Sierra Club Three Lakes Group
Fall 2015 Newsletter

Three Lakes Group Officers: Roger Blanchard; Chair and Secretary, Carol Ward; Vice Chair and Forestry Chair, Annemarie Askwith; Treasurer, Pat Egan; Conservation Chair, Dave Aho; Communications and Internet Technology, Stephanie Aho; Communications

Fall Program Schedule

Programs are held at Bayliss Public Library in Sault Ste. Marie, MI at 6:30 pm.

Thursday Sept 10 - Renown tree expert Steve Gregory will talk about tree planting and maintenance. If you have been thinking of planting a Sequoia or Eucalyptus tree in your front yard, Steve can give you some sage advice about doing it.

Thursday Oct. 22 – We're planning on a program about Isle Royale wildlife but at this time do not have a speaker.

Tuesday Nov. 10 - Dr. Ted Ludwig will talk about Great Lakes colonial nesting birds, trends and problems. He will talk about contaminants and invasive species in relation to their affect on bird populations.

What We are Working On

Dave and Stephanie Aho attended the UPEC Quarterly Meeting at the Clear Lake Education Center (near Shingleton) in July as guests, there were about 13 people who attended. The weekend was a combination of meetings, recreating and facilitated getting to know many of the people who make up the UPEC Board, and gaining a better understanding as to their individual and group objectives.

The UPEC Celebration is being held in Hancock in 2016, and there was interest among the group to look at having the 2017 celebration in Sault Sainte Marie. The celebration consists of various public information sessions reflecting on the ecology we have here in the Upper Peninsula, and efforts to support it.

Currently Nancy Warren is the acting president of UPEC, but she has voiced interest in stepping down due to her lack of time to commit to this role. There will be discussion in the near future on replacing that position, or in modifying the UPEC leadership model, which may include a co presidency or executive committee structure.

After the meeting Stephanie and Dave were both asked if we would have interest in being on the UPEC board, and if so to submit a letter of interest. It was decided that Dave would pursue this position, and be was accepted to the UPEC board.

The hope is that this can act as a conduit between UPEC and the Three Lakes Group, and will help to share resources and information between both, assisting is each accomplishing their goals.

If we do decide to have the UPEC Celebration in the Sault, we would need a TLG celebration committee to drive this effort, as this would be a big undertaking.

Dave

What's going on with Oil

The material below concerning oil is not something you are likely to get from the mainstream media. It illustrates problems with the U.S. oil industry. Major oil companies have little involvement with tight oil production

(fracking) in the U.S. because they can't make money at it. The statements and article below indicate that few, if any, small to medium sized oil companies can make money at it either.

Since the price of oil dropped significantly last year, there has been a substantial decline in tight oil well drilling. The industry had drilled a lot of wells without completing them, fracking and tying in. What they have been doing in recent months is completing wells that were previously drilled, almost exclusively in the sweet spots. They need to do that to make money to pay their debt obligations and other expenses. The problem they will have going forward when prices increase is that they will have saturated the sweet spots with wells and will have to rely on wells outside of the sweet spots that produce much less oil on average.

The statements below are from a recent presentation by David Einhorn, cofounder of Greenlight Capital

"The large oil frackers (in the U.S.) have spent $80 billion more than they have received from selling oil. Wall Street greased those skids by underwriting debt and equity securities that allowed them to garner billions in fees. The banks are clearly incentivized to enable the frack addicts. What's less obvious is whether investors are furnished a clear analysis of the returns these companies actually generate.

"As oil prices rose, it seemed like the frackers should have been drowning in cash. But none of them generated excess cash flow, not even when oil was at $100 a barrel. In fact, the opposite was true.

"Recently, oil prices have declined. Because the frackers have less revenue, they've been forced to cut Capex (capital expenditures). Though they will continue to spend more dollars than they take in, production is no longer growing. A business that burns cash and doesn't grow isn't worth anything.

"On the $36 of revenues per BOE [barrel of oil equivalent], Pioneer [Pioneer Natural Resources] spends about $14 on field operating expenses and another $6 on corporate expenses. Subtract the historical $28 of Capex, and Pioneer loses $12 for every BOE it develops. That's like using $50 bills to counterfeit $20s."

