

December 29, 2015

VIA ELECTRONIC FILING

Secretary John Quigley
Pennsylvania Department of Environmental Protection
Chairman, Pennsylvania Pipeline Infrastructure Task Force
400 Market Street
Harrisburg, PA 17101

RE: Bringing Pipeline Infrastructure into Compliance with Art. 1, Sec. 27

Dear Chairman Quigley:

The undersigned public interest organizations respectfully request that the Pipeline Infrastructure Task Force take seriously the mandates of Article I, Section 27 of the Pennsylvania Constitution, and ensure that the Commonwealth “consider in advance of proceeding the environmental effect of any proposed action on the constitutionally protected features.”¹ To date, the Task Force has not acknowledged that Section 27 applies to Commonwealth actions concerning pipeline infrastructure, let alone that such actions cannot proceed without the constitutionally required environmental review. As we discuss below, compliance with Section 27 must start—but certainly does not end—with such a review. Both the review and the substantive decisions informed by that review must comply with Section 27’s mandates.

Section 27 provides:

The people have a right to clean air, pure water, and to the preservation of the natural, scenic, historic and esthetic values of the environment. Pennsylvania’s public natural resources are the common property of all the people, including generations yet to come. As trustee of these resources, the Commonwealth shall conserve and maintain them for the benefit of all the people.²

The location of Section 27 in the Commonwealth’s Declaration of Rights signifies a particular constraint on Commonwealth actions because this portion of our charter “delineates the terms of the social contract between government and the people that are of such ‘general, great and

¹ *Robinson Township, Delaware Riverkeeper Network, et al. v. Commonwealth*, 83 A.3d 901, 952 (Pa. 2013) (plurality) [hereinafter “*Robinson Twp.*”].

² Pa. Const. art. I, § 27.

essential’ quality as to be ensconced as ‘inviolable.’”³ Pennsylvania courts have made clear that Section 27 thus constrains every entity within the Commonwealth government⁴—including the Governor and any state or local government entity called upon to implement the Task Force’s recommendations.⁵

As we discuss below, each of the “three mandatory clauses”⁶ in Section 27 establishes distinct “substantive”⁷ constraints, and they all reinforce the Commonwealth’s duty to complete robust environmental reviews before taking action. Specifically, in this case, the Commonwealth’s environmental review must:

- ◇ Study cumulative impacts, including the foreseeable incremental changes to the environment—such as climate change—over generations, and the foreseeable impacts of induced growth of fossil fuel extraction if pipeline infrastructure is expanded;
- ◇ Study possible alternatives, including an immediate moratorium on pipeline infrastructure expansion to allow for the completion of the constitutionally-required environmental review, and policies to advance clean, cost-effective renewable energy and energy efficiency to defer, reduce, or entirely avoid the need for more pipeline infrastructure.
- ◇ Be published and allow for public participation so that the people and the judiciary may fulfill their roles in enforcing Section 27.

The failure to complete such an environmental review before proceeding is not only unlawful but unwise. For example, the Task Force indicates in its mission statement: “In the next decade,

³ *Robinson Twp.*, 83 A.3d at 947 (citing Pa. Const. art. I, Preamble & § 25).

⁴ *See, e.g., id.* at 950; *see also id.* at 952 (“[T]he constitutional obligation [in Section 27, clause 1] binds all government, state or local, concurrently.” [citations omitted]); *id.* at 977-78 (“With respect to the public trust, Article I, Section 27 of the Pennsylvania Constitution names not the General Assembly but ‘the Commonwealth’ as trustee. We have explained that, as a result, all existing branches and levels of government derive constitutional duties and obligations with respect to the people.”); *accord Pennsylvania Environmental Defense Foundation v. Commonwealth*, 108 A.3d 140, 156-57, 160 (Pa. Cmwlth. 2015) (“PEDF I”) (quoting *Robinson Twp.*)

⁵ Unless otherwise noted, “Commonwealth” refers to all entities of the Commonwealth government.

⁶ *Robinson Twp.*, 83 A.3d at 950.

⁷ *See, e.g., id.* at 957 (“[T]ird clause [of Section 27] ... establishes broad but concrete substantive parameters within which the Commonwealth may act.” [emphasis added]).

Pennsylvania will undergo a substantial pipeline infrastructure build-out to transport gas and related byproducts from thousands of wells throughout the state.”⁸ There can be no honest dispute that the proposed build-out will very likely do violence to the constitutionally protected features, including the people’s common property interest in public natural resources and the people’s right to clean air, pure water, and to the preservation of the natural, scenic, historic and esthetic values of the environment. The proposed build-out also presents outsized economic risk, especially given an evolving regulatory environment around fossil fuels and carbon, and the unsustainable debt that U.S. shale developers, including those in the Marcellus, use to prop up their operations.⁹

In contrast, Pennsylvania has an unprecedented opportunity to meet its electricity needs and advance its economic development goals through clean, low-cost, low-risk renewable energy and energy efficiency. This opportunity is perhaps best illustrated by the fact that neighboring states are adding renewable energy and energy efficiency profitably and much faster than Pennsylvania.¹⁰ Indeed, across the country, states are ramping up investments in these resources because they are more economical and less environmentally destructive than

⁸ Governor’s Pipeline Infrastructure Task Force Draft Report (Nov. 2015) at 5, *available at* <http://goo.gl/XPtkyn> [hereinafter “Draft Report”].

⁹ *See, e.g.*, D. Lawrence, “Motherfrackers” and Big Oil Hypesters (Apr. 2015) (“Examining a universe of 21 shale operators including all the usual suspects, free cash flow has been overwhelmingly negative since at least 2009.”) *available at* <http://goo.gl/nwR213>; *see also* Union of Concerned Scientists, *The Natural Gas Gamble: A Risky Bet on America's Clean Energy Future* (Mar. 2015) (reporting on “complex risks for our economy, our health, and our climate” from growing over-reliance on natural gas) *available at* <http://goo.gl/Pf4Gbg>; *see also* Ceres, *Practicing Risk-Aware Electricity Regulation: 2014 Update* (Nov. 2014) (“This report, authored by utility industry and finance experts, concludes that almost without exception the riskiest investments for utilities—the ones that could cause the most financial harm for utilities, ratepayers and investors—are large base load fossil fuel and nuclear plants.”) *available at* <https://goo.gl/p9Opeu>.

¹⁰ *See, e.g.*, American Council for an Energy Efficient Economy, *Pennsylvania & The 2015 State Energy Efficiency Scorecard* (Oct. 2015) (“Despite its energy efficiency resource standard, Pennsylvania has yet to realize the same level of energy savings as its neighbors in the Northeast.”) *available at* <http://goo.gl/uAlf5a>; *see also* The White House, *Administration Announces 68 Cities, States, and Businesses Are Working Together to Increase Access to Solar for All Americans* (Nov. 2015) (Pennsylvania cities and states are missing from nationwide initiative to promote community solar, with an emphasis on scaling up solar for low- and moderate- income households.) *available at* <https://goo.gl/LFm4VQ>; NREL, *Open PV State Rankings* (showing states that have outpaced Pennsylvania in terms of their solar photovoltaic installed capacity in megawatts) *available at* <https://goo.gl/7kDoOg> (last visited Dec. 27, 2015).

Pennsylvania's heavy investments in natural gas.¹¹ A recent study commissioned by the Massachusetts Attorney General confirms that natural gas infrastructure expansion is not needed for electrical power in New England and public monies are better spent on clean energy.¹² In fact, the clean energy policies of the Regional Greenhouse Gas Initiative (RGGI) member states, for example, are saving billions of dollars, spurring local job growth, and allowing those states to re-invest large sums in their most vulnerable communities.¹³

Timing is critical. Once private companies invest substantial resources in pipeline projects, pursuit of alternatives may be limited, due in part to financial constraints and in part to the time it takes to plan, permit, and implement changes to large-scale energy infrastructure. Moreover, the Task Force has identified significant gaps in government oversight of pipeline infrastructure, and any further delay of corrective actions allows industry to exploit these gaps and lock-in projects that have multi-decadal book lives. In other words, we will be stuck with these projects for a very long time. Therefore, the Commonwealth has a time-sensitive duty to complete the constitutionally required environmental review, and further, it has a time-sensitive duty to take corrective action to minimize pipeline infrastructure's adverse impacts on the constitutionally protected features.

In Part 1, below, we discuss the application of Section 27 to the Commonwealth's actions concerning pipeline infrastructure, and in Part 2 we show how the Task Force has overlooked these Section 27 requirements and missed key issues that should inform the Commonwealth's decision-making regarding pipeline infrastructure. With these comments, the undersigned

¹¹ For example, according to Lazard's recently released unsubsidized levelized cost of energy, the levelized cost of onshore wind is \$32-77/MWh. Lazard, *Levelized Cost of Energy Analysis—Version 9.0* (Nov. 2015), 9, *available at* <https://goo.gl/z0xFJw> [hereinafter "2015 Lazard"]. Thin film utility scale solar is \$50-60/MWh. *Id.* at 5. These unsubsidized ranges compare very favorably with the cost of natural gas combined cycle at \$52-78/MWh. *Id.* at 2; *see also* Energy & Policy Institute, *Value of Solar Versus Fossil Fuels* (series of four reports showing solar is "clear winner" compared to natural gas) *available at* <http://goo.gl/kVCldJ>.

¹² *See* Analysis Group, *Power System Reliability in New England: Meeting Electric Resource Needs in an Era of Growing Dependence on Natural Gas* (Nov. 2015) *available at* <http://goo.gl/enZCs0> [hereinafter "2015 Analysis Group"].

¹³ *See, e.g.,* RGGI, *Investment of RGGI Proceeds through 2013* (Apr. 2015) ("RGGI investments have spanned a wide range of consumers, providing benefits and improvements to private homes, local businesses [*sic*], low-income housing, industrial facilities, community buildings, retail customers, and more. ... Re-investments of about \$1 billion in RGGI allowance proceeds have returned more than \$2.9 billion in lifetime energy bill savings to more than 3.7 million participating households and 17,800 businesses.") *available at* <http://goo.gl/B0qrm0>.

organizations respectfully urge you, as the Chairman of the Task Force, to correct course. Specifically, we request that the final Task Force report:

1. Make clear that Section 27 applies to the Commonwealth's actions concerning pipeline infrastructure, and further that the Commonwealth must complete the advance, robust environmental review, described herein, to assure that no Task Force recommendation promotes action that would unduly infringe upon the people's constitutional environmental rights, or interfere with the Commonwealth's fiduciary duty as trustee to conserve and maintain public natural resources for the benefit of all the people, including generations yet to come.
2. Recommend to the Governor to promulgate regulations or guidance on the Commonwealth's use of the constitutionally required environmental reviews in its decision-making.
3. Recommend to the Governor to establish a central clearinghouse of pipeline infrastructure-related information that the public can easily access.
4. Address other key issues that the Task Force has ignored thus far, including but not limited to market conditions, available staff and resources, on-the-ground environmental protection, abusive practices by pipeline companies, pipeline safety in rural areas, wetlands protection, and the siting and operation of compressor stations.
 - I. **Article 1, Section 27, requires the Commonwealth to conduct robust environmental reviews before taking action, and to take only those actions that adhere to the constitutional constraints established by Section 27.**

As we noted above and discuss in this part, Article I, Section 27 consists of three mandatory clauses; each constrains Commonwealth actions, and each reinforces the need for advance, robust environmental reviews.

A. Section 27, Clause 1

The first clause of Section 27 states: "The people have a right to clean air, pure water, and to the preservation of the natural, scenic, historic and esthetic values of the environment."¹⁴ In *Robinson Township*, a plurality of the Pennsylvania Supreme Court found that the people's rights

¹⁴ Pa. Const. art. I, § 27.

recognized in this clause are “inviolable”¹⁵ and, thus, it is the Commonwealth’s duty to conduct environmental reviews to avoid unduly infringing upon these rights:

The corollary of the people’s Section 27 reservation of a right to an environment of quality is an obligation on the government’s behalf to refrain from unduly infringing upon or violating the right, including by . . . executive action. Clause one of Section 27 requires each branch of government to consider in advance of proceeding the environmental effect of any proposed action on the constitutionally protected features.¹⁶

The value of informed decision-making is uncontroversial. Nor is it novel for authorities to avail themselves—and the public—of the information on the environmental dimensions of their proposed actions. The National Environmental Policy Act of 1969 established the requirement for federal agencies to publish their environmental reviews to ensure that environmental considerations are properly disclosed and factored into federal decision-making.¹⁷ Subsequently, many states adopted similar state environmental policy acts.¹⁸ It was at this time,

¹⁵ *Id.* at 947-48. *see also id.* at 951 n. 39; *id.* at 976 (citing Pa. Const. art. I, § 27) (citizens seek “to vindicate fundamental constitutional rights” under Section 27); *Nat’l Wood Preservers, Inc. v. Commonwealth*, 414 A.2d 37, 44 (Pa. 1980) (citing same) (“maintenance of the environment is a fundamental objective of state power”); *accord Pennsylvania Environmental Defense Foundation v. Commonwealth*, 108 A.3d 140, 156-157 (Pa. Cmwlth. 2015) (“PEDF I”) (quoting *Robinson Twp.*); *cf. Nixon v. Department of Public Welfare*, 839 A.2d 277, 287 (2003) (the right to engage in a particular occupation is protected by Article I, Section 1, but it is not expressly established therein and “is not a fundamental right”); *Zauflik v. Pennsbury Sch. Dist.*, 104 A.3d 1096, 1128 (Pa. 2014) (“unlike other provisions in Article I—such as Section 27, the Environmental Rights Amendment, which was at issue in *Robinson Twp.*—Section 11 expressly includes a limitation on the individual right to ‘open courts’ and remedies therein”); *Robinson Twp.*, 83 A.3d at 1014-1015 (J. Eakin dissenting) (“It is a very fundamental precept of constitutional law that the Constitution assures the rights of individuals, not governments.”).

¹⁶ *Id.* at 953; *see also id.* (“[W]hen government acts, the action must, on balance, reasonably account for the environmental features of the affected locale . . . if it is to pass constitutional muster.”).

¹⁷ 42 U.S.C. §§ 4321 *et seq.*; *see also Marsh v. Or. Natural Res. Council*, 490 U.S. 360, 371 (1989) (“NEPA promotes its sweeping commitment . . . by focusing Government and public attention on the environmental effects of proposed agency action. By so focusing agency attention, NEPA ensures that the agency will not act on incomplete information, only to regret its decision after it is too late to correct.”).

