GOODENERGYBADENERGY
TRANSFORMING OUR ENERGY SYSTEM FOR PEOPLE AND THE PLANET

GOOD ENERGY
BAD ENERGY?

TRANSFORMING OUR ENERGY SYSTEM FOR PEOPLE AND THE PLANET

Friends of the Earth International

Cover image: Woman carrying firewood on desertified land in India. The destruction of forests leads to desertification, increases climate change, and adds to the heavy workloads of women in many countries.

GOOD ENERGY
BAD ENERGY?

TRANSFORMING OUR ENERGY SYSTEM FOR PEOPLE AND THE PLANET

Friends of the Earth International is the world's largest grassroots environmental network, uniting 74 national member groups and some 2 million members and supporters around the world. We challenge the current model of economic and corporate globalisation, and promote solutions that will help to create environmentally sustainable and socially just societies.

Our vision is of a peaceful and sustainable world based on societies living in harmony with nature. We envision a society of interdependent people living in dignity, wholeness and fulfilment in which equity and human and peoples' rights are realised.

This will be a society built upon peoples' sovereignty and participation. It will be founded on social, economic, gender and environmental justice and free from all forms of domination and exploitation, such as neoliberalism, corporate globalisation, neo-colonialism and militarism.

We believe that our childrens' future will be better because of what we do.

Friends of the Earth has member groups in Argentina, Australia, Austria, Bangladesh, Belgium, Belgium (Flanders), Brazil, Bulgaria, Cameroon, Canada, Chile, Colombia, Costa Rica, Croatia, Curaçao (Antilles), Cyprus, Czech Republic, Denmark, El Salvador, England/Wales/Northern Ireland, Estonia, Finland, France, Georgia, Germany, Ghana, Grenada (West Indies), Guatemala, Haiti, Honduras, Hungary, Indonesia, Ireland, Italy, Japan, Korea, Latvia, Liberia, Lithuania, Luxembourg, Macedonia (former Yugoslav Republic), Malaysia, Mali, Malta, Mauritius, Mexico, Mozambique, Nepal, Netherlands, New Zealand, Nigeria, Norway, Palestine, Papua New Guinea, Paraguay, Philippines, Poland, Scotland, Sierra Leone, Slovakia, South Africa, Spain, Sri Lanka, Swaziland, Sweden, Switzerland, Tanzania, Timor Leste, Togo, Tunisia, Uganda, Ukraine, United States, and Uruguay.

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Friends of the Earth International

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Friends of the Earth's Flood for Climate Justice mobilisation, 2009, Copenhagen, Denmark.

INTRODUCTION

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Energy is a common good and access to it is a basic human right and a necessary condition of a dignified life. We need energy for fuel and electricity to cook our food, to have habitable homes and workplaces in hot and cold places, to ensure that everyone has access to basic services like health and education, to communicate and travel and to share and access information via the internet.

> **“OUR CURRENT ENERGY SYSTEM – THE WAY WE PRODUCE, DISTRIBUTE AND CONSUME ENERGY – IS UNSUSTAINABLE, UNJUST AND HARMING COMMUNITIES, WORKERS, THE ENVIRONMENT AND THE CLIMATE.”**

Yet our current energy system – the way we produce, distribute and consume energy – is unsustainable, unjust and harming communities, workers, the environment and the climate. This is fundamentally an issue of power: of corporate and elite power and interests outweighing the power of ordinary citizens and communities.

This report examines the central problems with the current energy system; the drivers and logic that underpin these problems; the destructive impacts of the energy sources on which the system is primarily reliant (oil, gas and coal); and energy sources that are being misleadingly put forward as supposed ‘clean’ energy alternatives (nuclear power, industrial agrofuels and biomass, mega dams and waste-to-energy incineration).

The report also sets out what Friends of the Earth International considers to be the main features of a just, sustainable climate-safe energy system, as well as some of the changes needed to get there, and some ideas on how they can be achieved.

We believe it is possible to build a new system which ensures access for everyone to sufficient energy to meet their basic needs for wellbeing and lives with dignity, while respecting diverse cultures and ways of life. An energy system where energy production and use support a safe climate, clean air, clean water, the protection of biodiversity, and healthy, thriving local economies that provide safe, decent and secure jobs and livelihoods with dignity for everyone.

This vision is guided by the principle of energy sovereignty – the right of people to have access to energy, and to choose sustainable energy sources and consumption patterns that will lead them towards sustainable societies and harmony with nature.

The ideas set out in this report are not set in stone. As Friends of the Earth International, we believe transformation of the energy system is connected to transformation of the power structures and inequalities that underpin the exploitative, crisis-prone global economy. Further, we believe this transformation will only be possible if we can help to build a sufficient collective force to overcome the power of those interests that are and will continue to resist this transformation.

There is an urgent need for dialogue and alliance-building between those with an interest in transforming the energy system and those whose skills are needed to effect the transformation – affected communities, communities without energy, energy sector workers, climate campaigners, energy users, workers in energy-intensive industries, academics and technical specialists amongst others. This is Friends of the Earth International’s initial contribution to that conversation. We are keen to learn from and with others in the movement and change our perspectives in response, as we move forward together to create the world we want to see.

> **“ENERGY SOVEREIGNTY – THE RIGHT OF PEOPLE TO HAVE ACCESS TO ENERGY, AND TO CHOOSE SUSTAINABLE ENERGY SOURCES AND CONSUMPTION PATTERNS THAT WILL LEAD THEM TOWARDS SUSTAINABLE SOCIETIES AND HARMONY WITH NATURE.”**

ENERGY BASICS

02

Energy efficient lightbulbs in use in Kuna Yala, Panama.
© Ronnie Hall / Critical Information Collective

WHAT IS 'ENERGY'?

The term energy has a number of different meanings. In this report we use it to mean the fuel and electricity derived from a range of different sources including wood, fossil fuels, agrofuels, mega dams and nuclear power, and used for a wide range of human activities including heating, lighting, cooking, transport and industrial processes. It is connected to wider economic processes like the extraction of resources, the production and consumption of goods and services, and processes of technological development, and to the power relations which shape in whose interests all of these processes operate and who benefits and who pays. For this reason, energy can also be understood as a social relation.[1] There are valid concerns[2] that such a broad, abstract concept serves to hide and obscure the power relations, inequalities and injustices that the generation and use of energy involves. We aim to expose and elucidate some of these power relations, injustices and inequalities in this report.

WHAT IS 'RENEWABLE ENERGY'?

This report uses the widely accepted definition of renewable energy to mean energy that comes from resources which are continually replenished on a human timescale such as sunlight, wind, rainfall, tides, waves and geothermal heat.

WHAT IS 'SUSTAINABLE ENERGY'?

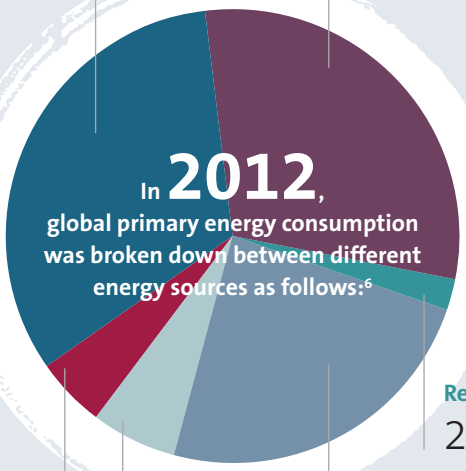
An energy system based on renewable energy resources is not necessarily sustainable. More discussion to define sustainable energy is needed, but at a minimum, sustainable energy should mean renewable energy, in which generation, distribution and consumption contribute to human wellbeing, do not undermine fundamental human rights, and do not deplete or permanently damage the earth's biodiversity, ecosystems and non-renewable resources.

BASIC **ENERGY STATISTICS**

400
years' plant growth burned every year

Every year, the equivalent of **400 years'** worth of plant growth is burned in the form of coal, oil and gas[4]

Current global annual energy use:
400
exajoules[3]



Today, coal, oil and gas supply the equivalent of plant mass from well over 1.25 billion hectares. The total land area taken up today by the global extraction, processing and transportation of fossil fuels, as well as the generation and transmission of thermal electricity, amounts to 3 million hectares worldwide, 400 times less.[5]

(with renewables defined here to include sources that FoEI does not consider to be climate-safe, just and sustainable energy sources, including agrofuels, industrial biomass, and waste to energy incineration).

Coal is still the **predominant fuel** for **electricity** generation

SUMMARY

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Girl with a solar cooker on the road to Zhongdian China.
© Dave Stamboulis

WHAT'S WRONG WITH THE CURRENT ENERGY SYSTEM?

The world's current energy system – the way we produce, distribute and consume energy – is unsustainable, unjust and harming communities, workers, the environment and the climate. This is fundamentally an issue of power: of corporate and elite power and interests outweighing the power of ordinary citizens and communities. Key problems include:

- **Climate change:** Climate change is already happening – wreaking devastation on communities and ecosystems around the world. Yet without urgent action to reduce global greenhouse gas (GHG) emissions, we face a far worse situation of runaway climate change, with impacts which would dramatically overshadow anything that we are seeing today. In total, a vast 57 per cent of global GHG emissions have resulted from CO_2 released by fossil fuel use.
- **Energy access and energy poverty:** Nearly 1.3 billion people – or one fifth of the world's population – do not have access to electricity, and 2.6 billion people – close to two fifths of the people on the planet – do not have access to clean cooking facilities. There are also major inequalities in energy consumption globally. In 2008, the US used on average 7,503 kg of oil-equivalent per person per year, Britain 3,395, China 1,598, Uruguay 1,254, Vietnam 698 and Bangladesh only 192.
- **Energy waste:** The way we produce and consume energy is extremely wasteful, especially in industrialised countries where the vast majority of energy and energy-intensive products are consumed. Centralised energy generation systems are believed to waste more than two thirds of their original energy input, and large amounts of energy are wasted on short-life and disposable consumer products.
- **Destructive impacts of energy sources:** The main energy sources on which the world is currently reliant (oil, gas and coal), and other energy sources that are misleadingly put forward as 'clean' alternatives (nuclear power, industrial agrofuels and biomass, mega hydroelectric dams and waste-to-energy incineration) all have major destructive consequences for people, communities and the environment.

SUMMARY OF IMPACTS OF DESTRUCTIVE ENERGY SOURCES*

*Coal, oil, gas, nuclear power, industrial agrofuels and biomass, mega hydroelectric dams, waste-to-energy incineration

- **climate change** and the growing risk of runaway climate breakdown
- **land grabbing** and **displacement** and **impoverishment** of small-scale farmers, fisherpeople and rural and indigenous communities
- **air pollution** and **water pollution**, water shortages, **inadequate clean water and sanitation**
- **deforestation**, biodiversity loss, and the **destruction of landscapes and sensitive ecosystems**
- **rupture or collapse of local economies**
- badly paid, **unsafe, insecure jobs** far away from people's homes and families
- **health problems and premature deaths** in people living close to harmful energy projects and infrastructure or exposed to toxic waste
- **human rights abuses** of community members, activists and investigative journalists including **surveillance, arbitrary detention, violence, torture and murder**
- **loss of traditional medicines**, livelihoods, cultures, traditions and important sites of ancestor worship
- **social upheaval and community breakdown**

DRIVERS OF THE CURRENT ENERGY SYSTEM

- **Energy and neocolonialism, neoliberalism and extractivism:** Our energy system cannot be understood without reference to the global political economy that drives and sustains it. The system is totally reliant on the continued extraction and exploitation of natural resources. Extractivism is an economic model that has its roots in the large-scale exploitation and expropriation of the natural resource wealth of developing countries that began under colonialism. Its impacts have been exacerbated by neoliberalism — a political approach which prioritises the profit-making activities of private enterprise above social and environmental concerns, and individual freedoms over collective, public goods.
- **Profits from energy exploitation backed by law:** Multinational energy corporations and their state backers use profit-sharing agreements and government-to-government treaties to guarantee continued access to energy resources and the maximisation of profits from these resources. These agreements are fundamentally undemocratic and serve to undermine environmental and social protections and lock in extractivism.

- **Export-oriented economic growth:** Today's dirty energy sources and their harmful impacts are inextricably bound up with a model of export-orientated economics which prioritises the production of goods for export. This comes at a very high environmental and social cost to the people living in exporting countries, as a result of both the destructive energy sources needed to fuel these industries and the energy-intensive industries themselves.
- **Energy-intensive lifestyles:** Modern life in advanced industrial economies is highly energy dependent. The industrialised world's high levels of energy consumption are predicated on the ready availability of energy, and on the environmental and social costs of the production of this energy being borne mostly by people and communities outside of their borders, mostly people and communities in the global South.
- **Energy market liberalisation and energy exclusion:** Energy poverty and lack of energy access is a direct result of governments' policies and legislative choices in favour of energy market privatisation and liberalisation, involving the sell-off and deregulation of energy infrastructure and services so that energy provision and investment becomes guided primarily by the objective of profit maximisation.
- **Corporate power blocking the energy transition:** The financial benefits extracted from energy production and use are a source of considerable economic power, which in many circumstances translates directly into political power – power that is exercised over and over again to maintain access to the profit-making opportunities that the destructive global energy system provides. In many places, politicians and policy makers have direct connections with and financial interests in destructive and unsustainable energy, and senior executives connected with energy industries are given powerful positions on government committees and regulatory bodies, all with obvious impacts on the energy policy choices of governments.

WINNERS AND LOSERS

The global energy system has clear winners and losers. Destructive energy and the wider system disproportionately affects some groups in society, while other groups reap significant benefits. Overall the vast majority of people are harmed, exploited or excluded by the system, while a small minority take all the benefits.

WHO **BENEFITS** THE MOST?

- Dirty energy companies, construction companies, energy-intensive companies, especially their senior executives, financiers and investors
- Corrupt political elites in resource-rich countries
- Western industrialised countries
- National security forces and private security firms
- Wealthy consumers

WHO **PAYS** THE BIGGEST PRICE?

- People in the global South
- Women
- Indigenous peoples and rural communities
- Ordinary workers in dirty energy industries
- People in poverty

AVOIDING THE CLIMATE TRAP

Stopping climate change and averting its worst impacts requires an urgent and dramatic reduction in the greenhouse gas emissions emitted from our energy system. This in turn necessitates a rapid transition away from high-carbon energy sources like fossil fuels, nuclear power, agrofuels and industrial biomass and the rapid expansion of renewable energy. This transition carries significant risks and pitfalls, some of which are in fact already being realised.

- **RISK 1:** Corporations will try to define what constitutes 'renewable energy'.
- **RISK 2:** Construction of renewable energy infrastructure could drive land grabbing, enclosures, human rights abuses and environmental destruction.
- **RISK 3:** Environmental destruction and human rights abuses result from raw material extraction for renewable energy infrastructure.
- **RISK 4:** Greenhouse gas emissions from renewable technology roll-out are more than the climate can handle.
- **RISK 5:** Poor environmental and labour standards in renewable technology manufacturing.
- **RISK 6:** Renewables transition becomes a Trojan horse for energy privatisation.
- **RISK 7:** Lack of public consent for renewable energy.

TOWARDS A VISION FOR A JUST, SUSTAINABLE, CLIMATE-SAFE ENERGY SYSTEM

Friends of the Earth International believes that it is possible to transform our current corporate-controlled, unsustainable and unjust global energy system into one that is climate-safe, just and sustainable, that respects the rights and different ways of life of communities around the world, and that meets the basic right to energy for everyone, without the extensive destructive impacts of current energy sources.

In this report we attempt to lay out what we consider to be the main features of a just, sustainable, climate-safe energy system. This vision is guided by the principle of energy sovereignty, which is **the right of people to have access to energy, and to choose sustainable energy sources and sustainable consumption patterns that will lead them towards sustainable societies.**

KEY FEATURES OF A JUST, SUSTAINABLE, CLIMATE-SAFE ENERGY SYSTEM:

1 | **Provides energy access for all as a basic human right**

2 | **Climate-safe and based on locally appropriate, low-impact technologies**

3 | **Under direct democratic control and governed in the public interest**

4 | **Ensures the rights of energy sector workers, and their influence over how their workplaces are run**

5 | **Ensures the right to free, prior and informed consent and rights of redress for affected communities**

6 | **As small-scale and decentralised as possible**

7 | **Ensures fair and balanced energy use and minimum energy waste**

Some changes to help drive this transformation

- Invest in locally appropriate, climate-safe, affordable and low-impact energy for all
- Reduce energy dependence
- End new destructive energy projects and facilitate a managed phase out of all destructive energy sources
- Ensure a just transition and compensation and support for affected workers and their communities
- Ensure the protection of free, prior, informed consent and rights of redress for affected communities
- Tackle the international trade and investment rules that prevent the transition to a just, sustainable and climate-safe energy system
- Facilitate the sharing, transfer, development and local adaptation of low-impact, renewable energy technologies
- End perverse incentives for destructive energy.

HOW TO CREATE THE CHANGE?

Transforming the current energy system is one of the most difficult challenges of all and needs the most discussion among those communities, activists, campaigners and organisations whose aim is to bring about this change. Around the world, many communities are fighting for a just and sustainable energy system through local campaigns and struggles. **All of these struggles are about living, building and embodying the world we want to see**. As civil society, it is critical that we seek to support and strengthen these struggles, but we also need to go further.

Unless we can outweigh the power of vested interests and exert real democratic control over national governments' decisions about the energy system then it is likely that grassroots struggles that do succeed will remain lone islands in the context of an overall energy system that remains unsustainable, exploitative and unjust. **We need to build a common vision with all those who have an interest in transforming the energy system and whose skills are needed to make it happen, and a common strategy for how to get there**. This process must include affected communities, communities without energy, energy users, energy sector workers, campaigners, academics and technical specialists amongst others.

Affected communities living with flooding in Bangladesh.
© G. M. B. Akash

PROBLEMS WITH THE CURRENT ENERGY SYSTEM

04

ENERGY AND CLIMATE CHANGE

Climate change is already happening – wreaking devastation on communities and ecosystems around the world. Yet without urgent action to reduce global greenhouse gas emissions, we face a far worse situation of runaway climate change, with impacts which would dramatically overshadow anything that we are seeing today. Exceeding climate tipping points brings a near certainty of even greater hunger, drought, flooding, and temperature and weather extremes, as well as mass extinctions and the forced migration of billions of people, combined with the breakdown of social order and political systems in many places.

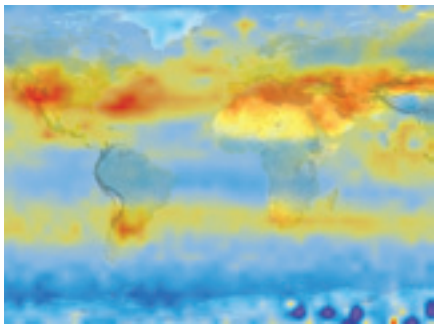
Governments have identified an increase of 2°C in global mean temperature above pre-industrial levels as a key threshold. They have committed to efforts to keep global warming below this threshold in order to avoid the worst impacts of climate change. According to NASA's Goddard Institute for Space Studies, average temperatures have climbed 0.8°C around the world since 1880.[7] However, further warming of 0.6°C is thought to be already locked in without any further increase in the concentration of global greenhouse gas emissions.[8] Furthermore, despite over 20 years of international climate negotiations under the United Nations Framework Convention on Climate Change (UNFCCC), global emissions are showing no sign of abatement. The latest report from the Intergovernmental Panel on Climate Change (IPCC) – the official intergovernmental body tasked with the assessment of climate change and its potential environmental and socio-economic impacts – published in September 2013, asserts that unless we change our current emissions pathway, warming above 4°C by 2100 is 'as likely as not'.[9]

Scientists have argued that in order to keep global temperature increase below 2°C we need to make global emissions peak and start declining by 2015. However, even a 2 degree increase is no longer considered safe – at best it is the border between dangerous and extremely dangerous climate change. Even a rise of 1.5°C is considered to be dangerous, with predictions of highly destructive impacts for significant parts of the world's population, including water scarcity, hunger and displacement for millions in Africa, as well as threatening the very existence of low-lying, small island states.[10]

In 2007 the IPCC identified that nearly 26 per cent of global greenhouse gas (GHG) emissions resulted from the global energy supply and a further 13 per cent from transport. In total, a vast 57 per cent of global GHG emissions resulted from CO_2 released by fossil fuel use.[11]

Tackling carbon emissions from the global energy system is therefore absolutely central to stopping climate change and avoiding tipping points that threaten runaway global climate disaster. The International Energy Agency (IEA) estimates that four fifths of the carbon emissions allowable by 2035, if we are to keep global mean temperature increase below 2 degrees, are already locked in by existing power plants, factories and buildings. If action is not taken by 2017 to reduce emissions and decarbonise the energy supply, then all the allowable additional CO_2 emissions would be locked in by energy infrastructure existing at that time.[12]

In deciding how to limit future carbon emissions, it is essential to consider the dramatic differences in per capita emissions between industrialised and industrialising countries, and the differing levels of responsibility of different countries for causing the problem of climate change in the first place. Advanced industrialised countries like the US and those in Europe have produced three quarters of the total historic CO_2 emissions that have accumulated in the atmosphere since 1850, despite only representing 15 per cent of the world's population.[13] Furthermore, despite the significant increase in emissions from industrialising countries like China in recent decades, per capita emissions remain highly unequal and still skewed significantly towards advanced industrialised countries. A very large proportion of China's emissions are generated to produce goods for export overseas rather than for domestic consumption.



