



LET'S TALK ABOUT PENNSYLVANIA

Let's talk about Pennsylvania



In examining how Alberta stacks up against other competitor and comparator jurisdictions, the Panel is looking at Pennsylvania, which is a major competitor with Alberta when it comes to natural gas.

Comparison with Pennsylvania is particularly relevant for a couple of reasons:

- It is a significant direct competitor for capital to drill and produce shale gas,
- Its production of natural gas competes directly with Alberta's natural gas.

One of the biggest differences between Alberta and Pennsylvania is the ownership of resources – most of the mineral resources are privately owned in Pennsylvania. To compare the fiscal regimes of the two jurisdictions you need to include the special fees that Pennsylvania levies, Pennsylvania's corporate taxes, and royalties that private land owners in Pennsylvania charge energy companies; and compare all that against Alberta's royalties and corporate taxes. Since the private royalties in Pennsylvania are individual private contracts that do not involve government, they are not required to be reported. This makes the comparison challenging.

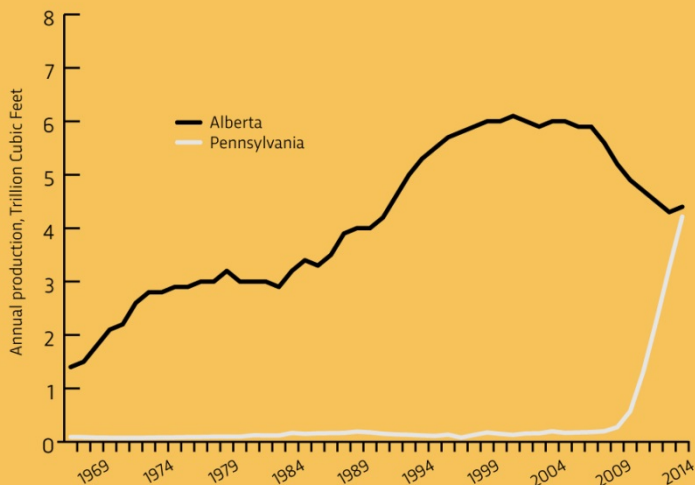
Geology and Geography

Pennsylvania is widely recognized as the birthplace of commercial oil production. Colonel Edwin L. Drake drilled the first commercially productive oil well in Titusville, Pennsylvania in 1859, launching a global industry and an energy revolution.

Today, Pennsylvania is known for its significant natural gas reserves and production, particularly the Marcellus shale formation. The Marcellus has been a major source of natural gas production since 2010. The rapid rise in gas production from Pennsylvania has been a game-changer for the North American gas market.

Operators in the Appalachian basin underlying Pennsylvania have known the Marcellus Formation to be a reservoir rock for over 75 years. It was originally considered a nuisance, as drilling through this formation would yield large volumes of natural gas just long enough to shut down drilling operations for a number of days. Once the gas had been drained from "pockets" in the shale, companies would continue drilling to deeper targets.

Comparison of raw natural gas production



With advancements in drilling and completion technology, the natural gas locked in the Marcellus shale became readily accessible and economic to produce. The use of horizontal drilling, combined with multi-stage hydraulic fracturing, has resulted in very high rates of gas recovery from the Marcellus. Approximately half of all wells in the Marcellus in Pennsylvania are now horizontal wells.

Pennsylvania's natural gas production was 15 times higher in 2014 than in 2009 because of development in the Marcellus. Natural gas output exceeded 4 trillion cubic feet in 2014, and made Pennsylvania the second-largest natural gas producer in the U.S. (after Texas). While Pennsylvania's natural gas production in 2014 was similar to Alberta's (which was 4.4 trillion cubic feet), Pennsylvania's production is rapidly increasing, while Alberta's is in decline.

Pennsylvania is also second only to Texas in estimates of proved natural gas reserves, which quadrupled from 2010 to 2013. The Marcellus, which extends under Pennsylvania, West Virginia, New York, Ohio, and Maryland, is the largest U.S. gas field ranked by estimated proved reserves.

In 2013, Pennsylvania had 53,762 producing natural gas wells. By comparison, in 2014, Alberta had 104,046 producing natural gas wells. While Pennsylvania and Alberta had roughly the same total natural gas production in 2014, Pennsylvania's production came from half as many wells. This is because the majority of Pennsylvania's gas came from relatively new high-producing shale gas wells. In contrast, the majority of Alberta's production came from existing conventional gas wells.

Until recently, Pennsylvania depended on interstate pipelines from the Gulf Coast to supply natural gas to the state. But thanks to natural gas production from the Marcellus, Pennsylvania can now meet its own gas demand and even has enough natural gas for export outside the state. In fact, pipelines are now being reconfigured and built to send natural gas from Pennsylvania to the U.S. Midwest and the U.S. Gulf Coast. Pennsylvania is strategically located to supply the U.S. East Coast and U.S. Midwest markets, and is displacing Alberta natural gas exports to these markets and to central Canada.

Structure of the Industry

Like Alberta, Pennsylvania is one sub-national jurisdiction that is part of a larger country. It has a stable democracy, the rule of law, and an open market economy. Also similar to Alberta, the energy industry in Pennsylvania is made of private companies undertaking the actual exploration, production and sale of the resources. The government is not directly involved in developing the resources through any kind of state-controlled energy company.

However, many of Pennsylvania's oil and gas resources are privately owned (rather than State-owned or Province-owned). In fact, approximately 92% of Pennsylvania's mineral rights are held privately. (In comparison, 81% of Alberta's oil and gas resources are owned by the "Crown", i.e. Albertans.) Energy companies operating in Pennsylvania will typically pay royalties to the private owners of the resources, but they do so through private agreements that they make with each private resource owner.

Fiscal Framework

Since most of Pennsylvania's oil and gas resources are privately owned, the Pennsylvania government does not collect royalties on oil and gas development. In fact, unlike many other states, Pennsylvania does not even collect a severance tax (which is typically a percentage of the gross value of production of natural gas). Additionally, the oil and gas industry is exempted from Pennsylvania's state sales tax.

Instead, Pennsylvania has what is called an "Impact Fee". The Impact Fee was enacted in 2012 and permits counties to impose a \$40,000 to \$60,000 flat fee on a producing natural gas well in its first year of operation, with the fee declining over the next 15 years. A producer's total fee is based on: (1) the number of wells the producer operates within each county that has imposed the fee; (2) the date each well was drilled/spud or ceased production; and (3) the price of natural gas. For gas produced in 2013, energy companies in Pennsylvania collectively paid \$223 million (USD) in Impact Fees. This worked out to an effective tax rate of less than 1.9%.

Pennsylvania's state-level corporate income tax is 9.99%. Energy companies in Pennsylvania also must pay 35% federal corporate income tax (versus energy companies in Alberta, which pay 12% provincial corporate tax and 15% federal corporate income tax.)

Comparing Alberta to Pennsylvania is particularly relevant because Pennsylvania's new plays are attracting significant investment, using the same technology, and bringing product to market putting the state in direct competition with Alberta. This makes the comparison a reasonable 'apples-to-apples' one for these investments.

Sources: Alberta Energy; Alberta Energy Regulator; U.S. Energy Information Administration; Pennsylvania Department of Conservation and Natural Resources; Pennsylvania Geology; Pennsylvania Budget and Policy Center