¹⁸ *See, e.g.*, Council on Environmental Quality, States with NEPA-Like Environmental Planning Requirements (June 2013) (compiling select state environmental review requirements that are similar to those in NEPA) *available at* <http://goo.gl/Jz9XUm>; *see also* K. Weiner, NEPA and State NEPAs: Learning

as governments across the U.S. embraced environmental reviews, that both chambers of the Pennsylvania legislature unanimously assented to the Environmental Rights Amendment,¹⁹ and Pennsylvania voters ratified it by large margins.²⁰

That Pennsylvania chose to advance environmental reviews through Section 27 is evident in the questions and answers (“Q&As”) that were distributed prior to the May 18, 1971, referendum to aid voters in understanding the proposed constitutional amendment. One of the Q&As stated:

Q. Will the amendment make any real difference in the fight to save the environment?

A. Yes, once [the amendment] is passed and the citizens have a legal right to a decent environment under the State Constitution, every governmental agency or private entity, which by its actions may have an adverse effect on the environment, must consider the people’s rights before it acts. If the public’s rights are not considered, the public could seek protection of its legal rights in the environment by an appropriate law suit....²¹

Moreover, in several cases, the Commonwealth’s failure to conduct environmental reviews pursuant to Section 27, especially regarding shale gas development, is now on appeal to state courts.²² The *Robinson Township* plurality gives an indication of the broad scope of environmental impacts for which the Commonwealth ultimately will be held responsible:

from the Past, Foresight for the Future (2009) (discussing evolution of federal and state environmental review acts).

¹⁹ Article I, Section 27 is commonly known as the “Environmental Rights Amendment.”

²⁰ *Cf. Robinson Twp.*, 83 A.3d at 963 (“The drafters and the citizens of the Commonwealth who ratified the Environmental Rights Amendment, aware of this history [of environmental degradation due to poor regulation of resource extraction], articulated the people’s rights and the government’s duties to the people in broad and flexible terms that would permit not only reactive but also anticipatory protection of the environment for the benefit of current and future generations.” [emphasis added]); *id.* at 959-63 (discussing history of poorly regulated resource extraction).

²¹ *Robinson Twp.*, 83 A.3d, 952 n.41 (citing Franklin L. Kury, *Clean Politics, Clean Streams: A Legislative Autobiography and Reflections*, app. C (2011)).

²² See John C. Dernbach, *The Potential Meanings of a Constitutional Public Trust*, 45 *Envtl. L.* 463, 494-97 (2015) (discussing pending claims before state courts and administrative judges that the Commonwealth violated Section 27 by failing to conduct advance, robust environmental reviews.)

[E]nvironmental changes, whether positive or negative, have the potential to be incremental, have a compounding effect, and develop over generations. The Environmental Rights Amendment offers protection equally against actions with immediate severe impact on public natural resources and against actions with minimal or insignificant present consequences that are actually or likely to have significant or irreversible effects in the short or long term.²³

We appreciate that the Task Force is engaging in a process that involves a kind of review of pipeline infrastructure in Pennsylvania, and does so with transparency and some opportunity for public engagement. However, as we discuss in Part 2, this does not fulfill the Commonwealth's constitutional duties. It alone will not yield adequate data to allow the Commonwealth to assure that the constitutionally protected features are, in fact, protected. It also includes significant omissions including no acknowledgement that environmental reviews are already mandatory under Section 27.

If the Commonwealth is to take seriously its constitutional duties, it should promptly begin an actual statewide environmental review of pipeline infrastructure. It should do so consistent with the legislative history, the judiciary's authoritative interpretation of Section 27, and with the best practices that state and federal agencies have developed over decades. As noted above and repeated here for emphasis, this review must:

- ◇ Study cumulative impacts, including the foreseeable incremental change to the environment—such as climate change—over generations, and the foreseeable impacts of induced growth of fossil fuel extraction if pipeline infrastructure is expanded;²⁴
- ◇ Study possible alternatives, including an immediate moratorium on pipeline infrastructure expansion to allow for the completion of the constitutionally required

²³ *Robinson Twp.* 83 A.3d at 959;

²⁴ *See, e.g.,* Draft Report at 17 (“Almost a third of the wells that have been drilled in Pennsylvania since 2004 are shut in because the pipelines to move that gas from the well to end users have not caught up with the pace of drilling. So, the primary challenge the industry faces now is to get the gas around or out of Pennsylvania to connect it to customers.”); *see also Sullivan v. Resisting Environmental Destruction On Indigenous Lands*, 311 P.3d 625 (Alaska 2013) (holding Alaska’s “public interest” constitutional standard for resource development requires courts to take a hard look at whether state agencies adequately considered the cumulative environmental impacts of oil and gas leases).

environmental review, and policies to advance clean, cost-effective renewable energy and energy efficiency resources to defer, reduce, or entirely avoid the need for more pipeline infrastructure.²⁵

- ◇ Be published and allow for public participation so that the people²⁶ and the judiciary²⁷ may fulfill their roles in enforcing Section 27.

All three of the foregoing elements are imperative. If the Commonwealth is to comply with Section 27, its environmental reviews must develop comprehensive and in-depth analyses, grounded in science, with the input and insights of stakeholders such as frontline communities. Ultimately, the factual record developed by the Commonwealth must be sufficient to guide government actions so that they respect Section 27, including the people’s environmental rights set out in clause 1, as reinforced by the availability of citizen enforcement suits and judicial review.

B. Section 27, Clauses 2 and 3

The second and third clauses of Section 27 state: “Pennsylvania’s public natural resources are the common property of all the people, including generations yet to come. As trustee of these resources, the Commonwealth shall conserve and maintain them for the benefit of all the people.”²⁸ These clauses reinforce the Commonwealth’s duty to conduct advance, robust environmental reviews. While the “public natural resources” protected in the second and third clauses are distinct from the even broader environmental features protected by the first

²⁵ Cf. Sierra Club comments of Nov. 12, 2015 (discussing imperative, as part of just, cost-effective compliance strategy for the Clean Power Plan, to invest in renewables and energy efficiency alternatives to climate disrupting natural gas), on file with DEP.

²⁶ Cf. *Robinson Twp.*, 83 A.3d at 953 (“[W]hen government acts, the action must, on balance, reasonably account for the environmental features of the affected locale ... if it is to pass constitutional muster.”) (citing John C. Dernbach, *Taking the Pennsylvania Constitution Seriously When It Protects the Environment: Part II—Environmental Rights and Public Trust*, 104 Dickinson L. Rev. 97, 17–20 (1999)).

²⁷ See generally *Robinson Twp.*, 83 A.3d at 927 (“[I]t is the province of the Judiciary to determine whether the Constitution or laws of the Commonwealth require or prohibit the performance of certain acts.”) (citing *Marbury v. Madison*, 1 Cranch 137, 166, 2 L.Ed. 60 (1803)); accord *PEDF I*, 108 A.3d at 167 (reviewing plaintiff’s claims of government action infringing up Article I, Section 27 rights) (citing *Hosp. & Healthsystem Ass’n of Pa. v. Commonwealth*, 621 Pa. 260, 77 A.3d 587, 598 (2013)).

²⁸ Pa. Const. art. I, § 27.

clause,²⁹ “there is considerable interaction between [all three clauses], and the legal doctrines invoked by each should tend mutually to support and reinforce the other because of their inclusion in a single amendment.”³⁰ This is true for environmental reviews. Unless the Commonwealth conducts such reviews before acting, it cannot conserve and maintain public natural resources as required by the second and third clauses, any more than it can respect the environmental rights protected by the first clause.

The *Robinson Township* plurality noted: “The plain meaning of the terms conserve and maintain implicates a duty to prevent and remedy the degradation, diminution, or depletion of our public natural resources.”³¹ Further, “[a]s trustee, the Commonwealth has a duty to refrain from permitting or encouraging” the same, “whether such degradation, diminution, or depletion would occur through direct state action or indirectly, e.g., because of the state’s failure to restrain the actions of private parties.”³²

The Commonwealth’s environmental reviews therefore must identify the protected resources, their current condition, and the foreseeable changes—including but not limited to the impacts of the Commonwealth’s proposed actions. Only with these data in hand can the Commonwealth possibly verify whether its actions will tend to “prevent and remedy”—and not “permit” or “encourag[e]”—the degradation, diminution, or depletion of the constitutionally protected resources. Similarly, the Superior Court has concluded: “[T]he trustee’s action must represent an actual and honest exercise of judgment predicated on a genuine consideration of existing conditions.”³³ This ruling is consistent with the widely recognized meaning of the duty of prudence for public trusts which includes, among other things, that, prior to making

²⁹ See *Robinson Twp.*, 83 A.3d at 955 (“On its terms, the second clause of Section 27 applies to a narrower category of ‘public’ natural resources than the first clause of the provision. ... At present, the concept of public natural resources includes not only state-owned lands, waterways, and mineral reserves, but also resources that implicate the public interest, such as ambient air, surface and ground water, wild flora, and fauna (including fish) that are outside the scope of purely private property.” [citations omitted].)

³⁰ *Id.* at 951 (quoting 1970 Pa. Legislative Journal—House 2269, 2272 (April 14, 1970)).

³¹ *Id.* at 957 (citations omitted).

³² *Id.*

³³ *In re Scheidmantel*, 868 A.2d 464, 492 (Pa. Super. Ct. 2005); see also PEDF I, 108 A.3d at 167 (citing superior court cases on trustee’s fiduciary duties).

decisions, the trustee should understand the impact of its decisions on public natural resources held in trust.³⁴ It is also consistent with the trustee's duty to keep records and provide reports.³⁵

Additionally, the Commonwealth must conduct environmental reviews mindful of its obligation to conserve and maintain public natural resources "for the benefit of all the people," including "generations yet to come." The *Robinson Township* plurality instructs that the "[t]he trust's beneficiary designation has two obvious implications: first, the trustee has an obligation to deal impartially with all beneficiaries and, second, the trustee has an obligation to balance the interests of present and future beneficiaries."³⁶ The Commonwealth needs to develop information to fulfill each of these obligations.

More specifically, because the duty of impartiality requires the Commonwealth to assure "equal access to and distribution of public natural resources,"³⁷ it reinforces the need for data on the current conditions of and the foreseeable changes to these resources. The Commonwealth needs these data to impartially regulate pipeline infrastructure expansion, for example, by ensuring that the immediate and long-term local air, water, and land pollution associated with this infrastructure does not disproportionately harm certain communities.

The duty to balance the interests of present and future generations also reinforces the need for a robust environmental review, or as the *Robinson Township* plurality put it, a "constitutional cross-generational analysis."³⁸ Specifically, accounting for foreseeable impacts and possible alternatives to minimize these impacts responds to the *Robinson Township* plurality's call for the Commonwealth to avoid the "bias toward present consumption of public resources by the current generation, reinforced by a political process characterized by limited terms of office."³⁹

³⁴ See, e.g., *Nat'l Audubon Soc'y v. Superior Court*, 658 P.2d 709, 727-29 (1983) (state's failure to consider impacts of water diversion on protected natural resources violated public trust doctrine) (cited with approval in *Robinson Twp.*, 83 A.3d at 958); see also *In re Water Use Permit Applications*, 9 P.3d 409, 455 (Haw. 2000) (citing cases from other states) ("[T]he public trust compels the state duly to consider the cumulative impact of existing and proposed diversions on trust purposes and to implement reasonable measures to mitigate this impact, including the use of alternative sources.").

³⁵ Restatement (Third) of Trusts § 83 (2007) ("A trustee has a duty to maintain clear, complete, and accurate books and records regarding the trust property and the administration of the trust, and, at reasonable intervals on request, to provide beneficiaries with reports or accountings.").

³⁶ *Robinson Twp.*, 83 A.3d at 959.

³⁷ *Id.*

³⁸ *Id.* n. 46.

³⁹ *Id.*

Once this accounting is published, public dialogue can follow and promote government accountability for the proper balancing of present and future generations' interests.

For all the foregoing reasons, compliance with Article I, Section 27 must start with the advance, robust environmental review—but this is not where compliance ends. We reiterate that Section 27 imposes substantive constraints on Commonwealth actions against the constitutionally protected features: The Commonwealth is prohibited from unduly infringing upon the people's environmental rights, and prohibited from permitting or encouraging the degradation, diminution, or depletion of public natural resources. The failure to review whether Commonwealth actions will meet these constitutional standards in no way excuses noncompliance with the same.⁴⁰

II. The Task Force has overlooked the mandates of Article I, Section 27, as well as several key issues regarding pipeline infrastructure.

In this part we highlight the most troubling omissions in the Task Force's work to date—the mandates of Article I, Section 27, as well as several key issues regarding pipeline infrastructure, including but not limited to: market conditions, available staff and resources, on-the-ground environmental protection, abusive practices by pipeline companies, pipeline safety in rural areas, wetlands protection, and the siting and operation of compressor stations.

This is not meant to be an exhaustive review of the Draft Report. Despite the open and webcast Task Force meetings, the expedited timeframe for public review and comment on the 184 recommendations drafted by the Task Force has thus far prevented the undersigned organizations from providing a point-by-point analysis of these recommendations.

A. The Task Force should revise its mission statement and report to the Governor to make clear that Article I, Section 27 governs Commonwealth actions concerning pipeline infrastructure, and further that the Commonwealth must complete the advance, robust environmental review described herein.

First, we deplore the fact that Article I, Section 27 is not referenced anywhere in the Task Force's published material. Even the Draft Report section dedicated to the "Legal Framework for Oil and Natural Gas Pipeline Development in Pennsylvania" does not acknowledge that Section 27

⁴⁰ See *Robinson Twp.*, 83 A.3d at 953 ("The failure to obtain information regarding environmental effects does not excuse the constitutional obligation because the obligation exists *a priori* to any statute purporting to create a cause of action").

governs the Commonwealth's actions, including, of course, its actions concerning pipeline infrastructure.

Further, we strenuously disagree with the "mission" statement of the Task Force which appears in the Draft Report: It seeks to compile "best practices and recommendations" in the service of "a world-class pipeline infrastructure system" and, specifically, "to assist in pipeline development (including planning, permitting and construction) as well as long-term operation and maintenance." Following this statement, the enumerated "objectives and responsibilities" speak to reducing the environmental footprint of the unquestioned infrastructure build-out. However, there is no attempt to investigate the feasibility and the environmental and economic benefits of avoiding additional pipeline infrastructure build-out entirely, or of limiting that build-out.