Satellite image shows where CO_2 is being emitted or absorbed, measured here in 2003. Red shades show sources; blue shades, absorption.
© NASA, 2003

These differences in the historic and current roles of different countries in causing the climate crisis are reflected in the UNFCCC's principle of Common But Differentiated Responsibility and Capacity to Act (CBDR). The Convention requires all countries to take decisive action on climate. However, recognising the CBDR principle and the fact that developing countries still have to address pressing social development needs, the UNFCCC commits industrialised countries to acting first and fastest to reduce their emissions, and also to compensate developing countries by funding the 'incremental costs' of their actions to develop low-carbon economies and adapt to the unavoidable impacts of climate change.

TACKLING CARBON EMISSIONS FROM THE GLOBAL ENERGY SYSTEM IS THEREFORE ABSOLUTELY CENTRAL TO STOPPING CLIMATE CHANGE AND AVOIDING TIPPING POINTS THAT THREATEN RUNAWAY GLOBAL CLIMATE DISASTER.

The IEA estimates of the remaining allowable global carbon emissions to 2035 are therefore made more striking because their timing results in a highly unfair distribution – with the energy, industrial and housing emissions of the minority industrialised world taking up all of the remaining available emissions to 2017, leaving no space for the majority developing world to increase their emissions in order to address basic development needs like energy access, health, education and sanitation. Yet the IEA also predicts that global energy demand will grow by more than one third between 2012 and 2035, with China, India and the Middle East accounting for 60 per cent of the increase.[14]

A dramatic and fundamental shift in how the world produces and consumes energy is therefore needed if we are to stop climate change and avert its worst impacts while also allowing developing countries to meet essential basic development needs. Furthermore, as energy infrastructure takes time to change, this transformation needs to begin as a matter of absolute urgency.

Ending reliance on fossil fuels is one of the most critical parts of this energy transformation. Only 20 per cent of total proven global fossil fuel reserves can be burned unabated if we are to keep global temperature increase below 2 degrees.[15] This leaves up to 80 per cent of the fossil fuel assets of private and public companies and governments technically unburnable. In spite of this, companies are still investing huge amounts in exploring for and developing new fossil fuel reserves.[16]

ENERGY ACCESS AND ENERGY POVERTY

While it is threatening the very existence of humanity on the planet, the energy system is also failing to provide billions of people around the world with sufficient energy to ensure their basic wellbeing and allow them to lead lives with dignity.

According to the IEA, nearly 1.3 billion people – or one fifth of the world's population – do not have access to electricity, and 2.6 billion people – close to two fifths of the people on the planet – do not have access to clean cooking facilities.[17] Ten countries, four of them in developing Asia and six in sub-Saharan Africa, account for two thirds of the people without electricity, while three countries – China, India and Bangladesh – account for more than half of those people without clean cooking facilities. Furthermore, little improvement in the situation is predicted over the next decade and a half, with 1 billion still without access to electricity and 2.6 billion without clean cooking facilities in 2030.[18]

The degree to which access to modern energy services such as electricity is essential for basic wellbeing and living with dignity varies considerably between different communities, regions and nations, depending on a range of factors including culture, lifestyle, climate, and access to locally-available energy resources. Many indigenous communities live comfortably and sustainably without access to such energy services. Yet for very large numbers of people around the world, lack of energy to meet their basic needs is a central problem, and one which directly correlates with the major elements of poverty, including inadequate health care, low education levels and limited employment opportunities.

Furthermore, while the problem of energy exclusion is primarily concentrated in the global South, many people in the advanced industrialised world also struggle to afford sufficient energy to meet their basic needs. Here, the problem is one of capacity to pay rather than energy availability. Definitions of fuel poverty vary, but the most widely used states that a household is fuel poor if it needs to spend 10 per cent or more of its income on all fuel use, including that needed to heat its home adequately.[19] In December 2011, one quarter of households in England and Wales were officially defined as fuel poor, and figures for all fuel poor across Europe are estimated at 50 to 125 million people.[20]

A woman making fire wood by processing cow dung. It is an alternative energy source to wood in many rural villages in Bangladesh.
© Mohammad Rakibul Hasan

GLOBAL INEQUALITIES IN ENERGY USE

Alongside the issues of energy exclusion and poverty there are massive inequalities in energy consumption. Global energy consumption is highly skewed towards the global North, despite the existence of severe fuel poverty, and is grossly unequal. As shown below, average energy use per person in the global North dwarfs that of the least developed countries in the global South and even that of rapidly industrialising countries like China:

- In 2008, the US used on average 7,503 kg of oil-equivalent per person per year, Britain 3,395, China 1,598, Uruguay 1,254, Vietnam 698 and Bangladesh only 192.[21]
- An average Swede consumes over 150 times more electricity compared to an average Tanzanian.[22]
- While China is importing and consuming more energy than ever before, energy consumption per head of population in the US and Canada is still roughly twice that in Europe or Japan, more than ten times that in China, nearly 20 times that in India, and about 50 times as high as in the poorest countries of sub-Saharan Africa.[23]

POLITICAL INSECURITY, CORRUPTION AND CONFLICT

Our current energy system and its reliance on significant natural resource inputs like fossil fuels and land is also a major driver of political insecurity, conflict and corruption worldwide.

In countries that have significant energy resources, struggles among different political factions and intervention by foreign powers for their control are key factors behind increased political insecurity, increased corruption and risk of conflict.

Landmark research in the 1990s, including by economists Jeffrey Sachs and Andrew Warner, discovered a strong negative correlation between a country's dependence on mineral exports (particularly oil), and their gross domestic product (GDP).[24] A whole body of research has since evolved, focusing on the so called 'resource curse', where an abundance of natural resources like oil, gas and minerals correlates directly with higher rates of poverty, malnutrition, child illiteracy, corruption, authoritarianism, civil war, indebtedness and other significant social, political and economic problems.

Development specialist Paul Collier has demonstrated that countries in Africa that depend on resource exports such as oil run a significantly greater risk of civil war than countries with no exports.[25] Research has also documented efforts by foreign powers such as the United States to intervene in the domestic political affairs of oil-rich nations, either through 'soft power' activities to keep certain political leaders in power contrary to the broader democratic wishes of a country's population, or harder interventions such as the US strategy of military control over oil reserves in Iraq.

Research on the relationship between corruption, authoritarian governments, conflict, and extractive industries has also found strong evidence of the so called 'repression effect', where resource wealth appears to hold back processes of democratisation by supplying governments with funds to support the forces and apparatus of repression.

> **"THE SO CALLED 'REPRESSION EFFECT', WHERE RESOURCE WEALTH APPEARS TO HOLD BACK PROCESSES OF DEMOCRATISATION BY SUPPLYING GOVERNMENTS WITH FUNDS TO SUPPORT THE FORCES AND APPARATUS OF REPRESSION."[26]**

On the other hand, the recent example of Venezuela's use of its oil revenue to tackle poverty and fund broad-based socio-economic development under the democratically-elected government of former President Hugo Chavez, suggests that the relationship between natural resource wealth and a range of political, social and economic problems is not necessarily causal. The Venezuela experience points to the importance of other factors in determining the degree to which resource wealth will bring benefits or problems for a country's wider population. These factors include the democratic mandate and political objectives of the government in power and its ability to resist pressures and interventions from foreign powers, as well as the strength of social movements and civil society and their ability to hold the government to account.

Currently, evidence for the repression effect is strong enough to suggest that if a country has natural resource wealth, then there will be significant incentives for political factions and foreign powers to seek to exploit those resources for their own gain, to the detriment of the security and wellbeing of people and communities.

ENERGY WASTE

Finally, the way we produce and consume energy is extremely wasteful, especially in industrialised countries where the vast majority of energy and energy-intensive products are consumed.

In terms of energy production, centralised energy generation systems are argued to waste more than two thirds of their original energy input. Out of every 100 units of energy:

- 61.5 units are lost through inefficient generation and heat wastage
- 3.5 units are lost via transmission and distribution
- 13 units are lost via inefficient end use
- Only 22 units are actually utilised.[27]

In addition, our economies are becoming increasingly dependent on the use of disposable materials such as plastic and paper packaging, rather than reusable and recyclable materials, as well as on cheap, short-life consumer products rather than higher quality, long-life products. Large quantities of energy are used in the production of these disposable materials and short-lived products, including the energy required to extract, transport and process raw material inputs like timber and crude oil, to manufacture products and materials, and to transport them to their points of sale and use.

Boy in a rubbish dump, Saltillo, Coahuila, Mexico. The lack of economic resources available to families forces many to live amongst rubbish dumps.
© Enrique Sifuentes

BOX 01 DESTRUCTIVE IMPACTS OF ENERGY SOURCES

The different energy sources on which the current system is primarily reliant are also extremely harmful and destructive in their own right, as are other sources that are being misleadingly put forward as supposed 'clean' energy alternatives. Here we summarise the key destructive impacts of the world's current main energy sources: oil, gas, coal, nuclear power, agrofuels and industrial biomass, mega dams, and waste-to-energy incineration. More detailed information on each of these is provided in chapter 5.

Action of FoE Croatia against the planned construction of the Plomin C coal power plant. 680 human cardboard silhouettes have been erected on the site of the proposed plant in front of the current power plant. They simbolize 680 deaths that would happen as a result of plant's operation in the course of 40 years.
© FoE Croatia

Sun Biofuels jatropha plantation, Mozambique.
© Justiça Ambiental (FoE Mozambique)

LAND AND LIVELIHOODS

- Oil and gas exploration and production, oil and gas pipelines, coal mining, mega dam construction, and industrial agrofuel and biomass for energy plantations all fuel land grabbing and the displacement and impoverishment of small-scale farmers and indigenous communities.
- Reducing Emissions from Deforestation and Forest Degradation (REDD) projects and proposals[28] – created to justify the continued use of destructive and harmful energy – are also encouraging land grabs across Africa, Asia and Latin America and driving the commodification of nature.

POLLUTION, DEFORESTATION AND BIODIVERSITY LOSS

- Industrial agrofuel and biomass plantations drive direct and indirect land use change that cause extensive deforestation.
- Oil, gas and coal exploration and extraction and the construction of oil and gas pipelines also drive deforestation and the destruction of landscapes, biodiversity and ecosystems.
- The extraction and processing of oil and gas, oil spills and the toxic waste from coal mining cause extensive water and land pollution and biodiversity loss.
- Oil, gas and coal combustion and waste-to-energy incineration all lead to significant air pollution and smog.

JOBS

- While some energy jobs are highly skilled, highly paid and desirable, the vast majority of jobs in coal mines, agrofuels plantations, oil and gas processing plants, and in the construction of energy infrastructure like gas and oil pipelines and mega dams, are badly paid, unsafe, insecure, and require workers to spend long periods away from their families and communities.
- Energy projects often generate a temporary increase in certain types of jobs, but more often than not they destroy more secure local jobs and livelihoods than they create. This increases poverty and inequality and often leads to the rupture or collapse of local economies, forcing people to migrate to urban areas or across borders in search of work to support themselves and their families.
- Furthermore, the environmental impacts of extraction of destructive energy sources like coal, oil, and gas often puts at risk the viability of other local economic sectors, for example agriculture.

WATER

- Water usage for energy extraction, processing and generation, and irrigation of industrial agrofuels and biomass, is extremely high and undermines the access of communities in many places to adequate clean water and sanitation.
- The energy sector is already the largest consumer of water in the industrialised world.[29] The IEA predicts that water requirements for energy production are set to grow at twice the rate of energy demand, with a predicted rise in water consumption linked to power generation of 85 per cent up to 2035.[30]
- If introduced on a large scale, carbon capture and storage (CCS) would lead to a further significant increase in water use (See Box 10 for more information on CCS).

HEALTH

- Air and water pollution from coal, oil and gas extraction, processing, transportation and combustion and waste-to-energy incineration, along with pesticide exposure from industrial agrofuels and biomass production and exposure to nuclear radiation from nuclear accidents, all give rise to significant health problems and premature deaths in people living close to harmful energy projects and infrastructure or exposed to toxic waste.

HUMAN RIGHTS ABUSES

- The establishment of new harmful energy projects like oil fields, coal mines and agrofuel and biomass plantations is often accompanied by human rights abuses of community members, activists and investigative journalists by state security and hired private security forces, including surveillance, arbitrary detention, violence, torture and murder.
- The affected communities' rights, including rights to a healthy environment, employment, health, education, and freedom of political association are often abused in the construction of destructive and harmful energy projects.

CULTURE, TRADITION AND SOCIAL COHESION

- By displacing and dislocating communities, these energy projects drive destruction of the cultures of communities and Indigenous Peoples – including the loss of their medicines, livelihoods, traditions and important sites of ancestor worship. The social upheaval caused by destructive energy projects very often undermines the social cohesion of communities and leads to social breakdown and increased social problems.
- False promises from energy companies often drive divisions and conflicts within communities.

Gas flaring in
the Niger Delta.
© E. Gilligan, FoE EWNI

COMPENDIUM OF CURRENT DESTRUCTIVE ENERGY SOURCES

05

Test pit of the Alpha Coal Project located in the Galilee Basin, in central Queensland, Australia. The test pit, excavated in 2011, was used to extract coal for quality sample burning in coal fired power stations in Asia.
© Hancock Coal

COAL

NASA scientist Jim Hansen has described coal as "the single greatest threat to the climate".[31] Coal contains more carbon than other fossil fuels such as oil and gas, resulting in the release of greater quantities of carbon dioxide into the atmosphere when it is burned. Coal therefore contributes more to climate change than any other energy source. Burning coal is the largest single source of carbon dioxide emissions in the world – in 2012, 43 per cent of CO_2 emissions from fuel combustion were produced by coal.[32] As one of the cheapest fossil fuels on the global energy market, many countries rely heavily on coal for their electricity. Nearly 40 per cent of the world's electricity comes from coal, but some countries such as Poland, South Africa and Australia rely on coal-fired power stations for more than 80 per cent of their electricity.[33]

Each step of the coal-to-energy process generates pollution and destructive impacts for communities, workers and the environment. Coal mining, like other types of mining, is often highly unsafe for workers. Thousands of people die in coal mining accidents each year,[34] with the worst fatality rates occurring in countries with poor health and safety standards for workers. And like other extractive industries, coal mining very often involves the displacement of communities, often under duress and with little or no compensation or support for developing alternative livelihoods. Small-scale farmers and indigenous peoples lose their land, their livelihoods, and access to natural resources on which they are often heavily reliant. In the global South, displaced people are often forced into low paid, insecure work as landless labourers or are forced to migrate to cities in search of work and often find themselves as slum dwellers, without access to basic services and vulnerable to eviction and continued displacement. Just one new proposed mine – the proposed Phulbari coal mine in Bangladesh – will involve the acquisition of 6,000 hectares of fertile agricultural land and, according to project documents and independent reports, will physically and economically displace 50,000 to 220,000 people.[35] Similarly, in Mozambique, Brazilian company Vale displaced communities from over 22,000 hectares of land for their open pit coal mines, and 'compensated' them with 3,800 hectares of rocky, infertile land.[36] One way communities have been protesting is by stopping the trains that carry the coal to ports.[37]

Coal mining often generates severe environmental impacts. The exact impacts depend on the type of coal mining. Open-cast (open-cut) coal mining and mountain-top removal are particularly destructive. Open-cast mining – mining of the surface rather than by tunnelling into the earth – destroys the topographical landscape, impacting groundwater and surface water systems, agricultural and forest lands, giving rise to significant noise and dust pollution and often to land subsidence. Mountain-top removal involves the demolition of mountain tops using explosives in order to reach thin seams of coal within. This form of mining produces millions of tonnes of rubble and toxic waste, often dumped into the streams and valleys below the mining sites, poisoning drinking water and destroying biodiverse forests and wildlife habitat nearby, as well as increasing the risk of flooding for nearby communities.[38]

Coal mining is itself highly polluting – generating waste soil and slurry polluted by toxic heavy metals such as cadmium, selenium and arsenic, which often leach into local water supplies. The toxic waste also pollutes the air in areas surrounding coal mines, affecting mine workers and communities who live locally.

Eskom coal power plant in the background of an urban township, South Africa.
© Foe South Africa/Groundwork

The health impacts from coal combustion are also extremely severe. Burning coal produces a variety of air-borne pollutants associated with numerous health problems, including bronchitis, emphysema, asthma, heart attacks, lung damage, problems with nervous system development in babies and young children and premature death.[39] And coal plants produce millions of tonnes of coal ash pollution, the toxic by-product that is left over after the coal is burned. The public health hazards to nearby communities from unsafe coal ash dumping include increased risk of cancer, learning disabilities, neurological disorders, birth defects, reproductive failure, asthma, and other illnesses.[40] China's coal plants alone generated 375 million tonnes of ash in 2009 – enough to fill an Olympic swimming pool every 2.5 minutes.[41]

Using the relatively tight pollution standards of Europe, health researchers estimate the worldwide health toll from air pollution due to coal combustion is 210,000 deaths, almost 2 million serious illnesses, and over 151 million minor illnesses per year, not including the effects of climate change. However, pollution standards are not as protective in countries like China, where coal combustion for electricity production causes an estimated 250,000 deaths per year.[42] A recent study by the European Health & Environment Alliance asserted that health costs of coal-fired power stations add a financial burden to the European population of up to €42.8 billion a year.[43]

Yet, despite the role of coal power as a driver of the climate crisis, governments around the world are supporting the expansion of the coal industry and the construction of many new coal-fired power stations. Investment in new coal-fired power is competing directly with much needed public investment in renewable energy, locking countries' economies in to highly destructive, high-carbon energy infrastructure, thus increasing the risk of runaway climate change and making energy transition far more expensive over the long term. Approximately 1,199 new coal-fired power plants are currently proposed across the world, 76 per cent of them in China and India,[44] which now host much of the highly polluting energy intensive dirty industry that has been 'offshored' from advanced industrialised countries because of their tighter environmental and social regulations. Carbon emissions from coal are expected to increase by 60 per cent by 2030.[45]

BOX 02 AUSTRALIA'S WANDOAN MEGA MINE

In the mid 2000s the Australian economy entered into a mining exploration and export growth phase, involving a ten year plan to develop 120 new mines / mine extensions and 34 new 'super size' mines, with the majority of these being coal mines to produce coal for export. The overall target is to increase Australia's coal exports to almost three times the current level.

Test pit of the Alpha Coal Project located in the Galilee Basin, in central Queensland, Australia. The project is joint owned by Indian company GVK and Australia's Hancock Coal. The test pit, excavated in 2011, was used to extract coal for quality sample burning in coal fired power stations in Asia.
© Hancock Coal

Dredging of the World Heritage protected Gladstone Harbour in Australia's Great Barrier Reef. The dredging supports the development of the new Wiggins Island Coal Terminal and four LNG export terminals. Wiggins Island will service 15 new coal mines. The LNG projects will service 40,000 Coal Seam Gas wells located in Queensland's Surat Basin.
© Tom Shjoland and FoE Australia

One example was the Wandoan Coal Project mine in Eastern Australia. If approved and financed, it would be one of the first of the super size mines. Driven by Glencore Xstrata Coal – one of the world's largest coal-producing corporations – the project aimed to build a mine 50 km long, covering 320 km², requiring the damning of two rivers, a 500 km rail line and risking biodiversity impacts with the construction of a coal port terminal in the Great Barrier Reef, the world's largest coral reef system.

Alone, the coal mined at Wandoan would have contributed 0.15 per cent of global emissions annually, and the total over its lifespan would be more than the emissions of 150 low-emitting countries.

