

Energy Casualties: How People are Dying for our Energy

*And Why America Needs to Convert to Safe,
Healthy, and Renewable Sources*



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Energy Casualties is the first report from **Better Future Project**, a new organization dedicated to moving America and the world beyond energy sources that require human casualties. A companion report, to be released later in 2012, will catalogue the efforts of local leaders to help their communities move beyond fossil fuels.

This report examines many of the various ways our consumption of fossil fuels leads to human suffering, conflict, and death. While some may see it as odd that an organization with as optimistic a name as Better Future Project would produce a report with such a negative outlook on the present, we believe that things can only get better if we are honest with ourselves about how truly bad they are. And right now, the way we consume energy kills people. Because we burn fossil fuels, people die. Human hearts stop beating. These casualties are unacceptable. No matter how addicted we are to fossil fuels, we have a moral imperative to rapidly and responsibly transition to energy sources that are safer, healthier, and do not require human sacrifices. Fortunately, healthy, safe, and truly renewable sources of energy exist that would allow us to produce energy without expected human casualties. This paper does not seek to explain how that transition will or should occur, but rather make the case for why it must.

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Introduction

The Changing Face of Fossil Fuels

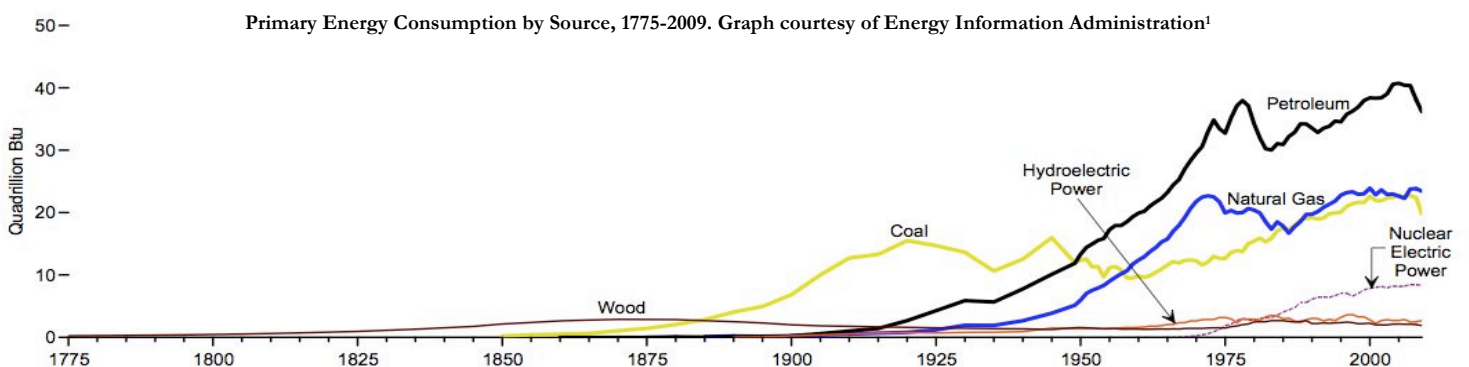
In the century and a half that we've used them, fossil fuels have caused vast casualties and threatened to throw the world into an irreversible state of crisis. US dependence on fossil fuels poses immediate problems in the realms of security, health, and justice, both outside and within the borders of the United States.

Human beings produce energy using a variety of different earthly resources. However, most of our energy is produced from three types of fossil fuels: petroleum (oil), natural gas, and coal. The cheap energy provided by fossil fuels allowed for the industrialization and expansion of the United States economy. Without this valuable and seemingly abundant resource, the nation's defense, medical, transportation, and economic infrastructures would not have become what they are today. Countless millions of lives have been saved and extended, and the global economy has flourished, largely due to the burning of fossil fuels.

But fossil fuels are not without their costs; our continued burning of fossil fuels causes human beings to suffer. As a result of our reliance on fossil fuels, our economic and military stability come under constant threat, hundreds of thousands face illness and death, and the most vulnerable communities suffer the worst of the effects. US dependence on fossil fuels poses immediate problems in

the realms of security, health, and justice, both outside and within the borders of the United States. In addition, our consumption of fossil fuels is causing drastic changes in the earth's climate, and these changes are radically intensifying existing problems and increasing the death toll attributable to fossil fuels.

All those who see the burning of fossil fuels as a necessary part of a modern, successful America, ought to look again. In the past, the lives saved by fossil fuels that powered hospitals and kept people warm in the winter may have exceeded the lives sacrificed. Today, we are not faced with a choice of deadly energy or no energy at all. Today, we are faced with a choice to continue using energy sources that cause people to die, or to switch to sources that have no expected casualties. Once symbols of progress, fossil fuels now symbolize stagnation, sickness, conflict, death, and rising threats to national and international stability. America needs a rapid and responsible transition to safe, healthy and renewable sources of energy.



