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The author of this article presents the potentials of what can be achieved without addressing the political likelihood of implementing any of the suggestions that are made. He hopes to promote a meaningful discussion that will advance the possibilities within and between the industry sectors that are mentioned.

Oops! We've been Drilling in the Wrong Place!

By Steven C. Hall

An energy resource is immediately available that will annually yield over three times the total energy produced from the US Gulf of Mexico (US GOM). Drilling into this resource creates over 5 million jobs annually over the next ten years. Oil or coal once burned are gone and leave residuals of pollution that cost additional money to clean up. In the case of strip mining of coal and the Gulf Oil disaster, we are left with permanent scars that harm our environment for a very long time or forever. National investments in oil and coal through subsidies go up in smoke. Our other resource is clean and actually reduces pollution by 30 percent, leaving only positive environmental benefits and adding value for users with permanent positive returns on investment. Its residuals create value and success for our general economy.

Oil and coal investments yield negative long term returns for America by reducing a depleting resource while increasing pollution and costs. Investment in this other resource will yield a positive return compounded forever. Using this resource is also estimated to add 10 percent in value to our aging infrastructure. The collateral value is restoring significant employment with a workforce trained to exploit this resource with new skills that will create new business opportunities. Energy costs of US businesses that use this resource will be reduced by 30 percent. A shopping center developer/owner told me a 30 percent reduction in energy costs would improve his bottom line 10 percent.

Both of these benefits will enhance the competitiveness of our workforce and of U.S. business in the global market. With proper incentives and financing, the use of this resource can provide immediate positive cash flow to all users both commercial and residential.

Where We Are Now

The total amount of crude oil produced annually from all U.S. drilling in 2009 was 1.6 million barrels per day¹. It is 8 percent of the total U.S. consumption - 20.7 million barrels per day². Oil is the largest fuel source for U.S. energy at 35 percent of our energy pie³. Buildings consume 39 percent of our overall energy requirements⁴. The touted value of oil is its domestic production, even if priced on the international market. While a small percentage of crude oil production ends up as heating oil, any

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reduction in its use is clearly of great value. Even better would be the satisfaction of the total U.S. energy requirements from alternative sources. While we still need oil, we all know we must move rapidly to significantly diminish our use of it.

The question is how much energy from other sources and how quickly. One result is surprising. In light of the recent disaster in the Gulf, it is instructive to compare the total energy value of the oil produced from the U.S. GOM with another domestic energy resource.

Our Other Untapped Domestic Energy Reserves

We have at hand another much larger domestic untapped reserve of energy. We need to get serious about drilling into this reserve to unlock its tremendous potential. It has collateral benefits of adding infrastructure value, significant job creation throughout the economy (particularly for small businesses), making U.S. business more competitive, dramatically reducing pollution as well as returning on investment at least 3 percent or more per year indefinitely.

Using the addict analogy of former President G. W. Bush, investment in oil will only get us to the next bottle, or barrel. Once it is burned, it is gone, no residual value — a temporary fix to what is a fatal addiction. All acknowledge the needed independence from this oil energy addiction.

This domestic source of energy requires no new or dangerous technology. We know how to do it and the results are in. It works. It is immediately available. It is time to really drill into this untapped resource, not just the token steps taken to date. The least expensive energy with no pollution side effects (hangovers, if you will), is energy not used.

Our Conservation Energy Resource

Creating energy conservation in existing buildings is our vast untapped reservoir. It is also a way out of our unemployment stagnation. Buildings ten years or more in age can achieve 30 percent or more in annual energy savings <http://www.usgbc.org/>⁵ through energy retrofits. A building energy retrofit is a renovation specifically targeted to reduce energy consumption, usually to a percentage goal that justifies the investment. A BTU⁶ comparison of the potential retrofit energy savings to the energy production from U.S. GOM oil is revealing. The potential of annual building retrofit energy savings equals over 2.75 times the total annual energy from oil produced from the U.S. GOM.

This calculation includes only commercial and single family homes. It does not include retrofit savings from other commercial, public, manufacturing or industrial building uses as those statistics are more difficult to isolate. It also does not include multi-family housing. Including these other building types would likely push the energy savings potential well past three times the energy value of the U.S. GOM oil. As it stands, the conservation figure of potential energy savings if compared for BTU energy



value would be 22 percent of the total U.S. oil consumption versus the 8 percent presently produced by the U.S. GOM.

