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The Role of Existing Generation in the Fight to Reduce Greenhouse Gases

5.30.08 [Scott Stallard](#), VP Energy, Asset Management Services, Black & Veatch

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Given all the attention being afforded renewables in the fight to reduce greenhouse gases, one could presume that the power generation industry can ignore existing generation as it fashions its strategy. That could be a significant miscalculation!

While it is clear that existing coal-fired power plants are indeed significant emitters of CO₂, the importance and size of the role such existing generation holds with respect to the CO₂ reduction opportunity is often less understood.

One can quickly see that the installed base is, indeed, a formidable opportunity for CO₂ emissions reductions due to both its sheer size and yet burdened by the inevitability or impossibility for new technologies to replace existing generation.

What about retirements? Given projections for continued growth of energy demand, one can postulate that as an industry we will be fortunate to keep up with increased demand even if we fully exploit *all feasible* sources of energy going forward for supply to even approach projected world demand. That picture would translate into existing coal-fired generation playing a significant role for the next 15-20 years with only the oldest or least-efficient of units being retired.

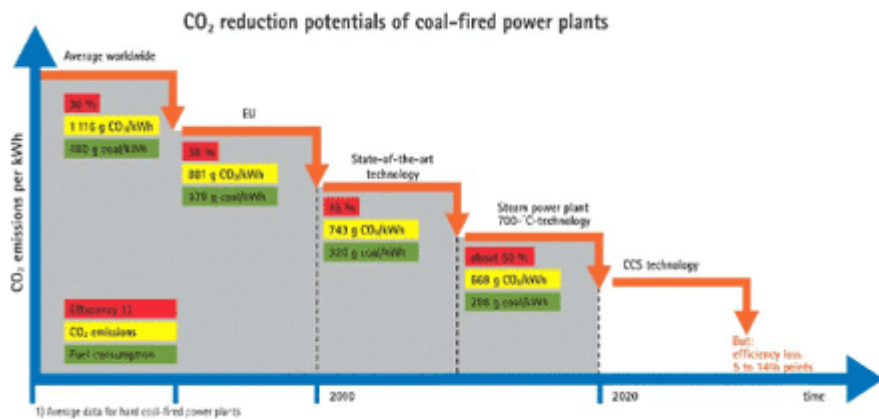
What about deployment of new technology? It's a given that new technologies can reduce incremental CO₂ emissions per MW of new capacity produced by coal ... the question then turns to what impact can new, high-efficiency coal units have on CO₂ situation given the potential role of carbon capture and storage (CCS)?

To answer this question, one needs to better understand to what degree technologies are commercially proven vs. "still in development." A particularly interesting picture of this has been developed by the German research organization, VGB. As one can see from the following picture, the addition of carbon capture and sequestration to the technology mix as a commercial offering remains at least 12-15 years away. It's obviously a goal/ambition of the industry to adopt such innovative solutions ... but at what price, what scale, and on what schedule?



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Source: VGB

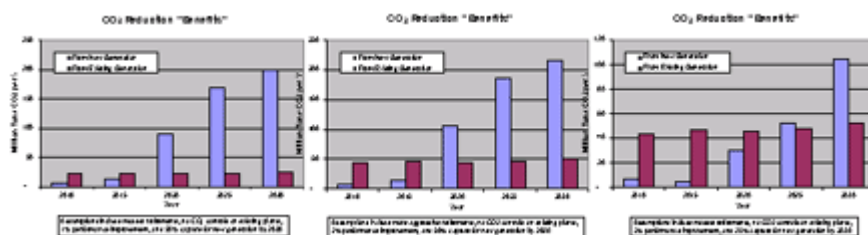
[Click here to view this image larger.](#)

Given the above, let's take a more refined look at the question of "how to reduce CO2 from coal-fired generation sector," – one that recognizes the impacts/limits imposed by both technology readiness and fleet size. Based on EIA projections for demand increases/generation mix, assuming baseline efficiency based on today's technology (without CCS), the projection for CO2 from US coal-fired generation is shown in the figure on the right.

Lets now explore the problem further by focusing on CO2 intensity/MWh along two key dimensions:

- The degree that incremental CO2 emission reductions can be realized from new coal plant
- The opportunity for improving plant efficiency/reducing CO2 from existing generation.

CO2 mitigation benefits from new generation can be approximated by combining value of heat rate impact and CO2 capture rate. This provides a large opportunity for the plant(s) in question but lesser impact at US level due to small contribution of "new coal" in overall generation mix. Conversely, CO2 mitigation benefits from existing generation can be equated to CO2 reductions achieved either through performance/efficiency improvements or, in the future, CO2 capture. At the plant level, improvements may be modest without CO2 capture but the large population of plants bolsters opportunity value. This is illustrated below.



