



## Drumbeat: August 14, 2013

Posted by [Leanan](#) on August 14, 2013 - 9:42am

### [What Is Peak Oil?](#)

Peak oil — the point in time when global oil production peaks and begins to drop — has been looming on the horizon for decades. Countless research reports, government studies and oil industry analyses have tried to pin down the exact year when peak oil will occur, to no avail.

The stakes are undeniably high: Much of human civilization is now inextricably linked to a readily available supply of inexpensive oil and petroleum products. From heating, electricity production and transportation to cosmetics, medicines and plastic bags, modern life runs on oil.

### [Another Nail In The Coffin For Peak Oil](#)

The theory of peak oil suffered another blow with the recent news that global crude oil production increased to a new all-time high in April 2013, the latest set of output numbers from the U.S. Energy Information Administration (EIA). Production touched 76.348 million barrels per day in April, inching above the previous global peak of 76.036 million bbl/day in December 2012. The new era of increased oil supply, in other words, continues to find broad support in the data.

“The main reason why Peak Oil theorists always turn out to be wrong,” writes David Blackmon of FTI Consulting, “is that they by and large appear to be unable to grasp the huge role advancing technology plays in allowing the industry to discover new oil resources previously unknown, to access known resources that were previously thought to be unexploitable, and to extract an ever-increasing percentage of oil long known to be in place via secondary and tertiary recovery techniques.” Given the numbers cited above, it’s not getting tougher to argue otherwise.

### [Whither Shale Oil?—Interview with David Hughes](#)

It’s interesting that the EIA has changed their outlook. For example, if you look at the April 2012 Annual Energy Outlook, they projected close to 12,000 locations available to drill in the Bakken and Three Forks formations. In their April 2013 Outlook, they’ve projected 43,000 drilling locations, so they’ve almost quadrupled their estimate of the number. And in the Eagle Ford they’ve doubled their estimate of drilling locations to 22,000. As a result, they’ve doubled their estimate of recoverable oil. However, if you

look at the 2013 EIA forecast for tight oil, they're actually pretty conservative compared to CitiGroup. The 2013 EIA reference case forecast projects a second peak in US oil production in about 2019, reflecting a 2020 peak and decline of tight oil.

### [Energy independence in the age of natural gas exports](#)

Natural gas producers keep telling the public and policy makers that US natural gas production is set to grow continuously for decades, and that additional natural gas export terminals are necessary. But that story isn't holding up.

### [WTI Crude Snaps Three-Day Gain Amid Signs Stockpiles Rose](#)

West Texas Intermediate declined for the first time in four days after an industry report showed fuel inventories rose in the U.S., the world's biggest oil consumer. Brent crude fell from the highest close since April.

Futures slid as much as 0.9 percent after advancing 3.3 percent in the previous three days. Gasoline stockpiles climbed by 1.7 million barrels, while distillate supplies gained 1.1 million, data from the American Petroleum Institute showed yesterday, according to two people familiar with the matter. The Energy Department is scheduled to release its report today.

"Product inventories are starting to gain as seasonal demand eases," said Andrey Kryuchenkov, an analyst at VTB Capital in London, who predicts WTI will trade in a range of \$102 to \$108 a barrel this month.

### [Brazilian government mulls gasoline, diesel price increase: report](#)

(Platts) - The Brazilian government is contemplating a further increase in domestic fuel prices as state-controlled oil major Petrobras continues to face losses from importing and selling gasoline and diesel below international market prices, Edison Lobao, Brazil's minister of Mines and Energy was quoted by Brazilian media as saying.

### [Atlantic Hurricane Season May Spark to Life Next Week](#)

The Atlantic hurricane season is about to enter its most active phase as conditions for the powerful storms improve across the basin.

Wind shear that can tear budding storms apart has been decreasing, said Dan Kottowski, an expert senior meteorologist at AccuWeather Inc. in State College, Pennsylvania. At the same time, the potential for more robust tropical waves, the seeds for hurricanes, is increasing.

