August 13, 2019

Michael S. Regan
Secretary of the N.C. Department of Environmental Quality
Linda Culpepper
Director of Division of Water Resources
217 West Jones Street
Raleigh, NC 27603

Re: Atlantic Coast Pipeline - Petition for Revocation of 401 Water Quality Certification

Dear Mr. Regan and Ms. Culpepper,

Thank you for your service to the people of North Carolina protecting our natural resources. A great threat to those resources and the people who value them lies in expanding use of fossil fuels through new pipelines like the proposed Atlantic Coast Pipeline. All pipelines create environmental damage during construction, but they also threaten safety and environmental health from leaks and emissions. These risks fall heaviest in North Carolina on the Lumbee community in Robeson County, with analysis showing the Atlantic Coast Pipeline and its related projects creating an environmental injustice. Facts we have discovered since January of 2018 show significant adverse impact to the largest community of American Indians east of the Mississippi River from the construction and operation of the Atlantic Coast Pipeline and projects dependent on it. Correct information not considered by DEQ shows that the impacts analyzed in the 401 and the FERC EIS were a mere fraction of the impacts directly related to the project. We ask you to revoke the 401 Certification since it was based on incorrect information and conditions have changed since the certification was issued.

I. SUMMARY OF BASIS FOR REVOCATION: NEWLY DISCOVERED INFORMATION SHOWS MAJOR PROJECT IMPACTS

The North Carolina Department of Environmental Quality (DEQ), through its Division of Water Resources (DWR), issued a § 401 certification under the Clean Water Act of 1972 (CWA) to Atlantic Coast Pipeline (ACP) on January 26, 2018, based on the application of Atlantic Coast Pipeline, LLC for a 401 certification and the Environmental Impact Statement (EIS) produced by staff of the Federal Energy Regulatory Commission (FERC). The 401 certification process represented a comprehensive opportunity for DEQ to protect the North Carolinians and their water resources from impacts related to the construction and operation of the ACP and the projects dependent upon it.

As mentioned in the cover letter from ACP to DEQ dated May 8, 2017, Atlantic Coast Pipeline, LLC (ACP LLC) is a company formed by Dominion Energy, Duke Energy, Piedmont Natural

Gas, and AGL Resources. ACP LLC members Duke Energy and Dominion Energy have disclosed plans showing that the FERC EIS was segmented, preventing the "hard look" required pursuant to the National Environmental Policy Act (NEPA) by FERC and DEQ on the actual scope of the project. Flooding which occurred following Hurricanes Florence and Michael in Robeson County in the fall of 2018 along rights of way cleared for construction show additional permanent impacts not considered by FERC EIS or DEQ. (Note that severe weather in the future will become more frequent due to climate change.)

Based on new information presented in the latest rounds of Integrated Resource Plan development proceedings before the North Carolina Utilities Commission, shows that all projected demands for gas in North Carolina is no longer needed. In addition, renewable alternatives to gas electric generating units are now the least cost option for electric power generation in North Carolina. All the environmental impacts of building this pipeline should be avoided since it is not needed by the public.

FERC staff made basic math errors in its assessment of impacts on Indian tribes, grossly understating the impact to these communities with erroneous modelling. No measurable benefit has accrued or will accrue to the Lumbee communities from the ACP project. It is crucial that impacts to the Lumbee communities along the pipeline route be analyzed in the EIS. Yet, this analysis is not included in the report. Specifically, Natural Gas facilities in Robeson County were excluded from analysis, even though they are directly related to the ACP. The math and scoping errors in the FERC EIS were discovered and documented after the 401 was issued and serve as basis to revoke the 401 Certification since the FERC EIS was a primary source of factual information relied upon by DEQ in issuing the certification.

Lumberton is listed as the second most diverse city and Robeson is listed as the fourth most diverse county in North Carolina. Since the issuance of the 401 certification, facts show the ACP will disproportionately impact low-income communities Indigenous Peoples and people of color, including the largest Native American community **east** of the Mississippi River, the Lumbee nation. Additionally, the citizens from the communities most impacted by this pipeline and all of its related projects have not been given a fair opportunity to voice their concerns and share what is occurring on the ground. DEQ has the power and authority under the Clean Water Act to rectify this injustice. As further detailed below the facts show that the 401 Certification for the ACP should be revoked.

II. STATUTORY AND REGULATORY FRAMEWORK

A. Clean Water Act Empowers and NC Law Directs 401 Certification Decisions to Meet Water Quality Standards set Forth in N.C. Gen. Stat. § 143-211 and Implementing Rules

The CWA empowers each State to evaluate the impacts of any significant federal action on water quality in that State. Such significant "federal actions" include projects that require a CWA § 404 permit to discharge dredging or filling materials into the waters of the United States. States have the power, under CWA § 401, to deny certification for such projects. Section 401 certification acts as a check on the Federal Energy Regulatory Commission (FERC) licensing of pipeline projects. The Clean Water Act expressly requires States to apply their water quality standards to a federal license applicant in order to ensure that the licensed project will not impede the State in upholding these water quality standards. See 33 U.S.C. 1341; see also J.B. RUHL ET AL., THE PRACTICE AND POLICY OF ENVIRONMENTAL LAW 306 (2008). State water quality standards must be approved by the United States Environmental Protection Agency under § 303 of the Clean Water Act, 33 U.S.C. § 1313. State water quality standards established under § 303 provide an important "supplementary basis . . . so that numerous point sources, despite individual compliance with effluent limitations, may be further regulated to prevent water quality from falling below acceptable levels." EPA v. California ex rel. State Water Res. Control Bd., 426 U.S. 200, 205 n.12 (1976). States therefore may impose more stringent water quality controls. See 22 U.S.C. § 1311(b)(1)(c). A state may not grant § 401 certification, unless it finds that **the project and the applicant** "will comply with" these intrastate water quality standards. See 33 U.S.C. § 1341(a). Section 1341(d) further provides that "effluent limitations or other limitations" may be imposed as "necessary to assure that any applicant" will comply with the Clean Water Act and state regulations.

Under the Clean Water Act, water quality standard consists of three elements: (1) one or more existing or designated "uses" of a water body, (2) water quality "criteria" indicating the amount of a pollutant that may be present in the water body while still protecting the uses, and (3) a provision restricting degradation of certain types of waters. Designated uses include fish and aquatic life, fishing, boating, aesthetic quality, irrigation and water supply. When met, these standards must be able to protect the designated uses. ***The Clean Water Act's requirements are the floor for environmental standards enacted by North Carolina, not its ceiling.*** The General Assembly has set seven minimum criteria when the Environmental Management Commission enacts North Carolina's water quality standards. North Carolina's standards must be designed to:

1) protect human health,
2) prevent injury to plant and animal life,
3) prevent damage to public and private property,
4) insure the continued enjoyment of the natural attractions of the State,
5) encourage the expansion of employment opportunities,
6) provide a permanent foundation for healthy industrial development,
7) secure for the people of North Carolina, now and in the future, the beneficial uses of these great natural resources.

N.C. Gen. Stat. § 143-211(c).

Numerous state water quality issues are implicated within the Project area and the State has adopted a broad array of requirements affecting water quality to protect the public welfare and serve the purposes of the Clean Water Act that are directly relevant to § 401's designated scope of review.

B. United States Supreme Court Precedent Establishes that North Carolina's Jurisdiction Under Section 401 of the Clean Water Act Broadly Covers Both the Applicant and the Project With North Carolina's Anti-degradation Rules

The US Supreme Court, when reading the two subsections of § 401 together, has explicitly determined that the "activity as a whole" may be scrutinized by state water quality standards if it can be categorized as an activity that has a discharge. See PUD No. 1 of Jefferson County v. Wash. Dep't of Ecology, 511 U.S. 700, 711–12, 727–28 (1994) (recognizing the broad scope of § 401). In other words, the Court's view of the statute is that while the activity must have a discharge to fall into the § 401 subject matter box, applicable water quality standards may extend beyond the discharge itself if it is related to the activity producing the discharge. See id. EPA's regulations implementing § 401 support the application of water quality standards to activity-related conditions as opposed to discharge-related ones. See 40 CFR § 121.2(a)(3)(2009). Therefore, States may "condition certification upon any limitations necessary to ensure compliance with state water quality standards." PUD No. 1, 511 U.S. at 713–14. This broad scope permits North Carolina to impose limitations needed to prevent adverse secondary impacts from the ACP. N.C.'s constitutionally-mandated policy of preservation and the general water quality standards set by statute in N.C. Gen. Stat. § 143-211 empower DEQ to protect natural resources and North Carolinians from adverse impacts of the project, not just the discharges of fill material in jurisdictional water bodies. US Supreme Court precedent also supports reading Section 401(d) as also providing broad authority for DEQ to ensure that the applicant meets all water quality standards. Section 401(d) "expands the State's authority to impose conditions on the certification of a project." PUD No. 1, 511 U.S. at 727. Namely, the certification must ensure that the ***applicant*** will comply with the Clean Water Act and State law requirements. As the US Supreme Court pointed out, this language "refers to the compliance of the applicant, not the discharge." Id. Under the mandate of § 401(d), the Department must "impose 'other limitations' on the project in general to assure compliance with various provisions of the Clean Water Act and with 'any other appropriate requirement of State law." Id. at 727–28 (quoting § 401(d)). The focus of § 401(d) is on ensuring that the applicant and the activity complies with State and federal water quality regulations. According to the US Supreme Court, "§ 401(d) is most reasonably read as authorizing additional conditions and limitations on the activity as a whole once the threshold condition, the existence of a discharge, is satisfied." Id. at 728.

As such, § 401(d) provides broad authority for DEQ to examine the applicant's compliance in related activities – specifically, the operation of applicant's pipeline project and all related projects under the applicant's sphere of influence. Section 401 certification is ***mandatory*** and the State does not have discretion to limit the scope of its review. The statutory language of § 401(d) makes this perfectly clear: "Any certification provided under this section **shall** set forth . . . limitations . . . and monitoring requirements necessary to assure that any applicant for a Federal license or permit **will comply** with any applicable . . . limitations . . . ." 33 U.S.C. § 1341(d) (emphasis added). In addition, § 401(b) guarantees State authority over other applicable water quality requirements: "Nothing in this section shall be construed to limit the authority of any department or agency . . . to require compliance with any applicable water quality requirements." Id. § 1341(b).

The broader goals of the Clean Water Act are: "to recognize, preserve, and protect the **primary responsibilities and rights of States** to prevent, reduce, and eliminate pollution." Id. § 1251(b). It is not enough to merely meet standards on paper or in the future under the old expression, "the solution to pollution is dilution." The federal antidegradation policy establishes three tiers of protection, depending on the quality of the water at the time a state sets the Standard. First, no matter the quality of the water, the standard must maintain and protect existing uses. Second, for waters with water quality exceeding that necessary to protect uses, a state must set the standard to maintain that level of quality. Finally, states must maintain and protect the existing level of quality for waters designated as "outstanding National resources" due to their "exceptional recreational or ecological significance." Thus, the Clean Water Act aims not only to protect uses, but also to maintain high quality water. North Carolina's antidegradation policy goes beyond the federal minimum. North Carolina's antidegradation policy requires "the Environmental Management Commission to maintain, protect, and **enhance** water quality within the State of North Carolina." 15A NCAC § 02B .0201 (Antidegradation Policy) (emphasis added). The Administrative Code also explicitly requires "protection of downstream water quality standards" in the water quality certification process. 15A NCAC § 02H .0506(b)(5).

C. NC Law Requires 401 Certification Decisions to Protect Natural Resources as a Public Trust

The Constitution of the State of North Carolina declares what the policy of the State shall be with respect to environmental protection and resource conservation. Article IV, § 5 reads:

> It shall be the policy of this State to conserve and protect its lands and waters for the benefit of all its citizenry, and to this end it shall be a proper function of the State of North Carolina and its political subdivisions to acquire and preserve park, recreational, and scenic areas, to control and limit the pollution of our air and water, to control excessive noise, and in every other appropriate way to preserve as a part of

the common heritage of this State its forests, wetlands, estuaries, beaches, historical sites, openlands, and places of beauty.

This section constitutes North Carolinian's Environmental Bill of Rights. This general public trust obligation is the lens through which the State's statutes, rules, regulations, and procedures must be read in order to ensure cohesiveness with its foundational goals. This provision is the guiding source of the NC General Assembly's power to enact legislation and DEQ's authority to interpret its power to prevent pollution. All pollution prevention enactments and their implementing rules must be judged with the Environmental Protection Clause in mind. In all its decisions, DEQ has a duty to carry out its powers to implement the protections afforded to the lands and waters for the benefit of all its citizenry.

The General Assembly has advanced this constitutional directive by enacting the General Statutes which enshrine these values, including Chapters: 113, 113A, 113B, 130A, 130B, 132, 139, 143, 143B, 146, 150B, 156, 159, 159A, 159B, 159C, 159G and 162A.
Among this comprehensive system of laws is found Article 21 of Chapter 143, captioned, "Water and Air Resources," wherein the General Assembly declares its intent for those laws: "to achieve and to maintain for the citizens of the State a total environment of superior quality. **Recognizing that the water and air resources of the State belong to the people**, **the General Assembly affirms the State's ultimate responsibility for the preservation and development of these resources** in the best interest of all its citizens and declares the prudent utilization of these resources to be essential to the general welfare." N.C. Gen. Stat. § 143-211(a) (emphasis added). North Carolina's Environmental Policy Act also recognizes that the State's "role as trustee for future generations" requires it to carefully consider all state agency actions. See N.C. Gen. Stat. § 113A-3. The General Assembly's enactments clearly show their intent to clarify the legal points (a) that natural resources belong to the people and (b) that the State bears responsibility to preserve and develop these resources as a public trust. This trust may not be devolved to private interests. See N.C. Const. art. I, §§ 32 and 34. As applied to decisions under Section 401 of the Clean Water Act, the duty to protect the public trust is the responsibility of the General Assembly to the Commission and to its staff at DEQ.

D. DEQ Has the Authority to Revoke the 401 Certifications Under 15A NCAC 02H .0507 Based on a Finding of Changed Conditions Since the Certification was Made or Incorrect Information was Presented

DEQ has the authority to revoke or modify any 401 certification they have issued under 15A NCAC 02H .0507(d)(2). The rule provides that, "Any certification issued pursuant to this Rule shall be subject to revocation or modification upon a determination that information contained in the application or presented in support thereof is incorrect or if conditions under which the certification was made have changed." New information presented by the undersigned show that the conditions

under which the certification was issued have changed. New information presented below also indicates that information submitted in support of the certification was incorrect. **Both triggers for revocation have been met.**

Pursuant to 15A NCAC 02H .0112(b)(4), DEQ also has power to suspend the 401 certification pursuant to Rule .0114(a). In turn, 15A NCAC 02H .0114(a) authorizes DEQ to revoke or modify permits for "(1) violation of any terms or conditions of the permit; (2) obtaining a permit by misrepresentation or failure to disclose fully all relevant facts; (3) a change in any condition that requires either a temporary or a permanent reduction or limitation of the permitted discharge." The relevant facts of the ACP project's need, scope, purpose and impacts on environmental justice communities were not disclosed by the applicant during the process. Changed conditions demonstrate that the ACP serves no need justifies for this project. DEQ has power to remedy the injustice against these communities by suspending and revoking the 401.

E. Law Mandates Comprehensive Review of FERC Pipeline Projects Under 401 Certification, Including Cumulative and Secondary Impacts

Regulatory agencies have long recognized that applicants with projects subject to review under the National Environmental Policy Act are incentivized to "segment" their projects in applying for environmental permits—to describe and analyze only one construction segment, rather than all projects directly related to it, which lead permitting agencies to reduce the scrutiny of adverse environmental impacts of the project. To address this concern, the Code of Federal Regulations requires agencies to consider connected, similar, and cumulative actions in the same EIS, and not to segment such actions out. 40 C.F.R. § 1508.25(a)(1)-(3). "Connected" actions are those that:

(1) "[a]utomatically trigger other actions which may require environmental impact statements";

(2) "[c]annot or will not proceed unless other actions are taken previously or simultaneously"; **or**

(3) "[a]re interdependent parts of a larger action and depend on the larger action for their justification." § 1508.25(a)(1).

The Fourth Circuit has explained that "in determining whether actions are connected so as to require consideration in the same EIS, courts employ an 'independent utility' test, which asks whether each project would have taken place in the other's absence. If so, they have independent utility and are not considered connected actions." Webster v. U.S. Dep't of Agric., 685 F.3d 411, 426 (4th Cir. 2012) (citations omitted).

"Cumulative" actions are those that, "when viewed with other proposed actions have cumulatively significant impacts and should therefore be discussed in the same impact statement."40 C.F.R. § 1508.25(a)(2).

Finally, "similar" actions are those that, "when viewed with other reasonably foreseeable or proposed agency actions, have similarities that provide a basis for evaluating their environmental consequences together, such as common timing or geography. An agency may request to (and for the purpose under NEPA, demand to) analyze these actions in the same impact statement. It should do so when the best way to assess adequately the combined impacts of similar actions or reasonable alternatives to such actions is to treat them in a single impact statement." 40 C.F.R. § 1508.25(a)(3). 40 C.F.R. § 1508.25 clarifies that agencies determining the scope of an EIS shall consider the direct, indirect, *and* cumulative impacts of connected, cumulative, and similar actions. The prohibition of segmentation obviously applies to agency permitting decisions. However, to the extent that such agency decisions result from intentional and systematic misrepresentation by applicants, both environmental and deterrent interests warrant the re-examination of permitting decisions, and call for fresh analysis that incorporates the best and most recent information available about both a permitted project and other connected projects in the region. Part III details information that has come to light **since** the approval of the permit. **Part IV.A will apply these new facts to the law on segmentation of agency review.**

North Carolina's state law incorporates these principles of federal law. "The North Carolina Court of Appeals has stated . . . that 'to the extent that the federal environmental law is relied upon to meet the requirements of NCEPA, the federal requirements are by reference enforceable against North Carolina agencies as state law.' . . . For this reason, in determining whether State Defendants were substantially justified in preparing the FEIS the court will consider NEPA's implementing regulations. Furthermore, for simplicity of language, the court will refer primarily to NEPA rather than to both NEPA and NCEPA when discussing the adequacy of the FEIS. N. Carolina All. for Transp. Reform, Inc. v. U.S. Dep't of Transp., 151 F. Supp. 2d 661, 678 (M.D.N.C. 2001) (citing *Orange County v. North Carolina Dep't of Transp.,* 46 N.C.App. 350, 368 (1980)).

III. NEW INFORMATION AND CHANGED CONDITIONS DISCOVERED SINCE PERMIT CERTIFICATION

A. Alternatives to Natural Gas-Fueled Electric Generating Units are Less Costly for Consumers and Avoid the ACP's Adverse Impacts

Most capacity for the ACP was subscribed by its electric utility partners who cited increased demand for electricity to be supplied by new gas-fired electric generating units proposed by the partners. Evidence submitted in 2018 in the North Carolina Utilities Commission's Integrated Resource Planning ("IRP") processes have shown that these demand projections are wrong. Indeed,

the evidence submitted shows that the least cost and most flexible method of meeting electricity demand in North Carolina relies on renewables, and not the ACP or its associated gas-fired plants.

During the 2018 IRP, North Carolina Attorney General's Office (AGO) produced evidence to show that conditions regarding the economic circumstances related to energy production and its impacts associated with natural gas production have changed. In a letter before the North Carolina Utilities Commission dated March 7, 2019 (Docket No. E-100, Sub 157, hereinafter referred to as "AGO Letter"), the AGO identified three areas where further analysis about the project was warranted given new information regarding the economic conditions of the energy industry, specifically that: "(i) Duke's modeling should test a wider range of storage technologies paired with renewable energy generation; (ii) planning should take into account the costs to ratepayers from climate change caused by natural gas power generation; and (iii) Duke's modeling should consider demand-side management, using energy efficiency resources, on a level playing field along supply-side alternatives."

The first new condition the AGO noted was a decrease in economic cost of renewable energy technology. AGO Letter at Page 5. The AGO Letter cited two studies noting downward trends in the cost of utility-scale renewable energy and battery storage technologies also known as "solar-plus-storage" technology. The decrease in cost of renewable technologies has led other utility projects to take more expansive consideration of solar-plus storage and other renewable energy technologies. For instance, NV Energy announced a plant on May 31, 2018 that will add battery capacity equal to 25% of their solar capacity. However, "Duke's initial modeling screen included nine natural gas-burning technologies, two coal technologies, two nuclear technologies, and two stand-alone storage technologies, [sic]" but included only one solar-plus-storage technology configuration in their initial model. No analysis about the ACP has been provided regarding the new conditions relating to the cost of renewable energy production and storage.

Expert modelling analysis submitted in the IRP by Intervenors Southern Alliance for Clean Energy, Sierra Club and Natural Resources Defense Council showed that the least cost and most flexible option for generating electric power under a power dispatch model included no new gas plants beyond those already under construction. In a filing before the North Carolina Utilities Commission dated March 7, 2019 (Docket No. E-100, Sub 157, hereinafter referred to as "SACE Filing"), the SACE Filing shows that Duke Energy's IRP's reliance on new gas plants to meet demand upon retiring coal plants cost consumers more than replacing coal with renewables coupled with storage. Energy efficiency was also cited as reducing need for new gas plants as projected. The SACE Filing's proposal would directly save consumers billions of dollars: "The total system cost under the IRP case comes in at $5.6 billion more than under the economically optimized case. Translated to the cost to the average residential customer, the IRP case results in bills that are 3% higher than in the economically optimized case by 2030, and about 5% higher than in the optimized

case by 2035. " SACE Filing at Page 5.

The AGO Letter also noted the additional costs associated with natural gas production including those caused by climate change. AGO Letter at Page 7. The AGO noted that "climate change has real costs that are ultimately borne by ratepayers" due to hurricanes, extreme temperatures, flooding, and drought exacerbated by climate change. See 4th National Climate Assessment, Hsiang et al. 2017, Emanuel 2018

The need, scope and impact analysis from the FERC EIS was based on demand forecasts for gas plants which are no longer economically feasible to build. Analysis conducted of the overall gas demand across the ACP in Virginia and North Carolina shows that projected gas plant growth has declined sharply and with it demand for the ACP's gas. In a report authored by the Institute for Energy Economics and Financial Analysis, analysts compared projected demand versus actual demand and finding no demonstrated need for the gas supplied by the ACP. (See "The Vanishing Need for the Atlantic Coast Pipeline: Growing Risk That the Pipeline Will Not Be Able to Recover Costs From Ratepayers" by Cathy Kunkel, IEEFA Energy Analyst, January 2019) The stated need for the ACP in the FERC EIS and the 401 Certification is factually wrong and was based on outdated information. Thus, the ACP 401 must be revoked.

Additionally, reporting of ACP's economic benefits was based on misrepresentations about the economic impact of the project, which touted positive growth but did not evaluate economic costs to communities. Dominion Energy submitted a Revised "Cumulative Impacts Assessment for Johnston, Cumberland, and Robeson Counties, North Carolina" (dated December 20, 2017), which asserted that the proposed pipeline will encourage significant economic development and that its cumulative adverse impacts would be minor. However, the basis of this assertion was a regurgitation of demographic information in Robeson County without context or analysis of costs. (See Report "The Failure of the Atlantic Coast Pipeline to Demonstrate Economic Development Benefit to the NC Department of Environmental Quality and the Public of North Carolina" Compiled by Nancy LaPlaca, Energy Consultant, and published the Alliance to Protect our People and Places We Live "APPPL" in January, 2018) The ACP Cumulative Impacts supplement does not account for the economic costs that will be generated by increased waste and noise pollution, as well as visible obstruction that will be caused by the project. Notably, the document did not specify specific industries that needed additional gas capacity as requested by DEQ. Nor did it evaluate the adverse impacts of these proposed industrial developments.

B. New Changes to the Legal and Regulatory Landscape

Since the certification of the permit, legal and regulatory conditions relevant to the 401 Certification have changed. ACP construction has been halted multiple times due to permit deficiencies found during judicial review and resultant appeals. Additionally, delays in construction of gas plants proposed to be served by the ACP due to flat demand and regulatory scrutiny by Virginia and North

Carolina's utility officials make the prospect of the ACP's economics more like a bailout than a windfall. Lastly, natural gas infrastructure's impacts to climate change must be considered in permitting decisions and related environmental assessments. On October 29, 2018, Gov. Cooper issued Executive Order No. 80 regarding North Carolina's Commitment to Address Climate Change and Transition to a Clean Energy Economy. (See "Executive Order No. 80, "North Carolina's Commitment to Address Climate Change and Transition to a Clean Energy Economy" (Oct. 29, 2018). The order established new requirements on State agencies regarding climate change. Among other requirements, the Order sets a goal of reducing statewide greenhouse gas emissions to 40% below 2005 levels by 2025; requires that cabinet agencies evaluate the impacts of climate change on their programs and operations, and; orders DEQ to develop a statewide Clean Energy Plan.

Recent case law supports requiring that federal agencies determining a Finding of New Significant Impact must include thorough research on the impacts a proposed project has on climate change. See See WildEarth Guardians v. Zinke, 368 F. Supp. 3d 41, 86 ERC 4692 (D.D.C. 2019), Court Opinion (D.D.C. Mar. 19, 2019). In the WildEarth case, the Court found an EA/FONSI defective because the agency reviewing a proposed oil and gas drilling project "failed to take a hard look at the climate change impacts of oil and gas drilling because the EAs (1) failed to quantify and forecast drilling-related greenhouse gas (GHG) emissions; (2) failed to adequately consider GHG emissions from the downstream use of oil and gas produced on the leased parcels; and (3) failed to compare those GHG emissions to state, regional, and national GHG emissions forecasts, and other foreseeable regional and national BLM projects. The Wildearth case supports the argument that oil and gas infrastructure project reviews cannot be segmented out of reviewing impacts caused by the greenhouse gas emissions associated directly with the project and its intended customers.

C. Cumulative Environmental Impacts of the ACP Include Past, Present, and Reasonably Foreseeable Activities Associated With the Project, Including the Transport South beyond North Carolina and Possible Export Overseas

DWR has published guidance on assessing cumulative impacts in its 401 programs. (See Guidance available at: https://.nc.gov/ncdeq files /Water%20Quality/Surface%20Water%20Protection/401/Policies_Guides_Manuals/FnewtiveImpactPolicy.pdf). Since 2004, DEQ has said that it shall determine whether any "project does not result in cumulative impacts, based upon past or reasonably anticipated future impacts, that cause or will cause a violation of downstream water quality standards." DEQ defined cumulative impacts as those "environmental impacts resulting from incremental effects of an activity when added to other past, present, and reasonably foreseeable future activities regardless of what entities undertaken such other actions."

From June 27, 2017 to December 14, 2017, DEQ sent four letters to ACP LLC directing the company to submit additional information with a focus on the cumulative impacts that might be caused by the construction of the ACP project. In particular, DEQ made it clear to ACP in more

than one request that (i) the "analysis of cumulative impact is required regardless of whether these projects are separate from ACP, not within ACP's purview or undertaken by entities other than ACP," (ii) "the analysis should include potential secondary and cumulative impacts (e.g., from anticipated development resulting from the construction of the pipeline)," and (iii) the "analysis is for past or reasonably anticipated future impacts, including expansion of the pipeline beyond the current terminus in Robeson County."

The ACP's Final Assessment Report submitted on December 20, 2017, contains a list as Attachment 1, entitled "Past, Present, and Reasonably Foreseeable Future Projects in Johnston, Cumberland, and Robeson Counties, North Carolina" (on pages from 1-1 to 1-4) (Attachment). The Attachment summarizes the components of the ACP project with potential cumulative impacts identified in each county. According to the Final Assessment Report, ACP's project will have "minimal adverse impacts on the waterbodies within the watershed basin and sub-basin crossed" and "minimal cumulative effects are anticipated when the impacts of the ACP are considered along with the projects identified in Attachment 1." (Attachment 1)

Attachment 1 was expanded on multiple occasions until ACP was granted 401 certification in January 2018. ACP's Final Assessment Report disclosed that among all the projects in the Attachment, only 4 proposed projects associated with Piedmont Natural Gas were connected to the ACP:

- Piedmont Natural Gas Facility Modifications at the Smithfield M&R Station in Johnston County;
- Piedmont Natural Gas Facility Modifications at the Fayetteville M&R Station in Cumberland County;
- Piedmont Natural Gas Facility Modifications at the Pembroke M&R Station in Robeson County; and
- Piedmont Natural Gas 26 miles of 20-in Diameter Pipeline in Robeson County.

This short list of projects related to the Atlantic Coast Pipeline failed to acknowledge, assess, and clarify its cumulative impact in relation to the full scope and scale of existing and planned PNG pipeline infrastructure. This included two existing projects and up to seven planned projects, counting those under design and construction at the time of the permit application. The full construction of the M&R stations and their impact, not mere "modifications", were neither acknowledged as linked directly to the pipeline's development and the transport of its gas, nor assessed in terms of their environmental and community impact. Finally, there is one project cited in the ACP application with only a site assessment with no reference to a potential future activity and project. In total, there are nine natural gas projects that are presently in existence, under construction, or formally planned which are directly connected to the Atlantic Coast Pipeline in Robeson County. All

nine of these natural gas projects are within an 8-mile radius of the ACP terminus in Pembroke/Prospect in the heart of the Lumbee community, the largest Native American community east of the Mississippi River.

When all nine natural gas projects in relation to the ACP in Robeson County are acknowledged and analyzed, the cumulative impact of the Atlantic Coast Pipeline is significant, not minimal as claimed in the ACP application. All nine of these natural gas projects and one potential biogas project should have been fully acknowledged and detailed within the ACP permit application and considered by DEQ when assessing the cumulative impacts of the Atlantic Coast Pipeline. Together, they form a complex of interrelated natural gas infrastructure, the cumulative impacts of which are greater than the sum of their parts. These nine projects are:

(1) The existing PNG/Duke Pipeline, which transects the ACP terminus en route extending from the Transco pipeline to Wilmington, NC.

(2) The existing Compressor Station that compresses natural gas along an existing PNG pipeline that crosses the ACP terminus.

(3) The terminus of the Atlantic Coast Pipeline: The terminus is located in the same complex as the existing PNG/Duke Energy Pipeline (1) and Compressor Station (2). Property was purchased across the road from the existing pipeline and compressor station for the ACP, the Metering and Regulating Station, and the intersection of up to four natural gas pipelines at this location. The scale of existing and planned natural gas infrastructure at this site was not fully described, detailed, or assessed in terms of its cumulative impact and risk to water quality, public health, and public safety in the ACP 401 permit application.

(4) A new PNG/Duke Metering and Regulating Station. The ACP was granted a Conditional Use Permit to construct the M&R Station from the Robeson County Board of Commissioners on August 7, 2017. The stated purpose of the construction of the M&R station is to carry ACP Gas along the new PNG Pipeline to Duke Energy's Smith Energy Center in Hamlet and provide gas for a new LNG facility in the Wakulla/Maxton area. By describing the M&R Project as one of "Facility Modifications" does not fully disclose the scope and scale of the construction project,
which more than doubled the footprint of PNG/Duke Energy's aboveground industrial complex in Prospect.

(5) PNG Line #434 Pipeline: This pipeline is described as 26 miles of 20-inch Diameter Pipe. It was built to carry ACP gas to the Smith Energy Center in Hamlet along with gas to the LNG facility nearby. Although constructed to transport ACP gas, this pipeline was segmented out of the ACP FERC EIS and received separate approval through other state and federal regulatory review pro-

cesses. This separate approval does not exempt the ACP from assessing its potential impact on water quality when its impact is aggregated as a part of the total, collective impact of all the existing and planned natural gas infrastructure in the 8-mile radius of the ACP terminus. The construction of this pipeline contributed to additional flooding following Hurricane Florence in September 2018. Line #434 crosses beneath the Lumber River, a National Wild and Scenic River.

(6) PNG/Duke Energy Liquidified Natural Gas Facility (LNG): On July 13, 2018 Piedmont Natural Gas, a Duke Energy subsidiary, announced plans to build and operate a 1 billion-cubic-foot LNG near Wakulla in Robeson County. Proposed construction of the facility was planned to begin in 2019 with an estimated completion date in 2021. Piedmont Natural Gas claims that the project is independent from the ACP; however, a Piedmont spokesperson stated they will have a choice of using gas from Transco or the ACP. Frank Yoho, president of the natural gas business for Duke Energy told the Charlotte Business Journal that "the new storage facility can use gas from either the existing Transco Pipeline, currently the state's only interstate pipeline, which runs through Western North Carolina, or the ACP." The LNG facility was not discussed in the cumulative impact statement despite claims that the facility could process ACP gas.

(7) A connector pipeline required to transport gas to the LNG facility. Currently there is no pipeline running to the site of the LNG facility. Piedmont Natural Gas held an Open House regarding the LNG facility on May 30, 2019 at Oxendine Elementary School, located one mile from the LNG site. At the meeting, PNG officials discussed the need to construct a 4 -mile pipeline to connect the LNG to the #434 Pipeline. Although officials have stated that the ACP could serve the facility, the connector pipeline was not referenced, assessed, or included in the cumulative impact statement of the ACP in its permit application.

(8) Pipeline Extension to South Carolina: The ACP disclosed its plan to transport gas to South Carolina from Pembroke in their response to DEQ dated June 27, 2017. This plan indicates that new pipelines will intersect and connect in Pembroke. However, in ACP's later responses to DEQ, ACP neither recognized nor assessed the cumulative impact of the construction of this significant addition to natural gas infrastructure on water resources and quality. Instead, it stated that it had no plan to extend ACP beyond Pembroke, which prevented DEQ's ability to cumulatively assess the impacts of the plan.

