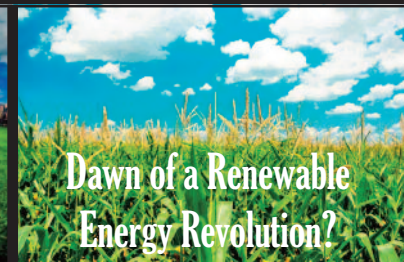




The real achievement of the Peru climate talks



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Editor: Gianni Serra

Editorial team: Eusebio Loria, Toby Lockwood, Alice Masili, Andrea Porcu, Simone Meloni, Giorgio Cucca, Andrea Testa

Contributors: Marcelo Teixeira, Anna Flavia Rochas, Bernard Orr, Henry Fountain, Emily Gosden, Amanda Saunders, Anton Woronczuk, Tim McDonnell, Megan Geuss, Navin Singh Khadka, Dina Cappiello, Damien Carrington, Christian Downie, Deborah Zabarenko

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www.onlynaturalenergy.com
info@onlynaturalenergy.com

POLLUTION

Begins—And Ends—With *You*



Everyday Water Quality Problems

<p>1 Undisturbed areas absorb rainwater and recharge the groundwater supply. Natural vegetation holds soil in place, preventing sedimentation of waterbodies. Pet waste pollutes our water. Scoop, double bag, and throw pet waste in the garbage.</p>	<p>4 Zinc from aging pipes, gutters and metal roofs leaches into rainwater and enters the environment, where it may harm aquatic life. Achromes and copper—both potential pollutants—leach into runoff from car and truck brake linings and worn pipes and fittings.</p>	<p>7 Used motor oil, household cleaners and chemicals disposed of outside can end up in our streams and bays. It washes down to local waterways where it harms fish and wildlife. Potential toxic chemicals can be taken up by animals within ocean food chains. Since most animal foods contain high fish meal and fish oil content, toxins can be found a few weeks later in commonly consumed food derived from livestock such as meat, eggs, milk and butter.</p>
<p>2 Paving an area prevents absorption of rainwater, increasing the potential for flooding and erosion of soil into waterbodies. Driveways and walkways can be sources of water pollution. Oil, antifreeze, and other pollutants can collect on your driveway. When spilled during maintenance or are dumped on the ground can be carried by runoff to our streams and bays.</p>	<p>5 Lawn clippings and yard waste in ravines and ponds can become unwanted fertilizer for streams. Lawn and garden fertilizers create runoff and increase nutrient levels (nitrogen and phosphorus) in waterbodies. Too much plant growth in streams can use up all the oxygen choking waterways and killing fish and aquatic life.</p>	<p>8 Trash thrown directly into lakes, streams, and wetlands is unsightly, may harm aquatic life and may pollute the water as it decays.</p>
<p>3 Boat and engine maintenance can pollute. Toxic chemicals, oils, cleaners, and paint scrapings from boat maintenance can make their way into the water. While boating, treat and dispose of your sewage properly.</p>	<p>6 Waste from leaf and grass clippings, garbage, animal droppings, and other organic debris pollute runoff. The decaying organics deplete oxygen levels in water and affect fish.</p>	<p>9 Sediment accumulates in waterbodies from soil erosion and destroys feeding grounds for aquatic life, clogs fish gills, blocks light transmission, and increases water temperatures.</p> <p style="text-align: center;">Remember Everything You Do <i>DOES</i> Make A Difference!</p>

Why ONE?

Because one is the world we have been given.

“There is no plan B, as there is no planet B”. The UN Secretary-General Ban Ki-Moon made this comment as he joined over 100,000 demonstrators on the People's Climate March through New York a few months ago.

ONE is the acronym for Only Natural Energy. Here we do not want to repeat the obvious: all energy sources are natural, as they exist in nature. Unfortunately the way these sources are exploited can very rarely be considered compatible with the natural environment they belong to.

When we say Only Natural Energy we aim to summarize with these three little words the starting point and the final goal: those natural resources, despite their exploitation, must be kept compatible with nature. A difficult balance to achieve. Difficult but unavoidable.

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ONE has no other ambition than to remain unbiased and to provide a good selection of the most interesting articles about climate change, new technologies, policies and strategies in the energy field. Nothing more, nothing less. **ONE**

Brazil readies big push on solar energy but companies are wary

By MARCELO TEIXEIRA and ANNA FLAVIA ROCHAS
(edited by BERNARD ORR)

Reuters

Grappling with its worst energy crisis in more than a decade, Brazil is making its first big move to develop a local solar power industry that could help reduce its dependence on a battered hydro power system.

In October, Brazil will hold an auction to negotiate energy to be produced exclusively by solar farms, the first ever of the kind in the South American country.

Power companies have registered some 400 projects for the auction, but many remain wary of the outlook for solar power in Brazil and say they need more clarity on investment conditions and financing before signing any deals.

The auction could negotiate up to 10 gigawatts (GW), although industry sources estimate final volumes at a much smaller level, varying from 500 megawatts (MW) to 1 GW. Sun-kissed Brazil has one of the highest solar radiation factors in the world and plenty of land for solar farms, plus large reserves of silicon, used to make

solar panels.

Yet the country has almost no solar power generation, while its BRICS partner China, for example, added 12 gigawatts last year alone – enough to supply around 10 million homes.

Sun-kissed Brazil has one of the highest solar radiation factors in the world and plenty of land, plus large reserves of silicon for solar panels.

OBSTACLES

The solar power industry sees room for a significant expansion in Brazil, but not without hurdles.

"Red tape is still a big problem, as well as the taxes," said Alberto Cutter, sales director for emerging markets at Jinko, a top producer of photovoltaic (PV) panels.

He complains about taxes at federal and state levels, which add complexity to the business and increase the cost to bring solar panels to Brazil by almost 50 percent.

"In Chile, for example, where the market is growing really fast, taxes are zero for solar equipment, similar to what we see in 95 percent of the countries we operate,"



he said.

Nelson Colaferro, chairman for lobby group Absolar, hopes the government will take into consideration the high costs resulting from taxes and the lack of scale when setting the maximum price in the auction.

He expects a ceiling of between 250 and 300 reais (\$110-\$132) per megawatt hour (MWh). By comparison, a previous auction open to non-solar energy sources awarded contracts at an average price of 130 reais/MWh (\$57), mostly to wind projects.

FINANCING

Companies such as Swiss ABB, a leading producer of inverters used to send solar power to the grid, will watch how the October auction pans out to decide whether

to invest to increase capacity in Brazil.

"We are evaluating ... It will depend on the demand coming from the auction," said Bruno Monteiro, a manager for the solar segment on ABB's Brazilian operations.

Financing will be another key factor companies will be closely watching. Brazil's government said it will offer public credit to investors, but the conditions have yet to be released.

Project owners fear the financing will come with requirements for use of locally produced equipment, which could increase costs. Brazil aims to add 3.5 GW to the

grid from solar power projects by 2018.

Project owners fear the financing will come with requirements for use of locally produced equipment, which could increase costs.

Originally published in the Reuters August 11, 2014

Corralling Carbon Before It Belches From Stack

By HENRY FOUNTAIN

New York Times

So much soot belched from the old power plant here that Mike Zeleny would personally warn the neighbors. “If the wind was blowing in a certain direction,” Mr. Zeleny said, “we’d call Mrs. Robinson down the street and tell her not to put out her laundry.”

That coal plant is long gone, replaced by a much larger and cleaner one along the vast Saskatchewan prairie. Sooty shirts and socks are a thing of the past.

But as with even the most modern coal plants, its smokestacks still emit enormous amounts of carbon dioxide, the invisible heat-trapping gas that is the main contributor to global warming. So this fall, a gleaming new maze of pipes and tanks — topped with what looks like the Tin Man’s hat — will suck up 90 percent of the carbon dioxide from one of the boilers so it can be shipped out for burial, deep underground.

If there is any hope of staving off the worst effects of climate change, many scientists say, this must be part of it — capturing the carbon that spews from power plants and locking it away, permanently. For now, they contend, the world is too dependent on fossil fuels to do anything less.

If all goes as planned, the effort in Saskatchewan will be the first major one of its kind at a power plant, the equivalent of taking about 250,000 cars off the road. And at least in theory, that carbon dioxide will be kept out of the atmosphere forever.

“Think about how far we’ve come,” said Mr. Zeleny,

who recently retired after four decades here, most recently as plant manager.

Despite President Obama’s push to rein in emissions from power plants across the United States, coal is not going away anytime soon. The administration expects coal will still produce nearly a third of the nation’s electricity in 2030, down from about 40 percent today, even if Mr. Obama’s plan survives the political onslaught against it.

The challenge is even more stark overseas. China already burns almost as much coal as all other nations combined, and its appetite keeps expanding. Worldwide, coal consumption in 2020 will be about twice what it was in 2000, according to the United States Energy Information Administration, and will continue to grow for decades.

Even the abundant natural gas unleashed by fracking, while cleaner than coal, is a major source of greenhouse gases. Ultimately, many scientists say, those emissions will need to be trapped and stored, too.

“If you want to carry on using those fossil hydrocarbons, that means cleaning up their emissions,” said Stuart Haszeldine, a geologist at the University of Edinburgh. Capturing carbon, he said, “is the single best way of doing that.”

Yet it is no magic bullet. Because it requires so much energy, sucking up carbon reduces a plant’s ability to

make electricity — the whole point of its existence. There are basic questions of whether carbon dioxide can be safely stored underground. And the technology is expensive. Updating the Saskatchewan plant alone cost \$1.2 billion — two-thirds of which went for the equipment to remove the gas.

In the pine woods of Kemper County, Miss., another carbon-capture effort is taking shape, in a massive new power plant that will be fed a steady diet of coal from the strip mine next door. Bruce Harrington, the operations manager, likened the hulking beast to an anthill: It seems curiously quiet on the outside, but deep within an army of workers is cutting, welding and testing. Disturb it, he said, and thousands of people will come pouring out.

Battling delays, the plant's owner, Southern Company, hopes to have it open next year. But it is more complex than the Saskatchewan effort, and the price tag has ballooned to \$5.5 billion, more than double the original estimate.

"It'll work," Mr. Harrington said. "It won't be easy at first, but it'll work."

Though the world has known for decades how to capture carbon dioxide from power plants, scant progress has been made. The United States and other nations have paid for research and helped some projects — Canada gave \$220 million to the Saskatchewan plant's owner, SaskPower, and Southern Company received \$270 million from the Department of Energy — but the costs are high enough that few other power companies

have done much beyond study the concept.

Crane work on the carbon capture section of a power plant in Kemper County, Miss. Credit Aaron Phillips for The New York Times

"There's no market," said Edward S. Rubin, a professor of engineering and public policy at Carnegie Mellon University, unless governments impose "a requirement to substantially reduce emissions."