### [Reports Of The Death Of Russia's Oil Sector Have Been Greatly Exaggerated](#)

Certain writers of the anti-declinst school, Dan Drenzer and Walter Russell Mead spring immediately to mind, are dismissive of the prospect of American decline and positively overjoyed at the opportunities afforded to the US by “unconventional” oil. These writers, and other like them, are openly contemptuous of “old” oil powers like Russia and decidedly skeptical of their ability to innovate and keep up with America’s flexible, adaptive, and growing energy sector. Without simplifying too greatly, the narrative preached by Drenzer, Mead, and their supporters is the following: Russia’s enormous, corrupt, and state-owned oil companies represent the past and America and its ever-growing number of small producers using the latest fracking and horizontal drilling techniques represent the future. Good guys win, bad guys loose, oil becomes cheap, and people can once again say “the American century” without sniggering.

I’m under no illusions that such a deep-seated debate, a debate that hinges on basic ideological and political values far more than it does oil production figures, will be solved (or even greatly impacted) by a single blog post. However, I was recently going through some EIA data on oil production and was struck by Russia’s rather boring and unexceptional performance. While it might very well cripple Russia at some unknown point in the future, so far the fracking revolution just hasn’t had any significant impact.

### [Death of 75-Year Monopoly Can’t Come Soon Enough](#)

President Enrique Pena Nieto’s plan to loosen Mexico’s 75-year-old oil monopoly is underwhelming the bond market after he unveiled fewer incentives for private drilling companies than his political rivals advocated.

### [Pemex plan spreads an oily sheen over Mexico’s history](#)

Pemex has been one of the cornerstones of Mexican identity since the expropriation, and Mr. Pena Nieto’s government will face an uphill battle to gain popular support for his proposed amendment to the Mexican constitution.

Recent polls indicate that 65 per cent of the population opposes opening the energy sector to private companies.

### [Oil Reforms by Mexico May Upend Markets](#)

HOUSTON — A sweeping reform suggested for Mexico’s energy laws has the potential not only to return the country to its early-1980s heyday of energetic oil drilling, when it was one of the world’s most promising producers, but also to reduce further the United States’ dependence on OPEC producers, according to oil experts.

### [Mexico Plans Oil Reserve Sweetener to Lure Exxon, Chevron](#)

Mexico has come up with an inducement for private companies such as Exxon Mobil Corp. to bid on contracts that would end a 75-year state energy monopoly.

Though the government will retain ownership of oil, President Enrique Pena Nieto plans to lift restrictions on companies registering the value of contracts with the U.S. Securities and Exchange Commission, Deputy Energy Minister Enrique Ochoa said in an interview today. Those values could then be converted into volume and recognized on balance sheets.

### [Strikes prevent Libya from issuing Sept oil export plans](#)

LONDON/TRIPOLI (Reuters) - OPEC oil producer Libya told its customers on Tuesday it could make no promises on crude deliveries next month as on-off strikes paralysed its major sea terminals.

The North African country's exports provided nearly 1.5 percent of global supplies until June, but output has since plunged, putting upward pressure on international oil prices.

### [Norway's crude oil production hits 14-month high](#)

(Platts) - Norwegian crude oil production in July hit its highest level for more than a year as output rebounded to an average of 1.576 million b/d, according to preliminary figures released Wednesday by the Norwegian Petroleum Directorate.

This is an increase of 5% from 1.5 million b/d in July 2012, and also was well up on the 1.321 million b/d of crude produced in June this year when output was impacted by the shutdown of the Ekofisk field and related fields.

### [Analysis - Statoil to gain in Europe's shift to spot gas pricing](#)

LONDON/OSLO (Reuters) - Norway's Statoil has been quick to offer pipeline gas contracts linked to spot prices rather than oil, and it stands to gain the most from these deals, while its clients are likely to find themselves at a disadvantage a few years later.

### [China looks to further open crude oil import market](#)

(Reuters) - China is considering opening up its crude import market to more refineries outside its dominant state giants, with quotas of at least 10 million tonnes being discussed for new entrants in 2014, according to traders and a government document seen by Reuters.

Any new quotas would follow the entry this year by refinery operator ChemChina into the tightly controlled crude import market, and signal a further measured opening of crude purchases to smaller players as China prepares to add refining capacity.

### [India's IOC to start work on its 1st LNG terminal by end-2013](#)

NEW DELHI (Reuters) - Indian Oil Corp will start work on its first liquefied natural gas (LNG) plant at Ennore in the east coast by the end of this year, its chairman said on Tuesday, as it sees a gradual rise in local acceptance of the costly imported fuel.

