EMPOWER NJ: STOP FOSSIL FUEL PROJECTS

FIGHTING CLIMATE CHANGE IN NJ:

The Urgent Case for a Moratorium on all Fossil Fuel Projects

EMPOWER NJ
NO FOSSIL FUEL PROJECTS

Acknowledgments

Empower NJ is a growing coalition of more than 50 environmental and grassroots groups, formed to advocate for an immediate moratorium on all new fossil fuel projects.

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Executive Summary

"The verdict is in. The world must act now to curb the cataclysmic effects of climate change. In NJ, we set a path to 100% clean energy by 2050, signed sweeping clean energy legislation and are protecting our land & water. Our children deserve nothing less." Governor Murphy, 11/24/18

There is a profound disconnect between these words and the actions and inaction of Governor Murphy's Administration. With this report, Empower NJ documents the extent of this disconnect and the need for an immediate moratorium on all new fossil fuel projects as a key step in putting New Jersey on track to meet the Governor's objectives.

Governor Murphy's Executive Order 28 commits the State to achieving 100% clean energy and directs the adoption of an updated Energy Master Plan by June 2019 detailing how this goal will be achieved, including meaningful interim benchmarks over the next 10 years.

The Governor also declared that the State would aggressively combat climate change. Achieving these goals will be challenging enough with the existing fossil fuel infrastructure in New Jersey; it will be impossible to achieve them if the 12 new (and unnecessary) fossil fuel projects (eight pipeline/compressor station projects, four power plants), in various stages of planning and execution, are allowed to go forward.

If these 12 gas-based projects are put into operation (plus one power plant that started operation in mid 2018), they would increase CO_2e (CO_2 equivalent) GHG (greenhouse gas) emissions by approximately 32 million metric tons per year. To put this in context, New Jersey's total GHG CO_2e emissions from all sources in 2015 were about 101 million metric tons.[1] These new projects would increase total GHG emissions by approximately 30 percent, in clear conflict with the Paris Climate Accord, NJ's 2007 Global Warming Response and Air Pollution Control Acts, and the Administration's own stated policy, including but not limited to, EO 28.

The CO_2e emissions from the five power plants alone are estimated at 14.2 million metric tons/year. New Jersey's

2017 emissions from electric power generation were 18.6 million metric tons of CO_2e[2]. Operation of these five power plants would increase CO_2e emissions from electricity generation by approximately 76 percent.

Reducing GHG emissions requires a focus on gas projects due to the large quantities of methane and carbon emissions throughout the life cycle production of electricity from fracked/natural gas. Methane is 86 times more efficient at trapping heat than CO_2 over a 20-year time frame.[3] In fact, GHG emissions from the extraction, processing and burning of fracked gas are greater than those from coal.[4]

The 12 proposed fossil fuel projects with their 30-40+ year lifespans would also significantly increase already out-of-compliance levels of ground level ozone and other Hazardous Air Pollutants for many years to come. This would cause new, and exacerbate existing, cases of air pollutant-related diseases, lead to more premature deaths and increase health care costs.

To achieve its stated policy objectives, the Administration must institute an immediate moratorium on all new fossil fuel infrastructure projects until rules, procedures and plans are implemented to regulate and reduce GHG's consistent with EO 28, NJ's Air Pollution Control and Global Warming Response Acts[5] and our commitments in the US Climate Alliance.[6] The specific steps the Administration should take include:

- Establish rules pursuant to the Clean Air Act (Title V), the New Jersey Global Warming Response Act and the NJ Air Pollution Control Act[7] that place limits on CO_2/GHG emissions, require fossil fuel applicants to conduct a comprehensive alternatives analysis of renewable energy technologies, and enable the DEP to reject permits for projects that would cause New Jersey to exceed GHG limits.

- Revise DEP policy that allows polluters to purchase ground level ozone credits, which today allows virtually unlimited production of ozone precursors even in areas of the State that exceed ozone attainment levels and are already rated as 'F' by the American Lung Association.

- Update the DEP rules regarding air deposition in order to allow rejection of permits that would increase water pollution beyond specific limits.

- Remove the cost cap on renewable energy projects, which does not exist on other energy sources.

- Reverse Governor Christie's rollbacks of regulations on flood hazard rules, water quality management planning rules, the Coastal Area Facility Review Act, Wetlands and Storm Water Management rules that make it easier to build pipelines and other developments in the Highlands and Pinelands, near water resources and other sensitive environmental areas.

- Champion a full ban on fracking and its associated activities throughout the Delaware River Basin and in New Jersey.[8]

- Appoint new members to the Pinelands Commission and Highlands Council, who will protect these fragile areas and the water supplies they provide and act consistently with Executive Order 28.

- Create a strong green jobs program including training and placement in the new green economy, built on and driving living wage union jobs in emerging sectors (solar, offshore wind, electric car infrastructure, energy efficiency, etc.).

In contrast to its rhetoric, the existing practices of the Administration will dramatically increase GHG emissions and other toxic pollution, fail to adequately regulate fossil fuel development and economically undercut the rapid development of a 100% clean energy economy, all while driving us further towards climate catastrophe. The time for real climate leadership is NOW.

The State Of Play

The Climate Change Crisis

We have known for years we have a climate change crisis. We now know that the crisis is much more immediate and threatening than previously understood.

The November 2018 National Climate Assessment[9] underscores the urgent case for an immediate moratorium on all new fossil fuel development. The Assessment states, "future risks for climate change depend primarily on decisions made today. We are dooming future generations by not acting now." The report details how global warming poses a profound threat to Americans' well-being and cites new research estimating that climate change could cause hundreds of billions of dollars in annual damage and, in the worst case scenario, a loss of more than 10% of U.S. GDP by the end of the century.

The recent Intergovernmental Panel on Climate Change report[10] by the world's climate experts also highlights the urgent need for immediate actions to sharply reduce fossil fuel use. The report concludes that absent aggressive action, many effects once expected several decades in the future will arrive by 2040 and that global net human-caused emissions of GHG's need to fall by 45 percent from 2010 levels by 2030 to avoid catastrophic climate change.

This 45 percent reduction applies to all greenhouse gases. Governor Murphy's objective of clean renewable energy by 2050 only addresses electricity production, which accounts for about 18 to 19 percent of all GHG emissions in New Jersey. Even if 100% clean renewable energy was achieved for electricity production, this would leave us far short of the 45 percent goal described in the IPC report.

New Jersey (and Florida) are ground zero for climate change as is evident from the devastating and still ongoing impact from Superstorm Sandy. A recent UCS report stated, "Of the roughly 14,000 commercial properties at risk on US coasts within the next 30 years, more than one-third are in Florida and New Jersey.[11]

There is something else new about the climate change crisis in 2019. The devastation caused by climate change in the last two years – unprecedented wildfires, hurricanes and droughts to name a few – have resulted in the vast majority of Americans recognizing that climate change is real and that government must address it. 87 percent of Democrats and 56 percent of Republicans agreed that CO2 emissions should be reduced from coal-powered plants even if it meant higher electricity prices. 85 percent of Democrats and 52 percent of Republicans agreed that environmental protection is more important than economic growth.[12] A moratorium on new fossil fuel infrastructure is not only good policy, but also good politics.

Of the roughly 14,000 commercial properties at risk on US coasts within the next 30 years, more than one-third are in Florida and New Jersey.

The Administration's Actions to Date

The Administration has taken some positive steps to address climate change in the State:

- The State has joined the US Climate Alliance, pledging to uphold the goals established by the Paris Climate Treaty to limit global temperature increases to 1.5 degrees Celsius and no greater than 2 degrees Celsius. States in this alliance have committed to implement policies to reduce greenhouse gas emissions by at least 26-28 percent below 2005 levels by 2025.

- Executive Order 28 requires the development of a 2019 energy master plan that "shall provide a comprehensive blueprint for the total conversion of the State's energy production to 100% clean energy sources on or before January 1, 2050."

- Executive Order 8 facilitates development of offshore wind in the State, with a goal of 3,500 megawatts by 2030.

- The Administration has aggressively opposed offshore drilling.

- Governor Murphy signed Executive Order 23 to promote environmental justice.[13]

- Attorney General Grewal filed a petition with the U.S. Appeals Court asking the Court to hear New Jersey's arguments that the FERC erred when it issued a Certificate of Public Convenience and Necessity for the PennEast pipeline.

- Governor Murphy wrote to the Delaware River Basin Commission in support of a full ban on hydraulic fracturing and all fracking-related activities, including the importation, storage, treatment, disposal and/or discharge of wastewater produced by fracking and water withdrawals for fracking outside the basin.

These positive steps, however, are insufficient to address the magnitude of the crisis or the Administration's own goals. After more than a year in office the Administration has not taken many obvious actions or remedied existing situations needed to fulfill its clean energy and climate change objectives and environmental protection promises, including:

- The Administration has not proposed rules that are consistent with achieving the goals of 100% renewable energy by 2050.

- Anti-environment, pro-development Christie appointments remain in place at the Pinelands Commission and the Highlands Council leaving them to approve projects such as the Pinelands pipelines.

- The Office of Climate Change and the Office of Climate Adaptation and Mitigation, closed by Governor Christie, remain shuttered.

The positive steps the Administration has taken to address climate change are insufficient to address the magnitude of the crisis or the Administration's own goals.

- Governor Christie's rollbacks of regulations on flood hazard rules, water-quality management-planning rules, the Coastal Area Facility Review Act, wetlands and storm-water management rules remain in place, making it easier to build pipelines and other developments across New Jersey.

- GHG emissions remain unregulated despite the Governor having the authority to do so under the Clean Air Act (Title V), The NJ Air Pollution Control Act, and the NJ Global Warming Response Act (GWRA). The GWRA, which requires New Jersey to reduce GHG emissions by 80 percent from 2006 levels by 2050 (this would require a reduction to 25.4 million metric tons)[14], was enacted in 2007, more than a decade ago, to address this crisis, yet it has not been fully implemented.

- NJDEP's policy permit processes, criteria and rules set up by the Christie Administration remain in place, which, for example, do not require fossil fuel energy projects to demonstrate alternative renewable energy solutions to meet projected demand, do not require unregulated gas infrastructure projects to provide evidence of demand before receiving permits and do not regulate GHG emissions while allowing polluters to exceed ground level ozone attainment levels via the purchasing of pollution credits.

- The cost cap on renewable energy projects, which does not exist on other energy sources, remains in place.

- New Jersey is the only state in the region without a comprehensive climate adaptation and mitigation plan.

- The effects of air deposition on water quality (pollution of water based on air emissions washed into water bodies by precipitation) are not considered by the DEP when granting permits.

- The DEP has approved water related permits for the Meadowlands power plant proposal, and approved all permits for the Rivervale South to Market project, and the Gateway Expansion Project.

- The Pinelands Commission has allowed the Pinelands pipeline to proceed.

GHG emissions remain unregulated. New Jersey is the only state in the region without a comprehensive climate adaption and mitigation plan.

- The Governor also signed the PSE&G nuclear bailout bill; committing ratepayers to pay up to $3 billion over the next ten years to subsidize nuclear power instead of investing it in clean renewable energy. The Governor's rationale at the signing ceremony was to allow the State "to reach our clean energy goals." In other words, to avoid the need for new fossil fuel projects.

The State's New Fossil Fuel Projects

The Governor has an enormous and immediate opportunity to be a climate change leader and protect the health and welfare of the residents of NJ by using his authority to stop the following 12 fracked-gas infrastructure projects currently in various stages of planning, permitting and implementation in the State:

PIPELINE AND COMPRESSOR PROJECTS:

- PennEast Pipeline
- Northeast Supply Enhancement (aka NESE) (Somerset and Middlesex Counties and The Raritan Bay)
- Cape Atlantic Reliability Project (aka South Jersey Gas Pipeline) (Pinelands)
- Southern Reliability Link (Pinelands)
- Garden State Expansion Project (Bordentown, Chesterfield)
- Gateway Expansion Project (aka Roseland Compressor Station) (Roseland and Paterson)
- Rivervale South to Market (Bergen, Hudson Counties and Meadowlands)
- Lambertville East Expansion (Lambertville)

GAS-FIRED POWER PLANT PROJECTS:

- North Bergen Liberty Generating Station (aka Meadowlands Power Plant) (North Bergen)
- Phoenix Energy Center (aka Highlands Power Plant) (Holland Township)
- BL England (Upper Twp)
- Keasbey Energy Center (Woodbridge)

A thirteenth fossil fuel project, the Sewaren 7 PSE&G gas-fired power plant in Woodbridge, was recently completed. This plant received its air quality permit from the DEP on 8/14/2018 and went into service in mid- 2018. It is included in this analysis because the emissions from this plant are not included in the latest DEP GHG report and will require even more GHG reductions than were previously estimated. This plant alone will emit over 5 million metric tons of CO_2e GHG's annually (see Appendix I).

The estimated GHG CO_2e emissions from each project are shown in Appendix I, along with a description of the methodology used in these estimates.

Each project is described in more detail in Appendix II, including actions the Administration has taken to support (or failed to oppose) to date and evidence to demonstrate they are not necessary. Appendix II also describes the potential climate impact of allowing fracking in the Delaware River Basin, where the Governor also has jurisdiction.

There are 12 fracked gas infrastructure projects currently planned in New Jersey.

The Impact of the New Fossil Fuel Projects On Climate Change

The proposed projects would distribute and burn natural gas, which consists primarily of methane. Methane leaks at all stages of the gas process (extraction/production, gathering, processing, transmission, storage, local distribution and consumption). Methane has a far higher global warming potential than CO_2 because of the way it traps heat. Leaked methane is 34 times stronger than CO_2 at trapping heat over a 100-year period and 86 times more efficient at trapping heat over a 20-year time frame.[15]

Contrary to popular perception, producing electricity from fracked-gas is worse for climate change than coal. Methane leakage along the gas supply chain more than doubles the lifecycle emissions of gas compared to counting emissions only from gas combustion. A 2011 Cornell University study,[16] comparing GHG potency, showed that shale (fracked) gas is worse than conventional gas, is worse than coal and worse than oil. The hydraulic fracturing process lends itself to more leakage because it takes more time to drill the well, requires more venting and produces more flow-back waste.

