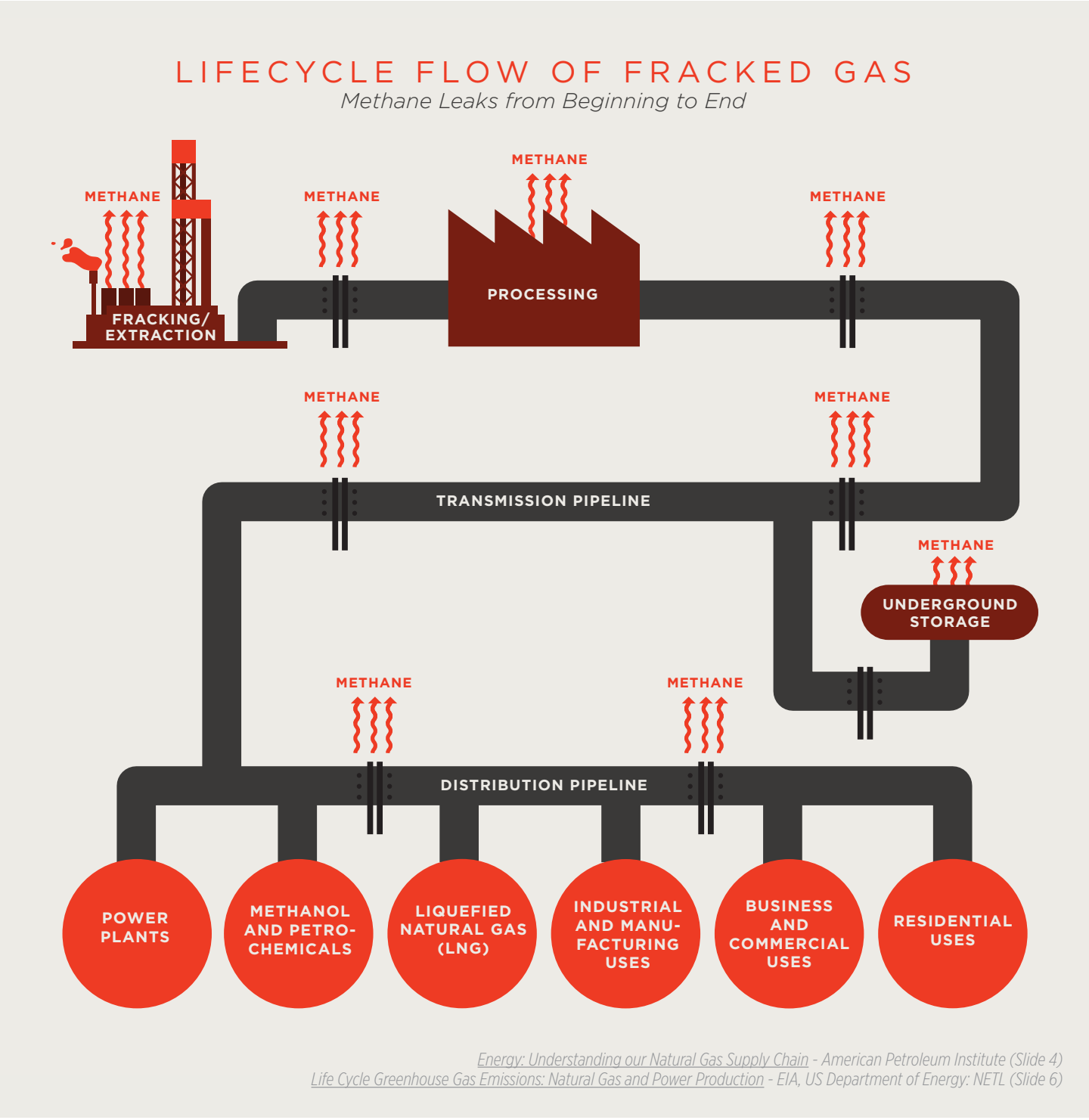
FRACKED GAS

THE NEXT BIG CLIMATE FIGHT

SIERRA CLUB

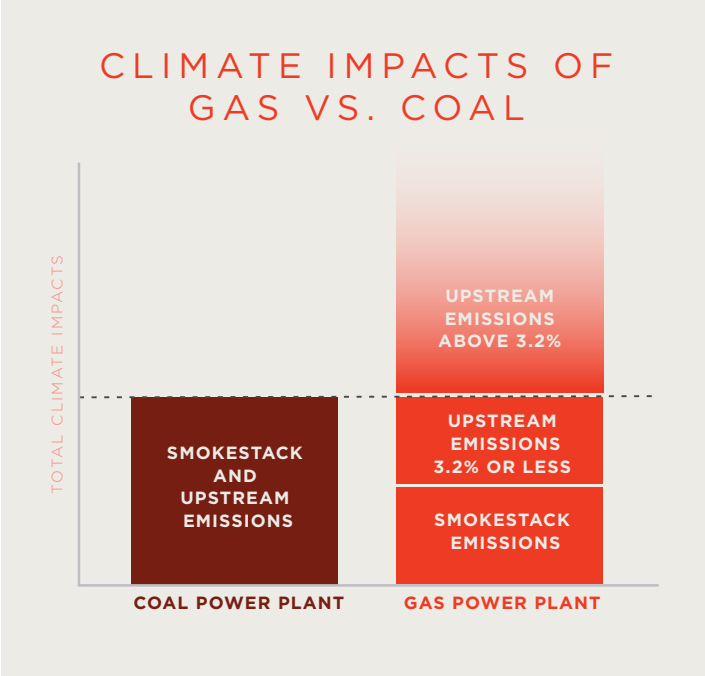


Coal, oil, and natural gas are the primary sources of human-caused climate change. Coal use has seen a dramatic decline in recent years and rapid advances in electric vehicle technology offer the promise of reduced oil use. However, natural gas—which, in the United States, comes primarily from the environmentally-destructive practice of hydraulic fracturing, or "fracking"—is on the rise. **Fracked gas is the next big climate fight in Washington State.**

SECTION 1: **THE TRUE CLIMATE DAMAGE OF FRACKED GAS**

There's nothing "natural" about natural gas. The introduction of fracking has transformed the industry and made fracked gas into one of the largest threats to our climate. Although fracked gas produces less carbon emissions than coal when burned, the production, processing, storage, transmission, and distribution of fracked gas leaks into the atmosphere immense amounts of methane, which is a much more destructive pollutant for our climate than carbon dioxide. **When accounting for methane leaks, fracked gas has climate impacts that rival those of coal.