



Research and strategy for the land community.

December 20, 2016

Kimberly D. Bose, Secretary

Federal Energy Regulatory Commission
888 First Street NE, Room 1A
Washington, DC 20426

REFERENCE: OEP/DG2E/Gas 3
Mountain Valley Pipeline, LLC
FERC Docket No. CP16-10-000
FERC/DEIS-Do272

Dear Ms. Bose and Mr. Davis:

Thank you for this opportunity to comment on the Draft Environmental Impact Statement (“DEIS”) regarding the Mountain Valley pipeline (“MVP”) project as proposed by Mountain Valley Pipeline, LLC (“MVP LLC”). I am an economist with over 25 years’ experience conducting research on the relationships between natural resource stewardship, environmental quality, and human well-being. I also teach microeconomics, natural resource economics, and natural resource policy at the undergraduate and graduate level.

Key-Log Economics has been retained by the POWHR coalition to conduct an independent analysis of key effects of the proposed pipeline, including changes in property value, lost natural benefits (also known as ecosystem services), health care impacts, and others.

Based on what we have found in the course of that research, I am including the following brief discussion of several deficiencies in FERC’s policies and its analysis of economic effects as reflected and reported in the DEIS. These include:

- A pipeline certification policy that invites one-sided input from applicants resulting in a predictable and overstatement of benefits and discounting of important external costs;
- Failure to critically evaluate applicant-provided assessments of potential economic benefit when those assessments use flawed research methods, apply the methods inappropriately, and base estimates on unrealistic assumptions;
- Failure to critically evaluate flawed research into gas-industry-sponsored and/or promoted research that concludes, falsely, that pipelines do not diminish property value ;
- In violation of the National Environmental Policy Act and other federal guidance, failure to consider external costs due to lost ecosystem service value, carbon and other greenhouse gas emissions, and impacts on regional recreation-, tourism-, and other amenity-dependent economic development;

c/o Studio IX, 969 2nd St., SE, Charlottesville, Virginia 22902
Main: 202.556.1269 mobile: 802.272.9849 | team@keylogeconomics.com

- A spurious and ill-informed dismissal of independent research into the likely economic impacts of the proposed Mountain Valley Pipeline.

These deficiencies exist relative to two distinct, but overlapping types of effects on human well-being. These are:

- Effects on human welfare that are at least partially reflected in observed prices of goods and services and/or expenditures on those goods and services. These would include both positive and negative economic impacts, such as income earned in jobs allocated to operating a pipeline, expenditures to repair roads and replace water supplies damaged or disrupted by pipeline construction, and reductions in the market price of properties near the proposed pipeline.
- Effects on human well-being that are not reflected in market prices that we can observe. These are commonly known as non-market benefits (of environmental quality or improvements, for example) and non-market costs (such as those from environmental degradation). Non-market benefits include the value to people (willingness to pay) over and above what they actually have to pay for an environmental good (such as clean water to drink) or over and above what they actually have to pay to remediate environmental damage. Non-market benefits and costs also include changes in human welfare from environmental effects for which there is no out-of-pocket payment at all. Enjoying the aesthetic quality of a view may cost nothing to experience, but it still is valued by the observer.

Closely related to these effects are “external costs.” External costs are effects on human welfare that are not considered as part of a given market transaction because they are borne by or imposed on people other than the parties to the transaction. They are outside—that is, external to—the transaction, but they are every bit as much of an economic effect as are private (internal) costs. When external costs are present, market prices can be said to be too low. Consequently, the level of provision of the market good in question—for example natural gas, or pipelines to transport it—will be too high, resulting in an inefficient allocation of resources and what economists call a “deadweight loss” to society.

Because “the market” fails to count external costs on its own, additional analyses and decision making processes are required. FERC’s policy on the Certification of New Interstate Natural Gas Pipeline Facilities (88 FERC, para. 61,227, or Hoecker et al., 1999) is one example of an attempt to ensure consideration of at least some external costs. The policy requires that adverse effects of new pipelines on “economic interests of landowners and communities affected by the route of the new pipeline” be weighed against “evidence of public benefits to be achieved [by the pipeline]” (Hoecker et al., 1999, pp. 18–19). Further, “...construction projects that would have residual adverse effects would be approved only where the public benefits to be achieved from the project can be found to outweigh the adverse effects” (p. 23).

In principle, this policy is in line with the argument, on economic efficiency grounds, that the benefits of a project or decision should be at least equal to its cost, including external costs. However, the policy’s guidance regarding what adverse effects must be considered and how they are measured is deeply flawed. The policy states, for example, “if project sponsors...are able to acquire all or substantially all, of the necessary right-of-way by negotiation prior to filing the application...it would not adversely affect any of the three interests,” with the three interests

being pipeline customers, competing pipelines, and “landowners and communities affected by the route of the new pipeline” (Hoecker et al., 1999, pp. 18, 26). The Commission’s policy therefore contends that the only adverse effects that matter are those affecting owners of properties in the right-of-way. Even for a policy adopted in 1999, this contention is completely out of step with long-established understanding that development that alters the natural environment has negative economic effects.

The policy’s confusion over what counts as an environmental effect (again, most of which will have economic effects) is further expressed by the following statement:

“Traditionally, the interests of the landowners and the surrounding community have been considered synonymous with the environmental impacts of a project; however, these interests can be distinct. Landowner property rights issues are different in character from other environmental issues considered under the National Environmental Policy Act of 1969 (NEPA) (Hoecker et al., 1999, p. 24)”

By the Commission’s reasoning, environmental effects are a matter of the Commission’s “traditions”, not science, and environmental effects are deemed to be both synonymous with, and distinct from, interests of landowners and the surrounding community. This statement seems to contradict the statement one page earlier (p. 23) that “There are other interests [besides those of customers, competitors, and landowners and surrounding communities] that may need to be separately considered in a certificate proceeding, such as environmental interests.” While we agree that separate/additional consideration of environmental “interests” must indeed be part of the Commission’s review¹, the policy embodies such a muddle of contradictions on the question of what impacts to examine and why (tradition versus science), that it seems unlikely that any pipeline certification granted under the policy would be scientifically or economically sound. In the case of the proposed MVP we find the DEIS to be greatly lacking both in the scope of economically relevant environmental effects considered and in the quality of the analysis of those few effects considered.

