

The Land and Water Conservation Fund at 60: Revenue Options for the Next 60 Years



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(Cover Photo: Rebecca Wynn/USFWS, Pete Morton, Lucy Holtsnider)



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INTRODUCTION

In 1964, Congress established the Land and Water Conservation Fund (LWCF) with bipartisan support to safeguard natural areas, water resources, cultural heritage, and provide recreation opportunities to all Americans (DOI 2023a). LWCF provides for numerous land acquisitions and a portion of funds used for the protection, restoration, and recreation programs on federal public land (Aldrich and Hjerpe 2022).

The majority of authorized LWCF funding comes from offshore oil and gas production (Vincent 2019a). As the U.S. plans to phase down the pace and scale of oil and gas leasing, supplemental revenue may be needed. In this paper we examine LWCF funding trends, historical issues, revenue sources and amounts, and options for evolving LWCF funding to include supplemental revenue from renewable energy.

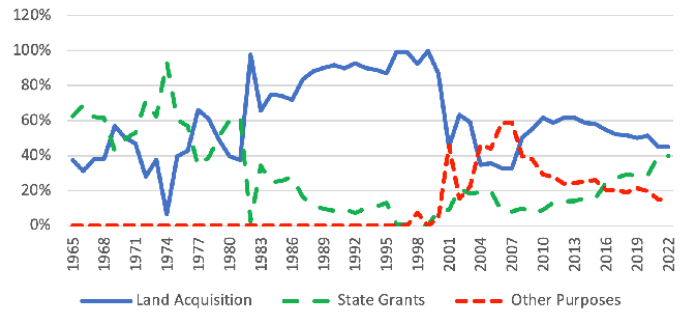
We begin our paper by examining historical LWCF funding trends. In the second section we identify past areas of Congressional debate before comparing royalty rates and revenue from oil, natural gas, coal, solar, wind and geothermal production in Section 3. In Section 4 we examine options for evolving LWCF funding followed by discussion and closing comments in Section 5.

1. LWCF FUNDING TRENDS

The Land and Water Conservation Fund (LWCF) Act of 1965 created the LWCF housed in the U.S. Treasury and authorized up to \$900 million to be deposited in the LWCF each year. By 2019, Congress had appropriated a total of \$18.9 billion in LWCF funding.¹ Sixty percent (\$11.4 billion) of the \$18.9 billion of appropriated funds went to acquire federal land usually purchased from the private sector. States received \$4.8 billion (26% of total) in LWCF recreation grants, while other purposes received \$2.7 billion (14% of total) (Vincent 2019a). Figure 1 shows the programmatic distribution of LWCF funding from 1965 to 2022.

¹ Of the \$18.9 billion, \$147 million was from mandatory appropriations from oil and gas leasing in Gulf of Mexico under Gulf of Mexico Energy Security Act of 2006 (Vincent 2019)

Figure 1. Percent of LWCF Congressional Appropriations by Program (1965 - 2022).



Source: Vincent 2019a, DOI Budget in Brief 2020, 2021, 2022.

LWCF is the principal source of funds for acquiring federal land. Table 1 shows the distribution of land acquisition funds across federal agencies from 1965 to 2019 (Vincent 2019a).

Table 1. Distribution of LWCF Land Acquisition Funding.

Federal Agency	Land Acquisition (billion \$)	Percent Total
USDI National Park Service	\$4.70	41%
USDA Forest Service	\$3.10	27%
USDI Fish and Wildlife Service	\$2.50	22%
USDI Bureau of Land Management	\$1.00	9%
USDI Office of Valuation Services	\$0.10	1%
Total	\$11.40	100%

Source: Vincent 2019a.