**

Two-thirds of all gas produced in the U.S. is fracked. In this report, we refer to all gas as "fracked" gas because any increase in gas infrastructure will also lead to a sustained increase in the harmful practice of fracking.

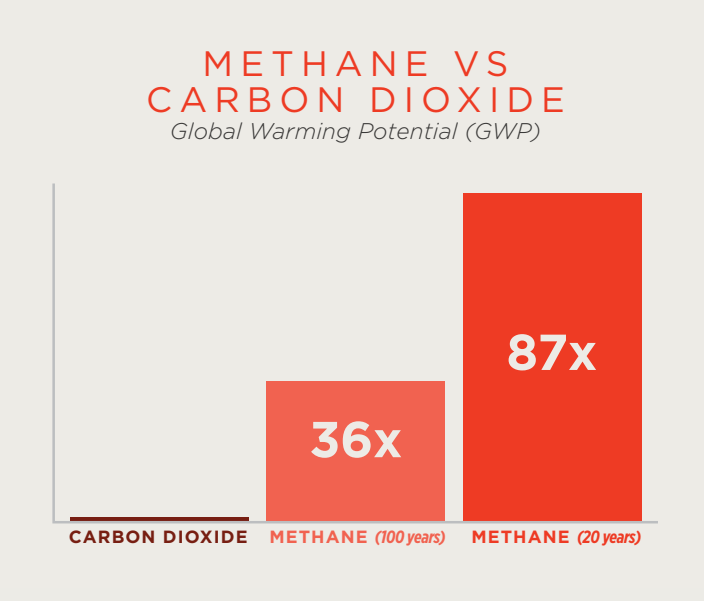


To meet our long-term climate reduction goals, we must first stop making the problem worse by halting all new or expanded uses of fracked gas, including new power plants, the Kalama methanol refinery, and the Tacoma liquefied natural gas facility. Then we must systematically retire all existing gas plants.

To address other climate emissions, we also must electrify as many vehicles as possible and replace gas appliances such as hot water heaters and furnaces with devices that are powered by a clean electricity grid. To that end, a truly clean electricity grid becomes an essential anchor for addressing global warming.

