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The Warming World

Is Capitalism Destroying Our Planet?

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World leaders decided in Copenhagen that global warming should be limited to 2 degrees Celsius. Achieving that target, though, would take nothing less than a miracle. With another round of climate negotiations approaching, it is becoming increasingly clear that mankind has failed to address its most daunting problem.

Humans are full of contradictions, including the urge to destroy things they love. Like our planet. Take Australian Prime Minister Tony Abbott. Like everyone living Down Under, he's extremely proud of his country's wonder of the world, the Great Barrier Reef. At the same time, though, Abbott believes that burning coal is "good for humanity," even though it produces greenhouse gases that ultimately make our world's oceans warmer, stormier and more acidic. In recent years, Australia has exported more coal than any other country in the world. And the reef, the largest living organism on the planet, is dying. Half of the corals that make up the reef are, in fact, already dead.

Indian Prime Minister Narendra Modi also wants the best for his country and is loathe to see it damaged by droughts, cyclones and storm surges. Nevertheless, he is planning on doubling India's coal production by 2019 in addition to importing more coal from Australia. It is necessary to do so, he says, to help his country's poor. India is already the third largest producer of

greenhouse gases, behind China and the United States. But climate change is altering the monsoon season, with both flooding and drought becoming more common.

And who would accuse the majority of US Senators of being insensitive to the extreme shortage of water afflicting California? Yet the law-making body recently brushed aside everything science has learned about global warming and voted down two measures that attributed the phenomenon to human activity. For Americans and foreign tourists alike, California is a magical place, famous for Yosemite National Park, its Pacific coastline, its golden light. The state also grows around a third of all US produce. For now. An historic drought that has been ongoing for over three years has forced farmers to abandon their fields and to slaughter their animals.

Since 1880, when global temperatures began to be systematically collected, no year has been warmer than 2014. The 15 warmest years, with one single exception, have come during the first 15 years of the new millennium. Indeed, it has become an open question as to whether global warming can be stopped anymore -- or at least limited as policymakers have called for. Is capitalism ultimately responsible for the problem, or could it actually help to solve it?

At the end of November, political leaders from around the world will gather in Paris to once again address the problem of global warming, just as they did five years ago in Copenhagen. Back then, a deep chasm opened up between the rich countries that want to protect the climate and the poor countries who are demanding that the rich countries pay for measures to combat climate change. Participants were hopelessly at loggerheads and proved unable to reach an agreement. The only product of the long days and nights of negotiation was a single number: 2 degrees Celsius.

Since then, politicians around the world have repeated the number like a mantra: Average global temperatures should not be allowed to increase by more than 2 degrees Celsius (3.6 degrees Fahrenheit) relative to pre-industrial times. A "dangerous anthropogenic interference with the climate system" is to be prevented, reads the United Nations Framework Convention on Climate Change.

The choice of 2 degrees Celsius as the maximum limit was largely an arbitrary one. Indeed, the 44 members of the Alliance of Small Island States (AOSIS) believe that, in a world that is 2 degrees warmer, many of their islands would disappear. They are demanding that the upper target limit be reduced to 1.5 degrees Celsius. But as things currently look, the 2-degree target is hopelessly utopian. It is supposed to sound reassuring, but it is little more than hot air. Since 1880, average global temperatures have already increased by 0.8 degrees Celsius, and the consequences have become widely evident.

At the Paris climate summit, leaders will have to reach agreement on questions that led to bitter disagreement five years ago in Copenhagen. Which countries have to reduce greenhouse gas emissions and by how much? What does it cost? And most importantly: Who pays? The goal is that of coming up with a successor treaty to the 1997 Kyoto Protocol, the first international agreement aimed at protecting the climate.

Should greenhouse gas emissions continue as they are today, the world will likely reach the 2 degree Celsius maximum within 30 years. Indeed, in order to have any chance at all of stopping global warming at 2 degrees Celsius, emissions would have to fall by 10 percent per year starting in 2017 at the latest, says Fatih Birol, head of the International Energy Agency.