[Click here to view this image larger.](#)

As can be seen from the above, the "relative" benefit from CO2 mitigation through performance improvement can be greater in short-term than that realizable through new generation and can remain a significant contributor through 2030 and beyond.

This brings us to the not-so obvious conclusion that seeking out ways to substantially reduce CO2 within the confines of the existing generation assets is quite relevant. While there are a number of possible options, the most practical would be combination of equipment upgrades and/or plant efficiency management/optimization.

Let's take a closer look. The World Energy Council (WEC) and others have shown in past that there is significant opportunity to reduce baseline emissions and fuel consumption by improvement to plant and transmission/distribution efficiencies.

- Improvements to management practices
- Reliability
- Fuel Utilization
- Efficiency
- Capacity

Such improvements can often pay for themselves and have dramatically better cost-to-results in terms of \$\$ investment required; they can be also tied to other plant performance, reliability, and cost drivers. Innovative means exist for leveraging tools and technologies that help raise plant efficiencies and lower emissions, help address aging equipment, aging workforce, and allow greater fuel variability – all within a capital scarce environment.

Today's technologies, if applied aggressively, can make a major impact on CO2 emissions and help both the US and the world migrate toward a more efficiency-oriented view of generation, irrespective of fuel source. Such a shift does require more concentrated efforts to leverage traditional efficiency and reliability enhancement tools including:

- Performance Monitoring Systems. Performance monitoring systems offer unique analytics to better quantify both actual and target heat rates, given current conditions; such systems also provide comprehensive frameworks for identifying and addressing sources of efficiency "leakage."
- Coal quality analytics. One of the difficulties in optimizing heat rate for coal fired generation lies in variability of coal quality, surface moisture, and its impacts on heat rate both in terms of boiler efficiency and auxiliary load requirements. Traditionally tools capable of addressing such issues have been off-line and more oriented toward analysis vs. operations support. Today, such capabilities are being redeployed, often in conjunction with real-time coal analyzers, to provide a much more comprehensive view of such impacts.
- Optimization tools/suites. Optimization is a complex issue that goes beyond pure efficiency as such systems must also consider other environmental issues, costs/risk associated with equipment operations tactics, load shape, etc. A new breed of optimizers that are capable of collaborating to address multiple objectives are now commercial offering both significant payback and substantial opportunity to reduce CO2 emissions for a given level of generation.
- Advanced Controls. Efficiency opportunities are also available by better managing dynamics of startup and ramping. Application of such systems provides both a more efficient and less risk/wear-and-tear operating regime.
- Capital modifications to improve overall cycle capability. While a substantially larger investment is required to take advantage of such opportunities, such as, for example, installation of new, more dense turbine rotors, the payback is nevertheless attractive; of course, since such systems often provide both additional capacity as well as efficiency, it is critical to address regulatory approval requirements.

Technological innovation has been identified across political, financial, and technology thought leaders as one of the key challenges in arresting the greenhouse gas problem. While most of the current focus has been on applying technology to address high hurdles to meet enormous reduction targets, one should not discount the use of innovation/technology to address lower and more readily attainable hurdles via existing plant performance/emissions improvements.

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Readers Comments

Date	Comment
Malcolm Rawlingson 5.30.08	Good article Scott. I read it with great interest. While I am no supporter of the notion that there is climate change being induced by CO2 in the atmosphere I do agree with you that better management of the exhaust of existing coal power plants is a much more productive use of resources and the gains to be had are significant. The simple replacement of old inefficient plants with modern fluidised bed technologies is much more productive than covering the country with windmills or PV arrays. Unfortunately the public is convinced that all production of CO2 must stop if the world is not going to be inundated with floodwater from high

sea levels. Of course none of that will happen - it is much more likely the earth is entering into another ice age rather than any significant warming - but as long as the public and its politicians believe otherwise coal will be the outcast and improvements - however significant to coal technology - will be out of favour.

Only in about 20 years when the public realises it has been "had" will that change.

Good article though - food for thought.

malcolm

Edward A.
Reid, Jr.
5.30.08

Scott,

The application of the techniques you describe is driven by, or constrained by, return on investment economics and regulatory decisions to allow/disallow the incremental investments in rate base. If managements see the economic benefits (or, in the case of carbon taxes or cap & trade, the economic cost avoidance opportunities) and regulators recognize them as well, there is hope for progress.

Malcolm
Rawlingson
5.31.08

I agree Edward. But returns should be based on real economics - not the fantasy world of carbon credits trading which seems more designed to line the pockets of credits brokers and traders rather than do any real and lasting good for the environment - or the economy for that matter.

