

Sierra Club Three Lakes Group Spring 2014 Newsletter

Three Lakes Group Officers: Annemarie Askwith; Acting Chair, Annemarie Askwith; Treasurer; Roger Blanchard; Secretary; Carol Ward, Forestry; Diane Meyer, Conservation Chair

Spring Program Schedule

Thursday February 13, 6:30 pm-Gasland Part II, which premiered at the 2013 Tribeca Film Festival, shows how the stakes have been raised on all sides in one of the most important environmental issues facing our nation today. The film argues that the gas industry's portrayal of natural gas as a clean and safe alternative to oil is a myth and that fracked wells inevitably leak over time, contaminating water and air, hurting families, and endangering the earth's climate with the potent greenhouse gas, methane.

March 13 - To Be Announced

April 10 or 17 – To Be Announced

U.S. Oil and Gas Production

In 2010 I predicted that oil production in the Bakken shale play would peak in 2014 +/- 1 year. At the time, segments on NPR news programs were predicting an ultimate recovery of at least 20-30 billion barrels (Gb) with a peak in the distant future. Even recent NPR news segments have predicted a rosy future for Bakken and other shale plays.

In the last few years, geologist David Hughes has used detailed data for Bakken and other shale plays to assess when production will peak in various shale plays. Until recently he had predicted a peak for Bakken in 2016/2017 but he has now changed his prediction to 2015, which would fall into the window that I predicted back in 2010. Also, recently an international petroleum geologist by the name of Jean LaHerrere wrote a paper on Bakken oil production and predicted that production would peak in the fall of 2014.

U.S. oil production has increased rapidly in the last few years, essentially totally due to increasing production from tight oil. Tight oil production comes about from hydraulic fracking. Most of the tight oil production comes from Bakken, in North Dakota and Eagle Ford, in Texas.

In terms of Eagle Ford, I predicted back in ~2011 that production would peak in 2014 +/- 1 year. David Hughes is still predicting a peak in 2016/2017 but I wouldn't be surprised if he moves the peak to 2015 or 2014. In both Bakken and Eagle Ford the oil industry has worked as fast as humanly possible to get the oil out of the ground. The reverse side of that rapidly increasing production is that production will also decline rapidly. David Hughes is predicting that Bakken production will be essentially zero by 2035, 21 years from now while Jean LaHerrere predicts that Bakken production will decline about 80% from its peak by 2020.

The U.S. Geological Survey, up until a year ago, had estimated that about two-thirds of the tight oil in the U.S. would be found in the Monterey shale of California. After extensive exploration that has provided terrible results, it's clear that little tight oil will come from Monterey shale. Chevron was a significant player in Monterey shale exploration but has recently left the play for better pastures.

Tight oil production within a play will follow the trend in shale gas production. Three of the four top shale plays in the U.S. are now in decline: Barnett, Fayetteville and Haynesville. The fourth shale play is Marcellus, which will likely start declining in 2-3 years. You may have the impression that U.S. gas production continues to increase but it has been flat over the last year as increases in Marcellus production are negated by declines in other shale plays.

In the spring of 2012, natural gas was selling for around \$1.85/mmBtu. Last week (last week of January) it climbed over \$5.00 mmBtu. I wouldn't be surprised if it climbs above \$6 mmBtu by spring. In a segment on the rising price of natural gas, a NPR reporter claimed that the problem was that the cold was slowing drilling. I don't know how accurate that statement is because I don't have data for natural gas drilling but the Bakken Weekly listed 138 well completions in the Bakken region for

the week of January 13, a record amount of completions in a week. The cold doesn't seem to be affecting Bakken drilling much. In the fall newsletter I predicted the price of natural gas would probably go over \$8/mmBtu in a few years. I still think that is a strong possibility.

Since 2010, production from the Gulf of Mexico (GOM) has declined roughly 400,000 b/d as fields decline. In the next few years there will probably be a production increase due to the introduction of the Jack, St. Malo, Puma and maybe a few more fields. The oil industry is now at the outer limits of the Gulf so I view the probable increase like what happened in Norway in the late 1990s. In 1999, 6 major fields were brought on-line in Norway which led to a production increase. Norwegian production peaked in 2001 and has declined steadily since then with production now less than half what it was in 2001.

Recently a retired petroleum geologist for British Petroleum by the name of Richard Miller gave a presentation in London concerning future global oil production. His main theme was that global oil production is essentially at peak. He views the tight oil production in North America as a minor factor in future global oil production and sees U.S. tight oil production declining soon. He sees serious financial problems for the future and likely military conflicts concerning oil. A recent set of meetings in Washington D.C. and London, organized by a U.S. military officer, concerning peak oil, indicates that at least some officials in the U.S. military consider the oil situation to be serious.