Commercial office space

There are 70 billion square feet of commercial office space as reported by Building Design and Construction <http://www.bdcnetwork.com/>⁷. Eighty percent of this space (56 billion square feet) is 10 years or older. The last EIA (U.S. Energy Information Administration www.eia.doe.gov) estimate of average energy costs per square foot was \$1.51 per square foot in 2001⁸. An escalation of energy costs at 3 percent per year is approximately \$2.00 per square foot in 2010. A 30 percent savings equals \$0.60 per square foot. Let's use heating fuel oil as a measure of value and energy for BTUs at a current price of \$2.90 per gallon. We then convert to BTUs and the math comes to a potential savings of an energy equivalent of 2.6 million barrels of crude oil per day at the established figure of 5.8 million BTUs per barrel.

Residential single family homes

There are 66.3 million owner occupied existing homes 10 years or older in the U.S. according to a report by the National Association of Home builders (NAHB <http://www.nahb.org/>)⁹. The average home uses 190.1 million BTUs per year¹⁰. A 30 percent energy savings equals 57 million BTUs. The math of a BTU energy comparison comes to 10 (rounded) barrels of crude oil per year. Energy retrofits on 66.3 million homes yields the energy equivalent of 1.8 million barrels of crude oil per day.

The total potential energy savings from both these building retrofits, commercial office and single family homes, is equal to 4.4 million barrels of oil per day, 2.75 times the total daily production of 1.6 million barrels from the U.S. Gulf of Mexico.

The Costs to Drill and Use this Resource

It is difficult to estimate an average cost for commercial office retrofits as every building will have different requirements. Measures for some buildings are relatively simple and straightforward such as replacing aging core plant equipment. In some cases a simple change out of the lighting may accomplish significant savings. Sometimes a new control system with building management training and a power purchasing agreement will achieve 30 percent savings. In many cases the thermal efficiency of the building envelope will do the same by replacing glazing and insulating the exterior walls and roof. Some owners may elect several measures at greater cost to get to 50 percent efficiency savings. Retrofits usually require other collateral work. Some may wish to add in architectural improvements to increase the marketability of their buildings.

With some judgment from practical experience, let's pick a figure of \$25 per square foot to achieve the 30 percent savings goal with some collateral work. That works out to \$1.4 trillion for 56 billion square feet. For homes the NAHB data average value for energy retrofits is \$12,898 with some collateral work¹¹, so let's round to \$13,000. Retrofits for 66.3 million homes would cost \$862 billion.



Using these figures, the estimate for fully exploiting the potential of commercial office and home retrofits today is \$2.3 trillion. Adding in other building types will only significantly raise this figure, perhaps doubling it.

Economic Benefits in Job Creation

A 2009 report¹² by the Associated General Contractors of America (AGC www.agc.org/) to the House of Representatives estimates that every \$1 billion in non-residential construction requires 28,500 jobs in construction and related industries. Using that ratio, \$1.4 trillion of commercial building retrofits would need the support of 40 million jobs. The NAHB Task Force report says \$1 billion in home retrofits creates 11,000 jobs, so \$862 billion will require 9.5 million jobs. That's an astounding total of 49.5 million jobs. These jobs are direct, indirect and induced spread across our entire economy: manual and skilled labor, architecture, engineering, manufacturing, supplier, legal, finance and support services such as restaurants and the like. And according to the AGC report, 91 percent of construction firms are small businesses, the source of most jobs. The local economies supporting the oil and gas industries will also need conservation conversions. The skill sets for jobs in the oil and coal industry are easily transferable to the construction industry as these jobs are replaced over time with jobs in the retrofit of buildings, but this will be over many years as the transition to a clean energy economy develops.

In year one, this building retrofit program would erase the current 17 percent unemployment in construction, restoring it to near the recent high in 2006¹³. It would reduce national unemployment of 14.9 million¹⁴ by one third from 9.6 percent to 6.4 percent.

As stated in the AGC report, the economic benefits are suffused throughout the entire economy. The multiplier effect for every \$1 trillion in construction is \$3.4 trillion added to the GDP. Building retrofits would add a total of \$7.8 trillion to our GDP over the duration of the conversion.

The Path to Success

Clearly we can't wave a magic wand and achieve these results quickly, but we must jump start our current meager sporadic local efforts with an aggressive national program. We set a goal of getting to the moon in ten years and did so. For this energy efficiency retrofit goal we don't need to invent or test technology. It is more akin to the mobilization of resources for WWII — a production issue. Surely we could set this goal for energy efficiency and independence. Averaging the figures over ten years, we would immediately soak up one-third of the total current unemployment with the need of roughly 5 million jobs per year to meet the annual need of \$230 billion in construction economic activity. Let's call it our "30/10" energy program: 30 percent conservation in 10 years.

