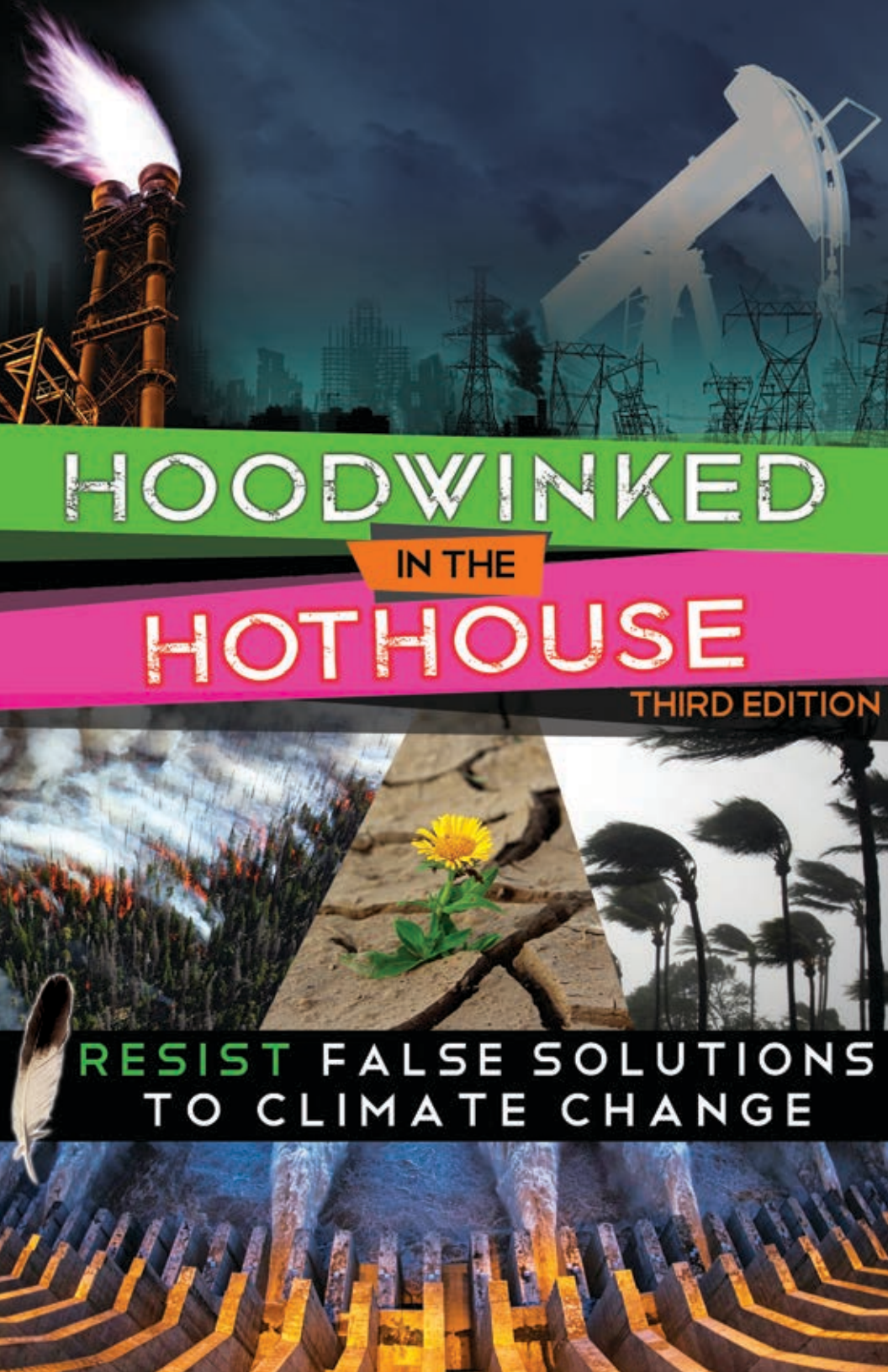
HOODWINKED
IN THE
HOTHOUSE
THIRD EDITION
RESIST FALSE SOLUTIONS
TO CLIMATE CHANGE

HOODWINKED IN THE HOTHOUSE

Resist False Solutions to Climate Change

THIRD EDITION
2021

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Check out the **audiobook version** of Hoodwinked
at climatefalsesolutions.org/audiobook
and on Soundcloud, Spotify, and YouTube

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Welcome back!

In the 12 years since the second edition of Hoodwinked in the Hothouse was released as a pop-ed zine, practices and policies to address climate change have expanded and deepened false solutions in shocking and alarming ways. We see the pressing need to address the root causes of environmental and climate injustices by confronting four centuries of colonial-imperialism, ongoing patriarchal and white supremacist oppression, and today's extreme neoliberal, globalized, industrial capitalist expansion. Hoodwinked demonstrates how climate change false solutions perpetuate, expand and reinforce these structures.

Many of us have been embroiled in a climate change narrative war with big business for at least two decades. Climate policies and programs are masked inside a narrative that has very real and violent impacts on the planet. Because false solutions are embedded in the root causes of climate change, this historical and ongoing conflict is generational, erecting a barrier that keeps us from implementing real solutions. We hope Hoodwinked can be a tool to resist the false solutions that block us from realizing meaningful, just and lasting change.

To use this zine, sections are written to stand alone so they can be read in whatever order makes sense to you at the time. We have highlighted words and phrases in bold throughout the text that are in the glossary at the very end. The website has a much more expanded glossary with additional items and longer definitions. Keep an eye on the website for more information, translations and updates.

We encourage readers, activists, teachers and allied dreamers to distribute and print at will. Everyone, heads out of the sand!

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HOODWINKED IN THE HOTHOUSE

THIRD EDITION

In the past decade,

and since the last edition of this booklet, we have seen a massive increase in activism to tackle the climate crisis. Indigenous Peoples' resistance to destructive industrial projects – from stopping oil and gas pipelines to blocking mega-dams, has been on the rise world-wide. Young people have mobilized against the inaction of governments and farmers have rallied to stop policies that favor polluting corporations. More than ever before, the center-of-gravity of the climate movements have shifted to a **climate justice** narrative – where we do not distinguish between the global war on biodiversity waged by corporate greed and the wars waged against the cultures, cosmologies, communities and bodies of oppressed peoples world-wide.

A climate justice framework does not reduce the climate crisis to a puzzle simply focused on counting carbon. Grassroots, community-led movements around the world look across the economy – at the exploitation of land, labor and living systems; at the erosion of seed, soil, story and spirit, and seek to lift up real solutions around us everyday – from **Indigenous Traditional Knowledge**, **food sovereignty**, decommodification of land, healthcare and housing; to abolishing the military industrial complex seeking to extract the last dregs of fossil fuel from Mother Earth.[1] From **just transition** and **energy democracy** where democratized, decentralized, detoxified and decarbonized energy powers our lives; to transformative justice, where we respond to violence and trauma with compassion and healing, not policing, punishment and prisons.

Climate justice emerged from global grassroots, **environmental justice** struggles rooted in Indigenous, Black, LatinX, Asian, Pacific-Islander, migrant and poor communities, and the leadership of women and gender non-binary folks – people first and most impacted by the storms, floods, sea-level rise, forest fires, droughts, and melting ice in the Arctic regions. These communities have also had to bear the brunt of pollution, poverty, police violence and criminalization of Earth and Sky defenders caused by the colonial extractive economy driving climate chaos. As such, climate justice centers the place-based leadership of peoples with the longest-living knowledge of Earth's natural ecological systems, understanding that such Indigenous Traditional Knowledge and local ecological knowledge are core to envisioning a long-term strategy for engaging future shocks, slides, pandemics and upheavals headed our way.

Climate justice centers organizing, direct action and community based decision-making by those on the frontlines of the crisis who are also at the forefront of change. In essence, people whose efforts are guided by shared principles and a common vision of restoring our relations with the Earth and each other; and embracing relationships that cultivate a **decolonized** worldview of respect, reciprocity, mutuality and solidarity across all communities, with the rest of the living world and Mother Earth.

At the same time that climate justice is becoming a unifying voice for the needs of those most vulnerable, we are witnessing a rise in climate denial, authoritarian political elites, and patriarchal and white supremacist governments around the world. We are seeing a dangerous slide towards a lawless capitalism, where free market ideology (**neoliberalism**) has privatized and atomized every aspect of our lives and nature, nearly drowning democracy in a bucket so that global corporations and nation-states can misbehave with virtually no public over-sight or accountability for their unethical practices and unfettered profiteering.

Climate justice centers organizing, direct action and community based decision-making by those on the frontlines of the crisis who are also at the forefront of change.

We are also seeing an alarming tendency towards "politics of desperation" in some sectors of the climate movement, where opportunistic disaster capitalism coupled with a myopic **carbon reductionism**, the financialization of nature and a growing techno-utopianism, has driven a proliferation of false, climate profiteering schemes. Even the symbolic Paris Agreement that was adopted by the United Nations in 2015 has largely served to enable and advance a host of corporate technology scams, carbon market mechanisms,and **carbon taxes** being falsely posited as solutions in recent years.

We have also seen a flood of philanthro-capitalist funds, with the likes of Bill Gates, Jeff Bezos and Elon Musk committing billions to tackle climate change. Due to a growing trend in diversity, equity and inclusion programs, a portion of these funds are being earmarked as "racial equity" grants. However, on closer examination it becomes clear that a lion's share of these climate investments are going to a cadre of elite international NGOs (who already have billions of dollars in their coffers) to promote corporate climate schemes, often at the expense of Indigenous and frontline communities.[2] Who controls global climate capitalism will also control the green economy.[3]

As you turn these pages, you will enter a Pandora's box of climate false solutions, primarily designed to profiteer from the global ecological crisis. Most of these can be characterized as unproven techno-fixes, negative emissions technologies, **carbon pricing** mechanisms, corporate snake-oil products or extreme energy projects. All claim to address the climate crisis while avoiding the very underlying drivers that got us into this mess in the first place: economies of greed and hoarding; endless growth; corporate enclosure of land; erosion of biodiversity and the exploitation of life.

While some of these seemingly futuristic proposals (like mirrors in space to reflect the sun's radiation) might feel creative and visionary, they are, in fact, exactly the opposite. These schemes, however magical they may sound, are an illusionary idea that technological innovation will provide a "fix" to the inherent limits of a finite Earth. They reflect a profound lack of imagination – an inability to imagine a world in which we can live in "right relationship" with the vital natural cycles of life upon which we depend.

What all these false promises have in common, apart from being untested and unproven to be safe or effective, is that they emerge from a world-view defined by racist **doctrines of discovery** and conquest; blind faith in market-based policies and corporate technologies; ideological practices of privatization, commodification and the exploitation of nature – putting a price on the sky, on forests, on waters, oceans and soils to create new derivative markets that increase inequality and expedite the destruction of all life. This dominant, arrogant culture of greed assumes that the ingenuity of individual gain can supplant the complexity of Earth's natural systems that have sustained all life in balance and harmony for so long.

In this world view, we use machines to make meaning of life; where Mother Earth is objectified like the objectification of women and treated like a machine made of parts that can be replaced, redesigned or engineered; where DNA is code to be edited and deleted; where our bodies are engines and food is fuel; where the world is not seen as a complex of interdependent, beautiful and sacred relations; but instead as a collection of objects to be monetized and manipulated. In this world view, practices of corporate and nation-state greed, hoarding, theft and private ownership constantly trumps all values of care, consent, compassion and collective responsibility.

If we are to co-create

and invest in the best climate justice pathways for the future of all life, then we must inoculate ourselves against these dubious and dangerous false promises that distract from where we really need to focus our time, resources and energy – a transition from global extractive economies to local, living economies rooted in shared values of reciprocity, care, dignity, mutuality, solidarity and the respect for the territorial integrity, sacred creative principles and natural laws of Mother Earth and Father Sky.

For such pathways to be aligned with a longer arc of justice, we need to repair our relations with all forms of life, and each other across multiple cultures and generations – starting with those people and ecosystems who have historically been most harmed. And, in doing so, we need to transform our relations so that such harm can never happen again.

Consistent with Indigenous prophecies, a reawakening to our true human nature is sweeping across both Indigenous and non-Indigenous communities. This inseparable relationship between humans and the Earth must be respected for the sake of all life and future generations. Mother Earth is the source of life which needs to be protected, not a resource to be exploited and commodified as "natural capital", as an "ecosystem service" or as a "**nature-based solution**." We urge all humanity to bring our hearts, spirits, minds and bodies together to transform the social structures, economies, institutions and power relations that underpin our deprivation, oppression and exploitation.

We only have One Mother Earth and One Father Sky

Indigenous Climate Action: indigenousclimateaction.com
Indigenous Environmental Network: ienearth.org
Just Transition Alliance: jtalliance.org
Movement Generation: movementgeneration.org

MARKET BASED MYOPIA VS ECOLOGICAL CONSCIOUSNESS

Industrial scale corporate techno-fixes

Governed by elitist, patriarchal concentration of power

Reductionist analysis, fixation on individual components

Serves capitalist mandates of global markets dictated by transnational corporations

Existing wealth concentration shielded from costs of adaptation and mitigation

Defined by uniform, monocultural and commodified systems and practices

Subsidized by global and national financial handouts and policy incentives

Embedded in colonial paradigms of endless growth, appropriation, and exploitation

Untested, unproven approaches rubber stamped by governments colluding with corporations

Indigenous Traditional Knowledge and stewardship

Appropriate bottom-up, decentralized, democratic, horizontal autonomy

Holistic Systems Consciousness that seeks to remedy root cause

Serves communities and ecosystems, transcends colonial borders and respects local leadership

Purposed to fortify local capacity and autonomy

Defined by localized and decentralized diversity of design and practice

Supported by local resources & funding associated with mutual aid and solidarity economics

Aligned with goals of reparation, redistribution, and restoration

Rooted in millenia old traditional ecological knowledge and regionally-proven practice

CARBON PRICING

In the last decade, carbon pricing systems have emerged as the primary strategy to address the climate crisis. However, approaches that assign a monetary value to greenhouse gas pollution mask the fact that carbon pricing allows fossil fuel extraction to continue unabated under the false assumption that market forces will drive significant emissions reductions. This section outlines the key carbon pricing mechanisms and demonstrates why they are false solutions to the climate crisis.

The foundations for global market-based climate policies began with the 1997 Kyoto Protocol. This treaty required developed countries to adopt binding commitments to reduce emissions. However, it allowed these commitments to be achieved through emissions trading systems. **Cap and trade** systems were promoted under the Kyoto Protocol as a way to limit emissions with a cap and allow corporations to trade permits among themselves, while being regulated by a government. Under a cap and trade system, polluters and investors looking to make a profit can buy, sell and bank allowances given for free or auctioned by the government. Polluters can emit more than their allotted amount (cap) by purchasing allowances from other participants in the market. All cap and trade systems include **carbon offsets.** Carbon offset credits are generated from projects that claim to reduce emissions somewhere else by doing something else. Offsets are purchased by polluters to justify more pollution.

Cap and trade and offset programs do *not* directly reduce emissions or fossil fuel use. Instead, they allow industries to keep polluting by paying for more allowances or reductions elsewhere. This results in emissions only being reduced where it is economically viable (if they are reduced at all), leaving pollution to persist in areas disproportionately populated by communities of color and poor communities. Further, carbon markets remain subject to boom and bust cycles. Consistently plagued by low prices, this results in minimal economic incentives for polluters to reduce emissions. Cap and trade and offsets regulated by governments are termed compliance markets, while **voluntary markets** do not fall under government regulatory structures and are unregulated. These markets are set up by profit-driven private companies and conservation organizations to sell offset credits to consumers, polluters, airlines and corporations.

Carbon offsets are often exploitive and restrict land sovereignty and rights of Indigenous Peoples as well as land access of Black people and other People of Color and low-income communities.[1] Carbon offsets can include destructive large-scale **hydroelectric** projects, **biomass** plants, mine methane capture, fuel switching or efficiency projects, so-called "forest management," animal agriculture methane digesters and many others. Forest and other land-based offsets are particularly problematic because they falsely treat emissions reductions from fossil fuel emissions as equivalent to emissions reductions from land use practices, such as forest management, despite scientific understanding that fossil carbon and land-based carbon are fundamentally different and should not be treated the same.[2] Further problems arise based on distractive accounting measures that implausibly seek to prove that reductions will be permanent and would not have occurred in the absence of the offset program.[3, 4]

Forest offsets do not mean that the timber industry or communities stop cutting down the trees. For example, in the California cap-and-trade system, the often 99-year contracts are signed for "forest management," which only means a reduction in felling trees. Additionally, the price of carbon itself has remained so low that it cannot compete with high deforestation risk commodities such as soy, palm, timber and fossil fuels. Further, carbon brokers in the voluntary market have increasingly targeted the governmental leadership of Indigenous nations in order to gain access to rights to the carbon on their lands.

In 2007, the United Nations Framework Convention on Climate Change (UNFCCC) and the World Bank rolled out the controversial and colonialist scheme, REDD (Reducing Emissions from Deforestation and forest Degradation). In 2010, REDD was expanded to REDD+, which purported

to include forest conservation, "sustainable forest management" and "enhancement of forest carbon stocks." A typical REDD+ project offers the promise of economic incentives to a community in the global South, often targeting Indigenous communities with intact forests, in exchange for forest management and selling credits to polluters for the carbon supposedly stored in the forests. Such projects tend to be accompanied by the claim that deforestation happens because too little economic value is placed on intact forests and that providing money for conservation to forested countries in the South will help to protect them while supporting economic development. This assertion has been challenged by many Indigenous Peoples and forest communities, who warn that putting a price on forests has in fact encouraged further **land grabs** by carbon traders, large companies and governments.[5]

In practice, REDD+ projects tend to follow a divide-and-rule strategy. Communities often find themselves subject to new restrictions on their livelihood activities, new accounting burdens, land grabs and criminalization, while the promised money is often not forthcoming and internal community tensions and divisions increase. Very few communities are even informed that the objective of the contract they have signed is to manufacture pollution rights for faraway industries and business sectors, thus negating any efforts toward consent.