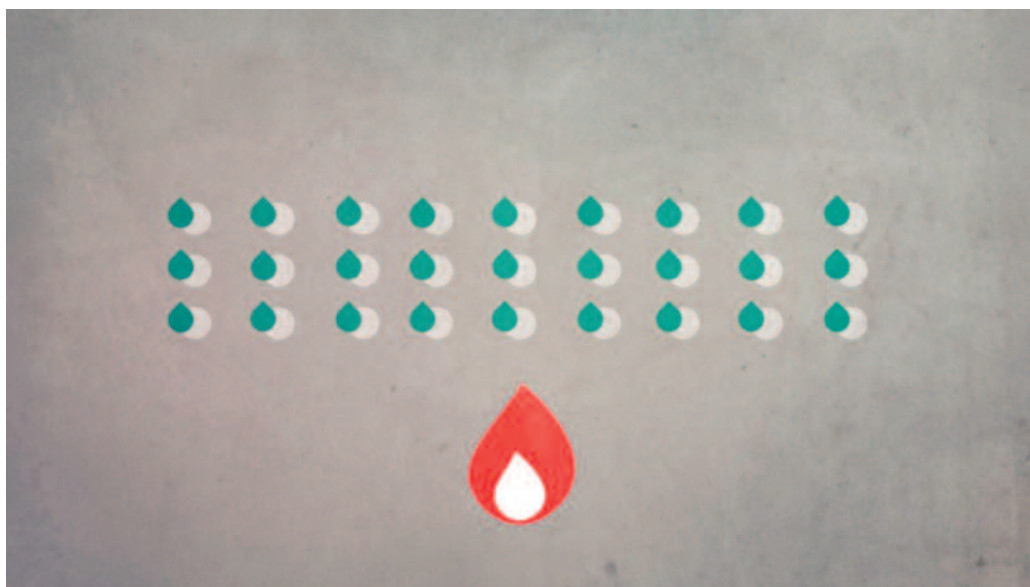
That is precisely what is happening here in Saskatchewan, given the Canadian government's recent restrictions on coal plants both old and new. But whether Mr. Obama's new rules are aggressive enough to spur a change in the United States remains unclear. Some experts see the Obama policy as a turning point, a mo-

ment that could help drive the business of collecting carbon dioxide. Yet the administration has been wary of pushing too hard, warning that any move to force existing coal plants to si-

phon off their carbon dioxide emissions "would affect the nationwide cost and supply of electricity."

The Obama administration plans to require that future coal plants capture their carbon dioxide, a rule that some utilities and politicians, particularly from coal-producing states, have vowed to fight. But for now the mandate is largely an empty one, because coal is so uneconomical compared with natural gas that no one expects many new American coal plants to be built in the foreseeable future.

"If you give power companies a loophole, they're not going to do the thing," said Howard J. Herzog, the di-



rector of a research program on carbon capture and storage, known as C.C.S., at the Massachusetts Institute of Technology. “Why should we even consider C.C.S.? Let’s just do natural gas.”

So at a time when many experts say 10 or more projects need to be undertaken to improve the technology and reduce costs, the opposite is happening. Work to modify a coal plant in Texas is expected to start this year, but there are only a few other projects worldwide, all in the planning stage. And as some government subsidies have begun to dry up – notably, federal stimulus funds in the United States – several efforts have been delayed or canceled.

“I’m concerned,” Mr. Haszeldine said. “Governments around the world see C.C.S. as a good thing. But they’re not pushing hard enough on enabling that to happen.”

The Costs

The technology has been around, in one form or another, for nearly a century, used at some refineries and other industrial plants, including large ones in Illinois,

North Dakota, Canada and Norway.

But removing carbon dioxide from the swirl of gases unleashed at a power plant is challenging, akin to plucking just a few colored Ping-Pong balls out of the air from a swarm of mostly white ones.

To do the job, the equipment is enormous. At the Saskatchewan plant, called Boundary Dam, a liquid chemical latches onto carbon dioxide molecules after being sprayed onto a plume of combustion gases. The “stripper,” where the carbon dioxide is finally pulled away, is 160 feet high – so high it pokes out of the roof.

The Boundary Dam power station in Saskatchewan will suck up 90 percent of the carbon dioxide from one of its boilers. Credit SaskPower

Beyond the equipment costs, efficiency is lost because some of the steam that would normally generate electricity goes to the stripper instead. And a monstrous motor compresses the carbon dioxide – until it effectively becomes a liquid – for transport. All told, capturing the carbon dioxide at Boundary Dam will sap electricity generation by about 20 percent, using as



much energy as about 25,000 homes. Experts call it the “energy penalty.”

Storage Concerns

Injecting liquids deep underground can present problems, too. Pumping wastewater from oil and gas production into the ground has been linked to spates of small earthquakes in Arkansas, Ohio, Oklahoma and other states. The carbon dioxide could taint drinking water, or eventually rise to the surface and bubble into the atmosphere, defeating the entire purpose.

In the most extreme case, leaking carbon dioxide could harm or kill people. In Cameroon, a volcanic lake suddenly released a cloud of naturally forming carbon dioxide in 1986, suffocating 1,700 people.

Still, carbon dioxide has been buried around the world with few problems. In Norway, a million tons have been stored every year since 1996, injected into sandstone about 3,000 feet beneath the North Sea. (By some estimates, that

site alone could store as much carbon dioxide as the world could capture for years.) Picking the right geological features could minimize the risk of earthquakes and leaks. But even then, storage wells would have to be monitored, presumably forever, at a cost someone would have to bear.

If done poorly, storing carbon dioxide can cause problems, said David Hawkins, the director of climate programs with the Natural Resources Defense Council, an advocacy group. “But that’s also true with operating an oil refinery.”

An Economic Case

Most of Boundary Dam’s carbon dioxide will not simply be buried in storage wells. Instead, the emissions

from burning one fossil fuel — coal — will become a tool to extract and consume yet another: oil.

After being sold and shipped through a 40-mile pipeline to an oil field, the carbon dioxide will be pumped into old wells, where it will mix with the oil inside, making it flow better. The process is known as enhanced oil recovery, and while some of the carbon dioxide will come up with the oil, it will be compressed and injected again. Over time, nearly all of it should remain underground.

“It won’t be easy at first, but it’ll work,” said Bruce Harrington, operations manager, standing.

The oil and gas industry has done this for decades, mostly with naturally occurring carbon dioxide that accu-

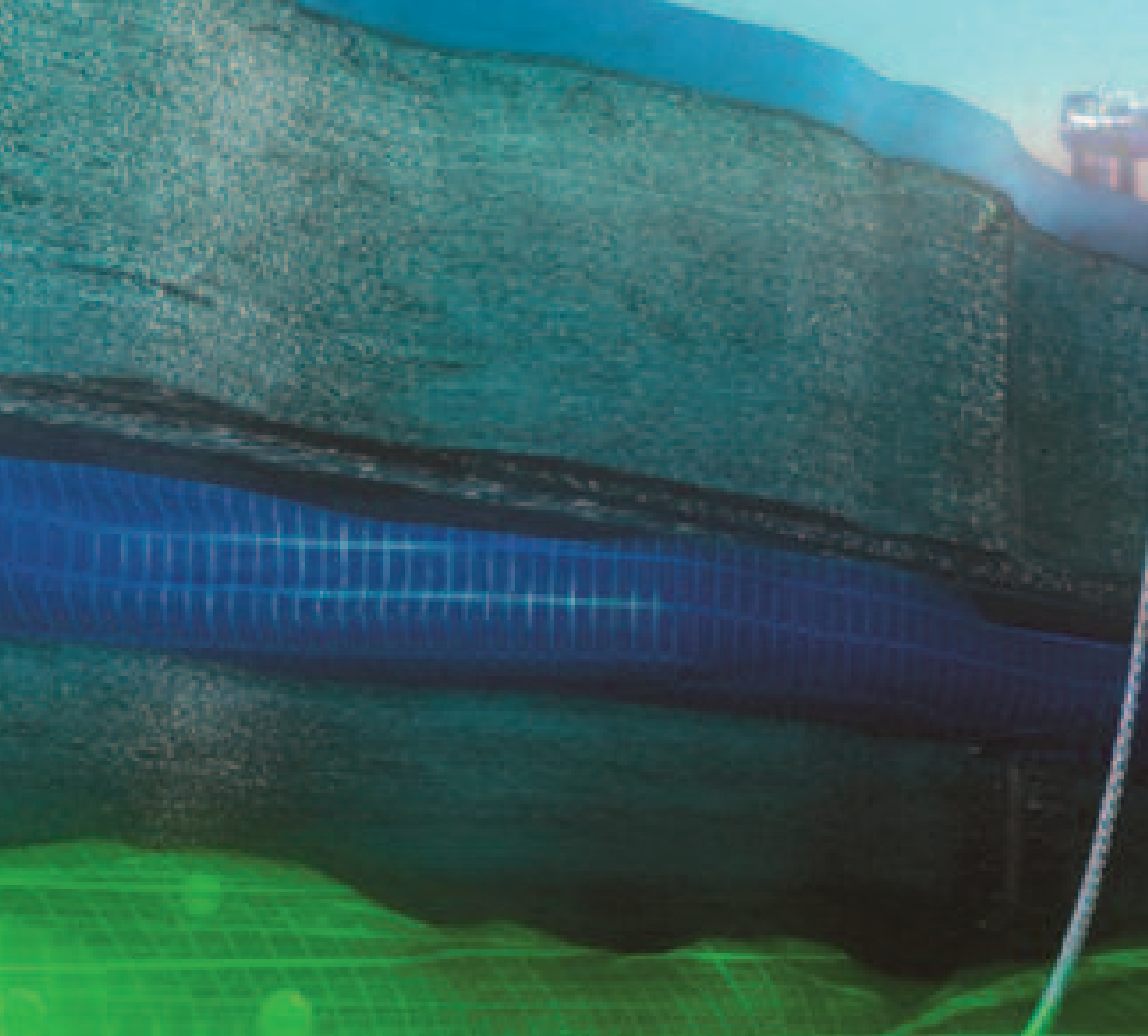
mulates underground. But each year in North America, more than 15 million tons of carbon dioxide from industry are used as well. Selling that carbon dioxide to the oil industry helps make a business case for capturing it at places like Boundary Dam.

**“It won’t be easy
at first,
but it’ll work”**

The practice could be expanded at many oil fields around the United States and beyond, experts say, potentially storing billions of tons of carbon dioxide and serving as a bridge to the day when it becomes necessary, and economical, to store the gas elsewhere.

To prod the industry, Congress is weighing incentives, including tax credits, loan guarantees and tax exemptions.

“It’s not going to happen by itself,” said Senator Michael Bennet of Colorado, a Democrat who is chairman of a Finance Committee panel on energy. “There ought to be broad bipartisan support for measures like these.” As for the apparent incongruity of using carbon dioxide captured from coal to produce more fossil fuels, Mr.



Hawkins said his group had struggled with the issue.

“Our view is that the most likely consequence is not to encourage more consumption of oil,” he said. Rather, drawing more oil from existing fields will reduce the need to develop new ones, “and that’s an environmental plus,” he said.

