

GO FOSSIL

COAL KILLS!



RISE FOR CLIMATE TO BUILD A FOSSIL FREE WORLD +350 PILIPINAS

TR  
FOSSIL FREE

PEOPLE'S DOSSIER ON 1.5°C

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# INDEX

**Executive Summary 4**

**Why We Need To Stay Under 1.5°C 11**

**Stories Of People Fighting For A Fossil Free World 17**

**Oceania 19**

**Japan 21**

**The Philippines 23**

**Thailand 25**

**Kenya 27**

**The Arctic 29**

**Italy 31**

**Senegal 33**

**Brazil 35**

**USA - Louisiana 37**

**USA - Montana and the Dakotas 39**

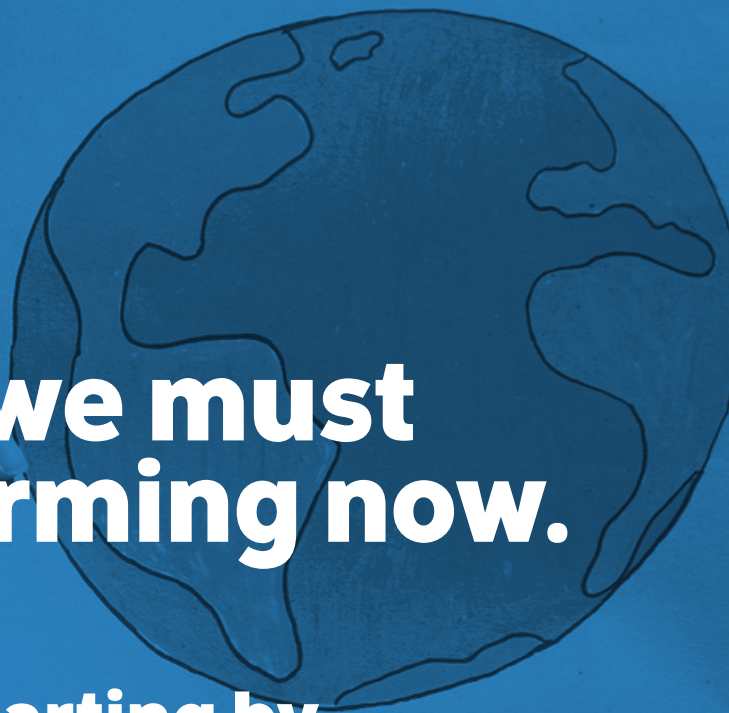
**USA - California 41**

**Canada 43**

**How Do We Get To 1.5°C And Stay There 45**

**Resources 49**

WE ♥



**Scientists say we must stop global warming now.**

**Here's how we do it, starting by blocking fossil fuels in every corner of the planet.**

**PAYAL PAREKH**

Programme Director, 350.org

The People's Dossier on 1.5°C contains the stories of communities fighting against fossil fuel projects and for a fast and just transition to 100% renewable energy. It outlines how climate change is currently impacting them and grounds their fight in the latest climate science.

The bad news first.

With a planet barely 1°C warmer than pre-industrial times, we are witnessing a chain of catastrophic climate-related extremes all over the globe.

If we want to avoid even more dramatic impacts, we have to stay under a 1.5°C increase in global mean temperatures.

The good news? We can do it.

It's going to require systemic change at a pace never seen before, but it is technically feasible, economically sound and it's not only the right thing to do, it's the only choice we have.

To save our planet we need to stop the use of fossil fuels right now and rapidly move to energy systems completely powered by renewable energy. It will be a true energy revolution, but this time around we need to make sure that it is a just and equitable transition.

The Paris Agreement set a temperature target of an increase by 2100 "well below 2°C", with a view to staying under 1.5°C.

That was three years ago.

In the meantime, we have lived through the three hottest years on record - 2016, 2015 and 2017-, with [2018 on track to join the top five](#). Extreme weather events have plagued essentially every corner of the planet.

In the boreal summer of 2017, while scorching heat parched southern Europe [setting fires everywhere](#) from Portugal to Italy - the heatwave was aptly christened "Lucifer"-, over 1,200 people died in [floods across South Asia](#), with over 40 million people being impacted in India, Nepal and Bangladesh. 11 million people were also impacted by the [overflowing of 60 rivers](#) in China, which resulted in floods taking the lives of dozens and destroying some 18,000 homes. A protracted one-in-a-century drought brought the Cape Town region in South Africa to its knees, forcing authorities to ration water supply.

**To save our planet we need to stop the use of fossil fuels right now and rapidly move to energy systems completely powered by renewable energy.**

The boreal summer of 2018 will perhaps be remembered as the summer of wildfires and heatwaves. The coniferous forests in the Swedish part of the Arctic Circle caught fire after an unusually dry season. Wildfires erupted all across the Northern hemisphere, from Athens to California, where the fire was reportedly so hot it created [its own weather system](#). In the meantime Japan experienced [heavy rains and floods](#), which killed over 220 people and forced two million people out of their homes, then a heatwave that killed over 80 people. Japan declared it a natural disaster.

Meanwhile, [95% of coral reefs](#) have been dying at an alarming rate in many subtropical regions, the Arctic and Antarctic ice sheets are [at their lowest since records began](#) and the amount of freshwater that pours into the oceans from melted ice is skewing the balance of salinity in the Atlantic, contributing to [slowing down the Gulf Current](#).

That all of this - and much more- is happening with a "meager" 1°C increase in global temperatures compared to pre-industrial levels should be enough to caution everyone against keeping up with business as usual. It should also explain why the 2°C threshold is not ambitious enough.

It was set, [somewhat controversially](#), as the upper limit beyond which it might be impossible to stop runaway climate change and feedback loops that would further accelerate warming trends even if greenhouse gas emissions stopped overnight. What scientists acknowledge, however, is that even with just a 2°C increase in global mean temperatures, many of the Earth ecosystems as we have come to know them would disappear or change dramatically.

The UN-backed Intergovernmental Panel on Climate Change (IPCC) was commissioned to explore the feasibility of preventing a global temperature rise beyond 1.5°C.

This international team of scientists have produced a report, signed off by our governments, confirming that limiting the rise in global temperatures to 1.5°C would be [significantly better](#) than breaching the 2°C threshold. But to achieve it will require deeper cuts

to emissions and a much faster transition to energy systems based on 100% renewable energy.

According to the IPCC the pathways consistent with a 1.5°C limit require to cut emissions in half by 2030, with the share of solar, wind and hydro energy increasing 60% by 2020, to then provide 49-67% of total energy by 2050.

In other words, the 1.5°C target is still achievable, but the window of opportunity is narrowing ever so rapidly and the transformation needed is going to require decided and swift actions globally.

Unfortunately, we are not nearly on track to showing the type of response that the situation would require.

The Paris Climate Agreement relied on national governments to submit Nationally Determined



Contributions (NDCs), essentially their voluntary plans for how they intend to tackle climate change. All of the current NDCs combined, however, would only get us to [a world 3.5°C warmer](#) than pre-industrial levels, an increase in global temperatures that lands us squarely into the scenario of catastrophic and runaway climate change.

Some of the biggest emitters had already put forward highly insufficient commitments, which they have in the meantime signalled that they will drop. President Trump's announcement that the U.S. would withdraw from the Paris Agreement created a precedent that some of the known climate laggards, such as Australia, are poised to follow, largely on the grounds that climate action would allegedly hurt the economy, when the exact opposite is in fact true.

According to [an Obama-era White House report](#), a 4°C temperature rise would cost the global economy 3.1% of the global GDP a year. Conversely, achieving the 1.5°C target might [save the world about \\$30tn in damages](#) compared to 2°C, far more than the costs of cutting carbon emissions. In practice, achieving the 1.5°C target will actually make us 3% richer by 2100.

We only have a couple of decades left to secure a 2°C target and a handful of years to have a decent chance of staying under a 1.5°C increase in global temperatures. In other words, there is no time to waste.

Achieving the 1.5°C target will require an unprecedented effort on a scale such as the world has never seen before.

The required transformations are so deep, large and urgent that they cannot possibly be left to market forces alone.

In recent years we have seen a clear trend with fossil fuel investments dropping and renewable energy production and jobs increasing substantially. However, even if such a trend continued, it would not secure the rapid and just transition that we need to stay under 1.5°C.

Laws and policies need to change at all levels of government; financial institutions need to incorporate scientific evidence in their assessments of energy projects; fossil fuel extraction needs to be phased out very rapidly and new fossil fuel projects cannot see the light of day; lifestyles will need to change, from the way we work to the way we eat and the way we move around.

**Achieving the 1.5°C target will require an unprecedented effort on a scale such as the world has never seen before.**

According to CarbonBrief, to have a decent shot of staying under 1.5°C we would need to cap our total future emissions between now and 2100 to about 120 GtCO<sub>2</sub>e. To put this in perspective, the world emits on average 40 GtCO<sub>2</sub>e every year. The known fossil fuel reserves are [somewhere between 2,734 and 5,385 GtCO](#). That's between 23 and 45 times more than we can afford.

What this means is that [we have less around three years](#) of emissions as usual before we hit the budget for 1.5°C. If we start slowing down emissions dramatically now, we might get a few more years of controlled phase-out. But this means no new fossil fuel extraction projects, anywhere, ever again.

Spelled out this way, it would seem that too many

changes would need to take place, and too rapidly. Unfortunately, such changes will have to happen nonetheless. We don't have a choice between action and inaction. We only have a choice between acting when we can still make a difference or being forced to act when it will be too late to preserve the planet more or less as we know it.

Fortunately, the solutions are already at hand.

Last year, a team of researchers developed [100% renewable energy roadmaps](#) for 139 countries, making it clear that even at the current technological levels, we would be able to power our economies entirely through renewable energy.

A [global conversion to renewable energy sources](#) can deliver a net gain of over 24 million jobs worldwide, prevent 4.6 million premature deaths yearly - it will eliminate over \$20 trillion in air-pollution costs and almost \$30 trillion in climate costs by the year 2050. A just transition will stabilize energy prices and increase access to energy by decentralizing power.

But when?

According to the IPCC, renewable energy could account for almost 80% of the world's energy supply within four decades. That is, if governments pursue the policies needed to promote green power.

On the much shorter term, by 2020 renewable energy will be consistently cheaper than fossil fuels both at producer and consumer ends. And this is not only about large solar panel fields or wind farms. In recent years, off-grid solar energy has been [one of the fastest growing industries](#).

Off-the-grid renewable energy also helps combat energy poverty, potentially providing access to energy to the one billion people still without electricity, [eliminating the costs of building cumbersome infrastructures](#) and protecting communities from the immediate impacts of fossil fuels extraction and use for energy production.

In short: we have the means to dramatically cut our emissions within the timeframe needed to give us a good chance to stay under 1.5°C. Nature-based carbon-dioxide removal (for instance through reforestation and afforestation) can give us the





extra boost needed to quickly reach a peak of CO<sub>2</sub> concentration in the atmosphere, without the massive deployment of carbon capture and geo-engineering technologies, most of which are unproven, were never implemented on a large scale and carry unspeakable potential drawbacks to their very use, such as the case with solar radiation management, which might actually make things worse if implemented only in some places or suddenly stopped.

## It's clear that the fossil fuel industry is trying to squeeze a little more juice from their current business model before being forced to change the tune.

The hard truth is that we can't engineer our way out of the climate change mess.

We need to start making some real changes, instead.