Here are a few quotes from noted petroleum geologist Art Berman:

"The U.S. E&P (exploration and production) industry (oil industry) is really good at spending other people's money to increase production. It doesn't matter if there is a market for the oil and gas. As long as the capital keeps flowing, they will do what they do best."

"This is an industry (the U.S. oil industry) in crisis despite the talk about showing OPEC a thing or two about American ingenuity. Increasing drilling when you're losing money and prices are falling doesn't sound very ingenious to anyone."

Here is a recent article that applied to U.S. tight oil production.

Once Burned, Twice Shy? Utica Shale Touted to Investors As Shale Drillers Continue Posting Losses

By Sharon Kelly

For the past several weeks, the drilling industry — hammered by bad financial results — has begun promoting its next big thing: the Utica shale, generating the sort of headlines you might have seen five years ago, when the shale drilling rush was gaining speed. "Utica Shale Holds 20 Times More Gas Than

Previous Estimates", read one headline. "Utica Bigger Than Marcellus", proclaimed another.

The reason for the excitement was a study, published by West Virginia University, that concluded the Utica contains more shale gas than many estimates for the Marcellus shale, a staggering 782 trillion cubic feet.

"This is a landmark study that demonstrates the vast potential of the Utica as a resource to complement - and go beyond - what the Marcellus has already proven to be," Brian Anderson, director of West Virginia University's Energy Institute, told the Associated Press.

But those considering investments based on the Utica's potential may want to pause and consider the shale industry's long history of circulating impressive predictions, later quietly downgraded, while spending far more than they earn.

The industry has not been generating enough money to cover its capital spending and dividends," Fidelity Investments energy fund manager John Dowd told Barrons.

Indeed, while it is clear that the shale drilling rush has produced large amounts of oil and gas, (alongside wastewater and other environmental impacts), the financial prosperity promised by its backers has not seemed to materialize.

Burning Through Cash

Companies like Chesapeake Energy, the nation's second largest producer of natural gas and one of the most aggressive advocates of the shale rush nationwide, have been hammered hard by low oil prices and high costs in 2015.

"Chesapeake is expected to post a net loss of $3.18 billion this year, based on the average of eight analysts' estimates compiled by Bloomberg. That would be the company's steepest annual loss since 2009," Bloomberg reported last week as Chesapeake announced that it was eliminating dividends paid out to investors.

"Only twice in the past two decades has the second largest gas producer reported positive cash flow," Bloomberg added.

In other words, even while the price of oil and gas touched record highs, Chesapeake and others in the industry were burning through cash. All told Chesapeake Energy's market capitalization has plunged from highs over $21 billion in 2011 to just $5.9 billion today – meaning that investors in the company have lost billions of dollars over the past four years.

And now, as oil prices have dropped to below $50 a barrel, down from highs of roughly $140 in 2008, a wave of bankruptcies and stock price collapses has begun to sweep the industry, with many analysts predicting more hard times to come.

"The top 60-odd shale firms are making a return of roughly zero on the swollen stock of capital they employ," the Economist reported earlier this month. "With less cash flowing in, shale firms need to slash their investment by over two-thirds if they are to balance their books."

For those living in heavily drilled areas, job losses might be the most visible signs of the industry's downturn. Two of the largest oilfield services companies, Halliburton and Baker Hughes, have cut over 25,000 jobs — more than double what they projected in February — due to the downturn. Consol Energy recently announced it would lay off 10 percent of its workforce. And Weatherford International recently said it would lay off 11,000 workers, 10 percent more than it had projected.

Hype and Downgrade

Wildcatters and their supporters have rarely been shy about promoting the economic potential from drilling. Aubrey McClendon, former CEO of Chesapeake Energy, ousted over undisclosed risk-taking and loans revealed by investigative reporters at Reuters, once called the Utica the "biggest thing to hit Ohio since the plow."

But under McClendon, Chesapeake Energy's business model was in no small part based on ginning up interest in one shale play after another, then selling that acreage to other drillers at a vastly increased price.

