

# TOXIC ASSETS

Making Polluters Pay When Wells Run Dry  
and the Bill Comes Due



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ENVIRONMENTAL LAW



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## Executive Summary

**A**s the fossil fuel era faces its necessary and inevitable end, several questions loom large: When the oil and gas stop flowing, what will happen to the millions of wells drilled onshore and offshore, the pipelines and plants that transport and process the fuels, and the lands and waters where they sit? Who pays the cost of closing down and cleaning up extraction sites, or remediating the significant health and environmental impacts of production — including when the company that dug the wells has gone bankrupt? What legal obligations do public and private actors have to protect local communities from the toxic legacy of oil and gas production? While not new, these end-of-life issues have taken on greater urgency as the COVID-19 and climate crises accelerate the fossil fuel industry's long-term decline.

Faltering markets and increased pressure for a clean energy transition are driving larger oil and gas companies to scale back production plans and smaller ones to go bankrupt. While these changes signal an overdue and welcome wind-down of fossil fuel production, they also expose communities, investors, and governments around the world to post-production costs and risks on a massive scale and an accelerated timeframe.

This report explores the risks associated with the shutdown of oil and gas infrastructure from these three constituencies' perspectives: communities, investors, and governments. Abandoned and leaking infrastructure threatens communities with health and environmental harms that undermine their human rights, in violation of government duties to protect against such foreseeable injuries and business responsibilities to refrain from causing them. Investors face the possibility of near-term losses due to what were once considered far-off closure costs. And governments face the prospect of having to use public funds to clean up the messes private companies have left behind.

The report exposes the structural flaws in legal and regulatory frameworks that have created these unfunded environmental liabilities through a close look at problems with planning and financing for well closure in the United States and Canada. It makes recommendations about what is needed to mitigate the resultant harms to public health and the public purse, and ensure that polluters pay. Finally, it cautions those countries contemplating starting up oil and gas operations today to think hard about the costs associated with shutting them down tomorrow.

Ending oil and gas production is an urgent and necessary step in a just and equitable transition to a clean energy future. But it is not as simple as turning off the tap. Properly closing down and cleaning up the oil and gas industry requires immediate and careful planning to ensure that people and the environment are protected and that polluters pay for the impacts of their business operations. The heavy toll of oil and gas production will long outlast the industry itself. For decades, companies have avoided addressing that toll, and governments have done far too little to ensure that they do so. We can no longer afford that delay. The world must confront the toxic legacy oil and gas leaves behind and take urgent action to ensure the cleanup costs fall on companies, not communities. The first and best way to reduce those looming costs is not to drill any new wells. And for those wells already dug, it is to accelerate their closure and secure funds in the present to manage the fallout from fossil fuels well into the future.

Addressing the climate damage caused by fossil fuels is a global challenge of monumental proportion. Shutting down oil and gas operations prevents the problems caused by production from worsening. More fundamentally, it opens the way for real economy- and society-wide remediation of the deep wounds that oil and gas have left.



## Key Findings

- **The oil and gas industry is in long-term, inevitable decline.** The signs are varied, but the signal is clear. From ExxonMobil's write-off of nearly one-third of its proven reserves to acknowledgments by BP and Shell that the demand for oil likely peaked in 2019, and from major automotive manufacturers' plans to convert to entirely electric-powered passenger vehicles to the ongoing price drops for new solar, wind, and battery storage, evidence abounds that we are living through the oil and gas industry's last gasp.
- **The decline must be managed.** There are already millions of unplugged oil and gas wells around the world, with new drilling underway — even though there is more than enough oil and gas already under production to push the world beyond 1.5°C of warming. These wells, in cities and on farms, in rainforests and river deltas, and on the ocean floor, will be the ghosts of the fossil fuel era, which could haunt communities for years to come unless they are properly closed down and cleaned up.
- **Pollution outlasts production.** The environmental, social, and economic costs of fossil fuel extraction keep accruing even after the oil and gas stop flowing. With the oil and gas industry in long-term decline, the risk of orphaned wells and stranded infrastructure is rising, posing a mounting threat to both public health and the public purse.
- **Frontline communities face long-term threats from oil and gas.** Improperly closed oil and gas wells leak methane and other toxic substances into the air, water, and soil, compounding the damage they cause throughout their operation. Low-income communities and communities of color bear a disproportionate toxic burden from the fossil fuel industry, both during and after production.
- **Well closure is a necessary part of moving past oil and gas.** Closing down — and cleaning up — oil and gas operations is a critical step in a just transition away from fossil fuels. Doing it right requires protecting people and the environment and ensuring that polluters pay.
- **Planning for cleanup is necessary to protect human rights and the environment.** Human rights law obliges governments to adequately regulate private actors and hold them accountable for harms, including those stemming from pollution and contamination. The polluter pays principle, firmly established in international environmental law, dictates that companies should bear cleanup costs. These requirements apply squarely to the phaseout of the oil and gas industry.
- **The industry's end-of-life costs are coming crashing down.** The combination of higher than expected decommissioning expenses, accelerating time frames for closing wells down, and proposed fixes to outdated laws on financial set-asides for closure costs means end-of-life issues in the oil and gas industry represent significant looming liabilities. Those costs will be incurred sooner than expected as declining demand for oil and gas and increased competition from alternative energy sources leads wells to be abandoned.
- **The bill for cleanup is far costlier than anticipated.** The costs of safely plugging wells and remediating oil and gas fields will be higher than companies may have led lenders, investors, and governments to believe, in part because of the expense of plugging unconventional wells, such as those used in fracking and deepwater drilling. These environmental liabilities are on top of oil and gas companies' already massive and mounting debts, with material impacts for their shareholders and creditors alike.
- **Ongoing and proposed changes to the regulation of idle oil and gas wells increase industry exposure to end-of-life expenses.** As governments awaken to the costliness of managing environmental hazards left by decades of deregulation, they are beginning to require the oil and gas industry to pay for more of its own cleanup. If broadly enacted, increases in bonding requirements and charges for keeping wells idle, earlier compelled closure of wells, and stricter application of bankruptcy law could force oil and gas companies to internalize closure costs. Eliminating these and other loopholes will prevent the industry from foisting the costs and consequences of contamination onto the public.
- **Recovery funds should not cover polluters' costs.** Funds to “build back better” from the COVID-19 crisis could help usher in the needed transition to a fossil-free future. However, early experience indicates that some COVID-19 response and recovery funds are enabling companies to evade closure costs they owe, while continuing and even expanding oil and gas production. Leaving taxpayers to foot the bill for cleanup, while shareholders reap gains from ongoing pollution, is at odds with a just transition.
- **Safely decommissioning oil and gas infrastructure is a global concern.** The experience of the United States and Canada — the principal focus of this report — should stand as a warning to other countries contemplating the startup of new oil and gas operations: shutting those operations down is neither easy nor cheap. The environmental, social, and fiscal costs of closure and cleanup loom larger and closer on the horizon than previously thought. Those costs are another reason why sinking public or private money into oil and gas production today invites disaster tomorrow.

## INTRODUCTION

## The Accelerating Problems of Closure &amp; Cleanup

The problems of oil and gas closure and cleanup have exploded into prominence in the past year. News stories of unplugged oil and gas wells causing sickness in homes and schools<sup>1</sup> ran alongside sobering reports that such wells contribute more to climate change than anyone suspected,<sup>2</sup> and new research on the enormous resources it will take to close them.<sup>3</sup>

Wells spew pollution throughout their lifecycle — and continue to do so long after they have stopped pumping oil and gas. These “inactive” wells can leak methane, benzene, sulfur dioxide, and other dangerous substances into groundwater, air, and soil, threatening local communities and the environment. Such harms continue until the well is properly decommissioned, and even then, some hazards persist. For communities on the frontlines of hydraulic fracturing (or “fracking”), leaks of methane and other hazardous substances from abandoned wells compound the cumulative toxic impact of drilling techniques, which rely on the injection of a chemical soup deep into the ground to release oil and gas<sup>4</sup> — cumulative impacts that some governments continue to ignore or downplay.<sup>5</sup>

International human rights law requires governments to protect against such foreseeable threats by adequately regulating hazardous activity and holding polluting companies responsible for their harms. The polluter pays principle, rooted in international environmental law and many domestic legal frameworks, dictates that companies should bear the costs of properly closing and cleaning up their operations. Inactive wells should be quickly “decommissioned” to minimize their harms to health and the environment. Decommissioning includes removing drilling equipment, plugging the hole, and cleaning the surrounding environment to restore it to its original condition. Operators, however, drag their feet. If the company responsible for a well goes bankrupt before doing this necessary work to shut-in and clean up the well, it can become “orphaned” — left to the government to decommission.

Managing the end-of-life of oil and gas wells is a global problem. While this report focuses primarily on the causes and consequences of unplugged wells in the United States and Canada, examples from Ecuador to Nigeria to the North Sea demonstrate that closure and cleanup present challenges no matter where oil and gas wells are drilled, as further explored in Part 5.

AN ABANDONED OIL EXTRACTION STATION, FROM SKELETON COAST, NAMIBIA © ELLEON VIA ISTOCK





Absent a comprehensive inventory of global oil and gas wells, it is difficult to estimate with precision the total number of unplugged wells worldwide. According to the US Environmental Protection Agency (EPA),<sup>6</sup> there are roughly 1.1 million decommissioned and 2 million inactive but unplugged onshore wells in the United States. An independent study using different assumptions about the number of wells dug before record-keeping began put the combined total of decommissioned and inactive, unplugged US wells at 4 million.<sup>7</sup> Furthermore, there are approximately 1 million active wells in the United States that will also need to be closed down and cleaned up in the future.<sup>8</sup> At least several hundred thousand more unplugged wells are located in Canada<sup>9</sup> and offshore in US waters.<sup>10</sup> Given these two countries' respective shares of global oil and gas production, it can be safely assumed that the number of unplugged wells outside of the United States and Canada is of *at least* equal magnitude and likely into the tens of millions. Some of these wells are still producing oil and gas, bringing the planet ever closer to climate catastrophe. Many are no longer producing, but continue to leak emissions that contribute to climate change. All need to be closed and cleaned up, as do the pipelines,<sup>11</sup> compressor stations, refineries, and other infrastructure involved in bringing their carbon-intensive products to market.

The total cost of closing existing oil and gas wells around the world is daunting. One initial estimate put the price of decommissioning all remaining active or idle oil and gas wells in the world at USD 500 billion<sup>12</sup> — a figure the study's author has acknowledged is likely conservative.<sup>13</sup> Actual costs could be in the trillions of dollars. However, closing and remediating well sites also bring enormous benefits, as one recent study has partially quantified, by returning land to other productive uses and, more importantly, by protecting the health and well-being of surrounding communities.<sup>14</sup>

Oil and gas producing countries have long assumed that the industry would cover decommissioning costs (often called “asset retirement obligations”) with future cash flows from oil and gas production. Now that the time horizon for reaping fossil fuel profits is shortening and future production plans are shrinking, that assumption is less credible than ever.

The fracking industry is particularly ill-equipped to pay for closing down and cleaning up its production sites. The costs of plugging and abandoning fracked wells, among the most difficult to close safely,<sup>15</sup> threaten to overwhelm this already struggling industry. Old assumptions regarding the size of asset retirement obligations on corporate balance sheets are no longer tenable. As a result, the oil and gas industry's financial backers, both investors and lenders, are more exposed to these environmental liabilities than they may realize.<sup>16</sup>

Moreover, the costs of properly closing down and cleaning up production sites are materializing sooner than projected.<sup>17</sup> Low

oil and gas prices, an unprecedented global economic slump caused by the COVID-19 pandemic, and increasing reliance on renewables have strained the oil and gas industry's business model. With the resulting surge of oil and gas bankruptcies,<sup>18</sup> the number of new orphan wells has correspondingly swelled.

Recognizing the urgency of the problem, US President Joseph Biden declared shortly after taking office that his administration will prioritize closing and cleaning up abandoned well sites and holding polluters accountable for the public health and environmental risks such sites pose.<sup>19</sup> A large infrastructure plan presented by the Biden Administration in March 2021 includes a proposal to invest billions of dollars in creating jobs plugging oil and gas wells.<sup>20</sup> This commitment is welcome, but the challenge of delivering on it remains significant — both in the United States and around the world.

The oil and gas industry's financial peril threatens to leave national and subnational governments worldwide paying for closure and cleanup. In the United States and Canada, industry actors have exploited inadequate regulatory regimes, lax enforcement, and bankruptcy loopholes that allow them to leave wells unplugged long after they have stopped producing, effectively transferring their environmental debts onto the public.

In countries where new unconventional and offshore oil and gas developments are underway or planned, such as in Argentina, Guyana, and Mozambique, the expense of closing down those operations in the future looms particularly large. Fracked and deepwater wells are the costliest to decommission.<sup>21</sup> Those costs — and the environmental and financial risks they represent — should be considered up front, as part of any public debate and assessment about whether to allow oil and gas development at all.

In some cases, governments are volunteering to take on those costs rather than ensuring that polluters pay.<sup>22</sup> Although well plugging programs are presented as a “win-win-win” for workers, local communities, and the environment,<sup>23</sup> they risk providing a windfall for oil and gas companies.<sup>24</sup> Programs that let companies off the hook for their environmental legacies undermine the polluter pays principle, prolong the life of an industry in terminal decline, and further exacerbate climate change. A just transition demands the opposite. The urgent need to clean up the oil and gas industry and its toxic legacy presents governments with both an imperative and an opportunity: to leverage corporate funds for proper closure, to heal and protect affected residents and workers, and to repair damaged ecosystems in numerous sites of oil and gas extraction — all while sustaining good jobs and rebuilding local, resilient economies.

The remainder of this report proceeds as follows: Part 1 discusses the environmental and health hazards posed by oil and gas production even after the last drop is extracted. Part 2 contrasts



government obligations under international law to prevent and protect against these hazards, by adequately regulating and holding oil and gas companies accountable, with the current regulatory regimes and enforcement practices in the United States and Canada, which fall short of these duties. Part 3 discusses exam-

ples of public well plugging programs that fail to address the orphan and abandoned well problem's root causes and risk subsidizing further oil and gas industry abuses. Part 4 considers the implications of well closure costs for financial industry actors. Part 5 puts the problem into a global context.

#### TEXT BOX 1: Definitions

Terms used to describe oil and gas wells vary across regions. The below definitions reflect common usage in the United States and Canada.

- **Abandonment:** The process in bankruptcy of renouncing title to an asset so that it is no longer considered part of the estate.
- **Debtor:** The entity that has declared bankruptcy.
- **Decommissioning:** The process of closing down a well and making the well site safe and available for alternative uses. This includes removing the wellhead and any associated equipment, filling the well with a plug to prevent leakage of gas or fluids, cleaning the surrounding soil or ocean floor, and repairing land if necessary. (These last two steps are sometimes referred to as remediation and reclamation.)
- **Environmental Creditor:** For simplicity, a government actor responsible for enforcing outstanding environmental obligations.
- **Estate:** All the assets of a debtor that can legally be liquidated to pay off its debts.
- **Financial Security:** A cash deposit or other instrument that provides a guarantee that the costs of decommissioning will be paid by the depositor (typically the responsible company/owner/operator of the well).
- **Idle Well:** A well that has been inactive for more than a specified period of time.
- **Inactive Well:** A well that is not producing more than a marginal quantity of oil or gas. As used in this piece, an inactive well is assumed to be unplugged.
- **Orphan Well:** An inactive well that is unplugged or has seen its plug fail, for which no solvent, legally responsible party can be located.
- **Plugged and Abandoned:** A term used especially in the US and Canadian onshore context to describe a decommissioned well.
- **Priority:** The order in which those with claims against the debtor are repaid from the estate.
- **Trustee:** The manager of the estate of the debtor. In Chapter 7 bankruptcy cases in the United States, appointed on an interim basis by the court and then selected by the creditors. In the case of a reorganization, commonly the debtor itself, in which case referred to as the “debtor in possession.”

## PART 1

## The Oil and Gas Industry Pollutes from Beyond the Grave

Air, water, and soil pollution occur throughout the fossil fuel lifecycle, from the digging, drilling, and pumping needed to extract hydrocarbons from the ground, to the processing, refining, and transportation required to get them to markets, to their burning as fuel in power plants, factories, vehicles, and homes, or their transformation into products, like chemicals, pesticides, and plastics.<sup>25</sup> Even after the oil and gas stop flowing, threats to human rights and the environment remain. Oil and gas wells left idle or improperly plugged can seep toxins into the surrounding water, air, and soil<sup>26</sup> and leak greenhouse gases, such as methane, into the atmosphere.<sup>27</sup> Stranded equipment and infrastructure can create hazards and eyesores.

AN ABANDONED OIL WELL STILL SEEPING OUT LIGHT CRUDE OIL AFTER A HUNDRED YEARS © LAKEVIEW\_IMAGES VIA ISTOCK



For communities on the frontlines of oil and gas production, the negative health and environmental consequences of unplugged wells and un-remediated drilling sites compound other threats to human rights. Because low-income communities and communities of color are disproportionately exposed to industrial activities like oil and gas production,<sup>28</sup> inadequate cleanup further entrenches environmental racism and injustice. Onshore, inactive oil and gas wells can contaminate nearby air and groundwater with methane, salty, radioactive brine, and known carcinogens.<sup>29</sup> Offshore wells pose their own set of dangers for coastal communities and marine life, including massive spills and explosions resulting from the high pressures involved in offshore drilling.<sup>30</sup>

These risks can be acute. In 2012, hydrogen sulfide leaking from an unplugged well near a house in Kentucky made the residents so ill they were forced to evacuate.<sup>31</sup> In 2014, a family in California also had to move out of their home after watching flames erupt from wall sockets due to explosive levels of gas leaking from a flow line to nearby idle wells.<sup>32</sup> In 2017, an idle well flow line gas leak underneath a home in Colorado caused an explosion, killing two people and badly burning another.<sup>33</sup> These are just a few documented examples of what is a much more widespread, if underrecognized, threat in areas of oil and gas production around the world.

