Sierra Club Three Lakes Group
Fall 2016 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, Kathy English; Group Representative

Fall Program Schedule

Programs will be held in Crawford Hall Room 207 at Lake Superior State University in Sault Ste. Marie, MI at 7:00 pm

Thursday Oct. 20 – Chasing Ice - Chasing Ice is the story of one man's mission to change the tide of history by gathering undeniable evidence of our changing planet. Within months of that first trip to Iceland, the photographer James Balog conceived the boldest expedition of his life: The Extreme Ice Survey. With a band of young adventurers in tow, Balog began deploying revolutionary time-lapse cameras across the brutal Arctic to capture a multi-year record of the world's changing glaciers.

Thursday Nov. 17 - Where to Invade Next - A 2015 American film written and directed by Michael Moore. The film, in the style of a travelogue, has Moore spending time in countries such as Italy, Finland, Tunisia, Slovenia, and Portugal where he experiences those countries' alternative methods of dealing with social and economic ills experienced in the United States.

What we are working on

A Bike Friendly Sault Ste. Marie -I (Roger) have been working hard on getting Bike Friendly Community Status for Sault Ste. Marie. I and a few others will meet again this fall with Oliver Turner (City Manager) and Linda Basista (City Engineer) to discuss the current and future status of a bike friendly community for Sault Ste. Marie.

Line 5 Oil Pipeline in the Mackinac Straits - We've been active on the Line 5 oil pipeline issue. Line 5 is an oil pipeline that's goes through the U.P. traverses the Straits of Mackinac and then goes down through the L.P.

Annemarie Askwith still has 12 sturdy 'Shut Down Line 5' signs in her possession. If you would like a Line 5 sign, contact Annemarie Askwith at askwitha2@gmail.com. The production price of each sign is $5 and anything above is a donation for our work. 23 million gallons of oil pass through this old line every day. The Sierra Club objects to the line saying the risk and consequences of any spill are simply too great to justify the continued use of the line (the line is ~63 years old). Beside, with climate change underway, all countries must immediately engage herculean transitions away from fossil fuel use.

Graymont Limestone Mine - Graymont has been logging off the Wilwin property all summer, 8-10 logging trucks/day. In the past couple of weeks, the drilling people have been working on test samples. The interesting thing is that the drilling company is from Lake City and the logging people are from the Raber area. Also, the drilling company is using water from a quarry versus clean water. So, once again, Graymont's promises of using local people was all a lie! In addition, the County Road Commission refuses to impose a load restriction on the Wilwin Road and the logging trucks are already tearing up the road. A point of interest is that there is a load restriction on the Strongs cutoff road, where no one lives, but the road commission won't impose restrictions on Wilwin where a number of people live.

U.P. Environmental Coalition – We are currently working on a plan for hosting a UPEC Celebrate event. The event here in Sault Sainte Marie is targeting September 2017. This event will be held on a Saturday and will include informational presentations related to the St. Marys River and the impacts from and to the city of Sault Sainte Marie. Included in the event is a luncheon and some other activities. This programs will be free of charge to the public. More information will be provided as it is available.

Educational Grants

UPEC provides educational grants annually for teachers and youth workers who provide quality environmental education programs to regional children. The deadline for applications for the 2017 grants is January 4, 2017, information can be found on UPEC's website.

http://upenvironment.org/mini-grants/

Photo Contest

UPEC is again hosting its annual photograph contest, the purpose being to highlight the best of the Upper Peninsula's scenes and activities. More information can be found on UPEC's website.

http://upenvironment.org/photocontest/

UPEC Merger

UPEC and SWUP (Save the Wild U.P.) have merged to create a far-reaching, inclusive environmental advocacy group for the Upper Peninsula. SWUP will become part of UPEC, allowing the strengths of both groups to be highlighted in the cooperative work to protect clean water, healthy ecosystems and wild places in our beloved U.P.

Board Meeting

UPEC's quarterly board meeting is scheduled for October 15th, starting at 1 p.m. at Peter White Library in Marquette. The public is welcomed to attend.

The Michigan Chapter Executive Committee Meeting - The ExComm meeting was interesting and informative. In addition to the business agenda items, there was a good discussion related to getting more participation at group meetings and volunteers to work on projects. Dr E.E. Timm gave an excellent presentation related to the pipeline issues. His information is impeccable and scary! If you have not heard him speak, he would be a good choice for an event.

Music Events

We're hoping that during the fall we can have some music events featuring Susan Askwith, Roy Nason and myself. We would play and sing some environmental and folksy songs. The objective is to have events that all can enjoy. Prior to events, I'll send out e-mails concerning when and where.

Roger

What's going on with Oil

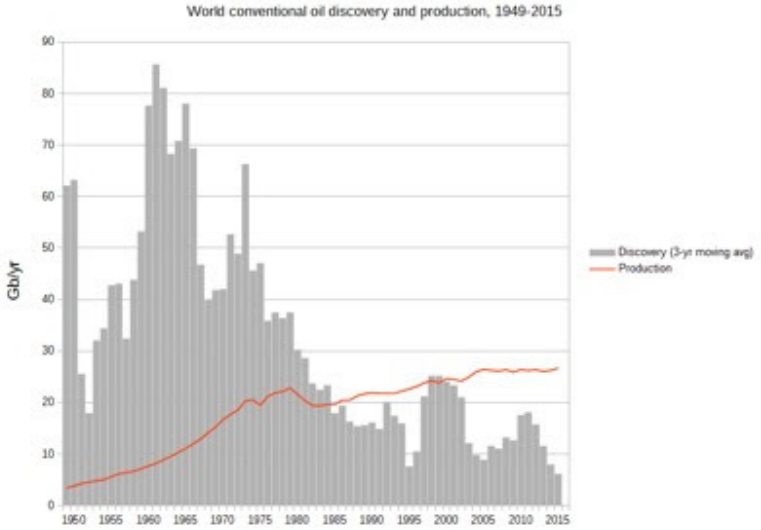
Here are a few interesting quotes by individuals associated with the oil industry.