State refiners IOC, Hindustan Petroleum Corp and Bharat Petroleum Corp, also major gas users, have all unveiled plans to build LNG plants as local gas output falls, which will increase the share of the costly imported fuel in India's energy mix.

### [China approves first floating terminal for LNG imports](#)

(Reuters) - China National Offshore Oil Corp (CNOOC) said it had won final government approval to build China's first floating terminal for liquefied natural gas (LNG), a type of terminal that will allow it to increase imports rapidly.

China, the world's top energy consumer, aims to raise the share of natural gas in its energy mix to 8 percent by 2015 from 5 percent now to cut emissions from coal and lessen dependence on oil imports.

### [Dozens killed across Egypt as security forces, protesters clash](#)

(Reuters) - Egyptian security forces killed at least 29 people on Wednesday when they moved in to clear a camp of protesters demanding the reinstatement of deposed President Mohamed Mursi, in a dramatic dawn swoop aimed at ending a six-week standoff in Cairo.

Troops opened fire on demonstrators in clashes that brought chaos to areas of the capital and looked certain to further polarize Egypt's 84 million people between those who backed Mursi and the millions who opposed his brief rule.

### [SSE Urges U.K. to Hasten Power-Plant Payments to Keep Lights On](#)

The U.K. must accelerate plans to pay power-station operators to guarantee generation capacity or risk stymieing investments, utility SSE Plc said.

Payments should be made from the tax year starting next April, Chief Executive Officer Alistair Phillips-Davies said in an e-mail. They're currently scheduled to start in 2018.

### [Shadow of new dark age haunts UK](#)

The United Kingdom was just hours away from running out of gas this spring as the coldest March for 50 years almost drained gas storage facilities. LNG tankers were diverted to gas terminals at Milford Haven in Wales that had just six hours' worth left.

It is a scenario that could become more common as Britain's creaking energy system gets closer to running on empty.

At the end of June, Ofgem, the energy markets regulator, warned Britain faced an earlier than expected energy crunch mid-way through this decade, as the margin of generating capacity - the difference between total demand for electricity and the power being produced from power stations - tightens to an unprecedented level.

### [RWE Profit Rises After Gazprom Arbitration Success](#)

RWE AG, Germany's second-largest utility, said first-half profit rose 19 percent after arbitration made gas supply contracts with Russia's OAO Gazprom more favorable.

Recurrent net income, the measure used to calculate the dividend, climbed to 1.99 billion euros (\$2.64 billion) from 1.67 billion euros a year earlier, the Essen-based company said today in a statement. That missed the 2.1 billion-euro average estimate of 12 analysts surveyed by Bloomberg. Sales advanced 5.2 percent to 28.5 billion euros.

### [RWE Shuts Unprofitable Power Plants to Revive Generation Unit](#)

RWE AG will close power plants as Germany's second-largest utility tries to revive profits at its electricity generating business.

The company will shut 3,100 megawatts of power plants in Germany and the Netherlands, about 7 percent of RWE's capacity in northern Europe, and look at idling more stations, the Essen-based company said in a statement today.

### [Iron Ore Gluts Seen Through 2017 on Record Supply: Commodities](#)

The seaborne iron ore market is poised for at least four years of expanding gluts as producers from Rio Tinto Group to Vale SA increase supply to a record just as growth in China drops to the slowest pace in a generation.

The surplus will reach 82 million metric tons in 2014, the most since at least 2008, and the glut will keep growing through 2017, according to Goldman Sachs Group Inc. Australia will account for about 66 percent of the supply gains next year, Morgan Stanley says. Iron ore will average \$115 a ton in 2014, 19 percent less than now and the least since 2009, according to the median of 10 analyst estimates compiled by Bloomberg.

## [North Dakota Oil Boom Seen Adding Costs for Rail Safety](#)

Crude oil shipped by railroad from North Dakota is drawing fresh scrutiny from regulators concerned that the cargo is adding environmental and safety hazards, something that analysts say could raise costs.

The U.S. Federal Railroad Administration is investigating whether chemicals used in hydraulic fracturing are corroding rail tank cars and increasing risks. Separately, three pipeline companies including Enbridge Inc. warned regulators that North Dakota oil with too much hydrogen sulfide, which is toxic and flammable, was reaching terminals and putting workers at risk.