A further weakness of the FERC policy is that it relies on applicants to provide information about benefits and costs. The policy’s stated objective “is for the applicant to develop whatever record is necessary, and for the Commission to impose whatever conditions are necessary, for the Commission to be able to find that the benefits to the public from the project outweigh the adverse impact on the relevant interests” (Hoecker et al., 1999, p. 26). The applicant therefore has an incentive to be generous in counting benefits and parsimonious in counting the costs of its proposal. And as reflected in the DEIS at hand, FERC has made no effort itself to ensure a full accounting of economic costs to landowners or the broader community despite the wealth of comments placed on the docket that could support such an assessment. Under these circumstances, it seems unlikely that the Commission’s policy will prevent the construction of pipelines for which the full costs are greater than the public benefits they would actually provide.

Compliance with the the National Environmental Policy Act (“NEPA”) adds, or should add, breadth to the assessment of economics costs of proposed pipelines. NEPA requires an

¹ Note that environmental effects overlap, but are not limited to, the interests of landowners and surrounding communities. The effects of air emissions, loss of productive or aesthetically pleasing land uses, lost recreational opportunities, impacts on climate, and others will affect many people, some much farther from the pipeline itself than “surrounding communities” would connote.

evaluation of all relevant effects. Of particular interest here, such relevant effects include direct, indirect, and cumulative economics effects—changes in human welfare that might or might not be reflected in the market economy. As the NEPA regulations state,

“Effects include ecological (such as the effects on natural resources and on the components, structures, and functioning of affected ecosystems), aesthetic, historic, cultural, economic, social, or health, whether direct, indirect, or cumulative. Effects may also include those resulting from actions which may have both beneficial and detrimental effects, even if on balance the agency believes that the effect will be beneficial (emphasis added, 36 CFR 1508.b, Council on Environmental Quality, 1978).”

It is important to note that NEPA does not require that federal actions—which in this case would be approving or denying the MVP certification—necessarily balance or even compare benefits and costs. NEPA is not a decision-making law, but rather a law requiring decisions be supported by an as full as possible accounting of the reasonably foreseeable effects of federal actions on the natural and human environment. It also requires that citizens have opportunities to engage in the process of analyzing and weighing those effects.

Relative to these requirements of NEPA, the Mountain Valley pipeline DEIS falls short. The DEIS ignores several important external costs and discounts others. It also relies too heavily on inadequate and misleading information provided by the applicant and the natural gas industry. While predictable, given the inherent bias and weakness in FERC’s certification policy noted above, the outcome leaves FERC and the public without a full picture of the relevant economic effects of the proposed MVP pipeline.

Details on economics-related shortcomings of the DEIS are provided in the remainder of this comment, beginning with the overarching issue of the DEIS missing several opportunities for meeting energy service needs in a least-cost/lowest impact manner.

The DEIS fails to define and analyze a reasonable range of alternatives.

As required by CEQ regulations mentioned in the above section, FERC considered in the DEIS a No Action alternative, alternative modes of natural gas transportation, system alternatives, pipeline route alternatives, pipeline route variations, and aboveground facilities alternatives. The selection criteria for alternatives include whether they 1) The alternative meets the stated purpose of the project 2) Are technically and economically feasible and practical 2) Offer a significant environmental advantage over the proposed action (FERC, 2016).

FERC’s failure to consider alternatives aimed at the bigger picture question of energy efficiency and renewables has important implications for the economics of the proposed pipeline. Namely, unless further alternatives for meeting actual regional needs for energy services (which is not the same as the applicant’s stated “need” to transport natural gas) are considered, it will remain impossible to know whether one of the alternatives considered is actually best. If energy services could be delivered to people and industry at a lower cost (including all external costs) by focusing on energy efficiency or power generation from renewable fuels, then considering ONLY gas transmission options will guarantee an inefficient, wasteful outcome.

FERC states that renewable energy generation or gains realized from increased energy efficiency are not considered because they are not natural gas transportation alternatives. But NEPA requires a broader view. Under NEPA, federal actions must consider the cumulative impact, defined as “the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions” (40 CFR §1508.7).

Changes in energy markets due to energy efficiency gains and/or further market penetration by renewable alternatives to fossil fuels are reasonably foreseeable. For example, renewable energy accounted for 40% of new domestic power capacity installed (American Council On Renewable Energy, 2014), and the relative cost of producing power from renewable sources, which is already competitive, is falling (Randall, 2016; U.S. Energy Information Administration, 2016). In light of these facts and related factors, FERC must consider alternatives that reflect the likely future reality in which the gas the MVP would transport is not needed and/or is not a cost-effective choice for consumers or electric power generators. To do otherwise—that is, to focus narrowly on only transportation options—could lead to a federal action that imposes significant environmental effects and associated economic costs for no reason.