Malcolm

Edward A.
Reid, Jr.
6.1.08

Malcolm,

I agree. However, government and regulators can (and likely will) redefine "real" to include what you accurately refer to as fantasy.

The only clear goal I see regarding this issue is the tax (or fee) collection.

Len Gould
6.3.08

Malcolm:

[\(AP\) -- NASA's press office "marginalized or mischaracterized" studies on global warming between 2004 and 2006, the agency's own internal watchdog concluded.](#)

Scott: [Black carbon pollution emerges as major player in global warming](#) -- I know, just saying, better be keeping track of soot emissions as well....

Paul
Stevens
6.4.08

Len NASA quietly fixes flawed temperature data

<http://michellemalkin.com/2007/08/09/hot-news-nasa-fixes-flawed-temperature-data-1998-was-not-the-warmest-year-in-the-millennium/>

"The warmest year on record is now 1934. 1998 (long trumpeted by the media as record-breaking) moves to second place. 1921 takes third. In fact, 5 of the 10 warmest years on record now all occur before World War II"

No argument with the benefits of reducing particulate emissions though. Saving 50,000 lives a year in North America seems like a worthwhile cause. They are all more at risk than the inhabitants of the Maldives.

Len Gould
6.4.08

paul: From a comment on the blog you linked "IMHO-This proves the whole report was a hoax and that the Anthropogenic Global Warming theory is not supported by Science"

This is completely ridiculous. As I've said here and elsewhere many times, anyone trying to point to current events to prove or disprove "earth will warm up significantly due to increased atmospheric GHG levels" is on extremely shaky ground. With earth's huge ocean heat sinks which could take a VERY long time to reflect any increase in retained heat, I'd be surprised if any PROVABLE measurable effects currently show up. (I will note however, that the corrections to the NASA temperature history data do not eliminate, simply moderate somewhat, the smoothed upward trendline in temperatures. Neither here or there IMHO). My concern is entirely based in the physics of the GHG molecules in earth's atmosphere, and the provable FACT that those in place to date have kept earth's average temperature a significant amount higher than the moon's, when they both receive identical insolation on average.

The ONLY way to get around that one is to PROVE that adding more GHG's to earth's atmosphere won't have exactly the same effect. Ice core historical data from as much as 450,000 past years indicate that atmospheric GHG levels and average temperatures change in very close synchronization at least up to 280 ppmv CO2. What happens at current or future levels is so far completely unproven, but the probability is obvious.

We're conducting a very stupid (and completely unnecessary) experiment with the only spaceship we know of which can support our species. Too bad the spaceship doesn't have any intelligent species on board.

Len Gould
6.4.08

And I could also point out the existence of some very numerous YouTube videos (can't find links anymore) showing that starting around 2000, several city weather stations have been moved from the rooftops of city buildings out into the centres of city parks (obviously cooler). Even granting this should be an improvement, has it been a widespread policy? Has the historical record been corrected for it?

Paul
Stevens
6.6.08

Hey Len

I'm obviously no climatologist. Just as obviously I know less about the physical interactions and physics on a molecular level than you. I don't know how much contribution GHG's are making to the warming or whether increasing CO2 causes, or is a result of increased world temperatures.

I guess my concern is about the effectiveness of money spent to combat increased warming as opposed to other things. We may disagree over that particular issue. The following link is from the CATO institute. They have an agenda, no doubt, but it still makes for interesting reading.

<http://www.cato.org/pubs/pas/pa-609.pdf>

I would love to see our societies pursuing alternative energy sources in an efficient and effective manner, based on rational energy policies devised by people that don't have pork barrelling or political agendas as their primary motives. (sigh). Still a child of the sixties I guess.

Edward A.
Reid, Jr.
6.7.08

Len,

<http://www.surfacestations.org/>

Everything you want to know about surface temperature measurement in the US.

Once you know it, you'll wish you didn't!

Ed

Len Gould
6.9.08

Paul: "I don't know how much contribution GHG's are making to the warming " -- Moon -23°C, Earth 15°C difference = 38 °C (68.4 °F)

Rough number, and a (relatively small) part of Earth's higher temp may be attributable to internal heat. Differences in albedo today can certainly be assigned some contribution, but still there have been times in the past when earth was describable as "snowball earth", almost entirely covered by highly reflective ice, yet it still was able to recover and remelt all the snow (no proof of what moons average temp may have been then), indicating the effects of GHG's at eg. 180 to 280 ppmv probably fairly close to above. At 500 ppmv CO2 equiv's all bets are off, no-one knows. Fairly obvious guesstimates possible though.