Another climate change mitigation policy is a **carbon tax**, or a fee imposed on polluters for emissions they produce. Carbon taxes have not historically deterred industries from polluting, as corporations can easily mitigate the costs by passing on the cost to consumers, cutting workers' wages, union busting, tax avoidance and lobbying for more subsidies or lawsuit immunity to name a few.[6] Recently, there has been an increased interest in so-called "nested-REDD+" with a carbon tax that allows polluting industries a tax break for investing in REDD+ projects.[7]

Systems such as "carbon fee and dividend" or "cap and invest" are carbon tax schemes that claim to use the funds paid by corporations to provide revenue for climate change mitigation efforts or refund energy consumers. Canada and Switzerland use these schemes. In the U.S., carbon taxes such as these have been pushed on the poor and communities of color with promises of revenue as a way to lobby and gain support for a carbon tax. While enticing, these systems are yet another distraction from moving off fossil fuels because the tax revenue is dependent on continuing pollution and does nothing to stop extraction at source. While Indigenous Peoples struggle against **fracking**

Carbon pricing schemes must be recognized for what they are: unjust and colonial extensions of an oppressive, racist, patriarchal capitalist system

and pipelines and Asian, Black and Latino communities fight against asthma and other health disparities living near petroleum refineries, carbon fee and dividend creates divisions in environmental and **climate justice** movements because the carbon tax creates a financial dependency mechanism that relies on further pollution with the claim of a payout for certain communities or other projects. The payouts can be in the form of "benefits" that can fund private corporations over communities and ultimately more false solutions.

In an effort to boost the failing carbon markets around 2013, extractive industry and organizations promoting carbon trading began to pursue a rebranding. Around the same time, governments and corporations combined carbon trading, offsets, taxes, REDD+ and other conservation-based trading under the common term **carbon pricing**, with ambitions to link the various schemes being implemented into a global framework. The 2015 Paris Agreement further solidified this goal by outlining mechanisms for countries to meet emission reduction commitments through linking regional carbon trading systems and other carbon pricing approaches.

Article 6 of the Paris Agreement is the carbon pricing article of the treaty. Article 6 includes two main mechanisms to trade pollution. Article 6.2 is called Cooperative Approaches and allows parties to trade directly without using an international mechanism. Article 6.2 could be used in a situation where national or regional instruments such as the European Union Emissions Trading Scheme (ETS) are linked with a comparable system in order to create a cross-border carbon market. National and bilateral carbon credit-based systems operated outside the realm of the UNFCCC could also be used under Article 6.2. For example, climate change mitigation activities can be implemented in one country and the emission reduction can be transferred to another country through carbon accounting in what is termed an Internationally Transferred Mitigation Outcome (ITMO). The ITMO is then counted towards a country's emissions reduction target called a Nationally Determined Contribution (NDC). Reductions would include most of the false solutions discussed in Hoodwinked.

Historically, the largest global carbon offset mechanism is the Clean Development Mechanism (CDM) set up through the Kyoto Protocol. Article 6.4 is the provision in which the CDM is slated to be converted into the Sustainable Development Mechanism (SDM) in the Paris Agreement. Offsets would again count towards a Party's NDCs. Questions remain regarding what will happen with existing CDM credits, how the SDM will function and who will be eligible. At the time of writing, it is clear that big business is invited by "offering suitable incentives" to the private sector.[8]

Finally, Article 6.8 is based on non-market based approaches. This section can include dodgy conservation efforts like Payments for Environmental Services (PES) that swap one precious ecosystem for a "conservation" project somewhere else. PES projects often support the expansion of the fossil fuel industries when they are required by the state to implement social or ecological projects through social license to operate (SLO) or by ecological permitting requirements. In these projects an entire region can be destroyed by extractivism in the name of development as long as some project is implemented somewhere else (See Nature-based solutions).

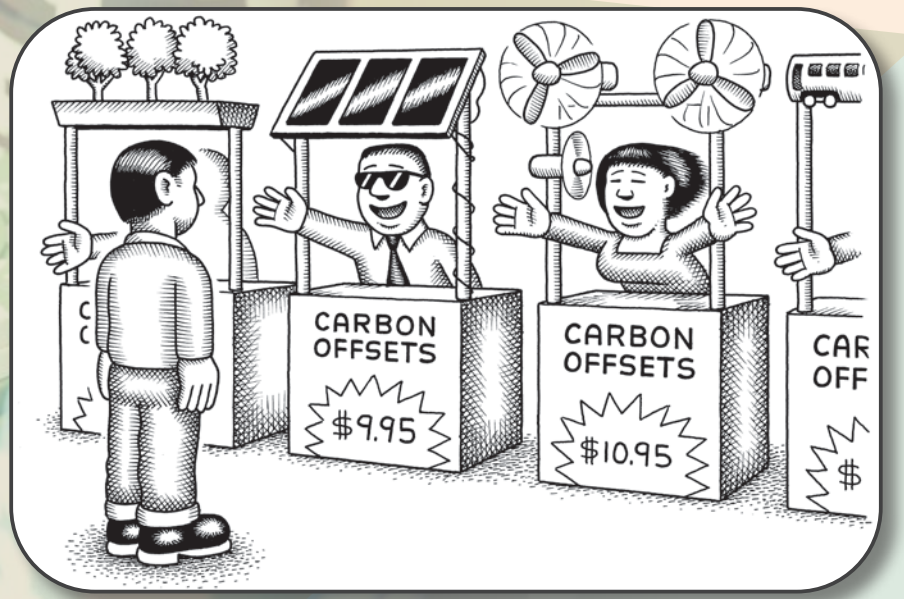
With the architecture of emissions trading in the Paris Agreement still being negotiated, by the end of 2019 the world saw the voluntary markets supersede the compliance markets for the first time. Big business was rife for claiming carbon neutrality in the booming and unregulated voluntary markets. From the major airlines to Microsoft, TC Energy and Amazon, forest offsets, land-based offsets and all the other iterations of carbon pricing took off into a new frontier. Today, dubious, misleading terms including **net-zero emission targets**, carbon neutral, carbon positive, carbon negative, **nature-based solutions (NBS)** and **carbon capture** occupy both policy and corporate-speak alike (see Nature-based Solutions and Carbon Capture). Net-zero emissions, while seeming to imply a state of not producing any carbon emissions, simply means that a business, government or other entity can subtract its total existing emissions on a spreadsheet to equal "zero" with a few stokes of a keyboard and some carbon offsets. But the emissions still exist.

Dangerously, there has been a recent shift to not only monetize carbon as a new environmental service commodity, but to also place nature on an equal plane with technology. Thus, the new wave of climate **geoengineering** focuses on "carbon dioxide removal," encompassing unproven technologies like **direct air capture** and **carbon capture and storage/sequestration (CCS)** (see Geoengineering and Carbon Capture). To achieve net-zero emissions targets, in addition to carbon capture the focus on removing carbon extends to so-called NBS, which has become the new terminology for land sector carbon. New emissions trading mechanisms are emerging that would provide a platform for the commercialization of now traditional forest-based offsets and extend land sector-based carbon offsets into soils, agriculture and factory farm gas (see Nature-based Solutions).

While the accumulating emissions and ecosystem impacts remain unaddressed by proponents of carbon pricing, the new focus on carbon dioxide removal and NBS is paired with the continuation of traditional yet still very popular forest-based offsets. In that sense, the more things change the more they stay the same, exposing how carbon dioxide removal, "natural climate solutions," net-zero emissions and NBS are based on the same underlying distraction from extraction. With governments, corporations and NGOs seeking to develop a global carbon market through the linking of national and subnational markets in Article 6, carbon pricing schemes must be recognized for what they are: unjust and colonial extensions of an oppressive, racist, patriarchal capitalist system meant to uphold the status quo and justify land theft to keep fossil fuels coming out of the ground and timber coming out of the forests for the purpose of lining the pockets of the global elite.

Indigenous Environmental Network: ienearth.org, co2colonialism.org

REDD-Monitor: redd-monitor.org

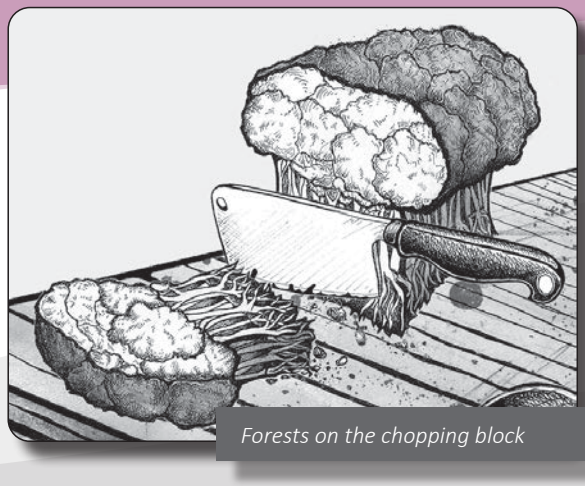


NATURE-BASED SOLUTIONS

Forest carbon offsets have long been a favorite false solution perpetuating fossil fuel use, and increasingly, agriculture and soils are entering offset schemes. Agriculture and forestry offsets are the basis for so-called **nature-based solutions (NBS)** (see Carbon Pricing). With the current political push to increase **voluntary carbon markets** for corporations and governments to achieve so-called "**net-zero emissions**," land-based offsets from forests and agriculture are center stage. Without a doubt, emissions from industrial agriculture and forestry are massive, estimated around one quarter of global greenhouse gas emissions.[1] There is potential to reduce emissions as well as to protect livelihoods and biodiversity by changing how we grow food and exist with forests. Changing our relationships with land has gained a lot of attention recently, but unfortunately, there are many false solutions that may sound nice, yet on closer examination only serve to entrench unsustainable and unjust practices.

There is great appeal to the notion that changing how we treat the land, forests and soils will provide solutions, but the basic premise of the argument that soils and trees can permanently and endlessly store carbon from extracted fossil fuels is flawed. Carbon is fundamental to living organisms and to the mineral composition of our planet. Carbon cycles between the oceans, soils and the atmosphere in a long-established balance to which life is adapted. But carbon in fossil fuels is held in below-ground deposits separate from the biosphere – until it is extracted and burned. When released into the biosphere, the carbon cycle balance is upset. The combusted fossil fuels cannot be endlessly absorbed. Yet, this flawed notion is the foundation upon which soil, forest, agriculture and conservation offsets and many other land sector false solutions are based.

Forests



Forests on the chopping block

The timber and forest products industries have worked to spread false mythologies aimed to convey ideas about forests and climate that support their goal to expand profitable logging and the replacement of natural forests with industrial tree plantations. First and foremost, the industries strive to confuse and confound the distinction between natural forests and tree plantations – industrial monocultures grown in rows using various chemicals for short rotation (5-20 years) harvest and to maximize wood harvests. But plantations fail to provide habitat for biodiversity, displace natural forests, and harm Indigenous Peoples and communities who depend on healthy, diverse forests for their survival.

To bolster support for logging and industrial tree plantations, the industry claims that younger trees are better at sequestering carbon than older trees, lending support to the abominable practice of logging old growth forests (the most valuable for timber) and replacing them with short rotation plantations. Yet old growth forests store more carbon in the active carbon cycle in the wood and soils than tree plantations. Corporations claim that forests "need" thinning to maintain health – yet logging practices damage soils, injure trees and introduce pests and pathogens. Capitalizing on fears, they claim that wildfires can be controlled or eliminated by thinning and logging. Yet logging disturbances in fact create favorable conditions for wildfires. The industry claims that the use of wood in construction or for other durable wood products should be subsidized as "carbon sequestration" just as burning wood is subsidized as "renewable energy" (see Bioenergy). Now some even promote using wood to produce "renewable natural gas."

Researchers are developing genetically engineered (GE) trees which they claim will sequester more carbon, provide more **biomass**, be easier to refine into liquid fuels or be suited to withstand the conditions of climate change and industrial plantations. The impacts of altering tree genetics for commercial and industrial uses simply cannot be anticipated, and GE traits could contaminate natural forests and damage ecosystems and biodiversity. GE trees are being experimented with in several places in the world, including the U.S. and Brazil. Corporations argue that they can grow the plantation trees faster and sequester more carbon, but as pointed out above, there are many problems with plantations. Much is unknown about the risks of using GE technology in one of the most crucial ecosystems supporting the survival of the planet today.

Creating vast new demands for wood under the guise of providing solutions to climate change is the goal of industries that profit from logging. Increasing demand for wood products is precisely antithetical to the goal of reducing deforestation and forest degradation, and thus, mitigating climate change. Further, the industry claims it can use "certification standards" to ensure that wood is sustainably harvested, but these standards are entirely insufficient. When the scale of demand itself is unsustainable, certification standards cannot deliver sustainability. Forests are rapidly dwindling under excessive logging, demand for land (especially for livestock), the impacts of climate change, and introduced pests and pathogens. Protecting and restoring natural forests require that we address the root causes of deforestation, not introduce vast new demands for wood.

Agriculture, Land and Soils

Even today, Indigenous Peoples, small-scale farmers and other agroecology-based farmers, mostly women, provide food to more than 70% of the world's people, and do so using less than 25% of the agricultural land.[2] In this way, agroecology represents a form of resistance to industrial, corporate agriculture. However, since the 1980s, the capitalist industrial agriculture system is increasingly managed by just a few multinational corporations who control the seeds and chemicals, promote debt-inducing contract farming and lobby governments to provide incentives for unsustainable industrial farming practices that increase their profit, exacerbating global inequalities.

Fewer farmers are working today than ever before because farming has become more focused on tech and automation than on people and the planet. The increase in climate policies for agriculture at the national and international levels are situated within and compatible with this exploitative industrial farming framework. Agroecology uses less energy and fewer external inputs as a whole, while it is estimated that between 44% to 57% of all greenhouse gas emissions come from the industrial food chain including: deforestation and high-energy intensive industrial-scale production, processing, packaging, retail, transportation, refrigeration and waste.[3]

Traditional farmers lose their lives and livelihoods under carbon offset schemes

False solutions include proposals that seek to turn soils into carbon sinks to "draw down" and compensate for corporations' excessive greenhouse gas emissions. Encouraging investment in agriculture to supposedly sequester more carbon, especially from private sources, will require a greater expanse of land, and as a result lead to an increased risk of **land grabbing** from small-scale farmers and forest-dwelling communities.[4] False solutions attempt to control seed diversity by giving rights and patents to transnational corporations and others whose irresponsible and deadly practices have reduced biodiversity, increased use of agrotoxins and expanded genetic manipulation, all of which has led to the emergence of superweeds, putting the survival of life as we know it on a cliff's edge.

Climate SMART agriculture, soil sequestration programs, NBS, payments for environmental services (PES) and many other derivations of the theme refer to agriculture and livestock practices that supposedly enhance soil carbon sequestration, reduce emissions and/or enhance biodiversity. These programs can be sold as carbon offsets in a carbon trading system, or as tax breaks in a **carbon tax** system, allowing polluting industries to pollute more. The petroleum and coal industries claim to reduce emissions by investing in agribusiness.

Another example is Royal Dutch Shell's investment in a NBS unit to buy up lands and claim carbon neutrality in addition to selling carbon credits.[5] Livestock, agroecology, organic farming, agroforestry and "urban forests" can be included in carbon farming offsets schemes. Carbon farming puts agriculture in the carbon market; privatizing, commodifying and selling nature, seeds, soils, food, grasses, air, pollinators, farms and traditional knowledge systems and shifting them into money making schemes for polluters.

GE approaches to addressing the climate impacts of agriculture are owned and controlled by a tiny handful of mega-conglomerate corporations that have engaged in an ongoing concentration of control over our food systems – claiming intellectual property rights over seeds, fertilizers, livestock genetics and pharmaceuticals, farming equipment and more. Locally adapted and controlled, diverse and life-sustaining farming practices have been undermined and abandoned in favor of vast

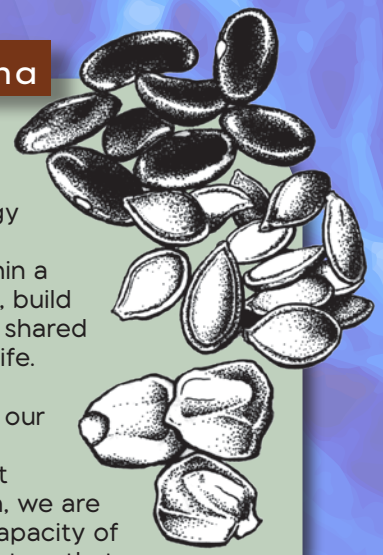
industrial production of a few centrally controlled commodity crops. False solutions to the climate impacts of agriculture are designed to perpetuate business as usual for these agriculture mega-conglomerates. Corporations claim that GE crop varieties resistant to herbicides (such as glyphosate) or resistant to pests and diseases reduce emissions because they require less tilling, operation of machinery and cause less soil disturbance. Companies such as Monsanto/Bayer, Dow, BASF and Syngenta among others are developing "climate friendly" crop varieties tolerant to high salinity, drought and temperature extremes. But ultimately, these developments are all designed to perpetuate the industrial agriculture model which is, itself, the root of the problem.