"The disturbing truth is that the real cost of oil production has doubled since the 1990s. That is very bad news for the global economy. Those who believe that technology is always the answer need to think about that…Tight oil may have bought us a few years of abundance but the resulting over-supply, debt and prolonged period of prices below the cost of production have exacted a terrible cost. Under-investment, a damaged service sector, weak oil company balance sheets and a decimated work force practically ensure cripplingly higher prices a few years in the future."
Art Berman, consulting geologist

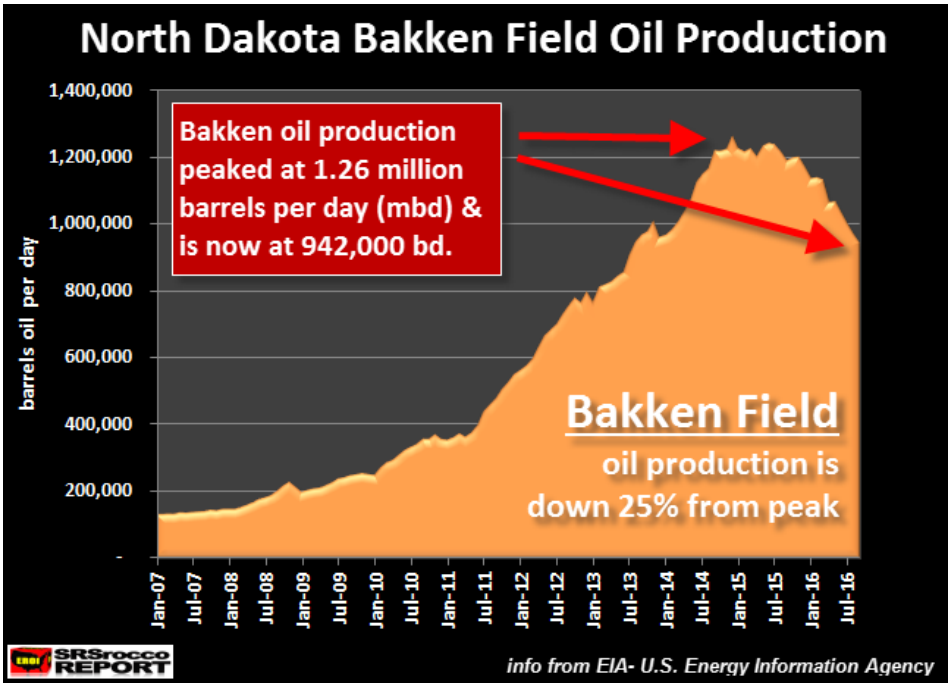
"Oil prices simply aren't going to rise fast enough to keep oil and energy companies from defaulting. Then there is a real contagion risk to financial companies and from there to the rest of the economy."
Jason Schenker, president and chief economist at Prestige Economics

"Put bluntly, the standard claim that the world has proved conventional oil reserves of nearly 1.7 trillion barrels is overstated by about 875 billion barrels. Thus, despite the fall in crude oil prices from a new peak in June 2014, after that of July 2008, the 'peak oil' issue remains with us."
Professor Michael Jefferson of the ESCP Europe Business School, a former chief economist at oil major Royal Dutch/Shell Group, former Deputy Secretary-General of the World Energy Council

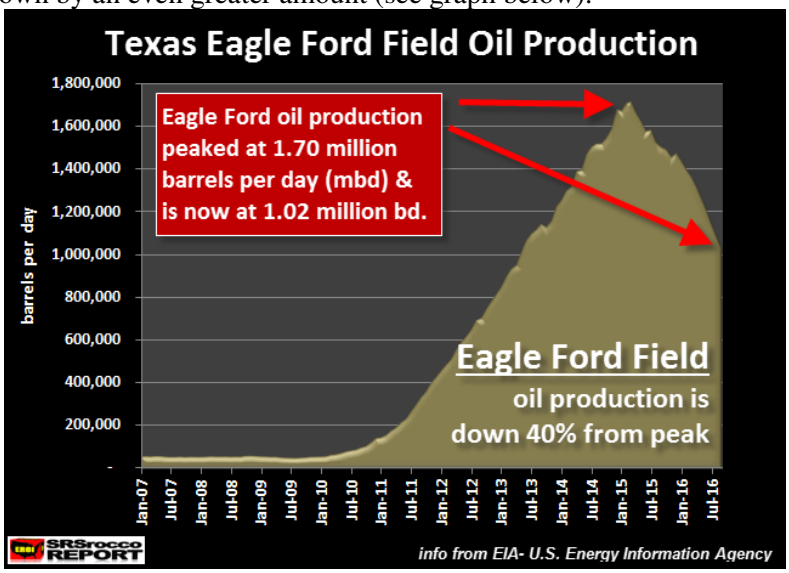
Explorers in 2015 discovered only about a tenth as much oil—2.7 billion barrels—as they have annually on average since 1960, and the lowest amount since 1947, according to consulting firm Wood Mackenzie. This year, they'll probably find even less, spurring new fears about their ability to meet future demand. With oil prices down by more than half since the price collapse two years ago, drillers have cut their exploration budgets to the bone. Global liquid hydrocarbons consumption is about 33 billion barrels/year.