DEIS Overestimates Positive Economic Effects

We have conducted a careful and independent review of two EQT-sponsored studies (one for Virginia and one for West Virginia) containing estimates of potential positive economic impacts of the MVP (Ditzel, Fisher, & Chakrabarti, 2015,a). As our report demonstrates, there are flaws in the methods and execution of the EQT study that render it dubious, at best, as a guide to what the benefits might be. In brief, the EQT studies

- MVP studies over-estimate “Construction Benefits” to the MVP region.
 - The chosen modeling technique and choice of region for analysis result in overestimates of regional benefit.
 - Most construction jobs will be filled by non-residents, further depressing the local economic impact.
- MVP studies overestimate total employment effects of pipeline operation and maintenance.
 - The studies’ modeling approach is unreliable for predicting multiplier effects more than one year into the future. Only direct operation/maintenance jobs should be counted as long-term effects.
- MVP studies overestimate benefits from fuel switching.
 - The studies do not demonstrate how much, if any, fuel switching would actually occur.
 - Estimated benefits for Franklin County, Virginia seem unlikely given potential demand that they should be removed entirely.²

² Note that since publication of our review, a tap has been proposed for Franklin County, which could stimulate increased demand there. As we note in the review, however, actual demand in Franklin county would have to more than triple for that tap to be economically viable. Unless and until such a vast increase in demand can be demonstrated, the purported estimates of fuel-switching benefits for Franklin County should be excluded from the analysis.

- The studies do not account for how future increases in gas prices and gas price volatility would affect either the likelihood of fuel switching in the first place or the long-run magnitude of any benefits from switching that still might occur.
- The studies ignore energy conservation and/or renewables as additional alternatives to which would-be gas users could switch.
- MVP studies overstate financial benefits to local governments.
 - Estimated revenue increases are tied to fuel switching that may not occur.
 - Any actual increases in tax revenue will fade over time.
 - Studies ignore potential reduction in net tax revenue due to changes in property values.
 - Studies ignore likely increases in local public service costs and fail to present estimates of net effects on local government finances.

DEIS Continues to Miss or Discount Important Economic Effects

In our report, *Economic Costs of the Mountain Valley Pipeline: Effects on Property Value, Ecosystem Services, and Economic Development in Virginia and West Virginia*, we provide estimates for the amount of property value and ecosystem services that could be lost due to the MVP. We also quantify scenario's for which the MVP may diminish the economic development of the study region. In the following sections, we will further elaborate and address the importance of considering 1) Property Value Impacts, 2) Ecosystem Services, 3) Economic Development, and 4) Climate Change and the Social Cost of Carbon.

Property Value: Claims that pipelines do not harm property value are invalid.

Both FERC and MVP LLC cite several studies purporting to show that natural gas pipelines (and in one case a liquid petroleum pipeline) have at most an ambiguous and non-permanent effect on property values. In its final EIS regarding the Constitution Pipeline, for example, FERC cited two articles concluding, in brief, that effects on property value from the presence of a pipeline can be either positive or negative, and that decreases in values due to a pipeline explosion fade over time (Diskin, Friedman, Peppas, & Peppas, 2011; Hansen, Benson, & Hagen, 2006). In its filing, MVP LLC cites additional studies drawing similar conclusions based on comparison of market and/or assessed prices paid for properties “on” or “near” a pipeline versus those farther away (Allen, Williford & Seale Inc., 2001; Fruits, 2008; Mountain Valley Pipeline LLC, 2015; Palmer, 2008). While the studies referenced differ in methods, they are similar in that they fail to take into account two factors that void entirely their conclusions that natural gas pipelines have no effect on property values.

First, the studies do not consider that the property price data employed in the studies do not reflect buyers' true willingness to pay for properties closer to or farther from natural gas pipelines. For prices to reflect willingness to pay (and therefore true economic value), buyers would need full information about the subject properties, including whether the properties are near a pipeline. Second, and for the most part, the studies find no difference in prices for properties closer to or farther away from pipelines are not actually comparing prices for

properties that are “nearer” or “farther” by any meaningful measure. The studies compare similar properties and, not surprisingly, find that they have similar prices. Their conclusions are neither interesting nor relevant to the important question of how large an economic effect the proposed pipeline would have.

When the pre-conditions for a functioning market are not met, observed property prices do not (and cannot) indicate property value.

Economic theory holds that for an observed market price to be considered an accurate gauge of the economic value of a good, all parties to the transaction must have full information about the good. If, on the other hand, buyers lack important information about a good, in this case whether a property is near a potential hazard, they cannot bring their health and safety concerns to bear on their decision about how much to offer for the property. As a result, buyers’ offering prices will be higher than both what they would offer if they had full information and, most importantly, the true economic value of the property to the buyer.

As Albright (2011) notes in response to the article by Disken, Friedman, Peppas, & Peppas (2011):

“The use of the paired-sales analysis makes the assumption of a knowing purchaser, but I believe this analysis is not meaningful unless it can be determined that the purchaser had true, accurate and appropriate information concerning the nature and impact of the gas pipeline on, near or across their property. ... I believe that the authors’ failure to confirm that the purchasers in any of the paired sales transactions had full and complete knowledge of the details concerning the gas transmission line totally undercut the authors’ work product and the conclusions set forth in the article. (p.5)”

Of the remaining studies, only Palmer (2008) gives any indication that any buyers were aware of the presence of a pipeline on or near the subject properties. For Palmer’s conclusion that the pipeline has no effect on property value to be valid, however, it must be true that **all** buyers had full information, which was not the case in the study.

In some cases, however, the location and hazards of petroleum pipelines become starkly and tragically known. For example, a 1999 liquid petroleum pipeline exploded in Bellingham, Washington, killing three, injuring eight and causing damage to property and the environment. In that case and as Hansen, Benson, and Hagen (2006) found, property values fell after the explosion, which is to say, once would-be buyers became aware of the pipeline in the neighborhood. The authors also found that the negative effect on prices diminished over time. This makes perfect sense if, as is likely, information about the explosion dissipated once the explosion and its aftermath left the evening news and the physical damage from the explosion had been repaired.

