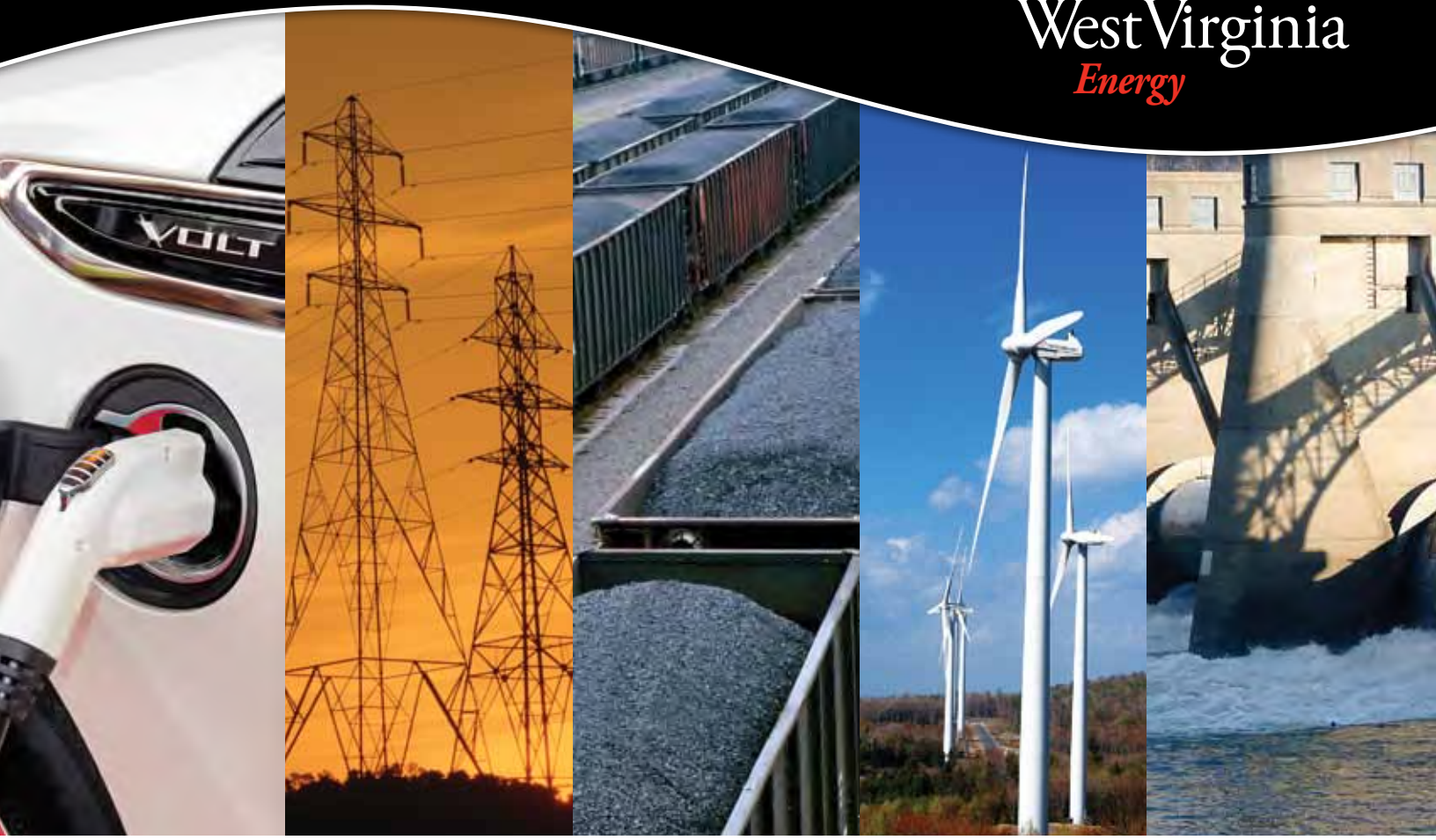
West Virginia
Energy



ENERGY BLUEPRINT

ENERGY STANDS AS ONE of the traditional strengths of West Virginia's economy. The state has long been — and remains today — one of America's leading electricity producers.

