ONE

Only Natural Energy

Africa's alternative route to climate adaptation

Climate change pledges not enough

Welcome to Greendia

Just One Degree

The Standing Rock Sioux

YEAR II - NUMBER 4 - OCTOBER-DECEMBER 2016

NATIONAL CHILDREN'S SCIENCE CONGRESS

A programme of

National Council for Science & Technology Communication (NCSTC)

Department of Science & Technology, Government of India

District Level (All Districts) **September**

State Level (All States-KVS & JNVS) **November**

National Level **27-31 December**

NATIONAL CHILDREN'S SCIENCE CONGRESS (NCSC)

An ideal and innovative programme for children to Inspire, Empower and Expand for their Mind and World.

Focal Theme for 2016 & 2017

SCIENCE, TECHNOLOGY & INNOVATION FOR SUSTAINABLE DEVELOPMENT

www.dst.gov.in

www.gujcost.gujarat.gov.in

ONE
Only Natural Energy

Year II - Number 4
OCTOBER-DECEMBER 2016

Editor:
Gianni Serra

Editorial team:
Eusebio Loria
Toby Lockwood
Jez Abbott
Alice Masili
Leonore Hitchler

Contributors:
Jeremy Hance
Susan Williams
Mark Trahant

Thanks this issue:
Mongabay.com
Euractiv
Talking Humanities
TrahantReports.com
Yes! Magazine

Cover Photo:
Namib Desert Coastline

Publisher:
Sotacarbo Ltd
CO2 Technology Centre Sulcis
Grande Miniera di Serbariu 09013
Carbonia (Italy)

Reg. Nr: 2/2014 Cagliari Ordinary Court

Only Natural Energy [ONE] is a digital magazine published every three months.
www.onlynaturalenergy.com
info@onlynaturalenergy.com

Africa's alternative route to climate adaptation

Global warming is making climates more extreme: wet areas will get wetter and dry drier. Data suggests the correlation between climate and poverty will grow only stronger in future years.

By JEZ ABBOTT

ONE

A recently launched World Bank plan sets out what is needed to boost both climate resilience and low-carbon development to protect growth and fight poverty in Africa.

"The consequences of climate change for Africa are devastating and threaten to push millions of people into extreme poverty by 2030," said the bank's environment and natural resources practice manager Benoit Bosquet on the report's launch back in May. "This is largely due to lower crop yields, higher food prices and negative health impacts. In light of the huge financing gap and the need for urgent action, the World Bank prepared the Africa Climate Business Plan to fast-track Africa's climate adaptation needs to meet development priorities."

The report, Accelerating Climate-Resilient and Low-Carbon Development: The Africa Climate Business Plan, aims to speed up initiatives to ease problems that are becoming catastrophic. Current levels of funding for climate adaptation in Africa - estimated at around $3 billion – fall well short on what is needed, up to $100 billion if warming increases by four degrees centigrade.

Allied to climate resilience is energy and last year former secretary-general of the United Nations Kofi Annan helped produce a report called Power, People, Planet: Seizing Africa's Energy and Climate Opportunities. This aims to assist African countries in 'leapfrog' into new technologies without the need to go through a high-carbon phase.

Reports such as these may be new, but this is an old story. The Sahara, the Arabian peninsula and other parts of arid Africa haven't been green for thousands of years. What has changed is global warming, which is making climates more extreme. Regional rainfall is difficult to predict, but most models agree on an overall pattern: wet areas will get wetter and dry drier.

And it's a story that is likely to be retold with a growing sense of urgency at COP22 this November. The 22nd Conference of the Parties to the United Nations Framework Convention on Climate Change (UNFCCC) follows the 21st conference last December that resulted in the much talked about Paris Agreement on reducing greenhouse gas emissions.

The desert is a good place for both visionaries and mirages and time will tell if initiatives such as the Africa Climate Business Plan will bear fruit or wither in the dust.

Next November thousands of delegates will converge on Marrakech


Photo Credit: African Solar Designs

in Morocco to share information on emissions, national policies and good practices, of which Africa has abundant examples but is also in abundant need. The desert is a good place for both visionaries and mirages and time will tell if initiatives such as the Africa Climate Business Plan will bear fruit or wither in the dust.

Fast-tracking the Africa business plan will, according to the World Bank, need just over $16 billion in the next four years alone. And fast-tracking is crucial: where rain is scarce, the combined effects of the beating sun, hooves and seasonal farming can turn a green landscape to savage ochre in only a generation.

“These are real deserts that are being born today, under our eyes,” the French botanist André Aubréville warned in 1949, coining the term 'desertification.' “The desert always menaces.”

The World Bank has two goals, to end extreme poverty within a generation and boost shared prosperity, and is made up of five organisations. These include the International Bank for Reconstruction and Development, which lends to poorer governments, and the International Finance Corporation, the largest global development institution focused on the private sector. Ending extreme poverty in a generation is optimistic: droughts, floods and cyclones are destroying crops and communities and sinking millions of Africans into poverty.

Meanwhile, data suggests the correlation between climate and poverty will grow only stronger in future years. The World Bank is not the first institution to try to slow down poverty and hit problems. According to reports in September President Barack Obama’s flagship initiative for Africa, a $9.7 billion plan to double electricity access fell well short of its goals. It has so far produced less than 5% of the new power generation it promised.

Obama announced Power Africa three years ago, aiming to add 10,000 megawatts of power and to sup-

ply electricity to 20 million households within five years. But addressing a US and African business forum in New York recently, delegates heard how political and economic difficulties had resulted in the project yielding less than 400 megawatts of new power.

“If you look at the number of megawatts that are actually on the grid directly related to the Power Africa initiative, it is very little,”

General Electric Co vice chairman John Rice told the World Economic Forum in Kigali, Rwanda, back in May. “Power Africa is a well-intentioned effort, with a lot of smart people, a lot of willing participants, financial institutions and yet, for some reason, it hasn't come together.”

The Obama administration insists Power Africa was never expected to change the continent’s energy landscape overnight. Results will take years, says one of the initiative's coordinators Andrew Herscowitz: “You can’t just wave a magic wand and have all the infrastructure appear - it takes time to build things.” He says Power Africa is backing projects across the continent, showing the private sector is responding to US efforts.

A growing market for solar panels, for example, is cropping up in places like Rwanda and Sierra Leone, and companies have committed more than $40 billion to dozens of Power Africa projects.
Part of this growth in solar power is in response to plummeting cost of solar photovoltaic (PV) projects in Africa. Those costs have dropped by as much as over 60% in four years, leaving experts forecasting a boom in solar deployment over the coming decade.

The International Renewable Energy Agency (IRENA), for example, reckons installation costs for solar PV projects now average $1.30 per watt against a global average of $1.80 per watt. Solar systems can deliver power to off-grid households for as little as $56 a year.

“In recent years, solar PV costs have dropped dramati-

Chad National Adaptation Programme of Action (NAPA). Photo Credit: NAPA

Dijbouti Adaptation Programme. Photo Credit: UNDP

cally and will continue to do so with further declines of up to 59% possible in the next ten years," says IRENA director-general Adnan Amin.

"These cost reductions, coupled with vast solar potential on the continent, present a huge opportunity for Africa. Both grid-connected and off-grid solar PV now offer a cost-competitive means to meet rising energy needs and bring electricity to the 600 million Africans who currently lack access.

"Africa's solar potential is enormous, with solar irradiation levels up to 117% higher than in Germany - the country with the highest installed solar power capacity," says Amin. "It has never been more possible, and less expensive for Africa to realise this potential."

Amin spoke in the same week it emerged a proposed solar farm in Abu Dhabi was on track to claim the title of lowest cost energy project in the world, with a bid to deliver over 1.1 gigawatts of capacity at the cost of 2.30 cents per kilowatt hour.

It also follows news that renewable energy developer Mainstream Renewable Power's joint venture in Africa Lekela Power recently agreed with the US government's Overseas Private Investment Corporation (OPIC) a $250m package for a 158 megawatt wind farm in Taiba N'Diaye, Senegal.

Meanwhile Lekela Power recently started its Noupoort wind farm in South Africa, which is expected to generate around 304,800 megawatt hours clean renewable energy and eliminate approximately 300,000 tonnes of carbon emissions each year.

Initiatives such as these suggest Africa is not only aware of the need for, but grasping the potential of, alternative energy sources in fighting climate change. Knowledge, after all, is power. ONE

Climate change pledges not nearly enough to save tropical ecosystems

By JEREMY HANCE
MONGABAY.COM

The Paris Agreement marked the biggest political milestone to combat climate change since scientists first introduced us in the late 1980s to perhaps humanity's greatest existential crisis.

Last December, 178 nations pledged to do their part to keep global average temperatures from rising more than 2 degrees Celsius (3.6 degrees Fahrenheit) over preindustrial levels — adding on an even more challenging, but aspirational goal of holding temperatures at 1.5 degrees Celsius (2.7 degrees Fahrenheit).

To this end, each nation produced a pledge to cut it's own carbon emissions, targeting everything from the burning of fossil fuels to deforestation to agriculture.

It seems like a Herculean task, bound, the optimistic say, to bring positive results.

Yet, less than eight months later, a study in the journal Nature finds that those pledges are nowhere near as ambitious as they need to be to keep temperatures below 2 degrees Celsius, let alone 1.5 degrees. And in August, British scientists reported that this year's record El Niño has already pushed us perilously close to the 1.5 degree milestone.

Meanwhile, temperatures are not rising evenly around the planet, with the Arctic warming far faster than the tropics. That fact originally caused scientists to hypothesize that polar ecosystems would suffer more dire climate change impacts ahead of tropical habitats.

But over recent years, researchers began seeing that some tropical ecosystems are being decimated by climate change far faster than expected — think coral reefs — while many more habitats may be crippled over time — think mangroves, cloud forests and rainforests — if global human effort and political willpower don't surge quickly.

Toward a hotter world

Study leader, Joeri Rogelj, told Mongabay that he wasn't surprised by his findings showing that current national carbon reduction pledges would blast past the 2 degree target, leading to global warming of between 2.6 degrees Celsius and 3.1 degrees Celsius.

"The pledges currently on the table are a first step in a continuous process of pledging, reviewing, and taking stock to what they add up," said Rogelj, a Research Scholar at the Energy Program of the International Institute for Applied Systems Analysis (IIASA). "This process has been defined by the Paris Agreement, and nations are thus expected to review and adjust their pledges in light of the best science over the coming years."

The Paris Agreement was structured from the bottom up, whereby national pledges would be reviewed every 5 years (beginning in 2020) in order to make sure that carbon cut targets are boosted as time goes by. Still, Rogelj cautioned, if pledges aren't sufficiently ramped up – and followed through on – it will make achieving the 2 degrees Celsius goal "significantly more ambitious" after 2030.

While a temperature rise of 1.5 to 2 degrees Celsius, as opposed to 2.6 to 3.1 degrees Celsius, may not sound like much in numerical terms, many scientists have pinpointed the 2 degree target as the limit beyond which the world would face dangerous climate

change. Impacts would likely, many say, become catastrophic if temperatures are allowed to come anywhere near 3 degrees Celsius (5.4 degrees Fahrenheit). Yet, for some ecosystems a 2 degree C rise in temperature is already going to be a catastrophe. Tropical ecosystems, just like Arctic ecosystems, appear to be particularly vulnerable because species there have evolved within very specific and often narrow temperature ranges. As many species face escalating temperatures, they may simply not survive.

And temperature rise isn't the only global warming impact to consider: extreme weather, ocean acidification, and sea level rise are all effects that are currently, and will continue to be, felt across the tropics.

Coral reef-mageddon

"We're kidding ourselves that a 2 degree Celsius global increase will be safe for coral reefs and for the people who depend on them, given the damage we're already seeing," Terry Hughes bluntly stated in a Mongabay interview.