SECTION 2: **WHY FRACKED GAS IS SO DAMAGING**

When burned at the power plant, fracked gas emits about half as much carbon dioxide as a typical coal plant to generate the same amount of energy.[1] However, unburned fracked gas consists primarily of methane. While carbon dioxide remains in the atmosphere for longer than methane, methane has a much stronger climate warming effect. **When methane is leaked directly into the atmosphere, it is 36 times more powerful at trapping heat than carbon dioxide when its impact is averaged over a 100-year period. Over a 20-year period, methane's heat-trapping impact is 87 times more powerful than that of carbon dioxide.[2,3]**



SECTION 3: **METHANE'S DEADLY RISE**

A 2016 Harvard study found that methane emissions in the United States increased by over 30 percent between 2002 and 2014.[4] This domestic increase accounted for a substantial share—by some estimates, a majority or more—of the total growth in methane emissions that occurred worldwide over that time period.

An academic study adopted by the United Nations predicts that without an immediate reduction in methane and other carbon emissions, we are in grave jeopardy of reaching a 1.5 degree (Celsius) warming by the year 2030 and continuing to a 2 degree increase soon after.[5] These are considered the thresholds above which the worst effects of climate change are likely to occur.

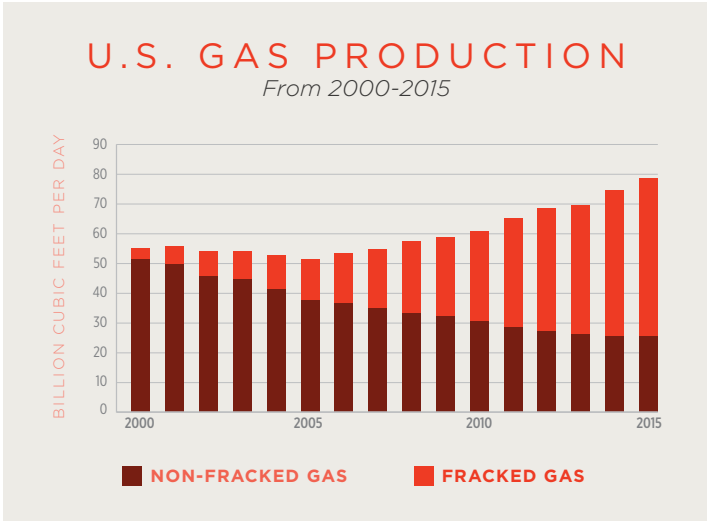
With this warming trend, we will not meet the goals set under the Paris Climate Agreement, the landmark climate plan signed by every country but the United States. The Paris Agreement has been upheld by thousands of U.S. cities, states and businesses despite the Trump Administration's stated intention to abandon the agreement in 2020.[6]

Washington's climate future with current emission trends:[7]

- *38 to 46 percent less snow than 1916-2006 by the 2040s*
- *Up to 400 percent increase in wildfire size with 1 more degree (Celsius) of warming[8]*
- *Up to 109 percent increase in ocean acidity compared to before 2005*

SECTION 4: **THE GAS INDUSTRY'S ROLE IN METHANE EMISSIONS**

Fracking has increased dramatically in recent years. The Energy Information Administration reports that about two-thirds of all natural gas production in the United States now comes from fracked wells, compared to less than 10 percent in 2000.[9] During that time, the average daily gas production from fracking has increased by about 1,200 percent. And according to the Environmental Protection Agency's (EPA's) 2017 U.S. Greenhouse Gas Emissions Inventory, the oil and gas industry is the second-largest source of methane emissions in the United States, contributing over 30 percent of all domestic methane pollution.[10]



SECTION 5: **HOW MUCH METHANE IS LEAKING?**

> *"Natural gas is not a bridge—it's a gang plank"*
>
> *—Michael Brune, Sierra Club executive director*

Just how bad is gas for the climate? That depends on how much methane is leaked before it is burned. Researchers have concluded that at leakage rates exceeding 3.2 percent of total production, the lifecycle climate impacts of burning gas are the same as those of burning coal.[11] So are leakage rates actually this high?

Studies indicate that the upstream methane leakage rates in the gas industry vary significantly from one production site to the next, as well as from one geological basin to the next, making it difficult to settle on a single average number. To the extent that researchers *have* calculated average emission rates from gas production, the most common global estimate is about 3 percent.[12] Although not all geologic formations in the United States necessarily reflect this estimated global average, studies of gas-producing basins in the West,[13] such as the Denver-Julesberg Basin, the San Juan Basin, the Uintah Basin, and the Los Angeles Basin,[14] indicate some of the highest leak rates in the country, often exceeding the global 3 percent average.

Furthermore, these figures only account for leakage that occurs between initial production and delivery to local distribution systems. Therefore, they don't capture leaks that occur while the gas is being moved *within* those distribution systems or at end-use facilities, implying that a 3 percent estimate may be conservative in many cases.