Australia's coal expansion is directly linked to the industrial development of China and India. Chinese state-owned companies and Indian companies account for 80 per cent of direct investment in Australia's coal mining development. In its drive for international investment and the thousands of jobs each mine creates, Australia is activity encouraging the world's largest mining corporations to access Australian lands, including National Parks and productive farming land, and turning a blind eye to illegal activities, land grabbing, destruction of Australia's fragile water reserves, and the industrialisation of farming communities.

In 2012 a Queensland State Court handed the farmers of Wandoan a bleak future, consisting of little more than metres of buffer between the mega mine and their productive farming enterprises, as well as allocation of some of their existing water resources. The decision left some farmers with stranded properties – physical islands in a sea of coal mine.

Friends of the Earth Australia worked with the affected communities, including in Wandoan, those along the railway line, and communities challenging the coal port terminal development. This included development of educational materials to inform farmers of their rights, communication materials, mapping, direct action blockade workshops, and media pressure to build and maintain a city profile that links impacted farmers with city consumers.

A significant victory for the environment movement was won in 2013 when, following years of protracted campaigning and a lengthy court case between Friends of the Earth and Xstrata, the CEO of Glencore Xstrata announced the company would not develop new 'greenfield' mine sites like that at Wandoan.

Campaigns such as this are being fought all around Australia. The goal is to undermine the ability of the Australian mining resource sector to provide coal product to international markets.

FOR MORE INFORMATION see FoE Australia: **www.foe.org.au**

OIL

Every day the world consumes over 80 million barrels of petroleum or crude oil.[46] The majority is used to create fuels such as petrol, diesel, jet fuel, kerosene and liquefied petroleum gas. Oil reserves are distributed unevenly around the world, with Venezuela, Saudi Arabia, Canada, Iran and Iraq having the biggest proven reserves.[47] A fossil fuel, oil is a key source of carbon dioxide emissions. Oil-based fuels were responsible for 36 per cent of CO_2 emissions from fuel combustion in 2010.[48] Current reserves of oil alone are more than enough to push the world over likely tipping points into full-blown climate chaos. Yet, each year the oil and gas industry continues to spend in excess of US$150 billion looking for new reserves.[49]

The oil economy – including extraction, processing, transportation, consumption and the struggles between different actors to control these processes – is the cause of a plethora of major environmental, social, economic, political and cultural problems and conflicts. A highly toxic and extremely polluting substance, it causes widespread damage to ecosystems and to the health of communities:

- Oil exploration often requires seismic explosions and the removal of large areas of forest.
- Oil extraction produces highly toxic muds and waste waters and often results in gas flaring, where gas released alongside the oil is burned. Gas flaring has been linked to cancers, asthma, chronic bronchitis, blood disorders, and other diseases.[50]
- Oil refining creates further chemical, thermal and noise pollution and affects the health and safety of refinery workers and nearby communities and ecosystems.
- Oil transportation gives rise to a significant risk of oil spills from pipelines and tankers.
- Oil combustion causes air pollution associated with health problems, especially in cities where pollution is concentrated.[51]

There are strong correlations between oil economies and human rights abuses, corruption and conflict. Oil operations frequently result in extensive human rights abuses,[52] including expropriation and forced relocation, repression, torture and murder. Control over oil resources was, and in some places continues to be, a key factor underlying conflicts, such as in the Niger Delta, Sudan, Colombia, Libya, Kazakhstan, and the US-led invasion of Iraq, with the latter being just one example of decades of US military involvement and covert action in oil-producing regions, especially the Persian Gulf.[53] A recent study estimates that the cost to the US taxpayer of 'defending' the country's oil supplies amounted to US$7.3 trillion over 30 years.[54]

While there are exceptions, such as Venezuela and Bolivia where oil revenues have been used for the provision of basic services and to make significant reductions in poverty, oil resources are not a guarantee of a strong and healthy economy – in fact the opposite is often true. A 2005 report found correlations between oil production and exports and increasing debt, indicating that while increasing oil exports improves the ability of developing countries to service their debts, it also generally correlates with an increase in the overall size of their debt.[55]

Technological developments in the oil industry, combined with the drying up of easily-accessible proven oil reserves, are leading oil companies to exploit new, unconventional, higher risk and more destructive sources. These include tar sands in Canada and Madagascar, deep-water extraction in the Gulf of Mexico and off the Brazilian coast, and drilling in remote and highly sensitive environments like the Arctic. Tar sands exploitation in Alberta, Canada has wrought devastation across millions of acres of land owned by Indigenous Peoples, destroying pristine boreal forest, polluting rivers and lakes, poisoning drinking water, agricultural land, plants and animals, and destroying the livelihoods of communities who have lived in harmony with rich ecosystems for thousands of years.[56]

Aerial view of the tar sands tailings pond north of Fort McMurray, Alberta, Canada.

Efforts are being made to expand unconventional oil extraction around the globe, including in highly sensitive ecosystems in Madagascar and Mozambique and the Orinoco river basin in Venezuela.[57] Oil companies are increasingly using more toxic, destructive and high-risk 'Enhanced Oil Recovery' techniques to increase the amount of oil they are able to extract. Such techniques include the injection of steam, gas and chemicals into oil wells.[58]

FOR MORE INFORMATION on the destructive impacts of oil see: **www.priceofoil.org.**

BOX 03 OIL POLLUTION IN THE NIGER DELTA

Nigeria is the tenth largest oil producer in the world and its oil production is largely concentrated in the Niger Delta of Southern Nigeria, home to many ethnic groups. Decades of oil extraction have had a devastating impact on these communities and their environment. A group of independent environmental and oil experts visiting the Niger Delta in 2006 put the figure for oil spilled, onshore and offshore, at 9 to 13 million barrels over the past 50 years, equivalent to an oil spill the size of the Exxon Valdez every year.[59]

One of the plaintiffs in a case brought against Shell in The Hague, Eric Dooh, at home in Goi village, Ogoniland, showing oil pollution due to the company's operation in the Niger delta.
© Marten van Dijl / Milieudefensie (FoE Netherlands), 2012

Shell oil spill at Ruhpoku.
© E. Gilligan, FoE EWNI

As one of the main foreign oil companies in Nigeria, Shell bears significant responsibility for the oil pollution. The UN has stated that Shell has not cleaned up the leaked oil for decades, or has done so insufficiently, and that the company does not comply with legal environmental standards. Moreover, Shell's own sustainability report stated that the number of leaks due to poor maintenance doubled in 2011, rising from 32 to 64.

Other corporations with oil operations in the Niger Delta include Chevron, Mobil, ENI (Agip) and several Nigerian companies, including the Nigerian National Petroleum Company (NNPC). The Nigerian government is a major investor and stakeholder in the operations, as is the World Bank.

While large amounts of money are earned by the oil industry from exploiting the Niger Delta's oil reserves, local residents have gained scarcely any benefit. Most are dependent on agriculture, fishing, fish farming and gathering snails and other products from the forests. For them, oil pollution means a lack of drinking water, inedible fish, poisoned agricultural fields that must lie fallow for years and crops that don't grow,[60] as well as major insecurity as different groups seek to control the oil infrastructure and resources and the Nigerian state repeatedly responds with excessive repression and military force.

Research published in 2011 by a coalition of organisations including Friends of the Earth Nigeria found that Shell had fuelled human rights abuses in Nigeria.[61] The report, Counting the Cost, tells how routine payments by Shell to armed militants exacerbated conflicts, in one case leading to the destruction of Rumuekpe town where it is estimated that at least 60 people were killed. It also asserts that Shell continues to rely on Nigerian government forces who have perpetrated systematic human rights abuses against local residents, including unlawful killings, torture and cruel, inhumane and degrading treatment.

Friends of the Earth Nigeria, supported by allies in the UK and the Netherlands, has been campaigning for decades for justice for the affected communities in the Delta and for Shell and the other oil companies to clean up the pollution that their oil operations have caused. In a partial victory, a Dutch court ruled in January 2013 that Shell's subsidiary is accountable for damage caused by oil spills at Ikot Ada Udo, Akwa Ibom State, Nigeria.[62]

FOR MORE INFORMATION see FoE Nigeria: **www.eraction.org**

GAS

Reserves of gas – another fossil fuel – are, like reserves of oil, distributed unevenly around the globe. Currently most gas burned for fuel is 'natural gas', a mixture mostly of methane which flows freely deep in underground rock. However, global gas markets have changed significantly over recent years, with major growth in the extraction of 'unconventional gas', especially onshore coal bed methane and shale gas. Extraction of conventional natural gas requires just the drilling of a well, but a controversial technique called hydraulic fracturing or 'fracking' is often used to exploit unconventional sources of gas such as shale gas and coal bed methane. Fracking is done by pumping millions of gallons of water mixed with what are often toxic chemicals into the ground at extremely high pressure, which helps the gas to flow more freely. About half of the water comes back to the surface and has to be treated. The other half stays underground where its movement cannot be controlled and it risks polluting groundwater serving communities, ecosystems and agriculture.

So far, most of the growth in unconventional gas has been in the US, which is now set to overtake Russia as the world's primary gas producer within the next 10 years, according to the IEA. Most of the world's coal bed methane reserves are located in Canada, Russia, China the US and Australia.[63] Other countries looking into potential shale gas extraction include Argentina, South Africa, Tunisia, China and a number of countries in Europe.[64]

The term natural gas is highly misleading, as it implies a clean energy source. In reality, while gas produces significantly less emissions than coal or oil, its combustion as a fuel source still produces carbon dioxide and is therefore a major problem from a climate change perspective. In the US, the average emissions rate from natural gas-fired generation is 1,135 lbs of CO_2/MWh[65] – about half the carbon dioxide compared to coal-fired electricity generation but still significant. Natural gas was responsible for 20.4 per cent of fuel's share of total CO_2 emissions in 2010.[66]

Energy companies are also misleadingly promoting 'unconventional gas' as natural gas and therefore as a lower carbon alternative to conventional fossil fuels. However, unconventional gas extraction is considerably more energy intensive than conventional, with an added risk of the leakage of methane – a highly potent greenhouse gas. Using a very conservative estimate of well-to-burner emissions from unconventional gas, the IEA's 'Golden Age of Gas' scenario puts global emissions on a trajectory for 3.5 degrees of warming,[67] and research from the USA indicates that gas obtained through fracking could have a bigger total greenhouse gas footprint than coal.[68] Like new coal and new nuclear power, investment in unconventional gas is a serious distraction from badly needed investment in renewable energy and reducing energy dependence.

Apart from the climate impacts of increasing reliance on gas as a fuel, gas extraction is the source of serious environmental and social conflicts around the world. Construction projects associated with gas pipelines and infrastructure drive land grabbing and threaten water resources and biodiversity in many places. Furthermore, there are significant risks of water contamination and air pollution from fracking and coal bed methane extraction. Extracting shale gas always involves fracking, while coal bed methane extraction does not – at least not in the early years of operation, although as gas flow starts to decline wells are often fracked to increase productivity. However, there are serious environmental problems associated with coal bed methane extraction, regardless of whether fracking takes place or not. The chemicals used can be just as toxic, and the same risks of spillages, leakages and mobilisation of naturally occurring chemicals and radioactive substances apply. In fact, because coal bed methane is often significantly nearer the surface than shale gas, certain risks such as groundwater contamination are increased.

Researchers in the USA looking at the impacts of gas drilling on human and animal health have warned that the gas boom is an uncontrolled health experiment on an enormous scale.[69] Many fracking chemicals are known to be toxic and an assessment of 353 chemicals used in fracking in the US found that a quarter could cause cancer and up to half could affect the nervous and immune systems.[70] Another US report lists more than 1,000 fracking-related spills of diesel, oil, chemicals and waste water in Colorado alone in the two years to September 2011.[71] Spillages and leakages of drilling and fracking fluids have led to death and reproductive problems in livestock and the contamination of agricultural land. In one instance, 17 cows died within one hour of the release of fracking fluid from a drilling rig in an adjacent pasture.[72] BTEX chemicals – naturally occurring in coal seams and shale and released by the drilling process – are notorious soil contaminants.

In terms of air pollution, monitoring of air quality near fracking sites in western Colorado found over 50 hazardous pollutants known as non-methane hydrocarbons near shale gas wells. Of these, 35 could affect the brain and nervous system. Some were found at levels which could potentially harm children exposed before birth.[73] Emissions from shale gas wells can also cause photochemical smog associated with asthma.[74] On the basis of this and other evidence, a report for the European Commission assessed fracking as having a high risk of causing problems for the local environment and human health.[75] Scientists are also finding links between increased seismic activity and hydraulic fracturing processes.

Finally, the processing and transportation of gas – both conventional and unconventional – has significant environmental and social impacts. In order to be transported, natural gas has to be turned into liquefied natural gas (LNG) via a super-cooling method which reduces its volume 600 times, turning it into a liquid that can then be transported via insulated tankers. Relying on gas as a fuel therefore requires the construction and maintenance of a vast network of pipelines, liquefaction and regasification plants and the use of energy to fuel the tankers which transport it. All of which bring additional problems in terms of local environmental and social impacts from construction, chemical disposal and so on.

BOX 04 THE STRUGGLE AGAINST FRACKING IN THE UK

Rising energy costs combined with austerity and declining real incomes means that a growing proportion of ordinary British households are struggling to afford energy bills for heating, cooking and hot water. Britain's coalition government is using issues of energy affordability, and propaganda about the possibility of power cuts because of insecure energy supplies from overseas, as justification for plans to build a huge number of new gas-fired power stations and to fuel this 'dash for gas' by exploiting the UK's supposedly vast deposits of shale gas. An official study of the Bowland Shale in Northern England, the UK's most geologically-promising area for shale gas, increased estimates of resources to over 37 trillion cubic metres.[76]

Cuadrilla drilling site, Balcombe, West Sussex, UK, 2013.
© FoE EWNI

Protest signs at the camp in Balcombe, West Sussex, against oil exploration by Cuadrilla, 7 August 2013. Campaigners fear the test drilling could lead to fracking. Friends of the Earth EWNI visisted local residents on 7 August, with legal and media experts and thousands of messages of support.
© FoE EWNI

The UK government is claiming that shale gas will cut energy bills. However, these claims are rejected by a number of experts, including renowned climate economist Lord Nicholas Stern who dismissed the government's claims as "baseless economics".[77]

Strong links exist between the UK fracking industry and the government. Lord John Browne, former CEO of British Petroleum (BP) and now chairman of shale gas drilling company Cuadrilla, is a Non-Executive Director of the Cabinet Office in the heart of government,[78] and Lord David Howell, president of oil and gas lobbyists the British Institute for Energy Economics, is father-in-law of the Chancellor of the Exchequer (the Head of the UK Treasury), George Osborne, and a former advisor on energy to Foreign Secretary, William Hague.[79] The government's determination to encourage fracking has included proposing tax breaks that the industry says it doesn't need, such as cutting the tax on income generated from shale gas from 62 per cent to 30 per cent, making these the world's most generous incentives for shale gas.[80]

Community opposition is springing up wherever fracking is proposed. The biggest protests around shale gas prospecting have taken place in Balcombe, 50km south of London, in one of the most prosperous areas of the UK. Local people, supported by campaigners from all over the country, blocked access to the drilling site by drilling company Cuadrilla for weeks until the police finally removed them, with dozens arrested.

Other hotspots of local opposition include Lancashire in north-west England (where Cuadrilla's test fracking in 2011 triggered earthquakes), south Wales, Fermanagh on the border between Northern Ireland and the Irish Republic, and Airth in central Scotland, the site of a huge proposal for coal bed methane extraction from Australian drillers Dart Energy. The number of communities threatened could grow next year, when the government plans to open up most of the rest of England and large areas of Wales and Scotland for licensing which would allow fracking.

Local communities are understandably highly concerned by threats to their local environment and their health, from water contamination, air pollution and increased traffic and noise. There is also growing understanding of the connections between local struggles and broader energy and climate change arguments. One community group in Lancashire has started working with local schools to get solar panels put on school roofs.

Friends of the Earth England, Wales & Northern Ireland and Friends of the Earth Scotland are supporting local community groups and climate campaigners and activists, providing technical expertise (land-use planning law and industry regulation) and campaigning advice and training. Together, the growing UK anti-fracking movement has succeeded in slowing the development of the industry in the UK. Despite the government lifting a moratorium on fracking in December 2012, no further test fracking has taken place.

FOR MORE INFORMATION see FoE EWNI: **www.foe.co.uk**

NUCLEAR

Nuclear power is a highly dangerous, high-cost energy source which poses the threat of nuclear proliferation and a severe risk to human life and the environment. Its potential as a major source of destruction has been clearly and repeatedly demonstrated. While the terrible disasters at Three Mile Island in the US (1979), the Chernobyl nuclear power plant in Ukraine (1986) and the triple meltdown at the Fukushima Daiichi plant in Japan in 2011 are perhaps the best known, the nuclear industry has been plagued by many more incidents, accidents and near-misses.[81]

The events that led to the Fukushima accident were previously considered impossible, thus demonstrating the severe inadequacy of the current safety regimes applied to nuclear power. Furthermore, the ageing of existing nuclear reactors poses major safety risks,[82] which look set to be exacerbated by climate change, as many nuclear power stations are located on coastal sites and are highly vulnerable to the impacts of sea-level rise.[83] Even the normal everyday operation of nuclear power plants is highly destructive. Nuclear power generation involves the constant release of low-level radiation into the environment via water used for cooling. The mining of uranium to fuel nuclear power also brings about severe environmental and social impacts. Production of around 25 tonnes of uranium fuel requires the extraction of half a million tonnes of waste rock and the production of over 100,000 tonnes of mill tailings which themselves remain radioactive for hundreds of thousands of years.[84] Contamination of local water supplies around uranium mines and processing plants has been documented in Brazil, Colorado, Texas, Australia, Namibia and many other sites.[85]

The risks to human health of exposure to radiation, such as during accidents at nuclear power plants or from exposure to radioactive nuclear waste include nausea, weakness, hair loss, skin burns, diminished organ function, cancer and genetic mutations in unborn children that can lead to physical and mental abnormalities.[86] Excessive radiation exposure results in death.[87] It is estimated that the Chernobyl nuclear accident was responsible for at least 4,000 fatalities: 56 direct deaths and approximately 4,000 extra cancer deaths.[88]

Disposal of the thousands of tonnes of radioactive waste produced by nuclear power also presents an enormous problem. High-level waste and spent fuel rods are a toxic and radioactive legacy for humankind without any solution: nuclear waste needs to be stored safely for 1 million years, until radioactivity is reduced to the level of natural uranium.[89] After 60 years of commercial use the so-called 'solution' to the problem of nuclear waste – deep geological repositories – does not exist anywhere in the world. According to a new study by the International Panel on Fissile Materials, there also remain major outstanding uncertainties.[90] Spent fuel rods need to be kept in containers of some material not yet devised which is able to handle the heat from radioactive decay, corrosion and the effects of radioactivity, while keeping water out at the same time. Earthquakes or active fault lines, water seepage and other changes in the geological environment pose the threat of leakage of this radioactive material into groundwater, rivers and the environment.

Finally, there are major human security risks of radioactive material generated by nuclear power being used in warfare, and the global proliferation of these materials. Some of the by-products of nuclear power such as plutonium can be used in the production of nuclear weapons; and all of the waste can be used in the production of 'dirty bombs' which involve radioactive material and conventional explosives.

A number of countries have already decided to either phase out or avoid nuclear power. Most recently, Germany took the decision post-Fukushima to close all of its nuclear plants by 2022. Japan is currently in a de facto phase-out and it is not unlikely that its almost 50 reactors will never operate again. However, many countries around the world are still clinging to their aging plants, making lifetime extension the only way of maintaining nuclear capacity.

New nuclear power plants encounter severe investment problems, so can only be built with state aid. There are currently only four new reactors under construction in Europe and all of them were supposed to be generating electricity by now. The Olkiluoto scheme in Finland is likely to open seven years late and cost nearly three times the original promised price. The Flamanville reactor in France is likely to open four years late and cost €8bn, more than twice the original price. Two reactors at Mochovce in Slovakia began and then stopped construction in 1987, restarting in 2009 but now running two years late and nearly 40 per cent over even the new price estimate.[91]

Despite the plethora of major risks and problems associated with nuclear power and widespread evidence of its destructive potential, the nuclear industry is now seeking to expand by promoting itself as a 'low-carbon', renewable energy source. Such claims are highly inaccurate. Nuclear power currently has a lower carbon footprint than current solar PV technologies, but higher than on-shore wind and hydro. However, if nuclear reactor numbers increased significantly this carbon footprint would rise dramatically as high-grade uranium resources will run out and the nuclear industry will increasingly rely on low-grade uranium.[92] Furthermore, these calculations do not take into account the many energy-intensive activities associated with the nuclear supply chain, for example the storage of tonnes of radioactive waste for hundreds of thousands of years.