In comments during 2008 conference call, when Chesapeake's stock was collapsing, McClendon was unusually blunt about how Chesapeake worked.

"That includes a part of our business model that apparently some people still have a hard time understanding, and I think there are two ways to make money in the business. One is to drill wells and just have the gas produce out over time. But there are other ways as well, and that is doing these various asset monetizations. I think when we're through with 2008, you will see that our company will have monetized somewhere between $10 billion to $12 billion of assets during the year including drilling carries and would have an indicated profit margin if you will on that of about $10 billion. I can assure you that buying leases for X and selling them for 5X or 10X is a lot more profitable than trying to produce gas at $5 or $6 mcf," Mr. McClendon said.

In other words, the country's second largest producer of natural gas was in the business of flipping acreage — giving it a strong incentive to predict incredible amounts of production from the land it leased.

Meanwhile, federal estimates of the amount of shale gas and oil that companies have the technology to tap have repeatedly suffered major downgrades.

Last year, the federal government slashed its projections for California's Monterey shale, concluding that the technology to tap it didn't exist, wiping out two thirds of the nation's predicted shale oil resources. In 2011, the USGS admitted it's estimates for the Marcellus shale were also unrealistic, leading it to conclude only 84 tcf could be drawn from the Marcellus, down 80 percent from its prior prediction of 410 tcf.

This time around, a close look at the WVU study highlights several reasons to believe the hype about the Utica is overblown, the Post Carbon Institute's David Hughes concluded.

"The WVU assessment of technically recoverable resources in the Utica is incomplete as presented and wildly optimistic compared to the earlier USGS assessment and compared to likely well performance," he wrote in a July 21 review. "Although the WVU report does provide a valuable roundup of pertinent geological data, its assessment of technically recoverable resources should not be viewed as credible."

The 782 trillion cubic feet is 1947% higher than the estimates published by the USGS in 2012, Hughes pointed out, adding that to reach its conclusions, the WVU study assumes an average well will produce roughly 12 times as much gas as the USGS predicts and would require so-called "sweet spots," places where the highest-producing wells can be drilled, to extend much further than the USGS concluded.

There's no question that the shale industry can drill some "monster wells," or wells that produce enormous gushers of gas. EQT announced on July 23rd that it had completed the most productive Utica shale well ever drilled, in a town in Greene County, PA.

But for all the excitement around that monster well, it's worth keeping in mind other Utica results announced by the same company earlier this year: in February, EQT wrote off all of its Ohio Utica acreage, taking an impairment of $162 million, because the amount of gas its wells produced over their lifetimes was "significantly below expectations."

Yesterday's Bust

The growing losses for drillers have by no means stopped the fracking rush and may in fact be bad news for those living near wells currently being drilled. Companies and their contractors are under enormous pressure to cut costs — and these shortcuts may mean that "best practices" are less likely to be followed.

Compared to others in the oil and gas industry, the shale industry has been aggressively slashing its costs. "North America's shale industry has seen the biggest cost declines, of 25% to 30% compared to 2014 levels, Espen Erlingsen at Rystad Energy estimates," the Wall Street Journal reported last month.

But it's not clear that state environmental regulators, who must now oversee an industry where incentives to take shortcuts are stronger, are prepared to adjust.

In fact, the recent slump has meant that environmental regulators are under greater financial pressure themselves, especially in states that depend on the industry to fund much of the cost of oversight.

"[The Pennsylvania Department of Environmental Protection] uses permit fees, fines and $6 million each year from the state's impact fee levied on Marcellus Shale and other unconventional wells to pay for the oil and gas program's roughly $21 million annual budget. That means the program has not had to rely on the fickle state general fund budget process each year to support its work," the Pittsburgh Post-Gazette reported earlier this year. "But now its primary funding source has turned out to be equally fickle, as natural gas operators have responded to low oil and gas prices by reducing their capital spending and improving efficiency by coaxing more gas from fewer wells."

Roger

What's Happening with Global Warming

Below is a commentary I wrote concerning renewable energy, which relates to global warming.

Renewable Energy: Is That Where Salvation Lies?
by Roger Blanchard, originally published by Resilience.org | May 19, 2015

Wind turbines and coal-fired plant image via shutterstock. Reproduced at Resilience.org.