With low prices, tight oil production in the U.S. has been dropping rapidly. Production in the Bakken region of North Dakota is down significantly relative to peak production (see graph below). That is in spite of approximately 1700 more producing wells in North Dakota since production peaked in North Dakota.



Eagle Ford (Texas) is down by an even greater amount (see graph below).



Eagle Ford and Bakken are two of the top 3 tight oil (fracking) producing regions in the U.S. I think it's an excellent bet that neither will again produce at a rate they previously peaked at. Producers concentrated on the sweet spots and drilled like there was no tomorrow. It appears that U.S. oil production will be down approximately 1 mb/d at the end of the year relative to the recent peak value. Production is going down about as fast as it went up in recent years. It's interesting that this is not covered by the mainstream media.

One reason I don't expect the future to be the same as the past for Bakken oil production is illustrated with the graph below:

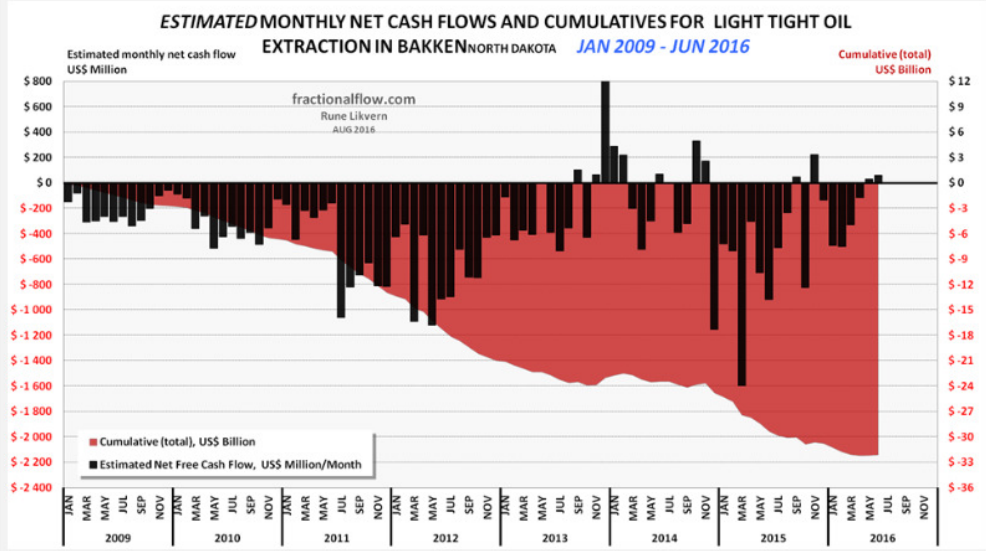


***Figure 3**: The chart above shows an estimate in development of cumulative net cash flows post CAPEX in manufacturing LTO wells in the Bakken (ND) as of January 2009 and as of June 2016 (red area and rh scale) and estimated monthly net cash flows post CAPEX (black columns and lh scale).*

The **BLACK BARS** are estimates of the monthly Free Cash flow from producing oil in the Bakken since 2009, while the **RED AREA** is the cumulative negative free cash flow. As we can see there are very few black bars that are positive. Most are negative, heading lower.

Furthermore, the red area shows that the approximate negative free cash flow (deducting CAPEX- capital expenditures) is $32 billion. **So, with all the effort and high oil prices from 2011-2014 (first half of 2014), the energy companies producing shale oil in the Bakken are in the hole for $32 billion**. Well done.... hats off to the new wonderful fracking technology.

If drilling in the sweet spots leads to significant debt for oil companies, what will concentrated drilling in the non-sweet spots lead to?

Is the Oil Industry Dying?

by Richard Heinberg, originally published by Pacific Standard | TODAY

The 'peak oil' controversy is staging a come-back as the industry confronts higher costs—and low prices

Talking about "peak oil" can feel very last decade. In fact, the question is still current. Petroleum markets are so glutted and prices are so low that most industry commenters think any worry about future oil supplies is pointless. However, the glut and price dip are hardly indications of a healthy industry; instead, they are symptoms of an increasing inability to match production cost, supply, and demand in a way that's profitable for producers but affordable for society. Is this what peak oil looks like?

When prices are high enough to generate profits (which is very high indeed these days), they are also high enough to destroy demand.

Aside from forecasts regarding the timing of the inevitable moment when petroleum production would max out (yes, many of those forecasts proved premature), the peak oil discussion more importantly highlighted three key insights, all of them as valid now as ever:

1. Oil is essential to the modern world. Energy is what enables us to do anything and everything, and oil is currently the world's primary energy source. But oil's role in society is even more crucial than that sentence might suggest. Nearly 95 percent of global transport is oil-powered, and if trucks, trains, and ships were to stop running the global economy would grind to a halt almost instantly. Even electricity (which is the other main energy pillar of commerce and daily life) depends on oil: coal mining, transport, and processing depend on oil; much the same is true for natural gas, uranium, and the components of solar panels and wind turbines.