Len Gould
6.9.08

Ed: Only 4% of US weather station in class 1 locations (eg. reliably un-influenced temperatures) simply enhances my argument the very little can be taken as proven from historical temperature records. Doesn't affect my position.

Edward A.
Reid, Jr.
6.9.08

Len,

The theory cannot be any better than the reliability of the "data" upon which it is based.

Accurately measuring temperature is not the easiest thing in the world, but it is a damned sight easier than accurately predicting the future based on a flawed understanding of the present and the past.

I have difficulty understanding why you insist on worshipping the quicksand they walk on.

Ed

Len Gould
6.10.08

Ed: Based on "Fairly obvious guesstimates" which are not yet disproven.

Edward A.
Reid, Jr.
6.10.08

Len,

I will leave the task of proving a negative to others.

I will also leave the task of proving the validity of a projection based on bad data to others.

Ed

Len Gould
6.11.08

Ed: If we were in a WW1 trench and I give you an estimate that you have a 50% chance of not living when hit by a sniper standing where you are, are you going to argue that I must prove a negative, or are you going to duck?

Edward A.
Reid, Jr.
6.11.08

Len,

I certainly wouldn't ask you to prove that there were no snipers, since I would realize that is an impossible task. I would already have been ducking anyway.

The precautionary principle gets to be very expensive, when the investment required for half a "solution" is estimated at \$45 trillion.

Ed

Todd
McKissick
6.11.08

The problem with 'estimated' is who's doing that estimate? Given that it's probably for a 20-40 year timeframe, some arguably credible estimates are even negative.

Might try turning your binoculars around.

Edward A.
Reid, Jr.
6.11.08

TOKYO - The world needs to invest \$45 trillion in energy in coming decades, build some 1,400 nuclear power plants and vastly expand wind power in order to halve greenhouse gas emissions by 2050, according to an energy study released Friday. The report by the Paris-based International Energy Agency envisions a "energy revolution" that would greatly reduce the world's dependence on fossil fuels while maintaining steady economic growth.

Todd,

Not my binoculars, though the estimate agrees with my own.

Ed

David
Smith
6.11.08

Well, I hate to blow everyone's collective mind, but we need to consider one basic long held tenet of basic physics as it applies to the so-called greenhouse effect: THERE IS NO SUCH THING AS A "GREENHOUSE GAS"!

Okay, now that Len has popped a few Prozac to settle down, according to basic laws of physics the greenhouse effect can only happen with reflection and/or refraction. Gases have no such qualities. Only droplets or ice crystals have that property. If an element is not in the form of a droplet or a minute crystal, it can't reflect or refract, thus no greenhouse effect.

That's why water vapor is THE greenhouse element. It is easily converted to a liquid or a solid at relatively low temperatures, a state necessary to induce the greenhouse effect. Carbon dioxide can and does form into ice crystals, but it takes an extremely low temperature for that to happen. And of course if such an extremely low temperature exists in the upper atmosphere, it runs counter to the notion that the planet is warming.

With CO2 amounting to only 0.036% of the atmosphere, and man's contribution a mere 3% of that 0.036%, it is statistically impossible for CO2 at it's present atmospheric level to have any measurable effect on Earth's climate. So attempts at mitigating man's emissions of CO2 is a wasted effort, period.

Dave Smith

Former AGW believer

Jim Beyer
6.12.08

Dave,

The sky is blue because the red light (longer wavelengths) has been absorbed by gas molecules in the atmosphere. Gas molecules have mass, even though they are small. When they are hit with light, some of it will be absorbed, and the gas molecules will heat up.

By your estimation, a greenhouse wouldn't work, as the gas inside it would never absorb light rays. But they obviously do. Otherwise, people wouldn't build greenhouses.

Todd
McKissick
6.13.08

Ed, First off, is \$45T really that much money? Dividing by 42 years (til 2050) and figuring the US would probably have around 10% of that cost, that's ONLY \$107 billion per year. Isn't our current energy bill double that now? (3800 tWh X \$0.05/kWh = \$190T/yr) Seeing that expense as a reason to not do anything seems shortsighted, hence the binocular comment applies to them also.

Second, those estimates rarely take into account any advances in technology. In this last dozen months alone, we've had so many significant advances that any estimate is out of date before it's complete anymore.

Edward A.
Reid, Jr.
6.13.08

Todd,

First, \$45 trillion is half a solution - the inexpensive half. The complete solution would require ~\$100 trillion. Second, the US share is likely closer to \$45 trillion, since we have: more infrastructure; more lawyers; more environmentalists; and, more activist judges. (Time is money.) That means ~\$1 trillion per year, or about 1/3 of the current federal budget; or, about 10% of GDP. Third, you can't plan and budget based on future technological advances. You benefit from them if/when they happen; but, you've got to invest based on what you have, until you have something better. Fourth, while there might be benefits, they will not begin to accrue until the investments are made. Finally, many of the countries which would have to invest the remaining \$1 trillion plus per year don't have the resources.