Global investment in oil and gas production has increased from approximately \$250 billion in 2000 to \$750 billion in 2012. Since 2005 global oil production (crude + condensate) has only increased 2-3%. While global oil production has stagnated, exportable oil has declined since 2005 because exporting countries are using more of the oil they produce and in some cases oil production in exporting countries is declining. Some people claim that with increasing production from Libya, Iraq, and Iran this year there will be a surge in global production and oil prices will decrease. The problem with that view is that it requires ~3.5 million barrels/day of new production per year to keep global oil production flat as older fields decline. The general trend in the price of oil will be up in the future.

Roger

Recent Commentaries

Below is a commentary I wrote recently concerning global warming.

The Psychology of Global Warming

Recently I watched a video concerning the psychological ways in which humans deal with the issue of global warming. The video was made by a professor from Santa Clara University named Jerry Kroth.

One way to psychologically deal with global warming is denial. For those who profit from fossil fuel production or those who want unlimited use of fossil fuels, this is the primary way in which the issue is addressed. The mainstream media in the U.S. is dominated largely by interests that promote denial. That is particularly the case for AM radio.

According to Professor Kroth, Clear Channel Communications controls about 80% of everything that is heard on AM radio in the U.S. The common radio personalities on Clear Channel include Rush Limbaugh, Michael Savage, Mark Levin, Sean Hannity and Herman Cain. They promote the corporate view of the world, which entails denial.

In the political realm, intellectual titans such as Sarah Palin and Michele Bachman provide intellectual musings concerning the science of global warming. Their musings fall into the category of denial. According to Professor Kroth, about 30% of U.S. adults are in denial concerning global warming, largely influenced by what they hear from the corporate media and political shining stars.

A second way to psychologically deal with global warming is by displacement. Those who deal with the issue in this manner agree with the science but place the blame associated with the problem on something other than themselves, such as those who don't agree with the science. Environmentalists typically fall into this category. Most environmentalists would say they recycle, use energy efficient vehicles and use energy efficient home devices. They may also be a member of an environmental group or groups.

The problem with the displacement approach is that generally those in the group have relatively high incomes and there is a strong correlation between greenhouse gas emissions and income. Professor Kroth gives several examples.

The first example he gives is a comparison between Atherton, CA and Humboldt County, CA. Atherton is ~70% Democratic and the average household income is ~\$70,000. Humboldt County is much less Democratic, and presumably has a smaller proportion of environmentalists, while the average household income is ~\$40,000. Not surprisingly, per capita greenhouse gas emissions are about 30% higher in Atherton compared to Humboldt County. Having energy efficient vehicles, refrigerators, air conditioning systems, dishwashers, audio/visual systems, computers, etc is negated by the many systems using energy that leads to the generation of CO₂.

Another example he gives is a comparison of the U.S. with Mexico and Brazil. The U.S. has about 3 times the population of Mexico and about 2 times the population of Brazil. Does the U.S. create 3 times the greenhouse gas emissions of Mexico and twice the emissions of Brazil? No. The U.S. produces about 15 times the greenhouse gas emissions of Mexico and 17 times the emissions of Brazil.

The U.S. has dramatically more environmental groups than Mexico or Brazil so having environmental groups that express concern about global warming doesn't translate into low greenhouse gas emissions.

Buying energy efficient vehicles and devices may make environmentalists feel good but the vehicles and devices still generate lots of CO₂ over their lifetimes. Something that few people talk about in this regard is that considerable energy goes into making manufactured goods; including solar cells, windmill components and batteries for electric vehicles. Typically, minerals have to be dug up, transported, refined, fabricated into a manufactured item and then shipped to a store or residence. All those steps require energy which overwhelmingly comes from fossil fuels.

In recent decades, a significant portion of manufactured goods purchased in the U.S. have been imported, to a large extent from China. The U.S. has a lower CO₂ emission level than it would have if the manufactured goods were made in America. As a result, we can blame China for their high CO₂ emission level and deflect attention from ourselves.

Environmentalists say that if policies to promote sources like wind and solar were pursued more vigorously, U.S. CO₂ emissions could decline to zero or near zero. By promoting that idea, environmentalists have no obligations for reducing their energy consumption and CO₂ emissions in the present. In their view, the problem of high CO₂ emissions resides with the political system.

