

Legislative Science and Technology Note

Orphaned Oil and Gas Wells in West Virginia

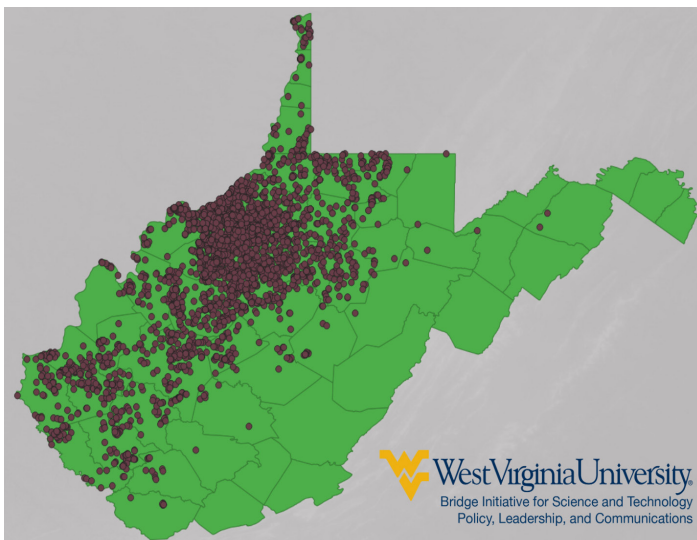
May 2024

This Science & Technology Note deals with economic costs and opportunities associated with orphaned oil and natural gas wells in West Virginia and considers possible policy options.

West Virginia's Orphaned Wells

An oil or natural gas well is considered abandoned in West Virginia after 12 months idle. If the well operator is unknown or insolvent, the state becomes responsible for this “orphaned” well. [Existing bond rates are insufficient](#) to cover the costs of well plugging, leaving taxpayers with a large financial liability. Orphaned wells are an [environmental and health hazard](#). They can leak oil or gas, emit methane, and allow contaminants into groundwater. Orphaned wells can also [impair farming activities](#) or other property uses. [Research has shown](#) homes within 2 kilometers of an abandoned well are worth 15% less than similar houses, and that home values fully recover upon remediation.

Documented Orphaned Wells In West Virginia



Source: WVU Bridge Initiative, data: [Grove and Merrill \(2022\)](#)

Research Highlights

- Due to West Virginia's abundant oil and natural gas industries in the state, thousands of no-longer producing oil or gas wells have become “orphaned”, or abandoned with no known operator, and remain unplugged.
- Responsibility for orphaned wells falls to the state. These wells represent an environmental, public health, and economic liability. The burden for remediation falls on the West Virginia taxpayer.
- Courses of action lawmakers could pursue include seeking to identify and characterize existing orphaned wells, creating incentives for private actors to plug and restore orphaned wells, and modifying the bonding system to make orphaned wells less likely in the future.

West Virginia has over [6,500](#) documented orphaned wells (see map), more than [all but nine](#) other states, with thousands more undocumented. Over 50% of all known orphaned wells in the United States are located in Pennsylvania, West Virginia, Ohio, and Kentucky. [West Virginia's regulations](#) are among the most stringent of major natural gas producing states. West Virginia has fewer documented orphaned wells per square mile (see figure) than Pennsylvania, Kentucky, and Ohio.

Locating, characterizing, and decommissioning orphaned wells could [put West Virginians to work](#) remediating an economic and environmental liability. It will [preserve the ability](#) to economically produce oil, gas and coal, enable potential natural gas, carbon dioxide, and hydrogen storage, and [improve property values](#) and allow for new economic development in the state.

Average [well-plugging and remediation costs](#) are around \$50,000 per well, but [vary widely](#) based on features such as well depth, age, and topography. West Virginia's mountainous terrain is likely to increase costs. Costs-per-well can be [reduced by 3%](#) when states award well plugging contracts in bulk. The Bipartisan Infrastructure Law made available [\\$4.7 billion in federal funds](#) for orphaned well plugging, remediation, and restoration. In April 2024 the US House of Representatives passed a bill which would invest [\\$150 million over five years](#) to help

locate the estimated 800,000 undiscovered orphaned wells across the United States. Information like the age, depth, and condition of orphaned wells can help policymakers prioritize which wells to address.

West Virginia Orphaned Well Policy

West Virginia currently [requires](#) a \$5,000 bond per well drilled, or a \$50,000 statewide blanket bond (covers all wells) for vertical wells. For horizontal natural gas wells, [the required bond is](#) \$50,000 per well or \$250,000 to cover all wells. Forfeited bond proceeds go to the [Oil and Gas Reclamation Fund](#). The 2020 passage of [HB 4090](#) lowered oil and gas severance taxes on particular wells and created the Oil and Gas Abandoned Well Plugging Fund to be funded with the increased severance tax.