Two-thirds of the electricity West Virginia generates is exported to the rest of the country. We rank fourth in the country in net interstate sales of electricity and remain a leader in low-cost electricity. Our industrial rates are the second- lowest among states east of the Mississippi.

West Virginia is taking a lead in meeting the country's energy needs through traditional resources and advanced technology. Today we are capitalizing on the opportunities presented by our Marcellus Shale deposits, which can be the cornerstone to new industrial development.

Our energy blueprint calls for the environmentally responsible development of all forms of feasible energy technologies, from clean coal to coal liquefaction, natural gas, biomass, hydrogen, hydro, wind and solar power.

The state's Alternative and Renewable Portfolio standard requires that 25 percent of the state's energy production to be alternative or renewable sources by 2025.

West Virginia advances small- and large-scale renewable energy systems. Virtually all hydropower resources are being used, and the state is home to the largest wind farm in the eastern United States.

We have made substantial investment in new technologies. More investment is required to continue this progress. I feel confident that working with the West Virginia Legislature we will continue to move forward in energy production and resource efficiency.

Sincerely,

Earl Ray Tomblin
Governor

Introduction

WEST VIRGINIA IS A NATIONAL ENERGY LEADER. While we supply eastern energy markets, we demonstrate to the nation our commitment to using domestic and secure energy resources to fuel our factories and heat and cool our homes. West Virginia's coal and electric generation capacity helped build this nation and power it through two world wars. Coal continues to be the leading resource energy source in West Virginia. Coal mining provided 20,476 direct West Virginia jobs in 2010 at an average wage above $79,000, generating more than $1.6 billion in wages.

West Virginia is finding new and better ways to use its coal. There is a balance between coal and the environment and West Virginia works hard to find that balance. Our 2009 Alternative and Renewable Energy Portfolio Standard requires 25 percent of the energy consumed in our state to come from an alternative or renewable energy source by the year 2025.

Other technologies being developed include recovery and water treatment technologies associated with new natural gas resources from Marcellus Shale formation. A hydrogen fueling station recently concluded its two-year operation at Yeager Airport in Charleston as established by the U.S. Department of Energy. The purpose of the project was to demonstrate that coal-based electricity could produce hydrogen for transportation purposes that is competitive to gasoline. More than 1,000 megawatts of wind power are in service or in development. West Virginia is home to the largest wind farm in the East.

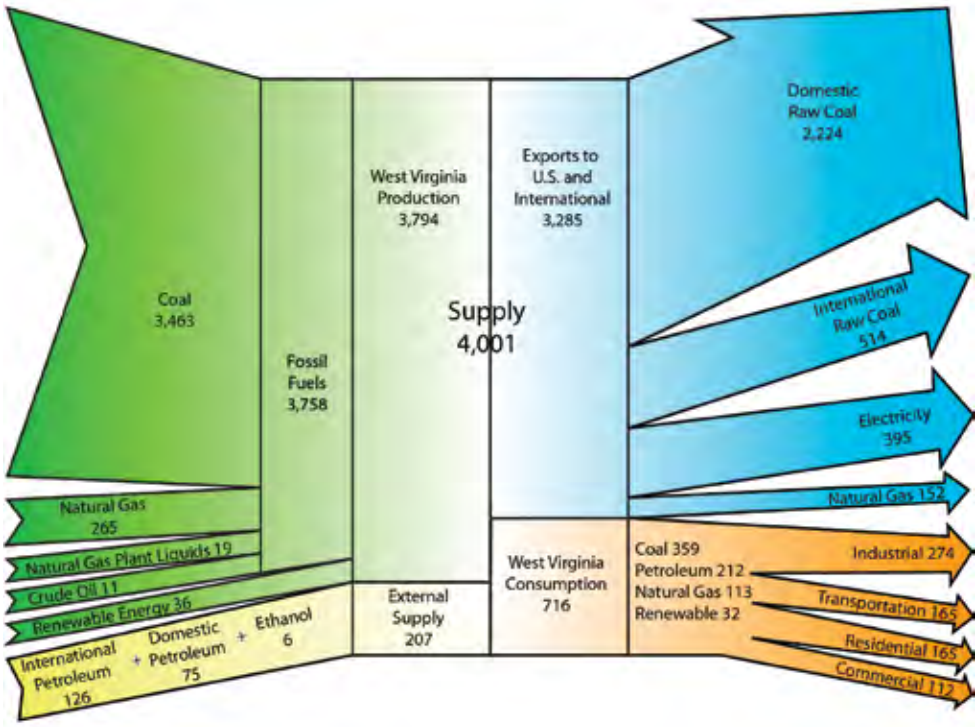
West Virginia is committed to industrial energy efficiency. Our Industries of the Future-WV program was recognized as a Champion of Energy Efficiency by the American Council for an Energy Efficient Economy (ACEEE).