Today’s market is quite different. In contrast to Bellingham homebuyers in the months and years after the 1999 explosion, today’s homebuyers can query Zillow to see the history of land prices near the pipeline and explore online maps to see what locally undesirable land uses exist near homes they might consider buying. They also have YouTube and repeated opportunities to find and view news reports, citizens’ videos, and other media describing and depicting such explosions and their aftermath. Whether the pre-explosion prices reflected the presence of the

pipeline or not, it is hard to imagine that a more recent event and the evident dangers of living near a fossil fuel pipeline would be forgotten so quickly by today's would-be homebuyers.

What Zillow.com or other sites do accomplish is lowering the effort required for homebuyers to visualize the location of properties relative to other land uses, including pipeline rights of way. Combined with other information, such as maps of pipeline routes and other searchable online information, real estate marketing tools do make it more likely that prospective buyers will gain information about the hazard they could be buying into.

With more vocal/visible opposition to large, high-pressure natural gas pipelines, it also seems likely that prospective home buyers will not have to wait for an incident involving the MVP to learn of it and, therefore, for the MVP to affect their willingness to pay (and actual offer prices) for properties nearby. A drive down the street and a quick online search for information about a community one is considering a move to is likely to reveal "no pipeline" signs, municipal ordinances opposing the pipeline, and facebook groups created by local community members formed to raise awareness about the pipeline. Anyone with an eye toward buying property near the proposed MVP corridor could quickly learn that the property is in fact near the corridor, that there is a danger the property could be adversely affected by the still-pending project approval, and that fossil fuel pipelines and related infrastructure have an alarming history of negative health, safety, and environmental effects.

When people have more complete information about a property, they are able to express their willingness to pay when it comes time to make an offer. Accordingly, the prices buyers offer for homes near the MVP pipeline will be lower than the prices offered for other homes farther away or in another community or region.

Studies concluding that proximity to pipelines do not result in different property values are not actually comparing prices for properties that are different.

While the studies cited purport to compare the price of properties near a pipeline to properties not near a pipeline, many or in some cases all, of the properties counted as "not near" the pipelines are, in fact, near enough to have health and safety concerns that could influence prices. In both studies written by the Interstate Natural Gas Association of America ("INGAA") the authors compare prices for properties directly on a pipeline right-of-way to prices of properties off the right-of-way. However, in almost all cases the geographic scope of the analysis was small enough where most or all of the properties not on the right-of-way were still within the pipelines' respective evacuation zones (Allen, Williford & Seale Inc., 2001; Integra Realty Resources, 2016).³

In the 2016 INGAA study, the specific distance from pipeline was reported for eight case studies. In those cases, an average of 72.5% of the "off" properties were actually within the evacuation zone and, like the "on" properties, are therefore likely to suffer a loss in property value relative to properties farther away. (We estimated the evacuation zone based on available information

³ Proximity of properties to pipelines is based on best estimate of the location of the pipelines derived from descriptions of the pipelines' locations provided in the studies and an approximation of the evacuation zone based on pipeline diameter and operating pressure (Pipeline Association for Public Awareness, 2007).

about the pipeline diameter and operating pressure.) For the other two cases, the study reported a simple “yes” or “no” to indicate whether the property abutted the pipeline in question. For these cases, we assume the author’s methods, while flawed, are at least consistent from one case study to the next, meaning it is likely at least 50% or more of the comparison properties (the “off” properties) are in fact within the evacuation zone.

To adequately compare the price of properties with and without a particular feature, there needs to be certainty that properties either have or do not have the feature. This is a situation where comparing apples and oranges is not only reasonable, but also essential, however, the INGAA case studies are only looking at and comparing all “apples.” INGAA relied upon case studies with little to no variation in the feature of interest exists. In the INGAA case studies, the feature of interest is the presence of a nearby risk to health and safety, or, living within the evacuation zone. With no variation in that feature, a systematic variation in the price of the properties is not expected. By comparing apples to apples when rather than comparing apples to oranges, the INGAA studies reach the obvious and not very interesting conclusion that properties that are similar in size, condition, and other features including their location within the evacuation zone of a natural gas pipeline have similar prices.

To varying degrees, the other studies cited by FERC and MVP LLC’s filing suffer from the same problem. Fruits (2008), who analyzes properties within one mile of a pipeline that has a 0.8-mile-wide-evacuation zone (0.4 miles on either side), offers the best chance that a sizable portion of subject properties are in fact “not near” the pipeline from a health and safety standpoint. He finds that distance from the pipeline does not exert a statistically significant influence on the property values, but he does not examine the question of whether properties within the evacuation zone differ in price from comparable properties outside that zone. A slightly different version of Fruits’ model, in other words, could possibly have detected such a threshold effect. (It should go without saying that such an effect would show up only if the buyers of the properties included in the study had been aware of their new property’s proximity to the pipeline.)

In short, the conclusion that pipelines do not negatively affect property values cannot be drawn from these flawed studies. The DEIS, and by extension FERC, continually fails to take into account the inherent flaws of the studies cited (FERC, 2016, p 4-313). To evaluate the effects of the proposed MVP on property value, FERC and others must look to studies (including those summarized in the next section) in which buyers’ willingness to pay is fully informed about the presence of nearby pipelines and in which the properties examined are truly different in terms of their exposure to pipeline-related risks.

Better information about the effect of pipelines on property values is available.

To say the impacts and potential impacts of the MVP on private property value are important to people along the proposed route would be an extreme understatement. Many local residents have expressed in comment letters, public forums, and through various media that they either expect or have already experienced a loss of economic value for properties on or near the proposed MVP route. FERC, unfortunately, rather capriciously dismisses these concerns. For example, the DEIS states:

“Patricia Tracy stated that she is a retired real estate agent who sold properties in Montgomery County, Virginia between 2003 and 2013. In her opinion, the MVP would cause properties in the Preston Forest, Brush Mountain Estates, and Coal Bank Ridge neighborhoods to suffer depreciation in real estate values. Unfortunately, Ms. Tracy did not present any evidence or real estate sales data to support her opinion (FERC, 2016, 4-284).”

