integrated or more competitive production technologies as well as third party generation entities were virtually absent in comprehensive energy policy decisions given considerable arguments for preserving industry monopolies for more efficient generation and exploitation of resources. As well, long-term sustainability goals were challenged in the face of public and industry pressure for low energy prices and sustained supply routes. Further, Baker (2002) argues that sunk costs and investments in current infrastructure make transitioning to alternative generation a tremendous cost. The justification for adding significant renewable sources of energy will have to generate quick return of profits while maintaining energy price stability given the current policy logic.

Two Economic Theories of Government Intervention in Industry

There are a few theories of economic policy and the effects of government intervention. Two, from Milton Friedman and John M Keynes, have received considerable attention over the past few decades with attempts to mitigate the effects of the depression and severe recessions and as well to spur innovation and economic growth. Generically, Friedman encourages more *laissez-faire* style intervention that allows expansion of unregulated capitalistic motives while Keynes promotes a more active government role in economics that attempts to manage components of economy and industry in some coordinated effort. The general theories are diametrically different positions that have seen realization and implementation in government policy initiatives at different times through the course of the past few decades. Each of these theories have therefore affected energy policy development in different ways at different times.

In order to examine the effects of government intervention in industry, we can review these theories as foundational arguments for or against intervention tactics that have been proposed. Using these theories, we can also examine the theoretical impact of certain regulations and tax policies upon energy policy. Additionally, an apparent issue with respect to government intervention is the political landscape that governed the implementation of these theories. Thus, some theoretical concepts were altered by specific political and financial interests to avoid regulation when other parts of the economy were significant affectedly by implementation of a particular theory.

Classic Market-based Economics

General macro-economic theories are concerned with GDP as a measure of production and growth as well as aggregate supply and demand influences over entire

markets. Classical economics suggests, via Say's Law, that GDP levels generate income for spending at that level of GDP. This suggests that when aggregate demand slows, production will respond by slowing production and subsequent investment will slow as savings rise. Thus, savings rates offset interest rates for borrowing to invest where the so-called cycle of saving and borrowing maintains a sense of equilibrium where real GDP does not fall below its natural levels.

This principle can be observed with respect to consumption of energy and corresponding changes in supply. Rational producers generally realize that price drives demand which affects the supply, and the available supply (scarcity and abundance) also drives the price. With respect to energy, power is generally a demand inelastic market (considered a commodity) where demand will be less affected by price changes, and thus price is determined by the amount of supply in the market. As noted by Vietor (1984) in Texas, large number of drillers for oil caused the price of oil to drop significantly as supply sources produced excess capacities while demand remained constant.

We can look at how government can impact the aggregate supply and savings given that the general economic model proposes there are four parts to the market: consumption, investment, government and exports. With respect to classical theory of markets, there is a faith element that the market mechanisms will provide natural equilibrium to supply and demand curves that do not need government intervention. This faith believes that consumption and investment will fluctuate only in response to natural levels. In most cases, the theory insists upon non-interventionist methods and tactics because intervention can supposedly impede natural growth or grossly inflate the value of the market.

Milton Freidman (1962) insists that any government intervention including taxes removes assets from the market and subsequently impedes market growth or natural market stabilization. He contends that taxes removes the capability for capital to be used for more efficient process, and he contends that government is inherently inefficient due to a need by the government to encompass many different interests rather than simple markets needs of a firm. He also suggests that intervention today may not see negative long term impacts of the wealth distribution.

The belief in inherent government inefficiency is evident in many policy and regulation attempts such as Vietor (1984) and Laird's (2001) description of energy policy debate during the Eisenhower, Johnson, Nixon, and Reagan-Bush administrations. Here, Laird (2001) describes how industry fought policy makers to keep control of energy markets within the hands of the state regulators or private industry rather than federally coordinated policy for coal, natural gas and oil and that fight resulted in legislation that did little to regulate supply issues and left price controls to major monopolies. This revelation falls in line with Friedman's assertion that government regulation either has little effect or actually has worse effects upon society and industry.

Friedman does suggest that "we cannot rely on custom or on consensus alone to interpret and to enforce the rules; we need an umpire" as this is the "basic role of government in a free society" (1962: 25). This suggests that he does not want an active government, but someone to make sure all players play with the same rules. He suggests that we cannot expect "absolute freedom" nor is anarchy a feasible alternative to a free society. Thus, government acts as rule and score keeper rather than catalyst or coordinator and infers an inherent fallibility of profiteering firms to stretch ethics or legal

issues to meet profit goals. This is most important with regard to the attribute of monopoly where entrance and effective freedom of exchange is not guaranteed. Yet, he argues that monopoly is the lesser of problematic arrangements as compared to government regulated industry (Friedman, 1962).

This is important to the energy industry since the government has provided significant support for large monopoly producers of power or helped to facilitate agreements with foreign governments to secure of oil supplies in Iran in 1952 on behalf of the "Big Sisters" (Vietor, 1984).

The argument for monopolistic energy producers was given that monopoly or oligopoly provided for effective means to manage production through fewer producers and less confusion within the public to understand where power was being delivered. Since relatively few producers are big enough to provide power to large sections of the market, we have to view the market dynamics in terms of monopolistic or oligopoly forces.

Industry players discuss power in terms of ability to generate or transmit power at economies of scale where entry to the market is nearly impossible since those producers can not provide the pricing that the larger institutions can (Vietor, 1984; Laird, 2002). Meanwhile, they have the government support for self-interest policies despite long-term public interests or limited market freedoms imposed by the cartels. Friedman, further argues, that such arrangements are difficult to reverse (1962: 128) and arbitrarily affect aggregate demands and savings despite actual market forces or inflation effects to support them.

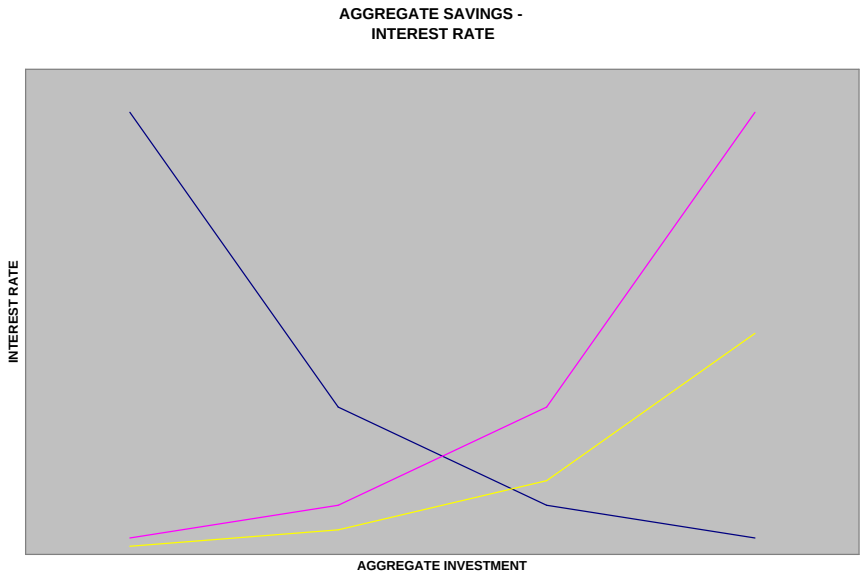

Figure 7: Classical Theory Affect of Interest Rates upon Aggregate Savings

Friedman's arguments against regulations reject all attempts to arbitrarily distribute income or to advance equality via regulatory requirements. Friedman suggests that government supported egalitarian society efforts like progressive income tax, corporate tax, social security and public housing have not been able to prove their effectiveness but actually present more "social costs" (1962: 178). He argues that equality legislation like anti-segregationist policies adversely affected freedoms of small businesses where the community had little interest in integrated society. He argues the regulation had forced small businesses to comply with an integration employment regulation may also be forced to close when government mandated integrated workforce is required in a less accepting community thereby causes declining demand for that business services (an unintended consequence principled regulation).

From this treatise, we can see an ethic by some economists that view regulation of industry as counter to freedom, counter to the interests of the private industry and counter

to the interests of the public. Other than enforcing rules for competitive markets, a government has little interest, according to Friedman (1962), in any attempts to help coordinate or to alter market pressures, as those would cause unimaginable and unintended consequences as well as cause a continued dependency by the markets for government intervention or assistance.

In some ways, we can observe possible examples that could be argued as adverse government manipulation of the energy markets. We can see an ugly side of government intervention in markets where government support has encouraged expansion of monopoly markets (despite current anti-trust laws) as well as government non-support has stalled technology development such as solar and wind. One can also see that government has allowed acceptance of only a few oil companies to benefit or compete in foreign supply contracts. Yet, Friedman prefers the monopoly over government market interventions.

Oligopoly and Monopoly of Energy Markets

Oligopoly and monopoly companies have been heavily supported by the government with respect to energy markets. The reasoning centers around the ability to deliver energy should done with minimal interruption that one provider can provide and minimal confusion to the consumer as to who is delivering the energy. This inherently places the control of prices within the realm of the monopolist or cartel control. As well they can impact the price in ways with or without regard to demand pressures for the product or public interests. This has been observed in the descriptions by Vietor and Laird where energy players have been able to impact the energy prices and influence the

government response to price and supply since the government is forced to work with the controlling entities of energy in order to develop policy.

As well, the market structure prevents the market penetration of new generation or new distribution where the monopoly provides the critical energy needs. Thus, the diversity of generation portfolios of energy is decided primarily by those that control the markets rather than allowing for competitive arrangements that may improve technology or further diversify that generation market. For example, AT&T was able to control the price and availability of telecommunications over the United States. As well, AT&T argued that monopoly of the telecom market helped the customer have clear understanding of the delivery of the telecommunications services. Since the break up of the company in the 1980s, the domestic market has observed expansive growth and development of telecom technologies as more companies entered the competitive market.

Keynesian Theory of Economics

Keynes (1936) suggests that the markets can not be assumed to be self correcting or guarantee real income when large sections of population are unemployed or demand is significantly depressed. He suggests that the economy is based upon consumption where aggregate consumption is a function of autonomous consumption expenditure and a marginal propensity to consume. Correspondingly, aggregate expenditure (AE) is the sum of the four parts of market where AE is a function of real current income and marginal propensity to consume. This function is the Keynesian multiplier and rejects the classical economics of natural cycles because unemployment causes lower AE to remain where prices can not simply return to a higher demand-supply due to an inability for people to consume. According to Keynes, the unemployment can last longer and

become a perpetuating downward cycle as regressively less is consumed or spent rather than a natural market return or progression towards growth and stability as proposed by classical theorists.