Energy production, especially when it is diversified across the energy spectrum, can boost a state's economic health. Of the eight states without budget shortfalls in fiscal year 2012, according to the Center on Budget and Policy Priorities, six are electricity exporters. As one of the states in the black, West Virginia is also the fourth-leading electricity exporter in the nation, a truly powerful place to be.

West Virginia Energy Flow 2009

WEST VIRGINIA ENERGY FLOW describes the production, delivery and consumption of energy resources in terms of energy value, expressed in trillion BTUs (British Thermal Units), the common denominator for all types of energy resources. The energy content by category of fuel is shown on the left side of the graphic.

The right side shows purchases of production, including electricity, gas and coal exports and in-state consumption by sector.



West Virginia produced 3,794 TBTU of energy commodities in 2009, of which 91 percent was the energy value of coal. Natural gas comprised close to six percent of the total value, with the remaining three percent from petroleum, natural gas plant liquids (such as propane, ethane, butane, etc.) and renewable energy produced from wood, wind and water.

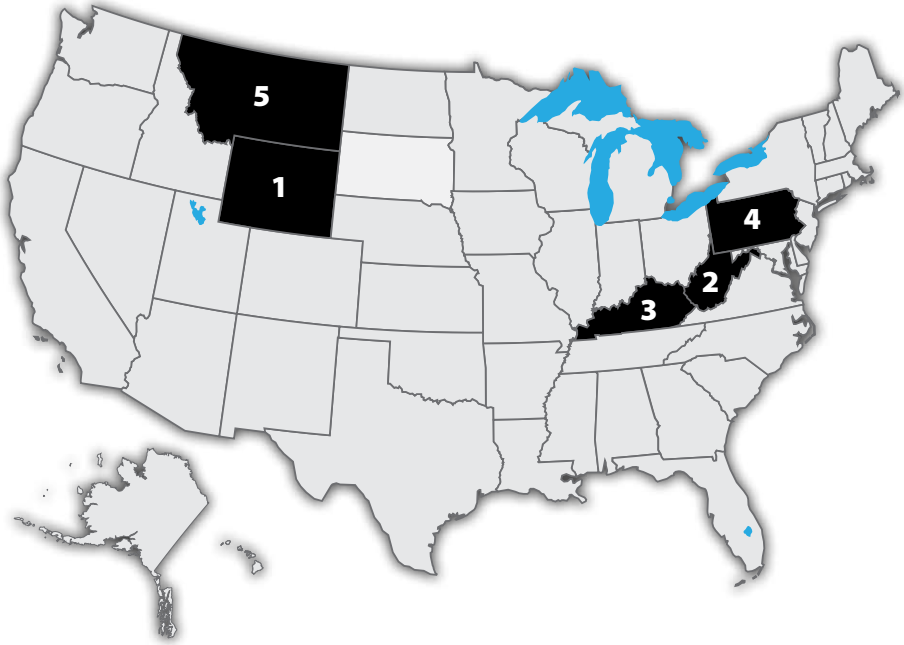
Like most states, West Virginia is a net consumer of petroleum products and had to import 95 percent of what it consumed in 2009. Of the imported petroleum, about 63 percent is from non-U.S. sources based on the U.S. ratio of gross imports to consumption. A small amount of ethanol is also consumed as a fuel additive and is included in consumption of renewables.

Of total supply including petroleum imports, West Virginia consumed about 18 percent in 2009. A majority of the rest was exported as raw coal to domestic and international markets. Additional exports were natural gas and electricity, generated largely from coal.