Biochar is burning biomass through a process called pyrolysis and burying the carbon-rich charcoal in soils. But biomass is from burning trees and biochar schemes do not address the impacts of deforestation, harvesting wood nor burning it to produce biochar. Studies of biochar are inconsistent: sometimes it increases soil carbon and other times decreases it. This is because the calculations rarely include the harvesting and burning. In addition, studies can change over time, likely reflecting the variable nature of the biochar itself, the soils and the environment.

Methane from livestock is a major source of greenhouse gas emissions.[6] To address methane emissions, farmers are advised to feed cows differently, to change management practices with manure and to slaughter at an earlier age to name a few. But this does not address the key problem that demand for meat is vast and rapidly increasing, and the price of meat is artificially cheap. In addition, **concentrated animal feeding operations (CAFOs)**, where livestock are raised inside confined structures in overcrowded and inhumane conditions, have been expanding since the 1990s causing problems for the earth and debt for farmers (see Natural Gas). There are efforts to expand existing factory farm methane gas offset programs for CAFOs and other livestock practices in carbon trading schemes. The methane capture is sold as an offset allowing fossil fuel corporations to pollute more, even though the methane is burned as a fuel.

Biofuelwatch: biofuelwatch.org.uk
Global Justice Ecology Project: globaljusticeecology.org
Indigenous Environmental Network: ienearth.org, co2colonialism.org
La Via Campesina: viacampesina.org

A Note from La Via Campesina



For peasants, Indigenous Peoples, and many communities, agroecology and **food sovereignty** offer huge potential for reducing emissions and realizing social justice. Agroecology and food sovereignty are social, political and ecological visions that unite multiple groups within a single movement to challenge business-as-usual, build relationships with nature and defend systems of shared control over and access to the requirements of life.

As peasants and peoples who work on the land, our soils, animals, seeds and crops are like members of our family. They are precious to us and cannot be commodified. When we talk about soil health, we are referring not only to the carbon sequestration capacity of the soil but also to the whole interdependent system that gives life: the microorganisms, the fungi, the minerals, the plant organic matter, the water, the sunlight. Healthy soils give life to people and also to the non-people who are also part of our territories. When we talk about animals and livestock, we recognize first of all that they are an integral part of our agroecosystems. Our animals conserve permanent grasslands, and animal and plant biodiversity. They also help build soil health. These contributions are important to combating climate crisis. Our animals and peasant livestock systems are not to blame for the climate crisis. Large-scale, high-input and industrialized factory farming is responsible, and must be overcome. And when we talk about the seeds, we know that, as the first link in the food web, we have a responsibility to care for, save, use, trade and share seeds so they can fulfil their role in the web of life.

Already peasants and Indigenous Peoples have contributed to humanity 2.1 million varieties of 7,000 domesticated plant species. Commercial breeders focus only on 137 crop species, and just 16 of these account for 86% of the world's global food production.[7] Focusing on biodiversity is necessary to building the resilience we need to face the climate crisis.

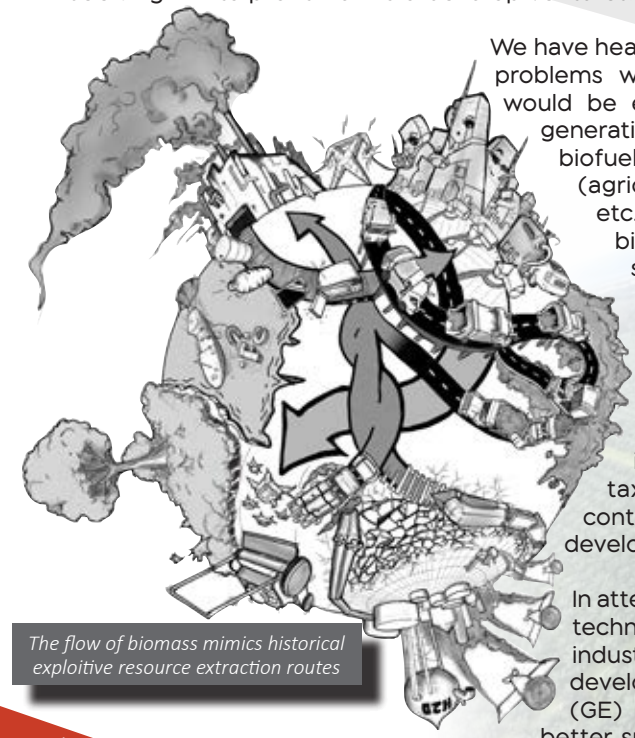
Fiber extraction from the fique plant in Colombia

BIOENERGY

Biofuels

The transport sector – private automobiles, air travel and global trade and transport of goods and materials – is a major source of demand for fossil fuels and of greenhouse gas (GHG) emissions, among other problems. But rather than contemplate serious measures to curtail demand for fuel, the false solution of **biofuels** is touted by a conglomerate of interests, including auto manufacturers, fossil fuel companies, the biotech industry, industrial agriculture and some career academics. They proclaim that biofuels are clean, green and climate friendly, and will enable countries to be "energy independent" – freed from domination by oil-rich countries. The biofuel mythology has won strong support, generous subsidies and legislative mandates, such as the Renewable Fuel Standard in the U.S. and similar laws in other countries.

Corn and sugarcane ethanol, soya and palm oil **biodiesel**, and a host of other biofuels have since come into widespread use, creating a direct and disastrous link between markets for commodity food crops and markets for fuel. Because of the extremely large land area required to grow crops for biofuel, as well as their demand for fertilizers, biofuel crop production competes with food production, even as demand for food is rising with global affluence. The new profitable market for fuel crops is a major factor in **land grabbing** – the displacement of communities and Indigenous Peoples from their lands – by speculative investors seeking to profit from biofuel crop ventures.



The flow of biomass mimics historical exploitive resource extraction routes

We have heard for many years now that the problems with "first generation" biofuels would be eliminated by a new "second generation" of cellulosic and advanced biofuels, made from non-food crops (agricultural residues, wood, algae, etc.). But those new improved biofuels have never been successfully produced in any significant quantity, in spite of numerous, much-hyped and costly attempts. Technical hurdles with turning woody material (cellulose) into fuel at commercial scales are likely insurmountable, but still a taxpayer-funded money pipeline continues to flow into research and development.

In attempts to overcome some of the technical hurdles, the biotechnology industry has taken a central role, developing genetically engineered (GE) crops such as corn varieties better suited for ethanol fermentation, trees with altered wood (cellulose) characteristics, and microbes to produce enzymes for some fuel production technologies. One contingent has long claimed that algae biofuels will solve the problem, and provide copious quantities of clean, green, climate friendly fuel from non-food feedstock. Researchers are hard at work genetically engineering microalgae for fuel production, introducing the risks of GE algae contamination. Even after decades of trying, algae biofuels remain forever "on the horizon" with a parade of much-hyped "breakthroughs" that only serve to prolong the hopes that some magical biofuel solution will allow us to continue to drive and fly and trade around the globe unabated. Meanwhile, real solutions to our overuse of transportation remain largely sidelined and untapped.

The aviation industry has developed the Carbon Offset Reduction Scheme for International Aviation (CORSIA). The underlying goal is to enable the ongoing exponential growth in the aviation industry, while claiming to reduce GHG emissions. The main pathway for "decarbonization" that CORSIA is pursuing includes forest offsets and alternative fuels (see Carbon Pricing). The industry is well aware that the only viable aviation biofuel available on such a massive scale would entail the use of palm oil – a leading driver of deforestation.

The biofuel industries have now linked up with the gas industry, touting the use of biodigesters to produce methane as "renewable natural gas" (see Nature-based Solutions). Similarly, ethanol producers are linking up with carbon capture interests, since fermentation produces carbon dioxide (CO_2). While claiming to reduce emissions by capturing the CO_2, in reality it is largely sold for use in **enhanced oil recovery** (see Carbon Capture).

Biomass

The false solution of biofuels as an alternative to fossil fuels is nowhere more problematic than in the "renewable energy" trend of burning so-called "**biomass**." The term has included everything from trash to trees, construction and demolition wood waste, black liquor (toxic paper mill goo), grasses, crop wastes, poultry waste and more – but usually involves burning trees in power

plants or burning lumber, and paper mill and sawmill wastes to heat these mills. All of these types of "biomass" create pollution while burning and can rival or exceed the pollution from coal burning. Coal plants under pressure to reduce emissions are subsidized grandly for burning wood chips and pellets instead, and new standalone biomass power stations are popping up around the world. Burning wood is almost universally considered to be clean, green and "carbon neutral" or "low carbon" in spite of the deforestation, and hence carbon emissions, that are resulting from this huge new demand for wood. Smokestack emissions from burning biomass are higher even than coal burning, per unit of energy, but this CO_2 is ignored.[1]

They are ignored due to an accounting error in United Nations Framework Convention on Climate Change (UNFCCC) guidelines that failed to count the smokestack emissions from **bioenergy** production in either the energy sector or land use sector. That was further reinforced by arguments that CO_2 released when trees are burned would be offset by CO_2 stored in newly grown trees. Yet, there is no guarantee that new trees will grow, and if they do, they may take decades – time we cannot afford.

A fast-expanding global trade in wood chips and pellets has nonetheless emerged over the past decade. Forests, including rare old growth forests in parts of the U.S., Europe and Canada are targeted for pellet production. In the U.K., the largest power plant, DRAX, has converted some of its energy generation from coal to wood pellets which are imported largely from forests in Canada and the southeastern U.S. Pellet manufacturing plants (dirty and noisy) have been established throughout the region – often in low-income communities. Meanwhile, the International Energy Agency advocates for greatly expanding this absurd false solution, and continues to advocate, along with policymakers around the world, for biomass as clean renewable energy, worthy of subsidies alongside wind and solar.

The biofuels industry and the forest products industries claim to resolve the potential problems through the adoption of "sustainability standards." Those standards, even when they sound good on paper, universally fail to protect, especially because certification itself has become a profit-driven industry lacking independent verification of compliance. Ultimately, simple common sense applies: when the scale of demand itself is too great to be met sustainably, then no sustainability standard can make it sustainable.

BECCS

As if demands on forests and land were not already far from sustainable levels, recent promotion of **bioenergy with carbon capture and storage (BECCS)** outrageously claims that burning trees for power and then capturing the carbon emissions and somehow sequestering them away would actually remove CO_2 already released into the atmosphere. The faulty logic starts by incorrectly assuming burning trees for energy is in fact carbon neutral. Then, proceeds to presume that we can safely and efficiently capture the CO_2 emissions from combustion and bury them somewhere (see Carbon Capture). Finally, the logic states that carbon absorbed by new tree growth (which cannot be assumed and will not be timely) would not just offset the combustion emissions but remove additional carbon from the atmosphere – i.e. carbon negative. This entirely fanciful logic fails on every count. And, if we were to go along with that false logic, the amount of land required to implement BECCS on a large scale would be astronomical – entirely beyond planetary boundaries. But none of that is likely to transpire because in the real world, there is no BECCS. A few pilot projects have been attempted but capturing CO_2 from burning biomass is even more challenging than from coal plants (so called "clean coal" which has a history of failure). The real danger of BECCS is that it is conveyed as a real-world potential way to remove CO_2 from the atmosphere. That false hope undermines efforts, funding and capacity that is urgently needed for implementing real solutions.

Creating this massive new demand for wood while at the same time advocating for forests as offsets, and tree planting as a solution, makes no sense. We cannot have our forests and burn them too! No amount of tree planting can undo the harms from logging old growth forests! While trees may technically be renewable, complex forest ecosystems are not. Industry interests are weaving a web of deceit, claiming for example, that young trees are better for climate because they absorb more carbon, when in fact old trees already hold carbon and continue to absorb more carbon. Industry favors young trees because they seek to create more tree plantations – industrial monocultures often of non-native species, treated with chemicals and fertilizers for the purpose of rapid and mechanically efficient short-rotation production of wood.

Claiming that tree plantations are good for the climate, they advocate increasing demand for wood and GHG accounting tricks that would represent the use of more wood – and more land conversion and deforestation – as lowering emissions. Those who profit from expanding markets for wood advocate its use for energy, in construction, as carbon storage in so-called "harvested wood products," as an alternative to concrete, and as carbon sinks – even when plantation trees will be cut down in as little as five-year growth cycles. Tree plantations are more akin to corn fields than to forests. When it comes to forests, one hand advocates forest protection, forest offsets, reducing emissions from deforestation and forest degradation (REDD+), and tree planting, while the other advocates logging, burning, pelletizing, industrial monoculture plantations, and GE trees.[2] What is held in common is a drive towards false solutions.

Biofuelwatch: biofuelwatch.org.uk

Dogwood Alliance: dogwoodalliance.org/our-work/our-forests-arent-fuel

Energy Justice Network: energyjustice.net/biomass

Partnership for Policy Integrity: pfpi.net

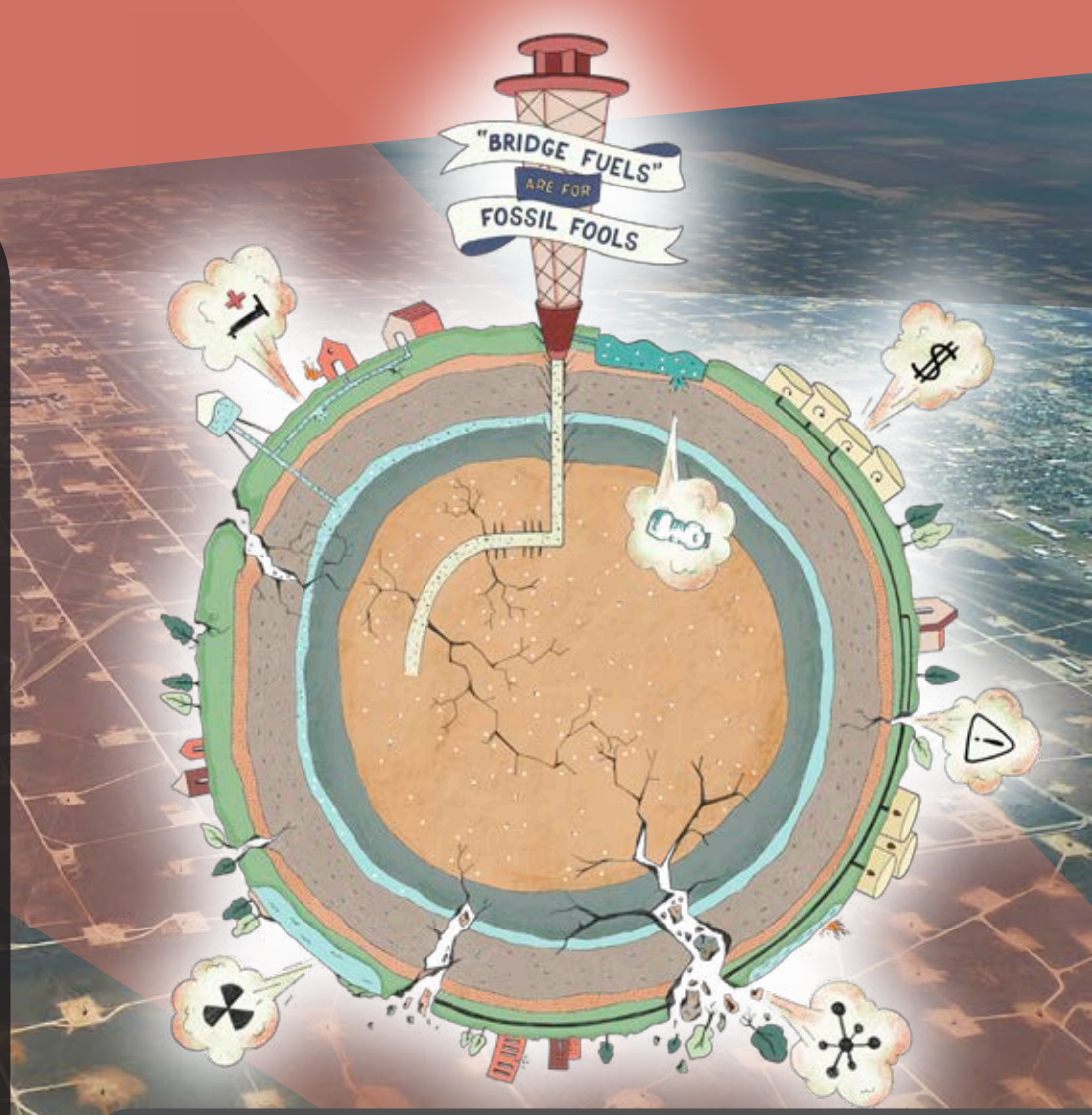
NATURAL GAS

Promoted by corporate backers as the "least dirty" of the fossil fuels, natural gas (methane) is still touted as a "bridge fuel" by claiming it can be a clean "alternative" to coal and petroleum. However, evidence of methane leaks all along the supply chain, from well to burning, demonstrates how natural gas is contributing to climate change. Furthermore, even if gas leakage was not a reality, natural gas is no longer cheaper than wind and solar on the other side of the bridge.[1] As the industry continues under pressure from **environmental justice** groups, expanding and diversifying of natural gas false solutions intensifies.

Natural gas is full of contradictions beyond its name. The industry uses an extreme extraction technique known as **hydraulic fracturing, or "fracking,"** where a toxic mix of water, sand and chemicals is injected underground at high pressures to release gas and oil trapped in geologic formations. At the same time, where crude oil is extracted using fracking technology, like the Bakken basin in North Dakota impacting the lives and livelihoods of Indigenous Peoples, unwanted natural gas is disposed of through flaring.[2] Community impacts from drilling and fracking include: health impacts from living near wells and compressor stations; contaminated water, air and soil; induced earthquakes; clogged and damaged roads; missing and murdered Indigenous women from the appearance of temporary communities of mostly male workers, known as "**man camps**"; and other impacts of a boom and bust economy.