As a result, developing new gas infrastructure is likely the absolute worst form of energy production in terms of negative impacts on climate change and it's getting worse. According to the US Energy Information Administration[17], US gas production has increased every year since 2005 with fracking contributing an increasingly larger percentage every year since 2000 (67% in 2015). That percentage is likely significantly higher in New Jersey in 2019 given those trends and proximity to Marcellus Shale fracking operations.

Appendix I shows the total estimated GHG emissions from each of the new fossil fuel projects and the total estimated net new GHG emissions from all projects combined. The net emissions reflect the fact that some of these projects interconnect and transport the same gas. Since the algorithm for computing GHG assumes all gas in a project is burned, the net computation removes this double counting. It also includes a description of the methodology used in arriving at the numbers, which is based mainly on the Oil Change International model.[18] The annual estimated CO_2 and CO_2e GHG emissions from each of these projects and the cumulative total for the State were calculated in two ways. Table 1 includes the full lifecycle methane CO_2e emissions from extraction through consumption of natural gas. Table 2 includes only the methane CO_2e emissions from transportation and consumption, which would occur primarily in New Jersey.

The Table 2 GHG emissions (transportation and consumption) show the total estimated net new CO_2e emissions from the 12 new projects would be 26.89 million metric tons/year. If the new Sewaren plant is included, this number swells to 32.05 million metric tons/year. This reflects the likely emissions in New Jersey, which only incurs methane leakage from transportation and consumption, not extraction of gas by fracking.

The total CO_2e emissions from the five power plants alone are estimated at 14.2 million metric tons/year. Considering that New Jersey's 2017 in-state power emissions were 18.6 million metric tons of CO_2e[19], this is equivalent to an increase of 76% in CO_2e emissions for electric energy production.

The new fossil fuel projects will produce staggering amounts of methane, a greenhouse gas which traps heat at 86 times the rate of CO_2.

These staggering numbers are much higher when CO2e emissions from extraction are also considered. The full methane lifecycle leakage adds an estimated 11.2 million metric tons/year in CO2e GHG's for a total of 43.3 million metric tons/year of additional estimated GHG emissions in New Jersey and Pennsylvania (including Sewaren 7). These estimates may, in fact, be understated, as the Trump Administration is hell-bent on rolling back the Obama Administration's rules regulating and controlling methane leaks and flaring.

Each new interstate transmission pipeline from the Appalachian Basin will spur new gas production. An analysis by the Delaware Riverkeeper Network showed that the PennEast pipeline would likely result in the drilling of at least 3,000 new fracked gas wells in Pennsylvania.[20]

Additional Negative Effects from the Proposed Fossil Fuel Projects

The proposed fossil fuel projects would have other deleterious effects on the environment and the health of New Jersey residents besides increased GHG emissions. Each has an expected lifetime of at least 30 to 40 years. The damage to the environment and residents' health,[21] premature death rates and associated financial burdens would last long after these facilities are closed. (See Appendix IV for information on social justice, public health and safety issues from fossil fuel development.)

The National Climate Assessment also puts a renewed emphasis on the impacts of other atmospheric pollutants like ozone and smoke, which can cause respiratory problems and lead to premature death. The report notes with "high confidence" that climate change will increase ozone levels. Most of Northern and Central New Jersey already have an "F" grade from the American Lung Association[22] for ground level ozone pollution, which would only increase by approving new gas infrastructures such as the proposed Meadowlands power plant. Altogether, the 12 new fossil fuel projects, especially power plants and compressor stations, will significantly increase the volume of ozone and HAPs (Hazardous Air Pollutants) in New Jersey as more fully set forth in Appendix IV.

Fracking Must be Banned in the Delaware River Basin

Governor Murphy should continue his efforts to ban fracking and frack waste discharges in the Delaware River Basin, and water withdrawals from the Delaware River for fracking operations elsewhere, in order to fight climate change.

The extraction of gas, the storage, processing and discharge of waste produced by fracking in the Basin, and the use of Delaware River Watershed water for fracking outside of the Basin would have substantial negative impacts, including: causing irreversible pollution of the Delaware River and its watershed, which supply drinking water for more than 15 million people, (2.9 million people in New Jersey); depleting water resources and flows; degrading water quality and ecosystem health; and release significant amounts of methane into the atmosphere. The projected emissions from the build out of the Marcellus Shale formation in Pennsylvania outside of the Delaware River Basin alone will prevent the achievement of Pennsylvania's global warming goals.[23]

The new fossil fuel projects will produce ozone pollution and negatively affect the health of all New Jersey residents.

Climate change impacts on the Basin's water resources include changes in precipitation and runoff that increase flooding and drought, impairment of habitats and water quality (including salt water intrusion to Delaware River water supplies, including irreplaceable withdrawals for South Jersey and Philadelphia), severe storms and weather events, and sea level rise. Billions of dollars in damage and long-lived environmental degradation would result today and for future generations.

Lack of Need for New Fossil Fuel Projects

As set forth more fully in Appendix II, the new fossil fuel projects will be of little to no benefit to residents and businesses in New Jersey. Any true increase in energy demand can be met with improvements in energy efficiency, conservation and clean renewable energy developments.

Two major projects would not even deliver any energy to State residents. The Meadowlands power plant would transmit electricity under the Hudson River to connect with a Con Edison substation in Manhattan. All of the electricity would be used in New York[24] and New York regulators have already stated it is not needed. Neither PSE&G nor PJM Interconnect has asked for this plant to be built to meet demands for electricity in NJ. Similarly, the Northeast Supply Enhancement (NESE) would deliver gas to the Rockaways Transfer Point in New York to be used by customers in Brooklyn, Queens, Staten Island and Long Island.[25] A study showed that the capacity far exceeds any additional need in New York and NYC Comptroller, Scott Stringer, publicly opposes it.

The New Jersey Rate Counsel and multiple independent studies have also found that the PennEast Pipeline is unneeded. Rate Counsel concluded that the forecasted supply and demand requirements for New Jersey and Pennsylvania local gas distribution companies could be met through existing supply arrangements. Rate Counsel stated that the annual regulatory filings of New Jersey and Pennsylvania utilities, which will be PennEast's customers, show that they have sufficient capacity without the new pipeline to meet forecasted load growth.

According to a study by the Labyrinth Consulting Group, "existing interstate pipelines supply all of New Jersey's natural gas demands," and that the true intent of the PennEast project is to deliver gas to other downstream markets.[26] Two studies by Skipping Stone on behalf of the NJ Conservation Foundation came to the same conclusion that New Jersey gas demands can be met by existing pipelines and supplemental supplies through 2030 and that PennEast is "not needed to meet peak winter demand, not even for a single day, even during extreme weather events."

Another Skipping Stone report showed that the major purpose of the Cape Atlantic Reliability pipeline (aka South Jersey Gas (SJG) Pipeline) is to allow an expansion of SJG business.

New Jersey Natural Gas' claim that its Pinelands Pipeline, the Southern Reliability Link (SRL), is needed for backup was shown in a Skipping Stone report to be highly

Much of the planned production is not even for the benefit of New Jersey residents or businesses.

unlikely. In addition, SRL fails to provide full backup and the same level of increased reliability could be provided by a 5.4-mile pipeline connection outside the Pinelands.

Williams' Garden State Expansion project supports SRL and can support NESE and PennEast. Since none of those pipelines are necessary, the Garden State Expansion is not necessary.

Williams has failed to cite any specific need other than general growth for its Gateway Expansion project and the proposed horsepower far exceeds that needed for the stated gas volume implying plans for out of state usage and/or export.

Williams stated that its third project, Rivervale South to Market, would serve the Northeast including New York and New Jersey, but has not made any other specific claims. While some of its capacity is to be provided to a terminal in Hudson County, this would clearly not be needed if its purpose is to feed the unnecessary Meadowlands power plant in North Bergen.

The Lambertville East Expansion expects to receive gas from PennEast, which itself, is unnecessary.

Empower NJ has not been able to find any evidence that any New Jersey utility or PJM Interconnect has indicated there is demand for the Phoenix Energy Center power plant and it would use PennEast gas.

The Pinelands Preservation Association has demonstrated that the BL England power plant is not needed for reliable electric service in the Pinelands and PJM Interconnect has said it is not needed to replace power from Oyster Creek.

Empower NJ has not been able to find any evidence that any New Jersey utility or PJM Interconnect has indicated there is demand for the Keasbey Energy Center project.

Political and Economic Factors Involved in Transitioning to a Green Economy

To meet the Administration's objective of 100% clean energy by 2050, and to uphold our commitments in the Global Warming Response Act and the US Climate Alliance, New Jersey needs to aggressively reduce, not increase, greenhouse gas emissions. This requires annual reduction benchmarks and objectives starting NOW. Approving any new fossil fuel expansion projects will move us further away from achieving necessary GHG targets and make it virtually impossible to fight climate change and achieve the Governor's 100% clean energy goal. As Will Rogers once said, "If you find yourself in a hole, stop digging."

The new fossil fuel projects will not only dramatically increase GHG's, but effectively choke off the development of clean new energy sources. According to research by Oil Change International[27], pipelines not only enable the exploitation of oil and gas reserves, but also lock in the use of oil and gas even as policies and markets shift

There is no need for the new fossil fuel projects.

toward zero-carbon sources. Once capital has been sunk into a pipeline, operators are incentivized to continue operation, even as policies or market alternatives try to move society away from the products they deliver. Major interstate gas transmission pipelines generally cost billions of dollars to build and years of pipeline operation are needed to recoup these capital expenditures. However, as the cost of operating pipelines is relatively small compared to their capital costs, pipeline companies are incentivized to continue their operations indefinitely. A new pipeline project may not make any economic sense when it is built, but once the capital is sunk into the project, it is unlikely to be shut down.

Another insidious factor in new gas infrastructure is that it competes with clean energy. The Oil Change International report cited above also states, "The cost of building and operating renewable energy plants is coming down fast and is close to parity with gas and coal, and in some cases, can already outperform those sources. This means that new gas plants are not only competing with existing coal plants, but increasingly with new wind and solar plants, not to mention other technological solutions such as efficiency, demand management and storage."

In addition, many of these expansion projects will incentivize property owners to convert to gas at a time when the solutions for saving the earth from the dangers of climate change will require a transition to electricity for heating and cooking. In short, the new projects will not only increase GHG's in the short term, but also make it more difficult to transition to clean energy solutions in the long term.

Another factor driving development of gas pipelines and unfairly increasing their competitiveness is FERC's power to guarantee a return on equity that is currently about 14 to 15 percent. This eliminates the risks of overdevelopment and decreases in demand[28] and incentivizes the building of new infrastructure even when existing pipelines can satisfy a region's energy needs. This guarantee attracts capital that could be used to develop renewable energy projects and makes it more challenging for investors to put money into renewable projects. Once fossil fuel projects are built it becomes much harder to justify renewable energy projects to displace them.

Green Energy Projects Will Create More Jobs

The Department of Energy 2017 U.S. Energy and Employment Report[29] shows that clean electricity jobs are the engine that drives America's electric energy economy, outstripping the number of paychecks provided by the fossil fuel industry by at least five to one. All told, nearly 1 million Americans are working near- or full-time in the energy efficiency, solar, wind, and alternative vehicles sectors. This is almost five times the current employment in the fossil fuel electric industry, which includes coal, gas, and oil workers.[30]

The fossil fuel projects will suppress the development of green energy and green jobs.

New Jersey needs a strong green jobs program for our climate and for our economy.

Examples of other studies and reports demonstrating the jobs benefits from green energy are:

The Stanford based TheSolutionsProject.org study[31] has shown that a transition to 100% renewable energy in New Jersey for all purposes (electricity, transportation, heating/cooling and industry needs) would create 58,600 operations jobs and 86,000 construction jobs. At the same time this would prevent 1,528 annual deaths from air pollution.

A study by Synapse Energy Economics[32], sponsored by the Labor Network for Sustainability, shows the nationwide commitment to reducing GHGs by 80% by 2050 would produce more than 550,000 jobs on average per year. It includes new jobs in energy efficiency programs, renewable energy production, and auto manufacturing (making electric cars).

A recent report by the ACEEE (American Council for an Energy Efficient Economy)[33] shows that the energy efficiency sub-segment alone employed 2.25 million Americans in 2017— more than the combined total of jobs to produce coal, oil, gas, and electricity (including renewables).

Empower NJ recommends that the Administration create a strong green jobs program including training and placement in the new green economy with a just transition for displaced fossil fuel workers. The faster New Jersey moves to renewable energy the faster the green job opportunities will increase. Our climate cannot wait and neither can New Jersey's economy. Not only is there a loss of growth opportunity associated with delayed action to rapidly reduce our greenhouse gas emissions, there will be direct negative economic impacts from the resulting climate disruptions.

The Moratorium

In order to meet its stated goals, the Administration should impose an immediate moratorium on all new fossil fuel infrastructure projects. The moratorium should last until the legislature, BPU and DEP develop rules and procedures and any laws needed to regulate GHG's in New Jersey, and adopt specific annual plans to reduce GHG's consistent with Executive Order 28, the State's commitments in the Global Warming Response Act and the US Climate Alliance.

In implementing the moratorium, the state should utilize all of its authority under state and federal law to freeze all permitting activities on all intrastate fossil projects and not approve interstate fossil fuel project permits. Actions that must occur before the moratorium is lifted include:

- Establish rules pursuant to the Clean Air Act (Title V), the New Jersey Global Warming Response Act and the NJ Air Pollution Control Act that place limits on GHG emissions and other pollutants, require fossil fuel applicants to conduct a comprehensive alternatives analysis of renewable energy technologies and enable the DEP to reject permits for projects that would cause New Jersey to exceed these limits. Currently, the DEP does not deny permits to any development based on GHG emissions, no matter how high the level.

- Utilize the NJ Air Pollution Control Act to regulate CO_2/GHG emissions. The act gives the DEP broad powers to determine air pollutants that are detrimental to public health and regulate them. In 2005 the DEP declared CO_2 an air pollutant that affects public health enabling it to regulate CO_2/GHG emissions.[34]

- Revise DEP policies that allow polluters to purchase ozone credits, which today allows virtually unlimited production of ozone precursors even in areas of the State that exceed ozone attainment levels and are already rated as 'F' by the American Lung Association for ground level ozone pollution. The DEP must be able to deny applicants permission to purchase credits in areas that already exceed unhealthy attainment limits or when this will cause ground level ozone levels to exceed unhealthy local limits.