2. Oil is hard to substitute. A colleague, the energy analyst David Fridley, and I recently finished a year-long inquiry into details of the necessary and inevitable transition from fossil fuels to renewable sources of energy. While lots of sunshine and wind are available, not all the ways we use energy will be easy to adapt to renewable electricity. Some of the biggest challenges we identified are in the transport sector. Electric cars are certainly feasible (more are on the road every year), but batteries alone can't power heavy trucks, container ships, and large airplanes.

There are other possibilities (including biofuels and hydrogen-based fuels made using electricity), but these are likely to be much more expensive and will require large energy inputs for their ongoing production. Moreover, transitioning to them will take major investment and infrastructure build-out occurring over two or more decades.

3. Depletion of oil (and of other non-renewable resources) tends to follow the low-hanging fruit principle. Humanity has been extracting oil on an industrial scale for 150 years now. At first, all it took was identifying places where petroleum was seeping to the ground surface, then digging a shallow well. Today, globally, millions of old conventional oil wells lie depleted and abandoned. The primary remaining prospects for production include heavy oil (which requires expensive processing); bitumen (which must be mined or steam-extracted); tight oil (produced from low-permeability source rocks, which requires hydrofracturing and horizontal drilling, with typical wells showing a rapid decline in output); deepwater oil (which entails high drilling and infrastructure costs); or arctic oil (which has so far mostly proven cost-prohibitive). All of these options entail rapidly growing environmental costs and risks.

It's that third point that helps explain the disturbing recent evolution of the petroleum world. Most industry analysts focus on oil prices, and it's clear on this score that the market has gone seriously weird in recent years. In 2001, petroleum sold for about $20 a barrel, a price that sat well within a fairly narrow band of highs and lows that had bounded price for roughly 20 years following the politically generated oil shocks of the 1970s. But, by the summer of 2008, the price had ascended to the unprecedented, dizzying altitude of $147; then (following the cratering of the global economy) it plummeted to $37. Following that, prices gradually recovered to around $100, where they remained for nearly three years before sliding again, starting in mid-2014, to the high $20s, from which they have partially rebounded to today's approximately $40.

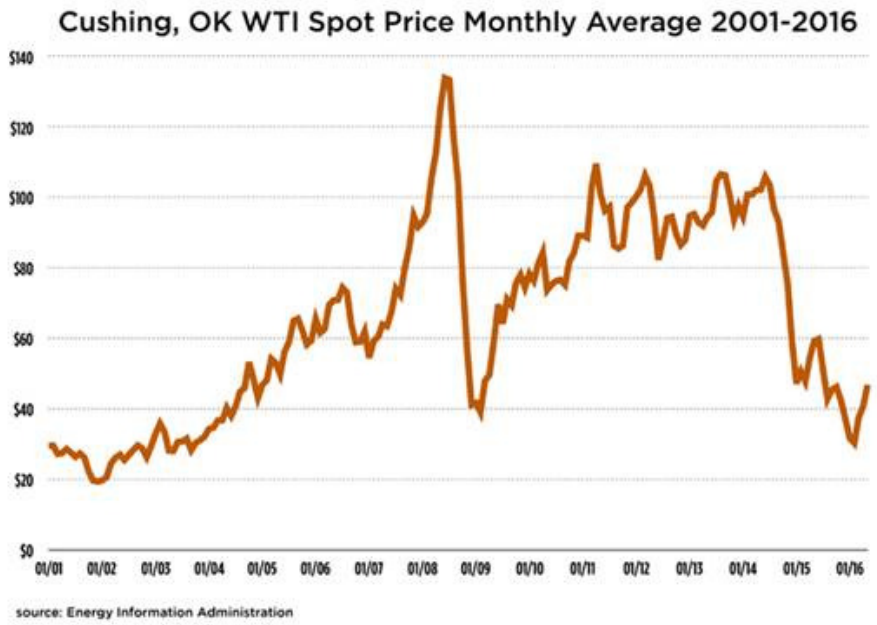


Figure 1 WTI Spot Price, Monthly Averages Jan 2001 - May 2016

The recent highs (above $100) are incomprehensible, until we recognize that the oil industry's costs of production have skyrocketed in the past decade. Throughout the first decade-and-a-half of the new century, demand for oil was growing rapidly in Asia. Normally, the industry would have simply ramped up its supplies of conventional crude to satisfy the needs of new car buyers in China and India. But output of conventional oil topped out in 2005; all the new supply growth since then has been from hard-to-reach or low-grade resources. Producers didn't resort to these until demand outstripped supply, raising prices and justifying the far higher rates of investment that are required per unit of new production. But that meant that, henceforth high prices would have to continue if producers were to turn a profit.

When oil was selling for $100 per barrel, many tight oil projects in the United States were nevertheless only marginally profitable or were actually money losers; still, with interest rates at historic lows and plenty of investment capital sloshing around the financial industry, drillers had no trouble finding operating capital (David Hughes of Post Carbon Institute was one of the few analysts who questioned the durability of the "shale gale," on the basis of meticulous well-by-well analysis). The result of cascading investment was a ferocious spate of drilling and fracking that drove levels of U.S. oil production sharply upward, overwhelming global markets. The amount of oil in storage ballooned. That's the main reason prices collapsed in mid-2014—along with Saudi Arabia's insistence on continuing to pump crude at maximum rates in order to help drive the upstart American shale-oil producers out of business. The Saudi gambit mostly succeeded: Small-to-medium-sized U.S. producers are now gasping for air, and, as their massive debts come due over the next few months, a wave of bankruptcies and buyouts seems fairly inevitable. Meanwhile, in the continental U.S., oil production has dropped by 800,000 barrels a day.