"Most reefs have already bleached three or more times in less than 20 years," explained Hughes, who is the Director of the Australian Research Council (ARC) Centre of Excellence for Coral Reef Studies.

He points to his own country's global warming-catastrophe: the Great Barrier Reef. Super-warm waters this year led to around half of the coral in the northern section of the Great Barrier Reef dying off. In some places, nothing is left but white coral ghosts. These massive changes came far earlier than were forecast by climate models.

Tropical corals — tiny animals that build up reefs over time out of the exoskeletons of their ancestors — live in a complex, symbiotic relationship by trading nutrients with single celled algae called zooxanthellae. It's these zooxanthellae that lend corals their splendid bright colors along with the bulk of their energy.

But when coral reef water temperatures get too high, the coral expels the zooxanthellae and the symbiotic partnership, at least for a while, is shattered. This is called coral bleaching and it doesn't mean the coral is dead – yet. But it is starving. Corals can recover from such bleaching events, but not if they occur too often or if the waters simply become too hot for the zooxanthellae to return. If that happens, a tipping point is reached where the coral will starve for energy and the whole reef is at risk of dying and being taken over by seaweed — setting up a new, less biodiverse marine ecosystem. "This is the third global bleaching event since the first one in 1998, triggered by a rise in average global temperature of just one [degree] Celsius," Hughes noted darkly.

What's happened on the Great Barrier Reef due to a 1 degree Celsius rise is almost beyond comprehension — a 2 degree Celsius increase and the world's biggest coral reef and one of the globe's greatest ecosystems may be eradicated — something that could happen within a few decades. While nearly 50 percent of the northern Great Barrier Reef was lost this year, the southern portion was also damaged. In all, around 90 percent of the entire ecosystem was hit by this current bleaching — an event linked to high El Niño temperatures supercharged by climate change.

The Great Barrier Reef is not alone: what happened there is just a part of a vast global bleaching event that began in 2014 (the longest yet recorded) which is striking many of the world's reefs with similar devastation. The full impact will likely not be known for months, if not years.

This mass-bleaching event, combined with recent ones, raises a serious question: can coral reefs survive any further climate change? Or have they already hit their survival threshold? Jan Lough weighs in, asserting that the "only acceptable level" for coral reefs is the Paris aspirational goal of 1.5 degree Celsius. But this is a goal some scientists believe we have already passed, or inevitably will pass shortly — there already being too much heat in the climate system to avert this temperature increase. Add to this the fact that even if global carbon emissions begin to fall soon, it's extremely unlikely they will fall fast enough to con-

serve the bulk of the planet's coral reefs. Lough said that even if the improbable 1.5 degree Celsius goal were achieved, some coral reefs are "likely to change in terms of community composition, as resilient species survive, and vulnerable species are lost, with future bleaching events." This will make surviving reefs "much simpler ecosystems."

And science tells us that simpler ecosystems tend to be less robust and more vulnerable to stressors. Among those escalating stressors: ocean acidification — caused when high levels of atmospheric carbon are absorbed by the oceans. Acidification at high levels could eventually cause corals and shellfish to melt away into the seawater.

Tropical coral reefs are arguably the ocean's most important ecosystem. They are by far the most biodiverse marine habitat: although they cover just one percent of the ocean's surface, it's estimated they may house a staggering 25 percent of the world's marine species at some point in their lifecycles. That is bad news for human beings too: coral reefs are vital to many of the world's fisheries and provide food and work to hundreds of millions of people.

"Tragically, we're losing corals from the most remote, most pristine places where there are no other human pressures," said Hughes. "We simply have to reduce emissions if we want our children to see reefs for themselves."

"Shocking" mangrove die off

There is some good news on the climate change front regarding tropical coral reefs. Last year, scientists reported finding a reef-building refuge for corals — they hide from high temperatures and acidification extremes by growing in the shade of mangrove tree roots. But now, the bad news: other scientists have found that mangrove forests are being seriously impacted by global warming and sea level rise.

Norman Duke, an expert on mangroves with James Cook University, suffered a terrible shock in June when he flew a helicopter over northern Australia's Gulf of Carpentaria to witness a reported mass die off of mangrove forests in an otherwise remote and healthy region.

"I have not seen such imagery anywhere before," he told the Australian Broadcasting Corporation (ABC). "I work in many places around the world, and I look at damaged mangroves as part of my work all the time. These are the most shocking images of dieback I've ever seen."

Duke estimated that this mass mangrove death covered some 7,000-10,000 hectares (17,297-24,710 acres). Looking at past satellite images, he was able to confirm that the mangroves only died during the past year. He believes super-hot temperatures, combined with a lost rainy season are responsible. The mangroves simply couldn't stand up against the one-two punch of extreme drought combined with climate change.

Duke now believes the Gulf of Carpentaria mangrove ecosystem could change over time into saltmarsh and saltpans. "Where rainfall is higher, then these wetlands are dominated by mangroves, and where rainfalls are low, then these same wetlands are dominated by saltmarsh and saltpans," he explained. This year's die off, emphasized Duke, was "an extreme response instead of the previously observed gradual shift in the zonal ecotones." Climate change is popularly presented in the media as unfolding slowly over decades, with a gradual shift in temperature and precipitation regimes. But the reality we are seeing in the tropics and elsewhere is sometimes quite different, with some years (such as 2015-16) bringing sudden, abrupt temperature increases accompanied by drastic shifts in rainfall levels around the globe.

In the same way that coral reefs in a warmer world could be suddenly forced past a tipping point into a new type of ecosystem dominated by seaweed, mangrove forests could shift to become less-biodiverse and less productive saltmarsh, saltpan, or other type of ecosystem. The climate change double punch of increased heat and drought could even prove to be a quadruple punch: mangroves are also threatened by rising sea levels and by extreme weather events, such as global warming-induced super-storms.

Mangroves already represent some of the best buffers against intensifying extreme weather along coasts worldwide, but battering by too many severe storms can take its toll and weaken mangroves already struggling against rising temperatures and more erratic rains. Studies have shown that warmer seas are breeding more intense hurricanes, a reality that will escalate as global atmospheric and ocean temperatures climb.

Sea levels will also continue rising — due to both the expansion of ocean water as it is heated, and the melting of land-based glaciers. As that happens, marine waters will swamp many mangrove forests, eventually likely killing them. One ray of hope for mangrove forests: rising sea levels may allow this ecosystem to move inland, taking over freshwater marshes as they become inundated by salt water — but such a takeover depends on many factors. The potential for mangrove expansion also doesn't take into account the rapid degradation and clear cutting of mangrove forests to make way for fish and shrimp aquaculture operations to feed the globe's rapidly rising human population.

Burning rainforest

Predicting the impact of climate change on rainforests is difficult, but scientists expect some major shifts and potential shocks. One way in which climate change is expected to hit rainforests is by changing rainfall levels, likely increasing the length and intensity of droughts and thereby increasing the risk of wildfires. Massive drought and huge wildfires that were once rare to non-existent in tropical forests are becoming more common in places like the Amazon and Indonesia. (Though it is important to point out that these gigantic fires are often stoked or directly caused by careless deforestation and agroindustry policies. In Indonesia, for example, it's been customary for locals to clear land through burning.)

But continuing drought this year, NASA warns, has left the Amazon drier than any year since 2002. Doug Morton, an Earth scientist at NASA's Goddard Space Flight Center, said in a press release that the regional drought has "set the stage for extreme fire risk in 2016 across the southern Amazon."

The risk of fire from July to October exceeds levels seen in both 2005 and 2010 when vast areas of the Amazon rainforest burned. Intensified droughts and wildfires certainly harm wildlife and plant life in the tropics where species haven't adapted to fire as in temperate forests.. Such events also have another impact: they worsen climate change.

Last year's Indonesian wildfires, for example, released more carbon than the entire US economy over the time period the country was burning. In the Amazon, extreme drought in 2010 impeded tree growth and increased tree death, shutting down the Amazon's vast and vital carbon sink, temporarily preventing carbon storage across the region. And of course, the shutdown of tropical forest carbon sinks could mean more carbon in the atmosphere, worsening in turn the global warming impacts on rainforests. Still, Lucy Rowland, a University of Exeter post-doctoral research fellow, said the future impacts of global warming on rainforests remain "very hard to predict."

"We can say that rising temperatures, particularly accompanied by drought, are likely to limit rainforest atmospheric carbon uptake and most likely lead to tree mortality." But part of what makes forecasts difficult, according to Rowland, is that warmer temperatures and drought in rainforests are also offset in part by increased levels of photosynthesis fueled by rising CO2 levels. Unfortunately, non-plant species will receive no such compensation. A recent study in Scientific Reports found that even with a warming of only 2 degrees Celsius, some animal populations (as well as many human populations) may have to move as much as 1,000 kilometers (621 miles) over less than a century in order to stay within their current temperature regime. And of course, the specific trees, shrubs, or flowering plants which those animals associate with, and rely on for food and other needs, must likewise somehow move along with them. If they don't move, the authors of the paper write, "they will simply bear the cost of elevated environmental temperatures."

Those species unable to move or adapt will go extinct.

Monteverde Cloud Forest

Cloud forests marching too slowly

While scientific uncertainties make climate change effects on rainforest ecosystems hard to predict, the impacts on tropical cloud forests are more straightforward. In fact, "cloud forests are among the most vulnerable terrestrial ecosystems to climate change," according to one Nature study.

Like rainforests, cloud forests thrive in a very particular temperature range and require a significant amount of moisture. But cloud forests are also found in high mountains; they crown summits at very specific altitudes in great luminescent rings of green, and require almost constant cloud cover — hence their names — to survive. Scientists predict that as the world warms, cloud forest plant and animal species will be forced to migrate upslope to stay within safe, livable temperature ranges. Indeed, researchers have already documented cloud forest plants attempting to move upward. But already scientists are finding that although some plants are migrating toward mountain summits, they are not doing so fast enough to keep up with rapidly rising temperatures. And those migrating forests could hit roadblocks.

A 2013 study presented in PLOS ONE found that cloud forests in Peru were finding it difficult to move into the habitat occupied by the puna grasslands above them. The researchers don't know why this is the case, but it may spell doom for many of the plant and animal species in this region unless humans intervene and provide assistance. Many cloud forests will also run into human-dominated landscapes, such as livestock pasture or montane agriculture as they try and move upslope.

Also, as temperatures climb up the mountain, that will open the door for the large scale movement of lowland species upward, potentially resulting in conflicts with upland species. In Costa Rica, one researcher reports that 25 lowland bat species have already moved up into the famed Monteverde Cloud Forest. Climate change may also shift cloud cover and life giving rains away from tropical cloud forests. Without clouds, cloud forests and the unique wildlife and plants they support are unlikely to persist.

The Monteverde cloud forest is already seeing such drying out. If global temperatures rise unabated, cloud forests will eventually be forced to retreat higher and higher up mountain slopes, until upon reaching the very peaks, they simply have no place to go. With no escape route to cooler climes, submerged in heat, cloud forest species would be obliterated.

Norman Duke said it's important to remember that none of these climatic changes and impacts are strictly linear. "While there may be a longer term trend upwards, sea level doesn't just rise steadily, it also goes up and down. This applies to most of the [climate change] factors, including temperature." But as temperatures rise, there is no question that impacts will follow suit. "The greater the rise in temperature the worse the consequences," noted Duke.

The potential for mass extinction

Mark Urban, with the University of Connecticut, in a study last year looked at extinction risks for species linked to climate change. To get the best estimate possible, Urban analyzed findings from 131 studies. He found that currently 2.8 percent of species face extinction due to climate change — this with a warming of around 0.9 degrees Celsius.