With respect to Keynes, depression and recession economics requires consumption to return the natural current income rate by supplementing the lower consumption of consumers with either exports or the government investment in industry. We observe government intervention in economics for centuries as exampled by the British support of tea trade policies. We observe this since Keynes includes government as part of the consumption equation, and therefore, the government has a continued interest to be active in the aggregate expenditure and consumption curves. Where a market does not exist or demand is low, government can encourage or stimulate demand through small government investment in that market according to Keynes, and equally the government intervention for one market will multiply across the market and affect the prices for other markets (as the basis for the Keynesian multiplier). The tax incentives and subsidies provided by government for industry have shown how government intervention can impact the creation or preservation of a market or market structure as is for the oligopoly.

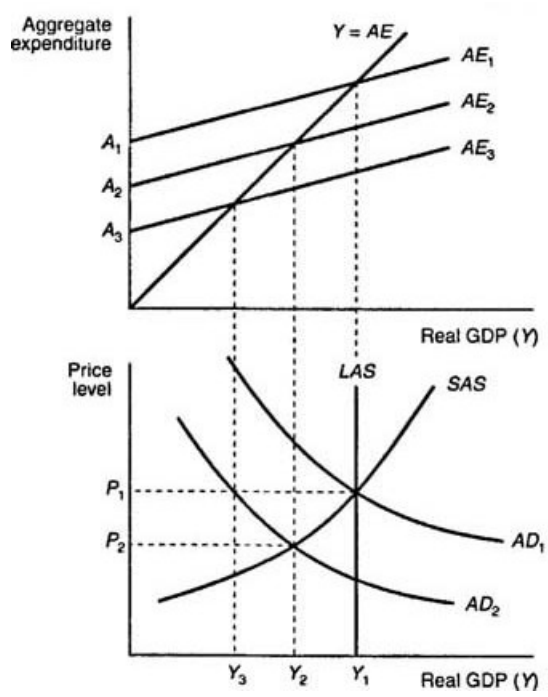

Figure 8: Keynesian Theory: AE to GDP (CN, 2009)

Thus, the government, in Keynesian thought, can encourage or stimulate development of energy markets such as natural gas to coal, or the government can affect expansionist markets that are over-consuming by putting additional cost pressures (via taxes or penalties) upon those markets. Examples of this theory in action can be observed when the government provides regulation that impedes growth or conversely declares that income from production of oil to be taxed at substantially low rates. Tax rates for power production by coal and oil have been substantially lower than other source of power, and thus one could argue that the government has successfully encouraged market growth from those fuels using lower taxes upon income received from that production.

Keynes assumes that there is a viable and independent government in place that has long-term interests of the public in primary concern over immediate short-term investments and interests of related businesses. Friedman argues this is a fallacy of Keynesian theory because government pressure may result from officials having

investments that are affected by public policy making decisions and government can envision the current or future interests of the market. This system of governing economics can be manipulated by profiteering individuals, and in the case of the United States, the Federal Reserve Board policies are made by unelected individuals that control the flow of money (although one could lobby Congress or the President to demand resignation where corruption is noted). This begets the question of who is overseeing the oversight and what mechanisms are in place to manage accountability of policy decisions.

Keynes does not believe the markets can be fully trusted to go beyond short-term interests of the industry or business and this actually fits inline with Friedman's assertion of government as a referee of business since business may be fallible in decisions regarding profits. Keynes goes further in suggesting that the allowing total free markets may take more time to rectify a bad situation (e.g. depression) than the public society can truly afford where government intervention can provide the missing aggregate investments during those situations. As well, Keynesian theories could argue the preservation and accountability of civil servants to the public mission will encourage proper government action by the officials.

Breadth Discussion

Energy policy is pivotal to economic progress and technology development in the United States, and the foundation of economic development and security is rooted in appropriate energy policy formations. The energy policy has been recognized by most of the administrations as key to security and later to economic stability as noted by Vietor (1984) and Laird (2002). While administrations have recognized this attribute of energy

policy, energy consumption (demand) has risen considerably over the years since oil and electricity were discovered for energy needs. For the entire time, our energy policy has been defined by resource exploitation, fossil fuel consumption, supply maintenance and price awareness, and at the same time, only minor efforts have been taken to change the overall energy portfolio away from diminishing carbon based resources. Generally, the low energy prices have allowed a sense of affluence to become more widespread across the society for generations. Thus, the primary interests of energy policy have been to maintain cheaper resources for power through existing infrastructure investments and prevailing market interests as realized by monopoly interests.

This focus upon inexpensive resources has been primarily short-term consideration of prices and available supplies rather than a long-term initiative that does not rely upon finite resources and does not encourage market based innovation. Using this focus, the country has endured economic shocks due to shortages, depletions, price hikes and embargos. The focus upon price control and subsequent supply maintenance, after the 1970s energy crisis, has relegated non-fossil fuel systems and resources to second class investments that provide a small fraction of the entire power base for the United States.

History has provided lessons and experiences with respect to energy policy decision-making and influences. The United States has shied away from centralized energy policy control on the belief that markets are better equipped and the markets can manage supply and price to meet demands (even for left-leaning administrations). Thus the virtual monopolies of large power companies or oligopolies were not compelled to diversify generation resources for power production but they are regulated to offer a

reasonable price for the power. These companies are, however, compelled to meet the growing power demands of the public with a focus upon price and securitization of supplies to help economic stability.

Efforts to introduce alternative power sources have been slow or diverted due to the higher priority of meeting the increasing demands at the lower prices in order to maintain the economic growth that has benefited the country for the past few decades. This focus may change with current generations as the growth capacity and seemingly apparent endless prosperity has been strained against the looming deficits created to support the affluence of generations. The current generation has never seen total price stability and supply as was the case in 1950s and 1960s for petroleum, and the younger generation appears more eager to change given the support by the younger generations and historical election of Barack Obama as first African-American President. Oil imports have risen ever since exceeding exports in 1948 to over 70% of current consumption. Despite the turmoil and shock of the OPEC embargos of the 1970s, the United States is even more vulnerable to supply disruptions since we import almost 70% of the oil that we use and petroleum is still the largest sector of energy.

As noted by the natural laws of energy, an engine can not achieve 100% efficiency, and our current efficiency is between 20 to 40% actual production of power per input of fuel (Bent et al, 2008). If energy demand continues to grow globally in the recent decades in this country alone, we have to consider the source of that fuel since we have a limited supply of fossil fuels at the current price. While energy from coal and natural gas have been getting cheaper and allowing for a means to provide electric power at better prices, they are finite resources and, further, they do not address environmental

concerns or possible global warming concerns. These sources have been subsidized by PURPA and the 2005 Energy Policy Act. Nuclear power systems may provide cheaper power and less carbon burning wastes, but the radioactive wastes, along with concerns about plant safety, limits public interest against having more nuclear power plants as noted by Laird (2001). Even still, nuclear power has to consider the available supply of uranium for long-term energy policy needs.

The existing infrastructure is aging and may be technically difficult to support alternative resources like wind farms or solar capacity systems because of non-centralized connection points as well as distribution of the energy for the east or west coast population centers from varied remote power production systems in places like rural Nevada, North Dakota or Iowa that accommodate the wind and solar facilities. As well, the current feasibility of developing enough solar or wind systems to accommodate increase of these forms of power production needs has not been fully tested by industry or government efforts.

Keynes economics suggests that government can be a catalyst to stalled economies or the brakes to excessive growth. We have seen evidence of this mechanism through the continued support for industry control of energy production despite long-term supply interests. As pointed out earlier, support for coal, natural gas and oil markets has elevated their profitability where alternative source have largely been ignored and relegated to small percentage of total energy production. This correlates to ideas offered by Friedman that suggest that government can have ill effects upon the market.

Keynesian theory assumes the truth of cyclical conditions of classical theory, but using laws of equilibrium, any government investment can help to push market demand

in future markets. Keynes also implies a market recovery that is well enough to pay for depressed economics where prosperous economies can repay government assistance efforts. Friedman argues that this does not provide actual investment but instead alters the natural market progression and evolution of markets to contain future threats. As well, Friedman argues that the dependency of industry upon government investment effectively nullifies the free markets ability to be flexible to aggregate demands.

For the energy policy and economic policy, we have seen Keynesian theory as well as Friedman theories of government economic intervention. Both have proven themselves worthy of consideration and both of them have shown ability to amount large deficits. Friedman policies were not fully implemented and Keynesian theories were not used to slow economic growth or energy demand in the 1950s and 1960s. Thus, the implementations have not seen full maturity in actual policy.

Neither industry nor government has made significant strides to reduce dependency upon limited fuel supplies despite the various crisis and foreign interventions that have taken place to ensure supply security. The consequence has been low price of energy and the professed affluence of society over the past few decades. The affluence and economic growth interests have been argued to sustain primary private sector control over energy policy.

Friedman's treatise argues that government should stay out of business cycles, but the profiteering by various drillers in Texas perhaps precipitated a premature depletion of those valuable resources that could have been more coordinated to maintain a supply over a longer term. The investments sunk in current production technology and facilities will be difficult to encourage the move towards alternative production facilities because of the

continued government support for this arrangement (Baker, 2002). Thus, one can see the influence government can have in energy policy development and industry changes, and we can observe that the industry is not independent of blame for the current energy issues we face today.

The question or assertion is not satisfied as whether industry can provide a suitable alternative to current policy in time to meet demands while moving towards a more sustainable and less risky resource supply issue. Government has not proved to be effective at driving policy alternatives (using the current mind frame) that challenge current investments, financial stakes or business structures that have restricted innovation. The short-term cycle of elections and corporate financial reporting converts into little time for investors and voters to see return on investments that are acceptable or energy prices that are acceptable as well (Baker, 2002; Graham, 1962)

Government has proven willing to allow and actually support monopolistic control of markets despite anti-trust efforts in other markets of rail, telecom, software and steel where a domestic interest in low price prevailed as well. Costs to third parties and long-term sustainable economic plans were rarely included in the overall planning (Orr, 2002; Baker, 2002). Thus, price of market entry to energy production or transmission was allowed to be high which consequently stalled growth of renewable energies and development of competitive technologies that were not part of vertical business models in existing firms. The higher cost of producing power means less market demand for that production system as was the case for solar and wind systems (Laird, 2001).