These omissions should be fixed. Otherwise, such a compilation of "best practices and recommendations" will remain fundamentally incomplete and cast doubt on the seriousness with which Commonwealth officials take their oath of fidelity to our Constitution. Specifically, the Task Force's mission statement and report to the Governor should make clear that Section 27 governs the Commonwealth's actions concerning pipeline infrastructure and, further, that the Commonwealth must complete an advance, robust environmental review. As discussed above, this review is to assure that no Task Force recommendation actually promotes action that would unduly infringe upon the people's constitutional environmental rights, or interfere with the Commonwealth's fiduciary duty as trustee to conserve and maintain public natural resources for the benefit of all the people, including generations yet to come. This is not a radical proposition. The Task Force itself already identified the need for more information on the environmental impacts of pipeline infrastructure, for instance, in: Environmental Protection Recommendation No. 32 ("Study Long-Term Impacts of Pipeline Infrastructure on Water Resources and Sensitive Landscape"); Environmental Protection Recommendation No. 67 ("Incorporate Cumulative Impacts into Applications and Review Process"); Siting and Routing Recommendation No. 1 ("Utilize Planning Process Appropriate for the Scale of the Pipeline Project"); and Siting and Routing Recommendation No. 4 ("Create a Taskforce of Affected Stakeholders to Study the Creation of a New Regulatory Entity, or Empower Existing Regulatory Entity to Review and Approve the Siting and Routing of Intrastate Gas Transmission Lines").

Let us be clear about what we are not saying here. We are not saying that the Task Force recommendations, as such and without more, individually or taken together, violate the substantive requirements of Section 27. What we are saying is that, thus far, the Task Force's concept of its mission and draft recommendations—promoting the enormous commitment of

infrastructure, financial, human, and natural resources—present a substantial risk of doing so. We are also saying that the Commonwealth has a constitutional duty to know—and let the public know—in advance the impacts of its actions on constitutionally protected features.

The Draft Report itself is no substitute for the constitutionally required environmental review. Its purpose is to compile “best practices and recommendations,” rather than to actually identify and analyze the impacts of pipeline infrastructure and the possible alternatives for the Commonwealth to pursue to minimize those impacts.

It may be argued that the Robinson Township case is “just” a plurality decision, and that the text of Section 27 may be safely ignored until the Pennsylvania Supreme Court issues a majority opinion on this issue. We think this approach is profoundly unwise, and puts at risk the financial and other investments that the Task Force recommendations would encourage or allow.

First, however the Pennsylvania Supreme Court decides the appeal from *PEDF I*, it will almost certainly recognize the text of Article I, Section 27 as the proper law for deciding such issues. That is what the Commonwealth Court did. Moreover, there is no other plausible choice of law. In addition to the fact that the three-part *Payne* balancing test has no basis in the constitution, it is patently unsuitable for deciding the constitutionality of statutes, regulations, and statewide programs.⁴¹ The Task Force should anticipate the significant likelihood that the text of Section 27 will become the basis for deciding the lawfulness of the recommendations that the Task Force is making.

Second, a robust statewide environmental review of the impacts of and alternatives to pipeline infrastructure expansion is likely to lead to reduced adverse impacts on constitutionally protected features, and may even lead to actions that enhance those values and resources. The laws and policies that result from the Task Force recommendations, and the financial investments that are made in reliance on those recommendations, will therefore be more likely to withstand judicial scrutiny.

Third, there is simply no other way of understanding the overall impacts of the Commonwealth’s actions concerning pipeline infrastructure. Individual permitting and other pipeline-related analysis at the federal, state, or local level will not do the job; the Draft Report itself recognizes this, for example, in the following:

⁴¹ John C. Dernbach, *The Potential Meanings of a Constitutional Public Trust*, 45 *Envtl. L.* 463, 498-503 (2015).

One of the greatest challenges to ensuring the reduction of impact and the consistency of responsible and safe transmission is that no single federal or state agency is responsible for pipeline permitting. Permits are not reviewed for the cumulative and long-term impacts at a landscape level. Chosen routes do not necessarily avoid sensitive lands, habitats, and natural features, nor are the impacts to natural and cultural resources, landowners, and communities along them always minimized or mitigated.⁴²

Timing is critical for any number of reasons, including those we have already discussed in these comments: (1) private companies will constrain the possible alternatives to their pipeline projects if they are allowed to proceed without greater direction from the Commonwealth; (2) delay only allows private companies to exploit the significant gaps in the current regulation of pipeline infrastructure; (3) there is overwhelming evidence that clean energy alternatives are abundant and a better deal than Pennsylvania's heavy investment in natural gas; (4) failing to pursue policies to advance clean energy alternatives in Pennsylvania will expose families and the business community to needless economic and environmental harms while robbing them of the wide ranging benefits of clean energy; and (5) failure to pursue policies to avoid pipeline infrastructure expansion would violate Commonwealth's fiduciary duties because these duties include "restrain[ing] the actions of private parties."⁴³

B. The Task Force should recommend to the Governor to promulgate regulations or guidance on the Commonwealth government's use of the constitutionally required environmental reviews in its decision-making.

We urge you to recommend to the Governor to promulgate regulations or guidance on the Commonwealth's use of the constitutionally required environmental reviews in its decision-making. As we discussed above, these reviews are critically important, and every entity within the Commonwealth government has a duty to conduct such reviews. Therefore, it is prudent to develop a set of principles and practices to regularize the development of environmental reviews. Representative Franklin Kury's explanation of the Amendment in the legislative history is particularly telling on this point: "We need a state government policy that is clearly stated and beyond question, one that will firmly guide the legislature, the executive, and the courts

⁴² Draft Report at 18.

⁴³ *Robinson Twp.*, 83 A.3d at 957.

alike.”⁴⁴ To be sure, the text of Section 27 provides much of that guidance. But a more particularized articulation of the meaning and effect Section 27, in the form of regulations or guidance, will promote government transparency and accountability, coordination, efficiency, and environmental reviews that ultimately achieve well-informed decision-making consistent with the constitutional standards established by Section 27. Luckily, as noted above, the Commonwealth need not start from scratch. Instead, it should draw on the legislative history, the judiciary’s authoritative interpretation of Section 27, and the best practices for environmental reviews that state and federal agencies have developed over decades.

C. The Task Force should recommend to the Governor to establish a central clearinghouse of pipeline infrastructure-related information that the public can easily access.

We urge the Task Force to recommend to the Governor to establish a central clearinghouse of pipeline infrastructure-related information that the public can easily access. We note that at least three recommendations in the Draft Report are quite similar, evincing a significant public disclosure gap that needs to be filled.⁴⁵ To fill this gap effectively, the Governor should prioritize the implementation of this recommendation and ensure sufficient staffing and resources to keep up with the tremendous push by industry to build pipeline infrastructure projects across the state. The eComment portal used for the collection of public comments on certain actions of the Department of Environmental Protection (“DEP”), for example, provides transparency and accessibility that should be replicated for pipeline infrastructure-related information gathered from permittees, Department field staff, and others on an ongoing basis.

It is axiomatic that open government requires timely public access to the factual record developed by government agencies to inform their decisionmaking. However, the public is not afforded timely access to information regarding pipeline infrastructure, as the Draft Report acknowledges, for example, in the following: “From the development of new pipelines, to the

⁴⁴ *Pa. Legislative Journal-House 486* (Apr. 21, 1969) (statement of Rep. Franklin Kury), in John C. Dernbach & Edmund J. Sonnenberg, *A Legislative History of Article 1, Section 27 of the Constitution of the Commonwealth of Pennsylvania*, 24 *Widener L. J.* 181, 189-90 (2015), *available at* <http://goo.gl/NAIZ6I>. See also *Pa. Legislative Journal-House 722* (June 2, 1969) (similar statement), in Dernbach & Sonnenberg, 24 *Widener L. J.* at 198.

⁴⁵ See Draft Report at 47-48 (Conservation & Natural Resources Recommendation No. 1); *id.* at 269-70 (Public Participation Workgroup Recommendation No. 1); *id.* at 300-01 (Siting and Routing Recommendation No. 9).

operation and maintenance of existing pipelines, the flow of information between pipeline companies and affected municipalities is fragmented and inconsistent at best.”⁴⁶

Indeed, the Draft Report identifies categories of information that landowners, local government officials, and the general public should know about a proposed pipeline infrastructure project.⁴⁷ Yet the public does not, in fact, have access to this information. For example, Conservation and Natural Resources Recommendation No. 2 states: “The GIS data for pipeline locations is essential to the public, as well as governmental activities in understanding current and proposed pipeline locations, as well as for planning purposes. It should be required of all pipeline companies that they make public digital GIS files delineating pipeline locations.” As another example, DEP requires the public to comment on proposed stream crossing permits and air quality permits in a 30-60 day timeframe. But DEP’s record custodians often cannot make the relevant agency files available for review during the limited public comment period. There is a significant backlog of file review requests at DEP regional offices. This can only be solved by a significant increase in DEP staff and resources dedicated to this critical public service function.

D. The Task Force should address other key issues that it has ignored thus far, including but not limited to market conditions, available staff and resources, on-the-ground environmental protection, abusive practices by pipeline companies, pipeline safety in rural areas, wetlands protection, and the siting and operation of compressor stations.

We reiterate that we are not providing an exhaustive critique of the Draft Report. Instead, we dedicate the remainder of our comments to highlighting several key issues regarding pipeline infrastructure that are missing from the Draft Report and should be addressed in the final version submitted to the Governor.

1. Market conditions disfavor pipeline infrastructure expansion while they favor investments in clean energy alternatives.

As referenced in the opening pages of our comments, the Commonwealth should take a hard look at market conditions before it spurs the development of financially risky and environmentally destructive fossil fuel infrastructure, especially when we have the opportunity

⁴⁶ *Id.* at 219.

⁴⁷ *See, e.g., id.* at 273-78.

to transition to low-cost, low-risk clean energy alternatives. Yet the Task Force has not so much as mentioned the dramatic market conditions favoring the alternatives.

First, there has been a historic drop in natural gas prices—particularly for Pennsylvania shale gas—and an oversupply of natural gas nationally. On December 16, 2015, natural gas futures closed at \$1.79 per million British Thermal Units (“BTUs”) and the price was poised to head lower, according to Bloomberg News.⁴⁸ Additionally, the biggest stockpile surplus since 2012 is expected to expand as production from Marcellus and Utica shale formation heads for a fifth straight annual record output.⁴⁹ These trends tend to exacerbate the outsized debt that shale developers have used to prop up their operations, increasing the likelihood of defaults and bankruptcies.⁵⁰

Second, investments in natural gas are risky particularly if we take the long view, as the Commonwealth must pursuant to Section 27. Pipeline infrastructure projects often have multi-decadal book lives and similarly long pay-back periods, so they amount to bolting huge amounts of money to the ground and hoping that the right bet was made ten, twenty, thirty or more years out. This is imprudent given the well-known volatility of fossil fuel prices, and the evolving regulatory environment around fossil fuels and carbon. However, none of this is discussed in the Draft Report; it does not use the words “price” or “market conditions” once and there is minimal discussion of only one U.S. Environmental Protection Agency regulation, the Clean Power Plan.

Third, energy efficiency is the standout no regrets investment.⁵¹ The energy and money saving technologies that fall under the energy efficiency umbrella continue to be the lowest-cost, lowest-risk energy resources that money can buy.⁵² There is overwhelming evidence from across the country that investments in energy efficiency yield greater returns than natural gas in

⁴⁸ C. Buurma, Bloomberg News, *Next Stop for U.S. Natural Gas Is 20-Year Low Amid Warm Weather* (Dec. 15, 2015) available at <http://goo.gl/gZuD99>.

⁴⁹ *Id.*

⁵⁰ D. Murtaugh, Bloomberg News, *Shale's Running Out of Survival Tricks as OPEC Ramps Up Pressure* (Dec. 27, 2015) available at <http://goo.gl/dtJa79>.

⁵¹ See, e.g., Regulatory Assistance Project, *The Clean Power Plan: Just Say, “No Regrets”* (June 2015) (“Energy efficiency policies and programs offer a ‘no regrets’ approach to delivering reliable, affordable electricity, while meeting the Clean Power Plan and other environmental policies.”) available at <http://goo.gl/GI8NEg>.

⁵² See, e.g., 2015 Lazard at 2 (showing energy efficiency remains the lowest cost resource, at \$0-50/MWh in unsubsidized levelized cost of energy comparison).

terms of economic growth and environmental protection.⁵³ Fortunately, Pennsylvania has abundant untapped energy efficiency potential.⁵⁴

Fourth, given the dramatic improvements in the performance of renewable technologies and the declines in levelized cost, it would be easy to underestimate the performance and overestimate the cost of renewable technologies when assessing them as an alternative to fossil fuel infrastructure—which, alas, the Task Force has not signaled any interest in to date. Over the past six years, the trends in unsubsidized levelized costs for both wind and solar are truly dramatic. Lazard documents a 61% decrease in the levelized cost of wind and an 82% decrease in the levelized cost of solar photovoltaics.⁵⁵ While these trends are not strictly linear, Lazard’s analysis shows that the low-end levelized cost for both wind and solar has uniformly declined year-on-year for the past six years, driven by “material declines in the pricing of system components (e.g., panels, inverters, racking, turbines, etc.), and dramatic improvements in efficiency, among other factors.”⁵⁶ And, unlike fossil fuels, these renewable technologies involve zero fuel costs and zero emissions, thereby reducing significant sources of cost and risk associated with electricity from burning fossil fuels.

Indeed, the U.S. Energy Information Administration—known for its very conservative analyses—recently found that overall market conditions “favor increased use of renewables.”⁵⁷ The EIA’s underlying study “focus[es] on the factors expected to shape U.S. energy markets through 2040.”⁵⁸ This is exactly the long view that should inform the Commonwealth’s decision-making.

Similarly, one of the Federal Energy Regulatory Commission’s pending rate cases illustrates how low-cost, low-risk clean energy alternatives will reduce the need for pipelines and the market for natural gas faster than some might think. This case also offers a glimpse of the consequences of ignoring these alternatives and allowing the build-out of excessive pipeline capacity.

⁵³ See, e.g., 2015 Analysis Group.

⁵⁴ See, e.g., GDS Associates, Inc. et al, Energy Efficiency Potential Study for Pennsylvania (Feb. 2015) available at <http://goo.gl/Pvol3j>.

⁵⁵ 2015 Lazard at 2.

⁵⁶ *Id.* at 10.

⁵⁷ EIA, Annual Energy Outlook 2015 (Apr. 2015), at ES-1, available at <http://goo.gl/92uyCB> [hereinafter “2015 AEO”].