Both onshore and offshore, unplugged or poorly plugged wells emit methane, a highly potent greenhouse gas that contributes significantly to climate change.<sup>34</sup> The US EPA estimated that in 2018, inactive onshore wells in the United States, both plugged and unplugged, emitted a combined total of 281 kilotons of methane, equivalent to the annual emissions of 5 million cars.<sup>35</sup> The vast majority of those emissions came from unplugged wells.<sup>36</sup> Some studies suggest, however, that these estimates may significantly understate the amount of leakage — by as much as 150% — given the large number of wells not counted in inventories, the tendency of plugs to fail over time, and the lack of capacity for sustained monitoring of sites that have been decommissioned and abandoned.<sup>37</sup> The long-lasting environmental impacts of wells that have stopped producing may represent a far bigger problem than we know, and one whose consequences for human health and ecosystem vitality demand closer examination.

## PART 2

## Polluters Should (But Often Don't) Pay

As conduits for toxic, explosive, and climate-forcing substances, idle and poorly plugged oil and gas wells contribute to the infringement of a range of human rights guaranteed under international and regional human rights instruments, as well as national laws. Those rights include, among others, the rights to water, health, a healthy environment, and life itself. Under human rights law, nation-states (“States”) have the primary obligation to protect individuals and communities from such infringements of their rights through adequate regulation, and to ensure access to remedy for harms that do occur.<sup>38</sup> With regard to industrial activities that have the potential to cause significant, adverse environmental and health impacts during and after operation, human rights courts<sup>39</sup> and United Nations (UN) human rights experts<sup>40</sup> have repeatedly found that States have a positive obligation to require the responsible actors to establish and implement plans to prevent contamination and ensure remediation of any pollution after productive activities cease. Making sure industrial actors set aside adequate funds while projects are active is critical for implementing such plans.<sup>41</sup> Moreover, it is a well-established principle of international environmental law that the polluters responsible for leaking toxins and greenhouse gases must cover the costs of preventing and remedying the resultant harms. Text Box 2, “Requirements Under International Human Rights and Environmental Law,” on page 8 includes further discussion of the international legal framework.

Governments should design legal regimes regulating the front-end (pre-extraction) and back-end (post-operation) of oil and gas production to ensure polluters plan and pay for cleanup and closure costs. In principle, most countries’ legal regimes require oil and gas operators to undertake and/or finance the costs of closure and remediation when they cease production. In practice, however, operators often fail to pay up or cleanup. Weaknesses and loopholes in both the front-end requirements of financial security and back-end allowances for well idling and bankruptcy mean that all too often, polluters *don’t* pay, leaving governments and communities to absorb those costs. For example, in the United States and Canada, lax regulations and permissive bankruptcy rules offer many producers a way to shirk their obligations.

The rest of this section examines the gap between what international law requires and what domestic law delivers, through a close look at the regulatory deficiencies in the United States and Canada. In both countries, sub-national governments have primary authority to regulate oil and gas production, except on federal lands and waters. The resulting patchwork of laws and regulations makes generalizations difficult. The typical approaches of the national and sub-national governments in both countries, however, share a number of inadequacies, which can be grouped into three categories: (1) long timelines for plugging inactive wells, (2) inadequate financial security, and (3) loopholes in bankruptcy processes.

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## TEXT BOX 2:

## Requirements Under International Human Rights and Environmental Law

Proper planning and implementation of closure and cleanup measures are critical to avoiding and remediating the impacts of oil and gas production on human rights and the environment. International law establishes binding obligations and norms for governments and private parties concerning how to decommission oil and gas infrastructure and who should pay.

Several treaties, including the UN Convention on the Law of the Sea, oblige States to decommission offshore oil and gas wells and the platforms to which they are attached in a manner that protects the marine environment and reduces hazards to shipping.<sup>42</sup> Some regional instruments create similar obligations and further require States to ensure that the responsible private actors carry out the decommissioning operations.<sup>43</sup> No equivalent provisions govern onshore wells and pipelines. As discussed below, however, international human rights and environmental law together require States to ensure the proper decommissioning of oil and gas infrastructure, which poses environmental risks and threatens human rights. These bodies of law also firmly establish the principle that responsible parties should pay.<sup>44</sup>

States are the primary duty-bearers under international human rights law. All States have obligations to respect human rights and protect against foreseeable harm to human rights arising from the conduct of private parties, including the local and global impacts of industrial pollution that causes environmental contamination and climate change.<sup>45</sup> Compliance with those obligations requires avoiding or minimizing the harmful effects of State action or inaction, and regulating private conduct that causes or foreseeably threatens to cause such adverse impacts.<sup>46</sup> Effective regulation of private actors includes “holding them accountable for harm they generate both domestically and extraterritorially.”<sup>47</sup>

Corporations themselves have a broadly recognized responsibility to respect human rights,<sup>48</sup> including by not generating pollution that infringes on rights or puts rights at risk. When they do cause or contribute to violations of human rights, corporations have a responsibility to provide or cooperate in the provision of remedy.<sup>49</sup>

When it comes to the closure and cleanup of oil and gas operations, States therefore have a duty to prevent operators from improperly plugging or abandoning wells, which leads to foreseeable environmental and health hazards, and to compel operators to redress those hazards when they arise.<sup>50</sup> Oil and gas companies, in turn, have a responsibility to take measures to avoid creating hazards both during and after production, by properly planning for and executing decommissioning, and by promptly remediating any pollution caused by idle wells.

The “polluter pays principle,” set forth in the Rio Declaration on Environment and Development and echoed in other legal regimes, creates a strong expectation that States will adopt measures to ensure that polluters bear the costs of pollution control and prevention.<sup>51</sup> In the context of asset retirement, that means that oil and gas producers should pay for closure and cleanup. Requiring oil and gas operators to adequately decommission their operations and cover the costs of remediating associated pollution is also consistent with the right to remedy, guaranteed under international human rights law.<sup>52</sup> When rights are violated, as they are when foreseeable risks of harm due to pollution materialize due to the insufficiency of preventive measures, the right to remedy entitles victims to reparation, in the form of restitution, compensation, rehabilitation, and satisfaction, as well as guarantees of non-repetition.<sup>53</sup> Ensuring that the actors responsible for pollution pay not only furthers reparatory aims, but also serves as a deterrent to future violations, advancing the principle of non-repetition.<sup>54</sup>

While implementation of these international duties and principles occurs at the domestic level, the quality and application of domestic laws vary widely. Structural weaknesses in regulatory regimes all too often let private oil and gas companies dodge responsibility for their damages. As a result, the public pays for these costs through taxes and long-term impacts on public health and the environment.

## Long Plugging Timelines: Keeping Options Open or Kicking the Can?

Inactive wells across the United States and Canada are allowed to remain idle for extended periods, whether by law or in practice. Nearly all jurisdictions in the United States place time limits on how long a well can remain idle or “temporarily abandoned” (capped with a shallower plug than that used in full abandonment and disconnected from some equipment) before being returned to production or permanently plugged and abandoned.<sup>55</sup> In Pennsylvania, a state with one of the largest backlogs of orphan wells, the limit stretches to five years.<sup>56</sup> In nearly all states in the United States, regulators have the discretion to extend the limits and/or simply fail to enforce them.<sup>57</sup> On the other hand, Alberta and California lack even minimal time limits, relying instead on charging operators fees on idle wells and requiring or incentivizing them to plug a certain percentage of inactive wells each year<sup>58</sup> (although some individual municipalities have enacted definitive time frames for plugging<sup>59</sup>). Enacting tighter timelines for companies to plug and remediate idle wells, which properly factor in the public health and environmental damages those wells cause and impose penalties for non-compliance, would help curb this silent but deadly source of toxic exposure.

Allowing wells to sit idle for many years not only increases the local and global environmental and health costs from those wells; it also makes it less likely that the companies that dug and operated them will ever pay for their cleanup.<sup>60</sup> The longer a company sits on idle wells, the more likely it is that it will either transfer them to a smaller operator who lacks the money to pay for cleanup, or liquidate while still owning the well, making it impossible for the government to compel the company to pay for the cleanup. While oil and gas lobbyists insist idle wells might someday return to production, previous empirical analyses have demonstrated that this is unlikely and that deferring the costs of abandonment is a more significant reason for producers to idle wells.<sup>61</sup>

## Inadequate Financial Security for Closure and Cleanup Costs

Almost every jurisdiction in the United States and Canada requires an oil or gas operator to set aside enough money or provide financial security guaranteeing payment to cover the full cost of plugging and reclaiming onshore wells.<sup>62</sup> Alaska is the possible exception, as the state increased bonding levels for new and existing wells in 2019,<sup>63</sup> as explained further in Part 4. Financial security (commonly referred to as “bonds”)<sup>64</sup> provides a backstop for the government if companies enter bankruptcy before plugging their wells — either because they refused to

comply with an order to plug their wells, or because they were never ordered to do so in jurisdictions that impose no timelines for closure. In such situations, the government can seize the bonds and recover the bonded amount from the insurance company. Unfortunately, however, the amount of those bonds is almost always too low to cover the actual costs of plugging and reclaiming a well site.

While it can be difficult to estimate up front precisely how much closure and cleanup will cost, there is ample room to improve the accuracy of bonding requirements so that they more closely approximate actual costs incurred after wells cease production. The cost of closure and cleanup correlates with certain factors, including well depth, population density, and proximity to other wells that require plugging at the same time.<sup>65</sup> Governments can draw lessons from the insufficiency of required securities to date, and adjust future requirements upward.

Historical data and in-depth studies have proven that the gap between the true costs of decommissioning and the financial security held by governments in the United States and Canada has grown into at least the tens — and more likely the hundreds — of billions of dollars.<sup>66</sup> The widening shortfall stems from drilling more wells and the declining current value of the financial security required up front in real dollar terms. The latter problem results in large part from regulations that allow for “blanket bonding” or posting one bond to cover multiple wells or even all of a company’s wells on federal lands nationwide.<sup>67</sup> The consequence is skyrocketing potential liability for taxpayers. In addition to holding bonds or other types of financial security, some states also collect fees from the industry that go into orphan well plugging funds. These funds, however, are almost universally insufficient to pay for the full costs of plugging and reclaiming all of a state’s orphan wells.<sup>68</sup> At current rates (determined principally by available funding), it would take US jurisdictions 23 years to plug just the *documented* existing orphan wells<sup>69</sup> — let alone the likely million or more undocumented or soon-to-be orphaned wells.<sup>70</sup>

Both industry actors and regulators systematically underestimate closure costs. Three reports by Carbon Tracker in 2020 have laid bare the inadequacies of the US approach to bonding as a system for covering the cost of well closure and cleanup. In *Flip Side: How Stranded Assets Will Give Rise to Stranded Liabilities*; *It’s Closing Time: The Huge Bill to Abandon Oilfields Comes Due Early*; and *Billion Dollar Orphans: Why Millions of Oil and Gas Wells Could Become Wards of the State*, Carbon Tracker has begun to fill an identified data gap regarding the true costs of decommissioning, especially unconventional (fracked) wells. Carbon Tracker’s analysis demonstrates that market forces and regulatory changes are accelerating the time frame in which the industry must plug and abandon its wells. As a result, environmental liabilities are due much sooner, and are much costlier in present value terms, than reported on industry balance sheets.

When combined, these findings spell unwelcome surprises for investors, including lower dividends and less recovery in the event of a bankruptcy, which these accelerating costs make more likely. They also portend an even larger financial burden on taxpayers than anticipated — unless legislators and regulators act quickly. Carbon Tracker has calculated that the costs of closing down and cleaning up all documented active and inactive wells in the United States could be up to one hundred times greater than the bonds that have been set aside for cleanup.<sup>71</sup> Carbon Tracker estimated the present shortfalls in state bonding coverage for eight states, ranging from USD 1.85 billion in Montana to USD 14.53 billion in Pennsylvania.<sup>72</sup> It has since expanded its analysis to further states through an online searchable portal.<sup>73</sup>

The problem of securing funds to clean up after an industry is by no means unique to upstream oil and gas production, or even the fossil fuel sector. Downstream petroleum refineries and petrochemical plants, as well as hardrock mining sites, are among the classes of facilities that the US EPA has deemed to pose a significant risk of experiencing hazardous releases after closure and so of necessitating a publicly-funded cleanup under the “Superfund” law.<sup>74</sup> In fact, the EPA had even started to propose new bonding rules for such sites, until, under the leadership of the Trump Administration, the EPA decided they were unnecessary.<sup>75</sup> With petroleum refinery closures accelerating in the United States<sup>76</sup> — and bankruptcies likely not far behind — the hazards of this decision are only becoming more apparent by the day.

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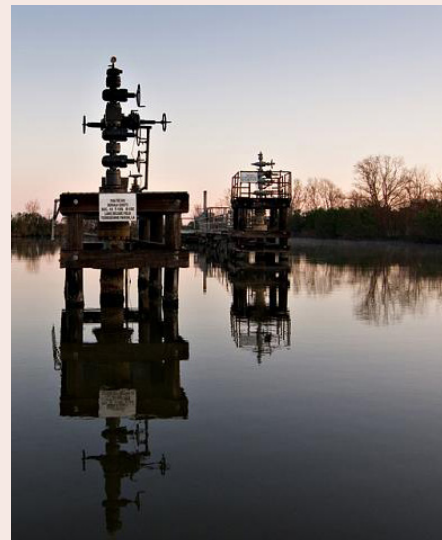
#### Alternative Approaches to Financial Assurance

In the United States, oil and gas companies are only required to provide limited financial assurance for decommissioning costs, typically in the form of surety bonds, which are a guarantee that an insurance company will pay if the operator refuses or cannot be made to do so. Surety bonds are not the only approach, however, to ensuring future costs are covered.

Other jurisdictions employ different methods for securing the funds needed to cover well closure and remediation costs. For example, the governments of Indonesia and Mexico (for offshore drilling) and of New South Wales, Australia (onshore) all require an operator to set cash aside at the start of the concession as a security deposit in a trust or other type of fund.<sup>77</sup> In Norway and Denmark, the government regulator most commonly requires either a letter of credit from a qualified bank or a parent company guarantee.<sup>78</sup> South African law allows for a bank guarantee or a security deposit, which must cover an itemized estimate of all decommissioning and remediation costs.<sup>79</sup>

With any form of financial security, making co-parties on a lease and present and prior operators jointly and severally liable (as many countries do, principally for offshore drilling<sup>80</sup>) can greatly improve the regulator’s security.<sup>81</sup> On the other hand, granting tax credits or exemptions for decommissioning costs is another way of shifting the burden to the taxpayer.<sup>82</sup>

Further study is needed to assess these different approaches’ relative success in ensuring operators pay for proper, timely cleanup. A cross-jurisdiction comparison of success in internalizing decommissioning costs to the industry would help ensure that, as the closure of oil and gas wells accelerates in the transition to a clean energy future, governments around the world employ the soundest techniques. It would also offer critical insights for countries that are newcomers to the industry to avoid replicating mistakes. For further discussion of this topic, see Part 5 on “Orphan Wells: A Global Problem.”



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## Bankruptcy Loopholes

Looming over all of the prior policy considerations is the threat that the company operating a well (which may not be the same company that dug it) will declare bankruptcy. Marginal oil and gas producers declare bankruptcy with regularity, and some larger companies have begun to do so, too.<sup>83</sup> Previous waves of bankruptcy, such as the 2015-16 shale rout, added to the ranks of orphan wells.<sup>84</sup> The confluence of crises detailed in CIEL's 2020 report *Pandemic Crisis, Systemic Decline*<sup>85</sup> has contributed to a wave of bankruptcies among oil producers and oilfield service companies that dwarfs the 2015-16 figures in total debt.<sup>86</sup> At one point, Rystad Energy projected that if the benchmark price of West Texas Intermediate (WTI) crude oil remained at USD 40/barrel, about 190 US-operating companies, holding a combined total debt of USD 168 billion, would seek to reorganize through bankruptcy between 2020 and 2022.<sup>87</sup> While as of the time of writing, the price of WTI crude has temporarily risen to about USD 60/barrel, the industry still faces a great deal of uncertainty due to the pandemic, and the long-term incompatibility of fossil fuel production with climate policies.<sup>88</sup>

For some companies, bankruptcy is the end of the road. For others, it is principally a chance to shed debts. Perversely, the threat of bankruptcy can discourage legislators and regulators from increasing bonding requirements for operators with unplugged wells.<sup>89</sup> Yet without adequate bonds, environmental creditors — that is, governments enforcing outstanding environmental obligations — often must participate in bankruptcy proceedings to seek money from insolvent operators to pay for decommissioning. However, as explained below, current loopholes in bankruptcy law, particularly in the United States, often prevent governments from successfully recovering those decommissioning costs.<sup>90</sup>

In the United States, there are two types of corporate bankruptcies: liquidations, when the corporation ceases to exist and its assets are used to pay off a portion of its outstanding debts, and reorganizations, when a court-approved plan allows a corporation to pay off some of its debts, shed others, and reemerge, sometimes as multiple entities. Both types of bankruptcies pose risks to public resources. Liquidation represents the last chance to make a company pay for its environmental obligations — but governments must compete with other creditors for a share of the debtor's diminished assets. In contrast, environmental obligations, like decommissioning, can survive a reorganization. However, in some reorganizations, the debtor can sell or transfer marginal assets to shaky companies that frequently, years or months down the line, themselves liquidate. Doing so can serve to rid the reorganizing debtor of these obligations. Both liquidations and reorganizations also allow the bankrupt company to divest itself of problematic assets through a process known as abandonment. Shedding assets marred by liabilities, like a well

that is at the end of its useful life or for which closure costs are due, is a major way that polluters offload environmental liabilities onto the public.