But is that even possible? In 2014, around 60 percent more greenhouse gases were pumped into the atmosphere than in 1990, the year against which most reduction targets are measured. There is little to indicate that the trend might soon change. And if it doesn't, if emissions continue at today's rate, the World Bank calculates that average global temperatures will increase by 4 degrees Celsius by the end of the century. The consequences of so much warming, the World Bank says, would be "extreme heat-waves, declining global food stocks, loss of ecosystems and biodiversity, and life-threatening sea level rise."

The sheer scope of the destructive effect the production of fossil fuels already has today is visible when you visit places that provide the world with its supplies of coal, oil and natural gas. Louisiana, for example, an oil-rich US state whose coast is sinking into the sea and which is threatened by hurricanes. Or the Chinese coal province Hebei, whose 70 million inhabitants would be better advised not to leave their homes on many days of the year because levels of fine particulate matter go far beyond those considered to be safe.

Is Capitalism the Problem?

Following the Copenhagen fiasco, the executive secretary of the United Nations Framework Convention on Climate Change, Yvo de Boer of the Netherlands, resigned in frustration. He had, he said in a 2013 interview with Bloomberg Business, lost his faith in climate diplomacy. "The only way that a 2015 agreement can achieve a 2-degree goal is to shut down the whole global economy," he said.

Might it be enough, though, to fundamentally change the rules by which the global economy functions? That is what Canadian bestselling author Naomi Klein is demanding. (Editors note: SPIEGEL International has also published an accompanying interview with Klein.) The leftist icon's controversial new book, which will be published in Germany next week, is a carefully researched polemic about mankind's collective failure in the face of the greatest challenge it has ever faced. Klein spells out her thesis in the introduction to her book "This Changes Everything": "We have not done the things that are necessary to lower emissions because those things fundamentally conflict with deregulated capitalism, the reigning ideology for the entire period we have been struggling to find a way out of this crisis."

In other words, climate protection and capitalism are mutually exclusive. In order to stop global warming, Klein argues, we have to use fewer resources. But in order to prevent the collapse of our capitalist economic system, unlimited growth is necessary. "Only one of these sets of rules can be changed," Klein writes. "And it's not the laws of nature."

Regardless of whether one finds her standpoint to be plausible, radical or beyond the pale, it is difficult to disagree with one of her points: Our reaction to climate change is inversely proportional to the dimension of the problem it presents.

For over two decades, more than 20,000 delegates from countries around the world have been traveling from conference to conference to negotiate a treaty to save the world. It is an historic challenge they are facing -- a heroic assignment they are failing to master. A miracle is necessary to put the brakes on climate change -- or a revolution, a global mass movement. Were such a thing to materialize, that too would be a miracle. The slow pace of climate change stands in fatal contrast to the speed of our times, an era characterized by distraction, consumption and shrinking attention spans.

When did global warming cease being merely a computer simulation? It must have been at some point between the 1970s, when the world experienced 660 natural catastrophes, and the last decade, with its 3,322 storms, heat waves and flooding. It came quietly, as most of us were looking away.

Since then, the ice cap at the North Pole is melting, glaciers in the Alps are disappearing and dikes on the North Sea have had to be heightened. Rainfall has become even more intense in Western Europe whereas precipitation has fallen in the southern part of the Continent. Extreme weather phenomena such as violent storms, torrential downpours and hail storms have become much more frequent in Germany since 1970. Back then, the country experienced an average of 10 such phenomena annually, says Peter Hoeppe, head of climate risk research for Munich RE, the world's largest re-insurance company. "Now, there are 35." In 2013, a July hailstorm in Germany cost insurance companies €3.6 billion, making it the most expensive catastrophe in the world that year.