It might not be far from the mark to suggest that we are witnessing the early stages of the thermodynamic failure of global industrial society.

Indeed, the entire petroleum business is currently in deep trouble. Countries that rely on crude oil export revenues are facing enormous budget deficits, and in some cases are having trouble maintaining basic services to their people.

Image credit: Empty shelves in a Venezuelan supermarket. By The Photographer - Own work, CC0

The worst instance is Venezuela, where hunger is rampant. But hard times have also fallen on Nigeria, the Middle Eastern monarchies, Russia, and even Canada to some degree. The oil majors (Exxon, Shell, Chevron, etc.) are still somewhat profitable because a significant portion of their output still comes from older, giant oilfields; but a large and increasing segment of their remaining profits now goes toward debt servicing. And their existing oil reserves are not being replaced with new discoveries.

Any way you look at it, the industry faces a grim future. Even if prices go up, there is no guarantee of recovery: Investors may be shy to rush back to oil since they have no assurance that a price rout won't recur in months or years. After all, when prices are high enough to generate profits (which is very high indeed these days), they are also high enough to destroy demand—which is also vulnerable to recessions, the growth of the electric vehicle market, and meaningful climate policy. It's simply unclear whether the global economy can consistently support an oil price that's sufficiently robust to pay the industry to extract and refine the kinds of resources that remain.

Again, most oil commentators look at all of this through a purely economic lens. But it may be helpful to think more in terms of thermodynamics. Oil, after all, is primarily useful as a source of energy. And it takes energy to get energy (it takes energy to drill an oil well, for example). Energy profits from oil extraction activities were once enormous, and those energy profits got spread throughout society, wherever oil was used. Now, petroleum's energy profitability is falling fast.

Oil production past and present. On the left is a 1902 "gusher" while on the right is an aerial view of tar sands production in Alberta, Canada. Sources: Wikimedia Commons. Tar sands image via shutterstock. Reproduced on Resilience.org with permission.

For example, while conventional oil wells 50 years ago often had a hundred-to-one energy payback, today's bitumen production in Canada shows an energy-return-on-energy-invested (EROEI) ratio of between 3:1 and 5:1. This declining energy profitability is why it's now so hard to produce oil at a financial profit, and also why—even when oil supplies are still expanding—they don't fuel as much economic growth throughout the economy.

Since oil is the key energy source of modern civilization, the effective EROEI of society as a whole can be said to be declining. It might not be far from the mark to suggest that we are witnessing the early stages of the thermodynamic failure of global industrial society. An earlier phase of the process manifested in the financial crash of 2008; when that occurred, governments and central banks responded by deploying easy money (massive debt, low interest rates) to prop up the system, and this temporarily masked society's dwindling EROEI. Debt can accomplish this over the short run: Money is effectively a marker for energy, and we can borrow and spend money now on costly energy with the promise that we will pay for it later (hence the massive build-up of debt in the oil industry). But if cheaper-to-produce energy and higher prices don't emerge soon, those debts will eventually become transparently unrepayable. Hence what is inherently an energy crisis can appear to most observers to be a debt crisis.

The problem of eroding energy profitability is hard to deal with partly because the decline is happening so fast. If we had a couple of decades to prepare for falling thermodynamic efficiency, there are things we could do to soften the blow. That's what the peak oil discussion was all about: It was an effort to warn society ahead of time. Once the dynamic of declining energy profitability really gets rolling, adaptation becomes much more difficult. Oil no longer provides as much of a stimulus to the economy, which just can't grow as it did before, and this in turn sets in motion a self-reinforcing feedback loop of stagnating or falling labor productivity, falling wages, falling consumption, reduced ability to repay debt, failure to invest in future energy productivity, falling energy supplies, falling tax revenues, and so on. How long can debt continue to substitute for energy before the next traumatic phase of this feedback process begins in earnest? That's anybody's guess, but our time-window for action is likely months or years, not decades.

Aerial view of large- scale solar photovoltaic array image via shutterstock. Reproduced on Resilience.org with permissions.

What could world leaders do about declining societal EROEI if they took the crisis seriously? Clearly, part of their strategy would entail building alternative energy supply infrastructure—which must be low-carbon, since we also face the existential threat of climate change. Indeed, some environmentalists say peak oil is a non-issue because whatever we do to tackle climate change will simultaneously solve our oil dilemma. I'm not so sure about that. Most proposed climate mitigation strategies start with transitioning the electricity sector to solar and wind power, and then proceed with a gradual electrification of other energy usage (electric cars, electric air-source heat pumps to heat buildings, etc.). But, as noted, much of the transport sector is hard to electrify. It's nice to see more Nissan Leafs, Teslas, and Chevy Volts on the road, but those carry people; our real challenge is moving all the stuff we need (food, raw materials, and manufactured goods of all kinds), and that stuff outweighs passengers by an order of magnitude and currently travels mostly by ship and truck.

Shipping containers at Hong Kong Terminal image via shutterstock. Reproduced on Resilience.org with permission.