As “environmental creditors,” governments have a chance in bankruptcy to recover some assets from the liquidated estate to apply towards the costs of plugging and reclaiming the debtor's unplugged wells. However, given that a bankrupt debtor lacks adequate assets to pay off all its debts, the amount recovered is largely determined by the government actor's place in the “priority scheme”<sup>91</sup> — and unfortunately, that place is rarely at the head of the line. Compounding this problem is a perverse incentive within the priority scheme: once it is clear that an operator is close to becoming insolvent, it is in the government's financial interest to delay taking actions that would protect the public's health, as doing so ups its chances of recouping the costs. Suppose a government waits to plug and reclaim a well until *after* the operator has filed for bankruptcy. In that case, it may get what is called “administrative expense priority” to recover the costs from the debtor's estate (although there is no guarantee that a court will give the government this priority status even in those situations).<sup>92</sup> Such a priority categorization bumps environmental creditors just behind “secured creditors” who get paid first. If, however, the government acts responsibly to close and clean up an abandoned well as soon as possible, *before* an operator filed for bankruptcy, then its claim for reimbursement from the debtor's estate will only be entitled to unsecured creditor status, placing it at the back of the line.<sup>93</sup>

A trustee also can act to defeat an environmental creditor's claim entirely, removing it from the distribution scheme through abandonment, sales, and spin-offs. In essence, bankruptcy proceedings can enable a debtor company to either dump liability-laden assets, such as wells that need to be cleaned up, onto the public, or to pass them off to another company that may be hard to track down or make pay. First, the trustee may, with court approval, “abandon” burdensome property, such as wells that would cost more to clean up than their productive value.<sup>94</sup> When real property is abandoned, ownership reverts to the natural or legal person with the strongest remaining legal claim to the property.<sup>95</sup> However, in the case of abandoned oil or gas wells, that residual owner can be unclear. The uncertainty is heightened in a reorganization, as the well could revert to the reorganized debtor, to a prior operator if one exists, or potentially to the landowner (which may be the state or federal government).<sup>96</sup> Because many state laws protect private landowners from responsibility for decommissioning, abandonment to either a private or public landowner could lead to the public bearing the cost.<sup>97</sup> One detailed study demonstrated that reorganizations were responsible for a significant number of orphan wells.<sup>98</sup> While the US Supreme Court has held that property cannot be abandoned in bankruptcy when it is deemed too dangerous to public health and safety,<sup>99</sup> some courts have narrowly interpreted that limitation.<sup>100</sup> One way of closing this loophole

in the bankruptcy regime would be to clarify that idle oil and gas wells must be considered dangerous property.

Additionally, the trustee can sell or assign rights to junk wells to another company or, in a reorganization, offload them to a new spin-off. Reorganization plans need the approval of a majority of every class of debtor and/or the judge. In principle, the debtor needs to show that all created entities will have sufficient assets to meet their liabilities as they come due.<sup>101</sup> In practice, however, companies have been able to subvert both the letter and the spirit of this requirement. For example, coal companies have been able to reorganize and give one successor company all the largely productive mines and burden the other with the liability-ridden inactive mines.<sup>102</sup> In a recent bankruptcy of Fieldwood, an offshore oil and gas producer, it has allegedly pursued a similar strategy.<sup>103</sup>

Absent close monitoring and strong intervention by the relevant environmental regulators, bankruptcy proceedings can facilitate the dumping of inactive wells and their associated liabilities,<sup>104</sup> or lead governments to ultimately agree to a bankruptcy settlement that gives them far less than the value of the decommissioning obligations.<sup>105</sup> Ensuring that environmental regulators actively engage during oil and gas reorganizations is critical to preventing private polluters from adding to the public debt.<sup>106</sup> So, too, is advocating for judicial interpretations of the law that recognize the hazard posed by idle oil and gas wells.

## Litigation: A Backstop?

The problem of closure and cleanup may increasingly come to the courts. As described above, a number of factors in the United States and Canada contribute to oil and gas wells re-

maining idle and eventually becoming orphaned: inadequate laws, inadequate enforcement, and often, inadequate corporate compliance with regulations and orders. In the face of such systemic, structural problems, litigation can serve as a valuable tool to induce regulatory reform or compel action by intransigent corporations while remedying harms.

Some concerned communities and regulators have initiated legal actions to address problems posed by inadequate decommissioning of inactive wells. For example, in Los Angeles, the city has pressed criminal charges against an oil company and its executives for failing to follow plugging orders.<sup>107</sup> Separately, a community group has filed a lawsuit against the LA Fire Department for failing to meet its non-discretionary duty to order a different set of idle wells to be either abandoned or reactivated.<sup>108</sup> In Texas, a lawsuit successfully challenged the Texas Railroad Commission's orders — supposedly in response to the pandemic — suspending mandatory plugging timelines and other environmental regulations of the oil and gas industry.<sup>109</sup>

Further legal action may be on the horizon. If regulators continue to abdicate their duties to the public and corporations continue to drag their feet or kick the can on paying for decommissioning, courts could see lawsuits challenging the regulations establishing bonding requirements, the failure to enforce idle well management plans, or the failure to secure resources for remediation through intervention in bankruptcy proceedings. Safely closing down the oil and gas industry and addressing its toxic legacy requires sector-wide action, not only case-by-case solutions. While litigation alone will not be enough to achieve the just transition to a fossil-free future, courts have a critical role to play in ensuring that those harmed have access to justice and that responsible parties are held to account.

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## PART 3

## COVID Relief Becomes Corporate Relief

The COVID-19 pandemic and the resulting economic crisis have decimated employment among rig workers and prompted a new wave of bankruptcies in the fossil fuel sector,<sup>110</sup> raising the specter of increased orphan wells. These concerning trends have prompted lawmakers in the United States and Canada to turn their attention to inactive oil and gas wells.<sup>111</sup> For the most part, however, lawmakers have not focused that attention on fixing the flaws in the regulatory and bankruptcy system detailed above, which are largely to blame for the million or more orphan wells across the two countries, or supporting sustainable jobs in alternative industries. Instead, most of the legislative proposals have centered on using public funds to cover closure and cleanup costs. In so doing, they set a dangerous precedent that could turn idle well plugging and remediation from a potentially central feature of a truly just transition strategy into just another subsidy to the fossil fuel industry.

Legislators across the political spectrum have touted publicly funded well plugging programs as a “win-win-win” for local communities, the environment, and workers, providing short-term jobs cleaning up the looming hazards. This claim might be warranted if the programs were limited only to wells for which no solvent responsible party can be identified, and/or if they forced the oil and gas industry to bear a substantial portion of the costs. As the two most prominent examples of such programs in North Dakota and Alberta illustrate, however, they have, to date, represented a primarily one-sided win for polluters, who have received massive taxpayer-funded subsidies.

## North Dakota

North Dakota’s Bakken Formation has been one of the main frontiers of fracking in the United States. In March 2020, North Dakota opted to use USD 66 million of federal funds from the Coronavirus Aid, Relief and Economic Security Act (the CARES Act)<sup>112</sup> to plug and reclaim several hundred abandoned wells. According to data reported in October 2020, about 380 wells have been plugged, although only about half that number have been reclaimed.<sup>113</sup> Active operators control most of these wells, but the state has indicated it does not intend to recover its costs from those companies. As a result, the program represents a large handout to the oil and gas industry. Shockingly, as discussed more fully below, in October 2020, North

Dakota reallocated USD 16 million of the USD 66 million to fund the fracking of *new* wells, effectively paying for more pollution, rather than making polluters pay.<sup>114</sup>

The plugging and reclamation program, which was approved in June 2020 and began implementation at the end of August, purports to focus on wells that are “orphaned,” despite the lack of definition for the term under North Dakota law.<sup>115</sup> While the widely accepted definition of an orphan well is one for which no active legally responsible party can be found,<sup>116</sup> the program includes many wells drilled by companies that continue to operate. Only four oil and gas operators (representing 16 wells) in North Dakota had filed for bankruptcy when the state took over the wells under this program. Although at least six more operators representing a further 27 wells have filed since then,<sup>117</sup> a bankruptcy filing alone does not automatically mean the company’s wells are “orphaned,” as a regulator can still seek payment from the estate, as further explained in Part 2. Neither does a company’s inability, at any given moment in time, to afford plugging and reclaiming a well, or paying premiums on additional bonds required to keep a well in a “temporarily abandoned” status, nor the state’s election to plug and reclaim a well without executing on the relevant bonds, make the well orphaned under widely accepted definitions of that term.<sup>118</sup> As a result of the state’s loose interpretation of what counts as an orphan well, it is giving a substantial number of companies a free pass on covering their closure costs.

North Dakota had a chance to ensure that polluters would pay for the plugging costs. In seizing wells under the program, the state reserved its rights to collect bonds or pursue operators’ civil liability. However, companies nearly uniformly protested, in many cases saying they did not mind if the wells were confiscated, as long as they were not required to pay for the plugging and reclamation.<sup>119</sup> As of late 2020, there was little indication that the state had sought to recover its costs, which came out of the USD 66 million in CARES Act funds plus USD 10 million from the state’s industry-funded Abandoned Well Plugging and Site Restoration Fund.<sup>120</sup>

In addition to paying to clean up after solvent operators, as noted above, the state repurposed USD 16 million of the funds originally designated for plugging and reclamation to pay for new fracking.<sup>121</sup> These funds will be used to reimburse companies for the costs of completing new wells, such as acquiring



water and disposing of the toxic waste sludge used for fracking.<sup>122</sup> Not only does subsidizing fracking add to North Dakota's greenhouse gas emissions and exacerbate the problem of well closure and cleanup, but it also diverts money that could have gone to COVID-19 prevention and relief, for which the need remains great. Moreover, close observers of the process have questioned whether this use of funds violates either the CARES Act requirements or the North Dakota Constitution.<sup>123</sup>

At least one other state is following North Dakota's lead. Wyoming recently instituted a program to use USD 15 million in CARES Act funds to pay operators to plug and abandon their idle wells or complete new wells.<sup>124</sup> As in North Dakota, covering the costs of solvent operators' plugging and abandonment costs — not least when Wyoming has a backlog of at least 2,700 truly orphan wells<sup>125</sup> — misuses taxpayer dollars.

## Alberta

The bailout in Alberta is on another scale altogether. Alberta has an estimated 97,000 inactive wells,<sup>126</sup> which, along with associated infrastructure, require a massive cleanup effort. Rather than making polluters pay, the Canadian federal government agreed in April 2020 to pay one billion Canadian dollars (CAD) (about USD 760 million) in taxpayer funds to Alberta, as a grant to clean up inactive wells (along with smaller grants to neighboring provinces and a CAD 200 million loan to the Alberta Orphan Well Association(OWA)).<sup>127</sup> The grant, which followed intense industry lobbying,<sup>128</sup> has been disbursed in multiple CAD 100 million allocation rounds.

The program has been a giveaway to industry throughout its brief life,<sup>129</sup> but most so in its third and fourth rounds. In the third round, each operator active in the province was eligible to receive up to CAD 139,000 for plugging and reclamation contracts covered by the fund regardless of the operator's own ability to pay.<sup>130</sup> In the fourth and most recent round, oil and gas licensees could have their 2020 closure costs fully covered merely by virtue of having submitted a confirmed closure plan to the government regulator.<sup>131</sup> In picking up the industry's tab, the government will be paying for cleanup that operators had planned to pay for themselves: public spending is *replacing* private spending, rather than incentivizing it. Because the grants are distributed not according to an operator's inability to pay, but based on their overall liability, the producers with the biggest environmental footprints get the largest checks. Canadian Natural Resources Limited, the leading crude oil producer in Canada,<sup>132</sup> is eligible for the most significant dividend, over CAD 31 million.<sup>133</sup>

The federal funds could have gone to existing programs designed to leverage industry fees to plug orphan wells, but which are chronically under-resourced, such as the OWA. Ironically, the federal program expressly excludes wells in the OWA inven-

tory.<sup>134</sup> The exclusion all but guarantees that the bailout funds go to plugging and remediating wells owned by solvent companies that have the means and obligation to pay for the cleanup themselves.

Relieving active operators of their environmental responsibilities by sending taxpayers, whether they are in the United States or Canada, the bill is wrongheaded for several reasons. First, it ignores the structural problems that underlie the problem of orphan wells, such as deficient regulations, agency capture, and bankruptcy law. In so doing, it creates a moral hazard,<sup>135</sup> incentivizing operators to shirk rather than shoulder their obligations. Second, it offends the "polluter pays principle," according to which the entity responsible for public health and environmental harms should bear their remediation costs. Third, it enables those operators receiving the public funds to pour more of their money into new drilling, which only creates new potential environmental liabilities and delays action that might address the root causes. Multiple bills were introduced in the last session of the US Congress to direct funds to federal and state well plugging activities: some replicate these problems,<sup>136</sup> while others are significantly better at ensuring polluters pay.<sup>137</sup> More innovative solutions, such as a federal Abandoned Well Administration,<sup>138</sup> deserve a closer look. The final costs of closing down and cleaning up oil and gas production sites will be far too high for the public budget to bear without a program to recover the costs from the responsible industry. Policymakers should prioritize pushing active producers to pay for decommissioning now, before the industry declines even further, and reserve scarce public funds for closing and cleaning up truly orphaned wells and helping workers transition out of fossil fuel-based employment.

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## PART 4

## Decommissioning Costs Pose a Material Risk to Companies (and Their Financial Backers)

While inadequate regulatory regimes, broken bankruptcy rules, and industry bailout programs provide oil and gas companies with ways to avoid some of their environmental liabilities, the costs of closing down and cleaning up operations still fall primarily to the companies. As discussed above, those costs are likely to be greater, and come due sooner, than many companies have anticipated, making them an increasingly material financial risk. These risks are especially acute for investors in the fracking sector, given the higher expense of decommissioning fracked wells,<sup>139</sup> elevated levels of debt across the industry, and the junk status of the bonds issued by most major US fracking firms.<sup>140</sup> Moreover, as state and federal regulators face mounting public pressure, including through litigation, to enforce existing laws and close the legal loopholes with respect to payment for well closure discussed above, companies may soon have fewer ways to skirt the bill when closing time comes.

These risks should be of great concern to shareholders of oil and gas companies, who will feel the pinch of balance sheet adjustments and lose everything in the event of bankruptcy. They should also concern creditors who are less likely to be repaid if the oil and gas companies whose bonds they have purchased or loans they have approved file for bankruptcy.

As detailed above, the costs of decommissioning onshore oil and gas wells are likely to be larger than companies anticipate. Analysis by Carbon Tracker found that the cost of plugging is correlated with well length, and that unconventional (fracking) wells will likely cost much more per well to plug and abandon than conventional wells.<sup>141</sup> Carbon Tracker's report further concludes that these costly asset retirement obligations are likely to come due sooner than companies have projected because of a positive feedback loop of decreased demand, well shut-ins, and bankruptcies.<sup>142</sup> Whereas oil and gas companies have historically anticipated well lifetimes of at least several decades, those assumptions no longer hold. Consequently, end-of-life costs are no longer a distant concern but rather a pressing and increasingly present one.

Equity investors in oil and gas companies should take heed of these risks. Such liabilities are already significant, representing at

least 8-14% of the combined market capitalization of the eight "super majors."<sup>143</sup> As noted above, they will increasingly exceed self-reported liabilities on company balance sheets due to underestimations of actual decommissioning costs, especially for shale wells,<sup>144</sup> and the acceleration of asset retirement when compared to the rosy 30- or 60-year production projections of operators.<sup>145</sup>

Even were the law to remain static and the present loopholes in regulations governing the front and back end of oil operations not addressed, these financial risks should be of significant concern to stockholders. Already, companies' asset retirement obligations threaten to wipe out independent upstream operators and present substantial costs to the Oil Majors. If bonding requirements are updated to reflect the cost of well closure, fees for idle wells are increased to disincentivize significant delay of cleanup, and/or regulators take action to compel well closures on an appropriate time frame, those costs will accrue even earlier. And fortunately, through law reform and litigation, these changes are starting to appear.

Momentum for bonding reform and accelerated closure is building among state and federal legislators and regulators. In 2019, Alaska was the first state to increase bond requirements to match what experts say are the true costs of plugging wells, from USD 100,000 to USD 400,000 for a single well bond.<sup>146</sup> In 2018, New Mexico raised its single well bond requirement to USD 25,000 + USD 2 per foot of well depth.<sup>147</sup> New Mexico is also following California's example in studying the liabilities the state is facing due to inadequate bonding, which may precipitate further changes.<sup>148</sup> The Colorado oil and gas regulator is currently engaged in a rulemaking process that could significantly raise state bonding levels.<sup>149</sup> At the federal executive level, the Biden Administration sent a strong message in its "Executive Order on Tackling the Climate Crisis at Home and Abroad" that it plans to use "federal leadership" to coordinate faster well plugging and included an orphan wells plugging proposal in the large infrastructure plan presented in March 2021.<sup>150</sup> At the congressional level, a bill introduced in the 116<sup>th</sup> US Congress in September 2020 would raise federal bonding levels and use conditional grants to states to incentivize raising theirs.<sup>151</sup> The



ABANDONED OIL WELLS IN BAKU, AZERBAIJAN, LEAKING OIL © PHOTOALIONA VIA ISTOCK

premiums and collateral required by surety companies will affect not just the profitability, but the fundamental viability of many oil and gas companies whose operating margins would not justify continued production at higher levels of financial assurance.

The increasing risk of bankruptcy and default in the oil and gas sector should likewise concern bondholders. As oil and gas bankruptcies accelerate,<sup>152</sup> defaults on bonds become increasingly likely. Moreover, the bond market for oil and gas companies — already largely junk bonds — has been artificially inflated by significant intervention from the Federal Reserve. According to a recent analysis by Friends of the Earth, the Federal Reserve bond purchasing program significantly buoyed the oil and gas bond market, in part by enabling new issuances of nearly USD 100 billion in oil and gas bonds since the program began in March 2020.<sup>153</sup> By propping up conditions for the continued financing of oil and gas production, this program has increased debt loads in the industry while doing nothing to fix the underlying structural weaknesses. Unsurprisingly, in October 2020, North American oil and gas debt in bankruptcy hit its all-time high.<sup>154</sup> The holders of this debt should know that massive cleanup obligations will compete with their own repayment.