In order to transport gas to South Carolina from the ACP terminus, a fourth pipeline would be needed to connect to the three other pipelines at the ACP terminus. The four pipelines connecting would be the existing PNG pipeline, the recently-completed PNG Line #434 Pipeline recently completed, the ACP, and the South Carolina extension. This fourth pipeline would also traverse numerous swamps, wetlands, and the Lumber River on its way to South Carolina. This additional pipeline, referenced once in the ACP application but segmented out of review was never assessed in terms of its cumulative impact on Robeson County. Whether this constituted a material omission or misrep-

resentation warrants further investigation by DEQ. Denials by ACP officials regarding the expansion of the ACP beyond the Pembroke terminus are highly contradictory to other written and oral statements indicating planned extension.

On June 27, 2017, DEQ asked ACP "[w]hat percentage or volume of new transportation capacity will be used for conversion of coal-fired plants to natural-gas versus the amount for new facilities." ACP responded in writing on July 12, 2017 that "[w]ith the existing facilities and the proposed gas generation growth in North Carolina, the transportation service from ACP is critical to the growing gas generation needs of DEP and DEC." Specifically, (i) with respect to the existing facilities, ACP referred to the provision of fuel source to the existing Duke Energy Progress (DEP) and Duke Energy Carolinas (DEC) facilities through interconnects with Piedmont Natural Gas; (ii) with respect to the proposed gas generation growth, ACP mentioned that DEP and DEC each prepared a planning document called an Integrated Resource Plan (IRP) which detail the generation needed for each utility to meet the forecasted electricity requirements for its customers over the next 15 years. In particular, ACP mentioned a new natural gas combined cycle that will be placed into service in Anderson County, South Carolina.

On December 20, 2017, ACP submitted a report on "Cumulative Impacts Assessment for Johnson, Cumberland and Robeson Counties, North Carolina," (Final Assessment Report). In the Final Assessment Report, ACP LLC indicated that (i) the terminus of the pipelines was located at "Junction A" in Robeson County, North Carolina, which is also a proposed point of delivery of natural gas to Piedmont's existing pipeline; and (ii) "Atlantic has no commitment to potential customers or reasonably foreseeable plans to extend ACP beyond the current terminus. Because there is no planned expansion that can be scoped or analyzed, the potential for extension of the pipeline is not addressed in this report." ACP LLC's statements from June lack credibility.

During the ACP permit application process, plans to take the ACP gas into South Carolina from the terminus in Pembroke had been denied. Yet, Dan Weekly, Dominion Energy's vice president and general manager of Southern pipeline operations, confirms in a statement to the Associated Press on September 29, 2017, that there are existing plans to extend the ACP beyond the Pembroke terminus. When asked about ACP expansion, he states that there will be a need to add "horsepower, upstream" to move the gas to South Carolina. His statements indicate that there will need to be an additional compressor station constructed at the ACP terminus in order to further transport the gas.

Weekley stated: "…Even though it dead ends in Lumberton, of course, it's 12 miles to the border. Everybody knows it's not going to end in Lumberton…. We could bring in almost a billion cubic feet a day into South Carolina by just adding horsepower, upstream. So those are one of the things, and I get to question the alternative (to volume) all the time. So, I get this question everyday: which direction are you turning? And I answer it very simply. You tell me where the load is and I'll tell you which way we are turning. Because do we hug 95 and come down what I'll call the huge

growth areas along the ocean there? Not without power generation you're not. You cannot cobble together enough hospital, or I mean, excuse me, hotel load and everything else. It's not going to be there. If we need to turn to meet power generation in what I'll call the mid-state midlands area, we will turn to the southwest. So, but I don't know which that's going to be. You all tell me. We'll turn one way or the other." https://www.apnews.com/d9e1216747d642abb025dedb0043462f/APNews-Break:-Disputed-East-Coast-pipeline-likely-to-expand; Dan Weekley's remarks were made at the 2017 South Carolina Clean Energy Summit, according to video obtained by AP, September 2017. Archived link: https://web.archive.org/web/20171028203356/https://thinkprogress.org/atlantic-coast-pipeline-expansion-5d5bfa25f26e/

In 2015, Dominion Energy bought the CGT interstate pipeline from SCANA (South Carolina's largest gas and electric company). The CGT has "the widest geographic coverage [of pipelines] in South Carolina," according to the South Carolina Energy Office. In 2018, Dominion acquired SCANA outright. In subsequent months, Dominion Energy steadily built in the direction of South Carolina, even as Duke and Dominion have continued to dance around the truth with the South Carolina Public Services Commission about its intent to build the ACP out across the border from North Carolina. [See the following: Bo Peterson, "Dominion's 600-Mile Gas Pipeline Heading in Direction of South Carolina," *The Post and Courier*, Sep. 9, 2018. https://web.archive.org/web/20180724092745/https://news.duke-energy.com/releases/piedmont-natural-gas-to-build-new-liquefied-natural-gas-facility-in-north-carolina (Dominion building ACP toward South Carolina); Frank Yoho (President of natural gas operations, Duke Energy), testimony before S.C. Public Services Commission, pp. 22-23, November 29, 2017, https://dms.psc.sc.gov/Attachments/Matter/5a208a6c-5f43-45be-9aa9-ab60a3108b7f (answering the Commission's question about what it would take to build into South Carolina, "Once we get [the ACP] built, it becomes — for the next tranche of capacity, I believe it'll be the most competitive place to go get capacity to either expand or extend. And as we know, it's not a long extension to get to other markets, whether it be others in North Carolina or South Carolina. But the number one thing in order to get it expanded is to get it built. . . . [T]here are no — current plans are for the current markets, but the expectation is that, given the benefits of natural gas — and this will be the low-cost, I believe, way to get gas into the Carolinas region — as soon as we can get it built and the markets can justify it, I think there are great opportunities there."). *See also* Thomas Farrell (CEO, Dominion Energy), Transcript of Proceeding before the Public Service Commission of South Carolina, Docket Nos. 2017-207-E, 2017-305-E, and 2017-370-E, November 16, 2018, https://web.archive.org/web/20190319213726/https://dms.psc.sc.gov/Attachments/Matter/6cc0dd99-bb4d-4c8b-af02-34c1f3fc8fa7 (in response to Commission's asking whether ACP would be expanded into South Carolina, "We would hope that demand will arise, and that the pipeline would be extended into South Carolina, but we have no plans to do so today, but I would hope that that happens.").]

The evidence of the ACP's failure to inform DEQ of this plan and analyze its environmental consequences and cumulative impact of this additional pipeline in its application is substantial. The withholding of this information and its segmentation from the ACP permit application are grounds for revocation of the permit. Its segmentation from its FERC application also raises serious regulatory and permitting questions.

(9) Hwy 72 Rail Site: In its December 20, 2017 submission to the NC Department of Environmental Quality in response to DEQ's request for additional information on December 14, the ACP describes the "Hwy. 72 Rail Site" in Robeson County on pp. 24-25. The site is acknowledged as a site of "project-induced growth" in relation to the ACP. Information provided states that "…new development would most likely occur" at this site (p. 24). Information focuses on the site plan and states: "The conceptual site plan for the Hwy. 72 Rail Site demonstrates that the Certified Site criterion mitigates impacts on water quality."

A one-page map of the Highway 72 Rail Site Conceptual Plan is included in the maps in Item 7, Attachment 3, entitled "General Extent of Potential Growth Areas Identified in Johnston, Cumberland, and Robeson Counties, North Carolina, and Highway 72 Rail Site Conceptual Plan". What is missing from the information provided is any information of what is planned for this site and the cumulative impact of any planned project. The site is within the 8-mile radius and to the southeast of the ACP terminus. It is described as having rail and gas access.

In 2015, Asbury Graphite Inc. of North Carolina received a One NC economic development award to construct a graphite and carbon product processing Carolina plant at 191 Magna Road in this site area near Lumberton. (see EDGE January 11, 2018 Follow-Up. https://www.ncleg.gov/DocumentSites/Committees/JLEDGEOC/2017-2018/Meetings/2018-01-11%20Prosp%20Zones,%20Econ%20Well-Being,%20Utility%20Acct,%20SB%20660,%20ED%20Awards/January%2011,%202018%20Follow-Up/004%20FRD_EDGE_Follow-Up_2018-01-11.pdf.) Asbury Graphite Inc. of North Carolina is a subsidiary company of Asbury Carbons, which conducts business in the oil, gas, and pipeline industries amongst other fields. (Asbury Carbons: Oil, Gas, and Pipeline. https://asbury.com/applications/oil-gas-and-pipeline/)

In 2015, Robeson County received a North Carolina Rural Infrastructure Authority Community Development Block Grant to construct a 2,100 linear feet rail spur to allow Asbury Carbons to locate in Lumberton. (NCRIA approves more than $1.1 million in grants to help with rail access." https://www.rtands.com/track-maintenance/on-track-maintenance/ncria-approves-more-than-11-million-in-grants-to-help-with-rail-access/) In 2015, Asbury Carbons Rail Spur received an Industrial Development Fund Utility Account Grant to construct a rail siding connecting Asbury Graphite Inc. of NC to the CSX mainline running from Wilmington to Charlotte. ("Asbury Graphite Win Highlights Rail Allies." http://www.ncse.org/news-and-media/the-southeast-compass/the-southeast-compass-summer-2015/asbury-graphite-win-highlights-rail-allies.)

The ACP permit application provided no information on the scope and scale of the project to be developed at this site. It is assumed that the site is possibly being prepared for a carbon fiber plant and there have been local references to support this projection. Information about this project and on the cumulative impact of the Atlantic Coast Pipeline were not analyzed by FERC or DEQ. All of these seven new, natural gas projects, combined with the two pre-existing projects, will have major impact on the environment and health and safety of Robeson County's vulnerable eco-systems and populations. More information is needed in order to determine if the project at this site will have cumulative or secondary impact on the environmental quality on this concentrated area of natural gas infrastructure and expansion.

All nine projects listed above are concentrated in an 8-mile radius in Robeson County, a unique region that is home to a large number of jurisdictional streams and wetlands, nearly all of which drain to the Lumber River, North Carolina's only blackwater stream with National Wild and Scenic River designation. It is one of the most racially diverse, rural counties in the U.S., and one of our nation's poorest with rising poverty, significant health disparities, and a major lack of affordable housing. It has suffered from two major hurricanes in a period of two years, exacerbating its economic and social conditions.

The 401 permit application of the Atlantic Coast Pipeline minimized the major adverse environmental impacts that such massive development of new fossil fuel infrastructure and industry will have on the fragile eco-system, economy, and diverse communities of Robeson County. DEQ should revoke the 401 Certification due to this new information showing the truly massive scope and scale of the ACP and its impacts in Robeson County, where the "Terminus" is really a "Launchpad."

ACP should have disclosed information about these facilities to DEQ and included them on Attachment 1. The correct information on the impacts of directly related facilities provided in this Petition demonstrate that the cumulative impacts analysis of the ACP project was completely understated. The Final Assessment Report does not assess these impacts which would include environmental justice, water quality, wetlands, and water resource impacts from these interconnected project proposals. Whether these projects are new proposals created by changed factual conditions or incorrect omissions from the initial application, they still provide a basis to revoke the 401 Certification.

While it is clear that this is new information for the public as well as DEQ staff, it is unclear when this information became new for the ACP LLC. New pipeline connection pipelines will be needed to transport natural gas from ACP to these new projects. It is our view that the impact of any project being planned by those four energy companies (which include, but not limited to, those identified above) that are relevant to the pipeline should also be assessed cumulatively.

Areas Needing Further Investigation

The relationship between pipeline construction and flooding caused by major hurricanes needs to be explored. Due to experience with the aftermath of the new Piedmont pipeline construction in Robeson County that included Hurricane Florence, new questions have surfaced about the impact of the compacted surface area above pipelines upon wetlands that they cross--and the populations surrounding those wetlands. Swamps in Robeson County, such as the one through which the Piedmont pipeline was built, represent an important natural defense against flooding; they store floodwaters and reduce both ingoing and outgoing floodwater impacts. With a hard-packed trail of impermeable surface along its path, floodwaters can easily flow past the natural barrier of

the swamp, increasing in concentration and strength. Environmental scientists call the resulting sluice a "preferential floodwater path" -- a path of least resistance for water. Prior to pipeline construction, communities in rural areas with serious flooding had previously relied upon the protection of the wetlands to reduce floodwater impacts.

Additional regional projects in neighboring projects may have cumulative or secondary impact on the water quality and quality of life in neighboring counties. What known or future project plans are connected to the placement of the two additional Metering and Regulating Stations in Johnston and Cumberland Counties? What known or future project plans will be the beneficiaries of the taps along the pipeline route. What is the cumulative or secondary impact of project plans for the former Weatherspoon Energy Plant in Lumberton, the Optima KV Biogas facility near Kenansville, and the Enviva Wood Pellet facility near Warsaw? What relationship, if any, do they have with ACP infrastructure and development? The Department of Environmental Quality needs to suspend and revoke the 401 permit and acquire answers to the many questions that were left unanswered in the ACP LLC application.

D. <u>Drastic Increase in Permitted Export of Natural Gas Outside of the U.S.</u>

In the Final Assessment Report, ACP stated that it "has no commitment to potential customers." It also stated that: "[T]he action forecast for the implementation of the project is informed by demand for natural gas observed in North Carolina. The ACP would serve the growing energy needs of multiple public utilities and local distribution companies (LDCs) in North Carolina. Based on current customer commitments, approximately 79.2 percent of the natural gas transported by the ACP will be used to generate electricity for industrial, commercial, and residential uses. The remainder of the natural gas will be used directly for other residential (9.1 percent), industrial (8.9 percent), and commercial and uses such as vehicle fuel (2.8 percent). By providing access to low-cost natural gas supplies, the ACP will increase the reliability and security of natural gas supplies in North Carolina."

FERC staff relied on these representations by ACP LLC as it completed its Final EIS issued on July 21, 2017 that "[t]he purpose of ACP is to deliver up to 1.5 billion cubic feet per day of natural gas to customers in Virginia and North Carolina." Since the FERC EIS was completed and the ACP 401 was issued, public reports show that ***the United States is poised to become one of the largest exporters of liquefied natural gas (LNG)*** in the next 20 years. Reports indicate exporting as much as 19 Bcf/d by some estimates, thanks to robust production. There is about 24 Bcf/d of U.S. liquefaction capacity either in operation, under construction or approved by both FERC and the Department of Energy (DOE). In total, DOE has approved export licenses for 52.9 Bcf/d. could put upward pressure on domestic prices and expose the previously isolated North American market to global market dynamics in the years to come, according to the U.S. Commodity Futures Trading Commission. [7] One large facility opened in Elba, Georgia this year and gas from the ACP could

well now be bound for it. The US President has announced an "energy dominance" strategy to make the United States a large exporter of fossil fuels to the world. This strategy includes, among other matters, the exportation of fracked gas to all possible international markets, such as Europe and China. The DOE and FERC approvals facilitate this explosive growth in exports, which benefit fossil fuel extraction companies, utility companies promoting pipeline projects, and their investors.

E. Erroneous Analysis About Impacts to Environmental Justice Communities

ACP LLC failed to disclose, and FERC Staff failed to analyze all relevant information about impacted Environmental Justice Communities. ACP LLC's discussion of environmental justice consideration is limited to references to the conclusion of FERC EIS that there would be no disproportionately high and adverse impacts. See "ACP Cumulative Impacts Assessment for Metering and Regulation Stations in North Carolina" included in their response to information Request Dated September 14, 2017. p. 42. However, this filing does not address the full scope of impacts that ACP will inflict upon Environmental Justice Communities in Robeson County. Instead, it lumps Robeson County in with other locations along the pipeline's path in order to perform a single unfocused analysis that almost by design is inappropriate for detecting environmental justice issues.

The obvious flaws in the FERC EIS on analyzing Environmental Justice impacts are part of ongoing appeals before the 4th Circuit in challenges to Virginia's actions on the ACP. See Friends of Buckingham et al. v. State Air Pollution Control Board et al. No. CV 19-1152 (4th Circuit, 2019) Failures by FERC's EIS to properly analyze disproportionate impacts appear to have occurred in both Virginia and North Carolina. ACP threatens to inflict a wide variety of harms to these vulnerable populations, including interference with their enjoyment of land, disruption and destruction of unmarked ancestral burials and sacred places, contamination of groundwater and aquifers, and general marring of the natural environment. The Lumbee community attaches great cultural and religious importance to the integrity of the natural environment. See Lumbee Tribe of North Carolina, Tribal Consultation and the Atlantic Coast Pipeline, CLLR-2018-0222-01, Feb. 22, 2018. https://web.archive.org/web/20190322155906/https://www.ncwarn.org/wp-content/uploads/2.23.18-Lumbee-resolution.pdf

Professor Ryan E. Emanuel, Environmental Science Professor at North Carolina State University, has analyzed the EIS and found that conceptual and methodological errors in FERC's analysis greatly minimized the extent to which the impact of the ACP disproportionately falls upon poor communities of color along the planned route. See "Comments of Dr. Ryan E. Emanuel, Ph.D. on the Atlantic Coast Pipeline" (2017) For example, DEQ coded negative impacts in census tracts with 75% minority populations as not raising disproportionate EJ concerns—simply because the tracts were located within counties that likewise had a high share of non-white residents. Professor Emmanuel observed that:

> "Not only does the project cross areas of high poverty in rural Appalachia, but it also runs through the so-called "Black Belt" of Virginia and North Carolina. Both regions have borne disproportionate shares of environmental burdens throughout US history, and their local populations live with an unfortunate legacy of past environmental decision making in which they have had little or no part. These are, quite literally, the textbook study regions for environmental justice. Federal regulators should be first to acknowledge these large-scale, multi-state patterns of inequity and to hold petitioners accountable for their activities in these regions. Instead, the environmental justice conclusions of this DEIS hinge on what is essentially a series of county- level calculations, combined in a mathematically indefensible fashion, and hard-wired to ignore important regional demographic patterns that frame the project as a whole."
> See "Comments of Dr. Ryan E. Emanuel, Ph.D. on the Atlantic Coast Pipeline" (2017)

Dr. Emanuel published papers on his analysis in detail in the prestigious journal, Science. See Ryan E. Emanuel, Flawed Environmental Justice Analyses, Science 21 Jul 2017: Vol. 357, Issue 6348, pp. 260. http://science.sciencemag.org/content/357/6348/260.1 This analysis shows that the ACP will indeed disproportionately impact low-income communities and people of color. For instance, about 30,000, or 13%, of the people who live within one mile of the proposed route of the pipeline in North Carolina are Native Americans, even though they represent only 1.2% of the State's total population. (https://web.archive.org/web/20190116011455/https://thinkprogress.org/native-americans-protest-natural-gas-pipeline-in-north-carolina-c4726edff47a/) Additionally, a RTI intentional study found "that disproportionately African American residents live within 1 mile of the pipeline route" in Northampton County. (https://www.rti.org/sites/default/files/resources/rti-publication-file-db772936-3fc3-4448-9a91-9c2b6ebed88a.pdf) The FERC EIS' analysis was just plain wrong in applying the math to the maps.

The inadequacies that Dr. Emanuel identified in FERC's analysis of environmental justice impacts, alone, raises deep concerns both about the usefulness of the analysis and about DEQ's commitment to engaging in the most rigorous analysis necessary to smoke out, evaluate, and address threats to the state's most vulnerable communities. DEQ's reliance on FERC's analysis fails against the Department's own standards, as framed by DEQ (then the Department of Environmental and Natural Resources), which resolve that to meet environmental justice goals, DEQ will "[a]ddress environmental equity issues in permitting decisions for projects potentially having a disparate impact on communities protected by Title VI of the Civil Rights Act of 1964." Additionally, the policy states DEQ's commitment to "Resolve environmental equity complaints, consistent with the protection afforded by Title VI of the Civil Rights Act of 1964." Although FERC and ACP made comments about this project's impacts on Environmental Justice Communities, none of the information about Robeson County's outlier position on EPA's environmental justice indices was

disclosed in the permitting process. Nor was the FERC EIS adequate in its assessment of these impacts. Neither the FERC EIS nor the ACP 401 assessed these impacts. The inadequacies of environmental justice review are new information which supports revocation of the 401 Certification.

F. New Information Regarding the Impacts of Climate Change on Impacted EJ Communities

In October 2018, the Intergovernmental Panel on Climate Change (IPCC) issued a special report calling for efforts to limit global warming to 1.5°C above pre-industrial levels. (Summary for Policymakers of IPCC Special Report on Global Warming of 1.5°C approved by governments. https://www.ipcc.ch/2018/10/08/summary-for-policymakers-of-ipcc-special-report-on-global-warming-of-1-5c-approved-by-governments/) Success in that goal would clearly benefit the world's population as well as natural ecosystems, and would ensure a more sustainable and equitable society (given that climate change is expected to do the most harm to the world's poorest). See Summary for Policymakers of IPCC Special Report on Global Warming of 1.5°C approved by governments. https://www.ipcc.ch/2018/10/08/summary-for-policymakers-of-ipcc-special-report-on-global-warming-of-1-5c-approved-by-governments/ The report emphasized that limiting global warming to 1.5°C would require rapid, far-reaching and unprecedented transitions in energy generation and consumption, including replacing fossil fuels like natural gas. (Also see Chapter 2: Mitigation Pathways Compatible with 1.5°C in the Context of Sustainable Development. Pp. 96. https://web.archive.org/web/20190321205610/https://www.ipcc.ch/sr15/)

Moreover, ACP's path cuts through a water-dependent landscape surrounding the Lumber River in Robeson County (through which the pipeline intends to run), which is highly sensitive to the effects of climate change. A new analysis of climate change in the Lumber River watershed by the *Journal of Contemporary Water Research and Education* published in April 2018 highlighted the fact that rising temperatures through the mid-21st century will have the potential to expose the surrounding wetlands to heat and drought-related damage. Drought damage would have cascading harms on wetland and aquatic environments, including erosion and sediment transport, increased flood susceptibility, and increased burdens of animal wastewater treatment and disposal.

Those environmental harms are intimately connected with damage that will occur to the Lumbee nation's cultural and spiritual connections to the waters that flow through the lands on which they live. Centuries-old traditions of resource stewardship and religious practices tied to physical areas and natural features would be washed away by changing terrains and receding waters. See Climate Change in the Lumbee River Watershed and Potential Impacts on the Lumbee Tribe in North Carolina. P. 88-90. https://onlinelibrary.wiley.com/doi/full/10.1111/j.1936-704X.2018.03271.x Notwithstanding the inherently prospective nature of climate change analyses,

the Lumbee's relationship with bodies of water of great historical and cultural value must be reflected and accorded due weight in considering the contributory impact of the Atlantic Coast Pipeline on climate change in Robeson County and the surrounding area, both today and in the future.

IV. CONCLUSION

Information disclosed to DEQ which formed the basis for its decision is incorrect as shown above. In addition, changed conditions in energy markets, permits being overturned in court proceedings, delays and gas markets call for revocation of the 401 Certificate. The new information we have supplied above fully supports a decision to revoke the ACP 401. The NC Department of Environmental Quality gave ACP LLC every opportunity to disclose all pertinent information on the scope, scale, and impact of its proposed pipeline. It failed to do so. Its claim that the cumulative and secondary impact of the Atlantic Coast Pipeline will have minimal impact on the water quality and quality of life in Robeson County is shown to be false, based on math errors, modelling errors and inadequate scope of analysis. The Atlantic Coast Pipeline is not only environmentally harmful, it is also economically irresponsible and unnecessary. It will burden the public with unfair and needless rate hikes. It will counter and eliminate the impact of all public and private efforts to reduce carbon emissions in our State. Furthermore, the ACP places a substantial, unfair burden on the indigenous people of Robeson County, concentrating up to nine natural gas projects in an 8-mile radius in the heart of the Lumbee and Tuscarora communities. The ACP is a short-term project with negative long-term impacts. In addition, this project locks the state and its citizens into a destructive use of energy resources.

On behalf of every ratepayer in North Carolina and every person who enjoys the natural resources belonging to all the people in North Carolina, we petition DEQ to revoke the 401 Certification for the Atlantic Coast Pipeline.

Very Truly Yours,

_____

Donna Chavis, Senior Fossil Fuels Campaigner,
Friends of the Earth

_____

Rev. Mac Legerton, Interim Executive Director
NC Climate Solutions Network

CC: Honorable Roy Cooper, Governor
Honorable Josh Stein. Attorney General

High Consequence Areas, Blast Zones and Public Safety Along the Atlantic Coast Pipeline

Oshin Paranjape, Hope Taylor and Ericka Faircloth

Clean Water for North Carolina

August, 2017
(Excerpts)

Introduction and Background: The Atlantic Coast Pipeline, "High Consequence Areas" and "Blast Zones"

The Atlantic Coast Pipeline in North Carolina

The Atlantic Coast Pipeline in NC would be a 186 mile section of 36 inch pipeline that would cross 8 counties in eastern North Carolina. While Dominion and ACP LLC claim that the pipeline is a response to a "growing need" for energy in the southeast, several reports have pointed out that overall energy demand has been flat for over a decade, and is projected to be flat well into the future—there is simply no urgent need for big investments in either gas fired power plants or the major pipelines that would supply them.

Proponents of the ACP also claim that thousands of jobs and major economic development will come to NC as a result of the pipeline. What isn't mentioned is the fact that the residents whose lands they would build the pipeline across, seizing land by eminent domain where necessary, won't even get to reap any benefits of the pipeline, due to the extremely high cost of installing a connection. That the pipeline is a done deal and the necessary permits have been obtained for its construction is misinformation widely spread by Dominion and pipeline proponents to discourage people from voicing opposition. Claims by of having notified to all residents living within close to the pipeline route in NC have also been discredited by the authors' door to door contacts in several locations along the pipeline, as well as comments at public meetings. To add to the confusion, the topographical maps submitted with the Draft Environmental Impact Statement do not show a many of the homes that currently exist along the pipeline's path.

What are "High Consequence Areas" and "Blast Zones"

The Environmental Impact Statement for the ACP identified 24 **High Consequence Areas** in the NC section of the proposed pipeline, located in 7 counties. These are areas within which the extent of damage to property or the chance of serious injury or death are significant. This is generally taken as 20 or more occupied buildings located within a hazardous distance from the pipeline, or where there are particularly vulnerable populations, such as day care centers, retirement homes, handicapped persons, etc.

The 'Potential Impact Radius', also called the **Blast Zone** or **Incineration Zone** is the distance at which there is a reasonable risk of incineration, injury or even death, and is calculated using a formula developed by C-Fer Technologies in a 2000 technical report, and validated by comparison with damage and injuries resulting from a number of actual pipeline incidents. For a 36 inch pipeline operating at 1440 pounds per square inch, this zone extends at least 943 feet, or 43% greater than the 660 foot radius assumed by Dominion. The **Evacuation zone** for the pipeline is 3071 feet from the center of the pipeine. However, these numbers do not account for wind and other factors, which could further extend the radius of impact.

Significant Pipeline Incidents Have Increased in Pipelines Built Since 2010

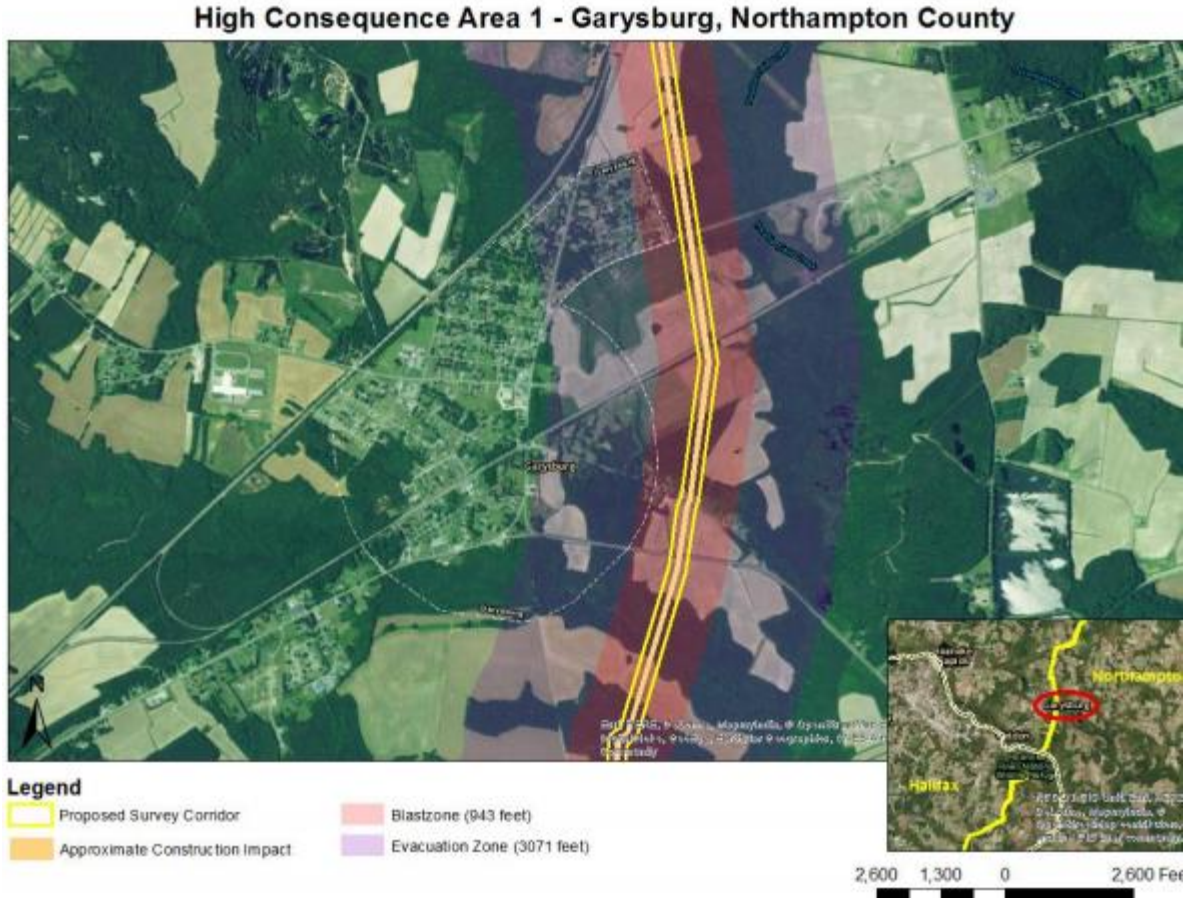
According to the Pipeline and Hazardous Materials Safety Administration, whose rules Dominion claims are enough to ensure the safety of the ACP, there has been a dramatic increase in the number of significant incidents occurring along pipelines built since 2010 in the US (see figure below). This coincides with the timeline for an accelerating "rush to build" pipelines, a result of 14 and 15% rates of return granted by the Federal Energy Regulatory Commission, making pipeline **building** more profitable than actually generating power or selling gas from pipelines.

What the Images Show, and Implications for Public Safety and Disproportionate Impact Along the Pipeline.

The images are numbered from HCA 1, the northernmost High Consequence Area in Garysburg, Northampton County through Halifax, Nash, Wilson, Johnston, Cumberland, through HCA 24, near Pembroke in Robeson County (Sampson County doesn't have a High Consequence Area). Each set of Google Earth images of individual High Consequence Areas is preceded by a locational map, to show the HCAs in a larger geographic context. The individual GIS images include indication of the survey corridor for the pipeline through each HCA, as well as color-coded translucent overlays to show the extent of the Blast Zone (943 feet from pipeline center) and Evacuation Zone (3071 feet). Using the underlying Google Earth image, it is easy to locate neighborhoods and other buildings within the Blast and Evacuation Zones.

Seven of the eight counties through which the ACP would pass have populations of color (African-American or Native American, predominantly) with percentages significantly above the state's average, and the majority of them also have higher percent poverty rates. This means that the pipeline represents a significant Environmental Justice threat of disproportionate impact on populations of color and low income, for any disturbances, impacts to air, land and water. However, the safety impact on residents near the pipeline may constitute the greatest threat of all, particularly as there is inadequate personnel and equipment for fighting pipeline fires or responding to leaks and explosions in these rural counties.

Images of Northampton County and Robeson County High Consequence Areas, Blast Zones and Evacuation Zones



Northampton County >60% African American

High Consequence Area 23 - Whistling Rufus Rd and Philadelphus Rd (Pembroke), Robeson County

Robeson County >95% Native American

The Atlantic Coast Pipeline is Unjust, Costly, Risky, and a Terrible Deal for Utility Customers!

The Atlantic Coast Pipeline (ACP) is a proposed 600 mile highly pressurized natural gas pipeline planned to go through WV, VA & eight eastern NC counties. The pipeline would enter NC in Northampton County, where a large compressor station would be built, and end in Robeson County, near Pembroke, with a likely extension to Hamlet. The cost of the project would be over $7.5 billion, and **will be paid for mostly by utility customers-you and me!**

The ACP was approved by the Federal Energy Regulatory Commission (FERC), in October, 2017, ignoring extensive studies on lack of need for the pipeline and major impact. **It's important to continue to build public resistance to the pipeline to protect landowners, water, safety of nearby residents and environmental justice, and continuing legal action has caused major delays and increased skepticism about the ACP.**

The Atlantic Coast Pipeline would have major impacts on vulnerable communities in the impacted NC counties, including Northampton. The pipeline builders, Duke and Dominion affiliates, have spent $$millions on advertising and lobbying about the myth of potential jobs and economic development. **Parts of Garysburg are within a few hundred feet of the proposed ACP, and within a "blast zone" over 900 feet wide, if an explosion happened**.

Economic Impacts

Jobs are always presented as a big selling point for new pipeline projects, particularly in low income areas like eastern NC, yet studies show that investments in renewable energy and efficiency upgrades produce many more jobs. Once construction is complete, the ACP would only need 18 permanent jobs in NC. The economic development promised by Dominion and Duke Energy is extremely unlikely--only larger cities or very large industry could afford connection to the pipeline. 80% of the gas would go to Duke and Dominion's own unneeded power plants!

This pipeline would be built based on exaggerated estimates of demand from the main pipeline owners, Duke and Dominion. Likely to be underutilized, The ACP would be funded by increased charges to utility customers to give a profit up to 14% for pipeline owners., whether or not the pipeline is used!