## [Canada rail blast firm loses license](#)

TORONTO – Canada’s transportation agency has taken away the operating license of the U.S.-based rail company whose runaway oil train derailed and exploded in a Quebec town, killing 47 people.

## [BP oil spill cleanup: US says the coast is nearly clear. Is it?](#)

Three years after the BP oil spill, the US Coast Guard says only 95 miles of coastline remain to be cleaned. But critics say the full extent of the damage is not yet known, especially in Louisiana, where oil is deep in the coastal environment.

## [BP sues U.S. over ban from contracts after spill](#)

NEW YORK – British energy giant BP is suing the U.S. government for banning it from federal contracts after the deadly 2010 Deepwater Horizon disaster in the Gulf of Mexico, documents showed Tuesday.

The U.S. Environmental Protection Agency last year barred BP from competing for new federal contracts following the catastrophic accident three years ago, which left 11 people dead and sent millions of barrels of oil churning into the gulf.

## [Chad suspends China firm CNPC over oil spill](#)

Chad has suspended all exploration operations of a Chinese state-run oil firm for causing environmental damage, Chad’s oil minister has told the BBC.

## [Indonesia’s energy watchdog chief arrested](#)

JAKARTA, Indonesia: Indonesia’s anti-corruption agency has arrested the head of the country’s upstream oil and gas regulator over allegations of bribery, an official said on

Wednesday.

### [South Korea bakes in extreme heat amid power cuts](#)

The timing could hardly be worse. South Korea is roasting in a record-breaking heatwave but doesn't have the electricity to crank up the air conditioning, as several power plants have shut down following a safety scandal.

Extreme heat has struck much of east Asia in recent weeks, including China, South Korea and Japan. Temperatures in southern China have hit 42 °C, and Japan set a record high at 41 °C on Tuesday. In South Korea, temperatures hit an all-time high of 39.2 °C last Saturday. Dozens are reported dead across the region.

### [KEPCO executive detained over corruption scandal](#)

Prosecutors detained Lee Jong-chan, senior executive vice president of the state-run Korea Electric Power Corp., on Tuesday as part of a probe into a corruption scandal involving the company, parts suppliers and certifiers.

Busan District Prosecutors' Office is looking into allegations that JS Cable, a signal cable supplier, colluded with Saehan Total Engineering Provider Co., a certifier suspected of forging test certificates for parts used in nuclear reactors. Officials from KEPCO and its subsidiaries are alleged to be deeply implicated in the case.

### [Anti-Keystone XL billionaire challenges TransCanada boss to live debate](#)

CALGARY — A San Francisco billionaire has challenged TransCanada boss Russ Girling to a live debate on the controversial Keystone XL oil pipeline.

Tom Steyer, an ardent critic of the project and a major Democratic financier, says in an open letter to Girling that he wants to have a “real, substantial conversation” on the more than US\$5.3-billion project.

### [NRA OKs plan on safety measures for Fukushima No. 1](#)

The Nuclear Regulation Authority on Wednesday approved Tokyo Electric Power Co.'s safety plan for the Fukushima No. 1 plant as the utility seeks to eventually decommission its reactors.

### [Japan Studies Ice Wall to Halt Radioactive Water Leaks](#)

Turning soil into virtual permafrost with refrigerated coolant piped through the earth



was first used in the 1860s to shore up coal mines. One hundred and fifty years on, it's the newest idea for containing the Fukushima nuclear disaster.

At least 300 tons of water laced with radioactive particles of cesium, strontium linked to bone cancer, and tritium flow each day into the Pacific Ocean from the crippled atomic station in Japan. The plan to contain the health threat is to build an underground containment wall made of ice.

### [Nuclear regeneration hit by red tape, costs and shale](#)

Nuclear power has supplied up to a third of the United Kingdom's electricity since 1956.

However, the industry in the UK is going to require substantial investment in the coming years if it is to continue to supply power at this level. Nine out of 10 nuclear power stations are due to close over the next 15 years, removing about 30 per cent of the country's generating capacity.

### [Government Must Continue Review of Nevada Nuclear Waste Site, Court Says](#)

WASHINGTON — A federal appeals court ruled on Tuesday that the Nuclear Regulatory Commission was “flouting the law” when it stopped work on a review of the proposed nuclear waste dump at Yucca Mountain, despite the Obama administration's insistence that the site be shut down.