A 2016 study by the Environmental Defense Fund of 65 large oil and gas companies found that only:[15]

- Only 14 percent of companies reported their methane leakage rate
- Zero companies had methane emission reduction targets
- One company thoroughly addressed how it planned to prevent leaks

Although Exxon recently announced plans to reduce methane voluntarily, the vast majority of gas companies have not taken active steps to address emissions from existing equipment and show no indication that they intend to do so soon.

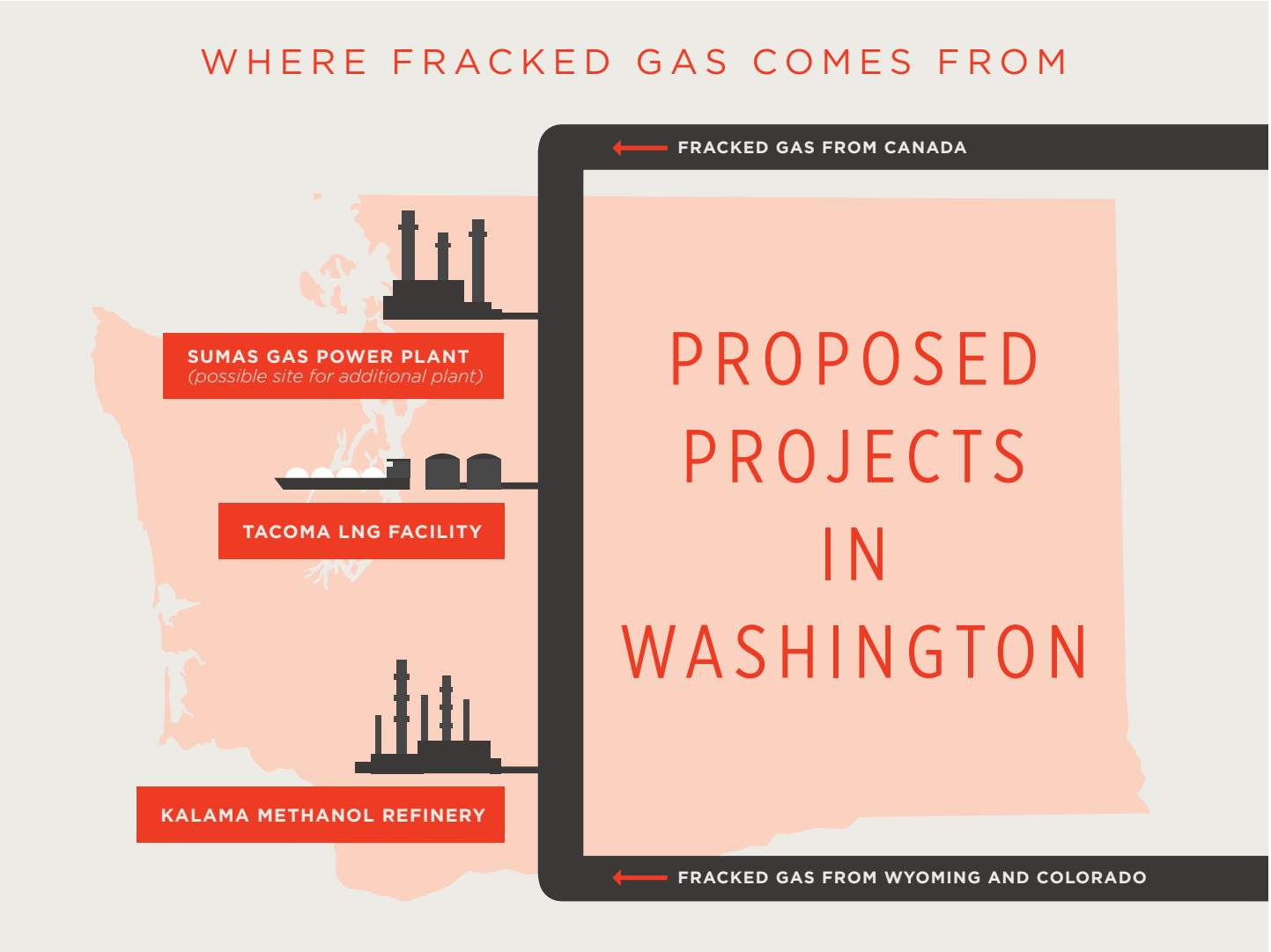
EPA's Greenhouse Gas Reporting Program requires companies to report their methane pollution. However, companies are able to exploit numerous loopholes that cause under-reporting of these emissions. These loopholes include:

- Completely excluding facilities under a certain size from the Program's requirements
- Exempting certain kinds of equipment, activities, and practices in the oil and gas industry from the Program's requirements, even though we know they emit methane
- Frequently relying on estimates rather than direct measurement

Making matters worse, one of Scott Pruitt's first orders of business when President Trump selected him to lead EPA was to cancel the agency's request for more information on opportunities for reducing methane emissions and to reconsider important safeguards against methane emissions from new oil and gas equipment, which the Obama Administration put in place last year.