No New Gas Pipelines Needed to Meet Region's Needs! Rate Hikes We'll ALL pay…

Multiple independent studies have shown that gas supply is not even needed for the region the ACP would pass through! Some industry leaders have warned that too many pipelines are being planned for the amount of gas still underground. Existing pipelines and storage, with less costly upgrades and expansions, will be more than enough to meet the region's gas demand through at least 2030

The electric and gas customers of Duke, Dominion and Piedmont Natural gas will pay for the pipeline through rate hikes for all NC and VA customers.

Compressor Station: Noise and Toxic Emissions

Northampton County would be the site of a huge compressor station to move the gas 180 miles through NC. 24/7 noise levels would be high and toxic chemicals and particulates will be released to the air. In addition, areas just below the compressor station will be at higher pressure, so increased risk of leaks and explosions.

Pipeline is Disastrous for Climate

Natural gas (mostly methane) is vented from drilling sites, pipelines and compressor stations, and even gas power plants! Methane is 86 times as powerful a greenhouse gas as carbon dioxide (CO_2) from burning fossil fuels. Hurricanes like Matthew and Florence, and extreme droughts, are types of major climate change impacts.

Pipeline Impacts on Vulnerable Communities, Loss of Land Use and Value

Pipeline operations are highly profitable for corporate owners, but not for the people along the pipeline faced with poverty, low employment and poor health care. The proposed path of the ACP would cause disproportionate impacts on low income, African American and Native American residents near the pipeline. The ACP would cross eight NC counties, most with a higher than average African American population, and half with Native populations above the state average. 7 of 8 impacted counties have household incomes significantly below the state average.

Landowners along the pipeline corridor who depend on their land for retirement security and inheritance, or for agricultural uses, may lose land value, forest, control of land use and productivity while still paying taxes on it!

LATEST NEWS ON THE ACP!

On December 7, a court order disallowed the US Fish and Wildlife permit for the ACP as not protective of endangered species in several locations along the pipeline. A few days later, the court "vacated" a critical US Forest Service permit for the ACP to pass through national parks.

As a result, Dominion announced that they would voluntarily "stop" all new construction on the pipeline. However, ACP has continued construction under the guise of environmental "stabilization", even as the pipeline route remains in question until judges decide whether or not to reinstate the tossed out permits in May.

Local Groups Opposing the ACP

Concerned Citizens of Northampton County
Belinda Joyner: 252-537-1078

Halifax Concerned Stewards
Valerie Williams valwilliams6@gmail.com

Nash Stop the Pipeline
Marvin Winstead: 252-478-5442
marwinstead@gmail.com

ACP Says "No Reason to Worry" about Pipeline Safety—Do You Believe Them?

Pipelines built since 2010 are **more likely to have serious accidents than pipelines built at any time since the 1940's according to federal agency data.** This is due to the very rushed construction of the large number of pipelines approved by FERC in recent years, and inadequate inspections and oversight. **Accidents include major leaks, explosions and fires**. (photo left: Nov. 2015, Calif.)

The calculated "blast zone" for the ACP is over 900 feet either side of the pipeline, and there are 24 "High Consequence Areas", or areas of 20 or more occupied buildings along the pipeline, including one in Northampton County. The ACP has been delayed for over a year, so it will be especially prone to construction flaws due to rushed construction.

Regional Groups Against the ACP

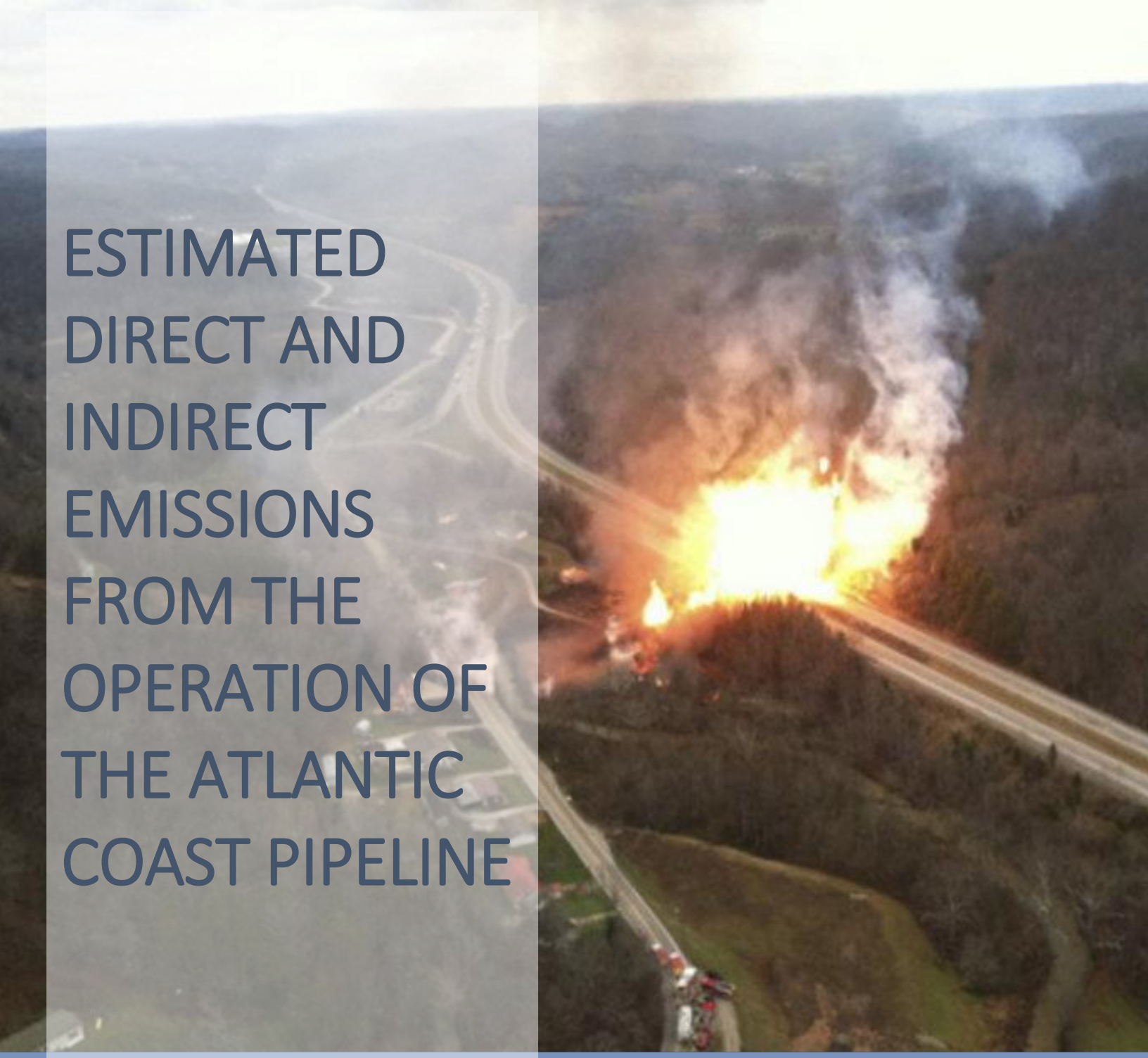
NC Environmental Justice Network
Naeema Muhammed 252-314-0703
naeema1951@gmail.com

Clean Water for NC Durham office
Hope Taylor: 919-401-9600
Hope@cwfnc.org

Blue Ridge Environmental Defense League
Therese Vick , therese.vick@gmail.com

Statewide Alliance Opposing the ACP

FrackFreeNC Alliance
Rachel Velez or Hope Taylor: 919-401-9600
rachel@cwfnc.org or hope@cwfnc.org



ESTIMATED DIRECT AND INDIRECT EMISSIONS FROM THE OPERATION OF THE ATLANTIC COAST PIPELINE

AUGUST 2019
(EXCERPT)

CLEAN WATER FOR NORTH CAROLINA

Authored by: Maria Velasco

Executive Summary

The Atlantic Coast Pipeline is a proposed 600-mile natural gas transmission line that would carry natural gas from Marcellus shale fracking operations in West Virginia, Pennsylvania and Ohio. It would pass through West Virginia, Virginia, and North Carolina, ending in Robeson County, but speculation is that the pipeline's builders, Duke Energy, Dominion Energy and Southern Company, plan to extend the ACP into South Carolina and closer to export terminals. Methane is the main component of natural gas and directly contributes to climate change as a very potent greenhouse gas. This report aims to estimate how much methane would be emitted indirectly and directly form the operation of the Atlantic Coast Pipeline and its climate forcing. The results from estimates show that **fugitive emissions from the supply chain of the Atlantic Coast Pipeline would increase the climate forcing for U.S. EPA estimates of methane missions from natural gas systems by 13.91%.**

Introduction

Methane and climate change

Methane (CH_4) is a greenhouse gas that directly contributes to climate change. Although methane's lifetime in the atmosphere is shorter than that of carbon dioxide (CO_2), it is more efficient at trapping radiation than CO_2. With a Global Warming Potential (GWP) of 86 in a 20-year time frame, CH_4 is 86 times more potent at trapping heat in the atmosphere than CO_2.[3] Even though CH_4 lasts only about 12.4 years in the atmosphere, after that period it breaks down into other greenhouse gases such as CO_2 and water vapor, extending methane's impact on the climate.[4]

Methane effects the atmosphere for a shorter period than CO_2, but in that period, the effect is far more substantial. **The acknowledgment of the 20-year impact of CH_4 is critical, as that is closer to the window of opportunity we have to slow down climate change.**[5] According to the 2017 IPCC report, the next 12 years (10 years from 2019) are decisive to keep world temperatures from increasing more than the 1.5 to 2°C that would result in melting the world's permafrost, releasing significant quantities of stored CO_2 and CH_4, making climate change irreversibly devastating.[6] Figure 1 shows the impacts warming the atmosphere by 1.5°C and 2°C would have on the planet.

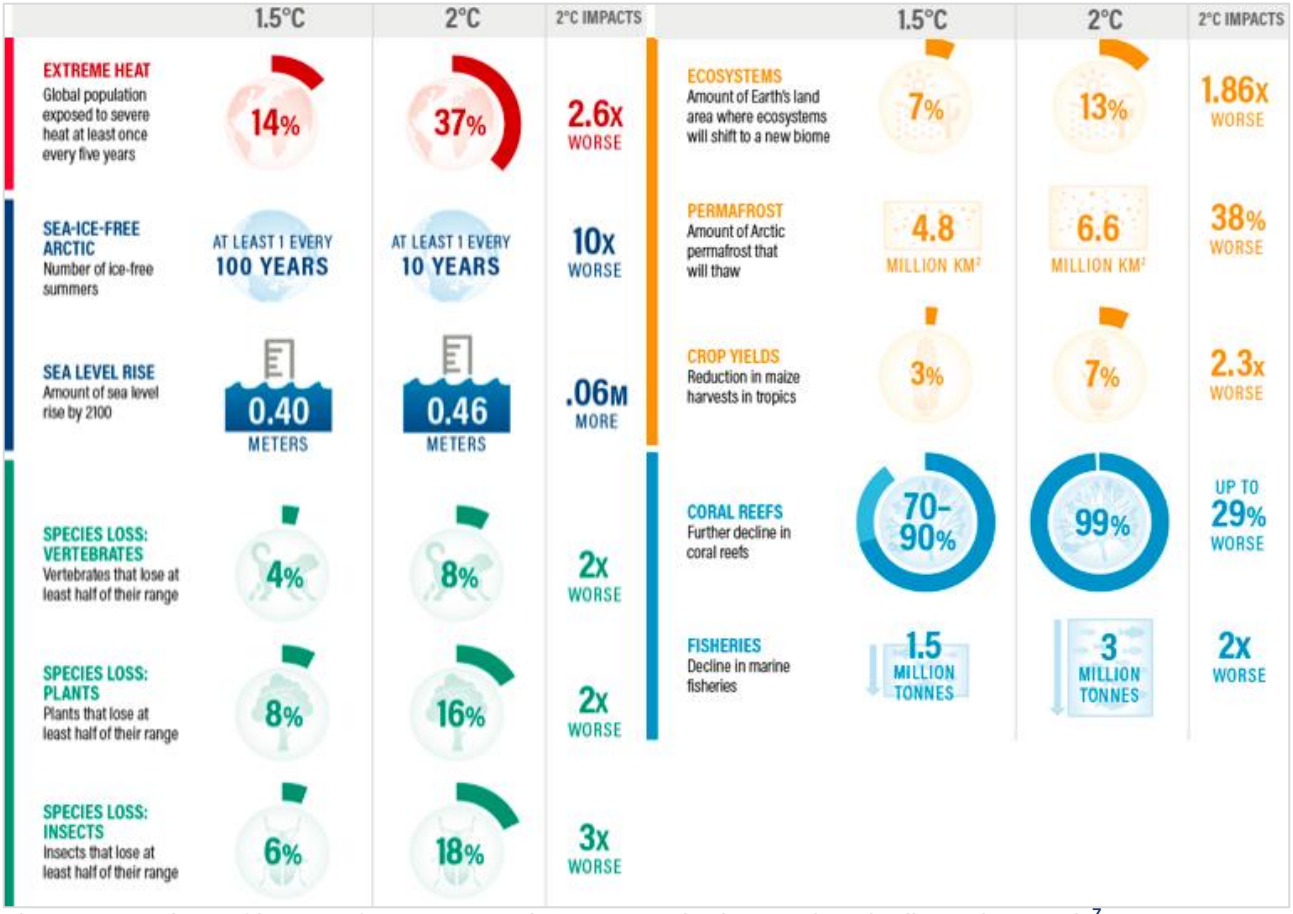


Fig 1. Comparison of impacts from 1.5°C and 2°C atmospheric warming. (Kelly Levin, 2018) [7]

Methane emissions to the atmosphere have increased substantially in recent decades. A 2016 study using satellite retrievals and surface observations of atmospheric methane reported that "U.S. methane emissions have increased by more than 30% over the 2002-2014 period". The same study suggests that this increase accounts for 30-60% of the global growth of atmospheric methane in the past decade. Several scientific reports estimate higher U.S. methane emissions than the EPA (Fig 2).[8]

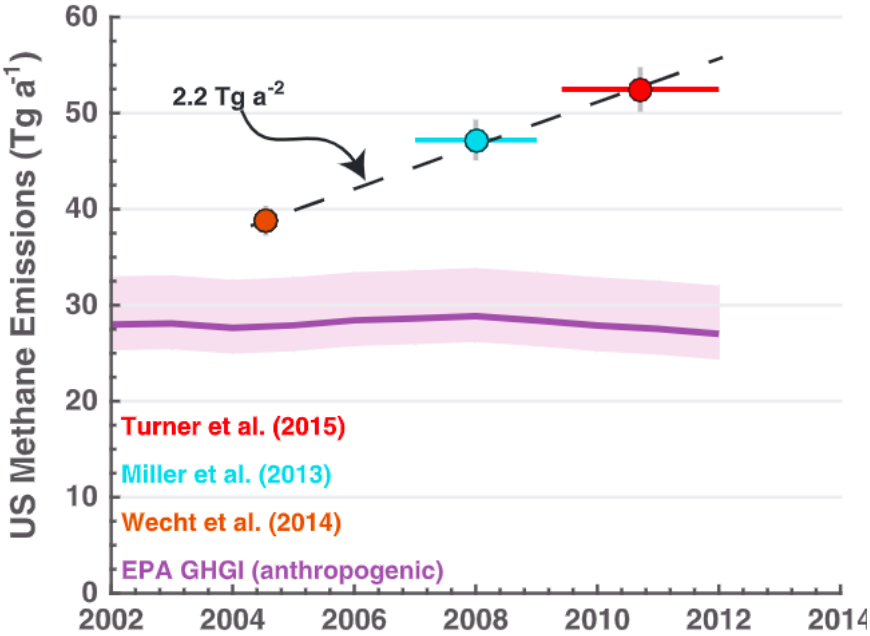


Fig 2. 2002-2014 trend in U.S. methane emissions from three studies compared to U.S. EPA emissions estimates. (Turner et al., 2016) [8]

Limiting global warming to 1.5°C will require drastic emission cuts. Scientists agree that we need to reach net-zero greenhouse gas emissions by 2050 to achieve this goal. Net-zero emissions mean adopting energy efficiency measures, switching to renewable energy, reducing energy demand, improving the efficiency of food production, and removing CO_2 from the atmosphere.[3, 7]

Climate assessment

Fugitive emissions

To assess the climate forcing of CH_4 emissions from the Atlantic Coast Pipeline, the estimated methane emissions from the entire natural gas supply chain were multiplied by the Global Warming Potential (GWP). GWP measures how much heat a greenhouse gas will trap in the atmosphere relative to CO_2. In this case, a GWP20 of 86 was used, meaning that over a 20-year horizon, CH_4 will trap heat 86 times more effectively than the same number of moles of CO_2.

Gas combustion

The climate forcing of the 1.5 BCF of gas from the ACP burned to make electricity, home heating and cooling, and industrial processes, assuming that none was lost in the supply chain, was also calculated. “Dry” natural gas is 93.9% methane, this percentage of methane was then multiplied by the GWP20.

Discussion

Implications for climate change

Direct and indirect emissions from the **operation of the Atlantic Coast Pipeline would not only accelerate climate warming due to a climate forcing of 453.01 CO_2e annually but also represent a step back in the process of achieving net-zero emissions**--as needed to keep the atmosphere from warming 1.5°C or more. If, in the next 10 years we don't limit the atmosphere's warming to 1.5°C, climate change in the U.S. and around the world will not only contribute to environmental deterioration but also pose a major threat to health.[3] Some of the health threats from climate change include heat waves, the spread of diseases transmitted by insects and other vectors, and intense natural disasters like hurricanes, flooding, wildfires, and droughts.

Actual leakage rates of methane from the natural gas supply chain are likely higher than estimated by agencies or limited studies, due to the difficulty of measuring these emissions. **The estimated 15.93 BCF that will be emitted as fugitive emissions from the Atlantic Coast Pipeline supply chain is likely to be an underestimate**. There are also a significant number of other health risks associated with pipelines. Even small leaks or incidents could cause natural gas pipelines to explode and burn, damaging homes and businesses, and injuries or death. Pipelines also emit gas during blowdowns, which involves complete venting of the gas inside a section of a pipe or compressor stations for repairs. Blowdowns are usually done before inspections or cleaning and release a 90- to 180-foot plume of natural gas into the atmosphere. A typical blowdown could last up to three hours and emit not only methane, but high concentrations of other gases toxic to local residents.

The industry argues that switching to natural gas for electricity and heat generation has a climate advantage, as it produces less carbon dioxide, when burned ,than coal. But methane, which is the main component of natural gas is a very potent greenhouse gas, and often leaks, unburned, to the atmosphere. Though energy companies claim methane is less potent than carbon dioxide because of its relatively short life, when it first enters the atmosphere, CH_4 is 120 times more powerful a greenhouse gas than CO_2, and 86 times more potent over its first 20 years in the atmosphere.[4] Overall, methane has a higher greenhouse gas footprint than carbon dioxide (Fig. 8), and the cumulative effects of CH_4 being emitted to the atmosphere in the next 10 years--the most critical to limit the effects of climate change according to the 2017 IPCC report,[3] ---overwhelm any claimed "advantages" of burning natural gas instead of coal.

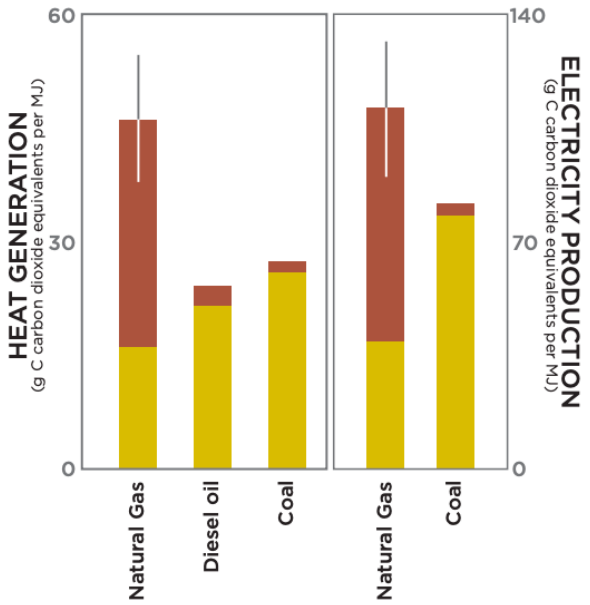


Fig 8. Comparison of the greenhouse gas footprint for using natural gas, diesel oil, and coal for generating primary heat (left) and for using natural gas and coal for generating electricity (right). (Physicians for Social Responsibility, 2017) [4]

There is a critical need to avoid the climate crisis, and **methane's impact on climate needs to be taken into account.** To meet the goal of limiting atmospheric warming and also meet the U.S.' energy need, there must be a transition from fossil fuels such as natural gas to energy-efficiency and carbon-free energy sources.

Atlantic Coast Pipeline - Risk Upon Risk

Threats to ACP go well beyond Forest Service permit

Friends of the Earth U.S., Oil Change International
March 2019

Friends of the Earth United States

OILCHANGE INTERNATIONAL

Introduction

The Atlantic Coast Pipeline faces some of the stiffest community and environmental opposition in the country today, comparable to that faced by TransCanada's ill-fated Keystone XL project. Seventeen months since certification by the Federal Energy Regulatory Commission, construction has barely progressed.

The ACP, if completed, would be a 600-mile, 42-inch-diameter pipeline carrying fracked gas from the Appalachian Basin in West Virginia through Virginia to North Carolina. It is owned by Dominion Energy, Duke Energy and Southern Company, which have together formed a private company, Atlantic Coast Pipeline LLC, specifically to build and operate the pipeline.

First announced in 2014, the project is two years behind schedule and substantially over budget. The latest update from Duke Energy estimates the project cost at $7 to $7.8 billion — 37 percent to 53 percent higher than the original $5.1 billion — with full operation pushed back to 2021.[1]

The ACP is facing a triple threat:

- extensive legal and regulatory challenges that are delaying construction and raising costs, which may lead to cancellation;
- fundamental challenges to its financial viability in the face of lack of growth in domestic demand for methane gas and increased affordability of renewable energy options; and
- an unprecedented citizen initiative positioned to ensure strict compliance with environmental laws and regulations, even in remote locations, if construction proceeds.

ACP: Putting human rights and the environment in peril

The ACP is a climate, environmental and human rights boondoggle. With a capacity of 1.5 billion cubic feet per day, the ACP will carry enough fracked gas to generate over 67 million metric tons of climate pollution per year, the equivalent of 20 average US coal plants.[2] It would cut from west to east through the entire Allegheny mountain range, requiring 38 miles of mountain top removal.[3] It would cross the Appalachian Trail and Blue Ridge Parkway, hundreds of rivers and wetlands and national forests, including the Monongahela and George Washington national forests. And, it would disturb hundreds of farms and communities along its route, threatening livelihoods and health.

The ACP could become a poster child for environmental racism. It will disproportionately harm African-American, Indigenous and poor communities, many of whom have been excluded from important decision-making processes. Thirty thousand Native peoples live in census tracts considered by the Federal Energy Regulatory Commission to be part of the project area in North Carolina. Compared to their statewide numbers, Native Americans are overrepresented by a factor of 10 along the North Carolina section of the pipeline route.[4] Further, there is grave concern about maintaining the integrity of historic artifacts given the failure to include the four impacted North Carolina state-recognized tribes in the programmatic agreement for historic preservation activities associated with ACP construction and operation.

Additionally, a methane gas compressor station, one of the largest ever if built, is set to be located in Union Hill, an African-American community of great historical and cultural significance in Buckingham County, Virginia. It would emit nearly 300,000 tons of carbon-equivalent pollution per year. At a recent visit to Union Hill, former vice president Al Gore called the ACP "a reckless racist rip-off" and referred to the compressor station as a "vivid example of environmental racism." Living near pipelines and infrastructure like compressor stations has been documented to cause multiple health complications, including skin, gastrointestinal, respiratory, neurological and psychological problems. [5]

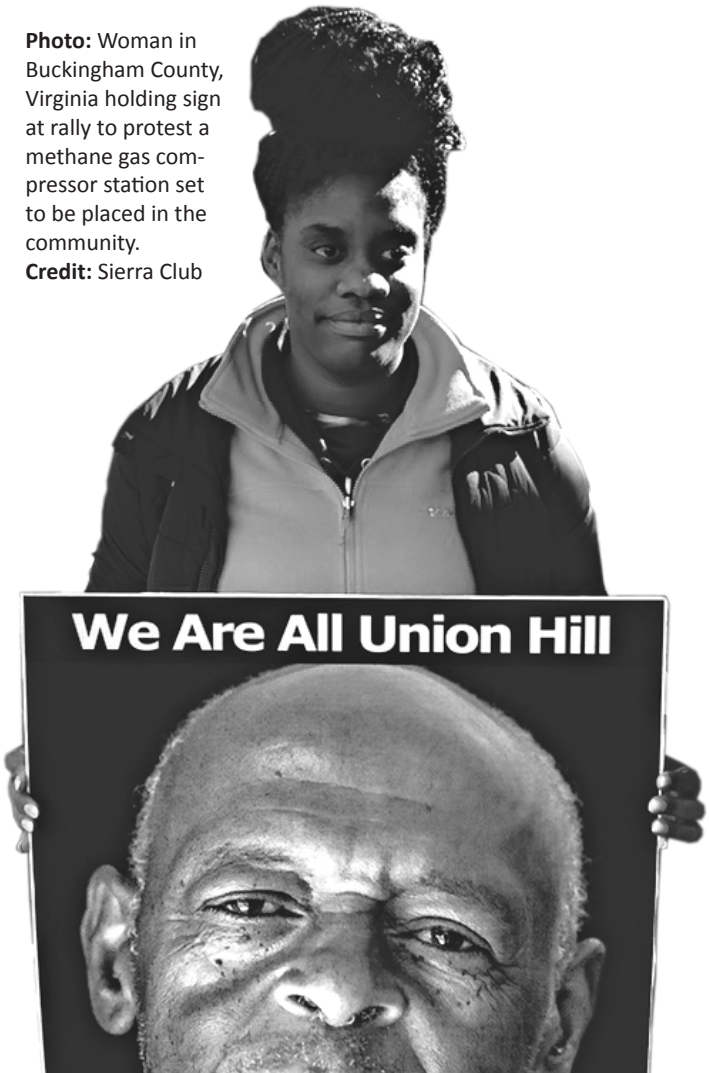


Photo: Woman in Buckingham County, Virginia holding sign at rally to protest a methane gas compressor station set to be placed in the community.
Credit: Sierra Club

ACP's Triple Threat

Threat #1: Legal and regulatory challenges

The ACP is facing an onslaught of legal challenges and losses. Seven federal permits have been stayed, suspended or vacated; in fact, all construction on the pipeline is currently stopped. When — or if — construction will start up again is unknown. Environmental groups, Indigenous Peoples and others have brought at least nine court challenges to ACP permits and certifications, most of which are ongoing.[6] These include:

- *Forest Service Permit* — In November 2017, the U.S. Forest Service amended the forest plans for the George Washington and Monongahela national forests to accommodate the ACP. Then in January 2018, the Forest Service granted the ACP a special use permit to cross forest lands and a right-of-way to cross the Appalachian National Scenic Trail. A suit was filed in February 2018 challenging the Forest Service's approval of the project, with the case argued before a three-judge panel in September. Arguments included that approval of the project violated the National Forest Management Act and the National Environmental Policy Act. In December, the Fourth Circuit ruled to vacate the Forest Service permit, agreeing with the petitioners on the improper evaluation of environmental threats and ruling that the Forest Service lacked the authority to grant the project permission to cross the ANST. On Jan. 28, 2019, ACP, LLC filed with the Fourth Circuit, requesting a rehearing en banc, meaning a hearing on the case before all 15 judges of the Fourth Circuit. On Feb. 25, the court declined to reconsider its ruling. Dominion Energy stated that it plans to appeal the decision to the U.S. Supreme Court within 90 days, but it is less than likely that the court will grant this petition. Without this permit, ACP will struggle to find a viable route.
- *FERC certificate* — A challenge to FERC's issuance of a Certificate of Purpose and Need for the ACP in October 2017 was filed with the Fourth Circuit Court of Appeals in August 2018. Fourteen conservation groups, represented by Southern Environmental Law Center and Appalachian Mountain Advocates, contend that FERC failed to adequately examine the demand for methane gas in the project's destination markets and took at face value inflated demand projections submitted by Dominion Energy and Duke Energy. A briefing before the D.C. Circuit Court for the case has not yet been scheduled, but oral arguments are likely to occur in the fall of 2019. If successful, this case could leave the project without a permit to proceed.

Photo: Sign protesting ACP in Augusta County, 2014. **Credit:** Steven Johnson Flickr

- *National Park Service Permit* — The NPS's December 2017 approval for the ACP to cross underneath the Blue Ridge Parkway was challenged in the Fourth Circuit. The court vacated the permit on Aug. 6, 2018 and FERC issued a stop work order for the entire project on Aug. 10. The NPS issued a new permit that purported to remedy the deficiencies in the earlier permit, lifting the stop work order on Sept. 17. Then, plaintiffs re-challenged that permit in the Fourth Circuit. Before the case was argued, the NPS asked the court to vacate the previously issued permit for the ACP to cross the Blue Ridge Parkway so it could "consider whether issuance of a right-of-way permit for the pipeline to cross an adjacent segment of the Parkway is appropriate." The Fourth Circuit granted that motion on Jan. 23, 2019. At present, there is no permit for the ACP to cross the Blue Ridge Parkway and therefore the project's route is not viable.
- *Fish and Wildlife Service* — The FWS's biological opinion and incident statement on threats to endangered species by the ACP was vacated by the Fourth Circuit Court of Appeals in May 2018. The court determined that the FWS had been too vague in their assessment of local wildlife that would be affected by the pipeline. The FWS issued a new biological opinion that sought to meet the court's objections, which was then challenged, with arguments expected to take place in May before the Fourth Circuit. Without this permit, the entire pipeline is in jeopardy.
- *Army Corps of Engineers* — The U.S. Army Corps of Engineers filed a motion on Jan. 18, 2019 with the Fourth Circuit Court of Appeals for a remand and vacating of the permit that the Huntington District of the Corps had issued for the ACP to cross more than 1,500 rivers and streams in West Virginia. The court had previously issued a stay of the Nationwide 12, or NWP12, permit issued for the ACP by the Huntington District, as well as other NWP12 permits issued for the project by Corps districts in Pittsburgh, Norfolk and Wilmington that have jurisdiction over other portions of the ACP project. The motion was unopposed and subsequently granted

by the court. While the action only directly affects the portion of the ACP subject to the Huntington District's jurisdiction (West Virginia portions of the route), the stays on stream and river crossings for the ACP in the other Corps districts remain in effect.

- *Buckingham County Compressor Station* — A challenge was filed with the Fourth Circuit Court of Appeals on Feb. 8, 2019 against the Virginia Air Pollution Board and the Department of Environmental Quality's decision to approve the compressor station in Buckingham County, Virginia.
- *Proposed Metering and Regulating Station* — Members of the Lumbee and Tuscarora tribes in North Carolina have filed a lawsuit against the ACP and the Board of Commissioners of Robeson County, North Carolina. The dispute centers on the county's permitting of the siting of the ACP's proposed metering and regulating station in the heart of their Indigenous communities. The complaint claims that the Board of Commissioners did not follow the statutory procedures during the public hearing and that the proposed station does not meet the requirements of the Conditional Use Permit, or CUP. The complaint states that "the decision to grant the CUP was arbitrary and capricious, and that the proposed M&R Station and Tower would endanger public health and safety, cause injury to the value of adjoining property, and would not be harmonious with existing zoning and usage of the surrounding land." These three criteria are required to be met in approving local conditional and special use permits. The lawsuit will be heard in the second half of April 2019.
- *Winstead Farm* — The U.S. Court of the Eastern District of North Carolina issued a stay on ACP development on the property of Marvin Winstead, a farmer whose land stands in the path of the pipeline. The 90-day halt, originally issued in November 2018, was recently extended until May 31, 2019.

Threat #2: Financial viability

Moody's Investors Service stated in February 2019 that "Dominion's execution risk with its Atlantic Coast pipeline is credit negative."[7] Bank of America Merrill Lynch also downgraded Duke Energy (from "buy" to "neutral"), citing the ACP as a primary reason; Bank of America is joint lead arranger and bookrunner for a loan to the ACP. The project's construction costs are now estimated to be more than $2 billion above the original price tag, and that figure looks likely to grow larger still, should the project make it to completion. According to Dominion, the construction halt costs up to $20 million per week.[8]

The ACP's cost inflation risks reducing returns on the project as state regulators are likely to balk at passing the project's full costs onto ratepayers. The high cost of the project is exacerbated by the lack of new demand for methane gas in the destination markets. Further, the project has no independent committed customers. Six companies, all of which are regulated utility affiliates of the pipeline's three owners, have contracted for 96 percent of the pipeline's capacity. Utility subsidiaries of Duke and Dominion in Virginia and North Carolina have contracted for 86 percent of the pipeline's capacity. Yet, the argument by these utilities that they need new methane gas pipeline capacity has been significantly weakened since the ACP was first proposed.

In Dominion's 2018 long-term Integrated Resource Plan (IRP), four out of five modeled scenarios showed no increase in methane gas consumption for power generation from 2019 through 2033.[9] However, in December 2018, this IRP was rejected by Virginia state regulators, in part for overstating projections of future electricity demand.[10] On March 8, Dominion submitted a revised plan using the grid operator PJM's more realistic power demand projections. This reduced the number of potential gas 'peaker' plants in the plan's scenarios from 8-13 to 4-7.[11] This reduces further the projected demand for gas in Virginia.