The 2-to-1 decision by the United States Court of Appeals for the District of Columbia Circuit allows an increment of progress that could help push the project forward and was embraced by supporters of the Yucca site, the focus of a quarter-century-old fight.

### [Clearing the Air on Diesel's Dismal Reputation](#)

The lack of interest in diesel in this country during the last 30 years also means that younger drivers may not be considering it when they shop.

As Mr. Creed put it: “You talk to someone 25 years old, they have no idea about diesel. They look at you and say, ‘Huh?’ ”

As a result, the BMW campaign will also have an informational aspect. To achieve its goals without seeming didactic or scolding, the campaign takes a humorous tack. For instance, many of the ads carry the theme “It's time to come clean,” reveling in the double meaning of the phrase.

### [Copping the copper thieves becomes big business](#)

Copper theft is costing businesses in the U.S. some \$1 billion a year—mostly through the destruction of property that thieves strip of the metal. But a growing industry is emerging to stop them.

These businesses sell services to catch copper thieves—even before they strike—including heavy steel encasing to video surveillance and satellite technology.

### [The Entire History of the World—Really, All of It—Distilled Into a Single Gorgeous Chart](#)

It's unclear what the width of the colored streams is meant to indicate. In other words, if the Y axis of the chart clearly represents time, what does the X axis represent? Did Sparks see history as a zero-sum game, in which peoples and nations would vie for shares of finite resources? Given the timing of his enterprise—he made this chart between two world wars and at the beginning of a major depression—this might well have been his thinking.

### [The economics of China's one-child policy](#)

Rumblings in China's state media suggest that Beijing is considering a move to relax its deeply unpopular one-child policy, a change that could significantly alter demographic trends in the world's second largest economy.

### [School lunch undergoes a revolution in Heber City](#)

Due to tight budgets, there's no way lunchroom employees can serve all organic, local, seasonal foods, as some would like. And federal regulations dictate what must be served in the cafeteria, with new rules enacted last year to ensure there are more grains, vegetables and fruits.

But they don't do any good if children throw it away, said Darren Wilkins, food service supervisor of the school district, who heard complaints of children not feeling full last year.

"They're used to eating at McDonald's and getting a 1,500 calorie meal. That's not good for you. Three-fourths of our plate is meant to be fruits and vegetables. If they're not eating their fruits and vegetables, they're probably not getting full."

### [Rainforest picnic: how to stop eating the Amazon this summer](#)

The fact that we import huge amounts of our food is well known but the extent to which this process is responsible for destroying precious natural capital, such as a tropical forest, who is responsible, and who finances it, is far less well understood.

### [Florida to Sue Georgia in U.S. Supreme Court Over Water](#)

Florida plans to file a U.S. Supreme Court lawsuit against Georgia, saying the state is consuming too much water that would otherwise flow to Florida, the latest battle nationally over an increasingly scarce resource.

The dispute is fueled by the rapid growth of the metropolitan area surrounding Atlanta, which is demanding more water and hurting the oyster industry in Northwest Florida, Florida Governor Rick Scott, 60, said yesterday. Scott, a Republican, said he would file suit next month after the two states couldn't reach an agreement.

"That's our water," Scott told reporters while standing next to the Apalachicola Bay in the Florida Panhandle. "They've impacted our families. They've impacted the livelihood of people down here."

### [With Less Than 3% Of Global Emissions, Africa Still Most Vulnerable To Climate Change](#)

Natural disasters, driven by climate change, threaten to undermine the hard-fought gains made over the last decade, just as Africa is beginning to realize its vast agricultural potential.

Smallholder farmers, who constitute the bulk of the sector across our continent, are especially vulnerable to changing weather and require government assistance to deal with it. As currently structured, the system for responding to natural disasters is not as timely or equitable as it should, or could be, with much of the cost borne by farmers. International assistance through the appeals system is secured on a largely ad hoc basis after disaster strikes, and we are forced to reallocate funds in national budgets from essential development activities to crisis response. Only then can relief be mobilised toward the people who need it most – and it is often too late. Lives are lost, assets are depleted, and development gains reversed – forcing more people into chronic hunger, malnutrition and destitution across the continent.

### [Farmers struggle to adopt climate-smart methods](#)

Preliminary results from a project aimed at helping Malawi, Vietnam and Zambia make the transition to a "climate-smart" approach to agriculture show that some farmers are struggling to adopt the new methods, while others are finding ways to cope well with climate-change problems like late rains.