The Orphan Well Prevention Act ([SB 532](#) and [HB 5414](#)) would replace the current bonding system with an escrow system. In 2024, this bill stalled in committee. [HB 5076](#) (2024) would modify prompt plugging requirements and limit legal liability for companies that abandon wells. This bill received a “do pass” recommendation but was not passed in 2024.

Opportunities for West Virginia’s Wells

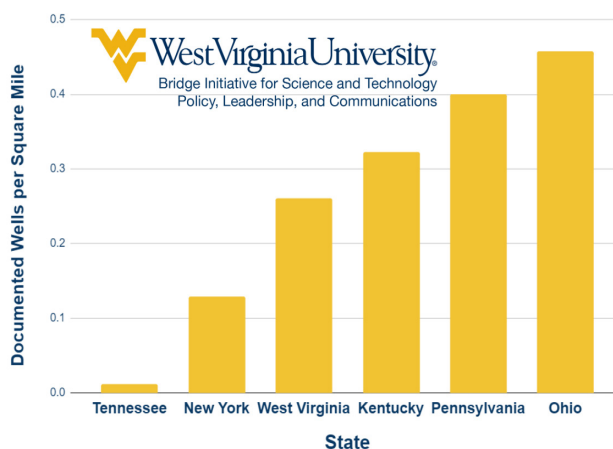
Eliminating potential sources of [groundwater and air pollution](#) by plugging orphaned wells may improve the health of West Virginians. Land restoration could increase property values and increase [available space](#) for commercial, industrial, or residential development. Well decommissioning will [create jobs](#) for West Virginians.

Another opportunity for orphaned wells is as [injection or monitoring wells](#) for underground carbon dioxide or hydrogen storage. West Virginia is positioned atop a saline aquifer, one of the only [accessible geologic formations](#) for hydrogen storage. There is potential for this economic and environmental liability (orphaned wells) to create jobs in West Virginia. Uncapped or improperly capped orphaned wells threaten the viability of storage, oil, gas, and coal operations in the state.

Locating and characterizing orphaned wells could enable [possible reuse](#) in future [enhanced geothermal energy systems](#) (EGS). Initial well drilling can account for [up to 95%](#) of EGS costs. Further, existing oil and gas industry knowledge in the region [could help spearhead](#) geothermal development in West Virginia, which is estimated to have the [largest geothermal resource](#) potential east of the Mississippi.

Documented Orphaned Wells per Square Mile (2022)

Data from Environ. Sci. Technol. 2022, 56, 14228–14236 and US Census



Source: WVU Bridge Initiative, data: [Boutot Et. Al \(2022\)](#)

State Policy Comparison

States have a [variety of bonding requirements](#) for oil and gas wells. [In many states](#), bonding requirements are tied to the depth and number of wells covered by the bond. In Colorado, for example, [statewide blanket bonds require](#) \$60,000 to cover fewer than 100 wells and \$100,000 to cover more than 100 wells, and the per-well bond amount doubles for vertical wells deeper than 3000 feet. Virginia also [requires](#) a \$2,000 fee per acre of disturbed land and \$50 per year per permit payment to a plugging and restoration fund. Utah has proposed a variable blanket bond amount based on average daily production and marginal well ratio (ratio of marginal or inactive wells to total wells).

States also [offer incentives](#) for plugging orphan wells. [Pennsylvania](#) has a “Good Samaritan Rule,” where third-parties receive liability relief and grants for well-plugging, and an orphaned well [mapping tool and reporting form](#). [Ohio](#) has a “prioritization scoring matrix” for orphaned well plugging.

West Virginia Policy Options

Policy options include efforts to characterize known and locate unknown orphaned wells. This would help give policymakers a better understanding of the problem and opportunities. Another policy option is [tying required bond amounts to specific well features](#), including blanket bonds that depend on the number of wells covered. This could compensate for the large [discrepancy between bond rates and the true cost](#) of well decommissioning. Additionally, the state could [offer incentives](#) for non-liable actors to plug orphaned wells.

This Science & Technology Note was written by Ryan Nesselrodt, PhD and West Virginia Science and Technology Policy Fellow, on behalf of the Bridge Initiative for Science and Technology Policy, Leadership, and Communications. Please see <https://scitechpolicy.wvu.edu/> or contact scitechpolicy@mail.wvu.edu for more information.