Since it first proposed the ACP, Dominion has canceled plans for power plants that it previously stated would be serviced by methane gas transported by the project. Further, all of its existing major methane gas-fired plants have long-term contracts with existing pipelines that can deliver methane gas at a much lower cost than via the ACP. Dominion's future peaking units, if built, would likely be supplied by existing pipelines. The bottom line is that Dominion's utility customers have no need for additional methane gas supply.

The most recent IRPs of Duke Energy Progress and Duke Energy Carolinas also revealed that previously planned methane gas plants have been delayed by at

least five years beyond the original proposal, and none have been approved by the state regulator. Duke's first power plant that might need more methane gas supply is proposed to begin operation many years after the ACP is supposed to be in service. It is also possible that new methane gas-fired power plants might not be built at all in North Carolina.

Moreover, on March 7, 2019, North Carolina's attorney general submitted official comments to the North Carolina Utilities Commission regarding the IRPs of Duke Energy for 2018-2033.[12] The attorney general recommended that the IRP not be accepted as is and that Duke submit a revised plan. The revised plan should more robustly evaluate storage-plus-renewables and more thoroughly asses the cost to ratepayers of climate change from Duke's proposed power generation from methane gas. Additionally, Duke should include the potential costs of future price volatility and government-imposed limitations on greenhouse gas emissions. The attorney general also proposed that Duke more thoroughly evaluate the benefits of renewables, including energy security and diversification and demand-side management and energy efficiency measures. If Duke were to accurately compare the total methane gas vs. renewables costs and savings, it could spell the end to the entire pipeline project.

Over the next decade, it is likely that the demand for methane gas in Virginia and North Carolina will decrease further as renewable energy and storage technologies continue to rapidly decline in price and undercut the cost of running methane gas-fired power plants. State utility regulators in Virginia and North Carolina must approve the pass-through of ACP transportation costs to customers. If the capacity that these utilities have reserved has no value, as appears likely, investors in the ACP run the risk that state regulators will not agree to saddle customers with the full cost of paying for the pipeline, leaving ACP investors holding the bill.

For a more in-depth analysis, see the recent report by the Institute for Energy Economics and Financial Analysis and Oil Change International: "The Vanishing Need for the Atlantic Coast Pipeline, Growing Risk That the Pipeline Will Not Be Able to Recover Costs From Ratepayers."

Threat #3: Citizen compliance initiative

If construction proceeds, an unprecedented, highly coordinated science and technology-based Pipeline Compliance Surveillance Initiative (CSI) is positioned to make sure environmental laws and regulations are strictly applied and enforced during construction. It is spearheaded by the Allegheny-Blue Ridge Alliance and member organizations. The Pipeline CSI promises unparalleled public scrutiny, utilizing innovative approaches. Concerned citizens will collect and submit "evidence-grade information concerning noncompliance with, or failure of, required environmental protection practices."[13] There will be CSI incident response teams, a CSI mapping system, a Pipeline CSI reporting hotline and more. Criminal charges are being investigated against the Mountain Valley Pipeline as a result of evidence compiled by a similar compliance effort.[14]

The Pipeline CSI intends to hold ACP to account for construction violations in some of the most difficult terrain for pipeline construction. While violations have often gone undetected in remote regions on many similar projects, this citizen's initiative promises to expose a higher number of incidents leading to possible further delays and cost increases.

Conclusion

The ACP faces a drawn-out legal and regulatory quagmire, as well as an unprecedented level of public scrutiny through a citizen-led Compliance Surveillance Initiative. These challenges are likely to further delay construction and raise the project's price tag even higher. If completed, state utility regulators in North Carolina and Virginia are unlikely to justify passing the full cost of methane gas transportation contracts onto ratepayers.

It would be prudent for investors in Dominion, Duke and Southern to question whether pursuing the ACP further is a good use of capital. As the transition to clean energy gathers pace, the risks and growing costs of this major methane gas pipeline project look increasingly unwise to ratepayers, regulators and investors alike.

Photo (page 4): Residents hold signs calling out Dominion Energy for its ACP involvement. **Credit:** Friends of Buckingham Facebook.

Photo (page 5): Woman raising #NoACP sign at community meeting. **Credit:** Elizabeth Ouztz, Energy News

Endnotes

1 Good, L. & Young, S. (2019, February 14). Duke Energy Earnings Review & Business Update. Retrieved from www.duke-energy.com/_/media/pdfs/our-company/investors/news-and-events/2018/4qresults/4q2018slides.pdf?la=en

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3 New Data: Atlantic Coast Pipeline Would Trigger Extensive Mountaintop Removal. (2017, April). Retrieved from www.chesapeake-climate.org/wp/wp-content/uploads/2017/04/Fact-sheet-Mountaintop-Removal-to-Build-ACP.pdf

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6 Allegheny-Blue Ridge Alliance (n.d.) ABRA Update. Retrieved March 7, 2019, from www.abralliance.org/pipeline-updates/.

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September 4, 2018

Governor Roy Cooper
DEQ Secretary Regan
Members of Environmental Justice and Equity Advisory Board

In reference to: Atlantic Coast Pipeline injustices: environmental and economic impacts, request to rescind or stay permits

Dear Governor Cooper:

We, the undersigned, representing over 30 organizations and thousands of people of all faiths, political parties from across our great state, write to call on you to look deep in your heart and reflect on all that you know and have recently learned about the threat of the Atlantic Coast Pipeline, as opposed to the touted benefits. Please consider North Carolina's most vulnerable Eastern NC populations, waterways, air, ecology , and sustainable economy—and call on your Dept. of Environmental Quality to justifiably rescind key state permits for the pipeline, especially the 401 Water Quality Certification, and issue no further permits for this project.

In January of 2017, many of our groups sent you a letter detailing the many adverse impacts--environmental, social and economic--that the ACP would have, and we included supporting documentation when we met with Jeremy Tarr, your Policy Advisor for Energy, Environment and Transportation. Groups have written you and met with your staff many times since, including additional information on ecological damage, inadequacy of permits, and inability of your DEQ to enforce them, as well as unconscionable treatment of landowners, commenting extensively to the agency throughout the process. While construction of the ACP in NC has barely started, trees have been felled in many locations, even all the way down to streams in some places. Now, during the opportunity the current work stoppage, caused by hasty and severely inadequate permitting, presents to all of us, we ask you again to stop and consider.

Last fall, after FERC had issued a Final Environmental Impact Statement that was essentially unchanged from the draft EIS, despite massive public comments pointing to its many grave flaws, we again called on you to prevent your agency from granting permits. In particular, we asked DEQ not to approve the 401 Certification, which agency staff must have known they could not adequately monitor and enforce. We released a report on the potential "blast or incineration zone" impacts all along the ACP route, but particularly at 24 identified "high consequence areas." Those areas included a portion of Nash County close to where your family lived, and we brought you images of the blast and evacuation zones overlaid on Nash County communities.

We pled with you to remember that the ACP is an unnecessary pipeline that will only raise utility bills for the Duke and Dominion customers throughout our state, while creating a tiny number of permanent jobs. We know now that you had received campaign contributions from Duke and Dominion, the lead pipeline builders, before your election, and, throughout the fall of 2017, had been in contact with former Governor McAuliffe of Virginia, as he was making a $58 M deal with the pipeline builders for a "voluntary contribution", an amount that could not begin to mitigate the ecological or social damage the pipeline would cause in that state.

On January 26, after multiple requests from your DEQ to ACP, LLC for additional information, including one for documentation of anticipated economic development and associated cumulative impacts, which yielded an embarrassingly inadequate response, DEQ granted approval for the 401 Water Quality Certification. This was the same day your office announced its $58 M Memorandum of Understanding

with Dominion and Duke. Can the public, including many who worked hard to get you elected in 2016, be blamed for believing these coincident events represented a shocking quid pro quo, despite repeated denials?

Just as the "Compliance Surveillance Monitoring" team, based in Virginia and West Virginia, has documented numerous cases of severe erosion and sedimentation, more than the state agencies could have found without citizen monitoring, the NC Pipeline Watch is now recruiting and training volunteers to monitor ACP construction activities through the 8 impacted counties. Now, before the extensive and quite predictable damage is done to our waters, wetlands and people, is the time to put a stop to this. Federal agencies are being found by the courts to have granted inadequate and unprotective permits, and ACP construction had to be stopped by the notoriously pro-pipeline Federal Energy Regulatory Commission.

You have been staunchly opposed to drilling offshore of North Carolina, and we salute that stand. Coastal communities include many wealthy interests speaking up loudly for the tourism economy as well as protection of their communities. We again invite you to come visit the humble people and onshore areas that will be impacted by the ACP-- the predominantly African American counties at the northern end of the NC route, the many vulnerable river crossings and forested wetlands all along the route, the Lumbee and Haliwa-Saponi tribal regions and even your family's home community "Between the Creeks." Crucially, in the two poorest counties along the pipeline route, Northampton and Robeson, residents tell us: "We've had multiple gas pipelines in our county for decades, and what have they done for us? Where are the jobs that we were told they would create?"

We represent thousands of NC citizens calling for your principled consideration and help, who firmly believe that the ACP will become an enormously expensive, unjust and ecologically destructive boondoggle, contributing substantially to climate crisis impacts on the globe and NC's most vulnerable communities. We believe you would deeply regret this pipeline as part of your legacy as Governor if construction is allowed to continue. We ask for your urgent help during this work stoppage, caused by failed regulatory decision-making. Please call for continued suspension of all work on the ACP, rescind critical permits, especially the 401 water quality certification, visit impacted areas and vulnerable communities along the pipeline and direct your DEQ to make a better decision for NC's future.

Yours in deepest concern,

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OILCHANGE INTERNATIONAL

MAY 2019

BURNING THE GAS 'BRIDGE FUEL' MYTH:

WHY GAS IS NOT CLEAN, CHEAP, OR NECESSARY

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350

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Oil Change International is a research, communications, and advocacy organization focused on exposing the true costs of fossil fuels and facilitating the coming transition towards clean energy.

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CONTENTS

LIST OF ABBREVIATIONS

°C	Degrees Celsius
BECCS	Bioenergy with carbon capture and storage
CCGT	Combined Cycle Gas Turbine
CCS	Carbon capture and storage
CO_2	Carbon dioxide
GHG	Greenhouse gas
GRE	Gas reciprocating engine
Gt	Billion metric tons / Gigatons
GW	Gigawatt
IEA	International Energy Agency
IPCC	Intergovernmental Panel on Climate Change
IRENA	International Renewable Energy Agency
LCOE	Levelized Cost of Energy
LNG	Liquefied Natural Gas
Mt	Million metric tons
MW	Megawatt
MWh	Megawatt hour
OCGT	Open Cycle Gas Turbine

INTRODUCTION – THE BRIDGE FUEL MYTH

As the global climate crisis intensifies while the production and consumption of gas[a] soars, it is clearer than ever that gas is not a solution to the climate crisis. This report unpacks and debunks the enduring myth that gas can form a bridge to a decarbonized future.

The mythology around gas being a "cleaner" fossil fuel that can support the transition to clean energy goes back at least three decades. Oil and gas corporations have championed and invested in this myth as a way to delay the transition away from fossil fuels. Alarmingly, despite the evidence that overreliance on gas is a recipe for climate breakdown, a number of politicians and decision-makers continue to repeat the myth of gas as a climate solution.[b]

In this report, we unpack the core arguments of the bridge fuel myth and the data that prove them to be false. First, we discuss how the issue of leaking methane, a highly potent greenhouse gas, makes clear that gas is not clean. But methane leakage does not define the climate impact of gas. This report details five additional reasons why gas cannot form a bridge to a clean energy future, even if methane leakage is addressed. These five points make clear that **gas is not clean, gas is not cheap, and gas is not necessary.**

Flaring on well pad, Lower Saxony, Germany. *©Andreas, Fractracker.*

FIVE REASONS GAS IS NOT A BRIDGE TO A SAFE CLIMATE

1. **Gas Breaks the Carbon Budget:** The economically recoverable oil, gas, and coal in the world's currently producing and under-construction extraction projects would take the world far beyond safe climate limits. Further development of untapped gas reserves is inconsistent with the climate goals in the Paris Agreement.

2. **Coal-to-Gas Switching Doesn't Cut It:** Climate goals require the energy sector to be decarbonized by mid-century. This means that both coal and gas must be phased out. Replacing coal plants with new gas plants will not cut emissions by nearly enough, even if methane leakage is kept to a minimum.

3. **Low-Cost Renewables Can Displace Coal and Gas:** The dramatic and ongoing cost declines for wind and solar disrupt the business model for gas in the power sector. Wind and solar will play an increasing role in replacing retiring fossil fuel capacity.

4. **Gas Is Not Essential for Grid Reliability:** Wind and solar require balancing, but gas is not the only, nor the best, resource available for doing so. Battery storage is fast becoming competitive with gas plants designed for this purpose (known as "peakers"). Wind and solar plants that are coupled with battery storage are also becoming a competitive "dispatchable" source of energy. Managing high levels of wind and solar on the grid requires optimizing a wide range of technologies and solutions, including battery storage, demand response, and transmission. There is no reason to favor gas as the primary solution.

5. **New Gas Infrastructure Locks In Emissions**: Multibillion-dollar gas infrastructure built today is designed to operate for decades to come. Given the barriers to closing down infrastructure ahead of its expected economic lifespan, it is critical to stop building new infrastructure, the full lifetime emissions of which will not fit within Paris-aligned carbon budgets.

a We use the term *gas* to mean all types of gas composed primarily of methane. *Fossil gas* is a term used in place of what the oil and gas industry calls *natural gas*. We use the term *fossil gas* where we are specifically referring to gas from fossil fuel sources. See Box 3 for details of why so-called *renewable gas* is not generally a solution to the impacts of *fossil gas*.

b For example, Secretary John Kerry used the term during the House Oversight and Reform Committee Hearing on Leadership to Combat Climate Change on April 9, 2019, and Virginia Governor Ralph Northam said, "gas has significant potential as a bridge fuel to help us reduce carbon pollution that drives climate change while we transition to solar, wind, and other clean energy sources" in a September 2018 press release on Virginia's climate action plan. https://www.governor.virginia.gov/newsroom/all-releases/2018/september/headline-829610-en.html

Gas fields and pipeline in the Netherlands. *©Ted Auch.*

The oil and gas industry has used the bridge fuel myth as cover for expanding gas supply and consumption as much as possible. Global gas production has grown 51 percent since 2000.[1] This has been greatly facilitated by the development of horizontal drilling and hydraulic fracturing (fracking) in North America, which has enabled access to vast quantities of hitherto inaccessible fossil gas. Aside from the climate implications, the growth in fracked gas has burdened many communities with pollution, health and safety hazards, and environmental injustice (see Box 1).

The growth in gas production has led to high levels of gas consumption in some regions such that for some, decarbonization now requires the transition from gas to clean energy rather than from coal and oil. This task is made more difficult by the lock-in effect of billions of dollars spent on recently built gas infrastructure.

During this period of rapid growth in gas production, global coal production also grew 68 percent.[2] Global fossil fuel emissions grew 2.7 percent in 2018, the largest increase in seven years.[3] Business-as-usual projections suggest gas production could grow a further 20 to 40 percent by the 2040s.[c]

This report does not attempt to map a detailed path towards an energy system with zero gas. There are many studies that show specific pathways to achieving zero emissions by 2050.[4] Instead, we detail why the transition to a zero-carbon energy system is being undermined by overreliance on gas and, in fact, requires a managed decline of gas production and consumption along with that of coal and oil.

While the power sector is the main sector discussed in this report, as it has been central to the bridge fuel myth, achieving climate goals will require that all sectors follow the power sector to decarbonization. Efficiency and electrification are key to reducing fossil fuel use in all energy sectors – not increasing reliance on a fuel that only makes the transition more challenging. The false hope of "renewable gas" likewise does not provide an adequate solution to the decarbonization of these other sectors (see Box 2).

By addressing these issues, this report makes clear that ongoing growth in gas production, consumption, export, and import cannot be justified on climate grounds. The urgent business of full decarbonization requires managing the phase-out of gas alongside other fossil fuels.

c Rystad Energy AS UCube Database projects a 20 percent growth in global gas production from 2018 to 2043, after which a modest decline leads to 2050 production some 17 percent above 2018 levels. The International Energy Agency projects a 43 percent growth in gas production from 2017 to 2040 in the "New Policies Scenario" in the *World Energy Outlook 2018*.

NOT CLEAN, NOT CHEAP, NOT NECESSARY

All methane-based gas emits carbon dioxide (CO_2) when it is combusted. In addition, methane leakage throughout the entire gas supply chain creates additional climate impacts. While some oil and gas producers have set targets for reducing methane leakage, in many cases there is insufficient transparency to verify how much methane is actually emitted.[5]

First, we briefly outline the methane issue. We then go on to demonstrate that methane is not what determines whether gas is positive for the transition to clean energy. With or without methane leakage, gas is not clean. Nor is gas the answer to the challenges of transitioning to a genuinely clean energy future.

METHANE LEAKAGE

Methane is the primary constituent of fossil gas. Gas produced at the wellhead may contain as little as 65 percent methane, with the rest a combination of gas liquids, mostly ethane, butane, and propane.[6] Liquids are separated at processing plants, and "dry" gas delivered in pipelines is generally more than 90 percent methane.[7]

Methane leaks from every part of the gas supply chain. Methane is highly potent when released to the atmosphere, i.e., without combustion. It is routine in the production, processing, transportation, and storage of gas for some gas to escape. Some is leaked through faulty equipment and human error, and some is vented as part of routine procedures, such as when pipelines must be emptied to perform routine maintenance or repairs.[8]

According to the Intergovernmental Panel on Climate Change (IPCC), the warming effect of methane is 87 times greater than CO_2 over a 20-year period and 36 times greater over a 100-year period.[9] However, the study of the radiative forcing, or warming effect, of different greenhouse gases is ongoing, and there is increasing evidence that these figures may underestimate the impact of methane.[10, 11]

If elevated levels of methane are leaked in the process of producing and delivering gas to consumers, then any emissions advantage gas may have over coal for power generation or other uses is reduced or negated.

Many studies have been conducted to ascertain how much methane leakage is occurring and what levels of leakage constitute a greater or lesser climate impact attributable to gas compared to the other fossil fuels.[d] Several studies have found that in the United States, especially, where gas production has been growing the fastest for most of the past decade, government estimates of methane leakage rates from oil and gas infrastructure underestimate the problem.[12]

While any broad consensus on how much methane is leaking remains elusive, there is hard data showing that oil and gas infrastructure is the prime source of the rising levels of methane in the global atmosphere over the past decade.[13] This rise in atmospheric methane corresponds very closely to the growth in fracked gas production in the United States.

There is no doubt about the importance of reducing methane leakage from existing oil and gas operations and distribution networks. But reducing methane leakage does not mean that gas production and consumption can continue to grow.

The limits of our climate system mean that we need to reduce all fossil fuel production and use, and gas is no exception. With this in mind, the five discussion points detailed below make clear that even in the hypothetical case of zero-methane leakage, gas cannot be a bridge fuel. To meet climate goals, gas production and consumption must, as with other fossil fuels, be phased out, and efforts to reduce methane leakage do not alter that conclusion.

d This is a substantial and ongoing area of study. We have avoided stating specific figures here on purpose as these parameters tend to change as new studies are published. Many of these studies are listed in a database maintained by PSE Healthy Energy under "climate/methane" found here: https://www.zotero.org/groups/248773/pse_study_citation_database/items

BOX 1: Gas Production Burdens Communities

Oil and gas production worldwide often brings pollution, habitat destruction, and health and safety risks for host communities, as well as issues of economic and environmental justice.[14] The process of fracking, which has become the main source of gas in the United States, is accompanied by particularly intense impacts for communities.

These impacts include groundwater contamination and excessive water consumption, air pollution, toxic chemical exposure, land erosion and habitat destruction, increased seismic activity, and health and safety risks associated with heavy truck traffic, man-camps, and the toxic and explosive nature of gas and associated hydrocarbons.[15, 16, 17]

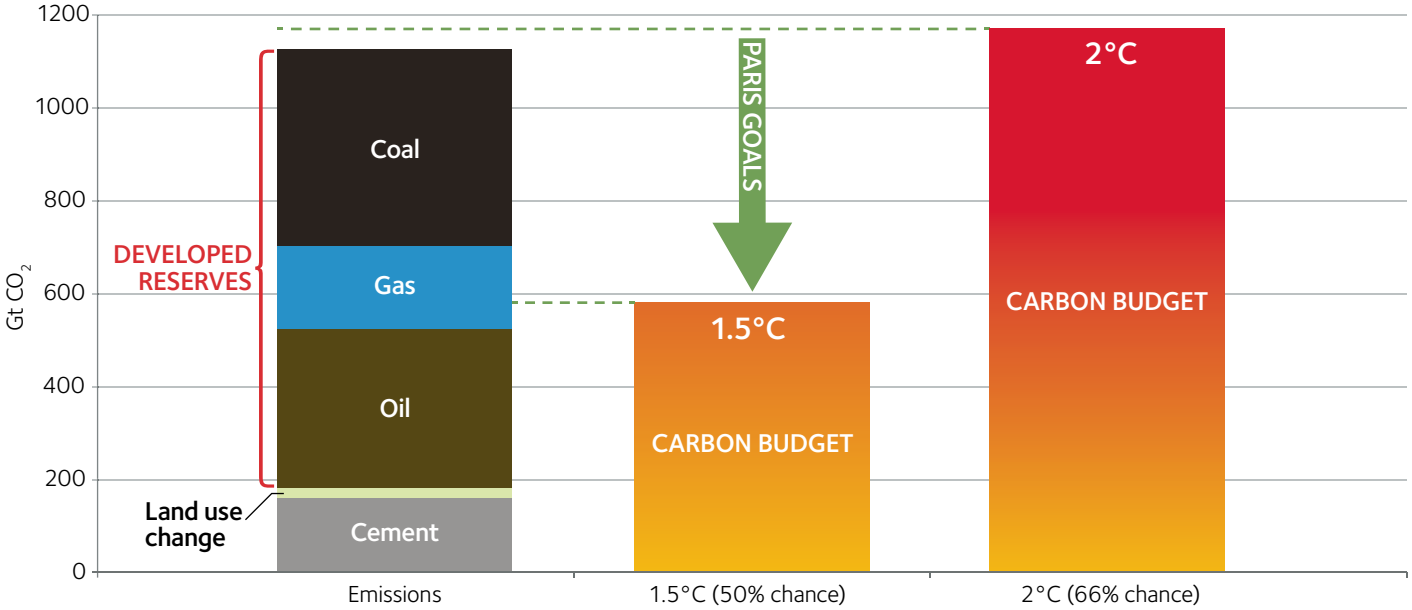
As gas production has grown in regions with previously little or no production, storage tanks, pipelines, and compressor stations have proliferated, bringing the risks into an increasing number of communities. Many gas pipeline projects have met with resistance from communities and landowners. Landowners have found themselves powerless to stop pipelines crossing their property due to the power of eminent domain granted to pipeline companies by state and federal regulators.[18] Gas infrastructure has been sited amidst poor rural, often minority, communities, in clear cases of environmental racism and injustice.[19]

The proliferation of gas drilling also produces associated hydrocarbons called natural gas liquids. Some of these liquids are used for plastic production and are triggering a disturbing rise in the number of petrochemical processing plants and plastics facilities constructed in already heavily burdened communities on the U.S. Gulf Coast and in Appalachia.[20]

These impacts add to the urgency with which the burgeoning growth in gas production must be addressed. Constraining gas production in line with climate limits will ease the tremendous burden that has been placed on the communities in the path of the ongoing fracked gas boom.

Drilling towers near a home in Colorado, U.S. *©Les Stone/Greenpeace.*

Figure 1: CO_2 Emissions from Global Developed Fossil Fuel Reserves, Compared to Carbon Budgets within Range of the Paris Goals



Source: Rystad Energy, IEA, World Energy Council, IPCC, OCI analysis[23]

1. GAS BREAKS THE CARBON BUDGET

The Paris Agreement, ratified by more than 170 nations, requires governments to pursue efforts to limit global temperature rise to 1.5 degrees Celsius (°C) above pre-industrial levels, and in any case, to hold it well below 2°C.[21] In 2018, the IPCC released a powerful report showing the critical importance of the 1.5°C threshold. Limiting warming to this level – the more ambitious end of the Paris goals – would significantly reduce the risks of unstoppable runaway climate change.[22]

Climate science shows us that cumulative CO_2 emissions over time are the primary determinant of how much global warming will occur. Based on the evolving study of this relationship, scientists are able to estimate the level of total cumulative CO_2 emissions that can occur for a given temperature limit. These cumulative totals – called a "carbon budget" – indicate a set limit to how much fossil fuel can be extracted and burned to meet global climate goals.

Using data sources from the energy industry and the IPCC, research by Oil Change International has found that CO_2 emissions from the oil, gas, and coal *in already-operating or under-construction fields and mines* globally would push the world far beyond 1.5°C of warming and would exhaust a 2°C carbon budget, as shown in Figure 1.[e] These "developed reserves" represent the oil, gas, and coal that fossil fuel companies have already invested in extracting over the coming decades: The necessary wells have been (or are being) drilled, the pits dug, and the related infrastructure built.

The licenses, permits, sunk capital, and related infrastructure that go into developing extraction projects create a "carbon lock-in" effect, meaning the oil, gas, and coal shown in Figure 1 will be more politically, legally, and economically difficult to leave in the ground, compared to reserves that have not yet been developed.

The implication of this analysis is clear: **There is no room for new fossil fuel development – gas included – within the Paris Agreement goals.** Even if global coal use were phased out overnight, developed reserves of oil and gas would push the world above 1.5°C of warming.

In practice, this means that achieving the Paris goals will require governments to proactively manage the decline of *all* fossil fuels together. The first step would be to stop digging a deeper hole by ceasing to issue licenses and permits for new oil, gas, and coal extraction projects (i.e., to stop pushing the developed reserves bar in Figure 1 even higher).

But stopping new projects alone will not be enough to keep warming well below 2°C. Governments must also phase out a significant number of existing projects ahead of schedule. These findings show that *managing the phase-out of gas* from our energy system – in tandem with other fossil fuels – is key to meeting the Paris goals.

e These conclusions account for optimistic estimates of future land use and cement manufacture emissions, which are the largest sources of non-energy emissions and more difficult to reduce than energy-sector emissions. The methodology and assumptions behind these estimates are detailed in: Greg Muttitt, *The Sky's Limit: Why the Paris Climate Goals Require A Managed Decline of Fossil Fuel Production,* Oil Change International, September 22, 2016, http://priceofoil.org/2016/09/22/the-skys-limitreport/, Appendix 2, p. 47.

2. COAL-TO-GAS SWITCHING DOESN'T CUT IT

Power Sector Climate Goals Cannot Be Met with More Gas

Over 40 percent of the world's gas is consumed in the power sector today, producing around 23 percent of the world's electricity.[24] No other sector burns as much gas. In the United States, the power sector accounts for about 39 percent of gas consumption.[25]

The power sector represents the low-hanging fruit for decarbonization and plays an additional role in decarbonizing other sectors via electrification of currently non-electrified sectors, i.e., transport, heating and cooling systems for buildings, and industrial heat. The IPCC's report on pathways to 1.5°C states that, *"[s]ince the electricity sector is completely decarbonized by mid-century in 1.5°C pathways, electrification is the primary means to decarbonize energy end-use sectors."*[26] In other words, a genuine decarbonization strategy will entail eliminating fossil fuels from the power sector while electrifying these other sectors so that eventually, the maximum possible proportion of energy is supplied by a combination of clean energy resources generating electricity.[27, 28]

Yet the myth persists: Gas is widely promoted as a means to reduce emissions in the power sector by replacing coal-fired power plants with those running on gas. The extent of emissions reductions achieved by such fuel switching depends on many variables, including methane leakage, the technologies the plants use, and the remaining economic lifetime of the plants being replaced. In all scenarios, however, it is clear that coal-to-gas switching will not deliver the scale or pace of emissions reductions required to achieve climate goals, even if methane leakage is kept to a minimum.

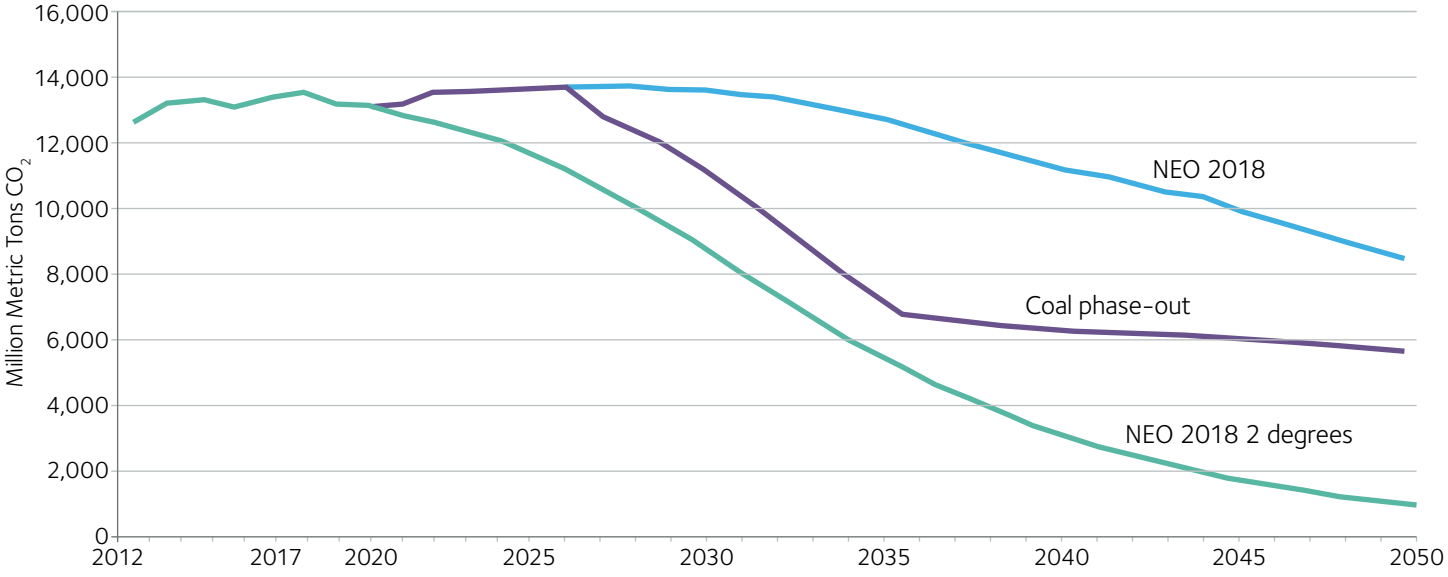
Current projections of how the global electricity sector is transitioning to cleaner energy sources show progress, but the sector remains a long way from aligning with climate goals. For example, the Bloomberg New Energy Finance (BNEF) New Energy Outlook 2018 (NEO 2018) projects that renewable energy is currently on course to provide nearly 50 percent of power generation globally by 2050.[29] This leads to a 36 percent decline in power sector emissions from 2017 levels by 2050 (see the blue line in Figure 2). However, this is well short of the emissions reductions needed.

But what if the phase-out of coal is accelerated with the help of more gas-fired generation? BNEF analysts also ran a scenario in which a phase-out of coal in the power sector by 2035 is implemented.[30] They measured how this would affect power generation from gas and renewables assuming current market dynamics and no other policy changes.

The results suggest that gas would fill around 70 percent of the void left by coal, while solar and wind would replace the rest. This would achieve significant carbon emissions reductions compared to business as usual.[f] But the projected level of gas generation locks in emissions such that by 2050, emissions remain substantially above thresholds consistent with the Paris goals (see the purple line in Figure 2). Note that BNEF measured this outcome against limiting warming to 2°C (see the green line in Figure 2), a threshold that carries extreme risks, rather than the Paris Agreement's goals of keeping warming *well below* 2°C and pursuing a 1.5°C limit.

If climate goals are to be met, any effort to phase out coal must be accompanied by policies to constrain gas and support zero-carbon generation. As Matthias Kimmel of BNEF stated, "[e]ven if we decommissioned all the world's coal plants by 2035, the power sector would still be tracking above a climate-safe trajectory, burning too much unabated gas. Getting to two degrees requires a zero-carbon solution."[32]

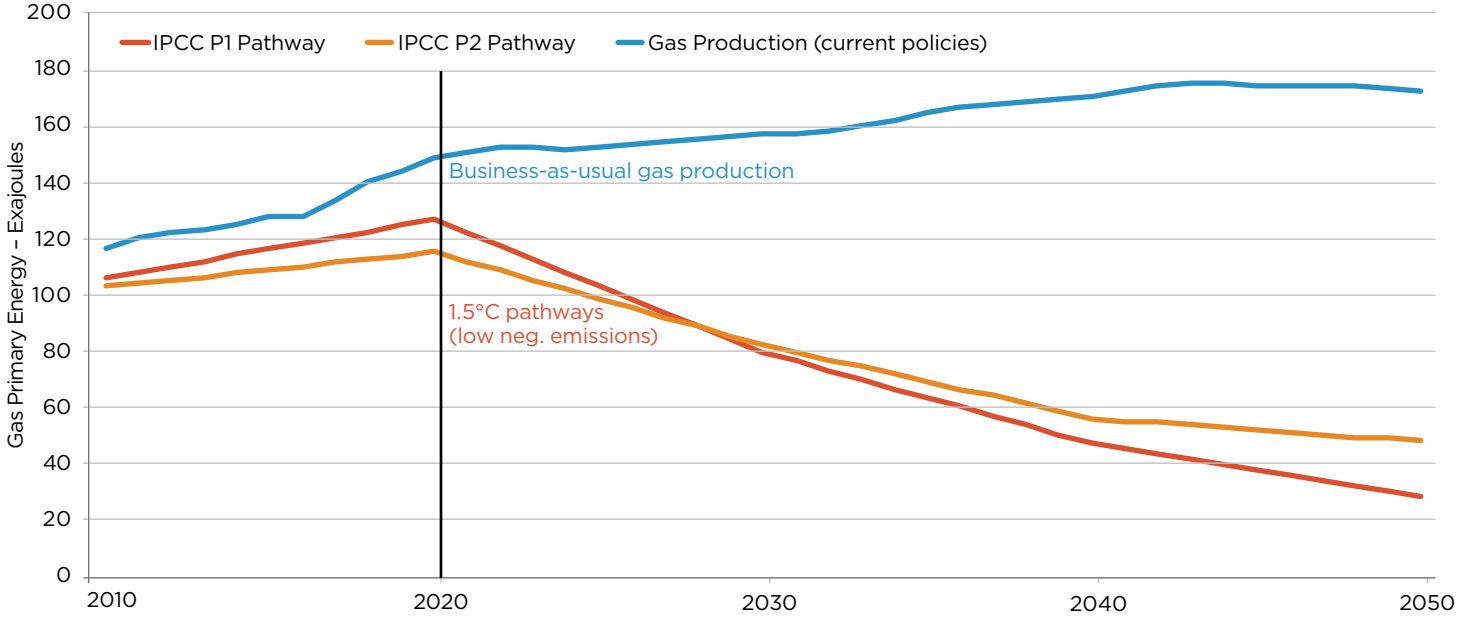
Figure 2: Global Power Sector Emissions in BNEF Scenarios



Source: Bloomberg New Energy Finance, 2018[31]

f Note that BNEF is only measuring emissions at the chimney stack. Methane leakage associated with gas production, processing, storage, and transport will mean that the actual reductions achieved in this scenario are less than stated.