The emissions created by nuclear power across its whole supply chain, combined with the time it takes for new nuclear capacity to come online, the significant up-front costs and the history of major delays in nuclear new-build projects, mean that even in the extremely unlikely event that all of the above impacts and risks could be mitigated, nuclear energy could never play a significant part in reducing carbon emissions in the tiny window we have to do so, before critical climate tipping points are reached.

BOX 05 THE FUKUSHIMA NUCLEAR DISASTER IN JAPAN

On 11 March, 2011, an earthquake hit the Pacific coast of Japan. The earthquake, known as the Great East Japan earthquake, was the most powerful known to have hit Japan. It triggered a powerful tsunami, and together the earthquake and tsunami killed over 15,000 people. The tsunami restricted the electricity supply to several reactors in the Fukushima Daiichi nuclear power plant, causing the reactors to stop functioning. This triggered the meltdown of nuclear fuel rods, explosions in the overheating reactors, and leakage of a huge amount of nuclear radiation. The nuclear disaster was rated as 7 – the most severe level of nuclear accident – on the International Nuclear and Radiological Event Scale.

Anti-nuke rally co-organised by Friends of the Earth Japan, May 2012.
© FoE Japan

Anti nuclear power protests in Kouenji, Japan.
© Matthias Lambrecht

The Fukushima Daiichi nuclear power plant, launched in 1971, had been in operation for around 40 years and had already deteriorated significantly with age. Before the tsunami, the Tokyo Electric Power Company (TEPCO) had postponed planned seismic strengthening works for the plant, despite the possibility of disaster in the case of earthquake having been pointed out. In any case, the magnitude of the Great East Japan earthquake was beyond the worst case assumptions of any seismic-resistant design. Considering these points, the Fukushima nuclear disaster can be understood as a man-made calamity. A large part of the responsibility lies with the government, which has both power over regulation and promotion of nuclear policy.

After the event, residents in the area surrounding the Fukushima power plant were provided with inadequate evacuation instructions and information about the nuclear accident. The division of responsibilities between the government, TEPCO and Japan's prime minister was unclear and as a result the emergency response was not properly organised. Their evacuation plan and training was found to be useless, and SPEEDI, the network system which was supposed to monitor the scale of the emergency by predicting the spreading of radiation, did not function well.

Radioactive substances released from the nuclear power reactor have been spread across a very wide area. 160,000 residents of the Fukushima prefecture have been evacuated and most of them still live in temporary refugee accommodation with inadequate services for elderly and disabled people. The government has now defined some areas within 20 km of the Fukushima nuclear power plant as no longer residential. However, there are high levels of pollution outside these defined areas, and disparities between the affected people inside and outside these areas in terms of compensation and support.

Tens of trillions of yen have already been spent on the removal of radioactive contamination with only limited success, and it is understood that the clean-up activities will have to continue for at least several decades. It is impossible to restore polluted nature back to its state prior to the nuclear accident. The clean-up operations also mean serious radioactive exposure for workers, and meanwhile 400 tons of water contaminated by radiation is dumped into the sea every day. Two years after the nuclear accident, the Fukushima situation looks set to get even worse before it gets better.

Friends of the Earth Japan undertook extensive advocacy work in the wake of Fukushima, organising public meetings and press conferences to build national awareness of the scale of the disaster; campaigning for stronger government guidelines on radiation levels for evacuation; working with communities to ensure their right to be evacuated and assistance for evacuees and local communities remaining close to Fukushima; and exposing the government's trillion-yen bailout scheme for TEPCO – the company responsible for the disaster.

Friends of the Earth Japan also hosts the 'e-shift' network – a network of organisations and individuals established in the wake of the disaster, which aims to facilitate a nuclear power phase-out and promote renewable energy policies to make Japanese society more ecological and sustainable.

e-shift has now launched a new public campaign, Nuclear Zeronomics, that debunks the myth of nuclear as cheap and safe energy.

FOR MORE INFORMATION see FoE Japan: **www.foejapan.org**

MEGA DAMS

While sometimes presented as sustainable energy sources, large-scale hydroelectric dam projects (so called 'mega dams') are highly destructive and not compatible with tackling climate change. The dam industry has choked more than half of the world's major rivers with around 50,000 large dams, many of which are hydro-electric projects. The consequences of this massive engineering programme have been devastating: wiping out species; flooding huge areas of wetlands, forests and farmlands; displacing tens of millions of people and destroying their livelihoods, often with little or no compensation or reparations; and leaving the planet's freshwaters in far worse shape than any other major ecosystem type, including tropical rainforests.[93] Furthermore, plans for the construction of many new mega dams are underway in many parts of the world.

Dams are the largest single anthropogenic source of methane, mainly from the rotting vegetation that dams collect. They are responsible for around 23 per cent of all methane emissions due to human activities, and 4-5 per cent of all human-caused warming.[94] Methane is a much more potent heat-trapping gas than carbon dioxide, although it does not last as long in the atmosphere. Mega dams also disrupt water and sediment flow which reduces biodiversity and blocks fish migration. Dams and river diversions are the main reason why one third of the world's freshwater fish species are extinct, endangered or vulnerable. Many shellfish, amphibians, plant and bird species that depend on freshwater habitats are also extinct or at risk.[95]

The construction of mega dams is associated with the forced displacement of communities and devastating social impacts. In 2000 the World Commission on Dams concluded that between 40 and 80 million people worldwide had been physically displaced by dams.[96] People displaced by dams lose their land and livelihoods and are frequently forced onto resettlement sites where they are often not provided with basic services like water, food or sanitation. Compensation is rarely provided, or is often inadequate, with communities forced to break up and displaced families facing poverty and destitution as migrant labourers or slum dwellers.

As with other destructive energy sources, the construction of dams and the removal of affected communities is often accompanied by significant repression and violence.

One of the worst human rights atrocities associated with dams occurred in Guatemala in the 1980s when more than 440 Maya Achí Indigenous People, mainly women and children, were murdered by paramilitaries because they refused to leave their ancestral lands for the World Bank-funded Chixoy Dam. Survivors of the massacre are still fighting for reparations for their suffering.[97]

Changes in river flow resulting from dam construction also impact negatively on the lives of millions of people living downstream from dams, leading to declines in fisheries, poor water quality and disruption of the annual floods essential for the irrigation of agricultural land, thus threatening local, regional and national food security.

The Mozambican territory that will be flooded when the construction of the proposed Mphnada Nkuwa dam begins.
© FoE Mozambique / Ja!

Despite all of these negative impacts, mega dams are considered a solution to the climate crisis by the UN, and their construction is encouraged by the UN's 'Clean Development Mechanism' (CDM). A carbon trading and offsetting mechanism and false solution to the climate crisis, the CDM allows highly polluting, industrialised countries to avoid reducing their greenhouse gas emissions by paying developing countries to invest in energy sources that supposedly reduce their emissions, but in reality lock them in to destructive energy sources and create perverse incentives to create more emissions.

BOX 06 THE HIDROITUANGO MEGA DAM IN COLOMBIA

Thousands of people are resisting the construction of the Hidroituango mega dam in Antioquia in the northwest of Colombia, which aims to generate an additional 2,400MW of energy for export to other Latin American countries and for domestic consumption by extractive industries in Colombia. If it goes ahead, the project will cause irreversible damage to the Bosque Seco Tropical in the north of Antioquia, a biodiverse-rich old growth forest area. It will also displace the communities of small-scale farmers, fisherpeople and traditional artisanal gold miners who inhabit the 3,800 hectares of land set to be flooded and the additional 24,000 hectares of surrounding land that is being established as a 'conservation' area around the reservoir.

The project is currently jointly owned by the local government authority of Antioquia and construction company Empresas Públicas de Medellín (Grupo EPM), based in Medellín, Antioquia, Colombia, which has the majority share in the project. There are plans to issue market bonds shortly which could open up the project to international investors in its subsequent phases.

The project is already giving rise to major social and environmental conflicts. Overall, the project will affect 12 municipalities in the north and west of the department of Antioquia. Local people have already suffered significantly from several displacements and massacres as a result of the armed conflict in the area involving guerrilla, paramilitary and state security forces that has been ongoing since the 1990s.

In Antioquia, Colombia, farmers were displaced by the Hidroituango hydroelectric project. Many of them are now living on the campus of the University of Antioquia.
© CENSAT Aqua Viva (FoE Colombia)

Despite the major impacts it will have on their land and livelihoods, local people have been provided with very little information or say in decision-making about the Hidroituango project.

The project developers have also failed to recognise the rights of the artisanal miners who come from traditional communities in the region and whose mining practices involve the small-scale extraction of gold from the Bajo Cauca river without any use of artificial chemicals or industrial processes. Small-scale mining has already been prohibited in many places in the reservoir site, and once the reservoir is flooded these mining communities, along with the small-scale peasant farmers and fisher people – who also derive their traditional livelihoods from the area's natural resources and contribute to the sustainable management of those resources – will all permanently lose access to their homes and livelihoods.

In 2013, more than 250 local people took part in a seven-month long peaceful mobilisation, aiming to establish dialogue between the local government and EPM to secure recognition of the basic rights of communities living in the affected area. These efforts were unsuccessful, and the displacement of communities by the police without compensation or consultation has already begun, resulting in their jobs lost, their way of life jeopardised, and many of their "cambuches" (artisanal houses by the river) burnt down.

Community members have also suffered harassment and detentions by the state police force in response to their peaceful protests against the construction of the mega dam. 12 people arrested on 16 March 2013 and charged with obstruction of public roads were released after a judge in Santa Rosa de Osos, Antioquia declared that the detentions were illegal.

The affected communities are demanding the establishment of a high level commission involving representatives from the national government and human rights organisations to report on the human rights situation in the north and west of Antioquia. Friends of the Earth Colombia is working as part of Movimiento Ríos Vivos Antioquia, the local branch of the national Colombian movement for the defence of the territory and people affected by dams, to help affected communities secure the establishment of the commission and recognition of their social, economic and environmental rights.

The community members are now facing serious threats to their individual and collective safety. On 17 September 2013 community leader Nelson Giraldo Posada was killed. Another community leader, Genaro Graciano, his family and neighbours were injured in an explosives attack on his home. The Rios Vivos Antioquia movement believes that the attacks are connected to the community leaders' activism against the mega dam. The movement, and international organisations like CIDH (the Interamerican Commission of Human Rights), have called upon the Colombian government and the Governor of Antioquia to identify those responsible for the attacks and their motives and to guarantee the safety of the other community members set to be affected by the dam.

FOR MORE INFORMATION see FoE Colombia, Censat Aqua Viva: **www.censat.org**

INDUSTRIAL AGROFUELS AND BIOMASS

Unlike traditional biofuels, such as dung and firewood that are usually locally sourced and used for heating and cooking, agrofuels are derived from large-scale industrial plantation agriculture and are blended with petrol and diesel primarily for use in motor vehicles. There are two types of agrofuel – bioethanol and biodiesel. Bioethanol is made from starch plants (e.g. maize, wheat and cassava) and sugar plants (e.g. sugar beet and sugar cane). Biodiesel can be made from palm oil, jatropha nut oil, coconut oil, soybean oil, and other vegetable oils.[98]

A big increase in global agrofuel production is taking place in order to feed the growing demand for road and air transport fuel. In many places, demand for agrofuels is also being further stimulated by government interventions such as subsidies and targets. For example, the United States and the European Union have both enacted legislation requiring an increased share of liquid energy for transportation to be obtained from agrofuels. This projected demand is driving large-scale investment by private investors to acquire land throughout the global South for plantations to supply the agrofuels feedstocks.[99]

The expansion of industrial agrofuels plantations is driving land grabbing across Africa, Asia and Latin America. Land grabbing occurs when land that was previously used by local communities is leased or sold to outside investors, including corporations and governments.[100] Agrofuels are estimated to account for about 66 per cent of land grabs in Africa,[101] and up to 44 per cent globally.[102] Such land acquisitions often result from investments by foreign private investors, although sometimes from national private interests. They frequently end up in violent forced evictions of small-scale farmers, the enclosure of local water supplies, and increased malnutrition and hunger as local farmers are deprived of land on which to grow food for themselves and local markets.[103]

Increased demand for agrofuels leads to deforestation and the clearing of land such as peatland and native grasslands, thereby removing important global carbon sinks. According to a report by the Oakland Institute, conversion of rainforests and native grasslands into fields to produce agrofuel crops will release 17 to 420 times more CO_2 than the amount of greenhouse gas emissions that would be avoided, following the replacement of fossil fuels with agrofuels.[104] The negative effects on biodiversity of industrial agrofuel plantations, also known as 'green deserts', are well documented. One 2008 study found that the conversion of primary rainforest to oil palm plantation resulted in the loss of more than 80 per cent of species.[105]

Working conditions on agrofuels plantations are generally extremely poor, with frequent labour rights abuses and conditions sometimes akin to slavery.[106] Furthermore, industrial agrofuels production very often competes with food production and drives up food prices. According to the UN's High Level Panel of Experts on Food Security and Nutrition: "When crops are used for biofuels, the first direct impact is to reduce food and feed availability. This induces an increase in prices and a reduction of food demand by the poor". They also argue that "all crops compete for the same land or water, labour, capital, inputs and investment and there are no current magic non-food crops that can ensure more harmonious biofuel production on marginal lands. Therefore, non-food/feedcrops should be assessed with the same rigour as food/feedcrops for their direct and indirect food security impacts".[107] In other words, second generation or so called 'advanced biofuels' – derived from industrial biomass, woody crops, agricultural residues or waste – are as threatening to food security as first generation agrofuels, as they will also compete with land and water for food production.

Many of the problems associated with industrial agrofuels production are also associated with the industrial production of biomass for energy. Industrial biomass tends to come from large-scale, intensively-managed monoculture plantations, mostly of fast-growing trees, known as industrial tree plantations (ITPs). The expansion of ITPs for biomass for energy is taking place mostly in the global South. According to the UN Food and Agricultural Organisation, the area of 'planted forest' in the South increased by more than 50 per cent between 1990 and 2010, from 95 million to 153 million hectares.[108]

Industrial biomass can be worse than coal for the climate. A recent study shows that the use of whole trees in large-scale power generation from wood increases greenhouse gas emissions by at least 49 per cent compared to using coal over 40 years.[109] The increased use of forestry residues from managed forests will also have a negative impact on the climate, as it depletes organic matter from the forest floor and the soil underneath the forest and therefore reduces the biosphere's carbon stock.[110]

The IEA predicts that consumption of biomass and agrofuels for power generation will grow four-fold by 2035.[111]

Jatropha farmer Bittal Tarak of Sunderkera village, Raipur district, India.
© Alok Shukla

Palm oil plantation.
© Dreamstime

BOX 07 OIL PALM PLANTATIONS IN LIBERIA

Expansion of palm oil production in Liberia by Malaysia-based industrial conglomerate Sime Darby is rapidly swallowing up farmlands and forests used by local communities to sustain their livelihoods. Sime Darby Plantation, the agri-business division of the Sime Darby Group, is one of the world's largest palm oil producers, with an annual output of 6 per cent of the world's crude palm oil output – 2.4 million tons. On July 23, 2009 Sime Darby signed a 63-year lease agreement with the government of Liberia, for 311,187 hectares of land. The government agreed to allocate the land 'free of encumbrances' to Sime Darby, with the understanding that the company would cultivate 220,000 hectares within twenty years of signing the agreement, and that it would pay US$5 per hectare per year for land it cultivates for oil palm.

Communities from Grand Cape Mount walk into the plantation with communities from Gbarpolu County, which had 51 percent of its land mass allocated to the Sime Darby concession. Grand Cape Mount County, 2012.
© Sustainable Development Institute (FoE Liberia)

Communties from Gbarpolu County discuss amongst themselves how they feel about oil palm plantations in an affected community conference held in Bopolu City in November 2012.
© Sustainable Development Institute (FoE Liberia)

Palm oil is a flex commodity, which means it can have multiple end uses once the crops reach global markets, including food and agrofuel production. While it is not possible to say what the end use of Sime Darby's Liberian palm oil will be, it is likely to be used for both food and agrofuels.

Sime Darby started operations in western Liberia in 2010 and since then has expanded into new areas of Liberia. There has been strong opposition from local communities to Sime Darby plantations in some places. A 2012 report by Friends of the Earth Liberia found significant negative impacts from oil palm plantation expansion on communities in the Garwula District. Farms and farmlands providing livelihoods and food for the local communities were swallowed up by the Sime Darby plantation, with very few alternative livelihoods available to those not in the company workforce. No compensation was paid to families for land taken over by the company, and forest areas used for various cultural practices were destroyed and planted with oil palm in 2011.

An independent Environmental and Social Impact Assessment (ESIA) of 20,000 ha of land targeted for clearance in another area – Bopolu District, Gbarpolu County - by the University of Reading found the risk of similar impacts there. According to the ESIA, Sime Darby operations could lead to a loss of biodiversity, particularly in the Upper Guinean Forest Ecosystem, which includes globally endangered and vulnerable bird species. Other likely impacts include land clearance of substantial areas of closed forest (more than 40 per cent tree cover), loss of livelihoods, increased food insecurity, the potential for chronic poverty, and increased risk of conflict and rural-to-urban migration.

The contracts for land concessions signed by Sime Darby and the Liberian government violate several Liberian laws and regulations, as exposed by a government agency report released in June 2013. They also violate several human rights principles in conventions ratified by the Liberian government as well as principles enshrined in Liberian law. In November 2012, communities from concession areas wrote an open declaration stating that they had not been consulted before their lands were taken and reaffirming their status as owners of the land.

While Sime Darby committed itself to conducting free, prior and informed consent (FPIC) negotiations in early 2103, it only did so after extensive civil society pressure. In at least one instance, despite local communities' customary ownership of land that was part of an old concession area, Sime Darby attempted to bypass an FPIC process with them. Affected communities and civil society have organised to demand from the company and the Liberian government that communities' rights are recognised and the contract between Sime Darby and the government is renegotiated to ensure that it is compliant with these human rights principles and laws.

FOR MORE INFORMATION see Sime Darby and land grabs in Liberia, Friends of the Earth International factsheet (2013): **www.foei.org/simedarby**

WASTE-TO-ENERGY INCINERATION

Incineration is a waste treatment technology that involves burning commercial, residential and hazardous waste, including paper, plastics, metals and food scraps. Heat is one of the by-products of the incineration process, along with ash, gases, air pollutants, waste water, and waste water-treatment sludge. The incinerator industry is trying to push 'Waste to Energy' as a low-cost and 'renewable' energy source.

The highly destructive impacts of waste-to-energy incineration and the misleading claims about its supposed low cost and potential as a renewable energy source have been well documented by the Global Anti-Incineration Alliance (GAIA). Municipal waste is itself largely non-renewable, consisting of materials such as paper, plastic and glass that are derived from finite natural resources such as forests that are being depleted at unsustainable rates. According to GAIA, burning these materials in order to generate electricity creates a demand for 'waste' and discourages much-needed efforts to conserve resources, reduce packaging and waste, and encourage recycling and composting.[112] More than 90 per cent of materials currently disposed of in incinerators and landfill can be reused, recycled or composted.[113]

Waste-to-energy incineration is also high in greenhouse gas emissions. Waste-to-energy incinerators and landfill contribute far higher levels of greenhouse gas emissions and overall energy throughout their lifecycles than source reduction, reuse and recycling of the same materials. According to the US Environmental Protection Agency (EPA), incinerators emit more carbon dioxide per unit of electricity (2988 lbs/MWh) than coal-fired power plants (2249 lbs/MWh).[114] Furthermore, incineration also exacerbates climate change by encouraging new, energy-intensive resource extraction and processing rather than the reusing and recycling of resources. Zero waste practices such as recycling and composting conserve three to five times the amount of energy that waste incineration produces.[115]

Waste-to-energy incineration poses significant environmental and health risks to incinerator workers, neighbouring communities and the general population. Even the most technologically advanced incinerators release thousands of toxic pollutants, including mercury and ultra-fine particles.[116]

In Montevideo, the capital of Uruguay, there are more than 6,000 people who make a living by collecting and sorting garbage for recycling.
© Cecilia Arregui

Waste-to-energy incineration is a very expensive and economically-inefficient source of energy. Incinerators require large amounts of material inputs in the form of waste in order to generate small amounts of energy because of the low calorific value of waste.[117] Yet despite this clear economic case against waste to energy, governments around the world are spending billions of dollars of taxpayers' money subsidising the construction and operation of incinerators.