SECTION 6: **THE GAS INDUSTRY'S BURDEN OF PROOF**

To the extent that there is uncertainty about the level of upstream emissions, the evidence points in one direction only: emissions are higher than industry currently estimates. The only way to quickly ensure accountability for the true magnitude of fracked gas's impact on the climate is to shift the burden of proof onto the gas industry. Fair yet minimal standards need to be established immediately. If the gas industry disagrees, then they can prove otherwise. Unless and until we shift the burden of proof, we will not know just how bad the problem truly is.



SECTION 7: **FRACKED GAS POLICY RECOMMENDATION**

Due to the extreme climate harm caused by methane emissions and the current lack of general accountability, proactive measures are needed.

As noted above, while the estimated global average emission rate for gas production is 3 percent, studies show that leakage rates at production sites in the West—where Washington sources most of its gas—may exceed this figure. To begin addressing this under-recognized climate threat, **we recommend four essential steps to address the gas problem.**

(1) As a baseline matter, projects in Washington State should assume a 3 percent overall leakage rate of methane. This modest standard reflects the global average leak rate, and is conservative in light of high average leak rates in the West and the additional losses that occur within distribution systems or at end-use facilities.

(2) This 3 percent standard should be applied **unless each company with a gas project can provide clear evidence that the leakage rate associated with that particular project is, in fact, below this 3 percent standard** (for instance, if it sources gas from a geologic basin with valid evidence of lower rates). The burden of proof for adopting a project-specific

Washington Current Proposed Projects

- *Kalama methanol refinery*
- *Tacoma liquefied natural gas facility*
- *Puget Sound Energy and Avista proposed gas plants*

standard should be on the project proponent, because the gas industry is the keeper of all crucial information about leakage rates. As such, if the proponent is confident that the 3 percent standard is inaccurate, it is in the strongest position to disprove this standard.

(3) State and local agencies use the more urgent 20-year Global Warming Potential, at which the climate-disrupting impact of methane is 87 times greater than that of carbon dioxide. Not only does the 20-year potential more accurately correspond to the average 12-year atmospheric lifetime of methane molecules than the 100-year potential, the urgency of climate impacts is with us now which merits using nearer-term impacts as the standard.

(4) All state and local agencies, including but not limited to those listed below, should include this 3 percent methane leakage rate and the 20-year Global Warming Potential when assessing the climate impacts of all fracked gas power plants, methanol refineries, LNG facilities, and all other projects and infrastructure in Washington State.

- The State Legislature
- The Utilities and Transportation Commission
- The Department of Ecology
- The Department of Natural Resources
- State and local government siting and permitting agencies
- State and local air agencies

SECTION 8: **FRACKED GAS: A BRIDGE TO NOWHERE**

As coal plants are shuttered across the United States, our decisions for energy replacement options will affect our climate, our health, and our security for years to come.

The fossil fuel industry has long touted gas as a "bridge" to a carbon-free energy mix, asserting reductions in climate pollution while clean energy technology develops. The truth is that our clean energy future is here now, creating jobs and cutting pollution through solar, wind, and energy efficiency projects. The gas plants we build now will likely be with us for decades to come. We must more rapidly reduce our reliance on fossil fuels and replace them with truly clean alternatives, such as wind, solar, and energy efficiency, not build a new fossil fuel backbone for our energy grid at a time when clean energy is cheap and plentiful.

SECTION 9: **BIG PROBLEMS BEYOND CLIMATE**

Climate impacts from fracked gas are one aspect of a larger problem; concerns about this dirty fuel run much deeper and deserve intense scrutiny. Many of these additional impacts are of primary concerns for communities living on the frontlines where these impacts occur. They include (but are not limited to):

- Contaminated groundwater from fracking
- Earthquakes from fracking
- Explosions due to leaking pipelines and storage facilities
- Nitrogen oxides and other air pollutants from smokestacks at end-use facilities
- Upstream emissions of traditional air pollutants, such as smog- and soot-forming volatile organic compounds and air toxins such as benzene, a known carcinogen

ENDNOTES

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4. *Cover photo from Greenpeace. Cattle Grazing near Hydrofracking Installation in Texas*

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