An April 25, 2013 article by Bill McKibben in Rolling Stone magazine made that argument. Here is what he stated in his article:

“With each passing month, something else weakens the industry’s (fossil fuels) hand: the steady rise of renewable energy, a technology that’s gone from pie-in-the-sky to panel-on-the-roof in remarkably short order. In the few countries where governments have really gotten behind renewables, the results are staggering: There were days last spring (that would have been spring 2012) when Germany (pale, northern Germany) managed to generate half its power from solar panels. Even in this country, much of the generating capacity added last year came from renewables. A December study from the University of Delaware showed that by 2030 we could affordably power the nation 99.9 percent of the time on renewable energy. In other words, logic, physics and technology work against the fossil-fuel industry. For the moment, it has the political power it needs – but political power shifts perhaps more easily than physics.”

Since I follow energy issues closely, I was a bit skeptical of his statement which suggests that a sizeable percentage of Germany’s energy now comes from renewable sources. I decided to look at data from the U.S. Department of Energy/Energy Information Administration (U.S.DOE/EIA) concerning German energy consumption. Based upon EIA data, Germany obtained 83.1% of its total energy from fossil fuels in 2012, essentially the same as in 2011.

The change in percent fossil fuel consumption in Germany over the last decade has been relatively minor. In 2002 Germany obtained 85.2% of its energy from fossil fuels and in 2007 it obtained 84.5%. For comparison purposes, the U.S. obtained 82.1% of its energy from fossil fuels in 2012. The energy transition in Germany isn’t nearly as dramatic as Bill McKibben suggests.

Michael Brune made the same case as Bill McKibben in an article in the January/February 2014 issue of Sierra magazine. In the article he states that the U.S. can produce all of its electrical power from renewable energy sources by 2030 and all of the

transportation sector energy by a decade or so later. In his view, all you have to do is dream it and it can happen. If you question the validity of his dream, you're a pessimist. There is an alternative to being an optimist or a pessimist and that is being a realist and the harsh reality is that in a high consumption world, there will be a practical limit as to how much fossil fuel consumption can be reduced and it will be a long way from zero.

Brune's argument is based upon reductions in fossil fuel use for power generation in Denmark and Portugal. Those countries have done an admirable job of reducing fossil fuel use in the electrical generation sector and beyond but they still get about 77% of their total energy from fossil fuels, down from approximately 90%.

Based upon the progress in Denmark and Portugal, Brune argues that U.S. fossil fuel use can be reduced to essentially zero in relatively short order if politicians would get with the program. Beyond the political environment, Denmark and Portugal are dramatically different in so many important ways compared to the U.S. that I don't view them as good models for what can be achieved in the U.S. in terms of renewable energy use.

I'm sure Brune's vision is popular with a large segment of the environmental community because many within the community have high consumption lifestyles. What he is saying is that you can consume to your heart's content and that there will be no environmental consequences, at least not in terms of CO₂ emissions. I think it's a delusional perspective but delusion can be very popular if it's what people want to hear. In the interim, you can continue consuming as you have been even if that consumption involves generating lots of CO₂ because at some point in the future, it will all be fixed.

European countries have per capita energy consumption and CO₂ emission values that are roughly half those of the U.S. That suggests the U.S. could consume considerably less energy and produce considerably less CO₂ than it does. The problem is that the U.S. infrastructure is not designed to minimize energy consumption, as it does in Europe. It would be exceedingly difficult for the U.S. to achieve per capita energy consumption and CO₂ emission levels that rivals European countries without dramatically changing the U.S. infrastructure.

If policies were enacted in the U.S. to more vigorously promote wind and solar, we could certainly improve upon how much energy we get from those sources, but we shouldn't get carried away with exaggerated claims concerning the displacement of fossil fuels by renewable energy sources.

To give just one example, many environmentalists like to say that people could be driving electric vehicles rather than internal combustion engine (ICE) vehicles and that could dramatically cut U.S. CO₂ emissions. There are several issues with purely electric vehicles that will limit their penetration into the U.S. market.

First, the energy density of even the most favorable battery is substantially lower than that of gasoline or diesel fuel which limits the practicality of electric vehicles. If you want to use a vehicle for towing or hauling purposes, an electric vehicle is a poor choice. How often do you see your neighbor who owns a Tesla Roadster pulling his electric powered bass boat with the Roadster? Probably not often. A purely electric vehicle is also a poor choice for long trips because of miles/charge and charging time factors. People buy vehicles for what they expect will be their most demanding use, not their least demanding use.