Vietor (1984) pointed out, as well, that the deregulation in some regions provided immediate and damaging price fluctuations that essentially pressured some legislation

away from allowing pure competitive energy markets. Any attempts to regulate were not on the business structure or to allow for fair diversified competition of production but more concerned with the consumer price of the energy as well maintenance of the supply routes of current resources to sustain the affluence (Vietor, 1984; Laird, 2001).

Breadth Conclusion

Energy policy management is critical to the economic interests of the United States since all production is affected by the price of power. Thus, the energy we use today has considerable strategic issues attached to the supply and price structure in order to maintain affluence and growth capability in domestic operations.

For decades, we have maintained supply systems for oil, gas and coal in order to maintain that sense of economic security, and in many ways, we have maintain those supply interests to prove a general principle and promise of private sector ability to resolve market issues. Despite varied energy price fluctuations and crisis, the United States has been fairly unwavering in support of fossil fuel use especially as the memory of particular crisis would fade as prices appear to stabilize.

Government has never managed a full comprehensive long-term energy policy for more than a couple years that addresses both short-term economic interests and long term resource depletion issues. No long term plan can be expected to solve issues within two to four years, and no plan can be expected to solve problems without public willingness to change with the plan or public willingness to endure short-run hardships that will occur. The government has however provided the groundwork for heavy investment in large oligopoly structures and physical investments in coal and oil production facilities while essentially ignoring (until recent years) any substantial renewable energy resources.

Given the physical properties of energy resources, the physical laws of energy and the demand growth, we have to address the finite resource dependency in order to minimize potential energy price shocks, to maximize efficiency of fuels, to mitigate supply disruptions, and to address environmental concerns of carbon consumption.

Both Keynes and Friedman have been proven to have valid points with respect to intervention in industry. Both arguments have also revealed in their implementations of general industry intervention techniques some significant limitations as to scope of intervention by Keynes and ability to respond to a genuine crisis by Friedman.

The solution to the impending crisis will have to be an untried event that challenges traditional principles of free markets as well as coordination of public interests, public pressure and private industry through a comprehensive energy policy. Since government has been largely absent from long-term interests and consequential decision making (partially due to the short political cycles already mentioned), any policy proposal will have to seriously build a road map with milestones for the next governments to adopt and to use over decades into the future. As well, the industry will have to adjust production and investments levels to meet those long-term interests in order to assure energy security and maintain economic growth.

The solution to the energy issues requires us to reshape and rethink the current "frames" (Laird, 2001). If we are only concerned with maintaining centralized private sector monopolistic roles for production and distribution, government can not hope to effectively direct or coordinate efforts across the markets that might encourages innovative and competitive resources of energy beyond the fossil fuel supplies. The ability of companies to compete and encourage the capitalistic nature that drives

entrepreneurial innovation has to be sought in free markets where the barriers and costs to market entry are reduced in order to have the fair and equitable competition.

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Challenges to Long Term Sustainable Energy:

Depth Component for KAM5

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SBSF 8520: Contemporary Research and Issues in Democratic Governance

Mentor: Richard Worch

24 May 2009

Depth Abstract

Using the current trend information from the Department of Energy, International Energy Agency, and others, we can se the affect of current energy policy over the course of the years as well as the global trends that will inevitable impact the domestic markets. Given the current energy consumption and production as well as an ideal sustainable policy, our current policy risks serious economic catastrophe and that risk is recognized by academics and industry players alike. The nature of the risk and catastrophe has only partially been explored, but we need industry players to buy into plans to change energy policy due to vertical monopoly structure of energy sector. We can review the plans from Pickens and Rogers as well as implementations in Europe to help define a path for a sustainable energy policy for the United States.

There are a number of plans to achieve production goals that reduce dependence upon foreign resources from industry, and if used together, the plans have significant potential to achieve the mutual goal of sustainable energy. With rising demand and rising affluence around the world, energy demand can be expected to increase exponentially given the path of consumption in the current industrialized world where overall global demand will increase over large populations (billions) that did not have affluence before. Therefore, policy will have to consider the critical supplies that are dwindling and how they will have higher value as time progresses due to diminishing supplies for future generations (especially for transportation energy use of petroleum resources).

SBSF 8520: Contemporary Research and Issues in Democratic Governance

Depth: Challenges to Long Term Sustainable Energy

The issues and challenges facing past government s of the United States with respect to energy are still issues for current and future administrations. The challenges of long-term sustainability are revealed in the different viewpoints of how to achieve that goal and unsustainable premises with short-term priorities that has plagued our progress for the past decades. Given the historical context of energy regulation and impact upon costs, prices, markets enhancement and market suppression, the price hikes of oil and natural gas in 2007 to 2008 caused the issue to become a mainstream issue again as happened in the shortages of the late 1940s and the oil embargo of the 1970s which highlighted the need for a better comprehensive energy strategy. These crises have revealed how accustomed we are to low prices and stable markets, and the crises have emphasized the vulnerability we face with respect to energy policy. The crisis also revealed short-term interests of the public towards price stability and short-term political willingness to consider alternative strategies in the face of crisis.

In 2008, the price hike of oil rippled through the American economy and may have hastened the economic slowdown where people began to feel a squeeze on the supposed affluence from rising fixed energy costs (in addition to other factors of their lives). Since low energy cost has been associated with an affluent and economic growth, the assumption has been to focus upon securing supply and to maintain energy delivered at a relative low price to the consumer in explicit preference over any proposed alternative long-term solutions (Laird, 2001; Vietor, 1984). Thus, the issue of securing limited fossil fuel supplies has to be supplemented with reviewing our entire energy

portfolio in order to find sustainable means to provide power over the next decades and centuries.

As the United States acts in a global environment of energy demand, we have to consider the rising use of energy from foreign countries like China and India to accurately determine how that will impact supply and demand for domestic operations. The National Geographic (Mar, 2008) published an admirable report about the global demands for energy that can act as foundations to our current considerations. As each adds a small percentage of demand each increase adds the overall global energy demand.

Given the government's actions of the global recession of 2008-2009, the United States has poured large investments (so-called stimulus money) into the economy based upon Keynesian theory of government economic intervention to push up aggregate demand and employment (of which a large portion of the stimulus funds are intended for energy efficiency and energy-related projects). Paul Krugman (2008) called this the return of depression economics emphasized by Keynesian theories. Using principles of government intervention, we can determine how the price of energy will be affected long–term and how the current energy portfolio is structured to manage and to support the low price premise.

We can determine if free market competition or government supported competition will help to foster new or renewable energy production development as part of that portfolio. Additionally, the historical examination observed that business structure and policy support has nearly stifled market penetration where government may need to consider loosening monopolistic grips on markets in a similar manner to AT&T or Carnegie Steel (in order to encourage growth and entrepreneurial innovation). As

well, when the supply diminishes, the real value of existing supply will rise exponentially.

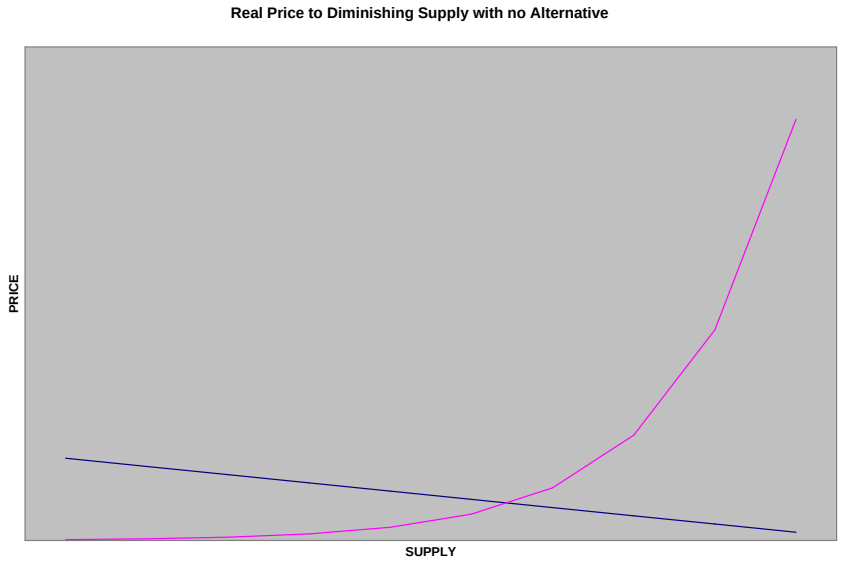


Figure 9: Real Price to Diminishing Supply without Alternatives

Since the government and industry have been integrated partners of energy production and energy trade agreements, the review of the energy portfolio will have to include government's role in the markets, market structure and the private sector needs. Using the previous context of policy, the institutional values, public pressure and frame of mind will have to fundamentally change in order to seriously challenge current energy markets and industry models. Thus, this examination of current energy policy and policy alternatives will focus upon different ways government can influence the markets: 1) business as usual 2) elimination of government regulations and 3) more active government direction.

The first part of the examination will review current portfolios of energy production and their limitations. The next part of the examination will review how government can influence these resources in comparison to how the government has

influenced the energy sectors. Since the government is already investing large sums of money in energy as part of the 2005 Energy Policy Act, proposed budgets and stimulus package, they have initiated changes in the dynamics of the debate, but the amount of change will be determined by the implementation of the policy and whether opportunity costs are preferred for sustainable energy. With these, we can propose the potential of future proposed budgets for energy with an objective to provide a sustainable and coordinated energy policy as well as the ability of the government to encourage more open energy markets. If the public attention to energy alternatives is dependent upon crisis and stability moves, policy alternatives will have to realize the power of public pressure where there seems to be a coincidental ratio of price to actions. Any policy change will have to be scrutinized in terms of the public willingness to adjust and their economic ability to be flexible.

First, this examination will begin by reviewing the statistics and outlooks from the U.S. Department of Energy and oil prices as well as the past intervention results. Using this data and the past policies, we can review the options for a long-term sustainable policy including potential alternatives that have been suggested from Paul Komor (2004), Pickens, (2008), Duke Energy proposals (2009) and others for feasibility and potential return on investments for the public as well as industry acceptance.