Real climate action means:

- Building decentralized renewable energy infrastructure that serves everyone's needs and doesn't just replace a big plant with another, excluding workers, citizens, farmers and wildlife.
- Addressing energy poverty by making leapfrogging to renewable, clean energy accessible for the many in the global South, for instance through investments in off-the-grid small scale renewable energy that can power up the homes of millions across the global South.
- That workers in the fossil fuel industry are given a chance to be part of the energy revolution. Small-scale renewable energy projects need more trained workers to build, install and maintain infrastructure than the fossil fuel industry would ever need.
- No swapping of one fossil fuel for another. It means no fossil fuels, period.
- Jobs, innovation and opportunities are possible with a low-carbon transition. There are no jobs on a dead planet, there is no innovation in propping up the fossil fuel illusion, there are no opportunities if the people have to leave their homes and lives behind when the next hurricane or drought hits them.

Three fundamental things need to happen for the world to have a shot at staying under a 1.5°C increase in global temperatures:

- 1 We must stop all new fossil fuel projects. It's clear that the fossil fuel industry is trying to squeeze a little more juice from their current business model before being forced to change the tune. From the Adani coal mine in Australia, to the TransMountain pipeline in Canada, the Keystone XL in the US and the TAP gas pipeline in Southern Europe, from the pre-salt oil fields currently being auctioned off by the Brazilian government to the coal plants being planned in Kenya, South Africa and all over the Asian continent, all of these projects need to never see the light of day.
- 2 Not a penny more can go to dirty energy companies and projects. Those who have control of the money, often our money, need to immediately and massively divest from fossil fuels and invest instead in renewable energy, energy storage and low-carbon

transition projects in the transport, building and agriculture sectors.

- 3** We must dramatically accelerate the transition to 100%, locally distributed, renewable energy systems, with off-the-grid solar and wind power and community-led energy production. This will take away power from energy giants and put it back where it belongs, with the people, while ensuring that we stop soiling our planet with the byproducts of fossil fuels extraction.

The weight of the climate crisis falls on those who have the least to do with creating and perpetuating it, including indigenous communities, climate vulnerable countries, low income communities of color, and the poorest communities bearing the brunt of fossil fuel extraction, overburdened with unsafe and unfair levels of exposure to pollution

Tackling the climate crisis requires building a new economy that works for all and leaves no one behind. A fast and fair transition away from fossil fuels to a renewable energy economy must protect these most vulnerable communities. Workers must be truly heard by companies and governments to develop employment plans that include training, support and, if appropriate, re-skilling of workers.

Left to their own devices, politicians and government officials would once again prove, through their inaction and dependency on fossil fuel money for their campaigns, how pervasive and toxic the fossil fuel dominance is.

A global uprising for climate action is underway, led by local communities and built from the ground up, which aims to tip the scales in favor of the fossil free world we need to see. People worldwide are already spearheading the change, taking action to confront those who are profiting from climate change and taking power for the people by promoting the kind of community-controlled and just alternatives we need.

The People's Dossier on 1.5°C contains the stories of these communities.

# Tackling the climate crisis requires building a new economy that works for all and leaves no one behind.

Based on the latest IPCC Assessment Report and more recent available science, it outlines how climate change is currently impacting those communities and how it will impact them at 1.5°C, 2°C and 3.5°C. It shows how and why citizens, activists and communities worldwide are fighting against fossil fuel projects, pressuring institutions to divest and working to support the 100% renewable energy transition.

The People's Dossier on 1.5°C puts faces and voices onto the facts and data that the IPCC Special Report on 1.5°C provides. It shows readers why we should all care more for this existential fight, and how each one of us can make the difference, not only through personal choices, but joining others, building grassroots movements from the ground up.

This, we believe, is our best shot at securing lasting change and creating the right momentum to secure, by 2020, a fast and just transition to a more equitable, fossil-free world.

Enjoy the read.

**WHY WE NEED TO STAY UNDER 1.5°C**

**COAL  
KILLS!**

**Impacts of climate change will be much worse at 2°C than at 1.5°C for all of the Earth's systems.**

**Here's a breakdown of what this means.**

The Paris Agreement commits the 195 countries that have signed on to the treaty to collectively keep global temperature rise “well below” 2°C”.

Thanks to relentless efforts by a coalition of island and vulnerable countries, the final wording of the treaty also says that countries would be “pursuing efforts to limit the temperature increase to 1.5°C above pre-industrial levels, recognizing that this would significantly reduce the risks and impacts of climate change”.

How significantly? A lot.

Over the past few years, the climate science community has been delving into this question, ending up with evidence that points to serious reasons for concern.

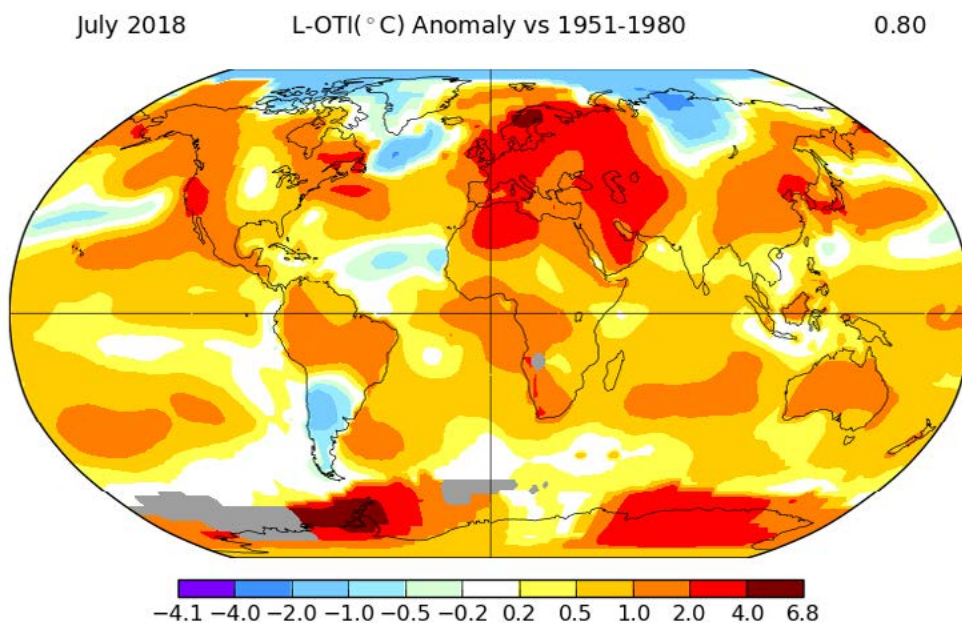
First of all, current climate plans set forth by national governments, if implemented, would only get us a 3.5°C warmer planet.

However, even if their plans were consistent with a 2°C temperature rise (technically, giving us a 66% chance of staying under 2°C), this would still mean unspeakable losses, especially for vulnerable and frontline communities. It would also take a heavy toll on ecosystems, changing large areas of the planet into more dangerous, poorer and harder places to live in.

This has started already. Human induced global warming is currently at about 1°C above pre-industrial levels. In July 2018, temperatures over much of Europe, North Africa and Central Asia were between 2°C and 4°C warmer than the average 1951-1980. Parts of the Antarctica were over 6°C warmer.

At less than 1°C above pre-industrial temperature average, we are seeing more weather extremes and other climate change effects than was predicted only a few years ago. According to a recent Nature Climate Change paper, “[due to time-lagged effects in many systems, we have not experienced the full impact of present-day warming yet](#)”. This is probably not surprising, as scientists tend to err on the side of caution and the models they use to make these predictions get more complex over time. This is important because current science tells us we are heating the world at about 0.2°C per decade and we are on track to hit the 1.5°C guardrail by 2040, if not earlier.

So, why should we make sure to keep warming close to the 1.5°C mark? In this section, we have compiled a list of projected climate impacts at 1.5°C and 2°C on key planetary systems. The scientific evidence compiled here is but a tiny fraction of all the published and peer-reviewed research out there, and it paints a stark enough picture.



## Heat

When scientists and journalists talk about temperature changes, they generally refer to global mean temperature changes on land.

This means that a global mean temperature increase of 0.5°C, for instance from 1.5°C to 2°C, is not equally distributed across the planet. Warming on land is more prominent than on the oceans. More worrying still is that the effects on temperature extremes of a 0.5°C warming can be as high as four or five times the global mean. If we cross the 1.5°C line and head towards 2°C, many places will actually warm way beyond the extra 0.5°C, and up to 2–2.5°C more in some regions.

Here's what this means in practice:

- [Studies](#) show that at 1.5°C warming, Kolkata would experience a similar heatwave to the deadly 2015 heatwave every year. At 2°C, Karachi would also have comparable heat waves per annum.
- The same study indicates that globally, twice as many megacities could suffer similar effects under a 1.5°C scenario. The net result would be around 350 million more people affected by similar heatwaves by 2050.
- According to [another study](#), keeping warming limited to 1.5°C would mean 15 to 22% less heat related deaths every summer, compared to a 2°C scenario, in key European cities.
- The [already drying](#) Mediterranean, including North Africa and the Middle East; South of Africa; Northeast Brazil will be severely affected in terms of water availability. The Mediterranean, for example, [is projected](#) to have 17% less fresh water at 2°C, as opposed to 9% at 1.5°C.

## Fire

That wildfires have been increasing in frequency and intensity is a [well established fact](#). In fact, [a study published in 2012](#) predicted that, without rapid and drastic measures to reduce CO<sub>2</sub> concentration in the atmosphere, the likelihood of fires would increase by 37.8% globally between 2010–2039 (<1.5°C) and by 61.9% in 2070–2099 (>3.5°C).

## Storms

The effects of climate change on increasing the intensity of tropical cyclones has been well known for years. [Recently, several](#) studies on the effects of warming on the precipitation associated with hurricane Harvey foreshadowed the slow moving storm surge of the recent [hurricane Florence](#). Further warming at 1.5°C or 2°C will increase moisture even more, at [about 7% for every 1°C above average](#). Since local warming can at times far exceed the global mean, this could mean exponentially more flooding for coastal regions. Experts are already wondering whether we will need to add a sixth grade to the five-grade scale measuring the intensity of hurricane winds.