Second, purely electric vehicles are expensive because the batteries are expensive and because exotic materials, which are more expensive, are used in the vehicle's construction to lighten the vehicle and improve the miles/charge. A significant percentage of the auto buying public is priced out of the electric vehicle market for the foreseeable future.

Fossil fuel interests have substantial influence over the political system in the U.S. because of the large amounts of money they can provide the political parties. That money will, unfortunately, strongly influence U.S. energy policies for some time to come.

Recently a group of prominent climatologists gave a warning that the earth can't be allowed to warm 2°C (3.6°F) over the historical average because it will lead to catastrophic consequences. Most people would say, "a few degrees can't be a problem, can it?"

The problem with a 2°C warming is that the magnitude of the warming will be much greater in the Arctic than outside of the Arctic (This phenomenon is known as Arctic Amplification). As the Arctic warms, methane and CO₂ (both greenhouse gases) will come out of the melting permafrost and the East Siberian Continental Shelf (ESCS). That will cause further

warming which will lead to more methane and CO₂ coming out of the permafrost and ESCS. A positive feedback loop will be created which will lead to quite unpleasant consequences outside of the Arctic.

The Arctic has already warmed considerably faster than the earth as a whole as can be seen in the NASA images below (Figure 1):

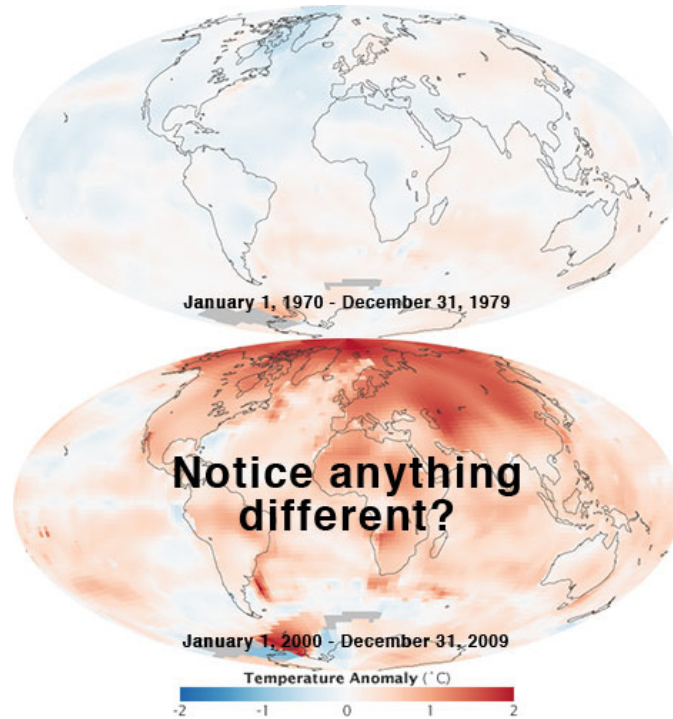


Figure 1

A recent paper by Cowtan and Way indicates that NASA has actually been underestimating Arctic warming. NASA uses data points around the edges of the Arctic to calculate interpolated temperature values between the edges. Cowtan and Way utilized satellite temperature data in conjunction with known surface temperature data to determine temperature values across the Arctic. Their values corresponding to recent warming are higher than NASA values.

A Massachusetts Institute of Technology (MIT) study from 2011 predicted that the median warming north of 70° latitude would be ~20°F by 2095, relative to 1981-2000, if we remain on our current greenhouse gas emissions trajectory. A warming of that magnitude would certainly lead to some interesting changes.

The climatologists mentioned above state that action to deal with greenhouse gas emissions must start immediately with a global reduction of 6%/year. That isn't going to happen. Americans have a lifestyle to maintain. People in China, India, Indonesia, etc have an American lifestyle to strive for.

Developed countries, including the U.S., have reduced their CO₂ emissions during the last decade but those reductions are being overwhelmed by increases in the developing world (See Figure 2). Note that the rate of increase in global CO₂ emissions is considerably higher after 2000 than before 2000 in Figure 2. I recently heard from a reliable source that a year's worth of CO₂ reductions in California are negated by a week's worth of CO₂ increases in China. That will be the problem going forward.