The Future

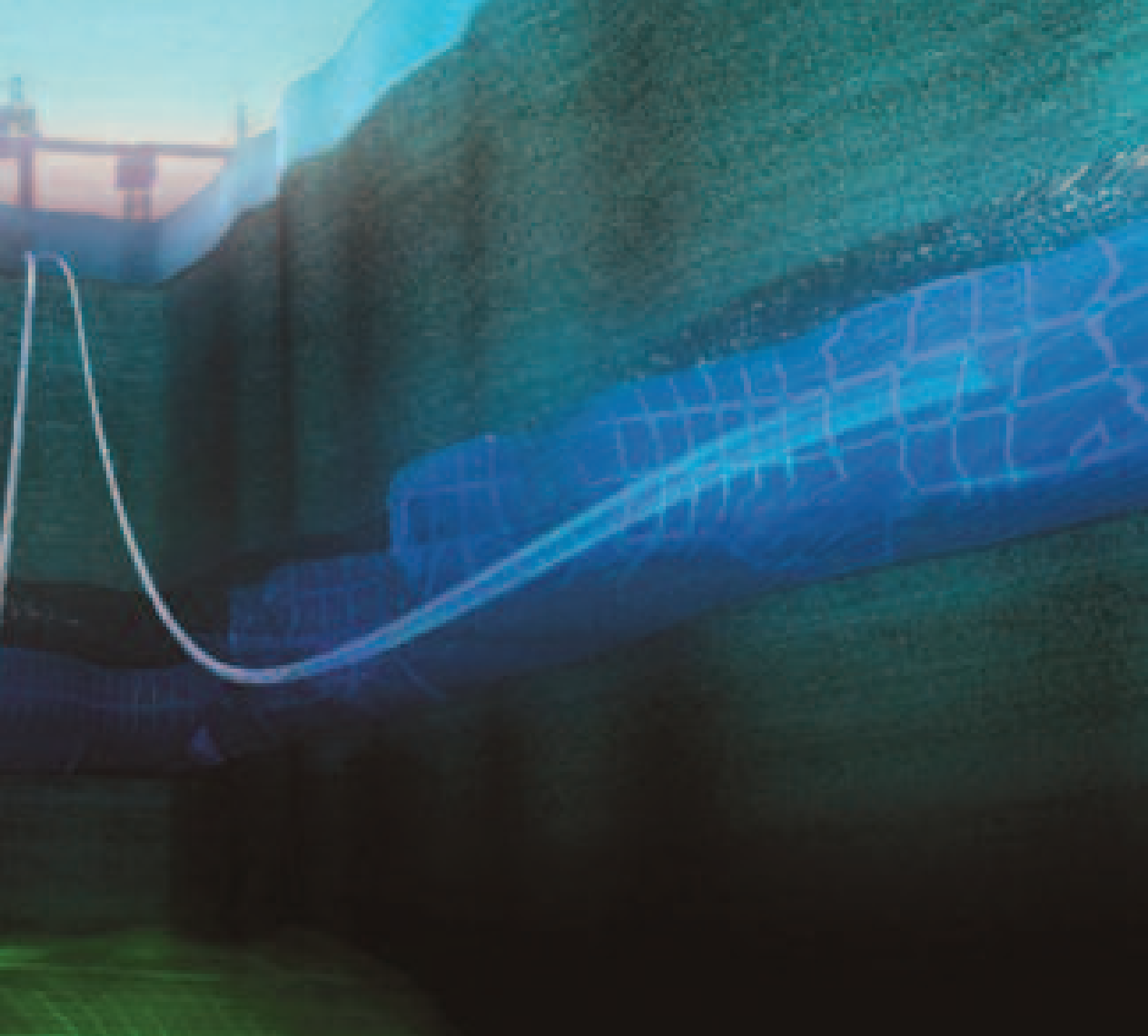
Boundary Dam’s owner will evaluate the project for two years before deciding whether to capture carbon dioxide from other boilers at the plant, which it says it could do at lower cost. Part of the calculus is that, less than

10 miles away, there is an almost limitless supply of cheap coal that it otherwise might not be able to use as Canada’s new standards take hold.

“We had to figure out if we could continue using coal as a fuel source for the next 100 years,” said Mr. Zeleny, the former employee.

As for the United States and the rest of the world, the prognosis for carbon capture is less clear. If the United States moves forward, China and other countries may make bigger strides as well.

This month, the United States and China announced



plans for several collaborative research projects.

“How this will play out over time is hard to tell,” said Professor Rubin of Carnegie Mellon. “Inevitably, there will be a balance between technological capability, cost and political realities.”

Others were even more upbeat. Dan Reicher, who directs the Steyer-Taylor Center for Energy Policy and Finance at Stanford University, said the Obama administration’s recent moves on emissions could be a catalyst.

“We’re finally getting some clarity on where we’re headed on carbon emissions,” Mr. Reicher said, arguing that collecting carbon dioxide could become a significant industry.

“We need every tool in the toolbox to address climate change,” he said.

*Originally published
in the New York Times
July 21, 2014*



True scale of wind industry revealed

By EMILY GOSDEN

Daily Telegraph

The number of onshore wind turbines in Britain has reached 30,000 after increasing by 13 per cent last year, according to research.

The disclosure has prompted suggestions that the wind industry is encroaching upon the countryside by stealth. The figure dwarfs the total that is commonly quoted by the industry, which currently stands at 4,399.

The discrepancy is because the lower figure does not include the vast numbers of small and mid-sized turbines

that have the capacity to produce less than 100kW of electricity each.

The smaller turbines range from "micro" roof-top turbines to those that can reach over 100 feet tall and have been installed by thousands of farmers and landowners across the UK. By comparison, the biggest onshore turbines can reach 475 feet tall.

The issue of wind power is likely to be a key election battleground after David Cameron pledged that there

would be no more subsidies for onshore wind under a Conservative government.

Wind farms have often met with strong local opposition, and are estimated to add £765 million a year to consumers' bills through subsidies, according to the Renewable Energy Foundation.

Many Tories fear that the issue could cost them crucial votes in rural areas.

Analysis by RenewableUK, the wind industry body, shows that the total number of turbines increased by 13 per cent, to 29,353 at the end of last year, and is now expected to have surpassed 30,000.

Developers have told The Telegraph that they have seen a surge in interest in smaller wind turbines around the country.

Data compiled by Earthmill, a specialist in farm turbines, showed a 60 per cent rise in the number of "live" planning applications for small and mid-sized turbines since October, with 810 applications in the system at the end of last month.

Chris Heaton-Harris MP, who has led the campaign against onshore wind turbines, said: "The true scale of onshore wind and its cost is only just beginning to come to light.

"Small-scale turbines can be as controversial as big wind farms, depending on where they are sited. I am very pleased my party has said we will let local communities decide where to site these things.

"But my opinion is we have too many already because the subsidy is too high, and we are backing a losing horse in the race for sustainable energy."

He said the smaller turbines "can go much closer to people's homes".

He added: "It is proximity to other dwellings that causes the upset."

In 2013, 605 medium and large-scale turbines of more than 100kW were installed. In the same year, RenewableUK estimates that 3,536 smaller turbines were also installed

However, the data for so far in 2014 shows that the installation rate for the larger turbines is slowing, amid a tougher planning regime as communities secretary Eric Pickles calls in more applications for review. Only 141 turbines of 100kW or greater capacity have been installed so far this year.

Steve Milner, director of Earthmill, said that small and mid-sized turbines were popular with farmers as they reduced their energy costs.

He said that a 225kW turbine – which could reach 147 feet tall – could cost up to £500,000 to install.

A farmer could however expect to recoup that cost within 10 years through a combination of subsidies, which are funded through levies on consumer energy bills, the avoided costs of buying power, and additional income from selling surplus power. The subsidies would continue for a further 10 years, meaning they could expect to make a further £500,000, he said.

But Mr Milner said that gaining planning permission was getting "significantly harder". "There are more objections and more hoops to jump through," he said.

Jennifer Webber, director of external affairs at RenewableUK, said: "Small and medium wind turbines are a lifeline for Britain's rural economy – research shows that 40 per cent of farmers are generating much-needed income from renewables, and a further 61 per cent are intending to do so over the next five years, so we could soon see three out of every four farmers using renewable energy.

"The vast majority of the onshore wind turbines installed in the UK are micro, small and medium-sized turbines installed by people living in rural areas generating their own power, and protecting themselves from the cost of having to import energy".

Small and medium wind turbines are a lifeline for Britain's rural economy

research shows that 40 per cent of farmers are generating much-needed income from renewables, and a further 61 per cent are intending to do so over the next five years, so we could soon see three out of every four farmers using renewable energy.

"The vast majority of the onshore wind turbines installed in the UK are micro, small and medium-sized turbines installed by people living in rural areas generating their own power, and protecting themselves from the cost of having to import energy".

Originally published in the Daily Telegraph May 16, 2014

Coal always wins and will stay No.1

By Amanda Saunders

Australian Financial Review

Peabody Energy chief executive Greg Boyce is calling on coal producers to spend more time and money fighting “symbolic” movements against the industry and is confident China will not adopt a cap on carbon emissions. As the anti-coal collective gathers more mainstream backers, St Louis-based Mr Boyce says the industry needs to do more to counter the attacks, particularly the global fossil fuels divestment campaign. But he is confident that “coal always wins out”.

“If as an industry if we spent more time educating, if we all spent more money, we would have less of these symbolic moves, which are really done without a full knowledge of the equation,” he said in an exclusive interview. If the coal industry “spent more time and money explaining the good that we do... people [would] understand what the new coal industry looks like”, he said. Mr Boyce expects global coal demand to grow by 700 million tonnes over the next three years, driven in the main by China. Peabody, which has a market capitalisation of about \$US4.2 billion (\$4.5 billion), is one of the largest coal producers in the world.

“There is a reason why coal has been the No.1 fuel in the world for the last 10 years, and why it is projected

to be No.1 over the next 10 years: because it always wins out,” he said. “From a global perspective, 80 per cent of our energy comes from fossil fuels. It’s going to be that way for the rest of our lifetimes and beyond.” A global divestment campaign to push banks and fund managers to pull capital from the coal industry has just started to gain momentum in Australia. It aims to stop

coal’s progress by forcing a wedge between the fossil fuel industry and debt and equity investors.

“Coal is crucial to pulling the world’s poorest out of “energy poverty”

“I think the folks that have gone down this path are doing it perhaps [because] they believe there is some symbolism in it,” Mr Boyce said. “But at the end of the day they are not putting economic activity – and ultimately they are not putting what is the best plan for a better environment – at the top of their priority list.”

Like BHP Billiton boss Andrew Mackenzie, Mr Boyce argues that coal is crucial to pulling the world’s poorest out of “energy poverty”, and says divestment proponents are largely from developed countries.

The local coal divestment movement is backed by 350.org and activist investment group Market Forces; the key targets now are Australia’s big four banks. It has

won support from Bendigo and Adelaide Bank, AMP Capital, education industry fund Unisuper and a collective of smaller Australian deposit takers including bankmecu, Credit Union Australia, Beyond Bank and Defence Bank. The lion's share of Peabody's operations are in the United States, mainly in thermal coal, but it is also the fifth-largest coal producer in Australia, with a portfolio of 10 mines. Peabody has taken a huge earnings hit on its Australian holdings, amid dramatic falls in coal prices since the lofty highs of mid-2011.