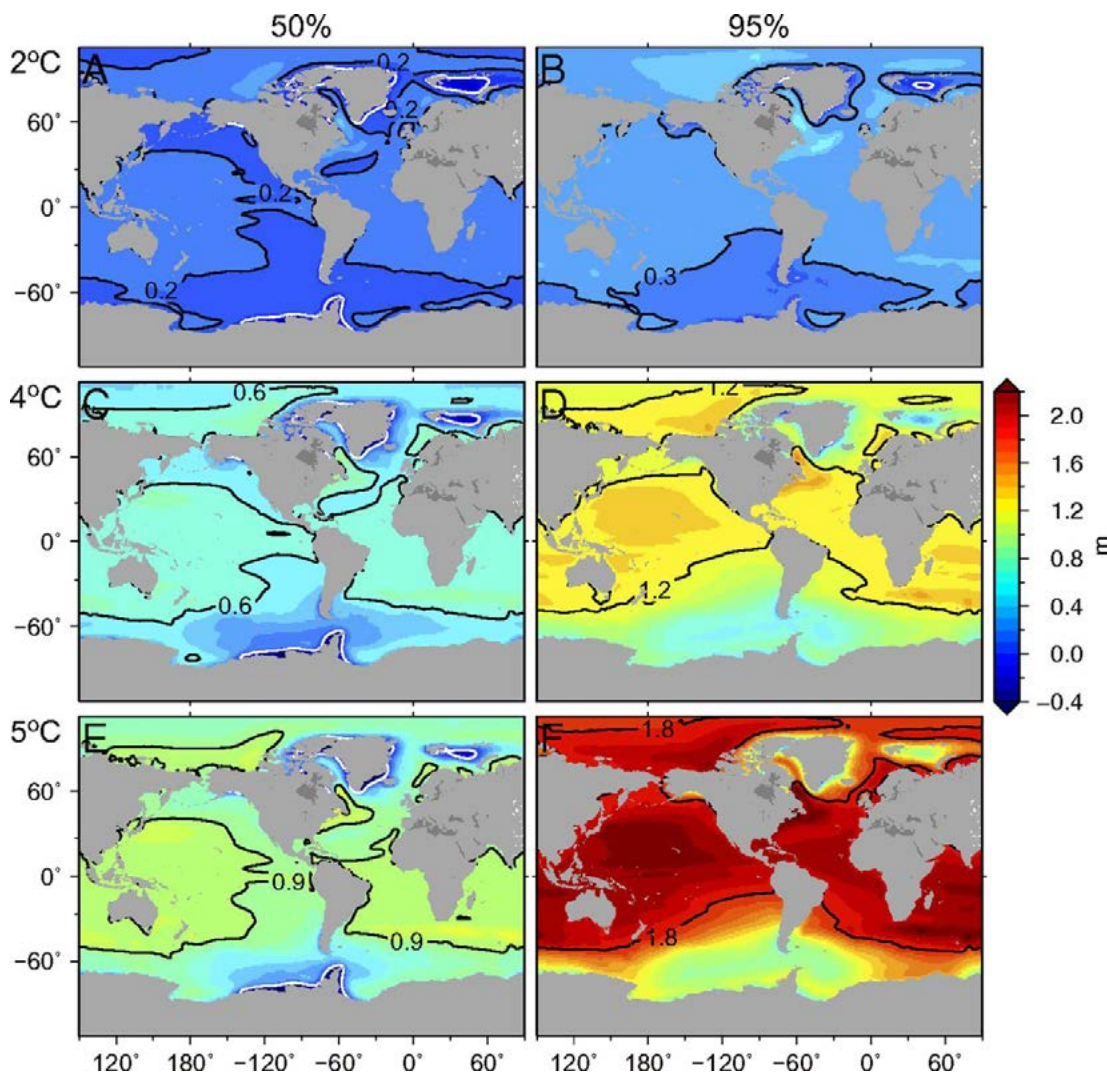
**Effects on temperature extremes of a 0.5°C warming can be as high as four or five times the global mean.**

## Sea ice and sea level rise

Coastal regions are also at risk from sea level rise. Arctic summer sea ice is fast receding. There's uncertainty as to when exactly the Arctic will be ice free during summer months but most models agree on a target between 1.5°C and 2°C, with some models suggesting a small possibility of the Arctic being fully ice free during summer months even at 1.5°C. [A recent study](#) predicts that "median global rises in sea level for 1.5°C and 2°C stabilization by 2300 are about 0.9 m and 1.2 m, respectively".

The good news is that year round sea ice could return, provided the climate is stabilized at a suitable level (at or below 1.5°C).

The bad news is that it's not only sea ice that is affected by warming. [According to scientists](#), 28-44% of current glacier volume is unsustainable and would eventually melt in the current climate (1°C above pre-industrial). Further warming to 1.5°C and 2.0°C "would lead to 159 (115–179) and 191 (139–205) mm" of sea level rise from glacier melt.



"Regional sea level projections for warming of (A and B) 2°C, (C and D) 4 °C, and (E and F) 5 °C relative to 1986–2005. A, C, and E show median projections, and B, D, and F show upper limits (95%). Black contours mark global sea level value, and white contours correspond to zero sea level rise."

Source: Coastal sea level rise with warming above 2°C, Svetlana Jevrejeva, Luke P. Jackson, Riccardo E. M. Riva, Aslak Grinsted, John C. Moore, *Proceedings of the National Academy of Sciences* Nov 2016, 113 (47) 13342–13347; DOI: 10.1073/pnas.1605312113

As a result, hundreds of millions of people, especially those living in coastal areas are at risk from sea level rise. By 2030, a total of 400 million people will be living in 23 coastal megacities, [including 370 million living on the coasts of Asia, Africa, and South America](#).

Even at 2°C of warming, more than 70% of global coastlines will experience sea-level rise greater than 0.2m. With 4°C of warming, 80% of coastlines could experience 0.6m of sea-level rise. Erosion, flooding, and other associated factors will increase the

vulnerability of coastal areas to sea level rise. In fact, [the cost of adapting coastal areas to sea level rise](#) is one of the strongest arguments for mitigation.

Coastal areas are also under other risks through the collapse of marine life as coral reefs disappear rapidly. Unfortunately, [more than 70% of global coral reefs](#) can die because of bleaching, even at 1.5°C. At 2°C, the prediction for under risk reefs rise to 99%. The loss of reefs and associated marine life would place considerable more strain on communities making their living out of those resources.

		1.5°C	2°C	
<b>Heat wave (warm spell) duration [month]</b>				
Global		1.1 [1;1.3]	1.6 [1.4;1.8]	Tropical regions up to 2 months at 1.5°C or up to 3 months at 2°C
<b>Reduction in annual water availability [%]</b>				
Mediterranean		9 [5;16]	17 [8;28]	Other dry subtropical regions like Central America and South Africa also at risk
<b>Increase in heavy precipitation intensity [%]</b>				
Global		5 [4;6]	7 [5;7]	Global increase in intensity due to warming; high latitudes (>45°N) and monsoon regions affected most.
South Asia		7 [4;8]	10 [7;14]	
<b>Global sea-level rise</b>				
in 2100 [cm]		40 [30;55]	50 [35;65]	1.5°C end-of-century rate about 30% lower than for 2°C reducing long-term SLR commitment.
2081-2100 rate [mm/yr]		4 [3;5.5]	5.5 [4;8]	
<b>Fraction of coral reef cells at risk of long-term degradation [Constant case, %]</b>				
2050		90 [50;99]	98 [86;100]	Only limiting warming to 1.5°C may leave window open for some ecosystem adaptation.
2100		70 [14;98]	99 [85;100]	
<b>Changes in local crop yields over global and tropical present day agricultural areas including the effects of CO<sub>2</sub>-fertilization [%]</b>				
Wheat	Global	2 [-6;17]	0 [-8;21]	Projected yield reductions are largest for tropical regions, while high-latitude regions may see an increase. Projections not including highly uncertain positive effects of CO <sub>2</sub> -fertilization project reductions for all crop types of about 10% globally already at 1.5°C and further reductions at 2°C.
	Tropics	-9 [-25;12]	-16 [-42;14]	
Maize	Global	-1 [-26;8]	-6 [-38;2]	
	Tropics	-3 [-16;2]	-6 [-19;2]	
Soy	Global	7 [-3;28]	1 [-12;34]	
	Tropics	6 [-3;23]	7 [-5;27]	
Rice	Global	7 [-17;24]	7 [-14;27]	
	Tropics	6 [0;20]	6 [0;24]	

*Summary of key differences in climate impacts between a warming of 1.5°C and 2°C above pre-industrial and stylized 1.5°C and 2°C scenarios over the 21st century. Square brackets give the likely (66%) range.*

*Corrigendum to Earth Syst. Dynam., 7, 327–351, 2016 [www.earth-syst-dynam.net/7/327/2016/](http://www.earth-syst-dynam.net/7/327/2016/)*

# The economic benefits of keeping global warming under 1.5°C could reach US\$20 trillion by 2100.

GDP per capita would be reduced by 13% by 2100. By comparison, economic impacts at 1.5°C on GDP growth would be almost indistinguishable from current conditions (1°C).

According to a recent [Stanford study](#), there's a 75% chance that keeping global warming under 1.5°C would significantly reduce economic losses compared to a 2°C temperature increase. The estimation is that there's a 60% chance that cumulative benefits could reach US\$20 trillion by the end of the century. Conversely, the losses in terms of global economic output would be considerably greater at 2°C or beyond. Per capita output would shrink by 15-25% in a 2.5-3°C warmer world, and global economic output could be as much as 30% lower under a 4°C warming scenario.

## Food and health

Both the [availability of food](#) and the [quality of it](#) is adversely affected with marked differences between carbon concentration in the atmosphere. A 1.5°C world yields more crops and the food is more nutritious. A similar effect is in place [for fisheries](#). Fish stocks and size are "somewhat affected" under a low warming scenario corresponding to 1.5°C, but they are "severely affected" under higher warming scenarios.

## Economy

According to a 2016 [Nature study](#), the current social cost of carbon could increase eightfold, from US\$15 per tCO<sub>2</sub> to US\$116 per tCO<sub>2</sub>, as climate tipping points are reached.

The authors argue that optimal policy would be an "immediate, massive effort to control CO<sub>2</sub> emissions, which are stopped by mid-century, leading to climate stabilization at <1.5°C above pre-industrial levels". [Another recent study](#) finds that 2°C warming would imply "significantly lower projected economic growth for a large set of countries", in fact average





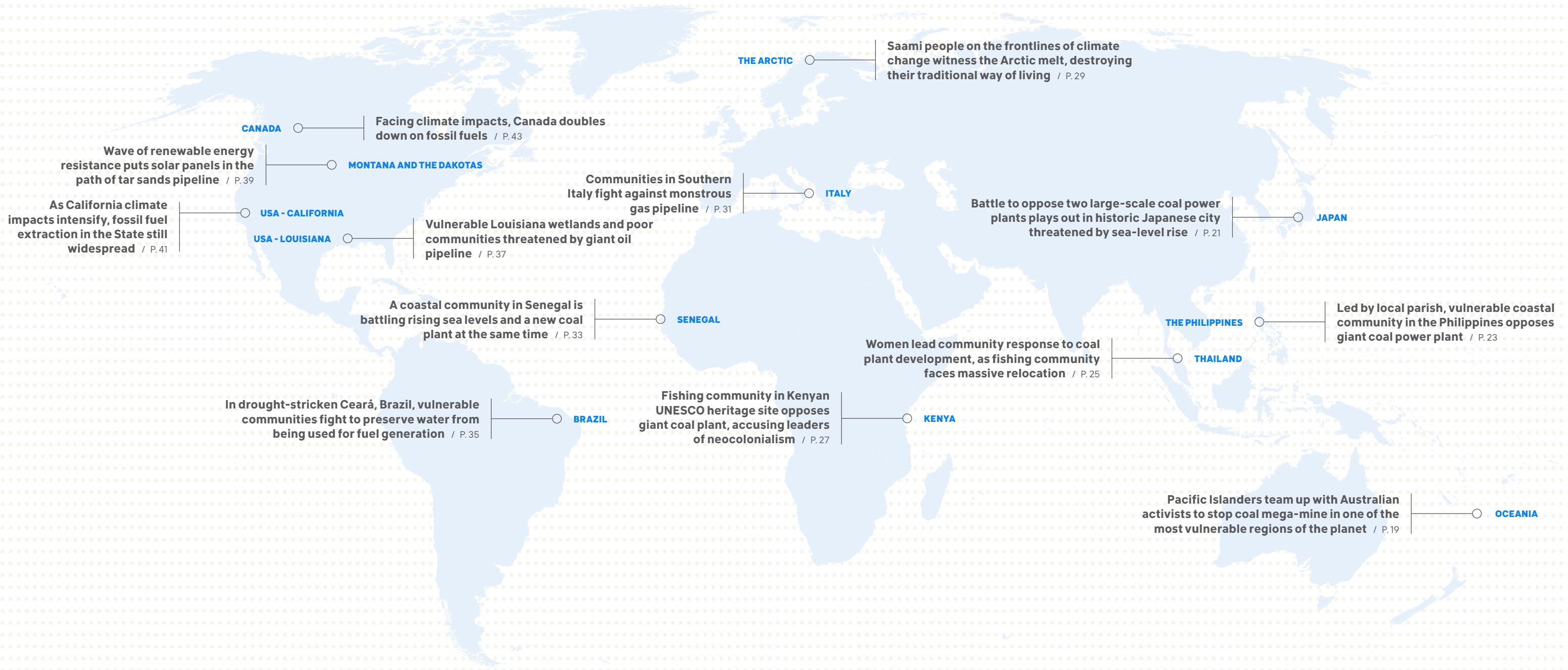


**THE PEOPLE FIGHTING FOR A FOSSIL FREE WORLD**

**Our fossil fuel addiction  
is burning, drowning and  
starving the planet.**

**Here are some stories of people  
fighting to stop it and replace it with  
something better.**

# THE PEOPLE FIGHTING FOR A FOSSIL FREE WORLD



THE ARCTIC

Saami people on the frontlines of climate change witness the Arctic melt, destroying their traditional way of living / P.29

