ENVIRONMENTAL LAW & POLICY CENTER
Protecting the Midwest's Environment and Natural Heritage

October 10, 2014

Secretary Ernest Moniz & Quadrennial Energy Review Task Force
Office of Energy Policy & System Analysis, EPSA-60
QER Meeting Comments
U.S. Department of Energy
1000 Independence Avenue SW
Washington, D.C. 20585-0121
Submitted electronically to: QERComments@hq.doe.gov

Dear Secretary Moniz & QER Task Force Members:

Thank you for hosting your August 8th public meeting on infrastructure constraints in Bismarck, North Dakota and for inviting the Environmental Law & Policy Center ("ELPC") to participate on a panel. ELPC is a non-profit organization operating throughout the Midwest and Upper Great Plains. We have offices in North and South Dakota, as well as in four Midwest states and Washington, D.C. ELPC focuses on public policies that promote energy efficiency, spur renewable energy development and create jobs while encouraging wise environmental practices.

As we mentioned in our comments at the panel, there are two important sets of energy issues facing North Dakota, which also impact the United States as a whole. First, North Dakota's untapped renewable energy resources provide important insights for the Department of Energy as it considers the nation's current energy infrastructure. Second, as oil development flourishes in North Dakota, it has highlighted the need for sensible policies to protect public health and minimize negative environmental impacts.

North Dakota's Untapped Renewable Energy Potential

The Department of Energy's National Renewable Energy Laboratory has rated North Dakota's wind resource as the sixth best in the nation. North Dakota also boasts a higher than average capacity factor for wind, such that wind turbines are more frequently producing

electricity in North Dakota than in other places.[1] However, the full potential of North Dakota's wind resource is not being tapped – despite having the sixth best wind resource, North Dakota only ranks twelfth in wind energy production.[2] If invested in fully, North Dakota wind power would be able to meet more than 230 times the state's current electricity needs.[3]

There is a substantial and costly gap between the potential represented in the size of North Dakota's wind resource and actual on-the-ground wind development. North Dakota wind power could provide a substantial boost to the state and national economy in the form of increased manufacturing and installation jobs, landowners' lease payments, local property taxes and state and federal tax revenues. In 2012, wind power projects accounted for between 1001 and 2000 jobs and nearly $5 million in land lease payments in North Dakota off of a largely untapped resource.[4]

Perhaps more importantly, wind power provides a source of constant, renewable energy that is part of the climate change solution, preserves our nation's water supply, and generates no waste in need of disposal. The wind power installed in North Dakota will avoid 3.4 million metric tons of carbon dioxide emissions annually, which is equivalent to taking 600,000 cars off the road. The water consumption savings from those projects is more than 1.2 billion gallons a year.[5] Those numbers could also be substantially higher if North Dakota were able to develop its wind resource effectively.

Currently, transmission line constraints are the biggest impediment to wind development in North Dakota. The current transmission in grid is "being utilized at near capacity."[6] New high-capacity transmission lines, including appropriately sited Multi Value Project lines in North and South Dakota are important to move North Dakota wind to load centers such as Milwaukee and Chicago. Transmission lines also improve the reliability of the electrical grid. We urge the Task Force to work with the Midcontinent Independent System Operator (MISO) and others to make sure adequate transmission is put in place to get renewable energy like wind power to market.

A strong national policy in favor of renewable energy and resultant federal tax incentives would also go a long way toward increasing wind development in North Dakota and across the country. A conversation between ELPC and a North Dakota wind developer indicated that the intermittency of federal tax incentives for wind energy development were a deterrent to development and had made it difficult to find investors and lenders who are willing to fund the complicated contingency deals that are now required for Power Purchase Agreements. To the

[1] For example, the Great Plains Energy Corridor at Bismarck State College reports that the Bison Wind Energy Center in central North Dakota has a capacity factor of 42-44%, higher than the U.S. average of 34%. *See Spotlight on North Dakota Energy 2013 Annual Report* at 9 (available at http://www.energynd.com/wp-content/uploads /2014/05/Spotlight-on-ND-Energy-2013.pdf).
[2] *Spotlight on North Dakota Energy 2013 Annual Report* at 9.
[3] American Wind Energy Association, *North Dakota Wind Energy* Fact Sheet, Mar. 6, 2014 (available at http://awea.files.cms-plus.com/FileDownloads/pdfs/NorthDakota.pdf).
[4] *Id*.
[5] *Id.*
[6] http://www.energynd.com/resources/transmission/.

extent that Department of Energy and other Task Force members can advocate for a stronger national policy favoring renewable energy, they should do so.