- Update the DEP rules regarding air deposition in order to enable rejections of permits that would increase water pollution beyond specific limits.

- Establish rules requiring all applicants for intrastate fossil fuel projects to provide realistic options for utilizing renewable energy technologies.

- Remove the cost cap on renewable energy projects, which does not exist on other energy sources.

To meet the Administration's stated goal, there must be an immediate moratorium of new fossil fuel projects.

- Reverse Governor Christie's rollbacks of regulations on flood hazard rules, water quality management planning rules, the Coastal Area Facility Review Act, Wetlands and Storm Water Management rules that make it easier to build pipelines, other fossil fuel infrastructure developments as well as non-fossil fuel related developments in the Highlands and Pinelands, near water resources and other sensitive environmental areas.

- Champion a full ban on fracking and its associated activities throughout the Delaware River Basin and in New Jersey.[35]

- Appoint new members to the Pinelands Commission and Highlands Council, who will protect these fragile areas and the water supplies they provide and act consistently with Executive Order 28.

- Advise all proponents of the fossil fuel projects that if they continue to move forward on the projects, they do so at their own risk and with the understanding that they may never be built.

- Create a strong green jobs program including training and placement in the new green economy, built on and driving living wage, union jobs in emerging sectors (solar, offshore wind, electric car infrastructure, efficiency, etc.) with a special focus in environmental justice communities and a just transition for displaced fossil fuel workers.

No one ever said that changes of this magnitude are painless and easy, but the existential threat of climate change is clear and growing closer each day. We must have the political will to do what is necessary to fight it. As Senator Loretta Weinberg communicated at a 10/23/18 rally against the Meadowlands power plant:

We have a long history of missteps when it comes to our environment. Too often, we have chosen the side of the polluter under the belief that the jobs or investments will be worth it. Such shortsightedness has, time and again, exacted a high toll on our water and air quality. We have a choice to make. We can choose the quick buck today and choke on unbreathable air for decades. Or, we can say "no, not this time!"

We need to fight the existential threat of climate change now. Delay is not an option.

APPENDIX I

GREENHOUSE GAS (GHG) EMISSIONS FROM NEW FOSSIL FUEL PROJECTS

The Empower NJ: Stop Fossil Fuel Projects Coalition has identified 12 new gas infrastructure projects in various states of proposal, planning, permitting and initial implementation in New Jersey. Eight of the 12 are new pipelines or compressor stations/upgrades. Four are new power plants. In an effort to assess the total impact these projects would have on New Jersey and on the Administration's commitment to eliminate fossil fuel usage to achieve 100% clean renewable energy by 2050, the coalition estimated the total GHG emissions these plants would add in New Jersey. (A fifth power plant, Sewaren 7, received its air quality permit from the Murphy administration and went into service in mid 2018 and is included in this analysis as its emissions should be part of the total view of additional GHGs from gas infrastructure projects under the current administration. The emissions from this plant are not in the latest (2017) EPA/DEP GHG report and must be considered as already putting NJ deeper into the GHG hole and, therefore, will require even more GHG reduction than may have been previously estimated.)

The tables below show the estimated annual CO_2 and Methane CO_2e (CO_2 equivalent) GHG emissions from each of these projects, the total for each project and the cumulative total for the state based on both full lifecycle methane leakage (extraction to consumption, which includes leakage in Pennsylvania) and partial methane leakage (transportation to consumption which is primarily leakage in New Jersey).

This is a complex analysis due to several factors:

- There is clear overlap among some of the projects in terms of gas volume. A number of these projects expect to receive gas from the PennEast pipeline and the emissions from those projects needed to be excluded from the total as the total includes the PennEast emissions themselves.
- One of the projects, Northeast Supply Enhancement (aka NESE) will receive gas from PennEast and send it to NY for consumption. Thus, not only have its GHG emissions been excluded from the total but its gas volume was subtracted from that of PennEast since the PennEast emissions should only reflect consumption in New Jersey.
- Compressor projects include information on additional pumping capacity but in some cases it is not clear which, if any, pipelines among the new projects will receive this gas.
- In some cases it was not possible to determine the source of the gas for power plants or new compressor stations due to the lack of information on projects or the need to analyze maps of the proposed network of gas pipelines. Those situations have been noted.
- Type of power plant technology and emissions data for some plants is not yet available.

The projects whose emissions are not included in the totals are shown in gray in the tables below and their emissions calculations are provided for education and informational purposes.

The methodology for estimating these emissions for the pipelines is based on the Oil Change International algorithm.[36] It assumes that all gas going into a pipeline is burned at some point whether by a power plant or home/business heating, cooking, etc. The algorithm uses gas capacity to compute both CO_2 emissions and CO_2e emissions from methane leakage. Pipeline gas capacity is provided by all pipeline descriptions and is easily available. A summary of the calculations is listed below (for more details see the Oil Change document):

- Gas combustion converted to metric tons of CO_2: 1Bcf = 69,726 Tons CO_2

- Percent of methane leakage (volume): 2.6% (The Oil Change algorithm used 3.8% but the more recent PSE Healthy Energy 2017 report on Marcellus shale GHG emissions,[37] analyzed the national average of methane leakage for the entire gas production, processing, transportation and storage system taking into account atmospheric measurements published since 2014 and estimated the weighted national average to be 2.6% ±1.2%. It concluded that this is a good value for emissions in the Marcellus shale area. This includes total lifecycle methane leakage from extraction to consumption.)

- Percent of methane leakage associated with transportation and consumption: 17%. This was based on a July 2018 article in Science magazine.[38] It shows most of the methane leakage occurs as part of the extraction, gathering and processing activities and only 17% is associated with transportation and consumption. This analysis shows both the full lifecycle and transportation/consumption views separately for informational purposes.

- Methane leakage volume converted to metric tons: 1Tcf = 19.26 Million Metric Tons

- Methane mass (tons) converted to CO2e: 86 (the methane tonnage is multiplied by this factor since methane is 86 times more effective as a GHG than CO2 over a 20 year span).

- Pipeline operational utilization: 90% (this is the percent of the time the pipeline will operate at full capacity). The Oil Change algorithm used 95% but it was lowered to 90% to be more conservative. Oil Change said that 95% was reasonable for new pipelines which should have relatively low maintenance needs and will work to maximize return by high utilization.

The GHG emissions for power plants was based either on data from the DEP (for plants that have applied for permits or are operational) or was modeled based on the Meadowlands power plant data as this reflects new technology that is assumed for other new plants.

The results in Table 1 below show the effect of the full life cycle leakage of methane. Total estimated CO2 emissions from burning the gas in these pipelines and power plants are 24.35 million metric tons/year. The estimated methane leakage from both adds another 13.65 million metric tons/year in CO2e GHGs for a total of 43.2 million metric tons/year of additional GHG emissions in New Jersey and in Pennsylvania where the bulk of the methane leakage will take place. (Note – the totals from CO2 and methane above do not include the total CO2e emissions from Sewaren 7, as can be seen in the table. The total emissions are the sum of the CO2 emissions, the methane CO2e emissions and the total CO2e emissions from Sewaren 7.)

Table 2 below shows the results by only considering the estimated methane leakage associated with transportation and consumption. It has the same volume of CO2 emissions but only 2.44 million metric tons/year from estimated methane leakage for a total of 32.05 million metric tons/year of additional estimated GHG CO2e emissions in New Jersey (including Sewaren 7).

It is also very illuminating to examine the emissions from power plants separate from the pipelines since pipeline gas will generally support both residential/business needs as well as power plants. The total CO2e estimated emissions from these five power plants are 14.2M metric tons/year (the methane leakage estimates for power plants is independent of the lifecycle considerations). Considering that New Jersey's 2017 in-state power emissions were 18.6 million tons of CO2e, according to the U.S. Environmental Protection Agency,[39] this is equivalent to an increase of 76%.

As described above there are some voids in the information needed to more precisely compute these GHG emissions. However, even if all the new projects use PennEast gas for 100% of their needs, the most by which this this could reduce the total in Table 2 would be about 11 million metric tons, leaving a net increase of approximately 21 million metric tons. Considering NJ total GHG emissions per year are about 100 million metric tons[40] this represents a 21% increase in an era when the most urgent goal is to reduce total GHGs.

If readers of this report believe that it has errors or significant omissions the coalition urges them to perform their own estimates and review the algorithms and assumptions (such as overlaps in these projects) and come to their own conclusions. Empower NJ will provide all the details on its calculations and work with any other entities who wish to perform their own analysis.

Table 1 - GHG Emissions (Full Methane Lifecycle - Extraction to Consumption)

PIPELINE PROJECTS	CO_2 Emissions (MM* Tons/Y)	CO_2e Methane Emissions (MM Tons/Y)	Total CO_2e Emissions (MM Tons/Y)
PennEast Pipeline (Central NJ)[1]	13.73	9.90	23.64
PennEast Pipeline (3 Compressors in PA)[2]	0.19	0.00	0.19
Northeast Supply Enhancement (NESE) (Somerset and Middlesex Counties, Raritan Bay)[3]	7.85	5.66	13.51
NESE Compressor #206 (Somerset NJ)[4]	0.14	0.003	0.14
Cape Atlantic Reliability Project (aka South Jersey Gas pipeline) (Pinelands)[5]	1.13	0.82	1.95
Southern Reliability Link (Pinelands)[6]	2.75	1.98	4.73
Garden State Expansion Project [7,8,17]	3.53	2.55	6.12
Gateway Expansion Project (Roseland) [7,8,9]	1.28	0.92	2.19
Rivervale South to Market (Hudson, Bergen County and Meadowlands)	3.73	2.69	6.42
Lambertville East Expansion (Lambertville)10	1.18	0.85	2.03
Lambertville East Expansion Compressors[11]	unk	unk	0.10
Net Emissions from Pipeline Projects	18.74	13.51	32.35
POWER PLANT PROJECTS			
North Bergen Liberty Generating Station (aka Meadowlands Power Plant) (North Bergen)[12]	3.50	0.09	3.59
Phoenix Energy Center (Holland Twp)[13,14]	1.93	0.04	1.98
BL England (Upper Twp)[13]	1.30	0.03	1.34
Keasbey Energy Center (Woodbridge)[13,16]	2.11	0.05	2.17
Sewaren 7 (Woodbridge)[15]	unk	unk	5.16
Total Power Plant Emissions (Informational)	8.85	0.21	14.23
Net Emissions from Power Plants	**5.61**	**0.14**	**10.91**
Total Emissions	**24.35**	**13.65**	**43.26**

*Million Metric

Table 2 - GHG Emissions (Methane Transportation and Consumption Only)			
PIPELINE PROJECTS	CO_2 Emissions (MM* Tons/Y)	CO_2e Methane Emissions (MM Tons/Y)	Total CO_2e Emissions (MM Tons/Y)
PennEast Pipeline (Central NJ)[1]	13.73	1.68	15.42
PennEast Pipeline (3 Compressors in PA)[2]	0.19	0.00	0.19
Northeast Supply Enhancement (NESE) (Somerset and Middlesex Counties, Raritan Bay)[3]	7.85	0.96	8.81
NESE Compressor #206 (Somerset NJ)[4]	0.14	0.003	0.14
Cape Atlantic Reliability Project (aka South Jersey Gas pipeline)[5]	1.13	0.14	1.27
Southern Reliability Link (Pinelands)[6]	2.75	0.34	3.08
Garden State Expansion project[7,8,17]	3.53	0.43	4.00
Gateway Expansion Project (Roseland)[7,8,9]	1.28	0.16	1.43
Rivervale South to Market (Hudson, Bergen County and Meadowlands)	3.73	0.46	4.18
Lambertville East Expansion (Lambertville)[10]	1.18	0.14	1.32
Lambertville East Expansion Compressors[11]	unk	unk	0.10
Net Emissions from Pipeline Projects	18.74	2.30	21.13
POWER PLANT PROJECTS			
North Bergen Liberty Generating Station (aka Meadowlands Power Plant) (North Bergen)[12]	3.5	0.09	3.59
Phoenix Energy Center (Holland Twp)[13,14]	1.93	0.04	1.98
BL England (Upper Twp)[13]	1.3	0.03	1.34
Keasbey Energy Center (Woodbridge)[13,16]	2.11	0.05	2.17
Sewaren 7 (Woodbridge)[15]	unk	unk	5.16
Total Power Plant Emissions (Informational)	8.85	0.21	14.23
Net Emissions from Power Plants	**5.61**	**0.14**	**10.91**
Total Emissions	**24.35**	**2.44**	**32.05**

*Million Metric

Notes: (Same for both tables)

1. Gas volume used in NESE was subtracted from total PennEast volume as PennEast is the source of gas for NESE and this will be burned in NY.

2. CO_2 emissions taken from FERC Final EIS for PennEast, Methane emissions computed based on NESE application for similar compressors.

3. All of the gas carried by the NESE pipeline is expected to be consumed in New York, other than that used to power the compressor.

4. CO_2 mass numbers are taken directly from the NESE FERC DEIS. Methane emission from NESE application.

5. GHG estimates based on the volume of gas capacity over the amount needed by BL England.

6. Assumes half of the capacity is used for reliability and the other half is used to support new customers. GHG calculation reflects half of the capacity.

7. Compressors are electric driven and do not burn methane as a power source.

8. Total GHG emissions include additional gas that will be carried by pipelines and compressor emissions.

9. Total additional horsepower is 33,000 to support additional 65K dekatherms/day (dt/d), while previous upgrade added 2,500 hp to support 115K dt/d. Total capacity of 33,000 hp is 1.5M dt/d but only used the stated increase of 65K dt/d.

10. Emissions estimated from burning and leakage of additional gas capacity. Commissioner LeFleur stated that total additional CO_2e emissions would be 1.16M metric tons.

11. Total CO_2e emissions from new compressors as stated in FERC EA. Separate data on CO_2 and methane was not provided.

12. CO_2 emissions are based on applicant's submission to NJDEP. Methane emissions are based on F&WW estimate including leakage. Gas for this plant will come from Williams Transco but it is not clear how much will be provided by the additional capacity of the Rivervale project. The plant needs about 110M cf/d and Rivervale will only provide 50M cf/d to Transco's station in Hudson County.