Figure 3: Global Gas Pathways: Business-as-usual extraction vs. demand aligned with 1.5°C



Source: IPCC/IAMC 1.5°C Scenario Explorer and Data hosted by IIASA (Release 1.1)[34] *and Rystad Energy AS UCube* (April 2019)

Not Just Power: Business-as-Usual Gas Production Drastically Overshoots Climate Models

Decarbonizing the power sector – by shifting from coal and gas to renewables by mid-century – is key to rapidly reducing climate pollution. But gas use must begin winding down in other sectors as well to avoid climate breakdown.

The recent IPCC Special Report features four illustrative pathways to achieving the 1.5°C target, with varying degrees of reliance on "negative emissions" technologies and alignment with development goals.[33]

In Figure 3, we show the trajectory for global gas consumption in the two illustrative pathways with the lowest reliance on negative emissions and closest alignment with sustainable development and reduced inequality. These are called the P1 and P2 pathways in the IPCC report, shown in the red and orange lines in Figure 3. The P1 pathway excludes reliance on unproven negative emissions technologies to suck CO_2 out of the atmosphere.[g] The P2 pathway includes limited amounts of unproven negative emissions technologies. By contrast, the blue line shows a projection of business-as-usual global gas extraction – if the industry continues to build new infrastructure and open up new fields.[h]

Clearly, industry plans to continue building out new gas infrastructure are far out of line with the necessary decline of global gas use, starting in 2020, shown in pathways to limit warming to 1.5°C. In the P1 pathway, which takes the most precautionary approach to unproven technologies, gas consumption falls by 74 percent below 2010 levels by 2050. In both 1.5°C-consistent pathways, gas consumption falls by 3 to 5 percent per year on average between 2020 and 2050.

Carbon Capture and Storage (CCS): A Dangerous Bet

Representatives of the oil and gas industry frequently argue that increasing gas use well into the future, or at least maintaining a much slower decline, is still consistent with climate goals.[35] They generally make their case by including large-scale deployment of commercially unproven technologies in their models. These are typically both carbon capture and storage (CCS) and bioenergy with CCS (BECCS), a technology conceived of by energy models to sequester CO_2 in trees, burn them for energy, and capture the emissions.

Scientists Kevin Anderson and Glen Peters conclude that bioenergy production and CCS "both face major and perhaps insurmountable obstacles."[36] Given most of the few CCS pilot projects to date have proved more costly and less effective

g While not relying on carbon capture and storage (CCS) or BECCS, the P1 pathway does rely on sequestration of 246 billion tons of CO_2 through planting forests. Without reliance on significant afforestation, the gas declines shown in Figure 3 would need to occur even faster.

h To compare with demand trajectories given by the IPCC, we exported data from the Rystad Energy Ucube database in energy-equivalent units. The variation in historical gas use between the lines in Figure 3 is likely due to differences in energy accounting between Rystad's production-based data and the demand-based primary energy data in integrated assessment models. Note that the IEA's New Policies Scenario projects almost double the growth in gas production compared to the Rystad projection (WEO 2018).

than hoped,[i] many analysts now consider that wind and solar power, which are proven technologies, are likely to remain cheaper than CCS, even if CCS technology improves. Large-scale reliance on BECCS, which exists to date primarily in theoretical models, would require converting land to grow bioenergy instead of food, risking large-scale food shortages, unsustainable freshwater use, and massive habitat conversion: For example, offsetting a third of today's fossil fuel emissions would require land equivalent to up to half of the world's total crop-growing area.[j]

By promoting increasing reliance on gas, the oil and gas industry is asking the world to make an incredibly dangerous bet on uncertain technologies that pose significant risks to society and ecosystems. If negative emissions technologies do not work out, climate change will be locked in. In fact, the recent IPCC report warns that, "[Carbon dioxide removal] deployed at scale is unproven, and reliance on such technology is a major risk in the ability to limit warming to 1.5°C."[37] It is far safer to reduce emissions in the first place – and that means planning for the phase-out of gas.

BOX 2: Renewable Gas: No Excuse for Expansion

The gas industry is finding new ways to push its agenda. In Europe especially, the gas industry claims that the pipelines and other gas infrastructure it wants to build will one day be used to process and transport so-called *renewable gas*.[38]

While non-fossil forms of gas could play a limited, intermediate role in decarbonizing hard-to-electrify sectors like heavy industry, this transition would still require reducing overall gas use to serve climate goals. Analysis by the International Council on Clean Transportation found that renewable methane could play "a small role" in decarbonizing the European Union's economy by 2050 but "cannot represent the primary strategy for decarbonizing an entire sector."[39]

The energy think tank E3G notes, "None of the Paris-compliant scenarios with renewable or decarbonised gas show increasing gas demand, and most of them show a sharp decline in gas volumes compared to today. **This suggests there is no justification for the expansion of the gas networks** [emphasis added]."[40]

Furthermore, the term "renewable gas" can be misleading. The industry uses it as a catch-all to refer to a variety of production processes and end products – including some still derived from fossil gas – all with differing implications for future pollution, cost, and infrastructure. These include the following[41]:

- **Biogas/biomethane:** Both terms refer to gas produced through anaerobic digestion of organic matter such as manure, sewer sludge, landfill waste, or biomass grown for the purpose. Biomethane is the "upgraded" form of biogas. This process involves removing some of the CO_2 so that its composition is similar to fossil gas, enabling its transport via existing gas infrastructure. Biomethane is still methane. **It emits CO_2 when burned and can leak from pipelines and other infrastructure like fossil gas.** To produce on a large scale, it would also compete with agriculture and forestry over land use, reducing its sustainability.

- **Hydrogen:** Hydrogen is emissions-free when burned, but it has to be manufactured. Its pollution footprint depends on how it is produced. Today, most hydrogen is made via the combustion of fossil fuels. Hydrogen can be produced from renewable electricity. But this "power-to-gas" technology is expensive and exists so far only in pilot project form. **Because hydrogen is a smaller molecule than methane, existing gas pipelines, storage facilities, and appliances would need to be overhauled to use it.** Hydrogen can technically be converted to synthetic methane to adapt to existing infrastructure, but that process requires adding CO_2, increasing costs and pollution while decreasing efficiency.

- **Gas with carbon capture and storage (CCS):** Using CCS to strip CO_2 from fossil gas cannot be considered "renewable," but some industry proponents lump it into this category. CCS could reduce CO_2 pollution emitted when converting gas to hydrogen. CCS could also be used to reduce emissions from biogas or biomethane. **CCS itself remains an uncertain, risky, and still-costly technology (See above).**

The high costs, technical limits, and climate and environmental risks of these technologies suggest they have a highly limited, specialized role to play in genuine decarbonization – if they have a role at all. According to E3G analysis of the European context, estimates of the total potential of renewable gases (excluding fossil gas-derived forms) "represent a fraction of the current gas consumption, even in 2050."[42] The principle solutions for decarbonization beyond the power sector lie in electrifying transport, heating, and industry and increasing energy efficiency to reduce demand.

i For example, the world's first industrial-scale CCS project, the Sleipner project in Norway, started in 1996 and was assumed to be safe until it was discovered to have fractures in its caprock in 2013. The Boundary Dam project in Canada, the first to install CCS at a power station, was exceptionally expensive to build and has struggled to operate as planned, suffered considerable cost overruns, and been forced to pay out for missing contractual obligations.

j Twelve billion metric tons of carbon dioxide extracted per year is estimated to require a land area devoted to bioenergy of 380 to 700 million hectares, equivalent to 25 to 46 percent of total world crop-growing area. Pete Smith et al., "Biophysical and economic limits to negative CO_2 emissions," *Nature Climate Change* 6, 2015, p. 5, https://doi.org/10.1038/NCLIMATE2870.

Wind turbines in Power County, Idaho, U.S. *©U.S. Department of Energy.*

3. LOW-COST RENEWABLES CAN DISPLACE COAL AND GAS

The bridge fuel idea is erroneously based on the assertion that only gas can affordably replace coal on a large scale in the short to medium term. While cost has been a constraint in the past, today, wind and solar are the cheapest forms of *bulk*[k] energy supply in most major markets.[43] As these technologies continue to gain from increasing economies of scale and implementation experience, the cost and performance of wind and solar power is only set to improve.[44] This means that renewable energy can and does replace coal as bulk generation while saving consumers money.

Even in regions of the United States where solar and wind are *not yet* lower cost than gas, we have reached the point where an energy system based on renewables will lower costs everywhere. As studies have shown, portfolios of clean energy resources will be needed to replace dispatchable fossil fuels.[45] Such portfolios will include variable renewables, flexible load, storage, transmission, and the gradual electrification of buildings and transportation. Modeling has shown that clean energy portfolios will produce a lower-cost energy system than the status quo gas-dependent system.[46]

While many energy markets are not currently designed to identify and support such clean energy portfolios, policymakers can step in. They can develop resource deployment pathways that grow these portfolios over time, developing balanced, reliable, and low-cost combinations of renewables, energy storage, flexible load, and other complementary resources while also electrifying buildings and transportation. Consumers will benefit from lower energy costs. This cost advantage will only grow over time.

k See Box 3 for definition of bulk generation.

BOX 3: Three Broad Types of Power Generation

We describe three categories of power generation technologies, based on BNEF[47], as follows:

- **Bulk Generation:** Technologies that can supply large amounts of cheap energy, including wind and solar, as well as Combined Cycle Gas Turbine[l] (CCGT) plants, coal, nuclear, and large hydro.
- **Dispatchable Generation:** Technologies that offer bulk generation but can be dispatched when needed, including coal, CCGT, nuclear, and large hydro. Wind and solar plants that are paired with storage capacity can be partially dispatchable.
- **Peaking and Flexibility:** Technologies that provide quick response and can be dispatched when needed, including open cycle gas turbines (OCGT) and gas reciprocating engines (GRE), as well as utility-scale batteries, demand response, and pumped-storage hydro. Wind and solar combined with battery storage can also be used as flexible generation.

Falling Costs

The burgeoning competitiveness of utility-scale wind and solar generation has been documented by at least two energy analyst teams that have each tracked the remarkable decline in the cost of these technologies over the past decade. They do this by calculating the Levelized Cost of Energy (or Electricity) (LCOE) for different power generation technologies. This is the unsubsidized cost per unit of energy produced of financing, building, and operating power plants.

Financial advisor firm Lazard has published an annual LCOE report for more than a decade. The 2018 report found that the average global unsubsidized LCOE for utility-scale solar and wind has dropped 88 percent and 69 percent, respectively, since 2009.[48] Despite the LCOE for gas-fired CCGT declining by 30 percent in the same period, wind and solar are now cheaper on average (see Figure 4). The clear implication is that wind and solar are not only cleaner but also more cost-effective choices for replacing coal-fired power, and they can also replace gas.

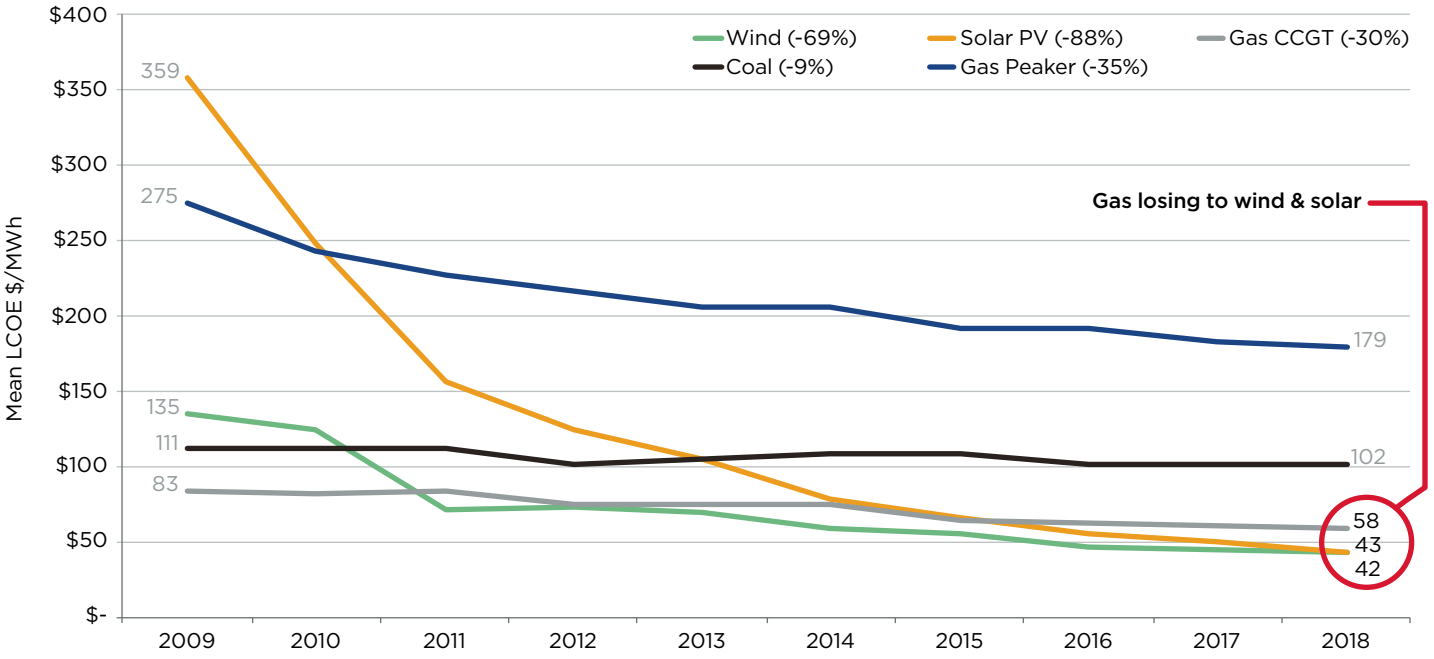
In March 2019, BNEF's LCOE report stated, "*The relentless decline of solar and wind costs has made these technologies the cheapest sources of new bulk electricity in all major economies, except Japan. This includes China and India, where not long ago coal dominated capacity additions, as well as the U.S. where the shale gas revolution has made gas cheap and abundant.*"[50]

Disruption

These steep and ongoing cost declines upend a key aspect of the bridge fuel myth. Wind and solar are now able to challenge the dominance of coal in many major markets. The high cost of imported gas in Asia and Europe, coupled with the effect of zero fuel-cost renewable energy on fossil fuel plant utilization rates, disrupts the economic case for new gas plant build.

As renewable energy capacity increases and its distribution improves, fossil fuel plants are switched on for less time because the energy produced by wind and solar is free at the point of generation. This means fossil fuel plants designed to operate for extended periods are increasingly used below their optimal utilization rates, known as the capacity factor.

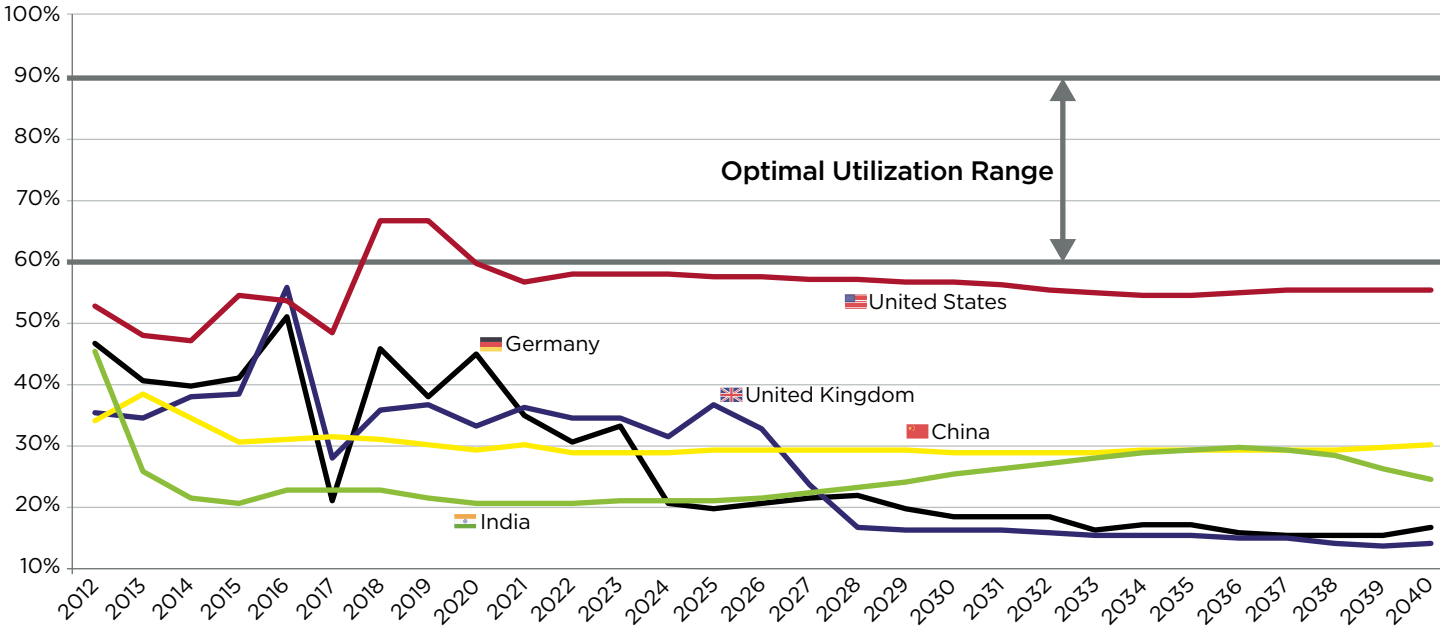
Figure 4: Wind and Solar Are Cheaper than Coal and Gas: Mean Global Levelized Cost of Energy for Select Technologies



Source: Lazard 2018[49]

l Also known as Natural Gas Combined Cycle (NGCC).

Figure 5: Historical and Projected Average Utilization Rates for CCGT Plants in Select Countries in BAU Scenario



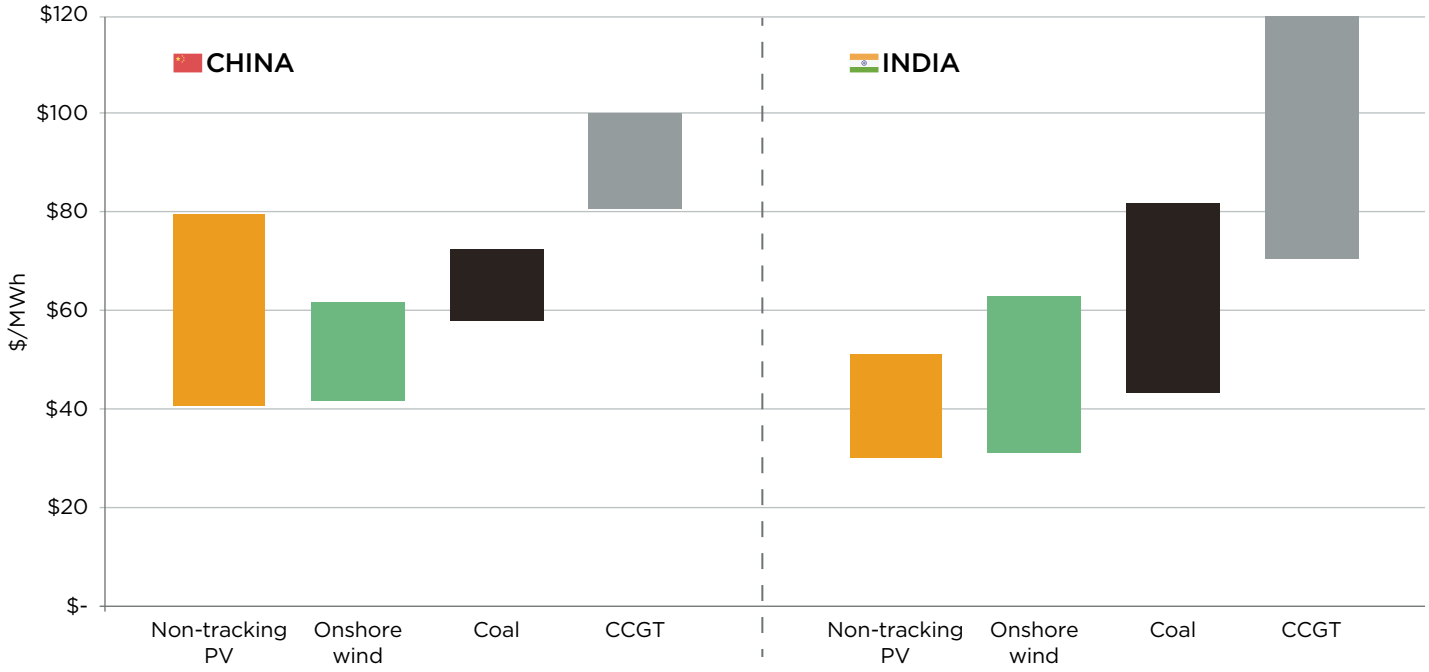
Source: Bloomberg New Energy Finance, New Energy Outlook 2018

Figure 5 shows historical and projected annual capacity factors for CCGT plants in five major markets. In the United Kingdom, Germany, India, and China, capacity factors have been well below the optimal level since at least 2012, and are projected to stay there through 2040. In the United States, capacity factors have been close to the lower end of the range and are projected to remain just below the optimal range through the same period, despite U.S. wholesale gas prices being among the lowest in the world. Note that these projections are from the business-as-usual case shown in Figure 2 (blue line), in which global emissions remain far above a weak interpretation of the Paris climate goals.

Low capacity factors raise the LCOE for new CCGT plants, and can be a factor in them losing out to wind and solar on a cost basis. Figure 6 compares the current LCOE for new generation in China and India. It is clear that utility-scale wind and solar have emerged as winners in the competition to provide the cheapest bulk power in these major emerging markets that are currently dominated by coal. Cost is clearly not a prohibitive factor to adding renewable generation capacity, whether to replace fossil fuel capacity or meet rising demand. This additionally raises challenges to both the economic and climate justifications for the massive Liquefied Natural Gas (LNG) capacity being built and planned in the United States and elsewhere, much of which targets the Asian market (See Box 4).

Workers install solar panels in the U.S. *©U.S. Department of Energy/Schroeder.*

Figure 6: Current LCOE of New Bulk Generation in China and India



Source: Bloomberg New Energy Finance, 1H-2019 LCOE Update

BOX 4: LNG: Making the Problem Worse

Liquefied Natural Gas (LNG) is fossil gas that is cooled to –162°C (–260 degrees Fahrenheit) to reduce volume and facilitate shipping across oceans. On arrival, the liquefied gas is generally regasified to be further transported by pipeline to its final destination.

As might be expected, this intense process requires a lot of energy. Electricity and gas are generally used to power the plants that chill the gas into LNG. Where gas is used, it is estimated that six to 10 percent of the gas processed is required for powering the plant.[51] Additional energy is required for shipping and regasification.

So, the LNG process adds a significant amount to the full lifecycle emissions of producing and using gas. If methane leakage is not kept at very low levels – well below two percent, depending on shipping distance and other factors – replacing coal with LNG will result in increased greenhouse gas emissions.[52]

But it is also dangerous to assume that LNG exports automatically lead to the displacement of coal in destination markets. A paper published in November 2017 in the international journal *Energy* studied this issue in detail, examining scenarios in which U.S. LNG is exported to Asia.[53] The study found that the displacement of coal by LNG exports is far from a given, and that, as a result of U.S. exports of LNG, "greenhouse gas emissions are not likely to decrease and may significantly increase due to greater global energy consumption, higher emissions in the United States, and methane leakage."[54]

4. GAS IS NOT ESSENTIAL FOR GRID RELIABILITY

As renewable energy costs have declined, eroding the economic case for new gas development, gas industry advocates have increasingly emphasized the variability of wind and solar as the reason to build more gas capacity. The sun does not always shine, and the wind does not always blow, and therefore – they argue – gas-fired generation is needed to balance supply and demand. But gas advocates are misleading the public on the role of gas in an electricity system dominated by renewable energy. The reality is that there are many choices for balancing wind and solar on the grid, and gas is losing ground to cheaper, cleaner, and more flexible alternatives. In summary:

- Most of the gas generation capacity being built today uses Combined Cycle Gas Turbine (CCGT) technology. CCGT technology is challenged by increasing renewable energy, rather than enabling it.
- Other types of gas generators, known as peakers, are already being challenged on cost by battery storage.
- With multiple technologies already available, managing grids with high renewable energy penetration is about policy and power market design, not adding or maintaining fossil fuel capacity.
- Policymakers can drive the adoption of complementary resources that enable the integration of high levels of renewables while maintaining reliable electric service at low costs.

CCGT – The Wrong Technology for the Energy Transition

The vast majority of gas-fired generation capacity being built today uses CCGT technology. In the United States alone, around 24 gigawatts (GW) of CCGT capacity was commissioned in 2017 and 2018, and more than 14 GW was under construction at the beginning of 2019.[55] There is more than 425 GW of CCGT capacity in operation globally.[56]

With its two-cycle system of directing heat from a gas turbine to a steam turbine, CCGT is the most efficient and cost-effective gas-fired generation technology for producing large amounts of energy.[57] But because most CCGTs take a relatively long time to ramp up to full power – at least 25 minutes – they are not as well suited or as economical for providing the flexibility needed to balance large amounts of variable renewable generation (see Figure 7).

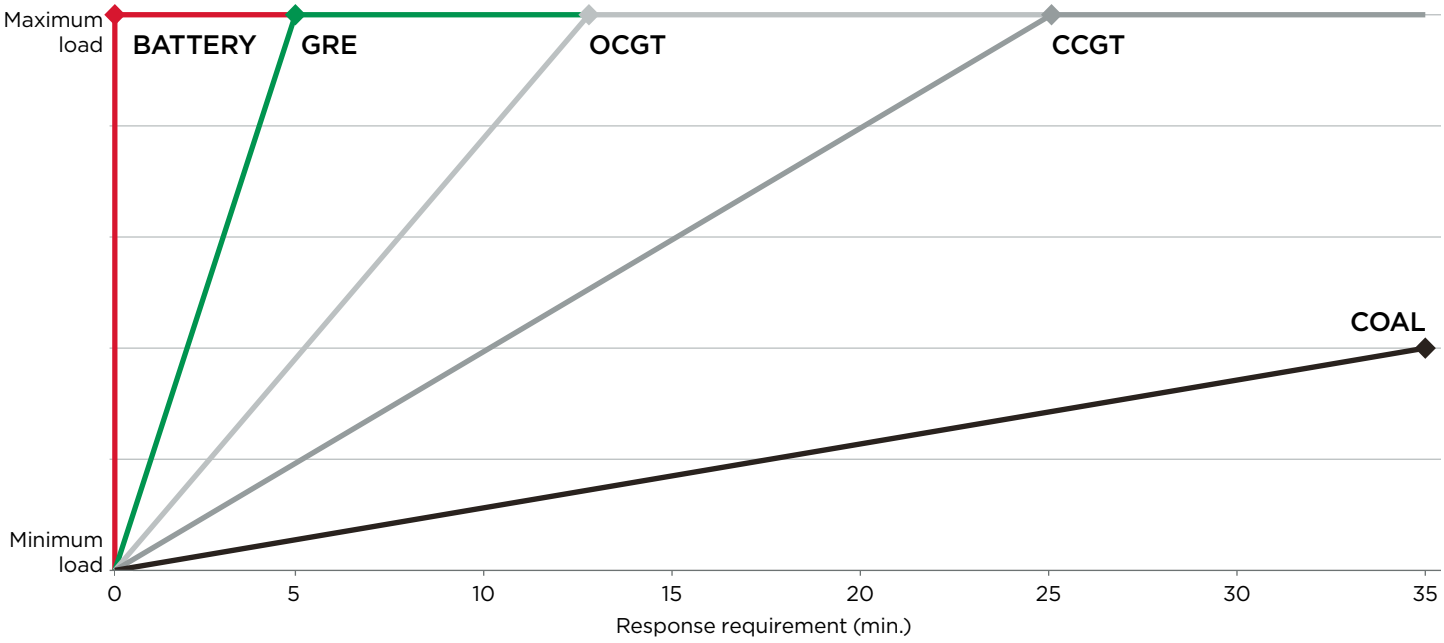
Further, CCGT plants are generally operationally and economically optimal at high utilization rates between 60 and 90 percent (see Figure 5 above). These factors mean that as increasing amounts of wind and solar are placed onto the grid, the economics of CCGT plants are challenged. In other words, rather than enabling higher penetration of wind and solar, CCGT plants are threatened by it. As new, more flexible, cost effective, and clean technologies come on stream, the addition of new CCGT capacity is unlikely to be the best solution for the flexibility requirements of a clean energy grid.

Batteries Challenge Gas 'Peakers'

The gas-fired technologies that are more suited to providing flexible generation capacity – gas reciprocating engines (GRE) and Open Cycle Gas Turbines (OCGT) – are often referred to as peakers, as they are designed to operate during periods of peak demand. They have faster response times compared to CCGT, but are slower than batteries (see Figure 7).

The immediate response capability of batteries is just one advantage the technology has over gas peakers. They are also cheaper over the lifetime of their operation. Utility-scale batteries are already competitive with gas peakers

Figure 7: Ramp-up Times for New Power Plants



Source: Bloomberg New Energy Finance, 2H 2018 LCOE Update[m]

m Ramp-up times assume a hot start.

in some major global markets, such as Australia, Japan, and the United Kingdom.[58] As the combination of accelerating demand for both electric vehicle and stationary uses triggers increasing economies of scale, costs are set to decline rapidly in the coming decade and beyond.

In the United States, the LCOE of stand-alone utility-scale batteries is currently above gas peakers, primarily due to the low cost of gas. But while gas peaker costs are set to rise over the next decade, battery costs are set to decline more than 55 percent by 2030. By 2023, four-hour stand-alone batteries are projected to be cheaper to build and operate than both OCGT and GRE gas peaker technologies in the United States (see Figure 8).

The emergence of batteries as an increasingly affordable and capable technology for storing energy has implications for the clean energy transition beyond their stand-alone flexible generation capacity. Batteries can be co-located with utility-scale wind and solar plants, storing excess power when sunshine and wind are abundant, and effectively allowing a proportion of a wind and solar plant's capacity to be dispatchable. This technology also allows the plant to provide load-shifting services, giving these plants access to high-value hours when they might otherwise be offline.[59] Combining wind or solar with battery storage enhances both the profitability and utility of these clean energy power plants.