On the Arabian Peninsula, which is almost entirely covered in desert, ground water levels are falling dangerously. In Africa and Central Asia, deserts are expanding. In Israel, Australia and Brazil, lakes and rivers are drying up. Soon, climate change could result in shortages of such goods as coffee, chocolate and wine from southern France.

Disappearing Land

In the American South, on the coast of Louisiana, a piece of land the size of a soccer field disappears into the sea every hour. At such a rate, the *New York Times Magazine* recently calculated, Central Park would vanish within a month. The Principality of Monaco would be history after just 15 days.

Had Naomi Klein sought to find a place to illustrate her theory of the destructive effects capitalism has on our climate, she couldn't have found a better one than Louisiana. It is the second poorest state in the US, but it is also an important hub of the oil and natural gas industries. It is a place that shows in all its grotesqueness what can happen when desire for fossil fuels trumps common sense.

The Pointe-au-Chien Indian tribe has lived on Louisiana's coast for generations, 50 miles southwest of New Orleans. The tribe today counts some 45 families, and they have had to move several times in recent years. Following Hurricane Lili in 2002, they built wooden houses on high stilts to avoid the storm surges, a strategy that helped them survive hurricanes Rita, Gustav, Cindy, Isodore and Katrina, the most expensive natural catastrophe in US history. Almost 2,000

people died in Hurricane Katrina, which slammed into Louisiana in August of 2005, and hundreds of thousands lost their homes. The storm caused more than $125 billion in damage.

"When the wind blows, the water rises," says Donald Dardar, 59. Dardar is the second chairman of the Point-au-Chien tribe, a compactly built man with tousled gray hair and the raw hands of a fisherman. After a storm, Dardar says nonchalantly, you clean up, just as it has always been. Lately, though, the wind has been blowing harder and the storms have become more frequent. And sea levels are rising. It's not a good combination.

Dardar's brother Russell steers the boat to the south, through a mosaic of land and water. He advances slowly and carefully, over black oil lines. A dolphin appears next to the small vessel; drilling rigs can be seen in the distance.

The boat has been chugging along for half an hour before Donald Dardar points ahead: "This is where we lived when I was a child." On the right side of the canal, a white cross can be seen among dead oak trees. "The gravestones have washed away," Dardar says. "But the dead haven't been forgotten."

Over the last several decades, energy companies have drilled over 50,000 holes into this section of Louisiana coast in order to suck oil and natural gas out of the ground. A 10,000-mile-long web of channels and pipelines criss-crosses the Mississippi Delta marshland, bringing the oil to refineries on the mainland.

Back when the river was still allowed to flow untamed into the Gulf of Mexico, the land at its mouth was constantly renewed by the sediment carried by the Mississippi. But today, the tamed river carries hardly any sediment at all and the land is sinking into the sea, bit by bit. The canals dug by the oil and gas industry have exacerbated the problem by allowing salt water from the sea to penetrate deep into the delta wetlands, killing the vegetation and causing the fragile land to sink. Thus, the industry whose products help cause global warming is also making the coast more vulnerable to one of its consequences: rising ocean levels.

Dardar and his brother live from oyster and shrimp fishing, as do most in their tribe. But in 2010, just five years after Hurricane Katrina, they experienced the next horrific disaster in the form of the largest oil spill ever seen off the US coast. In the Gulf of Mexico, the oil platform *Deepwater Horizon* exploded, and it took its operator BP fully 87 days to stop the oil from gushing out of the sea floor.

In the first years following the disaster, Dardar says, they hardly caught anything. Now, business is improving again and 2014 was a year free of bad storms. "We don't want to leave," he says. "We're going to stay until ..." He stops talking in the middle of his sentence.

The Green General

Native Americans don't have much of a lobby in Louisiana, but they do have a three-star general on their side: Russell Honoré, who led the army's relief mission following Hurricane Katrina. Since then, Honoré -- a broad-shouldered, mustachioed man of 67 who is fond of wearing

cowboy boots -- is considered a hero around these parts. "You know who gets rich in Louisiana?" he asks with a dismissive laugh. "Oil and gas companies. And the lawyers who sue oil and gas companies."