Efforts now underway to power trucking and shipping renewably are woefully insufficient. Peak oil demands that we focus on transport now, not later: We should supply substitute renewable fuels where

absolutely needed, but we must also quickly and substantially reduce our reliance on long-distance transport through economic re-localization.

Much as I hate to think so, thermodynamic decline and economic contraction could seriously impair our chances for a robust renewable energy transition in response to the threat of climate change. Building enough solar panels and wind turbines, and adapting the ways we use energy (in building heating, in industrial processes, in transportation, in food systems, and on and on), will take time and many trillions of dollars of investment. It will also require stable international markets and supply chains, and those could be thrown into turmoil by the declining thermodynamic profitability of our society's current primary energy source—unless we can somehow build a bridge to the future while the highway we're on is crumbling beneath us.

The subject of peak oil has been discredited following a short-term oil supply glut and low oil prices. Even many environmentalists have filed peak oil under "Things Not to Worry About." (One high-level climate campaigner of my acquaintance has said that peak oil is a lousy issue to organize around—as though we can afford to ignore a gargantuan problem if it offers insufficient fundraising potential). Thankfully, that small, resourceful audience has taken action anyway, in the form of community resilience-building efforts that often fly under the banner of Transition Initiatives and similar networks.

It may be counterproductive even to use the phrase "peak oil" today, though I've done so in this essay. After all, we don't know if the actual maximum in world oil output occurred last year, or will happen this year, next year, or several years from now. This lack of definitive predictive power is the Achilles' heel of an otherwise useful term. What instead should we call the complex, interrelated set of developments described above? Should we dub it "the thermodynamic collapse of industrial civilization"? That has a nice techno-apocalyptic ring to it and is probably more accurate. But it has too many syllables and requires too much background explanation. Only geeks could ever get it.

Something is happening here, whether we have a snappy buzzword for it or not. And we can't afford to ignore it, regardless how hard it is to explain it to economists, policymakers, and even many environmentalists. My colleagues and I keep trying to do just that. But at this point it also makes sense to batten down the hatches and build resilience close to home.

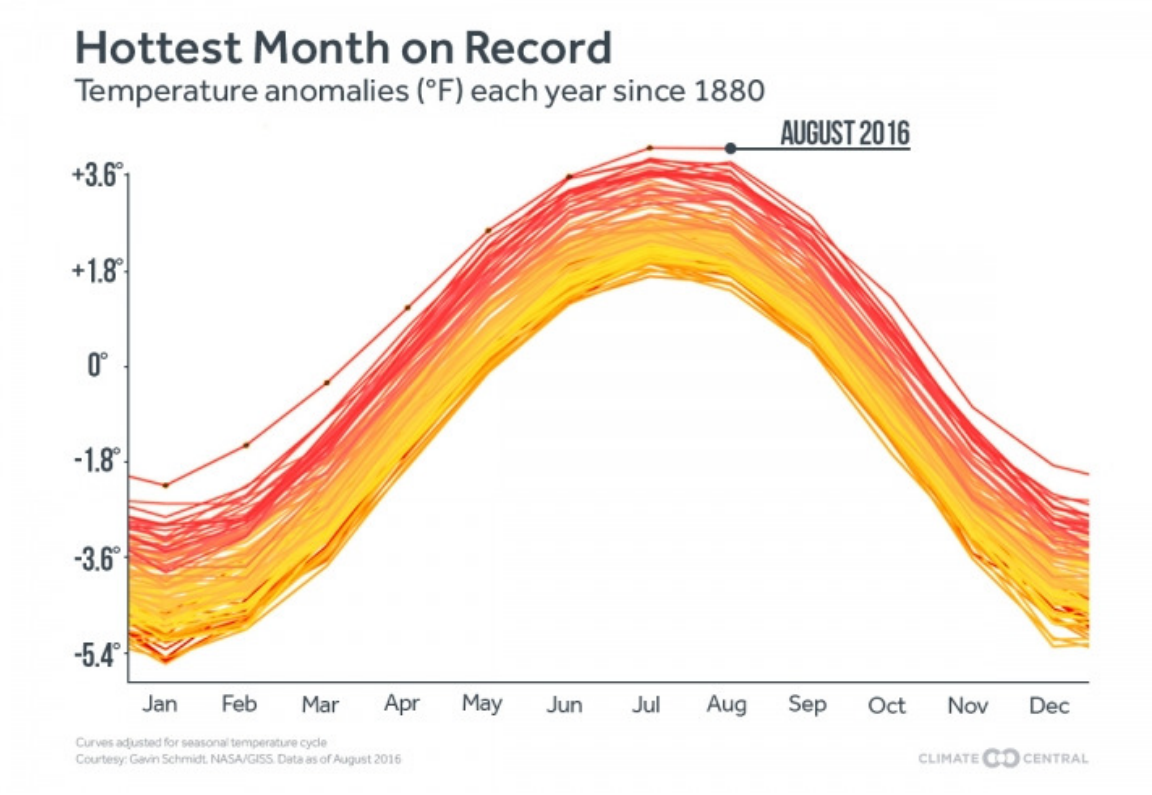
What's Happening in Global Warming

The global high temperature record will clearly be broken this year by a wide margin. Below is an update with the most recent data.

Streak of Record-Hot Temps Adds Another Month

The unprecedented streak of record-hot months that the world has experienced over more than a year just tacked on one more month: Data released Tuesday by the National Oceanic and Atmospheric Administration showed last month was easily the hottest August on record.