BOX 08 WASTE-TO-ENERGY INCINERATORS IN URUGUAY

Uruguay has significant problems relating to the management of industrial, commercial and domestic waste. In the capital Montevideo alone, 1,500 tons of solid waste are collected every day. Rather than tackling the root causes of this waste problem and putting in place processes to reduce the amount of waste generated and increase the recovery and recycling of materials, the Uruguayan government proposes to address its waste problem and provide energy through the construction of new waste-to-energy incineration plants.

In Montevideo, the capital of Uruguay, there are more than 6,000 people who make a living by collecting and sorting garbage for recycling.
© Cecilia Arregui

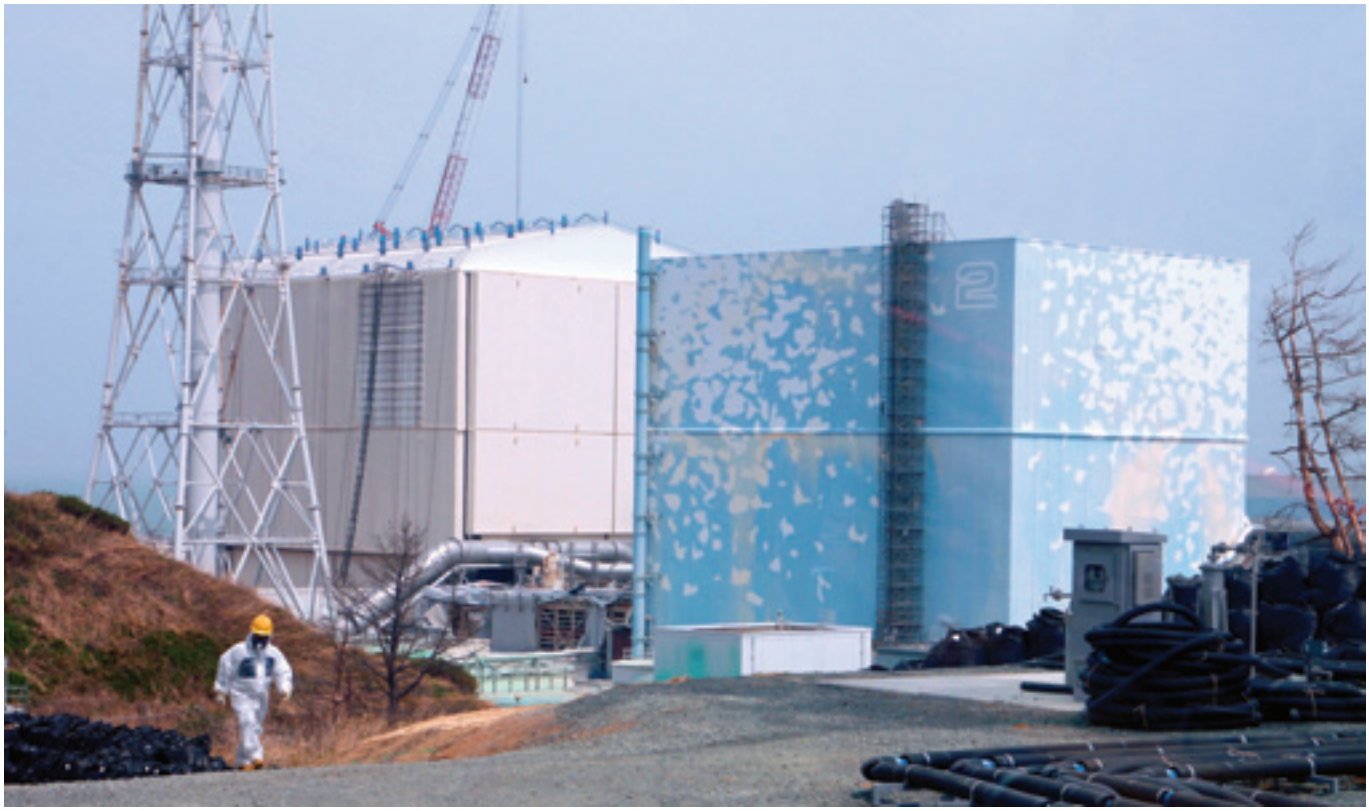
53 corporations have expressed an interest in building industrial plant for final waste disposal and electricity generation from biogas, and the President of the Republic and the Planning and Budget Office, in agreement with the Conference of Mayors (local governors) has begun a process of evaluation. Italian corporations have been most active in lobbying the government for contracts for plant construction.

However, the nationwide waste-to-energy programme is currently stalled and technical studies conducted by Uruguayan ecologist organisations and the workers' central union PIT-CNT have concluded the project is economically unviable. The studies indicate the plants will fail to produce a high volume of electricity. For the whole metropolitan area they estimate production of only 80MW as Uruguay's humid weather would necessitate that the plants use additional fossil fuels to burn the waste. This would significantly increase costs, thus rendering the project unviable.

Friend of the Earth Uruguay estimates that an incinerator burning 200,000 tons of waste annually would produce 6,000 tons of fly ash (highly toxic waste), which would need storage in special toxic treatment containers to prevent it from polluting local land and water supplies. The incinerator would also produce 60,000 tons of slag. As well as risking toxic air and water pollution in Montevideo (population 2 million people), waste-to-energy incineration would destroy the livelihoods of the 6,000 families of waste classifiers who live on waste collection and recycling in the capital.

Friends of the Earth Uruguay is working with other environmental organisations, PIT-CNT and the Union of Classifiers of Urban Solid Waste to resist the project, in coordination with GAIA and Taller Ecologista de Rosario (Argentina). Friends of the Earth Uruguay is campaigning for a Zero Waste policy based on a decentralised and socially-inclusive waste management system that recovers recyclable material. There are already successful initiatives implemented in small cities that could be applied nationwide. The lack of such a policy opens the door for incineration projects.

FOR MORE INFORMATION see FoE Uruguay, REDES: **www.redes.org.uy**



Units 1 and 2 tower above a worker at TEPCO's Fukushima Daiichi Nuclear Power Station. An IAEA expert team visited the site on 17 April 2013 as part of a mission to review Japan's plans to decommission the facility.

WHO BENEFITS, WHO PAYS?

06

One of the plaintiffs in a case brought against Shell in The Hague, Eric Dooh, at home in Goi village, Ogoniland, showing oil pollution due to the company's operation in the Niger delta.
© Marten van Dijl / Milieudefensie (FoE Netherlands)

The global energy system has clear winners and losers, with the destructive impacts of the energy sources examined in the previous chapter impacting disproportionately on some groups in society, while other groups reap significant benefits from the system in terms of profits, power and access to energy. Overall the vast majority of people are harmed, exploited or excluded by the system, while a small minority take all the benefits. The main winners and losers from the system are summarized below.

WHO **BENEFITS** THE MOST?

- **Dirty energy companies and their financiers and investors:** the owners, financiers, shareholders and senior executives of oil, gas and nuclear companies, coal mines, mega dams, waste-to-energy incineration plants, and industrial agrofuel and biomass plantations are the primary beneficiaries of harmful and destructive energy. These groups are comprised of a mix of private and state-owned multinational and national companies, private and institutional investors, and financial intermediaries such as banks, private equity funds and hedge funds.
- **Construction companies and their financiers and investors:** the owners, financiers, shareholders and senior executives of construction companies profit from the construction of dirty energy infrastructure like mega dams, gas and oil platforms and pipelines, and waste-to-energy incinerators.
- **Energy-intensive companies and their financiers and investors:** the owners, financiers, shareholders and senior executives of companies in energy-intensive industries such as chemicals, paper, ceramics, cement, iron, steel and aluminium benefit from the cheap energy made available to them from destructive energy sources and the increased profits they can generate from the products they produce as a result.
- **Governments and political elites of resource-rich countries:** governments often take a share of the revenues from destructive energy production via production-sharing agreements and taxation. These shares are often significant and a major source of corruption, although often much smaller than the proportion of revenues taken by private corporations and investors, with some exceptions such as Norway, Venezuela and Bolivia.
- **Western companies, financiers and investors:** despite much of the news propaganda asserting the increased role of Chinese state-owned companies in controlling natural resources in Africa, Asia and Latin America, it is still primarily Western companies, investors and financiers that benefit from the energy sector globally. For example, Western oil investments in Africa outstrip Chinese ventures by a factor of ten to one.[118]
- **National and private security firms:** these generate significant revenues from their role in establishing new destructive energy projects and infrastructure, especially where there is significant local and community resistance. These actors then benefit from their ongoing role in ensuring the security of energy infrastructure like gas and oil pipelines and platforms, nuclear power plants, and mega dams.
- **Wealthy consumers:** wealthy consumers in the global North and the global South are among the few who are able to benefit from the supply of energy to meet their household needs and fuel the lifestyle and recreational activities like international travel that the current energy system provides to those who can afford it. Many people reading this report probably fall into this bracket.

WHO **PAYS** THE BIGGEST PRICE?

- **People in the global South:** the vast majority of destructive and harmful energy projects and infrastructure is located outside of the advanced industrialised world, in resource-rich countries in Africa, Asia and Latin America. Much of the processing of dirty and harmful energy also happens in the global South, attracted by lower social and environmental standards and lower wages. As explored in chapter 4, the vast majority of people excluded from access to energy to meet their basic needs are also in the global South.
- **Women:** of the people affected by destructive and harmful energy, women suffer a disproportionate impact in multiple ways. Women's roles in the household division of labour are typically more dependent on common property resources like grazing lands, forests and water than those of men and they are impacted disproportionately by the removal of these common resources by destructive energy projects and infrastructure. In addition, energy exclusion has a disproportionate effect on women, especially in rural areas, as they are forced to spend large amounts of time and physical effort supplying fuel for their households.[119]
- **Indigenous peoples and rural communities:** much of the natural resource inputs for dirty and harmful energy are found in remote rural areas inhabited by Indigenous Peoples and rural communities in the global North and the global South who have often experienced significant historic exploitation and displacement. For example, in India the government estimates that 40 per cent of the people who have been displaced by dams are tribal peoples.[120] Very rarely do these people benefit from the energy produced in their territories as it is usually sold on to the global energy markets.
- **Ordinary workers in dirty energy industries:** while the various companies involved in the dirty energy system mentioned above provide some high skilled, well paid and dignified jobs, the vast majority of jobs connected to the global energy system are badly paid, unsafe, sometimes life threatening, insecure, and require workers to spend long periods away from their families and communities.
- **People in poverty:** people in poverty are the primary victims of energy exclusion and energy poverty because of their inability to pay the price of modern energy services. They also tend to suffer disproportionately from health problems resulting from toxic air and water pollution from harmful energy infrastructure because it is often located in areas and communities where people are impoverished and do not have the resources to be able to prevent dirty development in their communities.

THE **DRIVERS** AND LOGIC OF THE CURRENT ENERGY SYSTEM

07

Action of GLOBAL 2000 in front of a coal power plant in Austria, demanding one of the country's electricity companies to phase out coal.

ENERGY AND NEOCOLONIALISM, NEOLIBERALISM AND EXTRACTIVISM

The problems examined in previous chapters are not simply the consequences of the particular energy sources on which we currently rely. Instead, the extensive environmental and social impacts of our energy sources, energy exclusion, energy poverty, and energy waste all result from the wider system of political and economic structures, and relationships that determine how we produce and consume energy and who controls how this happens.

Our energy system cannot be understood without reference to the global political economy that drives and sustains it. The system is totally reliant on the continued extraction and exploitation of natural resources. This model, focused on "the exploitation of mineral, fossil or agrarian resources and their selling into the world market" with little or no consideration of environmental and social concerns, is known as extractivism.[121]

> **"EXTRACTIVISM IS AN ECONOMIC MODEL THAT HAS ITS ROOTS IN THE LARGE-SCALE EXPLOITATION AND EXPROPRIATION OF THE NATURAL RESOURCE WEALTH OF DEVELOPING COUNTRIES THAT BEGAN UNDER COLONIALISM."**

Extractivism is an economic model that has its roots in the large-scale exploitation and expropriation of the natural resource wealth of developing countries that began under colonialism. Even though colonialism ostensibly ended in the late twentieth century, corporations and elites of advanced industrialised countries still continue to be the main beneficiaries of continued extractivism in the global South. In the post-colonial era, the corporate and financial elites of wealthy industrialised countries continue to use their superior wealth and economic power to exert direct political pressure and control over countries in the global South. These elites push their governments to use their power and influence over global economic institutions like the World Trade Organisation, International Monetary Fund (IMF) and World Bank to ensure continued access to and control over cheap raw materials from the global South and the profit-making opportunities that result.

Extractivism is not, however, purely a feature of the countries of the global South. Companies and elites in advanced industrialised countries with energy wealth such as oil and gas also use their power to push for extraction of domestic energy resources, to the detriment of local communities and the environment.

Paint workshop "el territorio que queremos" with Wayuu indigenous children from the impact zone of coal mining in the south of La Guajira, Colombia.
© CENSAT Aqua Viva (FoE Colombia)

This model of relentless extraction of natural resources for the benefit of corporations, elites and wealthy consumers, primarily in the global North, has been driven and accelerated by the neoliberal political ideology which has dominated the economic policies of many governments around the world for the last three decades. Neoliberalism is a political approach which prioritises the profit-making activities of private enterprise above social and environmental concerns, and individual freedoms over collective, public goods. It emphasises corporate deregulation and the weakening of social and environmental protections; international 'free trade' for private enterprise unencumbered by national measures to protect national economies and foster domestic industries; the privatisation and sell-off of publicly-owned enterprises, services and infrastructure; and the shrinking of the welfare state and provision of public goods and services.

Together, the neocolonial political power relationships and neoliberal approach of many governments are driving the extractivism that is central to our current energy system and the widespread environmental destruction and injustice that it creates. Some of the ways in which these processes of extractivism are maintained and perpetuated, along with other key features of the destructive logic of the current energy system, are explored below.

> **"NEOLIBERALISM IS A POLITICAL APPROACH WHICH PRIORITISES THE PROFIT-MAKING ACTIVITIES OF PRIVATE ENTERPRISE ABOVE SOCIAL AND ENVIRONMENTAL CONCERNS, AND INDIVIDUAL FREEDOMS OVER COLLECTIVE, PUBLIC GOODS."**

PROFITS FROM ENERGY EXPLOITATION BACKED BY LAW

Multinational energy corporations and their state backers use profit-sharing agreements and government-to-government treaties to guarantee continued access to energy resources and the maximisation of profits from these resources. Multinational corporations involved in energy extraction, such as gas and coal, frequently go into legal partnership with the governments of fossil fuel rich-nations, signing Production Sharing Agreements (PSAs) which guarantee the companies a share in production and often provide special financial incentives which minimise the financial risks for the corporations involved.[122] PSAs – which are sometimes kept secret even from a country's parliament under the guise of 'commercial confidentiality' – divide the energy commodity share once all costs have been paid, and often work strongly in favour of the multinational corporation, with the government of the country involved receiving only a minor stake.[123]

PSAs are often part of, and backed up by, broader government-to-government treaties such as bilateral investment agreements, regional trade agreements such as NAFTA, or new treaties drawn up for specific energy projects such as that governing the Baku-Tblisi-Ceyhan pipeline.[124] These state-to-state agreements ensure that any dispute between multinational energy corporations and energy-producing countries are elevated above national law and contract law to international law.[125] PSAs and the bilateral and international agreements that back them up are often fundamentally undemocratic and serve to undermine environmental and social protections and lock in extractivism.

According to research organisation The Corner House, corporate PSAs often include clauses that 'stabilise' the agreement, meaning that corporations have the right to compensation for any changes in legislation or other circumstances that adversely affect their profits, for example new environmental laws to mitigate the detrimental impacts of oil extraction, or the coming into power of a political party that seeks to move away from an extractivist economic model. Essentially, these agreements "enable the companies to secure almost complete control over a country's oil and gas reserves and to supersede national and international human rights and environmental obligations".[126]

EXPORT-ORIENTED ECONOMIC GROWTH

Another feature of the dominant neoliberal economic model which underpins our unjust and unsustainable energy system is the emphasis on achieving macro-economic growth as measured by Gross Domestic Product (GDP): the overall value of the goods and services produced by all sectors of the economy – agriculture, manufacturing, energy, construction, and the service sector.

Many resource-rich developing countries still seek to achieve economic growth through export-oriented extraction and production, including industrial agriculture, heavy industries (mining, chemicals, cement) and the manufacturing of consumer products. This leads to a focus on investment in large-scale energy infrastructure[127] – for example large-scale coal, mega dams, pipelines and electricity grids – either for the export of energy itself or to feed heavy and manufacturing industries for the production of goods for export, not local use.

For example, heavy industries consume more than 70 per cent of China's total energy use,[128] in Chile mining uses 37 per cent of electricity produced in the country,[129] while more than 70 per cent of South Africa's energy is consumed by industrial, mining, agricultural and commercial interests, compared to only 16 per cent by South Africa's residents.[130] Strikingly, 11 per cent of South Africa's total energy supply is used by just one company, the Australian multinational mining company BHP Billiton.[131]

The energy that feeds such energy-intensive industry is often heavily subsidised and is predominantly used to produce goods for export. For example, China's development of an energy-intensive economy has been driven by the 'offshoring' of energy-intensive manufacturing industry away from the higher wages and better social and environmental protection of advanced industrialised countries like the US and Europe, and is predicated on the need of such countries to import products from energy-intensive industries which they had previously produced within their own borders.

Today's dirty energy sources and their harmful impacts are therefore inextricably bound up with a model of export-oriented economics which prioritises the production of goods for export. This comes at a very high environmental and social cost to the people of those countries as a result of both the destructive energy sources needed to fuel these industries and the energy-intensive industries themselves.

ENERGY-INTENSIVE LIFESTYLES

As described in chapter 4, global energy use per capita is extremely unequal, with the citizens of advanced industrialised countries like the US and those in Europe consuming significantly more energy per capita than the citizens of industrialising countries like China and India, and dramatically more than the citizens of developing and least developed countries. Modern life in advanced industrial economies is highly energy dependent. Electricity, heating, transportation and recreation all require significant energy inputs, as does the production of the extensive manufactured and industrially-produced agricultural products that people consume.

This energy-intensive, energy-dependent lifestyle which characterises modern life in the industrialised world is deeply connected with the models and processes of extractivism, neoliberalism and neocolonialism explored earlier. The high levels of energy consumption of the industrialised world are predicated on the ready availability of energy and the environmental and social costs of the production of this energy being borne mostly by people and communities outside of their borders. Furthermore, the economic and social infrastructure of developed countries has evolved the way it has because of this ready availability of cheap energy and the ability to ignore many of its destructive impacts. Oil, for example, has facilitated suburbanisation and models of production and consumption which rely on the transportation of goods and services over vast distances. The ready availability of cheap energy has led to often quite perverse economic processes and practices, such as the energy-intensive industrial production of food stuffs vast distances from where they are consumed.

Bales of plastic waste at Norcal's Recycle Central at Pier 96 in San Francisco.
© Walter Parenteau

Many people around the world aspire to the energy-intensive, high-consumption lifestyles of wealthy consumers in the global North. The rapid growth of the middle class in countries like China, India and Brazil has already begun to impact significantly on world commodity flows and prices.[132] In this context, a simple global transition to low-carbon energy sources is unlikely to be compatible with ending the broader negative social and environmental impacts of the current global energy system. Meeting the energy requirements needed to support the energy-intensive lifestyles of the global North and the expanding global middle class using current destructive and harmful energy sources will dramatically increase the negative impacts of the global energy system. It would also be unfair for elites and wealthy consumers in advanced industrialised countries to continue with energy-intensive, high-consumption lifestyles, while preventing others around the world from adopting similar lifestyles. The only just and sustainable way forward is a transformation of the energy system so that it provides for the wellbeing and basic energy needs of everyone in a way that is compatible with a safe climate, and sustainable ecosystems and resource use.

ENERGY MARKET LIBERALISATION AND ENERGY EXCLUSION

The corporate control of the energy system is one of the key driving factors behind the problems of energy access and poverty explored in chapter 4. Energy poverty and lack of energy access is not an accident. It is a direct result of governments' policies and legislative choices in favour of energy market privatisation and liberalisation, involving the sell-off and deregulation of energy infrastructure and services so that energy provision and investment becomes guided primarily by the objective of profit maximisation.