Exporting natural gas requires pipeline and port infrastructure. Pipelines can leak, catch fire or explode. Further, companies are often granted eminent domain rights to seize land and place pipelines through Indigenous Territories, backyards, farms, sacred sites and near schools, over the objections of communities. Before shipping, the gas must be compressed into a volatile **liquefied natural gas (LNG)** in dangerous port facilities. LNG is compressed, super-cooled methane that can be shipped overseas in giant tankers. Overseas transport of natural gas can account for up to 21% of its greenhouse gas emissions.[3]

Another growing threat to climate and community health comes from selling the "wet" component (natural gas is mostly methane but includes substances referred to as wet gas) of fracked gas to petrochemical plants for making disposable plastics. In addition to massive greenhouse gas emissions loads,[4] petrochemical facilities that produce plastics (i.e. ethane cracker plants) produce massive amounts of hazardous air pollutants, particulate matter, benzene, toluene and other toxins. This is on top of all the health and environmental impacts of the drilling, fracking, transportation and waste disposal associated with plastics production.



Most plastics are made to be disposable, permeating every aspect of our lives and causing centuries of harm. Microplastics are found in most tap water supplies, across all our oceans, in our food and in our bodies. Recent studies have shown we eat and drink enough plastic to make a credit card from what we ingest each week![5] In addition to the hydrocarbons used to formulate the resin, plastics contain various heavy metals and phthalates that are known carcinogens and endocrine disruptors. Plastic pollution also poses a serious threat to ocean ecosystems, with giant swirling masses of plastic in each of the world's oceans, such as the Great Pacific Garbage Patch.[6] While plastics represent less than 8% of the world's oil use,[7] and despite growing public rejection of single-use plastics, big oil is looking to plastics as the biggest source of new demand in coming years, investing billions to secure its growth.

Natural gas: coming to a suburb near you

A new form of **greenwashing** for the oil and gas industries is **hydrogen**, which is much hyped as a clean energy source (see Hydrogen).

However, creating hydrogen in a pure form on Earth requires as much energy as it uses. It is a sort of bait-and-switch, in which promoters talk about: "green hydrogen" produced via "renewable energy," "grey hydrogen" derived from burning fossil fuels," and "blue hydrogen" where the carbon dioxide (CO_2) emissions from production are captured and stored (see Hydrogen and Carbon Capture). Yet hydrogen is most commonly produced from natural gas, giving the industry another excuse to continue drilling and profiting.[8]

Ultimately, when examining causes of climate change, methane emissions are highly impactful. In comparison to CO_2, methane is about 86 times more potent in immediate effect but clears out of the atmosphere in around twelve years, whereas some of the CO_2 emitted today will still be causing climate change centuries from now.[9] However, right now is when we face critical tipping points. We cannot afford more methane emissions now, or the environmental and **climate justice** impacts they continue to produce from extraction to shipping to plastics.

Energy Justice Network: energyjustice.net/naturalgas

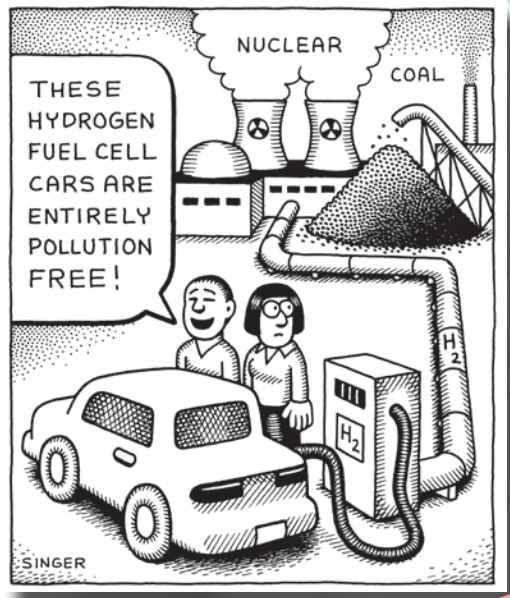
Indigenous Environmental Network: ienearth.org

HYDROGEN

Hydrogen is much-hyped as if it is a clean energy source. However, it is not really an energy source at all. It cannot be mined or obtained without stripping it off of hydrocarbons. In the U.S., 95% of hydrogen is produced from natural gas, a fossil fuel.[1] Schemes to make hydrogen from coal, oil, **biomass**, landfill gas and even nuclear power threaten to tie hydrogen to other dirty energy sources. Once produced, hydrogen is put into a **fuel cell** which uses a catalyst to speed up a chemical reaction between hydrogen and oxygen to make electricity and heat while the hydrogen and oxygen become water.

It takes energy to obtain hydrogen. Hydrogen can be produced by the electrolysis of water, which is only as clean as the source of energy used to obtain the electricity. When doing so, hydrogen is essentially being used as a battery, to store electric energy for later use when the hydrogen is converted back to water in a fuel cell. Due to large energy losses in conversion, more energy goes into the process than you get back. The only point of going through the process of electrolyzing water to make hydrogen is if electricity cannot be used directly and storage is needed.

Logistical problems of hydrogen storage make hydrogen impractical in transportation. Hydrogen must be liquefied, compressed or stored in a metal hydride, which takes up too much space, leaks or is too heavy to make sense. With improvements in battery technology, hydrogen vehicles are unlikely to emerge as a serious part of our future transportation systems. Doing so would require extensive hydrogen pipeline and distribution systems unless all hydrogen is produced on-site. Hydrogen embrittles steel pipelines and welds, causing dangerous fire and explosion risks. Hydrogen flames are invisible, making it even more dangerous should consumers routinely be fueling vehicles with hydrogen.[2]



There may be some applications where hydrogen could make sense as a stationary, grid-tied energy storage strategy for when there is extra wind and solar to electrolyze water. However, hydrogen in transportation and hydrogen from hydrocarbons are false solutions.

Energy Justice Network:
energyjustice.net/hydrogen

LANDFILL GAS TO ENERGY

Landfills are the third largest human-made source

of methane in the world, after livestock and natural gas.[1, 2] Landfill gas is about half methane and half carbon dioxide (CO_2), laced with hundreds of toxic contaminants, including **methylmercury** and many chlorinated chemicals that can form highly toxic dioxins when burned (see Waste Incineration). Radioactive tritium is also increasingly found in landfill gas, from emergency exit signs and other sources.[3] Methane is a greenhouse gas, 86 times more potent than CO_2 over a 20-year period.[4] It is produced when organic discards (food scraps, paper and wood products, yard waste, sewage sludge) decompose in an oxygen-starved environment.

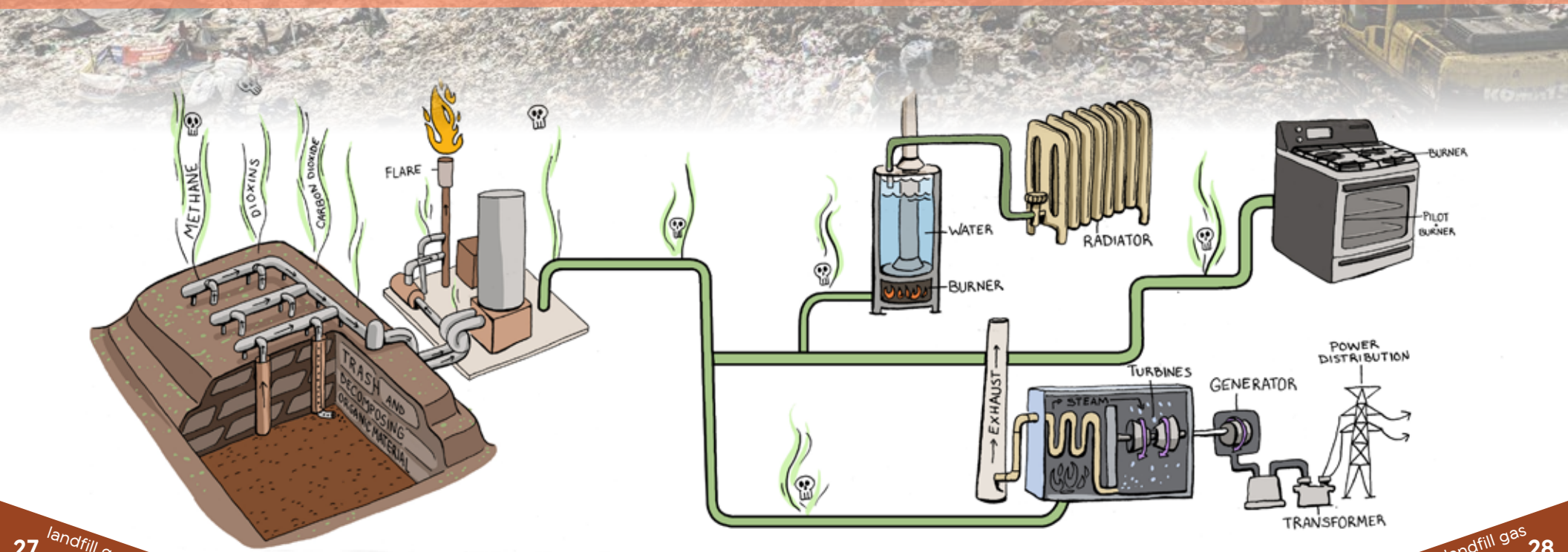
In the United States, larger landfills are required to capture landfill gas (and usually burn it), but capture systems are only partially effective. Landfills claim that they typically capture about 75% of their gas,[5, 6] but reality can be much lower.[7, 8] Much of the gas escapes as fugitive emissions, causing cancers and other health problems in neighboring communities.[9]

Many landfills burn gas in a flare, while others burn it to make heat or electricity, or clean it up to feed into natural gas pipelines. These are called **Landfill Gas-To-Energy (LFGTE)**. Burning the gas converts most of the methane to CO_2, drastically reducing the global warming impacts. While breaking down some pollutants in the gas, it also produces new ones like nitrogen oxides that trigger asthma attacks and ultra-toxic dioxins.[10] LFGTE projects receive many state and federal subsidies. Climate and energy policy-makers are lobbied by the waste industry to subsidize landfills and incinerators instead of supporting **zero waste** solutions like composting and recycling. As a result, some communities even cancel composting programs to dump more organics in landfills to maximize LFGTE opportunities.[11, 12] Nearly 90% of materials discarded in landfills and incinerators can be recycled or composted.[13] Typically competing with wind and solar in renewable energy mandates, landfills also absorb subsidies that ought to flow to these cleaner non-burn alternatives.

Ironically, burning landfill gas for energy can be worse than simply burning off the gas.[14] Managing landfills as energy facilities encourages the mismanagement of landfills to make them more gassy, when a proper waste system would do the opposite. Food scraps, yard waste and other clean organic materials should be separated at the source and aerobically composted. The dirty remaining organic materials in the trash and sewage sludge should be anaerobically digested to stabilize it before landfilling to avoid methane generation in landfills, where gas is harder to capture.[15]

Energy Justice Network: energyjustice.net/lfg

Global Alliance of Wastepickers: globalrec.org



WASTE INCINERATION
("WASTE-TO-ENERGY")

Incineration is the most expensive and polluting way to manage waste or to generate energy.[1] There is no need to burn any sort of waste, as safer non-burn alternatives exist for all materials, including recyclable and compostable discards like paper, plastics, glass, metals, food scraps and yard waste.

"**Waste-to-Energy**" is a public relations term used to promote incineration,[2] but waste is not magically transformed into energy. For every 100 tons of trash burned, about 70 tons become air pollution.[3] The other 30 tons become toxic ash that is typically dumped in landfills, making them more harmful than if all of the waste went there unburned. Even worse, some is used in dangerous ash reuse schemes.

Incinerators are a massive "waste-*of*-energy," since recycling and composting the materials being burned would save 3-5 times more energy by not having to recreate products from extracting raw materials.[4] **Zero waste** strategies such as recycling and composting create 5-10 times as many jobs per ton of waste than incinerators or landfills. By diverting discarded materials (and investment) away from recycling, incinerators burn much needed jobs.[5]

As filthy as coal burning is, trash incineration is even worse, despite the average incinerator being much newer and having additional pollution controls. To make the same amount of energy as coal, trash incinerators release 2.5 times as much carbon dioxide and much higher levels of dioxins, mercury, lead, cadmium, carbon monoxide, nitrogen oxides and hydrochloric acid.[6]

Incinerators are also far worse than directly landfilling the same materials, in terms of greenhouse gas emissions and emissions of toxic chemicals, nitrogen oxides, particulate matter, acid gases and chemicals that create smog – even when hauling the waste long distances to reach landfills.[7]

Public health studies have shown that living near incinerators increases birth defects, pre-term births, reproductive disorders, respiratory diseases and deaths in general, especially from various cancers.[8] Toxic incinerator pollution also contaminates the food chain. Dioxins, the most toxic chemicals known to science, are mainly released from burning, and can travel thousands of miles. They are long-lived and fat-soluble, causing them to bioaccumulate in the food chain, and can cause cancer, birth defects, failed pregnancies, endometriosis, diabetes, learning disabilities, immune system suppression, lung problems, skin disorders, lowered testosterone levels and much more.[9] Over 90% of human exposure to dioxins is through eating meat and dairy products where dioxins concentrate.[10]

In the U.S., incinerators disproportionately impact people of color, especially Black residents. Analysis by Energy Justice Network finds that 78% of U.S. trash incinerators are in communities where the population of people of color is above the national average, and that 35% are in communities where people of color are the majority.[11]

Incinerators are more expensive to build and operate than landfills or any other form of power generation (see Landfill Gas to Energy).[12, 13] Factoring in bond debt to finance them, a large-scale new waste incinerator can cost around US$1 billion. These costs are always paid by the public purse, and some cities and towns have faced bankruptcy due to the costs of incinerators.[14, 15] Unlike landfills, incinerators must be continually fed a certain amount of waste to operate, and "put or pay" clauses in incinerator contracts are common – where the communities have to provide a certain amount of waste, or pay regardless. This penalizes local governments that succeed in waste reduction efforts while allowing incinerators to take waste from elsewhere and be paid twice for the same capacity.

Incineration is a dying industry, primarily present in Japan, South Korea, Europe, Canada and the U.S. Hundreds of aging incinerators around the world have closed and the industry is only able to build new ones in nations that can afford to subsidize them. The one nation experiencing a proposed proliferation of waste burning facilities is China, where hundreds of new waste and **biomass** incinerators have been proposed in recent years. Community opposition is so strong in the U.S. that no trash incinerators have been built at a new site since 1995, despite hundreds of attempts. Aside from some rare expansions at existing sites, the industry sees their future mainly in Asia, Australia and parts of Europe.

Unable to compete economically with landfills or with other forms of energy, the incinerator industry is propped up by a variety of subsidies, including monopoly waste contracts, air pollution exemptions, bogus designations as recycling operations, and climate policies based on a false accounting of climate impacts. Renewable energy mandates also grant money from electric bills to incinerators where states have blessed the industry with a "renewable energy" label, cutting into the share that ought to go to real renewables like wind and solar. The industry has also adopted survival strategies such as burning more dangerous types of waste that fetch higher disposal fees.