⁵⁸ *Id.*

The Tallgrass Interstate Gas Transmission pipeline system, which extends from Wyoming to Missouri, is struggling to make ends meet.⁵⁹ In October 2015, Tallgrass Interstate Gas Transmission, LLC (“Tallgrass”) initiated a proceeding at FERC because its rates are not covering its costs, resulting in losses of more than \$40 million per year.⁶⁰

Tallgrass’s customers are shipping far less gas through its pipelines because the energy system has dramatically changed in the 17 years since FERC last set its rates, and there are cheaper alternatives for obtaining gas supply.⁶¹ In the future, according to Tallgrass, competition will come not just from other pipelines, but also from lower cost and lower emitting renewable energy and energy efficiency which, along with climate policies, will eat into the market share for gas.⁶² As Alexander Kirk, a witness for Tallgrass in the FERC rate case explained, “the average [power purchase agreement] price for wind in 2013 and 2014 are below natural gas fuel costs alone,”⁶³ and solar power prices “have fallen significantly in the past 20 years.”⁶⁴ As deployment of these cost-effective options for cleaner energy expands, he notes that the U.S. Department of Energy projects decreasing natural gas use.⁶⁵

According to Kirk, the bottom line is that “a large decrease in natural gas use would cause a significant amount of excess pipeline capacity ... and would greatly impact the ability of pipelines to collect their fixed costs.”⁶⁶

By speeding up the development of new pipeline projects, shale gas producers hope to hasten exports to foreign markets where gas may or may not fetch higher prices.⁶⁷ This will (1) induce

⁵⁹ See J. Peress, Environmental Defense Fund, *Caution: Future Market Need for Natural Gas Pipelines is Smaller than You Think* (Dec. 10, 2015) available at <http://goo.gl/ZGkQ1X> (discussing Tallgrass rate case).

⁶⁰ See Tallgrass Interstate Gas Transmission, LLC, Revised Tariff Records Filing (Oct. 30, 2015) at 4 in FERC Docket No. RP 16-137, available at <http://goo.gl/UBcOLY> [hereinafter “TIGT Tariff Filing”].

⁶¹ *Id.* at 2-3.

⁶² Kirk, Direct Statement (Oct. 30, 2015) at 2 (cover sheet) in Exhibit TIG-34 to TIGT Tariff Filing, available at <http://goo.gl/DbF4ML>, enclosed as Exhibit 1.

⁶³ *Id.* at 25 (citing Energy Information Administration’s 2015 AEO natural gas price projections).

⁶⁴ *Id.* at 24.

⁶⁵ *Id.* at 28.

⁶⁶ *Id.* at 30-31.

⁶⁷ Industry’s goal to export gas is evident in the numerous existing and proposed natural gas export terminals on all three coasts. See, e.g., FERC, Existing and Proposed Terminals, available at <http://goo.gl/NMKoSB>. Notably, many of the proposed terminals are being challenged in court and on

growth in Marcellus shale gas development; (2) increase the adverse impacts on constitutionally protected features such as forests and water bodies, in addition to the adverse impacts of the infrastructure itself; and (3) mainly benefit industry, not the public.

By not discussing any of these market conditions in a meaningful way, the Task Force promotes a blinkered view of pipeline infrastructure. The Commonwealth would do well to commission a study, like the one the Massachusetts Attorney General commissioned, to identify and disclose the implications of these market conditions on the need for, and the economic merits of, any more pipeline infrastructure in Pennsylvania.

2. The Commonwealth lacks committed staff and resources for implementing the Task Force's recommendations.

Of the 184 recommendations in the Draft Report, more than 120 would require significant government resources in staff, time, and equipment to implement. Yet the Task Force offers little assurance that these resource will be secured. For example, while the Environmental Protection Work Group's recommendations respond to well-known problems in siting, permitting, construction, and operation of pipelines, they lack crucial details on how the Commonwealth will increase and sustain its investments in state and local government agencies to carry out the recommendations.

However, the Task Force acknowledges that these investments are needed because the agencies that will likely be called upon to implement the Task Force's recommendations do not have the staff and resources to do so. Tellingly, one recommendation in the Draft Report states: "The Commonwealth and DEP should ensure adequate staffing, as well as staffing support, to effectively oversee activities of the natural gas industry and to ensure compliance with its Permit Decision Guarantee (PDG) Policy and other DEP regulations, policy and guidance as relevant to pipeline infrastructure projects."⁶⁸ The same recommendation does not identify any mechanism, such as fees, to secure this level of staffing. Submitting recommendations without sufficient resource commitment risks creating another unfulfilled promise.

November 12, 2015, one such proposal was rejected by New York Governor Cuomo due to safety and environmental concerns. See M. Santora, *New York Times*, *Cuomo Rejects Natural Gas Port Proposed Off Long Island* (Nov. 12, 2015) available at <http://goo.gl/9KAwti>.

⁶⁸ Draft Report at 188 (Environmental Protection Recommendation No. 57).

Skepticism is warranted. For years, we have been told shale gas development would be tightly regulated. That regulation has still not occurred. And this administration does not yet have a track record in funding strong environmental and safety programs, and in monitoring on the ground impacts of shale development and the related pipeline infrastructure. Therefore, before the public can support any of these recommendations, we must see a sustainable funding commitment for additional agency staff and resources which are commensurate with the implementation and enforcement task at hand.

3. On-the-ground environmental protection is overlooked.

The “objectives and responsibilities” section of the Draft Report states:

The purpose and goals of the Task Force were to define a series of best practices and recommendations to:

- ◇ Plan, site and route pipelines in ways that avoid or reduce environmental and community impacts;
- ◇ Amplify and engage in meaningful public participation;
- ◇ Maximize opportunities for predictable and efficient permitting;
- ◇ Employ construction methods that reduce environmental and community impact; and
- ◇ Ensure pipeline safety and integrity during operation of the pipeline.⁶⁹

Missing from these objectives is the need to fill significant gaps in government oversight and to fix existing problems with infrastructure already in place, rather than speed up new infrastructure buildout. For example, permit applications are not thoroughly reviewed, inspections are not being performed, and (as noted above) the public cannot review files and applications in a timely manner. It is time to revamp the procedure for processing and reviewing environmental permit applications and to undertake the comprehensive, prudent planning and oversight that is required by Article I, Section 27 of the Pennsylvania Constitution.

4. The Task Force has not addressed pipeline companies’ abusive practices.

⁶⁹ Draft Report at 5.

The Task Force has heard numerous public comments from landowners who have been abused by Sunoco Logistics regarding condemnation of right of ways along the Mariner East pipelines. Ralph Blume, a farmer in Cumberland County, told the Task Force about his experiences with Sunoco Logistics in taking an expanded right of way on his farm. In June, DEP fined Sunoco for unlawful releases of drilling fluids and wastewater, crossing streams without permits, and erosion and sediment control violations. In conversation with landowners along the Mariner East right-of-way, the Clean Air Council has received reports of trespassing by Sunoco employees and improper waste disposal and vegetation replacement practices. Such experiences are the tip of the iceberg. The Clean Air Council has tried to halt some of these practices.⁷⁰ But the Task Force does not even acknowledge them in the Draft Report, nor does it identify measures to deter and penalize such practices.

5. No one is reviewing gathering pipelines for safety in rural areas.

Natural gas gathering pipelines in rural areas in Pennsylvania are wholly unregulated for safety. Neither the federal Pipeline and Hazardous Materials Safety Administration (“PHMSA”) nor Pennsylvania’s Public Utility Commission (“PUC”) has asserted jurisdiction over these pipelines. There is a claim in the Draft Report that all gathering lines in rural areas are subject to federal safety standards,⁷¹ but no one is currently approving the route, design, operation, maintenance or safety of such rural gathering pipelines. PHMSA is only responsible for conducting inspections on pipelines that cross state boundaries.⁷² PHMSA thinks that the states maintains direct regulatory authority, but in Pennsylvania no one, not DEP, not the PUC, has regulatory authority over rural gathering lines.⁷³ The lack of regulation needlessly exposes communities to potential harms such as leaks and explosions. These potential harms are only increasing, as PHMSA notes:

The lines being put into service in the various shale plays like Marcellus, Utica, Barnett and Bakken are generally of much larger diameter and operating at higher pressure than traditional rural

⁷⁰ See J. Hurdle, State Impact, *Clean Air Council sues Sunoco over Mariner East 2 Pipeline Plan* (Aug. 28, 2015) available at <https://goo.gl/TQ9vPr>.

⁷¹ Draft Report at 113.

⁷² PHMSA, *Gathering Pipelines: Frequently Asked Questions*, available at <http://goo.gl/u0HFPP> [hereinafter “PHMSA FAQ”].

⁷³ Draft Report at 243-48.

gas gathering lines, increasing the concern for safety of the environment and people near operations.⁷⁴

Indeed, the PUC estimates that Pennsylvania has about 12,000 miles of these unregulated pipelines.⁷⁵ Where the PUC has authority to inspect some lines, it does not have the staff to do so.⁷⁶ In reality, these inspections are confined to paperwork, such as checking on a welder's certification during construction.⁷⁷ In addition, there is no repository for information about which gathering lines are operating and which are abandoned.

The Task Force's recommendation on pipeline safety in these rural areas is limited to the PUC working with PHMSA to define and publish a comprehensive list of line classifications.⁷⁸ While the Pipeline Safety and Integrity Workgroup recommended that the industry adopt "industry-standard" "best practices" for gathering lines in rural areas, the workgroup did not advance the concept that regulations be adopted for siting and safety.⁷⁹ In short, the Draft Report would leave gathering lines unregulated.

6. The Task Force recommendations do not protect wetlands.

The Draft Report misses the fact that wetlands loss is not being accurately monitored and reported. Indeed, recent experience shows that applicant-proffered wetland boundaries warrant scrutiny by the Army Corps of Engineers and other regulators, as documented by Dr. James Schmid, biogeographer and plant ecologist. For example, in one 2010 mining application in Greene County, National Wetland Inventory maps identified 4 wetlands on a 642-acre site. The applicant's consultant submitted a proposed delineation to DEP showing 10 wetlands. After field inspection by the Corps, the Jurisdictional Determination ("JD") drawing of the same tract of land showed 27 wetlands.⁸⁰ Similarly, in Sullivan County, a gas company consultant delineated streams and wetlands in a 50-foot wide right-of-way along some 4,000 feet of unpaved township road. After the adjoining landowners secured Corps JDs, the square footage

⁷⁴ PHMSA FAQ.

⁷⁵ State Impact, Your Guide to Pipelines, *available at* <https://goo.gl/j40HFD> (citing PUC estimate).

⁷⁶ *Id.*

⁷⁷ *Id.*

⁷⁸ See Draft Report at 113 (Emergency Preparedness Recommendation No. 5.).

⁷⁹ See Draft Report at 243-48 (Pipeline Safety and Integrity Recommendation No. 7).

⁸⁰ Schmid & Co., Inc. 2013.

of regulated streams and wetlands increased to 700% of that flagged for the gas company within the same 4-acre strip of land.⁸¹

Moreover, the Corps field representative in Pennsylvania has noted that significant under-identification of wetlands had occurred at several recent gas well installations where he had been involved with enforcement actions. None of those permittees had secured a Corps JD, and DEP approved their permits without questioning the accuracy of information in the applications.

It is not possible to overemphasize the necessity for JD applications followed by field-checking by Corps staff of proffered delineations to ensure proper identification of wetlands in Pennsylvania prior to permit approval. Unidentified wetlands are not protected at all.⁸² Simply recommending that “[t]he project sponsors should develop and implement plans that result in no net loss of regulated and applicable wetlands either through: avoidance, minimization; and/or compensatory mitigation”⁸³ does not address the loss of wetlands in areas the project sponsors have not identified.

7. The report offers little on the siting and operation of compressor stations.

An essential part of constructing a gas pipeline is the installation of compressor stations along its route. Compressor stations emit air pollutants, are loud, and are dangerous. Compressor stations can even explode.⁸⁴ Compressor stations emit methane, nitrogen oxides, volatile organic compounds, formaldehyde and other air toxics.⁸⁵ Under the Air Pollution Control Act, compressor stations are subject to best available control technology requirements. Their general goal is to minimize the emission of air contaminants in light of the design and operating features of the control technology. But these requirements, as interpreted by DEP, often vary.⁸⁶

⁸¹ Schmid & Co., Inc. 2011b.

⁸² Schmid and Co., Inc., *The Effects of Converting Forest or Scrub Wetlands to Herbaceous Wetlands in Pennsylvania* (2014) available at <http://goo.gl/Pwft3V>.

⁸³ Draft Report at 159 (Environmental Protection Recommendation No. 31).

⁸⁴ L. Legere, *Times-Tribune*, *State releases compressor station explosion report* (Apr. 14, 2012) available at <http://goo.gl/KDqeQm>.

⁸⁵ A. Robinson, *Air Pollutant Emissions from Shale Gas Development and Production* (2014) available at <http://goo.gl/2aOUkp>.

⁸⁶ See *Snyder v. DEP*, EHB Docket No. 2015-027-L (Opinion and Order of Motion to Dismiss) available at <http://goo.gl/WqoRzo>.

Under current rules, compressor stations can be sited near schools, day care centers, nursing homes, hospitals, and residential neighborhoods. The Pennsylvania Supreme Court held that the General Assembly may not abrogate municipal government authority over land use decisions.⁸⁷ The Task Force essentially endorses the *status quo* in its recommendation to “[a]llow [l]ocal [r]egulation for [s]urface [f]acilities.”⁸⁸ Pennsylvania’s municipalities would fail in their constitutional responsibilities if they did not regulate local land use.

The Task Force would do well to investigate specific solutions, for example, with regard to noise pollution: At an earlier stage in the Chapter 78 rulemaking process, DEP proposed that operators develop and implement noise mitigation plans. DEP has since put this proposal on hold. Nonetheless, in addition to statewide regulation, there are many ways to mitigate noise: Municipalities can require sound insulated buildings. Municipalities can establish construction and performance standards to limit noise. Local noise limits with a daytime permissible sound level of 55 dBA and an outdoor nighttime permissible sound level of 45 dBA have been advocated by many groups.⁸⁹

Conclusion

For all the foregoing reasons, we respectfully request that Task Force revise its mission statement and its report to the Governor to make clear that Article I, Section 27 applies to pipeline infrastructure and to address the key issues enumerated above.

Thank you for your consideration.

⁸⁷ See *Robinson Twp.*

⁸⁸ Draft Report at 226-27 (Local Government Workgroup Recommendation No. 3).

⁸⁹ Earthworks, Oil and Gas Noise, *available at* <https://goo.gl/nkbMEA>.