There is also a risk that oil and gas bankruptcies could ripple out to the insurance industry. The surety companies that commit to paying out bonds do so assuming that only a fraction of the bonds will be redeemed, and that the surety companies will be able to recover most of what they have to pay out on the redeemed bonds from the insured operators. This is how surety bonds differ from insurance — the surety system functions when bankruptcies are scarce and not correlated with one another. However, as the oil and gas industry weakens and increased bonding rules take effect, liability could concentrate dangerously in oil and gas surety providers (as it has for coal sureties<sup>155</sup>). Unless oil and gas regulators coordinate closely with their insurance counterparts, such a phenomenon could spread decommissioning risk to other investors.

Lenders, investors, and insurers should recognize that the environmental liabilities associated with the closure of oil and gas wells represent an increasingly material financial risk to the oil and gas industry, making further financing for oil and gas all the more imprudent. Regulators should ensure that reforms to bonding requirements for decommissioning mentioned earlier are coupled with close monitoring of the surety markets.



## PART 5

## Orphan Wells: A Global Problem

There are an estimated 800,000 onshore orphan wells in the United States and 3,800 in Canada as of 2019, although both figures likely understate the true numbers.<sup>156</sup> And these represent just a fraction of the total number of idle or abandoned wells, which is in the millions. While the scale of well orphaning may be especially large in these two countries, orphan, idle, and abandoned wells are by no means a uniquely American or Canadian problem. They represent a serious issue in many other jurisdictions around the world.

In Ogoniland in the Niger Delta, Nigeria, for example, multiple onshore wells, pipelines, and other installments were not properly decommissioned when Shell Petroleum Development Company ceased production in the region, according to a report from the United Nations Environment Programme (UNEP).<sup>157</sup> These abandoned, leaking wells and pipelines have contributed to many negative environmental and health impacts, including: disastrous impacts on mangroves that are important for climate resiliency; destruction of all fishing activities in some areas; and pollution of drinking water and local air with hydrocarbons and, in some cases, extremely high levels of benzene, a known carcinogen.<sup>158</sup> Nearly a decade after UNEP recommended proper decommissioning and remediation of the many contaminated sites, much of this work has yet to begin.<sup>159</sup> Recent breakthrough decisions in Dutch<sup>160</sup> and British courts<sup>161</sup> have re-opened the possibility that parent corporations may be held responsible for these harms. But the road to remediation and reparation of the extensive harms to human health and the environment remains a long one.

Decades of drilling have left another toxic legacy in the Lago Agrio region of Ecuador. While the causes of the environmental damage are manifold and include oil spills and dumping of drilling wastes into surface waters, unremediated or improperly remediated drilling sites are a highly significant source of ongoing dangers to health and the environment, according to Ecuadorian court rulings.<sup>162</sup>

An estimated 15,000 offshore wells have been drilled in the North Sea territorial waters of the United Kingdom, the Netherlands, Denmark, Germany, and Norway. Both previously plugged and yet-to-be decommissioned wells pose problems. Researchers detected methane leaking at 65% of plugged and

abandoned wells and estimated thousands of tons of methane were leaking from just a small area studied in the North Sea.<sup>163</sup> The decommissioning plans for several platforms in British waters have also drawn scrutiny in recent years, after UK regulators seemingly accepted the operator's argument that it would be too costly and risky to fully remove the structures, allowing them to leave parts containing toxic chemicals in place.<sup>164</sup> However, with proper planning, these regulators would have been aware of the inherent complexities and ensured that the companies had set aside sufficient funds to decommission the structures properly. For developing countries that already have offshore wells but where decommissioning of assets has largely yet to occur, such as Angola and Nigeria,<sup>165</sup> the true costs of decommissioning may come as an unwelcome surprise — and one that operators and governments may be unprepared to pay.<sup>166</sup>

These examples should serve as a warning to countries considering new oil and gas development, especially those where the targeted reserves are offshore or reachable through unconventional drilling like fracking, given the heightened costs associated with closing such production sites. Countries such as Argentina, which is looking to expand fracking in its western Vaca Muerta basin,<sup>167</sup> or Guyana, where a consortium of oil companies led by ExxonMobil seeks to undertake one of the largest offshore oil projects in the world,<sup>168</sup> should take heed and consider looming closure-related liabilities now, before operations begin or expand. While closure and cleanup costs often seem like distant concerns, they should be central to debates about whether to start down the path of oil and gas development at all. At a minimum, incentives should be structured to ensure companies pay closure and cleanup costs, and any new projects should be conditioned on companies committing to do so — and backing those commitments with adequate funds.

As the global community phases out oil and gas to combat climate change, the fiscal and environmental risks associated with shutting down wells, especially fracked and offshore wells, loom larger and closer on the horizon than countries may anticipate. Those expenses should form part of any cost-benefit analysis of proposed oil and gas developments. Environmental and social impact assessments and management plans should address the inevitable task of closure and remediation, and the risks of leaving wells idle or improperly cleaning up production sites.

## TEXT BOX 4:

## Uncovering the Costs of Unconventional Drilling

Because of the depth and angles at which fracked wells are drilled, they are generally more costly to close safely than are conventional onshore wells. As Carbon Tracker has reported, the true cost of decommissioning fracked wells is only now coming to light, but it is likely around USD 300,000 for a well dug to a depth of 10,000 feet<sup>169</sup> — an order of magnitude higher than frequently estimated by industry and regulators.

Decommissioning offshore infrastructure, which entails plugging the well, removing and towing to shore the platform, and removing pipelines that have been laid on the ocean floor,<sup>170</sup> is also much more costly than decommissioning onshore wells. Sources consistently place the cost of plugging deep offshore wells at USD 5 million to USD 11 million per well, with subsea wells more expensive to plug and abandon than platform wells.<sup>171</sup> Limited data from the US Gulf of Mexico suggests removing platforms and pipelines can more than double this cost.<sup>172</sup>

While the financial costs of decommissioning fracked and deep offshore wells may be particularly high, conventional wells, especially those located nearest to communities, can be the costliest from the perspective of remediating harms to human health and the local environment. Regardless of where or how the production occurs, safe closure and cleanup of oil and gas wells are critical. As the ultimate guarantors of their residents' safety, governments face material, legal, and financial risks if they do not adequately plan for decommissioning oil and gas operations.

Consideration of the costs and obligations associated with decommissioning is most important *before* the issuance of permits for oil and gas extraction — especially because, in the context of an industry in long-term decline, it weighs strongly against authorizing any new development at all. However, countries with mature oil and gas industries can and should still act to blunt these risks, by strengthening the applicable rules for closure and cleanup and requiring industries to set aside funds today for the phaseout tomorrow.

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## TEXT BOX 5:

## Guyana: In Deep Water

In December 2019, a consortium led by ExxonMobil began oil production from deepwater wells off Guyana's coast, pursuant to a 2016 Production Sharing Agreement with the Guyanese government. Amidst capital expenditure cutbacks and asset write-downs in other areas, ExxonMobil is increasingly looking to Guyana as a source of growth.

According to ExxonMobil's overview of its operations in Guyana, it may drill as many as 92 wells in the Liza 1, 2, and Payara oil fields alone.<sup>173</sup> ExxonMobil has drilled exploration wells at 16 different potential production sites so far. ExxonMobil drilled the wells at an average water depth of 1782 meters (5846 feet) and some are as deep as 2735 meters (8973 feet).<sup>174</sup> The eight wells already in production at Liza 1 are drilled in water depths of 1500-1900 meters (4921-6234 feet).<sup>175</sup> To put those depths into context, the US Bureau of Safety and Environmental Enforcement defines any well drilled in more than 122 meters (400 feet) of water as "deep water,"<sup>176</sup> and the average water depth of wells in the North Sea is 185 meters (607 feet).<sup>177</sup>



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As noted above, decommissioning such deep offshore wells is expensive. While the cost depends on a number of factors, including ocean conditions, it is significantly more expensive than the closure of conventional onshore wells. Estimates consistently place the costs of deepwater decommissioning in the tens of millions USD per well, once all associated measures are taken into account.<sup>178</sup>

Despite the significant looming expense of closing down these offshore operations, the Production Sharing Agreement does not require the companies to set aside any money for decommissioning in a dedicated fund or provide any form of financial security while the wells are producing. Instead, the Agreement permits the ExxonMobil-led consortium to deduct the estimated future costs of decommissioning as current operating expenses, according to a schedule based on production rates, without demonstrating that it has reserved those funds for future use. An independent report by the Institute for Energy Economics and Financial Analysis (IEEFA) estimates that ExxonMobil could charge Guyana as much as USD 227 million in amortized abandonment costs between 2020 and 2024.<sup>179</sup> The Agreement only requires that the consortium promise to pay when the time comes to close operations down. In other words, the recovered costs ultimately diminish the amount of profit oil shared with Guyana, effectively passing the bill of decommissioning on to the government up front.<sup>180</sup>

The high costs of closure costs may come due sooner than expected. The economically viable lifetime of the deepwater wells in Guyana is uncertain, given trends in the global oil and gas market, which is now unquestionably in decline. As a result, the time frame over which it is possible to spread those costs may be shorter than anticipated, and the revenues earned from the production may be lower than projected.<sup>181</sup> Due to both the structure of the Production Sharing Agreement and market conditions, Guyana faces higher costs and lower earnings than anticipated.<sup>182</sup>

Expense is not the only concern associated with the shutdown of deepwater drilling operations. If funds are insufficient to cover the costs of properly decommissioning the wells, there could be significant and lasting consequences for the marine environment and the human and biotic communities that depend on it.



## Conclusion

**T**he problem of idle and orphan wells is only growing as the oil and gas industry sunsets. Decommissioning wells represents a huge cost hiding in plain sight and a glaring liability on the balance sheets of oil and gas companies in deepening debt. The significant environmental, health, and financial risks associated with the “end-of-life” of oil and gas operations threaten public welfare and the public purse.

Yet, closing down and cleaning up oil and gas wells is a necessary and critical step in a just transition. Communities on the frontlines and fencelines of fossil fuel production and the workers dependent on the industry all have a stake in how the sector winds down and what takes its place.

In the United States and Canada, locating, plugging, and reclaiming all documented and suspected orphan well sites, as well as dismantling abandoned pipelines, could likely employ over 100,000 oil and gas workers for several years.<sup>183</sup> Such a program should prioritize the well-being of oil and gas workers — not oil and gas companies.<sup>184</sup> Because plugs fail with some regularity, monitoring and maintenance could also sustain a smaller number of jobs in perpetuity.

However, for those workers, and the communities surrounding oil and gas wells, there is an urgent need for more information on the health and safety hazards. Disclosure of information should include the presence of leaking oil and gas, toxic substances, and methane from idle wells, or any radioactive or otherwise harmful material clinging to discarded pipes or present in fluids removed from well sites.<sup>185</sup> Making information about the risks that wells pose public, and ensuring their swift closure and reclamation are both critical to preventing further tragic accidents.<sup>186</sup> For community members living near well sites, these measures are also necessary for realizing long-overdue environmental justice.

In the United States, the Biden Administration has taken a critical first step by announcing accelerated efforts to clean up wells and proposing job creation through plugging programs, with a welcome focus on community health and revitalization. In its Executive Order on Climate Policy, the Administration directs federal agencies to plug wells in an effort to assist “coal, oil and gas, and power plant *communities*”<sup>187</sup> — not companies.

Well plugging programs can be an important part of the path out of the current fossil fuel era. But public funds must incentivize measures that make polluters pay to clean up their mess, not pick up the tab for companies (much less pay for new wells). Any public money devoted to the problem of plugging and remediating orphan wells should at most supplement private dollars rather than crowding them out. And bankruptcy law must be changed to no longer serve as a liability shield for companies seeking to shirk their environmental obligations.

Finally, those jurisdictions on the frontiers of oil and gas expansion — especially those contemplating fracking and offshore drilling — should be clear-eyed about the anticipated environmental impacts throughout the wells’ lifecycle and the hefty costs associated with decommissioning.

AN OIL PUMPJACK WITH A LEAKY WELLHEAD DRIPS OIL ALONG THE SIDE OF THE ROAD IN CALIFORNIA © GARY KAVANAGH VIA ISTOCK



## Recommendations

- **The costs of closing down and cleaning up oil and gas operations should be front and center in any analysis of proposed new oil and gas developments and any plans for a just transition to a clean energy future.** As the oil and gas industry declines, closure costs loom ever larger and closer on the horizon, and planning for proper shutdown and cleanup of wells, paid for by polluters, is necessary to protect frontline communities' rights and pave the way for a safe climate future.
- **Oil and gas companies must be required to quickly and properly close idle wells.** Idle wells pose a danger to human health, safety, and the environment, and there is an existing and growing risk that operators will go bankrupt before they clean them up. Therefore, governments need to enact definitive timelines for companies to plug and remediate idle wells, without the option of extension, and with penalties to deter missing the statutory deadline.
- **Governments should conform their domestic policies on oil and gas well closure and cleanup to their international obligations under human rights and environmental law.** These bodies of law contain both general and specific imperatives for governments to protect affected communities from polluting industries throughout their lifecycle, including by ensuring prompt and adequate closure and cleanup, paid for by companies. Public policies regarding the wind-down of oil and gas production are a human rights concern. Human rights authorities should increase their attention to the harms associated with every phase of oil and gas production, including the end-of-life stage, and the obligations of public and private actors to prevent and/or remedy these harms.
- **Oil and gas companies must be required to set aside or securely guarantee more funds up front to cover the cost of closure and cleanup.** National and subnational legislatures in the United States and Canada should immediately implement a requirement of full financial security for both onshore and offshore wells, eliminating such practices as blanket bonding. They should coordinate with insurance regulators to ensure surety providers can guarantee the new, substantially higher resulting obligations. Regulators in other countries should take heed from the ineffectiveness to date of US and Canadian approaches and instead pursue approaches that provide full up-front security.
- **Bankruptcy loopholes must be closed to ensure that reorganization does not provide an easy way for companies to offload their environmental debts.** The US Congress should reform the Bankruptcy Code to clarify that state expenditures on the debtor's environmental obligations are always entitled to the highest priority for repayment and disallow trustees from abandoning any property or leases with outstanding environmental obligations. Environmental regulators should robustly pursue recovery of well closure and cleanup costs in bankruptcy proceedings.
- **Public resources for well closure and cleanup should compel, not displace, industry funding, reinforcing the polluter pays principle.** Any funding measures should be accompanied by regulatory reform to address the root causes of orphan wells, and provide strict oversight to ensure that efforts do not lead to taxpayers footing the bill for environmental cleanup obligations that by law reside with active oil and gas operators. Meanwhile, plugging existing orphan wells presents an opportunity to create over 100,000 well-paying, union jobs, potentially as part of a new federal workforce.
- **Lenders, investors, and insurers should recognize that the environmental liabilities associated with the closure of oil and gas wells represent an increasingly material financial risk to the oil and gas industry.** These risks make further financing for oil and gas all the more imprudent, and trigger fiduciary duties to reassess continued investment in the sector.
- **Given the mounting climate emergency and the accelerating decline of the oil and gas industry, there is no justification for new oil and gas drilling.** Governments that are nonetheless contemplating the startup of oil and gas projects should carefully consider the costs of properly closing down wells and the environmental and health risks of failing to do so. Failure to take reasonable measures to prevent these foreseeable harms associated with the end of operations breaches States' duties to protect human rights. Oil and gas operators, particularly those involved in drilling unconventional wells that are costlier to decommission, must be required to put adequate funds aside up front, so that the public is not stuck with an enormous bill on top of an already burdensome environmental debt. Companies' promises to pay are simply not enough.