The better question to ask, in my opinion, is: "Why consider half solutions, if you believe you have a whole problem?"

To me, the really important question is: "If what you project/conclude is accurate, would your recommended response resolve the issue?". (Kyoto wouldn't. McCain-Lieberman wouldn't. Lieberman-Warner wouldn't. Obama's "plan" wouldn't. "Son of Kyoto" wouldn't. Even Gore's "plan" wouldn't.)

Don't begin vast programs with half-vast ideas!

Todd
McKissick
6.16.08

Ed, Too often we look at these problems as too large to even begin tackling. If history has shown us anything, it's that any given problem's scope decreases with time. Gene mapping, DNA mapping, wireless phones, worldwide satellite coverage... just thinking of more examples is daunting. Are you saying that the first steps aren't justified because they aren't the final solution? That's crazy. Kyoto isn't a full solution because it's not meant to be one. It's purpose was to gather the politos of the world together under a common umbrella. The US failed to see that. Just because some countries appeared to have unfair roles in it, doesn't mean it didn't accomplish something meaningful. For politicians, that's all that matters. For the rest of us actually working in the technical world, it's a game we use to keep our politicians busy and out of our business.

My take on those \$45T and \$100T numbers is that it's complete hyperbole. Pure scaremongering type of propaganda intended to sway people toward a nuclear only solution. Right now, there are villages, towns and even cities that are either energy independant or headed there for nearly no extra money. Not that I've ever supported PV, but you can now lease a 2-5 kW array for nothing. Yep, pay nothing, get them installed, get your juice onsite, and they get the net metering bonus. When they get paid off, you keep the system. Beyond that, I don't know any details, but you have to admit that if both parties are profiting vs. status quo, that shift to renewables kills your estimate. These deals exist for both PV and wind now, but will be applied to all new tech since the middleman business has finally learned how to take a long term profit and turn it into a cash flow. If you combine this trend with the tech that's around the corner, the future looks even brighter.

Now add still more sunshine when you consider that we have genuine ways to cut the energy we use. For example, personal maglev pod transport is coming. It's fully complete, proven and being discussed in quite a few cities. When the first ones show off their benefits, we'll be seeing them everywhere. Who can argue with using one tenth of the money needed for a lightrail, eliminating accidents, opening up transport to those not able to drive, getting the cars included and running it on 1/14th of the consumer cost and all while using many times less energy? Now consider that these benefits can be applied to small/medium cargo autonomously and you start to get an idea of where we 'can' go if a few people would just get out of the way.

I personally like how most of the poorest African countries are discussing not installing a national grid at all because they find it much cheaper to make each town or village independant. They obviously see no benefit to running a wire to every house in the country.

Advocating no investment in these kinds of new technology on the basis that they don't exist yet is akin to sticking your head in the sand because they're everywhere. You just have to get off those biased sites.

My questions are - Would you consider the progress above half-vast and how much would it change those estimates if continued?

Jim Beyer
6.16.08

This is more of Ed's all or nothing thinking.

If global warming is real, we fix it. All of it. If not, we don't do anything. Ever.

Obviously, the global warming issue will evolve over time. Given that now we at least have concerns, it makes some sense to move forward with at least reasonable efforts - conservation, further research, etc. To get from our present rate of emissions to 0 will take some time, many decades. As we understand the problem, the tactics involved with solving it will change over time as well.

When the U.S. was in W.W.II, they didn't know how to build small transport ships (Liberty ships) well. It took 240 days to build each one. But by the end of the war, they were able to build a ship in 42 days, and 3 new ones were launched daily. The point is, they didn't wait to start building the ships until the process was optimized. You NEED a running process to FIND those optimizations.

If Ed would take off his restrictive blinders, perhaps he'd realize that the more current problem of oil depletion is a "close enough" problem to that of global warming. Working on this more immediate problem, with an eye kept on global warming as well, (i.e., maybe not jump to coal-to-liquids right away) may lead to new process and insights that can address global warming in a way that is economical and even beneficial to us all.

For example, some kind of neighborhood or home-based concentrated solar system (with thermal storage) that can produce electricity in the Summer and at least some heating in the Winter (maybe a little electricity too). Use the electricity to charge PHEVs. Use biomass to get some methane when needed. That would hit on some major users of coal, oil, and gas with one effort. Call me crazy, but I don't think it would take 45 Trillion dollars to develop such a gadget that would be economical to operate given the present and future prices of energy from coal, oil, and NG.