The US started using fossil fuels as an energy source around 1850 with the beginning of the industrial revolution. In the century and a half that we've used them, they have made critical contributions to American success and progress. And they have also caused vast casualties and polluted the atmosphere to the point that major shifts in weather patterns are underway, threatening to throw the world into an irreversible state of crisis.

Security

Economic Pains; Human Casualties

Dependence on fossil fuels costs Americans dearly not only in dollars, but also in life and limb. Oil politics alone are critically harmful to the country's economic and military security. America sends over \$350 billion overseas each year to purchase oil.² These \$350 billion add to a staggering trade deficit, and their loss causes harm to a U.S. economy that is additionally suffering from high unemployment, recession, and the aftershocks of the housing crisis.

The forever rising and unstable price of oil leaves our economy and military constantly at the whim of the international oil market.

- The Department of Defense (DoD), with an energy budget of \$20 billion, feels major shock waves with every price spike in fossil fuels.³ This jeopardizes the DoD's ability to adequately fund other vital aspects of its operations carried out under the Army, Navy, Marines and Air Force.
- The state of the U.S. economy is also wed to the peaks and dips of the oil market. Price spikes in gasoline are enough to cause oil scares and economic downturns within the country.
- Oil, a finite resource like other fossil fuels, becomes more scarce and difficult to extract as time goes on. While we can continue to develop new technologies to reach more oil, this is expensive and causes an upward slope in price over time. And, as world oil supply is finite, it will eventually be used up beyond the reach of new technologies.

What is more, this oil money props up a worldwide oil market that puts money into the hands of oppressive governments and enemies to U.S. national security. Among the players that directly benefit from U.S. oil money are dictatorships that use the money to oppress their own people, spread harmful propaganda about the United States, and even threaten American lives.

- Countries with vast resources of petroleum do not need to derive their power from the consent of the governed or earn their taxes from the ingenuity and hard work of their people.



Oil Funding Oppression and Rape: Spotlight on Libya

Population: approximately 6,600,000⁴

GDP per capita: \$14,000⁵

Oil Revenues: 95% of export earnings, 25% of GDP, and 80% of government income⁶

Oil Revenue (2010): \$32.43 billion⁷

After a 41-year rule as Libya's dictator, Muammar Gaddafi, along with his son Saif al-Islam and his military intelligence chief General Abdullah al-Sanoussi, were charged with crimes against humanity four months into the eight-month-long Libyan civil war.⁸

While at first the consumption of fossil fuels may seem unrelated to the oppression of the Libyan people, in reality the oil market had everything to do with Gaddafi's power. Gaddafi built his military might from the nation's wealth of oil reserves. Since Libya produces 1.8 million barrels per day of oil,⁹ the nation nets billions of dollars in oil revenue each year. Gaddafi embezzled billions of dollars and channeled much of the illegal funds towards brutally oppressing his own civilians.¹⁰ For example, petro-dollars directly paid for the wages and weapons of his mercenaries; in other words, they were directly paying for the rape, torture, and murder of unknown numbers of innocent civilians.

After suffering under him for four decades, the people of Libya peacefully rose up against Colonel Gaddafi, using rallies, marches, and graffiti to express their desire for him to leave office. Unwilling to step down, Gaddafi hired mercenaries, and used rape as a weapon of war. A former Libyan army major says that "the order to rape was not given to the regular army. Colonel Gaddafi knew we would never accept it. It was given to the mercenaries."¹¹ Rape in Libya, a conservative nation where women do not leave the house without covering their faces with a veil, is considered beyond shameful and dishonorable. Victims not only suffer from the psychological trauma of rape, but they are also threatened with honor killings if they become pregnant. "Many fathers will kill their own daughters if they found out that they have been raped," explains Nader Elhamessi from the Libyan aid agency, World for Libya.¹²

Until the outbreak of hostilities, the U.S. imported 51,000 barrels per day of oil from Libya,¹³ meaning that U.S. money directly propped up Gaddafi's corrupt and tyrannical rule, and later funded his inhumane war methods. And since oil is a global commodity, by continuing to consume it, we continue to drive up its price, allocating power to abusive dictators like Gaddafi.



A group of civilian rebel volunteers gathers for its first day of military training in Benghazi, Libya

"Unless the nation significantly decreases its dependence [on oil], declining supplies combined with increasing global demand will have severe impacts on the American economy and our ability to remain militarily strong." – Center for Naval Analysis¹⁴

Rather, they derive their power from a collection of dead plant and animal material from millions of years ago, known as fossil fuels, for which they need neither a free people nor a free market to develop and sell.