## Endnotes

1. Mark Olalde & Ryan Menzes, *The toxic legacy of old oil wells: California's multibillion-dollar problem*, L.A. TIMES & CENTER FOR PUBLIC INTEGRITY (Feb. 6, 2020), <https://www.latimes.com/projects/california-oil-well-drilling-idle-cleanup/>; Megan Milliken Biven, *The Wreckage of the Last Energy Epoch: Abandoned Wells and Workers*, CURRENT AFFAIRS (Jan. 12, 2021), <https://www.currentaffairs.org/2021/01/the-wreckage-of-the-last-energy-epoch-abandoned-wells-and-workers>.
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4. See PHYSICIANS FOR SOCIAL RESPONSIBILITY, COMPENDIUM OF SCIENTIFIC, MEDICAL AND MEDIA FINDINGS DEMONSTRATING RISKS AND HARMS OF FRACKING (UNCONVENTIONAL GAS AND OIL EXTRACTION) (7th ed. 2020), <https://www.psr.org/blog/resource/fracking-compendium/>.
5. In Pennsylvania, for example, a grand jury found that the Department of Environmental Protection failed to protect the public from fracking's health impacts, after ignoring or underestimating the risks. See Reid Frazier & Susan Phillips, *Pa. grand jury report on fracking: DEP failed to protect public health*, STATE IMPACT PENNSYLVANIA (June 25, 2020), <https://stateimpact.npr.org/pennsylvania/2020/06/25/pa-grand-jury-report-on-fracking-dep-failed-to-protect-peoples-health/>. In Mendoza, Argentina, a provincial decree regarding the process for authorizing fracking faces a legal challenge on the grounds that it was promulgated without adequate prior assessment of the environmental impacts of fracking, particularly on water, and inadequately protects against those harms. See, e.g., Earthjustice Supports Fracking Challenge in Mendoza, Argentina (Jan. 4, 2021), <https://earthjustice.org/news/press/2021/earthjustice-supports-fracking-challenge-in-mendoza-argentina>; FARN se opone a una reglamentación del fracking "a la medida de las empresas y en contra de la protección del ambiente" en Mendoza (Dec. 16, 2020), <https://farn.org.ar/farn-se-opone-a-una-reglamentacion-del-fracking-a-la-medida-de-las-empresas-y-en-contra-de-la-proteccion-del-ambiente-en-mendoza/>.
6. U.S. ENV'TL PROT. AGENCY, INVENTORY OF U.S. GREENHOUSE GAS EMISSIONS AND SINKS 1990-2018, Table 3-84 and 3-85 (2018).
7. Williams et al., *supra* note 2, at 567.
8. U.S. Energy Information Administration, "U.S. Oil and Natural Gas Wells by Production Rate" (Dec. 23, 2020).
9. Alberta, far and away the province with the most significant oil and gas production, counts 62,500 active and 97,000 inactive wells. See Alberta Energy and Gas Regulator, Oil and Gas Liabilities Management, <https://www.alberta.ca/oil-and-gas-liabilities-management.aspx>. British Columbia further counts between roughly 13,000 and 20,000 active wells and 9,000 and 13,000 abandoned wells (depending on which report one runs, "Well Index" or "Wells Drilled by Status"). See British Columbia Oil and Gas Commission, "Data and Reports: Wells," <https://www.bcogc.ca/data-reports/data-centre/?category=2772>. The study by Williams et al. calculated that there are roughly 373,000 decommissioned or idle but inactive wells in Canada. See Williams et al., *supra* note 2, at 567.
10. Seo, *supra* note 2.
11. See Molly Taft, *One of the Nation's Largest Pipelines Caused the Biggest Spill in Decades—And We're Just Hearing About It*, GIZMODO (Mar. 6, 2021).
12. BNP PARIBAS, DECOMMISSIONING: A \$3.6 TRILLION CHALLENGE 3-4 (2020), <https://docfinder.bnpparibas-am.com/api/files/65DC8307-F884-47B9-BE20-660DB337B978> (the \$3.6 trillion figure refers to costs of decommissioning multiple forms of energy infrastructure, including coal and nuclear).
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15. Carbon Tracker, *supra* note 3, at 20-23.
16. See generally CARBON TRACKER, FLIP SIDE: HOW STRANDED ASSETS WILL GIVE WAY TO STRANDED LIABILITIES (2020).
17. See generally CARBON TRACKER, *supra* note 3.
18. Haynes & Boone counted 46 bankruptcies among upstream oil and gas companies and oilfield service companies in the United States in 2020. Haynes & Boone, *Oil Patch Bankruptcy Monitor* (Dec. 31, 2020), [https://www.haynesboone.com/-/media/Files/Energy\\_Bankruptcy\\_Reports/Oil\\_Patch\\_Bankruptcy\\_Monitor](https://www.haynesboone.com/-/media/Files/Energy_Bankruptcy_Reports/Oil_Patch_Bankruptcy_Monitor). This number would have almost certainly been higher without the multiple new subsidies such firms have received from governments since the onset of the pandemic. See Lukas Ross et al., FRIENDS OF THE EARTH, BIG OIL'S \$100 BILLION BENDER (Sept. 2020), <https://foe.org/resources/big-oils-100-billion-bender/> (describing such support and the corporate bond issuances enabled in the United States); see also ENERGY POLICY TRACKER, <https://www.energy-policytracker.org/> (last accessed Mar. 24, 2021) (tracking fossil fuel industry support through COVID-19 relief packages in many countries).
19. Executive Order 14008, "Tackling the Climate Crisis at Home and Abroad" 86 Fed. Reg. 7619 §§ 201, 217 (Jan. 27, 2021).
20. The White House, *Fact Sheet: The American Jobs Plan* (Mar. 31, 2021), <https://www.whitehouse.gov/briefing-room/statements-releases/2021/03/31/fact-sheet-the-american-jobs-plan/>; Letter from Shalanda D. Young, Acting Dir., Executive Office of the President, Office of Management and Budget, to Sen. Patrick Leahy, Chairman, Committee on Appropriations, U.S. Senate (Apr. 9, 2021), <https://www.whitehouse.gov/wp-content/uploads/2021/04/FY2022-Discretionary-Request.pdf> (including in the President's request for FY2022 discretionary funding of over \$550 million aimed in part at remediating orphaned oil and gas wells) [hereinafter Letter with Summary of the President's Discretionary Funding Request].



21. See *infra* Text Box 4.
22. In the United States, these proposals include three bills introduced in 2020: The Moving Forward Act, H.R. 2, 116<sup>th</sup> Cong., which passed the House at the start of July and contains a section providing funds for well plugging; The Oil and Gas Bonding Reform and Orphaned Well Remediation Act, S.4642, 116<sup>th</sup> Cong., introduced in the Senate by Senator Bennet in September, which does the same and further requires federal agencies to reform their bonding rules and provides incentives to states and tribes to do so; and The POWER Act of 2020, H.R. 8332, 116<sup>th</sup> Cong., introduced in the House by Representative Thompson, which would provide funds for well plugging.
23. See, e.g., Michael Bloomberg, *Let's Hire Laid-Off Oil and Gas Workers to Fight Climate Change*, BLOOMBERG (Aug. 3, 2020), <https://www.bloomberg.com/opinion/articles/2020-08-03/let-s-hire-laid-off-oil-and-gas-workers-to-fight-climate-change>.
24. Allowing companies to orphan wells in the first place is a significant subsidy to the industry. See STOCKHOLM ENVIRONMENTAL INSTITUTE, EFFECT OF GOVERNMENT SUBSIDIES FOR UPSTREAM OIL INFRASTRUCTURE ON U.S. OIL PRODUCTION AND GLOBAL CO<sub>2</sub> EMISSIONS, 38-40 (2017), <https://www.sei.org/publications/us-oil-subsidies/>. Handing money to solvent companies to pay for their environmental debts is another form of subsidy. This appears to be the case in the two most prominent recent examples of such programs, in North Dakota and Alberta (see Part III *infra*).
25. See, e.g., Jill E. Johnston et al., *Impact of upstream oil extraction and environmental public health: a review of the evidence*, 657 SCI TOTAL ENVIRON. 187 (2019) (reviewing studies on various health consequences of non-occupational exposure to oil drilling, including chronic diseases, acute symptoms and quality of life); NAT. RES. DEFENSE COUNCIL, FRACKING FUMES: AIR POLLUTION FROM HYDRAULIC FRACTURING THREATENS PUBLIC HEALTH AND COMMUNITIES (2014) (identifying a number of studied health effects related to natural gas development, primarily at the extraction stage); John K. Nduka et al., *Impact of Oil and Gas Activities on Acidity of Rain and Surface Water of Niger Delta, Nigeria: An Environmental and Public Health Review*, 7 J. ENVT'L PROT. 566 (2016) (studying the impacts of oil and gas flaring and refining); CIEL ET AL., PLASTIC & HEALTH: THE HIDDEN COSTS OF A PLASTIC PLANET (2019) (reviewing the health impacts of plastic, 99% of which is made from fossil fuels).
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27. See the sources cited *supra* at note 2.
28. Adrienne Kropesch et al., *Environmental Justice in Unconventional Oil and Natural Gas Drilling and Production: A Critical Review and Research Agenda*, 53 ENVT'L SCI. & TECH. 6601 (2019); NATURAL RESOURCES DEFENSE COUNCIL, DRILLING IN CALIFORNIA: WHO'S AT RISK (2014), <https://www.nrdc.org/resources/drilling-california-whos-risk>; Mark Olalde & Ryan Menzes, *The toxic legacy of old oil wells: California's multibillion-dollar problem*, L.A. TIMES & CTR. FOR PUBLIC INTEGRITY (Feb. 6, 2020), <https://www.latimes.com/projects/california-oil-well-drilling-idle-cleanup/>; United Nations Special Rapporteur on the implications for human rights of the environmentally sound management and disposal of hazardous substances and wastes, *Implications For Human Rights Of The Environmentally Sound Management And Disposal Of Hazardous Substances And Wastes*, UN Doc. A/75/290, para. 11 (Aug. 5, 2020), <https://undocs.org/en/A/75/290> ("Around the world, industrial plants, landfills and other hazardous exposures are placed near areas where indigenous peoples, people of colour and racial and ethnic minorities, people of certain religions and low-income populations live, posing grave risks to their health and environment.").
29. See ALLISON & MANDLER, *supra* note 26; HO ET AL., *supra* note 26; JACKSON ET AL., *supra* note 26; OSBORN ET AL., *supra* note 26; FRACTRACKER ALLIANCE, *supra* note 26; RASMUSSEN ET AL., *supra* note 26; NAT. RES. DEFENSE COUNCIL, *supra* note 25.
30. See ENVIRONMENT AMERICA, OFFSHORE DRILLING, ONSHORE DAMAGE (2019) about the pollution threats posed by onshore infrastructure needed to support offshore drilling; Maureen Lichtveld et al., *The Deepwater Horizon Oil Spill Through the Lens of Human Health and the Ecosystem*, 3 CURRENT ENVT'L HEALTH REPS. 370 (2016) (reviewing research on impacts on ecosystems and coastal communities of a particularly severe well explosion and oil spill). These impacts are in addition, of course, to all the other lifecycle impacts of oil drilling on these communities, see, e.g., Adrian Hedden, *Where the Oil Goes: Communities Across the Gulf Coast Grapple with Impacts of Oil and Gas*, CARLSBAD CURRENT ARGUS (May 8, 2020), <https://www.currentargus.com/story/news/local/2020/05/08/oil-prices-natural-gas-market-us-economy-permian-basin/5132895002/>.
31. Groom, *supra* note 2.
32. Olade and Menzes, *supra* note 1.
33. John Aguilar, *Federal Report on Fatal Firestone Explosion Blames Gas Leak, Government Approval to Build Homes without Pipeline Maps*, THE DENVER POST (Oct. 29, 2019), <https://www.denverpost.com/2019/10/29/firestone-home-explosion-ntsb-report-anadarko/>.
34. See *supra* note 27.
35. This equivalent emissions calculation is based on figures presented in U.S. ENVT'L PROT. AGENCY, INVENTORY OF U.S. GREENHOUSE GAS EMISSIONS AND SINKS 1990-2018, Table 3-81 (2020), but uses a 20-year Global Warming Potential (GWP) of 86 for methane, based on the IPCC's 5<sup>th</sup> Assessment Report, rather than the older (and lower) 100-year GWP factor of 25 for methane that EPA uses, based on the IPCC's 4<sup>th</sup> Assessment Report. We rely on the updated GWP figures in the IPCC's most recent Assessment Report, and focus on warming over a shorter time horizon, both because methane is a short-lived gas whose warming impacts are most acute in the near-term, and because short-term temperature increases can lead to a number of climate-forcing feedback loops. Alternatively, using the updated 100-year GWP factor of 28 for methane, presented in the IPCC's 5<sup>th</sup> Assessment Report, estimated methane emissions from abandoned and inactive wells in the United States in 2018 were equivalent to placing about 1.7 million cars on the road. See Gunnar Myhre et al., *Anthropogenic and Natural Radiative Forcing in CLIMATE CHANGE 2013: THE PHYSICAL SCIENCE BASIS. CONTRIBUTION OF WORKING GROUP I TO THE FIFTH ASSESSMENT REPORT OF THE INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE*, 659, 714 (T.F. Stocker et al., eds. 2018), [https://www.ipcc.ch/site/assets/uploads/2018/02/WG1AR5\\_all\\_final.pdf](https://www.ipcc.ch/site/assets/uploads/2018/02/WG1AR5_all_final.pdf).
36. See U.S. ENVT'L PROT. AGENCY, *supra* note 35, at tables 3-84, 3-85.
37. Seo, *supra* note 2. According to a study published in December 2020, methane emissions from abandoned wells are likely underestimated by as much as 150% in Canada and 20% in the United States. See Williams et al., *supra* note 2.
38. See, e.g., Office of the High Comm'r for Human Rights, "Frequently Asked Questions on Human Rights and Climate Change," 30-31 (2021), [https://www.ohchr.org/Documents/Publications/FSheet38\\_FAQ\\_HR\\_CC\\_EN.pdf](https://www.ohchr.org/Documents/Publications/FSheet38_FAQ_HR_CC_EN.pdf); Comm. on the Elimination of Discrimination Against Women, Comm. on Econ., Social and Cultural Rights, Comm. on the Protection of the Rights of All Migrant Workers and Members of their Families, Comm. on the Rights of the Child & Comm. on the Rights of Persons with Disabilities, Joint Statement on "Human Rights and Climate Change" (Sept. 16, 2019), <https://www.ohchr.org/en/NewsEvents/Pages/DisplayNews.aspx?NewsID=24998&LangID=E> [hereinafter "Joint Statement on Human Rights and Climate Change"];];

- John H. Knox, *Report of the Independent Expert on the issue of human rights obligations relating to the enjoyment of a safe, clean, healthy and sustainable environment*, U.N. Doc. A/HRC/31/52, paras. 37-38 (2016), <https://undocs.org/A/HRC/31/52>; Comm. on Economic, Social and Cultural Rights, General Comment 24 (2017) on State Obligations under the International Covenant on Economic, Social and Cultural Rights in the context of business activities, paras. 10, 14, 38, U.N. Doc. E/C.12/GC/24, (June 23, 2017) [hereinafter “CESCR, General Comment 24”]; Comm. on the Rights of the Child, General Comment No. 16 (2013) on State Obligations Regarding the Impact of the Business Sector on Children’s Rights, paras. 4-5, 19-20, 28, 30, U.N. Doc. CRC/C/GC/16 (Apr. 17, 2013) [hereinafter “CRC, General Comment 16”]. See also CIEL & GIESCR, *States’ Human Rights Obligations in the Context of Climate Change: 2020 Update* (Mar. 2020), available at <https://www.ciel.org/reports/states-human-rights-obligations-in-the-context-of-climate-change-2020-update-march-2020/>.
39. See, e.g., *Öneryıldız v. Turkey*, 2004-XII Eur. Ct. H.R. 79, paras. 71, 89, 90 (holding that the State has a positive obligation to take appropriate steps to safeguard life against risks posed by “any activity, whether public or not, in which the right to life may be at stake, and a fortiori in the case of industrial activities, which by their very nature are dangerous,” including through establishment of a legislative and administrative framework); *Brânduse v. Romania*, 2009-III Eur. Ct. H.R., paras. 68, 73-76 (finding a violation of the Applicant’s right to respect for family and private life (Article 8 of the Convention) due to the State’s failure to ensure proper closure of a waste site); *Tătar v. Romania*, 2009-III Eur. Ct. H.R., paras. 87-88, 107, 121, 125 (discussing state duties to adequately regulate private sector activity to prevent harm to the environment and health and emphasizing that those duties apply both before and after damage occurs); *Socio-Economic Rights and Accountability Project v. Nigeria*, Final Judgment, ECW/CCJ/JUD/18/12, paras. 109, 111, 121 (Dec. 12, 2012) (finding a violation of the State duty “to act, to prevent damage to the environment and to make accountable the offenders” in the case of unremediated oil pollution); *Comunidades Indígenas Miembros de la Asociación Lhaka Honhat (Nuestra Tierra) v. Argentina*, Merits, Reparations, and Costs, Judgment, Inter-Am. Ct. H.R. (ser. C) No. 400, para. 208 (Feb. 6, 2020) (holding that the State’s duty of prevention requires measures to adequately regulate activities that are potentially damaging to the environment, including requiring ex-ante assessments, contingency plans, and mitigation in cases of environmental damage).
  40. See, e.g., Report of the Special Rapporteur on implications for human rights of the environmentally sound management and disposal of hazardous substances and wastes on the mission to Canada, U.N. Doc. A/HRC/45/12/Add.1 para. 90 (2020) (“Remediation remains a widespread concern. Concerns were raised regarding the adequacy of financial guarantees on polluting enterprises for site clean-up and remediation, leaving so-called orphan contaminated sites. ... Efforts by Québec and British Columbia are encouraging, towards ensuring polluters pay for various costs of closure and remediation of contaminated sites. However, thousands of such sites remain across Canada, particularly in Alberta, with considerable concern that the public and future generations will bear the \$100 billion price of restoration, monitoring and remediation.”); see also Report of the Special Rapporteur on the human rights to safe drinking water and sanitation to the General Assembly, U.N. Doc. A/74/197, para. 79-80 (2019) (“A way to prevent and mitigate the impact arising from non-compliance with decommissioning is to establish plans at the planning stage for the closure of the operation and the de-installation of physical infrastructure. Such decommissioning processes identified at the planning stage will ensure that resources will be allocated to comply with the plan.”); Report of the Special Rapporteur on minority issues on the mission to Nigeria, U.N. Doc. A/HRC/28/64/Add.2, para. 87 (2015) (“The Government, in coordination with oil companies implicated in the environmental damage, should implement the recommendations made by the 2011 United Nations Environment Programme report Environmental Assessment of Ogoniland, including the proper maintenance of oilfield facilities and the decommissioning of facilities that are no longer used...[and] the implementation of clean-up actions in all affected areas without further delay.”); Report of the Special Rapporteur on the implications for human rights of the environmentally sound management and disposal of hazardous substances and wastes, U.N. Doc. A/HRC/33/41, para. 102 (2016) (“A core component of an effective remedy for toxic chemical contamination is rehabilitation, both of the environment and of the people affected...States must ensure that businesses clean up contaminated sites to protect children in the future.”); Report of the Special Rapporteur on the issue of human rights obligations relating to the enjoyment of a safe, clean, healthy and sustainable environment (“Good Practices Report”), U.N. Doc. A/HRC/43/53, para. 101 (2019) (“The restoration of polluted or contaminated areas is also an important activity in ensuring a non-toxic environment.”).
  41. See Report of the Special Rapporteur on the human rights to safe drinking water and sanitation to the General Assembly, *supra* note 40, at para. 80; cf. Report of the Special Rapporteur on implications for human rights of the environmentally sound management and disposal of hazardous substances and wastes on the mission to Canada, *supra* note 40, at para. 90.
  42. The 1958 Geneva Convention on the Continental Shelf, the 1972 London Dumping Convention and its 1996 Protocol, and the UN Convention on the Law of the Sea create obligations on States to ensure the full or partial removal of offshore oil and gas infrastructure. See Convention of the Continental Shelf arts. 5(1)(5)(6)(7), Apr. 29, 1958, 499 U.N.T.S. 311; Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter arts. 1, 2, 3(a)(ii), Dec. 29, 1972, 1046 U.N.T.S. 120; 1996 Protocol to the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter arts. 2, 3, 4(1.1), Annex 1 arts. (2)(3), Nov. 7, 1996, 36 I.L.M. 7; U.N. Convention on the Law of the Sea, arts. 60, 192-94, Dec. 10, 1982, 1833 U.N.T.S. 397. See also Int’l Maritime Org., 1989 Guidelines and Standards for the Removal of Offshore Installations and Structures on the Continental Shelf and in the Exclusive Economic Zone, Oct. 19, 1989, IMO Res. A.672(16) (setting forth non-binding guidelines); Seline Trevisanut, *Decommissioning of Offshore Installations: A Fragmented and Ineffective International Regulatory Framework in THE LAW OF THE SEA BED* (Catherine Banet, ed., 2020) (discussing how these treaties interact and problems of interpretation).
  43. See, e.g., 1992 Convention on the Protection of the Marine Environment of the Baltic Sea Area (Helsinki Convention) Annex VI Reg. 8, April 9, 1992, 2009 U.N.T.S. 197; 1994 Protocol for the Protection of the Mediterranean Sea Against Pollution Resulting from Exploration and Exploitation of the Continental Shelf and the Seabed and its Subsoil (Barcelona Offshore Protocol) art. 20, Oct. 14, 1994, 2742 U.N.T.S. 77.
  44. See sources cited *infra*, notes 51-54.
  45. This principle has been recognized by regional human rights systems, international human rights treaty bodies, and independent human rights experts appointed by the UN Human Rights Council. For regional bodies see, e.g., Inter-Am. Ct. H.R., Advisory Opinion OC 23-17, at paras. 141-42 (Nov. 15, 2017) (recognizing that, with respect to “certain activities that involve significant risks to the health of the individual ... States have the specific obligation to regulate them, including the introduction of monitoring and oversight mechanisms...Likewise, based on the obligation of prevention in environmental law, States are bound to use all the means at their disposal to avoid activities under their jurisdiction causing significant harm to the environment”); *Marcelino Díaz Sánchez and others v. Mexico*, Precautionary Measures, Resolution, Inter-Am. Comm’n H.R. No. 1498-18, paras. 24, 26, 27 (Apr. 23, 2019) (granting precautionary measures in an application involving alleged threats to the rights to the life, personal integrity, and health of the applicants, ordering the State to “prevent damage” to the applicants’ rights, and affirming State duties to protect against exposure to toxic substances and their consequent harm); *Social and Economic Rights Center (SERAC) and Center for Economic and Social Rights (CESR) v. Nigeria*, Comm’n 155/96, African Commission on Human and Peoples’ Rights [Afr. Comm’n H.P.R.] paras. 46, 52-53 (Oct. 27, 2001); *Öneryıldız v. Turkey*, Eur. Ct. H.R. [GC], *supra* note 39, at paras. 71, 89; Inter-Am. Comm’n H.R. & Special Rapporteur on Economic, Social, Cultural and