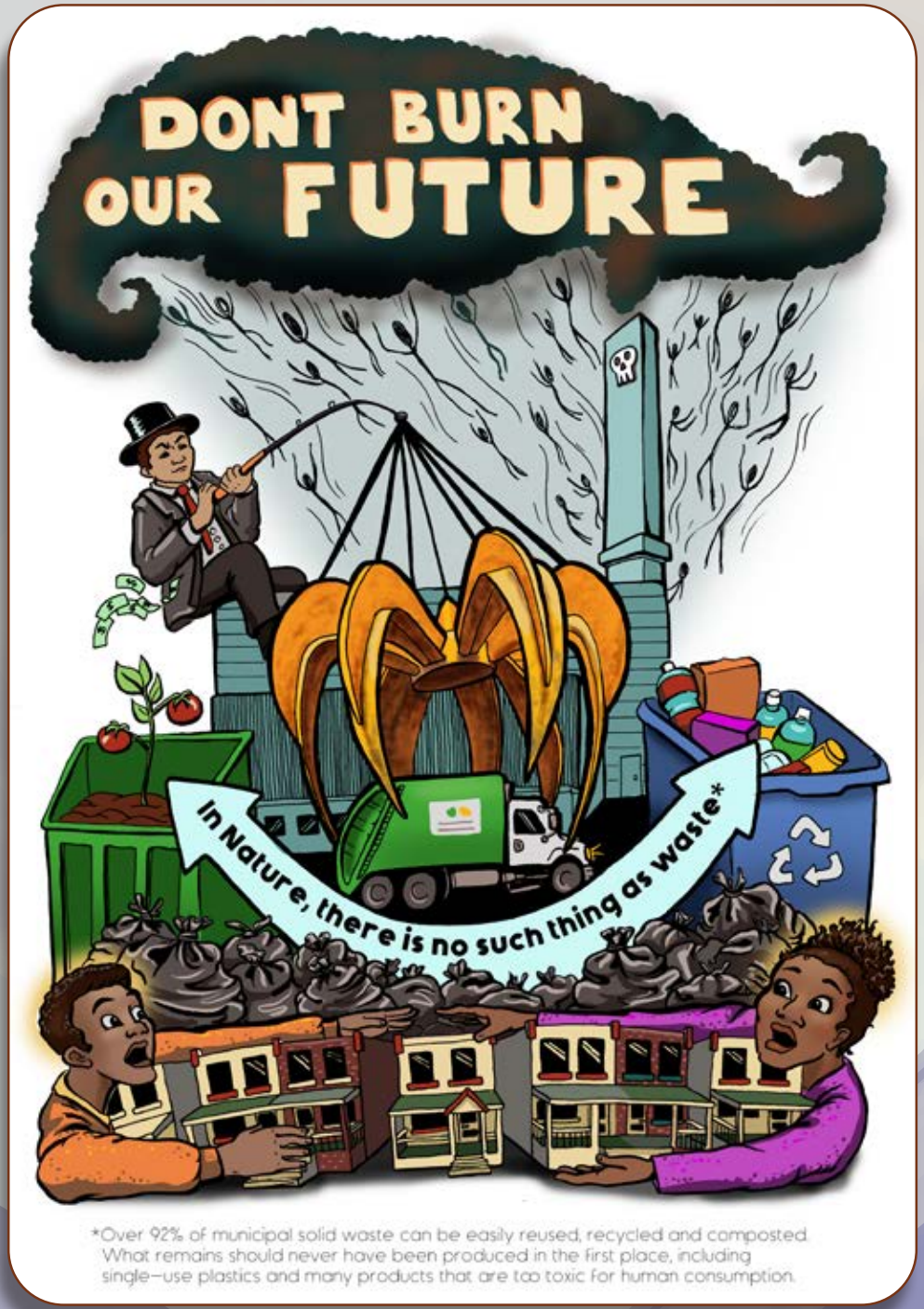
Incineration's New Directions

Refuse-derived fuel (RDF) is an old technology that has re-emerged. It involves pulling out the glass and metals that do not burn and turning the combustible materials (mostly paper and plastics) into fuel pellets. These trash pellets are either burned in a normal incinerator (where the pollution is comparable to normal trash burning), or are marketed as fuel to cement kilns or power plants looking to replace coal. Energy intensive paper mills and cement and aggregate kilns have long burned tire-derived fuel (TDF), and the kilns have also been a cheap dumping ground for hazardous waste in recent decades. Now, hard-to-recycle plastics are being marketed to cement kilns and steel mills as "plastic-derived fuel" (PDF). An Obama-era Environmental Protection Agency regulatory loophole (the "non-hazardous secondary materials" rule) has encouraged a wide range of waste streams to be burned as "fuels" in industrial furnaces without being regulated as waste incinerators.

Experimental incinerator technologies – namely pyrolysis, gasification, and plasma arc – have been proposed for many years by new companies claiming that these technologies are not incineration. Sometimes, they even claim to have no smokestack or to have "near zero emissions." However, these technologies are defined and regulated as incinerators in both the U.S. and Europe. They essentially break the combustion process into two steps. First, they use temperature and pressure to turn the waste into a "syngas," then they typically burn that gas in a second stage. These technologies have proved to be failures, both technically and economically.[16] They are more expensive than normal incinerators and have not been successfully developed at commercial scale. Small pilot-scale plants have been built, but break down a lot, and cannot operate continuously with any material that is not very homogeneous. Numerous attempts to process plastics or tires have failed, even though these are much more consistent than trying to process trash. Despite overwhelming failures and air pollution problems inherent to incinerators, many companies continue to court local officials desperate for economic development or "green" waste management solutions, and end up wasting time and public money pursuing these unproven, experimental "incinerators in disguise."

Waste-to-fuels (WTF?) schemes are also starting to emerge after a couple decades of trial and errors. Now called "waste conversion technologies" (to avoid their acronym problem), WTF technologies often start with pyrolysis or gasification. Instead of burning the "syngas" in a second stage, they use any of several methods to convert it to liquid fuels such as jet fuel, naphtha, and diesel, hydrogen and/or other chemicals. Solid residuals are often marketed as if they are desired as building materials or are burned on-site. Some WTF processes use acid hydrolysis, cellulosic ethanol or other fermentation processes aiming to make **biofuels**. With a growing public awareness of plastics pollution, including the proliferation of single-use plastics and the massive plastic gyres in all the world's oceans, we are witnessing a growing field of "chemical recycling" proposals, using these WTF processes. These technologies are still experimental and ultimately involve burning (and air pollution), destroying recyclable and compostable materials, increasing toxicity and producing solid wastes.[17]

Break Free From Plastics: breakfreefromplastic.org
Energy Justice Network: energyjustice.net/incineration
Global Alliantce for Incinerator Alternatives: no-burn.org
Zero Waste Europe: zerowasteeurope.eu



NUCLEAR POWER

Dirty energy companies want people to believe that nuclear power is necessary to reduce greenhouse gases and avert the climate crisis. This could not be further from the truth. Nuclear power is not a climate solution: it is too dirty, too dangerous, too expensive and too slow. At every stage of production, it is rooted in environmental injustice and human rights violations. The uranium fuel chain and nuclear disasters make the dangers of climate change worse, and the nuclear industry actively blocks renewable energy and other solutions to end fossil fuels. Uranium and fossil fuels must be left in the ground. We can and must phase out nuclear power along with fossil fuels, to repair environmental injustices and protect generations to come.

Too Dirty – The Nuclear Fuel Chain

Nuclear reactors make electricity by boiling water, just like coal, gas, and **biomass** plants do. But instead of using combustion that consumes fuel by burning it, nuclear reactors release subatomic energy by splitting uranium atoms in a chain reaction (nuclear fission). This generates immense amounts of heat, enough to melt the fuel (a **meltdown**), damage the reactor and release large amounts of radiation. It is the most complicated and dangerous way to boil water ever invented.

The fuel for nuclear power relies on a long chain of extraction, processing, enrichment, and generation of vast amounts of radioactive and toxic wastes. It contaminates air, land, and water, expanding the danger to ecosystems and essential sources of life and well-being. The **nuclear fuel chain** affects countries all over the world from Namibia to Russia, from Japan to Brazil, from Australia to Canada. It could soon expand to Indigenous lands in Greenland, where the industry is attempting to begin uranium mining.

The fuel chain starts with mining and milling uranium, then enriching it to increase the concentration of uranium-235 (the main isotope for fission). Mining and milling produce immense amounts of **radioactive waste**. Before a single pound of fuel goes into a reactor, it has produced more than 3,500 times as much long-lived radioactive waste dumped at mines and mills in the open air, either in piles or ponds.[1] Uranium is also extracted through a chemical process, in-situ leach mining (ISL). ISL produces less solid waste, but directly and irreversibly pollutes groundwater.

In the U.S., there are over 15,000 abandoned uranium mines predominantly on Indigenous lands west of the Mississippi River.[2] These sites contaminate air, land, and drinking water, causing cancer epidemics and other diseases among Indigenous Peoples. **Uranium enrichment** and fuel fabrication plants in New Mexico, North Carolina, Ohio, Oklahoma, South Carolina, and other locations are located predominantly in Black, Indigenous and People of Color (BIPOC) communities, and have a long track record of leaks and spills.

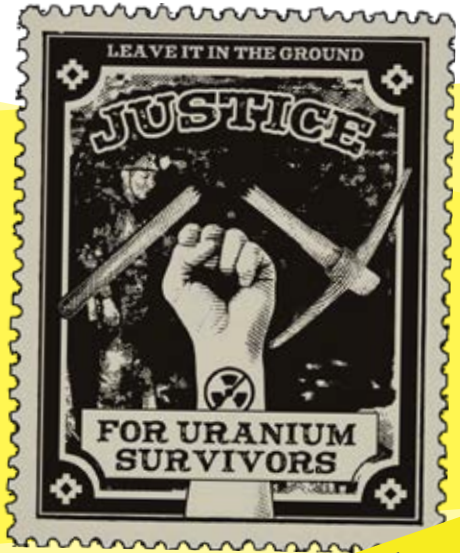
Too Dangerous

As long as we rely on nuclear power nuclear disasters such as Chernobyl and Fukushima will continue to occur. Yet, the likelihood of reactor meltdowns is increasing, due to rising sea levels, the increase in severe storms and extreme weather events, and warming water temperatures. In addition, reactors around the world are becoming more dangerous due to their age and the degradation of major components and structures. Two-thirds of reactors world-wide are over 30 years old; 20% are over 40 years old – longer than they were designed to operate.[3]

2011 Dai-Ichi disaster, Fukushima, Japan

Fukushima Dai-Ichi disaster has left one of Japan's prime agricultural and fishing regions contaminated, and tens of thousands of people can never return to their homes. The "cleanup" of the reactor site is expected to take up to 60 years and cost up to US$750 billion.[4, 5, 6]

The largest radioactive disaster in North America occurred in 1979 on the Navajo Nation. A mill tailings dam in Church Rock, New Mexico, burst, dumping over 90 million gallons of uranium tailings, flooding nearby pastures and flowing more than 80 miles down the Puerco River.[7] The radioactive and toxic waste was never cleaned up. Affected communities, including Red Water Pond Road, have suffered contamination and dislocation, despite decades of fighting for cleanup and reparations.



Too Expensive, Too Slow

Nuclear power has proved itself to be too slow and expensive for solving climate change. Building nuclear power plants almost universally runs way over budget, and takes at least 10-15 years, on average – if and when they are actually completed.[8] Over half of all reactors ever proposed in the U.S. were canceled, and the failure rate is much higher in the last decade.[9]

Utilities in nearly every country ran into billions of dollars of cost overruns and bad debts when building reactors in the 1980s. This led to a virtual halt to construction of new reactors in the 1990s.[10] In order to remain relevant in relation to the climate crisis, the industry declared a "Nuclear Renaissance" in 2005, with a new generation of reactor designs that were supposed to be safer, faster, and more affordable to build. Instead, by 2018, skyrocketing costs and delays led most projects outside of China to be canceled. Some of the largest nuclear corporations in the world went bankrupt, including Westinghouse and Areva. The only two reactors being built in the U.S. (Vogtle 3 and 4 in Georgia) are now US$14 billion over budget, and over five years behind schedule.[11] If Georgia utilities had invested in efficiency and renewables instead, their customers would have lower utility bills and the state would have reduced fossil fuels far more than the Vogtle reactors could ever do.[12]

Reactor Emissions and Radioactive Waste

Radioactive waste is, itself, another global environmental crisis, endangering water and health. The 80,000 tons of irradiated fuel at reactors in the U.S. contains enough radioactivity to make every drop of drinking water on Earth too dangerous to consume.[13] That is only 25% of the world's total and does not include the immense volumes of uranium waste rock and mill tailings, **depleted uranium**, and "low-level" radioactive waste.[14] There is still no "solution" for the waste, which will remain hazardous for over one million years.[15] This is an unjust burden on future generations, a danger to ecology and health we have no right to impose.

In addition, reactors release radioactive wastes into air and water, as part of their normal operation. These routine releases, along with leaks and spills, contaminate surrounding communities, most of which are low-wealth and rural, resulting in untold epidemics of cancer, congenital defects, and other diseases.

Nuclear Power Makes Climate Change Worse

Although reactors do not release very much carbon dioxide in generating electricity, nuclear power produces significant greenhouse gases – several times more than wind and solar. Mining, milling, and enriching uranium are very energy-intensive, resulting in significant greenhouse gas emissions. The construction of reactors entails a huge carbon debt, due to the concrete and steel used for construction. A half-built nuclear power project in South Carolina was canceled in 2017 when its cost doubled to US$25 billion. The project had already generated as much concrete and steel as building a professional football stadium.[16] Even after a reactor closes, the decommissioning, transportation and storage of huge volumes of radioactive waste will generate greenhouse gases for at least 10-20 years.[17]

Nuclear Power = Nuclear Weapons

As long as we have nuclear power, we will face the danger of nuclear warfare. Uranium enrichment for nuclear power uses the same technologies required to make warheads for nuclear weapons, and it generates 7-8 times as much depleted uranium (lower in U-235) as the enriched uranium for fuel.[18] In addition, the U.S. military has weaponized depleted uranium (DU) – using it to produce bullets for fighter planes, tank shells, and tank armor. The use of DU has contaminated land, air, and water in Puerto Rico, Iraq, Afghanistan, and other regions where the U.S. has engaged in military campaigns and munitions testing. Because uranium is also a heavy metal, it leads to multiple, severe, long-term health effects when it is breathed in or swallowed.

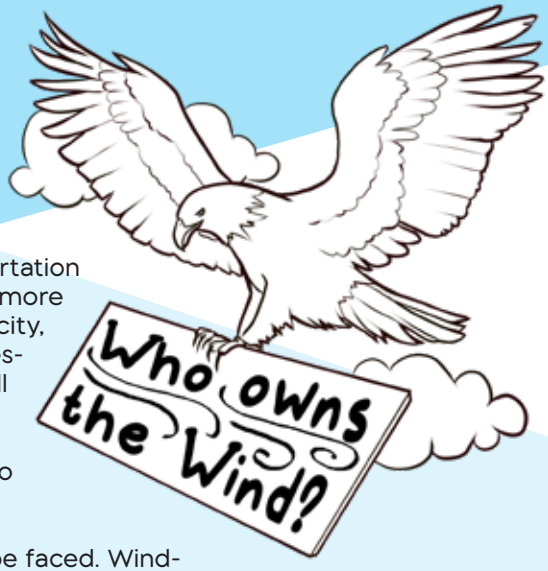
Beyond Nuclear: beyondnuclear.org
Don't Nuke the Climate: dont-nuke-the-climate.org
Nuclear Information and Resource Service: nirs.org
WISE-International: wiseinternational.org
WISE-Uranium: wise-uranium.org
World Nuclear Industry Status Report: worldnuclearreport.org

RENEWABLE ENERGY

Renewable energy can be part of real solutions to climate change, but there are quite a few caveats. In the spirit of **greenwashing**, many things may be labeled renewable energy that are actually false solutions. Several of the energy sources discussed in this report are sometimes considered renewable energy but can exacerbate climate change and cause a great deal of harm to the environment and communities including: **Biomass**, **biofuels**, incineration, **landfill gas-to-energy**, **hydrogen**, "renewable natural gas" or factory farm methane digesters, nuclear and corporate hydropower. Solar and wind can be genuinely renewable sources of energy. However, Earth's limits, distance, economics and social justice all play roles in determining whether these energy sources are truly renewable or sustainable.

Land, Limits and Resources

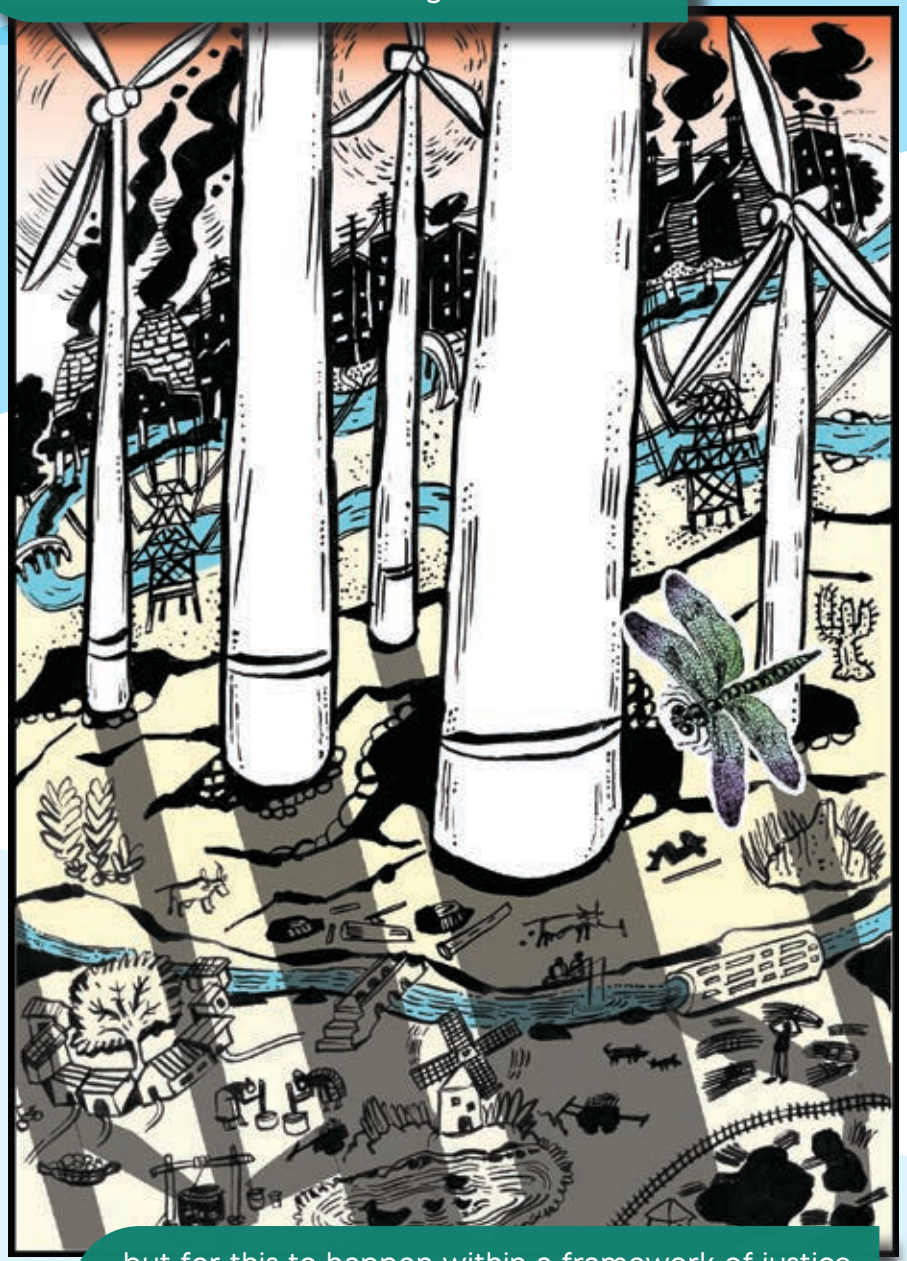
Solar and wind are ways of generating electricity and solar can also provide heating. However, generating electricity for buildings, cooking, water heating and transportation would require generating much more renewable energy-based electricity, which is problematic and raises questions about where the materials will come from, how and where they will be mined and transported, where they will be placed and who owns them.