- U.S. oil money funds oppressive regimes in such nations as Venezuela, Russia, and Saudi Arabia, all of which have used the power of law to oppress their own people and all of which have rocky relations with the U.S.
- In its 2009 Report on Human Rights Practices, the U.S. State Department's Bureau of Democracy, Human Rights, and Labor (DRL) lists a large number of human rights offenses committed under the Venezuelan government, including harsh prison conditions, arbitrary arrests, the keeping of political prisoners, and government attacks on public demonstrations.¹⁵
- The DRL provides a similarly dreadful list of human rights offenses committed within Russia, including severe corruption, the use of violence by police at peaceful protests, discrimination against minorities, and intimidation or harassment of the media.¹⁶ Notably, eight journalists who had been critical of the government disappeared during 2009, and "with one exception the government failed to identify, arrest, or prosecute any suspects."¹⁷
- The DRL lists a battery of human rights offenses under the government of Saudi Arabia, including disappearances, torture and physical abuse, arbitrary arrest, the keeping of political prisoners, restriction of religious freedom, restriction of

freedom of speech, and punishment or execution of rape victims.¹⁸

- Some U.S. oil money pays for the bloodshed of American citizens by funding terrorist organizations. Documents recently leaked by WikiLeaks revealed that Saudi Arabia passes American oil money into the hands of the terrorist groups al-Qaida, the Taliban, and Lashkar-e-Taiba.¹⁹

A rapid and responsible shift away from fossil fuels and towards safe, healthy, and renewable sources will simultaneously grow the American job market and make the military more secure.

- Renewable energies such as solar and wind power are based largely on local installation and maintenance rather than overseas extraction and purchase, and therefore could create millions of U.S. jobs while easing our harmful reliance on foreign fuels.
- Secretary of the Navy Ray Mabus, at a January 2011 conference, championed Navy plans to convert to alternative fuels, citing benefits such as new jobs, reduced energy spending, and improved security and combat capabilities.²⁰
- Over 3,000 American soldiers or contractors were killed in fuel supply convoys between 2003 and 2007 in Iraq and Afghanistan.²¹ Both Navy and Army sources have said that a conversion to renewable energy, which can often be produced on-site, will save American lives by reducing the number of these dangerous convoy missions.^{22,23}

Running low on fuel?

"Large Western oil-producing companies... are finding most accessible oil fields were tapped long ago, while promising new regions are proving technologically and politically challenging."²⁴ -- Wall Street Journal article, Feb 2, 2011

The longer the world continues to rely on fossil fuels, the more expensive they will become to extract and produce -- and the more expensive the transition to alternative fuels will be.



Climate and the Escalation of Conflict

Past and present burning of the earth's fossil fuels contributes to radical atmospheric changes that pose both immediate and looming security concerns. The DoD, the CIA, and the Navy have made a priority of preparing their organizations for the imminent dangers and the resulting demands that will be thrust upon them.^{26,27,28}

- For example, the Navy is already preparing for the impacts that rising sea levels and thinning Arctic ice will have upon its operations,²⁹ while all three organizations are concerned about the increased conflict that is expected to unfold internationally.
- Among the expected initial changes are increased temperature and rainfall, followed by "desertification, rising sea levels, population shifts, and heightened competition for natural resources."³⁰
- Additionally, increased rates of infectious diseases; interruptions to food yield; and extreme weather events including heat waves, droughts, and storms will add to the dangers.^{31,32} Worldwide, health and poverty crises will multiply, and they will contribute to a rise in civil unrest and diplomatic upheaval.

American military resources will be stretched increasingly thin as demand for both foreign interventions and domestic assistance increases.

"Assessments conducted by the intelligence community indicate that climate change could have significant geopolitical impacts around the world, contributing to poverty, environmental degradation, and the further weakening of fragile governments...placing a burden to respond on civilian institutions and militaries around the world." –
Pentagon Defense Review²⁵

- The American military will likely become entangled in new conflicts abroad as it is called upon to intervene in international crises and to stabilize foreign governments.
- The Pentagon believes that, while military forces are being diverted abroad, Americans at home will require assistance missions to respond to new threats such as "extreme weather events, drought, flooding, [and] life-threatening diseases,"³³ adding further strain to American military resources.
- Hostile threats from abroad may increase as international terrorist groups benefit from the rise of civil unrest.
- Increased defense costs, to address new conflicts, will have a huge impact on the U.S. economy, and will force the DoD to compete for a larger share of an already constrained federal budget.

While the burning of petroleum, gas, and coal up to this point in time cannot be undone, it is not too late to cut short the future of fossil fuels. By rapidly and responsibly abandoning fossil fuels, the United States can lead the world in a major energy shift that will put a stop to the deaths they cause and prevent the worst potential atmospheric changes and the related effects. With such a step, the economy will benefit, large military threats will be diminished, and the world will be a safer and healthier place for Americans and non-Americans alike.

Health

Asthma, Mercury and More Hidden Killers

At mines, drilling sites, and power plants, fossil fuel production poses a huge threat to human health. Americans pay for the energy that currently powers their buildings and cars in more lives and sicknesses than most would suspect.