A Note about Commodity and Security Markets

With respect to market prices, there have to be a buyer and a seller at an agreed price. In terms of commodity and security trading, there are legal implications for fixing or inflating values and prices. As a single investor with a small amount of capital, purchase of a thousand shares (or purchase units such as barrels) may result in the price

moving $0.01 on a single occurrence where as the continued trading of the security (or commodity contract) over larger volumes can result in larger price fluctuations as more volume indicates stronger demand for a better price. Therefore, people (or fund managers) with larger capital reserves can influence the price of a security or commodity more than a single investor buying a particular lot. Over the course of time (if not checked or flagged for review), the efforts can be coordinated to support graduated and sustained price changes.

If the government supports or allows the action, the price change is the market price. Otherwise, the government, via the SEC, can review the case for legality and price fixing. In crisis situations, investors are quick to accelerate market prices if there is fear of supply disruptions, and the potential to manipulate markets was the subject of considerable congressional and public debate in 2008 when gas prices peaked over $4.00 a gallon. The subsequent slow gradual change in price may not be easily detected and has been argued as part of the natural course of market aggregate supply and demand. This may explain the general patterns of price following crisis as observed in the historical examination if the OPEC cartel is interested in maintaining current oil consumption levels by adjusting prices to quiet demand for alternative fuels.

Reviewing DOE Data and Trends

As noted in the historical examination and shown in Figure 10, consumption of energy has steadily risen since 1945 while domestic production (especially for oil) has peaked since 1970 (DOE, 2009). For energy, we have primary markets: electricity, heating and transportation. The first two have domestic sources of production where the third requires significant imports where a majority of the import since 1968 is energy as

petroleum needs when domestic oil production peaked that year even though demand still grows. The energy produced from coal, wood, natural gas, nuclear and renewable sources get consumed as part of electricity production and heating.

The diminishing capacity of usable energy in fuels means that we have to be more efficient with respect to the initial extraction and production (Bent, Bacher & Thomas, 2002). Since coal, natural gas and oil have a high density of energy, they are preferred methods for generating power today, but their usefulness is used within the first cycle of production (as is for nuclear fission) and can not be reused for a second cycle. Wind and solar have a lower density of energy by volume than the fossil fuels, but the cycle of degradation does not apply since the resource is easily replenished as long as there is wind and sun. Thus, our efficiency of fossil fuel energy production and transmission is far greater than using wind and solar where, currently, carbon fuels like coal and natural gas provide almost a full three quarters of electricity production (DOE, 2009). Again, petroleum is the primary use for transportation energy with a small percentage of biomass energy entering that market.

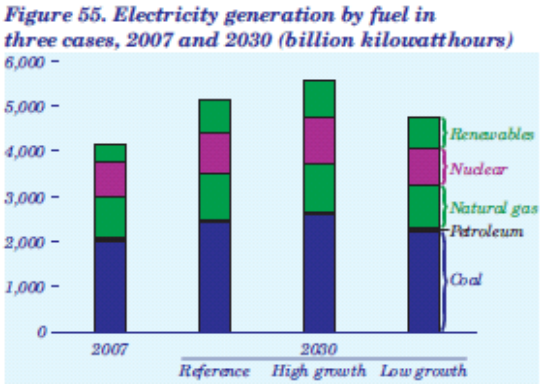


Figure 10: Electricity Generation by Fuel (DOE 2009)

The cost to produce the energy is lower for natural gas than for all other production means (coal, nuclear and renewable) as the latter resources are “capital-

intensive". Thus, production of new facilities will focus upon the lower cost to build them (DOE, 2009). Although, the cost of nuclear generation is calculated by the Department of Energy to be $0.49 for a kilowatt per hour (kwh) vs. $2.32 per kwh in fossil steam production (coal or natural gas). The initial capital-intense projects have pushed companies' development towards less intense projects like natural gas (which has a more variable market-based cost of production) despite the lower kwh per hour production cost of other resources like nuclear. Further, DOE (2009) estimates a gradual rise in price as fuel prices increases with supposed economic recovery.

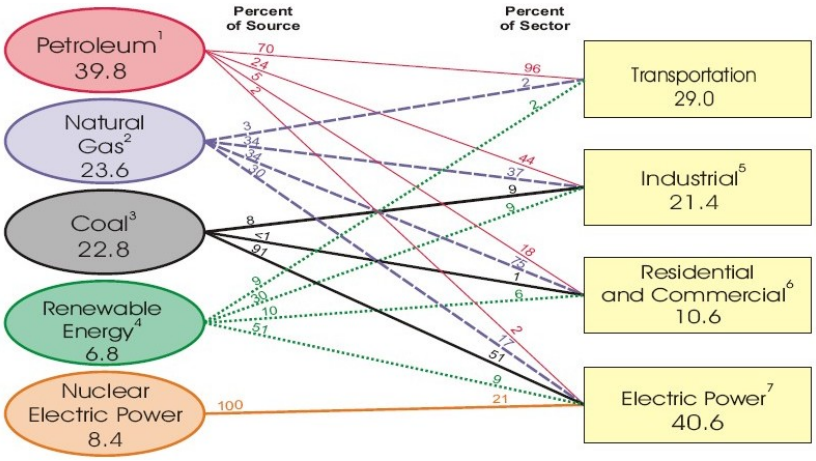


Figure 11: Percentage of production by source (DOE, 2009)

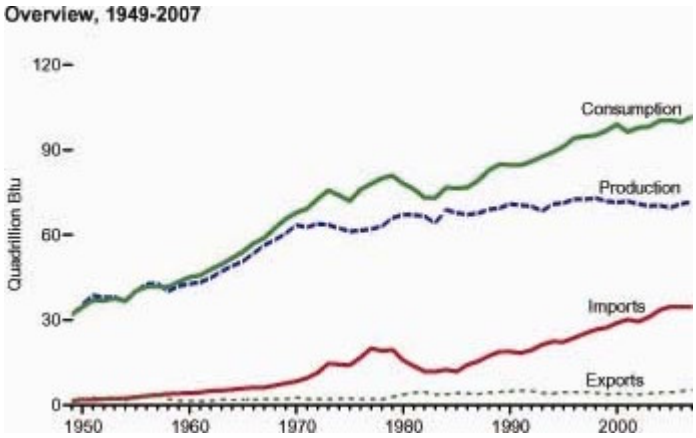


Figure 12: Overview of Energy Trends (DOE, 2009)

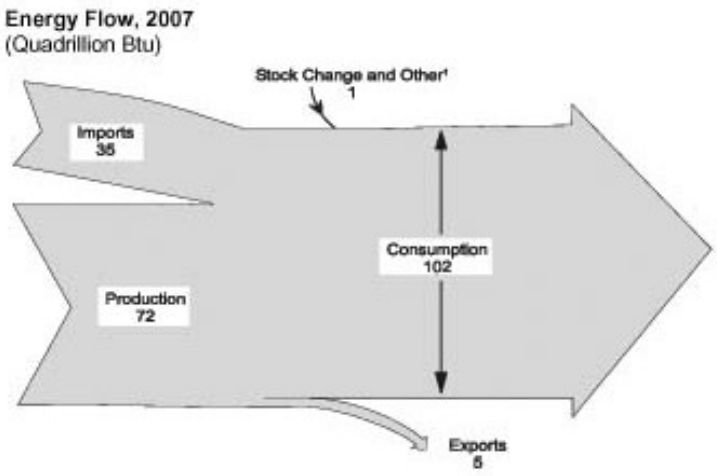


Figure 13: Energy Snapshot Diagram (DOE, 2009)

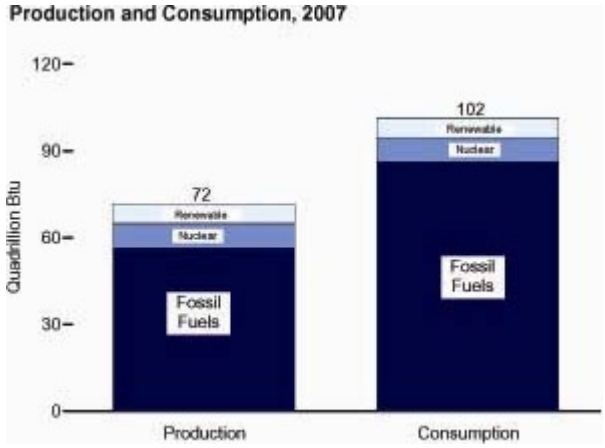


Figure 14: Production and Consumption 2007 (DOE, 2009)

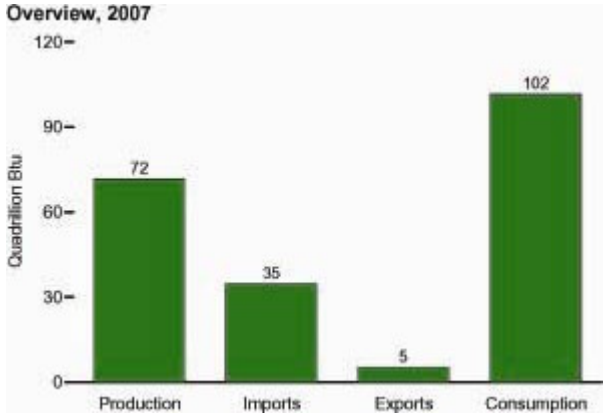
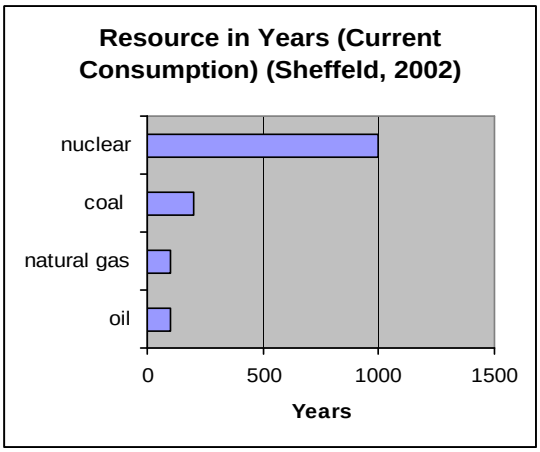


Figure 15: Energy Snapshot Overview (DOE, 2009)



PickensPlan (2008) points that the amount of oil imported is 70% of today's consumption (which increased steadily from 24%), and Pickens suggests that amount of oil in just one day consumed by the United States alone is equivalent to 133% of the entire production for one day by Saudi Arabia. Further, they suggest that world oil production peaked already in 2005 (suggesting that no more growth in total supply/production can occur). Thus, if (or when) other countries demand more of the oil supply, the real price will considerably rise to meet that demand for the rapidly dwindling supply as seen in Figure 9.