Lessons from the Bakken Oil Boom: Harnessing Wasted Energy and Curbing Resultant Public Health and Environmental Problems

As the Task Force considers our nation's energy and infrastructure needs over the next several decades, it should take note not only of the oil boom in the Bakken, but of the sheer amount of wasted energy in the Bakken region that should be added to our nation's energy supply through stopping the venting and flaring of natural gas. Production of oil is the main focus of companies drilling in North Dakota, meaning that the associated gas produced is less valuable to the companies and companies have less incentive to capture and process the natural gas. Instead, those companies choose to vent and flare the gas, wasting resources and negatively impacting the environment.

Venting and flaring have wasted millions of BTUs of gas that could have been added to the nation's energy supply. North Dakota wastes about 1/3 of the gas it produces at oil wells through flaring. Although some actions are being taken to cut flaring, including the construction of new gas processing facilities and pipelines, the volume of flared gas keeps growing as the number of wells in the state rises. **In May 2014 alone, operators flared nearly 10 *billion* cubic feet of gas (enough to heat around 100,000 average homes for a year[7]).** The current treatment of Bakken natural gas is particularly wasteful given that the gas is rich with high quality natural gas liquids, including ethane, propane, butane or natural gasoline. Eight to twelve gallons of these liquids may be present in 1,000 cubic feet of raw natural gas, adding much value to the gas.[8]

Venting and flaring natural gas are not only a waste of a valuable domestic natural resource, but also result in lost revenue for the federal government, the State of North Dakota, and mineral rights owners, in addition to causing serious health and environmental impacts from air pollution. In a report released last year, Ceres estimated that, in 2012 alone, producers in North Dakota flared over *$1 billion* worth of natural gas.[9] In May 2013, gas flaring was costing the state approximately $3.6 million per day in lost revenue.[10] Recently, the Western Values

[7] In May 2014, operators produced 36,940,468,000 cubic feet of gas and flared 27% of that. ND Pipeline Authority Monthly Update for July 2014 (https://ndpipelines.files.wordpress.com/2012/04/ndpa-monthly-update-july-14-20141.pdf). 27% of 36,940,468,000 = 9,973,926,360 cubic feet. Per the American Gas Association, one billion cubic feet of gas "meets the needs" of 10,000 – 11,000 American homes for a year. http://www.aga.org/KC/ABOUTNATURALGAS/ADDITIONAL/Pages/HowtoMeasureNaturalGas.aspx. Thus, with nearly 10 billion cubic feet, the gas flared in May alone could meet the needs of around 100,000 American homes – or more – for a year.

[8] *See* http://thebakken.com/articles/413/aware-of-the-flare.

[9] Ryan Salmon and Andrew Logan, "Flaring Up: North Dakota Natural Gas Flaring More than Doubles in Two Years," Ceres, July 2013 ("Ceres Report") at 7, *available at* http://www.ceres.org/resources/reports/flaring-up-north-dakota-natural-gas-flaring-more-than-doubles-in-two-years (last accessed April 18, 2014).

[10] *Id.*

Project estimated that if all the gas vented and flared on all federal lands in 2013 were sold instead, the BLM would have received at least $53 million in royalties.[11]

Venting and flaring of natural gas are also major sources of pollution that adversely affect public health and the environment. When associated natural gas is vented from wells, methane, which makes up a large percentage of natural gas, is released right into the atmosphere.[12] Methane causes great damage to the environment due to its severe global warming impacts. Methane has 86 times more global warming potency than carbon dioxide over a 20-year period.[13] Greenhouse gases such as methane and carbon dioxide endanger health and welfare by, among other things, increasing the likelihood of severe heat waves, increasing smog and wildfires, expanding the geographic range of food- and water-borne pathogens, further stressing water resources, and adversely impacting crop yields.[14]

All those impacts have a significant cost to society. U.S. EPA and other social scientists have developed economic formulas to determine the "social cost" of methane, which incorporates "the impacts of climate change on all relevant market and non-market sectors, including agriculture, energy production, water availability, human health, coastal communities, biodiversity, and so on."[15] A 2012 paper funded by the U.S. Environmental Protection Agency's National Center for Environmental Economics found the social cost of methane to be at least $370 per ton.[16] Even the lower social cost of methane calculated by another recent paper - $205 per ton – is still substantially higher than the social cost of an equivalent amount of carbon dioxide.[17]

Venting natural gas also allows direct release into the atmosphere of volatile organic compounds ("VOCs"), toxic chemicals that also comprise a significant proportion of natural gas. VOC pollution is associated with a whole host of known, severe health impacts, including but