BNEF reports that wind and solar plants with onsite battery storage are already able to compete with new coal or gas plants on an LCOE basis in Germany, the United Kingdom, China, Australia, and the United States.[60] They note, "these projects cannot displace fossil fuel plants entirely, but they are able to eat into their run-hours and negatively affect their economics."[61]

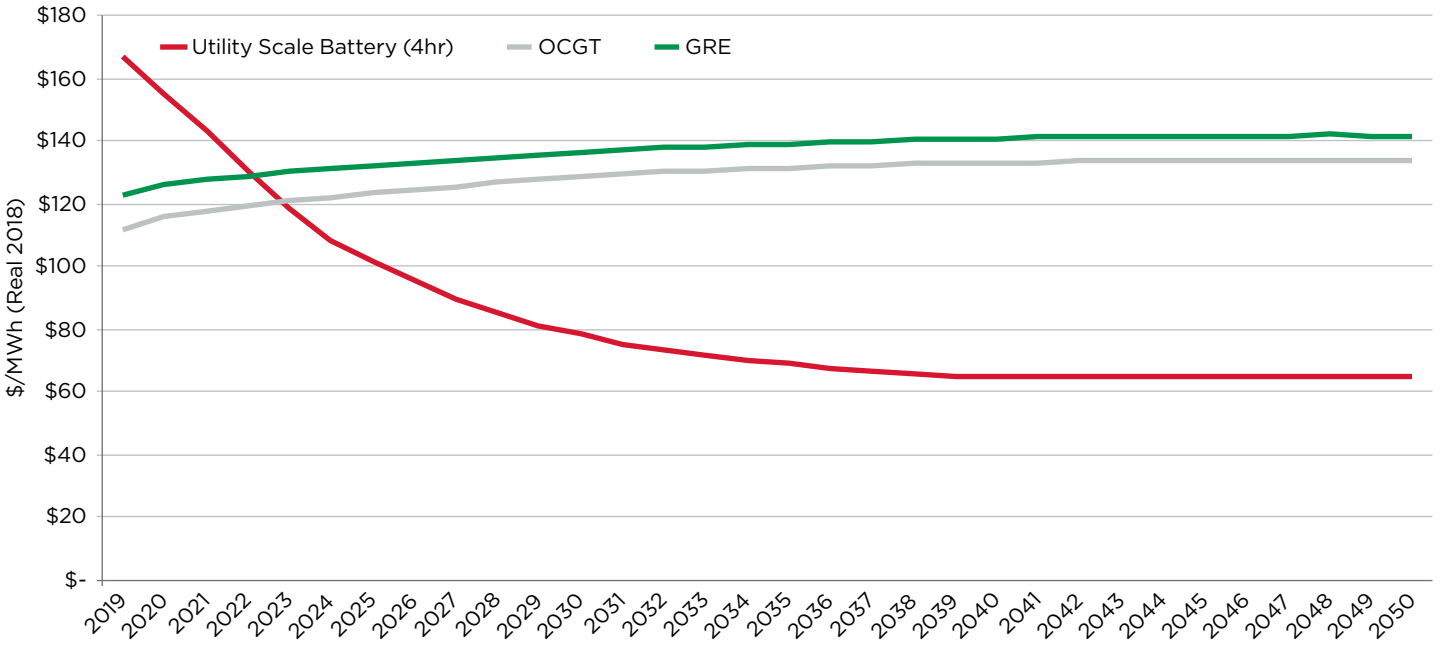
The key issue for batteries today is the duration for which they can discharge. The most common systems being installed today have durations of between one and four hours. The forecast in Figure 8 is based on four-storage-hour systems.[n] Gas peakers can, of course, operate for as long as needed given uninterrupted fuel supply. But a study by Wood Mackenzie in 2018 found that six- and eight-hour battery storage systems, which are beginning to enter commercial operation today, can address 74 percent and 90 percent of peaking demand, respectively.[62]

As battery technology evolves and installed capacity grows, additional gas-fired generation is not needed. As BNEF recently stated, "[t]he economic case for building new coal and gas capacity is crumbling, as batteries start to encroach on the flexibility and peaking revenues enjoyed by fossil fuel plants."[63]

With clean energy technologies beating gas on costs, flexibility, and emissions, it is imperative that policymakers avoid picking gas as the winner in the race to support variable renewable energy as the transition to clean energy gathers pace. In order to accelerate the clean energy transition, they must proactively design power systems and power markets that optimize a suite of truly clean technologies and resources that can meet reliability requirements with the lowest emissions and costs.

High levels of clean energy generation are possible and affordable today, and are only going to become cheaper and more reliable over time. Managing the challenges raised by transitioning to clean energy will require state and wholesale market policies that incentivize the right combination of solutions. The key problem to solve is climate change, which can only lead to substantial reductions in gas use.

Figure 8: Projected LCOE of Battery Storage and Gas Peakers – United States



Source: Bloomberg New Energy Finance, 1H-2019 LCOE Update

n I.e. systems designed to supply power at maximum capacity for 4 hours.

Solar photovoltaic array in Montezuma County, Colorado, U.S. *©U.S. Department of Energy/Schroeder.*

Power Market Design Is Key to the Clean Energy Transition

High levels of renewables are disrupting current energy markets. Two-thirds of the U.S. electric load is served by Regional Transmission Organizations (RTOs) that provide competitive markets for electricity.[64] In the United States and around the world, a myriad of competitive markets exist, each with rules that govern markets for energy services, ancillary services, and capacity. These markets were designed for centralized generation that is dispatched to meet predictable demand. It is increasingly clear that power market design will need to evolve to take advantage of low-cost variable renewable energy.

In many regions, current power market rules are an obstacle to the growth of renewable resources and complementary resources such as demand response and storage. Energy experts at Energy Innovation point to a number of near-term changes that would provide greater flexibility in wholesale markets. "Simple changes to market rules could unlock a significant amount of flexibility for RTOs. In some instances, existing market rules, even when well intentioned, preclude certain resources from offering services even though they could provide value. In other instances, market rules designed to accommodate certain technologies or contract structures limit the ability of grid operators to tap those resources."[65]

Renewables have also lowered energy prices for all generators. Most competitive power markets are based on power generators bidding their electricity into a market. At times of high demand, bids from more expensive sources of power are accepted and all generators are paid the highest accepted bid price. During periods of low demand, only the cheapest sources are compensated for supplying the grid.

Renewable energy is disrupting this model.[66] As wind and sunshine are free, renewable energy has low marginal running costs. In competitive power markets, wind and solar are pushing wholesale power prices down and reducing revenues for all generators. Indeed, far from being expensive for consumers, the rise of wind and solar has led to lower consumer costs by lowering the floor for wholesale energy prices.[67]

Policymakers in many regions, including U.S. states, have significant authority to influence the generation mix serving their state or regional electric grid. These policymakers can develop resource deployment pathways that grow clean energy portfolios over time, developing balanced, reliable, and low-cost combinations of renewables, energy storage, flexible load, and other complementary resources, while also electrifying buildings and transportation.

The International Renewable Energy Agency (IRENA) states that in order to maximize renewable energy capacity and foster the solutions to wind and solar variability, policymakers must support investment in a suite of technologies, none of which include gas. To do this, policymakers and regulators need to "*(p)romote innovative business models that enhance the system's flexibility and incentivise deployment of renewable technologies. Examples include virtual power plants, innovative forms of power purchase agreements, platform business models such as peer-to-peer trading, and business models that enhance demand side response.*"[68]

These are just a few examples of innovations in energy market development and management that are making headway today, and must be adopted more widely to truly enable the transition to clean energy.

5. NEW GAS INFRASTRUCTURE LOCKS IN EMISSIONS

Gas-fired power plants and related infrastructure such as pipelines and LNG terminals require large, up-front multibillion-dollar investments. Such investments are economically predicated on producing revenue for several decades.[69] Building more gas infrastructure today risks locking in emissions from gas for many decades to come. Every new gas-fired power plant we build, along with the pipelines and associated infrastructure to serve it, is making it more difficult to decarbonize by 2050, as the IPCC states we must.[70]

According to a database of global power-generating units, there are more than 1,100 gas-fired generators rated over 5MW, built in or before 1970 that are still in operation today; over 400 of these are in the United States.[71] In 2014, the Interstate Natural Gas Association of America reported that 60 percent of the country's interstate gas transmission pipeline network was installed prior to 1970.[72] Once it is built, gas infrastructure can last a very long time.

The Center for Sustainable Energy found that for potential gas power plants applying for permits in California between 2016 and 2020, most would be operating beyond 2050 based on average permitting and operating periods in that state.[73] The report points out that this would be a threat to California's plans for decarbonization.

The problem of carbon lock-in describes a feature of fossil fuel infrastructure that tends to persist over long timeframes and lock out alternatives due not only to economics, but also technical and institutional factors.[74]

Regulated utilities in the United States are incentivized to build infrastructure by a system that guarantees high returns by passing the cost and risk of new infrastructure onto ratepayers.[75] While this system can be utilized to support clean energy, in recent years it has been extensively used by utilities to build large interstate gas transmission pipelines that have only served to lock in gas supply during a period in which the transition to clean energy must proceed apace.[76]

However, economics is the prime factor at work when capital-intensive infrastructure has been built. Once capital has been sunk, operators can keep running a plant as long as it can sell power for more than the marginal cost of producing it – even if it incurs a loss on the invested capital. For this reason, the lower cost of new wind and solar capacity does not guarantee the early retirement of dirtier fossil fuel capacity.

For the clean energy transition to accelerate, it is crucial to cease investment in polluting energy sources and do everything feasible to encourage zero-carbon sources to grow to meet emissions targets. At this late stage in the depletion of carbon budgets, it is necessary to move straight to zero-carbon energy and avoid locking in further emissions before it is too late.

Fracking for fossil gas in the Marcellus Shale formations in Pennsylvania, U.S. *©Les Stone/Greenpeace.*

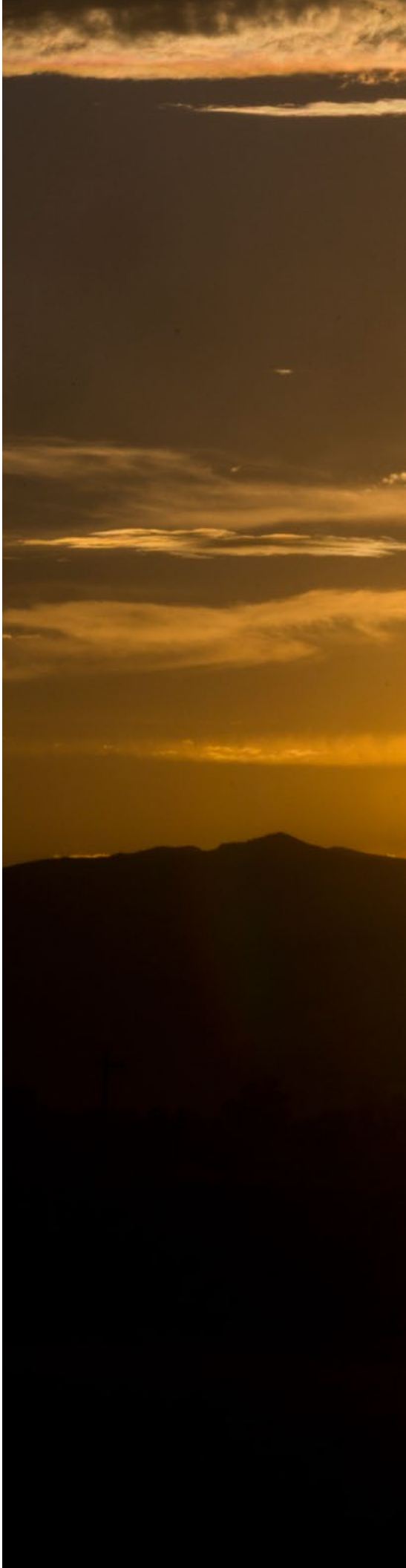
CONCLUSION

The myth of gas as a “bridge” to a stable climate does not stand up to scrutiny. While much of the debate to date has focused on methane leakage, the data show that the greenhouse gas emissions just from burning the gas itself are enough to overshoot climate goals. We must reduce gas combustion rather than increase it, and the fact that methane leakage will never be reduced to zero only makes this task more urgent.

Expanding renewable energy capacity does not require expanding gas use. Existing gas plants will not be shut down immediately, but power markets must be designed to enable the suite of technologies and resources that will support renewable energy as fossil fuels are phased out.

There is an urgent need for policymakers and investors to use climate goals as a starting point for energy decisions, particularly when it comes to gas. Rather than searching for ways to justify using the abundant supply that new drilling methods have unleashed, policymakers and investors should consider how much gas is compatible with achieving the goals of the Paris Agreement. The answer is the same for gas as it is for coal and oil: We need less, not more.

In the next ten years, global greenhouse gas emissions must be substantially in decline. It is clearer than ever, despite decades of industry propaganda, that gas is not clean, cheap, or necessary. Like all fossil fuels, we must urgently embark upon a managed decline of gas production and consumption.



The sun sets over the mountains beyond a fracking rig in Colorado, U.S.
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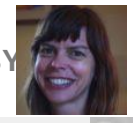
https://energynews.us/2019/08/21/southeast/in-north-carolina-novel-legal-maneuver-deployed-against-atlantic-coast-pipeline/

In North Carolina, novel legal maneuver deployed against Atlantic Coast Pipeline

WRITTEN BY  Elizabeth Ouzts August 21, 2019

Donna Chavis (left) and other American Indians protest the Atlantic Coast Pipeline.

A little-known administrative rule allows state officials to cancel environmental certificates if conditions change.

With the Atlantic Coast Pipeline mired in federal lawsuits and its construction stalled indefinitely, North Carolina environmental advocates are attempting a novel legal maneuver to stop the gas project from ever coming to the Tar Heel State.

Friends of the Earth and the North Carolina Climate Solutions Coalition have filed a petition with the administration of Democratic Gov. Roy Cooper, asking officials to revoke a key water quality certificate they issued for the pipeline early last year.

The filing rests on a little-known administrative rule that allows state officials to cancel the certificate if the conditions around its approval change, or if the information justifying it turns out to be wrong.

Petitioners say a revocation is warranted because — among other reasons — developers vastly understated the project's environmental footprint, especially at its proposed terminus in Robeson County.

A request like this hasn't been made recently, if ever, and no one knows quite how it will proceed. At a minimum, it will reignite debate over the pipeline's impacts in Robeson, one of the poorest and most racially diverse counties in the country. At its most successful, the petition could kill the project altogether.

"We have a golden opportunity here," said Gayle Tuch, chair of the Climate Solutions Coalition's board of directors.

Uncertain path forward

Designed to transport gas from Marcellus shale fields through West Virginia to Virginia and North Carolina, the 600-mile Atlantic Coast Pipeline once seemed inevitable. It was backed by utility heavyweights Duke Energy and Dominion Energy, who promised a $4.5 billion investment and hundreds of jobs. It was blessed by a string of politicians from governors to county commissioners, many praising fossil gas as a clean alternative to coal to environmentalists' dismay.

But today, the pipeline looks iffy, at least in its current iteration. Lawsuits have halted construction since December, with appeals likely to drag on into next year. Duke and Dominion predict they'll ultimately prevail in court but have acknowledged they need a "Plan B" if they lose. Costs have ballooned to $7.8 billion, and some hard-nosed investors doubt the project will ever be built.

Environmental advocates claim the pipeline isn't necessary to meet the region's energy demands and have sued to overturn the permission slip from the Federal Energy Regulatory Commission, or FERC. The panel's approval underpins a complex web of other permits from federal and state agencies.

The FERC case is yet to be heard, and so far, pipeline foes' most successful legal arguments have centered in the Virginias, where the project's 100-foot wide construction berth would cross the Blue Ridge Parkway, the Appalachian Trail and two national forests.

The 4th U.S. Circuit Court of Appeals in Richmond ruled repeatedly — most recently last month — that the pipeline would illegally harm endangered animals like the rusty patched bumble bee and the Indiana bat. The same court held last year that the pipeline couldn't cross the Appalachian Trail on federal forest land without congressional approval.

The courts have tossed three permits altogether — from the U.S. Fish and Wildlife Service, the National Park Service, and the U.S. Forest Service. The U.S. Army Corps of Engineers pulled a fourth permit before it could be struck down. To secure valid approvals, many believe Duke and Dominion must reroute the project around the sensitive landscapes and animals in the Virginias.

"They've got to go back to the drawing board. They've got to do their resource surveys and the engineering and get their approval from FERC for the rerouted option," said D.J. Gerken, an Asheville-based attorney with the Southern Environmental Law Center. "But there is a path forward."

"The problem is not that it's impossible to build a pipeline in the East," he added. "The problem is that they were bullies, and arrogant, and did a shoddy job."

'A chance for a do-over'

The companies could decide a rerouted project isn't worth the effort. But if they do opt for a new path, or if they win in court outright, North Carolina's clean water certificate will be a necessity.

Each state along the pipeline's route must certify under section 401 of the federal Clean Water Act that the pipeline doesn't violate state water quality standards. North Carolina was the last state to grant its certificate, outraging activists who'd viewed the Cooper administration as a final backstop against the project.

At the time, critics disputed the administration's logic that the state had little choice but to certify the pipeline, given the letter of the law. But a court challenge never came, and now activists say the work-stoppage and relative lack of activity in North Carolina give regulators a fresh opportunity to examine the project.

"This is a chance for a do-over," said Robeson County resident Donna Chavis, senior campaigner with Friends of the Earth and a member of the Lumbee Tribe. Of Cooper's environmental officials, she said, "we believe that they want to do what is right for the citizens of North Carolina."

The petition isn't a lawsuit but a direct appeal to state regulators based on a 1976 rule — most recently reauthorized in June — which governs 401 certifications. Any such certification, the rule says, "shall be subject to revocation or modification upon a determination that information contained in the application or presented in support thereof is incorrect or if conditions under which the certification was made have changed."

Advocates assert that both revocation triggers have been met. New circumstances have arisen, they say, such as Cooper's executive order on climate. And some information in

the permit application has been proven incorrect, such as a federal assessment that the pipeline won't disproportionately harm people of color and indigenous communities.

"These are, quite literally, the textbook study regions for environmental justice," wrote Ryan Emanuel, a professor at North Carolina State University and a member of the Lumbee Tribe, in a journal article for Science.

Most of all, petitioners claim, pipeline developers grossly underrepresented and underestimated the damage the pipeline could inflict on Robeson County.

Home to the Lumbee Tribe, the largest community of Native Americans east of the Mississippi, Robeson is one of the most racially diverse rural counties in the U.S. It's among several along the pipeline route that has more people of color and Native Americans than the state as a whole.

Nearly all of the county's streams and wetlands, part of some 300 in the state crossed by the pipeline, drain into the Lumber River, a slow-moving blackwater stream that's been the center of Lumbee culture for millennia.

Robeson is also one of the nation's poorest counties, with public health threats, rising poverty rates and an affordable housing crisis all exacerbated by two recent hurricanes. And the county is already home to two existing gas projects: a smaller pipeline and a compressor station.

Duke and Dominion didn't account for the environmental impact of these two existing facilities combined with a new compressor station and new connecting pipeline. Plus, petitioners say, the companies didn't calculate damage from five other projects it claims are related to the project, including a liquified natural gas storage facility and a possible extension into South Carolina.

"In total, there are nine natural gas projects that are presently in existence, under construction, or formally planned, which are directly connected to the Atlantic Coast Pipeline in Robeson County," the petitioners write. "Together, they form a complex of interrelated natural gas infrastructure, the cumulative impacts of which are greater than the sum of their parts."

These factors and others provide more than sufficient rationale for the Department of Environmental Quality to revoke the water quality certificate, said Ryke Longest, a clinical law professor at Duke University who worked with students and community groups on the filing.

"The certification has been finalized, but the conditions under which it was issued have changed so fundamentally that it calls for a reexamination of that decision," he said. "The record's not closed on this yet."

‘A complicated set of legal issues’

A spokesperson for the Department of Environmental Quality said little about the petition, acknowledging only that it had been received and was under review. But some evidence suggests its chances are slim.

The state has revoked only one other major 401 water quality certificate in recent memory, from the aluminum company Alcoa, for its hydroelectric projects on the Yadkin River (though not in response to a petition.) Regulators denied a follow-up application from Alcoa, but a state judge ultimately ruled that rejection illegal.

In Virginia, a suit against that state’s 401 certificate was one of the few to fail in the Richmond-based federal appeals court in January of this year. In March, the State Water Control Board declined to revoke the certification for a different gas project — the proposed Mountain Valley Pipeline — saying they lacked the authority to do so.

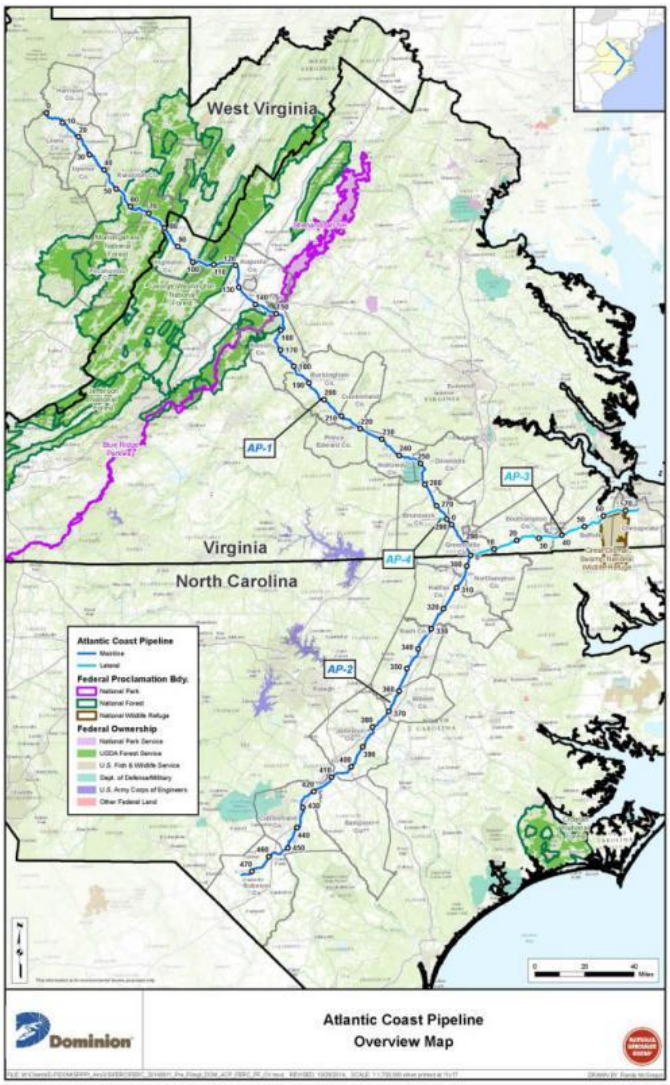
Robin Smith, a Chapel Hill attorney and a former assistant secretary of the Department of Environmental Quality, didn’t cast judgment on the petition’s merits. But she stressed that North Carolina’s water quality certificate was inextricably linked with FERC’s approval.

“The 401 certification isn’t actually a state permit. It’s something that’s required under federal law,” she said. According to guidance from the U.S. Environmental Protection Agency, Smith said, “there are very, very few, if any, circumstances in which a state can revoke a 401 certification once a federal permit has been issued.”

She added that some of the points raised in the petition, such as the need for the project, may be more relevant to a challenge to FERC’s underlying certificate than to the state’s water quality approval. “It’s a complicated set of legal issues,” she said, “and that’s going to have to be resolved by somebody.”

Pandemic erodes the case for the Atlantic Coast Pipeline

By Sue SturgisMay 22, 2020



Construction on the 600-mile-long Atlantic Coast Pipeline, proposed to carry fracked gas from West Virginia to Virginia, North Carolina, and possibly beyond, has been stalled for two years amid legal and regulatory challenges. Demand for gas was already falling before the pandemic, which has further depressed energy demand and raised new questions about the $8 billion project's necessity. (Map from Dominion Energy's website.)

Year since construction on the Atlantic Coast Pipeline — which Dominion Energy and Duke Energy want to build to carry fracked gas from West Virginia to Virginia, North Carolina, and possibly beyond — has been stalled amid legal and regulatory challenges: **2018**

Current estimated cost for the 600-mile project, which was first proposed in 2014: **$8 billion**

Percent by which that amount exceeds the original cost estimate, with the possibility that costs could continue to rise due to numerous permits for the project being invalidated by court challenges: **100**

Percent of the ACP's capacity that the utilities initially said was needed for new power plants: **80**

Portion by which the utilities' need for that power-plant capacity declined even before the COVID-19 outbreak: **more than 1/2**

Percent by which U.S. energy demand is expected to drop this year because of the pandemic-related economic slowdown: **9**

Year in which a top official with Dominion, the project's lead developer, told attendees at an energy conference that "everybody knows" the ACP isn't going to stop in North Carolina, which has led to speculation that the developers might try to connect it to the Elba Island liquefied natural gas (LNG) export facility in Georgia for shipping to global markets: **2017**

Percent by which the pandemic-related recession has reduced worldwide fuel demand, with Houston-based Cheniere Energy, the largest U.S. LNG company, recently announcing it expects investment in new projects to slump: **30**

Number of national and Virginia-based advocacy groups that recently signed on to a letter to Dominion Energy saying that the ACP's various challenges have made its completion "unrealistic": **78**

Month in which both Dominion Energy and Duke Energy held board meetings at which they resolved to move forward with the ACP despite questions raised by concerned shareholders: **5**/**2020**

Tons of carbon pollution that would be released annually by the ACP, not counting the climate impacts of methane leaks from the pipeline or the fracking wells that produce the gas: **30 million**

Percent by which fugitive emissions from the ACP's supply chain would increase current total EPA-estimated emissions of methane — a **particularly potent** greenhouse gas in the short term — from all U.S. gas infrastructure: **13**

Month in which a study was published in the journal Science Advances reporting that outbreaks of potentially life-threatening high temperatures and humidity are already occurring decades before scientists expected in several Deep South states including Florida, which is served by Duke Energy: **5/2020**

Percent by which the pandemic-related economic slowdown has reduced carbon emissions worldwide: **6 to 8**

Percent they would need to be reduced every year over the next decade in order to avoid crossing the threshold to dangerous levels of planetary warming: **10**

Some Draft Language for Advisory Statement from the EJ and Equity Advisory Board on Atlantic Coast Pipeline—based on the unanimously approved motion of Rev. Sadler at November 20th meeting

Rev. Sadler Motion: "I just want to do this as a member of this Board and see if it holds with the will of the larger Board to say that we are concerned about the current progress of the ACP. We're concerned about the sustainability of Executive Order 80 if the ACP is put in place. We're concerned about the fact that this continues to progress through lands that are primarily owned and occupied by environmental justice communities and we're concerned that the permitting process has taken place without due consideration of the concerns of the people of this state and I'd like to make that an official statement from the environmental justice and equity board. I put that in the form of a motion."

Dear Secretary Regan:
On November 20th, 2019, the Environmental Justice and Equity Advisory Board heard from a number of residents impacted by the Atlantic Coast Pipeline, following other communications about the impacts of the pipeline that have been raised to the Board for over a year in writing and oral comments. In response to the passionate appeals from those residents and advocates, Rev. Rodney Sadler moved to have an official statement from the EJ and Equity Advisory Board about the concerns raised. As required by our mission to advise the Secretary of arising significant Environmental Justice issues, we are sending this formal Advisory Statement.

Sustainability of Executive Order 80—As numerous commenters have pointed out, many studies by energy analysts have shown the lack of need for an additional high capacity gas pipeline to supply North Carolina. When coupled with the expected increase in methane emissions from the Atlantic Coast Pipeline routine operations, compressor stations, etc, as well as end users of the gas (with at least 86 times the climate impact of carbon dioxide) it is probable that the ACP would overwhelm any accomplishments in reduced CO2 emissions from the policies implemented under Executive Order 80.

Environmental Injustices—It has been known since before FERC granted the Certificate of Necessity and Convenience for the ACP in 2017 that the planned route of the ACP would have disproportionate impacts on communities of color and low income. Seven of the 8 NC counties that the ACP would pass through have significantly higher percentages of residents of color, African-American and Native American than NC. Also, seven of eight counties on the ACP 's NC route have lower median income than the state as a whole, with the route often passing through areas with lower income than the county. The impacts for residents in these areas include disruption of communities, loss of control of property, and even living or working inside the "blast zone" reaching more than 900 feet either side of the pipeline, meaning that a leak and subsequent fire or explosion could kill all within that zone.

Permitting process without due consideration of NC people—While NC DEQ hosted several well attended hearings related to the 401 permit, a compressor station and other components of the ACP project, and a majority of participants opposed the ACP, but the agency responded that it didn't have the authority to deny or significantly modify those permits. Still worse, the Federal Energy Regulatory Commission meetings and public comment opportunities about the pipeline project were VERY poorly noticed, so the major approval had been granted before most residents along the pipeline had received <u>any</u> notification of the project or its location. Non-profits doing outreach along the route of the pipeline after the Certificate had been granted talked with people living within 200 feet of the pipeline who had no notice at all about the ACP.

Additional concerns related to environmental/economic justice—In addition to concerns about major climate impacts of a massive, unneeded gas pipeline, promoted by Duke Energy and Dominion Energy in expectation of up to 14.7% rate of return on investment, we are acutely aware that these two utilities anticipate recovery of construction costs, cost of debt and profit via rate increases in North Carolina and Virginia. The now estimated $8 B cost of the ACP, in addition to the expected rate of return would have major impacts on utility rates for customers for decades. Further, in response to increasingly urgent need to respond to climate change, both Duke and Dominion have stated their intent to rein in their buildout of natural gas plants. That was the primary reason they gave for needing the ACP in the first place. It is reasonably expected that the ACP would be retired years before the high cost of construction, debt and profit would have been paid off by utility ratepayers. North Carolina already has higher energy burden than most of the US due to significant poverty levels. The ACP would greatly worsen that energy burden.

The Environmental Justice and Equity Advisory Board needs to convey to the Secretary that the Atlantic Coast Pipeline is unneeded and would place a heavy burden of environmental, community disruption, safety and economic impacts on NC communities of color and low income with no significant economic or energy availability benefits. We call on the Secretary to advise the Governor and other officials of the state of these impacts and to take all actions possible—through permitting, rate regulation and executive orders-- to prevent these impacts and save the people of North Carolina from the heavy and completely unjustified burdens of the Atlantic Coast Pipeline.

THE CASE AGAINST THE ATLANTIC COAST PIPELINE

StopTheACP.org

THE ATLANTIC COAST PIPELINE SCHEME

- The Atlantic Coast Pipeline (ACP) is a proposed 604-mile natural gas pipeline that would run from West Virginia to Virginia and North Carolina. Dominion Energy and Duke Energy are the primary owners of the project, and Dominion is responsible for its construction.
- The ACP is not the result of arms-length dealing between independent companies. Dominion and Duke own both the pipeline builder and the electric utilities that will use the pipeline.[1] The Federal Energy Regulatory Commission (FERC) relied exclusively on the contracts between these affiliated companies as proof that the project was needed.[2]
- The guaranteed yearly profit for ACP developers is 15%, a rate higher than for any other energy project.[3] Dominion and Duke plan to charge their electricity customers for the cost of building the pipeline *and* the 15% yearly profit.[4] Originally projected at $4.5 billion, expected project costs have ballooned to over $7 billion.[5]
- This scheme will generate a long-term, low-risk revenue stream for Dominion and Duke shareholders—*even if the pipeline is never used*.[6]

AN OBSOLETE PROJECT

- New evidence shows that the project is *not* needed to run power plants in Virginia. In 2018 and again in 2019, regulators found that Dominion already owns enough pipeline capacity to serve its existing power plants.[7] Also in 2018, regulators rejected—for the first time ever—Dominion's Integrated Resource Plan, finding that the company's demand projections "have been consistently overstated."[8] Dominion's revised Plan relies on clean, low-cost solar power.[9]
- The market is already pushing utilities away from gas-fired generation. Dominion recently acknowledged that it would not build new combined-cycle gas plants because solar power "offer[s] plentiful and inexpensive electricity."[10]
- Even if demand for gas-fired power grows, the existing pipeline system can meet it. Since late 2018, two expansions of existing pipelines—the Atlantic Sunrise project and the WB XPress project—have offered more capacity into Virginia and North Carolina than the ACP will. Most importantly, this capacity *is available for Dominion and Duke*.[11]
- According to two FERC commissioners, the ACP is not in the public interest.[12]

SELF-INFLICTED PERMITTING PROBLEMS

- Since May 2018, federal courts or the federal agencies themselves have vacated or suspended seven permits required for ACP construction.[13] The lack of necessary permits forced Dominion and Duke to halt all ACP construction indefinitely in December 2018.[14]
- The ACP's permitting problems are entirely self-inflicted. The route—across a national park; two national forests; and the steep, forested mountains of the central Appalachians—poses serious environmental problems and has been unduly risky from the beginning.
- Dominion and Duke plan to put an ACP compressor station in the historic, African-American community of Union Hill, Virginia, which was founded by Freedmen and Freedwomen after the Civil War. Descendants of those founders still live there today.[15]
- Dominion tried to use politics and influence to get ACP permits.[16] Acting at the company's request, political appointees applied intense pressure on federal agencies to authorize the pipeline over the objections of agency scientists and engineers.[17] That approach backfired when a federal court reviewed those permits.
- The ACP's certificate from FERC—the project's central approval—is still the subject of litigation in federal court. That case may expose even more problems for this project.

(Over, please)

For more information and updates, visit **SouthernEnvironment.org**.

Or contact Jonathan Gendzier at jgendzier@selcva.org • 434-977-4090.

- FERC has not approved ACP construction in Virginia, and Dominion and Duke have installed less than 6% of the entire project, mostly in West Virginia.[19]
- Despite the ACP's highly uncertain future, property owners have forfeited their land in eminent domain proceedings, and Dominion and Duke have incurred almost $3 billion in costs.[20]

CONGRESS: NO SPECIAL TREATMENT FOR THE ACP

- In December 2018, the Fourth Circuit vacated a permit from the U.S. Forest Service for the ACP, ruling that the agency did not have legal authority to allow the pipeline to cross the Appalachian Trail.[21] Dominion and Duke now want Congress to change the law. That issue is now before the United States Supreme Court.
- Congress should not inject itself into the ongoing review of this highly controversial project at the agencies and in the courts. The ACP's final route is *unknown* at this point. The Fourth Circuit ruled that the Forest Service must study alternative routes that avoid national forests, a process that may significantly reconfigure the project.[22] And other cases—like the challenge to the FERC certificate—are still in court.
- The ACP has other options. The Fourth Circuit ruling is specific to Appalachian Trail crossings on federal land and does not limit crossings on state or private land. Other new pipelines, like a 2016 Transco expansion, crossed the Trail on state or private lands.
- The Fourth Circuit's ruling does not affect the 55 existing oil and gas pipelines that cross the Appalachian Trail at 34 separate locations. Those crossings are either (i) on state or private land or (ii) on land owned by the National Park Service subject to property rights that predate federal ownership or the creation of the Appalachian Trail.[23]
- No existing pipeline crosses the Appalachian Trail on land owned by the Forest Service. Its recent approvals for the Mountain Valley and Atlantic Coast Pipelines were unprecedented.