But Mr Boyce is bullish on the future for coal exports, saying China will not adopt a carbon emissions cap, despite growing speculation that Beijing could enforce one. Last month, economist Ross Garnaut told *The Australian Financial Review* that China's appetite for thermal coal may already be in decline, which could see Beijing make bolder promises to reduce carbon emissions, at little cost. Professor Garnaut, who pioneered the now-defunct carbon price in Australia, projects that China's consumption of thermal coal will fall at an average annual rate of 0.7 per cent from now to 2020. But Mr Boyce said that though China was working to reduce its carbon intensity per unit of GDP, a cap on carbon emissions was "just not on the cards".

"Those are two completely different things," he said. "Ross Garnaut, of all people, should know that China can't grow its economy without having a continued total increase in carbon. As long as we are globally 80 per cent fossil fuels, you are going to have growth in carbon emissions." Natural gas shortages have hurt China's plans to move away from burning coal to heat homes and offices. Mr Boyce also applauded Prime Minister Tony Abbott's support of the fossil fuels industry. "I think the PM has it exactly right, in terms of: you have got to worry about people, you have got to worry about economic activity; once you get those two parts of the equation correct, then you can make significant advances in the environment."

He pointed to the European Union, saying member countries had "decimated their economies, moving down these 10-year paths of high-renewable targets and carbon management".



Greg Boyce: "From a global perspective, 80 per cent of our energy comes from fossil fuels. It's going to be that way for the rest of our lifetimes and beyond."

Photo: Louise Kennerley

"They went through the European crisis because they forgot, first and foremost, that you've got to have a healthy economy before you can move forward with environmental improvement." As for politics on his home soil, Mr Boyce was sceptical that President Barack Obama could pull off a crackdown on emissions from coal-fired power stations. He said energy efficiency should be a key focus but it was "misguided and wrong" to try to achieve that without coal. And Mr Boyce was scathing of climate change advocates who argue it is the most critical issue facing the world today, pointing instead to the challenge of pulling 3.5 billion people out of poverty globally.

"I think energy poverty is the biggest environmental and human problem that we have; I don't believe that it is the changing climate," he said. "The environmental issues that are driven by global poverty far outweigh anything we might model looking at climate models for the next 50 years. And remember, that's all they are: models."

"How we expect to drive global economic activity and have a healthy micro and macro-environment on this globe when we've got that much energy poverty? I just don't understand."

*Originally published
in the Australian Financial Review
August 12, 2014*

Is This the Dawn of a Renewable Energy Revolution?

By Anton Woronczuk

The Real News Network

Germany recently reached a major milestone. On a single day, it was able to obtain 75 percent of its electricity from renewable resources. And according to an April 2014 report from the Pew Charitable Trusts called *Who's Winning the Clean Energy Race?*, China is the world leader in clean-energy investment, having invested \$54 billion in renewables during 2013, well above U.S. investment of \$36.7 billion. So is the world in the middle of a renewable energy revolution?

With us to discuss his latest video on this topic is Peter Sinclair. Peter is a videographer and regular contributor to Yale Climate Connections. He is also media director of the Dark Snow Project, an international team of researchers and climate communicators. He also runs the highly popular website *Climate-Crocks.com* that debunks climate change deniers. And his videos on climate change have been viewed by millions. Thanks for joining us, Peter.

PETER SINCLAIR, videographer, Dark Snow Project: Thank you very much. I'm glad to be here.

WORONCZUK: So, Peter, let's

first take a look at a clip from your latest video "Birthing the Solar Age", posted on the Yale Climate Forum YouTube channel. In this clip, Jeremy Rifkin discusses a recent achievement of Germany, that in a single day it was able to get 75 percent of its electricity from renewable resources.

SINCLAIR: Two weeks ago on Sunday—and I want everyone to hear this—75 percent of the electricity that powered all of Germany—and Germany's the most powerful economic capitalist market system in the world per capital—75 percent of that electricity that powered all of Germany two weeks ago was solar and wind. Then when we have something like lots of wind creating a lot of supply, that is more than the demand, and so prices can fall negative.

SINCLAIR: And that's why that day, the actual prices for electricity on the German grid went to negative, 'cause the electricity was free.

WORONCZUK: So, Peter, this sounds pretty incredible. Energy prices apparently went negative. Tell us how Germany got to this point.

SINCLAIR: Well, Germany actually was kind of sparked by the United

States. And this was some 30 some years ago, back in the Carter administration, when this country really started devoting a lot of money to developing renewable energy. And many people in Germany, for a number of reasons, found this to be very compelling.

The difference is they got started on it, took our lead, and they didn't stop. Here in the U.S., during the Reagan administration, investment in renewables plummeted, and it's taken us a long time to rebuild from that. But Germany started putting a number of policies in place at that time. And then in the recent decade or so most especially, they put into place what they called a feed-in tariff, which is a program of compensating people for installing renewable energy—small businesses, individuals, farmers, co-ops. And the program has been far more successful than anyone would have predicted in the early days. And so it has brought a torrent of renewable energy onto the German system that has—as you say, on some days, there's so much energy coming in that electric prices go negative in Germany.

WORONCZUK: Okay. And your latest video also features a TED talk

by businessman Eli Musk, where he talks about solar energy shifting not just electrical power but financial power away from utility companies, who currently rely on coal, natural gas, and nuclear energy sources.

But, Peter, we also saw a recent bill passed in Ohio that froze the mandate for renewable energy use in that state. So what are the obstacles right now that are preventing the United States from doing what Germany has done?

SINCLAIR: Well, Ohio's a bit of an outlier. A number of other states have renewable portfolio standards, and there has been an effort on behalf of the Koch brothers and their related organizations to turn those laws back,

but Ohio is the only state that they've been successful in so far. Most of those places, the renewable energy, it remains overwhelmingly popular, even among conservative numbers of the population. And that's one of the major messages of this video, that even very, very conservative people see the advantages of renewable energy in terms of creating more competition, keeping prices low, and empowering small businesses, individuals, farmers, and communities.

WORONCZUK: So another thing that was discussed in the video was that some people are working towards a shift in the role of utility companies from being energy providers to energy management services. Now, what does that mean? And where do we see this happening right now?

SINCLAIR: Well, the renewable energy technologies have sprung up more or less in tandem with the information technologies that we utilized that we're utilizing right now. And there is an understanding that we're moving from an era of sort of hub-and-spoke energy, where a big power plant supplies a whole bunch of individual consumers, we're moving to a network of small power producers-prosumers would be one way to call it: people with solar panels on their roof or hundreds and

hundreds of wind turbines spread over a broad area, biogas generators, all the different flavors of renewable energy as a seamless Internet-like web. And the idea is that utilities are going to be less and less the primary generators of power and more and more the facilitators of moving that power around from many, many producers to the various users according to the need.

WORONCZUK: But then we might see some problems in the shift from fossil fuels to renewable energy in terms of, you know, technical, political, or economic control. I mean, for example, will we see the rise of big green monopolies over the solar and wind industries?

SINCLAIR: Well, the distributed nature of the power

sources kind of mitigates against monopolistic practices. For instance, in the video, one of the people I interviewed, Paul, points out that of the \$100 billion or so invested in new energy infrastructure in Germany, half of that is owned by people like you and me, individuals, small

businesses, communities, co-ops. And this is strikingly different from the breakdown we see in the United States. Only a small percentage of that renewable energy is owned by the big utilities in Germany, who now freely admit that they missed the boat, they totally miscalculated how successful this energy would be, and they're in a bit of a pickle right now try to figure out how to manage this transition.

WORONCZUK: Okay. Peter Sinclair, media director of the Dark Snow Project, thank you for joining us.

SINCLAIR: You bet. Thank you.

WORONCZUK: And thank you for joining us on The Real News Network.



Photo: Light Brigading. Creative Commons BY-NC.

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July 8, 2014*

CO2 Technology Centre of Sulcis - TCS

The "CO2 Technology Centre of Sulcis - TCS", which is based in Carbonia in the Sotacarbo research centre at the former Serbariu coal mine, will have a key role in redefining the future energy policies for Italy.



The Platform includes two independent gasification plants:

- a demonstration unit, equipped with a 1.3 m diameter gasifier and a syngas washing system;
- a pilot unit, equipped with a 0.3 m diameter gasifier and two different lines for syngas treatment and electrical energy and hydrogen production.

Both plants are based on the fixed-bed up-draft gasification technology.

Sotacarbo Pilot Platform was built in 2008, as a part of the COMEEN Project.



Sotacarbo's Centre is divided in three Research main areas:

- offices, archives, meeting rooms;
- laboratories, conference hall and exposition rooms;
- the two plants.



renewables efficiency clean coal



Established in 1987

Sotacarbo was established in 1987 by the Italian Government to study and develop advanced clean coal technologies for the benefit of the country.

Sotacarbo has been representing Italy in the IEA CLEAN COAL CENTRE since 1989. The shareholders are ENEA and REGIONE AUTONOMA SARDEGNA.




SOTACARBO
SOCIETÀ TECNOLOGIE AVANZATE CARBONE S.P.A.

This New Study Explains Why Fracking Won't Solve Climate Change

By Tim McDonnell
Mother Jones

For President Obama, fracking is a key weapon against global warming. Abundant natural gas, he said in his State of the Union address this year, is a "bridge fuel" to ubiquitous renewable energy—the key to securing economic growth "with less of the carbon pollution that causes climate change."

Not everyone agrees. In fact, the debate over whether natural gas is the antidote to our deadly addiction to coal, or a faux climate change solution that will stall the clean energy revolution, is one of the most hotly contested environmental questions of the day. It has produced a host of recent studies examining complex questions about global energy markets and the specific chemistry of various greenhouse gases. The latest volley in that debate is out today in a new paper in *Nature*.

Rolling together a suite of models that project energy use, economic activity, and climate systems through to 2050, the study finds that natural gas is essentially useless as a climate solution unless it is buttressed by new policies that discourage carbon pollution and promote investment in renewable energy. In other words, fracking alone won't save us.

"In the absence of policies that help natural gas play a

positive role, you won't make things much better," said Jae Edmonds, Chief Scientist at the Joint Global Change Research Institute and one of the study's lead authors. "It's kind of a wash."

The study compares two constructed scenarios: "conventional" gas, in which the fracking boom never happens and the world produces shale gas only on the level it can with older technologies; and "abundant" gas, where gas supplies shoot up and the cost drops as fracking technology developed in the US spreads across the globe. Our actual reality is somewhere in between those two extremes, Edmonds admits; the idea is to set up a "bounding exercise" to see what a fully realized global

shale revolution would really look like, compared to a baseline where it doesn't happen at all.

The other key assumption that (fingers crossed!) doesn't quite match reality is that there will be no new climate policies—a national or global price on carbon, for example, or new incentives for renewable energy—introduced between now and 2050.

When the models run, they simulate fluctuations in supply and demand for coal, oil, gas, and "low-carbon" (including wind, solar, geothermal, hydro, biomass, and nuclear power). That energy mix translates into global

"In the absence of policies that help natural gas play a positive role, you won't make things much better"

greenhouse gas emissions, which translate into global warming (climate "forcing," in science jargon). The study includes five separate models, each designed by different independent teams of scientists, that measure the same thing but are tweaked and calibrated differently. The specific outcomes vary, but all five models tell the same story: By 2050, global temperatures rise beyond the internationally agreed-upon limit of 2 degrees Celsius (3.6 degrees Fahrenheit) in both the "conventional" and "abundant" scenarios. In other words, simply using more natural gas, even as it displaces far dirtier coal, has an almost negligible effect on climate change.