CANADA

Facing climate impacts, Canada doubles down on fossil fuels / P.43

MONTANA AND THE DAKOTAS

Wave of renewable energy resistance puts solar panels in the path of tar sands pipeline / P.39

USA - CALIFORNIA

As California climate impacts intensify, fossil fuel extraction in the State still widespread / P.41

USA - LOUISIANA

Vulnerable Louisiana wetlands and poor communities threatened by giant oil pipeline / P.37

Communities in Southern Italy fight against monstrous gas pipeline / P.31

ITALY

Battle to oppose two large-scale coal power plants plays out in historic Japanese city threatened by sea-level rise / P.21

JAPAN

A coastal community in Senegal is battling rising sea levels and a new coal plant at the same time / P.33

SENEGAL

Women lead community response to coal plant development, as fishing community faces massive relocation / P.25

THE PHILIPPINES

Led by local parish, vulnerable coastal community in the Philippines opposes giant coal power plant / P.23

THAILAND

In drought-stricken Ceará, Brazil, vulnerable communities fight to preserve water from being used for fuel generation / P.35

BRAZIL

Fishing community in Kenyan UNESCO heritage site opposes giant coal plant, accusing leaders of neocolonialism / P.27

KENYA

Pacific Islanders team up with Australian activists to stop coal mega-mine in one of the most vulnerable regions of the planet / P.19

OCEANIA

## OCEANIA

# Pacific Islanders team up with Australian activists to stop coal mega-mine in one of the most vulnerable regions of the planet

The Carmichael mine proposed by fossil fuel giant Adani will be shipping millions of tons of coal through the Great Barrier Reef, increasing sea levels and making heatwaves worse and more frequent across Australia and the Pacific Islands.

While sea levels rise in the Pacific, huge droughts devastate and wildfires burn through Australia on a regular basis, a giant coal mine has been proposed right next to where Australia's greatest environmental asset, the Great Barrier Reef, lies. Under the motto "We are not drowning, we are fighting", Pacific climate activists are determined to stop it.

The Carmichael coal mine project, proposed by the Indian fossil fuel corporation Adani, will become one of the largest coal mines on the planet, covering an area of 200 square kilometres and producing 60 million tonnes of coal per year, all of which will be shipped through the Great Barrier Reef.

The coal deposit is part of the Galilee Basin, one of the world's largest untapped coal reserves, where a further eight new coal mines have been proposed. If they go ahead, the coal from these projects would unleash 705 million tonnes of carbon dioxide into the atmosphere each year. This would more than double Australia's annual coal production and burn through 5% of the world's carbon budget.

To build and run its proposed Carmichael coal mine, Adani also wants to extract a billion litres of water per year from a river in drought-stricken central Queensland for decades to come.

Australia is a "carbon bomb" country - the biggest exporter of coal and liquid natural gas on Earth.



## Oceania at >1.5°C

1.5°C will be already a challenge for small islands in the Pacific: changes in rainfall and temperature patterns, increased frequency of weather extremes, more intense tropical cyclones and higher sea levels will all contribute to the loss of critical ecosystems, freshwater resources and related livelihoods.

However, limiting global warming to 1.5°C can, among other things, substantially reduce freshwater stress projected under 2°C by 2030 and benefit marine fisheries, reducing the decline in maximum catch potential expected at >1.5°C scenarios.

According to scientists, with 2°C of warming, more than 70% of global coastlines will experience sea-level rise greater than 0.2m, with the associated threats from salinisation, flooding, permanent inundation and erosion.



While many of its closest neighbours are directly threatened by climate change, the Australian government acts as a powerful advocate for the coal industry, ignoring the existential threats its Pacific neighbours face.

Australia and the Pacific Islands have already witnessed the destructive potential of climate change. Australia is currently in a record drought and massive wildfires have already ravaged parts of the east coast this winter. The summer ahead looks devastating. Surging storm fronts and sea level rise have even forced some Pacific Islands States to plan the relocation of their entire population within a few decades.

Unless we rapidly bring greenhouse gas emissions to zero and keep the planet from warming over 1.5°C above pre-industrial levels, scientists estimate that 99% of coral reefs globally will be subject to coral bleaching annually. Opening up massive new coal fields and mines like the Adani mine will ensure we unleash the worst of climate change.

Despite the Australian government's determination to strongly support the Adani mine, the people of Australia have been fighting against it in one of the biggest community mobilisations ever seen. The #StopAdani movement has made the issue front page news, pressuring banks into withdrawing support to the project and galvanised a major new community revolt on climate change.

Over the past few years, the Pacific Climate Warriors, a network of young Pacific Islanders who are campaigning on the frontlines of climate change, have been strengthening their ties with the large diaspora community of Pacific Islanders in Australia. In the recent past, Pacific Climate Warriors from 12 Pacific Islands entered the port and coal terminal of Newcastle with their traditional hand-carved canoes to protest against the Australian government.

In 2018 they have plans to knock on the doors of fellow Pacific Islanders and other Australian citizens to raise awareness on the threat that the Adani coal mine poses to lives, livelihoods and ecosystems in the Pacific.

"We have to find ways to keep coal and gas in the ground. People all around the world are recognising this and taking action to challenge the power of the fossil fuel industry. For us Pacific Islanders, there is nothing more urgent or necessary" said Mikaele Maiava, Pacific Climate Warrior from Tokelau.

While the conservative Australian government is more than ever in the firm grip of the coal lobby, the opposition has so far been lukewarm in denouncing the Adani project and the sheer lack of climate action by the federal government. As general elections get closer, activists plan to put the issue of climate change and the urgency of contrasting it by withdrawing any social license to the fossil fuel industry at the centre of the public debate in Australia.

"The decisions made by the Australian government will have a serious impact on the future for all Australians and our neighbours. It is up to us to ensure these decisions are made to protect us, not create greater threat" said Blair Palese, CEO of 350.org Australia.

**The Australian government acts as a powerful advocate of the coal industry, ignoring the existential threats its Pacific neighbours and its own citizens face.**

## JAPAN

## Battle to oppose two large-scale coal power plants plays out in historic Japanese city threatened by sea-level rise

In Kobe, Japan, an activist group is facing off with a controversial company's plans to build coal plants, and offering hope for the region's future.

Kobe, situated between the sea and the Rokko mountain range in Japan's Hyogo Prefecture, is considered to be one of the most beautiful and attractive cities in the Kansai region. It is also home to a 1,400-megawatt coal-fired power station. Now, a group of local citizens, environmental organizations, and environmental policy and law experts is fighting to stop the construction of two new large-scale coal power plants.

The group states that the additional plants would further pollute the skies of Kobe with emissions of sulfur oxides (SOx) and nitrogen oxides (NOx), byproducts of burning coal that contribute to respiratory disease and degrade the environment through acid rain and damage to plant life, among other impacts.

Air pollution and environmental degradation will not be the only effects of adding new coal infrastructure

in the city. In 2017, the Guardian released a [report](#) on the world's cities most susceptible to sea level rise as a result of a 3-degree warming of the planet. Osaka City, directly west of Kobe, was designated as one of the most vulnerable, where 5.2 million people are projected to be impacted by global sea-level rise, storm surges, and other factors. Coastal cities along Osaka Bay, including Kobe, are also thought to be highly vulnerable.

The most recent edition of the [United Nations Environment Programme's Emissions Gap Report](#) states that as a necessary condition for keeping warming below the 1.5-2°C threshold, as laid out in the Paris Agreement, no new coal power can be built and an accelerated phasing out of existing plants will be needed. Further expanding coal capacity in Kobe will only contribute to global temperature increase and sea level rise.



### Japan at >1.5°C

According to the Central Environment Council of Japan, at 1.5C the number of days with temperatures of 30°C or higher will increase by 12 to 27 days per year. If climate change is not addressed rapidly, annual mean temperature might increase by over 4°C, relative to the end of the 20th century. The country would also face increased flooding, adverse effects to most of its agricultural produce and biodiversity, increased risks to its coastal cities through sea level rise and stronger cyclones.

Plans to build additional coal plants in the city are led by Kobe Steel, a major Japanese steel manufacturer headquartered in Kobe. The company has a notorious history when it comes to air pollution. In the 1970s, [Kobe Steel was among ten companies that were taken to court](#) by local residents for air pollution at the root of man-made diseases that affected thousands of citizens. 20 years later, the companies admitted their fault and issued apologies compensation to those who had been affected, settling the dispute

Kobe Steel's current plans to push through new coal power plant constructions despite overwhelming opposition from the community illustrates how little the company learned from its polluting past.

Reputational challenges related to improper conduct in product assessments has also created roadblocks for Kobe Steel. In August 2017, the company admitted it had falsified certifications on the strength and durability of its metals for at least a decade. In October 2017, the Hyogo Prefecture government suspended the company's environmental impact assessment for the planned plants, citing the company's dishonesty in falsifying its product information.

[Research](#) produced by 350.org Japan indicates that financial institutions are at fault for fanning the issue by increasing their loans and underwriting services to companies including Kobe Steel who are engaged in domestic coal development after the Paris Climate

Accord was signed in 2015. Mizuho Financial, Sumitomo Financial Group and Mitsubishi UFJ were the top 3 creditors and provided approximately 62% of the credit identified as attributable to coal development.

Currently, the battle to oppose the new coal plants are mired as [the local group has decided to take Kobe Steel to court](#) over air pollution concerns and climate change risk.

"In recent years, we have seen an increase in the number of extremely hot days and torrential rains. The effects of global warming have never felt as real as they do now" said Haruka Kubo, professor at the Konan University and one of the members leading the litigation case. "Besides the inevitable impacts on the stability of the climate, the power plants will be built in the immediate vicinity of a population densely populated with children vulnerable to pollution and patients affected by man-made diseases. It is obvious that these coal power plants will lead to many problems, but the current political and legal systems in Japan are not effective in stopping the construction. Thus, we have decided to take matters into our own hands and decided to go to the courts."