Respectfully submitted,

Joanne Kilgour
Thomas Au
Diana Csank
Associate Attorney
Sierra Club

Myron Arnowitt
Pennsylvania Director
Clean Water Action

John C. Dernbach
Distinguished Professor of Law
Director, Environmental Law and Sustainability Center
Widener University Commonwealth Law School

Ann K. Pinca
President
Lebanon Pipeline Awareness

Pam Bishop and Doug Lorenzen
Concerned Citizens of Lebanon County

Dick Martin
Coordinator
PA Forest Coalition

Karen Feridun
Founder
Berks Gas Truth

Briget Shields
Outreach Director
Marcellus Protest-Shalefield Stories

Michael Helfrich
Lower Susquehanna Riverkeeper

David Masur
Director
PennEnvironment

Susan Carty
President
League of Women Voters of Pennsylvania

Joseph Otis Minott
Clean Air Council

Exhibit 1

**UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION**

Tallgrass Interstate Gas Transmission, LLC)
)
) Docket No. RP16-____-000

Summary of the Prepared Direct Testimony of Alexander Kirk

Mr. Kirk is a Vice President of Brown, Williams, Moorhead & Quinn, Inc. and has served energy industry clients on matters relating to natural gas supply and demand, rate design and cost of service modeling, and economic life determinations for natural gas pipelines. The purpose of Mr. Kirk’s testimony is to present an analysis of the gas supplies available to the Tallgrass Interstate Gas Transmission, LLC (“TIGT”) system. His analysis regarding gas supply is used in support of Witness Crowley’s testimony regarding depreciation and the economic life of TIGT.

Mr. Kirk discusses the decline in gas supplies from the traditional Kansas Hugoton and Denver Julesburg supply areas that historically supplied the TIGT pipeline system. He explains how TIGT shippers have replaced the traditional on-system sources of supply with gas received from other interstate pipeline interconnects, which impacts the flows of gas supplies across the TIGT system.

Mr. Kirk expects that future potentially recoverable gas supplies available to the TIGT pipeline system will primarily be from Rocky Mountain and Midcontinent gas production. He does not believe it is appropriate to use the total gas supplies from North America, or some subset thereof, in addition to Rocky Mountain and Midcontinent supplies in determining gas supplies available to TIGT. Based upon proven reserves data

from the U.S. Energy Information Administration (“EIA”) and estimates of probable and possible resources from the Potential Gas Committee (“PGC”) (*i.e.*, non-speculative resources) and EIA’s scenarios regarding production, Mr. Kirk concludes that gas supplies from the Rocky Mountain Region and the Midcontinent Region (with greater uncertainty) are projected to be available to the TIGT system for 35 years (if demand exists). He also notes that consideration of gas supplies from other areas would not change his conclusion that gas supplies will be available to the TIGT system for the entirety of the maximum 35 year period the Commission has found is appropriate to include in a depreciation analysis.

Finally, Mr. Kirk discusses some of the factors affecting the demand for the transportation services of TIGT. The future uncertainty about long-run natural gas demand can be tied to three sources: (1) the technological development of alternative energies (*e.g.*, wind and solar resources); (2) potential gains in energy efficiency; and (3) energy and environmental legislation/regulation. Mr. Kirk describes how advancements in technologies have lowered the cost of alternative energy. He also provides examples of how evolving governmental energy and environmental policies may cause significant changes to the energy mix utilized in the United States in the long-run (the Endangerment Finding under Section 202(a) of the Clean Air Act, evolving methane regulations, the Clean Power Plan final rule, and the U.S. Department of Energy’s long-term goal regarding greenhouse gas emissions). Mr. Kirk concludes that while sufficient supply may be available to TIGT over the next 35 years, natural gas demand is highly uncertain, particularly beyond a 35 year horizon.

Table of Contents

I.	Introduction.....	1
II.	Shifts in Production	4
III.	Economic Life and Gas Supplies Available to TIGT	6
A.	Description of Data Used for the Supply Analysis	10
B.	Discussion of Remaining Non-Speculative Resources.....	11
C.	Production Projections	15
IV.	Demand for the Transportation Services Provided by TIGT.....	22

Glossary of Terms

AEO	Annual Energy Outlook (Published by the EIA)
Commission	Federal Energy Regulatory Commission
Company	Tallgrass Interstate Gas Transmission, LLC
CPP	Clean Power Plan
DOE	U.S. Department of Energy
Dth/d	Dekatherms per day
EIA	U.S. Energy Information Administration
EPA	U.S. Environmental Protection Agency
FERC	Federal Energy Regulatory Commission
GWh	Gigawatt hours
MMcf	Million cubic feet
NREL	National Renewable Energy Laboratory
PGC	Potential Gas Committee
PGC Report	April 2015 PGC report entitled “Potential Supply of Natural Gas in the United States”
PPA	Power purchase agreement
Tcf	Trillion cubic feet
TIGT	Tallgrass Interstate Gas Transmission, LLC

1 tort litigation and provided economic analysis for the Oregon Economic and
2 Community Development Department.

3 I have included my curriculum vitae as Exhibit No. TIG-35.

4 **Q. Have you previously testified before the Federal Energy Regulatory**
5 **Commission (“Commission” or “FERC”)?**

6 A. Yes, I filed testimony in the following rate cases:

7 Portland Natural Gas Transmission Company, Docket No. RP10-729;
8 Tuscarora Gas Transmission Company, Docket No. RP11-1823;
9 ANR Storage Company, Docket No. RP12-479;
10 CenterPoint Energy – Mississippi River Transmission, LLC, Docket No.
11 RP12-955;
12 Viking Gas Transmission Company, Docket No. RP13-185;
13 Southern Star Central Gas Pipeline, Inc., Docket No. RP13-941;
14 Trailblazer Pipeline Company, Docket No. RP13-1031;
15 WBI Energy Transmission, Inc., Docket No. RP14-118;
16 Viking Gas Transmission Company, Docket No. RP14-1214;
17 Gulf South Pipeline Company, LP, Docket No. RP15-65; and
18 Transcontinental Gas Pipe Line Corporation, Docket Nos. RP06-569 and
19 RP07-373 (consolidated).

20 **Q. On whose behalf are you submitting your prepared testimony in this**
21 **proceeding?**

22 A. I am submitting testimony on behalf of Tallgrass Interstate Gas Transmission,
23 LLC (“TIGT” or the “Company”).

24 **Q. What is the purpose of your direct testimony?**

25 A. I am submitting testimony concerning an analysis of the gas supplies available to
26 the TIGT system. In Section II, I will briefly discuss the decline in gas supplies
27 from the traditional Kansas Hugoton and Denver Julesburg supply areas that
28 historically supplied the TIGT pipeline system. In Section III, I review the gas
29 supplies that are available to TIGT and discuss how the sources of supply on the

1 TIGT system have changed over time. In Section IV, I discuss some of the
2 factors affecting the demand for the transportation services of TIGT. My analysis
3 regarding gas supply is used in support of Witness Crowley's testimony regarding
4 depreciation and the economic life of TIGT.

5 **Q. Have you provided any exhibits with your testimony?**

6 A. Yes. I have included the following exhibits with my testimony:

7 Exhibit No. TIG-35 *Curriculum Vitae* of Alexander Kirk

8 Exhibit No. TIG-36 EIA Region Map Defining the Rocky Mountain and
9 Midcontinent Regions

10 Exhibit No. TIG-37 Rocky Mountain and Midcontinent Resources

11 Exhibit No. TIG-38 Excerpts from the December 31, 2014 Potential Gas
12 Committee Report

13 Exhibit No. TIG-39 EIA Proven Reserves Definition

14 Exhibit No. TIG-40 2014 and 2015 EIA Projections for the Rocky Mountain
15 Region

16 Exhibit No. TIG-41 2014 and 2015 EIA Projections for the Midcontinent
17 Region

18 Exhibit No. TIG-42 2014 and 2015 EIA Projections for CO2 Emissions

19 Exhibit No. TIG-43 2015 NREL Sunshot Update

20 Exhibit No. TIG-44 Excerpts from 2014 DOE Wind Report

21 Exhibit No. TIG-45 DOE Methane Factsheet and EPA News Release --
22 Proposed Measures to Cut Methane Emissions

1 Exhibit No. TIG-46 Excerpts from the DOE Strategic Plan and White House
2 Press Briefing

3 Exhibit No. TIG-47 NREL Renewable Energy Futures Scenario Results

4 **Q. Were these exhibits prepared by you or under your direction and**
5 **supervision?**

6 A. Yes, all of these exhibits were prepared by me or under my supervision.

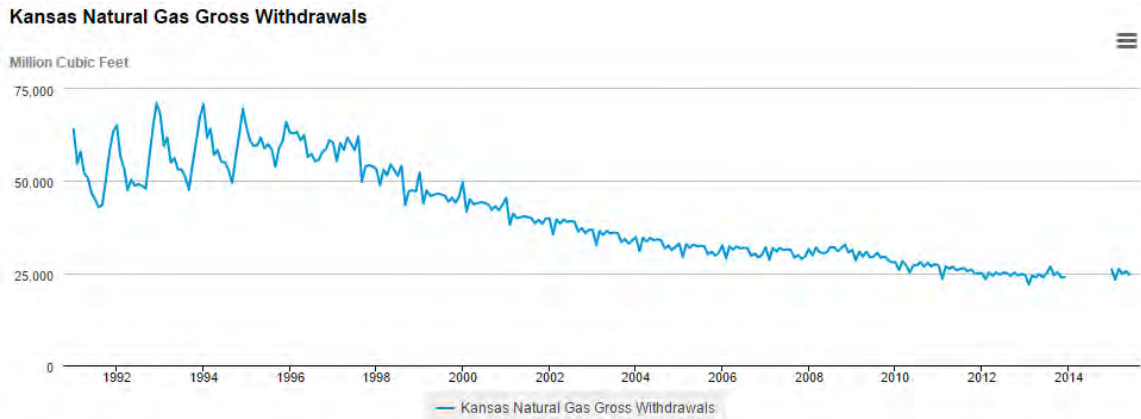
7 **II. Shifts in Production**


8 **Q. How have the sources of gas supply for the TIGT shippers changed over**
9 **time?**

10 A. Historically, TIGT received significant amounts of gas supply from production in
11 Wyoming from the Hugoton in Kansas and from the Denver-Julesburg Basin in
12 Northeast Colorado. Since 2007, TIGT's receipts from Wyoming have decreased
13 from approximately 200,000 Dekatherms per day ("Dth/d") to 70,000 Dth/d,
14 receipts from Kansas have decreased from approximately 65,000 Dth/d to 25,000
15 Dth/d before they fell to 0 Dth/d once ONEOK Field Services, LP idled its Scott
16 City processing plant in June 2013, and Northeast Colorado receipts have shown
17 steady decline from a peak of approximately 55,000 Dth/d in 2008 to
18 approximately 25,000 Dth/d today.

19 Several factors contribute to the diminishing receipts, such as diminishing
20 production in a region, more expensive delivered prices from these locations
21 compared to other sources, or a combination of factors. Diminishing production
22 from the Hugoton (a traditional source of supply for TIGT) is reflected in the U.S.

1 Energy Information Administration's ("EIA") production data for Kansas as a
2 whole.



3  Source: U.S. Energy Information Administration

4 As seen above, production in Kansas (the location of the Hugoton from which
5 TIGT received supplies) has fallen sharply since the 1990s, from a maximum of
6 approximately 71,000 million cubic feet ("MMcf") in November 1992, to 24,655
7 MMcf in June 2015 (the latest month available).

8 The TIGT shippers have acquired supplies from alternative sources as the
9 traditional sources of supply on TIGT have declined. Customers have replaced
10 the traditional on-system sources of supply with gas received from other interstate
11 pipeline interconnects, such as interconnects with Colorado Interstate Gas
12 Company, L.L.C., Wyoming Interstate Company, L.L.C., Panhandle Eastern Pipe
13 Line Company, LP, Trailblazer Pipeline Company LLC, Cheyenne Plains Gas
14 Pipeline Company, LLC, Northern Natural Gas Company, Natural Gas Pipeline
15 Company of America LLC, Southern Star Central Gas Pipeline, Inc., ANR
16 Pipeline Company, and WBI Energy Transmission, Inc.

1 **Q. What are the implications of such shifts in production and supply for TIGT's**
2 **pipeline system?**

3 A. The shifts in gas supply sources, such as from traditional sources to other off-
4 system sources, impacts the flows of gas supplies across the TIGT system.

5 **III. Economic Life and Gas Supplies Available to TIGT**

6 **Q. Why is it important to examine gas supply when determining a pipeline's**
7 **economic life?**

8 A. A pipeline's economic life is significantly impacted by the availability of natural
9 gas supplies. While a pipeline's economic life is also affected by the pipe's
10 physical life and market demand, by definition the economic life can be no longer
11 than the time during which natural gas supplies are available to the pipeline.

12 **Q. Please explain how you selected the appropriate regions to analyze as the**
13 **basis of your gas supply study?**

14 A. Historically, the Commission has required pipelines to file gas supply information
15 supporting the economic life of their pipeline systems by analyzing the potential
16 recoverable natural gas reserves in a pipeline's gas supply areas. *See, e.g.,*
17 *Trunkline Gas Co.*, 90 FERC ¶ 61,017, 61,057 (2000). The TIGT pipeline system
18 currently receives the majority of its gas supplies from basins and interconnected
19 pipelines located throughout the Rocky Mountain Region as well as the
20 Midcontinent Region. As such, it appeared preliminarily that I needed to analyze
21 the resource bases for those two regions.

1 **Q. Do you expect that future potentially recoverable gas supplies available to**
2 **the TIGT pipeline system will primarily be from Rocky Mountain and**
3 **Midcontinent gas production?**

4 A. Yes. As explained in Witness Sullivan's testimony, gas supplies from the
5 Marcellus/Utica are having a dramatic impact upon gas supplies across North
6 America. In the immediate future, Gulf Coast and Marcellus/Utica supplies may
7 be transported by shippers on interconnecting natural gas pipeline systems and
8 delivered to the TIGT pipeline system. However, it is more likely that supplies
9 from the Gulf Coast and the Marcellus/Utica will be exchanged with Rocky
10 Mountain and Midcontinent gas supplies to save shipper transportation and fuel
11 costs. These other supplies also may be "delivered" to the TIGT system through
12 displacement arrangements where the natural gas supplies physically reaching the
13 system are from the Rocky Mountain and Midcontinent regions regardless of the
14 contract path underlying the transactions.

15 **Q. Why is this important?**

16 A. North American natural gas markets are fully integrated and connected. Flowing
17 gas supplies can be purchased or exchanged through numerous pipeline
18 interconnects. Natural gas supplies compete across North America based on basin
19 differentials. Marcellus/Utica supplies are a relatively low-cost source of gas
20 supply in North America.