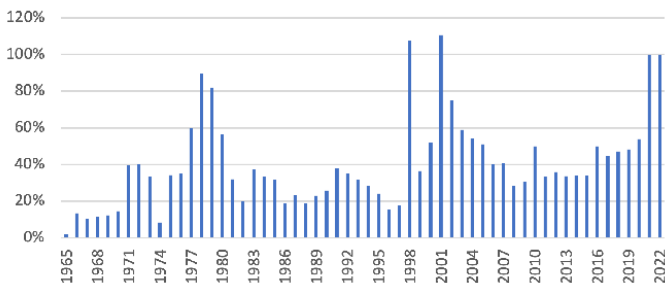
The LWCF state-grant program is administered by National Park Service (NPS) and includes two types of cost sharing grants: 1) traditional grants with revenue divided among states; and 2) competitive grants for urban areas. Since 1965, LWCF has distributed \$5.2 billion in support of more than 45,000 projects in every county in the country (BLM 2023a). In 2014, the Outdoor Recreation Legacy Partnership competitive grant program began providing funding for urban areas with priority

given to outdoor recreation projects in economically disadvantaged areas lacking in opportunities for outdoor recreation (BLM 2023a).

In 1998, Congress began using LWCF appropriations for “other purposes” related to natural resources. Between 1998 and 2019, the \$2.7 billion in other funding primarily went to three programs: USDI Cooperative Endangered Species Conservation Fund (53%), USDA Forest Legacy (35%), and State and Tribal Wildlife Grants (17%) (Vincent 2019b).

While \$900 million is authorized and collected annually, Congress determines how much LWCF funding is spent each year as part of its annual appropriations process. From 1965 until 2020, Congress continually chose to appropriate much less than \$900 million of authorized LWCF funding. Figure 2 shows the percent of \$900 million in authorized funds that were appropriated each year.

Figure 2. Percent of LWCF Authorized Funds Appropriated by Congress Each Year (1965 - 2022).



Source: Vincent 2019a, DOI 2020,2021,2022.

The chronic failure of Congress to fully appropriate LWCF funding was addressed in 2020, when President Trump signed the Great American Outdoors Act (GAOA). This act bypassed the Congressional appropriations process by mandating that all \$900 million of LWCF annual funding be available each year for future investments in federal and state outdoor recreation opportunities.

2. ISSUES AND CONCERNS

Past Congressional debates on LWCF focused on how much of LWCF authorized funds should be appropri-

ated. The 2020 GAOA resolved this debate as LWCF is now fully funded each year at \$900 million. With full funding of LWCF finally achieved, there is still the need to adjust LWCF for inflation in response to higher land, labor and material costs. Adjusting LWCF funds for inflation, \$900 million increases to \$3.4 billion when calculated in 2020 dollar (Walls 2020).

Outdoor recreation has never been more popular. Unfortunately, despite significant mental and physical health benefits from outdoor recreation, federal land management budgets have historically underfunded recreation and conservation programs (Morton 1997, Aldrich and Hjerpe 2020). The lack of funding combined with increased visitation has created a maintenance backlog for roads, bridges, trails and facilities (see Table 2, Vincent 2023). The balance between allocating more LWCF money to maintenance and less to acquisition has been long debated in Congress. Recognizing that sustaining outdoor recreation requires maintaining recreation areas, the GAOA provided \$9.5 billion of funding over 5 years (separate from \$900 million for LWCF) to begin addressing the maintenance backlog (BLM 2023).²

Table 2. Deferred Maintenance for Federal Agencies.

Federal Agency	FY 2022 Deferred Maintenance (\$billions)
National Park Service	\$21.09
Forest Service	\$ 7.66
Bureau of Land Management	\$ 4.77
Fish and Wildlife Service	\$2.02
Total	\$35.53

Source: Vincent 2023.