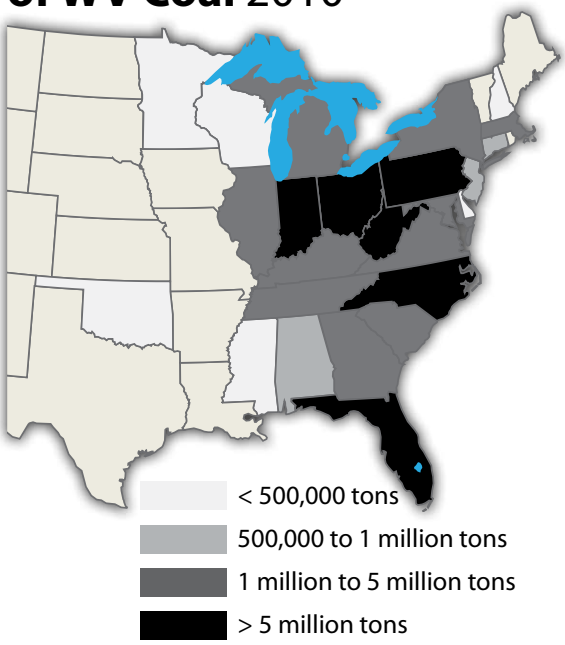
West Virginia Coal Production

THE LARGE MAJORITY of coal production in West Virginia is directly tied to electricity production. In 2009, about 86 percent of coal produced in the state was distributed for electricity production. Historically, coal has provided about 50 percent of electricity in the U.S. but that share has declined somewhat as natural gas has become a more competitive fuel.

Top Coal Producing States 2010

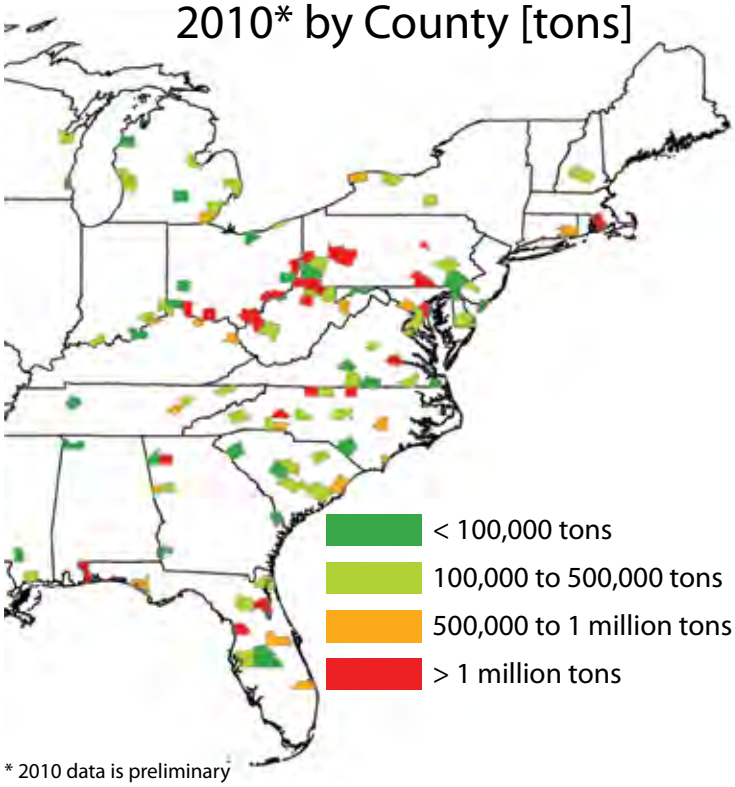


Domestic Distribution of WV Coal 2010*



Power Plant Consumption of WV Coal

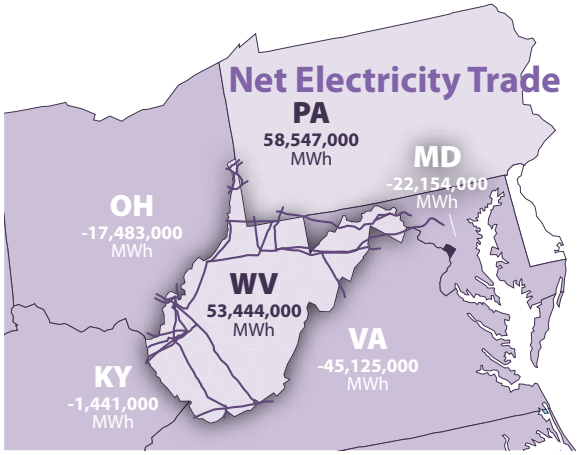
2010* by County [tons]