- 1 **Q. If natural gas markets are fully integrated and natural gas from supply**
2 **basins across North America compete to serve end-use markets, would it be**
3 **appropriate to use the total gas supplies from North America, or some subset**
4 **thereof, in addition to Rocky Mountain and Midcontinent supplies in**
5 **determining the resource base available to TIGT?**
- 6 A. No. There are four primary reasons why such an analysis would be improper and
7 why my gas supply analysis focuses on the future availability of Rocky Mountain
8 and Midcontinent natural gas supplies. First, Commission precedent in
9 depreciation practice provides that gas supply studies should be focused on the
10 areas of supply that are in reasonable proximity and connectivity to the pipeline
11 system being analyzed. For example, the Commission, in *Trunkline Gas Co.*, 90
12 FERC ¶ 61,017 at 61,057 (2000), adopted a gas supply analysis that included
13 supplies located in areas near the footprint of the Trunkline Gas. Co. system,
14 including Texas Railroad District 2, 3, and 4, onshore South Louisiana and
15 Federal Offshore Louisiana. In *Williston Basin Interstate Pipeline Co.*, 107
16 FERC ¶ 61,164 (2004), the Commission adopted a gas supply analysis that
17 included the Western Canadian Sedimentary Basin and the Rocky Mountains,
18 areas that could reasonably be expected to provide supplies to the Williston Basin
19 Interstate Pipeline Co. system in the future, and excluded more distant supplies.
20 Second, although non-traditional gas supplies from other areas (*i.e.*, the Gulf
21 Coast or Marcellus/Utica) may impact TIGT in the future, much of this impact
22 will be from displacement or exchanges as I just discussed. Third, my analysis of
23 the Rocky Mountain and Midcontinent Regions is, in part, based on Commission
24 precedent that holds that gas supply forecasts in excess of 35 years are
25 speculative. I have reservations regarding forecasts of both gas supply and

1 demand beyond a 35 year horizon as I will explain in detail later in this testimony.
2 Fourth, I conclude that gas supplies from the Rocky Mountain Region and the
3 Midcontinent Region (with greater uncertainty) will be available to the TIGT
4 system for 35 years. As such, consideration of gas supplies from other areas
5 would not change my conclusion that gas supplies will be available to the TIGT
6 system for the entirety of the maximum 35 year period the Commission, as
7 discussed below, has found is appropriate to include in a depreciation analysis.

8 **Q. What methodology did you use to analyze the gas supply availability in the**
9 **Rocky Mountain and the Midcontinent Regions?**

10 A. I analyzed the total amount of non-speculative resources that I describe in each
11 region in Sections III.A and III.B. Next, I examined the EIA's Annual Energy
12 Outlook ("AEO") 2014 and 2015 projections to show what I describe as plausible
13 projections of natural gas production. I examined both years of EIA's projections
14 because the 2015 edition is more limited, since in 2015 the EIA began using a two
15 year cycle, providing a shorter edition and longer edition in alternating years. I
16 then confirmed that sufficient non-speculative gas resources will be available over
17 a 35 year horizon to satisfy natural gas production projections under the EIA's
18 various scenarios.

19 **Q. Why did you examine a 35 year horizon for gas supply?**

20 A. I examined a 35 year horizon based on Commission precedent that provides that
21 projections beyond 35 years are speculative. Specifically, in *Portland Natural*
22 *Gas Transmission Sys.*, 134 FERC ¶ 61,129, at P 127 (2011), the Commission
23 noted:

1 The [Administrative Law Judge] rejected [Portland Shippers
2 Group's] recommended end-life of 40 years for Portland's System,
3 finding it extended beyond the Commission's standard of 35 years,
4 and is inconsistent with Commission precedent indicating that
5 reserve estimates projected beyond 35 years are speculative.

6 The Commission affirmed the Administrative Law Judge's rejection of the
7 Portland Shippers Group and Staff's recommended life beyond 35 years. I
8 discuss factors regarding demand in Section IV that cause forecasts of demand
9 beyond 35 years to be highly uncertain as well.

10 **A. *Description of Data Used for the Supply Analysis***

11 **Q. What states and areas comprise the regions you analyzed?**

12 A. I utilized the broadly defined Rocky Mountain Region and Midcontinent Region
13 analyzed by the U.S. EIA in its Annual Energy Outlook, as shown in the map in
14 Exhibit No. TIG-36 at 2. The specific states and basins located within the Rocky
15 Mountain Region and the Midcontinent Region can be found in Exhibit No. TIG-
16 37. Using the same regions as the EIA allows for a straight-forward analysis of
17 non-speculative resources. However, since the regions are very broad compared
18 to the footprint of TIGT, I will explain throughout the sections of this testimony
19 how the location of some of the resources may impact their availability to TIGT
20 by examining the proportion of the resource base that is located proximate to the
21 TIGT system.

22 **Q. What is the source of the data you used to analyze gas supplies?**

23 A. I examined proven reserves data from the EIA, and estimates of probable and
24 possible resources from the Potential Gas Committee's ("PGC") April 2015 report
25 entitled "Potential Supply of Natural Gas in the United States" ("PGC Report"). I

1 provide further detail with respect to these data sources in Section III.B. I also
2 analyzed projections from the EIA's Annual Energy Outlook 2014 and 2015.
3 Complete details regarding all EIA sources are available on the agency's web site,
4 www.eia.gov.

5 **Q. What is the PGC?**

6 A. The PGC is an independent organization that works closely with the Potential Gas
7 Agency at the Colorado School of Mines, and consists of volunteer members from
8 all segments of the oil and gas industry, government agencies, and academic
9 institutions. The PGC offers biennial estimates of the potential gas supply of the
10 United States which can be used to estimate the long-term gas supply. As
11 discussed later in my testimony, the Commission has previously relied upon PGC
12 estimates to assess gas supply.

13 **B. Discussion of Remaining Non-Speculative Resources**

14 **Q. What is the estimated quantity of remaining natural gas resources in the**
15 **Rocky Mountain Region?**

16 A. I calculated an estimate of remaining non-speculative resources by summing
17 proven reserves, probable resources, and possible resources, using the latest data
18 available. The EIA's estimate of remaining proven reserves for the Rocky
19 Mountain Region is 74.6 trillion cubic feet ("Tcf"). I utilized the independent
20 estimate of the PGC to determine the quantity of undiscovered resources to
21 include. The PGC's latest estimate of probable and possible undiscovered
22 resources for the Rocky Mountain Region is 270.6 Tcf. Total non-speculative
23 resources therefore equals 345.2 Tcf (74.6 Tcf of proven reserves plus 270.6 Tcf

1 of probable and possible resources). The tabulation of resources by state (proven
2 reserves) and basin (probable and possible resources) is shown in Exhibit No.
3 TIG-37.

4 **Q. What is the estimated quantity of remaining natural gas resources in the**
5 **Midcontinent Region?**

6 A. I calculated an estimate of non-speculative remaining resources for the
7 Midcontinent Region in a similar fashion as I had for the Rocky Mountain
8 Region. The EIA's estimate of remaining proven reserves for the Midcontinent
9 Region is 40.4 Tcf. I also utilized the independent estimate of the PGC to
10 determine the quantity of undiscovered resources to include in the Midcontinent
11 Region. The latest estimate of probable and possible undiscovered resources for
12 the Midcontinent Region is 105.0 Tcf. Total non-speculative resources therefore
13 equals 145.4 Tcf (40.4 Tcf of proven reserves plus 105.0 Tcf of probable and
14 possible resources). The tabulation of resources by state (proven reserves) and
15 basin (probable and possible resources) is shown in Exhibit No. TIG-37.

16 **Q. Would you please describe the PGC estimates?**

17 A. The estimates of the PGC represent potential gas resources that, in the judgment
18 of its members, can be recovered by future drilling under: a) adequate economic
19 incentives in terms of price and cost; and b) current foreseeable technology. The
20 PGC projects resources based on knowledge of areas of proven reserves. The
21 PGC's estimates included in this study represent "Most Likely" values derived
22 from statistically aggregated mean values.

1 **Q. You said the PGC’s “Most Likely” estimates are statistically aggregated**
2 **mean values. What does that mean?**

3 A. The “Most Likely” estimates, as described by the PGC, “represent the best
4 judgment of individual Committee members and are considered the most credible
5 assessments for purposes of analysis, planning and exploration.” See Exhibit No.
6 TIG-38 at 2. The Commission had explicitly relied upon PGC estimates in
7 *Trunkline Gas Co.*, 90 FERC ¶ 61,017 at 61,057 (2000).

8 **Q. What are the differences between proven reserves, probable resources,**
9 **possible resources and speculative resources?**

10 A. Proven reserves are defined by the EIA as “the estimated quantities which
11 analysis of geological and engineering data demonstrate with reasonable certainty
12 to be recoverable in future years from known reservoirs under existing economic
13 and operating conditions.” See Exhibit No. TIG-39. Probable, possible, and
14 speculative resources are estimated by the PGC. As defined by the PGC:

15 Probable resources are associated with known fields
16 and are the most assured of potential supplies.
17 Relatively large amounts of geologic and
18 engineering information are available to aid in the
19 estimation of resources existing in this category.
20 Probable resources bridge the boundary between
21 discovered and undiscovered resources. The
22 discovered portion includes the supply from future
23 extensions of *existing pools* in known productive
24 reservoirs ... Although the pools containing this gas
25 have been discovered, their extent has not been
26 completely delineated by development drilling.
27 Therefore, the existence of quantity of gas in the
28 undrilled area of the pool are as yet *unconfirmed*.
29 The undiscovered part is expected to come from
30 future new pool discoveries within existing fields
31 either in reservoirs productive in the field or in
32 shallower or deeper formations known to be
33 productive elsewhere within the same geologic

1 province or subprovince. (*See* Exhibit No. TIG-38
2 at 3 (emphasis in original) (endnotes omitted)).
3

4 By contrast,

5 Possible resources are a less assured supply because
6 they are postulated to exist outside known fields,
7 but they are associated with a productive formation
8 in a productive province. Their occurrence is
9 indicated by a projection of plays or trends of a
10 producing formation into a less well explored area
11 of the same geologic province or subprovince. The
12 resources are expected to arise from *new field*
13 discoveries, postulated to occur within these trends
14 or plays under both similar and different geologic
15 conditions—that is, the types of traps and/or
16 structural settings may be either the same or
17 different in some aspect. (*See* Exhibit No. TIG-38
18 at 3 (emphasis in original) (endnotes omitted)).

19 The PGC defines speculative resources as:

20 Speculative resources, the most nebulous category,
21 are expected to be found in formations or geologic
22 provinces that have not yet proven productive.
23 Geologic analogs are developed in order to ensure
24 reasonable evaluation of these unknown quantities.
25 The resources are anticipated from *new pool* or *new*
26 *field* discoveries within a productive province or
27 sub-province and from *new field* discoveries within
28 a *province not previously productive*. (*See* Exhibit
29 No. TIG-38 at 3 (emphasis in original) (endnotes
30 omitted)).

31 Summing proven reserves, probable resources, and possible resources, I
32 calculated total remaining non-speculative resources. I excluded speculative
33 resources from my analysis due to the “nebulous” nature of their existence. The
34 Commission has stated that it is appropriate to rely on “the PGC’s most likely
35 estimates for probable and possible resources in [a pipeline’s] gas supply areas.”
36 *See Trunkline Gas Co.*, 90 FERC ¶ 61,017 at 61,057 (2000). Speculative

1 resources should only be included in a gas supply analysis if and when the
2 resources are reclassified as proven, probable, or possible.

3 **C. Production Projections**

4 **Q. Why did you examine production projections?**

5 A. The estimates for non-speculative resources I discussed in Section III.B are
6 measurements of the stock of resources that may be available for production, but
7 further context is required in order to understand the magnitude of the stock and
8 for how long the stock might be available.

9 **Q. Which production projections did you examine for the Rocky Mountain and**
10 **the Midcontinent Regions?**

11 A. I examined the six scenarios projected by the EIA's Annual Energy Outlook 2015
12 and the other 24 scenarios projected by the EIA's Annual Energy Outlook 2014
13 (that were excluded in the EIA's shorter 2015 edition) for the Rocky Mountain
14 and Midcontinent Regions. I discuss these geographic areas in more detail below.
15 The EIA is specific in that it only produces projections, which are estimates that
16 may occur given specific hypothetical assumptions. Alternatively stated, the EIA
17 does not place any expectation that any one outcome, such as its Reference Case,
18 is any more likely to occur than any of its 29 alternate scenarios. Furthermore,
19 there is no expectation by the EIA that any of the 30 total scenarios will
20 necessarily occur. I used the combination of scenarios to evaluate whether
21 sufficient non-speculative resources exist to fulfill such production estimates and
22 will be available for at least a 35 year horizon.

23 **Q. Why did you separately examine non-speculative resources and compare**
24 **them to EIA's projections?**

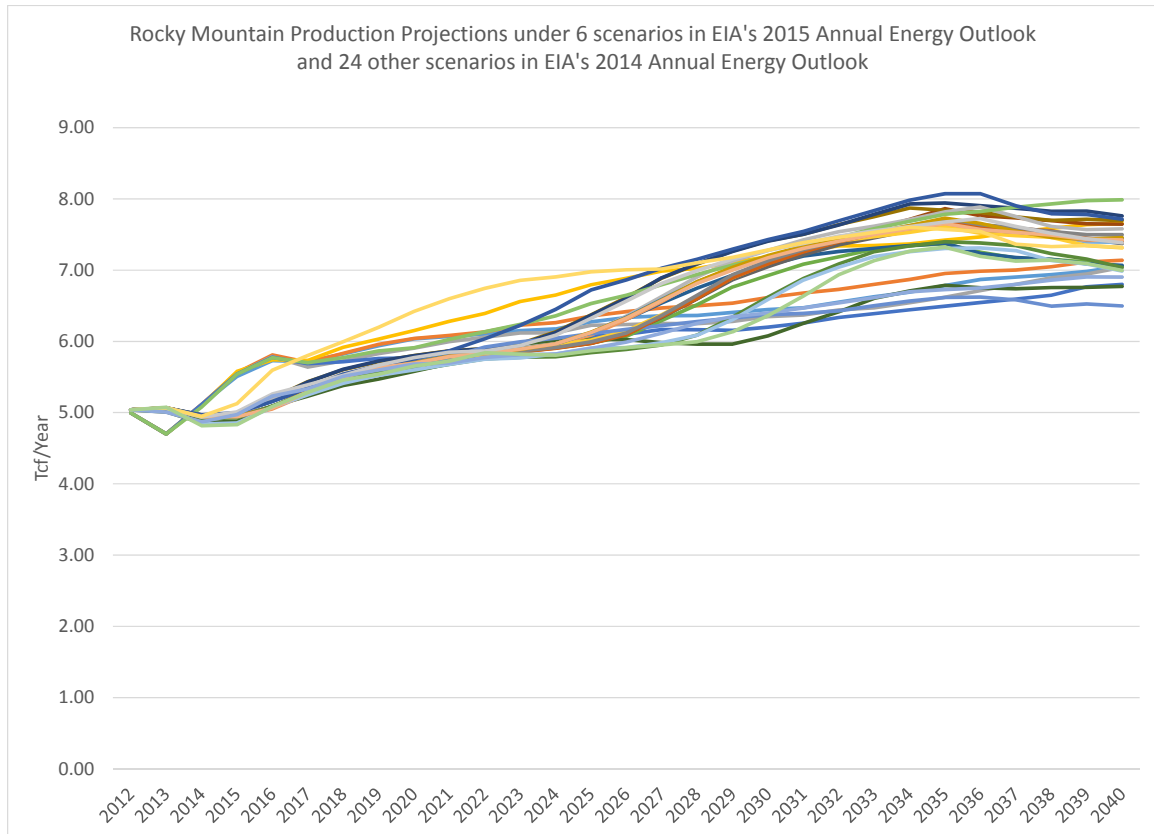
1 A. The EIA's Annual Energy Outlook uses its proven reserves estimates in addition
2 to estimates of "unproven resources," which may include resources that can be
3 classified as speculative. By comparing the resource projections to the amount of
4 non-speculative resources available in each region, I can ensure that such
5 projections will not require the existence of speculative resources to come to
6 fruition.