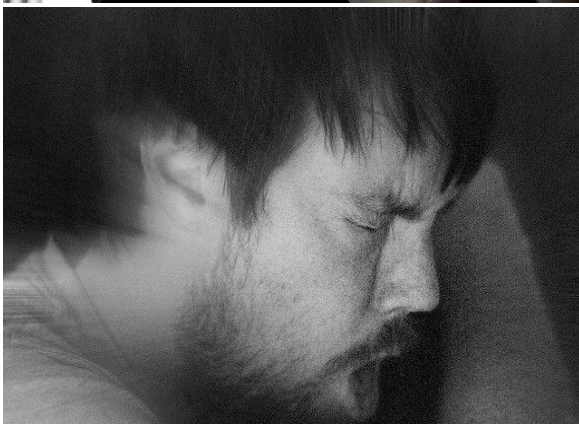
Fossil fuel burning releases a mixture of toxic pollutants, among which are mercury, uranium, arsenic, and lead as well as sulfur and nitrogen oxides.

- These pollutants, which leak into air, food and water supplies, ultimately cause millions of illnesses and an estimated 24,000 deaths each year nationwide from fossil fuel power plants alone,³⁴ while cars and other sources cause additional cases of sickness and death.

- Specifically, these pollutants cause increased rates of lung cancer, other lung and cardiovascular diseases, reduced lung function, asthma, chronic bronchitis, respiratory tract infections, and death.³⁵
- When burned, fossil fuels emit mercury, a neurotoxin that enters our bodies through the food we eat. It is especially harmful to prenatal infants and children, and is associated with stunted brain development and cardiovascular diseases.³⁶

Whether it is the drilling of oil, the mining of coal, or the drilling and hydraulic fracturing ("fracking") of natural gas, all the various methods of extracting fossil fuels from the earth produce a range of adverse health effects.

- The drilling processes for natural gas and oil





release toxic pollutants into groundwater and oceans, contaminating water and food supplies and from there making their way into human bodies.³⁷

- Those who live in coal mining regions are regularly exposed to increased levels of pollutants in their air, water, and food. An estimated 1,700-2,900 Americans die every year in the Appalachian coal mining region alone due to coal mining pollution,³⁸ while tens of thousands survive but suffer sicknesses such as cancer, heart, lung, and kidney diseases, chronic pulmonary disorders, and hypertension.³⁹
- Natural gas, often falsely portrayed as a "clean" alternative to coal and oil, threatens human health as well. As an alternative to drilling, gas companies increasingly use the method of hydraulic fracturing to extract natural gas. In this process a mixture of water and hundreds of toxic chemicals are pumped into the ground, where they seep into groundwater and well water, threatening the health and livelihoods of nearby inhabitants.
- Hundreds of people living above the Marcellus Shale natural gas deposit across West Virginia, Pennsylvania, Ohio, and New York have come forth to protest foul-smelling, unsafe groundwater after the recent commencement of hydraulic fracturing to extract natural gas on their land.⁴⁰

Beyond the regular death and sickness caused by everyday pollution, the extraction of fossil fuels leads to dangerous accidents that result in death, injury and sickness.

- Coal mine explosions, natural gas explosions, and oil blowouts all often result in the tragic deaths of workers.
- Oil spills, an inevitable periodic occurrence on drilling sites and along lines of transport, injure and kill workers and poison ocean life and wildlife that serve as safe and healthy food for local residents. The pollution from oil spills also causes acute health problems such as respiratory problems, rashes, nausea and chemical irritations.

Sacrificing Life for Energy: Plant Scherer

Location: Juliette, Georgia
Permanently employs: 400 people⁴¹
Produces: 3,520,000 kW of energy⁴²
Responsible for (in 2010 est.):
180 deaths, 240 heart attacks, 3,000 asthma attacks, 110 cases of cronic bronchitis,
120 hospital admissions, and 180 ER visits for asthma⁴³

In the small, unincorporated community of Juliette, Georgia, lies the largest and dirtiest coal plant in the United States.⁴⁴ Once a vibrant community, Juliette has changed quite a bit over the decades. The town today is best known for its use as the drab setting in the movie *Fried Green Tomatoes*. Today, most of Juliette's visitors are the mile-long, coal-carrying freight trains that come on an average of three times per day.

The small town of Juliette houses Plant Scherer, a giant among U.S. coal power plants. Georgia procures over 60% of its electricity from coal.⁴⁵ And as the 5th largest electric generating power plant in the nation⁴⁶ and the largest employer in Monroe County, Plant Scherer exerts significant influence over Georgia's economy. But in spite of its contributions to Georgia's economy and energy production, the plant has its costs, namely sickness and the loss of human life. Plant Scherer has been found to be the fourth worst polluting coal plant⁴⁷ and the third worst mercury polluter⁴⁸ in the country.

As Charles D. Connor, president of the American Lung Association (ALA), states quite simply, "Power plant pollution kills people." In fact, according to the ALA, the particulate pollution that U.S. coal plants emit kill an estimated 13,000 people per year.⁴⁹ Plant Scherer, which burns an estimated 40,000 tons of coal each and every day, is among the very worst offenders.