Financing an Efficient Energy Future and Economic Recovery



Our economic recovery is presently stuck. Business, even with cash in hand, is unwilling to count on projections of returns on investment. Even modest energy improvements with calculations that support simple paybacks are on the back burner. Even if building owners decide to go ahead, they cannot find financing. There are, and have been, incentive programs that have created some spurts in retrofits in parts of the country. Yet these programs are localized by state and municipality with the uncertainty of the availability of funds. As an example, Connecticut recently voted to raid its Clean Energy Fund to pay budget deficits even as its economy is sinking. It is grabbing a bottle to drink versus building a boat to get to the other side.

New regulations are coming online that will mandate energy efficiency in new construction. Some cities like New York are mandating energy upgrades of older buildings of 50 thousand square feet or more. In New York that adds up to 17,000 buildings according to Candace Damon of HRA Advisors, Inc.¹⁵.

The modest escalation of 3 percent in energy costs may be low in coming years. The price of gas at the pump is estimated to rise by 6.4 percent¹⁶ in 2011. We need a key to unlock the door to an efficient energy future from building retrofits as well as all other alternatives. Above all, business needs uniform policies, stability and constancy at least five to ten years out. This needs to be a national priority. We need national energy standards for percentage use reductions locally implemented regardless of local energy pricing.

Bonding to Finance and Bonding to Secure Risks

It is unlikely that the full potential of construction described above is a reality, although it could be if we as a nation unify in this goal. But 50 percent or even 30 percent would be a great benefit, and certainly when other building types are added, the numbers for construction costs and jobs will move back up. \$2.3 trillion is a lot of money, even over ten years. But in contrast we have spent or will spend something like that amount on wars in the last ten years, except that we borrowed it. Unfortunately that money is gone and we can't afford to spend that amount again on borrowed money. We need to find alternatives that are deficit neutral.

Traditional financing

The private investment and banking sector will probably finance a portion of projects with the most attractive payback options, but this portion will be small unless much larger energy efficiency incentives are offered. With higher incentives and the bonding programs described below, they can enter the energy efficiency retrofit market with confidence backed with sound underwriting that justifies their lending and investments.

Finance Bonding

On the table right now and being implemented in pilot programs is Property Assessment Clean Energy (PACE) financing for energy improvements¹⁷. These are state and local municipal bond



programs designed to finance building energy retrofits with assessments on the properties for the value of the improvements. Although initially targeted for residential properties, there is no reason the program could not be applied to commercial properties as well.

Project Surety Bonding for Payment and Performance

Years ago I was hired to execute the workout of what was then the largest contractor surety default in history, \$500 million in 1981 costs of bonded construction by Travelers for one contractor on 22 large jobs spread from Las Vegas to the Gulf and on up the East coast to New Jersey. We successfully completed this work, and I learned a lot about bonding. In fact, I was later asked by the United Nations to write an article, published in the U.N. Development Forum, on the virtues of this system that started in the U.S. and is unique to North America <http://www.chandlerllc.com/pdf/DevelopmentForum.pdf>¹⁸.

This form of security was a key instrument in the early infrastructure development of the U.S. when capital was scarce or non-existent and financial guarantees or collateral could not cover the cost of construction. One hundred percent Surety Payment and Performance bonding later became nationally institutionalized with the Miller Act of 1935¹⁹ requiring that all municipal projects be bonded providing owner protection for all government projects, federal to local, as well as payments for material and labor suppliers to government projects that are not legally subject to liens.

This is an instrument ideally suited to energy retrofits for traditional financing and would be especially effective for PACE projects. What it offers is a one hundred per cent guarantee of contractor performance and payments. Bonds by the private surety industry would provide substantial risk protection for both owners and lenders. Underwriting would screen projects for both projections and actualization of performance in both energy savings and construction. With the precedent of the Miller Act, we could pass a federal bonding program for PACE initiatives, and in fact for applications to all retrofit financing. A 30 percent savings threshold could be the qualification for getting a bond. Bonding was the key in our early development, now it can play the same role in our re-development.

The use of these financial instruments should be designed to yield an immediate positive cash flow return to building owners on the gains in energy efficiency.