Kenneth
Kok
6.16.08

Todd:

Your comment about poor African Countries not installing a national grid is interesting. If I recall correctly that is where the US started many years ago. Are we wrong in pursuing a new and better national grid?

Ken

Todd
McKissick
6.16.08

In my opinion? yes.

Don't get me wrong. I think the US needs 'a' grid, but if we go much more distributed and waste less energy, our current grid will be more than enough for quite a while. It should only be upgraded to make it smarter and reduce efficiency losses as repairs are required. To heavy of a reliance on it leads to too much power concentrated in the hands of too few.

I haven't been able to find it again, but I read months ago about a village in Brazil that's discussing adding a small factory but aren't sure if the houses all give enough 'extra' to cover the factory's needs.

We joined a party Saturday evening at a log cabin where they grew their own animals and such. Mostly elk, buffalo, zebras, ducks and geese. They were partly self sufficient in electricity, fully in water and in heat, had a huge cabin and 3 big machine sheds to run their construction business. Very impressive. His goal was to even supply his heavy machinery from onsite fuels by 2012. BTW, I really liked the buffalo ribs!

Edward A.
Reid, Jr.
6.16.08

Todd/Jim,

I have shared my plan for US energy independence by 2050 (which I think is important) with this group. That plan also gets the US to a 95% reduction in anthropogenic carbon emissions by 2050. You can read it at the link below, if you are curious.

http://www.utilitiesproject.com/documents.asp?grID=111&d_ID=4296

My point, here and elsewhere, has been that, if you believe something must be accomplished, you need a goal and a plan to achieve the goal. We ain't got a goal or a plan. We got "bupkis"!

Kyoto would not reduce global annual anthropogenic emissions, even if every country committed to it actually did what they committed to do; and, the US signed on and did what it was asked to commit to do. China is increasing its emissions faster than the Kyoto signers plus the US would be required to do. Emissions would be lower than they would otherwise have been, but not lower absolutely.

If all you care about is developed country pain and suffering, Kyoto is all you need. If, on the other hand, you want anthropogenic carbon emission reductions, you need a plan which will reduce anthropogenic carbon emissions.

My concern about Kyoto and the other "band-aid" approaches currently on the table is that many of the actions being taken/to be taken under them are not on the path to an absolute reduction in anthropogenic carbon emissions. Therefore, they are an utter waste of time, energy and money. That may make you "feel good", but they won't get the job done.

Todd
McKissick
6.16.08

I don't necessarily disagree, but people are going to do what they want unless they have incentive to do otherwise. I don't believe there should be any global law that mandates what everyone should do. If it's not cost effective to do, don't ever let a politician know it's better for the environment! I always thought that the statement "it's a game we use to keep our politicians busy and out of our business" was equivalent to the statements "Kyoto and the other "band-aid" approaches currently on the table is that many of the actions being taken/to be taken under them are not on the path to

an absolute reduction in anthropogenic carbon emissions. Therefore, they are an utter waste of time, energy and money. That may make you "feel good", but they won't get the job done. "

I know one thing for sure and that's government regulation has put us where we are today and more will make it worse. Without it, we would have had a nice mix of alternatives since oil's first day in school.

At this point, I have high hopes that technological advances will keep coming faster and faster, to the point where within 20 years, no one will want to pay someone else for their energy since they can make it themselves. This goes for electricity, heat and personal transport. It's just plain silly for me to pay someone else every month forever for my est. 100 kWh/day total energy when I have double that landing on my roof on the average January day, double again blowing past my airspace and could grow close to it again on my spare land. How long will it take for me to justify the equipment to capture that, given that we heard Friday that our utility bills are rising 30% this fall? (Seems we've been behind the price curve and need to catch up being only coal and nuke.)

Now ask yourself what will happen to the centralized energy companies, both mobile and stationary, when it's cheaper to call Joe's Renewables and install a system. Beyond niche markets, they won't last 10 years.

Edward A.
Reid, Jr.
6.16.08

Todd,

We can become energy independent on our own initiative, if we choose to do so.

We cannot eliminate anthropogenic global warming on our own initiative, no matter how fondly we may desire that outcome, or how aggressively we pursue self-flagellation. Can't happen.

I am supportive of achieving energy independence for US.

I am not supportive of spending a dime to reduce AGW if all of the other anthropogenic carbon emitters are not an active part of the process, simply because no such effort can succeed without all nations being committed to making it happen.

I will continue agitating for a clear goal and a plan to achieve it before we start singing Kumbaya.