[11] Western Values Project, "Up in Flames: Taxpayers Left Out in the Cold as Publicly Owned Natural Gas is Carelessly Wasted," May 2014, at 4, *available at* http://westernvaluesproject.org/wp-content/uploads/2014 /05/Venting-Flaring-Final1.pdf (last accessed May 22, 2014).
[12] Michael Ratner and Mary Tiemann, "An Overview of Unconventional Oil and Natural Gas: Resources and Federal Actions," Congressional Research Service, 15 July 2013, at 9 n.22, *available at* http://www.fas.org/sgp/crs/misc/ R43148.pdf (last accessed Oct. 9. 2013).
[13] Intergovernmental Panel on Climate Change, "5th Assessment Report," September 2013, at 714, *available at* http://www.climatechange2013.org/images/report/WG1AR5_Chapter08 _FINAL.pdf (last accessed May 28, 2014).
[14] *See* U.S. EPA, "EPA's Endangerment Finding: Health Effects," *available at* http://epa.gov/climatechange/ Downloads/ endangerment/Endangerment Finding_Health.pdf (last visited Oct. 9, 2013), and "EPA's Endangerment Finding: Environmental and Welfare Effects," *available at* http://epa.gov/ climatechange/Downloads/endangerment/ EndangermentFinding_EnvironmentalEffects.pdf (last accessed Oct. 11, 2013).
[15] A.L. Marten and S.C. Newbold, *Estimating the Social Cost of Non-CO2 GHG Emissions: Methane and Nitrous Oxide*, Feb. 13, 2012, at 3, *available at* http://yosemite.epa.gov/EE/epa/eed.nsf/WPNumber/2011-01?OpenDocument (last accessed May 28, 2014)
[16] *Id.* at 14.
[17] Stephanie Waldhoff et al., *The Marginal Damage Costs of Different Greenhouse Gases: An Application of Fund*, Working Paper No. 380, March 2011, at 8, *available at* http://www.esri.ie/UserFiles/publications/WP380/ WP380.pdf (last visited May 28, 2014).

not limited to the creation of ozone (smog), which aggravates and exacerbates respiratory ailments such as asthma and emphysema and can lead to heart failure or even premature death.[18]

Though one method to reduce methane and VOC pollution from oil and gas wells is to flare the natural gas, flaring creates its own set of serious environmental and public health problems. First, when methane is combusted, it is converted into carbon dioxide ("CO_2"). While CO_2 is a less potent global warming pollutant than methane in the short term, it stays in the atmosphere much longer and thus has severe negative environmental impacts over the long haul. In 2012, gas flaring in North Dakota produced 4.5 million metric tons of CO_2 - as much carbon dioxide as about 1 million cars would emit in a year.[19]

Just like methane, CO_2 emissions impose significant costs on society. Along with their determination of the social cost of methane, the U.S. EPA and other federal agencies have developed a calculation for the social cost of carbon, which is meant to be "a comprehensive estimate of climate change damages and includes, among other things, changes in net agricultural productivity, human health, and property damages from increased flood risk."[20] If gas flaring in North Dakota in 2015 produces as much CO_2 as was produced in 2012 – a likely scenario, with the volume of flared gas growing significantly as drilling continues to grow in North Dakota – the social cost of carbon pollution from North Dakota's flares in 2015 alone will be between $54 million and $522 million.[21]

In addition to CO_2, natural gas flaring also produces substantial amounts of harmful, smog-forming nitrogen oxides ("NOx").[22] Combustion of the VOCs contained in natural gas functionally turns them into NOx, another ozone (smog)-forming pollutant.[23] NOx emissions are similarly linked to adverse respiratory health effects, including exacerbation of asthma and airway inflammation.[24]

Moreover, flares allow significant amounts of methane and VOCs to be released into the air uncombusted. In August 2012, the U.S. EPA estimated that, even using flares with efficient combustion, VOCs that remain uncombusted from a single well in the Ft. Berthold Reservation in the Bakken would amount to 75 tons of VOC emissions per year.[25] Considering that over 9,300 wells were in production in North Dakota in July 2013, EPA's estimate of 75 tpy

[18] Richard K. Lattanzio, "Air Quality Issues in Natural Gas Systems," Congressional Research Service, March 4, 2013, at 10, *available at* http://www.civil.northwestern.edu/docs/Tight-Shale-Gas-2013/Air-Quality-Issues-Natural-Gas-Ratner-2013.pdf (last accessed Oct. 9, 2013) ("Air Quality Issues Report").
[19] Ceres Report at 6.
[20] U.S. EPA, "Fact Sheet: Social Cost of Carbon," November 2013, at 1, *available at* http://www.epa.gov/climatechange/Downloads/ EPAactivities/scc-fact-sheet.pdf (last accessed April 18, 2014).
[21] *See* Fact Sheet: Social Cost of Carbon at 3.
[22] Air Quality Issues Report at 5-6, and U.S. EPA, "Approval and Promulgation of Federal Implementation Plan for Oil and Natural Gas Well Production Facilities; Fort Berthold Indian Reservation (Mandan, Hidatsa, and Arikara Nations), ND," ("Ft. Berthold FIP") 77 Fed. Reg. 158 (Aug. 15, 2012).
[23] Air Quality Issues Report at 6.
[24] *Id.* at 11.
[25] Ft. Berthold FIP at 48886.