A number of prominent American environmentalists, as well as individuals not necessarily noted as environmentalists, have stated that the best way to avoid catastrophic global warming is to switch, as quickly as possible, from fossil fuels to renewable energy sources. The list of noted individuals seeing salvation in

renewable energy includes Bill McKibbon (350.org), Michael Brune (Sierra Club), Paul Krugman (economist), and Joe Romm (Climate Progress).

According to Paul Krugman, not only can renewable energy sources replace fossil fuels, presumably totally, but they can do it cheaply, rapidly and with economic advantages to those countries that move in that direction. Michael Brune has written that the U.S. can be essentially free of fossil fuels by 2030, 15 years from now. Easy, cheap and fast - that's what I call optimism.

It's common to read on blogs dealing with global warming that the only thing preventing renewable energy from replacing fossil fuels in short order within the U.S. is the political muscle of the fossil fuel industries.

Germany is offered as a template for how governments can encourage a move to renewable energy. Germany has had a fairly long legislative framework for promoting renewable energy starting in 1990 with the Electricity Feed Law and moved further along with the Renewable Energy Law of 2000. These laws set goals for electrical generation from renewable energy sources and offer substantial subsides to achieve those goals. Thus, Germany has had a fairly aggressive effort in renewable energy for 25 years.

Table I has energy consumption and CO_2 emissions data for Germany in 1990, 2000, 2010 and 2012.

Energy Consumption and CO_2 Emissions for Germany

Year	Oil	atural Gas	Coal	otal Fossil Fuels	otal Energy	ossil Fuels	$_2$ Emissions (million metric tons)
1990*	5.523	2.192	5.394	13.109	14.857	88.2	990.6
2000	5.720	3.042	3.448	12.210	14.261	85.6	854.7
2010	5.093	3.422	3.155	11.670	14.021	83.2	797.0
2012**	4.947	3.094	3.210	11.251	13.466	83.6	788.3

Table I: Energy consumption values are in quadrillion BTU and data is from the U.S. DOE/EIA

*1990 data is the sum for East and West Germany
**This is the most recent complete data from the U.S. DOE/EIA

Between 1990 and 2012, Germany's energy obtained from fossil fuels declined 14.2% and CO_2 emissions dropped 20.4%. Carbon dioxide emissions dropped 13.7% from 1990 to 2000 and 6.8% from 2000 to 2010. The higher percentage decline for CO_2 emissions from 1990 to 2000 can be attributed largely to easier to eliminate coal uses within Germany (see Figure 1).

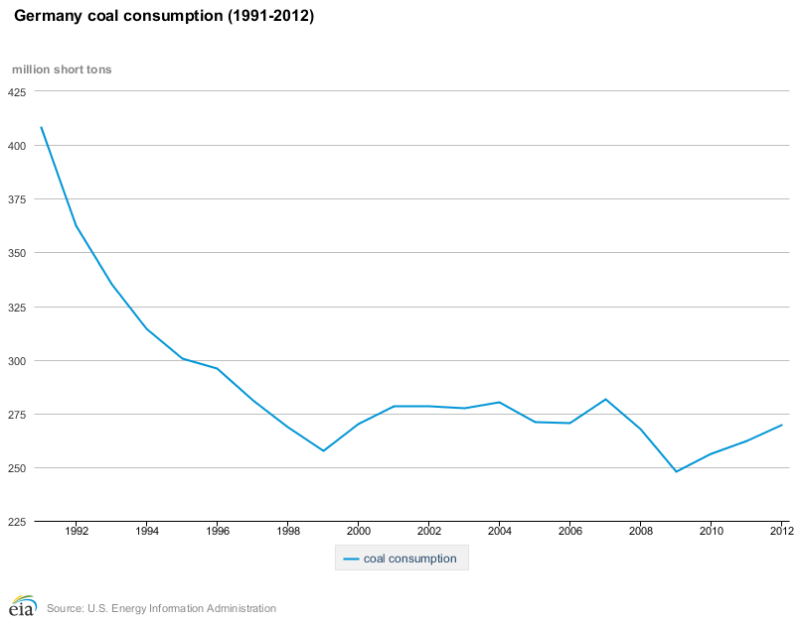


Figure 1- Coal consumption in Germany since 1990

I occasionally read that a high percentage of daily **electrical** energy generation within Germany is due to renewable energy sources, namely wind and solar. That can be the case on good days when the wind is blowing strongly and/or the sun is shining brightly. There are also many days when little electrical energy comes from renewable energy sources. That is particularly the case during winter because of limited sunlight hours, low incoming radiant flux angles and the attenuation of incoming solar radiation by clouds (see Figure 2).