If that warming jumps to the Paris pledged 2 degrees, extinction rates could rise to 5.2 percent of all species on the planet. And if we hit 3.1 degrees Celsius this century, as projected by Joeri Rogelj's study, which totaled up the current Paris pledges and the maximum temperature rise they could bring? Then we could lose 9 percent of the world's species due to

global warming. That's nearly one-in-ten species facing extinction from climate change — and of course that doesn't figure in extinction from other human induced threats like habitat degradation and destruction, deforestation, pollution, overharvesting, poaching, invasive species, or a lethal combination of any two or more of these combined with climate change.

It's also important to realize that climate change impacts, including extinctions, won't suddenly just cease in 2100. Without action they will continue apace into the next century. "With every increase in the global temperature, extinction risks do not just increase, they accelerate," Urban explained. "Therefore, even going a bit beyond the current 2 degree Celsius limit greatly enhances the risk to the Earth's biodiversity."

That's why "nations have to start implementing their [Paris] pledges without delay." said Rogelj. He added that he hoped studies like his "help countries to increase the ambition of their pledges, even before 2020." That's the year when countries must come up with their second round of pledges.

Raising the stakes, avoiding the endgame

But cutting emissions is only part of the answer. Warming is already occurring and will keep occurring due to the climate forcing already introduced into the climate system. And ecosystems are already suffering its impacts, as are many human populations. As a result, William Laurance, a rainforest ecologist with James Cook University, asserts that conservationists should also turn to an old, but tried, tool to combat climate change: protected areas.

"In terms of [climate] mitigation measures, the best strategies are to conserve large, topographically and climatically complex, and interconnected protected areas," he said. "This will give species the best chance to move or find refugia during extreme climatic events."

Those large core areas could be linked by wide wild corridors that allow for mass animal and plant migrations to adjust for climate change.

For species and ecosystems in dire straits, humans will have to decide whether or not to intervene. Should we pick up and move species to help them remain in the right climate? Should we bring especially climate-sensitive species into captivity to create insurance populations — captive refugia — against extinction? Could some ecosystems only survive in manmade climate-controlled facilities, with hopes that one day the world could be rewilded?

At the same time, Laurance said, conservationists can't ignore other threats "such as poaching, illegal fires, and habitat fragmentation" that could wipe out species already struggling in a warming world. In addition rapid research and response scientific teams may be needed to respond to climate change induced ecosystem emergencies already impacting endangered species and biodiversity hotspots.

Paris was a first step. But it was a late step — the world has already warmed 0.9 degrees Celsius. Now countries must struggle to achieve individual carbon cut pledges that will add up to meet the overall goal. Then in 2020 — or preferably before — they will need to step up and redouble their efforts to meet new more stringent goals. This was always the plan, but it won't be easy.

However, coral reefs and cloud forests haven't the time to wait. And nature does not negotiate. Nor does the 2 degree Celsius goal set in Paris offer any real assurance to the survival of many tropical ecosystems and species.

"I remain optimistic that we can still limit warming," said Urban. "But even if we manage to meet [the Paris] targets, we still have the challenge of keeping natural and human systems intact for a long and protracted heat age as a result of centuries of emissions."

Originally published by Mongabay.com August 16, 2016

Cape Denison, East Antarctica

Just One Degree

By LENORE M. HITCHLER

ONE

Colder springs and summers. Excessive rainfall. Late spring and early frosts. Years without summers. Crop failures. Starvation. Increased Poverty. Pestilence and Plagues. Mass Death. Fear. Disorder. Turmoil. Scapegoats. Witch trials. These related calamities appeared sporadically throughout the period known as the Little Ice Age.

The Little Ice Age, from approximately 1300 to 1850 A. D., was a time of extremely erratic and unpredictable climate change. Weather would be normal for a time, then the spring and summer would fail to become warm enough, or there might be too much rainfall. Crops would fail, and famine and pestilence might ensue. After a period of death and chaos, the milder weather would return. It is reasonable to assert that humanity did not adapt because there were never any permanent climatic conditions. The result was that pain and suffering periodically afflicted much of the planet. Although this climate change led to death and destruction in many regions of the globe, we will focus here on its effects specifically on Europe.

Even though the average temperature did not radically change, Europe suffered greatly. Dr. Henry Diaz, a climatologist at the National Oceanic and Atmospheric Administration, stated that the temperature during the Little Ice Age was not that much colder than today's climate. Nevertheless, there were

disastrous consequences. He wrote that "It looks like about 1 degree, maybe as much as 1.5 degrees Celsius [about 2 to 3 degrees Fahrenheit] colder than modern. It doesn't appear to be a large number, but the growing seasons were shortened, spring was slower in coming, fall was earlier in arriving, summer had things like lots of hail. ... It was pretty bad."

Europeans needed an explanation for the appalling things that were happening. They found an answer when Pope Innocent VIII issued a Papal Bull in 1484 blaming witchcraft for bad weather. Two friars authored the Malleus Maleficarum, (The Witches Hammer) which was published in 1486. The book included the Papal Bull, and it provided the guidelines for the prosecution of witchcraft. Historian Wolfgang Behringer wrote that "the Malleus Maleficarum unquestionably impuned to witches the ability to affect weather-magic." Behringer also stated that "Contemporary court records and broadsheets tell about the importance of meteorological events as triggering factors in the background of the persecutions in these areas. ... court records dwell upon disease and the deaths of children and cattle and the destruction of crops and vineyards. Chroniclers relate these individual misfortunes to more general meteorological developments."

Various historians corroborate Behringer's findings. For instance, Christian Pfister wrote that "peaks of persecution coincided with the critical points of climatic deterioration." Emily Oster studied the relationship between witchcraft trials and weather and found that various kinds of data demonstrate more than a coincidental relationship between the two.

Oster stated that an increase in witchcraft trials around the year 1560 coincided with one of the largest drops in temperature of the Little Ice Age. Pfister amplified Oster's assertion by pointing out that a significant rise in witchcraft executions increased with extra cold weather which occurred after 1565. Behringer made a similar observation and wrote that in 1570, after two years of "catastrophic coldness," there was another wave of witchcraft persecution.

Just as the 1500s saw both cold weather and witchcraft prosecutions, these phenomena continued throughout the 1600s, and this time, period included some of the worst weather of the Little Ice Age. Historian Geoffrey Parker stated that some of the coldest weather recorded in over a millennium occurred during the 1600s. It is estimated that one-third of the population perished.

Behringer indicated that the years 1621-1630 sustained cold winters, late springs, and cold, wet weather in the summer and autumn. He noted that in 1628 witchcraft persecutions reached their peak. Pfister corroborated Behringer's information by stating that harsh weather dominated the years between 1618 and 1630 and this was followed by larger numbers of executions.

According to Parker, "in southern Germany, a hailstorm in May 1626 followed by Arctic temperatures led to the arrest, torture and execution of 900 men and women suspected of producing the calamity through witchcraft." He further stated that "Two decades later, the Scottish Parliament likewise blamed a winter of heavy snow and rain followed by a cereal harvest of 'small bulke' on 'the sin of witchcraft [which] daily increases in this land'; and, to avert more divine displeasure, it authorized more executions for sorcery than at any other time in the country's history."

Thus, a change of merely one degree Celsius resulted in devastation during the Little Ice Age. A huge portion of the population died from starvation and disease, and society was wracked by social upheaval.

Different ages? Sure. But it does not seem unreasonable to assume that a one degree Celsius rise in temperature could still put large areas of the planet at risk for the dire consequences of climate change. Some of these ramifications might include crop failures, starvation, additional poverty, increased physical and mental illness, and massive social conflict including civil war and international warfare. ONE

Welcome to Greenindia

By ALICE MASILI

ONE

In medio stat virtus. Sure, when we look at the BRICS, virtue stands in the middle. The "I" of India has gradually increased its profile, despite being sandwiched in between the other so-called emerging economies of Brazil, Russia, China and South Africa. There is something new going on there.

India, given its geopolitical position and its demographic growth potential, is destined to become a major artery of the economic and social growth of the Asian region. The permanence of Delhi among the largest in the world depends on its ability to continue to stimulate growth and economic development. In this scenario, the energy policy assumes strategic importance: the energy is, in fact, an enormous driving force for the national economy as it supports its expansion and is configured as an indispensable asset on which the success of Indian development is projected.

The link between energy policy, foreign policy and security is resulting more and more evident as the capacity of state actors to exercise its authority on the global stage is influenced by one's ability to be energy independent from other countries.

The Indian Prime Minister Narendra Modi has chosen a policy of vigorous development of photovoltaic and renewable, to meet the great demand for energy in their country and to reduce the continually increasing pollution.

This means that India is seen as a propitious land to develop and invest in renewable energy. India, in fact, has the fifth world's largest power generation portfolio with a power generation capacity of 271.722 GW. India is the first country in the world to set up a ministry of non-conventional energy resources, the Ministry of New and Renewable Energy (MNRE). Its focus is to develop and deploy new and renewable energy for supplementing the energy requirements of the country.

Nevertheless, India cannot renounce burning coal and, during the COP21, it was among some countries that claimed the right to grow, pointing the finger at the rich nations that must take more responsibility in the fight against climate change.

Under National Wind Resource Assessment Programme, Ministry installed and monitored 794 dedicated Wind Monitoring Stations. The National Programme includes wind resource assessment activities, research and development support, and policy support.

The Ministry has given out guidelines for wind power development to bring a balanced growth of the sector and regulate preparation of detailed project reports, micro-siting, selection of wind turbine equipment, operation and maintenance, performance evaluation, etc.

The ministry has also introduced fiscal and financial incentives as accelerate depreciation, concessional custom duty on specified items, excise duty exemption, sales tax exemption, income tax exemption for 10 years, etc. In addition, State Electricity Regulatory Commissions (SERCs) are determining preferential tariff.

Wind energy is the largest renewable energy source

India is seen as a propitious land to develop and invest in renewable energy.

in India with a contribution of 63 % of the renewable power. The installed capacity of wind power is about 27,000,00 MW, mainly spread across Tamil Nadu, Maharashtra, Gujarat, Rajasthan, Karnataka, Andhra Pradesh and Madhya Pradesh.

Demonstration projects will be taken up only in those states where commercial wind power projects have not yet been started. Wind Electric Generators are made in the country by manufacturers, through joint ventures under licensed production, subsidiaries of foreign companies, under licensed production and Indian companies with their own technology.

India is not only a windy land but is also densely populated and benefits of a high solar insolation, an ideal combination to exploit solar power.

Indeed, the country offers unlimited growth potential for the solar PV industry that now contributes for 16 %. The Indian Solar Loan Programme, supported by the United Nations Environment Programme has won the prestigious Energy Globe World Award for Sustainability for helping to establish a consumer financing program for solar home power systems.

Over the span of three years more than 16,000 solar home systems have been financed, particularly in rural areas of South India where the electricity grid does not yet extend to.

In 2009, the Government of India proposed to launch its Jawaharlal Nehru National Solar Mission under the National Action Plan on Climate Change with plans to generate 1,000 MW of power by 2013 and up to 20,000 MW of solar power by 2022, creating a positive environment among investors keen to tap into India's potential.

By 2020 the Mission aims to achieve grid parity - electricity provided at the same cost and quality as that one delivered on the grid.

Near the city of Challakere, 150 km north of Bangalore a solar concentration test photovoltaic system has developed. To protect solar panels and isolate them from high temperatures and humidity that cause deterioration to the adhesive substances that hold together more modules, polymers are being studied.

Dust is also a big problem. But not as big as the monkeys. These funny primates lick the morning dew on the solar panels and gnaw photovoltaic cables. At the moment no solution has been found for the second problem.

In Kerala, Southern India, we also find the first airport in the world operating entirely on solar energy - the Cochin International Airport Limited (CIAL). A 100kWp rooftop PV system installed in 2013, but the latest addition brings its solar energy capacity up to 12 megawatts (MW) of power per day, a sufficient amount to run all of the airport's daily functions.