The Earth's ecological limits must be faced. Windmills impact the pathways of birds and require large amounts of steel and cement, and most use neodymium, a rare earth metal mined in highly polluting conditions. Solar panels and batteries use rare earth metals, including lithium and cobalt, which may be mined in horribly exploitive conditions.[1, 2] When Elon Musk, CEO of Tesla Motors, was challenged over whether the need for batteries for his electric cars might have had something to do with the 2019 coup in Bolivia (site of one of the largest lithium mines), he tweeted, "We will coup whoever we want. Deal with it."[3]

Proposals around the world abound to spike the economy and solve the environmental problems of fuel-powered cars by converting to all-electric vehicle fleets. Certainly, this would create many jobs, and the batteries

Wind and solar power can allow future generations some of the conveniences we have come to take for granted...



...but for this to happen within a framework of justice, sustainability and environmental protection, the overdeveloped world must go on an energy diet.

The Solar Two facility in the Mojave Desert. Compensating for something...?

would help store power produced by renewable sources, but building new cars and trucks requires a lot of materials, which raises the questions of where do the materials come from and at what social and ecological costs?

In addition to the concerns about sourcing materials for solar panels, wind turbines and batteries, building renewable energy requires a lot of energy input. Therefore, extra power is required for a major buildout of renewable energy and will largely come from burning fossil fuels. Avoiding the use of more fossil fuels requires high-consumer countries to reduce current energy demands and use less energy. Prioritizing the end of future fossil fuel use is of critical importance in a warming world (see Bioenergy).

Grids, Space, Time and Distance

Providing power on demand continues to be one of renewable energy's greatest challenges. Wind and solar are intermittent, so if we stick with the current standard – that every desired watt of power must be instantly delivered at all costs – increased energy storage would be necessary. Furthermore, the infrastructure needed to set up large-scale renewable energy is problematic. There are plans to generate large amounts of electricity in deserts in northern Africa and the U.S. Southwest, and then run the power over long distances across the Mediterranean to Europe or to eastern U.S. cities. Such projects would incur efficiency loss along the conduit, environmental injustices in one place, and a benefit far away.

Economics, Scale and Offsets

Ideally, new solar and wind development should be planned and run by and for communities. Often these programs are built to a large-scale to justify the corporate model impacting local land, communities and ecology. Resistance against proposed large-scale wind or solar farms is based on corporate developers coming in from the outside and imposing changes that benefit utility companies and shareholders, not the affected community. Similarly, the current model in which large utilities have huge, centralized generation sites from which they send power to people over a wide area is disempowering, as ratepayers are dependent on corporate utilities.

Further, from U.S. **Renewable Energy Credits (RECs)** to **carbon offsets** in the United Nations (UN) backed Paris Agreement Article 6, and Shell Oil's electricity tariff offsets in the U.K., the Netherlands and Australia, all over the world renewable energy can be sold as offsets that allow polluting corporations to claim **net-zero** or carbon neutrality (see Carbon Pricing). Large-scale wind farms have displaced communities in Maharashtra, India and have sold offset credits to polluters in the global North through the UN-backed Clean Development Mechanism (CDM) for years.[4]

Energy Inequality and Social Justice

Finally, of critical importance, a significant part of the human population currently has no access to electricity, clean water and sufficient food. Simple social justice demands we prioritize extending renewable energy to the people who need basic energy resources the most.

Along with accepting limits, we need to look critically at each proposed development and ask important questions: Has it been endorsed by the local people it will most affect? Does it supply local needs? What would it entail elsewhere in supplying components? How long will it last? How can its parts be recycled or safely disposed of? Keys to a sustainable future are relocalizing and **decolonizing**. A region that can supply most of its own food and other necessities is more secure than one that depends on long supply chains. Wind and solar power can allow future generations some of the conveniences we have come to take for granted, but for this to happen within a framework of justice, sustainability and environmental protection, the overdeveloped world must go on an energy diet.

HYDROELECTRICITY

Functioning rivers are essential to all life.

Generating electricity by altering river systems disrupts ecology, harms communities and is financially unsound. Megadams, large dams, small dams, run of the river and pumped storage hydropower all negatively impact the physical and ecological conditions of river systems.[1, 2] Hydroelectric dams and their reservoirs displace people from their lands and undermine the survival of people who rely on functioning river systems to hunt, fish, trap and gather wild foods. Indigenous and marginalized communities are often the most impacted. Hydroelectric systems have displaced at least 40 to 80 million people and an estimated 472 million people living downstream have been impacted.[3, 4] Hydropower development frequently violates Indigenous sovereignty and often occurs without the consent of people with ancestral rights to the lands and waters.

Hydroelectric dams artificially manipulate seasonal river flow causing water pollution and disrupting drinking water supplies. When water is stored in reservoirs behind dams the water temperature rises and when released downstream interferes with ecological functioning and warms the ocean. Dams often block or impair fish migration, impacting their ability to move from spawning to feeding grounds and back again. In less than 50 years, globally there has been an overall average decline of 76% in monitored migratory freshwater fish populations.[5]

Hydroelectric dams and their reservoirs are a major source of greenhouse gas emissions.[6] Emissions from individual facilities can exceed fossil fuels.[7] Seventy-nine percent of the hydropower reservoir greenhouse gas emissions are methane, a greenhouse gas 86 times more potent than carbon dioxide in accelerating climate change over a decade or two.[8, 9] Methane from hydropower reservoirs accounts for more than 4% of all human-caused climate change. In the first decade after a new hydropower generating system is built, it can contribute to more greenhouse gas emissions than coal burning through on-going methane releases fueled by microbes feeding on flooded vegetation.[10] This means new hydropower projects will cause a sharp increase in greenhouse gas emissions today as we seek to slow the climate crisis. Rivers also play an important role in moderating the climate.[11, 12]

Hydropower dams stimulate the production of the bioaccumulative toxin **methylmercury** by releasing mercury from vegetation and soils into the water where it enters the food chain. People who consume foods from these river systems are exposed to methylmercury. Ninety percent of new and proposed Canadian hydroelectric projects will expose Indigenous communities relying on wild caught foods to methylmercury.[13]

Hydropower makes up two-thirds of the world's so-called renewable energy. **Hydroelectricity** is not renewable simply because the precipitation to run power turbines keeps falling from the sky. Only one-third of the world's 177 longest rivers remain free flowing and only 21 rivers longer than 1,000 kilometers (621 miles) retain a direct connection to the sea.[14]

At least 3,700 new hydroelectricity facilities (greater than 1 megawatt) are planned or under construction across the world.[15] Electricity production from hydropower is expected to grow by 45 to 70% by 2040.[16] New hydropower is of negligible benefit in transitioning to climate neutrality in the European Union.[17]

Large hydropower projects fall short of truly expanding energy access for the poor. They are often built to meet the demands of mining and industrial projects, despite developers' claims that the energy is intended for under-served communities. On average, large dams experience cost overruns of 96% and time overruns of 44%.[18]

Hydropower projects are categorized as renewable energy around the world, and as such, are considered a suitable project used for generating **carbon offsets**. In fact, hydroelectricity offsets currently make up 26% percent of all projects registered with the United Nations-backed Clean Development Mechanism (CDM). In addition, offset credits are sold in national, subnational and voluntary **carbon pricing** schemes throughout the world.[19] These credits are often sold on to the fossil fuel industry to boost their claims for carbon neutrality and **net-zero emissions**, harming both the rivers and people near the hydro projects and those near extraction and combustion sites. Climate finance for large hydropower projects creates the illusion of climate action to the exclusion of real solutions.[20]

Aging dams, that have exceeded or soon will exceed their design life are facing intensifying and unpredictable extreme weather events that threaten both the structural integrity of dams and the rapid uncontrollable releases of impounded water, flooding downstream affected communities.[21]

Rivers and freshwater ecosystems must be protected and our relationship with water respected. We must work towards freeing the rivers and not build more dams in the name of the manmade climate crisis. There is a growing movement to secure **legal rights for rivers** with successful efforts in New Zealand and communities such as the Innu Council of Ekuanitshit and Minganie County which adopted similar resolutions granting the Muteshekau-shipu nine legal rights, including the right to flow, to maintain its biodiversity and the right to take legal action. In this view, the river is inseparable from the people: "I am the river and the river is me."[22]

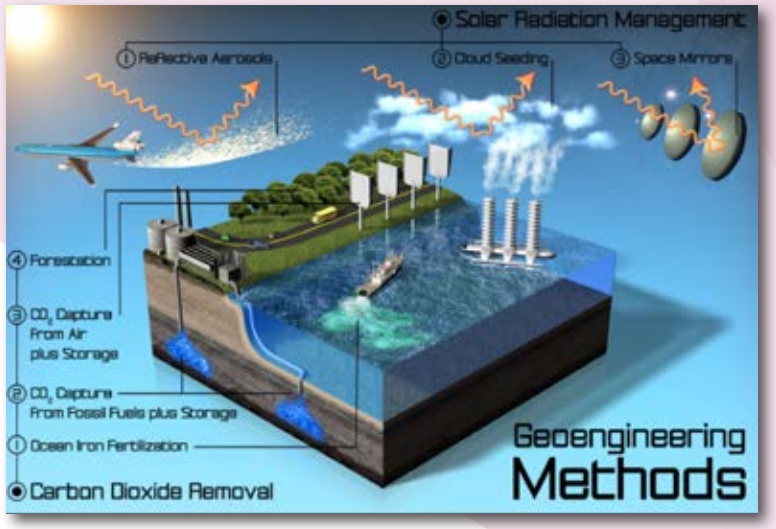
Brazilian Movement of People Affected by Dams:
mab.org.br
Mexican Movement of Dam Affected People in Defense of Rivers:
mapder.lunasexta.org
North American Megadam Resistance Alliance:
northeastmegadamresistance.org

GEOENGINEERING

Geoengineering refers to a set of proposed technologies to deliberately intervene in and alter Earth systems on a mega-scale. In a desperate, potentially catastrophic attempt to roll back some of the effects of climate change, geoengineering seeks to change the way the planet functions. To do this, techno-fixes would be deployed at a massive scale. Whatever impacts may emerge, now or in the future, cannot be reliably predicted or tested. The only way to find out what will happen is to carry out testing at scale, at which point it may be too late to turn back.

Who is Behind Geoengineering?

The biggest driver of the climate crisis is the fossil fuel Industry – big oil, coal and gas. This is the same industry cluster that has funded climate change denial for decades and fought every attempt to limit pollution. The fossil fuel industry is among the biggest funders of geoengineering. For big oil, geoengineering looks like a way to keep profiting while seeming to address the climate devastation it has caused. Some of the richest men on Earth, including Bill Gates and Jeff Bezos, are funding geoengineering.



Among the proposed schemes are:

Carbon Capture & Storage (CCS)

CCS seeks to extend fossil fuel extraction and consumption by storing carbon emissions underground. There is no certainty that they would stay there (see Carbon Capture). A variant on this is **carbon capture, utilization (use) and storage (CCUS)**, in which carbon dioxide (CO_2) is captured to make feedstock for manufacturing. The emissions become embedded in the products and would eventually be released when the products are incinerated or decompose. CCUS has gained considerable ground in recent energy legislation.

Ocean Iron Fertilization

This means dumping iron particles into large areas of the ocean to encourage plankton blooms that are supposed to increase the amount of CO_2 absorbed by oceans. This runs the risk of causing harmful algal blooms, which would endanger human and marine animal health, while negatively impacting fisheries.

Solar Radiation Management (SRM)

SRM techniques are attempts to reflect sunlight back into space. There are a range of proposals, including installing banks of mirrors in Earth's orbit; injecting sulfates into the stratosphere; and modifying clouds, plants or ice to make them reflect sunlight away from the Earth. Some of these concepts are gaining traction in corporate-funded climate conversations and are getting close to becoming real-world experiments. Once SRM has begun, stopping it could lead to termination shock, which would cause temperatures

Have we reflected long enough on the impacts of space mirrors?

to rise rapidly to even higher levels than if nothing had been done. SRM does not reduce greenhouse gas levels, but temporarily masks the effect.

Here is a quick look at some of the SRM proposals:

Stratospheric Aerosol Injection (SAI)

SAI is based on shooting particles of sulfur dioxide, or other materials, into the stratosphere using fossil fuel-powered jet planes or other means, to mimic the effects of a volcanic eruption.

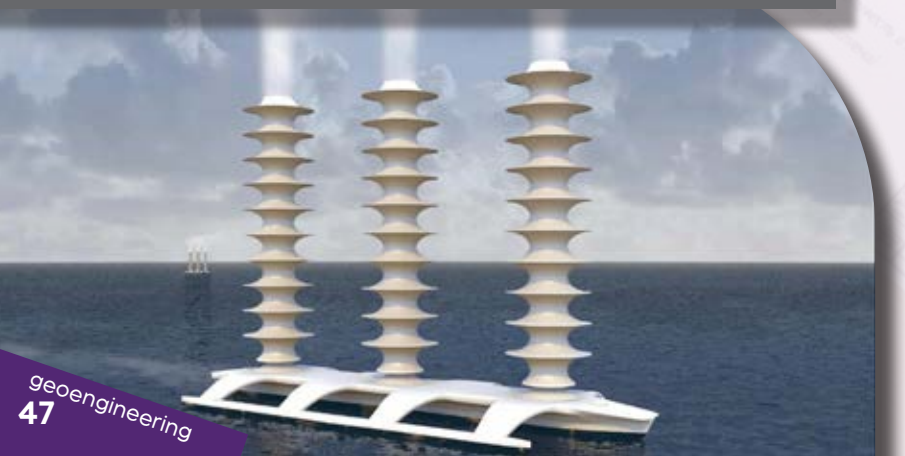
Microbubbles, Microbeads, Sea Foam & other Albedo-Altering Materials

Proponents of this approach want to spread bubbles, beads, or foam over water bodies and/or ice (such as in the Arctic) to whiten the surface, thereby increasing the albedo (reflectivity). Depending on the material used, these practices can have chemical polluting effects on the sea. These activities could also have destructive impacts on the subsistence life-ways of Indigenous communities in the Arctic. In addition to not addressing the real causes of climate disruption, dumping these materials into the oceans and other bodies of water could disrupt the light that is needed for ocean life and may reduce oxygen to the upper layers of the ocean, negatively affecting biodiversity.

Marine Cloud Brightening (MCB)

In this technique, clouds would be pumped full of salt-water or bacteria to increase the volume of water vapor, which would make them whiter so they reflect more of the sun's radiation away from the oceans and land. This could result in decreased precipitation in some parts of the world (the Amazon) and increased land run-off in other parts of the world (the tropics). Overall rainfall is likely to be reduced, which forces the question: Who decides who will get droughts and who will get floods? In addition, questions around how additional weather changes would exacerbate conflicts in a world where climate change is already making farming more difficult remain unaddressed. Like all SRM techniques, MCB does nothing to reduce greenhouse gas emissions, transition us to **energy democracy** or grapple with the root causes of climate change.

Bill Gates would like to marine cloud brighten everyone's day, non-consensually



Brushing Aside Human Rights

SRM cannot honor the right to **Free, Prior and Informed Consent (FPIC**) of those that stand to be impacted, as enshrined in the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP) and broadly supported by other vulnerable communities, including peasants, Small Island Nations, and frontline communities in the global North and South. This is because every community and every person would be impacted by SRM. The huge scale and transboundary nature of SRM make FPIC impossible and governance unfeasible. And, because some countries, like the U.S., can choose to "go it alone" and move forward with geoengineering projects that would impact the entire planet, geoengineering is inherently undemocratic and uncontrollable. Because these schemes must be maintained for extremely long periods of time, with consequences that could manifest over generations, these proposals assume that existing governmental and economic structures will be stable for the next 100 years or more. This is a huge, dangerous and frankly absurd assumption.

With geoengineering, we can make it rain whenever we want

Frontline Communities Bear the Burden

The assumption behind SRM techniques is that we cannot, or will not, cut greenhouse gas emissions and end the environmental injustices they cause – from fossil fuel extraction to coal or gas-fired power plants, refineries, pipelines and mountaintop removal mining. Geoengineering promoters argue that they are preparing for a worst-case scenario. But frontline communities the world over are already in the worst-case scenario, in which industry and capital are more important than the right to clean air, clean water, healthy soil, human rights and justice.

Promoting Real Solutions or Preserving the Status Quo?

Geoengineers claim to be "true believers" in climate change, but appear more concerned with preserving the status quo and creating new markets for their technologies than promoting real solutions. The time, money, energy and political will expended on promoting dangerous and speculative geoengineering experiments are resources that would be better used for a **just transition** to energy democracy, a living **regenerative economy** and powerful community action.

We know what we need to do to tackle the climate crisis. We need a just transition towards a healthy, regenerative economy based on sustainable, renewable energy; agroecology; **zero waste**; ecosystems protection; Indigenous sovereignty; human rights; social equity; and keeping fossil fuels in the ground. The crisis and the urgency are real, but urgency does not justify false mechanisms like geoengineering. We do not have the time or resources to waste on deadly distractions! This applies to all the false solutions in this booklet, but with geoengineering there is the additional risk that reckless experimentation may yield horrific unintended consequences.

