



## North America/Pennsylvania

# The Energy Equation: *Analysis Overview*

### Key Findings:

- About 1,800 Marcellus natural gas wells have already been drilled and as many as 60,000 more could be developed by 2030 if trends continue.
- By the end of this year, 500 wind turbines will be generating energy on Pennsylvania's Allegheny Front and Appalachian ridges, and between 750 and 2,900 more would need to be built by 2030 to meet the state's renewable energy goals.
- Because of the scale of development, about 40 percent of the most ecologically valuable large forest patches in Pennsylvania could see serious impacts from Marcellus gas drilling.
- These impacts could result in degradation of breeding habitat for vulnerable forest species including the black-throated blue warbler, wood thrush, green salamander, scarlet tanager and Northern goshawk. Gas development is also likely within most of the state's remaining brook trout watersheds.
- Wind energy developments will have smaller footprints than Marcellus gas developments, but in some places, turbines could impact key habitat for vulnerable species.



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Hours from the city and miles from any highway, turbine blades that are longer than the Statue of Liberty is tall slice the air. Pipes extend miles below the ground, using pressurized liquid to shatter solid rock and free natural gas. Trucks are piled high with logs and travel down raw new roads to be transformed into biofuel.

The most staggering development boom that the state has seen in a century is underway deep in Penn's Woods, and it's all about energy.

"The best of Pennsylvania's forests and headwater streams lie directly in the path of this development," said Nels Johnson, Deputy State Director and lead scientist for new analysis of how energy development will impact the Commonwealth's wild places.

The analysis reveals that Marcellus shale gas wells, wind turbines, woody biomass harvests and the electric wires, pipelines and the roads that are required to

transport this energy to population centers, have the potential to impact thousands of acres – much of it forestland that's critical habitat for nesting songbirds, rare plants and salamanders, but also economically crucial farmland and working forest.

New energy technologies bring the potential for both promise and peril – for people and for nature – as they continue to grow in the coming years.

That potential risk to habitat led Audubon Pennsylvania to provide data and staff time to help The Nature Conservancy produce this report, said Audubon Executive Director Phil Wallis. "Pennsylvania's deep forests provide breeding habitat for many songbirds that depend upon the health of Penn's Woods, including the scarlet tanager, wood thrush and black-throated blue warbler," Wallis said. "This analysis gives us a glimpse of how substantial the loss of our forests may be as a result of new energy development activities. We need to actively work to maintain the resilience and health of our wild forests at the same time that we find new energy solutions for our nation."

The unique project uses digital mapping to integrate myriad data sources and model the scale of future energy development statewide. We can expect to see 500 wind turbines by the end of this year and as many as 3,400 by 2030.

Over 4,000 Marcellus shale wells have already been permitted and we could see as many as 60,000 more over the next two decades. Dozens of biomass plants could be built and miles of new roads, transmission wires and pipelines will be needed to connect this new energy infrastructure to the market.

The analysis also models where wind, Marcellus and wood biomass development are likely to occur. Likely development hotspots overlap with critical songbird nesting areas, rare species habitat and rural counties where people rely on the forest for their livelihood and for recreational opportunity.

And impacts stretch far beyond the forestland that will be cleared, with nearby habitat at the edges of development in deep forest areas likely be degraded as well. The Nature Conservancy's assessment reveals that 8,500 acres of forest have already been affected by existing energy developments, and estimates potential cumulative impacts over the next 20 years at hundreds of thousands of acres.

Yet Johnson finds the analysis encouraging; "It's possible to develop much of the energy potential that Pennsylvania has without destroying what's best in our globally important forests," he said.

"By providing this data to energy developers, policymakers and local landowners, The Nature Conservancy can help inform decisions about energy now and ensure a future for conservation, local jobs and green energy," Johnson said.