The system is grid-connected without battery storage, with a power banking module established with the Kerala State Electricity Board allowing the airport to feed into the grid as much power as it produces during the day and to buy back power when required.

The airport no longer pays for electricity. It is expected to offset carbon emissions by more than 3 lakh (300,000) metric tons over the next 25 years, the equivalent of planting three million trees or not driving for 750 miles, according to the airport.

During a recent visit to the airport, Piyush Goyal, India's of State with Independent Charge for Power, Coal and New & Renewable Energy and Mines, highlighted that Cochin's solar initiative is the demonstration on how large-scale transport infrastructure can be powered, and said that Cochin-model solar energy generation facilities could be installed in all Indian railway stations and airports.

Recently, the Ministry of Shipping announced the intention to deploy more than 160 MW of renewable energy capacity at 16 major ports across the country by 2017. Solar arrays with a combined capacity of 6.94 MW have already been completed, and almost all of that capacity is located at the Vishakhapatnam port. Other ports with completed solar installations include Kolkata Port, New Manglore Port, VO Chidambaranar Port and Mumbai Port.

Hydropower is a further source of clean energy in India. In fact, India is the 7th largest producer of hydroelectric power and ranks 5th in terms of exploi-

Punatsangchu hydropower project-Wangdue (Photo credit: Dawa Gyelmo)

table hydro-potential on a global scale. In addition to the 45 GW of installed capacity, an additional 14 GW are under construction. Hydropower in Darjeeling and Shivanasamudra stations were built and put into service in 1898 and 1902, respectively, and were among the first in Asia.

India has been the dominant player in the global development of hydropower. Also, 56 sites have been identified for pumped storage schemes with a total installed capacity of 94,000 MW. The potential of hydropower in Central India is part of the Godavari, Mahanadi, Nagavali, Vamsadhara and Narmada river basins has not yet been developed on a larger scale because of the potential opposition by the tribal population.

Despite the technical problems and public opposition, hydropower can bring multiple benefits as a flexible source of clean electricity and means of water management for flood control, irrigation and domestic use.

Bioenergy accounts for about a quarter of India's energy consumption. Mostly used in the form of biomass for cooking in households, it is linked to several problems, such as especially indoor air pollution and the consequent negative effects on health. India has also developed and implemented other modern bio-energy applications, based on the reuse of waste in the agricultural sector. A part of bioenergy is produced via a range of gasification technologies using biomass for the production of synthesis gas (syngas).

Although modern bioenergy is only a small share of energy consumption at present, Indian policy makers has recognized - with the launch of a national mission Bioenergy - the current bioenergy potential to become a much larger part of the energy picture, especially in areas rural, where it can provide both a valuable source of income for farmers, and power and process heat for consumers.

MNRE renewable electricity targets provide the increase from just under 43 GW in April 2016 to 175 GW by the year 2022, including 100 GW of solar power, 60 GW of wind power, 10 GW from bio power and 5 GW of small hydro power.

Such ambitious targets would see India quickly becoming one of the top world leader green energy producers, surpassing numerous developed coun-

India is the third largest greenhouse gas emitter in the world, with over 300 million people still without electricity.

tries, and place it at the centre of its International Solar Alliance project promoting the growth and development of solar power internationally to over 121 countries.

These same targets are likely to stumble upon some very real difficulties. Challenges related to solar energy collection outages have been highlighted for about two hours a day and been stressed by different operators. Besides that, the collapse of the solar energy prices in recent auctions has made photovoltaic projects less convenient.

But India is the third largest greenhouse gas emitter in the world, it is heavily dependent on coal, with over 300 million people who still live without electricity, and many millions more who can use it only in part, it is in urgent need of energy.

In a context such as the Asian one, marked by the scarcity of hydrocarbons reserves and the growing competition of China, India's energy security cannot only depend on internal dynamics but, above all, on the ability to establish relations with foreign countries.

India is the fourth largest importer of oil and the 15th largest importer of petroleum products and liquefied natural gas (LNG) globally. The government intends to increase the use of indigenous renewable resources to reduce India's dependence on expensive imported fossil fuels of 40 % by 2030.

India has rescheduled its second renewable energy global investors' summit on 15-17 February 2017. The Summit is an invitation to projects developers, investors, manufacturers and other stakeholders by the Indian government.

Some of the largest renewable energy developers from around the world made commitments to set up renewable energy capacity in India. SunEdison, SkyPower Global, Sindicatum Carbon, Trina Solar, First Solar, Yingli Solar and SolarReserve were among the international companies that made commitments to set up large-scale solar and wind energy projects in India.

Thanks to its politic and expansion plans of renewable energy, India has attracted financial investors like the Finnish Wärtsilä Corp. that have decided to look for opportunities in the country's renewable energy capacity expansion programme.

Wärtsilä is interested in supplying know-how and services for balancing and stabilising the grid, which requires massive amounts of renewable energy and is entirely dependent on vagaries of nature such as sunshine and wind availability.

India's renewable energy passes through ABB equipment. On first of September ABB India inaugurated a new solar inverter manufacturing facility in the city (Bengaluru) to double its output capacity.

Tata Group is also interested in becoming one of the largest renewable energy players with a clean energy portfolio spanning wind, solar, hydro and thermal of 1996 MW, which now equates to around 21% of its total generation capacity.

Tata has just commissioned its 44 MW Lahori wind farm in Madhy Pradesh together its subsidiary, Tata Power Renewable Energy Limited (TPREL).

Development of renewable energy, however, is clashing with the tensions in the management of the electrical network, and the discrepancies with the production cycles (that the continuous production of conventional sources does not suffer). With the risk that the ambitious objectives of India in the field of sustainable energy should be resized.

Despite real difficulties of energy harvesting, through the national grid, and the tortuous road to the future of the Renewable program, India's growth is aligned with the country's larger vision of clean energy and efficiency and smart cities with reliable power.

In April 2016, India's cumulative grid-interactive or grid-tied renewable energy capacity (excluding large hydro) reached about 42.85 GW, surpassing the installed capacity of large-scale hydroelectric power for the first time in Indian history. ONE

Is there a way back for CCS in the UK?

By TOBY LOCKWOOD
ONE

The development of carbon capture and storage (CCS) suffered a surprise blow last November when the United Kingdom's widely admired 'CCS Commercialisation Competition' was quietly cancelled by the government, just a couple of months before the winning project was to be decided. Already used to store CO2 emissions in underground rock formations at a handful of sites worldwide, the technology offers the potential to decarbonise fossil fuels, but has mostly relied on state grants to get going.

The UK scheme was to offer up to £1 billion to one or both of two finalist CCS projects: Shell and SSE's conversion of an existing gas-fired plant at Peterhead in Scotland, and White Rose – a new coal plant to be built in northern England by a consortium including GE and BOC. Despite this huge setback for the emerging industry, last month provided two interesting new perspectives on both the past and possible future for CCS in the UK and elsewhere.

A meeting in London brought the companies behind the two failed bids together to discuss the challenges and successes in taking their projects to the final hurdle, shortly followed by the release of Lord Oxburgh's report to the government on the future role CCS should play in the country's plans for decarbonisation.

Both the meeting and the report emphasised the fact that the principal challenges facing CCS are not technical, but relate to the considerable regulatory and financial barriers associated with what is a capital intensive and complex process. CO2 must first be separated from the power plant emissions, then transported down a pipeline and injected into offshore wells in the North Sea. Although future carbon capture projects should be able to simply plug into an existing pipeline and reservoir infrastructure, these first projects have the difficult task of developing the entire process chain – requiring huge amounts of investment and carrying considerable risk.

Aside from the small but potentially very costly risk of escaping CO2, issues surround the likely need for several different industry players to operate each stage of the chain, usually involving power companies at the plant side and oil and gas industry companies dealing with the gas itself. This interdependency introduces a 'cross-chain' risk associated with the possibility of one member of the chain defaulting on their obligations to the rest, which the White Rose project found particularly difficult to manage and insure against.

Shell's involvement in the Peterhead project managed to circumvent these issues, as the petroleum giant had the will, expertise, and financial means to manage the whole chain alone. However, any future model for a CCS industry is much more likely to follow the White Rose example, in which separate companies will exchange the CO2 in financial transactions.

These sort of unknown risks make debt lenders uncomfortable and ultimately add to the cost of financing such projects. On top of this, another unique

Melkøya-Snøhvit remains a fantasy for the UK. Photo: Øyvind Hagen Statoil

expense faced by these 'first-time' projects was their obligation to the government to build oversized transport and storage infrastructure which could later be shared by other CO2 emitters in the area, adding £110m to the bill for White Rose.

As a consequence, both projects were set to require generous subsidies from the government in the form of the 'Contracts for Difference' which are used to guarantee high power prices to low carbon emitters. Although never publicly declared, these would probably have needed to be over £150/MWh, or somewhat higher than contracts offered to new offshore wind farms. Given the heated recent debate in the UK over subsidising a new nuclear plant (Hinkley Point C) to the tune of a mere £92.50/MWh, these costs may have been what led to the government's last minute move to axe the competition.

However, both projects maintain that any follow on CCS plant, not faced with these initial challenges, could offer a much more competitive rate below £100/MWh. Does there need to be a complete rethink of how this industry is set up in order to skip the costly and politically unpopular first steps? This was the firm conclusion of Lord Oxburgh's report, which advocates a fairly old idea in the CCS community of setting up a state-owned enterprise with the task of delivering the necessary infrastructure. This would be split into a power generation entity and a CO2 transport and storage entity, with the government taking on the cross-chain and CO2 storage risks which are initially too difficult for most private sector players to bear.

The relatively modest sum of £200-300m was estimated to be sufficient government funding to get such a venture of the ground. At first glance a radical idea for the highly liberalised UK energy market, the report argues that many other large infrastructure projects, such as the London 2012 Olympics and rail links, have received similar government backing, and even large energy projects such as the ever-growing fleet of offshore wind turbines are backed by the majority state-owned enterprises of other nations. In any case, the ultimate goal would be for the new company to be privatised, in much the same way as happened with the country's electricity and gas transmission networks. From the beginning, private sector technology providers would play a role in developing each part of the process, but would be free to concentrate on their area of expertise – free from worry about the rest of the business chain.

This approach is intended to cement three factors seen as key to guaranteeing the lowest possible price for a first CCS plant: maximising private sector competition, setting out a clear risk and regulatory structure, and maximising economies of scale by building large plants and infrastructure from the start. The power plants would be pay a separate CO2 company to take their emissions, and be compensated by power price subsidies similar to the existing contracts for difference. A system of tradeable CO2 certificates would be introduced to attest that the greenhouse gas had actually been permanently removed from the atmosphere, whether underground or by conversion to other products.

Such is its confidence in this 'least-cost' strategy, the report concludes that an energy price figure of around £85/MWh, once projected to be obtainable by projects in 2030, should be immediately possible for a first generation of power plants. Given that this figure was partly intended to take into account the kind of technological improvements that can only be made with experience of large-scale CCS, this estimate may be ambitious, but is not far off the rates thought readily achievable by the two cancelled projects.

Many regard CCS in the power industry as merely a first step towards the real target of decarbonising the equally great CO2 emissions from industrial processes such as cement, steel, and chemical manufacture, for which no other low carbon solutions are available.

While the CO2 is often easier to capture, these processes are seen as too challenging for a first wave of projects, as there is currently no financial mechanism to reward industry for imposing such extra costs and

IEA CLEAN COAL CENTRE

SOTACARBO
SUSTAINABLE ENERGY RESEARCH CENTRE

The eighth international conference on Clean Coal Technologies

CCT 2017
8-12 May
Cagliari

For its 8th edition, CCT2017 returns to Cagliari on the beautiful Italian island of Sardinia. In the 14 years since its inception, the CCT series has established itself as a leading forum for showcasing state-of-the-art coal research, with the previous event assembling 200 delegates from 30 different countries. A comprehensive scope and a diverse mix of industry, academic, and government representatives make this event an ideal opportunity for networking within the international coal community.