In addition to maintenance needs, there is a tremendous funding need for more monitoring. Monitoring improves transparency and accountability by collecting data and providing feedback in support of maintenance. For example, a wilderness

² Following the passage of GAOA, a DOI Task Force developed four overall goals: 1) maximize the return on investment to citizens served; 2) improve the financial health of maintenance programs; 3) improve safety for the public and employees; and 4) plan for the future by modernizing infrastructure (BLM 2023).

ranger monitoring trail conditions provides valuable feedback for prioritizing trails in need of maintenance and overused areas in need of restoration. Road maintenance crews monitoring the condition of roads, bridges and culverts serve a similar function. Agency personnel monitoring trailheads collect visitation data, educate visitors on backcountry safety and ethics, and reduce opportunities for vandalism. Monitoring dispersed camping spots for poorly located fire rings is useful information for identifying potential fire ignition sources and mitigating wildfire risk. Importantly, both maintenance and monitoring are labor intensive programs that create jobs in local communities.

Full LWCF funding can help resolve many LWCF issues debated in Congress including: 1) distribution of funds between acquisition of more land versus maintenance of existing facilities; 2) allocation of LWCF between federal and state programs; and 3) allocation of LWCF for other purposes (Vincent 2019a, 2019b, Walls 2020). With LWCF annual funding practically doubled from historic funding levels, state and federal agencies have an opportunity to address the above issues and fund priorities not funded in the past.

With full LWCF funding achieved, the next issue to confront is the reliance on oil and gas revenue. Since 1965, ninety-five percent of LWCF funding has come from revenue derived from oil and gas leasing of offshore federal land (Vincent 2019a). In the next section we examine options for supplemental revenue to decrease dependency on offshore oil and gas revenue.

3. Comparing Rents, Royalties, Fees and Revenue for Renewable and Non-Renewable Energy

In order to gain a better understanding of options for supplemental funding from renewable energy produced on public land we compare oil and gas royalty rates and revenue with those of renewable energy, including solar, wind, geothermal, and gen-tie. Gen-tie refers to the use of public land to provide transmission of electric energy from production locations (often on private land) to the electric power grid. Federal revenue from private companies extracting energy resources from public land primarily comes from one-time bid bonuses, plus annual fees, rents, and royalties.

Rents, Royalties and Fees

Table 3 shows royalty rates for oil, natural gas, coal, solar, wind, gen-tie and geothermal production. Annual per acre rents are higher for offshore oil and gas and onshore solar, wind and gen-tie, while onshore oil and gas, coal, geothermal and offshore wind have very low annual rents. Prior to May 2023, onshore solar, wind, and gen-tie rents were based on county-specific zone rates reflecting non-irrigated agricultural land values adjusted for buildings and other improvement using data from the National Agricultural Statistics Service. Under the old rules, rental rates reflected a 5.5 percent annual rate of return on land value. Under the old rules, the large variation in onshore solar and wind zone rates reflected the large variation in property values between states and counties.

Table 3. Annual Rents and Royalty/Fees by Energy Resource.

Energy Resource	Annual per Acre Rent	Annual Royalty/MW Capacity Fee
Onshore Oil and Gas	\$1.50 - \$2.0 rent per acre	16.67% of production value (price multiplied by quantity)
Offshore Oil and Gas	\$7.0 - \$44.0 rent per acre	16.67% - 18.75% of production value (price multiplied by quantity)
Coal	\$3 rent per acre	8% - 12.5% of production value (price multiplied by quantity)
Onshore Solar Old Rule	\$17.48 - \$58,471 zone rate per acre	\$2,863 to \$4,294 per MW multiplied by approved MW capacity

Table 3. Annual Rents and Royalty/Fees by Energy Resource. (Continued)