Jim Beyer
6.16.08

I agree we shouldn't work toward reducing AGW until everyone else (or at least most everyone else) agrees. But the U.S. isn't even taking that position.

Also, becoming energy independent would at least reduce our emissions somewhat. I know Ed's plan is about building more nuclear power plants. Building more coal-fired plants at this point is short-sighted if we are at least conditionally accepting of a global plan to reduce AGW. As usual, there is no leadership on energy policy in Washington.

Todd
McKissick
6.16.08

"Can't happen" That says so much. Sorry, but it IS HAPPENING, just not in this country. There are only individuals achieving emission reduction AND energy independence here while entire cities are doing so in other countries. Our failed top-down policy of 'we can't so why start' here has stifled the desires of local cities here.

Those in the other countries are doing so now because they recognize that you can't build a jet airplane without building a prop plane first. Their jets are doing test flights while we're throwing paper airplanes in million dollar wind tunnels and then we say it's too expensive. We're shunning the ones that work, mandating the ones that aren't cost effective and then complaining that the whole effort is too expensive.

All this talk about how much it costs is pure crap. If a method becomes available that is cheaper than being hooked up to the grid, then people (and countries) will flock to it. Right now only a few high effort ones are, but they are all setting their sights on it and many will get there soon. Sure, we pay some subsidies right now, but those installing the systems now are paying the bulk of the cost themselves and those subsidies are already dropping. How is that costing "us" too much? How will you be able to say "it's too expensive" when the individuals will simply be dropping off the grid because the utilities started raising their rates too high? Seems to me that they need those connections and their new peak leveling capabilities (PHEVs and onsite storage) to get their large scale baseload and cheaper opportunity wind effectively to the big users.

Too many people look at all renewables and say they can't and won't, but in reality, most all of them have sprung up from nothing in 2-5 years from some garage shop. I wouldn't discount them just yet. Since we haven't helped them yet, why complain that allowing them to play on a fair field would cost too much? Since I also wouldn't advocate spending a dime (by the government) on any renewables since we don't have a clear plan, I would also not advocate spending a dime on any other energy source. Kill the other subsidies, give that back to the people and let them decide which is the best choice for them.

I do agree that it's counter productive to allow more coal to be built, e.g. China, but they aren't building as many as they may have. That is a reduction of some amount while giving other people more incentive to solve the alternatives problem sooner.

Edward A. Todd,
Reid, Jr.
6.16.08

Words and context are important. That's why they are there. Ignore at your peril.

"We cannot eliminate anthropogenic global warming on our own initiative, no matter how fondly we may desire that outcome, or how aggressively we pursue self-flagellation. Can't happen."

The paragraph above refers, in its context, to the US. It states, correctly, that the US cannot ELIMINATE AGW. It does NOT say that individuals, towns, cities, counties, states, even countries cannot reduce their anthropogenic carbon emissions.

However, assuming AGW, the US contribution is ~19% and declining as a percent of the total emissions, which are increasing. China's contribution is ~22% and growing at 7-10% per year. Therefore, the US could not possibly eliminate AGW, nor could the US and China together.

Right now, assuming AGW, it is getting worse because anthropogenic carbon emissions are not only continuing, but are continuing to grow.

Assuming AGW, atmospheric CO2 concentrations have been increasing since ~1750, with notable inflection points in the rate of growth in ~1850 and ~1950. Logically, stopping the growth of atmospheric CO2 concentrations would require reducing annual CO2 emissions below the level at which atmospheric concentrations began to increase; ie., ~1750 emission levels, which were ~0.04% of current levels. By my reckoning, that is close enough to ZERO for government work.

Far be it from me to discourage you or anyone else from deciding to invest in equipment and systems to reduce your "carbon footprint". However, understand that you are merely reducing global annual carbon emissions by a very small percentage of WHAT THEY WOULD HAVE BEEN IF YOU HAD NOT TAKEN YOUR ACTIONS, not reducing emissions in absolute terms. Kyoto, if its goals were fully achieved, would reduce global average temperature ~0.0007oC BELOW WHAT IT WOULD OTHERWISE HAVE BEEN, not in absolute terms. (NOTE: Gaia has, on her own, decreased her average temperature by ~0.7oC in the past year, virtually offsetting the growth over the past century, which occasioned all of the current "handwringing".)

Reducing anthropogenic carbon emissions in absolute terms means more than offsetting any growth in emissions which is still occurring. China and India are countries with large populations which have a growing interest in improving their lifestyles. China alone added coal-burning power generation capacity equal to 20% of US coal fleet capacity in 2006; and, an additional 15-20% in 2007. That may not be "building as many as they may have", but it is certainly building a lot.