13. Emissions are estimated based on those expected from the North Bergen plant as no information has been found on the gas power technology that will be used.

14. Methane burned by this plant would come from the PennEast pipeline whose emissions are shown in that pipeline section above. Emissions from the Phoenix plant are not included in the total emissions.

15. Emission data from NJDEP operating permit. Plant started operations in mid 2018 and emissions need to be counted as new. Since this plant is in operation it does not need gas from any new pipeline project. Sewaren 7 replaced four older peaker plants (Sewaren 1, 2, 3, 4) which were shut down, thus its emissions should be considered a combination of replacements and new (it is not a peaker plant).

16. It is not known which proposed pipeline project, if any, would supply gas to this power plant. There may be some overlap in the computation of emissions between pipelines and power plants.

17. Phase 1 of the Garden State Expansion project, which only contributes about 11% of that project's total capacity, was completed in September 2017. The second compressor was completed in 2018.

APPENDIX II

13 FOSSIL FUEL PROJECTS IN NEW JERSEY

Pipelines and Supporting Infrastructure

Below is the list of the major new fracked gas pipelines and other supporting fossil fuel infrastructure projects such as compressor stations currently proposed or in various stages of planning and permitting. Only one, the Garden State Expansion Project has been constructed. Construction has not started the other projects except for the Southern Reliability Link.

Gas pipelines all need compressor stations. Information on the health problems caused by emissions from these stations is provided in Appendix IV and Appendix V, instead of repeating this information for each project.

PennEast Pipeline (Central NJ)
(FERC docket number CP15-558)

There is significant grassroots and litigation opposition to this project led by the Delaware Riverkeeper Network, NJ Sierra Club, Environment NJ, HALT and Rethink Energy NJ.

The proposed 118-mile PennEast pipeline would cross the Delaware Wild and Scenic River and more than 4,300 acres of preserved lands in New Jersey, threatening significant natural and historic resources. The pipeline would originate in Dallas, Luzerne County, in northeastern Pennsylvania, and terminate at Transco's pipeline interconnection near Pennington, Mercer County, New Jersey (approximately one-third of the route is located in New Jersey).

The PennEast pipeline would bring an additional 1.1 billion cubic feet per day of gas to Southeast Pennsylvania and New Jersey. Multiple experts have stated and documented that there is no need for the PennEast pipeline. According to a study by the Labyrinth Consulting Group41, operation of PennEast, as proposed by the operator would result in a 53% surplus beyond current demand in New Jersey. The Labyrinth Study also concluded that "existing interstate pipelines supply all of New Jersey's natural gas demands," and that the true intent of the project is to deliver gas to other downstream markets. A report written by Barbara Blumenthal, Ph.D., research director, NJ Conservation, provides data and analysis showing that the pipeline isn't needed to satisfy need, to reduce natural gas prices, or to ensure reliability or a low-cost transition to a clean energy future.[42]

Two studies by Skipping Stone came to the same conclusion regarding the lack of need for PennEast. Skipping Stone first analyzed the assertion that PennEast was required to provide year round service, and/or even to meet peak winter demand in 2016, and found no evidence that it was required. The report states that both New Jersey and eastern Pennsylvania natural gas demands can be met by existing pipelines and supplemental supplies through 2030.[43]

Skipping Stone performed a second analysis based on winter weather for 2017/2018 (aka the "bomb-cyclone") and stated, "Our analysis shows that gas flow for this region is now bi-directional, which has greatly expanded the available delivery capacity, without additional, pipeline capacity into the subject region," and, "this analysis shows that PennEast is not needed to meet peak winter demand, not even for a single day, even during extreme weather events."[44]

The New Jersey Rate Counsel, an independent state agency that represents the interests of utility customers, has concluded that the project backers have failed to demonstrate actual need for the gas.

PennEast asserts that the need for the pipeline is demonstrated by contracts for most of the proposed pipeline's capacity. As described by the New Jersey Division of Rate Counsel's comments on the PennEast FERC

Docket these contracts do not demonstrate need; it is the PennEast companies that have contracted *for their own capacity* in order to support their argument that there is a need.

"PennEast bases its claim of need on "precedent agreements with seven foundation shippers and twelve total shippers, which together combine for a commitment of firm capacity of 990,000 dekatherms per day ('Dth/d')," approximately 90% of the Project's total capacity. …. In this case, approximately 610,000 Dth/d of the 990,000 Dth/d of capacity has been contracted by affiliates of the Project owners. ….. Of the twelve shippers that have subscribed to Project capacity, five of them are affiliates of companies that collectively own PennEast. ….. **Thus, two-thirds of the demand for the pipeline exists because the Project's stakeholders have said it is needed. This self-dealing undermines the assertion of need that the DEIS relies upon** …." (emphasis added; *citations omitted*)[45]

A NJSpotlight article on Nov. 2016 states, "Rate Counsel notes PennEast bases the need on the fact that several New Jersey and Pennsylvania utilities — some of which are sponsors of the project — have subscribed to 60 percent of the pipeline's anticipated capacity. But Rate Counsel countered that those same utilities, in annual filings to state regulators, "make plain that they have sufficient capacity without the new pipeline to meet forecasted load growth." [46]

The Rate Counsel's comments to FERC go on to state, "Given that two-thirds of the capacity under precedent agreements is with affiliates of the owners, the DEIS should have included an independent analysis of the need for the capacity the proposed Project will provide. NJ Rate Counsel asserts that such an independent analysis would have revealed that the forecasted supply and demand requirements for New Jersey and Pennsylvania local gas distribution companies ("LDCs") can be met through existing supply arrangements. Data show that the forecasted demands of the LDCs (local distribution companies) that PennEast is designed to supply are already being met by existing gas supply arrangements and available transportation capacity."[47]

"The pipeline proposed by the PennEast Pipeline Company, LLC…would adversely and permanently affect critical forest and water resources that provide essential habitat and other natural resource services." stated Bonnie Watson Coleman, U.S. Representative (D – District 12). The PennEast pipeline would cut through 67 bodies of water and over 15,186 feet of wetlands. It would clear thousands of acres of forest in New Jersey, fragmenting mature forests into smaller patches of habitat, reducing their value for forest-dependent wildlife and making these areas more susceptible to colonization by non-native invasive species that can out-compete native species.

The PennEast project includes three Solar Mars 100 compressor units (total 47,700 hp) in Kidder Twp. (Carbon County) PA. Based on data from the NESE applicant, each such unit could emit 130,863 tons of CO_2/year and 33.4 tons of methane/year for a total of 392,589 tons of CO_2/yr. and 100.2 tons of methane/yr from the burning of methane to power the compressors.

Based on the assumptions and estimates documented in Appendix I the total annual GHG emissions from the PennEast pipeline would be:

- Emissions from the combustion of the gas the pipeline would carry = 13.73 MMt (million metric tons) CO_2
- Total emissions from methane leaked across the gas supply chain (extraction to consumption) (Pennsylvania and New Jersey) = 9.9 MMt CO_2e
- Emissions from methane leaked during transportation and consumption in New Jersey = 1.68 MMt CO_2e
- Total emissions from pipeline in New Jersey = 15.42 MMt CO_2e

Emissions from the three compressors in Pennsylvania would be 0.19MMt of CO_2.

On September 19, 2018, New Jersey's Office of the Attorney General filed a petition for review of FERC's certificate for the PennEast pipeline in the D.C. Circuit of the U.S. Court of Appeals.

Northeast Supply Enhancement aka NESE (Somerset and Middlesex Counties and the Raritan Bay) (FERC docket number CP17-101)

Grassroots opposition to this project is lead by SCRAP-NESE (Stop Compressor and Resist Added Pipeline – Northeast Supply Enhancement Project) https://www.scrap-nese.org with support from many environmental organizations.

Williams is in the application review stage of the Northeast Supply Enhancement Project, also called NESE. The project is being designed to add 400,000 dekatherms (400M cubic feet) per day of additional natural gas transmission capacity and is targeted to start construction in the fall/winter of 2019 and be in service for the winter heating season of 2020. The project design includes:

Greenfield Compressor Station 206, Somerset County, New Jersey – a new 32,000 HP compressor station near Transco's mainline consisting of two natural gas-fired compressor units and associated facilities.

- Approximately 10 mile, 42 inch loop (pipeline laid parallel to existing lines) in Lancaster County, Pennsylvania,
- Compressor Station 200, Chester County, Pennsylvania – add 21,902 HP by installing one electric motor-driven compressor unit,
- Approximately 3.4 mile, 26-inch loop of Transco's existing Lower NY Bay Lateral from Transco's Station 207 downstream to the Morgan meter and Regulating station, Middlesex County, New Jersey (onshore)
- Approximately 23 mile, 26-inch loop of the existing Lower NY Bay Lateral from the Morgan Meter and Regulating station in Middlesex County, New Jersey to the Rockaway Transfer Point, New York State waters (offshore) which would trench 23 miles of ocean floor and churn up toxins that will land on beaches.

The Northeast Supply Enhancement project will increase Transco pipeline deliveries to National Grid (distributor) by 400 million cubic feet per day.

Williams withdrew and resubmitted applications for the following permits in June 2018:

- Waterfront Development Individual Permit
- Water Quality Certificate under Section 401 of the Clean Water Act
- Flood Hazard Area Individual Permit and Verification
- Freshwater Wetlands Individual Permit and accompanying Transition Area Waiver
- Concurrence with Applicant's Coastal Zone Management Act (CZMA) Consistency Assessment.

A report commissioned by the EELC and written by Michael Aucott48, which reviewed documents associated with the project including Transco's Resource Report 9 on Air Quality & Noise, and FERC's Draft Environmental Impact Statement dated March 2018, stated:

(1) Transco's emissions of nitrogen oxides (NOx) will exacerbate the region's ozone pollution problem. The project will be built in an area that is in a Clean Air Act "non-attainment area for ozone pollution. Construction of the pipeline will emit a precursor for ozone, nitrogen oxides (NOx), in a quantity that is well above acceptable levels (100 tons per year). Transco's proposal to mitigate these emissions is faulty.

(2) Transco's statements on New York City's demand for natural gas rely on outdated City documents that have been revised and updated numerous times. The up-to-date City documents do not support Transco's position. The proposed pipeline's supply of 400,000 dekatherms per day is more than twice as much additional natural gas as NYC would need even if it achieved the highly unlikely goal of converting all of its residential and commercial buildings' fuel oil use to natural gas. Given the City's current emphasis on implementation

of efficiency measures designed to reduce demand for natural gas, and the possibility that increasingly cost-effective non-fossil fuel energy sources including solar and wind will displace natural gas for some uses, there appears to be no realistic possibility that the bulk of the proposed project's natural gas supply increase will actually be needed to convert the City's buildings' fuel oil use to natural gas. Implementing a pipeline construction project that would more than double the supply of natural gas that the City would be likely to need in the extremely unlikely possibility that it could convert all its buildings' fuel oil use to natural gas is inimical to the expressed goal of the City to actually reduce its dependence on natural gas and to make major reductions in its emissions of greenhouse gases.

(3) Hazardous Air Pollutant emissions from the Project will significantly exceed NJDEP's new HAP reporting thresholds. Transco's Resource Report 9, published March 2017, asserted that Transco's Hazardous Air Pollutant emissions would be below NJDEP's reporting thresholds. That is no longer accurate. New NJDEP thresholds became effective in February 2018. These current HAP reporting thresholds appear in N.J.A.C. 7:27-17.9. According to these thresholds, HAP emissions from each of the two Mars 100 turbines exceed reporting thresholds for formaldehyde, acetaldehyde, acrolein, benzene, ethylbenzene, napththalene, and propylene oxide. Transco's position on the health impact of Hazardous Air Pollutants was based on compliance with the old NJDEP thresholds: that position must be revisited.

(See Appendix IV and Appendix V for information on health problems from gas compressor emissions.)

Even if it can be demonstrated that the NESE project can provide an overall benefit to New York City (and this may be unlikely), no benefits are projected to accrue to New Jersey. And the people and the environment of that state will bear the impacts of the excess emissions of NOx and the associated threat of exacerbation of ozone pollution.

New York City Comptroller Scott Stringer provided the following statement on 9/5/18 opposing the Williams pipeline:[49]

"New York City is on the path to a greener, more sustainable future and the construction of the proposed Williams Northeast Supply Enhancement pipeline in the Rockaways is simply a monumental step backwards from that vision."

"The 23-mile pipeline would extend from New Jersey, along the Staten Island coast, past Coney Island and into the Rockaways. Allowing the construction of the pipeline risks damage to many of New York's most precious habitats and natural assets, including New York Harbor, Jamaica Bay, and the Rockaway's many beaches."

"I urge the Federal Energy Regulatory Commission to reject plans for the Williams pipeline and to deliver an Environmental Impact Statement that truly accounts for the harm that climate change and rising sea levels pose to New Yorkers and our environment."

"Our goal of cutting 80 percent of emissions by 2050 makes the construction of this pipeline wholly unnecessary. Rather than enhance the energy infrastructure of yesterday, our City must instead do all that it can to transition to renewable energy sources and promote greater energy efficiency."

Other environmental dangers besides climate change include:

- Air pollution
- High heat exhaust and volume from smokestacks at CS206 (unstudied effects on wildlife or the environment)
- Spread of toxic groundwater & toxic soil
- Destruction of habitat for threatened & endangered species
- Trenching 23 miles of ocean floor, which will churn up toxins that will endanger sea life and land on beaches.
- Transco's NESE Project will impact a significant amount of wetland in New Jersey — over 41 acres,

including approximately 20 acres of forested wetland. In addition, the NESE Project will remove 35.3 acres of upland forest, and the impacts will be long term or permanent. The trees would take up to 50 years (or longer) to become reestablished, and cannot be reestablished directly over the pipeline.

- Noise & toxin impacts on marine life as well as habitats for wildlife in/by the Bay
- Damage to wetlands, removal of trees, constructing in soils that produce sulfuric acid when exposed to the air (and create very difficult re-vegetation conditions)
- Increased velocity of gas leading to increased chances of more rapid corrosion leading to increased chances of unexpected cracks, leaks or explosions (thus, more methane released and potential to spread toxins from nearby Superfund and toxic sites)
- Potential economic damage to the fishing and recreation industry by the bay.

