US subsidies boost the expected profits and development of new oil and gas fields
29 July 2021

Oil and natural gas wells require concrete to seal the area between the well casing and the surrounding borehole, but because of the high temperatures and pressures at depth, it has been hard to study how these specialized cements harden. Now, a new method developed at MIT can help to fill in that missing knowledge. CC0:Public Domain

Researchers at the Stockholm Environment Institute (Somerville and Seattle, U.S.) and Earth Track, Inc. (Cambridge, MA, U.S.) examined 16 subsidies and environmental regulatory exemptions, providing one of the first estimates of how government subsidies will affect investment decisions for new gas fields in the coming decade. Their results are published on 29 July 2021 in the IOP Publishing journal, Environmental Research Letters.

Despite repeated pledges to phase out “inefficient” fossil fuel subsidies, the United States—the world’s largest current oil and gas producer—continues to provide billions of dollars each year to the oil and gas industry through various support measures. The study not only looks at tax incentives, but it is one of the first of its kind to also account for the effects of regulatory exemptions that reduce the costs for hazardous waste and wastewater management for oil and gas producers.

"Besides two federal tax incentives that have existed since 1916, we were surprised to find that less widely recognized forms of government support can also be highly beneficial," said SEI Scientist Ploy Achakulwisut, a lead author of the paper. "The public ends up footing the bill for services like well closure and hazardous waste disposal—directly with their tax money and indirectly with their health."

For their analysis, the study's authors developed a cash-flow model, using Rystad Energy’s UCube database and their own assumptions regarding commodity prices. They then evaluated the effects of 16 subsidies and regulatory exemptions on the expected investment returns of thousands of oil- and gas-producing fields that are projected to be developed between 2020 and 2030.

The results show that, depending on future oil and gas prices and the minimum required rates of return, subsidies (including exemptions) either encourage more extraction than would otherwise be economically viable, or flow to excess profits. In the former instance, subsidies would help lock in higher greenhouse gas emissions, as well as increase air and water pollution and health risks. In the latter case, they would not be fulfilling their stated economic purpose.

For example: at 2019 oil and gas prices—or $64 per barrel of oil and $2.6 per mmbtu (million British Thermal Units) of gas—only 4% and 22% of new oil and gas resources would be subsidy-dependent. In this case, over 96% of subsidy value would flow directly to excess profits. This scenario assumes that investors require a 10% minimum rate of return, or "hurdle rate".

However, if oil and gas prices are as low as they were in 2020—or $40 per barrel of oil and 2 per
mmbtu of gas—then more than 60% of new oil and
gas resources would depend on subsidies to be
economically viable. This scenario assumes that
investors would require a higher 20% hurdle rate,
which may already be the case as risks increase for
oil and gas investments.

The authors also examine the extent to which
subsidies to fossil-fuel producers affect CO₂
emissions by depressing oil and gas market prices
and incentivizing higher consumption. They
estimate that, under a 10% hurdle rate, the subsidy-
duced decrease in oil price could result in an
additional 374 million barrels of oil being burned in
2030, adding 150 million tonnes of CO₂ emissions.

"In the wake of the COVID-19 pandemic, our
results illustrate how different choices about
economic recovery and tax reform can shape the
US oil and gas industry and energy infrastructure in
the years to come," said co-lead author and SEI
Senior Scientist Peter Erickson. "In addition, fossil
fuel subsidies can have symbolic effects, since their
continued existence may be read by other nations
as a sign that the US is not taking its commitments
to subsidy reform, or to climate action, as seriously
as it should be."

"Good governance requires transparency on who is
receiving subsidies," added co-author Doug Koplow
from Earth Track. "Our study helps to shine a light
on the effects of subsidies on the expected returns
of US oil and gas producers and their investment
decision-making. The same methods could be
applied to inform ongoing subsidy reform efforts in
other countries." G7 governments continue to
provide billions of dollars in subsidies each year.

**More information:** Ploy Achakulwisut et al, Effect
of subsidies and regulatory exemptions on
2020–2030 oil and gas production and profits in the
United States, *Environmental Research Letters*
(2021). [DOI: 10.1088/1748-9326/ac0a10](https://doi.org/10.1088/1748-9326/ac0a10)

Provided by Institute of Physics
APA citation: US subsidies boost the expected profits and development of new oil and gas fields (2021,