Energy Resource	Annual per Acre Rent	Annual Royalty/MW Capacity Fee
Onshore Solar New Rule	\$8.33 – 75.13 state rate per acre. 100% encumbrance	\$0/MW first year, \$1000/MW second year, \$2000/MW third and subsequent years multiplied by approved MW capacity.
Onshore Wind Old Rule	\$1.75 - \$5,847 zone rate per acre	\$5,010 per MW multiplied by approved MW capacity
Onshore Wind New Rule	\$0.84- \$7.51 / state rate per acre 10% encumbrance.	\$0/MW first year, \$1000/MW second year, \$2000/MW third and subsequent years multiplied by approved MW capacity.
Offshore Wind	\$3 rent per acre	2% of anticipated production value
Geothermal	\$1- \$5 rent per acre	1.75% of gross proceeds first and second year 3.5% third and subsequent years, of gross proceeds from electricity or steam sales.
Gen-tie	\$4.17-\$37.50 state rate per acre 50% encumbrance.	none

Source: DOI 2023b, DOI 2023d, DOI 2016 DOI 2017a, b.

In May 2023, BLM announced rule changes designed to promote renewable energy production on public land. The new rules base per acre rents on state averages of the value of non-irrigated agricultural land minus improvements and a 2 percent return on land value (see DOI 2023d for details). Land values for solar projects reflect a 100% use of the land (BLM’s calls this encumbrance), geothermal has an implicit 100 percent encumbrance, gen-tie reflect a 50% encumbrance, and wind projects have a much smaller 10% encumbrance. The rule changes also reduce megawatt (MW) capacity fees. The changes are expected to reduce solar, wind, and gen-tie revenue by 50-80% (Molina 2022).

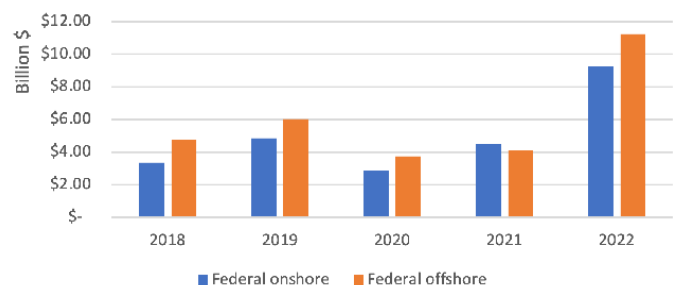
Royalty rates are higher for oil, gas and coal, and lower for geothermal and offshore wind. It is not possible to compare royalty rates for onshore solar and wind, because they are not calculated under current policy. Implicit royalty rates would have to be calculated using the fees per MW currently charged. Under the old rule, the wind MW capacity fee was fixed while the solar MW fee varied for solar, increasing with the level of technology used – solar, concentrated solar, or concentrated solar with storage capacity. Under the new rule the MW capacity fee is the same for all technologies; wind

and solar, is zero for the first year of operation, \$1000 for the second year, and \$2000 for the third and all subsequent years.

Annual Revenue

Annual revenue from federal onshore and offshore oil and gas production are shown in Figure 3 below. Cumulative revenue from onshore wind, solar and geothermal energy production from federal land is shown in Table 4. It is worth noting that the onshore renewable energy total of \$660 million, collected over a 25-year period of time, is much less than 1 year of oil and gas revenue from onshore federal lands.

Figure 3. Annual Revenue from Oil and Gas Production U.S. Federal Land and Water (2018 - 2022).



Source: DOI 2023b.

Table 4. Total Revenue from Federal Onshore Renewable Energy (1982 – 2019).

Onshore wind	\$105,704,796
Solar	\$95,146,561
Geothermal	\$459,642,577
Total Revenue	\$660,493,934

Source: Springer and Daue 2020.

The DOI manages approximately 2.5 billion acres offshore, some of which is leased for wind energy. Between 2010 and 2021, offshore wind generated \$504 million in total revenue – \$472 million (94%) from bonus bids and \$32 million (6%) from rent (DOI 2023). In 2022, offshore bonus bid revenue soared to \$4.6 billion primarily from the largest offshore wind energy sale in U.S. history off the coasts of New York and New Jersey (Table 5).

Table 5. Wind Revenue Offshore Source.