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[1] *Atlantic Coast Pipeline, LLC*, 161 FERC ¶ 61,042, at ¶¶ 5, 9 (Oct. 13, 2017) [hereinafter ACP Certificate Order], https://www.ferc.gov/CalendarFiles/20171013192035-CP15-554-000.pdf.
[2] *Id.* ¶ 63.
[3] Atlantic Coast Pipeline, LLC, Abbreviated Appl. of Atlantic Coast Pipeline, LLC for a Certificate of Public Convenience & Necessity & Blanket Certificates 30, *Atlantic Coast Pipeline, LLC*, Dkt. No. CP15-554-000 (Sept. 18, 2015) (FERC eLibrary No. 20150918-5212); ACP Certificate Order ¶ 104.
[4] Hearing Transcript at 49, *Appl. of Va. Elec. & Power Co. to revise its fuel factor pursuant to Va. Code § 56-249.6*, Case No. PUR-2017-00058 (June 14, 2017) [hereinafter 2017 Dominion Fuel Factor], http://www.scc.virginia.gov/docketsearch/DOCS/3f%25%2401!.PDF.
[5] Dominion Energy, *4th Quarter 2018 Earnings Release Kit 5* (Feb. 1, 2019), https://s2.q4cdn.com/510812146/files/doc_financials/2018/q4/2019-02-01-DE-IR-4Q18-Earnings-Release-Kit-vTC.pdf.
[6] Hearing Transcript at 49, 2017 Dominion Fuel Factor (June 14, 2017), http://www.scc.virginia.gov/docketsearch/DOCS/3f%25%2401!.PDF.
[7] Order Establishing 2018-2019 Fuel Factor at 3 n.8, *Appl. of Va. Elec. & Power Co. to revise its fuel factor pursuant to § 56-249.6 of the Code of Va.,* Case No. PUR-2018-00067 (Aug. 27, 2018), http://www.scc.virginia.gov/docketsearch/DOCS/3nf%2401!.PDF; Order Establishing 2019-2020 Fuel Factor at 3 n.8 *Appl. of Va. Elec. & Power Co. to review its fuel factor pursuant to § 56-249.6 of the Code of Va.,* Case No. PUR-2019-00070 (Aug. 15, 2019), http://www.scc.virginia.gov/docketsearch/DOCS/4%24b%2401!.PDF.
[8] Order at 7, *In re: Va. Elec. & Power Co.'s Integrated Res. Plan filing pursuant to Va. Code § 56-597 et seq.*, Case No. PUR-2018-00065 (Dec. 7, 2018) [hereinafter 2018 Dominion IRP], http://www.scc.virginia.gov/docketsearch/DOCS/4d5g01!.PDF.
[9] 2018 Compliance Filing at 4, 2018 Dominion IRP (Mar. 7, 2019), http://www.scc.virginia.gov/docketsearch/DOCS/4f0801!.PDF.
[10] Alwyn Scott, *General Electric's Power Unit Fights for Growth as Wind, Solar Gain*, REUTERS, May 24, 2016, https://www.reuters.com/article/us-ge-renewables/general-electrics-power-unit-fights-for-growth-as-wind-solar-gain-idUSKCN1IP0LE.
[11] Final Joint Opening Brief of Conservation Petitioners and Landowner Petitioners at 23-24, *Atlantic Coast Pipeline, LLC v. FERC*, No. 18-1224 (D.C. Cir. filed July 24, 2019).
[12] ACP Certificate Order, (LaFleur, Comm'r, *dissenting*); *Atlantic Coast Pipeline, LLC*, 164 FERC ¶ 61,100 (Aug. 10, 2018) (LaFleur, Comm'r, *dissenting*), https://www.ferc.gov/CalendarFiles/20180810203730-CP15-554-002.pdf; Statement of Comm'r Richard Glick on Atlantic Coast Pipeline, LLC (Aug. 10, 2018), https://www.ferc.gov/media/statements-speeches/glick/2018/08-10-18-glick-ACP.pdf.
[13] Letter from Angela M. Woolard, Dominion Energy Transmission, Inc., to Kimberly D. Bose, Sec'y, FERC, Dkt. Nos. CP15-554-000, *et seq.* (Nov. 21, 2018) (FERC eLibrary No. 20181121-5094) (notifying FERC of suspension of Nationwide Permit 12 verification by U.S. Army Corps of Engineers' Pittsburgh, Norfolk, and Wilmington Districts); *Cowpasture River Pres. Ass'n v. Forest Serv.,* 911 F.3d 150 (4th Cir. 2018) (opinion vacating U.S. Forest Service special use permit and record of decision); Order, *Sierra Club v. U.S. Dep't of the Interior*, No. 18-2095 (4th Cir. Jan. 23, 2019) (order remanding construction and right-of-way permits to National Park Service for vacatur); Order, *Sierra Club v. U.S. Army Corps of Eng'rs*, No. 18-1743 (4th Cir. Jan. 25, 2019) (order vacating Nationwide Permit 12 verification by U.S. Army Corps of Engineers' Huntington District); *Defs. of Wildlife v. U.S. Dep't of the Interior*, 931 F.3d 339 (4th Cir. 2019) (opinion vacating U.S. Fish and Wildlife Service's biological opinion and incidental take statement).
[14] Letter from Matthew R. Bley, Dominion Energy Transmission, Inc., to Kimberly D. Bose, Sec'y, FERC, Dkt. Nos. CP15-554-000, *et seq.*; CP15-555-000 (Dec. 7, 2018) (FERC eLibrary No. 20181207-5147) (informing FERC that Atlantic has stopped construction on the pipeline).
[15] Petitioners' Final Opening Brief at 8-11, *Friends of Buckingham v. State Air Pollution Control Bd.,* No. 19-1152 (4th Cir. filed Aug. 16, 2019).
[16] Petitioners' Motion to Stay at 4-5, *Defs. of Wildlife*, 931 F.3d 339 (4th Cir. 2019) (No. 18-2090); *Cowpasture*, 911 F.3d at 166.
[17] *Cowpasture*, 911 F.3d at 158–60, 166; Petitioners' Motion to Stay at 3-6, *Defs. of Wildlife*, 931 F.3d 339 (4th Cir. 2019) (No. 18-2090).
[18] *Atlantic Coast Pipeline, LLC v. FERC*, No. 18-1224 (D.C. Cir.).
[19] Harry Weber, S&P GLOBAL PLATTS, Dominion confident it will win Atlantic Coast Pipeline legal challenges (June 11, 2019), https://www.spglobal.com/platts/en/market-insights/latest-news/natural-gas/061119-dominion-confident-it-will-win-atlantic-coast-pipeline-legal-challenges (Dominion representative stating that 35 miles of pipeline are in the ground).
[20] *Dominion Energy Inc. CEO Thomas Farrell on Q4 2018 Results – Earnings Call Transcript*, SEEKING ALPHA (Feb. 1, 2019), https://seekingalpha.com/article/4237561-dominion-energy-inc-d-ceo-thomas-farrell-q4-2018-results-earnings-call-transcript
[21] *Cowpasture*, 911 F.3d at 179–81.
[22] *Id.* at 168–69.
[23] Letter from Austin Gerken, Southern Environmental Law Center, to Kathleen Atkinson, U.S. Forest Service, Dkt. Nos. CP15-554-000, *et seq.* 3 (June 24, 2019) (FERC eLibrary No. 20190624-5131).

It's Time to Abandon the Atlantic Coast Pipeline

Friends of the Earth & NC WARN
May 2020

About the Author

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Friends of the Earth

Friends of the Earth fights to create a more healthy and just world. Our current campaigns focus on promoting clean energy and solutions to climate change, ensuring the food we eat and products we use are safe and sustainable, and protecting marine ecosystems and the people who live and work near them.

NC WARN

BUILDING PEOPLE POWER FOR ENERGY & CLIMATE JUSTICE

Now in its 32nd year, NC WARN is building people power in the climate and energy justice movement to persuade or require Charlotte-based Duke Energy – one of the world's largest carbon polluters – to make a quick transition to renewable, affordable power generation and energy efficiency in order to avert climate tipping points and ongoing rate hikes.

It is Time to Abandon the Atlantic Coast Pipeline

Executive Summary

Shareholders should encourage Duke Energy and Dominion Energy executives to re-evaluate the prudence of pouring billions of dollars more into the Atlantic Coast Pipeline (ACP). Current events demonstrate that it is time to change course.

Current (pre-pandemic) plans require less than half of the capacity in new power plants that was originally announced as the reason to build the pipeline. Further decreases appear likely. Dominion canceled the plants that would have used the ACP just months after the pipeline was approved. It has since announced that a significant build-out of gas-fired power plants "is no longer viable." In North Carolina, new gas-fired baseload units have been postponed until the mid-2020s or later.

Risks are increasing. The ACP continues to face an onslaught of legal and regulatory obstacles. The project has been stalled since 2018. Numerous vacated permits must be resolved before construction could resume.

There is a growing surplus of generating capacity serving the region. The coronavirus-induced economic shock has lowered electricity use by 8-10%. It might take several years, or more, for usage to recover to previous levels. Energy efficiency and renewables increasingly offset the need for more gas-fired plants.

Gas production is in disarray for an uncertain period. Many producers are on the verge of bankruptcy.

Should there be a need for additional gas supply, Virginia and the Carolinas can be served by existing pipelines. Dominion notified the Federal Energy Regulatory Commission (FERC) that the gas requirements for Duke's three utilities in North Carolina, and more, could be met using available capacity in the Transco system.

Recent expansions to currently operating pipelines have increased capacity by more than what the ACP would provide. Expanded existing pipelines can transport gas far less expensively than the ACP – saving families and businesses billions of dollars.

It is inappropriate for leading energy companies to be saddling customers with higher energy costs for an unnecessary pipeline during what could be a prolonged time of deep economic distress.

To obtain permission to pass through the cost of the ACP contract to its ratepayers, a new law requires Dominion to prove the ACP is needed to maintain system reliability. If needed, it must be cheaper than available options.

Lower-cost renewables, storage, and reduced demand due to more efficient energy use threaten the operation of higher-cost gas-fired units. New carbon emission fees will further increase operating costs for gas-fired plants.

New legislation, state policies, and the stated aims of Duke Energy and Dominion Energy to be carbon-free by 2050 limit the financial viability of the ACP. The ACP, projected to be repaid over 50 years, will lose the gas-fired units that 80% of its capacity was intended to serve within the first 28 years of its operating life.

Shareholders could be at risk from stranded costs or the portion of the capacity reservation contracts that are not passed through to ratepayers.

Competition for capital will intensify because of the economic downturn. Investing in energy projects that serve customer interests would reduce risks and give more reliable returns than investing in the ACP.

Without the ACP, state economies would be free of the drag that an unnecessary $30 billion increase in energy costs would produce over 20 years. Investments in energy-efficiency, storage, grid improvements, and renewables would create thousands of long-term jobs and lower energy costs, while profiting the energy companies too.

The ACP should be abandoned, losses capped, and priority given to the development of new projects that help create a modern energy system. This would re-align the interests of the shareholders with those of the ratepayers.

Introduction

If completed, the Atlantic Coast Pipeline would be a 600-mile, 42-inch diameter pipeline designed to carry fracked gas in the western Appalachian Basin from a production zone in West Virginia for use in Virginia and North Carolina. Subsidiaries of Dominion Energy and Duke Energy formed Atlantic Coast Pipeline, LLC to build and operate the pipeline. An application was filed with FERC in September 2015 with commercial operation scheduled by November 1, 2018. Construction has been stalled since November 2018, and the project is now three and one-half years behind schedule, with commercial operation anticipated in the first half of 2022. Estimated costs are currently $7.8 billion and climbing.[1] This is 53 percent higher than the original estimate.

1. "In face of litigation, Dominion reiterates Atlantic Coast Pipeline timeline, cost estimate," Jim Magill, S&P Global/Platts, November 1, 2019.

The lack of need for the ACP is clear

- The FERC application shows that 80% of the capacity of the ACP was reserved for new power plants.[2]
- Things have changed. Fewer plants are now proposed. Current plans require less than half of the capacity originally announced as the reason to build the pipeline, with further decreases likely.[3]
- Dominion Energy Virginia canceled the plants that would have used the ACP just months after the pipeline was approved.[4] It has since announced that building more gas-fired power plants "is no longer viable."[5] Two proposed peaking facilities, if built, will use other pipelines.
- In North Carolina, new gas-fired baseload units have been postponed until the mid-2020s or later. Since the ACP was proposed, no new gas-fired combined cycle plant that would require the ACP has been approved by regulators; and it is possible that none will ever be approved.
- Plans are based on exaggerated growth in demand and are contrary to policies to reduce carbon emissions.
- Proposed gas-fired plants will likely continue to decline. The economic setback caused by the coronavirus has reduced electricity demand. A Wood Mackenzie study predicts it could be several years before usage returns to previous levels.[6]
- S&P Global Market Intelligence projects that, in 2023, shortly after the ACP is scheduled to begin operation, there will be 35 percent excess generation in the region from which Virginia draws its power, growing to 60 percent excess by 2027.[7] Duke Energy's electric utilities in the Carolinas forecast excess capacity beyond what is needed for reliability for at least the next 15 years.
- Energy sales are being set back at a time when energy efficiency and renewables are gaining a stronger foothold. Building new gas infrastructure that will take 40-50 years to pay off is ill-advised.
- If additional gas supply is needed, there are better ways to provide it.

Abundant cheaper capacity is available

- Based on rates filed with FERC and the current estimated cost of the pipeline, the utilities' 20-year contracts with the ACP will add $30 billion to energy costs in Virginia and North Carolina.[8]
- Gas is purchased separately and priced about the same at the various production zones that serve the region. Differences in delivered gas prices are mainly due to differences in pipeline transportation costs.
- If the ACP becomes operational, Dominion's Virginia utility must pay $6 billion over the 20-year contract with the ACP; its North Carolina gas subsidiary owes $2 billion. Duke's gas company and two electric utilities are obligated to pay the ACP over $18 billion for the first 20-year contract. Virginia Natural Gas must pay more than $3 billion.[9]
- If the ACP becomes operational, contracts with the ACP must be paid in full even if only some or none of the reserved capacity is used.
- Since the ACP was proposed, existing pipelines serving Virginia and the Carolinas have increased in capacity by more than what the ACP would provide.
- FERC approved three different pipelines to serve the same potential need for new power plants in Virginia and the Carolinas: Atlantic Coast Pipeline, Atlantic Sunrise, and Mountain Valley Pipeline. Of the three, Atlantic Sunrise, which expands the Transco system, is the only pipeline that is operating.

2. Application for a Certificate of Public Convenience and Necessity, Atlantic Coast Pipeline, LLC, September 18, 2015, Federal Energy Regulatory Commission, Docket No. CP15-000, p6.
3. Integrated Resource Plans, submitted by Dominion Energy Virginia (2018), Duke Energy Progress (2019), and Duke Energy Carolinas (2019).
4. "No New Natural Gas Plants for Vistra, Dominion, As Solar Soars, Reuters Reports," Frank Andorka, SolarWakeUp, http://www.solarwakeup.com/2018/05/29/natural-gas-plants-vistra-dominion/
5. "Dominion: Significant new natural gas generation not viable," Sarah Rankin, April 8, 2020, AP News, https://apnews.com/3c711d503a304e67310a62e63a123b74
6. "WoodMac: Coronavirus Will Undercut North American Power Demand through 2021," Rob Whaley and Paul Taube, April 7, 2020, Greentech Media, https://www.greentechmedia.com/articles/read/coronavirus-will-undercut-power-demand-from-east-to-wecc
7. "Overpowered: Why a US gas-building spree continues despite electricity glut," Stephanie Tsao and Richard Martin, December 2, 2019, S&P Global Market Intelligence, https://www.spglobal.com/marketintelligence/en/news-insights/videos/power-forecast-briefing-capacity-shortfalls-to-test-the-renewable-energy-transition
8. Amendment to Application for a Certificate of Public Convenience and Necessity and Blanket Certificates, Atlantic Coast Pipeline, Docket No. CP15-554-001, Volume I Public, March 11, 2016, Exhibit P.
9. See Appendix A, attached.

- In August 2018, Dominion informed FERC that Transco has sufficient available capacity to provide all of what Duke's utilities were expecting to get from the ACP, and more.[10]

- Other Transco expansion projects added even more capacity. Local gas distribution companies in North Carolina owned by Duke and Dominion have reserved new capacity from Transco, which has been their primary supplier for decades.

- As shown by rates on file with FERC, recent expansions to currently operating pipelines can transport gas far less expensively than can the ACP.[11]

- Rather than saving money, as promoted by the ACP, customers will pay billions more to use the ACP.

Business case for future gas usage is gloomy

- There is an excess of generating capacity serving Virginia and North Carolina, and electricity demand has been essentially flat, even with a growing population and an economy that was strong until the pandemic.

- The economic downturn caused by the coronavirus has reduced electricity usage. After the last recession, energy use in developed nations fell by 5%.[12] Ten years later, the most developed nations consumed less energy than they had before the recession, although their economies had grown by 18%.

- The U.S. Energy Information Administration reports that residential gas use was less in 2019 than it was nearly 25 years ago, with a continued gradual decline projected through 2050. Commercial gas usage was less in 2019 than in 2014 but could rise slightly by 2050. Industrial use is price sensitive.

- Gas was considered attractive because it was cheap. It was cheap because of an oversupply.

- The coronavirus-induced economic downturn and oil price competition have stressed oil and gas producers.

- Gas production is in disarray. Demand is down, and a surplus of supply continues, driving prices down further. Many producers are on the verge of bankruptcy.

- It is quite possible the industry will consolidate in the hands of fewer, better-capitalized companies. They could decrease supply to match demand, causing gas prices to eventually rise, reducing its use.

- Shutting in some existing wells and allowing new wells to go through their normal 50% decline in output during the first year will reduce supply fairly rapidly.

- There is a surplus of generation in PJM that is expected to exist through 2050. Additions of gas-fired generation are unnecessary, except to improve utility profits.

- Eventually, higher-priced gas, a surplus of generating capacity, curtailed electricity demand, retirements of carbon-emitting generators, and competition from renewables will result in a declining demand for gas in the region, not an increasing one.

- Even if gas demand does end up matching previous projections, there is adequate gas supply and plenty of available pipeline capacity without the ACP.

Risk to owners and shippers has increased

Legal and regulatory challenges

- The ACP continues to face an onslaught of legal and regulatory obstacles.

- The Virginia Attorney General filed an amicus brief in the Supreme Court case related to the ACP crossing of the Appalachian Trail, saying the Atlantic Coast Pipeline was unnecessary and should be stopped.

- Regardless of the outcome of the Supreme Court case, numerous other revoked permits remain unresolved.[13] A flurry of new permits that meet court requirements would be needed for construction to resume soon.

10. Letter from Matthew R. Bley, Dominion Energy Transmission, Inc., to Kimberly D. Bose, FERC, at 3 (Aug. 13, 2018), eLibrary No. 20180813-5065.
11. Application for a Certificate of Public Convenience and Necessity, Atlantic Sunrise Project, March 31, 2015, Federal Energy Regulatory Commission, Docket No. CP15-, Exhibit P.
12. "Recession and Recovery: Lessons From the 2010 BP Statistical Review of World Energy," Christof Rühl and Joseph Giljum, 4th quarter 2010, International Association for Energy Economics Energy Forum, pp 9-14, https://www.iaee.org/documents/2010FallEnergyForum.pdf
13. https://www.southernenvironment.org/uploads/words_docs/11.25.19_Case_Against_the_ACP_Factsheet_.pdf

- For example, no air quality permit exists for the Buckingham Compressor Station and no meetings of the Virginia Air Quality Board are scheduled to deal with the issue.

- In North Carolina, the Section 401 water quality permit is being challenged.

- A recent court ruling involving the Keystone XL pipeline overturned Nationwide Permit 12 (NWP 12) administered by the U.S. Army Corps of Engineers to authorize interstate pipelines to cross streams and other water bodies.[14] The ACP crosses waterways over one thousand times in Virginia, with perhaps 600 or more crossings in North Carolina.[15] NWP 12 had been temporarily suspended awaiting updates that might have allowed the ACP to construct water crossings later this year. Now the nationwide permit has been vacated awaiting what could be multiple appeals. No timeline has been identified as to when the NWP 12 process might be functional again.

- The overall FERC certificate for the ACP is under court review. Action is delayed until after the Supreme Court ruling is issued.

Vastly changed political and legislative landscapes

- In Virginia, recently passed legislation requires Dominion's utility to answer several questions before the state regulator can pass through the costs of the pipeline contract to electricity ratepayers.[16] The utility must show it needs added pipeline capacity to maintain system reliability and, if more capacity is necessary, that the ACP is cheaper than other available options.

- Testimony in previous Fuel Factor proceedings indicate that the utility will be unable to answer affirmatively to these and other required questions. The current projected rate for transporting gas using the ACP is over five times the rate for using the Transco Southside pipeline that was recently built to serve Dominion's two newest gas-fired power plants in Southside Virginia.[17]

- Dominion Energy is greatly exposed. It is now a 53% owner of the pipeline. The company abandoned plans to build new gas-fired power plants in Virginia that would use the ACP. Despite information showing the pipeline is unnecessary to serve its customers, the utility intends to pass through the full $6 billion cost of its ACP contract to ratepayers, a move that could be blocked by Virginia law.

- In North Carolina, even without a new state law, it will be challenging to pass unwarranted costs for an unnecessary pipeline on to ratepayers.

- If its North Carolina utilities need more gas supply, Duke can access Transco and reserve abundant pipeline capacity at a much lower cost than from the ACP.

Connection to South Carolina is unlikely to replace the huge loss of gas demand for electricity generation

- The ACP might plan to replace some of the significant reduction in demand due to canceled power plants with the unofficially announced connection with Dominion's pipeline network in South Carolina. Dominion might attempt to add a new gas-fired plant for its South Carolina utility, or connect the ACP with the Elba Island liquefied natural gas (LNG) export facility in Georgia.

- Phase II of U.S. LNG export facility expansion has slowed down. RBN Energy reports that "[m]any of these projects were conceived when prospects for U.S. LNG exports were considerably brighter." Now the "market is saturated and both LNG demand and financing have dried up."[18]

- An extension of the ACP into South Carolina would require a new FERC proceeding.

- Transco serves South Carolina and already connects to Elba Island. Any need for greater gas supply in the area could be provided far less expensively using Transco.

Cost and capacity challenges

- Reserving the expanded capacity in existing pipelines is much cheaper than using the ACP. New capacity from existing pipelines can be reserved in small increments, as needed, rather than paying for huge amounts of capacity from the ACP far in advance of when it might be used, if ever.

14. "Keystone XL Ruling Has 'Sweeping' Impacts for other Projects," Ellen M. Gilmer, April 16, 2020, Bloomberg Law, https://news.bloomberglaw.com/environment-and-energy/keystone-xl-ruling-carries-sweeping-impacts-for-other-projects
15. Atlantic Coast Natural Gas Pipeline, Chesapeake Bay Foundation, https://www.cbf.org/about-cbf/locations/virginia/issues/atlantic-coast-natural-gas-pipeline.html
16. HB 167 Recovery of Fuel and Purchased Power Costs, 2020 Virginia General Assembly.
17. Application for Certificate of Public Convenience and Necessity, Virginia Southside Expansion Project II, Filed March 23, 2015, Exhibit P.
18. *"Holding On for Life - Second-Wave U.S. LNG Projects Stagnate Amid Market Uncertainty,"* Sheetal Nasta, April 16, 2020, RBN Energy, https://rbnenergy.com/holding-on-for-life-second-wave-us-lng-projects-stagnate-amid-market-uncertainty

- The very expensive contracts for capacity on the ACP would have to be renewed to serve the entire service life of a new gas-fired generating facility. Lifetime costs of using the ACP could be much greater than described above.

Huge increase in competition for capital challenges energy companies

- The economic downturn caused by the coronavirus pandemic will create an enormous demand for capital from ailing companies and a stricken populace.

- It is unwise and unconscionable for Duke and Dominion to burden families and businesses with higher utility bills for their own private gain while citizens and their companies attempt to recover from a massive economic shock.

- Access to capital could be reduced from what energy companies have experienced in the past decade.

- Investors will require the prudent use of what capital is available.

- Dominion and Duke might have to choose between projects that are risky, like the ACP, and those that have a more definite chance of success.

Climate change and stranded assets

- The recently passed Virginia Clean Economy Act requires Dominion to halt operation of all its fossil-fired generation in the state by the end of 2045. As a result, Dominion announced that building more gas-fired power plants "is no longer viable."

- Synapse Energy Economics released a paper on March 9, 2020 that reviewed the decarbonization efforts of the three original owners of the ACP.[19] Southern Company, Dominion Energy, and Duke Energy contribute 12.4 percent of U.S. CO_2 emissions in the electric power sector. The study showed:
  - Two-thirds of the coal capacity the companies had online in 2012 is still operating today.
  - Seventy-five percent of this remaining coal capacity is expected to operate beyond 2030.
  - Nearly three-quarters of the retired coal capacity was replaced by carbon-emitting gas-fired plants, which have similar greenhouse gas emissions to coal plants when factoring in related methane releases.
  - Assuming a 40-year lifetime, new gas-fired plants added since 2012 and those that might be built in the future will outlive the requirements of Virginia law and fall short of the companies' climate commitments for 2050.
  - Ratepayers or shareholders will pay for these stranded assets after they cease operation.
  - Each ACP owner has a heavy reliance on gas. Even with a downward trajectory in emissions through 2040, their emissions will plateau near the 2040 levels unless plans are changed.

- The Synapse study finds that, contrary to what the companies "say on their websites, in television ads, and in shareholder reports and pamphlets, the three companies are thus far taking minimal actions to decarbonize their electricity systems."

- Southern Company has withdrawn as an owner of the ACP. The investment no longer serves its corporate goals.

- Investors might feel the same way about the pipeline as Southern Company. They might feel that they would be better served if their money were used to invest in a forward-looking energy system rather than having billions invested in old technologies that go against the trend in state policies.

- Shareholders could be at risk from stranded assets and other costs of the ACP.

Investments in a modern energy system are a better investment than the ACP

- The economic downturn could make access to capital more difficult. If scarce capital must be allocated, investing in renewable energy and modernizing the grid would reduce risks and give more reliable returns than investing in the ACP.

- The Clean Economy Act awarded Dominion a windfall in profits for developing wind, solar, and energy efficiency projects throughout Virginia over the next 30 years. North Carolina's policies might soon catch up. Energy companies must adjust to the times.

- Wind, solar, and energy efficiency projects have been the greatest source of new jobs in the U.S. Investing in modern energy projects[20] would help

19. *"Investing in Failure - How Large Power Companies are Undermining their Decarbonization Targets,"* Bruce Biewald, et al., March 9, 2020, Synapse Energy Economics.
20. Modern energy projects would include solar, wind, energy efficiency, storage, demand-response, smart-meter installations that make the information available to customers to optimize their energy use and lower their bills, microgrids, and advanced grid modifications that would allow the two-way flow of energy and information.

to get our economy back on its feet and put people back to work in long-term jobs.

- This would also serve customers better and re-align the interests of the shareholders with those of the ratepayers.

- Lower-cost renewables, storage, and demand reductions from greater energy efficiency threaten continued operation of higher-cost gas-fired units.

- Increasing carbon emission fees will contribute to higher operating costs of gas-fired units.

- Burdening customers with $30 billion in higher energy costs for the ACP hampers job creation and economic development rather than boosting it.

- Shareholders should encourage Duke and Dominion executives to re-evaluate the prudence of pouring billions of dollars more into the ACP. Current events demonstrate that it is time to change course.

Appendix A

The costs shown in the table below are based on the initial rates established by FERC for the ACP.[21] The "ACP Current" costs are an extrapolation based on what the rates might be if the pipeline is constructed at the current estimated cost of $7.8 billion[22] instead of the $5.1 billion estimate used to establish the initial rate. The initial published rate for the ACP is $1.88 per Dekatherm per day ($1.72 + $0.16 for the supply header). This was increased by 53% to account for the current cost estimate for the pipeline. The increased allowance for funds used during construction that is accruing because of the significant delays could further increase the capital costs used for setting permanent rates, increasing the ACP final costs to values higher than what are shown here. This would offset the slightly lower rates that could be negotiated but not publicly released. A permanent rate will be established three years after commercial operation to account for actual construction and operating costs and adjustments in taxes and other expenses. FERC allows for increased rates during a pipeline's operating life if the owners are not achieving the target rate of return.

Shipper	Capacity Dth/d	ACP Initial 20-Yr Total	ACP Current 20-Yr Total
Dominion		in Billions of $	
Virginia Power	300,000	$ 4.12	$ 6.30
PSNC	100,000	$ 1.37	$ 2.10
Duke			
Piedmont	160,000	$ 2.20	$ 3.37
Duke Progress	452,750	$ 6.21	$ 9.50
Duke Carolinas	272,250	$ 3.74	$ 5.72
Virginia Natural Gas			
VNG	155,000	$ 2.13	$ 3.25
	Total	$19.77	$30.24

Gas distribution companies such as PSNC and Piedmont could add capacity in small increments from Transco, as the need arises. They are already connected to the Transco system. It would be a matter of negotiating new long-term contracts with Transco, in amounts and terms that good business strategy dictates. There would be no reason to burden customers with paying for unused capacity for years or decades, as the ACP contracts require.

The same would apply to Duke's electric utilities. If the first power plant is years away, if ever, why make customers pay far in advance for capacity that is not required? The utility makes no money on the transaction. They are only the bill collectors that hand the proceeds over to their parent company via the ACP. Any new power plants could be connected to Transco as easily as to the ACP.

21. Amendment to Application for a Certificate of Public Convenience and Necessity and Blanket Certificates, Atlantic Coast Pipeline, Docket No. CP15-554-001, Volume I Public, March 11, 2016, Exhibit P.
22. "In face of litigation, Dominion reiterates Atlantic Coast Pipeline timeline, cost estimate," Jim Magill, S&P Global/Platts, November 1, 2019.

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January 2019

The Vanishing Need for the Atlantic Coast Pipeline

Growing Risk That the Pipeline Will Not Be Able to Recover Costs From Ratepayers

Executive Summary

The Atlantic Coast Pipeline (ACP) is a 600-mile, 42-inch natural gas pipeline currently under construction to bring natural gas from northern West Virginia to Virginia and North Carolina. The project is being built by a joint venture of Dominion (48%), Duke Energy (47%), and Southern Company (5%). Its construction was approved by the Federal Energy Regulatory Commission in October 2017.

The project was originally projected to cost $5.1 billion.[1] Cost overruns to date have raised the cost of the project by about 30% to $6.5 to $7 billion, excluding financing costs[2]. But cost overruns are not the only challenge faced by the project.

The biggest threat to the project's profitability may come if and when the project is ever completed. The demand outlook for gas has changed dramatically since the project's inception and much of the project's original justification has evaporated. Indications are that the project's affiliated utility customers may struggle to convince state regulators to pass the full cost of pipeline transportation agreements through to utility customers. Indeed, the project does not represent good value to the ratepayer.

This briefing discusses the considerable headwinds faced by the Atlantic Coast Pipeline. Key findings include:

- Six companies, all of whom are regulated utility affiliates of the pipeline's sponsors, have contracted for 96% of the pipeline's capacity.

- Atlantic Coast Pipeline, LLC will recover the costs of the pipeline through rates charged to the pipeline's customers. Given that the vast majority are

[1] Atlantic Coast Pipeline, "Abbreviated Application for a Certificate of Public Convenience and Necessity and Blanket Certificates: Volume 1," Federal Energy Regulatory Commission Case No. CP15-554, September 18, 2015, p. 2.
[2] S. Layag, Dominion raises Atlantic Coast-related cost estimate by $500M, citing snags," S&P Global Market Intelligence, November 1, 2018.

regulated utilities, these costs will have to be approved by state utility regulators in Virginia and North Carolina.

- Electric utility subsidiaries of Duke and Dominion in Virginia and North Carolina have contracted for 68% of the pipeline's capacity. Yet, the argument by these utilities that they need new natural gas pipeline capacity has been significantly weakened since the ACP was first proposed.

- In its most recent long-term Integrated Resource Plan (IRP), four out of five of Dominion's modelled scenarios show no increase in natural gas consumption from 2019 through 2033.

- Dominion's 2018 IRP was rejected by Virginia state regulators, in part for overstating projections of future electricity demand. This implies that future natural gas consumption will likely be even less than forecasted in the IRP.

- The most recent IRPs of Duke Energy Progress and Duke Energy Carolinas show that previously planned natural gas plants have been delayed further into the future. We also find that Duke also has a history of overstating its forecast of electricity demand.

- Over the next decade, it is likely that the demand for natural gas in Virginia and North Carolina will be further eroded as renewable energy and storage technologies continue to rapidly decline in price.

We recommend several questions investors could be asking management in order to obtain a clearer view of the project's value.

The Atlantic Coast Pipeline Proposes to Recover Costs From Ratepayers of Affiliate Companies

The pipeline is owned by Dominion (48%), Duke Energy (47%), and Southern Company (5%), which together formed Atlantic Coast Pipeline LLC (ACP-LLC). These project owners intend for the upfront capital cost of building the project, currently estimated at $6.5 to $7 billion, to be recovered through transportation rates from the companies that contract with ACP-LLC to ship natural gas on the pipeline. Ninety-six percent of the capacity on the pipeline was contracted when the pipeline was first proposed to FERC. Following Dominion's acquisition of SCANA, all of these transportation contracts are with regulated utility companies affiliated with the three ACP-LLC partners, as shown in Table 1.

Table 1: Six Companies, All of Whom Are Regulated Utility Affiliates of the Pipeline's Sponsors, Have Contracted for 96% of the Pipeline's Capacity

Natural Gas Shipper Company	Parent Company of Shipper	Amount of Capacity Contracted (Dth/day)	Percent of Total Pipeline Capacity
Virginia Power Services, Inc.	Dominion	300,000	20%
Duke Energy Progress, Inc.	Duke Energy	452,750	30%
Duke Energy Carolinas, LLC	Duke Energy	272,250	18%
Piedmont Natural Gas Company, Inc.	Duke Energy	160,000	11%
Public Service Company of North Carolina, Inc.	Dominion	100,000	7%
Virginia Natural Gas, Inc.	Southern Company	155,000	10%

These companies are regulated utilities in Virginia and North Carolina, which means that their rates must be approved by the Virginia State Corporation Commission and North Carolina Utilities Commission, respectively. Costs that are not approved cannot be recovered through customer rates. In the case of the Atlantic Coast Pipeline, the utilities would seek to recover the cost of the pipeline once these utilities start shipping gas on the pipeline.

