Benefiting from Unconventional Oil: Summary Findings and Conclusion

Headwaters Economics

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As oil production from the Bakken formation continues to unfold—bringing with it increasing infrastructure needs and service demands—this report analyzes North Dakota's fiscal policy in terms of how well the state collects and distributes fossil fuel revenue and how the state is capturing wealth to ensure long-term economic benefit. The report discusses how the specific development strategies for an unconventional oil resource change the nature and longevity of drilling impacts and compares North Dakota's policy to three peer energy-producing states in the West: Colorado, Montana, and Wyoming.

Unlike conventional oil extraction, which is premised on "sticking a straw in the ground" and watching valuable resources flow out, unconventional oil resources—like those found in the Bakken—involve a much more complicated extraction effort. In addition, after an initial rush of production, the flow out of unconventional wells tends to decline quickly: a typical Bakken horizontal oil well will produce only 55 percent of oil in the second year of production compared to the first—a 45 percent annual decline. Unlike previous periods of oil development in the West—which were marked by an initial disruptive drilling phase followed by a long, relatively quiet production phase—development in the Bakken will be characterized by an ongoing cycle of drilling, fracking, and often re-fracking of producing wells.

The "treadmill" of drilling and fracking activity suggests that impacts will be heightened and more continuous throughout the life of the Bakken play (as long as high oil prices support this expensive form of energy production). Intensive oil extraction creates the need for expensive improvements to road, water, and sewer systems and increases demand for public services such as police, fire, and emergency response, social services, and—significantly—housing.

Fiscal policy—the way state and local governments tax oil production and distribute the proceeds—will be central to helping states adapt to the new unconventional resource plays and to ensuring that communities benefit from oil development.

In previous research, Headwaters Economics has articulated three requirements of sustainable fiscal policy relative to oil and natural gas:

1. Fossil fuel extraction pays its way through effective impact mitigation;
2. Fossil fuel extraction supports economic diversification and resilience; and
3. Fossil fuel extraction leaves a lasting legacy in the form of a permanent fund.

As we have documented in previous studies,[i] existing fiscal and planning tools have had limited efficacy during recent energy booms in achieving these goals. This report indicates that the fiscal policies on the books in North Dakota and other states may be especially ill suited to unconventional oil plays. North Dakota appears to be learning on the job, but a more consistent approach in all states that are facing future unconventional energy plays will need to replace the current, often ad hoc assistance to oil-impacted communities.

Summary Findings:

- An unconventional oil well in shale generates an initial rush of oil that subsequently declines quickly. Production from Bakken unconventional oil wells declines by nearly half in the second year (45%), meaning more wells need to be drilled to produce oil from unconventional shale plays compared to more conventional oil. This has implications both for the impacts of development and for the structure of revenue policies.

- Industrial and community impacts from development of the Bakken are greater and more continuous than impacts from development of conventional oil fields. The "treadmill" of drilling and fracking activity means employment opportunities will be greater, but will also impose heightened and more continuous industrial impacts on rural infrastructure and stress on community services.

- North Dakota's effective tax rate is average compared to other energy-producing states in the West, with room to increase. In fiscal year 2010, the state's effective tax rate on oil and natural gas of 10.1 percent ranked behind Wyoming (11.4%) and Montana (10.5%), and ahead of Colorado (4.4%). Higher effective tax rates collect more revenue from extraction with no effect on prices and little effect on industry investment or production.

- North Dakota stands out among its peers for providing the least direct funding for oil-impacted communities. Local North Dakota governments received directly 8 percent of total state revenue from oil and natural gas in FY 2011; this amount is estimated to rise to 11.2 percent in FY 2012-2013, since changes were made to the distribution formula. In addition North Dakota has contributed $885 million more in one-time infrastructure assistance for the coming fiscal year. By comparison, local governments in Colorado receive 63 percent directly; in Montana, 39 percent; and in Wyoming, 35 percent. Such transfers fill an important gap, but as the experiences of Wyoming in the natural gas boom of 2003-2008 suggest, leaving impact assistance to the discretion of state legislatures is not a responsible approach to managing an energy boom.[ii]

- States can no longer rely on lasting production and tax revenue from unconventional oil plays after drilling activity slows. The steep production decline curve for individual wells means that total field production will drop steeply when drilling activity slows either in response to low prices (below $60 a barrel in the Bakken), or when the resource is exhausted. States may need additional revenue to mitigate impacts as they occur and investing in permanent funds will be more important to ensuring lasting fiscal benefits.

Conclusion

North Dakota's fiscal policy faces many of the same challenges as other energy-producing states. To date, North Dakota has avoided many of the worst mistakes made by its peers, but the state's policy retains flaws, primarily the relatively small direct revenue distributions to oil-impacted communities.

Development of the Bakken presents greater challenges for communities than development of conventional oil fields. More wells and more activity mean heightened and continuous impacts on rural infrastructure such as roads and water resources, and increased stress on public safety, housing, and other community services from rapid population growth.

North Dakota should pay particular attention to key aspects of its fiscal policy to ensure that communities in the oil patch have the resources they need in the timeframe and amount necessary to mitigate impacts. Revenue from oil production always lags behind the impacts of drilling. Tying community prospects to biennial appropriations processes, even if significant resources are forthcoming, is ad hoc and can increase the gap between on-the-ground impacts and mitigation resources. Distribution formulas should be revisited to increase the amount of money retained directly by communities.

Still more work will be required to help communities meet the more ambitious but reasonable goal that the oil wealth leaving the state not only mitigates impacts, but also diversifies the state's economy and makes western North Dakota a better place to live. Achieving this goal will require many approaches, but fiscal policy will be important in growing and protecting a permanent fund, and investing in education, restoration to improve natural amenities, transportation and communications infrastructure, and other economic development strategies that will help the region compete in a post-oil economy.

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[i] Headwaters Economics. 2011. *Fossil Fuel Extraction and Western Economies*; Headwaters Economics. 2009. *Impacts of Energy Development in Colorado, with a Focus on Mesa and Garfield Counties*; Headwaters Economics, 2008. *Energy Revenue in the Intermountain West*. All of these reports are available at: http://headwaterseconomics.org/topic/energy/western.

[ii] Headwaters Economics. 2009. *Impacts of Energy Development in Wyoming, with a Case Study of Sweetwater County.* http://headwaterseconomics.org/energy/western/energy-development-wyoming-sweetwater/.