And that includes *just* the direct health impact of coal plant pollutants. The deaths truly pile up when one factors in how the burning of coal shakes the stability of our global weather patterns -- weather patterns that farmers depend upon to grow food, that countries depend upon to bring rain, and that the world depends upon to keep sea levels steady and its communities safe from excessive extreme weather.

When we can grasp the connection between local coal plant pollution and the strife brought by changes in global climate, it becomes even more alarmingly clear that we need to transition away from such dangerous and deadly energy sources. In the mean time, perhaps it is enough to consider the sickness and death suffered by the children, senior citizens, and all residents of towns like Juliette, those communities that suffer the worst of the direct effects of coal burning.



Aerial View of the Scherer Plant

- The Deepwater Horizon spill in the Gulf of Mexico was estimated to have caused roughly \$36 billion of damage to the economy and the environment, more than the yearly output of some U.S. states.⁵⁰
- Oil spills have deep and lasting effects. In 1989, 11 million gallons of oil poured into Prince William Sound in the Exxon Valdez oil spill. Over 20 years later, fish populations have not recovered, and Alaskans can still venture off the coast and find dense, tar-like oil in their waters.⁵¹

An Increasing Menace to Human Health

The continued burning of fossil fuels worsens dangerous shifts that are already underway in our climate and in our food systems. The Centers for Disease Control (CDC) and the American Medical Association (AMA) independently recognize that worldwide shifts in climate will result in severe health impacts right here within the borders of the United States and therefore are spending resources to research and prepare for imminent medical needs.^{52,53}

- Recent reports by the CDC and AMA project increases in air pollution, allergens, disease vectors, and heat waves which, when combined, will cause great increase in cases of infectious diseases, respiratory problems, heat stroke, and death.^{54,55}
- The leading theories predict increased cases of severe weather, disruptions in agricultural production, and shortages in food and water availability,⁵⁶ which will cause injuries, fatalities, malnutrition, and sickness.
- The burning of fossil fuels also leads to ocean acidification, which occurs when oceans absorb some of the excess carbon dioxide released from fossil fuels, increasing their levels of acidity.
- Ocean acidification is currently rising at an unprecedented rate,⁵⁷ harming many marine animals and throwing off the balance of marine food webs.⁵⁸ This spells out a worldwide food crisis as one of the world's major sources of food comes under extreme threat.

Already in recent years, an increase in weather-related

international emergencies has shocked the world with devastating death tolls and injuries. These events are exclusive to no single region, and their far-reaching effects certainly heed no national borders.

- Severe weather events and infectious diseases are not confined by national borders, while food shortages and localized weather emergencies send shock waves around the globe.
- The tragic flood in Pakistan in 2010 killed thousands, displaced millions, destroyed the country's food supply, and infected many with fatal and infectious waterborne diseases.⁵⁹
- The terrible 2010 heat wave in Russia caused wildfires across the countryside, degradation of air quality, thousands of deaths from heat stroke, and ensuing respiratory and cardiovascular diseases.⁶⁰
- Following the Russian heat wave and the resulting damages to Russia's wheat harvest, worldwide wheat availability plummeted, resulting in a huge spike in worldwide wheat prices and indicating the connectivity and vulnerability of global markets.
- Hurricane Katrina hit the gulf coast of the United States in 2005, and the city of New Orleans met with particular tragedy when the levee protecting the city from flood became overwhelmed and broke from the added stress of the storm waters. Many hundreds died and many thousands became refugees in this sad event of U.S. history.
- The sharp increase in major weather events will produce millions of new refugees worldwide, putting pressure on all countries to increase aid efforts and to house foreign refugees.

While it is fair to say that developing countries will likely face the harshest consequences of impending changes in climate, it is undeniable that people of all countries around the globe, including right here in the United States, will feel harsh effects. From weather events, to infectious diseases, to chronic sickness from pollution, people are dying and will continue to die from fossil fuel burning. A rapid and responsible shift away from fossil fuels and toward safe, healthy, and renewable sources is the only way to curtail the catastrophic climate effects and medical consequences projected for the future.

Justice



A Cruel Series of Events

Americans from low-income communities and communities of color consume the lowest amount of fossil fuels, and yet they pay the highest price for the fossil fuel crisis. While the richest Americans consume the most fossil fuel energy, and while wealthy fossil fuel executives stall efforts to switch to alternative energy sources, low-income Americans and people of color pay in economic and medical well-being. A handful of the economically poorest communities in the nation shoulder the burden of coal mining.

- The people of Appalachian coal mining communities, for example, face chronic sickness and disease, frequent missed days from work and school, and high health care costs and infrastructure costs associated with supporting the coal industry.⁶¹
- On top of that, the coal industry has destroyed sacred sites, natural animal habitats, and safe water supplies for many Native American communities, and displaced members of the Navajo and Hopi Nations.⁶²
- The coal mining industry robs coal mining regions of precious resources, from the money spent on personal healthcare costs, to missed work days, to lost natural resources such as forest and clean water. Without these resources the regions fall into an economic slump -- a state of persistent poverty -- that is nearly impossible to overcome.