Environmentalists, by contrast, had a tough time of it prior to Honoré's arrival. In 2013, he formed an alliance of environmental groups, dubbed it the Green Army, and began recruiting supporters. People took notice, in part because of Honoré's military past. He was a tank commander in the 1980s on the West German border with East Germany and later, as general of the First Army, he had 500,000 soldiers under his command. He drives a Cadillac Escalade and likes to eat blood sausage and pork rinds.

Honoré is sitting on a veranda in front of a horse stall in Baton Rouge, where his stallion Big Red is kept. Big Red used to be named Pie, but the general thought the name didn't suit the animal. "I spent 37 years, three months and three days in the army," Honoré says. "I didn't come back to my home state to see it run by oil and gas companies."

The companies, he says, pollute the air and water and destroy the land while politicians who depend on their donations allow them to do as they please. In frequent public appearances, Honoré encourages people to protest against the destruction of their environment. He also threw his support behind a lawsuit filed against 97 oil, gas and pipeline companies that, should it be successful, will overshadow even the multi-billion dollar proceedings against BP following the *Deepwater Horizon* catastrophe.

The lawsuit was filed by the Southeast Louisiana Flood Protection Authority-East (SLFPA-E), a local flood protection authority that was founded in the aftermath of Hurricane Katrina. SLFPA-E came to the conclusion that oil and gas exploitation in the region is the primary cause of the coastlands sinking into the sea and that the companies involved should pay to protect the coast to the degree possible. The plan to provide that protection is called the Coastal Master Plan, but between $50 billion and $100 billion dollars are necessary to implement it, depending on which calculation you go by.

Earlier this month, a federal district court dismissed the lawsuit and the governor of Louisiana, Bobby Jindal, has been doing all he can to prevent it as well. Those who publicly support it have earned themselves powerful enemies. But the general of the Green Army isn't concerned. "The governor is a smart guy," Honoré says. "But he sold his brain to the oil and gas industry. He goes with the dollar."

Governor Bobby Jindal said last September that climate change is nothing more than a "Trojan horse" for the left: "a way for them to come in and make changes to our economy that they would otherwise want to make." Jindal is considering a presidential run in 2016 and statements like that tend to be well received by the Republican grassroots.

Not long ago, the Senate -- which has been in Republican hands since last November -- backed Jindal's viewpoint by rejecting the notion that humankind has anything to do with global warming. "God is still up there," Jim Inhofe, the new Republican chairman of the Environment

and Public Works Committee, has said. "The arrogance of people to think that we human beings would be able to change what He is doing in the climate is to me outrageous."

In the US, in the year 2015, the issue of climate change continues to trigger a culture war between two adversarial political camps. On the one side are the Republicans who, following last November's midterm elections, now control both houses of Congress. On the other are the weakened Democrats, led by President Barack Obama, who at least seems to take the warnings of climate scientists seriously.

"No challenge poses a greater threat to future generations than climate change," Obama said in January during his State of the Union address. "I will not let this Congress endanger the health of our children." His government, he said, has done more than any before it to protect the climate.

It was a strong, courageous speech by a president who is famous for his public speaking abilities. More, even, than for his deeds. It is, after all, also true that the US under Obama has become one of the world's largest producers of oil and natural gas. When he steps down in 2016, his country will likely produce more fossil fuels than even Saudi Arabia. And that's a development Obama is indeed proud of. During a campaign appearance in Oklahoma in 2012, he said: "We've added enough new oil and gas pipelines to encircle the Earth and then some."

India and China Blockade Efforts

Last December, the United Nations' climate diplomats converged once again, bringing together hundreds of politicians and negotiators as well as thousands of experts and lobbyists. This time they met in a tent city the Peruvian government had erected in central Lima. Their aim was to prepare for the Paris summit and take initial steps toward a new climate treaty.