- Environmental Rights (REDESCA), Business and Human Rights: Inter-American Standards, paras. 46, 80, 89, 92-93, 100, 114, 117 (2019). For international human rights bodies and experts *see, e.g.*, Joint Statement on Human Rights and Climate Change, *supra* note 38; Human Rights Comm., General Comment No. 36 on article 6 of the ICCPR, on the right to life, U.N. Doc. CCPR/C/GC/36, paras. 18, 62 (Oct. 30, 2018) [hereinafter HRC, General Comment 36] (“Obligations of States parties under international environmental law should thus inform the contents of article 6 of the Covenant ... Implementation of the obligation to respect and ensure the right to life, and in particular life with dignity, depends, inter alia, on measures taken by States parties to preserve the environment and protect it against harm, pollution and climate change caused by public and private actors.”); CESCR, General Comment 24, *supra* note 38, at para. 16 (“The obligation to protect entails a positive duty to adopt a legal framework requiring business entities to exercise human rights due diligence in order to identify, prevent and mitigate the risks of violations of Covenant rights, to avoid such rights being abused, and to account for the negative impacts caused or contributed to by their decisions and operations and those of entities they control on the enjoyment of Covenant rights.”); CRC, General Comment 16, *supra* note 38, at paras. 19-20, 28; Report of the Special Rapporteur on the Issue of Human Rights Obligations Relating to the Enjoyment of a Safe, Clean, Healthy and Sustainable Environment, A/74/161 at 65-66 (July 15, 2019). *See generally supra* notes 39-40 (collecting statements from human rights courts and experts on the government obligation to ensure proper closure and cleanup paid for by the responsible industries after polluting and dangerous activities, including oil and gas production).
46. *See, e.g.*, HRC, General Comment 36, *supra* note 45, at para. 62; CRC, General Comment 16, *supra* note 38, at paras. 26-28; CESCR, General Comment 24, *supra* note 38, at paras. 14, 16; Report of the Special Rapporteur on the Issue of Human rights obligations relating to the enjoyment of a safe, clean, healthy and sustainable environment, U.N. Doc. A/74/161, para. 65 (July 15, 2019).
  47. *See* Joint Statement on Human Rights and Climate Change, *supra* note 38, at “States’ human rights obligations” paras. 1, 3. *See also* CESCR, General Comment 24, *supra* note 38, at paras. 10, 30, 39; HRC, General Comment 36, *supra* note 44, at para. 22.
  48. *See* Office of the High Comm’r for Human Rights (OHCHR), *The Guiding Principles on Business and Human Rights*, princs. 11-15 (2011) [hereinafter *Guiding Principles*].
  49. *Id.* at princs. 11, 22, 29-31.
  50. *See supra* notes 39-40.
  51. U.N. Conference on Environment and Development, Rio Declaration on Environment and Development, U.N. Doc. A/Conf.151/26/Rev.1 (Vol. 1), principle 7 (Aug. 12, 1992) [hereinafter Rio Declaration]; *see also* Declaration of the Conference on the Human Environment, Principle 22 (1972); International Convention on Oil Pollution Preparedness, Response and Co-operation, Nov. 30, 1990, 1891 U.N.T.S. 51 (preamble “taking account of the ‘polluter pays’ principles as a general principle of international environmental law”); Council Directive 2004/35/ of the European Parliament and of the Council of 21 April 2004 on environmental liability with regard to prevention and remedying of environmental damage, O.J. (L.143), 56-75 (Apr. 30, 2004); Consolidated Version of the Treaty on the Functioning of the European Union, art.191(2), 2020 O.J. (C 202) 1.
  52. Numerous international and regional human rights instruments codify the right to remedy. *See, e.g.*, G.A. Res. 217 (III) A, Universal Declaration of Human Rights, art. 8 (Dec. 10, 1948); Int’l Covenant on Civil and Political Rights, art. 2(3), Dec. 16, 1966, 999 U.N.T.S. 171; Int’l Convention on the Elimination of All Forms of Racial Discrimination, art. 6, Dec. 21, 1965, 660 U.N.T.S. 195; Convention Against Torture and Other Cruel, Inhuman or Degrading Treatment or Punishment, art. 14, Dec. 10, 1984, 1465 U.N.T.S. 85; Convention on the Rights of the Child, art. 39, Nov. 20, 1989, 1577 U.N.T.S. 3; Organization of American States, American Convention on Human Rights, art. 25, Nov. 22, 1969, O.A.S.T.S. No. 36, 1144 U.N.T.S. 123; Convention for the Protection of Human Rights and Fundamental Freedoms (European Convention on Human Rights), art. 13, Nov. 4, 1950, 1950 Europ. T.S. No. 5, 213 U.N.T.S. 221. *See also* Factory at Chorzów, Germany v Poland, Judgment, Claim for Indemnity, Merits, Judgment No 13, (1928) PCIJ Series A No 17, at 29 (“It is a principle of international law, and even a general conception of law, that any breach of an engagement involves an obligation to make reparation.”); *see generally* DINAH SHELTON, REMEDIES IN INTERNATIONAL HUMAN RIGHTS LAW (3d ed., 2015).
  53. *See* U.N. General Assembly, Basic Principles and Guidelines on the Right to a Remedy and Reparation for Victims of Gross Violations of International Human Rights Law and Serious Violations of International Humanitarian Law, U.N. Doc. A/RES/60/147, Part IX, paras. 18-23 (Mar. 21, 2006) (describing “full and effective reparation,” as including restitution, compensation, rehabilitation, satisfaction, and guarantees of non-repetition); *see also* Human Rights Council, General Comment No. 31, U.N. Doc. CCPR/C/21/Rev.1/Add.13, para. 16 (May 26, 2004); CESCR, General Comment 24, *supra* note 38, at para. 41.
  54. *See* Basic Principles and Guidelines on the Right to a Remedy and Reparation, *supra* note 53, at para. 15 (“In cases where a person, a legal person, or other entity is found liable for reparation to a victim, such party should provide reparation to the victim or compensate the State if the State has already provided reparation to the victim.”).
  55. Ho et al., *supra* note 26, at 28.
  56. 25 Pa. Code § 78.104 (2017).
  57. Ho ET AL., *supra* note 26, at Map 5; Mark Schleifstein, *Number of ‘Orphaned’ Wells Increased by Fifty Percent, Could Cost State Millions: Audit*, NOLA.COM (Apr. 19, 2020), [https://www.nola.com/news/business/article\\_313d8dd2-7a9d-11ea-b4a4-e7675d1484f7.html](https://www.nola.com/news/business/article_313d8dd2-7a9d-11ea-b4a4-e7675d1484f7.html).
  58. *See* CALIFORNIA COUNCIL ON SCIENCE & TECHNOLOGY (CCST), ORPHAN WELLS IN CALIFORNIA: AN INITIAL ASSESSMENT OF THE STATE’S POTENTIAL LIABILITIES TO PLUG AND DECOMMISSION ORPHAN OIL AND GAS WELLS 9-10 (2020); *see also* Alberta Energy Regulator, *Area Based Closure*, <https://www.aer.ca/regulating-development/project-closure/liability-management-programs-and-processes/area-based-closure> (describing the voluntary, incentives-based approach used by Alberta).
  59. *See, e.g.*, Los Angeles City Fire Code § 57-5706.3.16.1 (2017).
  60. LUCIJA MUEHLENBACHS, 80,000 INACTIVE OIL WELLS: A BLESSING OR A CURSE? 2 (2017), available at <https://journalhosting.ucalgary.ca/index.php/sppp/article/view/42617/30498>; Olade & Menzes, *supra* note 1.
  61. Muehlenbachs, *supra* note 60, at 2 (“The paper finds that only with a drastic, arguably implausible increase in prices and recovery rates will there be a significant increase in the number of reactivated oil and gas wells. This implies that wells are typically left suspended not because of the option to reactivate, but rather to avoid costly environmental obligations, coupled with the fact that there is no penalty for leaving wells suspended indefinitely.”).
  62. CARBON TRACKER, BILLION DOLLAR ORPHANS 16-17 (2020); Jacqueline Ho et al., *Managing Environmental Liability: An Evaluation of Bonding Requirements for Oil and Gas Wells in the United States*, 52 ENVIRON. SCI. TECHNOL. 3908-3916 (2018).
  63. Elizabeth Harball, *State Agencies at Odds Over New Law to Address ‘Orphan’ Oil Wells*, ALASKA PUBLIC MEDIA, (May 22, 2019), <https://www.alaskapublic.org/2019/05/22/state-agencies-at-odds-over-new-law-to-address-orphan-oil-wells/>; *see* 20 Alaska Admin. Code § 25.025 (2021).
  64. In the United States, most of the states and federal agencies responsible for obtaining financial security allow a variety of types of instruments to provide such security (along with actual cash deposits), but in practice, surety bonds predominate. These are essentially guarantees provided by a specialty insurance company that it will pay the bonded amount in the event of a default. The surety company then has the legal right to try to recover the cost from the operator if it is required to pay the regulator. *See* Ho ET AL., *supra* note 26, at 21.
  65. CARBON TRACKER, *supra* note 62, at 29-32; Ho et al., *supra* note 62 (describing these factors and some limits in existing data).
  66. CARBON TRACKER, *supra* note 62, at 19; ALBERTA LIABILITIES DISCLOSURE PROJECT, DESCRIPTION OF ALDP’S METHODOLOGY FOR COMPLETING THE AER’S INTERNAL STUDY OF OIL AND GAS WELL RECLAMATION COSTS, available at <http://www.aldpcoalition.com/research>.



67. CARBON TRACKER, *supra* note 62, at 13; UNITED STATES GOVERNMENT ACCOUNTABILITY OFFICE, BUREAU OF LAND MANAGEMENT SHOULD ADDRESS RISKS FROM INSUFFICIENT BONDS TO RECLAIM WELLS at 16 (2019).
68. CARBON TRACKER, *supra* note 62, at 10.
69. *Id.*
70. Carbon Tracker has calculated that there are roughly 2.7 million unplugged (both active and inactive) onshore wells in the United States, *see* CARBON TRACKER, *supra* note 62, at 9. Separately, the Interstate Oil and Gas Compact Commission (IOGCC) collected data from 30 oil-producing states, which reported 56,000 documented orphan wells and estimated between 210,000 and 746,000 undocumented orphan wells. However, only 12 states provided an estimated number of undocumented wells. It is unlikely the remaining 18 states truly have no undocumented orphan wells, so the estimate may understate the extent of the problem. *See* IOGCC, IDLE AND ORPHAN OIL AND GAS WELLS: STATE AND PROVINCIAL STRATEGIES, Table 1 (updated 2020), *available at* [https://iogcc.ok.gov/sites/g/files/gmc836/t/2020\\_03\\_04\\_updated\\_idle\\_and\\_orphan\\_oil\\_and\\_gas\\_wells\\_report\\_0.pdf](https://iogcc.ok.gov/sites/g/files/gmc836/t/2020_03_04_updated_idle_and_orphan_oil_and_gas_wells_report_0.pdf). Furthermore, in one of the few in-depth studies of its kind, the California Council on Science and Technology found that in addition to the 2565 likely orphan wells already existing in California, there was an even larger number — nearly three thousand — at high risk of becoming orphaned. *See* CALIFORNIA COUNCIL ON SCIENCE & TECHNOLOGY, *supra* note 58, at Table 6. This ratio of existing to high-risk-of-becoming orphaned wells would not need to hold true in every state for the total orphan well count based on IOGCC to soon pass 1 million in the United States — by Carbon Tracker's data, it likely already has.
71. CARBON TRACKER, *supra* note 62, at 17.
72. *Id.* While it is unlikely that all remaining documented active wells will be orphaned, these figures do represent the additional funds that full bonding would require.
73. CARBON TRACKER, *ARO Portal: State Profiles*, <https://carbontracker.org/aro-portal-state-profiles/> (last accessed Mar. 25, 2021).
74. Envtl. Prot. Agency, Identification of Additional Classes of Facilities for Development of Financial Responsibility Requirements Under CERCLA Section 108(b), Advanced Notice of Proposed Rulemaking, EPA-HQ-SFUND-2009-0265; FRL-9100-5, 75 Fed. Reg. 816 (Jan. 6, 2010).
75. *See, e.g.,* Earthjustice, *Trump EPA Abandons Safeguards Protecting Taxpayers From Mine Cleanup Costs*, (Dec. 4, 2017), <https://earthjustice.org/news/press/2017/trump-epa-abandons-safeguards-protecting-taxpayers-from-mine-cleanup-costs> (explaining the procedural background); Envtl. Prot. Agency, Financial Responsibility Requirements Under CERCLA Section 108(b) for Facilities in the Electric Power Generation, Transmission, and Distribution Industry; the Petroleum and Coal Products Manufacturing Industry; and the Chemical Manufacturing Industry, 85 Fed. Reg. 77384 (Dec. 2, 2020).
76. Juliane Geiger, *The Oil Refinery Crisis Will Worsen This Winter*, OIL PRICE (Dec. 9, 2020), <https://oilprice.com/Energy/Energy-General/The-Oil-Refinery-Crisis-Will-Worsen-This-Winter.html> (noting that eleven U.S. refineries were scheduled to close and could not find buyers).
77. Mira Fadhya et al., *Indonesia in OIL AND GAS DECOMMISSIONING: LAW, POLICY AND COMPARATIVE PRACTICE* 285, 295 (Marc Hammerson, ed. 2013) and Ivan Aleksei Alemán Loza, *Mexico in id.* at 317, 324 (describing Indonesia and Mexico's regulations and/or model contracts that require this); Scottish Government, *Unconventional Oil and Gas: Decommissioning, Site Restoration and Aftercare - Obligations and Treatment of Financial Liabilities* at 5 (2016), archived at <https://www.webarchive.org.uk/wayback/archive/20170107222058/http://www.gov.scot/Publications/2016/11/2034/5> (describing the requirements in New South Wales).
78. Scottish Government, *supra* note 77, at 5; *see also* Erlend Bakken et al., *Norway in OIL AND GAS DECOMMISSIONING: LAW, POLICY AND COMPARATIVE PRACTICE* 347, 352 (Marc Hammerson, ed. 2013).
79. Mineral and Petroleum Resources Development Act, 28 of 2002, arts. 53 & 54, [https://www.gov.za/sites/default/files/gcis\\_document/201409/26275rg7949gon527.pdf](https://www.gov.za/sites/default/files/gcis_document/201409/26275rg7949gon527.pdf).
80. *See, e.g.,* US: 30 C.F.R. § 250.1701(a) & 30 C.F.R. § 556.64(h)(1); Norway: Act Relating to Petroleum Activities 29. Nov 1996 nr. 29 §§ 5-3-5-4; UK: Petroleum Act 1998, c. 17, s. 30(1), 36, 38(1B).
81. GREG ROGERS, ACCOUNTING FOR ENVIRONMENTAL LIABILITIES IN BANKRUPTCY, 60 (2016), <http://www.era-tos-thenes.com/wp-content/uploads/2016/09/Accounting-for-Environmental-Liabilities-in-Bankruptcy.pdf> ("The ability of a creditor to pursue predecessors and successors in interest if the debtor cannot satisfy its obligation reduces default risk.").
82. *See* Nick Fletcher, *North Sea oil and gas industry cost UK taxpayer £396m in 2016*, THE GUARDIAN, (Apr. 4, 2017); National Audit Office, Oil and Gas in the UK — Offshore Decommissioning (Jan. 25, 2019) (detailing how, beginning in 2013, UK authorities began locking in tax relief for decommissioning to encourage operators to devote more resources to extracting every last drop of oil and less to setting aside funds for decommissioning — and that, ultimately, if firms failed, UK taxpayers would be even more on the hook).
83. Chesapeake Energy, a "fracking giant" and "poster child of the U.S. shale revolution" filed for Chapter 11 bankruptcy in June 2020, following the filing in April by another "once great driller," Whiting Petroleum. *See* Pippa Stevens, *Chesapeake Energy Files for Bankruptcy, as Details Emerge of Wine Cellars and Botox*, NBC News (June 29, 2020), <https://www.nbcnews.com/business/business-news/fracking-pioneer-chesapeake-energy-files-bankruptcy-amid-plunging-oil-prices-n1232384>.
84. KRISTIN COOK, AN INESCAPABLE OBLIGATION: THE TREATMENT OF WELL-DECOMMISSIONING LIABILITY IN RECENT OIL AND GAS BANKRUPTCIES, 64-66 (2019) (Master's thesis, submitted to the University of Texas at Austin), *available at* <https://repositories.lib.utexas.edu/handle/2152/81927>.
85. CIEL, PANDEMIC CRISIS, SYSTEMIC DECLINE: WHY EXPLOITING THE COVID-19 CRISIS WILL NOT SAVE THE OIL, GAS, AND PLASTIC INDUSTRIES (2020), <https://www.ciel.org/wp-content/uploads/2020/04/Pandemic-Crisis-Systemic-Degradation-April-2020.pdf>.
86. Paul Takahashi, *Over 100 oil and gas companies went bankrupt in 2020*, HOUSTON CHRONICLE (Jan. 20, 2021), <https://www.houstonchronicle.com/business/energy/article/More-than-100-oil-and-gas-companies-filed-for-15884538.php?converted=1>.
87. Rystad Energy, *Even at \$40 WTI, about 150 more North American E&P's will need Chapter 11 protection by end-2022* (Aug. 21, 2020), [https://www.rystadenergy.com/newsevents/news/press-releases/even-at-\\$40wti-about-150-more-north-american-eps-will-need-chapter-11-protection-by-end-2022/](https://www.rystadenergy.com/newsevents/news/press-releases/even-at-$40wti-about-150-more-north-american-eps-will-need-chapter-11-protection-by-end-2022/).
88. *See* Sam Meredith, *An industry 'operating on borrowed time': Energy experts on the increasing risks ahead for Big Oil*, NBC News (Feb. 2, 2021), <https://www.cnbc.com/2021/02/02/big-oil-climate-and-covid-energy-experts-on-the-industrys-outlook.html>.
89. Sophie Quinton, *Why 'Orphan' Oil and Gas Wells Are a Growing Problem for States*, PEW CHARITABLE TRUSTS (July 9, 2018), <https://www.pewtrusts.org/en/research-and-analysis/blogs/stateline/2018/07/09/why-orphan-oil-and-gas-wells-are-a-growing-problem-for-states>.
90. Except where otherwise noted, the discussion below is of US bankruptcy law.
91. Rogers, *supra* note 81, at 23-24; *see also* CLARK WILLIAMS DERRY, CLEANED OUT BY BANKRUPTCY: A PRIMER ON ENVIRONMENTAL CLEANUP DUTIES IN BANKRUPTCY (2019), [https://ieefca.org/wp-content/uploads/2019/12/Cleaned-Out-by-Bankruptcy-Primer\\_December-2019.pdf](https://ieefca.org/wp-content/uploads/2019/12/Cleaned-Out-by-Bankruptcy-Primer_December-2019.pdf).
92. *Compare, e.g., In Re Microfab*, 105 B.R. 161 (Bankr. D. Mass. 1989) and *In Re Oldco M Corp*, 438 B.R. 775 (Bankr. S.D.N.Y. 2010) with *In Re Appalachian Fuels*, 521 B.R. 779 (Bankr. E.D. Ky. 2014) (on whether future costs are recoverable); *compare Southern Ry. Co. v. Johnson Bronze Co.*, 758 F.2d 137 (3d Cir. 1985) with *In Re American Coastal Energy*, 399 Bankr. 805 (Bankr. S.D. Tex. 2009) (on whether government costs related to environmental obligations that ripened pre-petition are eligible for AEP).
93. Rogers, *supra* note 81, at 24-25; LAWRENCE R. AHERN & DARLENE T. MARSH, ENVIRONMENTAL OBLIGATIONS IN BANKRUPTCY (2014 ed.).