VOCs/well suggests that over 210,000 tons of VOCs per year are polluting North Dakota's from flare-controlled wells alone.[26]

The pollution coming from the venting and flaring of natural gas in the Bakken is already showing up in North Dakota's air monitoring system. The North Dakota Department of Health has found that North Dakota's ozone monitoring network reveals ambient smog levels approaching the 75 parts per billion ("ppb") health-based National Ambient Air Quality Standards ("NAAQS") for ozone set in 2008, and in some cases exceeding the 60-70 ppb threshold that EPA's Clean Air Science Advisory Committee has repeatedly recommended as the standard necessary to protect human health. Several air monitors in the northwest portion of the state already show significant ozone concentrations.[27] Notably, in 2011, a monitor in the Northern Unit of Theodore Roosevelt National Park, downwind from the Bakken, recorded a spike in 1-hour ozone of 327 ppb, more than four times the national air quality standard.[28]

In addition to our objections to wasteful flaring and venting, ELPC is also concerned about water usage demands and water contamination issues related to fracking. Water is being used for fracking in ever-larger volumes in North Dakota. Each fracking well requires millions of gallons of water per fracking attempt. The more natural gas that is wasted through venting and flaring, the more wells will need to be fracked to meet our energy needs, with increasingly adverse impacts on water supply for farmers, ranchers, other businesses and public water supplies across the state.

As it considers our energy and infrastructure needs, the Task Force should not be relying on the status quo of oil production in the Bakken. That oil has too many strings attached to it – in the form of wasted energy, polluted water, and in the form of those flares and vents resultant negative effects on public health and our climate. The Task Force should work with the Bureau of Land Management and other federal and state agencies to ensure that flaring and venting of natural gas is no longer permitted in Bakken and at other oil wells. Doing so will provide for a healthier national energy supply in more ways than one.

The Task Force should also push for the intensive infrastructure upgrades necessary to safely transport Bakken oil and fracking wastewater. Upgraded, safe pipelines, rail cars, and trucks used for transporting oil and fracking wastewater are critical to protecting the nation's water supply. These improvements may help prevent accidents such as the December 2013 derailment of a mile long oil train outside of Casselton, North Dakota, which forced the evacuation of the town and surrounding areas.[29] In addition, already nearly a million gallons of

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[26] *See* Lynn Helms, "Director's Cut [Report on June/July 2013 Production], 13 Sept. 2013, NDIC Department of Mineral Resources, ("Sept. 2013 Director's Cut"), at 1, *available at* https://www.dmr.nd.gov/ oilgas/directorscut/ directorscut-2013-09-13.pdf (last accessed Oct. 9, 2013).

[27] *See* North Dakota Department of Health, *Annual Report: North Dakota Air Quality Monitoring Data Summary 2011*, *available at* http://www.ndhealth.gov/aq/ambient/ Annual%20Reports/ ANN_11.pdf (last accessed Oct. 9, 2013).

[28] *See id.* at Figure A4-10.

[29] Daniella Silva, "Mile-long Train Carrying Crude Oil Derails, Explodes in North Dakota," NBCNews.com, Dec. 30, 2013, *available at* http://usnews.nbcnews.com/_news/2013/12/30/22113442-mile-long-train-carrying-crude-oil-derails-explodes-in-north-dakota (last visited Oct. 3, 2014).

fracking wastewater have spilled from broken pipelines and contaminated tributaries of the Missouri River.[30] It is more necessary than ever to address these important infrastructure issues.

ELPC appreciates the opportunity to provide input on the QER process. We hope that your visit to North Dakota was helpful and that you were able to witness the opportunities to broaden the energy mix. ELPC believes we can have responsible energy development that also provides greater protection for North Dakota air, water and special places. We look forward to continuing to work with the Task Force to achieve those goals.

Respectfully submitted,

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[30] Andy Tully, "Huge ND Wastewater Spill Prompts Calls for Fracking Regs," OilPrice.com, July 14, 2014, *available at* http://oilprice.com/Latest-Energy-News/World-News/Huge-ND-Wastewater-Spill-Prompts-Calls-For-Fracking-Regs.html (last visited Oct. 3, 2014).