In its order approving the Atlantic Coast Pipeline, the Federal Energy Regulatory Commission specifically declined to comment on whether the contracts (known as precedent agreements) that regulated utilities had entered into with affiliates to ship gas on the pipeline were prudent, noting that "state utility regulators must approve any expenditures by state regulated utilities… [A]ny attempt by the Commission to look behind the precedent agreements in this proceeding might infringe upon the role of state regulators in determining the prudency of expenditures by the utilities that they regulate... Should they elect to construct the projects before affirmative action by the state regulators, the applicants will be at

risk of not being able to recover some, or any, of their costs."[3,4]

We review recent forecasts for electricity generation and natural gas consumption by Duke and Dominion's electric utilities (Virginia Power, Duke Energy Progress and Duke Energy Carolinas), which together have reserved 68% of the Atlantic Coast Pipeline's capacity.[5] We find that the argument by these utilities that they need new natural gas pipeline capacity has been significantly weakened in the last couple of years, with implications for the likelihood of recovering pipeline costs from ratepayers.

Updated Company Forecasts Show Reduced Demand for Natural Gas Over Previous Projections

The Atlantic Coast pipeline was predicated on rapidly growing natural gas demand in Virginia and North Carolina. In its original application to the Federal Energy Regulatory Commission, the pipeline joint venture cited an ICF International study forecasting that "demand for natural gas for power generation in Virginia and North Carolina is expected to grow 6.3 percent annually between 2014 and 2035."[6] The specific volumes of natural gas to be delivered to various end user utilities is reflected in Table 1, above.

In just the past few years, the case for the Atlantic Coast pipeline has become much weaker, in terms of the outlook for natural gas power generation in Virginia and

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[3] Federal Energy Regulatory Commission, Docket No. CP15-554, "Order Issuing Certificates," October 13, 2017, 60. We also note that, although the North Carolina Utilities Commission approved Duke Energy Carolinas and Duke Energy Piedmont's decision to enter into precedent agreements to ship gas on the Atlantic Coast Pipeline, the Commission's order "for ratemaking purposes … do[es] not constitute approval of the amount of compensation paid pursuant to the Agreements." (North Carolina Utilities Commission, Docket No. E-2 Sub 1052, "Order accepting affiliate agreements, allowing payment thereunder and granting limited waiver of code of conduct," October 29, 2014.)

[4] In a dissenting opinion, Commissioner LaFleur noted, "it is appropriate for the Commission to consider as a policy matter whether evidence other than precedent agreements should play a larger role in our evaluation regarding the economic need for a proposed pipeline project. I believe that evidence of the specific end use of the delivered gas within the context of regional needs is relevant evidence that should be considered as part of our overall needs determination." (Federal Energy Regulatory Commission, Docket No. CP15-554, Dissenting Opinion of Commissioner LaFleur, October 13, 2017, page 4.

[5] In addition to these three electric utilities, Piedmont Natural Gas announced that approximately half of its contracted natural gas capacity would be used for resale to electric utilities within its service territory, which includes Dominion, Duke and several electric cooperatives. (See: Atlantic Coast Pipeline, "Abbreviated Application for a Certificate of Public Convenience and Necessity and Blanket Certificates: Volume 1," Federal Energy Regulatory Commission Case No. CP15-554, September 18, 2015, p. 7; and Atlantic Coast Pipeline, "Abbreviated Application for a Certificate of Public Convenience and Necessity and Blanket Certificates, Resource Report 1: General Project Description", Federal Energy Regulatory Commission Case No. CP15-554, September 18, 2015, p. 1-12).

[6] Atlantic Coast Pipeline, "Abbreviated Application for a Certificate of Public Convenience and Necessity and Blanket Certificates, Resource Report 1: General Project Description", Federal Energy Regulatory Commission Case No. CP15-554, September 18, 2015, p. 1-6.

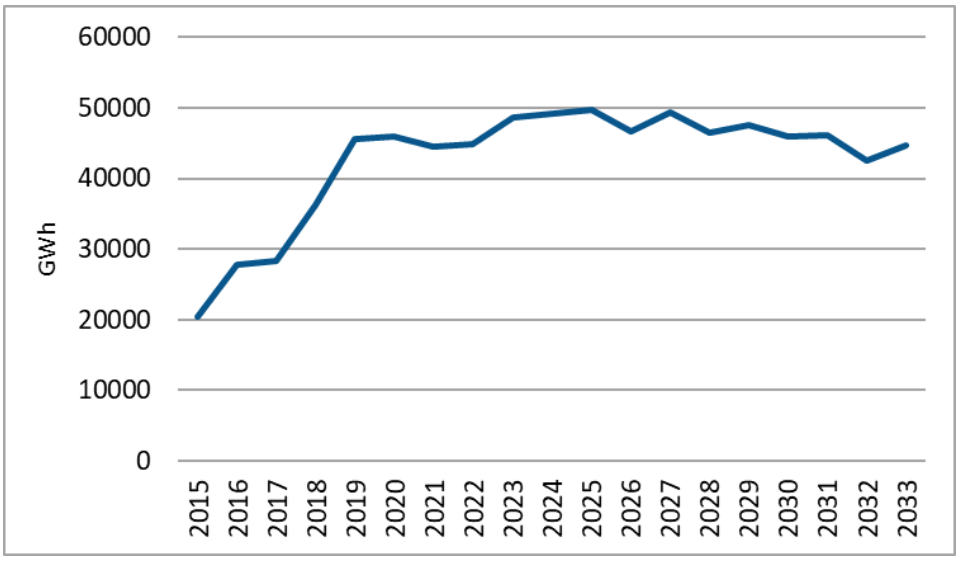
North Carolina. In this section, we look specifically at Duke Energy Carolinas, Duke Energy Progress, and Dominion Virginia Power, which together contracted for 68% of the gas to be shipped on the Atlantic Coast Pipeline.

Dominion's Most Recent Integrated Resource Plan Shows 2033 Natural Gas Consumption Maintained at 2019 Levels

In the case of Dominion Virginia Power, the need for new natural gas has completely evaporated. Virginia Power has recently constructed a new natural gas combined cycle plant at Brunswick and another at Greensville. According to documents filed with the State Corporation Commission, Brunswick and Greensville are receiving natural gas from the Transco pipeline.[7] After the Greensville natural gas plant enters service in 2019, Virginia Power's natural gas consumption is likely to remain flat to slightly declining over the next 15 years, according to Virginia Power's most recent long-term Integrated Resource Plan. At the same time, the plan notes the increasing competitiveness of renewable energy and shows significant growth in renewable energy generation over the next fifteen years. In the plan, Dominion lays out what it considers to be five plausible future scenarios for meeting future electricity demand through 2033. The plan provides annual natural gas consumption figures for only one of its five scenarios, shown in Figure 1. In that scenario, natural gas consumption in 2033 is actually lower than in 2019. Based on the information provided for the other four scenarios, we estimate that only one of those four scenarios shows a significant (16%) increase in natural gas consumption by 2033 relative to 2019. In other words, **in four out of its five plausible future scenarios, Dominion's 2018 Integrated Resource Plan models natural gas consumption in 2033 as equal to or slightly lower than 2019 natural gas consumption**.

[7] Dominion represented to the Virginia State Corporation Commission that the Brunswick plant would have a contract for firm natural gas supply from Transcontinental Gas Pipe Line Company ("Transco"), which was to construct nearly 100 miles of new pipeline to the plant. (State Corporation Commission of Virginia, Case No. PUE-2012-00128, "Application of Virginia Electric and Power Company for approval and certification of the proposed Brunswick County Power Station electric generation and related transmission facilities under §§56-580 D, 56-265.2 and 56-46.1 of the Code of Virginia and for approval of a rate adjustment clause, designated Rider BW, under § 56-585.1 A 6 of the Code of Virginia," November 2, 2012.). Similarly, Dominion represented that the Greensville Plant "will be fueled using 250,000 Dth per day of natural gas with reliable firm transportation provided by Transcontinental Gas Pipe Line Company, LLC" though it also noted that Greensville "will also have access to" the Atlantic Coast pipeline. (State Corporation Commission of Virginia, Case No. PUE-2015-00075, "Application of Virginia Electric and Power Company for approval and certification of the proposed Greensville County Power Station and related transmission facilities pursuant to §§56-580 D, 56-265.2 and 56-46.1 of the Code of Virginia and for approval of a rate adjustment clause, designated Rider GV, pursuant to § 56-585.1 A 6 of the Code of Virginia," July 1, 2015.) While there may be some reliability benefit to Dominion to having multiple pipelines serving the same plants, as suggested by FERC's final order approving the ACP (at p. 27-28), no economic evaluation of the cost-benefit trade-off of this alleged reliability improvement has ever been provided.

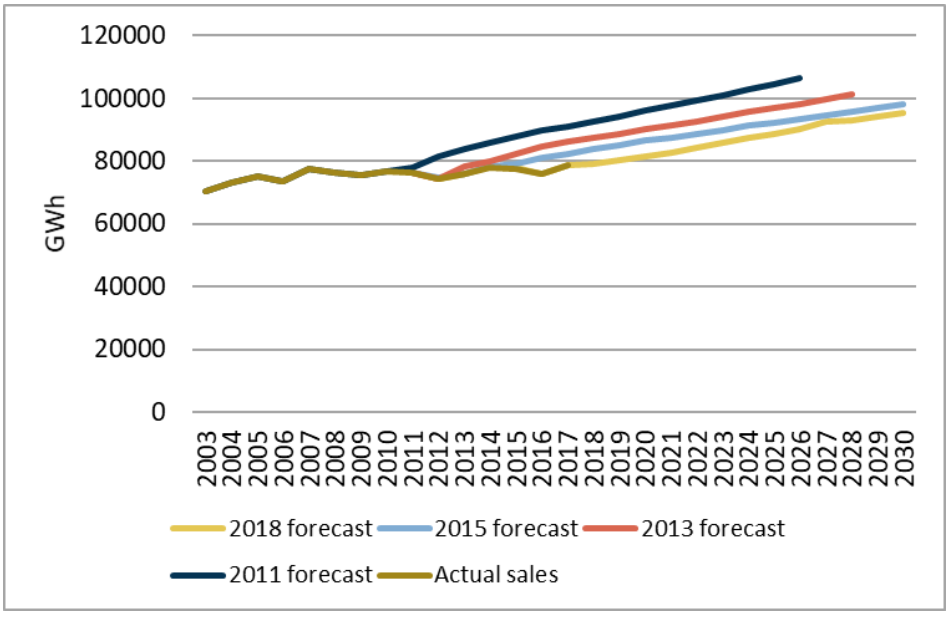
Figure 1: Dominion Virginia Power's Actual and Forecasted Power Generation From Natural Gas, 2015 Through 2033



Source: Dominion Virginia Electric and Power Company's 2018 Integrated Resource Plan, Appendix 3G.

Dominion's need for natural gas in 2033 will be even lower if Dominion's forecasted growth in electricity sales does not materialize, as appears likely. As shown by Figure 2, Dominion has consistently predicted growing electricity demand, while actual electricity demand has remained essentially flat since 2007.

Figure 2: Dominion Virginia Power's Actual and Forecasted Electricity Sales Show a Consistent Pattern of Overstating Forecasts

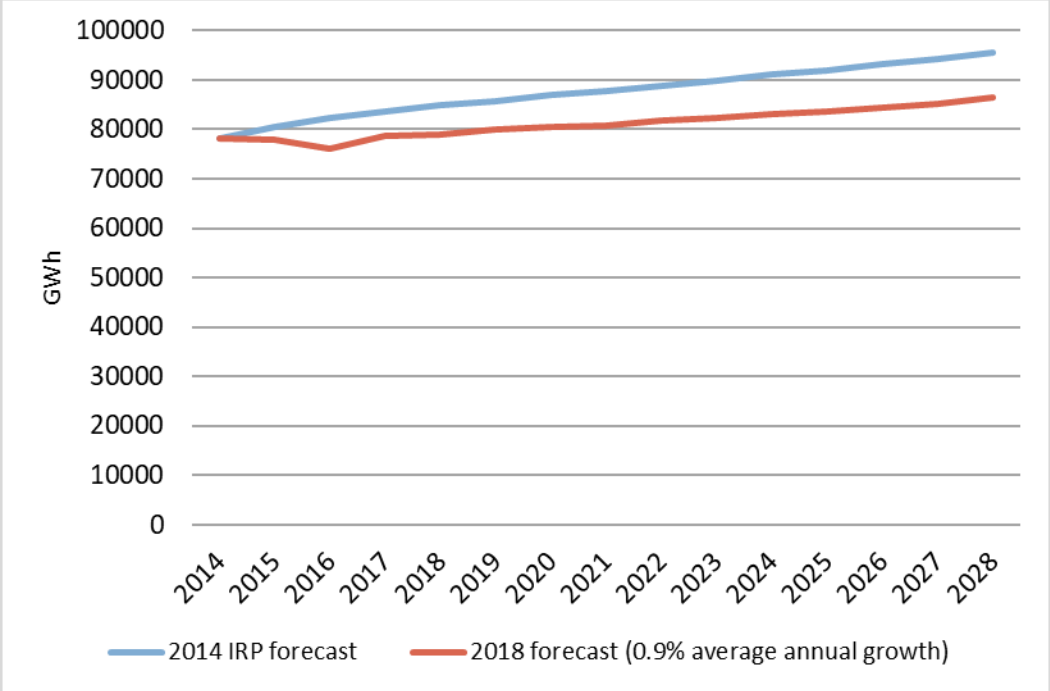


Source: Dominion Virginia Electric and Power Company's 2011, 2013, 2015 and 2018 Integrated Resource Plans.

For the first time ever, the Virginia State Corporation Commission rejected Dominion's Integrated Resource Plan in 2018. Among other issues, the Commission noted its "considerable doubt regarding the accuracy and reasonableness of the Company's load forecast." The Commission cited the inaccuracy of Dominion's forecasts in the recent past, as well as the fact that PJM – the regional transmission organization – forecasts load growth for Dominion's region of only 0.9% per year, compared to Dominion's forecast growth of 1.4% per year.[8]

Figure 3 compares Dominion's load forecast from 2014 (the year in which the Atlantic Coast Pipeline was first proposed) with a forecast based on PJM's assumption of 0.9% per year load growth. By 2028, the last year of the 2014 forecast, the difference between the forecast equates to 6550 GWh. For comparison, this is about 60% of the expected generation of the Greensville power plant currently under construction.

Figure 3: Revised Forecast of Dominion's Load Growth (Based on PJM Assumptions) Is Significantly Lower Than Dominion's Forecast When ACP Was First Proposed



Source: Dominion Virginia Electric and Power Company's 2014 Integrated Resource Plan, and IEEFA calculation based on PJM Load Forecast Report (January 2018).

Thus, assumptions about load growth have significant implications on the demand for new energy resources. It is likely that Dominion's rejected 2018 Integrated Resource Plan continues to overstate future electricity demand. Yet, even so, the majority of the scenarios in Dominion's IRP do not indicate any significant growth in

[8] Virginia State Corporation Commission, Order, Case No. PUR-2018-00065, December 7, 2018, p. 6-7.

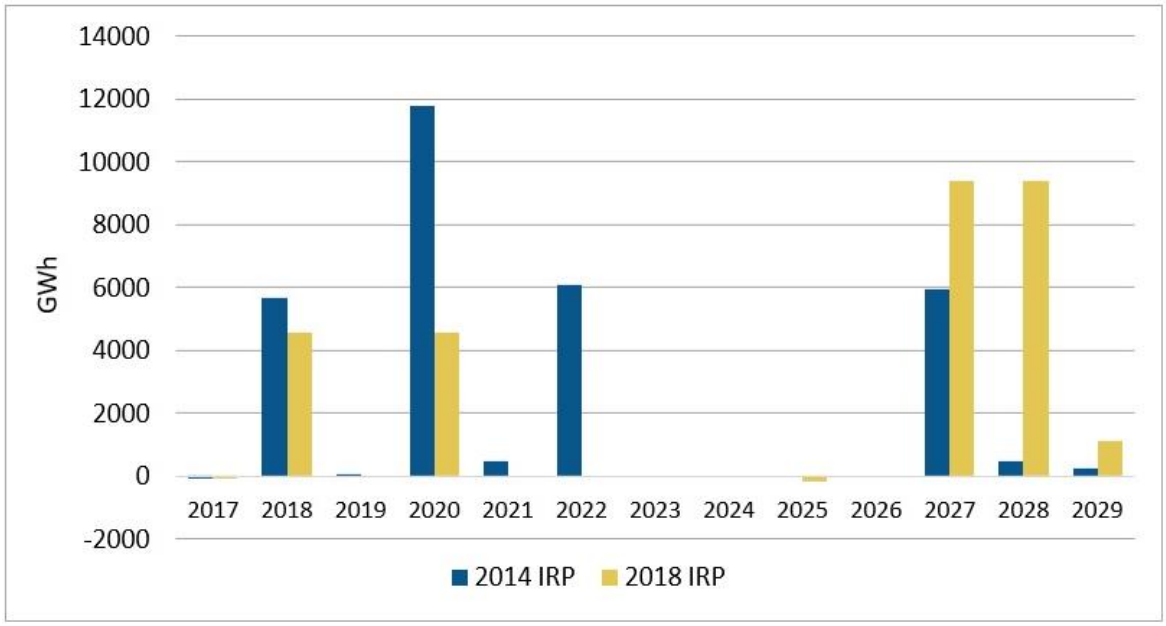
natural gas power generation after the construction of the Greensville gas plant, which is served with gas from the Transco pipeline.

Duke's Lower Forecasts for Electricity Demand Have Resulted in Significant Delays in New Natural Gas Plant Construction

The case for Duke Energy's demand for natural gas from the Atlantic Coast pipeline has also weakened substantially since the project was proposed in 2014.

Duke's most recent Integrated Resource Plans show that the demand for new natural gas power plants has been significantly delayed.[9] Figure 4 shows the proposed net additions and retirements of new natural gas plants in Duke's 2014 Integrated Resource Plan (the year that the Atlantic Coast Pipeline was announced) versus its most recent 2018 Integrated Resource Plan.[10] Major natural gas capacity additions that were initially projected to occur in 2020-2022 are now projected for 2027-2028.

Figure 4: Projected Natural Gas Generation Additions (Net of Retirements) for Duke Energy Progress and Duke Energy Carolinas in 2014 and 2018 Forecasts



Source: Duke Energy Progress and Duke Energy Carolinas 2014 Integrated Resource Plans and 2018 Integrated Resource Plans.

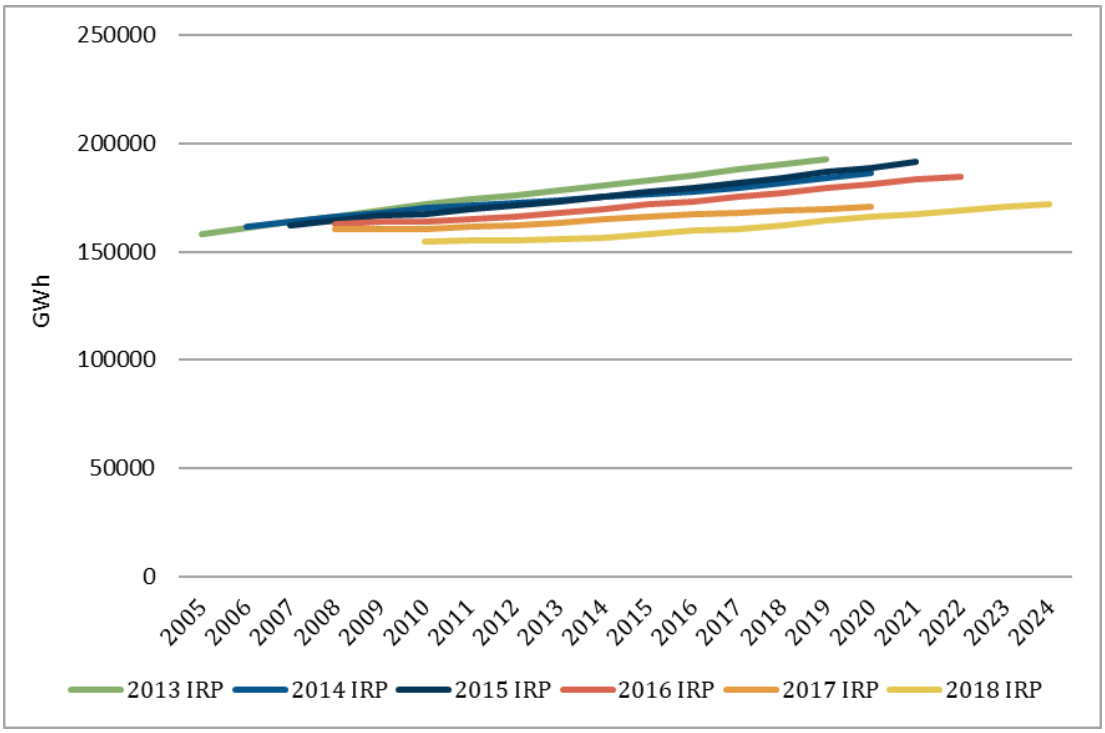
[9] Unlike Dominion, Duke's Integrated Resource Plans do not provide an annual forecast of natural gas power generation.

[10] Figure 4 assumes an 80% capacity factor for natural gas combined cycle power plants and a 7% capacity factor for natural gas combustion turbines.

The delay in the buildout of these projects appears to be driven by Duke's downward revision of its load forecast, as shown in Figure 5. Like Dominion, Duke had forecasted growing electricity sales in 2014, whereas actual sales have been relatively flat. The difference in Duke's 2014 and 2018 load forecasts amounts to 20,356 GWh by 2029. As can be seen from Figure 4, this is more than the total amount of electricity that would have been generated from the new natural gas plants that Duke originally intended to construct in 2020 and 2022. This amount of electricity, if entirely generated from natural gas, equates to 54% of the natural gas capacity that Duke has reserved on the Atlantic Coast Pipeline.[11]

Duke's 2018 load forecast projects electricity demand growing at 0.7% per year through 2033. As shown from Figure 5, Duke's sales have been relatively flat for the last five years. Indeed, Duke's most recent 2018 sales forecast starts from a lower level than its 2013 sales forecast.

Figure 5: Load Growth for Duke Energy Progress and Duke Energy Carolinas Has Failed to Materialize as Projected



Source: Duke Energy Progress and Duke Energy Carolinas 2013, 2014, 2015, 2016, 2017 and 2018 Integrated Resource Plans.

[11] This calculation assumes a heat rate of 7000 BTU/kWh for natural gas power plants.

While Duke still plans significant new natural gas capacity additions in the late 2020s, the further into the future these projects are pushed the more speculative they become. In particular, Duke's history of overstating its load forecast should raise concerns for investors that these plants will not materialize at the scale currently projected.

The Outlook for New Natural Gas Combined Cycle Capacity Is Challenging

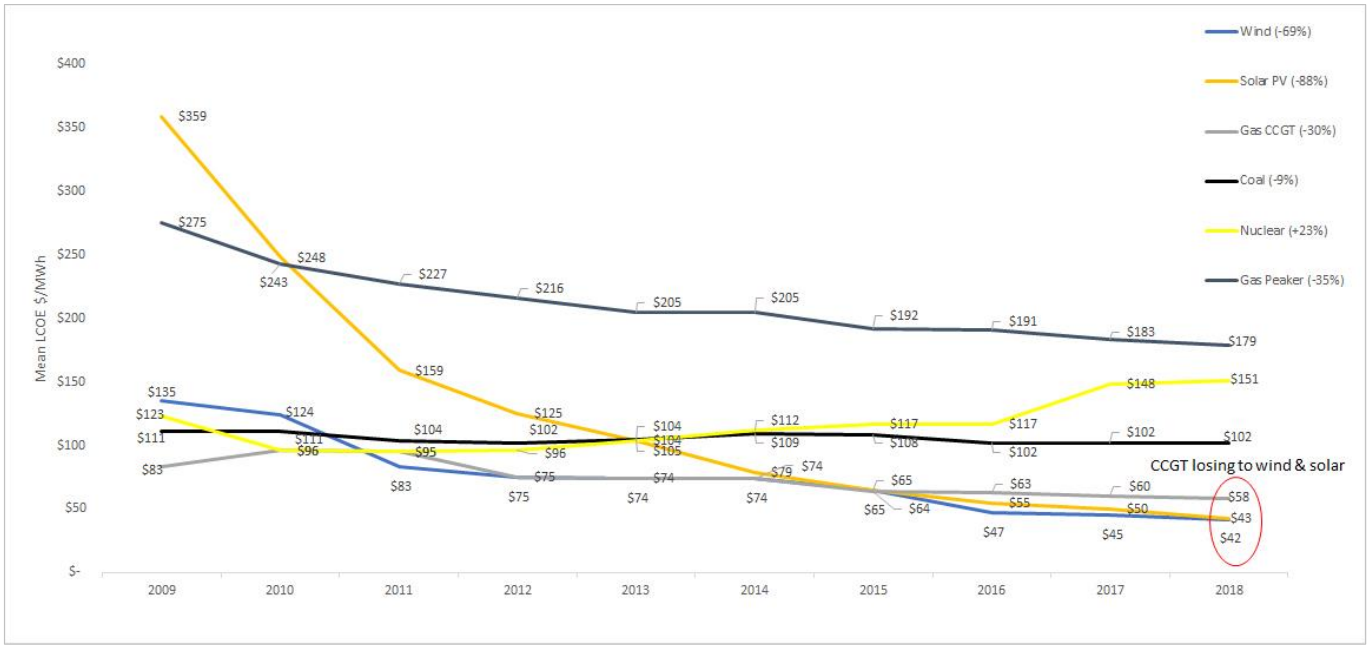
Duke's expectation that it will build new natural gas combined cycle (CCGT) capacity in the late 2020s appears to ignore the decreasing competitiveness of this form of generation amid the remarkable cost reductions and technological advances of renewable energy. Recent analyses of the Levelized Cost of Electricity (LCOE) for a range of generation technologies shows utility-scale wind and solar already competitive with CCGT in many markets. In November 2018, Bloomberg New Energy Finance declared that, "(s)*olar and/or onshore wind are now the cheapest source of new bulk power in all major economies except Japan*."[12]

The combination of battery storage with wind and/or solar plants is already competitive in some markets with traditional dispatchable power sources such as CCGT. The fact that rapidly evolving technology is triggering frequent changes in the outlook for power generation should increase caution around a multi-billion gas pipeline with no clear short- or medium-term market justification. Assuming that something will come along in the long-term is not a strategy for such a substantial investment.

Figure 6 shows the Lazard analysis of mean unsubsidized LCOE values since 2009. Wind and solar have been competitive with CCGT since 2015 and further cost declines have placed their mean cost below CCGT for the past two years despite decreases in CCGT costs.

[12] Tifenn Brandily, '2H 2018 LCOE, Update, Global Levelized cost of generation, capacity and flexibility', Bloomberg New Energy Finance, November 19, 2018 at p.5

Figure 6: Global Mean Unsubsidized Levelized Costs of Energy Show Natural Gas Combined Cycle Plants Losing to Wind and Solar



Source: Lazard's Levelized Cost of Energy Analysis, Version 12.0, 2018.

The Lazard chart shows a global mean. In Figure 7 below, LCOE analysis for the United States provided by Bloomberg New Energy Finance (BNEF) is shown. BNEF groups generation technologies into three categories: Bulk, Dispatchable and Flexible. This recognizes the differing functions of available generation technologies. While CCGT is dispatchable, it is not flexible as it takes a long time to ramp up to full capacity. These comparisons show that today, wind and solar are the cheapest form of bulk generation and can already compete with CCGT for dispatchable generation when combined with onsite storage. Standalone battery storage can compete in some cases with gas-fired flexible generation.[13]

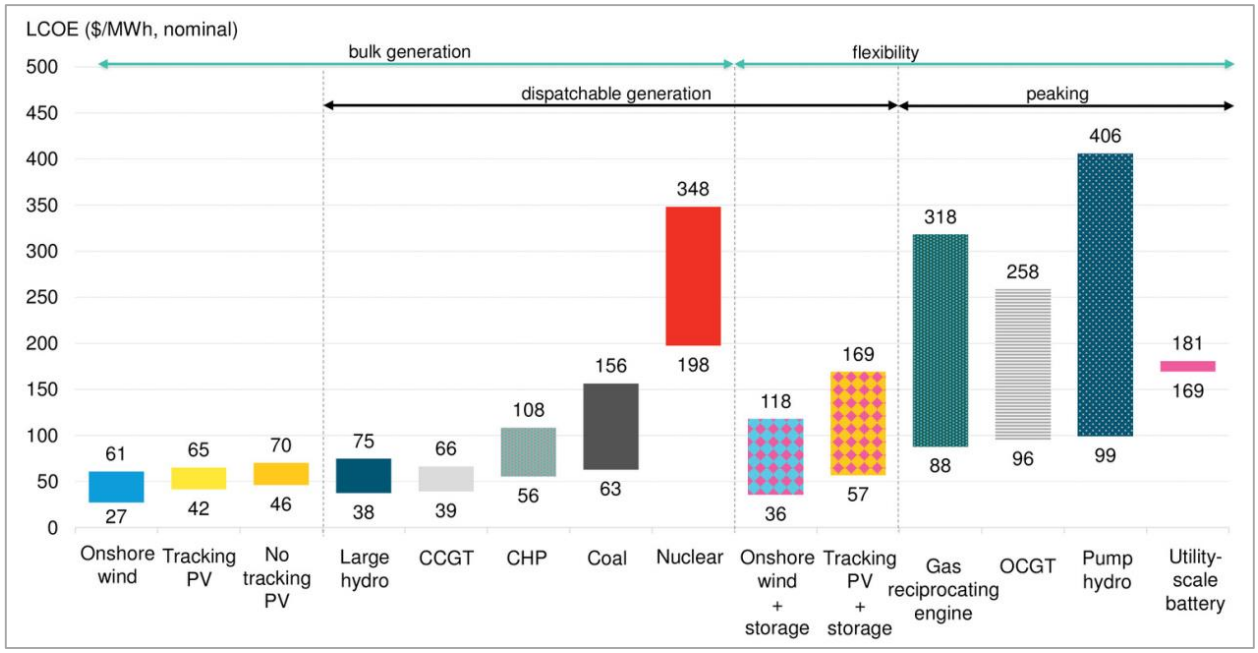
Over the next decade, the cost of batteries is projected to mirror the substantial cost declines recently achieved by wind and solar, while those generation technologies will also achieve further cost reductions. As mature technologies, gas-fired generation of all types will face stagnant technology costs while a major component of operational costs – fuel – is only likely to rise.

The fracking boom has sunk U.S. gas costs to the lowest in the world and that has made gas-fired generation more competitive than in most markets globally. However, as production plateaus over the next decade and exports rise, further cost reductions are unlikely. BNEF notes in its latest LCOE report that U.S. gas prices only need to rise a little above today's level to undermine the economics of running CCGT plants:

[13] Open cycle gas turbine (OCGT) and gas reciprocating engines.

> *"In most locations in the U.S. today, onshore wind without subsidy outcompetes CCGT plants supplied by cheap shale gas as a source of new bulk generation. If the gas price rises above $3/MMBtu, new and existing CCGTs run the risk of becoming rapidly undercut by new solar and wind. This means fewer run-hours and a stronger case for technologies such as gas peakers and batteries that thrive at lower capacity factors."*[14]

Figure 7: Wind and Solar With Storage Are Competitive With Natural Gas Combined Cycle Generation in the United States



Source: Bloomberg New Energy Finance, Nov. 2018.[15]

These trends, partially acknowledged by the growing role of renewable energy and storage resources in the long-term plans of the ACP-LLC partners, are reasons for skepticism around the future of a gas pipeline project that does not have a single independent committed customer. The most recent long-term resource plans of both Dominion Virginia Power, Duke Energy Carolinas and Duke Energy Progress do not show the rapid demand growth for natural gas power generation that the Atlantic Coast Pipeline was originally premised on. These utilities have revised downward their load forecasts and delayed or cancelled plans for new natural gas power plants.

[14] Tifenn Brandily, "2H 2018 LCOE Update, Global: Levelized cost of generation, capacity and flexibility". November 19, 2018. P.5. BloombergNEF. Available by subscription only.
[15] Tifenn Brandily, Op. Cit. P.73

Conclusion and Recommended Questions

Recent long-term plans filed by the Virginia and North Carolina regulated electric utilities that are contracted for 68% of the capacity of the Atlantic Coast Pipeline show that the case for growing natural gas demand by these utilities has substantially eroded since the project was first proposed. Both Duke and Dominion have a history of overstating their forecasts of electricity demand. And even under these inflated forecasts, previous plans for new natural gas capacity have been delayed or cancelled in recent years.

Ultimately it is the State Corporation Commission of Virginia and the North Carolina Utilities Commission that are responsible for approving the inclusion of natural gas pipeline transportation costs in electric rates. If the capacity that these utilities have reserved on the Atlantic Coast pipeline is significantly underutilized, as appears likely, investors in the Atlantic Coast pipeline run the risk that state regulators will not approve full inclusion of pipeline costs in electric rates.

We recommend that investors ask hard questions of the ACP-LLC joint venture partners:

- What is the risk that state regulators will disapprove, or partially disapprove, recovery of project costs from ratepayers?
- Does the Virginia State Corporation Commission's rejection of Dominion's 2018 Integrated Resource Plan and its order that Dominion develop a revised load forecast change the perception of the risk that the SCC will not fully approve the pass-through of ACP project costs in rates?
- Without rate recovery, or with partial rate recovery, does the project still make sense?

About IEEFA

The Institute for Energy Economics and Financial Analysis conducts research and analyses on financial and economic issues related to energy and the environment. The Institute's mission is to accelerate the transition to a diverse, sustainable and profitable energy economy. www.ieefa.org

About Oil Change International

Oil Change International is a research, communications, and advocacy organization focused on exposing the true costs of fossil fuels and facilitating the coming transition towards clean energy. www.priceofoil.org

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