94. See U.S. Bankruptcy Code, 11 U.S.C. §§ 554(a) & 365(a) (2018).
95. S. Rep. No. 95-989 (1978); *Ohio v. Kovacs*, 469 U.S. 274, 284 n.12 (1985); AHERN & MARSH, *supra* note 93.
96. AHERN & MARSH, *supra* note 93; Cook, *supra* note 84, at 50-53 (noting both a Chapter 7 and a Chapter 11 case in which the issue of vesting of title for abandoned property was not clearly resolved).
97. See *Wells Fargo Bank v. Goldzband*, 53 Cal. App. 4th 596 (1997) (providing a helpful summary of different state laws in this regard).
98. Cook, *supra* note 84, at 66-67.
99. *Midlantic Nat. Bank v. New Jersey Dept. of Envtl. Prot.*, 474 U.S. 494, 507 (1986).
100. Mary J. Koks & Tim Million, *Environmental Issues in Bankruptcy*, 40 Tex. Envtl. L.J. 43, 60-62 (2010). Compare *In re Peerless Plating Co.*, 70 B.R. 943 (Bankr. W.D. Mich. 1987) (“The clear impact of the *Midlantic* [decision]...would appear to be that a trustee may not abandon a hazardous waste site [with less than full compliance with the applicable environmental law] unless: 1. The environmental law in question is so onerous as to interfere with the bankruptcy adjudication itself; or 2. The environmental law in question is not reasonably designed to protect the public health or safety from identified hazards; or 3. The violation caused by abandonment would merely be speculative or indeterminate.”) with *In re L.F. Jensen* 4 F.3d 887, 890 (10th Cir. 1993) (“[B]efore abandonment of a property can violate *Midlantic* the property must represent an immediate and identifiable harm to public health or safety.”). Insofar as courts differ on abandonment and other doctrines, certain courts are more important for oil and gas bankruptcies, namely: the US bankruptcy and district courts in Texas and the Fifth Circuit in which they sit (half of E&P bankruptcies filed in 2015-19 were filed in Texas) and the US Bankruptcy and District Court of Delaware and the Third Circuit in which they sit (next largest with 17% bankruptcies).
101. 11 U.S.C. § 1129(a)(11) (2018).
102. Joshua Macey & Jackson Salovaara, *Bankruptcy as Bailout: Coal Company Insolvency and the Erosion of Federal Law*, 71 STANFORD L. REV. 879, 912-915 (2019) (describing how Peabody and Arch Coal pursued this strategy).
103. See Chevron U.S.A. Inc. And Noble Energy, Inc.’s Objection To debtors’ Motion for Entry of an Order Approving (I) The Adequacy of the Disclosure Statement, (II) Proposed Voting and Tabulation Procedures, (III) Procedures For Executory Contract Assumption and Assignment, and (IV) Procedures For Assignment and Transfer of Property of the Estate 23-26, No. 20-33948, Dkt. 880 (Bankr. S.D. Tex. Feb. 12, 2021) (alleging that Fieldwood’s reorganization plan would both create a new entity loaded up with inactive wells and without the assets to properly decommission them and abandon other wells to “predecessors in interest”). Chevron objected because, due to the law establishing joint and several liability among current and present owners of offshore wells in the US they could be on the hook if the successor with the bad assets folds and would be the presumptive recipient of the abandoned wells. One of the surety companies involved has also filed an objection, see Objection of North American Specialty Insurance Company to Debtor’s Motion to Approve the Disclosure Statement for the Joint Chapter 11 Plan of Fieldwood Energy LLC And Affiliated Debtors, No. 20-33948 Dkt. 1030 (Bankr. S.D. Tex. Mar. 16, 2021).
104. See, e.g., Dune Energy Docket in Primeclerk, <https://cases.primeclerk.com/duneenergy/Home-DocketInfo> (no objection to confirmation of reorganization plan from Louisiana Department of Natural Resources filed). Cook, *supra* note 84, at 113, documented 18 orphan wells resulting from this bankruptcy. See also Magnum Hunter Resources Corporation Docket in Primeclerk, <https://cases.primeclerk.com/magnumhunter/Home-DocketInfo> (no objection to confirmation of reorganization plan filed from West Virginia Department of Environmental Protection). Cook, *supra* note 84 at 65, documented 146 abandoned wells in West Virginia from Viking Resources International Corporation, a subsidiary of Magnum Hunter included in the bankruptcy proceedings.
105. See Debtors’ Mot. for Entry of an Order Approving Full and Final Settlement Agreement by and Among the Debtors, City of Beverly Hills and Beverly Hills Unified School District, No. 17-10828-KG, Doc 643 (Bankr. Del. Nov. 13, 2017), and Order Approving Full and Final Settlement Agreement between the Debtors and the City of Goleta, California, No. 17-10828-JTD, Doc 1156, (Bankr. Del. Aug. 6, 2019), *In re Venoco LLC* (memorializing the settlements reached by the City of Beverly Hills/BHUSD and the City of Goleta, with Venoco for general unsecured claims of USD 760,000 and USD 4,750,000 as against initial claims of USD 11,499,800 and USD 22,540,658, respectively). See also Rob Schuwert, *Petroshare Gets the Oil and Colorado, the Hole*, CARBON TRACKER (Sept. 18, 2020), <https://carbontracker.org/petroshare-gets-the-oil-and-colorado-the-hole/> (describing Colorado’s disadvantageous settlement of claims against Petroshare); Naveena Sadasivam, *Dying Oil Companies’ Parting Gifts: Millions in Clean Up Costs*, TEXAS OBSERVER (Mar. 2, 2021), <https://www.texasobserver.org/dying-oil-companies-parting-gift-millions-in-clean-up-costs/> (describing a similar deal struck by the Texas regulator with Weatherly Oil and Gas).
106. Ctr. for Biological Diversity & Sierra Club, *Letter to Gov. Gavin Newsom* (July, 16, 2020), available at <https://www.sierraclub.org/sites/www.sierraclub.org/files/blog/20%2007%2016%20Ltr%20to%20Gov%20Newsom%20Re%20Bankruptcy.pdf>.
107. Emily Alpert Reyes, *Oil company Allenco and its leaders face criminal charges over deteriorating wells*, L.A. Times (Aug. 4, 2020), <https://www.latimes.com/california/story/2020-08-04/allenco-lawsuit>.
108. Verified Petition for Writ of Mandate and Complaint for Declaratory and Injunctive Relief, *Redeemer Community Partnership v Los Angeles City Fire Department*, No. 21stcp00733 (Cal. Sup. Ct., L.A. Cty. Mar. 5, 2021).
109. See Public Citizen, *Public Citizen, Landowners Sue Texas Railroad Commission Over Illegally Suspending Environmental Protections* (July 23, 2020), <https://www.citizen.org/news/public-citizen-landowners-sues-texas-railroad-commission-over-illegally-suspending-environmental-protections/>; Scott Di Savino & Shreyansi Singh, *Judge Orders Texas Energy Regulator to Halt Exceptions to Environmental Rules*, REUTERS (Dec. 10, 2020), <https://www.reuters.com/article/us-texas-energyregulator-order/judge-orders-texas-energy-regulator-to-halt-exceptions-to-environmental-rules-idUSKBN28K32Y>.
110. See Paul Takahashi, *Texas lost nearly 60,000 oil and gas jobs in 2020, trade group says*, HOUSTON CHRONICLE (Feb. 4, 2021), <https://www.houstonchronicle.com/business/energy/article/Texas-lost-nearly-60-000-oil-and-gas-jobs-in-15924339.php>; Takahashi, *supra* note 86.
111. See *supra* note 22 and accompanying text.
112. The Coronavirus Aid, Relief, and Economic Security Act (or “CARES Act”), § 5001 established a “Coronavirus Relief Fund” from which the Treasury Department was to make payments to states and tribes for “necessary expenditures incurred due to the public health emergency.” See 42 U.S.C. § 801 at 601(b)-(d), as amended by “CARES Act,” Pub. L. 116-136 (Mar. 27, 2020). However, Treasury Department Guidance interpreted this to include “providing economic support to those suffering from employment or business interruptions due to COVID-19-related business closures.” See Department of Treasury, “Coronavirus Relief Fund Guidance for State, Territorial, Local, and Tribal Governments” (updated Sept. 2, 2020), available at <https://home.treasury.gov/system/files/136/Coronavirus-Relief-Fund-Guidance-for-State-Territorial-Local-and-Tribal-Governments.pdf>.
113. See Amy R. Sisk, *North Dakota lawmakers redirect \$16M in Virus Aid to Fracking*, BISMARCK TRIB. (Oct. 28, 2020).
114. *Id.*
115. See generally North Dakota Century Code Chapter 38-08 and North Dakota Admin. Code § 43-02-03.
116. Definitions of an “orphan well” differ. The IOGCC defines “orphan wells” as “idle wells for which the operator is unknown or insolvent,” see IOGCC, *supra* note 70 at 3. Resources for the Future (RFF) and Greenpeace, in contrast, limit the category of “orphan wells” to those wells for