There are two reasons for that: First, cheap gas also takes market share away from clean energy. Even though gas's carbon footprint is about half that of coal, it's obviously not as low as sources like wind, solar, or nuclear, and is therefore never an adequate permanent substitute for them. Second, the combination of cheap gas and no new energy efficiency policies means total energy consumption goes up. Together, these two effects offset any carbon savings that result from a move away from coal.

You can see the results of the the five models below—each has its own vertical column. The blue line is "abundant" gas; the red line is "conventional" (the gray shading represents the range of possible outcomes reported in existing peer-reviewed literature).

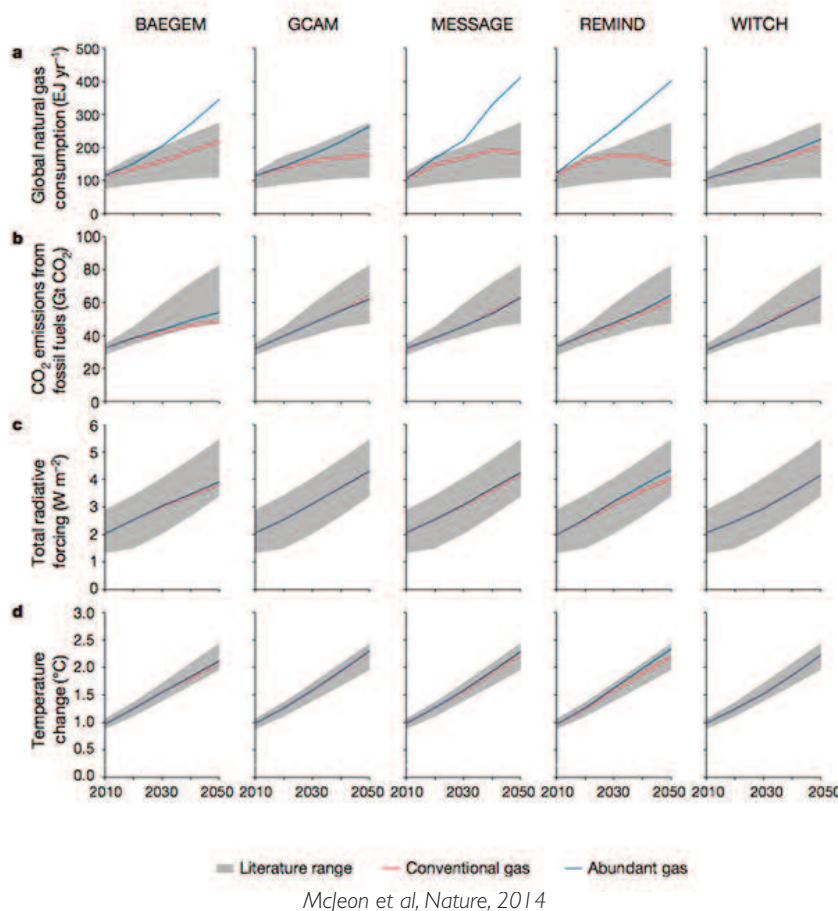
The first horizontal row shows global natural gas consumption. As you might expect, having more cheap na-

tural gas means the world uses more of it. The increased consumption comes in part because natural gas replaces more expensive fuels (by 2050, it replaces 18 percent of coal and 17 percent of low-carbon sources). Gas consumption also increases in this scenario because total energy use increases. But in the subsequent rows, the blue and red lines lie close together, suggesting the difference between the scenarios—and thus the impact of widespread natural gas—is small. The second row shows global carbon emissions; the third shows "radiative forcing," which is scientists' metric for the greenhouse effect; and the fourth shows temperature change.

Interestingly, the researchers reached the same conclusion when they recalibrated their models for both high and low levels of fugitive emissions of methane, the potent greenhouse gas that is known to leak from nearly every stage of the natural gas production process and that is often cited as an argument against fracking's supposed climate benefits. In other words, the study suggests that methane is a bit of red herring: It's not the

main reason fracking doesn't work as a climate solution. By the same token, fixing the methane problem won't make natural gas work as a "bridge." So what's the upshot? Is it time to give up Obama's dream of fracking our way to a stable climate? Not exactly. For one thing, as energy analyst Alex Trembath of The Breakthrough Institute points out, the models make a number of assumptions (most importantly, that

technological advances will halve the cost of extracting natural gas by 2050) that are basically impossible to pre-



dict with any certainty.

"It's exactly as realistic as any projection over 40 years," he says. "Which is to say, not very instructive."

Still, the study is useful in that it adds fresh data illustrating a flaw in the "all-of-the-above" approach to energy—a flaw that many scientists and energy analysts have long pointed out. Without a policy framework that explicitly charts the course to abundant low-carbon energy, merely flooding the market with natural gas is no better, from a climate perspective, than continuing to rely on coal. Of course, there are other benefits to cutting our coal consumption. Outdoor air pollution, to which coal-fired power plants are a leading contributor, caused nearly four million deaths worldwide in 2012. Natural gas plants work better than coal as a bac-

kup to renewable power, because they can be fired up much more quickly when the sun isn't shining or the wind isn't blowing. And regardless of the source, abundant, inexpensive energy is a boon to the 19 percent of the global population that today lives without electricity.

For that reason, University of Chicago geophysicist Ray Pierrehumbert argues that anti-fracking activists should focus their energy on climate policies—he suggests taxing natural gas and using the revenues to support renewables. What he doesn't want to see is a ban on fracking, which, he says, "would just mean more coal."

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Photo: Brennan Linsley/AP

Geothermal energy has success in Nevada, wants to spread to the rest of the West

By Megan Geuss
Ars Technica

On an uncharacteristically rainy day in western Nevada, a small tour bus of journalists rumbled past security gates at the Ormat Steamboat Complex in Washoe County. We were there to learn about geothermal power, a renewable energy resource produced by transferring heat from underground rocks up to power plants.

Most people think of Iceland when they think of geothermal power. On that island, approximately 90 percent of homes are heated by geothermal energy. But some 12 gigawatts of geothermal power are generated worldwide, and the US is one of the largest producers of it, generating nearly 3.4 gigawatts in 2013.

Ormat's Steamboat Complex is within the Reno city limits, and it's made up of seven smaller plants that collectively generate 78 megawatts of power. A typical coal-fired power plant can generate around 660 megawatts of power, so Ormat's 78 megawatts are not a lot by comparison. But when compared to other renewables, geothermal has some advantages.

"The darling in California is solar, in Texas it's wind, but both of those are intermittent power sources," Bob Sullivan, an Ormat vice president, told the group. "Geothermal is a base load source, and as such it's not subject to spikes in prices."

From a paper titled "Assessment of Moderate- and High-Temperature Geothermal Resources of the United States," this map shows "the relative favorability of occurrence for geothermal resources in the western contiguous United States." Black dots are geothermal systems that have already been identified.

USGS

Geothermal energy advocates are quick to point out that when the Sun isn't shining and the wind isn't blowing, geothermal facilities can be brought online "in under an hour" as one worker explained to me. Coal-fired plants, on the other hand, have long and costly ramp-up times. Doug Hollett, a program director for

the US Department of Energy (DOE) Geothermal Technologies Office, told a round table on Tuesday that the ramp-up issue can be seen in California. The state has been a leader in renewable energy, but it will have to deal with intermittency if it wants to incorporate more renewables into the grid.

"Because of the changing grid, there's an increasing need and value for resources that are flexible, that can be dispatched to deal with the intermittency issue and the peaking of solar during the day, so California is faced with huge ramp rates in the morning down as solar peaks up and then also in the evening up as solar goes down. And geothermal is capable of providing all of these things. Right now it's not valued in the marketplace, but the discussion that's on-

"Geothermal is a base load source, and as such it's not subject to spikes in prices"

going is to value it."

So why is this discussion about the value of geothermal energy happening now? Part of it has to do with technology, and part of it has to do with perception.

"10 years ago everybody said you won't see much power from Ormat," Karl Gawell, executive director of the Geothermal Energy Association, told Ars. "But new technologies are making more power possible."

In consumer tech terms, the "new technologies" that Gawell references are anything but new. One notable advance occurred in the late '80s, when researchers and entrepreneurs started implementing what is called a binary cycle in geothermal plants. That system allows power plant ope-

rators to generate electricity at geothermal wells with lower temperatures.

In a binary system, hot geothermal fluid is pumped up out of the ground from a production well into a tank that contains a separate and secondary fluid, called a "working fluid," that has a lower boiling point than water, like pentane or butane. The surrounding water heats the secondary fluid and vaporizes it. The vapor powers a turbine connected to a generator.

As the fluid cools, it recycles back into the tank, and as the steam from the geothermal well cools back into water, it's pumped back into an injection well in the ground. It will eventually trickle back into the production well and restart the cycle. With this method, little water is

lost, and the power plant is able to maintain pressure underground.

Ormat's Steamboat complex is a good example of the use of newer tech; it powers its turbines despite pumping water out at between 300 and 320 degrees Fahrenheit. By contrast, flash steam plants, which are still the most common type of geothermal plant today, usually require ground water above 360 degrees Fahrenheit. "People think of geothermal tech as old, but it isn't," Gawell added. "It's very new."

Hollett noted that the DOE spends "a lot of effort and a lot of investment on technical barriers, the goal of which is to make development of new geothermal resources increasingly competitive with all other energy sources. So we're invested across the full gamut, really, of



Ormat's 89-megawatt geothermal "Steamboat Complex" in western Nevada.
Photo: Ormat Technologies

geothermal... there's hydrothermal resources, enhanced geothermal, low temperature, co-production."

Being able to use geothermal activity at less-than-ideal temperatures has done well for Ormat. The company bought and consolidated the seven scattered geothermal plants in 2004, and today it supplies power to the entire residential portion of the city of Reno.

Not a gravy train

As Gawell tells it, "Geothermal was dead in the '90s," and he admits that it's still a small industry. In 1993, Nevada only generated 150 megawatts of geothermal power. With the help of some measures passed by the state in the late '90s, however, investment started flowing in from a few key companies. Today, Nevada has tripled its geothermal capacity, with Ormat providing 200 megawatts to the state. That's not an awful lot compared to traditional power sources, but it's a start.

Still, without government help, geothermal energy as an industry has a tendency for stagnation. The risk involved in drilling a geothermal well is much higher than it is to build a solar or wind farm in a place where it's usually sunny or windy. At the same time, the monetary reward for drilling and striking geothermal activity is often less than you'd see from drilling and finding, say, natural gas.

"There's no surface manifestation

for geothermal usually," lamented Gawell. "It's a blind resource."

He continued, "oil and gas relies on seismology, but for geothermal you're looking for an intersection of hard rock, heat, and existing fractures." When you find those, getting the wells in place can still be tough because geothermal activity is best in granitic systems, so it can be harder to drill down. With oil, drilling is easier because the rock is generally softer.