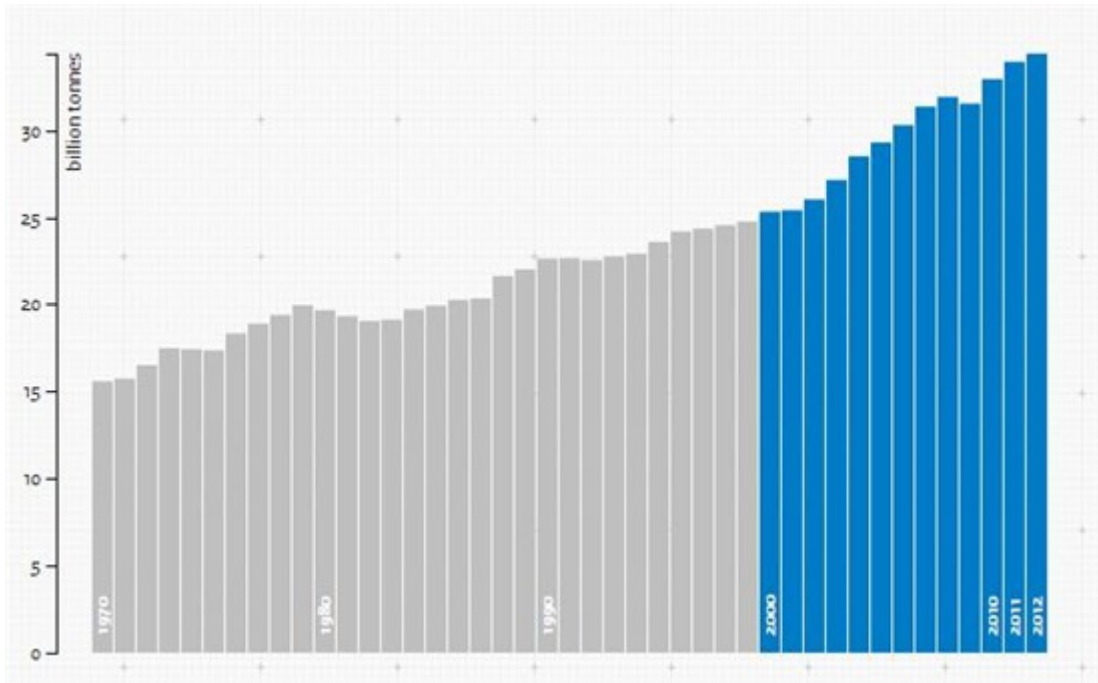


Figure 2 – Global CO₂ Emissions versus Time

Our economic system is based upon perpetual growth and a high level of consumption. Those factors are not compatible with a stable climate. We strive to eliminate any form of physical work by replacement with machines that generate CO₂ even if it would be beneficial for humans to do the work directly. As an example, I see people drive a block or two to the grocery store to pick up a bag of corn chips when it would be more beneficial for them to walk or ride a bike. The lack of exercise by Americans no doubt contributes to the high obesity rate in the country.

When I was younger my brother-in-law would adamantly tell me that there was no scientific evidence that smoking caused cancer. He was a chain smoker whose life revolved around smoking. He was also in denial about the ultimate consequences of smoking. My brother-in-law smoked heavily for over 30 years before he ultimately died of lung cancer.

We are in the same situation as my brother-in-law when it comes to global warming. Some people deny the science of global warming as my brother-in-law did smoking, some don't. But neither group will change their lifestyles to prevent the ultimate consequences. Since our economic system requires perpetual growth and a high level of consumption, wholesale changing of lifestyles is not considered an acceptable option. Thus, environmental leaders provide the false hope that technology will be our salvation.

We can go on as we are for some time before the consequences of global warming become overwhelming because of the large thermal inertia associated with the system. Some people may hope they'll be gone before the overwhelming consequences must be faced, but what about today's children, their children and generations beyond? Are there any moral issues here or is immediate shelf interest the only thing that matters? Few people appreciate the gravity of the situation now but I have no doubt that future generations will appreciate the gravity of their situation.

Sierra Club Calendars

The sale of Sierra Club calendars provides funds for the Three Lakes Group. If you would like a calendar or calendars, they can be ordered from Annemarie Askwith at:

askwitha@lighthouse.net

Price: \$12 for wall; \$13 for engagement.

Three Lakes Group Meetings

Three Lakes Group meetings are held infrequently. If you receive the e-mail version of this newsletter, you will be notified prior to a meeting. If you don't receive the e-mail version of this newsletter but would like to be notified of meetings, send me your e-mail address at rblanchard@Issu.edu or phone number at (906) 253-9316.

"We tend to think of Earth as inanimate matter because we've become alienated from it. We are even alienated from our own bodies. We spend many hours every day forgetting that we even have a body. We get so caught up in our work and our problems that we forget that we are more than just our minds. Many of us are sick because we forget to pay attention to our bodies. We've also forgotten Earth--that she is part of us and that we are part of her. Because we're not taking care of Earth, we have both become sick."

Thick Nhat Hanh