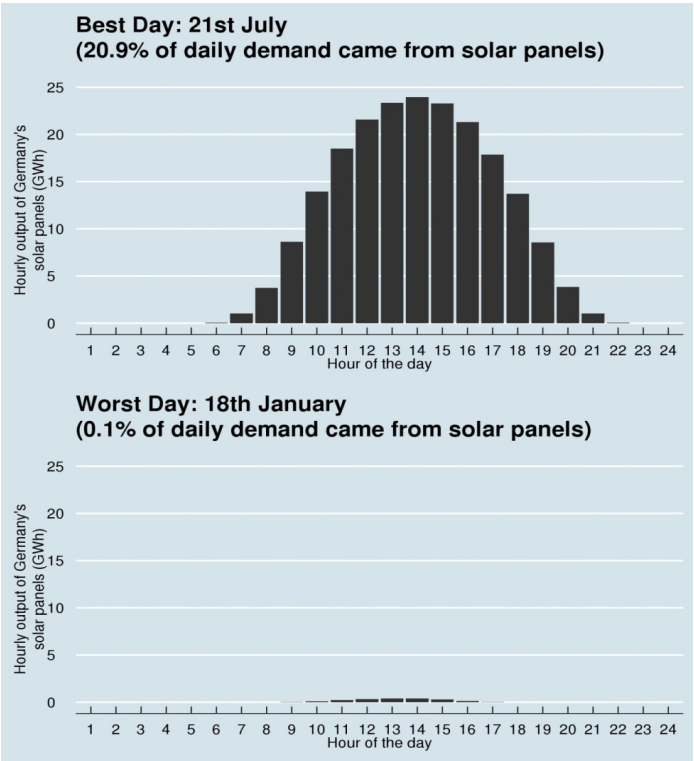


Figure 2 – The best and worst days for solar electrical generation in Germany during 2013

There can be a large gap between the generating capacity of wind and solar, the maximum amount of electrical power they can produce, and how much those sources actually produce. That is because the wind isn't always blowing strongly and the sun isn't always shining brightly. Installing more solar and wind generating capacity will not change that fundamental limitation of renewable energy generation in Germany.

There isn't the storage capacity in Germany to store electrical energy for prolonged periods when wind and solar produce little energy. It's unlikely that the necessary storage capacity will be built anytime soon because of the high cost of building such capacity.

Averaged over the course of a year, renewable energy (wind, solar, geothermal, biomass, and hydro) provided ~24% of Germany's **electrical generation** in 2012 (see Figure 3) and a reported ~30% in 2014.

Power Generation by Source (2012, %)

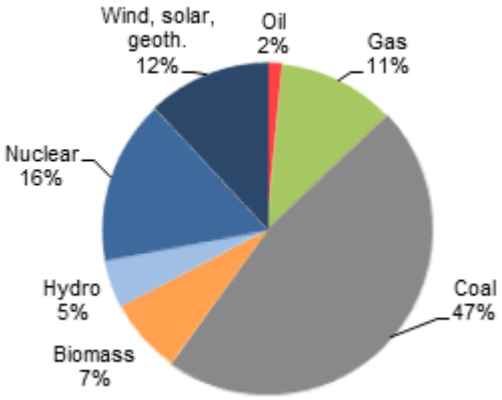


Figure 3-Germany's electric power generation by source in 2012

At the end of 2013, there were 36 gigawatts of installed solar capacity in Germany which produced 28.3 terrawatt-hours of energy. For the period 2011 through 2015 Germany plans on installing 19.7 gigawatts of new coal-burning power plant capacity with an average annual output of 75 terawatts hours of energy. Coal provides considerably more energy from its installed capacity than solar or wind do. In the case of wind, Germany's capacity factor, the percent of produced power relative to its maximum potential, has generally been under 20% each year over the last 20 years.