Wall Street has been endlessly creative in devising financial instruments that have been destructive. Now let's give them a chance to redeem themselves and devise instruments for a constructive bonding mechanism that operates from the national to the local level for both commercial and residential retrofit projects. A not insignificant additional motivation would be bonding fees at current rates of 2 percent on \$2.3 trillion of construction work. Fee income of \$46 billion is not chump change. I am reminded of a bond underwriter who in the 1950's proudly showed his family the major infrastructure projects benefiting them and their neighbors that were possible because of his work.



Let financiers once again have pride in seeing and touching the physical fruits of their labor as the nation redevelops and maintains its world leadership role.

Incentives

We need a standardized approach and guidelines to energy efficiency to replace the patchwork quilt of programs at state and local levels. We could set minimum national standards for qualification for, say, bonded PACE programs. Energy use reductions of 30 percent could again be the benchmark. The financial industry would then react to these programs by self pricing bonding in the marketplace as it has done with the Miller Act requirements.

To jump start the economic decisions to make improvements, we need to provide incentives of greater magnitude than now available in most locations. The size of the incentives must be unequivocal in proving to owners and bankers that there is bondable economic benefit. Sooner or later we will pay much higher prices for energy and, in particular, for oil. Indirectly we are already paying a huge price for oil and coal in protection of resources, in pollution and in cleanup. The longer we put off the transition the more difficult and expensive the transition will be. We must touch the third rail and transfer some of the many direct and indirect subsidies given to the oil and coal industries and pass them to energy conservation.

The current annual subsidies to oil and coal are difficult to estimate as there is a morass of hidden indirect subsidies and benefits buried over many years in various pieces of legislation and the tax codes, federal state and local. The total amount is variously estimated at many times the direct subsidies. The Environmental Law Institute <http://www.eli.org/> reported²⁰ direct subsidies (2002-2008) at an annualized rate of \$12.4B that includes ethanol, a fuel that contributes to environmental degradation and is a net consumer of energy. We must dig deeper for the sake of our energy future and provide at least \$20B per year for building retrofits. That amount is about 10 percent of the ten year annualized cost of retrofits, a reasonable incentive amount to move owners and lenders. And according to the 3.4 ratio in the AGC report, this investment will provide an annual yield of \$68B in GDP, a pretty good return even for venture capitalists. It seems just plain commonsense that we must invest in the re-construction of an energy efficient America able to compete with other nations already on this track.

The counter argument is that this transfer of subsidies will increase the cost of energy. In the case of oil, it is priced on the global market and the U.S. GOM accounts for only 2 percent²¹ of daily worldwide crude production, thus negligible impact and the \$20B would actually be spread across all oil products and energy from coal. But for the sake of argument, let's account for the total transfer of \$20B per year in the price of gas at the pump. That amount divided by the total U.S. consumption of gallons of gasoline of 137 billion²² gallons is \$0.15 per gallon. The national average of 12,000²³ miles driven by each person at the average of 20.3 mpg equals 591 gallons per year for an extra annual cost



of roughly \$90, or \$7.50 per month. Does anyone doubt that an out of work person would not jump at the chance to pay this small amount for a job? Or that the general public would not support this small increase to achieve the reduction in unemployment of 3.2 percent and the boost to the economy with all the other benefits of the retrofit energy efficiency program?

Let's Drill in the Right Place!

The dean of energy analysts, Charles T. Maxwell, says it best. He is a senior energy analyst at Weeden & Co www.weedenco.com/ in Greenwich, CT. He has been working in the energy field for 36 years. In an article, "The Gathering Storm"²⁴ first published in 2004 in Barrons www.barrons.com, he laid out three energy choices for America. We have tried the first option with the negative results he predicted, we are presently on the second untenable option, so with his permission let's focus on his third more optimistic option:

" - - - changing our life style by deep conservation while heavily investing in alternative energy sources at higher costs.

By elimination, if not by wisdom, we will eventually turn to a massive national and international conservation effort.

Whenever we decide to confront this reality, the resulting program surely will require many years of investing vast amounts of capital. - - - Without discipline, mental and physical preparedness and an intelligent selection of priorities conceived early enough to keep us from wavering, we will not pass the oncoming test."

Energy is one of the most serious issues we are facing for the future of our country. So let's get on with this program we all know will work and put America back in control of its energy future and our economy back on track.

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⁵ US Green Building Council <http://www.usgbc.org/>

⁶ Btu- British Thermal Unit: a universal measure of energy whether from oil, natural gas, electricity or other fuels

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