CCT2017 will be held in the congress centre of Cagliari's exclusive T Hotel, where three days of technical sessions and keynotes will cover the research, demonstration, and deployment of clean coal technologies and related areas including:

- High efficiency, low emissions plant
- Developments in carbon capture
- SOx, NOx, mercury, and particulate controls
- Low rank coal utilisation
- Highly flexible power plant
- Gasification, IGCC and IGFC
- Coal-bed methane
- Underground coal gasification
- High-temperature materials
- Advanced power cycles
- Coal to chemicals
- Efficiency upgrading technologies
- Fluidised bed combustion
- Biomass cofiring and co-gasification
- Coal beneficiation and blending
- Policy and financing
- Social acceptance

Successful conference papers will be published in a special issue of the journal *Fuel*.

Abstracts should be submitted before 15 December 2016 – please visit the event website to submit your abstract or sign up for updates.

WWW.CCT2017.ORG

The hidden virtues of environmental taxes

By EUSEBIO LORIA
ONE

Economic instruments for pollution control and natural resource management are an increasingly important part of environmental policies in the EU Member States. The range of tools available includes environmental taxes, fees and charges, tradable permits, deposit-refund systems and subsidies.
Eurostat defines the green tax as "a tax whose tax base is a physical unit of something that has a proven, specific negative impact on the environment, and which is identified in the European System of Integrated Economic Accounts (ESA) as a tax" (Environmental taxes: Statistical Guide, 2013).

Environmental taxation is often considered an effective instrument to achieve sustainability in the economy. It is imposed on environmental pollutants or on goods whose use produces pollutants and is meant to reduce their negative impact on the environment, providing incentives to polluters to reduce emissions and search for cleaner and sustainable alternatives.
The European Environmental Agency (EEA) billed the Environmental Tax Reform (ETR) in Europe "a reform of the national tax system where there is a shift of the burden of taxes, for example on labour, to environmentally damaging activities, such as resource use or pollution". ETR has two primary goals: a) to discourage environmentally harmful activities by making them more costly; b) to recycle the revenues to create economic and social outcomes, such as increasing employment.

Low or flat revenues from environmental taxes could result from high tax rates that had the (positive) effect of changing behavioural patterns of consumers. On the other hand, higher levels of environmental tax revenue could be due to low tax rates that incentivize to purchase taxed products across a border (e. g. petrol or diesel).
The total revenue from environmental taxes in the EU-28 in 2014 was EUR 343.6 billion and equates to 2.5 % of gross domestic product (GDP) and to 6.3 % of the total revenues derived from all taxes and social contributions (Eurostat, 2016).
In 2014, the level of environmental tax revenues was more or less EUR 79 billion higher than in 2002. Environmental taxes exceeded 10.0 % of total revenue from taxes and social contributions in three Member States — Slovenia (10.6 %), Croatia (10.5 %) and Greece (10.2 %) — as well as in Serbia (10.8 %). They were followed by Bulgaria (9.8 %), Latvia (9.3 %), Cyprus and the Netherlands (both 9.0 %).

About GDP, environmental tax revenues reached the highest value in Denmark with a ratio of 4.1 %, followed by Slovenia and Croatia (both 3.9 %), with Serbia (4.0 %). The lowest rates of environmental tax revenues to GDP were recorded in Lithuania, Slovakia and Spain, all three below 2.0 %.
European statistics distinguish four different categories of environmental taxes relating to energy, transport, pollution and resources.
Energy taxes (which include taxes on transportation fuels) represents the highest share of overall environmental tax revenue, accounting for 76.5 % of the EU-28 total in 2014. Energy taxes were prominent in Lithuania, the Czech Republic and Luxembourg. By contrast, energy taxes slightly exceeded 50 % of the revenues from environmental taxes in Malta and Norway.
Transport represented the second most significant

Environmental tax revenues reached the highest value in Denmark with a ratio of 4.1 %. The lowest were recorded in Lithuania, Slovakia and Spain.

contribution to total environmental tax revenues, with 19.9 % of the EU-28 total in 2014. Their importance was considerably higher in Malta (40.6 % of all income from environmental taxes) and even in Norway (42.6 %); the smallest shares of transport taxes in total revenues from environmental taxes were in Estonia (2.1 %) and Lithuania (3.5 %).

Pollution and resource taxes represented a relatively small share (3.6 %) of total environmental tax revenues in the EU-28 in 2014. This category of taxes was implemented more recently in most European coun-

tries. However, a much higher share of pollution and resource taxes was experienced in Croatia (17.4 %), and in the Netherlands (13.8 %). By contrast, in some EU Member States, Germany, Greece and Cyprus, no taxes of this category have been enacted.

Tables below show the split of revenues from different types of environmental taxes suggested for implementation in the 28 Member States. The majority of the overall increase comes from additional taxes on transport excluding. transportation fuels (0.59% of GDP).
The additional revenue generated from increasing energy duties amounts to 0.25% of GDP. Finally, an increase of 0.21% of GDP is estimated from increased taxes on pollution and resources.

The difference between "good practice" and “politically feasible” was around 0.08% GDP. For transport taxes, a greater proportion of the change was consi-

The Hemicycle of the European Parliament in Strasbourg during a plenary session in 2014. Photo: Diliff

dered politically feasible: under good practice, the transport taxes would raise taxes equivalent to 0.57% GDP, whereas the politically feasible scenario generated taxes equal to 0.55% of GDP. For the pollution and resource taxes, the difference was between 0.22% GDP for the good practice situation and 0.18% GDP in the politically possible scenario.

Environmental taxes have been increasingly used to influence the behaviour of economic operators, whether producers or consumers. The EU has frequently encouraged any policy aiming to affect, through environmental taxes, the conduct of main economic actors, whether they are producers or consumers.

The use of financial instruments for the benefit of the environment is openly backed by the EU Environment Action Programme to 2020 — 7th environment action programme (EAP), the EU sustainable development strategy and the Europe 2020 strategy.
The secretly added value of taxation is not so secret anymore.

SARDINIA
Technology & Nature

ENEA

CO2 Technology Centre of Sulcis

SOTACARBO

What is the EU doing about truck CO2 emissions?

Pressure is mounting on manufacturers to lower carbon dioxide emissions from trucks, buses and coaches. The European Commission is planning to introduce the first EU-wide standards to measure CO2 from heavy duty vehicles this summer, as a first step to regulate emissions.

By EURACTIV

The European Commission is expected to propose a new method for measuring trucks' CO2 emissions this summer, marking the EU's first step towards regulating carbon dioxide from heavy duty vehicles.
The computer simulation tool, called VECTO, has been several years in the making, and was developed jointly with truck makers.

VECTO is one crucial step in the Commission's efforts to curb emissions from trucks, buses and coaches. Up until now, CO2 emissions were neither measured nor reported, something that should soon become mandatory.

Industry groups and campaigners alike are now wondering if the EU executive will introduce binding limits on truck pollution. On its website, the Commission says the most apparent option is to set mandatory limits on average CO2 emissions from newly-registered HDVs, as is already done for cars and vans.

Disproportionate share

Trucks only make up a small part of vehicles on the roads in Europe: less than 5% of total traffic. But they've alarmed regulators because of the disproportionate share of CO2 emissions they create. Between 1990 and 2010, CO2 emissions from trucks rose by 36% in Europe, according to Commission figures.

Road freight continues to increase in Europe, so more trucks are driving on roads now than ever before. That puts the Commission in a tough position. Estimations from the EU executives show that emissions from trucks will remain at around the same level until 2050.

This would run contrary to a Commission pledge to drastically bring down CO2 emissions from the transport sector. In its 2011 Transport White Paper, the EU executive outlined a 60% cut from emissions levels in 1990. That was backed up by the Commission's plan for a low-carbon economy in 2050, which called for more fuel efficient diesel and petrol engines and an increase in electric and hybrid cars on the European market.

Technology

Manufacturers and industry groups have embraced several technological developments that could cut CO2 emissions. These include cleaner fuels, electrified vehicles, and use of 'connected' or digital communication with infrastructure and other vehicles to make driving more efficient.

But campaigners argue a binding limit to truck emissions would be the only way to significantly speed up adoption of cleaner technologies and make a real dent on overall CO2 emissions.

Regulation of truck emissions - why the wait?

Several EU member states are actively pushing for binding limits on CO2 emissions form trucks to be set at European level. In September 2015, the UK, Slovenia, the Netherlands and Belgium called on the European Commission to introduce binding limits on truck's CO2, which account for 30% of road transport emissions.

The Umweltbundesamt, the German environmental protection agency, also said there is a need for "a more intensive discussion about CO2 limit values" for trucks. The agency emphasised, “we also require ambitious regulation”.

The European Parliament has joined the calls and put pressure on the Commission to regulate. In a report published last September, the Parliament said that “if appropriate” the executive should set out obligatory limits to CO2 levels from newly registered trucks.

But so far, the Commission has refused to come out with a proposal to put a legally binding lid on CO2 emissions from trucks. Instead, it chose to focus on developing a methodology, called VECTO, for manufacturers to monitor and report on emissions as a first step. Looking forward, "the most apparent option is to set mandatory limits on average CO2 emissions from newly-registered HDVs, as is already done for cars and vans," the Commission said.

This is making manufacturers cringe. Erik Jonnaert, secretary general of the European Automobile Manufacturers' Association (ACEA), said the European truck industry is “too complex” to be regulated by across-the-board CO2 limits, and that there are too many different kinds of trucks on the market for legally binding limits to make sense.

ACEA has instead advocated for other methods to cut CO2 emissions, including better truck models, internet connectivity in vehicles and road engineering that can facilitate driving in a way that creates less pollution.

The car industry and environmental campaigners are now looking ahead to a proposal from the European Commission expected this June on the decarbonisation of transport. Some have speculated that the proposal might address trucks and CO2 emissions specifically, and even include a binding limit.

Fuel efficiency

Up until now, CO2 reductions were mainly driven by demand for trucks that consume less.

"Put simply, the best-in-class on fuel consumption will sell more, and provide better business for us as manufacturers," said Niklas Gustafsson, Chief Sustainability Officer at the Volvo Group, in a recent interview with EurActiv.

But although fuel efficiency has improved, CO2 emissions have continued to rise since the 1990s, mainly due to increasing road freight traffic. "This is clearly incompatible with the goal of reducing greenhouse gas emissions from transport by around 60% below 1990 levels by 2050," the Commission said, referring to its 2011 Transport White Paper.

As often, industry and environmental campaigners cite widely varying statistics on how fuel efficient European trucks really are.

ACEA argues that trucks in Europe today are one third more fuel efficient than they were in the 1980s. The industry association predicts that trend will grow: new heavy duty vehicles will be around 15% more fuel efficient by 2020 because of technological developments.

But NGOs disagree with those figures. A study from The International Council on Clean Transportation argues that the level of CO2 emissions from tractor trailers has remained constant since the early 2000s.

The organisation draws comparison to an opposite trend in the United States, where trucks have improved their fuel efficiency as the result of emissions regulation.

Photo: truckofthefuture.eu

Larger trucks: More efficient than small ones?
The ICCT study also claimed that trucks sold in the EU are becoming heavier and larger, contributing to more fuel consumption.

But the claim that smaller trucks are more fuel-efficient is subject to debate.

While smaller vehicles might emit less individually, industry representatives say longer modular trucks actually pollute less on aggregate because fewer of them are needed on the road. They point to Nordic countries, which already allow combining loading modules to have longer trucks, improving logistics efficiency along the way.