FERC is similarly dismissive of the professional opinion of Patricia Laurrell, a certified real estate appraiser with 25 years of experience and a resident of Blacksburg, Virginia.

On the one hand, yes, of course there is not (much) evidence in the form of closed real estate transactions or reassessments that reflect the impact of a pipeline that has not yet been permitted, let alone built. But in the absence of ex post observation, one could do a lot worse than to seriously consider the experience and professional judgement of experts familiar with the markets that will be affected.

Moreover, there is in fact evidence that the MVP has already had a detrimental effect on land markets. For example, Dr. Christian Reidys, a landowner in Montgomery County, Virginia testifies that “[upon learning of the proposed MVP route through my property,] I immediately put the land on the market, disclosing its [bisection] by the pipeline...I was told by a realtor that a sale was out of the question, as the land had lost its value for building.... As of now I have not received any offers except ones that make a purchase contingent on the pipeline not being built. Apparently buyers do care” (Reidys, 2016).

What Dr. Reidys is experiencing is evidence that his property lost value due to the proposed pipeline. He cannot sell the property now, and any delay in the sale will be an economic cost due to the time value of money. Moreover, the MVP has already imposed a cost on him in that the pipeline caused him to cancel his plans to build a home on the property. With the value as a place to build a home and live, the property as lost value to Dr. Reidys, regardless of whether he ever sells the property and realized the sort of loss that would show up on the Montgomery County grand list.

It is well worth noting, that the economic benefits due to fuel switching or pipeline construction and operation promoted by the applicants and repeated by FERC are themselves not supported by “any evidence” of the sort that FERC demands of landowners and real estate experts concerned about property value. All of the promoted benefits are estimates based on modeling, not observations of new jobs, local spending, or fuel switching that has occurred. It goes without saying that those things could not be observed, because the pipeline has not been permitted, built, or commenced operations. The point is not that economic models (when selected and used properly) or expert opinion, such as that of those who conducted the economic benefit studies, cannot provide insights into future impacts. Rather, the point is that FERC must not arbitrarily decide that modeling and expert opinion are “evidence” of future benefits, while modeling and expert opinion is not evidence of future costs.

While it is impossible to know precisely how large an effect the specter of the MVP has already had on land prices, there is strong evidence from other regions that the effect would be negative. In a systematic review, Kielisch (2015) presents evidence from surveys of Realtors, home buyers,

and appraisers demonstrating natural gas pipelines negatively affect property values for a number of reasons.

Kielisch's findings, summarized detailed in our report, *Economic Costs of the Mountain Valley Pipeline: Effects on Property Value, Ecosystem Services, and Economic Development in Virginia and West Virginia* (Phillips, S., Wang, S. Z., & Bottorff, C. 2016), demonstrate that properties on natural gas pipeline rights-of-way suffer a loss in property value.

In addition, an econometric study by Boxall, Chan, and McMillan (2005) shows that pipelines also decrease the value of properties lying at greater distances. In their study of property values near oil and gas wells, pipelines, and related infrastructure, the authors found that properties within the "emergency plan response zone" of sour gas⁴ wells and natural gas pipelines faced an average loss in value of 3.8%, other things being equal.

The risks posed by MVP would be different than the pipelines included in that study—it would not be carrying sour gas, for example—but there are similarities with the MVP scenario that make Boxall et al.'s finding particularly relevant. Namely, the emergency plan response zones (EPZs) are defined by the health and safety risks posed by the gas operations and infrastructure. Also, and in contrast to the FERC- and MVP-cited studies showing no price effects (see "Property Value: Claims that pipelines do not harm property value are invalid," above), the Boxall study examines prices of properties for which landowners must inform prospective buyers when one or more EPZs intersect the property.

The underlined phrases in the preceding two paragraphs are important in light of FERC's false claim at page 4-313 of the DEIS:

The KeyLog [sic] report [Phillips, Wang, and Bottorff, 2016] cited two other studies that also claimed that the presence of oil and gas facilities reduced property values. An analysis of 532 sales of rural residential properties in 30 townships around the city of Calgary, Canada found that oil or gas production wells had negative impacts on property values (Boxall et al., 2005). However, production wells are not equivalent to natural gas pipelines. (Emphasis added.)

While this final statement is self-evidently true, it is not true that the effects Boxall et al. demonstrate are restricted to "oil of gas production wells." Their study included pipelines as well, and their study results are therefore applicable to the MVP and other natural gas transmission pipelines.

FERC goes on to cite a "preponderance of evidence from multiple studies...that refute the claims of KeyLog [sic] that the presence of a natural gas pipeline would significantly reduce property values" (FERC, 2016, p. 4-313). Those same studies are, as we have outlined above, deeply flawed and incapable of providing reliable information rendering the extent to which pipelines affect property value. Moreover, even the most recent of those studies (Integra Realty Resources, 2016) predates publication of (Key-Log Economics') May 2016 study, so they cannot be said to "refute" our estimates.

⁴ "Sour" gas contains high concentrations of hydrogen sulfide and poses an acute risk to human health.

Interestingly, FERC states on the previous page that it “would generally agree” with Key-Log Economics’ premise (and that of a vast body of other literature) that amenities and disamenities affect property value and that “the presence of a pipeline...may influence a potential buyer’s decision whether or not to purchase the property” (FERC, 2016, p. 4-312). The question then, is this: since FERC understands that the presence of a natural gas transmission pipeline affects consumer behavior, and if it also understands that market prices arise as the result of consumer behavior, why has FERC not made any attempt to estimate the extent to which this particular pipeline affects land prices?