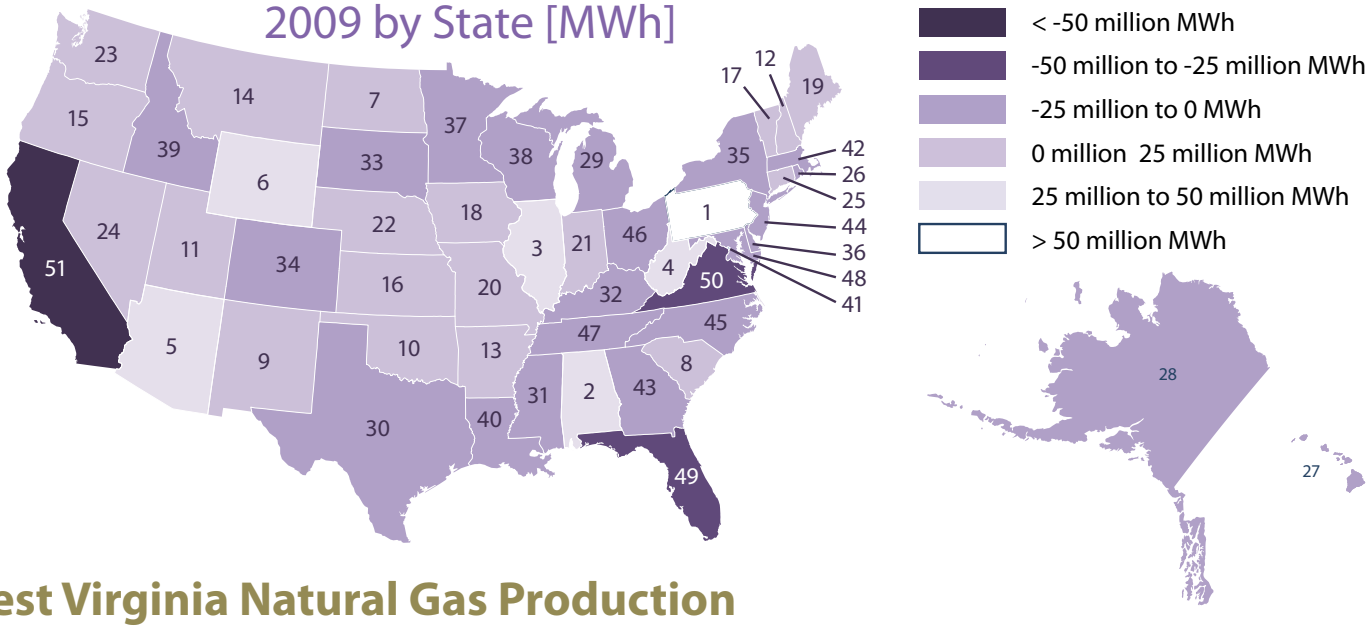
* 2010 data is preliminary

West Virginia Electricity Production

ELECTRICITY PRODUCTION in West Virginia is closely tied to both state and national demand trends. Due to a portfolio of power plants with generation capability in excess of in-state demand, West Virginia's utilities have historically supplied 60 to 70 percent of their generation as wholesale power to several neighboring utilities whose customers demand more than their capability. Geographically, West Virginia is in a unique position to provide power to large metropolitan areas in the eastern U.S. that must import electricity.



Electricity Exporters
2009 by State [MWh]