Under the Murphy Administration, the NJDEP's Air Quality Division denied a request to withdraw the 9/7/17 Air Pollution Control Preconstruction Permit and Certificate to Operate Construction of a New Source (10/17/18 letter from Ken Ratzman) even though they are allowed to do so since there has not been any activity at the CS206 site for one year after issuance of this permit.

The Murphy administration can stop the NESE project under the following rules:

1. NJDEP can deny permit applications for the following (received by NJDEP on 6/20/18)

- Waterfront Development Individual Permit
- Water Quality Certificate under Section 401 of the Clean Water Act
- Flood Hazard Area Individual Permit and Verification
- Freshwater Wetlands Individual Permit and accompanying Transition Area Waiver
- Concurrence with Applicant's Coastal Zone Management Act (CZMA) Consistency Assessment.

2. NJDEP can withdraw the Air Pollution Control Preconstruction Permit and Certificate to Operate Construction of a New Source and require Williams/Transco to submit a new application that would need to address the new HAP reporting thresholds in N.J.A.C. 7:27-17.9.

3. Demand a Health Impact Assessment be conducted around the proposed CS206 site before, during and after construction (if approved).

According to the Freshwater Wetlands Protection Act Rules, N.J.A.C. 7:7A, "compelling public need" means that "based on specific facts, the proposed regulated activity will serve an essential health or safety need of the municipality in which the proposed regulated activity is located, that the public health and safety benefit from the proposed use and that the proposed use is required to serve existing needs of the residents of the State, and that there is no other means available to meet the established public need." Clearly this is not the situation with the NESE compressor station and pipeline.

The Williams DEIS stated the annual potential to emit for Compressor Station 206 in New Jersey as being 130,863 tons of CO_2 per year and 33.4 tons of methane per year. Based on the assumptions described in Appendix I it is estimated that total annual GHG emissions in the region (all of the gas is expected to be consumed in New York) would be as follows:

- Emissions from the combustion of the gas the pipeline would carry = 7.85 MMt (million metric tons) CO_2
- Total emissions from methane leaked across the gas supply chain (extraction to consumption) (Pennsylvania and New Jersey) = 5.86 MMt CO_2e
- Emissions from methane leaked during transportation and consumption in New Jersey and New York = 0.96 MMt CO_2e
- Total emissions from pipeline in New Jersey and New York = 15.42 MMt CO_2e

The Somerset compressor would emit 0.14 MMt of CO_2 per year.

Cape Atlantic Reliability Project (aka South Jersey Gas pipeline)

The pipeline would be approximately 22 miles from just outside Millville in Maurice River Township, Cumberland County, through Estell Manor to Beesley's Point in Upper Township, Cape May County. Pipeline capacity is 125M cf/day.

This 22-mile, 24" natural gas pipeline would traverse the Pinelands Forest Area of Cumberland and Cape May Counties to deliver natural gas for a proposed new electric generating facility at the BL England site on the shore of Great Egg Harbor. It would traverse the Forest Area, a Pinelands planning district where this type of infrastructure is forbidden by the Pinelands CMP, unless it primarily serves the needs of people already in the Pinelands. The SJG pipeline would destroy sensitive ecosystems of the Pinelands and create air and water pollution that threatens communities and contaminates drinking water.

RCCM (the owner of the BL England plant) has a 20-year Standard Gas Service Agreement ("SA") with SJG for 125,000 Mcf (thousand cubic feet) per day. Assuming a 6,500 Btu/KWh heat rate, a 447 MW combined cycle facility will burn approximately 69,700 Dth or approximately 67,224 Mcf of natural gas per day when operating at 100%. This amount is slightly more than just half the 125,000 Mcf per day ("Mcfd") Daily Contract Quantity of the SA with SJG. Annualizing the 67,224 Mcfd yields an annual quantity of 23,535,391 Mcf per Year. Assuming the plant runs at full capacity, which is likely to be somewhat smaller when taking into account normal maintenance, actual use is estimated at 22,600,000 Mcf. This number is consistent with the Annual Minimum Quantity set forth under the SA of 20,797,397 Mcf per year.

Pinelands Preservation Alliance, New Jersey Sierra Club, and Environment New Jersey challenged the Pinelands Commission approvals in the appeals court, based on the merits of the decision and the way the Commission went about it. Despite being held up in court, the Murphy Administration granted South Jersey Gas permit extensions.

The Appellate Division of the Superior Court of New Jersey issued a ruling in early November 2016 on the consolidated appeals of the approvals of the New Jersey Board of Public Utilities and Pinelands Commission staff of the Cape Atlantic Reliability Pipeline. The decision affirmed the approval issued by the Board of Public Utilities regarding the proposed pipeline, and remanded the issue of whether the proposed pipeline conforms to the Pinelands Comprehensive Management Plan to the full Pinelands Commission for decision.

Although the court's ruling directs that the full Pinelands Commission must decide whether the pipeline conforms to the Comprehensive Management Plan, it affirmed the BPU's determination that the pipeline to supply a repowered B.L. England plant is necessary for the service, convenience or welfare of the public.

As of February 24, 2017, South Jersey Gas received final approval from the New Jersey Pinelands Commission to construct its Cape Atlantic Reliability Project.

The proposed pipeline is exactly the kind of infrastructure development which the CMP bars from the Forest Area because, once approved, such developments (1) create pressure for more development along their length (whatever the project's proponents may hope or claim today), (2) strike at the integrity of the CMP, (3) create precedents for future violations of the CMP, and (4) risk damage to natural resources in a Pinelands conservation zone. If this project is approved, it will render the long-standing, fundamental rule of the CMP governing infrastructure in the Forest Area completely meaningless.

In her January 2014 findings regarding the proposed pipeline, the Executive Director of the Pinelands Commission (Nancy Wittenberg) stated that, "the proposed pipeline is not fully consistent with the permitted use standards for a Forest Area." The draft MOA, which both the Commission's Executive Director and SJG urged the Commission to adopt, stated, "Given that the proposed pipeline is in-

tended to serve customers located both inside and outside of the Pinelands, it is evident that the project does not primarily serve only the needs of the Pinelands."

SJG's claim that the whole capacity of the pipeline is committed to the power plant is false and misleading. It is not technically defensible on any operating scenario and, given the company's ability to operate the pipeline at 700 psig, its argument simply represents an attempt to do a bait and switch on the BPU and Pinelands Commission.

The BL England plant itself does not and will not primarily serve the needs of the Pinelands, because the vast majority of demands for electricity are outside the Pinelands.

The pipeline will be immersed in the Kirkwood-Cohansey Aquifer along much, if not most, of its length. Natural gas leaks into the aquifer may cause significant natural resource damage. The route crosses several non-degradation streams designated as "PL" or "FW1" streams under the state surface water quality standards and Clean Water Act. No activity is permitted that may affect the water quality of these streams except towards improved water quality.

A Skipping Stone report from January 2017[50] stated:

Customers within the Pinelands represent less than 30% of total gas customers benefitted by the "redundancy" benefit purported by SJG. The total capacity of the line would be available to SJG to serve non-BL England customers on the highest demand days of the year and primarily serve a redundancy /reliability purpose and a potential SJG market growth of as many as 100,000 +/- residential customers (emphasis added). This is due to the excess capacity of the line relative to the use that the (Power) Plant could make of the line.

The report concluded that:

- the proposed pipeline is designed for a capacity several times the amount of natural gas that a new 447 KW power plant at the BL England site could consume.

- the agreement between SJG and the owners of the BL England Plant gives SJG's other customers first call on the capacity of the new pipeline.

- the great majority of South Jersey Gas customers who could receive gas through the new pipeline are outside the Pinelands.

- Accordingly, it is our conclusion that the proposed pipeline will not "primarily serve the needs of the Pinelands."

The Skipping Stone report clearly shows that a major purpose is to allow expansion of SJG business. In the section of this report on the repowering of the BL England plant are statements from the Pinelands Preservation Association demonstrating that it unnecessary to repower BL England (see section on BL England power plant below). The conclusion is that neither SJG nor the BL England plant are needed to support current NJ residents.

GHG emissions are based on the portion of the gas that would be available in the pipeline to serve residents after meeting the needs of BL England. Although SJG's residential customers have priority, for purposes of these computations it is assumed that the pipeline delivers the total amount needed for BL England (the associated GHG emission volumes are shown in the BL England section below).

Based on the assumptions described in Appendix I the annual volume of GHG's would be as follows:

- Emissions from the combustion of the gas the pipeline would carry = 1.13 MMt (million metric tons) CO_2

- Total emissions from methane leaked across the gas supply chain (extraction to consumption) (Pennsylvania and New Jersey) = 0.82 MMt CO_2e

- Emissions from methane leaked during transportation and consumption in New Jersey = 0.14 MMt CO_2e

- Total emissions from pipeline in New Jersey = 1.27 MMt CO_2e

Southern Reliability Link (FERC docket number CP15-89)

New Jersey Natural Gas (NJNG) has submitted an application to the NJ Board of Public Utilities and the Pinelands Commission to build a 28-mile long, 30-inch diameter natural gas pipeline through portions of Burlington and Ocean Counties. The proposed route passes through Chesterfield, North Hanover, Upper Freehold and Plumsted before reaching Route 539, where it turns south and enters the Pinelands and travels through the Joint Base. Before leaving the Base, the route then turns east near the southern boundary of the Base, enters the Borough of Lakehurst and ends in Manchester. NJNG promotes it as a second pipeline feeding the southern end of its territory that would enhance the reliability of the service provided to customers.

On January 27, 2016, the BPU approved the company's request to construct and operate the SRL. On March 18, 2016, the BPU found the SRL reasonably necessary for the service, convenience or welfare of the public.

The BPU approval in 2017 was based on the stated rationale that it would provide greater reliability to NJNG's customers in the event of a major interruption on TETCO (Texas Eastern Transmission Company), the primary pipeline supplying gas to NJNG's network. In its approval, BPU explained that SRL would address the situation in which a major failure on TETCO, at a single point, would make NJNG unable to get a majority of its supplies from TETCO and that, If built, SRL would enable NJNG to get a portion of that supply at a new interconnection with Transco, a pipeline that is already a second source for NJNG.

BPU's approvals of SRL relied entirely on the premise that SRL is reasonably necessary to serve the public because it would avoid major disruptions due to a Single Point of Failure in the TETCO supply to NJNG.

As of September 2017, New Jersey Natural Gas had also obtained approvals for the pipeline from the state Department of Environmental Protection, and had secured permits from many of the affected municipalities and counties. On September 14, 2017 it was approved by the Pinelands Commission (8-4), during the current Murphy administration.

The Pinelands Preservation Alliance and impacted municipalities are fighting the project in the courts.

The Pinelands Preservation Alliance commissioned Skipping Stone, an energy consulting firm, to do a second analysis of the Southern Reliability Link proposal. The Skipping Stone report[51] found that the pipeline is unnecessary, and a major disruption to the existing natural gas network is highly unlikely. Further, the Skipping Stone report found that a 5.4-mile pipeline connecting the Transco and TETCO pipelines further north, in the Freehold area, would provide the same level of backup as the Southern Reliability Link. The report states:

"Our analysis shows that SRL is not an effective or reasonable response to a single point of failure scenario and that a less costly and less disruptive alternative exists to address a possible interruption on TETCO. The analysis also shows that SRL does not, in fact, provide an adequate remedy, and would leave NJNG with 66% of its requirements unmet.

This analysis demonstrates that there is only one genuine, though remote, Single Point of Failure scenario for the TETCO supply to NJNG's system, based on a failure along a recently built 12-mile lateral line. Skipping Stone was unable to construct any scenario involving a major disruption of the TETCO mainline at a single point for which a facility of the magnitude of SRL would be an efficacious, reasonable or cost-effective response.

To address the only genuine risk on the TETCO system, Skipping Stone identified a viable alternative to SRL that would cost less than 20% of the cost of SRL and pose minimal local impacts, without traversing the protected region of the Pinelands. This analysis concludes that SRL is an unneeded and flawed project."

The designed capacity of the SRL is 280,000 dekatherms/day (280Mcf/day). Although this is being positioned as

a backup pipeline, given the above critique it would be reasonable to assume NJNG has other plans to use this pipeline, such as supporting customer growth. Therefore, for the purposes of GHG emissions calculations it is assumed that half the capacity will be used annually.

Based on the assumptions described in Appendix I the GHG emissions are estimated as follows:

- Emissions from the combustion of the gas the pipeline would carry = 2.75 MMt (million metric tons) CO2
- Total emissions from methane leaked across the gas supply chain (extraction to consumption) (Pennsylvania and New Jersey) = 1.96 MMt CO2e
- Emissions from methane leaked during transportation and consumption in New Jersey = 0.34 MMt CO2e
- Total emissions from pipeline in New Jersey = 4.73 MMt CO2e

The Christie administration provided approvals by the BPU and the DEP. On September 16, 2016 the New Jersey Department of Environmental Protection (DEP) determined that, based on the recently modified Flood Hazard rules, no formal authorization for the proposed New Jersey Natural Gas Southern Reliability Link Pipeline would be required.

The Pinelands Commission approval was under the Murphy administration.

Garden State Expansion project
(FERC docket number CP18-18)

The Garden State Expansion project recently completed construction of a new compressor station in Bordentown, which connects to the above-described Southern Reliability Link Pipeline, and increased the capacity of an existing compressor station in Mercer County. This is a Transco Williams FERC approved project. The compressor station has been built and is technically in operation – but won't be in service until the SRL Pipeline, which is being challenged in the courts, is constructed. However, as noted below, this compressor can be used to support other pipelines.

Chesterfield and Bordentown Township continue to appeal both FERC's approval of the compressor station itself and the New Jersey BPU's approval of the Southern Reliability Link pipeline[52,53]. Both towns and the New Jersey Sierra Club and Pinelands Preservation Alliance have also appealed the New Jersey Pinelands Commission vote to permit the pipeline to proceed through a portion of the protected Pinelands Reserve on the joint base.

Attorneys for Chesterfield and Bordentown Township, which opposed approval of the station and pipeline because of the safety and pollution risks they may pose to nearby homes and businesses, sent their own letters to FERC arguing that allowing the station to go into service was "completely premature" given the uncertain status surrounding the Southern Reliability Link.