EU legislators were unable to resolve the controversy when they adopted new legislation last year on lorry design. While the new law allows larger and more aerodynamic vehicles to be put on the road, trucks that cross EU borders won't be allowed to exceed 18.75 metres in length and 40 tonnes in weight. The larger ones, which Green legislators refer to as "monster trucks", will only be used for trials within national borders, like in Scandinavia. Ismail Ertug, a German MEP from the Socialists & Democrats (S&D) group said the ban on large 'megatrucks' traveling between EU countries “will not only reduce CO2 emissions through improved aerodynamics, they will allow for a wider field of vision through the installation of bigger windshields, thus improving safety for drivers. “

This view was not shared by Nordics, however: "With the bigger trucks, we can also achieve considerable reductions in logistical costs," said Merja Kyllˆnen, a Finnish MEP from the leftist GUE/NGL group in the European Parliament.

VECTO
Part of the "magatruck" controversy is down to differences in measurements. Currently, there is no official EU-wide method to measures CO2 emissions from trucks.

As a first step towards regulation, the European Commission has helped truckmakers develop a methodology to measure emissions from heavy duty vehicles. The new measurement system, called Vehicle Energy

2009: European Commission starts developing VECTO method to measure trucks' CO2 emissions in cooperation with industry groups and manufacturers
April 2010: European Commission presents green vehicles strategy, promising "a future proposal on fuel consumption of, and CO2 emissions from, heavy-duty vehicles"
2011: Commission presents Transport White Paper, which sets out goal of cutting emissions by 60% compared to the 1990 levels
May 2014: Commission strategy on cutting CO2 emissions and fuel consumption from heavy duty vehicles proposes
February 2015: Commission presents Energy Union plan, mentioning the need to cut CO2 emissions and fuel consumption from trucks, including through better traffic management
Summer 2015: The US Environmental Protection Agency introduced new standards regulating trucks fuel consumption in the US
August 2015: Germany's environmental protection body, the Umweltbundesamt, said there needs to be regulation of CO2 emissions from trucks
September 2015: European Parliament report calls for the Commission to set binding limits on truck emissions "if appropriate"
November 2015: 14 MEPs send letter to Commissioner Bulc asking for a new road toll system for trucks that charges based on driving distance and CO2 emissions
6 April 2016: Dutch Council Presidency organising 'truck platooning' experiment bringing semi-autonomous trucks from around Europe to Rotterdam
14 April 2016: EU transport ministers meet to agree on declaration for deploying autonomous vehicles
Mid-2016: Commission expected to present VECTO method for measuring CO2 emissions from trucks
Mid-2016: Commission expected to propose legislation on the decarbonisation of transport.

Consumption Calculation Tool (VECTO), is a computer simulation programme which is expected to become mandatory as of this summer after the Commission issues new legislation.

The proposal has dragged on for several years. VECTO is supposed to give an accurate reading of fuel consumption in actual driving conditions so that buyers get the information before making a purchase. VECTO will measure CO2 emissions and fuel consumption based on a range of information such as overall truck mass, tire dimensions and engine type.

After years of testing, the Commission claims VECTO is now accurate within a 3% margin of error. Truck manufacturers at ACEA have praised VECTO, saying the new tool will allow consumers to choose the most fuel efficient truck, putting pressure on the industry to produce vehicles that are more fuel efficient.

However, they are also worried that the methodology will not take account of all potential parameters influencing fuel consumption, such as the use of biofuels.
"To us it is very important to look at the trucking industry in an integrated way, taking into account what can be done from a technology point of view on the engine, on low rolling-resistance tyres, on aerodynamics, etc.," said Niklas Gustafsson Chief Sustainability Officer at the Volvo Group.

"But we should also look at efficient fuels, infrastructure, logistics and other parameters that influence fuel consumption. Because you can have a very efficient drivetrain and still not be very efficient if you have a poor logistic system."

Green NGO Transport & Environment agrees that VECTO will mark an improvement on measuring trucks' fuel efficiency and could boost competition between manufacturers who will be incentivised to build cleaner vehicles.

But the NGO argues that VECTO should be more transparent than it was in trial phase. Data used to calculate emissions and efficiency should be made accessible to third parties so that they can test trucks during use, T&E said. The Commission's current version of VECTO makes much of that data confidential, meaning that only OEMs that manufacture truck parts can use the test.

Electrification

In the long run, technological developments ó including electrification ó are expected to play a big role in reducing truck emissions.

The European Commission has touted electric vehicles as a step towards cutting CO2 from vehicles across the board because they do not emit tailpipe exhaust. It has funded research projects to develop new technology and try to tackle some of the main issues standing in the way of electric vehicles going mainstream, including cost, battery reliability and charging.

But a 2011 study funded by the Commission said electric trucks are still a 'niche' market, mainly because the technology is not mature enough and the costs too high.

So far, the technology has been used mainly for city buses travelling on short distances without heavy loads. Hybrid-electric buses already on the market can save a lot of fuel, in particular in stop-and-go urban traffic conditions, says Volvo's Gustafsson. In his view hybrid diesel engines are a stepping stone towards heavier trucks that eventually become fully electrified.

However, for long-distance trucking, liquid fuels will remain dominant for the foreseeable future, he said. "The amount of batteries that would need to be equipped on long-distance trucks would be so huge, it wouldnít make sense. So you need to bring energy in some other form. And if you donít want to go for fossil-based diesel, then you need alternative or renewable fuels in liquid form so you can bring the amount of energy needed for long-distance trucking."

Volvo is not alone looking at electrification. BMW started running fully electric trucks on short distances in Germany last year (2015).

Some technological developments would help trucks use more electric power by using power supplies based in road infrastructure. In an experiment billed as the 'eHighway', Siemens is currently testing a new electric overhead metal track to power trucks on a 2.1 km-long stretch of highway outside Berlin. Last summer, Siemens outfitted a short stretch of a public highway in Sweden with the overhead electric rails to connect to trucks.

Siemens says using the electrified overhead track to connect to trucks as they drive will be energy efficient. The company says the technology will be available soon for commercial use.

Intelligent transport systems

The European Commission is also pushing 'intelligent transport systems' (ITS), or the technological communication between vehicles and road infrastructure.

ITS technology facilitates information sharing to help drivers find parking spots, travel routes and pay tolls. The Commission and some of the groups pushing ITS, like public-private organisation ERTICO, argue that increasing ITS technology use on the road will decrease traffic congestionóand cut CO2 emissions as a result. The Commission also wants ITS technology to help cargo carriers combine loads more efficiently, meaning less trucks could be on the road. Overall, the EU executive estimates that using ITS technologies can cut CO2 emissions by 10-20%.

There are obstacles to expanding ITS, however: the International Road Union told EurActiv in a recent interview that commercial truck operators are reluctant to share information about their travel routes with authorities.

A study conducted by ERTICO last October found the average fuel savings from ITS systems was 6.4% for passenger cars, a figure which was even slightly higher for trucks and buses.

Digital technologies have also been developed to group vehicles into "platoons" as a way of reducing emissions and increase road capacity. In April 2016, the Dutch Council Presidency is organising an experiment to test trucks that drive semi-autonomously, or without complete driver control.

A fleet of trucks will drive from other European countries to Rotterdam on 6 April in a 'truck platooning' test that can cut CO2 emissions by up to 20%, according to the Dutch presidency. Trucks drive close to each other to reduce the air drag between them, which can save fuel.

Tolls

Regulators have also considered green tolling systems as a way of cutting CO2 emissions from road traffic in general. EU Transport Commissioner Violeta Bulc has said she wants to introduce a unified, EU-wide road toll system that would override the patchwork of different national road tolls.

An EU directive dating back to 1999 allows member states to introduce tolls for trucks that are based either on distance or time travelled.

An EU directive dating back to 1999 allows member states to introduce tolls for trucks that are based either on distance or time travelled.
Bulc is in favour of tolls that are based on the distance vehicles drive, not on the amount of time they use roads.

Last November, 14 MEPs wrote a letter to Bulc asking her to reform the directive and scrap road tolls based on distance. Instead, the MEPs asked for new legislation that would require road tolls be determined by trucks' CO2 emissions levels and fuel efficiency. Tolls based on how long trucks use roads do not promote efficient vehicles or driving, the MEPs argued.
T&E suggests charging tolls based on trucks' CO2 emissions recorded by the VECTO tests. Trucks that are not certified by a VECTO test could be charged the highest possible road toll, the NGO argued.

A study carried out by consultancy CE Delft said road tolls based on trucks' CO2 emissions could be a good potential policy instrument. It argued that other measures to charge road users, such as raising fuel taxes, would have less public support.

ACEA said in a recent position paper that European vehicle manufacturers see no need for new road tolls to limit air pollution since the current EU road toll system has reduced emissions and emissions are already curbed by fuel taxes. Tolls that charge trucks based on greenhouse gas emissions would discourage road transport in favour of other modes of transport ó such as trains and barges ó which the Commission wants to encourage.

Positions

Germany's **Umweltbundesamt** is among one of the national authorities that have called for binding EU CO2 limits for trucks. "We strongly urge a shifting from road freight to the railways and ships ñ the climate protection action programme emphasises this point appropriately. It would also be wise to extend the HGV toll to vehicles with a gross weight of 3.5 tonnes and more. And we must finally engage in a more intensive discussion about CO2 limit values for HGV. In this regard, we also require ambitious regulation," said Maria Krautzberger, president of the Umweltbundesamt.

The **European Automobile Manufacturers' Association (ACEA)**, has pushed against binding limits on CO2 emissions from trucks. “Firstly, because new ve-

hicles represent such a small fraction of the fleet, we want to look at the entire vehicle fleet, rather than just new vehicles. Secondly, there are many more factors than just the vehicle alone that determine CO2 emissions ñ such as permitted vehicle length and weight, trailer designs, alternative fuels, driver behaviour, optimised transport operations, infrastructure and more," said Martin Lundstedt, CEO of **Volvo Group** and chair of ACEA's commercial vehicle board.

"We believe that the integrated approach is the right way forward ó and the only way to reduce the CO2 emissions of the transport industry in Europe on a large scale."

Environmental groups say the EU is falling behind on regulating trucks and point to the US as an example to follow. Last year, the **US Environmental Protection Agency (EPA)** introduced new CO2 standards for trucks that will see a drastic slash in fuel consumption limits. Environmental groups say that means European trucks will soon no longer be the cleanest. Within the next five to ten years, American trucks will be produced to meet their tough new standardsóoutpacing European trucks and perhaps even posing a challenge to manufacturers.

The **International Council on Clean Transportation (ICCT)** has said that the US is outpacing the EU on clean trucks and called for CO2 emissions standards in Europe.

"It is quite probable that due to lack of an EU HDV efficiency standard over the next 10 years North America will surpass the EU to become the definitive leader in advanced truck technology. With annual EU HDV sales volumes second to only China and the US, and with many of its truck manufacturers being global leader with major exports in foreign markets, it is critical that the EU embrace a more progressive stance on CO2 emissions from HDVs," the NGO wrote in a blog post.

Environmental NGOs have argued for binding emissions standards for trucks. "Lorry-makers have made no progress on fuel economy in 20 years, said Carlos Calvo Ambel, policy analyst at Transport & Environment (T&E). According to Ambel, that shows that "manufacturers canít be trusted and that Europe needs to move ahead with CO2 standards like the U.S. and Japan".