The atmosphere was once again one of hope -- despite the resolution taken by many delegates to lower their expectations following the disastrous Copenhagen summit. Shortly before the Lima conference, the American and Chinese presidents had actually made some progress, agreeing for the first time to concrete annual figures for emissions reduction targets, even if they remain modest.

For one week, attendees met in mobile units and tents, discussing, arguing and sometimes actually making a serious effort to save the planet. But the important questions didn't get answered in Lima. Like the speed at which emissions cuts should be made and what they might cost.

On the surface, the talks focused on commitments, obligations and controls. Behind the scenes, however, delegates forged new alliances. The industrialized nations, including Germany, wanted to leave behind the old world order -- with rich countries on one side and poor ones on the other -- and hold emerging economies like China, Brazil and Indonesia more accountable for their emissions.

As in Copenhagen, however, envoys representing those countries wanted to hear nothing of it. Instead the Chinese acted as the voice of the developing nations and as the chief blockader

among them. "We were astounded by the extent to which the African countries aligned themselves with China," an EU negotiator would later confess.

An additional emerging economy, one which has now become the world's third-largest emitter of greenhouse gases, likewise showed little willingness to budge: India. Even as growth in China has begun to level off, India's big growth spurt still lives in the future. Indeed, analysts expect economic growth in India to exceed that seen in China within just a few years. In a related forecast, India's consumption of coal is expected to increase from just under 600 million tons to over 1 billion.

When Barack Obama arrived for his state visit in New Delhi at the end of January, Indian Prime Minister Modi announced his contribution to improving the global climate: India plans to expand its solar energy capacity from today's modest 3 gigawatts to 100 gigawatts by 2022. The US, meanwhile, promised to provide a large share of the investments necessary to make that happen in exchange for the opportunity for US companies to invest in the development of India's civilian nuclear energy sector.

Modi, who addressed environmental issues during his campaign, now has other priorities. By 2022, he plans to ensure that all Indians have access to electricity, 24 hours a day. It's a goal that China achieved long ago, not to mention the West. But the price has been large, measured in the mega- and gigatons of greenhouse gas emissions now polluting the atmosphere.

The scale of China's coal consumption is historic in its dimensions: The country is the world's largest producer and consumer of coal and it emits more greenhouse gases than the United States and Europe combined. The cities of Beijing and Tianjin as well as the Hebei and Shandong provinces alone burn more coal than all of Europe.

Hebei is to China what China is to the world: a coal-consuming monster. The province surrounding Beijing has more than 70 million inhabitants and is half as big as Germany. It produces more than double the amount of steel created in the US each year. Seven of China's 10 most-polluted cities are located in Hebei. Among the most polluted is Xingtai, a city two hours away by high-speed train from Beijing. In 2013, Xingtai had a daily average level of 150 micrograms per cubic meter of fine particulate matter, six times the maximum amount suggested by the World Health Organization. Visitors arriving at the city's train station are greeted by an acrid burning smell and the other side of the station is blurred by a gray haze.

One of the biggest polluters is Kingboard Cokechem, a coking plant in the northeastern part of the city. It's a subsidiary of Hong Kong-based, publicly traded Kingboard Chemical Holding, whose shareholders also include major international investors like JPMorgan Chase & Co.

Farmer Zhao Chunhe, 60, stands at the edge of her wheat field located next to the coking facility. Every few minutes, a massive cloud puffs out of its quenching tower. Although the field's yield hasn't changed much since the arrival of the coking plant, she says the color definitely has. "Earlier, the wheat was white," she says. "Now it's black and we have to wash it before we can sell it."

On the street that leads from Zhao Chunhe's village to Kingboard, heavy trucks loaded with coal from the surrounding mines are lined up for kilometers. Empty trucks wait to load the refined coke.