"As opponents have been arguing all along, with (the pipeline) there is no need for the GSE compressor in Chesterfield," Chesterfield's attorney John Gillespie wrote. "The GSE compressor was designed and constructed in response to a single shipper's request, and that single shipper's project very realistically may never come into existence."

A March 19, 2018 article in Marcellus News stated that the lawsuit by Chesterfield and Bordentown asking the U.S. Court of Appeals for the Third Circuit to overturn FERC's previous decision to allow the project was unsuccessful.

The same article addressed the issue of this project being built only for the SRL pipeline saying, "So if the Southern Reliability Link pipeline isn't yet built, where will the extra Marcellus molecules flowing through Transco's pipeline go? Don't worry–there's plenty of other markets where Williams can sell the extra gas until the short pipeline through the scrub pines gets built."

The new compressor station in Chesterfield can push gas north to the newly bi-directional Trenton Woodbury Line up to the expanded compressor station in Lawrence Township (also part of the Garden Expansion) and would tie

directly into the proposed Greenfield Compressor Station 206 in Somerset, described as part of the NESE project.

This compressor station can be used if SRL isn't built. While Transco said it was just for SRL, it can tie into the Trenton Woodbury line (as stated above), it can get gas from Compressor station #200 in Chester County PA (also included in the NESE project) and it could receive gas from PennEast.

(See Appendix IV and Appendix V for information on health problems from gas compressor emissions.)

The EIA data base shows two Garden State Expansion phases as follows:

- Phase 1, completed 9/9/17, 20 MMcf/d
- Phase 2, completed 3/16/18, 120 MMcf/d

Articles on this project consistently show that its total capacity is 180 MMcfd (million cubic feet per day).

The FERC Environmental Assessment (docket no. CP15-89-000) shows total annual GHG CO2e emissions from operation of the compressors of 39,174 tons per year (0.04M tons per year). This is very low compared to other compressors because these are electric-driven and do not burn methane for power. Emissions are mainly from blowdowns and methane leaks at the compressor. The EA does not have separate measures of CO2 or methane.

While this project is a compressor station the additional gas (180 MMcfd) will be transported by pipelines. Therefore, it is appropriate to compute the GHG emissions of this additional gas associated with these compressors.

Based on the assumptions described in Appendix I the estimated GHG emissions would be:

- Emissions from the combustion of the gas the compressor/pipeline would carry = 3.53 MMt (million metric tons) CO2
- Total emissions from methane leaked across the gas supply chain (extraction to consumption) (Pennsylvania and New Jersey) = 2.55 MMt CO2e
- Emissions from methane leaked during transportation and consumption in New Jersey = 0.43 MMt CO2e
- Total emissions from compressor/pipeline in New Jersey = 4.00 MMt CO2e

Gateway Expansion (Roseland)
(FERC Docket Number CP18-18)

Roseland Against Compressor Station is leading a grassroots opposition to this project, www.facebook.com/RoselandAgainstCompressorStation/

Williams Transco's proposed Gateway Expansion Project would co-locate a new, 33,000 horsepower compressor station immediately adjacent to an existing 27,500 horsepower compressor station, both of which would be located right next to high tension interstate electric transmission lines and next to PSE&G's switching station, all within a flood plain and immediately next to the Passaic River. This proposal creates both known and unknown compounding risks for the nearby residents, businesses, schools and critical infrastructure for the Borough of Roseland, as well as East Hanover and other towns. The risk will be heightened when hurricane and tropical storm sized storms hit this area, as they almost certainly will in coming years. If permitted and built, the Gateway Expansion Project would significantly increase the amount of compressed natural gas flowing through Roseland Borough. It would increase the amount of toxic pollution released through leakage and deliberate gas blowdowns into the surrounding areas. Williams Transco has a poor track record when it comes to safety issues. Both state and federal agencies have fined the company at numerous times going back many years for problematic operations of natural gas plants and pipelines. Over the past four years there have been at least five workers killed and 120 people injured by accidents at Williams natural gas facilities. In the town of Roseland, in 2013, an unannounced blowdown of gas during construction of the gas compressor station led to the panicked evacuation of the

Noecker elementary school less than one mile away.

Williams has stated that the Gateway Expansion Project has been designed to provide up to 65,000 dekatherms per day (65 MMcfd) of natural gas transportation service to PSE&G and UGI Energy Services. It cites the general growth of gas usage in the Northeast but provides no specific information on demand. It has also not explained the need for an additional 33,000 horsepower compressor. The amount of gas Williams says would be sent through this compressor is less than 5% of the total flow-through capacity of the existing compressor built in 2013.

In 2015-2016 Williams/Transco received FERC approval and subsequently added 2,500 horsepower to the original 25,000 hp compressor built in 2013. Williams said they needed it to send an additional 115,000 dekatherms of gas through their system. In the Gateway Expansion Project, they are saying they want to send an additional 65,000 dekatherms through their system which is 56.5% of the 115,000 dekatherms added in 2016 and they claim they need 33,000 hp, which is 1300% of the 2,500 hp added in 2016, to do so. This does not appear to make sense and again, implies plans, which it will not divulge.

While the future capacity that could be driven by 33,000 hp is 1.5M dt/d (as opposed to 65,000) the GHG emissions calculations in this report used the 65,000 volume to be conservative.

Williams has also said that the existing compressor is used only in times of very high, peak demand, such as very cold spells. Williams appears to be using a segmentation strategy to build new gas infrastructure in New Jersey that it recognizes will be very unpopular such as support for the proposed Meadowlands power plant (see below) or infrastructure to support exporting gas. There is no evidence that this project is needed to provide service to residents of New Jersey.

(See Appendix IV and Appendix V for information on health problems from gas compressor emissions.)

Current Status: Governor Murphy's NJDEP approved the project's final "fresh-water wetlands" permit on December 27, 2018.

The FERC Environmental Assessment (docket no. CP18-18-000) shows total annual GHG CO2e emissions of 862 tons per year. This is very low compared to other compressors because these are electric-driven and do not burn methane for power. Emissions are mainly from blowdowns and methane leaks. The EA does not have separate measures of CO2 or methane.

While this project is a compressor station, the additional gas (65 MMcfd) that will be transported by pipelines will either be burned or leak into the atmosphere. Therefore, it is appropriate to compute the GHG emissions of this additional gas associated with these compressors.

Based on the assumptions described in Appendix I the estimated GHG emissions would be:

- Emissions from the combustion of the gas the compressor/pipeline would carry = 1.28 MMt (million metric tons) CO2
- Total emissions from methane leaked across the gas supply chain (extraction to consumption) (Pennsylvania and New Jersey) = 0.92 MMt CO2e
- Emissions from methane leaked during transportation and consumption in New Jersey = 0.16 MMt CO2e
- Total emissions from compressor/pipeline in New Jersey = 1.43 MMt CO2e

Rivervale South to Market (Hudson, Bergen County and the NJ Meadowlands)
(FERC Docket Number CP17-490)

The Williams website[54] describes the project as:

"Williams is pursuing an expansion of its Transco interstate natural gas pipeline to provide additional service to natural gas consumers in the Northeast — including New Jersey and New York City — in time for the 2019/2020

winter heating season. The company has executed an agreement with Direct Energy Business Marketing and UGI Energy Services for firm transportation service under the Rivervale South to Market project."

The Rivervale South to Market project has been designed to provide up to 190,000 dekatherms per day (190 MMcfd) of gas transportation service from the existing Williams Transco pipeline interconnection with the Tennessee Gas Pipeline in River Vale (Bergen County), N.J. to Transco's Central Manhattan Meter Station in Hudson County, N.J. and the Station 210 pooling point in Mercer County, N.J. 50,000 dt/day of firm transportation service will be provided from the Rivervale Interconnect to Transco's Central Manhattan Meter Station in Hudson County, New Jersey and 140,000 dt/day of firm transportation service will be provided from the Rivervale Interconnect to the Station 210 pooling point in Mercer County, New Jersey.

Williams' objective is to have the project completed in time for the 2019/2020 winter heating season. It is also expected that the proposed (and unnecessary) Meadowlands power plant would connect to the Rivervale South Pipeline but the Meadowlands power plant will require about 110M cf/d and the volume of gas being sent to Transco's Central Manhattan Meter Station in Hudson County is only 50M cf/d.

Transco cited in its FERC application the general increase in gas consumption as proof of market need, but failed to cite any specific needs in New Jersey.

This pipeline project in the Meadowlands, proposed by Oklahoma-based Williams, would uprate 10.35 miles of pipeline through Bergen County to allow about 10 percent more gas to be pumped to northeastern customers for heat and electricity generation. (Uprating is a process that is used to increase the allowable operating pressure in a pipeline). The work would include the placement of a new 42-inch pipeline parallel to two existing pipes that already run along Metro Road in Carlstadt.

The executive director of the Hackensack Riverkeeper said the Williams project is being built too close to protected wetlands - marshes which have, after years of rehabilitation and cleanup, begun to make a comeback following decades of industrial pollution and commercial environmental abuse. The wetlands are now cleaner, and starting to once more attract a greater number of wildlife species back to the area. Construction of this project is expected to take its toll. The trench will be 40 feet wide because of all the wet soil that could cave in which will place significant stress on the local ecological environment.

Based on the assumptions documented in Appendix I it is estimated that total annual GHG emissions from the Rivervale South to Market pipeline would be as shown below.

- Emissions from the combustion of the gas the pipeline would carry = 3.73 MMt (million metric tons) CO_2
- Total emissions from methane leaked across the gas supply chain (extraction to consumption) (Pennsylvania and New Jersey) = 2.69 MMt CO_2e
- Emissions from methane leaked during transportation and consumption in New Jersey = 0.46 MMt CO_2e
- Total emissions from pipeline in New Jersey = 4.18 MMt CO_2e

Lambertville East Expansion (Lambertville)
(FERC docket number CP18-26)

Grassroots opposition to this project is lead by Lambertville Coalition Against PennEast Pipeline (CAPP).

On December 7, 2017, Texas Eastern Transmission, LP (Texas Eastern) filed an application pursuant to sections 7(b) and 7(c) of the Natural Gas Act (NGA) and Part 157 of the Commission's regulations, requesting certificate and abandonment authorizations for its proposed Lambertville East Expansion Project. Texas Eastern requests authorization to replace two existing compressor units at its Lambertville Compressor Station in Hunterdon County, New Jersey. The project is designed to allow Texas Eastern to provide an additional 60,000 dekatherms per day (Dth/d) (60 MMcfd) of firm transportation

service from interconnections in Lambertville, New Jersey, and Marietta, Pennsylvania, to existing city gates in New Jersey in or near Union, Somerset, and Middlesex Counties in New Jersey. Specifically, it will connect the PennEast pipeline with the Texas Eastern pipeline and the Transco substation in East Amwell.

Additionally, the project is proposed to enable Texas Eastern to comply with new air emissions regulations in New Jersey. Texas Eastern claims this will result in a more than 90% decrease in potential nitrous oxide emissions from the turbines at the facility.

Texas Eastern proposes to expand its Lambertville Compressor Station in West Amwell Township, Hunterdon County, New Jersey. Specifically, Texas Eastern proposes to abandon and remove: two existing 5,100 horsepower (hp) Clark DC-990 natural gas-fired compressor units. To replace the abandoned facilities, Texas Eastern proposes to install two new Solar Taurus 70 natural gas-fired compressor units, each rated at 8,600 hp.

The proposed Lambertville East Expansion Project will enable Texas Eastern to provide 60,000 Dth/d of incremental firm transportation service for PSEG and Elizabethtown, which have executed 15-year precedent agreements for the full capacity created by the project.

The Lambertville East expansion of gas capacity is unnecessary as it expects to receive its additional gas from PennEast, which has been shown to be unnecessary.

On November 16, 2018 FERC issued an ORDER ISSUING CERTIFICATE AND APPROVING ABANDONMENT

Paragraph 37 of the order (under section IV Environmental) stated: Regarding the EA's (Environmental Assessment provided by applicant on July 24, 2018) air quality analysis, the New Jersey DEP clarifies that the EA misstated New Jersey's Title V threshold values for volatile organic compounds and nitrogen oxides. Based on the New Jersey DEP's comments, the applicable thresholds for a Title V permit are 25 tons per year for volatile organic compounds and nitrogen oxides. The EA indicated that Texas Eastern would need to obtain a modified Title V permit for the project. Under the corrected and lower applicable thresholds, Texas Eastern will still be required to obtain the modified permit; therefore, the EA's findings remain unchanged.

Information on GHG and hazardous emissions contained in section B.8 of the EA states that total facility wide CO2 equivalent emissions for the project will be 182,265 tons per year, an increase of 109,681 tons per year. The EA does not show any CO2 or methane volumes. The total emissions data includes the effect of blowdowns and fugitive gas leaks.

Commissioner LaFleur issued a separate (concurring) opinion stating: Using a methodology developed by the Environmental Protection Agency to estimate the downstream GHG emissions from the project, and assuming as an upper-bound estimate that all of the gas to be transported is eventually combusted, 60,000 Dth/d of natural gas service would result in the emission of approximately 1.16 million metric tons of CO2e. The 1.16 million tons of GHG emissions from downstream use would result in a 1 percent increase in GHG emissions from fossil fuel combustion in New Jersey and 0.02 percent increase nationally.

Based on the assumptions documented in Appendix I it is estimated that total annual GHG emissions from the project would be as shown below.

- Emissions from the combustion of the gas the compressor/pipeline would carry = 1.18 MMt (million metric tons) CO2
- Total emissions from methane leaked across the gas supply chain (extraction to consumption) (Pennsylvania and New Jersey) = 0.85 MMt CO2e
- Emissions from methane leaked during transportation and consumption in New Jersey = 0.14 MMt CO2e
- Total emissions from compressor/pipeline in New Jersey = 1.42 MMt CO2e

Gas-fired Power Plants

Below is the list of the major new gas –fired power stations. With the exception of Sewaren 7 all are currently proposed or in various stages of planning and permitting in NJ. The Sewaren 7 plant has been completed and is in operation.

North Bergen Liberty Generating Station (NBLGS) aka Meadowlands Power Plant (North Bergen)

Grassroots opposition to this project is lead by the Don't Gas the Meadowlands Coalition.