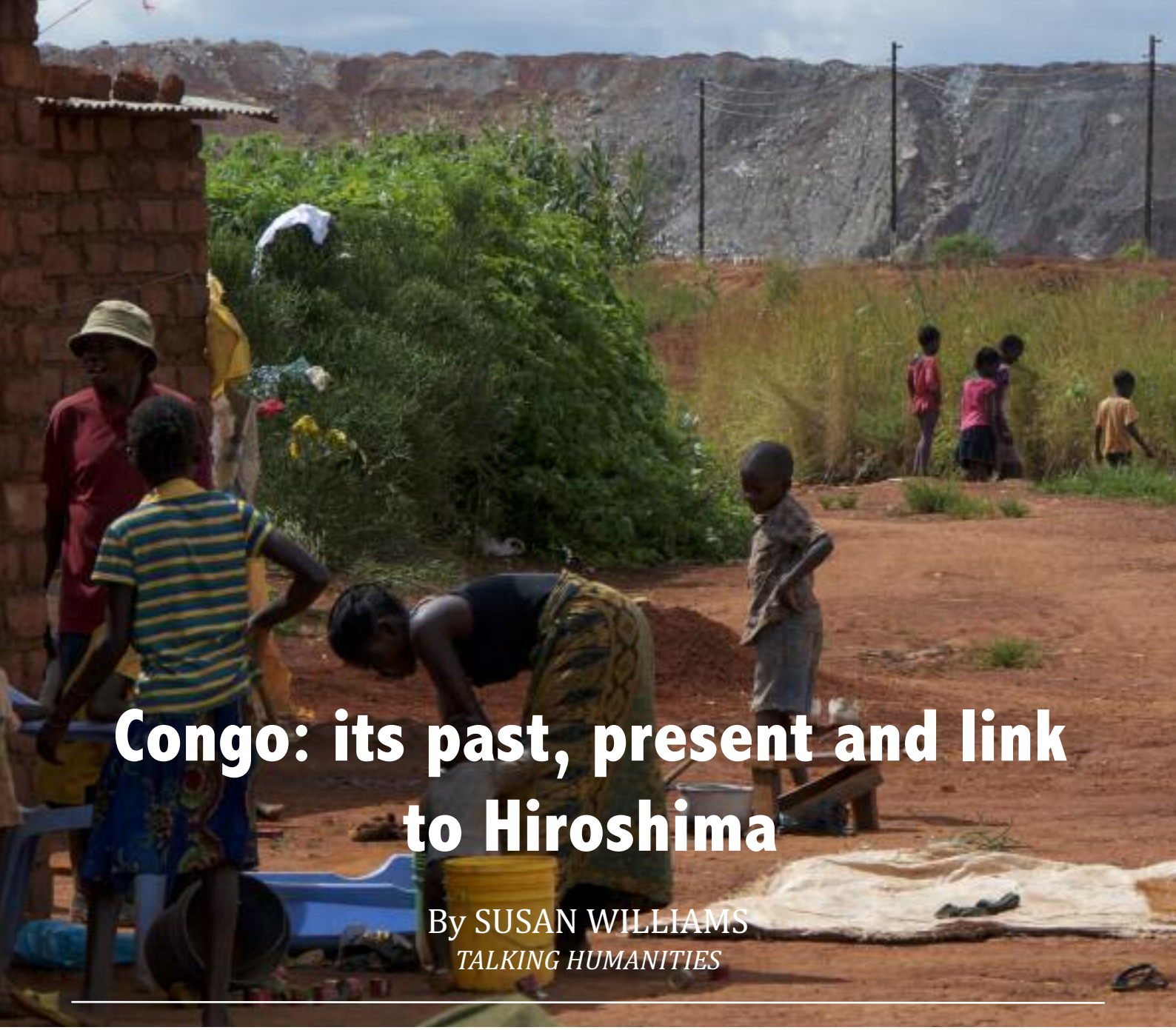
EU Transport Commissioner Violeta Bulc called intelligent transport systems "necessary to reach essential objectives of the EU, for example for transport decarbonisation or the reduction of road fatalities. Intelligent Transport Systems will also provide plenty of opportunities to EU industry to export products and solutions at a time where transport is booming everywhere in the world".

Steve Philipps, secretary general of public sector association the **Conference of European Directors of Roads (CEDR)**, has advocated for semi-autonomous truck platooning on highways as a way to cut CO2 emissions. Regulation is part of the solution but itís not the only part of the solution. We have been through all our discussions now with the automotive sector. With other partners as well, we have been looking at possibilities for reducing CO2. This comes from improved traffic management, so all cooperative ITS [intelligent transport systems] solutions, of which platooning is a part, Philipps said.

"But it is more than that. It is the whole 'how do we encourage smoother journeys'? How do we help the truckers to plan their journeys better to take into account incidents on the road? To avoid congested spots so that trucks can actually have smooth journeys? Because for them smooth journeys mean lower CO2." **Siemens** announced in summer 2015 that is building a stretch of highway in Sweden as part of its electric infrastructure eHighway demonstration.

"The electric hybrid is the first step on the road to electrically powered vehicles that will come to play an increasingly important role in the development of sustainable freight transport," said Roland Edel, chief technology officer at Siemens' mobility unit.

Originally published by Euractiv.com April 7, 2016



Congo: its past, present and link to Hiroshima

By SUSAN WILLIAMS
TALKING HUMANITIES

On 6 August – Hiroshima Day – I participated in a groundbreaking event at the South African Museum in Cape Town entitled 'The Missing Link: Peace and Security Surrounding Uranium'.

The event had been organised by the Congolese Civil Society of South Africa (CCSSA) to put a spotlight on the link between Japan and the Democratic Republic of Congo (DRC): that the uranium used to build the atomic bomb dropped on Hiroshima came from the Shinkolobwe mine in the province of Katanga. This was the richest uranium in the world, an average of 65 per cent uranium oxide, in comparison with American or Canadian ore, which contained less than one per cent.

The mine is now closed, but its existence put it at the centre of the Manhattan Project in the Second World War, when the Congo was a Belgian colony and the Congolese suffered from the harsh colonial reality of racism, segregation and extreme inequities. Following the war, the mine became a focus for the Cold War conflict between the superpowers. Today, freelance miners, desperate to earn a living, still go to the site to dig out uranium and cobalt, at severe risk to their health.

"The safety net is much different in Europe," says Robert Godby, a University of Wyoming economist.


Photo credit: SOMO.NL

The CCSSA seeks to bring together the DRC community living in the Cape Town area. In February this year they presented a memorandum to the South African Parliament, asking for support for human rights and democracy in DRC. The organisers[i] believe that the uniqueness of Shinkolobwe's ore has had a destructive impact on their history and they held their first Missing Link event last year, at the University of Cape Town. This developed out of a proposal by Isaiah Mombilo, the CCSSA General Secretary, to the Scalabrini Centre, a secular non-government organisation in Cape Town established by the Scalabrini Fathers, which cares for the needs of migrants and refugees from African nations. The CCSSA is based at the Scalabrini Centre.

The second Missing Link event was much more ambitious than the first. The lecture hall at the museum was packed with Congolese, including families with children, and other members of the public. A number of people hailed from the area around Likasi, the nearest town to Shinkolobwe. Posters were put on the walls, including the flags of Japan and DRC, next to each other. Many women wore striking and brightly-coloured kangas.

I had been invited to the event because my new book, Spies in the Congo, centres on America's efforts to se-

cure all the uranium in the Belgian Congo, following Einstein's warning of the risk that Nazi Germany was building an atomic bomb. The US arranged for its wartime intelligence agency, the Office of Strategic Services, to send some agents to the Congo to protect the transit of the ore and to prevent smuggling to Germany. The story of these courageous agents – and the dangers they encountered from Nazi sympathisers in the mining multi-nationals and the Belgian colonial administration – has been secret until now.

Haunted by the ghost of Hiroshima

Also secret, for many long years, was the reliance of the American atomic project on Congolese ore. Following Hiroshima, a statement by Churchill drew attention to the 'indispensable raw material for the project' provided by Canada, but made no mention of the Congo. The impact on DRC has been largely invisible to the wider world. But in the local community, it was fully apparent. Oliver Tshinyoka, a journalist in the CCSSA, grew up close to Shinkolobwe, which he describes as a deserted place where vegetation blankets empty homes. His profound words end my book: 'Shinkolobwe has never been commemorated. The town is dead and is haunted by the ghost of Hiroshima.'


The Katanga Mine. Photo credit: Africanbusinessmagazine.com

There was little in the way of health and safety precautions. Speakers at the Missing Link event told of the deformities and illness caused by working in the mine and living near it. Sylvie Bambemba Mwela spoke with pain of her grandfather, who had been poisoned by radiation and had a piece of brain coming out of his mouth. People nodded in vigorous assent to the statement that when a miner went near a television, he caused severe interference with reception. There were sad references to genetically inherited malformations.

Poems had been written for the event, including Shinkolobwe's Tear by 14-year-old Benina Mombilo. 'When the predator took Africa's mines,' she stated quietly to a spellbound audience, 'he left behind death, poverty, conflict and war.' Christian Sita Mampuya observed thoughtfully that none of the people living in the Likasi area had been consulted on why the uranium was mined. Nor, he added, are there any records available about the impact on DRC of the exposure to radiation over the last seven decades.

Léonard Mulunda, in a trenchant political analysis, insisted firmly that the Congolese must take responsibility for themselves, for their own welfare and government. But he noted that DRC's lack of information about its past makes it difficult for the Congolese to plan for the present and the future. For this reason, he emphasised the significance and value of the Missing Link event.

Its importance was also highlighted this month in the USA – by Dr Akiko Mikamo, the author of Rising from the Ashes, whose father Shinji Mikamo is one of the Hibakusha, who are the survivors of Hiroshima. Last year, the Institute of Commonwealth Studies and the United Nations Association Westminster Branch invited Dr Mikamo to give a keynote speech at a conference at the School of Advanced Study on nuclear politics and the historical record. Here she le-

arned about the Congo-Hiroshima link for the first time. 'None of the Hiroshima and Nagasaki survivors I was in contact with,' she has explained, 'had any knowledge of it.'

'A searching and constructive examination of the past'

Dr Mikamo introduced this story and the CCSSA's efforts to the International Peace and Humanity Day 2016, a Peace Forum held this month by the non-profit organisation, San Diego-WISH (Worldwide Initiative to Safeguard Humanity). 'It is very important,' observes Dr Mikamo, 'that we learn also about the people and regions that are not widely known or "big players" in history textbooks. But those people's lives have been significantly affected, and it has serious implications for our global society's future. I received many comments from those who attended that it was extremely educational and inspirational to learn about The Missing Link.'

This global connection came full circle at Cape Town's Missing Link event, where warm and appreciative references were made to Dr Mikamo's work.

The sufferings generated from Congo's uranium featured in the singing and dancing during the interval. One song was entitled 'La peine et la generation suivante de Shinkolobwe'. A deeply moving contribution was a poem entitled A Bomb Fashioned out of Dirt, which was delivered with great power by Beauty Gloria Kalenga and brought tears to many of our eyes. This dirt, she said, using another name for the mine and playing on its meaning, was 'a fruit that scalds known as Shikolombwe'.

The question period was a time of dignified and respectful dialogue, when many engaged with the issues faced by DRC at this moment, especially in relation to the presidency of Joseph Kabila. Some argued that Shinkolobwe's miners and their families should be compensated by the Belgian and US governments, but there was a consensus that compensation should be postponed until there are mechanisms to ensure it is received by the victims. The formal part of the event was brought to an end with words by Neil Goodwin, the Human Rights officer at the Scalabrini Centre, and Fidèle Kalombo. But people were still eager to speak and at the reception, conversation was animated.

The Missing Link event was a searching and constructive examination of the past and its relationship to the present. It seemed to me to exemplify the value of public engagement at its best, where everyone listens and interacts and benefits together. Isaiah Mombilo, speaking on behalf of the CCSSA, said he was proud that DRC's role in the history of the world was witnessed so successfully on Hiroshima Day in Cape Town this month. It was a way, he believed, of 'claiming Shinkolobwe's tears'. But this, he added, was only the beginning: 'There is more to say.'