**Kobe Steel's plans to push through new coal plants despite overwhelming opposition from the community show how little the company learned from its polluting past.**



## THE PHILIPPINES

# Led by local parish, vulnerable coastal community in the Philippines opposes giant coal power plant

Atimonan, Quezon, has been for years at the center of the debate, opposing fossil fuel development and implementing small-scale renewable energy as a solution for the country's energy future.

A frontline community already dealing with the impacts of climate change, Atimonan is also confronting the power of the fossil-fuel industry and its plans to develop a huge coal power plant in the vulnerable coastal area.

The proponent of the plant, Meralco PowerGen, converted an earlier plan to build a liquefied natural gas (LNG) combined cycle power plant into a traditional coal plant. The local government was quick to approve the project believing that it would generate jobs for local construction workers, aside from a tax windfall expected from the plant's operations.

The proposed 1,200-megawatt coal power project will be the fifth such plant in the province, sitting on the Philippines' eastern seaboard, an area deemed four times more vulnerable to sea-level rise than

the average of similar areas globally. The project is widely regarded as a glaring example of the country's needless and dangerous dependence on coal. One of the main concerns of those opposing that plant is that the project will lock the town into up to 40 years of coal dependence.

Local opposition to the construction of the plant is led by the Our Lady of the Angels parish, who have for the past few years been organizing the community, joining the national campaign for energy transition and implementing community-based renewable energy solutions.

Over the past 3 years, the church has organized the community through educational campaigns targeting different segments of the town's population, all with the intent of getting them to participate to public mobilizations. As a result of this



## The Philippines at >1.5°C

The Philippines are often in the path of tropical storms, some of which may reach an intensity comparable to a category 5 hurricane. Increasingly warm seas will further exacerbate this problem, endangering in particular coastal communities on the storm front.

Crop yields will also be negatively affected by climate change, at a greater degree at 2°C and beyond. Current temperatures are in fact already reaching critical levels during the months of the year when the rice plant is more susceptible to temperature stress.

grassroot work, thousands hit the streets to voice their opposition to the project.

A recent economic study concluded that the proposed coal plant in Atimonan is a risky proposition at best, since investors have already caught on to the fact that coal is no longer the least-cost option for baseload demand, even before externalities such as public health impacts and environmental damage are factored in.

While trying to block the construction of this giant coal power plant, the community has been eager to implement solutions to energy needs that offer an alternative path to energy independence for the region. The Our Lady of the Angels parish installed 12 kilowatt of rooftop solar panels to power their church, convent and the park outside the parish. A way of lighting hope for a community that has also been subjected to intentional rotating blackouts done to reinforce the need to build the coal plant.

Recently Atimonan has been selected for the scoping of a renewable energy company's plan to put

## The fossil fuel project will lock Atimonan into up to 40 years of coal dependence.

up a micro-grid solar farm that would not only rival the plant but would enable the community to pay lower electricity, since the proposed solar project would provide power directly to them.

The struggle to act on climate change is one that requires both urgency and ambition not only in terms of reducing emissions, but also of providing a development program that enables communities to thrive amidst the warming climate.





## THAILAND

## Women lead community response to coal plant development, as fishing community faces massive relocation

Women in Pattani Province are rising to oppose a planned coal-fired power plant with potentially serious environmental and health impacts for their families and the Pattani Bay community.

As plans for the planned Thepha coal-fired power plant move forward, women groups are joining academics, local community members, and environmental and civil society groups in Pattani Bay, southern Thailand, to oppose the plant's construction. The group is concerned by the threat that the planned plant poses to the bay's marine resources, which many community members depend on.

Women play a significant role in the local fishing industry and rely on Pattani Bay for nutrient-rich foods to feed their families.

Lamai Manakarn, an activist from the Pattani Southern Border Province, said that the developers of the planned Thepha coal plan declared "that coal and this coal plant project are clean energy and safe for us."

Community members have indicated that the plant would require the relocation of 240 families, two mosques, two Muslim cemeteries, a religious school, and a Buddhist temple. They also denounce a lack of transparency in the plant's construction plans, pointing to three public hearings about the plant and its coal transport pier that they allege were conducted improperly.

Thailand's struggle with climate change extends beyond Pattani bay. This summer, the World Meteorological Organization (WMO) released a [special report](#) pointing to the "episodes of extreme heat and precipitation" experienced around the world, which "are increasing as a result of climate change." This is unfortunate news for the country like Thailand which experiences monsoon seasons every year. Scientific consensus holds that climate change



### Thailand at >1.5°C

In [Thailand](#), the number of warm days (>35° C daily mean temperature) per year is expected to increase, extending the hot period of 2-3 months on average.

Total annual precipitation is expected to increase up to 20% in some areas.

The shoreline might shift between 10 - 35 m inland due to sea level rise. Over 30% of Thai people relies on agriculture for their livelihood: over the past few decades droughts and floods affected up to a quarter of total agriculture lands and resulted in annual crop losses of up to €425 million.

## The impacts of coal power plants know no borders, and are not limited to those who live nearby the plant; they affect everyone.

is already increasing the frequency and severity of extreme weather events, such as heavier rains and more destructive typhoons that could cause unfathomable damage.

"Global Warming is already affecting our livelihoods in the southern border provinces of Thailand" said Manakarn. "People living along the coast have been fleeing from the rising sea which drives land loss through coastal erosion. The changing climate has caused sea level rise and extreme typhoons, which are negatively impacting our livelihoods and threatening our lives. We demand from policy makers that they promote a just transition to renewable energy for all. The impacts of coal power plants know no borders, and are not limited to those who live nearby the plant; they affect everyone."

Local villagers have vowed to renew their sit-in protest in Bangkok against the Ministry of Natural Resources and Environment approval of the proposed plant's Environmental and Health Impact Assessment (EHIA).

The voices of women rising to protect the health and livelihoods of their families will add power and energy to the coal opposition movement around Pattani Bay.



## KENYA

# Fishing community in Kenyan UNESCO heritage site opposes giant coal plant, accusing leaders of neocolonialism

Proposed coal plant could displace up to 120,000 people and disrupt delicate marine environment threatened by climate change. Kenyan civil society is up in arms.

Lamu Old Town is one of the oldest and best preserved Swahili settlements in East Africa. In 2001, it was declared a UNESCO World Heritage site, in recognition of its outstanding universal value to Swahili and Islamic cultures. In 2013, the Government of Kenya initiated plans for developing a coal-fired power plant in the area. The proposed plant is scheduled to generate coal-fired thermal power on 865 acres of land at Kwasasi, Lamu County.

Lamu residents, local community leaders, national and international environmental groups have raised serious concerns about the environmental, social and human health implications of the fossil fuel plant. The coastal areas of Lamu County are rich in biodiversity, both marine and terrestrial. This is evident in the vibrant tourism sector that employs many on the island. The coal power would cause

serious risks to Lamu's delicate marine environment, which many fear will harm its two most vital industries: fishing and tourism.

Once constructed, the project risks causing massive pollution according to various reports, negatively impacting the livelihoods of Lamu residents, already affected by a pre-existing oil infrastructure project known as the Lamu Port and Lamu-Southern Sudan-Ethiopia Transport Corridor (LAPSSET).

"The coal plant threatens the marine ecosystem and the livelihoods of our people. We won't accept it. We're not anti-development, but no one in the world has ventured into coal mining and faced no long-term consequences. Coal is dirty energy, and its effects are detrimental," said activist Wahlid Ahmed, whose family has been living in Lamu for generations.



## Kenya at >1.5°C

Floods and droughts are projected to cost Kenya about 2.4% of GDP annually at mid-century, and water resources degradation a further 0.5%. Yield for both maize and beans (Kenya's staple crops) are projected to be 25% lower under a 2°C scenario, compared to 1.5°C. A 10% intensification of the current 1-in-100-year storm surges combined with one meter of sea level rise could affect around 40% of total coastal land and urban areas.



The proposed coal plant could potentially displace 120,000 people living in Lamu County, and single-handedly emit the highest amount of toxic chemicals in the region.

Public debate over coal intensified in 2017-2018. Media and public attention on the project increased significantly and several street demonstrations were held by potentially affected communities.

Community groups are pursuing litigation. They argue that the economic, environmental, and health impacts they will endure because of burning coal for electricity have not been sufficiently considered in granting licenses for the plant and that the plans to

protect them from health and economic harm are insufficient.

In 2009, Lamu Environmental Protection and Conservation (LEPAC) spearheaded an initiative to unite groups and individuals in a campaign to save the Lamu Archipelago. Out of this initiative, a coalition of groups came together under the banner "Save Lamu".

"We cannot forget Africa's colonial history and it is totally inexcusable for us to ignore a neocolonial system powered by the coal industry. African communities are coming together to resist fossil fuels and embracing clean energy because the time has come to chart a solid course to deco(a)lonisation of the continent." said Nnimmo Bassey, Director of the Health of Mother Earth Foundation.

The resistance against coal expansion has been growing significantly among Kenyan civil society and the community at large, following continued anti-coal mobilisation and advocacy efforts to oppose the proposed Lamu coal plant. Recently, the Kenyan faith movement added their voices to those calling on leaders to make the right decision and asking for self-determination and community control over the resources, including with regards to energy distribution systems.

**The proposed coal plant could potentially displace 120,000 people living in Lamu County, and single-handedly emit the highest amount of toxic chemicals in the region.**

## THE ARCTIC

# Saami people on the frontlines of climate change witness the Arctic melt, destroying their traditional way of living

Reindeer's grazing land and migration routes are disrupted by off-the-scale warming, deforestation and large energy projects.

In the far north of Europe live the Saami people whose culture has existed before the Finnish, Swedish and the Vikings. Living in the Arctic regions of Sweden, Finland, Norway and Russia, they have survived the harshest environment for thousands of years. But the changing climate has made life more difficult for the Saami, who are now fighting through warmer and increasingly unpredictable conditions in the Arctic.

The Arctic is warming twice as fast as the global average. Unpredictable ice sheets make traditional routes over frozen lakes dangerous. People and reindeer have drowned because of unusually thin ice. Earlier this year, scientists were alarmed when the strongest and thickest Arctic sea ice north of Greenland started to break up for the first time on record. This summer's unprecedented drought and wildfires in the Arctic Circle have done serious

damage to the winter grazing lands of reindeer, which will take decades to recover.

Reindeers are an essential part of life for the Saami. They use them for transport, milk and meat production. Traditional knowledge on reindeer herding has been passed down from generation to generation, including the knowledge of how to use land during extreme weather fluctuations. However, due to the drastic increase in temperatures, Saami reindeer herders are struggling.

Jonas Vannar recalls the difficulties he is facing as a Saami reindeer herder. Due to the warming Arctic and increasing deforestation, it has been more difficult for the reindeers to find lichen, their primary source of food.

"As a reindeer herder you need the reindeer to be able to find food on their own. They smell the lichen



## The Arctic at >1.5°C

At 1.5°C ice free summers in the Arctic are likely to occur only once every 40 years, whereas at 2°C they would happen once every five.

In the Arctic circle, a warming of 2°C would see permafrost-covered land shrink by more than 40%, while at 1.5°C almost two thirds of permafrost-covered land will remain. Permafrost is crucial for reindeers and other wild fauna, as well as a formidable deposit of methane and CO<sub>2</sub>, which, if released, would further add to global warming.

under the snow. When it gets warm during the winter and then cold again, you get layers of ice building up on the ground, and they can't smell the lichen. The reindeer then start looking for lichen hanging from trees. [...] It makes the conflict with the forestry industry worse because these mostly grow on old trees. When you cut down the forest, the hanging lichen also disappears" says Vannar. He has experienced reindeer dying in his arms due to lack of food. Something, he says, he never wants to have to go through again.