An electronic display board is set up at the factory gate indicating the coking plant's emissions values. On this particular morning, there are 479 micrograms per cubic meter of fine particulate matter, 19 times the recommended amount. Officially, children are no longer allowed to go out onto the playground at this level of smog. During the winter, hundreds of millions of Chinese live in conditions of thick smog. A study by the Global Commission on the Economy and the Climate concluded that air pollution was linked in 2010 to the premature deaths of 1.23 million people in China. In other words, the very industry that is destabilizing the climate is also ruining the health of the people who live near these industrial sites.

In contrast to many countries in the West, the consequences of China's failed environmental policies are clearly palpable. In order to mollify an angry public, Beijing has spent the past three years tightening emissions laws and raising fines for violaters. Chinese Prime Minister Li Keqiang announced in March 2014 that China was "declaring war on pollution."

It's Time for a New Energy Policy

So does Naomi Klein have it right? Is climate protection doomed to failure so long as the world continues to pursue growth?

During that past two centuries, humanity has experienced something never before seen on this scale: a period of almost continuous growth. Earth's population has increased sevenfold since 1800. Per capita earnings have grown on average from $700 to $6,500 per year and economic output is 60 times bigger than it was 200 years ago.

That continual boom, though, was made possible fossil fuels, resources people long held to be inexhaustible. Coal, followed by oil and natural gas, made unprecedented economic growth in Europe, America, Australia and Asia possible.

Naomi Klein's argument sounds almost banal. She believes that growth is inevitably linked to destruction of nature and that the climate can only be protected by curbing economic activity. In other words, the only thing that can help the environment is giving up material things. "Less is more" is the mantra of the degrowth movement, which began more than four decades ago when a research group lead by the American Dennis Meadows was tasked by the Club of Rome to examine the frontiers of economic expansion in 1972. The resulting report was titled, "The Limits to Growth," and the theory that grew out of it has been finding great resonance ever since.

As proof of the irreconcilability of capitalism with environmental goals, economists like to cite the "rebound effect," which holds that all efforts to increase efficiency are negatively offset by increasing demand.

The first person to describe the rebound effect was William Stanley Jevons of Britain. His book, "The Coal Question," was published 150 years ago and described how steam engines required

decreasing amounts of coal because of technological advances. Nevertheless, he noted, consumption of the fuel continued to rise because an increasing number of steam engines were being used. Jevons concluded that more efficient use of energy is not accompanied by sinking consumption. Instead the opposite is true.

Newer car engines use less fuel, heating becomes more efficient and yet the total consumption of oil, natural gas and fuels continues to increase because automobiles get heavier and apartments larger. In that way, what has been gained in efficiency has been lost again -- at least to a certain degree. But the extent of the effect is the subject of debate. A few studies have concluded that no more than 15 percent of the savings are lost. Others claim the loss to be as great as 30, 50 or even 80 percent.

In some cases, though, the rebound effect can also destroy all efficiency gains. Lighting provides a good example. With each level of development -- from the candle to the light bulb to today's LED lights -- less and less energy was required, with efficiency increasing within 200 years by 1,000 times. And yet per capita use of lights has grown at an even faster rate -- by more than 25,000 times.

A similar trend can be observed in crude oil. Thanks largely to improved extraction technologies, the global supply has grown so much that it has caused prices to collapse and triggered a renaissance of gas-guzzling SUVs.

Low energy prices should provide a natural opportunity to reform energy policies, at least in theory. Developing nations could pare back the subsidies they pay to make fuel cheaper for consumers. And industrialized nations should systematically invest the billions saved by consumers through cheap fuel into renewable energies. Unfortunately, though, that kind of farsightedness goes beyond the constraints of the current everyday political reality in which many governments are trapped.

That backdrop is the reason that proponents of degrowth like Naomi Klein consider the idea of green growth to be an illusion, indeed self-deception. But it's a view that Ottmar Edenhofer doesn't share. The researcher says there's a "fallacy" in that thinking.