That could explain a lot of the trouble with the technology, called Enhanced Geothermal Systems (EGS), too. EGS, which tries to harvest geothermal energy from hot rock that does not naturally have the right fractures or water supply, has often been touted as the answer to the tepid growth of the geothermal industry. But Gawell himself called it a "tough business," one that hasn't seen any real success aside from a few government-funded projects. For now, the industry seems to be setting its sights on increasing efficiencies through the use of different working fluids and finding ways to develop sub-standard resources.

The power of the Earth meets the power of the Sun

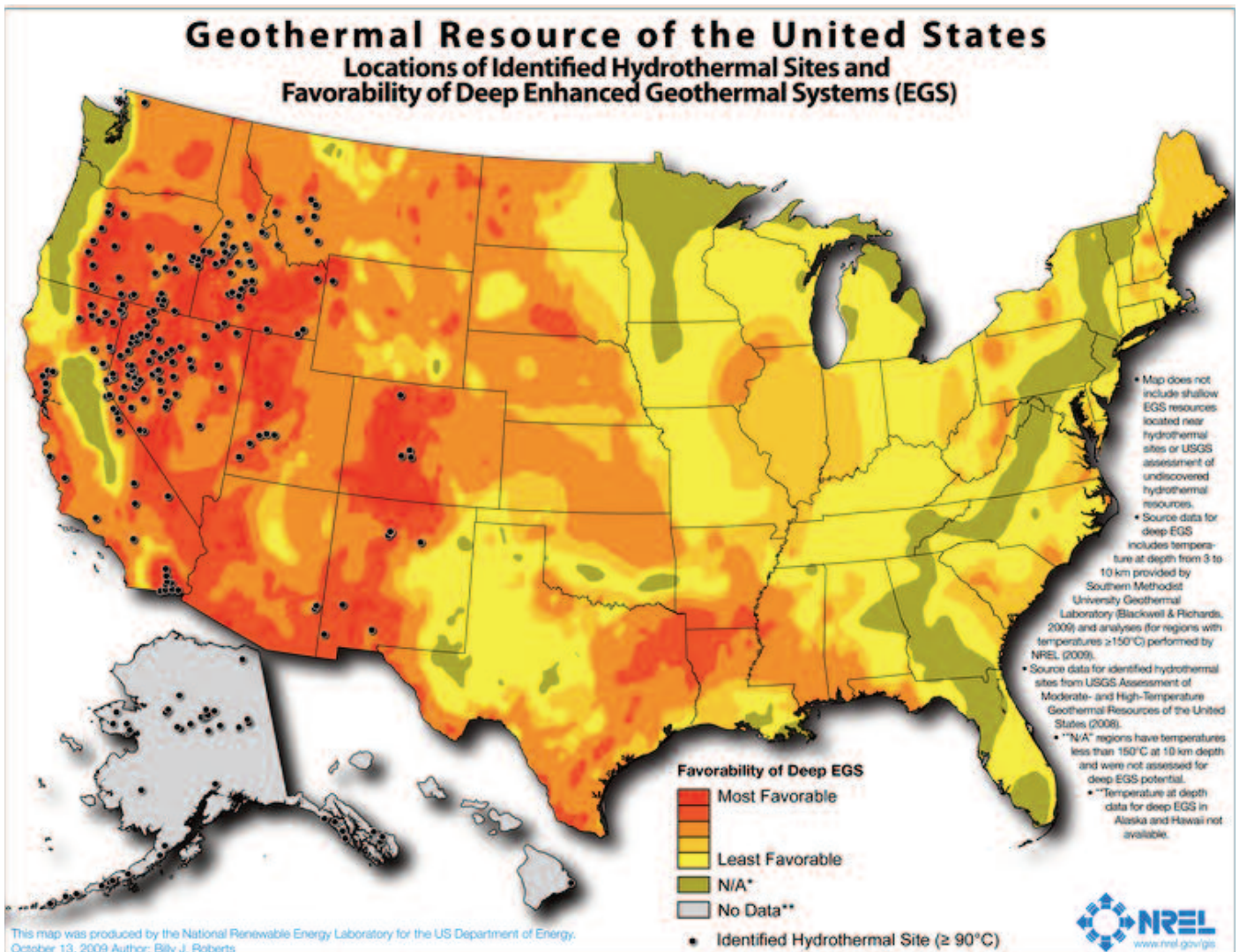
One way of making the heat from the Earth hotter is by adding the

power of the Sun. Later in the day, our group arrived at the Stillwater Solar Geothermal Hybrid power plant in Fallon, Nevada. In the coming months, energy company Enel Green Power will christen a field of mirrors that will reflect the heat from the Sun into pipes full of geothermal water to get it up to 390 degrees Fahrenheit.

Even before this solar thermal addition, the Stillwater plant had a field of 89,000 photovoltaic (PV) solar panels that were also supplying energy to the city of Fallon in conjunction with the geothermal plant. (Solar thermal power is different from PV solar in that the Sun's energy is used to heat a fluid that will create the energy; PV solar cells generate electricity directly by using photons to excite electrons.) The plant has been an example of how solar and geothermal can work together to boost power output and solve the intermittency of solar. According to Bill Price, vice president of engineering and construction at Enel, the small community of Fallon is 100 percent renewable, and the rest of the energy is distributed by NV Energy, a state public utility.

The combination of solar thermal power and geothermal heat is a novel one. As Price explained, "We took one branch of our geothermal output with lower pressure, and we use that branch to heat it to a higher temperature. We add more energy to what will become electricity."

In building the addition to the existing geothermal plant, "Golden Rule number one was don't affect the geothermal," Price continued.



A map using 2009 data shows locations of identified hydrothermal sites and favorability of deep Enhanced Geothermal Systems (EGS). Unfortunately, for all the enthusiastically colored space on this map, the money-making potential of EGS has not yet been realized. National Renewable Energy Laboratory

"So the [system's] design is something that boosts, but doesn't have a long-term impact, on that system. There were a lot of things we didn't do, because the system would lose pressure" or experience some other negative effect.

Together, the geothermal and solar thermal fields will produce 35 megawatts of electricity, and Enel's solar PV field will produce 26 megawatts for a total of 61 megawatts.

Enel's hybrid plant may be a model for other companies in the future.

Terry Page, the director of regulatory affairs innovation at Enel, told a Tuesday round table, "We're seeing some renewed interest in geothermal recently in California... In California, with the wind and solar resources, there's a significant shortfall when the Sun goes down or the wind doesn't blow." Luckily, California is also estimated to have a lot of land that may be concealing geothermal activity.

The path won't be easy, and not everyone is certain it will be lucrative. But Karl Gawell wants to make it

happen. "It's quite clear that the next five years are going to be critical for the geothermal industry," he said at the industry round table on Thursday. "Can we not just sustain the growth that we've had but can we really make that step out into a new growth curve for the industry?"

*Originally published
in Ars Technica
August 10, 2014*

Rising economies 'ahead on climate'

By Navin Singh Khadka
BBC World Service

Four of the world's emerging economies have claimed that they are far ahead of developed countries in their efforts to slow climate change.

Brazil, South Africa, India and China are known as the BASIC bloc in international climate negotiations.

They have also accused developed nations of keeping their carbon emission cuts ambitions at a low level.

Ministers from the BASIC countries made the claim after meeting in the Indian capital, New Delhi, on Friday.

Developed countries have long argued that shares in global carbon emissions from fast emerging economies like China and India were huge and yet they were not committed to making cuts.

The two sides have been at loggerheads for years, presenting hurdles to a deal on climate change.

"Our [climate change] mitigation efforts are more than developed countries," Prakash Javadekar, India's environment minister told the BBC after he held the meeting with his counterparts from Brazil, China and South Africa.

"We are going ahead with our voluntary actions which will reduce carbon emissions and also bring about increased

energy efficiency from 25% to 50%.

"We want the developed world to walk the walk."

The comments come ahead of a major climate meeting of heads of state and government being hosted by UN secretary-general Ban Ki-moon next month.

The meeting in New York aims at securing political support for a global climate deal next year.

At loggerheads

But an official with the EU's climate commission said figures showed an opposite picture.

"The latest United Nations Environment Programme (Unep) emissions gap report clearly says that developed countries have cut more than developing countries when we use the same baseline," said the official, who did not want to be named.

The 2013 report said: "Between 2000 and 2010, developed countries' share in global emissions decreased from 51.8% to 40.9%, whereas developing countries' emissions increased from 48.2% to 59.1%."

Past negotiations, most notably the Copenhagen summit in 2009, had failed in part because of the conflicting po-

"The latest United Nations Environment Programme (Unep) emissions gap report clearly says that developed countries have cut more than developing countries when we use the same baseline"

sitions of the developed world and rapidly rising economies like China and India.

BASIC countries in the past argued that they should not be asked to make mandatory emissions cuts because it was now their turn to speed up development works and tackle poverty.

They insisted that the developed countries had the "historic responsibility" to shoulder the burden of carbon cuts given their past emissions since the industrial revolution.

China tops the list of the world's major carbon emitters followed by the US and India.

In its latest report, the Intergovernmental Panel for Climate Change (IPCC), the top UN body on climate science, said natural systems were already hit by climatic changes. It highlighted that the amount of scientific evidence on the effects of warming had almost doubled since the last report in 2007 and that growing impact on humans was feared.

Scientists say average global temperature rise should be limited to two degrees compared to what it was before the industrial revolution to avoid dangerous climate change. To achieve that goal, they believe global carbon emissions should peak soon and drop drastically.

But several reports have shown greenhouse gases that trap heat on Earth are rising inexorably.

US fall

Earlier this year, President Obama proposed a new law to cut US carbon emissions by 30% by 2030, mainly targeting coal-fired power plants.

"Developing nations with some of the fastest-rising levels of carbon pollution are going to have to take action to meet this challenge alongside us," he said, announcing his climate policy in 2013.

"They're watching what we do, but we've got to make sure that they're stepping up to the plate as well."

The European Union has offered to increase its emissions reduction from 20% to 30% by 2020 "if other major emitting countries in the developed and developing worlds commit to undertake their fair share of a global emissions reduction effort".

**"Europe has
to do much more
than
what they are doing
now"**

But Mr Javedekar countered: "After the US discovered shale gas and following their economic downturn, they have shown that their emissions have gone down, but that is not real. "Europe too has to do much more than what they are doing now.

Although major economies like China and India claim that they are doing what they can to emit less as they intensify development activities, several studies have shown that their carbon emissions continue to rise steeply.

Developed countries argue that without major emitters like China and India making mandatory and significant cuts, climate change cannot be addressed.

Long-time observers of international climate negotiations say that as long as the developed countries and the BASIC bloc remain at loggerheads, they fail to see how a meaningful global climate deal can be reached next year.

*Originally published
in BBC.com
August 12, 2014*

Not in my backyard: US sending dirty coal abroad

By Dina Cappiello*
Associated Press

As the Obama administration weans the U.S. off dirty fuels blamed for global warming, energy companies have been sending more of America's unwanted energy leftovers to other parts of the world where they could create even more pollution. This fossil fuel trade threatens to undermine President Barack Obama's strategy for reducing the gases blamed for climate change and reveals a little-discussed side effect of countries acting alone on a global problem. The contribution of this exported pollution to global warming is not something the administration wants to measure, or even talk about.