Wind Revenue	2010 - 2021	2022
Bonus Bids	\$ 472,369,479	\$ 4,632,500,000
Rent	\$ 31,567,173	\$ 6,811,612
Total	\$ 503,936,651	\$ 4,639,311,612

Source: DOI 2023.

Revenue from renewable energy will continue to increase as renewable energy capacity on federal land and water is expected to grow significantly in scale. DOI has plans to lease an additional 30 gigawatts (GW) (30,000 MW) of offshore wind energy capacity by 2030. DOI also plans to permit an additional 25 GW (25,000 MW) of onshore solar, wind, and geothermal production on public lands by 2025 (DOI Strategic Plan 2023c).

To provide guidance on the nature and magnitude of revenue potentially available from renewable energy projects on public land, we consider the active renewable energy projects permitted (but not operating) or under environmental review as of May 2023 (Bureau of Land Management 2023). The projects total nearly 25,000 MW of capacity, which represents roughly twice the renewable energy capacity reported by BLM in November 2021 (BLM 2021). The projects are briefly summarized in Table 6 and are likely to be representative of BLM’s renewable energy projects over the next decade.

Table 6. Active BLM Renewable Energy Projects May 2023.

Project Type	Number of Projects	Megawatt Capacity	BLM Acres	Acres per Megawatt
Gen-tie	17	526	851	1.6
Geo	6	21	464	22.1
Solar	32	17372	155591	9.0
Wind	3	164	19840	120.9
Total	58	24791	176746	7.2

Source: BLM 2023.

Using these 58 projects, we estimate the annual revenue that can be expected from BLM’s renewable energy projects including rental fees, capacity fees, and royalties from geothermal projects. These projects are disaggregated to the state level in Table 7 because rental rates vary by state, while capacity rates do not.

Table 7. Estimated Annual Revenue from Onshore BLM Renewable Energy Projects.

BLM Active Projects by State and Project Type					
State/Project Type	Megawatt Capacity	BLM Acres	Capacity Revenue	Rental Revenue	Royalty Revenue
AZ	6835	52162			
Gen-tie	150	34	\$0	\$141	\$0
Solar	6685	52128	\$13,370,000	\$434,226	\$0
CA	3304	8062			
Gen-tie	1985	82	\$0	\$3,080	\$0
Geo	4	15	\$0	\$75	\$6,63
Solar	1315	7965	\$2,630,000	\$598,410	\$0
CO	132.5	1522			
Solar	132.5	1522	\$265,000	\$39,252	\$0
ID	1000	4300			
Wind	1000	4300	\$2,000,000	\$16,383	\$0
NM	1021	179			
Gen-tie	1020	170	\$0.00	\$68	\$0
Solar	1	9	\$2,000	\$73	\$0
NV	10649	101099			
Gen-tie	1400	484	\$0	\$3,165	\$0
Geo	210	449	\$	\$2,245	\$2,986,222
Solar	8639	89131	\$17,278,000	\$1,164,942	\$0
Wind	400	11035	\$800,000	\$14,456	\$0
UT	1310	4917			
Gen-tie	710	81	\$0.00	\$766	\$0
Solar	600	4836	\$1,200,000	\$91,739	\$0
WY	240	4505			
Wind	240	4505	\$480,000	\$6,037	\$0
Grand Total	24491.5	176746	\$38,025,000	\$2,375,680	\$2,992,859

Source: BLM 2023.

We estimate BLM annual revenue from these projects to be \$43.4 million. Since renewable energy projects are relatively long-lived (20-30 years), these and similar projects can be dependable sources of revenue for contributions to the LWCF. But the annual revenue does not appear to be of a magnitude able to substantially replace offshore oil and gas revenue any time in the near future (excluding recent one-time offshore wind bonus bid revenue). This conclusion is especially true if BLM continues with its reduced MW capacity fees and per acre rental rates.