By our own estimates, property owners on the right-of-way and in the evacuation zone can expect to lose, collectively, between \$42.2 and \$53.3 million if the MVP is built. FERC contends that “KeyLog [sic] did not present any facts or evidence to support that claim.” Unless FERC believes that “facts or evidence” refers exclusively to observed data about events that have already occurred,⁵ this is patently false. We would refer FERC to pages 24-33 of our report for a detailed description of the model on which these estimates are based, including the supporting facts, GIS analysis, and other supporting evidence.

We would also welcome, and in fact would urge FERC to conduct, a serious and rigorous examination of the land value effects of other natural gas transmission pipelines. Such an examination would stand in stark contrast to the contention, presented in the DEIS and in opposition to FERC’s “general agreement” that pipelines affect consumer behavior, that pipelines nevertheless do not affect land prices. (See “Property Value: Claims that pipelines do not harm property value are invalid,” above.)

In addition to the emerging body of evidence that there is a negative relationship between natural gas infrastructure and property value, there have been many analyses demonstrating the opposite analog. Namely, it is well-established that amenities such as scenic vistas, access to recreational resources, proximity to protected areas, cleaner water, and others convey positive value to real property.⁶ There are also studies demonstrating a negative impact on land value of various other types of nuisance that impose noise, light, air, and water pollution, life safety risks, and lesser human health risks on nearby residents (Bixuan Sun, 2013; Bolton & Sick, 1999; Boxall et al., 2005). The bottom line is that people derive greater value from, and are willing to pay more for, properties that are closer to positive amenities and farther from negative influences, including health and safety risks.

Ecosystem Services: FERC continues to ignore the potential loss of human benefit due to pipeline-induced land conversion.

The idea that people receive benefits from nature is not at all new, but “ecosystem services” as a term describing the phenomenon is more recent, emerging in the 1960s (Millennium Ecosystem

⁵ If FERC does believe that only observed data, and not estimates from economic models, is acceptable as evidence of the effect of a pipeline, then FERC will have to reject the results of the IMPLAN modeling undertaken by Ditzel et al. (2015a,b) that include estimates of economic benefit that might arise from the construction and operation of the pipeline. There are, as noted above, many problems with the IMPLAN model and the use Ditzel et al. made of it, but we do not reject the notion that FERC seems to espouse in the case of land price effect, that economic modeling cannot provide useful insights into the possible effects of future actions or phenomena.

⁶ Phillips (2004) is one such study that includes an extensive review of the literature on the topic.

Assessment, 2005). According to a White Memorandum titled “Incorporating Ecosystem Services into Federal Decision Making” (Donovan, Goldfuss, & Holdren, 2015), ecosystem services are “benefits that flow from nature to people.” They include tangible physical quantities, such as food, timber, and clean drinking water, life support functions like assimilating waste that ends up in air and water or on the land, as well as aesthetics, recreational opportunities, and other benefits of a more cultural, social, or spiritual nature.

If ecosystem services are the products of nature, then ecosystems themselves—the land—are the factories where those products and values are produced. Just as with different man made factories, different types of ecosystems (forest, wetland, cropland, urban areas) produce different arrays of ecosystem services, and/or produce similar services to greater or lesser degrees. This is true for the simple reason that some ecosystems or land uses produce a higher flow of benefits than others.

Changes in ecosystems or more fundamentally, changes in land use, will change the type, amount, and value of the ecosystem services produced in the affected area. In the case of the MVP, there is the conversion in the short run of all land in the construction zone from forests, cropland, urban open space, and other productive uses to barren land with very little, if any ecosystem service value.

In the longer run, a portion of the construction zone will revert to its pre-disturbance land cover, though the effects of soil compaction, introduction of invasive species, etc. may make even reverted land formerly in the construction zone less productive. In the right-of-way however, land that had been forested before construction, will revert to the (less productive) land cover of grassland, or perhaps shrub scrub, depending on the frequency of mowing to keep the right-of-way free of trees.

Cropland in the ROW could revert to cropland, but if there are restrictions on the weight of vehicles that can be operated on top of the buried pipeline, it may turn out to be the case that cropland reverts, at best, to pastureland. Moreover, there could be long-standing harm to agricultural productivity due to soil compaction, soil temperature changes, and alteration of drainage patterns due to pipeline construction. As agronomist Richard Fitzgerald (2015) concludes in the context of another proposed pipeline, “it is my professional opinion that the productivity for row crops and alfalfa will never be regenerated to its existing present ‘healthy’ and productive condition [after installation of the pipeline].”

On this point, we should point out inaccuracies and misunderstanding in FERC’s response to our report. FERC states:

“...the KeyLog [sic] report incorrectly stated that during pipeline operation cultivated land would be converted to pasture/forage. This is not necessarily the case. Cultivated land affected by construction could be used again as cultivated land after pipeline installation, as crops can be grown over the entire right-of-way during operation.... Therefore, for the purposes of our analysis, we can assume that all 1,069 acres of agricultural land disturbed by construction along the entire 301-mile-long length of the proposed pipeline route would be returned to agricultural land use after restoration (FERC, 2016, p. 4-239, emphasis added).”

First, the Key-Log Economics report does not assume that cultivated cropland would cease to be agricultural land after construction. (FERC's comment implies that we made such an assumption.) Rather assumed that it would revert to pasture forage, an agricultural use that has annual income generation potential that we fully accounted for in our estimates. Pasture/forage does, however, typically produce less value than cultivated cropland, which is what drives the decrease in ecosystem service value from the affected land. As we did state in the report:

“Reclassifying cropland as pasture/forage (which is a generally less productive ecosystem service) recognizes these effects while also recognizing some sort of future agricultural production in the ROW (grazing and possibly haying) could be possible (Phillips, Wang, and Bottorff, 2016, p. 19).”