"That's no Earth... It's big business turning the planet into a machine to mask the effects of their pollution!"

The promoters of geoengineering are trying to force dangerous experiments on communities around the world. For example, Indigenous Peoples in Alaska are under threat by an experiment on their lands that would cover sea ice with glass microbubbles to deflect sunlight, as part of the Arctic Ice project.[1] Similarly, fisherfolk in Chile have found the waters they depend on threatened by plans for an iron fertilization experiment by the company Oceaneos Environmental Solutions, Inc., which would supposedly stimulate phytoplankton growth to sequester CO_2.[2] The ecological impacts of these types of experiments are little known and could have dire long-term consequences.

Geoengineering represents a potentially catastrophic threat to human rights and the environment, yet does nothing to address the root causes of climate change. In this sense, it is perhaps the ultimate false solution.

Climate Justice Alliance:
climatejusticealliance.org

ETC Group:
etcgroup.org

Geoengineering Monitor:
geoengineeringmonitor.org

Indigenous Environmental Network:
ienearth.org

CARBON CAPTURE

There has been a recent shift towards big money investments in climate **geoengineering** that focuses on removing and storing carbon dioxide (CO_2). Carbon capture is the basis of the myth that carbon dioxide can be sucked out of pollution or directly from the air and stored, which is being touted as a magic bullet solution to the climate crisis. The first section outlines the types of carbon capture and their shortfalls, and the second section outlines key arguments against carbon capture.

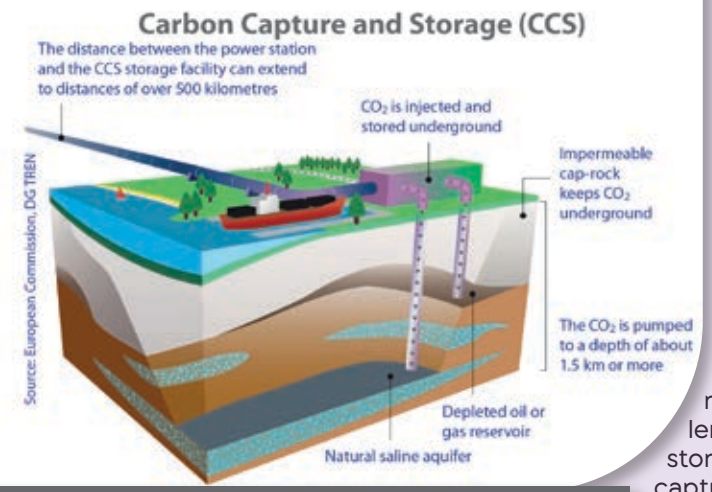
Carbon Capture Takes Several Forms

Carbon capture and storage/sequestration (CCS) is often a catch-all term for carbon capture and has been deployed in the form of technology used to capture CO_2 emissions from natural gas facilities, fertilizer plants, ethanol refineries and coal-fired power plants (sometimes referred to as "clean coal"). The CO_2 is then compressed into a liquid and transported to be stored in underground geological formations.

CCS is usually referred to when addressing **enhanced oil recovery (EOR)**. EOR is an older technology used by the oil and gas industries to inject CO_2 into underground oil and/or gas deposits in order to extract more oil and gas. Industry groups claim that by using CO_2 captured from industrial facilities or the atmosphere it provides a climate solution by storing this CO_2 underground.[1] However, the goal is to extract more fossil fuels. CCS as EOR is profitable for extractive industries in the U.S. through a lucrative 45Q tax credit. Corporations can also sell the CO_2 for use in EOR to other companies for profit.[2] In addition, CCS is a tremendous PR asset for fossil fuel industries.

Carbon capture, utilization (use) and storage (CCUS) refers to a range of technologies with many unproven and still in research stages. CCUS is based on the idea that CO_2 could be converted into a new product to be stored in manufactured materials like cement and plastics. However, a lack of certainty around CO_2 remaining permanently stored when materials break down leads to questions of permanence. If CO_2 were to be stored in materials such as plastics, it would support the destructive oil and gas industries in multiple ways, as well as contribute to the plastics pollution crisis.

Bioenergy with carbon capture and storage (BECCS) is the dubious concept of burning wood pellets and capturing the CO_2 emissions, which is falsely referred to as a "negative emission technology" (see Bioenergy).



Charting wishful thinking. See also: poor math skills, denialism

Direct air capture (DAC) is a largely theoretical concept that proposes removing CO_2 directly from the atmosphere using chemical and mechanical means. It would require deploying carbon capture machines on a vast scale, using massive amounts of energy and resources, and the problem remains of where to store all the carbon that is captured.[3]

All of these iterations of carbon capture allow for fossil fuel extraction and combustion to continue unabated, impacting **environmental justice** communities, destroying biodiversity and causing climate change.

Carbon Capture Will Never Be a Real Solution

Public funds for private gains: For decades the promise of carbon capture has failed to materialize. Yet, governments continue to pour more research and development tax dollars into these technologies that could instead be used for renewable and community-based **just transition**. Ultimately, it is the private sector that benefits from these public funds. For example, in the U.S., the second COVID-19 stimulus package extended the 45Q tax credit for companies capturing carbon and included US$2 billion to finance six carbon capture projects: four of them for EOR and the others to fund a steel and a cement plant.[4]

Energy penalty: Capture of CO_2 emissions is technically challenging and itself requires a large amount of energy. That means a coal, gas or power plant will burn more fuel to produce the same amount of energy. That means more mining, more **fracking**, more cutting down of forests for biomass, more of the various forms of power plant pollution (nitrogen dioxide, sulfur dioxide, particulates, mercury, etc.), and more of the social and environmental damage from extraction – all without producing any additional energy.

Infrastructure demand: Once carbon is captured, it must be pressurized and transported via pipelines to suitable locations to be pumped into wells or underground geological formations for (theoretical) storage. Massive amounts of infrastructure would be required.

Unproven reliability of storage: There is no sound basis to assume that CO_2 that is injected below ground will remain there. When CO_2 is used for EOR, it is assumed that some portion will remain below ground, and the rest will return to the surface in solution with the oil. In theory, that CO_2 could be separated out from the oil and reinjected underground.

Uncapped and abandoned oil wells are scattered across the world and leak various gases. When CO_2 is pumped into these wells, which often are not isolated from one another below ground, it can leak out from adjacent openings in unpredictable ways.

Following CO_2 injection for EOR in the Salt Creek oil field in Wyoming, CO_2 seeps were found in several locations. In 2016, a nearby school was shut down after CO_2 and other toxic gases leaked into the school.[5] When concentrated, CO_2 is lethal. A catastrophic release would be damaging to the climate as well as deadly. But many smaller leaks from wells and infrastructure can also wreak havoc. Very little monitoring at the injection sites is mandated. ExxonMobil and other oil companies have lobbied persistently to ensure that requirements for monitoring are minimal at best.

Carbon Capture & Sequestration is a powerful tool to capture public funds out of thin air and safely store them in corporate bank accounts

The myth of carbon capture has enabled fossil fuel industries to continue spewing emissions and pollution despite climate, environmental, and environmental justice consequences.

Biofuelwatch: biofuelwatch.org.uk

ETC Group: etcgroup.org

Indigenous Environmental Network: ienearth.org, co2colonialism.org

REAL SOLUTIONS
FOR CLIMATE JUSTICE

The root causes of climate change are multifaceted and intersectional: namely, resource extraction at a pace exceeding the natural limits of the earth systems, carried out through colonial economies that provide profit for a few at a cost to many. Real solutions must be tailored to tackle root systemic drivers, in addition to being demonstrated through principled practice, to actually work. For a **climate justice** future, we must move beyond carbon targets (whether parts per million or emissions percentages), because such targets reinforce a **carbon reductionist** paradigm, which has emerged from Euro-centric scientific discourse and markets-based frameworks that avoid addressing the root causes of climate change.

Addressing root causes entails working with the diversity of place-based needs and available resources instead of seeking "one-size-fits-all," centralized solutions. Examining root causes allows us to understand how reducing carbon needs to be coupled with efforts to eliminate toxic pollution, biodiversity and cultural destruction, theft and colonization of lands, militarization and authoritarian governments, racialized and gendered poverty and violence. Tackling root causes requires us to first "scale deep," prioritizing locally-led, locally-designed initiatives; and then "scale out" to facilitate translocal networks of co-liberation, before we can consider "scaling up" in truly democratic and impactful fashion.

Real solutions to climate change must:

1. Be guided by principled practice
2. Be guided by Indigenous Traditional Knowledge, place-based experience and public-interest science
3. Be holistic in tackling all intertwined ecological and social harm
4. Replace economies of greed with economies serving ecological and human need
5. Advance deep, direct and participatory democracy, rooted in local self-determination
6. Center the leadership and needs of those presently and historically most harmed

1. Real solutions must be guided by principled practice.

Real solutions must be guided by principles such as those of **environmental justice** (EJ),[1] **just transition**,[2] democratic organizing and **energy democracy**,[3,4] which have been articulated and vetted by grassroots environmental movements around the world. By providing intersectional guidelines for transformative change, these principles help us determine "just" pathways to both "decarbonizing the economy" and reducing other forms of environmental harm that have disproportionately burdened historically oppressed communities. These principles help guide climate strategies and solutions that break free from the barriers created by white supremacy culture, reductionist thinking and **neoliberal** ideologies that lead us astray. In addition to these movement principles, credible climate solutions must adhere to the **precautionary principle**,[5] prior to any field testing and application. While corporate lobbyists often critique the precautionary approach as a "hurdle to progress," this science-based guideline should be applied to all new innovation, technologies and practices that are not rooted in Indigenous Traditional Knowledge and local ecological experience.

Examples:

A core value across these sets of principles is that of "nothing about us, without us" or centering the voices, needs and leadership of those most directly and severely impacted.[6] Participatory Action Research (PAR) principles have been developed by movements and their academic allies around the world,[7] with their own sets of principles to guide research and study of locally appropriate solutions centering the voices of those harmed.

An early example of applied PAR are the Barefoot Colleges that were born from South Asia's struggle against British colonial rule, with the belief that those most historically oppressed needed to be supported with institutions of study and research tailored to their traditional ways of knowing and centering their rights to collective self-determination. After 50 years of experimentation in India, the barefoot college model has spread to over 1300 villages in over 17 countries across Asia, Africa and Latin America.[8]

These principles help guide climate strategies and solutions that break free from the barriers created by white supremacy culture, reductionist thinking and neoliberal ideologies that lead us astray.

2. Real solutions must be guided by Indigenous Traditional Knowledge, place-based experience and public-interest science.

To be able to look into the future to see which solutions are most beneficial, least harmful, durable and equitable, we need to rely on the historic knowledge of humanity's oldest living memories of how to live in harmony, balance and reciprocity with the Earth and all her children. Centering local **Indigenous Traditional Knowledge**, wisdom and values allows us the clearest line of sight for tackling the storms, floods, fires, droughts and disease headed our way.[9] Noting that in many parts of the world colonial rule has attempted to wipe out Indigenous Peoples and their knowledge systems, at times we may need to look to settler and migrant cultures that have cultivated subsistence practices rooted in local ecology, and learn from these practices to build living **regenerative economies** purposed to heal, restore and revitalize our relations with all life. In addition to the place-based wisdom of Indigenous and non-Indigenous peoples, real solutions must be guided by credible, public-interest research and science, namely science that has strong public oversight and is publicly funded (not influenced by corporate dollars). Finally, to be aligned with a just transition, all colonial states need to seek approval from the leadership, territorial governance and wisdom of Indigenous Peoples, for all climate strategies. And where **Free, Prior and Informed consent (FPIC)** is applied as a framework for seeking such approval, all FPIC protocols and processes should be determined by the leadership of each Indigenous Nation.

Examples:

For Indigenous Peoples and peasant farmers, agroecology and **food sovereignty** are key strategies for reducing emissions and realizing social justice.[10] Indigenous Food Sovereignty is a holistic framework that looks beyond the harm caused by industrial, productionist and commodified agriculture, as well as the limitations of settler, colonial farming, to support regenerative practices of fishing, hunting, harvesting and farming rooted in Indigenous Traditional Knowledge, to meet essential food, medicine and cultural needs while protecting and restoring the ecosystems that provide these.[11]

From reversing human-caused desertification around the world,[12] to restoring aquatic ecosystems and wildlife habitat – Indigenous land use practices are critical to restoring the balance between atmospheric and biotic carbon.[13, 14, 15] And as international disaster response agencies continue to fail at tackling the increasing scale and intensity of climate chaos, there is a growing recognition that we need Indigenous Traditional Knowledge to effectively fight the fires, the floods and the droughts.[16]

3. Real solutions must be holistic in tackling intertwined ecological and social harm.

All efforts to reduce greenhouse gas emissions must be coupled with strategies to reduce toxic co-pollutants, waste and biodiversity destruction, as well as disproportionate pollution and poverty burdens borne by Black, Brown, Indigenous, migrant and poor communities around the world. Real solutions must be guided by our reciprocal relations with all life; aligned with restoring ecosystems and species impacted by the global extractive economy; restoring the health of all species whose wellbeing we depend on for our own.

The climate crisis cannot be tackled without gauging "decarbonization" efforts by their ability to detoxify, decommodify, degentrify, demilitarize, decentralize, **decolonize** and democratize our economies. Such an integrated approach ensures that harm reduction in one aspect of any process does not exacerbate burdens in another. As such, real solutions need to be holistic in examining the life-cycles of carbon in a broader context of all associated harm, i.e. the proliferation of plastics in our oceans, the depletion of soil nutrition and high COVID-19 mortality in EJ communities due the disproportionate industrial pollution burdens they bear.

Examples:

Zero Waste: In nature there is nothing such as waste, hence efforts to create zero waste systems to reduce, reuse, recycle and compost waste in our cities and towns lighten the human footprint in a variety of ways – from significantly reducing climate and toxic pollution loads to relocalizing the materials economy, while creating millions of new jobs and just transition pathways for the poorest communities.[17] Zero waste strategies, which avoid burning or burying waste, are one of the most affordable ways for cities and communities to transition to local, community-controlled economies.[18]

Public Transportation: The fastest growing source of global greenhouse gas emissions are from the transportation sector, and over 72% of these emissions are from road travel.[19] By relocalizing transportation and reallocating fossil fuel subsidies to serve essential human needs such as housing and healthcare, far more jobs can be created with far less pollution than the status quo. Innovative examples of transportation solutions include the design of walkable cities,[20] like the district of Vauban in Freiburg Germany;[21] and community organizing campaigns such as that of the Los Angeles Bus Riders Union, the Strategy Center and their allies to shift the LA Mass Transit Authority (MTA) towards intersectional transportation goals of *Free Public Transportation, No Police on MTA Buses and Trains, Ending MTA Attacks on Black Passengers, No Police in the LAUSD Schools,* and *No Cars in L.A.*[22]

Looking to shift the hundreds of billions in subsidies presently handed to the oil and gas sector, we need to look at the trillions spent on the war industry. While there are few examples of efforts to demilitarize the global extractive economy, campaigns like About Face - Veterans against War, acknowledge that repurposing the lives of hundreds of thousands of young people, from serving fossil fuel corporations to serving humanitarian needs, would help to both save lives and reduce massive amounts of atmospheric carbon.[23]

4. Real solutions must replace economies of greed with economies that serve ecological and human need.

To be effective at doing so, real solutions need to be part of a suite of just transition strategies that move us towards local, regenerative economies guided by caring, sharing, solidarity and mutual aid.[24, 25] There are thousands of active experiments around the world, providing emergent lessons from efforts to build a solidarity and feminist economy, from timebanking and trans-local community investment assistance, to federations of worker-owned cooperatives such as Mondragon in the Basque region of Spain.[26]

Often, the best places to find such holistic analysis are at the intersections of the oldest struggles, amidst some of the poorest, most marginalized communities – where people continue to struggle against racialized poverty, resource wars, forced migration; as well as the onslaught of hurricanes, forest fires and disease. These intersections are where "lived experience" guides the most sophisticated strategies to dismantle multiple facets of colonial rule, with communities and workers designing and building new systems tailored to meet their needs.

Examples:
Tierra Y Libertad – an Indigenous land cooperative in the Pacific Northwest embodies a vision of organizing a solidarity economy that serves to launch other cooperative projects led by Indigenous and migrant farm worker families – creating pathways of resilience for land rights, migrant justice, healthy food, ecosystem restoration and worker coops; breaking the intertwined chains of labor exploitation, border imperialism, white supremacy and environmental racism.[27]

One of the largest urban gardening complexes in the U.S. has been self-organized by Black, working class communities on the frontlines of food insecurity, economic collapse and environmental racism. The Detroit Black Community Food Security Network serves as a space where multiple community farming and food cooperatives and collectives come together to cultivate a transformative vision of change, while training future generations to organize it.[28]

5. Real solutions must advance deep, direct and participatory democracy, rooted in local self-determination.

Real solutions need to be democratically determined and governed locally, involving the collective leadership of communities and workers historically most harmed and impacted by the extractive economy.

While neoliberal policies are based on the ideological premise that corporations have the best interest of people and environment at heart, corporations are actually like machines that will always be guided by their profit-motive. Any real solutions need to be aligned with reining in the power and influence of corporations; eliminating their influence over neoliberal policy arenas that promote false solutions; prioritizing local democratic vision, the essential needs of all peoples, and returning what is owed to those most historically harmed. Over time, we need to build more democratic models of governance that replace present concentrations of wealth and corporate influence with tools that deepen democracy such as participatory budgeting and participatory policy-making.[29]

Like community-owned energy, zero waste and community-supported agriculture,[30, 31] there are many models for economic relocalization that align with deepening and broadening democratic governance and community self-determination.