That dwindling global supply is estimated by Sheffeld (2002) for about 100 years left of current oil and natural gas reserves at current demand. Some estimates, by DOE (2009) and others, consider this to be generous with estimates closer to 50 years. Coal is estimated between 200 and 300 years while nuclear fissionable material is projected to be around a millennium. Renewable energy implies a renewable-unlimited supply as long as Earth is in existence.

Discussion of the Data

In each of the presentations by the DOE, we see three cases presented for growth projections of energy in terms of production and consumption. As well, we see the import

and export numbers where imports provide around 35% of total consumption where that import is primarily petroleum. Since President Carter the 1978 PURPA, renewable energy credits have encouraged market penetration but that market share is still gradual and considerably less than all other sources of energy that require a non-renewable fuel source.

Domestic production has been able to meet the needs of electricity demands but the crude oil consumption far exceeds domestic production. As well, U.S. Energy Secretary Steven Chu (2009) suggests that United States and China are on a collision course to secure the dwindling oil supplies for their respective economies. Both the United States and China used to export oil where now both are importers of oil. He points out that roughly one-third of the trade deficit the United States has overall is due to oil imports.

The DOE data shows only the changes in domestic production, but the data does not account for foreign influences to global or domestic consumption. The National Geographic (2009, Mar) reports that energy use has nearly doubled from 1976 to 2006 and previous third world nations of China and India are now demanding energy, as a whole, more than the United States where in 1976 the two countries combined were only about a third of U.S. production. Additionally, China is burning coal at three times its production levels in 1980 while the entire globe has seen almost two-thirds increase over the same period. China now burns coal at a two to one ratio over what the United States burns. Thus, the model projections of energy may be grossly underestimating the increasing demand when the statistics exclude worldwide demand.

Further, the burning of fossil fuels has significant environmental concerns from the increasing amounts of emissions and of pollutants that get pushed into the air. The search for, transportation of and the burning of fossil fuels causes the destruction of lands due to mining, to drilling, and to accidents as evidenced with an oil spill near Alaska's Prince William Sound, Chernobyl reactor meltdown or coal ash near Kingston, Tennessee (Essek, 2009). Further, many scientists and advocates argue that carbon burning is provoking a climate-change crisis as emissions accelerate due to the consumption of fossil fuel power (T Friedman, 2008; Enkvist, Nauder &OppenHeim, 2008; Stern, n.d.).

Even if one does not believe that climate-change crisis is being provoked by the carbon emissions, there are other concerns about the energy wasted that occurs from the generation of energy. From a business viewpoint and using the principle of degradation, we know that production and processes, like energy, are not 100% efficient, and thus, one has to consider how much the actual waste is costing the companies and, as well, what the cost is to the public. If current production generates power between 20-40 % useful energy, there may be more efficient processes to explore that increase efficiency of the generation systems. We also have to place a market value (or cost) upon the production waste.

If the climate crisis warnings are correct, the public cost of continued (or increased) carbon emissions includes eventual destruction of coastlines and perhaps civilizations. Climate change also means changes in agricultural production where vegetation may not be able to grow in certain conditions as well as certain species may not be able to survive significant climate changes (Stein, n.d.).

If one does not align with climate change theories (some members of Congress have repeatedly challenged the notion of a climate change crisis), there is still actual observable environmental impacts as noted with respect to drilling, mining as well as emission pollutants. We must still consider that the cost of production can be measured in terms of cost of total resources used, production processes and labor. In this case, we have to review the law of conservation of energy where no energy is destroyed and no energy is created in the isolated system. Therefore, the elements of input for the system must have an equal amount of output for that system. Here, the production inputs can be measured against energy output, production processes, and waste output where currently much of the waste output has an assumed production cost rather than an actual market value. The waste output is unused energy as well as emissions, and there is no market value for the waste since there is no market for the unused energy or waste. Additionally, the value of the pollutants is measured in terms of disposal cost, and the unused energy value is pushed out as exhaust into the air without actual monetary cost or value attributed to the pollutants and lost energy.

Business as Usual Discussion

As well, we have significant infrastructure and processes in place to extract more energy supply from fossil fuels than any other source (Baker, 2002). With that infrastructure, the price of electricity has been stable and low as noted previously. The prevailing wisdom is that low price of power has allowed the United States to experience significant growth and provide generations of people with affluent means of living.

Current cost of electricity production, however, can be maintained using the vast supply of coal (not accounting for the environmental concerns) and nuclear power for

nearly a millennium before any shortages can severely change the production market if we bring more nuclear power plants online within the next couple decades as shown in Figure 16.

Prevailing Wisdom or "Business as usual" Flaws

David Sokol, CEO of MidAmerican Energy, in a recent conference suggested that conventional wisdom about the markets has proven to be "unreliable" (in speech, 2009). For years, many businesses assumed a level of risk tolerance and operational inefficiency in a forgiving credit environment that hid the extent of the true costs. People were willing to buy high priced and high risk securities, loans, and commodities despite the true value and risk associated with them. When the conditions of that market changed, the masks came off the true value where real costs could not be deferred anymore, and some businesses with poor foresight and high leverage had to close.

This is a natural consequence of capitalism as Milton Friedman (1962) points out and this consequence favors those businesses that planned properly. In the 2008-2009 recession, as Friedman (1962) would suggest, the substantial growth revealed weaknesses that caused a downward correction of the economic cycle towards real GDP. The economy can not just continue to grow without consequence, and the change has forced business to realize contingencies that mitigate for changes in prices and the overall market conditions. The consequence model is also a consequence model for economies that flexibility, risk management, and long –term vision.

With respect to energy policy, there are fundamental flaws in the prevailing wisdom where the assertions erroneously disregard a global limit to supplies of fuel and public resilience to tremendous price fluctuations. People in the previous generations as

well as current generations may not have to worry about the eventual depletion since the estimates suggest ample supply exists only for the next 50 to 100 years. Yet, within the next few decades, we can be assured that supply lowers while global demand increases for those supplies where the United States, as well as the rest of the world, will see eventual overall supply depletion. Part of the current and many of the future generations will experience this depletion, and that fact may be affecting generational opinions towards alternative energy policies (Bent, Orr, & Baker, 2002; Baker, 2002; T. Friedman, 2008). Ignorance of this impending depletion will impede serious strategies that enable energy independence and security while causing catastrophic affects to all industrialized economies. Thus, business and government will have to consider the cost of change in business models when the supply is depleted and execute implementations that effectively manage and plan for the risks as inevitable consequences.

The prevailing wisdom also suggests that fluctuations of energy production will be felt throughout the economy as evidenced by the economic reaction to shortages in the 1940s and the energy price hikes of the 1970s and 2000s. Thus, any policy alternatives to current policy have to be conscious of the economic impact of price changes, public willingness to survive them, as well as the feasibility of the alternative to mitigate the depletion risk. In some European countries, the reaction to the energy crisis of the 1970s caused dramatic (essentially forcing) changes in energy production systems that substantially reduced their dependency upon foreign resources (specifically oil) (Komor, 2004). The United States can look at what policies they have implemented to reduce the supply disruption risk.

The more compelling flaw is that industrialized economies are heavily reliant upon petroleum fuel for transportation energy. According to the DOE (2009) and Sheffeld (2002), petroleum supplies will diminish within 50-100 years, which is long before the quantities of coal and fissionable nuclear material are exceeded. If Secretary Chu is correct about competing demand from other nations, that estimation may be generous and the supply may diminish even more rapidly given the growing appetite of developing countries (National Geographic, 2009; Chu, 2009; IEA,2008). When that energy is depleted and absent of any alternative, the world transportation will return to slower modes of steam or wind driven transportation and mobile economies will be pushed into severe depression.

Policy Alternatives Discussion

Thomas Friedman (2008) points out that we can both complain about the eventual problems and ignore them, or we can be part of the revolution that readies the economy and markets for new "green" technologies while addressing the energy demand and supply issues. The initiatives that have been legislated, thus far, have done little to dramatically change the consumption and fuel production activity of the energy sector (except to allow more oil imports and relatively obscure contributions by renewable energy). As noted in the historical discussion, penetration in the energy markets has been difficult for alternative resources except through subsidies for the small percentage of renewable energy (Hansen, 2009).

Energy policy alternatives have to address both reduction of overall consumption to more sustainable appetites instead of insatiable demand as well as more efficient energy production using more sustainable resources. The policy alternatives will also

have to effectively guide sustained public pressure towards sustainable energy goals while limiting or mitigating for the inconvenience factors that result from operational changes.

A part of the policy has to address the stability of the grid infrastructure. Currently, the grid infrastructure is designed primarily around centralized locations of power plants, and the infrastructure facilitates the investment in the current power plants. As well, the infrastructure is designed around the ability to deliver that power to high population markets, and the infrastructure is designed to accommodate demand at general peak times rather than smart systems that transmit on-demand with minimal degradation due to redundancy. Therefore, policy alternatives will have to address or encourage the technology and the ability of the infrastructure to handle future demands more efficiently in addition to more efficient production technologies.

Policy alternatives have to address expectations of current transportation methods (airplanes, automobile, trains, and shipping) that have become the foundation of mobile and interactive economies around the world. Fuels (e.g. biomass, solar, electric) that replace petroleum will need to mitigate the costs for current transportation systems, will need to refine the fuel for commercial use, and will need to be able to effectively deliver that fuel to the consumer. Biofuels will have to consider cost effects to food production and water resources required to produce the fuel (Clark, 2009; Stern, n.d.).

Alternatives to current policy have to understand the limitations in addition to the potential of the proposed alternative. The alternatives have to include and engage the current power generation industry to conduct change of technologies and operations as well as provide more efficient production systems. In this case, we can review the

European policy implementations as well as proposals from T. Boone Pickens and proposals from Duke Energy as suggested by the company's CEO, James Rogers. In order to compare the plans, one should consider the destination to see if the plan provides a good roadmap towards that destination.

An Ideal Destination

The ideal destination of energy policy and strategy is attaining economic stability, low cost power and sustainable resources (supply). Therefore, perfect sustainability is to use the most abundant and renewable resources possible with 100% efficiency for on-demand consumption for the energy. Incidentally, this is no different than what human civilization has been using for millennia previous to the industrial revolution. Solar, hydro and wind energy provide the most useable form with minimal loss to zero degradation of the resource over the lifespan of the Earth.