That makes 16 straight record-hot months, unparalleled in NOAA's 137 years of record-keeping. The previous record streak was only 10 months, set in 1944. NASA's data, released earlier, also said August was record hot, not to mention tying for the hottest month the planet has ever recorded.



The record-hot months of 2016 clearly stand out against the past 137 years.

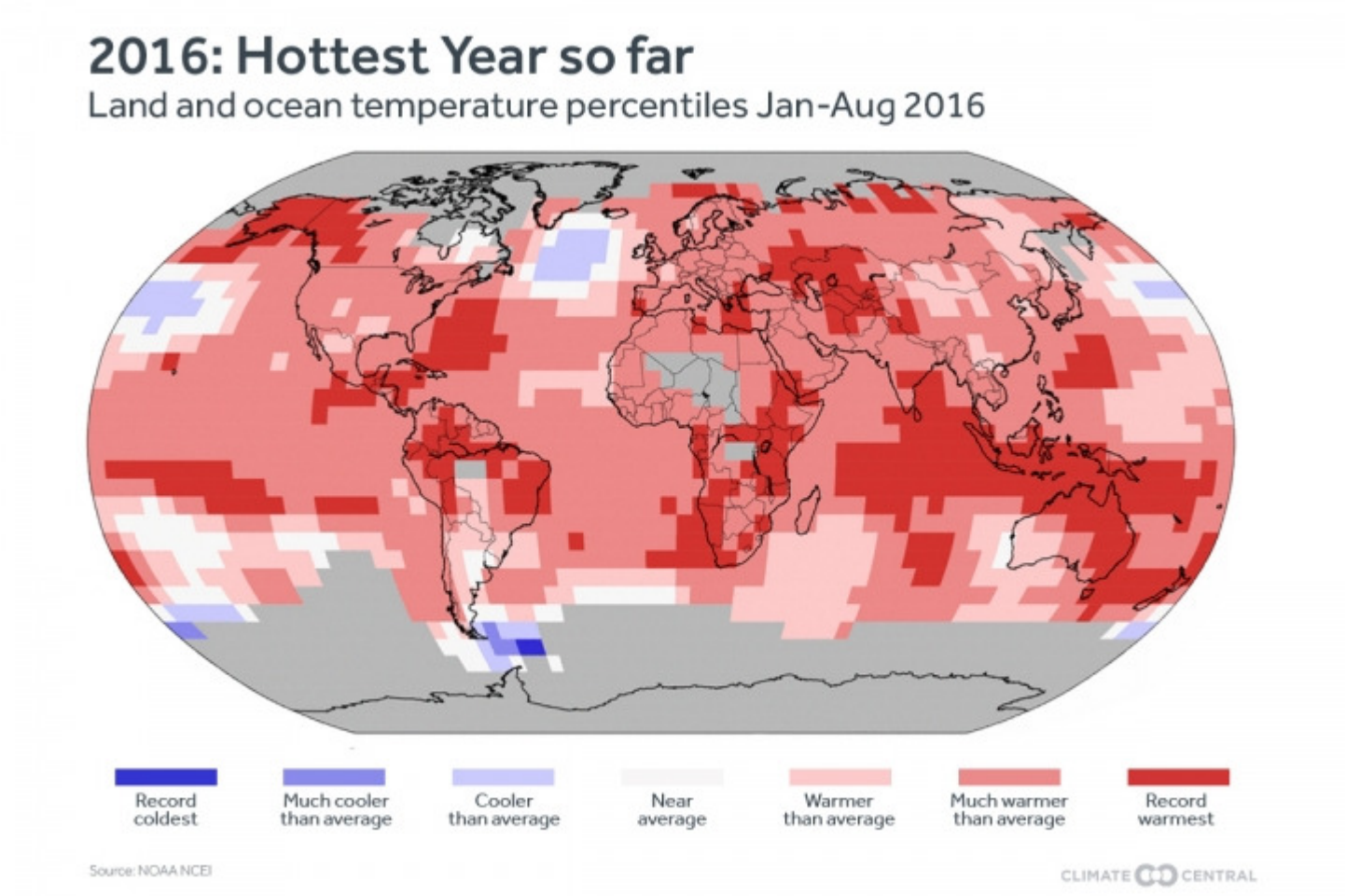
Though there are still several months left in the year, it is a virtual certainty that 2016 will be the hottest year on record, and by a significant margin. While global temperatures can fluctuate from year to year, 2016 is serving as something of an exclamation point for the long-term trend of warming driven by the buildup of heat-trapping gases in the atmosphere.

According to NOAA, August 2016 was 1.66°F (0.92°C) above the 20th century average of 60.1°F (15.6°C). NASA, which uses different methods to analyze global temperatures and a different baseline of comparison, recorded August as 1.76˚F (0.98˚C) above the average from 1951-1980.

In NOAA's books, the month beat out the previous record holder, August 2015, by 0.09°F (0.05°C); according to NASA, it bested August 2014 by 0.29°F (0.16°C).

Both agencies have 2016 as the hottest on record through August, NOAA by 0.29°F and NASA by 0.14°F.

While an El Niño event helped boost temperatures at the end of last year and over the first half of this year, it is predominantly the excess heat trapped by greenhouse gases that is sending those temperatures ever skyward.