In many countries around the world from the early twentieth century up until the 1980s, "energy – oil, gas, coal and electricity – was largely provided either by state monopolies at prices determined by the state with investment centrally planned by government bureaucracies, or by private monopolies subject to government oversight and regulation to protect users from excessive charges".[133] However, this changed in the 1980s when energy services were just one of a whole swathe of public services impacted by the rapid adoption of 'hands-off', neoliberal policies across the advanced industrialised world, and the forced adoption of these policies by developing countries through conditionalities on lending by international financial institutions such as the IMF and World Bank.

The 1980s saw country after country 'unbundling' state-owned electricity and gas companies into their constituent generation, retailing, transmission and distribution parts and selling off these pieces of publicly-owned energy infrastructure to private corporations and investors, often at a price well below those at which they were valued.[134] These energy sector privatisations were generally coupled with deregulation of the energy sector, including the weakening or lifting of state-regulated price controls. Tellingly, the first utility privatisations were undertaken in Chile in 1982 under the dictatorship of General Pinochet and under the advice of free market economists from the University of Chicago in the US.[135] Chile was shortly followed by the United Kingdom, and then a host of other countries.

Energy privatisation and deregulation were further accelerated globally because of their adoption as conditions by the IMF and the World Bank as part of the Structural Adjustment Policies (SAPs) that developing countries were forced to implement in return for national debt restructuring and development aid. As a result, many developing countries were forced to sell off their energy infrastructure and services, often to foreign investors. [136] More recently, the need to adopt renewable energy infrastructure is being used by some governments, including Mexico's and Uruguay's, as a justification to roll out further privatisation of electricity generation and distribution.

Lack of energy access – the exclusion of poorer consumers from energy services, either because of lack of investment in energy infrastructure to serve them or unaffordable energy prices – is the direct result of energy market liberalisation. Privatising energy and thereby allowing the delivery of profit to shareholders to take priority over wider social and environmental concerns, combined with the deregulation of energy prices, means that poorer energy users are what economists call "rationed out of the market".[137]

According to The Corner House, poorer countries have also been less able to put energy welfare systems in place, which has meant that energy price rises following privatisation have translated directly into the exclusion of poorer people from energy services. For example, in Uganda "after the newly privatised electricity distribution company, Umeme, increased its prices by 24 per cent in 2005 and soon after by another 37 per cent, many poorer Ugandans were forced to take electricity themselves from the grid; Umeme's manager is reported to have called for their execution".[138]

CORPORATE POWER BLOCKING THE ENERGY TRANSITION

A final critical factor that must be taken into account is the role of the different corporate, private and financial interests which derive their power from the current unjust and unsustainable energy system and which seek to prevent, slow or corrupt efforts to move away from it. As explored in chapter 6, our reliance on harmful energy sources benefits a wide range of actors, especially Western-based multinational corporations and investors. The financial benefits extracted from energy production and use are a source of considerable economic power, which in many circumstances translates directly into political power – power that is exercised over and over again to maintain access to the profit-making opportunities that the global energy system provides.

The power of the profit motive in determining global energy outcomes is seen nowhere more strongly than in the vast and highly perverse efforts being undertaken by fossil fuel companies to find and exploit additional reserves globally, despite the overwhelming evidence of the connection between fossil fuel use and climate change. And despite their enormous profit margins, fossil fuel companies continue to receive significant direct support from governments, including tax breaks and subsidies. Subsidies from developed countries to support fossil fuel production are hard to estimate, but according to the Organisation for Economic Co-operation and Development (OECD) the global total could be as much as US$100 billion per year.[139]

In many places, politicians and policy makers have direct connections with and financial interests in destructive and unsustainable energy, and executives connected with energy industries are given powerful positions on government committees and regulatory bodies, all with obvious impacts on the energy policy choices of governments. Recent research by the UK campaigning organisation the World Development Movement revealed that one third of ministers in the current UK government have links with the fossil fuel industries, whether through former employment, receipt of donations, or use of their influence in favour of particular energy firms.[140]

Action of GLOBAL 2000 in front of a coal power plant in Austria, demanding one of the country's electricity companies to phase out coal.
© GLOBAL 2000 (FoE Austria) / Alexander Jandl

Similarly, the "choice" of large dams over other hydroelectric technologies in Nepal is argued to have resulted "not from a rational assessment of what would best ensure access to energy for all, but from the entrenched power within government circles of what Dipak Gyawali, a former Minister for Water Resources in the country, and Ajaya Dixit of the Nepal Water Conservation Foundation term 'hydrocracies' – government departments and international financial institutions whose economic, bureaucratic and political interests are intimately bound up with the large dam industry".[141]

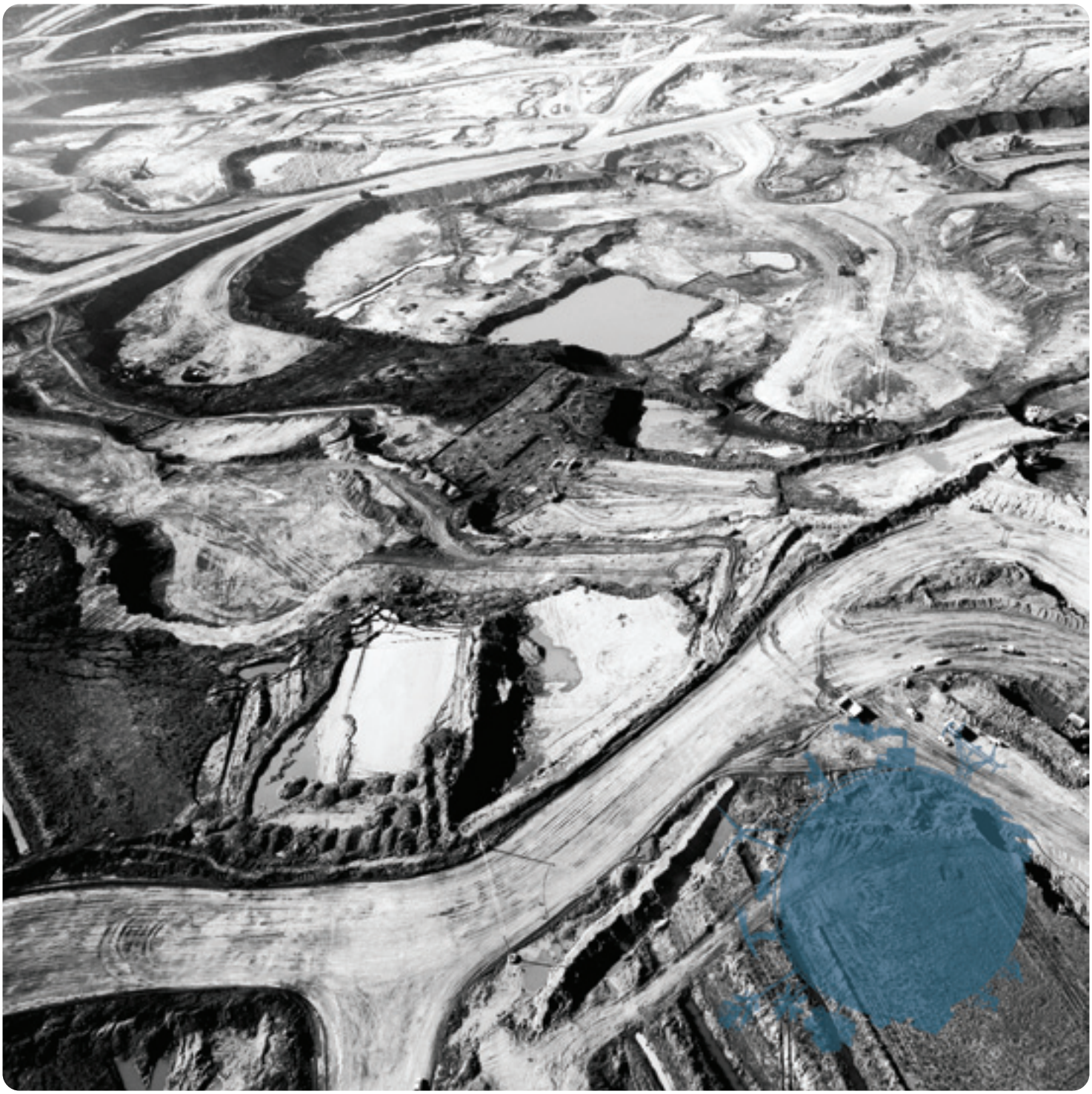
Where governments choose to regulate corporations and investors and limit the destructive impacts of their energy-related activities, these actors often resort to arbitration through opaque international trade and investment agreements to overrule the democratic wishes of governments. One recent example is the case of Swedish energy company Vattenfall filing a request for arbitration at the International Centre for the Settlement of Investment Disputes (ICSID) against Germany after the German government's decision to phase out nuclear energy. Vattenfall's claim relies on its rights under the Energy Charter Treaty, which grants foreign investors the right to bypass the domestic courts of the host country and to directly file a complaint to an ad hoc international tribunal to challenge proposed government regulations. The Swedish company is claiming over €3.7 billion in compensation in response to the closure of the Krümmel and Brunsbüttel nuclear power plants as part of the German government's decision to close down its nuclear sector following the Fukushima nuclear incident in Japan.

Corporate and financial actors with a vested interest in the current energy system are making significant efforts to resist the transformation in global energy production and use that is needed to stop climate change, and instead to push for so called 'techno fixes' and false solutions like carbon trading, carbon capture and storage (CCS), and large-scale geoengineering. All three of these false solutions allow for a continued reliance on harmful and unsustainable energy sources and the further locking in of the infrastructure associated with them (see Box 9 for further information). Their power is also demonstrated by the corporate capture of relevant international processes such as Sustainable Energy for All (SE4All) (see chapter 8 for further information).

A hydroelectric dam in the Sun Koshi river., Nepal. The 11-MW power plant was built by the Chinese forty years ago. It was hit by a flood in 1987. New, much bigger dams are currently being planned upstream the Koshi river basin.
© Deepak Adhikari

AVOIDING THE CLIMATE TRAP

08



Suncor Millennium mine north of Fort McMurray, Alberta, Canada. The Alberta Tar Sands are the largest deposits of their kind in the world and their production is the single largest contributor to Canada's greenhouse gas emissions.
© Jiri Rezac / WWF UK

Stopping climate change and averting its worst impacts requires an urgent and dramatic reduction in the greenhouse gas emissions emitted from our energy system. This in turn necessitates a rapid transition away from high-carbon energy sources like fossil fuels, nuclear power, agrofuels and industrial biomass. At the same time, we need an urgent effort to expand energy access and affordability so as to provide everyone in the world with affordable and reliable energy to meet their basic needs. All of this points to a massive new-build programme to roll out low-carbon renewable energy technologies like on- and offshore wind, tidal and solar energy.

This transition is already underway, with renewable energy investment totalling US$257 billion in 2011 and 430,000 MW of renewable energy capacity installed globally in the last decade.[142] Several attempts have been made to map out the scale of the construction of new renewable energy infrastructure that would be needed in order to keep emissions low enough to avoid runaway climate breakdown. According to these plans, it is still technically possible to decarbonise the energy supply in time to avoid runaway climate breakdown. However, what is striking is the staggering scale of industrial build that these plans require in order to reduce emissions from energy while also meeting projected energy demand. For example, the plan by Jacobson and Delucchi aimed at transition to 100 per cent renewable electricity generation of 11.5 TW of energy by 2042[143] (with renewable electricity sources here defined as solar, wind, hydro and geothermal), would require, among other things, one new tidal plant to be built every 32 minutes, one new wind turbine to be erected every 4 minutes, and one rooftop solar power system to be installed every half a second between 2012 and 2042.

Such an industrial programme carries with it significant risks of its own for sustainability, justice and human rights. Nor is it guaranteed that such a renewables new-build programme would automatically be compatible with stopping climate change and keeping global emissions below highly dangerous tipping points, or that it would tackle the major problems with energy inequality and access examined in this report. While the phasing out of high-carbon energy sources and the expansion of renewable energy is essential, this transition carries significant risks and pitfalls which must be avoided. Some of the major risks and pitfalls which must be avoided in the transformation of the energy system are set out below.

RISKS AND PITFALLS IN THE ENERGY TRANSITION

1 | Corporations will try to define what constitutes 'renewable energy'

Corporations with a vested interest in the current unsustainable and destructive energy system have already begun to use their power to influence and co-opt processes to define how the energy transition happens and what types of energy sources and technologies are used. One key example of this is the corporate capture of the UN Sustainable Energy for All (SE4All) process. An international process launched in 2011 by UN Secretary General Ban Ki-moon, its stated aim is to tackle the twin challenges of energy access and climate change by providing, as the name suggests, 'sustainable energy for all'. However, a handpicked unaccountable group dominated by representatives of multinational corporations and fossil fuel interests is defining how this is being achieved. SE4All's definition of 'renewable energy' includes highly destructive and unsustainable sources like mega hydro-dams and agrofuels[144] and also leaves room for 'advanced fossil fuel technologies'.

2 | Construction of renewable energy infrastructure could drive land grabbing, enclosures, human rights abuses and environmental destruction

The large-scale industrial build required to rapidly increase energy generation from renewables also carries a significant risk of replicating the widespread land grabbing, enclosures of commonly held resources, and human rights abuses associated with the destructive energy sources. There are already a significant number of cases where the construction of renewable energy infrastructure has been linked to abuses of communities' rights to free, prior, informed consent and rights of redress. Also, there are highly concerning cases of state violence being used to push forward renewable energy developments which local communities are resisting, because their rights and needs have not been adequately respected. Moreover, there is a significant risk of rapid and large-scale renewable energy infrastructure expansion driving the destruction of forests, biodiversity and sensitive ecosystems . See Box 9 for case studies of already existing destructive renewable energy projects.

3 | Land grabbing, environmental destruction and human rights abuses from raw material extraction for renewable energy infrastructure

Most existing solar, wind and tidal energy technologies require large quantities of non-renewable raw materials, including aluminium, chromium, zinc, copper, manganese, nickel, and lead. The mining, extraction and processing of these raw materials often involves land grabbing and other human rights abuses of communities living in close proximity to the mineral resources; labour rights abuses for the workers involved in mining and processing; the destruction of forests, landscapes, biodiversity and ecosystems; and land, air and water pollution.

4 | Greenhouse gas emissions from renewable technology roll-out

The lifecycle emissions of renewable energy technologies like tidal, wind and solar are only a fraction of those of traditional fossil-fuel energy sources, but will add up if the transition to a low-carbon energy system is to keep up with the burgeoning energy demands of energy-intensive lifestyles. Emissions are created at every stage in the renewables life cycle, from the mining and processing of material inputs, to manufacturing, to infrastructure construction and servicing.

5 | Poor environmental and labour standards in renewable technology manufacturing

The production of many renewable technologies, such as wind turbines and solar panels, involves industrial processes which generate effluents and waste that contribute to air, land and water pollution. In addition, as with all industrial processes, there is a risk of labour rights abuses, poor wages, and poor health and safety standards in the manufacturing process. Worker struggles in renewable energy manufacturing have already emerged, including against Vestas wind energy in the UK, and REpower and Enercon in Germany. Enercon only recognized the right of its workers to unionise in September 2013.[145] And there were already reports in 2011 of communities and farmers in China being negatively impacted by pollution from solar-panel manufacturing.[146]

6 | Renewables transition becomes a Trojan horse for energy privatisation

There is also a significant risk – already being realised in some countries – that the changes in policy and legal frameworks governing national energy systems that are required to support the renewables transition will be used by corporations and their allies in governments to extend the privatisation of energy infrastructure and services, to the detriment of energy access and affordability. A transition to low-carbon energy sources is by no means guaranteed to go hand in hand with the expansion of access to affordable energy and could mean increased energy poverty and exclusion.

7 | Lack of public consent for renewable energy

Finally, there is a strong likelihood that if some or all of the risks above are realised, many citizens and communities will rightly come to regard renewable energy as something that is forced upon them without their consent; that doesn't benefit them by making energy more accessible or affordable or help meet their basic needs; that is linked to the abuse of their rights; and that furthers their exploitation as workers and consumers by corporations and private financial interests. Such withdrawal of public consent could threaten the energy transition overall and thus dramatically increase the risk of worsening climate impacts and runaway climate breakdown.

In Mexico, retail giant Walmart will purchase all of the energy generated by the Oaxaca Lamatalaventosa wind farm for the next 15 years.
© Walmart Corporate

BOX 09 SOME EXAMPLES OF EXISTING DESTRUCTIVE RENEWABLES PROJECTS

WIND POWER IN OAXACA, MEXICO

Violence and death threats have been used against local indigenous community members resisting the construction of Latin America's largest wind farm, the San Dionisio del Mar project. A corporate wind energy consortium consisting of FEMSA/Coca-Cola, Heineken, Mitsubishi, Macquarie, Vestas, PGGM (a Dutch pensions fund) and others, and financed by the Inter-American Development Bank, formed paramilitary shock troops with the intention of invading the ancestral lands of the Mexican indigenous Ikojts/Huave people to clear land for the wind farm, which is intended to produce power for both FEMSA, the Coca-Cola bottling company in Mexico, and for Heineken.[147]

SOLAR POWER IN THE SAHARA, MOROCCO

In Morocco, the government is advancing proposals for the construction of a mega solar power plant with the purpose of exporting electricity to Europe. Major concerns have been raised about the proposed Ouarzazate solar project – part funded by the World Bank's so-called Clean Technology Fund – including that it would likely lead to an increase in electricity costs for ordinary people in Morocco, as well as the depletion of much-needed water resources and the displacement of indigenous nomadic farmers.[148]

GEOTHERMAL POWER IN BEDUGUL, INDONESIA

Friends of the Earth Indonesia is campaigning against a proposed geothermal project in the Dasong forest conservation area in Bedugul in Bali, Indonesia. The area is considered a sacred space by Balinese Hindus and is an important water catchment areas for traditional farmers. According to its environmental impact assessment the project would have severe impacts on water and biodiversity. The project was initially proposed under the Soeharto regime and has involved no community consultation or participation, as well as bribery and intimidation of community members critical of the project.

WIND POWER IN TRØNDELAG, NORWAY

The development of renewable energy is much debated within and between environmental organisations in Norway, especially how to balance the need for more renewable energy with the consequences some projects will have for vulnerable nature. Friends of the Earth Norway is resisting the construction of an industrial area hosting eight large wind power plants in Trøndelag in the middle of Norway. Construction would cause habitat loss for many species and pose a serious threat to bird populations, including white-tailed eagles. It could also have significant detrimental impacts on the lives and livelihoods of the local indigenous Sami people, who have launched legal action to try to stop or delay the construction of the plants and transmission lines. Instead of this new energy production, Friends of the Earth Norway is campaigning for energy efficiency and savings to reduce overall energy demand.

MITIGATING THE RISKS: REDUCING ENERGY DEPENDENCE

If we are to create a sustainable, just and climate-safe energy system, it is essential to mitigate the above risks to the greatest degree possible. We need to focus not just on stopping climate change and avoiding the trap of runaway climate breakdown, but on ensuring that decarbonisation of the energy system does not come at the cost of other social and environmental outcomes. This in turn requires two things.

First, it necessitates that we reduce energy dependence so that the renewable energy infrastructure needed is minimised. In advanced industrialised countries this means prioritising reduction of energy dependence and excessive energy consumption, increases in energy efficiency, and meeting the reduced energy demand with renewable energy. This doesn't mean that we should delay the transition to renewable energy until we have reduced energy dependence – the dual aims of energy policy should be to reduce unnecessary and excessive energy use and to meet the remaining essential demand with renewable technologies. In the global South, where energy consumption is far lower, it means increasing energy access and meeting basic energy needs via the roll-out of renewable energy, while avoiding the unsustainable, high-energy consumption models of the industrialised world.

Second, it requires us to minimise corporate influence over the energy transition and exert democratic control over energy policy and the energy system, minimising negative social and environmental outcomes and maximising positive outcomes. How we do this is more difficult, and is explored in the final chapter.