Second, while it is true we assumed that all cultivated cropland would revert to pasture/forage, we do not present that as fact, but rather as a plausible scenario given what farmers have stated as their concerns regarding what would or would not be practical, even if permitted, under pipeline easements. Again, quoting what our report states:

“We recognize some pre-MVP cropland may be used for crops after construction has been completed, but as expressed in comments to FERC and elsewhere, and as we discovered through personal interviews with agricultural producers in the region, it seems likely that the ability to manage acreage for row crops will be greatly curtailed, if not eliminated entirely by the physical limits imposed by the MVP and by restrictions in easements to be held by MVP LLC. These include limits on the weight of equipment that could cross the corridor at any given point and difficulty using best soil conservation practices, such as tilling along a contour, which may be perpendicular to the pipeline corridor. (This would require extra time and fuel use that could render some fields too expensive to till, plant, or harvest) (Phillips, Wang, and Bottorff, 2016, p. 19).”

FERC goes on to demonstrate its lack of understanding of the methods clearly described in our report related to the extent of conversion of forestland to shrub/scrub due in the proposed pipeline right-of-way.

“Likewise, the indication by KeyLog [sic] that forested land would be completely converted to scrub-shrub land use over the entire right-of-way during pipeline operation is also misleading. In fact, only the 50-foot-wide permanent easement would be kept clear of trees, resulting in the conversion of forest to grasslands/shrub land use during pipeline operation. The remainder of the temporary construction workspace (including ATWS) along the pipeline route (75 feet or greater) would be allowed to regenerate back to forest; although it would take many years for trees to mature (FERC, 2016, pp. 4-239-40, emphasis added).”

We are not entirely sure what FERC is objecting to, given that our estimates assume that it is only the pre-MVP forestland that would be occupied by the 50-foot-wide permanent ROW that would revert to (and remain in) shrub/scrub (Phillips, Wang, and Bottorff, 2016, p. 18). Moreover, we also assume, as FERC suggests, that pre-construction forest lying between the outer edge of the permanent ROW and the outer edge of the construction zone will eventually revert to forest. Indeed, and in light of FERC's recognition that “it would take many years for trees to mature” in those strips, we assume that the loss of ecosystem service value from those

narrow strips (each would be 12.5 feet wide) and from forestland cleared for temporary work spaces would persist for merely two years.

Having carefully and conservatively estimated the acreage that would be converted during the construction period and during ongoing operations, we then applied the well-established benefits transfer method to estimate ecosystem services costs. This method is described Organization for Economic Cooperation and Development (2006) as “the bedrock of practical policy [cost-benefit] analysis.” We apply per-acre ecosystem service productivity estimates (denominated in dollars per acre per year) to the acreage in each land use and estimate ecosystem service value produced each year in the periods before, during, and after construction. The difference between annual ecosystem service value during construction and before construction is the annual loss in ecosystem service value of construction. The difference between the annual ecosystem service value during ongoing operations (i.e., the value produced in the ROW) and the before-construction baseline (no pipeline) is the annual ecosystem service cost that will be experienced indefinitely.

Using BTM methods established in Phillips and McGee (2016), we estimate that the Mountain Valley Pipeline would cause an initial loss of between \$22.9 and \$82.2 million during construction period. For each year the pipeline is in operation, the pipeline would induce an additional loss of \$4.1 and \$14.8 million in ecosystem service value due to conversion of land in the ROW (Phillips, Wang, & Bottorff, 2016). Note, relative to FERC’s misplaced objections noted above, that one of the reasons the annual cost is lower during ongoing operations is that a portion of the forestland stripped bare during construction is assumed to revert to forestland in the long run, and that all agricultural land (pre-MVP cropland as well as pre-MVP pasture/forage land) is assumed to return to agricultural use after the construction period.

It is important to note that these estimates are for just an eight-county area representing just half of the MVP’s proposed length. We therefore recommend FERC undertakes its own assessment of the ecosystem services impacts of the proposed action. Such a review would be consistent with current executive branch direction and coming implementation guidance (Donovan, Goldfuss, & Holdren, 2015). FERC should follow the lead of other agencies and use existing resources, such as *Federal Resource Management and Ecosystem Services* (National Ecosystem Services Partnership, n.d.) and *Best Practices for Integrating Ecosystem Services into Federal Decision Making* (Olander et al., 2015) in its review. Such a review would help ensure that these important environmental effects (and their economic consequences) are no longer ignored in FERC’s decision making.

The failure to include in the DEIS an analysis of ecosystem services lost due to the construction and operation is a glaring example of inadequacy of FERC’s “traditional” conflation of the interests of landowners and surrounding communities with environmental impacts described above. The exclusion of ecosystem service losses means that many of the economic consequences of environmental effects, not to mention many environmental effects, have not been considered at all. This renders the DEIS inadequate for informing decision making about the MVP pipeline.

Potential Economic Development Impacts

The DEIS very narrowly discusses the potential for the MVP to hinder economic development in the region, it states “operation of the MVP would not result in significant impacts on tourist attractions, as the pipeline would be installed underground” (FERC, 2016, p 4-309). This suggests FERC is not considering the long-term economic impact of the pipeline on tourism, an important driver of economic development in the region. Recreationists flock to this region because of the unspoiled visual landscapes as well as the pristine environment. The information supplied in the DEIS does not adequately address citizens’ concerns for the potential losses the MVP could contribute to, ranging from less visits to Smith Mountain Lake in favor of other, more pristine recreation areas, to choosing a different agri-tourism business to visit, one not hindered by a pipeline easement.

The DEIS also does not make note on whether or not it interviewed local business owners, tourism industry representatives, agri-tourism businesses, or farms along the route in order to see whether or not the people most affected predict or have already seen businesses slow.