**For more information: [nature.org](http://nature.org) or [pa.audubon.org](http://pa.audubon.org)**

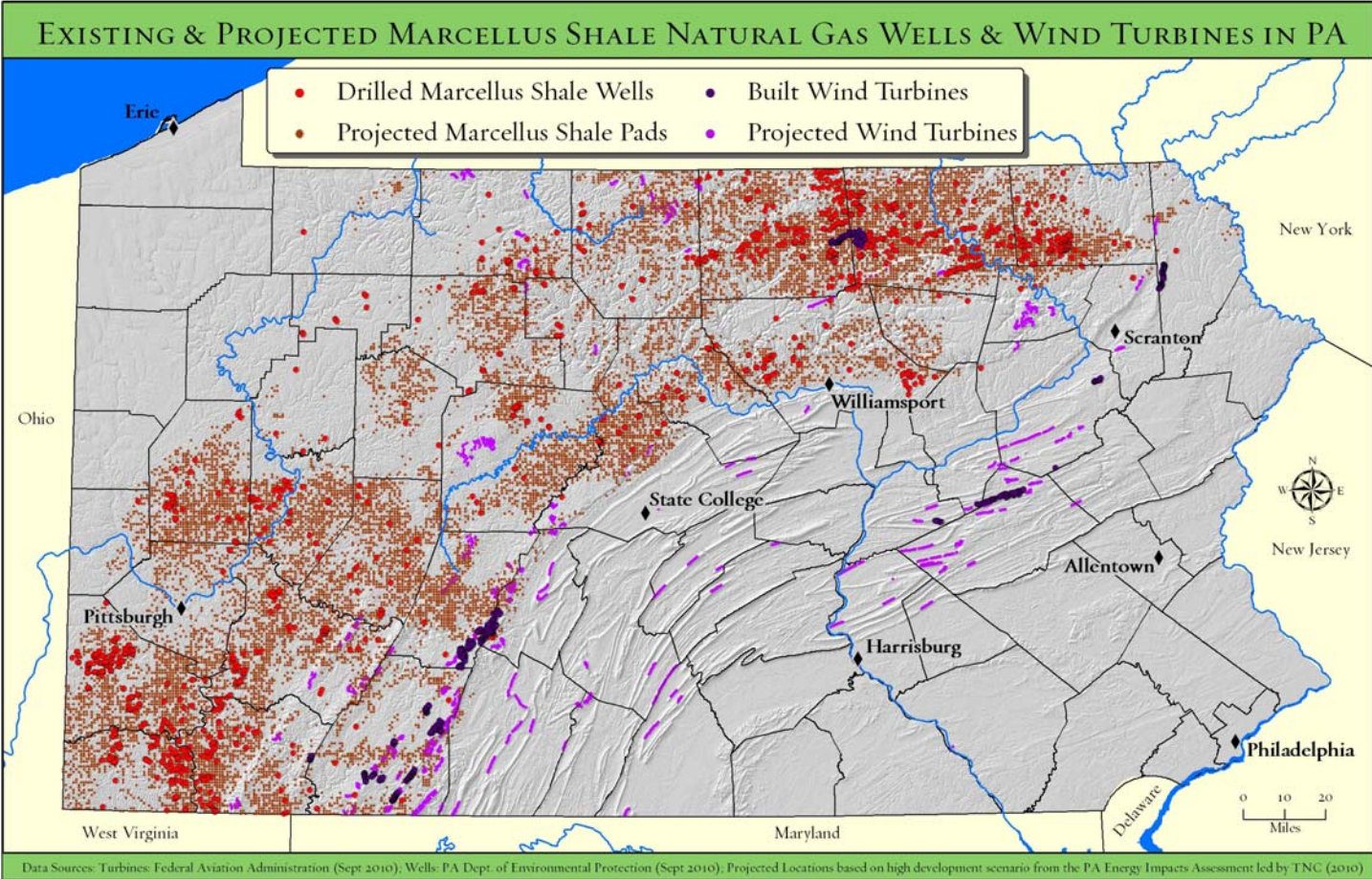


Photo courtesy of Kent Mason

**The Pennsylvania Energy Impacts Assessment**

Led by Nels Johnson, Deputy State Director of The Nature Conservancy's Pennsylvania Chapter, a team of scientists, including Audubon Pennsylvania spent nearly a year analyzing data from myriad public sources to model the location and intensity of likely future energy development in Pennsylvania — including natural gas from the Marcellus shale formation, wind, wood biomass and the transmission wires and pipelines required to get this energy to consumers. The project, titled the Pennsylvania Energy Impacts Assessment, assesses the forest and habitat impacts of existing energy developments, and considers the cumulative impacts to habitat from these multiple types of energy development over the next 20 years, based on current trends.

*Sources included: The Nature Conservancy, Audubon Pennsylvania, PA Natural Heritage Program, Western Pennsylvania Conservancy, Pennsylvania Breeding Bird Atlas, Federal Aviation Administration, Pennsylvania Dept. of Environmental Protection, U.S.D.A. Natural Resources Cons. Service, Digital Globe, National Land Cover Database, Eastern Brook Trout Joint Venture, U.S.D.O.E. National Renewable Energy Laboratory, ESRI StreetMap. For more information about methods, contact Johnson at [njohnson@tnc.org](mailto:njohnson@tnc.org).*



Data Sources: Turbines: Federal Aviation Administration (Sept 2010). Wells: PA Dept. of Environmental Protection (Sept 2010). Projected Locations based on high development scenario from the PA Energy Impacts Assessment led by TNC (2010)