In recent years nuclear power has supplied approximately 16% of Germany's electrical energy. It's German government policy to phase out nuclear power by 2022 so that either fossil fuels or renewable energy will have to fill the gap that phasing out nuclear power will create. The expectation by authorities is that in 2023, coal and natural gas will be relied upon as much, if not more, than in 2013 to generate electrical energy as nuclear is phased out.

Figure 4 is a bar graph showing how much **primary energy**; which includes **electrical** as well as **non-electrical** energy such as non-electrical energy used in transportation, heating, industry, etc.; that has come from renewable energy sources in recent years for Germany.

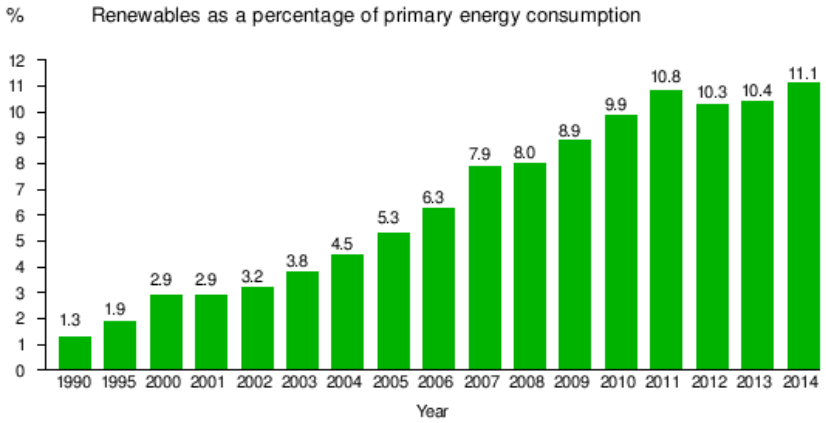


Figure 4-Renewable energy as a percentage of primary consumption in Germany

There are sectors of the German economy that remain heavily dependent on fossil fuels and will remain so for the foreseeable future. Those sectors include aviation, surface transportation, mineral extraction, agriculture, heavy construction, etc. so no one should expect renewable energy to provide most or all of Germany's energy anytime soon.

Since I have been taking Germany as an example of a country that is doing far more than most to transition from fossil fuels to renewable energy sources, imagine for a moment what it would mean if we took Germany as the standard for how much per capita CO_2 emissions people around the world should be allowed to generate.

If that were the case, people in the U.S. would have to dramatically cut their CO_2 emissions from ~17 metric tons/person/year to ~10 metric tons/person/year. That wouldn't go over well in the U.S.

On the flip side, people in developing countries would be able to dramatically increase their CO_2 emissions. As an example, per capita CO_2 emissions in India could increase from ~1.7 metric tons/person/year to ~10 metric tons/person/year.

Globally, if all countries had the per capita CO_2 emissions of Germany, CO_2 emissions would rise from the present ~35 Gtonnes/year to ~72 Gtonnes/year. That's not so good if the objective is to reduce global CO_2 emissions in order to avoid catastrophic global warming.

If there is one country that should want to move in the direction of renewable energy, it's Japan. Japan has no indigenous coal production and next to no oil and natural gas production so they have to import almost all of the fossil fuel energy they use.

Japan has attempted to rely heavily upon nuclear power as a means of reducing imports of fossil fuels as much as possible. The Fukushima Daiichi Power Plant disaster in 2011 has led to a substantially increased reliance upon fossil fuel energy in Japan as can be seen in the data of Table II.