4. OPTIONS FOR EVOLVING LWCF FUNDING

Onshore Oil and Gas

Historically, federal onshore oil and gas production has not contributed revenue to LWCF and efforts to reduce the pace and scale of onshore leasing will have little impact on LWCF funding levels. The GAOA does however allocate 50 percent of all miscellaneous receipts from all energy developments to the National Parks and Public Land Legacy Restoration Fund, up to \$1.9 billion per year (Tracy 2020).

While LWCF would still be dependent on oil and gas, billions in onshore oil and gas revenue could replace any decline in revenue from a reduction in offshore leasing. However, if phasing out LWCF dependency on oil and gas is a policy goal, onshore oil and gas revenue is not an option.

Renewable Energy

Wind, solar and geothermal revenue is a logical source of LWCF supplemental funding. Since most of LWCF funding is spent acquiring and managing onshore federal lands, expanding LWCF funding to include revenue from onshore and offshore renewable energy is an obvious option to consider. One-time bonus bids represent a significant source of revenue. Royalties from offshore wind and onshore geothermal, as well as rental rates and MW fees for onshore wind and solar could provide supplemental funding. Royalty rates for geothermal and offshore wind are low and could be increased for additional revenue from renewable energy sources.

Rental Rates

Rental rates should reflect the opportunity cost (e.g., lost recreation, grazing, scenic beauty, and other ecosystem services) of using public land for energy production regardless of the energy source. Rental rates and methods for calculating rates are not consistent across energy sources. In general, rental rates are low on a per acre basis. Raising rental rates to more accurately account for the per acre opportunity costs would generate more revenue.

For onshore wind and solar, rental rates are based on state average agricultural land values. The current property value-based fee structure makes onshore solar and wind lease rates much cheaper in states with lower agricultural property values. For example, wind and solar energy development is occurring at large scales in both southern Nevada and interior southern California. Both areas have nearly identical soil and climate conditions and thus similar agricultural potential. Yet, BLM would charge a solar project in California a rental rate of \$75.13 per acre, compared to a Nevada rate of

\$13.07. Similar differences would emerge for wind energy projects.

Current methods for estimating rent for onshore wind and solar may not efficiently promote “smart development”. The solar and wind zone rates are not, but perhaps should be, based on solar and wind production potential and proximity to transmission infrastructure and electrical load.³

Onshore Wind and Solar MW Fees

The MW Capacity fee methods are a bit confusing. A better understanding of the implicit royalty rate from MW fees is needed for onshore wind and solar. Is the implicit royalty rate from current MW fees for onshore solar and wind less than or greater than the 2% royalty rate for offshore wind? Increasing MW fees for onshore and offshore wind and solar would increase revenue. Raising the implicit royalty rate for onshore wind and solar, if proven too low, would generate additional revenue.

1872 Mining Law

The construction of solar panels, wind turbines and batteries require the mining of non-renewable minerals. The 1872 Mining Law subsidizes extraction of these mineral by not charging any royalty payments. If mineral royalties were collected, they could provide supplemental revenue for LWCF. After 151 years, this law is long overdue for updating.

Impact Fees

Impact fees are an option to increase revenue from all forms of energy development (Morton et al. 2022). Whether public land is covered with solar panels or oil and gas wells, recreation opportunities and many ecosystem services are displaced until the land is restored post-production.

Impact fees can be used in conjunction with rental rates to dynamically estimate the opportunity costs of using public land. For example, impact

³ An electrical load is a component or portion of an electrical circuit that consumes electric power] such as electrical appliances and lights inside your home. https://en.wikipedia.org/wiki/Electrical_load

fees could be based on the lost ecosystem services (e.g., lost recreation opportunities and carbon sequestration) from beginning of energy production until the land is restored.