Members of communities of color, and particularly low-income communities of color, are more likely to be exposed to, get sick from, and die from fossil fuel pollution.

- African Americans and Hispanic Americans are more likely than the average American to live within 30 miles of a coal plant (the distance within which the worst health effects of pollution are felt),^{63,64} and 80% of Latinos (23% higher than non-Hispanic Whites) live in counties that fail to meet federal air quality standards.⁶⁵
- Asthma, largely caused by pollution attributable to fossil fuel plants and cars, sends African Americans to the hospital at three times the rate of non-Hispanic Whites, and African Americans are twice as likely to die from asthma.⁶⁶

What is more, the fossil fuel industry disproportionately targets communities of color for toxic waste storage sites. Low-income African American communities in the South, for example, have repeatedly been selected for toxic waste sites, proximity to which exposes these communities to dangerous toxins:

- After a massive spill of toxic coal ash in eastern Tennessee's Kingston power plant in 2008, spill waste was shipped to communities with high poverty rates and large African American populations in Georgia and Alabama.⁶⁷
- In recent articles, environmental justice leader Robert Bullard has said that toxic waste from the disastrous Deepwater Horizon Oil Spill in 2010 was disproportionately dumped in low-income African American communities in Louisiana and Florida.⁶⁸

Appalachian coal mining communities face chronic sickness and disease, frequent missed days from work and school, high health care costs, and chronic poverty.

“The country's most vulnerable are least able to protect themselves. They also contribute least to... greenhouse gases. Without action they will pay a high price for the actions of others.” –Kofi Annan⁶⁹

Who Pays the Price for Changes in Climate?

The human consequences of the changing weather patterns put into effect by the burning of fossil fuels are extremely unbalanced. Infectious diseases, famine and drought, heat stroke, respiratory problems, malnutrition, and the other projected results of changes in climate will largely be targeted toward the most vulnerable populations. Within the United States, people of color, those living in urban areas, the uninsured, and the low-income will suffer the worst of the blows.

- In 2008, uninsured Americans totaled about 45 million.⁷⁰ 34% of Hispanics, 22% of African Americans, and 20% of Asian/Pacific Islanders, compared to only 12% of non-Hispanic Whites, are uninsured.⁷¹ The uninsured are less able to afford adequate health care to prevent and combat new health ailments, and therefore these people of color are disproportionately harmed by health impacts of climate change.
- Those living in cities, including a higher proportion of African Americans and Hispanics, are at greater risk for heat stroke and death during the more frequent heat waves we expect to see, because urban areas retain heat throughout the night and therefore experience more intense heat waves.⁷²
- Urban populations are once again at further risk for death and sickness because heightened temperatures in urban areas are expected to increase ground-level ozone and other air pollutants that cause respiratory diseases.⁷³
- Forced to miss days of work and to pay health care bills they cannot afford, low-income and uninsured Americans will face new financial burdens in addition to the medical and emotional burdens of each sickness and injury suffered.
- And with every increase in sickness among low-income Americans, all Americans pay more, through taxpayer contributions to programs such as Medicaid and asthma treatment programs, and emergency room visits.

Meanwhile, the richest countries globally contribute the most to fossil fuel pollution, but as stated in the UN's 2007/2008 Human Development Report, "it is the poorest who did not and still are not contributing significantly... that are the most vulnerable."⁷⁴ The developing and emerging nations of the world lack the infrastructure and resources to protect their people from disasters such as tsunamis, droughts, floods, rising sea levels and disease outbreaks-- and therefore these nations are where consequences are most devastating.

- The astounding consequences of such weather disasters as the 2004 tsunami in the Indian Ocean,⁷⁵ the 2010 floods in Pakistan,⁷⁶ and the 2010 heat wave and wildfires in Russia⁷⁷ demonstrate that large-scale weather

Losing Ground

Citizens of Cape Cod, Massachusetts, face a decision: hold their ground, retreat from the sea, or "protect" the shore. The narrow peninsula, made up of low-lying land and largely separated from mainland Massachusetts by a canal, is losing land to rising sea levels, helped along by more frequent extreme weather, flooding, and erosion of the Cape's beaches.⁷⁸

The rising sea is threatening not only Cape Cod but also coastal communities rich and poor all along the East Coast of the United States. Some individuals and communities can afford to "protect the shore," building seawalls and elevating the land to delay the submergence of their homes.⁷⁹ But not everyone has ample money for relocation, shore protection, or weathering the storms. What about those without the resources to cope?