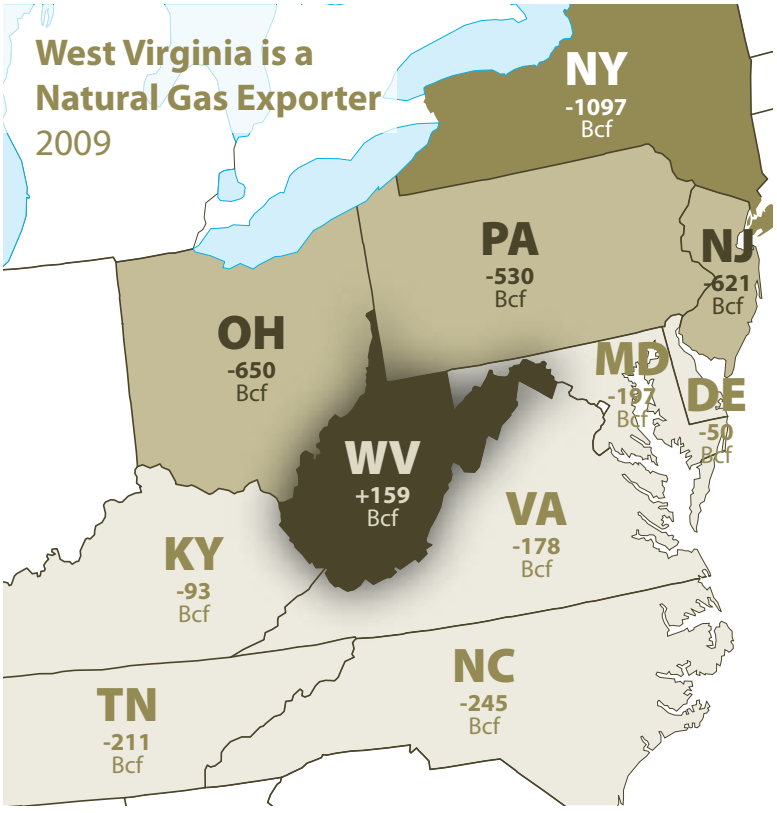
West Virginia Natural Gas Production

WEST VIRGINIA NATURAL GAS production has increased by 50 percent over the past decade. The state is part of a gas producing, consuming and transporting region that extends from the dominant production zone in and around Texas to the large consuming zones of the northeastern U.S.

West Virginia produces more than twice as much gas as is demanded by its residents and businesses. The rest is delivered to neighboring states to the east and northeast.

In 2010, total production of natural gas in West Virginia increased by 11percent to 285 BCF. Nationally, demand for natural gas has been fairly constant over the last decade. New demand for natural gas is anticipated nationally for electric power generation.

West Virginia natural gas produced from the Marcellus Shale, including commingled, has increased to 26 percent of total gas production in 2010. In 2005, Marcellus accounted for less than 1 percent of production. Substantial infrastructure investments and well completions will insure that natural gas production in West Virginia will continue to grow.



Appalachian Shale Gas Development

What Lies Ahead . . .and Below?

MARCELLUS SHALE underlies most of West Virginia. The most favorable region for production is in the northern part of the state, where it is thickest and over-pressured. Although the state has produced gas from other Devonian Shale for many decades, the Marcellus Shale became the target for new wells once engineers demonstrated the effectiveness of horizontal drilling and large hydraulic fracturing.

The Marcellus Shale development is important for our state because of the state's proximity to markets in the eastern states. Because the state has produced oil and gas for 150 years, there is a resident knowledge base and experienced workforce.

Marcellus has the potential for being the largest shale gas play in the United States. However, what we are seeing today from the Marcellus is only the first step in a sequence of natural gas plays. The second step is starting in the Utica Shale.

The Utica Shale is thicker than the Marcellus, it is more geographically extensive and it has already proven its ability to support commercial production.

The Utica Shale is a rock layer below the Marcellus Shale that is developing into another incredible source of natural gas. The Utica Shale, located a few thousand feet below the Marcellus Shale, is as yet unproven in West Virginia. Although it underlies much of the state, present knowledge is insufficient to evaluate the geographic extent of a Utica Play in West Virginia. The most favorable area is the northern part of the state, specifically the northern panhandle, where drilling is taking place in adjoining Pennsylvania and Ohio.