- which no owner can be identified. See HO ET AL., *supra* note 26 (“If a well does not have an owner, it is deemed an orphaned well.”); GREENPEACE, REMEDIATION OF ORPHAN OIL & GAS WELLS IN COVID-19 STIMULUS (2020), <https://www.greenpeace.org/usa/wp-content/uploads/2020/04/Orphan-Oil-Wells-Briefing-Greenpeace-April-2020.pdf> (proposing that federal funding be used “only for wells that are orphaned — meaning no operator or owner is known”). CIEL uses the narrower RFF and Greenpeace definition, because even if a well’s owner is technically insolvent (liabilities exceed deemed assets), it still is legally responsible for the wells, and can be made to pay through or after the bankruptcy process. It is therefore worth noting that North Dakota’s use of the term “orphaned” suggests a definition much looser than even that used by IOGCC.
117. Email from Katie Haarsager, Public Information Officer, North Dakota Department of Mineral Resources to Nathaniel Eisen, CIEL Legal Fellow (Sept. 11, 2020), (on file with authors).
  118. See discussion *supra* note 116.
  119. See company responses to confiscation orders contained in CaseFile # 28530 and CaseFile # 28495, available at <https://www.dmr.nd.gov/oilgas/C28530.pdf> and <https://www.dmr.nd.gov/oilgas/C28495.pdf>; Amy R. Sisk, *Landowners, oil companies support plugging abandoned wells but want concerns addressed*, BISMARCK TRIB. (June 10, 2020), [https://bismarcktribune.com/news/state-and-regional/govt-and-politics/land-owners-oil-companies-support-plugging-abandoned-wells-but-want-concerns-addressed/article\\_3fa707fa-89a4-52e1-a7ae-7e5dd9fc80b0.html](https://bismarcktribune.com/news/state-and-regional/govt-and-politics/land-owners-oil-companies-support-plugging-abandoned-wells-but-want-concerns-addressed/article_3fa707fa-89a4-52e1-a7ae-7e5dd9fc80b0.html).
  120. According to news reports, the department seized bonds from five operators whose wells were confiscated in the program on the basis of past complaints about abandoned wells. See Amy R. Sisk, *Rigging up: Program to plug 400 abandoned oil field wells kicks off*, BISMARCK TRIB. (Aug. 23, 2020) [https://bismarcktribune.com/bakken/rigging-up-program-to-plug-400-abandoned-oil-field-wells-kicks-off/article\\_d60118c3-8d0c-5de6-9147-7a0cf94a2ab.html](https://bismarcktribune.com/bakken/rigging-up-program-to-plug-400-abandoned-oil-field-wells-kicks-off/article_d60118c3-8d0c-5de6-9147-7a0cf94a2ab.html). However, this does not represent a larger effort to recover these CARES Act funds.
  121. Sisk, *supra* note 113.
  122. ASSOCIATED PRESS, *North Dakota seeks to Repurpose Coronavirus Aid for Fracking* (Oct. 22, 2020), <https://apnews.com/article/virus-outbreak-environment-north-dakota-hydraulic-fracturing-6968ecb57bac7b90ed-2273142b1bb0e>.
  123. Amy R. Sisk, *Advocacy groups question legality of spending \$16M in virus aid on fracking in North Dakota*, BISMARCK TRIB. (Dec. 15, 2020), [https://bismarcktribune.com/news/state-and-regional/advocacy-groups-question-legality-of-spending-16m-in-virus-aid-on-fracking-in-north-dakota/article\\_8ce520e8-7f64-5bca-a3a3-9be7d8a44fe5.html](https://bismarcktribune.com/news/state-and-regional/advocacy-groups-question-legality-of-spending-16m-in-virus-aid-on-fracking-in-north-dakota/article_8ce520e8-7f64-5bca-a3a3-9be7d8a44fe5.html).
  124. Wyoming Business Council, *Energy Rebound Program*, (last accessed Mar. 18, 2021), <https://wyomingbusiness.org/ERP>.
  125. Camille Erickson, *Could Wyoming create oil and gas jobs by accelerating the cleanup of orphan wells?*, CASPER STAR TRIB. (June 2, 2020), [https://trib.com/business/energy/could-wyoming-create-oil-and-gas-jobs-by-accelerating-the-cleanup-of-orphan-wells/article\\_eb4f5cd0-174f-5345-b830-b851930c11a0.html](https://trib.com/business/energy/could-wyoming-create-oil-and-gas-jobs-by-accelerating-the-cleanup-of-orphan-wells/article_eb4f5cd0-174f-5345-b830-b851930c11a0.html). The IOGCC 2020 supplement reports 2906 orphan wells in Wyoming. See INTERSTATE OIL AND GAS CONSERVATION COMMISSION, IDLE AND ORPHAN OIL & GAS WELLS: STATE AND PROVINCIAL REGULATORY STRATEGIES - SUPPLEMENTAL INFORMATION (2020), available at [https://iogcc.ok.gov/sites/g/files/gmc836/f/supplemental\\_information\\_orphan\\_wells\\_5-28-2020.pdf](https://iogcc.ok.gov/sites/g/files/gmc836/f/supplemental_information_orphan_wells_5-28-2020.pdf).
  126. Province of Alberta, *Oil and Gas Liabilities Management* (last accessed Mar. 18, 2021), <https://www.alberta.ca/oil-and-gas-liabilities-management.aspx>.
  127. Cayley Ramsay, *Trudeau announces \$1.7B to clean up orphan wells in B.C., Alberta, Saskatchewan*, GLOBAL NEWS (Apr. 17, 2020), <https://globalnews.ca/news/6832608/coronavirus-trudeau-alberta-bc-saskatchewan-energy-industry-orphan-well-cleanup/>; Carl Meyer, *Trudeau pumps \$1.7 billion into cleaning orphan and inactive wells*, NAT’L OBSERVER (Apr. 17, 2020), <https://www.nationalobserver.com/2020/04/17/news/trudeau-pumps-17-billion-cleaning-orphan-and-inactive-wells>.
  128. Mike De Souza, *Trudeau offers new money to oil patch, but rejects calls to suspend climate action over COVID-19*, GLOBAL NEWS (Apr. 17, 2020), <https://globalnews.ca/news/6830754/capp-justin-trudeau-laws-coronavirus/>.
  129. See Alberta Liabilities Disclosure Project, *ALDP response to Alberta’s Site Rehabilitation Program* (Apr. 24, 2020), <https://www.aldpcoalition.com/news>.
  130. Alberta Energy, *Period 3 Guidance*, <https://www.alberta.ca/assets/documents/energy-supplemental-guidelines-site-rehabilitation-program-period-3.pdf>.
  131. Alberta Energy, *Period 4 Guidance*, <https://www.alberta.ca/assets/documents/energy-site-rehabilitation-supplemental-guidelines-period-4.pdf>.
  132. Canadian Natural Resources Limited, *Corporate Profile*, <https://www.cnrl.com/about-cnq/corporate-profile> (last accessed Mar. 18, 2021).
  133. Alberta Energy, *Period 4 Eligible Licensees*, <https://www.alberta.ca/assets/documents/energy-site-rehabilitation-program-period-4-eligible-licensees.pdf>.
  134. Alberta Energy, *Site Rehabilitation Program Guidelines* 12, <https://www.alberta.ca/assets/documents/energy-site-rehabilitation-program-guidelines.pdf>.
  135. Daniel Raimi & Nathan Lemphers, *Look Before You Leap: Three Governance Challenges for Taxpayer-Funded Cleanup of Oil and Gas Wells*, RESOURCES MAG. (Sept. 9, 2020), <https://www.resourcesmag.org/common-resources/look-you-leap-three-governance-challenges-taxpayer-funded-cleanup-oil-and-gas-wells/>.
  136. Moving Forward Act, H.R. 2, 116<sup>th</sup> Cong. (2020), POWER Act of 2020, H.R. 8332.
  137. S.4642, The Oil and Gas Bonding Reform and Orphaned Well Remediation Act, 116<sup>th</sup> Cong. (2020), introduced in the US Senate by Senator Bennet in September requires federal agencies to reform their bonding rules and provides incentives to states and tribes to do so, although its definition of an orphan well and other provisions could be strengthened to prevent subsidies to solvent firms.
  138. See Megan Milliken Biven’s proposal for an Abandoned Well Administration, outlined at TrueTransition.org; see also Mark Olalde, *Support Grows for Taxpayer-funded Oil Well Cleanup as an Economic Stimulus*, ENERGY NEWS NETWORK (Jun. 23, 2020).
  139. Carbon Tracker, *supra* note 3, at 20-23; see also *infra* Text Box 4.
  140. OIL CHANGE INTERNATIONAL & RAINFOREST ACTION NETWORK, FRACKING FIASCO (2020), available at <http://priceofoil.org/2020/09/24/fracking-fiasco-shale-bust/>.
  141. Carbon Tracker, *supra* note 3, at 33-35.
  142. *Id.* at 16.
  143. Carbon Tracker, *supra* note 16, at 3.
  144. Carbon Tracker, *supra* note 3, at 33-35.
  145. Carbon Tracker, *supra* note 16, at 2.
  146. See Harball, *supra* note 63.
  147. New Mexico Admin. Code § 19.15.8.9(C)(1).
  148. Hannah Grover, *Environmental Advocate Warns Legislators of Loopholes in Draft Methane Rules*, FARMINGTON DAILY TIMES (Sep. 5, 2020), <https://www.daily-times.com/story/news/local/2020/09/05/new-mexico-water-natural-resources-committee-methane-gas-regulations/5706388002/>.
  149. Nick Bowlin, *Energy Companies Have left Colorado with Billions of Dollars in Oil and Gas Cleanup*, HIGH COUNTRY NEWS (Mar. 11, 2021), <https://www.hcn.org/issues/53.4/south-energy-companies-have-left-colorado-with-billions-of-dollars-in-oil-and-gas-cleanup>.
  150. Executive Order 14008, *supra* note 19 §217; see also Letter with Summary of the President’s Discretionary Funding Request, *supra* note 20.
  151. S. 4642, *supra* note 22.
  152. HAYNES & BOONE, *supra* note 18.
  153. ROSS ET AL., *supra* note 18, at 3-4.
  154. See Rystad Energy, *North American Oil and Gas Bankruptcy Debt Has Hit an All-Time High*, OILPRICE.COM (Oct. 25, 2020), <https://oilprice.com/Energy/Energy-General/North-American-Oil-And-Gas-Bankruptcy-Debt-Has-Hit-An-All-Time-High.html>.
  155. Mark Olalde, *Exposed: West Virginia and Other States Relying on ‘House of Cards’ to Pay for Coal Mine Cleanup*, DESMOG (June 25, 2020), <https://www.desmogblog.com/2020/06/25/coal-surety-bond-pools-liabilities-mine-cleanup>.



156. See *supra* note 70 and accompanying text. Similarly, no Canadian province reported having any undocumented orphan wells, See IOGCC, *supra* note 70, at Table 1, which also seems highly unlikely.
157. UNITED NATIONS ENVIRONMENT PROGRAMME (UNEP), ENVIRONMENTAL ASSESSMENT OF Ogoniland 98-100 (2011).
158. UNEP, *supra* note 157, at 158, 177-78, 188, 190-92.
159. AMNESTY INTERNATIONAL ET AL., NO CLEAN-UP, NO JUSTICE: AN EVALUATION OF THE IMPLEMENTATION OF UNEP'S ENVIRONMENTAL ASSESSMENT OF Ogoniland, NINE YEARS ON (2020).
160. See Bart H. Meijer, *Environmentalists, Farmers win Dutch Court Case over Shell Nigeria spills*, REUTERS (Jan. 29, 2021), <https://www.reuters.com/article/us-shell-nigeria-court/environmentalists-farmers-win-dutch-court-case-over-shell-nigeria-spills-idUSKBN29Y1D2>.
161. Julia Payne & Kirstin Ridley, *Nigerians Win UK court OK to Sue Shell Over Oil Spills*, REUTERS (Feb. 12, 2021), <https://www.reuters.com/article/us-britain-shell-nigeria-judgement/nigerians-win-uk-court-ok-to-sue-shell-over-oil-spills-idUSKBN2AC16A>.
162. *Aguinda v. Chevron Corp.*, Provincial Court of Sucumbios, No. 2003-0002, Feb. 14, 2011, pp. 105-112, *aff'd* Provincial Court of Justice of Sucumbios, No. 2011-0106, Jan. 3, 2012, pp. 10-12.
163. Christoph Böttner et al., *Greenhouse Gas Emissions from Marine Decommissioned Hydrocarbon Wells: Leakage Detection, Monitoring and Mitigation Strategies*, 100 INT'L J. GREENHOUSE GAS CONTROL (2020).
164. Philip Oltermann & Jillian Ambrose, *UK Facing EU Outrage Over 'time bomb' of North Sea Oil Rigs*, THE GUARDIAN (Sept. 4, 2019).
165. Antonio Vicente Marques, *Angola in OIL AND GAS DECOMMISSIONING: LAW, POLICY AND COMPARATIVE PRACTICE* 215 (Marc Hammerson, ed. 2013); Gbenga Oyeboode, *Nigeria in id.* at 337.
166. Peter Millard et al., *Underperforming Offshore Wells Rack up Over \$100 Billion in Abandonment Liabilities Worldwide*, WORLD OIL (June 5, 2020), <https://www.worldoil.com/news/2020/6/5/underperforming-offshore-wells-rack-up-over-100-billion-in-abandonment-liabilities-worldwide>.
167. See Reuters Staff, *Argentina Readies Gas Plan to Spur Vaca Muerta Production*, REUTERS (Oct. 14, 2020), <https://www.reuters.com/article/argentina-gas/argentina-readies-gas-plan-to-spur-vaca-muerta-production-idUSL1N2H52BC> (explaining the Argentine government's new plan to support gas production in Vaca Muerta basin); Jonathan Gilbert, *Biggest Shale Play Outside of Texas Gets \$5.1 Billion Lifeline*, BLOOMBERG (Oct. 22, 2020), <https://www.bloomberg.com/news/articles/2020-10-22/biggest-shale-play-outside-of-texas-gets-5-1-billion-lifeline> (reporting the Argentine government's announcement of a four-year, \$5.1 billion subsidy program for gas drilling in the Vaca Muerta basin).
168. See Press Release, ExxonMobil Corp., ExxonMobil to proceed with Payara development offshore Guyana (Sept. 30, 2020), [https://corporate.exxonmobil.com/News/Newsroom/News-releases/2020/0930\\_ExxonMobil-to-proceed-with-Payara-development-offshore-Guyana](https://corporate.exxonmobil.com/News/Newsroom/News-releases/2020/0930_ExxonMobil-to-proceed-with-Payara-development-offshore-Guyana); Irina Slav, *Exxon Moves Ahead With Major Guyana Oil Field*, OILPRICE.COM (Oct. 1, 2020), <https://oilprice.com/Energy/Crude-Oil/Exxon-Moves-Ahead-With-Major-Guyana-Oil-Field.html>.
169. Carbon Tracker, *supra* note 3, at 29.
170. U.S. BUREAU OF SAFETY & ENVIRONMENTAL ENFORCEMENT, DECOMMISSIONING METHODOLOGY AND COST EVALUATION 4-3 – 4-11, <https://www.bsee.gov/sites/bsee.gov/files/tap-technical-assessment-program/738aa.pdf>.
171. See Press Release, Rystad Energy, Global Oil & Gas Decommissioning Costs to Total \$42 Billion Through 2024, Dominated by UK North Sea (May 22, 2020), [https://www.rystadenergy.com/newsevents/news/press-releases/global-oil-gas-decommissioning-costs-to-total-\\$42-billion-through-2024-dominated-by-uk-north-sea/](https://www.rystadenergy.com/newsevents/news/press-releases/global-oil-gas-decommissioning-costs-to-total-$42-billion-through-2024-dominated-by-uk-north-sea/); Millard et al., *supra* note 166. Subsea wells are not initially dug via a connection to a fixed platform and thus can be more costly to reach and plug.
172. See U.S. BUREAU OF SAFETY & ENVIRONMENTAL ENFORCEMENT, *supra* note 170, at Table 8-24 (a likely non-representative sample of actual platform removal costs), Table 8-5 (same for pipeline decommissioning)
173. ExxonMobil, *Guyana Project Overview* (Oct. 1, 2020), <https://corporate.exxonmobil.com/Locations/Guyana/Guyana-project-overview>.
174. ExxonMobil, *supra* note 173.
175. *Id.*
176. U.S. BUREAU OF SAFETY & ENVIRONMENTAL ENFORCEMENT, *supra* note 170 at 4-2 n.5.
177. OSPAR Commission Data Inventory and Management System, *Inventory of Offshore Installations (2017)*, available at [https://odims.ospar.org/odims\\_data\\_files/](https://odims.ospar.org/odims_data_files/) (last accessed Mar. 18, 2021).
178. Rystad Energy, *supra* note 171; Millard et al., *supra* note 166; U.S. BUREAU OF SAFETY & ENVIRONMENTAL ENFORCEMENT, *supra* note 170, at Table 8-23.
179. INST. FOR ENERGY ECONS. & FIN. ANALYSIS, GUYANA'S OIL DEAL: PROMISE OF QUICK CASH WILL LEAVE COUNTRY SHORTCHANGED App'x 1 (Oct. 2020), available at [https://ieefa.org/wp-content/uploads/2020/10/Guyana-Oil-Deal\\_Promise-of-Quick-Cash-Will-Short-change-Country\\_October-2020.pdf](https://ieefa.org/wp-content/uploads/2020/10/Guyana-Oil-Deal_Promise-of-Quick-Cash-Will-Short-change-Country_October-2020.pdf).
180. Petroleum Agreement Between The Government of the Cooperative Republic of Guyana and Esso Exploration and Production Guyana, Ltd., CNOOC NEXEN Petroleum Guyana Ltd., Hess Guyana Exploration Ltd., art. 11.2 & App'x C and art.20.1(d)(iii)(gg)-(hh), (Oct. 7, 2016), available at <https://gyeiti.org/wp-content/uploads/Petroleum-Agreement-Oct-7-2016.pdf>; INST. FOR ENERGY ECONS. & FIN. ANALYSIS, *supra* note 179, at 6-9.
181. See INST. FOR ENERGY ECONS. & FIN. ANALYSIS, *supra* note 179, at 18-21.
182. *Id.*
183. See Daniel Raimey et al., COLUMBIA CTR. FOR GLOBAL ENERGY POL'CY & RESOURCES FOR THE FUTURE, GREEN STIMULUS FOR OIL AND GAS WORKERS: CONSIDERING A MAJOR FEDERAL EFFORT TO PLUG ORPHANED AND ABANDONED WELLS (2020), [https://www.energypolicy.columbia.edu/sites/default/files/file-uploads/OrphanWells\\_CGEP-Report\\_071620.pdf](https://www.energypolicy.columbia.edu/sites/default/files/file-uploads/OrphanWells_CGEP-Report_071620.pdf) ("if the average job creation estimates [employed in the paper]...are used, a hypothetical program to plug 500,000 wells could lead to 119,000 job-years"). This is scaling up considering that these figures are based on a relatively conservative estimate of the total number of undocumented orphan wells and adding in work on pipelines.
184. See Biven, *supra* note 1.
185. See Justin Nobel, *America's Radioactive Secret*, ROLLING STONE (Jan. 21, 2020), <https://www.rollingstone.com/politics/politics-features/oil-gas-fracking-radioactive-investigation-937389/>.
186. See Aguilar, *supra* note 33; Marissa Pianko, *Affordable Housing Developers Set their Sights on Former Toxic Oil Fields in LA*, DESMOG (Oct. 24, 2020), <https://www.desmogblog.com/2020/10/24/affordable-housing-los-angeles-oil-fields> (reporting on the construction of low-income housing on the site of a former oil-field); John Cox, *Oil Companies Square Off Over Sinkhole Death*, BAKERSFIELD.COM (Sept. 3, 2014), [https://www.bakersfield.com/news/oil-companies-square-off-over-sinkhole-death/article\\_50ef46c3-f9b9-5d01-9ca1-30e635a4aa5c.html](https://www.bakersfield.com/news/oil-companies-square-off-over-sinkhole-death/article_50ef46c3-f9b9-5d01-9ca1-30e635a4aa5c.html) (detailing the death of an oil worker who fell into an unreported sinkhole and company attempts to evade responsibility).
187. Executive Order 14008, *supra* note 19, at §227 (emphasis added).

# TOXIC ASSETS

## Making Polluters Pay When Wells Run Dry and the Bill Comes Due

As the fossil fuel era faces its necessary and inevitable end, several questions loom large: When the oil and gas stop flowing, what will happen to the millions of wells drilled onshore and offshore, the pipelines and plants that transport and process the fuels, and the lands and waters where they sit? Who pays the cost of closing down and cleaning up extraction sites or remediating the significant health and environmental impacts of production? What legal obligations do public and private actors have to protect local communities from the toxic legacy of oil and gas production?

*Toxic Assets* explores the fast-approaching post-production phase of the oil and gas lifecycle. As infrastructure shuts down, communities, investors, and governments worldwide are exposed to significant environmental, health, and financial risks that come with wells at the end of their life. The world must confront this toxic legacy and take urgent action to ensure the cleanup costs fall on companies, not communities.

The report begins by exposing the structural flaws in legal and regulatory frameworks that have created these unfunded environmental liabilities through a close look at problems with planning and financing for well closure in the United States and Canada. It then makes recommendations about what is needed to mitigate the resultant harms to public health and the public purse and ensure that polluters pay. Finally, it cautions those countries contemplating starting up oil and gas operations today to think hard about the costs associated with shutting them down tomorrow.

Ending oil and gas production is an urgent and necessary step in a just and equitable transition to a clean energy future. But it is not as simple as turning off the tap. Properly closing down and cleaning up the oil and gas industry requires immediate and careful planning to ensure that people and the environment are protected and that polluters pay for the impacts of their business operations. If these considerations are made, shutting down operations can open the way for real economy- and society-wide remediation of the deep wounds that oil and gas have left.



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