A subsidiary of Mitsubishi has proposed to build a $1.5B, 1,200-MW gas-fired power plant in North Bergen, NJ near Railroad Avenue on the banks of Bellman's Creek. The electricity would be transmitted under the Hudson River to connect with a ConED substation in Manhattan. All of the electricity would be used in New York. Neither PSE&G nor PJM Interconnect has asked for this plant to be built to meet demands for electricity in NJ. The NJDEP, during the Murphy administration has already approved the following permits: Waterfront Development, Flood Hazard, Wetlands and Water Quality Certificate. On March 29th, 2018 the company applied with NJDEP for five additional permits. On July 14, 2017 the company applied for an air permit from the NJDEP. Given the scope of the project and the extent of the permits needed, the earliest the proposed plant could be approved is sometime in 2019.

The owners of the proposed gas-fired plant have stated this is being built to replace the energy that will be lost when the Indian Point Nuclear Plant is closed. However, a 2017 study by Hudson Riverkeeper and the Natural Resources Defense Council states, "By 2023, assumed new energy efficiency and required new renewable energy [will] provide as much output as IPEC would have produced. The New York Independent System Operator has also stated "there will not be a system reliability need" following deactivation of Indian Point-2 and -3 in 2020 and 2021, respectively, "assuming that sufficient replacement sources of power are added within the Lower Hudson Valley." This plant has not been requested by any NJ electric utility or PJM Interconnect.

This plant would be one of the largest sources of air pollution and greenhouse gas emissions in New Jersey. It will emit 3.5 million tons of CO2 per year and hundreds of tons of pollutants annually including particulate matter and nitrogen oxides, which contribute to health-harming ozone production. While the DEP has not released an estimate of the additional ground level ozone that would be produced the plant is about one mile from an existing PSE&G plant that produces similar emissions and would be in an area that already receives a grade of 'F' from the American Lung Association for its ozone levels. The plant would expose local residents and the environment to toxic air pollutants, put public health at risk, damage a crucial ecological resource, and halt progress on the region's clean energy and climate mitigation objectives.

As stated above in the description of the Rivervale South to Market project, the Rivervale South to Market project will only provide 50,000 dt/day (50M cf/day) of firm transportation service from the Rivervale Interconnect to Transco's Central Manhattan Meter Station in Hudson County, New Jersey. The Meadowlands power plant will require approximately 110M cf/day. Williams' description of the project states it will serve residential and business customers in the Northeast US. Thus it is not clear how much of the power plant's gas will come from the Rivervale project.

The plant will emit the following GHG's/year: 3.5 MMt of CO2 and at least 73 tons of methane, although it is not clear if this methane emission is only from the combustion process (stack emissions) or takes into account the volume of methane that leak from similar plants. Taking leakage into account, the estimate of total methane emissions is 1,000 tons. The resulting CO2e emissions (based on using the 1,000 tons/year estimate for methane) are 3.59 MMt of GHG emissions per year.

The Murphy Administration can stop this plant by not approving the air quality permit, using its authority to regulate and limit GHGs and end the practice of allowing applicants to purchase ozone credits.

Phoenix Energy Center (aka Highlands Power Plant) (Holland Township)

Grassroots opposition to this project is lead by the Highlands Coalition[56] and the Musconetcong Watershed Association.[57]

The applicant, Phoenix Energy Center, is seeking to build a 663 MW power plant on the site of a former paper mill on the Musconetcong, one of the few rivers in the state classified as a Category 1 (C1) stream, the designation given to the most pristine waterways. The gas for the power plant would come through Elizabethtown and PennEast. Empower NJ has not been able to find any evidence that any New Jersey utility or PJM Interconnect has indicated there is demand for this project. This unnecessary gas plant could be used as a justification by PennEast to build its unnecessary pipeline.

The project is located in the Highlands Preservation Area, which is regulated to prohibit major industrial developments such as power plants. In order to overcome this obstacle Phoenix Energy submitted a Highland Applicability Determination application to the state Department of Environmental Protection in April 2018 requesting approval of the redevelopment exemption from the Highlands Rules.

Under the Murphy Administration, the Highlands Council, with pro-development commissioners installed by Governor Christie still in place, ruled it qualified for exemption #4 ("reconstruction for any reason of any building or structure within 125 percent of the footprint of a lawfully existing impervious surface in existence on August 10, 2004"). At the same time, however, the DEP found the project is inconsistent with the Upper Delaware Water Quality Management Plan, a verdict that means the agency cannot issue any permits for the plant until and unless the applicant applies and amends the area wide plan. The Sierra Club argued that the rationale behind the Highlands exemption provision was to allow small developments that benefit the region without threatening the ecosystem and that the whole purpose of passing the Highlands Act. The New Jersey Highlands Coalition argued the more significant action taken by the state was to rule the project inconsistent with the WQMP, a tool DEP uses to protect water quality in the state. Water quality issues are crucial in the Highlands, which provides drinking water to 6 million people in New Jersey. The Musconetcong River is also widely regarded as the state's finest trout stream. Upstream of the site, the Musconetcong is a designated National Wild and Scenic River, and downstream communities of Holland and Pohatcong Townships have passed resolutions in support of 4.3 miles of the Musconetcong being designated a National Wild and Scenic River. This section of the Musconetcong River has been the focus of recent ecological restoration efforts utilizing approximately $4 million in public funds that have improved water quality, restored migratory fish habitat, and increased recreational access for boating and fishing.

This plant is proposed to utilize approximately 5.5 million gallons a day of groundwater and surface water from the Musconetcong River to provide cooling water for the plant to be discharged to the Musconetcong River. The Musconetcong River is classified by the NJ Department of Environmental Protection for Trout Maintenance, and requires temperatures not to exceed 21 degrees centigrade, which will be jeopardized by the water from the power plant.

The NJ Department of Environmental Protection has designated this section of the Musconetcong River as a Category 1 waterbody to prevent water quality degradation, and maintain water quality for ecological restoration, in accordance with federal Clean Water Act rules. The Highlands Council indicates the site is located in a Carbonate Rock Area, and that Carbonate Rock can have geological properties that facilitate transfer of groundwater to surface waters, and surface waters to groundwaters, through which surface water levels can be decreased through withdrawals from their underlying groundwater aquifers. The NJ Highlands Council has also identified the site as being located in an area with a pre-existing water quantity deficit. The proposed site currently has a permitted use of approximately 550,000 gallons a day of groundwater and no permitted surface water withdrawals or discharges, while the proposed

water discharge of approximately 1.5 million gallons a day represents approximately 1% of the Musconetcong River's average flow.

The area is already a nonattainment area for 8-hour Ozone levels as determined by the U.S. Environmental Protection Agency since 2004, which threatens the respiration of vulnerable populations, including the elderly and children, and which can increase the risk of asthma, and the American Lung Association graded Hunterdon County's Air Quality as "F" in its 2017 What is the State of Your Air? Report.

It is estimated that this plant will emit about 1.93 MMt of CO2 per year and will leak/emit about 500 tons of methane annually. This will result in total GHG emissions of 1.98 MMt of CO2e. (These estimates are based on a comparison with the proposed Meadowlands power plant as no information on the specific gas power technology to be used by Phoenix has been found.)

Phoenix Energy Center has not yet applied to the NJDEP for any permits.

The Murphy Administration can stop this plant by using its authority to regulate and limit GHGs and end the practice of allowing applicants to purchase ozone credits. It may also be able to stop this plant by not upgrading the DEP permitting rules as described above.

BL England (Upper Township)

The state has issued a draft air permit for a new 447-megawatt natural-gas power plant at the B.L. England generating station, which would replace an existing coal-fired unit at the facility in Upper Township. The owner of the plant, which was once viewed as one of the dirtiest in the state, agreed to shut down the coal unit in an administrative consent order several years ago with the state Department of Environmental Protection that would resolve a series of air pollution violations at the facility. The closing has been repeatedly extended by the state,[58] the most recent occurring in 2014.The $90 million project is awash in controversy and litigation, mostly because the plant will get its fuel from a new 22-mile natural gas pipeline (SJG – South Jersey Gas pipeline described above) through parts of the Pinelands, a route opposed by four former governors and conservationists.

Assuming a 6,500Btu/KWh heat rate, a 447 MW combined cycle facility will burn approximately 69,700 Dth or approximately 67,224 Mcf (thousand cubic feet) of natural gas per day when operating at 100%. This amount is slightly more than just half the 125,000 Mcf per day ("Mcfd") Daily Contract Quantity of the SA with SJG.

Comments from Pinelands Preservation Association members include the following information demonstrating that it is unnecessary to repower BL England:

- B.L. England Is Not Needed for Reliable Electrical Service in the Pinelands

- South Jersey Gas relies principally on a report by engineering consultants PowerGEM as evidence that the majority of electricity generated by a repowered B.L. England would be consumed in the Pinelands. Not only does the report rely on obsolete models of New Jersey's electrical grid, but also the only way it can reach its conclusions is to make demonstrably false assumptions about the structure of New Jersey's power grid, the manner in which system operators dispatch electricity over it, and (incredibly) the laws of physics.

- In fact, five (5) of B.L. England's seven (7) generating units have been deactivated entirely and, for the past three (3) years, one of the remaining units has been operating at approximately 60 percent (60%) of its capacity, while the other is operated less than 50 percent (50%) of the time, mostly on high demand days and only during the summer.

- Nevertheless, the regional transmission operator PJM has not identified a single reliability issue for the Pinelands that is associated with this phasing out of B.L. England's capacity.

- While South Jersey Gas claims that electricity from B.L. England is particularly critical given the retirement of the Oyster Creek nuclear plant, PJM Interconnection (PJM) acknowledged as early as 2014 that deactivating both Oyster Creek and B.L. England poses no reliability issues because "the market had already responded to the planned retirement of Oyster Creek by driving the construction of new natural gas plants in the service territory."

- In addition to more than 2,000 MW of new natural gas generation from plants built in West Deptford and Woodbridge, nearly 750 MW of new, cleaner generating capacity have come online in the service territory since the last time South Jersey Gas analyzed the issue.

- In fact, South Jersey Gas has repeatedly mischaracterized reliability violations it claims are attributed to B.L. England's retirement, in some cases even characterizing as reliability concerns violations that PJM determined would only occur should B.L. England NOT retire.

- In other cases, the company presented violations of PJM's "Generator Deliverability Test" as reliability concerns even though PJM itself admits that this test evaluates the system's ability to operate at optimal economic efficiency and does not identify required reliability upgrades.

South Jersey Gas justifies the need to repower B.L. England in part on the basis of network upgrades that PJM identified in July, 2014 and which the company continues to mischaracterize as necessary to avoid reliability violations caused by the plant's retirement. In fact, PJM indicated that many of the upgrades South Jersey Gas identified (which are now planned, funded or in construction) were required because of aging infrastructure issues that had nothing to do with B.L. England. Moreover, Atlantic City Electric acknowledged in testimony before the New Jersey Board of Public Utilities that the identified upgrades would be necessary even if B.L. England is repowered, "to maintain reliability during the process when the facility is offline" being retrofitted with new gas turbines.

It is also important to note as Oil Change International has stated that producing electricity from gas is currently dirtier than coal-fired power because methane leakage along the gas supply chain more than doubles the lifecycle emissions of gas compared to just counting emissions from gas combustion. Repowering the plant with gas is worse for the climate than leaving it to burn coal.

It is estimated that this plant will emit about 1.3 MMt of CO_2 per year and will leak/emit about 500 tons of methane. This will result in total GHG emissions of 1.34 MMt of CO_2e annually. (These estimates are based on a comparison with the proposed Meadowlands power plant as no information on the specific gas power technology to be used by BL England has been found.)

The Murphy Administration can stop this plant by using its authority to regulate and limit GHG's and end the practice of allowing applicants to purchase ozone credits.

Keasbey Energy Center (Woodbridge)

Competitive Power Ventures, the owner of a 725-megawatt Woodbridge Energy Center (WEC) power plant in Woodbridge Township, is seeking approval to build another natural-gas plant adjacent to its existing unit in the Keasbey section of the community.

Empower NJ has not been able to find any evidence that any New Jersey utility or PJM Interconnect has indicated there is demand for this project. An August 9, 2018 article on this project in NJ Spotlight[59] stated, "Before the state deregulated the energy sector, it required power suppliers to prove there was a need for a new generating plant through something called a certificate-of-need process. That hurdle was removed when the state broke up its electric and gas monopolies, leaving the decision to owners and investors in power plants, regardless of state policies."

No information on the proposed capacity has been found. Assuming it is another 725MW plant It is estimated that this plant will emit about 2.1 MMt of CO_2

per year and will leak/emit about 625 tons of methane. This will result in 2.17 MMt of CO2e GHG emissions annually. (These estimates are based on a comparison with the proposed Meadowlands power plant as no information on the specific gas power technology to be used by CPV has been found.)

The Murphy Administration can stop this plant by using its authority to regulate and limit GHGs and end the practice of allowing applicants to purchase ozone credits.

Sewaren 7 (Woodbridge)

Sewaren 7 is a 540 MW combined-cycle power plant in Woodbridge, New Jersey developed by PSEG to produce electricity for 500,000 homes. The new plant is part of PSEG's plan to replace units 1, 2, 3 and 4 of its existing Sewaren coal-fired power plant located on the same site. The units are being retired after approximately 70 years of operation. Construction of the Sewaren 7 plant commenced in June 2016 and was scheduled to be completed by the summer of 2018. Based on PSE&G 2Q18 financial performance statement this plant is finished and in operation.

Total annual GHG CO2e emissions are 5.16 MMt (based on NJDEP operating permit - Permit Activity Number: BOP170001). Sewaren 7 replaced four older peaker plants (Sewaren 1, 2, 3, 4) thus its emissions should be considered a combination of replacements and new (it is not a peaker plant). GHG emissions are included in this analysis to demonstrate the total amount of GHGs from gas projects that have been or could be added under the Murphy administration.