Japanese Energy Consumption and CO_2 Emissions

Year	Oil	Natural Gas	Coal	otal Fossil Fuels	Total Energy	ossil Fuels	Emissions (million metric tons)
1990	10.807	2.142	2.739	15.688	18.768	83.6	1047
2000	11.131	3.077	3.939	18.147	22.408	81.0	1201
2010	**8.920**	**4.078**	**4.827**	**17.825**	21.793	**81.8**	1177
2012*	**9.520**	**4.722**	**4.725**	**18.967**	20.306	**93.4**	1259

Table II: Energy consumption values are in quadrillion BTU and data is from the U.S. DOE/EIA

*This is the most recent complete data from the U.S. DOE/EIA

There are efforts in Japan to increase the use of renewable energy but Japan will rely heavily upon fossil fuels for the foreseeable future. I assume there isn't a large fossil fuel lobby in Japan that is preventing a move to renewable energy as some claim is the case in the U.S.

Despite the desires of many American environmentalists to see the U.S. become largely or totally free of fossil fuels, that certainly won't happen in the next 20 years, if ever.

Why won't the U.S. move beyond its great dependence on fossil fuels in the next 20 years, or even in the next 50? Because fossil fuels have major advantages in terms of energy density, energy on demand, and relatively high energy return on energy invested values.

It's appealing to think that these advantages aren't important, but they are. And because they are, the U.S., and other developed countries, will continue to rely heavily upon fossil fuels in the foreseeable future no matter how much they may want to transition to renewable energy sources.

A problem with expecting renewable energy to be the solution for global warming is that it gives people the impression that it's not necessary to actually cut back on energy use. That is because the energy will come from renewable sources at some point in the near future, or at least that is the promise. So in the view of many and perhaps most people today, if renewable energy use doesn't grow rapidly, it's due to backward politicians and the power of the fossil fuels lobby, not to the practical limitations of renewable energy sources.

There will of course be a transition to renewable energy as fossil fuels are depleted as there is no alternative, but what we will end up with is far, far less energy consumption than we have today, and far, far less than most people believe we will have in the future.

If the ultimate results associated with the continued burning of large amounts of fossil fuels are nasty, that will be unfortunate but people today have lifestyles to maintain or to strive for and they can't be bothered with the long-term consequences of those lifestyles. That is for people in the future to deal with. Although most people today have no appreciation or even understanding for the implications of physical phenomena such as thermal inertia or positive feedback, people in the future will get to experience the results of those phenomena.

On Another Note Concerning Global Warming

Prominent climate scientists are expressing increasing concern about where we are headed in terms of global warming. Politicians may want to talk about holding the global temperature increase to 2°C but climate scientists are making the case that that is beyond the safe level of warming. At this point in time, it is essentially not possible to hold the temperature increase to 2°C above the base level (This year we are running about 0.85°C above the base but thermal inertia ensures we'll go a lot higher). We're actually on a path for a temperature

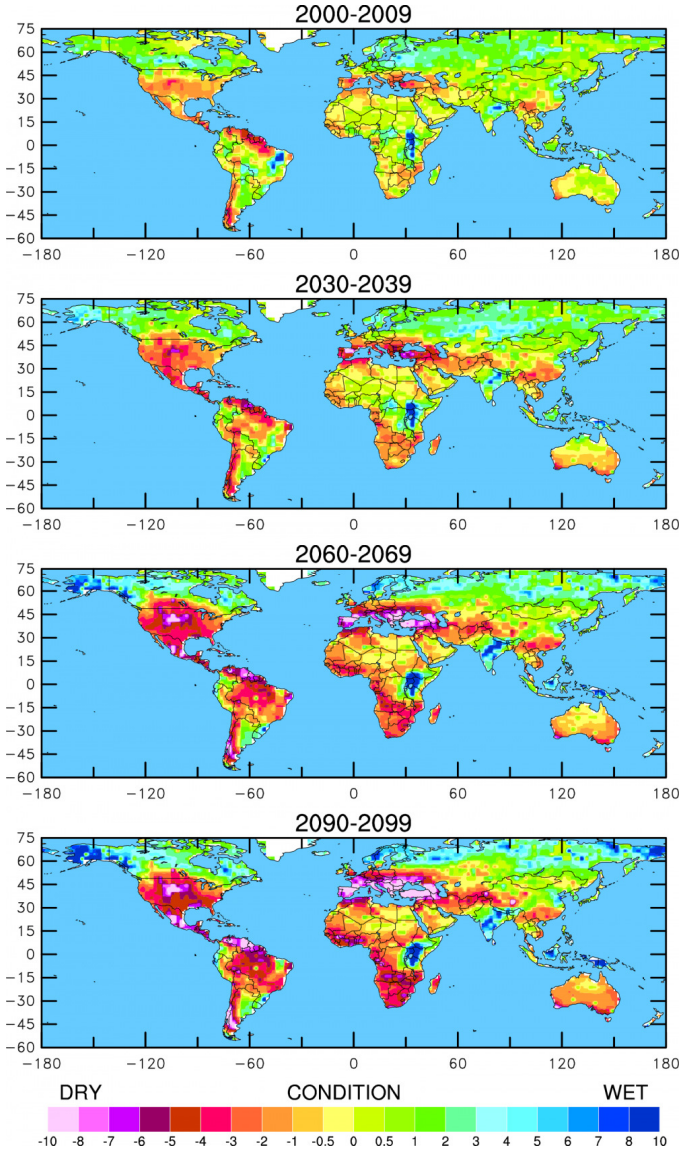
increase of 4°C (~7°F) or more. Increasingly scientists are using the term catastrophic global warming to talk about our future. As an example Dr. Kevin Anderson, former deputy director of the Tyndall Centre for Climate Change Research, the UK's top academic institute researching climate change, states the following:

"we are almost guaranteed to reach 4 degrees of warming, as early as 2050, and may soar far beyond that - beyond the point which agriculture, the ecosystem, and industrial civilization can survive."

We're going to test the proposition that warming of ~4°C will be catastrophic. Looking at the bright side, people over 50 years old largely won't have to deal with the problems that ensue because of thermal inertia.

You are probably asking yourself why 7°F would cause any problems. Wouldn't it be nice if it were a little warmer here? There are three significant problems with warming beyond a degree centigrade or so.

First, the expectation is that large agricultural areas will get much drier. Here are projections from the National Center for Atmospheric Research:



Why would major land areas get much drier due to global warming? To a large extent it will be due to an expansion of the Hadley cell, an air circulation pattern that brings dry air down from high altitudes creating many of the major deserts around the world. The cell is expected to expand to higher latitudes in the northern hemisphere where agricultural production is important, such as in much of the U.S. The good news is that water extraction from aquifers can occur for awhile. After that, scientists will have to develop GMO crops that don't require water or GMO humans that don't require food. The alternative is for nature to take its course.

Second, even at the present effective CO_2 level, the equilibrium sea level is roughly 20 feet higher than the present level. It will take considerable time to reach the equilibrium level but it will ultimately be reached. Most, if not all, coastal cities will be inundated at some point in time. Cities like Miami have no chance of not being totally inundated.

Third, positive feedbacks may take the system out of any human control. What a positive feedback does is amplify the warming. As an example, warming in the Arctic will release CO_2 and methane from the melting permafrost so it can go into the atmosphere where it can then cause further warming which leads to more permafrost melting and the release of more CO_2 and methane.

What we would need to do to address global warming is equivalent to climbing Mt. Everest. At best Americans are willing to climb Ashmun Hill (in Sault Ste. Marie) if they can do it in their motor vehicles.

Odds and Ends

Sierra Club Calendars

The sale of Sierra Club calendars provides funds for the Three Lakes Group. We are looking for regular supporters. If you would like a calendar or calendars, they can be ordered from Annemarie Askwith at askwitha2@gmail.com. Prices: $12 for wall (always features spectacular wilderness areas); $13 for engagement (award winning nature photos every week) spiral, firm paper)

Web Page and Facebook

We're on the Web and Facebook. The addresses are:

http://tlgsierraclub.org/

https://www.facebook.com/ThreeLakesGroupOfSierraClub?ref=bookmarks

Please take a look at what we have online. We'll try to supply material regularly to these sites. Feel free to contact us with questions, concerns and suggestions.

Hardcopy Version of Newsletter

If you receive the hardcopy version of this newsletter and want to continue to receive it or get the digital version, send me a e-mail message at blanchardclimate@gmail.com or call (906) 203-4118.

Roger