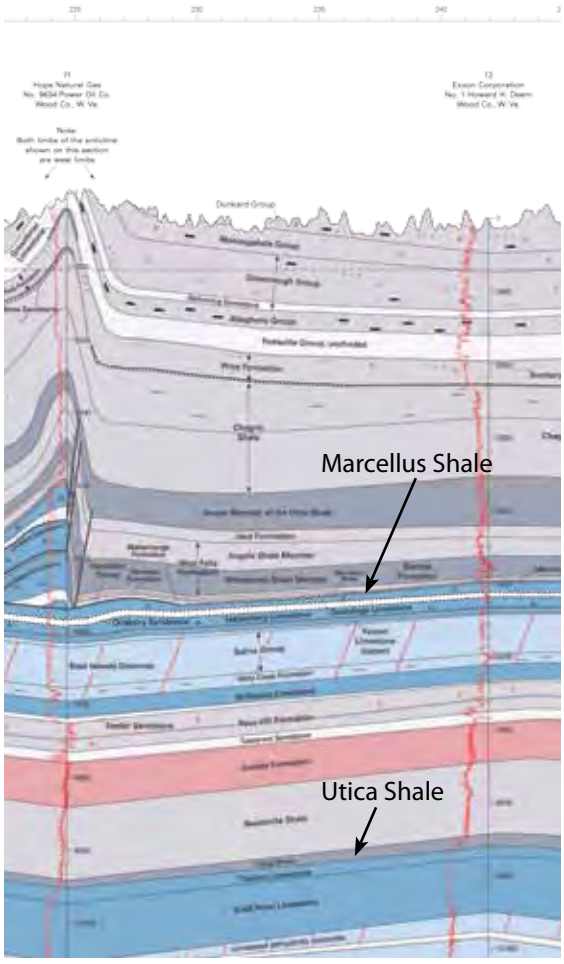
Most of the major rock units in the Appalachian Basin are thickest in the east and thin towards the west. The rock units that occur between the Marcellus Shale and the Utica Shale follow this trend. In central Pennsylvania, the Utica can be up to 7,000 feet below the Marcellus Shale but that depth difference decreases to the west. In eastern Ohio the Utica can be less than 3,000 feet below the Marcellus.

The Utica Shale is thicker than the Marcellus, it is geographically larger and it has already proven its ability to support commercial production. It has the potential to produce even more natural gas than Marcellus. But it is impossible to say at this time how large the Utica Shale resource might be because it has not been thoroughly evaluated. Little public information is available about its organic content, the thickness of organic-rich intervals and how it will respond to horizontal drilling and hydraulic fracturing. However, the results of early testing indicate that the Utica Shale will be a very significant resource.

See more about the Appalachian Shale gas plays on the back cover.

Geology.com/U.S. Geological Survey

Geographic extent of the Marcellus Shale play in the Appalachian Basin.



U.S. Geological Survey

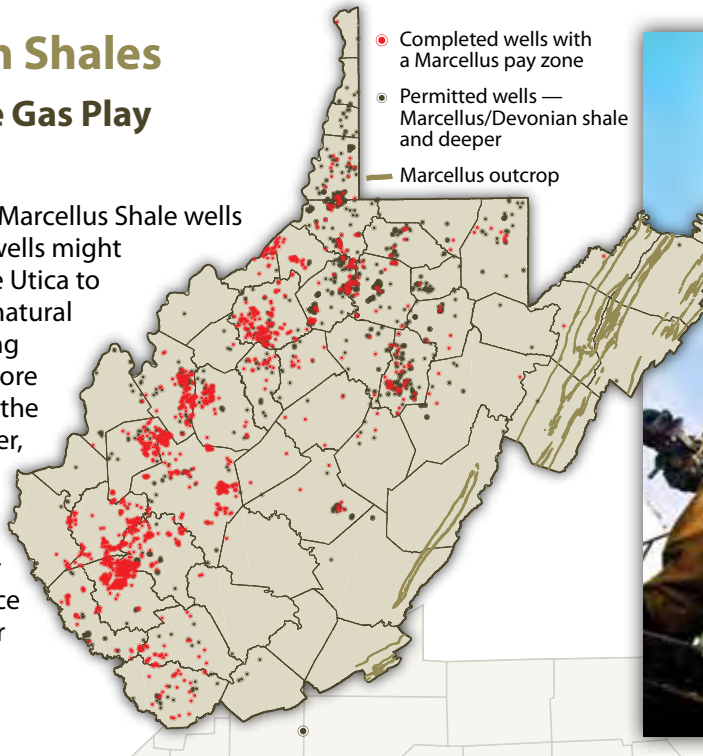
Geologic cross section through the Appalachian Basin at Wood County, West Virginia..