But the problems the Saami face are not only climate change.

Large energy projects, such as hydropower dams, threaten their way of living.

The dams block the paths of the reindeer, which run along river valleys, and change the rivers' natural patterns. Usually, rivers have greater flow in the summer than in winter. The dams collect water in the summer and release it during winter, further exacerbating the thinning of the ice sheets. Vannar's Saami village had to move all the reindeer paths up on the land.

**The Arctic is warming twice as fast as the global average. Unpredictable ice sheets make traditional routes over frozen lakes dangerous.**

Wind farms on reindeer grazing land cut off their migration routes, a stark reminder that clean energy solutions need to be implemented taking into account the needs of the ecosystem and of the local communities.



## ITALY

# Communities in Southern Italy fight against monstrous gas pipeline

As the Mediterranean is already struggling with droughts and wildfires, Europe fuels the climate crisis with new gas mega-pipelines. A local community protecting its century-old olive groves is fighting back.

Communities in Salento, in the southern 'heel' of Italy, are on the frontlines of the struggle to stop the Trans Adriatic Pipeline (TAP). If completed, TAP would connect with the Southern Gas Corridor, carrying billions of cubic metres of gas from Azerbaijan to Italy every year from 2020.

The pipeline would come onshore in the beautiful seaside town of San Foca, Puglia. Local people fear its construction, including a gas receiving terminal, will damage and pollute the local landscape, coastline and clear blue waters.

Despite the climate impacts of the project and the objections of the local people, the Italian government and the European Commission are trying to force it through.

Facing police violence and being threatened with heavy fines, local people are organising peacefully and powerfully to stop the pipeline's construction.

The story of the TAP pipeline is a glaring example of the short-sightedness of European politicians. The EU and its member states are planning to massively expand gas infrastructure with new mega pipelines such as the Trans Adriatic Pipeline and Nord Stream II, even though existing gas reserves blow the remaining carbon budget already, and existing infrastructure is standing unused.

The project will cost €45bn, making it the most expensive fossil fuel project under development in Europe. When factoring in the potential methane leakage that will take place along the route, the climate impacts of the gas it will carry is thought to be at least as bad as coal.

The Mediterranean region has already warmed by 1.3°C above pre-industrial levels, which has already led to drier conditions, increasing the risk of wildfires like the ones raging across the region this past summer.



## Italy at >1.5°C

Like most of the Mediterranean region, the South of Italy faces a wide range of climate adverse impacts, going from [sea level rise in coastal areas](#) to increased intensity and frequency of heat waves to loss of tourism revenue. Agriculture in the region is under considerable risk. Precipitation over irrigation reservoirs in the South of Italy is expected to decrease by 5 to 20%, with the fall markedly sharper at higher temperature. The [incidence of vector borne diseases](#) for the South of Italy is also expected to increase. While tourism is predicted to be relatively stable at 1.5°C warming, 2°C will mean marked decline in peak season.



**Scientists** warn that unless average temperature rise in the region stops short of reaching the 1.5°C threshold, large parts of Southern Europe and Northern Africa will permanently turn into deserts with more frequent deadly heatwaves and dramatic consequences on food production.

Olive groves and grapes that have shaped the Salento region over thousands of years might be gone within a couple of generations, if projects such as the TAP pipeline move forward and contribute to tipping the scales of climate change.

"This is a European-wide problem," says Sabina Giese, a local resident organising against the pipeline. "We don't need this pipeline, as we don't need all the others. We the people of Europe need to be united in this fight."

Locals have been concerned about the TAP project for years, but the struggle heated up in March 2018, when the pipeline company – without any official permits from the local government – moved in to remove hundreds of ancient olive trees near the rural town of Melendugno.

These trees are the backbone of the economy in the area and are essential to the livelihoods of local communities. They carry strong cultural value for local people and are hundreds (some thousands) of years old.

Mass gatherings of people, both locals and from other areas of the country, have been peacefully resisting the uprooting of the trees and the construction of the pipeline, among other things by climbing on the olive trees themselves to protect them with their own bodies and building stone barricades to stop vehicle accessing the site. They were often pushed back by police in riot gear.

In early July, the police, enacting a Mussolini-era law for public order, effectively put the tiny town

on lockdown, blocking all roads in and out of the town, while the contractors moved in to remove the uprooted olive trees. Those that resisted were violently attacked by the police, including the Vice-mayor of the town.

Tensions is still high in San Foca and Melendugno. The police seems to be trying to intimidate those taking part in the resistance. They have been identifying individuals through photo and video footage, and people have started receiving notifications of fines of €2,500-10,000 for being involved in peaceful protests and roadblocks.

But the spirit of resistance is strong, and local gatherings are getting bigger and bigger. The local No TAP Committee is determined to stop the pipeline altogether. They believe that it is unnecessary, undemocratic, and that it will cause vast economic and environmental damage to the area. Their message is "Né qui né altrove" – "No TAP, not here or anywhere".

**Olive groves and grapes that have shaped the Salento region over thousands of years might be gone within a couple of generations, if projects such as the TAP pipeline move forward and contribute to tipping the scales of climate change.**



## SENEGAL

# A coastal community in Senegal is battling rising sea levels and a new coal plant at the same time

With rapidly rising sea levels, and the threat of unpredictable storms, the Atlantic Ocean, source of life and tradition in Bargny, is now one of the greatest threats to its future. Plans for a new coal plant will only add fuel to the fire.

The sleepy town of Bargny, Senegal, is one of the country's most vulnerable to coastal erosion. Located about 15 km to the east of the capital, Dakar, continued rising waters have destroyed hundreds of houses in fishermen communities. Sea rising has become a major threat that grows by more than two meters a year, forcing hundreds of people to pile up in riparian neighborhoods. Bargny is now also threatened by the construction of Senegal's first coal power plant in the nearby village of Sendou.

Already victims of the pollution provoked by the Sococim, a cement plant at 1.5 km distance, and of the coastal erosion due to climate change, citizens are concerned by the potential impact that the new power plant will have on their health and the environment.

Like the hundreds of coal plants planned or already under construction worldwide, the Sendou coal plant will only add to the climate crisis that is threatening the people of Bargny. If the world will warm more than 1.5 Celsius degrees above pre-industrial levels, the fight against rising sea levels will be lost.

Since 2014, community members have been organising and mobilising in Bargny and surrounding villages to challenge and oppose the construction of the coal plant. They held a mass demonstration at the same time of COP21 in Paris and organized marches and awareness raising events, calling on President Macky Sall to take a stand against coal power plants, and to invest instead in renewable energies.



## Senegal at >1.5°C

Temperatures have already been rising in subtropical regions of Southern Africa at approximately twice the global rate over the last five decades. This trend will continue.

At 1.5°C, the number of heat waves will go from 1-3 to 8 per year. At 3°C, they will reach a projected 300 days per year in some areas around the equator.

At 1.5°C there will be 20 to 150 additional hot nights every year; 40 to 200 at 2°C; 100 to 300 at 3°C.

Coastal areas will experience increased daily rainfall intensity at >1.5°C.

A warming of 2°C by 2040 might cause yield losses for all the main African crops. Maize cropping areas will be reduced by 40%.

"They want to get it up and running this month, but we're gonna do everything we can to stop it." said Fadel Wade, a local activist.

The construction of the plant, however, goes on, and some farmers reported bulldozers entering their fields to clear the land to make way for the construction of a coal terminal on the endangered coast.

"Polluting industries are established throughout the area. We're caught in a pincer!" added Wade.

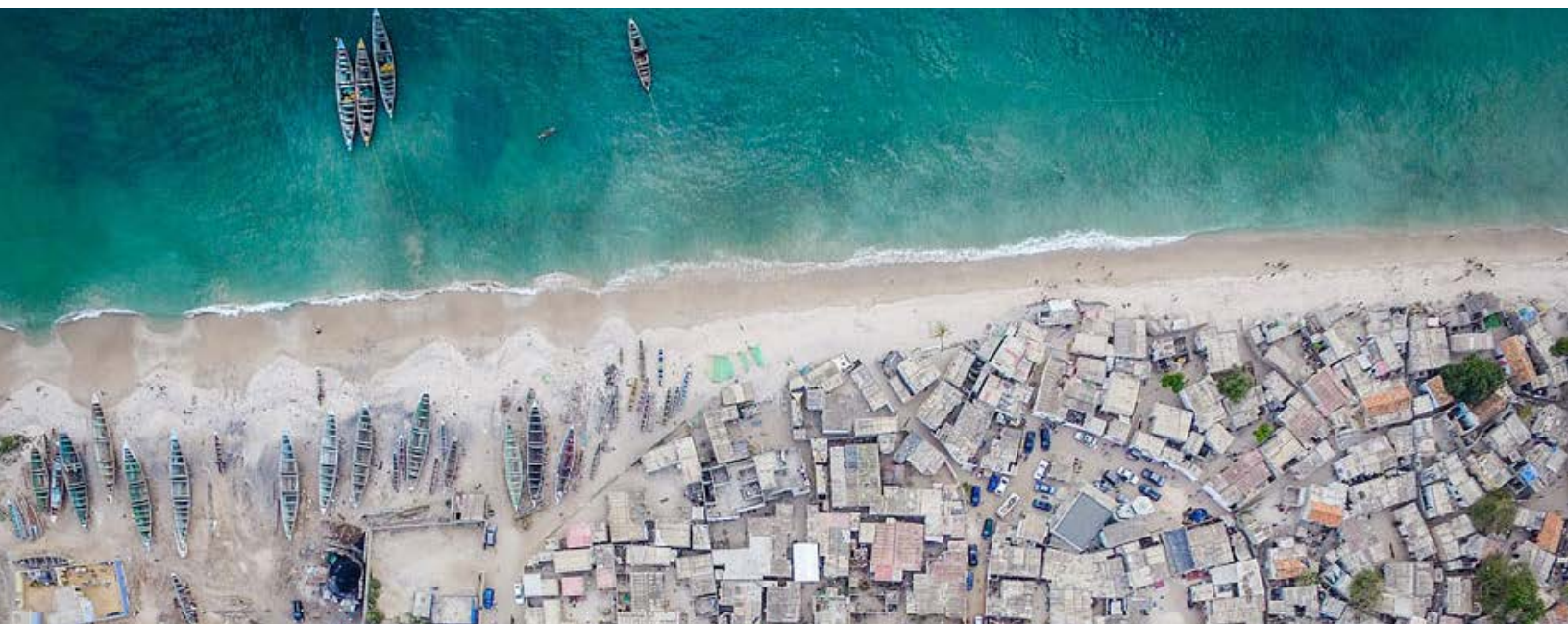
The site of the plant lies a few hundred meters from a fish-processing site that employs 1,000 women from the village, a daycare and health center, and a primary school. It is half a kilometer away from the houses recently rebuilt after the latest storm surge.

Ocean systems and coastal areas are particularly vulnerable to climate change. The entire economy of coastal Bargny is based on the marine life that is threatened by a warming climate.

The long-term benefits of limiting warming to 1.5°C, as enshrined in the Paris Agreement, largely outweigh the short-term costs in terms of increased economic growth, employment, avoided climate impacts, energy security, access and imports and health. However, fossil fuel energy expansion is portrayed by the Senegalese government and elites as necessary to achieve development of the country.