### [Large coal power plants getting life extensions](#)

BIG STONE CITY, S.D. – The nation's big coal-burning power plants are not ready to become dinosaurs.

Utilities are making substantial investments to keep their largest coal generating stations operating for decades – and emitting millions of tons of carbon dioxide annually.

### [Interactive map to support climate change adaptation planning in Great Lakes region](#)

A jointly developed interactive map launched this month by the University of Michigan's Graham Sustainability Institute and Headwaters Economics gives Great Lakes policymakers and decision-makers easy access to targeted data to help them plan for, and adapt to, the regional impacts of climate change.

The free online tool—the "Socioeconomics and Climate Change in the Great Lakes Region" map— provides social, economic and demographic statistics on 225 counties in the region, overlaid with detailed data about municipal spending, land-use change and climate-change characteristics.

### [Caribbean policymakers get climate adaptation tool](#)

A decision-support website has been launched to help policymakers in the Caribbean build resilience to the risks that climate change poses to activities such as tourism and agriculture.

The Caribbean Climate Online Risk and Adaptation Tool (CCORAL), unveiled last month (12 July) in Saint Lucía, allows users to identify whether their activity is likely to be influenced by climate change and how to deal with this.

### [Google user's carbon footprint equal to 'one mile drive in car'](#)

Google's carbon footprint per user is equal to a person driving a car for one mile, the company has announced.

In 2012 it says it was responsible for emitting 1.5 million metric tons of carbon dioxide, a 32% drop in carbon intensity on 2011 figures.

To put these numbers in perspective, Google has assumed that a user completes 25 searches and watches 60 minutes of YouTube a day, has a Gmail account and uses their other services. To serve that user, Google emits about eight grams of carbon per day.

### [Brokered EU Carbon Trade Plunges as Banks Scale Back](#)

Carbon trading via brokers including ICAP Plc and GFI Group Inc. plunged to its lowest since at least January 2011 as banks scaled back buying and selling amid tighter regulation and a record glut of permits.

The volume of EU allowances handled by six members of the London Energy Brokers' Association dropped 61 percent in July to 84.1 million metric tons from a year earlier, according to an Aug. 8 report by the lobby group. Trading in Certified Emission

Reductions, the United Nations-regulated offsets, plunged 81 percent. Activity on ICE Futures Europe in London, the biggest exchange for carbon contracts, slid 19 percent in the month.

### [From Coal In Kentucky To Solar In Ohio, Campus Environmentalists Face An Uphill Battle On Clean Energy](#)

College campuses are centers of innovation and research. They can also use as much energy as small cities.

In addition to playing an important role in climate activist Bill McKibben's campaign to divest from fossil fuels, college students across the country are becoming increasingly aware of the enormous amounts of energy their campuses consume and are pushing for greener alternatives. The movement has been an uphill battle, but activists are staying positive.

### [America's new \\$60 trillion deadliest enemy](#)

SAN LUIS OBISPO, Calif. (MarketWatch) — By 2024, the end of the next president's second term, water shortages and pollution problems will be America's deadliest enemy, worse than Big Oil, killing economic growth, destroying America's future.

The decline is already in progress, GDP is predicted to collapse below 1% in this century.

Can this disastrous trend be stopped? Maybe. Taxpayers cost? \$60 trillion, estimates a Scientific American research study. Bad news for a planet where the total GDP of all nations is only \$70 trillion.

### [Four Hiroshima bombs a second: How we imagine climate change](#)

The planet is building up heat at the equivalent of four Hiroshima bombs worth of energy every second. And 90 percent of that heat is going into the oceans.

Right, now I've got your attention.

### [Timing a Rise in Sea Level](#)

We have to see if their results withstand critical scrutiny. A sea-level scientist not involved in the work, Andrea Dutton of the University of Florida, said the paper had failed to disclose enough detailed information about the field sites to allow her to judge the overall conclusion. But if the work does hold up, the implications are profound. The only possible explanation for such a large, rapid jump in sea level is the catastrophic collapse of a polar ice sheet, on either Greenland or Antarctica.

Dr. O'Leary is not prepared to say which; figuring that out is the group's next project. But a 17-foot rise in less than a thousand years, a geologic instant, has to mean that one or both ice sheets contain some instability that can be set off by a warmer climate.



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