7 **Q. How much of the EIA's Rocky Mountain Region's resource base is located**
8 **within TIGT's supply areas?**

9 A. As shown in Exhibit No. TIG-36 at 2, the EIA's Rocky Mountain Region includes
10 Nevada, Arizona, New Mexico, Idaho, Colorado, Utah and Wyoming. Some of
11 these states, such as Nevada, Arizona, New Mexico, and Idaho, contain supplies
12 that are likely to have limited, if any, availability to TIGT. The states from which
13 supplies are more likely to be available to TIGT, including Colorado, Utah and
14 Wyoming, amount to approximately 82 percent of the Rocky Mountain Region's
15 remaining non-speculative resources. The resources and basins located within
16 these states are denoted with an asterisk (*) in Exhibit No. TIG-37. The
17 production projections (unlike the remaining resource estimates) by the EIA are
18 not disaggregated for more granular areas. However, given that 82 percent of the
19 remaining non-speculative resources within the EIA's Rocky Mountain Region
20 are proximate to TIGT's system, a relatively high percentage, I consider that
21 conclusions made based on the region as a whole would also apply generally to
22 the more limited region proximate to the TIGT system.

23 **Q. What do the Rocky Mountain production projections show?**

- 1 A. The results from the various EIA projections are shown below, with each color
 2 representing a different scenario (for presentation purposes, the scenario labels are
 3 not provided below, but can be found in Exhibit No. TIG-40).



4
5
6
7
8
9
10
11
12

As I explained earlier, the Commission has previously used 35 years for a pipeline’s economic life, even when additional years of supplies may have been available. My purpose here is therefore to confirm whether supplies will be available for 35 years. Since the EIA’s projections only extend 25 years, I use the annual average growth (or decline) rates of each scenario in its last 5 years to project production for 2040 to 2050, in order to reach 35 years from present day. The total aggregate production from 2013 to 2050 is 269 Tcf from the highest-production scenario, and 248 Tcf from the Reference Case (AEO 2015), which

1 are approximately 78 percent and 72 percent respectively of the 345 Tcf of
2 estimated remaining non-speculative resources in the region. This comparison
3 demonstrates that sufficient levels of non-speculative resources in the Rocky
4 Mountain Region are projected to exist to support a 35 year period (if demand
5 exists), although some portion of the production (approximately 18 percent) of the
6 resources are located in areas where they are not likely to be available to TIGT
7 once produced. Since TIGT also currently receives gas supplies from the
8 Midcontinent Region, I turn next to an analysis of supplies in that region.

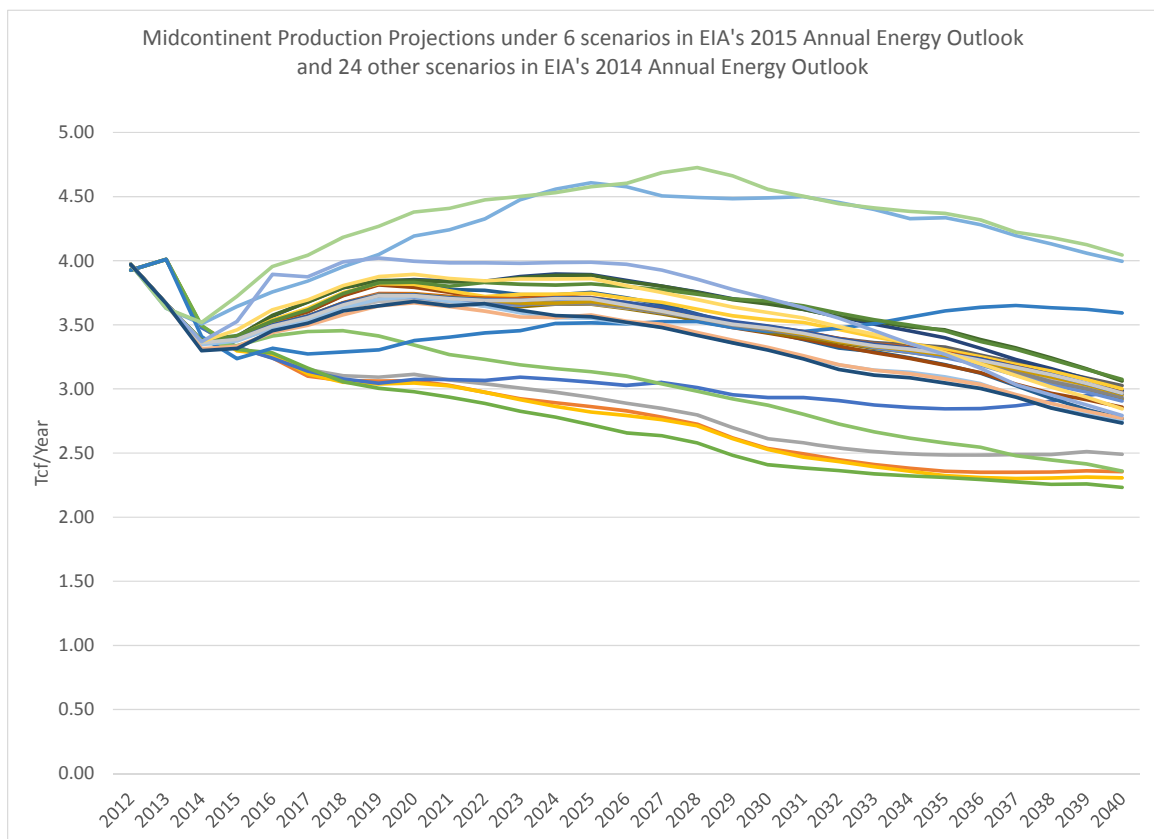
9 **Q. How much of the EIA's Midcontinent Region's resource base is located**
10 **within TIGT's supply areas?**

11 A. As shown in Exhibit No. TIG-36 at 2, the EIA's Midcontinent Region includes
12 Arkansas, Minnesota, Oklahoma, Kansas, Nebraska, Missouri, and Texas
13 Railroad District 10. Some of these states, such as Arkansas and Oklahoma, and
14 Texas Railroad District 10, contain supplies that are likely to have limited, if any,
15 availability to TIGT (Minnesota contains no non-speculative resources). The
16 states from which supplies are more likely to be available to TIGT, including
17 Kansas, Nebraska, and Missouri, amount to approximately 30 percent of the
18 Midcontinent Region's remaining non-speculative resources. The resources and
19 basins located within these states are denoted with an asterisk (*) in Exhibit No.
20 TIG-37. The production projections (unlike the remaining resource estimates) by
21 the EIA are not disaggregated for more granular areas. The remaining 70 percent
22 of remaining non-speculative resources is located within Arkansas and the
23 Arkoma basin, Oklahoma, and Texas Railroad District 10. I will discuss below

1 how the limited quantity of non-speculative resources located within the states
 2 near TIGT may impact their availability.

3 **Q. What do the Midcontinent production projections show?**

4 A. The results from the various EIA projects are shown below, with each color
 5 representing a different scenario (for presentation purposes, the scenario labels are
 6 not provided below, but can be found in Exhibit No. TIG-41).



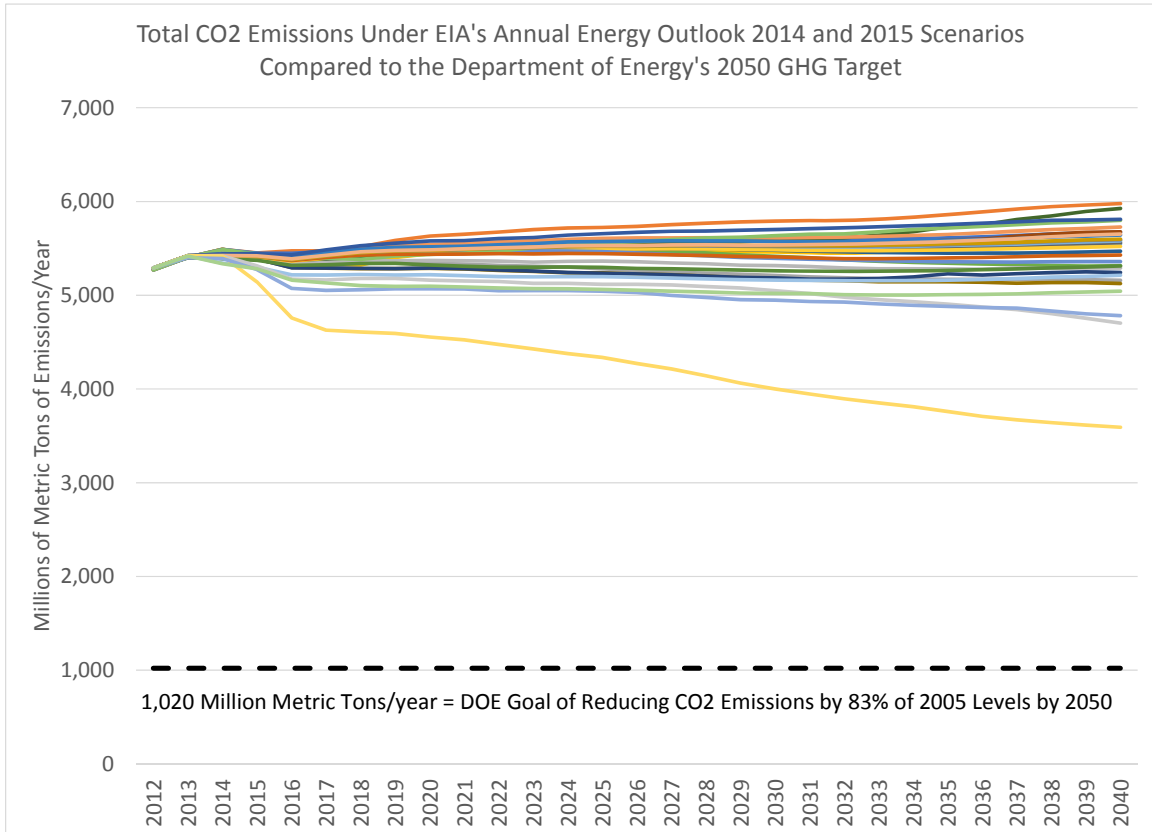
7
 8 Since these projections also only extend 25 years, I again used the annual average
 9 growth (or decline) rates of each scenario in its last 5 years to project production
 10 for 2040 to 2050, so as to reach 35 years. The total aggregate production from
 11 2013 to 2050 is 158 Tcf from the highest-production scenario, and 102 Tcf from
 12 the Reference Case (AEO 2015), which are approximately 109 percent and 70

1 percent respectively of the 145 Tcf of remaining non-speculative resources in the
2 region. The results of this exercise demonstrate that some gas supplies within the
3 Midcontinent Region may be available for transport on the TIGT system via
4 interconnecting pipelines for a 35 year period if sufficient demand exists, though
5 uncertainty exists as to whether supplies will be available beyond a 35 year
6 period. The comparison also demonstrates that the EIA's projections showing the
7 highest levels of production would require significant amounts of speculative
8 resources to exist. Furthermore, 70 percent of the Midcontinent Region's
9 resources are located in Arkansas and the Arkoma Basin, Oklahoma, and Texas
10 Railroad District 10, areas that are not traditional sources of supply for TIGT.
11 While interconnecting pipelines may allow access to these supplies, the distance
12 adds to the uncertainty associated the availability of these supplies to the TIGT
13 system. Regardless, any production available to TIGT from the Midcontinent
14 Region would be additive to gas supplies from the Rocky Mountains, which itself
15 provides 35 years of supplies.

16 **Q. You mentioned that the EIA's figures are projections, and that the EIA does**
17 **not state an expectation that any particular projection is likely to occur.**
18 **How do you view the likelihood of the EIA's projections?**

19 A. Due to several considerations of demand discussed in Section IV, all of the
20 projections are likely to over-estimate natural gas production in the long-run. For
21 instance, government policy goals regarding energy and the environment could
22 result in the EIA projections overstating the production that will occur. A specific
23 example of such a government policy is the U.S. Department of Energy ("DOE")
24 goal of reducing greenhouse gas emissions by 83 percent of 2005 levels by 2050

1 (discussed in Section IV). As shown in the graph below, it does not appear that
 2 the EIA has put forth a scenario that will approach this target (for presentation
 3 purposes, the scenario labels are not provided below, but can be found in Exhibit
 4 No. TIG-42).



5
 6 None of these projections reflect the impact of a reduction of CO2 emissions of
 7 83% by 2050. To the extent that the DOE’s goal for reducing greenhouse gases is
 8 achieved, this will likely diminish the amount of produced supplies considerably.

9 **Q. What are your primary findings with regard to natural gas supply as it**
 10 **pertains to the TIGT system?**

11 A. If demand for the transportation services provided by TIGT’s system exists,
 12 sufficient supplies will be available from TIGT’s supply areas within a 35 year

1 horizon. Factors discussed in Section IV and throughout this section make such
2 demand in the long-run highly uncertain, particularly beyond 35 years.

3 **IV. Demand for the Transportation Services Provided by TIGT**

4 **Q. Why is it important to consider the demand for the transportation services of**
5 **TIGT?**

6 A. Even if available supplies exist, factors affecting demand may limit the amount of
7 *available* supplies that could be expected to flow to the TIGT system. I explain
8 some of the sources of uncertainty of demand for natural gas in the long-run.
9 Conclusions that rely on long-run forecasts must be considered speculative due to
10 these inherent uncertainties over long horizons. It also should be noted that most
11 energy forecasts are limited to approximately a 25 year time frame, which reduces
12 some of the uncertainty that exists in forecasts with a longer horizon. Notably,
13 the EIA Annual Energy Outlook 2014 and 2015 both only project to 2040, a 25
14 year time frame.