Powering electricity grids would require significant use of these renewable sources in technologies current and future. As well, these sources could be envisioned to use in transportation systems other than having the wind to blow into a sail or using animals to pull a carriage. Therefore, devices and their primary power would be derived from electricity and battery-stored power except for air and space travel. Incidentally, NASA and world space agencies have already developed and use technologies that do not rely upon petroleum fuel to propel vehicles at tremendous velocities into the atmosphere and beyond.

In this ideal world, we would not have emission or waste issues that we have with burning of fossil fuel energy. We would have devices that do not waste energy in transmission or draw power just simply by being plugged into the grid. Carbon dioxide

emissions would not be causing global warning or any climate changes. As well, economies can be mobile and interdependent without excessive overuse of, or dependence, upon physical mineral resources.

The Pickens Plan

The Pickens Plan (2008) is a set of proposals that addresses the current crude oil dependencies, sustainable electric energy production and grid technologies. The largest part of the plan focuses upon steadily switching electric energy generation systems to using wind power that uses the strong wind speeds in the plains states (from Texas to North Dakota) of the country. This proposal would build a large set of wind turbines through the middle of the United States and the supporting infrastructure to deliver the power from the center to the coastal regions of the country.

As well, he proposes to change the fuel for transportation by increasing the use of natural gas to power vehicles. This plan points outs that natural gas is cheaper than oil (at current rates), and there is an ample domestic natural gas supply rather than relying upon foreign repositories of oil for supply. As well, emissions from natural gas engines for transportation are less pollutant than oil engine emissions (PickensPlan, 2008).

The plan calls for a $15 billion a year in Production Tax Credit to be extended for at least ten years, which aligns with Silverstein's (2008) suggestion about using wind credits more. Since tax subsidies seem to have encouraged some building of renewable energy generation systems, one can see how extending current credits would encourage more renewable energy production. Incidentally, the tax credit also applies for fossil fuel based energy production and resource exploitation, and thus should be reviewed for incentives to prefer building the renewable power over exploiting carbon resources.

Additionally, the tax credit would also apply to increasing production of natural gas as energy.

This plan effectively addresses many of the concerns for electric power production, but this plan does not detail whether individual consumers would be able to generate electric power as well as whether those individuals would be able to sell back energy into the grid. The plan does not address the market penetration difficulties, for energy generation and transmission, which have plagued previous federal policies that attempted to increase the renewable energy portfolio.

While the plan does well to address electric power production, the plan still relies upon the limited quantities of domestic natural gas supplies in place of foreign petroleum resources to relieve the consumer demands for transportation. As well, the DOE (2009) suggests that the current market distribution of liquefied natural gas does not make owning a natural gas based vehicle feasible since there are relatively few service stations to provide the fuel, and the fuel does not provide as much power or longevity as current diesel or gasoline systems.

Pickens's (2009) asserts that $15 billion in tax subsidies for the production credit is far less than the $700 billion imported worth of oil. The problem with this comparison is the federal budget does not pay for oil imports directly except for any oil-related subsidies that are awarded to companies that trade international commodities. Thus, the $15 billion annual budget for renewable energy would not directly affect the $700 billion exported wealth. If implemented with marketplace diversity of fueling stations, assumed constant domestic demand for transportation energy, and consumer available natural gas

fuel vehicles, the $15 billion a year energy sector investment would reduce the overall importation of foreign resources to the United States.

Duke Energy

James Rogers, CEO of Duke Energy, has been making another set of proposals for a coordinated energy strategy and policy. Kai Ryssdal of NPR interviewed Rogers and asked what his plan involves. Rogers believes that decades will be needed to change power industries and that requires a long term plans with milestones that addresses the global warming issues "with a minimal carbon footprint" (2009, as quoted).

Rogers (as cited by Gelber and Bach, 2009; Ryssdal, 2009) advocates the use of cap-and-trade regulations that essentially put a market value upon carbon gas emissions specifically from power plants. This cap-and-trade would put a value upon carbon emissions where companies could build less dirty production facilities or upgrade existing facilities, or trade excess carbon emissions to other companies. Rogers believes that companies, like Duke Energy, will eventually transition to renewable forms. The cap-and-trade will put a market cost upon the emissions from power plants that will diminish pollutants while encouraging renewable, cleaner forms of production.

In his interviews, he claims that the United States can not simply abandon coal since the resource provides so much electric power, and he provides an example where one Duke Energy's power plants provides power for over "a half million homes". He also advocates an overall strategy that transitions from carbon based power to renewable forms to be completed near the year 2050 using a milestone based strategy planning to check progress. Further, he argues that anything sooner is not possible from the industry (Gelber and Bach, 2009).

His plan to transition electric power generation to renewable power will help the long term sustainability of energy resources domestically held as well as the future of electric power. Duke Energy's 2009 report about sustainability suggests the company wants to increase power production by building nuclear plants and to implement clean-coal technology to reduce emission pollutants even though they have no current plans submitted for a new nuclear plant. Nuclear is also heavily advocated by Banks (2008) to achieve carbon-free emission generation. Duke Energy (2009) also plans to reduce wasted power consumption through new smart-grid technologies that improves efficient and on-demand consumption. In addition, the large oligopoly companies, like Duke Energy, can introduce wind and solar energy as forms of market penetrations as part of their respective generation systems (where outside companies still would not be able to penetrate). Since this is an industry-driven plan, this strategy may be more easily promoted to other industry players and employed by most electric power companies in the United States through a coordinated effort and overall long term implementation strategy to provide power that sustains fuel supply.

The Duke Energy plan does not provide specific details or suggestions for policy regulations to encourage industry changes that Duke is proposing. The plan does not consider selling back energy (feed-in laws) that is cornerstone to many European countries implementation of renewable energy. As well, Rogers does not provide details for proposed tax incentives (other than the cap-and-trade regulation) or other regulations that might encourage or require renewable energy development using those tax credits.

The biggest issue with Duke Energy's proposal is the absence of transportation energy details. Since economies are increasingly mobile and reliant upon oil for transport

and oil has been basis for many of the military and economic security concerns of the past few decades, updating the electric power systems leaves the transportation system untouched and vulnerable to the security and demand issues that have perpetuated public debate for those past decades.

Testing Green Markets and European Examples

European countries (e.g. Denmark, Germany and France) have provided options of policy alternatives that have transitioned their economies from oil dependencies to more sustainable nuclear and renewable energy focused generation. Komor (2004) writes about restructuring electric power markets in the United States and in Europe to meet the power demands. These restructures were an effort to move to renewable or more sustainable domestic resources. Komor cites public utilities managers that say the public wants renewable energy, and thus, many U.S. utility companies want to give the impression that they are doing something in that direction (2004:102). The companies will partner with environmental groups in these efforts, but many within the companies are resistant to changing the power production facilities for various reasons.

Komor (2004) refers to green buyers as early adopters of innovation via the Rogers' innovation curve where early adoption of technology is slow due to higher costs of initial low demand and low economies of scale for small market technologies that happens with new technology. This adoption process may affect the implementation of renewable generation here to delay until margin costs reduce.

Germany and Denmark have implemented substantial renewable energy systems (including offshore wind farms) that significantly reduce overall importation of oil and programs that offer residential customers the ability to sell back energy "feed-in" laws

(Komor, 2004: 135) to the public. Additionally, China is focusing on more hydro power generation facilities (IEA, 2008). Thomas Friedman (2008) points out that companies like First Solar were able to make profits from the market for solar collectors that opened in Europe. UK implemented a price reduction approach for renewable electricity where the market prices for renewable energy in later rounds of that program dropped by two-thirds of original costs, however, the actual unit build per contracts awarded were different where only 35 of 146 large wind systems were actually built (Komor, 2004).

Komor (2004) reviews a Renewable Portfolio Standard (RPS) and green certificates to promote more renewable energy development. The RPS attempts to define a specific renewable energy production goal with low administrative or bureaucratic costs. The RPS can work well with other programs to broaden market appeal and to achieve goals/standards while implementing price pressures and risk reduction. The RPS can use green certificates that give renewable electric providers the ability to sell the actual power as well as the environmental attributes of the power similar to cap and trade concepts. The RPS squarely sets the government as administrator of price and goals rather than market. The RPS inherent government-guided nature does not provide for market pressures or differing costs of various technologies (Komor, 2004).

Depth Summary

Proper energy policy management is critical to the long-term economic interests of the United States as well as short term market interests since all production is affected by the price of the energy production. Thus, the energy we use today has considerable strategic issues attached to the supply and price structure in order to maintain affluence and growth capability in domestic operations. Thus in order to maintain that affluence

and growth, we have to coordinate efforts across the energy sector to build more sustainable energy production systems.

The information from the IEA (2008), DOE (2009) and Bent, Orr & Baker (2002) provides us with a description of our energy policy progress over the years as well as the projections into the next couple decades. Using this information, we see that the United States has two primary targets for energy policy development 1) consumption and 2) production. Reviewing the properties of fuels, the global supply of energy resources and an ideal energy market, there is a clear objective towards cleaner and more sustainable production of electricity. Thus, consumption will have to be tailored to be more efficient thereby reducing overall energy consumption to be in line or better than overall production capacity. The production capacity will need to realize more diversified portfolios of energy rather than a consistent reliance upon limited resources if we are to meet overall sustainability goals. In meeting these goals, the traditional resistance to interference by the government in the energy sector will have to be shed for a more interventionist method of encouraging renewable growth while coordinating goals and strategy (T Friedman, 2008), and the vertical monopoly of business regulated electricity systems may have to be challenged as well (Joskow, 2008).

The consumption goals can be met through increased conservation programs like those from MidAmerican Energy as well as weatherization programs to update structures to minimize energy demand. For these goals, Friedman (2008) argues that the green solutions have to be “not boring” in order for the technology to be more marketable, and Joskow (2009) believes that consumers have difficulty with the rationale of energy efficiency primarily because of high initial costs. Thus, the public pressure to advocate

alternative energy has to overcome high cost barriers and to sustain across governments and despite softening energy prices. Policy makers and industry will have to implement creative ideas that make energy efficiency more palatable to the average consumer.

There are a number of plans to achieve production goals that reduce dependence upon foreign resources from industry, and if used together, the plans have significant potential to achieve those goals. With rising demand and rising affluence around the world, energy demand can be expected to increase exponentially given the path of consumption in the current industrialized world where overall global demand will increase over large populations (billions) that did not have affluence before. Therefore, critical supplies that are dwindling will have higher value as time progresses and supplies diminish (especially for transportation energy use of petroleum resources).