"This is the single biggest flaw in U.S. climate policy," said Roger Martella, the former general counsel at the Environmental Protection Agency under President George W. Bush. "Although the administration is moving forward with climate change regulations at home, we don't consider how policy decisions in the United States impact greenhouse gas emissions in other parts of the world." Over the past six years, American energy companies have sent more coal than ever before to other parts of the world, in some cases to places with more lax environmental standards.

The consequence: This global shell game makes the U.S. appear to be making more progress than it is on global warming. That's because it shifts some pollution — and the burden for cleaning it up — onto other countries' balance sheets.

"Energy exports bit by bit are chipping away at gains we are making on carbon dioxide domestically," said Shakeb Afsah, an economist who runs an energy consulting firm in Bethesda, Maryland. As companies look to double U.S. coal exports, with three new terminals along

the West Coast, America could be fueling demand for coal when many experts say that most fossil fuels should remain buried to avert the most disastrous effects of climate change. But the administration has resisted calls from governors in Washington and Oregon to evaluate and disclose such global fallout, saying that if the U.S. didn't supply the coal, another country would. White House officials say U.S. coal has a negligible global footprint and reducing coal's use worldwide is the best way to ease global warming. The U.S. in 2012 accounted for 9 percent of worldwide coal exports, the latest data available.

"There may be a very marginal increase in coal exports caused by our climate policies," said Rick Duke, Obama's deputy climate adviser, in an interview with The Associated Press. "Given that coal supply is widely available from many sources, our time is better spent working on leading toward a global commitment to cut carbon pollution on the demand side." Guidance drafted by White House officials in 2010 did outline how broadly agencies should look at carbon emissions from U. S. projects. Four years later, that guidance is still under review. "They have sat on their hands," said George Kimbrell, a senior attorney for the Center for Food Safety, which has sued the administration over this delay. Carbon dioxide, regardless of where it enters the atmosphere, contributes to the sea level rise and in some cases severe weather in the U.S. and the world. Changing the global system to account for production would carry political risks, especially for the U.S., which is trying to boost production of energy and exports even as it addresses global warming.

"The U.S. needs to be pragmatic on this," said Jason

Bordoff, director of Columbia University's Center on Global Energy Policy. "If our coal exports are very small and having no or little impact on global greenhouse gas emissions ... the government has to take into account the economic and foreign policy costs of restricting exports." He was a National Security Council energy and climate change adviser to Obama until January 2013.

Over the past six years, as the U.S. cut coal consumption by 195 million tons, about 20 percent of that coal was shipped

overseas, according to an AP analysis of Energy Department data.

Less coal being burned here has helped the power sector reduce carbon emissions by 12 percent and left more U.S. coal in the ground. But a growing share is finding its way abroad.

Analyses suggest U.S. exports could be reducing by half or wiping out completely the pollution savings in the U.S. from switching power plants from coal to natural gas. The nexus of the challenge can be found in and around Norfolk, Virginia, which exports more coal than any other place in the U.S. and is already experiencing one of the country's fastest rates of sea level rise. When the Prime Lilly, a massive cargo ship, set sail from Norfolk recently, its 80,000 tons of coal were destined for power plants and factories in South America. The 228,800 tons of carbon dioxide contained in that

coal disappeared from America's pollution ledger. But it still pollutes the planet. It's a planet hungry for American coal. U.S. exports to Germany have more than doubled since 2008, providing a cheaper alternative to cleaner-burning natural gas and a replacement for nuclear power, which is being phased out after Japan's nuclear accident.

Last year, Germany's carbon dioxide emissions grew by 1.2 percent, in large part because the country burned more coal. German environmental officials say the re-

cent boom in coal-fired power is making it harder for the country to meet its climate-protection goals, even as it has increased renewable energy and participates in a carbon market that has lowered emissions throughout Europe. Activists partly blame the U.S. "This is a classic case



In this May 22, 2014, photo train cars containing coal roll into an unloading facility at Dominion Terminal Associates' coal terminal in Newport News, Va. As the Obama administration weans the U.S. off dirty fuels blamed for global warming, energy companies have been sending more of America's unwanted energy leftovers to other parts of the world, where they could create even more pollution. With companies looking to double America's coal exports, the nation's growing position in the global energy trade could make global warming worse, fueling the world's demand for coal when many experts say most fossil fuels should remain in the ground to avert the most disastrous effects of climate change.

AP Photo: Patrick Semansky

of political greenwashing," said Dirk Jansen, a spokesman for BUND, a German environmental group. "Obama pretties up his own climate balance, but it doesn't help the global climate at all if Obama's carbon dioxide is coming out of chimneys in Germany."

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Associated Press reporters David Rising and Kirsten Grieshaber contributed reporting from Berlin and Luenen, Germany.

IPCC: rapid carbon emission cuts vital to stop severe impact of climate change

By Damian Carrington
The Guardian

Climate change is set to inflict “severe, widespread, and irreversible impacts” on people and the natural world unless carbon emissions are cut sharply and rapidly, according to the most important assessment of global warming yet published.

The stark report states that climate change has already increased the risk of severe heatwaves and other extreme weather and warns of worse to come, including food shortages and violent conflicts. But it also found that ways to avoid dangerous global warming are both available and affordable.

“Science has spoken. There is no ambiguity in the message,” said the UN secretary general, Ban Ki-moon, attending what he described as the “historic” report launch. “Leaders must act. Time is not on our side.” He said that quick, decisive action would build a better and sustainable future, while inaction would be costly.

Ban added a message to investors, such as pension fund managers: “Please reduce your investments in the coal- and fossil fuel-based economy and [move] to renewable energy.”

The report, released in Copenhagen on Sunday by the UN’s Intergovernmental Panel on Climate Change (IPCC), is the work of thousands of scientists and was agreed after negotiations by the world’s governments. It is the first IPCC report since 2007 to bring together all aspects of tackling climate change and for the first time states: that it is economically affordable; that carbon emissions will ultimately have to fall to zero; and that global poverty can only be reduced by halting global warming. The report also makes clear that carbon

emissions, mainly from burning coal, oil and gas, are currently rising to record levels, not falling.

The report comes at a critical time for international action on climate change, with the deadline for a global deal just over a year away. In September, 120 national leaders met at the UN in New York to address climate change, while hundreds of thousands of marchers around the world demanded action.

“We have the means to limit climate change,” said Rajendra Pachauri, chair of the IPCC. “The solutions are many and allow for continued economic and human development. All we need is the will to change.”

Lord Nicholas Stern, a professor at the London School of Economics and the author of an influential earlier study, said the new IPCC report was the “most important assessment of climate change ever prepared” and that it made plain that “further delays in tackling climate change would be dangerous and profoundly irrational”.

“The reality of climate change is undeniable, and cannot be simply wished away by politicians who lack the courage to confront the scientific evidence,” he said, adding that the lives and livelihoods of hundreds of millions of people were at risk.

Ed Davey, the UK energy and climate change secretary, said: “This is the most comprehensive and robust assessment ever produced. It sends a clear message: we must act on climate change now. John Kerry, the US secretary of state, said: “This is another canary in the coal mine. We can’t prevent a large scale disaster if we don’t

heed this kind of hard science.”

Bill McKibben, a high-profile climate campaigner with 350.org, said: “For scientists, conservative by nature, to use ‘serious, pervasive, and irreversible’ to describe the effects of climate falls just short of announcing that climate change will produce a zombie apocalypse plus random beheadings plus Ebola.” Breaking the power of the fossil fuel industry would not be easy, McKibben said. “But, thanks to the IPCC, no one will ever be able to say they weren’t warned.”

The new overarching IPCC report builds on previous reports on the science, impacts and solutions for climate change. It concludes that global warming is “unequivocal”, that humanity’s role in causing it is “clear” and that many effects will last for hundreds to thousands of years even if the planet’s rising temperature is halted.

In terms of impacts, such as heatwaves and extreme rain storms causing floods, the report concludes that the effects are already being felt: “In recent decades, changes in climate have caused impacts on natural and human systems on all continents and across the oceans.”

Droughts, coastal storm surges from the rising oceans and wildlife extinctions on land and in the seas will all worsen unless emissions are cut, the report states. This will have knock-on effects, according to the IPCC: “Climate change is projected to undermine food security.” The report also found the risk of wars could increase: “Climate change can indirectly increase risks of violent conflicts by amplifying well-documented drivers of these conflicts such as poverty and economic shocks.”

Two-thirds of all the emissions permissible if dangerous



November 2, 2014. Rajendra Pachauri, chair of the IPCC, addresses the Copenhagen meeting. IPCC Photo

climate change is to be avoided have already been pumped into the atmosphere, the IPCC found. The lowest cost route to stopping dangerous warming would be for emissions to peak by 2020 – an extremely challenging goal – and then fall to zero later this century.

The report calculates that to prevent dangerous climate change, investment in low-carbon electricity and energy efficiency will have to rise by several hundred billion dollars a year before 2030. But it also found that delaying significant emission cuts to 2030 puts up the cost of reducing carbon dioxide by almost 50%, partly because dirty power stations would have to be closed early.

“If you wait, you also have to do more difficult and expensive things,” said Jim Skea, a professor at Imperial College London and an IPCC working group vice-chair.

Tackling climate change need only trim economic growth rates by a tiny fraction, the IPCC states, and may actually improve growth by providing other benefits, such as cutting health-damaging air pollution. Carbon capture and storage (CCS) – the nascent technology which aims to bury CO₂ underground – is deemed extremely important by the IPCC. It estimates that the cost of the big emissions cuts required would more than double without CCS. Pachauri said: “With

CCS it is entirely possible for fossil fuels to continue to be used on a large scale.”

The focus on CCS is not because the technology has advanced a great deal in recent years, said Jean-Pascal van Ypersele, a professor at the Université Catholique de Louvain in Belgium and vice-chair of the IPCC, but because emissions have continued to increase so quickly. “We have emitted so much more, so we have to clean up more later”, he said. Linking CCS to the burning of wood and other plant fuels would reduce atmospheric CO₂ levels because the carbon they contain is sucked from the air as they grow. But van Ypersele said the IPCC report also states “very honestly and fairly” that there are risks to this approach, such as conflicts with food security.

In contrast to the importance the IPCC gives to CCS, abandoning nuclear power or deploying only limited wind or solar power increases the cost of emission cuts by just 6-7%. The report also states that behavioural changes, such as dietary changes that could involve eating less meat, can have a role in cutting emissions.

As part of setting out how the world’s nations can cut emissions effectively, the IPCC report gives prominence to ethical considerations. “[Carbon emission cuts] and adaptation raise issues of equity, justice, and fairness,” says the report. “The evidence suggests that outcomes seen as equitable can lead to more effective [international] cooperation.”

These issues are central to the global climate change negotiations and their inclusion in the report was welcomed by campaigners, as was the statement that adapting countries and coastlines to cope with global warming cannot by itself avert serious impacts.

“Rich governments must stop making empty promises and come up with the cash so the poorest do not have to foot the bill for the lifestyles of the wealthy,” said Har-

jeet Singh, from ActionAid.