Poverty and Security: Bangladesh

Population (July 2011 est.): Approximately 159,000,000⁸⁰
Population Density (2006): 2,639 per square mile⁸¹, the 8th highest in the world⁸²
GDP per capita: \$1,700⁸³
Borders: India and Myanmar
Agriculture accounts for: 18.8% of GDP (very high)⁸⁴

Once a successful farmer by Bangladeshi standards, Sudhir Koiborto Das, a 60-year-old local, is now struggling to get by. Koiborto was stripped of his livelihood by invading saline waters that rendered his two hectares of land useless. In Bangladesh, one of the world's most densely populated countries, rising sea levels in the Bay of Bengal have drowned coastal ecosystems, wiped out local animal and plant life, and submerged vast areas of farmland, robbing many farmers like Koiborto of their source of income and food.⁸⁵

"The result has been disastrous. The once fertile land of this whole southwestern region has now turned into a huge saline swamp where no vegetation grows. We cannot grow rice or any vegetables. Coconut palms and banana groves are dying," said Koiborto, explaining the dramatic effects of rising seas.⁸⁶

Due to the overcrowded nature of Bangladesh, residents routinely move into regions where previous occupants have been pushed out by storms. Unfortunately, new residents do not only put themselves at risk by moving into high storm areas, but they often also worsen their fate when, in the process of developing the land, they destroy mangrove trees that serve as a natural defense against both storms and erosion. The government finds it difficult to prevent these actions, and so the residents' lives become more at peril.⁸⁷

The impending sea level rise will not effect only those who rely on coastal crop lands; on the contrary, a sea level rise of one meter (3.28 feet) would inundate 17 percent of this poverty-stricken nation.⁸⁸ And Bangladesh, which does not have adequate funds to cushion such disasters, would not easily recover. For the Bangladeshi citizens, the numbers are grim.

When large portions of Bangladesh do succumb to rising sea levels, displaced citizens like Koiborto, impoverished and without a home, will be forced to migrate away from the coast. But in a poor, densely populated nation, surrounded by other poor nation without the space or the resources to accommodate large numbers of refugees, where will they go? Will rich countries like the United States open their borders and their homes to tens of millions of climate refugees like Koiborto? Or will millions like him be left to struggle on their own, competing over the remaining resources that the changing climate has not eliminated?



Flooding in Dhaka, capital of Bangladesh



Refugee children in Pakistan following the 2010 floods.

disasters have profound impacts upon the health, agriculture, and economy of developing and emerging nations.

- The 2011 drought and ensuing famine in the Horn of Africa caused tremendous numbers of death, malnourishment, and refugees in the region. Two weeks after the crisis was declared, Somalia alone had seen 860,000 refugees flee the country, with an additional 1.5 million Somalians displaced internally.⁸⁹
- A number of small island developing states such as the Maldives and Grenada face destruction of coastline, devastation of infrastructure, and in some cases even their ultimate termination due to the rising of sea levels.⁹⁰ Thousands upon thousands of refugees will be left without the resources to rebuild or relocate.
- Changing rainfall patterns and temperatures will disrupt existing agricultural patterns throughout agricultural regions in Africa, Asia, and Latin America,⁹¹ leading to widespread and severe food shortages and economic struggle.

The hardships of the developing world, adequately regrettable though they might be, will not contain themselves within the countries in which they occur. Undoubtedly their effects will reverberate around the globe. Economic hardships and food shortages can cause

economic depression and food emergencies around the world, including right here in the United States, regardless of the country of origin. Developing countries affected by climate changes will call upon developed countries for medical and economic aid. Furthermore, developed and developing countries alike will face an influx of refugees seeking safe homes after medical and economic emergencies in their home countries.

Developing countries will tragically endure the worst of the long-term hardship that fossil fuel burning has brought upon the earth. Likewise, low-income Americans and people of color will face more hardship than other Americans, in spite of their disproportionately smaller contribution to the problem. Given that every major world religion requires its followers to look after their neighbors, particularly the poor, sick, and weak, our actions would count as a high sin in any religion. But if we act soon, there may be time to rapidly and responsibly transform our country into a place that does not sacrifice human lives among its most vulnerable residents and the most vulnerable countries of the world, as a side effect of procuring cheap energy.

Disappearing Nation: The Maldives

Population: Approximately 395,000⁹²

GDP per capita: \$6,900/year⁹³

Arrival of first human inhabitants (estimated): 300 BC-300AD⁹⁴

Departure of last human inhabitants (predicted): Within 100 years⁹⁵

Walking with a limp, Mohamed Nasheed, the first democratically elected President of the Maldives, strives to save his drowning country: the emerald green island clusters, pale white sand, and blue oceanic waters. The long-term survival of the 1,190 islands of the Maldives, none of which lie even two meters above sea level, is a serious concern for the leader and its residents. A former political prisoner who was jailed 13 times and even tortured for past efforts to advance democracy in his nation,⁹⁶ President Nasheed faces the challenge of climate change with every bit of conviction that he has carried for social issues through his life. The dictatorship that oppressed his fellow citizens and freedom fighters threatened the rights and dignity of his people, but climate change threatens something even more crucial: their very existence as a nation. Viewing climate change as a human rights issue rather than as an environmental crisis, Nasheed's entire focus is on preserving the livability of his nation.⁹⁷