## **Ocean systems and coastal areas are particularly vulnerable to climate change. The entire economy of coastal Bargny is based on the marine life that is threatened by a warming climate.**

The resistance to fossil fuel infrastructure by the people of Bargny offers an alternative path to development for Senegal and Western Africa, one that can spare the next generation from inheriting the behemoth infrastructure of outdated and destructive technologies, and instead open a new chapter through a continent-wide adoption of small scale, decentralized renewable energy to satisfy the energy needs of families and small businesses throughout the continent.



## BRAZIL

# In drought-stricken Ceará, Brazil, vulnerable communities fight to preserve water from being used for fuel generation

In the midst of the longest drought ever recorded in the region, lack of renewable energy investments set fossil fuel plant and vulnerable communities at odds.

The North-East of Brazil is still experiencing its longest drought ever, going on since 2010, with climate change to blame. The water scarcity has had a devastating impact on local agriculture and fishery, but that's not the end of it, for local communities.

With the reservoirs of the hydroelectric plants - the country's main source of electricity - empty and for lack of investments in other renewable energy sources, the government has to activate the fossil fuel-fired thermoelectric plants. These plants, in addition to being more polluting, often contaminate rivers and underground reservoirs, and use in its activities large amounts of the little potable water left.

This is the case of the Pecém Industrial and Port Complex, located in the metropolitan region of Fortaleza, the capital of the northeastern state of Ceará. Pecém I and II are the two largest coal-

fired thermoelectric plants in the country and are authorized by the state government to collect up to 800 liters of water per second (or 70 million liters per day) from the Castanhão Water Reservoir, which could supply a city of 600,000.

The largest multi-purpose and public reservoir in the country, Castanhão supplies the entire metropolitan region of Fortaleza, where almost half of the state's population lives. Last November the reservoir reached its dead volume and stopped supplying the city for more than 20 days. With Castanhão being empty, the government began to explore other locations, including protected areas such as the Environmental Preservation Area of Lagamar do Cauípe, where many indigenous and riverside communities live, and whose natural resources they depend on.

At the end of 2017, the Anacé indigenous people



## Brazil at >1.5°C

Brazil will suffer a wide range of adverse effects. For the North East region of Brazil, the difference between 1.5 to 2 degrees will mean a marked increased in dryness and a higher risk of droughts.

Due to water shortage, the energy output of the country's four largest power stations will decline between 38% and 57%. The yield of Brazil's main crops will also drop: corn (-28%), beans (-26%) and rice (-24%). The worst affected will be the country's main export crop, soybeans, declining by up to 39%.



of Barra do Cauípe saw a group of workers, accompanied by police officers, begin operations to withdraw water from Lagamar do Cauípe to supply the Pecém Complex. With the support of popular movements and civil organizations, Anacé leaderships obtained a state court injunction ordering the interruption of the works. The project, which aims to extract 200 liters of water per second from the area, could highly compromise the already sparse water resources in the region.

"In one of the worst water crisis in the state, the government is allowing the water meant for the population's primary consumption, to be diverted to industrial interests. They enter the territory without asking for permission, without consulting the traditional communities that live there. This only further intensifies the existing conflicts in the region," said chief Roberto Marques, leader of the Anacé indigenous people.

In addition to its environmental importance, Lagamar do Cauípe is also essential for the livelihood of local communities and for the maintenance of fishing and tourism activities in the region. Not to mention cultural and spiritual matters. "My people believe that our ancestors, the 'enchanted ones', still live in the Cauípe lagoon. But just like water, they can also disappear. If the government wants to kill our land, then they will kill us too. It may already be all lost, but we will not lose without fighting."

In Brazil, the Northeastern semi-arid region will be the most severely affected by climate change. According to [the latest IPCC data](#), the temperature in the region, which has historically suffered from periodic droughts, is expected to increase from 2°C to 5°C by 2100 if nothing is done to stop the planet from warming.

According to projections, a total of 1,488 Brazilian cities and 36 million people - or a fifth of its population - will be directly affected by lack of water in the very near future. The state of Ceará is already experiencing the first life-threatening impacts of climate change.

"The greatest impact in the region is certainly the water scarcity, which in turn generates direct impacts on the economy and people's health. The increase in temperature, coupled with a lower rainfall rate, makes the surface reservoirs dry faster, ending with the main source of human supplies," explains Nicolas Fabre, advisor of Rural and Environment Development of the Association of Municipalities of the State of Ceará.

According to him, the problem is not so much of rainfall volume, but of its distribution in time and space. "Some municipalities receive in only one day half the amount of rain expected for the whole year, and in the other they are completely dry. They declare a state of emergency because of the floods, and six months later they declare emergency due to the drought. In addition, these torrential rains cause silting of the rivers, which reduces their water storage capacity, since they are filled with sand and sediments," he said.

The consequences for livelihoods are also putting in jeopardy the lives of many in the region. A few years ago Ceará had become the federal state with the largest production of tilapia fish. Today, it does not even appear in official statistics. "If there is no water, there is no fish. The family producers and the artisanal fishermen have to resort to government aid, and unemployment and poverty trends have risen again."

The Brazilian government currently subsidizes fossil fuel production in direct and indirect ways for a total of [over 66 billion USD](#), nearly half of which are tax breaks for the fossil fuel industry.

If that money were to be invested in policies to foster technologies for resilience and adaptation and on the development of a solid renewable energy infrastructure, the people of Ceará could hope to save their water sources and with them their livelihoods and traditional way of living.

## USA - LOUISIANA

# Vulnerable Louisiana wetlands and poor communities threatened by giant oil pipeline

Water protectors face harsh police response to protect communities from pollution, as rural and coastal areas face increasingly extreme weather.

In the bayous of Louisiana, long term residents, committed activist, and community leaders are rising up against Bayou Bridge, a proposed 162 miles long pipeline owned by Energy Transfer Partners which is threatening their water and their way of life. The very construction of the pipeline is damaging Louisiana's wetlands: BBP will destroy 150 acres of wetlands in its path and will impact 450 more acres. Louisiana's wetlands are already being impacted by climate change and development, with the state losing an average of one acre of coastal wetlands per hour to rising sea levels. Existing oil pipelines have already damaged industries in the area, and BBP only makes these problems worse, increases flooding, and irreparably damages the ecosystem.

The water protectors of Louisiana are risking arrest to protect their communities from the many detrimental effects of a pipeline running through

their area- not only does it threaten their water and way of life; these types of fossil fuel projects and fossil fuel extraction contribute to our planet's warming at dangerous levels. The oil running through the Bayou Bridge Pipeline emits a carbon equivalent of 30 new coal plants. The pipeline is not compatible with a global mandate to limit warming to below 1.5°C.

The oil that would move through the BBP would come directly from North Dakota by way of the Dakota Access pipeline, only to be exported overseas. Inspired by Dakota Access Camp, Bayou Bridge Resistance created the [L'eau est la Vie Camp](#). The fight has been intensifying, [with police tasing and arresting water protectors](#) who are actively putting their bodies on the line to stop the pipeline.

Louisiana is one of the hardest hit regions of the United States when it comes to climate impacts such as intense hurricanes, which have devastated



## USA - Louisiana at >1.5°C

In a few decades, Louisiana is likely to experience 35 to 70 days per year with temperatures above 35°C (95°F), compared with about 15 days today. Storms, floods and the damage associated with them will prove increasingly challenging to manage. Rising sea level and higher temperatures also threaten Louisiana's fisheries. The loss of Louisiana's wetlands, which support about 75 percent of the state's total commercial fisheries, will accelerate.

in particular low-income communities, people of color, and other vulnerable populations who face the highest risk and have the hardest recovery. In addition, toxic waste dumps, sewage treatments, and other deadly pollution sources have greatly impacted poor communities in the region, and are rarely if ever found near middle class, white, affluent suburbs. The people of St. James, Louisiana, who are fighting against the Bayou Bridge Pipeline are already surrounded by multi-billion dollar methanol plants. St James has earned the name of [Cancer Alley](#).

The inspiring resistance of the water protectors and allies in Louisiana is a demonstration of a fight for livelihoods in the face of corporate greed and intensifying climate impacts.

## The water protectors of Louisiana are risking arrest to protect their communities and the planet from the Bayou Bridge pipeline.



## USA - MONTANA AND THE DAKOTAS

## Wave of renewable energy resistance puts solar panels in the path of tar sands pipeline

Troubled KeystoneXL pipeline, rejected by Obama and resuscitated by Trump, finds fierce opposition in indigenous communities, landowners and farmers supporting the SolarXL project.

Keystone XL is a proposed tar sands pipeline that would connect Alberta, Canada with Gulf Coast refineries carrying around 800,000 barrels per day of tar sands oil across the United States. President Obama rejected the federal permit for this project in 2015 because of the impact Keystone XL would have on our climate. One of Trump's first moves in office was to reverse Obama's decision and give TransCanada the federal permit for construction. In Nov 2017, the Nebraska Public Service Commission voted to give a "conditional" approval of the Keystone XL pipeline, mandating TransCanada use a different route. TransCanada is now scrambling to buy out politicians to move the project forward.

As a means of blocking this pipeline, indigenous communities, landowners, farmers, along with supporting organizations, launched [Solar XL](#) - a wave

of renewable energy resistance that's building solar arrays directly in the route of the proposed Keystone XL pipeline - putting clean energy solutions in the path of the problem. The project was launched by Bold Nebraska, 350.org, Indigenous Environmental Network, CREDO, and Oil Change International.

On November 20, 2017, the Nebraska Public Service Commission rejected the preferred route for the Keystone XL pipeline, but granted a permit for an alternate route through the state, which creates many more obstacles for the company. TransCanada has asked the PSC to reconsider its decision, while Nebraska farmers and ranchers have pledged to continue resisting the project in the courts.

The Solar XL project continues with new installations of solar arrays, led by communities on the ground in



## USA - Montana and the Dakotas at >1.5°C

The number of days with temperatures reaching over 38°C (100°F) is likely to double over the next 70 years, subjecting children, elderly and the poor to serious health risks. Higher temperatures will cause water use to rise by about 25% over the next 50 years, mostly due to irrigation. Rainfall patterns will change, with the frequency of heavy storms likely to increase together with the risk of flooding. Montana may lose some of its glaciers completely by 2030.



Nebraska. Meanwhile, indigenous leaders and their allies launched the Promise to Protect, a call for everyone who can to commit to future resistance along the pipeline route if Keystone XL moves forward. They announced this plan at a gathering in South Dakota for the second signing of a treaty against the expansion of Canada's tar sands.

The project - and the indigenous communities, landowners, and farmers who are leading the project - are demonstrating the necessary solutions to fighting the climate crisis and keep warming below 1.5°C.

**To block the KeystoneXL pipeline, indigenous communities, farmers and activists are putting solar panels directly in its route.**



## USA - CALIFORNIA

# As California climate impacts intensify, fossil fuel extraction in the State still widespread

Thousands of oil and gas drilling wells pollute poor and vulnerable communities. Governor Brown has a last chance to leave behind a strong climate legacy by banning all permits.

In California, wildfires are intensifying and temperatures are rising every year due to climate change. For years, communities on the frontlines of climate impacts and of oil and gas extraction have been urging the state's administration to stand up to the fossil fuel industry. Now, as California's governor comes to the end of his term, communities in the state are urging him to deny all new permits for oil and gas drilling and phase out existing fossil fuel extraction across the state.