The statement that carbon emissions must fall to zero was “gamechanging”, according to Kaisa Kosonen, from Greenpeace. “We can still limit warming to 2C, or even 1.5C or less even, [but] we need to phase out emissions,” she said. Unlike CCS, which is yet to be proven commercially, she said renewable energy was falling rapidly in cost.

Sam Smith, from WWF, said: “The big change in this report is that it shows fighting climate change is not going to cripple economies and that it is essential to bringing people out of poverty. What is needed now is concerted political action.” The rapid response of poli-

ticians to the recent global financial crisis showed, according to Smith, that “they could act quickly and at scale if they are sufficiently motivated”.

Michel Jarraud, secretary general of the World Meteorological Organisation, said the much greater certainty expressed in the new IPCC report would give international climate talks a better chance than those which failed in 2009. “Ignorance can no longer be an excuse for no action,” he said.

Observers played down the moves made by some countries with large fossil fuel reserves to weaken the language of the draft IPCC report written by scientists and seen by the Guardian, saying the final report was conservative but strong.

However, the statement that “climate change is expected to lead to increases in ill-health in many regions, including greater likelihood of death” was deleted in the final report, along with criticism that politicians sometimes “engage in short-term thinking and are biased toward the status quo”.

“This report is the most important assessment of climate change ever prepared”

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The real achievement of the Peru climate talks

By Christian Downie
ABC Environment

After more than two weeks of negotiations at the United Nations climate talks in Lima, Peru, political leaders finally announced over the weekend that they had reached an agreement. For the first time, all countries, rich and poor, are expected to cut their greenhouse gas emissions, which are causing climate change.

"The agreement calls on countries to publish their so-called nationally determined contributions to reducing global emissions ideally by March next year, and certainly ahead of the negotiations next December in Paris, where much of the detail is to be finalised. Much

lip service will be paid to the outcome in the coming days, especially the divisions between rich and poor countries, which have plagued the climate negotiations for almost two decades. But the question for many sitting back in their lounge rooms watching the evening news is do these negotiations matter? At the opening of the negotiations Rajendra Pachauri, the UN's chief climate scientist, stressed the need for countries to take urgent measures in order to limit the global rise in temperatures to no more than 2°C. That is the point at which the impacts from climate change become unimaginable. If you want to try - just imagine the next bu-



The UN Secretary-General BAN KI-MOON at the Climate Change Conference in Lima.
UN Photo/Mark.

shfire season being worse than the last, until in 30 years from now loss of lives and homes seems an almost annual event.

The UN talks will not stop this from happening. As the US secretary of state, John Kerry, put it: "We are on a course leading to tragedy." International negotiations alone won't change the course, but if combined with domestic actions they just might. What countries like the US and China do domestically will have

a much greater impact on future reductions in greenhouse gas emissions than any announcement in Lima.

For example, China's decision last month ahead of the G20 summit to stop its emissions from growing by 2030 could have a significant impact

on our chances of keeping temperatures within the so-called 2°C guardrail.

Likewise president Obama's announcement that the US would emit 26 per cent to 28 per cent less carbon in 2025 than it did in 2005 will do the same. Also, the US president's decision to impose tough new rules on power plants is already having an impact on the US coal

sector. For anyone who doubts that this is true, just ask US coal companies and electricity utilities how much harder it is now to secure investors following the announcement. Every time countries reaffirm their desire to address the problem it tightens the hold on those who want to do nothing. So it is government domestic actions that matter most. These actions are the only way we can effectively reduce greenhouse gas emissions. But this is the

scribed as a "Bob Brown bank on an international scale". While the contribution is small compared to other countries, the backflip reflects the mounting international pressure that the Government is facing on climate change. Although the decisions of countries at a national level to phase out coal, or switch to gas, or invest in solar power, is what will really reduce greenhouse gas emissions, increasingly international gatherings, such as APEC and the

G20 last month and the UN this month, are building pressure for domestic action. And every time they do, the harder it will be for governments at home to shirk their responsibility to slash carbon pollution.

If the message from our closest ally wasn't clear enough in Brisbane at the G20 summit, it just became clearer this week, as John Kerry argued: "If you are a big developed nation and you do not lead, you are part of the problem."

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Peru's President Humala, right, jokes with U.S. Secretary of State John Kerry in Lima for a conference on climate change.
Photo: AP

key; international talks like the ones held this week increase the pressure on governments to act. Every time countries around the world reaffirm their desire to address the problem it tightens the hold on those who want to break away and do nothing. Witness Australia's decision at the talks to contribute \$200 million to the Green Climate Fund, which only one year ago Tony Abbott de-



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6 Stories to Watch in 2015: Global Climate Deal, Sustainable Development Goals, Rising Water Risks and More

By Deborah Zabarenko
World Resources Institute

As world leaders deal with climate change, aim to lift more people out of poverty, and make the world a more sustainable, prosperous place in 2015, here are the top Stories to Watch, according to WRI's experts and as presented by WRI President and CEO Andrew Steer on January 8.

1) Global Climate Deal

December 2015 is the target date for a worldwide agreement that will unite all countries in an ambitious response to climate change. But what kind of agreement will it be?

"It won't be your old grandfather's plain-vanilla, textbook climate deal. It's going to be much more interesting than that," Steer told a packed briefing at the National Press Club in Washington. Following the hottest year on record, 2015 begins with momentum to limit greenhouse gases, as 38 countries and 23 cities, states and provinces now have a price on carbon dioxide emissions. With emissions now higher than at any point in history, keeping the planet cool enough to avoid the worst consequences of climate change is possible only with rapidly reduced emissions and big changes in the energy mix.

The United States, the European Union and China, which together account for half of all greenhouse gas emissions, have pledged to do more, but that may not be enough. All nations are expected to make their emissions-cutting commitments known in the first half of the year, and these pledges will send important signals

about the ambition of the final agreement to be reached in December. The United States can lead on this issue, and has proposed to cut its emissions by 26 to 28 percent from 2005 levels by 2025. But whether this reduction can happen will largely depend on rules on power plant emissions to be released by the U.S. Environmental Protection Agency. How strong will the EPA's final standards be? Will leaders rise to the climate challenge this year?

2) Sustainable Development Goals

In September, leaders will gather at the United Nations headquarters to agree on goals to reduce world poverty while encouraging sustainable development, replacing the Millennium Development Goals that expire in 2015. While the MDGs helped cut poverty in half from 1990 through 2015, there are still 1.2 billion people living on less than \$1.25 a day.

Sustainability will be at the core of the new goals, a shift from the expiring ones. The new goals will also be universal in nature, reflecting the shifting balance in world power, and be more comprehensive, with a different form of financing. Will the world embrace the new goals? Will they spur people to action?

3) New Coalitions for Action

"The old government-to-government way of doing things is breaking down quite rapidly," Steer said. He pointed to public-private partnerships that bring gover-

nments, businesses and civil society groups together to make progress on sustainability, climate and other issues. These include the Tropical Forest Alliance 2020, which aims to reduce tropical deforestation from commodity expansion by 2020; the Compact of Mayors, an agreement signed by leaders of 228 cities to cut 13 gigatons of carbon emissions by mid-century; and the New York Declaration on Forests, a giant initiative committed to restoring 350 million hectares (865 million acres) of degraded land in the next 15 years. Provided these coalitions and others follow through on their commitments, they can tap into the message of the New Climate Economy report, making economic growth and environmental sustainability work together. Will these coalitions drive global action?

4) Water Risk Rising

From the western United States to Brazil to China, water scarcity is a global stressor. WRI's Aqueduct platform found that 36 countries face extreme levels of water stress. According to a recent scientific paper, the U.S. West is experiencing its worst drought in 1,200 years. In Brazil, the city of Sao Paulo is in its worst drought in 80 years, with its reservoir system down to 7.1 percent of capacity. In China, 90 percent of coastal cities are facing water stress.

The private sector is starting to respond. Brewer Ambev now uses 3.3 liters of water to make 1 liter of beer, down from 5 liters in 2002. McDonalds is incorporating Aqueduct's water risk assessment into their supply chains. Consumer products giant Procter & Gamble plans to reduce water use in its factories by 20 percent per unit of production over 2010, focusing its plans in water-stressed regions. Will other companies and governments follow? Will there be innovative water management policies, such as water pricing or new efficiency mandates and incentives?

5) India in the Spotlight

"We couldn't possibly do this, this year, without having a story on the country that is perhaps going through the biggest discontinuity of all in terms of policy, which

is India," Steer said. Newly elected Indian Prime Minister Narendra Modi is a populist with a bold leadership style and a mandate to drive economic growth for the world's largest democracy. He has indicated that he will be very active in his first months, and 2015 will be an important time for him to advance his agenda. Modi has the difficult task of ensuring that the country expands economically while also addressing major sustainability and human rights challenges. India's urban population is expected to double by 2030, meanwhile 300 million still lack access to electricity and the country's coal use and air pollution continue to grow. The Modi government plans to invest \$1.2 billion in 100 smart cities over the next year, with funding coming from private investors and abroad. The government has also promised a 30-fold increase in solar capacity, installing 100 gigawatts by 2022. Achieving these targets will require significant investment and a commitment to low-carbon growth. What role will India play on the global stage? What impact will President Obama's upcoming visit to India have?

6) New Leadership

Along with India's Modi, Brazil's Dilma Rousseff, Turkey's Recep Tayyip Erdogan and Indonesia's Joko Widodo together represent 1.8 billion people, one-quarter of the world's population. Their countries are also rife with major challenges: Brazil's cities are grappling with crippling drought, and Indonesia is facing pressure from expanding agriculture and other industries that drive deforestation. Will these leaders embrace sustainable, low-carbon growth?

The U.S. picture is equally complex. President Barack Obama is looking to cement his legacy over his last two years in office. Meanwhile, Congress offers few signs of hope for a productive approach to the climate challenge. Looking ahead to 2016, the U.S. presidential campaign will offer candidates a chance to articulate their positions on sustainability and climate issues. Now that's a Story to Watch.

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HASHIMA ISLAND

Hashima Island, is an uninhabited island about 15 kilometers from Nagasaki. The island was populated from 1887 to 1974 as a coal mining facility. In the Sixties coal mines began shutting down all over Japan, and Hashima's mines were no exception. Mitsubishi officially announced the closing of the mine in 1974, and today it is empty and bare, which is why it is called Ghost Island. Travel to Hashima was re-opened on April 2009 after 35 years of closure.

Tackling climate change is one of America's greatest economic opportunities of the 21st century

(and it's simply the right thing to do).

What made America great was taking a stand. Doing the things that are hard. And seizing opportunities. The very foundation of our country is based on fighting for our freedoms and ensuring the health and prosperity of our state, our community, and our families. Today those things are threatened by a changing climate that most scientists agree is being caused by air pollution. We cannot risk our kids' futures on the false hope that the vast majority of scientists are wrong. But just as America rose to the great challenges of the past and came out stronger than ever, we have to confront this challenge, and we have to win. And in doing this right, by saving money when we use less electricity, by driving a more efficient car, by choosing clean energy, by inventing new technologies that other countries buy, and creating jobs here at home, we will maintain our way of life and remain a true superpower in a competitive world. In order to make this happen, however, there must be a coordinated effort to combat climate change—with America taking the lead here at home. **Leading is what we've always done. And by working together, regardless of politics, we'll do it again.**



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