Here, we can review Pickens and Duke Energy plans for reducing dependence upon dwindling oil supply with natural gas based vehicles and by expanding the electric grid to accommodate for electric vehicles. Each of these plans recommends transition towards more sustainable electric power production using nuclear, wind and solar. These two plans have the support of significant energy industry entities that will be critical to moving forward with such plans as well as renewable energy advocates except for the focus upon nuclear and natural gas fuels. Each of these plans can implement the European energy policy initiatives revealed in Komor's research that helped to broaden market and technology development in Western Europe.

In each of these ideas, we have a significant focus upon more sustainable policy approaches. Even though the policies fall far short of instituting an ideal 100% renewable generation, they propose to significantly change the overall production of

energy rather than continuing upon a course that makes the industrial economy more vulnerable to supply shocks and depletion. As well, these proposals offer an added bonus of reducing "carbon footprint" by putting market values upon emissions and using cleaner production technologies while providing a means to transition the public towards sustainable energy.

Policy makers will need to consider these proposals, public pressure, and the historical efforts to change energy policy, which has not been easy. The policy makers have had to balance interests of private enterprise, effects of price to the economy, and securing fuel supplies. If policy makers can get sustained public pressure to support more market penetration of renewable energy and emissions control, they should be able to write policy that designs a sustainable roadmap towards effective manage price fluctuations while maintaining economic security.

The traditional market ideas of fuel abundance have to be abandoned if we are to seriously address the future of our economy and energy needs especially with respect to oil and subsequent depression if left unchanged. Climate change may or may not happen as a result of carbon emissions, but a severe energy crisis is inevitable if we do not change current policy. If we do anything less than build more sustainable energy production, we risk significant price fluctuations, halted economies, and supply depletions where no new resources will be available to meet demand. In the same sense, the economy will risk being a victim of improper risk management of markets by not properly planning contingencies for inevitable consequences.

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Recommended Strategy for Energy Policy:

Application Component for KAM5

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SBSF 8530: Professional Practice and Application of Democratic Governance

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24 May 2009

Application Abstract

The energy policy has to clearly define an objective and strategy for getting to that objective in for the public to support the policy. If the objective is sustainability for current and future generations, we have to be careful with reliance upon physical mineral resources that face eventual depletion. We can use the vast resources and current production investments in more clean ways while developing sustainable long-term means as recommended by industry leaders. We can weatherize and make more buildings more efficient as well as vehicle transportation that does not depend upon petroleum supply. Taxes paid as investments for sustainable growth represent some measure of overdue expenses for the excess consumption of the recent decades, and those investments can spur an economic growth cycle that will pay long-term growth results while curbing some of the consumption habits. Market will dictate some of the ability to transition away from unsustainable energy, and thus putting a price upon wasted energy and emissions will help to curb the wasteful use of carbon-based resources. In the meantime, we can focus the investments upon building more efficient and renewable energy systems that provide for the sustainable goals. The policy makers will have to sell the policy alternatives to the public by building a better public perception of sustainable energy use and may have to reconsider the market structure as part of the policy alternative to encourage innovation in the markets. Given the limited supply of current fuels, the United States has limited time to transition to other supplies as well as to use more efficient energy habits.

SBSF 8530: Professional Practice and Application of Democratic Governance

Application: Recommended Strategy for Future Energy Policy

This paper will recommend a long-term strategic course for energy policy that attempts to satisfy many of the short-term interests identified in the previous discussions. Given the benchmark of an ideal energy production environment, we can use the various proposals reviewed and build a comprehensive approach and strategy for long-term sustainable energy policy. Again, this recommendation will be based upon the several proposals reviewed, data projections as well as the previous observations of what has and has not worked in changing government policy.

The plan can not assume a rational decision making within the population and industry where the profit and low cost are the only considerations. That assumption has guided the current policy and resource exploitation where the monopolized markets can not be fully trusted to move towards public interests that exceeds the horizon of short-term gain and profits.

The proposal for a strategic energy policy will have to across multiple sectors and institutions in order to be successful. First, the proposal will have to gauge public willingness to accept the proposal and engage the public to support the changes despite any immediate hardships that may arise. The proposal will have to gain industry cooperation and using many of their own proposals may help to gain that cooperation. The proposal will have to manage or will have to be conscious of changes in market prices as well as market conditions to encourage innovative technologies. Additionally, the utilities and power companies will have to review their objectives and plans to fit into an overall long term strategy that does not impede short term needs. The plan will

require better government oversight from federal through state level institutions that focus upon the long-term objectives.

This recommendation will implement business strategy model from MidAmerican Energy Company of "plan, execute, measure, and correct" as a model for driving effective operational change on a macro-economic level with a clear objective towards sustaining long-term power demands and production needs. This is in line with Rogers (2009) suggestion of milestones to measure progress in order to determine level of the progress as the strategy matures. At those points, administrators can use the milestone progress to measure feasibility of policies and determine what option are available in order to correct issues that arise.

Sustainable Energy Is the Objective

The primary and general objective is to achieve a sustainable energy generation pathway that is not limited to domestic physical mineral resources. Corollary to this premise is to be able to transition the public consumption from current operations to a different consumption and production patterns with minimal inconvenience to the public and minimized negative impact to short term needs of the companies. Thus, the public will have to be engaged and their sustained support for a long-term strategy will be essential to the operational changes required to attain sustainability.

Green energy policy will have to become exciting and profitable for a favorable public perception to take hold (Baker, 2002; T Friedman, 2008). The objective will provide for economies to be mobile and interdependent without the excessive overuse or dependence upon physical mineral resources. Industry will have to be able to weigh opportunity costs in favor of sustainability instead of maintaining current policy because

adaptation is inevitable (Stern, n.d.). People will further have to view passing on the energy, via conservation and investment, wealth to generations in a similar way as people consider passing inheritance to their children (Stein, n.d.).

An Ideal Energy System Review

The ideal target of energy strategy is attaining low cost power and sustainable supply that encourages economic growth beyond a couple decades. In that sense, sustainability is based upon most abundant and renewable resources possible with near 100% efficiency for on-demand energy consumption. Incidentally, civilizations for millennia have been using solar, hydropower and wind energy to provide energy as the most useable and accessible forms with minimal degradation of power over the lifespan of the Earth and minimal impact to future generations capacity to use that power. For air and space travel, non-petroleum propellants developed by world space agencies can be refined for commercial applications.

A Pathway to New Technology and Economic Growth

Commitment to new technologies and research are critical to delivering the next generation of energy systems and to be able to bring those investments to market prior to global competitors. Power companies in the industry will have to agree to allocate funds towards investment in new technologies where the government can provide additional support in the form of low cost loan as extra incentive and leverage to build them.

Thus, the initial government investment today will be paid back over time until the investment is paid back, and puts the government into a position of investor in the technologies. That position will obligate for a public “seat at the table” (as quoted by Gov. Kunin, Apr 2009) of deciding what money goes where and deciding if the objective

is being met. Additionally, Pickens's (2008) proposal to extend the Production Tax Credit should be implemented since subsidies appear to have improved renewable energy production, but the subsidy will have to be reviewed to promote sustainable and renewable power generation beyond 100 years. Quarterly reports by companies using the federal monies will have to report the progress of renewable energy development.

If the companies will be required to invest with government oversight, the public can assist with a $0.01 sales tax to raise funds for energy research and to curb consumption with an exception for groceries in order to not further disadvantage low-income people. The essential logic for this idea focuses upon that fact that the previous generations have abuse the excess capacity with short-sighted demands for low price power, profiteering and corresponding voracious appetite without real cost for the consumption. We can use a consumption tax to put a value upon the consumption, and invest the money into future technologies such as better grid technologies. Buchanan (as cited by Lee & Vedder, 1992) believes that Americans are willing to pay tax if they feel and see a value for the tax, as well if the tax is fair (FairTax.org, 2009). Further, taxes can be used effectively to curb consumption and attain energy related goals when people see the corresponding energy developments (Metcalf, 2008).

A one penny contribution per dollar spent on non-essential items can provide billions of needed investment dollars for energy production (given a GDP of over 11 trillion dollars of consumption yields an estimated $110 billion for development revenues per year). Some will argue this will slow economic recovery and there is a regressive nature of sales tax where poorer individuals pay larger percentage of income to taxes in these forms than those of larger. To that end, the exception is provided for groceries

which are the largest expenditures for low-income households outside of actual housing costs (Editors, 1996). For others, $0.01 increase in cost has not dramatically changed markets when cities localities have imposed them, and instead the investments from the energy developments will provide incomes and more market demand to offset any negative affect by the tax. This tax implementation could also provide for a study to determine the feasibility of replacing federal incomes taxes with an alternative sales tax strategy.

Another tax that should be seriously considered is an additional gasoline tax to curb the demand of petroleum of at least $0.10 per gallon. Europeans already have large taxes assessed upon gasoline which has effectively curbed the use of automobile transportation in favor of mass transit systems and trains (Komor, 2004; Baker, 2002). According to Center for Strategic and Internationalist Studies panelists discussing options for a low-carbon economy, the period of 2007-2008 showed lower demand for gas when prices rose (as cited by CSIS, 2008). The lower demand allows for slowed overall depletion of those resources due to higher cost of the price of gas. Funds raised from the gasoline tax should go to research for alternative transportation fuels. Given U.S. consumes over 15 million barrels of oil per day (production and imports) and one barrel contains approximately 19 gallons of refined gas, we get almost over $28.5 million a day (or over $10 billion a year).

All new tax increase proposals will be met with resistance due to people's desire to not spend any more in taxes. A gasoline consumption tax, like this one, will receive severe criticism since the reaction to the high prices last in 2008 where met with many public protests and pressure for Bush to release petroleum reserves. Any tax higher than

an average weekly standard price change should be gradually implemented in order to avoid shocking the economy.

Weatherization and technology updates for existing structures will be pivotal to reducing overall consumption of electric power. Many companies like Puget Sound Energy, Duke Energy and MidAmerican Energy offer energy audits, weatherization advice, and efficiency rebates for home remodeling and construction. Further, reduction of consumption can be achieved through augmenting these conservation programs as well as other weatherization programs to update structures to minimize energy demand.