Originally published by Talking Humanities August 18, 2016

Dr Susan Williams is a historian, historical advisor and senior research fellow at the Institute of Commonwealth Studies, a member of the University of London's School of Advanced Study. She is particularly interested in the strands of the past that have been neglected or concealed and in the voices that have not been heard, such as those of the colonised. Her recent book, Spies on the Congo: America's Atomic Mission in World War II, looks at espionage in the Belgian Congo during the Second World War, in the context of global power struggles, the European colonial presence in Africa, and the competition for strategic raw materials. A film entitled A United Kingdom, based on Colour Bar, Dr Williams's book about Sir Seretse Khama, Botswana's founding president, is soon to be released. Her book, Who Killed Hammarskjöld? The UN, the Cold War and Supremacy in Africa, triggered a new UN inquiry in 2015 into the death in Zambia in 1961 of UN Secretary General Dag Hammarskjöld.

A Test of U.S. Climate Leadership Will Be How We Treat the Standing Rock Sioux

By MARK TRAHANT
YES! Magazine

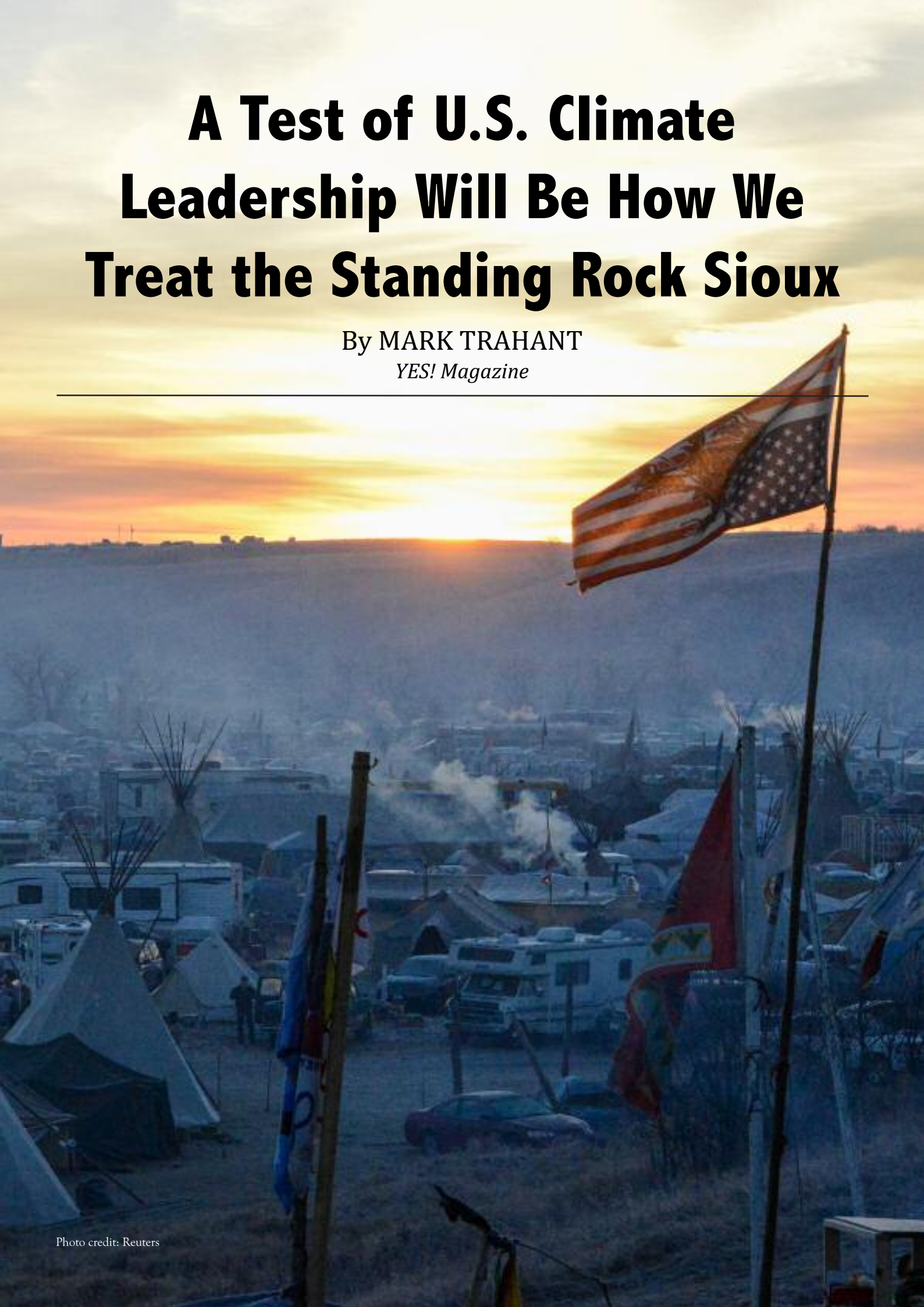


Photo credit: Reuters

"The United States is an exceptional nation. I believe we are still Lincoln's last, best hope of Earth. We're still Reagan's shining city on a hill. We're still Robert Kennedy's great, unselfish, compassionate country"

Hillary Clinton, former US Secretary of State

My ears perked up when I heard that Hillary Clinton was giving a speech on American Exceptionalism. I cringe every time this is a topic; the idea is far too close to Manifest Destiny.

"The United States is an exceptional nation. I believe we are still Lincoln's last, best hope of Earth. We're still Reagan's shining city on a hill. We're still Robert Kennedy's great, unselfish, compassionate country," Secretary Clinton said Wednesday. She went on to say that "we are the indispensable nation. People all over the world look to us and follow our lead."

If that's true, that's not a bad thing. But it all depends what happens over the next few weeks and months near Cannon Ball, North Dakota. If the United States is to be that "indispensable nation," it has to lead on the most important crisis Mother Earth faces, climate change.

This is not what Clinton was talking about. Her speech was all about global security, the military, and global alliances. But her words were exactly on point on the issue of climate change.

As she put it: "Because, when America fails to lead, we leave a vacuum that either causes chaos or other countries or networks rush in to fill the void. So no matter how hard it gets, no matter how great the challenge, America must lead. The question is how we lead. What kind of ideas, strategies, and tactics we bring to our leadership. American leadership means standing with our allies because our network of allies is part of what makes us exceptional."

And those are applicable themes when it comes to the global reaction to climate change.

Last year, Clinton praised the Paris Climate Change Agreement. "The Paris agreement is testament to America's ability to lead the world in building a clean energy future where no one is left out or left behind," she said … "we will only succeed if we redouble our efforts going forward to drive innovation, increase investment, and reap the benefits of the good-paying jobs that will come from transitioning to a clean energy economy. The next decade of action is critical—because if we do not press forward with driving clean energy growth and cutting carbon pollution across the economy, we will not be able to avoid catastrophic consequences."

So let's be absolutely clear here: The tribal community of Standing Rock and the people downstream on the Cheyenne River Indian Reservation are those who would be left out and left behind unless the Dakota Access Pipeline is stopped.

Let's connect the dots. Paris Mismatches: The Impact of the COP21 Climate Change Negotiations on the Oil and Gas Industries , a report last month by The Chatham House, says that in order to meet global targets (you know, the ones the United States agreed to reach) the "impact on the oil and gas sector will intensify."

Three key points from that study. First, the United States and other nations that signed, must apply "additional and more stringent measures" on fossil fuels going forward.

Second, "as a result, the impact of regulation on the oil and gas sector is set to intensify." And third, in language that should say in bold—No Dakota Access Pipeline—"avoid over-investment in potentially unnecessary projects."

"The energy we produce enables light, heat, mobility, mechanized agriculture, modern communications, the health system that keeps us well, and the many electronic devices that keep us connected and entertained. It's also the feedstock for everything from crayons to contact lenses, not to mention the basis of our roads and runways."

Steven S. Watson, Chevron Chief Executive

The report says if nations do not do this then "investment in consumption and production of fossil fuels will continue and oil and gas companies will make risky investments to meet unsustainable demand."

That is exactly the problem in North Dakota. The same day Secretary Clinton was outlining "American Exceptionalism," the chief executive officer of Chevron, Steven S. Watson, was posting on LinkedIn why he thinks oil and gas are indispensable. (There's that word again.) "Ours is a long-term business, so we know that eventually supply and demand will come back into balance and prices will stabilize. The global economy depends on it," he says. "The energy we produce enables light, heat, mobility, mechanized agriculture, modern communications, the health system that keeps us well, and the many electronic devices that keep us connected and entertained. It's also the feedstock for everything from crayons to contact lenses, not to mention the basis of our roads and runways."

Watson argues that change will come slowly. Even with reductions in emissions, "oil and natural gas will still account for 44 percent (of all energy use), with coal providing an additional 16 percent."

I disagree. I think this whole line of thinking misses the impact of disruption. And, as I wrote in my recent piece for YES! Magazine, I think the events at Standing Rock are a disruption of the norm.

That logic of "we all need more oil" is a recurring theme used to belittle the actions at Standing Rock. The line goes: Folks drive to the camps using gas; they mark up signs with oil-based writing instruments; and, sleep under fabrics made from petroleum. The charge is, "How can you be against the Dakota Access Pipeline when you use these things?"

But no one—not the people at Standing Rock, not the Paris agreement signers (again, including the United States)— is saying we will stop using fossil fuel-based products. What's being said — and not heard— is that we as humans have to reverse course. Instead of consuming more oil every year, we need to start using less and leave more oil, gas, and especially coal in the ground. Significantly less. As the Chatham House report says: to "send a strong signal to those who consume and produce carbon-based fuels so that their investment plans can be amended to reflect the shape of a lower carbon economy."

Especially ending the construction of "potentially unnecessary projects."

Tim Kaine, the Democrats' vice presidential nominee, was asked yesterday if he would stand against the Dakota Access Pipeline. According to a video posted by 350 Action on Twitter, he replied: "That's one I have to educate myself on" but said the court should take the tribe's complaint "very seriously."

But the Clinton-Kaine would-be-administration has already said what it thinks about this issue when it promised an energy future "where no one is left out or left behind."

So the question is whether or not those words have meaning.

Originally published by TrahantReports.com and has been edited by YES!Magazine September 2, 2016

MARRAKECH

COP22 | 2016 | CMP12

UN CLIMATE CHANGE CONFERENCE

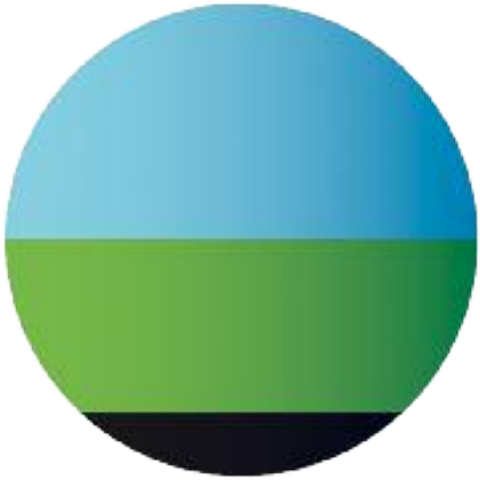
Photo: ONE

MOLENTARGIUS

Molentargius is the Sardinian word for "donkeys handlers", as the salt extracted was carried by mules. The salt industry was the richest in the Cagliari area for centuries. Until the mid-800 salt marshes were entirely natural, salt collected in basins or coastal ponds where it crystallised spontaneously. Given the high revenue arising from the sale, the "saline" of Cagliari were designed on the French model, as a proper salt industry. In the 1930s, the Italian government provided funds to modernise the plants and to re-design the architecture of the buildings inside the area. After World War II the demand for salt products decreased so much to lead to the suspension of the production. The "Molentargius Saline" lost its importance gradually and was closed down in 1985. In 1999 that area became the core of the Molentargius Regional Natural Park. At the moment it remains a fascinating but still unfinished idea. ONE

SOTACARBO

SUSTAINABLE ENERGY
RESEARCH CENTRE



www.sotacarbo.it

www.onlynaturalenergy.com
info@onlynaturalenergy.com