15 **Q. Please explain some of the sources of uncertainty that will influence the**
16 **demand for the transportation services of TIGT in the future.**

17 A. The demand for any good or service is influenced by the prices of alternatives and
18 substitutes, as well as other factors called “demand shifters.” The demand for
19 transportation on TIGT is a function of the demand for natural gas as a
20 commodity. The future uncertainty about long-run natural gas demand can be
21 tied to three sources: (1) the technological development of alternative energies;
22 (2) potential gains in energy efficiency; and (3) energy and environmental
23 legislation/regulation. While there is less uncertainty in the short-run, large
24 changes can occur in the long-run due to changes in these three areas.

1 **Q. What do you mean by the phrases “short-run” and “long-run”?**

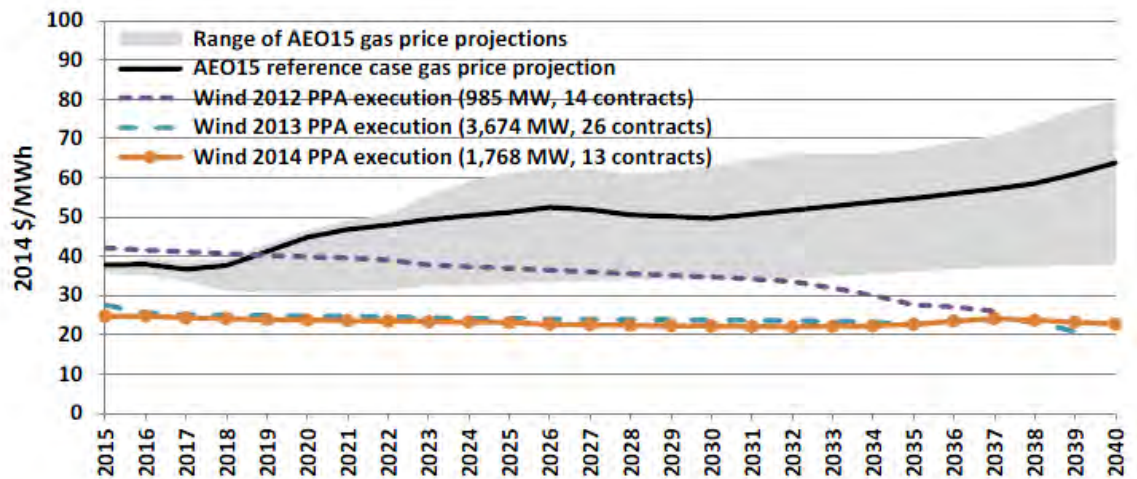
2 A. These terms are economics concepts. The “long-run” refers to a period of time
3 over which no factors of production are fixed. The “short-run” refers to a period
4 of time during which some factors of production may be fixed but others are
5 variable. In the short-run, it is economic to continue to sell a good or service as
6 long as the price is above variable cost, even if the price is not high enough to
7 recover the large “sunk” investments involved in production. In the long-run,
8 since all factors of production are variable, there is flexibility in the mix of energy
9 sources utilized in each region. For purposes of this testimony, and consistent
10 with the Commission precedent discussed earlier, I generally refer to a time
11 period of 35 years or more when I refer to the “long-run.” A 35 year time period
12 should be sufficient to consider most productive inputs in the economy to be
13 variable.

14 **Q. Please explain how technological development of alternative energies and**
15 **energy efficiency can diminish demand for natural gas in the long-run?**

16 A. As technology advances and the prices of alternative energies decline, alternative
17 energies may become the economic choice for many energy consumers.
18 Alternative energies, such as wind and solar, are likely to offer a viable
19 competitive alternative to natural gas, particularly over a 35 year period.
20 Increases in energy efficiency due to technological development and adoption
21 also may reduce the demand for natural gas over time.

22 **Q. Do you have any recent examples of how advancements in technology have**
23 **lowered the cost of alternative energy?**

1 A. Yes. Solar power prices, such as from photovoltaic systems, have fallen
2 significantly in the past 20 years. The National Renewable Energy Laboratory
3 (“NREL”), a national laboratory of the U.S. Department of Energy, in a report
4 titled “Photovoltaic System Pricing Trends,” dated August 2015, stated that
5 “[r]eported system prices of residential and commercial [photovoltaic] systems
6 declined 6%–12% per year, on average, from 1998–2014, and by 9%–21% from
7 2013–2014, depending on system size,” and that “analysts expect system prices to
8 continue to fall.” *See* Exhibit No. TIG-43 at 4. Wind power prices have also
9 fallen substantially in the recent past. An August 2015 study by the DOE titled
10 “2014 Wind Technologies Report” stated that “wind [power purchase agreement
11 (“PPA”)] prices have reached all-time lows” and that “[t]he continued decline in
12 average levelized wind PPA prices, along with a continued rebound in wholesale
13 power prices, left average wind PPA prices signed in 2014 below the bottom of
14 the range of nationwide wholesale power prices.” *See* Exhibit No. TIG-44 at 4.
15 The DOE provided a comparison of average long-term wind PPA by vintage as a
16 future stream to the EIA’s 2014 Annual Energy Outlook natural gas fuel cost
17 projections, shown below.



Source: Berkeley Lab, EIA

Figure 49. Average long-term wind PPA prices (by vintage) and natural gas fuel cost projections over time

1

2 As can be seen above, the average PPA price for wind in 2013 and 2014 are
 3 below natural gas fuel costs alone, under the EIA’s 2015 AEO natural gas price
 4 projections. As noted by the DOE, there are a number of caveats to the
 5 comparison above. For example, full social costs of natural gas generation are not
 6 included, and the wind PPA prices include certain financial incentives. Please see
 7 Exhibit No. TIG-44 at 5 for the DOE’s full notes.

8 **Q. How might energy and environmental policies impact natural gas demand?**

9 A. Evolving governmental energy and environmental policies may cause significant
 10 changes to the energy mix utilized in the United States in the long-run. I will
 11 discuss the Endangerment Finding under Section 202(a) of the Clean Air Act,
 12 evolving methane regulations, the Clean Power Plan final rule, and the DOE’s
 13 long-term goal regarding greenhouse gas emissions.

1 **Q. What is the “Endangerment Finding” under Section 202(a) of the Clean Air**
2 **Act?**

3 A. On December 7, 2009 the U.S. Environmental Protection Agency (“EPA”), under
4 Section 202(a) of the Clean Air Act, determined that the current and projected
5 concentrations of six key greenhouse gasses in the atmosphere threaten the public
6 health and welfare of current and future generations. The six greenhouse gases
7 listed by the EPA as endangering the public health and welfare include: carbon
8 dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), hydrofluorocarbons (HFCs),
9 perfluorocarbons (PFCs), and sulfur hexafluoride (SF₆). The EPA’s
10 Endangerment Finding lays the groundwork for the federal government to
11 regulate these emissions from power plants, factories, automobiles, and other
12 major sources.

13 **Q. How does the Endangerment Finding impact the future of natural gas use in**
14 **the United States?**

15 A. The production and consumption of natural gas involves some of the greenhouse
16 gases mentioned above. A web site owned by the Natural Gas Supply
17 Association (<http://naturalgas.org/overview/background/>) identifies the
18 composition of natural gas:

Typical Composition of Natural Gas

Methane	CH ₄	70-90%
Ethane	C ₂ H ₆	
Propane	C ₃ H ₈	0-20%
Butane	C ₄ H ₁₀	
Carbon Dioxide	CO ₂	0-8%
Oxygen	O ₂	0-0.2%
Nitrogen	N ₂	0-5%
Hydrogen sulphide	H ₂ S	0-5%

Rare gases	A, He, Ne, Xe	trace
------------	---------------	-------

1 According to EPA, lost and unaccounted for gas from, *e.g.*, production and
2 distribution, endangers the public health and welfare and can be regulated under
3 the Clean Air Act. Although natural gas may be considered a relatively clean
4 burning fuel compared to other fuels, the burning of natural gas also produces
5 carbon dioxide and nitrous oxide according to the DOE's website
6 (<http://www.epa.gov/cleanenergy/energy-and-you/affect/natural-gas.html>).

7 **Q. You mentioned that evolving methane regulations causes uncertainty in**
8 **natural gas demand. Can you discuss how regulations pertaining to methane**
9 **emissions are evolving?**

10 A. Yes. The DOE has recently announced a number of actions, partnerships, and
11 stakeholder commitments in order to modernize the nation's natural gas
12 transmission and distribution system and reduce methane emissions. *See* Exhibit
13 No. TIG-45 at 1-7. The EPA also announced new measures to cut methane
14 emissions from the oil and gas sector earlier this year. *See* Exhibit No. TIG-45 at
15 8-9. Compliance costs associated with methane regulations will drive economic
16 decisions and will act to increase the relative price of using natural gas compared
17 to alternative fuel sources, thereby creating an additional source of uncertainty in
18 the demand for natural gas.

1 **Q. You have focused on natural gas emissions and have not yet discussed coal.**
2 **If natural gas use is “cleaner burning” than coal, is it reasonable to expect**
3 **that natural gas consumption will increase with more environmentally-**
4 **sensitive regulations, such as the Endangerment Finding?**

5 A. In the short-run, yes. However, the long-run goals of greenhouse gas reduction by
6 the DOE would require a dramatic decrease not only in coal use, but natural gas
7 use as well.

8 **Q. What is the EPA’s Clean Power Plan?**

9 A. On August 3, 2015, the EPA announced the Clean Power Plan (“CPP”). The
10 regulations are meant to reduce the amount of carbon dioxide emitted by power
11 plants under Section 111(d) of the Clean Air Act. *See* 40 C.F.R. Part 60. The
12 CPP requires that states reduce carbon dioxide emissions by a total of 32 percent
13 of 2005 levels by 2030. By 2030, under the CPP, it is estimated that renewable
14 energy will account for at least 28 percent of U.S. generation capacity. The CPP
15 is an example of how new energy and environmental rules and regulations can
16 increase renewable energy use and, correspondingly, displace demand for other
17 energy sources.

18 **Q. Please discuss the DOE’s long-term goal regarding greenhouse gas emissions.**

19 A. The DOE has set a goal of reducing greenhouse gas emissions by 83 percent of
20 2005 levels by 2050. *See* Exhibit No. TIG-46 at 2. Additionally, a March 31,
21 2015 press release by the White House mentions that a new 2025 emissions target
22 submitted by the U.S. State Department to the United Nations Framework
23 Convention on Climate Change “will keep the United States on the pathway to
24 achieve deep economy-wide reductions of 80 percent or more by 2050.” *See*

1 Exhibit No. TIG-46 at 6-7. Such a goal is likely to require a drastic cut in natural
 2 gas use during the next 35 years. While it is true that natural gas use may emit
 3 less carbon dioxide emissions than coal, the long-term greenhouse gas emissions
 4 goal cannot be achieved without substantial declines in natural gas usage. The
 5 data below, from the EIA, shows annual energy-related carbon dioxide emissions
 6 from coal, natural gas, and petroleum from 2005 to 2014.

Annual Energy-related Carbon Dioxide Emissions
 (million metric tons of carbon dioxide)

Year	Coal	Natural Gas	Petroleum	TOTAL
2005	2,182	1,183	2,623	5,999
2006	2,147	1,168	2,593	5,920
2007	2,172	1,243	2,596	6,023
2008	2,139	1,253	2,437	5,841
2009	1,876	1,230	2,307	5,424
2010	1,982	1,290	2,339	5,623
2011	1,876	1,306	2,304	5,498
2012	1,664	1,364	2,254	5,293
2013	1,722	1,391	2,262	5,375
2014	1,720	1,434	2,250	5,404

Source: <http://www.eia.gov/todayinenergy/detail.cfm?id=10691> and
<http://www.eia.gov/forecasts/steo/tables/pdf/9atab.pdf>

7 Energy-related carbon dioxide emissions in 2005 were 5,999 million metric tons.
 8 A reduction of 83 percent of 2005 emissions would require carbon dioxide
 9 emissions to be reduced to a total of 1,020 million metric tons ($=5,999 * (1-$
 10 $0.83)$). Natural gas related carbon dioxide emissions in 2014 alone were higher
 11 than this 2050 target for total energy-related carbon dioxide emissions.
 12 Furthermore, even if natural gas emits up to 45 percent fewer carbon dioxide
 13 emissions than coal, the conclusion that natural gas use must be significantly
 14 reduced to meet the 2050 greenhouse gas standards is unchanged. This is because

1 if all sources of coal related carbon dioxide emissions were replaced by natural
2 gas with 45 percent fewer emissions, natural gas carbon dioxide emissions alone
3 would equal 2,380 million metric tons ($=1,434 + 1,720 * 0.55$). This amount is
4 more than twice the 2050 goal of 1,020 million metric tons, which still excludes
5 petroleum emissions, which totaled 2,250 million metric tons in 2014. The
6 DOE's goal of reducing greenhouse gas emissions by 83 percent of 2005 levels
7 by 2050 likely requires a substantial decline in current natural gas use within the
8 next 35 years.

9 **Q. Are you aware of any estimate of how much natural gas use must fall by 2050**
10 **in order to meet the DOE goal?**

11 A. I am aware of a related NREL analysis regarding high penetrations of renewable
12 energy use for electricity generation, which results in similar declines of carbon
13 dioxide emissions as the DOE goal. In 2012, NREL prepared an analysis
14 examining the integration of high levels of renewable electricity into the United
15 States electric system. An update of NREL's analysis in 2014 shows an estimate
16 of how much natural gas-based electricity generation would have to fall by 2050
17 in order to accommodate approximately an 80 percent decrease in carbon dioxide
18 emissions, which provides insight into how much the demand for natural gas in
19 electricity may drop to meet such goals. NREL finds that natural gas generation
20 (from both combined cycle and combustion turbine generators) would decrease
21 from 1,265,635 gigawatt hours ("GWh") in 2012 to 353,670 GWh in 2050 – a
22 decrease of about 72 percent. See Exhibit No. TIG-47 and
23 http://www.nrel.gov/analysis/re_futures/ for further documentation. Such a large

1 decrease in natural gas use would cause a significant amount of excess pipeline
2 capacity to exist and would greatly impact the ability of pipelines to collect their
3 fixed costs.

4 **Q. What are your primary findings with regard to natural gas demand as it**
5 **pertains to the TIGT system?**

6 A. Although my research discussed in Section III shows that sufficient supply may
7 be available to TIGT over the next 35 years, the factors discussed throughout this
8 Section IV cause natural gas demand to be highly uncertain, particularly beyond a
9 35 year horizon.

10 **Q. Does this conclude your Prepared Direct Testimony?**

11 A. Yes, it does.