Unfortunately, rising sea levels and flooding have already devastated agriculture and heavily reduced freshwater supplies, threatening the livelihoods and quality of life of Maldivian residents. In response, Nasheed has committed his country to being carbon-neutral by the year 2020.⁹⁸ In spite of the drastic measures the Maldives has taken to combat the forces of climate change, their leadership will accomplish nothing unless more nations, and most crucially economic leaders such as the U.S., China, and India, agree to rapidly transition away from fossil fuels. With every failed international climate negotiation, the window of opportunity grows smaller and the fate of this archipelago nation, more grim. In a 2009 BBC video report, Maldivian Vice President Dr. Mohammed Waheed Hassan takes a peaceful walk along the beach with Chris Morris; Morris asks how long civilians would be able to inhabit the particular island on which they walked. With Hassan's reply of, "Not more than 20 years,"⁹⁹ the urgency of immediate action becomes frighteningly clear.

To save their paradise from extinction, Maldivians are treating environmental science with the same emphasis as math and writing, and are teaching it in every school. And in case they fail to stop the rising seas, the Maldivians are planning for the worst — 300,000 residents becoming refugees — by setting aside some of the revenue from its lucrative tourist industry to buy a new homeland.¹⁰⁰ Already, Maldivian residents have abandoned 16 islands due to rising sea levels. Maldivian citizens are split: most are reluctant to leave the submerging islands and seek life elsewhere, but none wish to wait too long to leave, only to see their future generations living as nationless refugees.



President Mohamed Nasheed of the Maldives

Editor's note: After the writing of this report, President Nasheed has resigned under pressure from military forces and political opposition. There appears to be no connection between this event and the government's climate policies, but details are still emerging. Readers are encouraged to seek information on recent developments and consider implications for the long-term survival of this island nation.

You're up, America

A decision rests upon the country



Why do we continue to use an energy source that results in so much death and suffering, when we know how to generate energy without sacrificing human lives? Rapidly and responsibly transitioning to solar, wind, and geothermal, along with energy efficiency and conservation, would allow us to meet our needs without requiring human beings to be sacrificed upon the "altar of development."

Although we depend heavily on fossil fuels to power everything from hospitals and schools to office parks and military bases, we do not need to do so. America has transformed itself before, and it can transform itself again. We have had exceptional hospitals, schools, offices, and military bases for many decades, and we will continue to have them after we stop burning fossil fuels.

But with each passing moment, the threat of climate change will make it harder and harder to complete this transition. And the longer we wait, the more lives are sacrificed.

The question is not *whether* we will stop burning fossil fuels – they are in limited supply, and sooner or later we will have to stop using them – but *when and how*. Will we choose to stop energy casualties willfully and deliberately, while we have sufficient access to fossil fuels to allow for a

quicker and cheaper transition? Or will we cling to fossil fuels until the last possible second, regardless of the consequences, and then painfully struggle to make the inevitable transition when the costs are even higher and casualties are even more unconscionably high?

The fate of the nation is inseparably wed to American energy practices. To support the strength of the country's economy and military, to be concerned for human health and well-being, and to promote civil rights for all, is to recognize the need for swift energy reform. The good news is, we *do* have the technology to solve this. We can continue to power the infrastructures that lend us a high quality of life, while simultaneously cutting out the most deadly and terrible effects of our current addiction to fossil fuels.

Inevitably, when speaking of a transition of this magnitude, the question of cost arises. This transition will have deep short-term costs. Over the long-term, these investments in our future will undoubtedly repay themselves many times over. But in the end, does it really matter? Does anyone know the cost of abolishing slavery? More importantly, does anyone care? There was a time when our agricultural system relied heavily on involuntary labor, torture, and murder. There were deep economic



Is the solution closer than we might think?

According to the most optimistic predictions, the world could be converted entirely to renewable energies in a matter of mere decades. A recent Stanford study finds that, by using the energy technology we have today, the world can get itself running entirely on renewable energy within the next 20-40 years.¹⁰¹

"This really involves a large scale transformation... But it is possible, without even having to go to new technologies. We really need to just decide collectively that this is the direction we want to head as a society." -- Mark Jacobson, Stanford researcher¹⁰²

While other predictions may be less optimistic, the truth is that the science shows a swift transition to safe, healthy, renewable sources of energy is possible. And as we well know, it is necessary.

costs to ending slavery, but it was the right thing to do, and few today will argue that the economics did not pan out. With fossil fuels, we find ourselves in a similar situation, where our energy systems rely heavily upon resources that, directly and indirectly, cause sickness, death, and destruction. Rapidly and responsibly moving away from fossil fuels is simply **the right thing to do**, regardless of costs.

When people in the future look back upon our decision to move beyond fossil fuels, they will not wonder if we struck the right balance between short-term economic costs and the preservation of human life; they will wonder how there could even be such a debate. Today, the choice is in our hands. You're up, America.

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