LWCF Trust Fund

By 2019, a total of \$40.9 billion had been deposited in the LWCF. Of the \$40.9 billion deposited in the LWCF, less than half of the money (\$18.9 billion) was actually appropriated by Congress and spent on outdoor recreation. As a result, LWCF has an unspent balance of \$22 billion (Vincent, 2019a). Americans have a unique opportunity to create a \$22 billion LWCF Trust Fund using the unspent LWCF authorized funds that have accumulated over time.⁴ The annual distribution of revenue from the trust fund could be based on the interest earned.

The LWCF trust fund could be a standalone fund providing a new source of annual revenue in addition to LWCF funding for addressing the maintenance backlog. Alternatively, a portion of revenue from the LWCF trust fund could be combined with revenue from renewable energy to reduce LWCF dependency on offshore oil and gas revenue. With a conservative interest rate of 2% the trust fund would generate \$440 million per year – just under half of fully funded LWCF. At 4%, the trust fund would generate enough income to practically cover the \$900 million in annual LWCF funding.

To grow the trust fund, a portion of revenue from renewable energy could be added to the fund each year. The National Park Service (NPS) currently manages distribution of state funds, and is arguably one of the most trusted federal agencies. As such, the NPS is well positioned to be the steward of the LWCF trust fund.

⁴ Some have argued that LWCF was originally intended as a revolving fund earning interest in an account separate from the General Treasury (Vincent 2019a).

5. DISCUSSION

With full LWCF funding finally a reality, for better or worse, LWCF funding remains in the near term, dependent on offshore oil and gas. Annual revenue from onshore and offshore oil and gas production is in the billions. Combined annual revenue from solar, wind and geothermal energy is in the millions, if recent one-time bonus bids for offshore wind energy are excluded. Future annual revenue from additional renewable energy capacity will certainly increase but the increase will be tempered by the new lower rental rates and MW fees which begin in 2023. At the current rate structure and planned expansion plans, annual revenue from renewable energy will take some time to entirely replace annual revenue from offshore oil and gas.⁵ The revenue potential from bonus bids could however be a gamechanger. Recent record bonus bids for offshore wind, if available, could completely fund LWCF for 5 years.⁶

If the two policy goals are to address the maintenance backlog and phase out LWCF dependency on oil and gas, supplemental revenue sources from renewable energy will be needed. But there is a tradeoff to consider. The faster LWCF becomes dependent on renewable energy revenue, the longer it will take to address the maintenance backlog.

It is important to close our discussion by noting offshore oil and gas revenue can continue to cover LWCF even if leasing and production decrease. In 2022, offshore oil and gas revenue was over \$10 billion. If annual revenue drops to \$5 billion, LWCF would represent 18% of revenue. If revenue drops further to \$2.5 billion, LWCF would account for 36% of revenue. In other words, even with a 75% drop in revenue from 2022 levels, there is still enough revenue to cover \$900 million in LWCF funding.

In addition, higher oil prices may result in no

⁵ Higher material costs and increased capital costs from higher interest rates may slow the pace of offshore wind development. <https://www.utilitydive.com/news/avangrid-cancel-park-city-offshore-wind-contracts-southcoast-shell/695552/>

⁶ Bonus bids are on the rise. The BLM recently received \$105 million in solar bids in southern Nevada. It is likely that reduced royalties and rental rates will translate into higher auction bids for solar and wind. <https://www.utilitydive.com/news/nv-energy-nextera-subsiidiary-among-high-bidders-for-interiors-record-brea/684960/>

loss in revenue, even if leasing levels drop. Oil prices are set in the global market and global consumption (i.e., demand) of oil is highly insensitive to price. Global plans to reduce the pace and scale of oil and gas production will likely result in higher prices. An increase in global oil and gas prices may counterbalance some of the decline in production revenue from decreased leasing.

With LWCF fully funded for the near term with oil and gas revenue, the supplemental revenue sources identified above can help evolve LWCF funding if and when revenue from oil and gas declines. It is time for the wind, solar and geothermal energy industries that use public land to contribute funds in support of outdoor recreation for the next 60 years, just as the oil and gas industry has done since 1968.

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