Edenhofer is a professor for the economics of climate change at Berlin's Technical University, the only academic post of its kind in the world. His office is located on the second floor of a modernized brick building that was formerly part of a Berlin gas plant. The professor stares out at the steel frame of a gasometer, "an icon of the Industrial Revolution," he says almost awestruck. Today electric cars are parked in front of it charging their batteries, and energy for the campus is provided by solar and wind power, biogas and geothermal sources.

Is Germany a Model for the World?

For Edenhofer, the site is the perfect place to conduct his work: Although he's surrounded by physical evidence of the fossil past, it's the transition to renewable energies that dominates the thinking here. Edenhofer says he firmly believes that growth can be managed in ways that are

not in conflict with the environment. For that to happen, it is essential that an important criterion be fulfilled: "We have to put the right price on CO2."

As societies, we haven't succeeded in doing that so far. The European Union has had emissions trading for 10 years now, but the system has never functioned as intended.

The idea is nevertheless a fascinating one. The EU places an upper limit on pollution rights, with just over 2 billion certificates allocated in 2014. Around 11,000 companies participate in emissions trading, purchasing the certificates and trading them amongst each other, thus setting a price for each ton of CO2 emitted.

The problem with the system is that the EU -- under pressure from countries like Poland, where 92 percent of electricity is generated from coal, and Germany, with its strong coal lobby -- issues far more certificates than the companies actually need. The result being that the price on CO2 emissions certificates is stagnating at under €7.

Additionally, the emissions trading system doesn't even cover half of the greenhouse gases that are being emitted. It excludes the transportation, real estate and agriculture sectors. All efforts to change the system are met with stiff resistance. Edenhofer argues that if the price of CO2 were considerably higher, there would be greater incentive to invest in low-carbon technologies. "The problem is not that we're short on fossil energy sources," he says, "it's that there's not enough storage space in the atmosphere. We need to apply a price to this scarcity. That's the whole point."

Of course, it would also be possible to reduce emissions by restricting growth the way Naomi Klein proposes. Edenhofer says it would be conceivable, but costly. Assuming a 1 percent reduction in both economic output and CO2 emissions in an environment of global gross domestic product of $70 trillion and emissions of 33 gigatons, he calculates it would cost $2,100 to cut a ton of CO2.

By comparison, he says it would only cost around $40 to reduce the same amount of CO2 by instead using wind power. Edenhofer believes that deliberately lowering growth is the most expensive option.

The climate economist argues that Earth's fate hinges largely on whether countries can agree to an appropriate price for CO2. Of course, the world is far from reaching any agreement, particularly given that Europe is comparatively more environmentally conscientious than other areas of the world and it still hasn't come up with a working model.

Therefore, at the climate conference in Paris, world leaders will once again be discussing who will have to foot the bill for a global shift to sustainable energies.

The wealthiest countries will have to bring a lot of money to the table. In 2010, they held out the prospect of spending $100 billion a year starting in 2020, with just under one-third of that money coming from governments. The rest was to be raised by private investors. Germany would be responsible for about 10 percent of the fund. "The developing nations are expecting us to provide

reliable financing," says State Secretary Jochen Flasbarth, Germany's chief climate negotiator. "If we don't manage that in Paris, then there will be no treaty."

No real solution has been found at any of the other climate summits over the past 23 years. What if that happens again this time in Paris?

Two countries could prove decisive in the battle to improve the climate globally. One is Germany. As controversial as it is domestically, the "German Energiewende," the shift away from nuclear power and fossil fuels to renewable energies, has become a term that has been picked up internationally. So far, the Germans have gone further than any other country in seeking to address the very existential question at hand: Can an industrialized nation succeed in entirely transforming its energy production within the scope of a few decades? And if so, at what price? Germany has begun this process, but the costs have proven enormous. German electricity customers are currently paying €23 billion a year in extra costs, billions that are the direct result of the expansion of alternative energies.