> **WE NEED TO FOCUS NOT JUST ON STOPPING CLIMATE CHANGE AND AVOIDING THE TRAP OF RUNAWAY CLIMATE BREAKDOWN, BUT ON ENSURING THAT DECARBONISATION OF THE ENERGY SYSTEM DOES NOT COME AT THE COST OF OTHER SOCIAL AND ENVIRONMENTAL OUTCOMES.**

BOX 10 TECHNO FIXES AND FALSE SOLUTIONS

Tackling climate change requires a large-scale transformation of our global energy system and the power structures and inequalities that underpin the exploitative, destructive and crisis-prone global economy. This transformation poses a significant threat to corporate and financial actors with a vested interest in the current system. As a result, these interest groups are making a significant effort to find and promote so called 'techno fixes' to the climate crisis. Many of these are either unproven or false solutions that serve to lock in dependence on destructive, unsustainable energy sources and delay the much-needed energy and economic transition. This box explores three of the false solutions that are being pushed most aggressively: carbon trading, CCS, and geoengineering.

Thousands of Friends of the Earth International campaigners and volunteers from 20 countries expose carbon offsetting as a false solution to climate change in a peaceful, colourful march during UN Climate Talks in Copenhagen.
© Christoffer Askman

Members of the Friends of the Earth International delegation carry a 'no carbon trading' banner on the streets of Durban during the Global Day of Action, 2011.
© FoEI

CARBON TRADING

Carbon trading has been widely exposed as a false solution to the climate crisis. A multi-billion euro industry built around the buying and selling of artificial pollution rights, carbon trading is a loophole designed to legitimise inaction by industrialised countries on their greenhouse gas emissions and help them avoid their moral and legal obligation to provide adequate climate finance as repayment of their climate debt to the developing world.

> **"CARBON TRADING IS A LOOPHOLE DESIGNED TO LEGITIMISE INACTION BY INDUSTRIALISED COUNTRIES ON THEIR GREENHOUSE GAS EMISSIONS AND HELP THEM AVOID THEIR MORAL AND LEGAL OBLIGATION TO PROVIDE ADEQUATE CLIMATE FINANCE AS REPAYMENT OF THEIR CLIMATE DEBT TO THE DEVELOPING WORLD."**

All existing and planned emissions trading schemes allow for offsetting – where polluting firms covered by a cap on their emissions are allowed to buy credits from elsewhere, usually from developing countries, in order to avoid making emissions cuts. Offsetting projects place the burden for cutting emissions on the countries that have done the least to cause the climate crisis. They frequently do not deliver emissions reductions at all, and are sometimes worse than doing nothing.

The European Union Emissions Trading Scheme (EU ETS) is currently the largest carbon trading scheme in the world. The scheme has had a surplus of carbon permits since its inception, creating little or no incentive for European companies to reduce their emissions. The carbon price in the EU ETS has now collapsed to such a low that the European Union is having to look at policy and legislative measures to rescue it. Unfortunately, the options on the table look set to keep this fundamentally flawed system in place, rather than scrap it all together.

There is a strong corporate lobby that supports expansion of the global carbon market, consisting of a variety of different financial, business and industrial sectors in both developed and developing countries. It includes financiers, traders, owners of polluting industries and owners of resources and infrastructure with potential to qualify for offset credits.

Carbon trading locks in fossil fuel dependency and through the creation of tradable carbon credits it creates a perverse incentive to actually generate more climate change-causing emissions. The biggest beneficiaries of carbon trading are polluting companies and financial actors in the global North.

FOR MORE INFORMATION see: **www.carbontradewatch.org**

GEOENGINEERING IS A TECHNO FIX FOR THE CLIMATE CRISIS, AIMED AT SLOWING CLIMATE CHANGE WITHOUT ADDRESSING ANY OF ITS UNDERLYING CAUSES, SUCH AS THE WORLD'S RELIANCE ON DESTRUCTIVE AND UNSUSTAINABLE ENERGY SOURCES. GEOENGINEERING IS NOT ONLY UNPROVEN, IT CANNOT BE TESTED.

CARBON CAPTURE AND STORAGE

Carbon capture and storage or sequestration (CCS), sometimes called geosequestration, is an industrial process by which CO_2 emitted by power stations fuelled by fossil fuels or industrial biomass is captured and stored in places where it is prevented from entering the atmosphere, usually in underground geological formations or abandoned mines. CCS is not a single technology – it involves a series of technical processes.

CCS is being heavily promoted by the fossil fuel and industrial biomass industries and also by many of the energy sector trade unions as a way to keep generating energy using their infrastructure while also reducing emissions. The claims that CCS can play a role in averting climate catastrophe are misleading. CCS is expensive, unproven,[149] and could not generate sufficient reductions in greenhouse gas emissions in the time period we have to avert the worst impacts of climate change. CCS technology is still being demonstrated at only a pilot scale and demonstration of large-scale integrated CCS systems is unlikely to happen for another 10-15 years,[150] and would require billions of dollars of investment.

CCS technology would also serve to lock in fossil dependence and therefore the continuation of the significant negative environmental and social impacts of fossil fuels. It is likely that the predominant fuel of CCS technology would be coal. CCS deployment would therefore likely accompany continued air pollution from coal combustion; the generation of significant solid and liquid toxic waste with impacts on ground and surface water; and the degradation of the environment from coal mining and the construction of associated infrastructure.

CCS is also itself highly energy intensive. Over 25 per cent more coal would likely need to be burned to produce the energy needed to scrub out sulphur dioxide and mercury, liquefy the CO_2 and transport it to storage sites.[151] Furthermore, the dangers of underground storage of liquefied CO_2 are largely unknown, and future generations would inherit these storage sites and the costs associated with monitoring and maintaining them and remediating any spills and leakages.

FOR MORE INFORMATION CCS Info, Friends of the Earth Denmark: **ccs-info.org/index.html**

GEOENGINEERING

Geoengineering is understood here as "the deliberate large-scale manipulation of an environmental process that affects the earth's climate, in an attempt to counteract the effects of global warming".[152] Geoengineering can refer to a wide range of techniques. According to campaigning organisation ETC Group, climate geoengineering technologies can be divided into three broad areas: solar radiation management (reflecting sunlight into space), weather modification and greenhouse gas removal and sequestration. Technologies currently being explored with the aim of slowing or preventing climate change include blasting sulphate particles into the stratosphere or 'whitening' clouds to reflect the sun's rays, dumping iron particles in the oceans to encourage CO_2-absorbing plankton, depositing silver iodide into clouds to produce rain and genetically engineering crops so their foliage can better reflect sunlight.

Like carbon trading and CCS, geoengineering is a techno fix for the climate crisis, aimed at slowing climate change without addressing any of its underlying causes, such as the world's reliance on destructive and unsustainable energy sources. Geoengineering is not only unproven, it cannot be tested. In order to have a noticeable impact on the climate, geoengineering must be deployed on a massive scale, so 'experiments' or 'field trials' are actually equivalent to deployment in the real world because small-scale tests do not deliver the data on climate effects.

The side effects of geoengineered interventions are still largely unknown and there is a very high likelihood of unintended consequences, due to inadequate understanding of the Earth's climate and ecosystems. Impacts on people and biodiversity are potentially massive, immediate and irreversible.[153]

Because of these significant risks the United Nations Convention on Biological Diversity (CBD) – the international negotiating forum on biodiversity, consisting of 193 countries – has decided on a de facto moratorium on geoengineering projects and experiments. Delegates at the tenth meeting of the CBD in 2010 agreed to ask governments to ensure that no geoengineering activities should take place until risks to the environment and biodiversity and associated social, cultural and economic impacts have been appropriately considered.[154] However, unregulated tests on highly dangerous geoengineering technologies continue to be carried out, in breach of this moratorium.[155]

FOR MORE INFORMATION see: **www.etcgroup.org**

09

TOWARDS A VISION FOR A JUST, SUSTAINABLE, CLIMATE-SAFE ENERGY SYSTEM

In 2011, Friends of the Earth International joined FoE South Africa (groundWork) and people from around the world in a Global Day of Action at the climate conference in Durban.
© FoEI

Friends of the Earth International believes that it is possible to transform our current corporate-controlled, unsustainable and unjust global energy system into one that is climate-safe, just and sustainable, that respects the rights and different ways of life of communities around the world, and that meets the basic right to energy for everyone, without the extensive destructive impacts of current energy sources. As the 2010 Cochabamba Declaration stated: "It is imperative that we forge a new system that restores harmony with nature and among human beings. And in order for there to be balance with nature, there must first be equity among human beings."[156]

Below we attempt to lay out what we consider to be the main features of a just, sustainable climate-safe energy system. This vision is guided by the principle of energy sovereignty, which is the right of people to have access to energy, and to choose sustainable energy sources and sustainable consumption patterns that will lead them towards sustainable societies. This vision is an initial proposal. It is not final and some aspects are still subject to different views and considerable discussion within our own federation. We believe that to transform the energy system we need to forge a collective vision among all those who have an interest in, and are pushing and mobilising for, this transformation. This is Friends of the Earth International's initial contribution to that important conversation.

Changing Life with technology: An indigenous Bangladeshi woman talks on a mobile phone during a festival. Mobile phones have brought a tremendous change in life style for many isolated communities.
© Abir Abdullah

KEY FEATURES OF A JUST, SUSTAINABLE, CLIMATE-SAFE ENERGY SYSTEM:

1 | Provides energy access for all as a basic human right

Access to energy is a basic human right and a necessary condition of a dignified life. Everyone will have access to sufficient sustainable, clean, safe, affordable, reliable and appropriate energy to meet their energy requirements for a dignified life. This means adequate energy for:

- lighting, heating and cooking
- ensuring clean water supplies for adequate sanitation
- ensuring access to essential public services like hospitals and schools
- pumping water for irrigation and to run small-scale agricultural industries and other small businesses
- communication, entertainment, and climate-safe recreation.

2 | Climate-safe and based on locally-appropriate, low-impact technologies

Energy will be generated from climate-safe sources with low social and environmental impacts. This means no energy sources that:

- are high carbon or produce significant quantities of other dangerous greenhouse gas emissions through their production, combustion, distribution, or the direct or indirect land use change that they give rise to
- abuse the rights of local communities and Indigenous Peoples
- result in deforestation or forest degradation
- result in the production of toxic waste
- result in significant air, land or water pollution
- deplete non-renewable resources.

Energy technologies will also be appropriate to the needs of the communities who are using them and to their local and regional environmental, economic, social and cultural contexts.

3 | Under direct democratic control and governed in the public interest

Energy is a common good. In a just energy system energy infrastructure and resources are therefore under direct democratic control. Decisions about the production and use of energy:

- are democratic, participative, open and accountable
- prioritise social outcomes, including energy access, fairness, environmental sustainability, and dignified work
- are governed by the principle of subsidiarity, with decisions delegated to the most local and least centralised level possible, while also allowing for sub-regional, national and regional planning and coordination
- give adequate power to all directly-affected groups to influence decisions, including energy users, energy sector workers, and people who are excluded from energy systems
- respect the rights of communities to define their energy needs and how these needs are met in accordance with their cultures and ways of life, as long as these choices do not have destructive impacts on other people and communities.

4 | Ensures the rights of energy sector workers, and their influence over how their workplaces are run

Workers involved in all aspects of the energy system are assured of their basic rights, including the right to freedom of association and collective bargaining, a living wage, safe, secure and dignified work, and influence over how energy infrastructure is developed and run.

5 | Ensures the right to free, prior and informed consent and rights of redress for affected communities

The construction of new energy infrastructure will be done on the basis of the free, prior and informed consent and appropriate compensation / remuneration of affected communities and will respect the other rights of Indigenous Peoples and affected communities, and customary law. The same holds for the extraction of any material inputs needed to build energy infrastructure and develop and produce energy technologies.

6 | As small-scale and decentralised as possible

Energy infrastructure, including supply and distribution, will be decentralised as much as possible. This is the case where energy solutions come from local opportunities at both small and community scale, and where energy is generated at or near the point of use, and either connected to a local distribution network system, supplying homes and offices rather than the high-voltage transmission system, or as stand-alone systems entirely separate from the public network.[157]

Decentralisation will help ensure energy access for people in remote and rural areas; will facilitate subsidiarity and community or local ownership and control; and will reduce energy wastage in distribution because energy and heat will be produced close to the point of use. Some large-scale renewable energy infrastructure such as large-scale wind or concentrated solar energy may be needed to complement decentralised supply to large towns and cities and essential public services and infrastructure. However, decision making over any such large-scale infrastructure will be subject to the democratic and participative decision-making process set out above, and subject to rigorous testing to ensure that measures to reduce energy dependence have already been exhausted and that the end use of the energy produced has high social importance or value.

Photovoltaic solar panels on a roof in Hackney, East London.
© Balthazar Serreau / FoE EWNI

7 | Ensures fair and balanced energy use and minimum energy waste

Energy use is broadly fair and balanced globally and within countries, economical, and with minimum energy waste.

Sustainable energy
in Australia.
© Simon Coutts

SOME OF THE **CHANGES** NEEDED TO CREATE A JUST AND SUSTAINABLE SYSTEM

10

To create a climate-safe, just and sustainable energy system we need to transform the way we produce, distribute and consume energy. This chapter sets out some key changes that are needed to help drive this transformation and get us moving in the right direction. Again, this is not presented as a comprehensive blueprint but rather an initial contribution to collective discussions on what needs to happen to transform the energy system.

1 | Invest in locally appropriate, climate-safe, affordable and low-impact energy for all

Energy infrastructure is intricately connected to wider questions of local and regional development, which vary considerably between different localities, regions, countries and regions of the world. For example, in Colombia alternative renewable energy sources have been used in a creative way by people in accordance with their particular local needs, cultures and contexts. This includes the production of hydroelectric energy by means of pelton wheels and watermills, biogas production through biodigesters, solar panels for water warming and pumping and other direct uses, communal aqueducts working on solar energy, communal public transport or cycling, pedal-powered machines and wind energy to pump water out of the ground.

It is critical therefore that the emphasis is on bottom-up, participative planning and local decision making, as this is the only way to ensure that new energy infrastructure is locally appropriate and meets local needs.[158] Globally, 84 per cent of people without access to modern energy services live in rural areas, so the only way to ensure their energy access is to prioritise decentralised energy infrastructure.[159]

Appropriate ownership structures need further discussion and are likely to vary between different contexts and involve a mix of state, municipal, community and tightly-controlled private ownership. Expanding collective community ownership and control of energy infrastructure is a key way to help ensure community consent and support for new renewable energy infrastructure.

This is strongly backed up by the experience of Denmark, which now has one of the highest rates of renewable energy in the world. Wind power took off strongly in Denmark in the 1980s and 1990s when local residents set up wind turbine cooperatives. Farmers were given planning permission to build wind turbines on their land only if local people were able to buy cooperative shares in the energy project. People unconnected to the area were unable to buy shares and there was also a limit to the number of shares each member could buy. This ownership model led to high public acceptance of wind power, faster deployment and tremendous good will.[160] However, in the late 1980s the national government abolished restrictions on planning permission and ownership, and as a result outside investors began to push for shares in more and bigger wind projects, which resulted in a dramatic increase in local opposition to such projects, with corresponding increases in conflicts and delays and cancellations.[161] A similar emphasis on collective community ownership and control is facilitating the roll-out of renewable energy infrastructure in many places around the world, from Brazil to Indonesia to Belgium.[162]

In terms of costs, renewable energy is already directly competitive with heavily subsidised conventional electricity generation in a number of countries.[163] The IEA estimates that nearly US$1 trillion in cumulative investment is needed to achieve universal energy access by 2030.[164] Greenpeace International estimates that by investing only 1 per cent of global GDP in renewable energy by 2050, 12 million jobs would be created in the renewables sector alone, generating fuel savings that would cover the additional investment twice over.[165]

However, a critical question is how to finance this transition. In industrialised countries in the global North, many alternative energy projects are financed almost entirely with small contributions by local community members and often supported by public support schemes such as feed-in tariffs. However, there are still big cost barriers to initiating such projects and a risk of exclusion for people with low incomes, which means that so far it is mostly wealthy people who are able to invest in and benefit from community-owned renewable energy infrastructure. Scaling up community-owned renewables will require significant state investment, alongside policies supporting small-scale, 'end-user' investment, for example by local banks and microfinance supporting the creation of local energy networks and ensuring everyone can benefit from community-owned energy.[166]

> **THE FAR BIGGER AND MORE URGENT CHALLENGE IS TO SUPPORT THE ROLL-OUT OF SOCIALLY-OWNED AND CONTROLLED ENERGY PROJECTS IN THE GLOBAL SOUTH. HERE, THE RESPONSIBILITY FOR FINANCE LIES WITH THE RICH INDUSTRIALISED COUNTRIES OF THE NORTH, WHICH ARE PRIMARILY RESPONSIBLE FOR CREATING THE PROBLEM OF CLIMATE CHANGE AND ALREADY HAVE A LEGAL OBLIGATION TO PROVIDE FINANCE FOR DEVELOPING COUNTRIES' TRANSITION TO CLIMATE-SAFE, SUSTAINABLE ECONOMIES UNDER THE UNITED NATIONS FRAMEWORK CONVENTION ON CLIMATE CHANGE.**

The far bigger and more urgent challenge is to support the roll-out of socially-owned and controlled energy projects in the global South. Here, the responsibility for finance lies with the rich industrialised countries of the North, which are primarily responsible for creating the problem of climate change and already have a legal obligation to provide finance for developing countries' transition to climate-safe, sustainable economies under the United Nations Framework Convention on Climate Change.

There are many potential sources of public finance which could be mobilised to fund this transition, without detracting from other important social spending needs. These include redirecting state military spending, cracking down on tax abuse by multinational corporations and wealthy individuals, taxing unproductive and dangerous financial speculation, and redirecting perverse and socially destructive subsidies. However, mobilisation of most of these sources is beyond the reach of developing countries to decide. Rather they are dependent on the political will of Northern governments to make them available, and this will is not forthcoming due to the considerable corporate and financial vested interests involved. So in the meantime, consideration of other sources of finance directly controlled by developing country governments might be needed, including using revenues from current destructive and harmful energy sources. These public finances could then be used for the urgent transition away from these energy sources to develop sustainable, climate-safe, locally-appropriate sources which guarantee the right to energy for all.

2 | Reduce energy dependence

As demonstrated in chapter 9, the transformation of the energy system cannot happen in isolation from the transition to fairer and sustainable economic models and more sustainable lifestyles. It is not sufficient to simply replace all of the destructive energy sources with renewable energy sources in a context of high energy dependence and growing energy demand. Such a system will continue to have major destructive social and environmental impacts. While we urgently need to roll out locally appropriate, climate-safe and low-impact energy infrastructure, this must happen alongside a reduction in energy dependence and excessive energy consumption in industrialised countries, and support for developing countries in the global South to improve wellbeing and basic services without following the global North's energy-dependent and energy-intensive model.

Reducing energy dependence and energy consumption does not have to mean a drastic reduction in living standards for ordinary people, although it will have to mean limits on excessive energy use from very energy-intensive recreational activities. Reducing energy dependence means changing the way we produce and consume food, the way we travel and transport goods and services, how we organise our towns and cities, and how we use energy in our homes and workplaces. Many of these changes will bring about other significant benefits for people and communities. Some key steps in moving away from energy dependence include:

Bicycling as a way of reducing energy dependence.
© Chris Mole

- **Transforming industrial agriculture:** the global food sector, including input manufacturing, production, processing, transportation, marketing and consumption, accounts for approximately 30 per cent of global energy consumption, and produces over 20 per cent of global greenhouse gas emissions.[167] The global industrialised and corporate-controlled nature of our food economy lies at the heart of the problem. We urgently need to embark on a transition away from industrial, high-input and intensive agriculture towards small-scale sustainable agriculture that is less energy intensive and energy dependent and which stimulates rural development and local markets. It is also critical to tackle global demand for products associated with damaging energy-intensive agriculture, for example industrially-produced meat and dairy products. This transformation should be based on the protection and extension of food sovereignty and the right of people to healthy and culturally appropriate food produced through ecologically sound methods.