Women have been cultivating frontline community practices in healing and transformative justice for many decades now, away from police, prisons and other institutions of violence, and towards systems of caring, sharing and healing.

Examples:
Taiwan's Sunflower student movement led a massive demonstration in 2014, occupying the country's parliament to prevent their government from signing a new trade deal with China. To activate direct democracy, the students developed an online platform that engaged popular opinion on the streets, and built mass, popular consensus in shaping the services and trade agreement at hand. This hugely successful, grassroots initiative led to further public deliberations that helped shape Taiwan's nuclear energy policy and constitutional reform.[32]

In the U.S., environmental justice community groups have been organizing to force their local governments to move away from the monopolies of large utility companies and towards community-owned and cooperatively run renewable energy facilities like Sunset Park Solar in Brooklyn, New York.[33]

6. Real solutions must center the leadership and needs of those presently and historically most harmed

Communities that continue to be first and most harmed by both climate change as well as the economic systems causing climate change are owed a historic debt from those whose growing wealth continues to cause the harm. The genocide of Indigenous Peoples, the Trans-Atlantic slave trade, the femicide of woman leaders by patriarchal religions and the globalized theft of land, labor and lives by colonial empires, have resulted in the massive wealth disparities that exist around the world today. This historic harm has also directly served to create the economic systems driving climate change. Our ability to tackle climate chaos will hinge on how well we are able to repair such harm and redistribute stolen resources to the communities on the frontlines of this crisis.

Fortunately, these communities are often those best equipped to provide leadership, and have been cultivating real solutions by:

1. *Investing in grassroots, front-line organizing that builds our power, improves conditions in our communities and stops the corporations causing disruption in our backyards;*
2. *Prioritizing localized action to build resilient communities, economic alternatives and infrastructure we need to weather the storms; and,*
3. *Supporting solidarity with grassroots movements around the world, to link struggles and share policies, strategies and resources trans-locally.*[34]

These strategic paths allow us to tackle the disproportionate burdens and benefits experienced by historically oppressed communities everywhere.

Examples:

One of the best pathways to simultaneously protect biodiversity, decolonize our economies and mitigate climate chaos is for colonial settler states to give land back to Indigenous Nations and tribal grassroots communities who are best equipped to lead us in restoring natural ecosystems and the elemental balance that will sustain our children in years ahead.[35]

A solution path that emerged with the Movement for Black Lives rising up against police and prison violence across the U.S. is #DefundThePolice, where the bloated budgets of highly-militarized police forces are now being examined in dozens of cities, to see where billions in public funds can be freed up to pay for essential community needs, like health-care, housing and real protection.[36] While led by a long-term vision of police abolition, some local campaigns have taken significant strides in diverting funds, such as in Austin, where money cut from the police budget will be used to convert a hotel to housing for the city's homeless population.[37]

#Homes4All is a strategy key to unpacking many intersectional avenues to undo systemic oppression and mitigate climate change. One of the most obvious facets being that heating homes consumes a large amount of energy because of reliance on electro-mechanical (active) heating.[38] Examples of passive heating and cooling methods that make intelligent use of building design and materials without using fossil fuels are abundant in many Indigenous and place-based societies,[39] such as the Hogan homes of the Navajo Nation (Dinetah) in the U.S. Southwest,[40] as well as going back millennia to cultures such as the Indus Valley Civilization.[41] Like many Indigenous communities, the encroachment of their lands by coal, uranium mining and other extractive industries has left the Navajo Nation short of housing, water and healthcare, exposing them to disproportionate environmental health impacts from lung disease, asthma, cancer and COVID-19.[42] Increasingly, societies are becoming aware that tackling the crisis of homelessness first serves as a preventative measure for other poverty-related crises such as mental illness, hunger and addiction. In Finland, the Housing First Program has led the way in reducing homelessness amongst member nations of the European Union by giving permanent housing to the homeless as a first step intervention.[43]

Finally, in seeking to center the leadership and restore the health of those most historically harmed, we need to acknowledge that the destruction of Mother Earth's complex and beautiful biological systems is directly linked to the femicide, misogyny and patriarchal systems of oppression that women, two-spirited, transgender and gender non-binary people continue to face around the world. If we are to be successful at shaping pathways for future generations to survive this global ecological crisis, we must embrace the leadership of women, two-spirited, trans-gender and gender non-binary people across our movement spaces.

Women have been cultivating frontline community practices in healing and transformative justice for many decades now, away from police, prisons and other institutions of violence, and towards systems of caring, sharing and healing. The Nari Adalats (Women's Justice Circles) of India are excellent examples of such a move away from carceral and punitive measures to address gender-based violence,[44] and the Berta Caceres International Feminist Organizing School is an inspiring new project cultivating a new leadership to guide a just transition away from the destruction of life and towards a pluralist, feminist economy.[45]

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Global Tapestry of Alternatives: globaltapestryofalternatives.org
La Via Campesina: viacampesina.org
Trade Unions for Energy Democracy: unionsforenergydemocracy.org
World March of Women: marchemondiale.org

ENDNOTES

INTRODUCTION

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GLOSSARY

Biochar – Biochar is charcoal produced by pyrolysis of biomass. This biochar, which largely consists of carbon, is then buried in soils. Proponents claim this sequesters carbon emissions, but the practice does not address the impacts of deforestation and harvesting wood to produce biomass, nor the toxic emissions from the pyrolysis process.

Biodiesel – A combustible fuel created from land-based crops such as soya and the fruit of oil palms.

Bioenergy – A term for energy produced from burning plant and animal-based materials (see biomass and biofuel).

Bioenergy with carbon capture and storage (BECCS) – BECCS involves burning biomass for energy and then capturing the carbon emissions and injecting them in geologic reservoirs. The biomass needed for a scaled-up BECCS would require massive amounts of land.

Biofuel – These fuels produced from biomass, including corn and sugarcane ethanol, soya and palm oil biodiesel, and a host of others have come into widespread use, causing increased land-grabbing and creating a disastrous link between markets for commodity food crops and markets for fuel.

Biomass – A term for materials that can be combusted for energy that includes everything from trash to trees, construction and demolition wood waste, black liquor (toxic paper mill goo), grasses, crop wastes, poultry waste and more – but usually involves burning trees in power plants or burning lumber, and paper mill and sawmill wastes to heat these mills.

Carbon capture and storage/sequestration (CCS) – Carbon dioxide is collected from industrial smokestacks, compressed into a liquid and transported by pipeline to a site where it can be pumped underground into oil or gas reservoirs, into saline aquifers or beneath the ocean. There is no guarantee the carbon dioxide will remain underground.

Carbon capture, utilization (use) and storage (CCUS) – CCUS is unproven technology that uses captured carbon dioxide to make manufactured products. While the emissions could be temporarily isolated, they would likely get released back to the environment when these products are burned or decompose.

Carbon offsets – Polluters, individuals and states can purchase offsets to supposedly compensate for emissions they produce. Offset credits are generated from projects that dubiously claim to reduce emissions and have been documented to often bring harm to local communities.

Carbon pricing – An umbrella term including a myriad of programs that put a monetary value on units of pollution. These programs include cap and trade, carbon offsets, REDD+, nature-based solutions, carbon capture, carbon fee and dividend, baseline and credit, baseline and offset and so on.

Carbon Reductionism – The practice of examining, explaining and simplifying a complex issue such as climate change by focussing solely on global greenhouse gas (or carbon dioxide) emissions, to the point of minimizing, obscuring, and distorting the ability to understand and effectively tackle this ecological crisis and its systemic drivers.

Carbon tax – A fee imposed on polluters for emissions they produce. Importantly, carbon taxes do not keep fossil fuels in the ground. Carbon fee and dividend is the same as a carbon tax, but proponents promise that the revenue will be paid to the local communities either directly or through government "benefits."

Cap and trade – Legislation that sets a jurisdiction-wide limit or "cap" on emissions while allowing corporations to save money by trading emissions cuts (using allowances/permits) among themselves to wherever they can be made most cheaply. All cap and trade programs also include carbon offsets.

Climate justice – Climate justice focuses on the root causes of climate crisis through an intersectional lens of racism, classism, misogyny, and environmental harm. Climate justice organizers serve communities on the frontlines of climate change, working to create holistic solutions and strategies to tackle such root causes to ensure the right of all people to live, learn, work, play and pray in safe, healthy and clean environments.

Concentrated Animal Feeding Operations (CAFOs) – Areas where livestock are raised inside confined structures in overcrowded and inhumane conditions. CAFOs have been expanding since the 1990s impacting the fair treatment of animals, putting farmers in debt, and violating antitrust laws as well as laws that protect water and air.

Decolonization – The process of dismantling colonialism with the goals of "self-governance" and "self-determination," usually involving the undoing of Eurocentric culture, worldview and economic practices, while uplifting practices based on Indigenous Traditional Knowledge.

Depleted uranium (DU) – The byproduct of uranium enrichment. It is called "depleted" because it has a lower concentration of uranium-235, but it is still radioactive.

Direct air capture (DAC) – DAC is a largely theoretical technique to directly remove carbon dioxide from the atmosphere, using chemical and mechanical means.

Doctrine of Discovery – The Doctrine of Discovery is a principle of international law dating to the 15th century that established a spiritual, political and legal justification for European colonization, seizure of land and violence to Indigenous Peoples by European Christians. The doctrine is still used to invalidate Indigenous sovereignty and treaty rights in favor of modern colonial/imperial governments.

Energy democracy – An approach to building energy sustainability that seeks to transfer ownership and governance of energy resources from the energy establishment to the public and communities, empowering working people, low-income communities and communities of color to control and benefit from their energy systems.

Enhanced oil recovery (EOR) – Carbon capture and storage (CCS) was developed over 40 years ago for use in EOR, a practice in which oil companies pump carbon dioxide into old, nearly depleted oil wells to keep them producing. In the U.S., companies get hefty tax breaks and subsidies for developing EOR infrastructure and using carbon dioxide for EOR extraction.

Environmental justice (EJ) – Environmental justice embraces the stance that all people and communities have a right to equal protection from environmental crises, and that the voices and self-determination of communities first and most harmed need to be centered in finding solutions to such crises. The global EJ movement recognizes that Black, Brown, Indigenous, migrant and poor communities around the world have historically been most harmed by (and are least likely to benefit from) the global extractive economy. The first multinational EJ summit in 1991 produced 17 Principles of Environmental Justice that have guided EJ and climate justice movement platforms and practices ever since.

Food sovereignty – Food sovereignty is the right of all peoples to share healthy and culturally appropriate food produced through ecologically sound and sustainable methods, and their right to define their own food and agriculture systems. It puts the knowledge, aspirations and needs of those who hunt, fish, gather, produce and consume food at the heart of food systems and policies rather than the demands of markets and corporations.

Free, Prior and Informed Consent (FPIC) – Enshrined in the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP), FPIC aims to establish bottom-up participation, transparency and consent of an Indigenous population prior to the beginning of development or using resources within the Indigenous population's territory.

Fuel cell – A device used to make electricity from hydrogen that utilizes a catalyst to speed up a chemical reaction between hydrogen and oxygen to make electricity, heat and water.

Geoengineering – A set of proposed technologies to deliberately intervene in and alter Earth systems on a mega-scale. It is a potentially catastrophic attempt to manipulate the climate in an effort to roll back some of the effects of climate change.

Greenwashing – Includes all attempts by polluting corporations or other entities to use cosmetic changes or public relations to cover up the harm caused by their operations and appear environmentally responsible.

Hydraulic fracturing, or "fracking" – A technique where a toxic mix of water, sand and chemicals is pumped under pressure into the ground for the purpose of extracting oil and gas.

Hydroelectricity – Electricity generated using the flow of water. Mechanisms for generating hydroelectricity involve building dams and other means of altering bodies of water. Such methods disrupt ecological systems, harm and displace communities from their lands and result in major greenhouse gas emissions.

Hydrogen – Hydrogen is increasingly being promoted as a clean energy source. However, most hydrogen is produced using natural gas or other dirty energy sources. It can only be used for energy storage and takes large amounts of energy to produce.

Indigenous Traditional Knowledge – A cumulative body of knowledge, beliefs, traditions and practices maintained by Indigenous Peoples and developed through histories of learning how to live in harmony, balance and reciprocity with the Earth and local environments.

Just transition – Just transition is a framework of principles, strategies and practices that shift society away from polluting, extractive economies to local, healthy, caring and sharing economies. Just transition centers the leadership of frontline communities and workers – working together to envision, organize and build these new economies, aligned with local ecosystems and the needs of those most harmed.

Land grabbing – A process by which large tracts of lands are used for export-oriented commodities exacerbating land

rights contention, inequality and food scarcity, especially in the global South.

Landfill Gas-To-Energy (LFGTE) – Landfills produce methane and carbon dioxide and a host of other toxic emissions that are burned to make heat or electricity.

Legal rights for rivers – Legal protections given to rivers as part of a global Rights of Nature movement recognizing rivers as living entities worthy of rights. Such efforts aim to protect rivers and the biological and human communities that depend on them from threats such as hydropower development.

Liquefied natural gas (LNG) – For ease of transport, natural gas is compressed into this highly volatile liquid form.

Man camps – The fossil fuel industry mostly hires men who move from site to site and live near work sites in man camps, many of which are located near Indigenous lands where high rates of trafficking, violence and murder of Indigenous women continues unchecked by local and federal law enforcement.

Meltdown – A disaster involving a loss of coolant to the fuel in a reactor of a nuclear power plant. The fuel rods heat past their melting point, which can cause explosions from the production of hydrogen gas, along with release of radiation into the air.

Methylmercury – A fat-soluble form of mercury that bioaccumulates (climbs up the food chain, concentrating in meat and dairy that people eat, and in human breast milk). It is formed when mercury is in wet environments where microbes can convert it to this form, such as in landfills and land inundated by water from hydropower dams.

Nature-based solutions – A newish buzz word for land-based carbon offsets including – agriculture, soils, factory farm gas and trees among others.

Neoliberalism – A wide array of market-led reform policies such as eliminating price controls, deregulating markets, lowering trade barriers, promoting trade-related intellectual property rights, and reducing, especially through privatization and austerity, state influence in the economy.

Net-zero emissions targets – Net-zero is a misleading term that uses offsets programs to allow a business, government or other entity to subtract its total emissions to equal "zero." In other words: Total Emissions – Offset = Net-Zero Emissions. Corporations can claim net-zero emissions while continuing to pollute.

Nuclear/uranium fuel chain – The sequence of steps involved in the production of nuclear fuel and the storage, management, and disposal of irradiated fuel and other radioactive wastes.

Ocean iron fertilization – Dumping iron particles into large areas of the ocean to increase plankton blooms, which is supposed to increase the amount of carbon dioxide the oceans can absorb.

Precautionary principle – An approach that states that if any new innovation, technology or practice has potential for serious harm to the public or the environment, protective action should be taken to prevent the harm before social and scientific certainty of the risk is reached.

Radioactive waste – A type of waste that is generated along the nuclear fuel chain and by nuclear weapons production. This waste can consist of dozens of different radioisotopes, with a variety of biological impacts, targeting different organs, tissues and biological functions.

Refuse-derived fuel (RDF) – A variation on waste incineration that involves pulling out the glass and metals that do not burn and turning the combustible materials (mostly paper and plastics) into pellets that are either burned in a normal incinerator or marketed as fuel to cement kilns or coal-fired power plants.

Regenerative economy – An economic system based on ecological restoration, community resilience, social equity and participatory processes. It requires a re-localization and democratization of how we produce, consume and share, and ensures all have access to healthy food, clean energy, clean air and water, good jobs and healthy living environments.

Renewable Energy Credits (RECs) – A Renewable Energy Credit is a tradable certificate corresponding to the environmental attributes of energy produced from renewable sources. Meant to cover the premium (extra cost) of generating renewable energy (when renewable energy was more expensive), RECs can be purchased by individuals and institutions wanting to claim that they use clean energy, but most are bought and sold by electric utilities to meet the requirements of state renewable energy mandates, often known as Renewable Portfolio Standards.

Solar radiation management (SRM) – Techniques that attempt to reflect sunlight back into space in order to temporarily mask the effects of climate change. Proposals include installing mirrors in Earth's orbit; injecting sulfates into the stratosphere; and modifying clouds, plants or ice to reflect more sunlight.

Stratospheric aerosol injection (SAI) – Shooting particles into the stratosphere to mimic the effects of a volcanic eruption, thereby blocking some of the Sun's radiation from reaching Earth, with the goal of temporarily masking the effects of climate change by attempting to lower the temperature.

Uranium enrichment – An energy intensive process used to increase the concentration of uranium-235 (U-235) to be used in nuclear fuel or weapons. U-235 makes up only 0.7% of uranium in most ore deposits. For fuel in most reactors, the concentration of U-235 must be 3.5-4.5%. For use in nuclear weapons, it must be enriched to 90% U-235.

Voluntary offsets – Offset credits not subject to government regulation that any polluter or individual can purchase to supposedly offset their greenhouse gas emissions.

Waste-to-Energy – A public relations term created by the Incinerator industry lobby groups to promote trash incinerators that produce electricity.

Zero waste – The conservation of all resources by means of responsible production, consumption, reuse, and recovery of products, packaging, and materials, without burning, and with no discharges to land, water or air that threaten the environment or human health.

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