Potential Impact of Fracking in the Delaware River Basin

Until the Delaware River Basin Commission votes to ban all fracking activities and adopts regulations to this effect, the threat of fracking and its related operations remains. Fracking in the Delaware River Basin would substantially increase air emissions, including methane. A report released in 2015 assumed 4000 shale gas wells would be developed in the Basin's most productive Marcellus Shale regions, primarily located in the Pennsylvania portion of the Basin.[60] The annual methane contribution from these gas wells would be between 1.4 billion cubic feet (Bcf) and 5.3 Bcf, including gas well gathering pipelines but not counting interstate pipeline leakage or compressor stations. This totals approximately 240 Bcf of methane at build-out.

The projection also shows the potential for these fracked wells to cause a marked increase in nitrogen oxide (NOx) emissions. NOx is a greenhouse gas that contributes to climate change and acid rain. NOx gases also lead to the formation of fine particles in the air and ground level ozone to form smog, both of which have known harmful health effects. These impacts would occur in areas that currently have low NOx emissions. For instance, in Wayne County, PA, the county with the greatest potential for gas well development, the NOx emissions would almost double and three of the four counties underlain by the Interior Marcellus Shale would see greater than a 34% increase in NOx. In Wayne County, this means that nearly 60% of the population could experience adverse health effects by exposure to new NOx emissions from fracking. People in the downstream airsheds of New Jersey and New York, could also be affected.

APPENDIX III

ORGANIZATIONS ASSOCIATED WITH THE EMPOWER NJ: STOP FOSSIL FUEL PROJECTS CAMPAIGN AGAINST FOSSIL FUEL EXPANSION

350NJ-Rockland
Already Devalued and Devastated Homeowners of Parsippany
Bergen GreenFaith Circle
BlueWaveNJ*
Central Jersey Coalition Against Endless War
Central Jersey Environmental Defenders
Central NJ Chapter: The Climate Reality Project
Citizens United for Renewable Energy (CURE)
Clean Ocean Action
Clean Water Action*
ClimateMama
Coalition Against Pilgrim Pipeline NJ
Coalition for Peace Action
Coalition to Ban Unsafe Oil Trains
Cooper River Indivisible
Delaware Riverkeeper Network*
Don't Gas the Meadowlands Coalition*
Don't Gas the Pinelands
Environmental Action Club at Morris County Vocational High School
Environment NJ*
Food & Water Watch*
Franciscan Response to Fracking
Franklin Women's Club
Gloucester County Food and Water Watch
GMO Free NJ
GreenFaith
Hackensack Riverkeeper
Indivisible Lambertville/New Hope
Monmonth Community Climate Coalition
New Jersey PACE/Center for Regenerative Community Solutions, a NJ Nonprofit Corporation
New Jersey Tenants Organization
New Jersey Working Families Alliance
NJ Citizen Action
NJ Sierra Club*
NJ7 Forward
North Jersey Sierra Club
North NJ Chapter of Climate Reality
Northern NJ Chapter, National Organization for Women
Northjersey Pipeline Walkers
People Over Pipelines
Pinelands Preservation Alliance
Ramapough Lenape Nation
Raritan Headwaters
Ridgewood JOLT
Roseland Against Compressor Station (RACS)
Sierra Club, Loantaka Group, NJ Chapter
SOMA Action
Sourland Conservancy
Surfrider Foundation: Jersey Shore Chapter
Sustainable South Jersey
The Climate Mobilization Hoboken Chapter
The Wei
UU Faith Action NJ
Voters of Watchung Hills (VOW)
WATERSPIRIT
Westfield 2020
Women for Progress
Women's March on New Jersey
**Steering Committee member*

APPENDIX IV

SOCIAL JUSTICE, PUBLIC HEALTH AND SAFETY ISSUES FROM FOSSIL FUEL DEVELOPMENT

How we harness our energy is also a social justice issue. The effects of climate chaos and fossil fuel pollution disproportionately affect the poor and marginalized. People living in poverty struggle to recover from the devastating storms, droughts and extreme weather events plaguing our warming planet. People of color and low-income people are more impacted by power plants and toxic sites. Many studies show that power plants and toxic disposal sites are overwhelmingly located near communities of color. For example researchers at the University of Minnesota, writing in the journal PLOS ONE[61] have found that concentrations of nitrogen dioxide, a fossil fuel emission and a major cause of heart disease, are 38 percent higher in people of color communities. An article in Mother Jones[62] showed that Latinos are 51 percent more likely to live in U.S. counties with dangerous levels of ozone, and Latino children are two times more likely to die from asthma than white children.

Gas-powered electric plants, while less toxic than coal plants, emit hundreds of tons of pollutants annually including particulate matter, toxic chemicals, known carcinogens such as benzene and formaldehyde, and can also be a source of radioactive contamination. Exposure to these pollutants is linked to neurological, cardiovascular and respiratory disease (such as COPD and asthma), cancer, premature death and birth defects, increased susceptibility to infections as well as damage to lungs, liver, kidneys, reproductive, nervous and cardiovascular systems, increases in obesity, diabetes, Parkinson's disease, Alzheimer's and other forms of dementia and stroke. Developing fetuses and children are uniquely vulnerable.

While the mining and burning of fossil fuels are creating a toxic warming planet, they are also making our families and children sick. The statistics are alarming and completely unacceptable.

According to the new report by Environment New Jersey Research & Policy Center[63]:

- Metropolitan areas across New Jersey experienced an average of 91 days of degraded air quality in 2016, or roughly three months, increasing the risk of premature death, asthma attacks and other adverse health impacts.

- The New York/Newark area experienced 75 days in 2016 in which half or more monitoring locations reported elevated ozone and/or PM2.5 particulate matter.

- It cited a 2017 Journal of the American Medical Association study[64], in which researchers examined more than 22 million deaths in the Medicare population from 2000 to 2012 and found that a 10-parts-per-billion rise in smog pollution increased the daily mortality rate by 0.5 percent, regardless of how low pollution levels had been initially.

- It cited research at the Harvard School of Public Health[65] which found that death rates for older Americans rise as air pollution increases – even when air pollution levels are below current national standards.

Other studies have similar findings:

- Children residing in near proximity to major industrial installations (petroleum refineries in particular) experienced excessive premature mortality rates from leukemia and other cancers

- According to a study published by MIT[66], air pollution from power generation causes 52,000 premature deaths per year, and a study published by NYU[67] revealed that the health costs associated with pre-

mature births from fossil fuel emissions add up to nearly $5 billion. A study published[68] in the journal Science Advances that found that of over 1.1 million births in Pennsylvania over nearly a decade, women who lived within two miles of a fracking site were more likely to give birth to low-weight babies. Furthermore, Bureau of Labor Statistics'[69] data shows that workers employed in mining, quarrying, oil and gas extraction are nearly four times as likely to incur fatal and severe injuries as the average worker in the U.S.

- Oil refining is a major health hazard for people living and working in nearby areas. Hydrocarbons, flue gas and particulate emissions from oil refining and combustion are correlated with increased risk of death from cardiovascular and respiratory illnesses. Workers in the oil and gas industries experience higher rates of occupational-related fatalities[70] than all other U.S. industries combined.

- Statistically speaking, more people die of asthma than homicides in Newark. School age children in Newark have double the state and national average rate (25%) for asthma resulting in missed school days and unaffordable medical bills.

Global warming itself is a cause of increased pollution and premature deaths. Another study cited by Environment NJ estimates global warming will increase the number of air-pollution-related premature deaths (if no measures are implemented to counteract global warming's impact on air quality). (Premature deaths are deaths that occur before the average age of death for a given population cohort.) The analysis estimates that 1,130 Americans may die prematurely in the year 2030 from smog pollution made worse by global warming, and that the number of premature smog-related deaths could rise to 8,810 annually by the year 2100. The study also estimates that particulate pollution worsened by global warming could cause 6,900 premature deaths in 2030 and 19,400 premature deaths in the year 2100.

This new infrastructure will also increase the volume of gas and, in some cases, operating pressures and velocities through existing system. These projects will push more gas, faster and hotter through lines. This could lead increased corrosion rates as well as weld failures. This is especially concerning because pipelines are most vulnerable to explosion in their first five years and later in life as they age. Unfortunately, New Jersey has the perfect storm — new and proposed pipelines like PennEast and NESE and older, aging pipelines.

These interstate pipelines are not built to New Jerseys' higher safety standards. As the most densely populated state in the nation New Jersey has required higher safety standards for in-state lines since 2009 and recently introduced concurrent assembly and senate resolutions SCR118/ACR164 that urge Congress and the President of the United States to require all interstate gas pipelines constructed in New Jersey to be built, operated, and maintained to New Jersey's higher class 4 safety regulations.

Significant pipeline accidents (as defined by PHMSA) on transmission and gathering lines have been on the rise. PHMSA records show that only 20% of these failures are from external forces on pipes. 80% is from corrosion and material failure, operator error, and equipment failure. Despite this poor industry safety history, PHMSA has opened a docket to consider industry recommended loosening of class location safety requirements for existing pipelines, which will put NJ at higher risk. Given the lack of federal safety oversight, especially for proposed infrastructure, New Jersey needs to include a safety evaluation as part of its rationale for moving to renewable energy sources.

APPENDIX V

HEALTH EFFECTS OF COMPRESSOR EMISSIONS

Natural gas compressor stations release 10 carcinogenic (cancer-causing) chemicals (see below), but communities don't know how much will be released because pipeline/compressor companies can't say how many major releases will occur in a given year or how much gas will be released in any given release or blowdown. Blowdowns (venting of large volumes of gas at one time) are especially problematic as they release very large volumes of gas in a single location and do not allow for normal dilution of emissions in the atmosphere.

"The National Ambient Air Quality Standards (NAAQS) used as a benchmark for air quality were not created to assess the air quality and safety in a small geographic area with fluctuating emissions…NAAQS reflects what, over a region, over time, is deemed safe population-wide. This is very different that what is safe within for instance 1200 feet of [a] compressor station."
— SWPA-EHP Report

Carcinogenic Chemicals Emitted by Natural Gas Compressor Stations:

- 1,3-Butadiene
- Acetaldehyde
- Acrolein
- Benzene
- Ethylbenzene
- Formaldehyde
- Naphthalene
- Propylene oxide
- Toluene
- Xylenes

(Above information on compressor station releases was taken from https://www.nocompressor.com/air-quality/).

Formaldehyde, Acetaldehyde and Benzene, that will be released are known carcinogens and mutagens (which are substances that cause genetic mutations).[2-4] Acetaldehyde's and Toluene's Hazardous Substance Fact Sheets clearly state in capital letters that the chemicals are known teratogens, which are substances that cause birth defects.[3,5] Acetaldehyde is implicated as the cause of fetal alcohol syndrome through its inhibiting effects on DNA synthesis, placental amino acid transport, and development of the fetal brain.[6]

Children may be exposed to higher concentrations of Toluene since it is denser than air and its vapors stay closer to the ground. Also, children have faster breathing rates than adults and may therefore breathe in more Toluene. In older children and adolescents, repeated exposure to Toluene has been associated with loss of muscle control, loss of memory, poor balance, and decreased mental abilities. Some of these changes may last for a long time after Toluene has left the body. Exposure to Toluene during pregnancy has been associated with birth defects, including retardation of mental abilities and growth.[5,7]

Repeated exposure to Benzene can cause aplastic anemia, a life-threatening blood disorder resulting from damage to the bone marrow and blood cell-producing stem cells, which leaves the individual vulnerable to sepsis and hemorrhage.[4]

Acetaldehyde, Benzene, Toluene, Ethyl Benzene, Naphthalene, and Xylenes have been associated with neurological problems, including headache and dizziness.3-5,8-10 Ethyl Benzene is a known hepatotoxin, producing liver damage.[8]

Seizures and cardiac arrhythmias have been associated with high exposure to Benzene.4 Repeated exposure to Xylenes can affect concentration and memory as well as vision and can lead to muscle coordination problems.[10]

Toluene, Ethyl Benzene, Naphthalene (the active ingredient in moth balls), and Xylenes can damage the liver and/or kidneys.[5,8,9,10] Formaldehyde, Acetaldehyde and

Naphthalene also cause skin allergies.[2,3,9] Repeated exposure of Naphthalene can lead to anemia.[9] Repeated exposure to Toluene can cause brain damage.[5]

Formaldehyde, Benzene, Toluene, Ethyl Benzene, Naphthalene, and Xylenes are absorbed into the body via the lungs and skin thereby increasing the risk of exposure.[2,4,5,8-10] All the compounds released could cause skin, eye and/or respiratory irritation.[1-5,8-10]

Gas compressor stations and power plants also release small particulate matter (less than 2.5 microns known as PM2.5). Studies have revealed significant evidence of adverse effects related to exposure to PM2.5 at concentrations below the national standards including increased risk of death. High particulate concentrations are of grave concern because they absorb airborne chemicals in their midst. Certain combinations of air pollutants have synergistic effects. For example, PM2.5 and carcinogens are more dangerous together because particulate matter absorbs pollutants and then carries them deep into the lungs. Thus, the consequences are much greater than additivity would indicate. Exposure to PM2.5 at concentrations below "safe" "NAAQS levels is associated with increased risk of kidney disease/kidney failure, chronic bronchitis and other lung diseases, cardiovascular problems, including heart attacks, strokes, congestive heart failure, and reduced blood supply to the heart, neurological diseases (Autism, Alzheimer's), birth defects, cancers and premature death.

In addition to these human effects, wildlife is also subject to these effects as is our delicate ecosystem of the wetlands.

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8. The Governor should follow up on his January 28th letter to the Delaware River Basin Committee by i) voting to adopt a complete and permanent ban on hydraulic fracturing (fracking) for gas and oil throughout the Delaware River Basin, to ban frack waste storage, processing, disposal and discharge, and to ban Delaware River Watershed water withdrawals for fracking to protect water supplies, air, species and their habitats, and public health; and ii) lobbying the Governors of New York, Pennsylvania, and Delaware to also cast their votes in support of a full ban. A complete ban on fracking and its activities will prevent methane emissions from shale gas development.

The Governor should use his leadership and authority at the Delaware River Basin Commission to ensure that gas pipelines and infrastructure that pass through the Delaware River watershed are subject to strict compliance with the most protective interpretation of DRBC's rules, regulations and authorities, and that the DRBC advance creation of nonpoint source pollution control plans pursuant to its Special Protection Waters regulations which will ensure additional proactive protections from gas infrastructure.

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