Global annual anthropogenic carbon emissions have increased in every year since the Kyoto Accords were signed, including the years since they went into effect, despite the efforts you listed above. While I will grant that those efforts have reduced emissions below what they would otherwise have been, at the margin, they have NOT reduced global annual carbon emissions, or even stopped their growth.

Todd
McKissick
6.17.08

Ed, I fully understand the context of your paragraph. Stating that it is correct doesn't make it so just as saying that because some fledgeling technology that hasn't cut emissions means it can't. While we can't directly stop AGW in other countries, we can support the technology that gets us there and export that to those countries. How many coal plants do you think China would put in, or even shut down, if their people swapped their grid load for surplus DG supply at a rate of say 8% per year? That's a percent over their min growth plus a further offset from the DG. Coupling this with the load balancing capacity of these installations and the by-then-available PHEVs, and you've just cut new plant needs by close to 15% per year.

Add to that the reduction in oil needed by installing a personal maglev rail system INSTEAD of the roads they are going to need and you've just cut oil growth by a huge chunk. If any country can supplant the one-car-per-person mantra, it's china. (Look up technology leapfrogging. It a prominent part of almost every tech meeting in a developing country. e.g. skipping land line phones for cells) Showing them it works in the real world can indirectly cause their energy use growth to slow, recede and possibly go negative. That's why I give examples of regions going independant. To show how close we are to having the potential for everyone getting off fossil fuels. They are to show what is possible, not to show how limited they are. Eventually we can get global absolute levels down to what the natural sinks can absorb.

I could go on all day about ways to cut every single fossil fuel energy use but I feel most people here don't appreciate the effort. The fact is that they are the result of millions of individuals trying to solve hundreds of problems, each on an individual basis and each fighting the entrenched system on their own, with not only little to no support, but with sometimes tremendous false hurdles to overcome. Too many people say they aren't practical or don't have the scale possibilities when they haven't spent more than 5 minutes considering it. This is a field of hundreds of technologies that have nothing in common with each other, have completely separate potential and have their own individual technical roadblocks, but yet they are consistently lumped together to fight for a piece of the tiny support given to all 'renewables'. On top of that, there's the snake oil salesmen giving many renewables a bad name. Between free energy, zero point energy, magnet motors, and any number of perpetual motion machines, and the large scale, simply

impractical technologies (Ethanol, big PV arrays), the rest of the field can't set themselves apart.

I've been promoting CSP for two decades. In the beginning I was told it wasn't possible (hopefully, you all know they are going in in a dozen countries). Then it was supposedly not cost effective (Orders are getting backlogged and plants are being upscaled). With both of those past, now I'm being told it can't do storage, can't scale to where we need it, requires too much land and can't be done on rooftops. That's ok. When people finally learn that those are just more false assessments, we'll see people saying something else. Meanwhile, China, India, Israel, Germany, Japan, UAE, Spain, Austrailia will already be making them by the millions and exporting to us. The us could have had the chance to sell them, but you will have to settle for buying instead.

That's just the one technology I'm most familiar with but for some reason I usually feel that I have to defend all the other alternative energy tech because we all seem to be rated by our weakest link.

Edward A.
Reid, Jr.
6.17.08

Todd,

Market-based adoption of distributed, non-fossil technologies (PLAN) to achieve energy independence (GOAL) and eliminate anthropogenic carbon emissions (GOAL). Works for me. I'll be interested to see how it works.

Suggested milestone events: 1) halt global growth of anthropogenic carbon emissions; 2) halve global annual anthropogenic carbon emissions; 3) eliminate global anthropogenic carbon emissions.

Ed

Todd
McKissick
6.17.08

Ed, You're not anywhere near Munich, are you? From Newsfox via PR-Inside.com:

"Munich (pts/16.06.2008/08:30) - Today the world's largest trade show for solar technology, Intersolar 2008, is opening its gates for the ninth time. At the new Munich location, the trade show once again achieved strong growth and an expansion of exhibition area by more than 120%. Around 1,050 exhibitors from 40 nations will be presenting innovations of the international solar industry on 76,000sqm. This is a 65% rise over last year in the number of exhibitors at the industry meeting point for solar thermal technology, photovoltaics and solar architecture."

Interest is good, and showing support is better, but helping is what it takes. We've got to get this country caught up to the rest of the world and I think that means listening less to the currently entrenched crowd.

Todd
McKissick
6.17.08

Sorry but I forgot the link. <http://www.pr-inside.com/intersolar-2008-intersolar-grows-more-r644543.htm>.

Edward A.
Reid, Jr.
6.17.08

Todd,

I wish!

Ed