California is already seeing the impacts of climate change, even as the state is positioned as a leader in the fight against the climate crisis. Year after year, wildfires have continued to break records for their size and the immense amount of destruction they cause. This year, experts predict wildfire season will continue to get worse. Meanwhile, headlines forecast

that California's wildfire season "may now be year-round." Six of California's most destructive wildfires on record have occurred in the last 10 months.

The likelihood of these destructive fires is made all the worse by record-breaking temperatures being experienced across the state. This summer, all-time-high temperature records were set across Southern California. Overall, July was California's hottest month ever recorded.

In response to worsening impacts from climate change and the direct effects of oil and gas production on the health of nearby communities, people across California are demanding action from Governor Jerry Brown. Specifically, communities are calling on Brown, who is winding down his last term in office as Governor and his career as an elected



## USA - California at >1.5°C

Climate change has doubled the area scorched by forest fires during the last three decades across the American West, burning an additional 16,000 square miles. This will only get more and more common as temperatures rise.

California, together with most of the United States, is expected to reach the 1.5°C and 2°C marks 10-20 years earlier than the average. Drier summers will fuel more deadly wildfires and negatively impact agriculture in coastal areas.

official, to deny new permits for oil and gas drilling and to phase out fossil fuel extraction as a whole in the state.

California is often held up as a leader on climate action in the U.S. and Brown has supported measures to increase energy efficiency in the state. Yet the governor has stopped short of addressing of the oil and gas industry directly, despite the urging of communities most impacted by fossil fuel production. Recently, the state's legislature passed a bill, called SB 100, to move the state's electrical grid to 100% clean energy by 2045.

"This is a massive victory for Californians who've been demanding a swift transition to clean energy in the state," said 350.org executive director May Boeve of SB 100. "SB 100 is a critical first step toward addressing the worsening climate crisis, but to truly change course, we must end fossil fuel extraction. Governor Brown should go even further by kickstarting the transition off of fossil fuels while protecting Californian's lives and livelihoods."

As climate impacts worsen across California, from rising temperatures to intensifying wildfires, the state's government has a critical opportunity to act on phasing out the extraction of fossil fuels and transition to a 100% renewable energy economy that prioritizes community-led solutions. If California takes this critical step, it could set a precedent for climate action both in the U.S. and around the world.

## Communities in wildfires-hit California are urging Gov. Brown to deny all new permits for oil and gas drilling.



## CANADA

## Facing climate impacts, Canada doubles down on fossil fuels

Following record breaking wildfires and deadly heatwaves, Canada bought a multi-billion dollar pipeline. Indigenous nations lead the fight against the project in courts and on the streets.

In late August, with wildfires in the Canadian west reaching record breaking levels and residents in the east still reeling from mid-summer heatwaves that killed dozens, the Canadian government bought from American company Kinder Morgan the Trans Mountain tar sands pipeline project, an 890,000 barrel per day pipeline project that would make it all but impossible for Canada to meet its Paris climate commitments.

For years, this project has been fought, following the leadership of Indigenous nations, in the courts, on

the streets and the land. In the past few months that fight has escalated with nearly 250 people arrested in mass acts of civil disobedience, thousands of people taking actions across Canada and around the world and, most recently, a massive court victory that quashed the government's unjust approval of the pipeline.

Without drastic action, scientists warn that wildfires, drought and extreme heat are expected to be a perennial issue in Canada.



### Canada at >1.5°C

Canada would be very much affected by an increase of warming from 1.5°C to 2°C. [Under higher emission scenarios](#), 2050 summer days in cities like Toronto will be almost 5 degrees hotter than the 1976-2005 average.

Precipitation is also expected to increase significantly in both Eastern and Western Canada with significant difference between 1.5°C and 2°C scenarios. This has significant direct effects in terms of flooding.

The observed severity and frequency of forest fires in Canada are already increasing. Due to wetter winters leading to more grass growth and drier and longer summers, the incidence of forest fires are expected to increase. Furthermore, the incidence of lightning is expected to increase. Every degree of warming is predicted to cause a [12% increase](#) in lightning incidence. Lightning is the cause of almost half of all forest fires in Canada.



In British Columbia and Alberta, temperature rise is nixing hotter, drier weather with expanding mountain pine beetle infestations, [transforming western forests into a wildfire tinderbox](#). 2017 was the worst wildfire season on record – until 2018 that is.

On the other side of the country, [nearly 100 people died in connection to extreme heat in Quebec this past summer](#). Scientists predict that heat wave events like this are [expected to become more frequent and up to five times more deadly](#).

Despite increasingly dangerous climate impacts and strong public opposition, the government of Canada continues to promote and expand tar sands expansion - Canada's fastest growing source of emissions and a fossil fuel reserve that, if fully

exploited, could burn up nearly a quarter of the entire world's remaining carbon budget for the 1.5°C threshold.

Knowing that the pipeline has the same impact as putting 7 million new cars on Canada's roads, Canadian Prime Minister Justin Trudeau decided to spend at least \$4.5 billion in taxpayer money to buy the Kinder Morgan pipeline, pledging to put shovels in the ground as soon as possible.

For now, the path forward for the pipeline remains unclear, but communities opposed to it are stalwart in their opposition. The task that remains is to force Canada's politicians to understand that our climate commitments mean no new fossil fuel projects.

**Knowing that the pipeline has the same impact as putting 7 million new cars on Canada's roads, PM Justin Trudeau decided to spend \$4.5 billion to buy it, pledging to put shovels in the ground as soon as possible.**

# HOW DO WE GET TO 1.5°C AND STAY THERE



**A fossil free, <math><1.5^{\circ}\text{C}</math> world is achievable.**

**This is how we make it happen.**

By now it should be clear why exactly we need to do whatever is possible to keep the planet from warming more than 1.5°C. But is it actually feasible? And how do we do it?

"Feasibility" has to do with a number of things: the physical boundaries and capacities of the Earth to compensate imbalance, our technological capacities, economic cost/benefit analyses, and lastly the social, cultural and political factors determining the range of choices we leave ourselves.

On the physical boundaries and capacities dimension, much of the debate has recently focused on the concept of 'carbon budget'. According to a recent [analysis](#) by Carbon Brief, different models and methods offer different results on how much more carbon we can burn at current emission levels. Some studies show a carbon budget already in the negative, meaning we would need to employ carbon dioxide removal mechanisms, while others show carbon budgets ranging from a couple of years to 15 years or more at current emission levels (for a 66% chance of staying under 1.5°C). The IPCC expects that we will globally reach the 1.5°C threshold in 2040. Factoring in the fact that there is a ten-year delay between CO<sub>2</sub> concentration in the atmosphere and the resulting warming, it is clear that we really do not have much time left until we lower our emissions to net zero.

The first thing that [needs to happen](#) is for emissions to peak by 2020 and then start to decline drastically. Net emissions must go to zero by 2050. Emissions

would also need to go into the negative in the second half of the century, meaning we must employ some mechanism of carbon dioxide removal.

What it means in practical terms is that we can't have any more fossil fuel infrastructure installed, as each new fossil fuel infrastructure locks us in for more emissions. It also means that we must embark on an ambitious phase-out process for existing fossil fuel infrastructure, which brings us to the issue of our technological capacity.

Some entertain the wrong notion that carbon capture and storage (CCS) technologies can be the silver bullet to solve all our problems. The truth, however, is that at the moment there are no economically feasible and large scale CCS projects. Like other technofixes, CCS are a false solution to a very real and present problem. We can't engineer our way out of climate change - we have to first put in the work, which means preventing CO<sub>2</sub> and other greenhouse gases from entering the atmosphere in the first place. The good news is that [negative emission technologies](#) are not limited to CCS. Large scale afforestation and other attempts at increasing the capacity of [natural](#) carbon sinks to store CO<sub>2</sub> can play a crucial role in reaching negative emissions during the second half of the century.

In addition to supply side solutions, there are also other [policy-based solutions](#) such as setting "sectoral targets, building codes, performance standards, behavior oriented interventions, and carbon pricing" that focus on the demand side.



Keeping warming limited to 1.5°C is ambitious enough that we need a mix of supply and demand side policies on global, national and subnational levels to have a chance of meeting it.

On the energy front, 1.5°C means rapid electrification of all energy sectors. The good news is [we have the capacity](#) for large scale energy transformation to bring most of the world to 100% renewable energy by 2050. Economically, [the cost of producing energy](#) from renewable sources is getting lower and lower. According to IRENA, electricity from renewable sources “will be consistently cheaper than from fossil fuels and by 2020 all the power generation technologies that are now in commercial use will fall within the fossil fuel-fired cost range, with most at the lower end or even undercutting fossil fuels”.

Sure, the cost of this energy transformation will be relevant, running up to tens of trillions of dollars. However, if we approach the feasibility of 1.5°C in terms of an economic cost/benefit analysis, several studies - some dating back to [the '90s](#) - put the cost of inaction at similarly impressive and often higher figures.

Damages from large scale events are also missing or underrepresented in most cost models. The 2017 Atlantic hurricane season by itself cost upwards of \$200 billion in damages. In addition, what’s not usually reflected in this sort of cost/benefit analysis is the loss of life and [biodiversity](#) for exceeding warming thresholds. Putting all those factors together, it becomes clear that an equitable transformation to a post fossil fuel global energy system is not only technologically and economically feasible but also morally imperative, especially

considering that, in the words of the IPCC, climate mitigation inaction “shifts burdens from the present to the future, and insufficient adaptation responses to emerging impacts are [already eroding the basis for sustainable development](#)”.

This People’s Dossier includes many examples of how this is happening in practice.



**On the energy front, 1.5°C means rapid electrification of all energy sectors. The good news is we have the capacity for large scale energy transformation to bring most of the world to 100% renewable energy by 2050.**



The pathway to 1.5°C will be a huge challenge, which will require all of our human ingenuity and best spirits to be overcome.

At the same time, there are [hugely powerful vested interests](#) trying to keep the necessary transformation from happening. These are the main reason why the current Nationally Determined Contributions submitted by national governments under the Paris Agreement put us on track [for a 3.5°C warming](#) of the planet.

Meeting the 1.5°C target is very difficult but it's not impossible. The same complexities that make it difficult for climate models to make specific predictions, also make the claim that we are out of options untenable. In addition, climate models keep improving, and every time they become more precise and predictive, they revise downwards the amount

of time we have left to act and upwards the amount of impacts we are going to face. This is why it's of utmost importance that we strive to keep warming as low as we possibly can.

The uncertainties about things like carbon budgets, including the possibility of having exceeded them already; the enormity of the transformation needed; plus a stocktake of what we have already lost at <1°C can sometimes add up to prevent action by pushing us into [despair](#).

This is a luxury for those of us not already fighting for our lives against the impacts of climate change. It is also a luxury none of us can afford - climate change will impact all, sooner or later, and we don't have much time left to defeat it.

As the stories included in this People's Dossier, but a tiny fraction of all the fights under way in every corner of the planet, show, there is much work to do to stop the fossil fuel industry and kickstart a systemic transition that works for all.

In the studies and reports we mentioned in this chapter we find the confirmation that staying under 1.5°C is possible. In the stories of fossil free fights globally, we find the hope that by building up people power and mobilizing our communities, we can take on this giant problem and keep pushing until it's solved. Not for the few, but for the many; not for the lobbies and vested interests, but for the people.

**The pathway to 1.5°C will be a huge challenge, which will require all of our human ingenuity and best spirits to be overcome.**



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## Why We Need To Stay Under 1.5°C

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