> **“WE URGENTLY NEED TO EMBARK ON A TRANSITION AWAY FROM INDUSTRIAL, HIGH-INPUT AND INTENSIVE AGRICULTURE TOWARDS SMALL-SCALE SUSTAINABLE AGRICULTURE THAT IS LESS ENERGY INTENSIVE AND ENERGY DEPENDENT AND WHICH STIMULATES RURAL DEVELOPMENT AND LOCAL MARKETS.”**

Two hundred peasant farmers take to the streets in Durban to denounce the model of industrial agriculture as one of the main drivers of climate change, 2011.
© FoEI

- **Transforming transport and prioritising strong, diversified local economies:** the IEA estimates that the transport sector already accounts for over half of global oil consumption and this is predicted to increase with the increase in road freight in China, India and the Middle East, which the IEA estimates will be responsible for 40 per cent of the increase in global oil demand to 2035.[168] Reducing energy use from transport is therefore critical to building a more just and sustainable energy system. To do this requires not only regulation of the transport sector to reduce energy use and dramatic investment in public transport, but a more fundamental change to the way we plan and organise our economies so that we are less dependent on transport. For example, a return to consuming more locally-produced food; planning new town, city and rural developments and reorganising existing places so that people are able to work and socialise closer to where they live; and localising other supply chains as much as possible, so that we reduce the quantity of goods that need to be transported long distances.
- **Increasing energy efficiency and regulating energy-intensive industries:** Reducing energy dependence also necessitates efforts to increase energy efficiency. The IEA estimates that four fifths of the potential to reduce energy demand in the buildings sector and half of the potential to reduce demand in industry remains untapped.[169]

  Some of the most important energy-savings options include improving heat insulation and building design, improving the efficiency of electrical machines, replacing old electric heating systems with renewable heat production, and reducing energy consumption by goods and passenger vehicles.[170]

  It is import to recognise however, that energy efficiency does not automatically lead to reduced energy demand or reduced energy dependence overall. In fact, energy efficiency can lead to increased energy consumption.[171] For example, between 1980 and 2000, China halved the energy intensity of its economy, but more than doubled its per capita energy consumption.[172] Furthermore, energy-efficiency measures can also serve to justify the further locking in of economic dependence on energy-intensive industries.

  The transformation of our energy system will also require us to look at energy-intensive industries such as aluminium, steel, chemicals, cement and car production and ask what place these industries have in a sustainable economy and how they need to be transformed at their core, not just improved with energy-efficiency measures. Hence, while energy efficiency is important, it is not a solution by itself. Energy-savings measures must be integrated into a far bigger rethink of how to shift our economies towards sustainability and away from energy dependence.

3 | End new destructive energy projects and facilitate a managed phase out of all destructive energy sources

The urgency of the climate crisis requires that we bring about an urgent end to the use of harmful and destructive energy sources, including an immediate moratorium on all new fossil fuel, nuclear, waste-to-incineration and mega-dam projects, combined with a managed phase out of existing fossil fuel projects, nuclear energy infrastructure, industrial agrofuels and biomass for energy and the decommissioning of mega dams. This phase-out must happen concurrently with rolling out locally-appropriate low-impact energy infrastructure, which will extend access to basic energy services, so that the transition doesn't negatively impact the ability of people and communities to meet their basic needs.

“THE URGENCY OF THE CLIMATE CRISIS REQUIRES THAT WE BRING ABOUT AN URGENT END TO THE USE OF HARMFUL AND DESTRUCTIVE ENERGY SOURCES, INCLUDING AN IMMEDIATE MORATORIUM ON ALL NEW FOSSIL FUEL, NUCLEAR, WASTE-TO-INCINERATION AND MEGA-DAM PROJECTS, COMBINED WITH A MANAGED PHASE OUT OF EXISTING FOSSIL FUEL PROJECTS, NUCLEAR ENERGY INFRASTRUCTURE, INDUSTRIAL AGROFUELS AND BIOMASS FOR ENERGY AND THE DECOMMISSIONING OF MEGA DAMS.”

In May 2012, Friends of Earth Croatia / Zelena akcija organised an action outside the Croatian government building, demanding that the government put a stop to construction of the environmentally damaging and financially questionable Ombla hydroelectric power plant.

4 | Ensure a just transition and compensation and support for affected workers and their communities

Millions of workers and whole communities are currently dependent for their basic livelihoods on the current unjust and unsustainable energy system. This includes mine workers, energy industry workers, transport workers and many other groups. It is essential that the phase out of harmful energy sources and the transformation of the energy system happens with a high level of participation and input from these affected workers and their communities. This is necessary in order to ensure that the transition is a just one. There should be well-planned policies and frameworks in place to protect and support workers and communities who are directly affected, and the components of this just transition must be defined with the affected workers themselves and their trade unions and wider communities. At a minimum we believe a just transition should ensure:

- dialogue and consultation with trade unions at all levels
- sound assessment of the job impacts of the transition
- job losses as a result of the transition are minimised and job creation opportunities maximised
- affected workers are supported with education, training and re-skilling to maximise the potential for them and their communities to benefit from the transition
- the movement of jobs to new industries does not occur at the expense of decent work, and terms and conditions for workers
- affected communities are supported with sound planning and policies to drive economic diversification
- affected workers and communities receive adequate and appropriate compensation for any job losses that do occur.

5 | Ensure the protection of free, prior, informed consent and rights of redress for affected communities

Ensuring the protection of the rights of affected communities is essential both for reducing the negative impacts of destructive energy sources and ensuring that new energy technologies do not replicate these impacts. Energy extraction and the construction of energy infrastructure must adhere to the principles of relevant international agreements and declarations, including the United Nations International Covenant on Civil and Political rights and the Declaration on the rights of Indigenous Peoples. Key principles are:

- **The right to free, prior and informed consent:** prior to the approval of any project affecting peoples' lands or territories and other resources
- **Land tenure and land rights:** the rights of local communities and Indigenous Peoples to the lands, territories and resources which they have traditionally owned, occupied or otherwise used or acquired.
- **The right to redress:** by means that can include restitution or, when this is not possible, just, fair and equitable compensation, for the lands, territories and resources which local communities and Indigenous Peoples have traditionally owned or otherwise occupied or used, and which have been confiscated, taken, occupied, used or damaged without their free, prior and informed consent.
- **The right of Indigenous Peoples to their self-determination and self-government:** including the right to autonomy or self-government in matters relating to their internal and local affairs, as well as their right to participate fully, if they so choose, in the political life of the state.
- **The right of Indigenous Peoples to the management and customary use of natural resources:** in accordance with traditional cultural practices that are compatible with conservation or sustainable use requirements.

It is also essential to ensure that the rights of communities affected by existing destructive energy infrastructure are upheld and that communities receive adequate compensation and reparations for their loss of land, livelihoods, culture and dignity.

6 | Tackle the international trade and investment rules that prevent the transition to a just and sustainable energy system

As indicated above, transforming the energy system necessitates direct democratic control over energy infrastructure and resources and governance of these resources in the public interest. The transformation of the energy system therefore necessitates the dismantling of the international trade and investment agreements that undermine the sovereignty of democratically-elected governments and foster the privatisation and commodification of energy and natural resources. These agreements, and international arbitration processes like ICSID which enforce them, are part of the architecture of impunity of transnational corporations. They enable these corporations, investors and other private interests to use opaque international legal processes to ensure their continued control over destructive and harmful energy sources and continued profit-making opportunities from the unjust and unsustainable energy system.

7 | **Facilitate the sharing, transfer, development and local adaptation of low-impact energy technologies** Transforming the energy system to reduce greenhouse gas emissions in the time frame we have to avoid climate tipping points requires the urgent worldwide deployment of low-impact, climate-safe technologies in very short time frames, which in turn requires urgent measures to facilitate technology transfer. Technology transfer is understood here in its most comprehensive definition as set out by Third World Network, involving the transfer of skills and know-how to use, operate, maintain as well as to understand the technology so that further independent innovation is possible by recipient firms.[173] It also includes copying the technology through 'imitation' or reverse engineering, adapting it to local conditions and eventually designing and manufacturing original products. Addressing the barriers to technology transfer created by global intellectual property rules is therefore an urgent essential step in facilitating the transformation of the global energy system.

A nuclear power plant in France.
© Tomasz Chmarra

8 | **End perverse incentives for dirty and harmful energy** In order to phase out harmful energy sources and accelerate the transition to a just and sustainable energy system, we need to end the perverse incentives that artificially prop up or legitimise its continuation. These include carbon trading and subsidies, tax breaks and other incentives for fossil fuels, industrial agrofuels, nuclear power and mega dams; and false solutions like CCS and large-scale geoengineering. Action on fossil fuel subsidies must follow the roll-out of affordable, climate-safe low-impact energy sources so that the removal of such subsidies does not impact on energy access for ordinary people and communities.

Advertisement for mining security on a bill board in the streets of Maputo, Mozambique.
© JA! Justica Ambiental (FoE Mozambique)

A Mirrar child in Kakadu National Park, Australia. The site of the Jabiluka uranium mine.

HOW TO MAKE CHANGE HAPPEN

11

The challenge of transforming the current energy system is one of the most difficult steps of all and needs the most discussion among those communities, activists, campaigners and organisations whose aim is to bring about this change.

Around the world, many communities are fighting for a just and sustainable energy system through local campaigns and struggles. This report has shown some of the struggles that Friends of the Earth International member groups are engaged in, working with communities to support their battles to resist polluting and destructive oil, gas and coal extraction, dirty waste-to-energy incineration, land grabbing, mega dams, and high-risk, expensive and dangerous nuclear power. These examples are just the tip of the iceberg. Around the world, communities on the front line are resisting with everything they have the grabbing, commodification and destruction of their common resources to feed the destructive energy system. These struggles are not just about resisting the encroachment of destructive energy, they are also prefigurative: defending livelihoods based on low-impact, sustainable energy use and the collective protection of commonly-held natural resources that will need to be a central feature of a just and sustainable energy system. All of these struggles are about living, building and embodying the world we want to see.

Many communities are also taking the issue of affordable energy access into their own hands, building small-scale, locally-owned and -controlled wind, solar and micro-hydro co-operatives which meet local needs and end their reliance on the current exploitative, destructive, corporate-controlled energy system. In a forthcoming publication, we will provide more information on some of the community-led renewable energy projects and initiatives that our member groups are involved in supporting around the world.

All of these prefigurative efforts are essential – defending and building just and sustainable ways of meeting our basic energy needs and protecting our natural resources inside the shell of the old broken system. They are essential not only for exposing the deep flaws and failings of the current system and showing what is possible, but also for delivering real improvements now: real cuts in emissions, real improvements in energy access and affordability, and a strengthened sense of community, solidarity and empowerment among the people involved.

While some of these local struggles and initiatives are succeeding, many are not. The resources available to communities resisting destructive energy projects from encroaching on their lands are tiny compared to the financial, political and legal resources that corporations can use to ensure their ability to exploit and profit from destructive, harmful energy. Similarly, many community renewable energy projects are struggling to get off the ground because of lack of funds, and the only current alternative is to hand over control to outside investors who are likely to value maximising return on their investments over local economic wellbeing, sustainability and energy access.

Although great efforts are being made to strengthen and connect community struggles, many remain atomised, or unconnected to related endeavours, like those of energy sector and mine workers for decent wages and safe working conditions. And finally, there are many places where community-led, small-scale solutions are simply not commensurate with the need – in slums and mega cities around the world where access to basic energy services remain entirely conditional on capacity to pay.

This poses a number of critical questions for the environmental justice movement: how can we help scale up, strengthen and replicate resistance to the ongoing encroachment of the destructive, unsustainable energy system, and support the construction of grassroots, sustainable alternatives instead? How can we bring our skills, expertise and resources to help strengthen and spread this resistance and the initiatives that prefigure just, sustainable and climate-safe energy system?

Many campaigning organisations are already lending direct support to community initiatives by assisting alliance-building and communication between groups involved in energy struggles in order to share experiences and skills. But given the scale of corporate vested interests that these local struggles are challenging, and the urgency and threat of the climate crisis, these efforts are necessary but not sufficient.

Most of the levers that can influence the production and distribution of energy in any major way are held by national governments, including:

- what exploration and extraction licenses to issue;
- how to regulate extractive industries;
- what type of energy infrastructure to encourage through finance and other measures;
- what labour, social and environmental standards to impose on energy infrastructure, on energy technology manufacturing, and on energy-intensive industries;
- whether or not to regulate to expand energy access and ensure energy affordability.

All of these powers are in the hands of the state. And in most places these decisions have been captured by private vested interests, like the owners and financiers of extractive industries, as well as energy companies and large-scale corporate energy users like mines, smelters and petro-chemical industries.

Unless we can exert real democratic control over national governments' decisions about the energy system then it is likely that grassroots struggles which do succeed will remain lone islands in the context of an overall energy system that remains unsustainable, exploitative and unjust. Without taking control of energy production and distribution out of the hands of the owners and financiers of corporations that profit from the current unsustainable system, the urgent transformation we need to a just and sustainable system will never get under way.

> **WE NEED TO BUILD A COMMON VISION WITH ALL THOSE WHO HAVE AN INTEREST IN TRANSFORMING THE ENERGY SYSTEM AND WHOSE SKILLS ARE NEEDED TO MAKE IT HAPPEN, AND A COMMON STRATEGY FOR HOW TO GET THERE.**

There is no blueprint for how transformation can be achieved. Different countries and localities are already in very different situations in terms of the degree of corporate versus social control over energy policy and energy infrastructure. But it is clear that to win we need to build our power, strengthening the collective forces working to bring about change at the national and international level. And this in turn points to the urgent need for dialogue and alliance-building. We need to build a common vision with all those who have an interest in transforming the energy system and whose skills are needed to make it happen, and a common strategy for how to get there. This process must include affected communities, communities without energy, energy users, energy sector workers, campaigners, academics and technical specialists amongst others. Therefore, Friends of the Earth International's vision of a just and sustainable energy system, and the steps needed to get there, is not set in stone, but our initial contribution to that conversation. We are ready and willing to change our perspective based on what we hear and understand from others in the movement.

As part of this process, we will inevitably need to address questions of nationalisation and public / social ownership and control over energy resources, energy infrastructure and energy-intensive industries. Democratic government ownership or strict governance over the energy system is a precondition for ensuring the urgent transformation we need. History shows that breaking down government monopoly ownership and control of energy resources and infrastructure often opens the way for market liberalisation and corporate control rather than community control and clean energy. In the recent experiences of Bolivia, Ecuador and Venezuela, nationalisation of energy resources and infrastructure has been a centrepiece of the major leaps those countries and their governments have made in terms of economic justice. Yet there is nothing inherently progressive about nationalisation. Hitler's Germany and apartheid South Africa both nationalised aspects of the energy system, and many post-Soviet countries have had negative experiences under nationalised energy systems.

Solar kitchen demonstration, India.
© Kailash Mittal

Increasing public control and reducing corporate control over the energy system is another necessary but not sufficient step in transforming the system. We also need to ensure that our governments are accountable to and act in the interests of ordinary people. We need them to prioritise social outcomes like community rights, tackling climate change, and expanding energy access. And we need decisions on energy to be delegated to the most local and least centralised level possible, and for all directly-affected groups to have the power to influence decisions, including affected communities, energy users, energy sector workers, and people who are excluded from energy systems.

As Friends of the Earth International, we believe that the transformation of the energy system will only be possible if we can help to build a sufficient collective force to outweigh those groups in whose interests the current system is operating.

Solar Energy being used in the Kuna Yala Indigenous Comarca in Panama.
© Ronnie Hall / Critical Information Collective

> **INCREASING PUBLIC CONTROL AND REDUCING CORPORATE CONTROL OVER THE ENERGY SYSTEM IS ANOTHER NECESSARY BUT NOT SUFFICIENT STEP IN TRANSFORMING THE SYSTEM. WE ALSO NEED TO ENSURE THAT OUR GOVERNMENTS ARE ACCOUNTABLE TO AND ACT IN THE INTERESTS OF ORDINARY PEOPLE.**

FURTHER RESOURCES ON ENERGY

Many organisations and activists are doing amazing work on transforming the energy system nationally and internationally. Here are some of the networks that Friends of the Earth International works closely with on energy, and whose valuable insights, information and resources have informed our work (listed alphabetically):

- 350.org: 350.org/
- Carbon Trade Watch: www.carbontradewatch.org/
- The Corner House: www.thecornerhouse.org.uk/
- Biofuelwatch: www.biofuelwatch.org.uk/
- ETC Group: www.etcgroup.org/
- Focus on the Global South: focusweb.org/
- Food & Water Watch: www.foodandwaterwatch.org/
- Earthlife Africa Johannesburg: www.earthlife.org.za/
- GAIA: www.no-burn.org/
- Global Frackdown: www.globalfrackdown.org/
- Greenpeace International: www.greenpeace.org/international/en/
- Indigenous Environmental Network: http://www.ienearth.org/
- International Rivers: www.internationalrivers.org/
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A bulldozer driver searching through the waste in Gibraltar.
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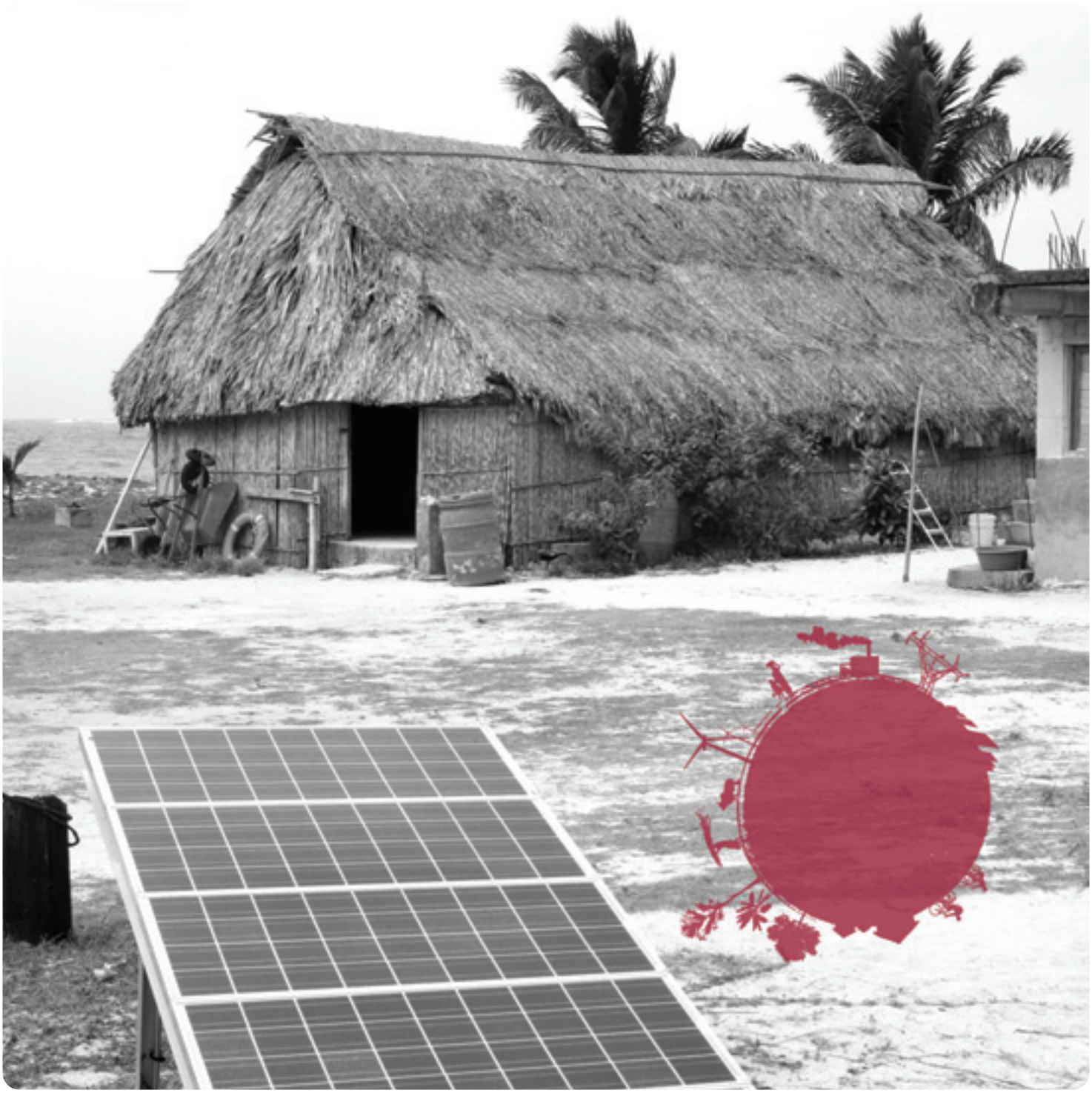

Solar Energy being used in the Kuna Yala Indigenous Comarca in Panama.
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The Climbing for Climate Justice Everest expedition – organised by the Save the Himalayas Campaign and Khangri Media, in collaboration with Friends of the Earth Nepal / Pro Public – successfully climbed Mt. Everest on May 20 to demand climate justice from the top of the world. Banners are held by Pemba Dorge Sherpa (left with white helmet) and Suman Shrestha (right without helmet).
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