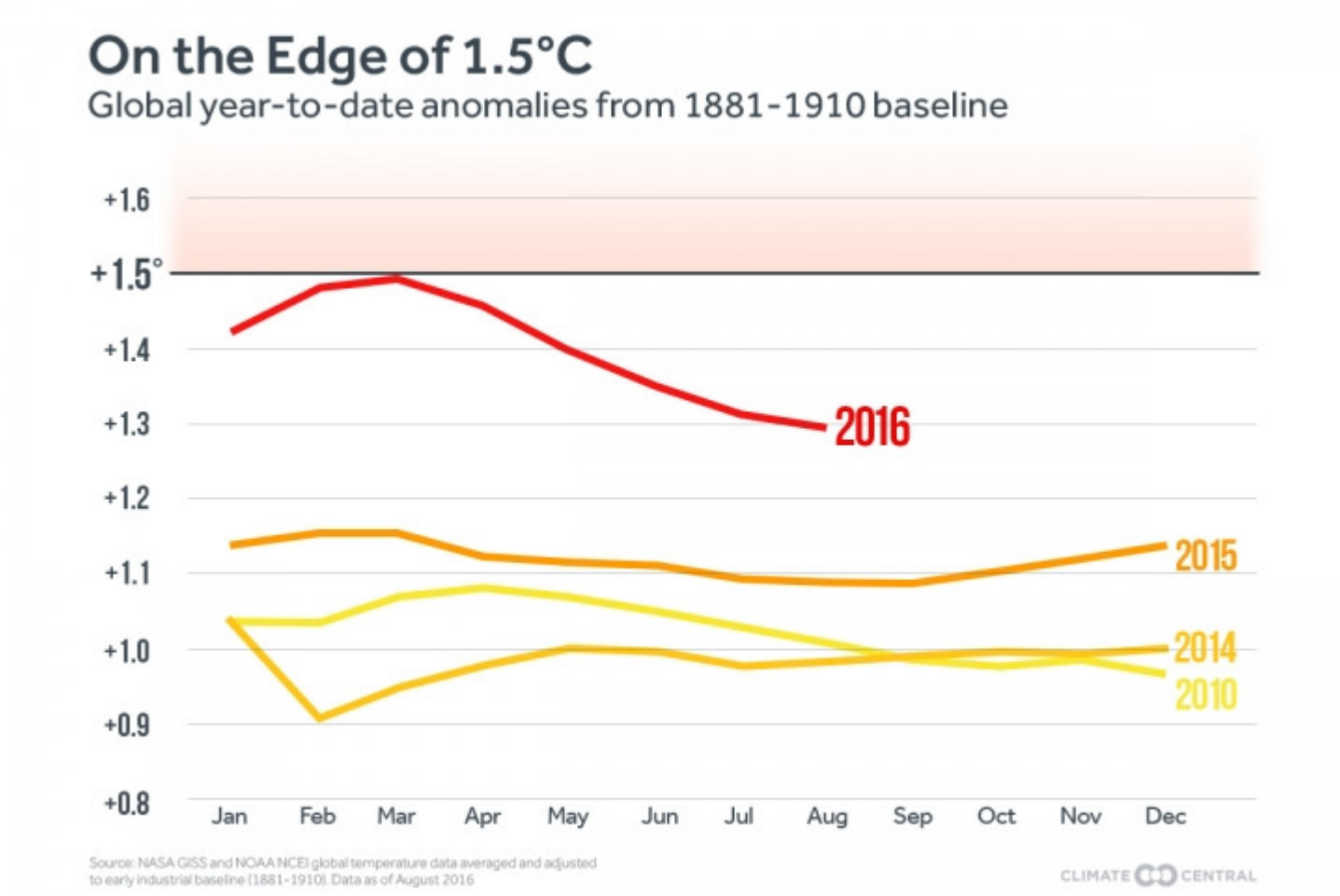


How temperatures around the globe have differed from the 20th century average through August.
Credit: NOAA

It is this long-term trend that climate scientists prefer to emphasize over any particular monthly or yearly record. This year's soaring temperatures have inspired some scientists and others to try to put the current climate into context, to show just how far the planet has heated up.

Ed Hawkins, a climate scientist at the University of Reading in the United Kingdom, made the metaphorical upward spiral of temperatures into a literal one, and the animation went viral on social media. Hawkins also assembled a series of 167 tiny world maps, each showing how temperatures have changed since the 1850s — the maps progress from cool blues early on to a mass of angry reds in recent decades.

Randall Munroe, author of the webcomic xkcd, created a scrollable timeline of temperature change over the past 20,000 years, annotated with key events in human and natural history. That comic became another viral hit.



The year-to-date average of global temperatures during each month of 2016 through June.
Click image to enlarge.

The increased attention to the feverish levels of Earth's temperature has come as the world's nations have agreed to limit warming by the end of the century to less than 2°C above temperatures before the Industrial Revolution unleashed a torrent of greenhouse gases. Some countries are pushing to limit that warming even more, to 1.5°C.

Because NASA and NOAA don't compare current temperatures to a preindustrial baseline, Climate Central has been reanalyzing the data each month. The numbers from each agency are averaged and then compared to that from 1881-1910. August 2016 measured 2.32°F (1.29°C) above the average from that period.

With the waning of El Niño's influence on temperatures, monthly temperature departures (or the amount each month is higher or lower than the average), are expected to decline as the year goes on. Perhaps as early as September, the string of record-setting months will cease.

But 2016 is so far above the pack that it is all but guaranteed it will displace 2015 as the hottest year on record.

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.