Appalachian Shales

Marcellus Shale Gas Play

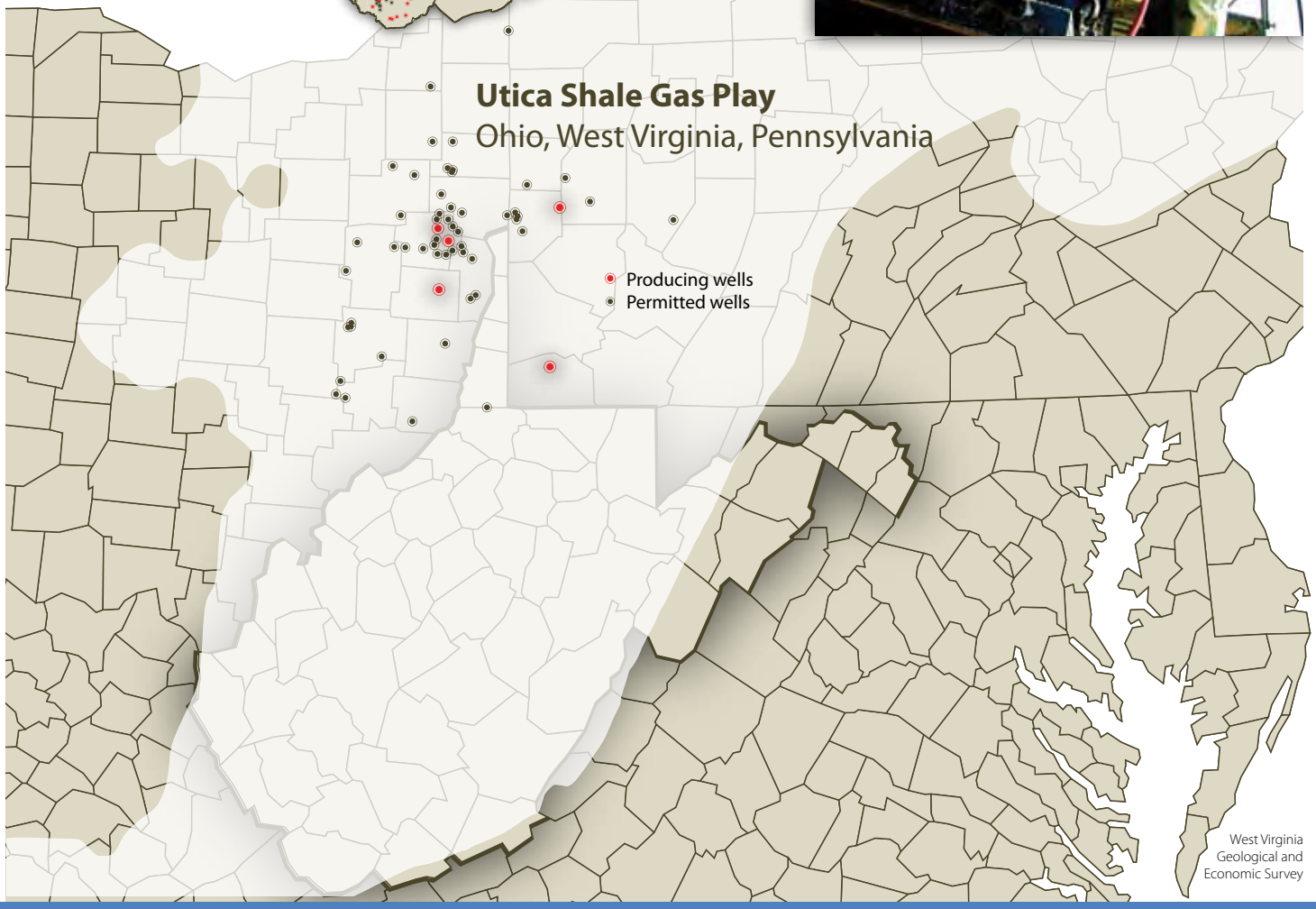
West Virginia

WHEN THE YIELD of Marcellus Shale wells start to decline, new wells might be drilled down to the Utica to continue a stream of natural gas production. Drilling for the Utica will be more expensive because of the greater depth, however, the infrastructure of drill pads, right-of-ways, pipelines, permit data and other investments will reduce development costs for Utica Shale wells.



Utica Shale Gas Play

Ohio, West Virginia, Pennsylvania



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