It is acknowledged globally that the Germans have led the pack in pushing ahead with the development of wind and solar energy. "You shouldered the development costs for everyone else with your Renewable Energies Act," an energy expert from the United States told a delegation from the German parliament attending the Lima conference.

Indeed, the rest of the world is directly profiting from Germany's shift. A study conducted by the Fraunhofer Institute for Wind Energy and Energy System Technology and the Berlin think tank Agora Energiewende found that wind and solar energy are becoming the "cheapest way of producing electricity in an increasing number of regions around the world."

Germany has also been more ambitious than all other countries in setting its goals for emissions reductions. The country is aiming to cut emissions of greenhouse gases by 40 percent compared to 1990 levels by 2020. It's an old target, set by the German government in 2007 and anchored anew in the coalition agreement for Chancellor Angela Merkel's current administration. Despite this, emissions grew considerably in Germany between 2008 and 2013.

This is largely due to the coal industry. In Germany, 80 percent of all energy consumed is still derived from coal, oil or gas. The country remains home to about 500 coal-fired power plants. Germany currently has plans to take 48 coal power stations offline by 2020, but it will need to shut down at least 50 additional plants in order to achieve its emissions target. As of today, there is still no law requiring such closures, and operators of power plans are firmly opposed.

And what about the other country that could provide a solution for climate change?

It turns out that there's an alternative narrative to China's coal-producing Hebei province and its oppressive pollution. In the western part of the country's Gansu province, the skies are upliftingly blue, and giant vehicles can be seen on the highway transporting the elegant white rotor blades of wind turbines.

The first wind park to be seen is located just outside of the city of Yumen and it stretches for as far as the eye can see. So far, around half of the planned 20,000 turbines at the Gansu Windfarm have been erected. Some 7,427 have already been connected to the grid, with a capacity of 8.1 gigawatts, or almost one-quarter of Germany's wind energy output.

A Bit of Hope

China's wind power capacity has quintupled over the past four years. Meanwhile, investments in coal, gas and oil power plants declined by 50 percent in China between 2008 and 2012, whereas those in non-fossil energies rose by 40 percent. In total, around one-third of the electricity produced in China today comes from renewable sources.

It is a telling indicator of the country's enormous hunger for energy that the world's greatest climate polluter is also the biggest user of hydro, wind, solar and bioenergy. China's capacity for renewable energies is greater than that of the United States, Germany, India and Spain combined.

"What we're looking at here is a long-term project," says Li Maolin of the Goldwind wind turbine factory. Pictures mounted on the staircase to his office are of visits from high-ranking party officials right up to President Xi Jinping, who declared the use of clean energy to be part of his "Chinese dream".

It's not necessarily even environmental concerns that are driving China's leaders to green energies. It's also due to their worry that, in their years of economic boom, they have become overly dependent on fossil fuel suppliers. In 1993, China became a net importer of crude oil, natural gas followed in 2007 and coal in 2011.

Ironically, it is China's boundless pursuit of growth that is now contributing to its efforts to make green energy more affordable and thus competitive. In order to secure its energy supplies, China has increased manufacturing of solar panels one hundred fold in the past 10 years. That's one reason that prices for photovoltaic cells have fallen by 80 percent since 2008. A similar development is happening in the wind industry. Recently, Australian economists John Mathews and Hao Tan concluded in the science magazine *Nature* that, in this manner, China is "contributing more than any other country to a climate-change solution."

Whatever the reason or motive behind Beijing's move to reduce coal consumption and increase the share of renewable energies, the rest of the world should accept it because China is officially planning to double both economic output and the per-capita income during each of the next two decades.

Can China succeed, almost as a byproduct of its growth, in saving the climate? Or will it be the Germans, with their more deliberate efforts? Perhaps one should seek to think a bit more daringly here: Maybe humankind will pull off a miracle in the end. After all, destroying the things we love is by no means a law of nature.