In our report, *Economic Costs of the Mountain Valley Pipeline: Effects on Property Value, Ecosystem Services, and Economic Development in Virginia and West Virginia* (Phillips, Wang, and Bottorff, 2016), we describe what we believe to be a fairly conservative scenario in which the pipeline results in a 10% reduction in visitor spending and 10% reduction *in the rate of growth* in retirement-related. These changes would entail a drop in personal income of \$42 million per year, plus lost state and local tax revenue, and profits for recreation and tourism businesses. (See Phillips, Wang and Bottorff, 2016, pp. 35-8.)

We based the scenario for how a natural gas transmission pipeline might affect local economic development on input (including comment letters to FERC) from business owners, retirees, and other residents. FERC’s assumption that the MVP would have no affect on tourism (or other economic development) whatsoever is also a scenario. While we would not claim the true harm the MVP would visit upon recreation/tourism businesses or on the attractiveness of the affected region to retirees and entrepreneurs would be exactly 10% of spending or 10% of current growth trends, we are quite certain that the effect would be more than zero, as FERC contends. The bottom line is that it is incumbent upon FERC to conduct and communicate a thorough review of the economic effects of its actions including a serious and realistic estimate of the extent to which the MVP would limit opportunities in important industries and on key drivers of current income growth.

Climate Change and the Social Cost of Carbon

In August 2016, the Council on Environmental Quality (CEQ) issued final guidance for federal agencies to consider climate change when evaluating proposed Federal actions. The guidance states “agencies should consider applying this guidance to projects in the EIS or EA preparation stage if this would inform the consideration of differences between alternatives or address comments raised through the public comment process with sufficient scientific basis that suggest the environmental analysis would be incomplete without application of the guidance, and the additional time and resources needed would be proportionate to the value of the information included” (Council on Environmental Quality, 2016).

FERC, in the DEIS for MVP states “there is no standard methodology to determine how the proposed projects’ relatively small incremental contribution to GHGs [greenhouse gasses] would translate into physical effects of the global environment” (FERC, 2016, p. 4-516). While technically true, this statement is misleading in that the CEQ guidance does not require that FERC follow a “standard methodology”, but rather that it give “focused and effective consideration of climate change in NEPA reviews” including quantitative, or at least qualitative, evaluation of the impacts of greenhouse gas emissions associated with the project (Council on Environmental Quality, 2016, pp. 3-6).

Instead, and despite its admission that the project “would increase atmospheric concentration of GHGs...and contribute incrementally to climate change that produces [negative impacts on ecosystems and people],” FERC hedges: “because we cannot determine the projects’ incremental physical impacts on the environment caused by climate change, we cannot determine whether the projects’ contribution to cumulative impacts on climate change would be significant” (FERC, 2016, p 4-516). We leave it to others to comment on the extent to which this statement is true and/or whether FERC’s treatment of the physical effects of greenhouse gas emissions in the DEIS is adequate relative to direction provided by the CEQ.

We do question, however, is FERC’s failure to consider the economic effects of greenhouse gas emissions. The “social cost of carbon” (SCC) is a comprehensive estimate of the external costs imposed on all the world’s inhabitants by the release of greenhouse gasses. The SCC is important for regulation because it helps agencies more accurately weigh the costs and benefits of a new rule or regulation. SCC is also one of the effects of the proposed MVP for which a standard methodology does exist (U.S. EPA, 2016; Interagency Working Group on Social Cost of Carbon, 2015). And in April 2016, a federal court upheld the legitimacy of using the social cost of carbon as a viable statistic in climate change regulations (Brooks, 2016). There is no good reason, therefore, for FERC’s having excluded this external cost from the DEIS.

MVP LLC estimates the pipeline would transport a maximum of 730.0 million dekatherms annually, contributing to an equivalent of 38.7 metric tons of CO₂ emitted per year (U.S. EPA, 2016). Using the most conservative estimate of the cost per metric ton of carbon (U.S. EPA, 2016a), the additional emission of CO₂ would cost \$48.6 million annually.

For comparison, Ditzel, Fisher and Chakrabarti (2015a, pp3-4.; 2015b, p 3.) estimate that wages, property taxes and fuel cost savings during operation of the MVP would total \$33.8 million per year during pipeline operations. That FERC repeats these benefit estimates without comment while completely ignoring larger costs, such as the social cost of carbon, is further evidence of how FERC’s certification policy, as implemented, is incapable of rendering decisions that are economically efficient.

Conclusion

Based on our own and others’ research regarding the potential economic effects of natural gas transmission pipelines, we find the following critical weaknesses in FERC’s Draft Environmental Impact Statement regarding the proposed Mountain Valley pipeline.

1. The DEIS reflects FERC’s policy on pipeline certification, which embodies confused and economically incorrect guidance regarding the scope or extent of the area within which economic costs the pipeline would be experienced. Namely, the policy looks only at

impacts on owners of pipeline rights of way and an undefined “surrounding community,” rather than the full geographic area over which impacts could be felt. In addition, the policy ignores even the surrounding community if a significant proportion of landowners have agreed to sell easements to their property.

2. The range of alternatives is inadequate, resulting in the potential that the DEIS has missed opportunities to meet the same energy services need at a lower environmental and economic cost.
3. The DEIS, while noting that economic benefits would be slight, still relies on over-estimates of those benefits.
4. The DEIS ignores important economic costs, the social cost of carbon, the value of ecosystem services lost due to land conversion in the pipeline construction corridor and right-of-way, and diminished property value for landowners in the right-of-way and the evacuation zone.

Taken together, these flaws render the DEIS unsuitable as a guide to evaluating the economic effects of the proposed Mountain Valley pipeline.

Sincerely,



Spencer Phillips, Ph.D.
Principal

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