NERC currently supplies electricity to over 334 million in North America and is responsible for setting many of the international standards in North America for electric reliability. The electric grid will have to be updated to use the new generation systems and on-demand smart technologies in using computer controlled switches and thermostats that do not waste energy and to be in compliance with NERC reliability concepts. Companies like Honeywell, General Electric and Cooper Power Systems have developed performance transmission systems that could reduce overall demand and corresponding emissions to generate the energy. The bulk power system (generation and transmission) still has to provide adequacy and security to maintain balance between supply and demand while implementing these new technologies. Money gained from the taxes could help to offset these costs to utility generation and transmission providers.

The initiation of a cap-and-trade system promoted by Duke Energy will put a market value upon pollution and wasted energy. This proposal will allow existing structures and generation facilities to be used and upgraded for improved environmental affects while industries migrate production towards newer systems with cleaner

technologies. This proposal will act as a catalyst since there has not been a market cost for the pollution in previous business models, and thus, this will favor the development of cleaner technology such as renewable wind, hydro and solar energy. Suddenly carbon emissions will become an asset to trade (Enkvist, Nauclér, & Oppenheim, 2008; Rau & Toker, 2008) However, older dirtier systems will be costly energy producers that get transferred to more costly consumer energy. If the public can withstand the price changes as they have in the past, these measures should be implemented.

The cap and trade system may negatively affect the markets that primarily generate electricity using coal or natural gas systems found in the central and western parts of the United States. These parts of the country may be more impacted by the new costs associated with the carbon emissions from generation plants. Therefore, the states should be mandated to penalize excessive petroleum-based emissions similar to proposals in California where states could trade the emissions credits in markets like the carbon credits. This will impact motorists while forcing states to implement tough standards to auto makers to build better and more efficient automobile or mass transit transportation.

Low cost efficiency technologies have to be marketed beyond upper class households and reach into the larger residential sections as well as commercial communities. Zero-energy home projects like San Diego project observed by Corburn and Farhar (2004) and a proposed project in Iowa from Hansen (2009) can be implemented across large developments to build new structures and remodel existing structures with a specific population target of middle to low-income households. Broadening the energy efficiency will increase the consumption reduction rate as well as encourage economies of scale for the developed technologies.

The transition from current to new methods does not have to automatically result in net loss of jobs or destruction of current investments in refinement systems. The reduction of oil imports will cause changes in business structures for major oil companies and thus affect related jobs. Money saved from imports could be transferred to building new production systems that enable retention and reeducation of labor forces with newer technologies. Europe was forced to transition production systems in the 1970s and has been able to develop a skilled workforce that adapted to the new market conditions (Komor, 2004).

The markets will have to be opened in order to allow for more competition among production facilities. Government support of energy monopolies has only perpetuated the resource exploitation rather than broadening into more diversified energy portfolios while ignoring anti-trust statutes that have been argued against other markets. By encouraging pure competitive markets to function, the capitalist ability to innovate and to stimulate growth will be encouraged. Additionally, government oversight of commodity markets will have to be tightened to keep companies, fund managers, and investors more accountable to their pricing schemes and to minimize use of market prices to challenge market penetration or policy objectives.

Oil Reduction is Priority

Reduction or elimination of petroleum as a fuel reduces overall energy consumption by almost two-fifths (DOE, 2009). The reduction will lower import demands, and the reduction will mitigate against future foreign price shocks considering the estimated importation of 70% oil consumption and rising global demand (Pickens, 2008; Chu, 2009). Yet, that reduction will have to be offset by other sources with whole

new technologies that implement a useable form of transportation energy that transition away from petroleum. Electricity and natural gas powered vehicles may provide the offset to maintain the mobile economies.

Again, the largest sector of energy that has to change is petroleum in order for the United States to become "energy independent". The previously mentioned projects can upgrade and prepare the power grid for extensions into alternative fuels for transportation since petroleum is primary source for transportation energy. Expansion of natural gas as a vehicle fuel puts the United States into a position of short-term relief but would not provide long-term resolution since there is a limited quantity of 200 years according to Sheffeld (2002). If we switch all vehicles to natural gas, the corresponding demand for natural gas will rise exponentially to include the previous demand for oil until we reach another depletion crisis for natural gas.

Application Discussion

Thomas Friedman (2008) comments can be reiterated here that points out that we can complain about the eventual problems and ignore them, or we can be part of "the revolution" that readies our economy for sustainable energy. The markets created by transitioning to new "green" technologies and research while addressing the energy demand and supply issues will provide jobs over the long-term as the antiquated jobs are replaced. Clearly, the United States has to abandon the business as usual methods that have proven to be unreliable in pushing towards a long term coordinated objective. As noted in the historical context, there are markets barriers for sustainable and renewable energy and that has made domestic market penetration difficult for alternative resources except through subsidies for the small percentage of renewable energy (Hansen, 2009).

Weatherization and energy efficiency products can help to address the demand portion of the energy policy while the industry reviews ways to change facilities to tackle the production issues. The overall grid infrastructure can be migrated to accommodate new technologies and lower the loss of deliverable energy. A more responsive grid and delivery system can deter or limit needless idle energy use and redirect the power to accommodate actual demand. This requires investment by the power companies at a potential cost to overall electricity prices to absorb the investment.

The cap and trade may adversely affect the economic development of the middle and western United States since majority of the coal generation is located in those areas. While the prices may trickle out, the economic impact will be felt most in those areas as companies adjust to new cost structures. Emission penalties should also be implemented for cars that should be assessed to the states that exceed emissions standards. This will force states to move towards tighter auto emission needs to lower overall pollutants.

While the electric grid is updated, policy will have to address oil as the priority concern due to diminishing global quantities available for consumption. Here, we can review a couple different proposals that provide a means for transitioning away from oil dependency, but any proposal should scrutinized for the sustainability objectives for future generations as well as our current generations. Changes in transportation energy will cause some inevitable inconveniences. Low efficiency SUV vehicles that have gained significant popularity in the United States (Baker, 2002) will have to be among the first vehicles to be given stricter efficiency requirements and to be converted to using alternative fuels in order for changes to import requirements and overall oil consumption to be affected.

Airlines and oceanic shipping will have to reconsider fuels for aircraft and cargo systems as previously mentioned. Since the airlines are already financially strained, the changes here in fuels will impact them and their ability to transition to alternative fuels while trying to stay in business. Updates to vessels may incur higher shipping costs which may stall global economic growth that is dependent upon international trade.

Current investments in oil companies reach many diverse portfolios include many 401k plans, and thus, protection of those investment values will be paramount to retirement options as well as general market profitability. When oil companies are forced to change whole business models, that change will impact the overall profitability as operational costs accumulate to meet the new operational changes.

"Transition", "restructuring" and "change" in terms of business and economics infers a corresponding cost where extra variable costs are usually calculated in terms of labor. Resistance to change will be most revealed from those who want to secure current employment and business environments that sustain the current workforce environment. Resistance to green technologies will also be seen in those that feel too much inconvenience to current lifestyles (Stein, 2004). There are, however, two problems with this resistance and the first is that the current business model is not sustainable past a few decades. Second, the younger generations of workers have become less loyal to single companies over the past couple decades due to corporate restructurings, use of offshore resources, as well as pursuit of individual career advancements (Cetron & Davies, 2008).

The current, younger workforce has endured and learned to adapt to employment inconsistency that have been prevalent over the past years. This generation has not had the consistent strain of a cold war or continued affluence that marked previous

generations. Younger generations have had to endure devastating terrorists attacks, stock market bubbles, price fluctuations, space shuttle disasters, and at least three wars (not including strikes in Bosnia, Libya, Grenada or Somalia). The consistency in environment and the workplace have been absence in the past couple decades that were more prevailing for previous generations (Cetron & Davies, 2008). Thus, this workforce appears to be less concerned with company loyalty, more accustomed to environmental changes, and more welcoming to positive change ideas as evidenced through the strong support of Barack Obama in 2008 where "hope" and "change" were his core mantra. As well, this workforce will be more willing to change when there is a clearly defined, positive potential to secure better opportunities in the near term.

This position by the younger workforces infers that they are looking for leadership to drive the change that appears to be missing from government and industry. Sustained public pressure will be required to see government action translate into actual industry changes. This transition will have to be governed with strong leadership that is willing to take political hits while focusing upon the objective and pushing towards a long-term sustainable goal. The leadership will have to understand the complexities of organizing across sectors and getting self-interested companies to work together (Agranoff, 2003; Boutelle, 2004; Schorr, 1997). Further, the leadership will have to transfer to future leadership the importance of the long-term objective and the underlying goals.

Application Summary

Given that over 85% of the energy supply that generates electricity and powers vehicles today will be gone within the next couple centuries requires that the United

States reconsider energy policy that is so heavily reliant upon exhaustible fuels. Especially since the mobile economies are based upon even smaller quantities of petroleum resources, alternative fuels have to be developed before the world faces a complete crisis of depletion that will bring economic development to a crawl.

The energy policy has to clearly define an objective and strategy for getting to that objective in for the public to support the policy. If the objective is sustainability for current and future generations, we have to be careful with reliance upon physical mineral resources that face eventual depletion. We can use the vast resources and current production investments in more clean ways while developing sustainable long-term means.

Taxes paid as investments for sustainable growth represent overdue expenses for the excess consumption of the recent decades, and those taxes can spur an economic growth cycle that will pay long-term growth results while curbing some of the consumption habits. Resistance to the taxes will be immediate, but avoidance of the consequences will not be sustained for long. Additionally, tax credits and government treatise have to focus upon promoting sustainable resources rather than securing vulnerable resources from foreign entities that do not have United States' interests as priority.

The best effect of efficient systems is to target those whom use the most. For example, SUV vehicles have become popular for their multi-purpose capabilities, but they also have significantly lower mileage (Baker, 2002). More efficient standards or changing to alternative fuels for these vehicles will change the majority of vehicles on the road today and the technology can be pushed to regular automobiles. Thus, new

technology development can not be available to exclusive or to only upper-class households with the discretionary means or to the smallest markets. Instead, technology developed with economy of scale can benefit a wider population while reducing overall energy demand.

Understanding these ideas, leadership can guide public sentiment and keep focus upon the overall objective to ensure better implementation of the policy. Leadership can not get diverted by needless scandals and has to muster public pressure in a sustained attempt to get a sustained policy. Hardships and price fluctuations are to be expected where many fully understand that complication through the recent years of tough times.

Change is not a strange concept to the younger generations and this will be the generation that has to bear the burden of the transition. Hopefully, the apparent desire to change as exercised in the voting booth translates to a real effort to get a long-term energy policy. We need to transition now as we may not have the resources to transition further into the future.

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