

STATE OF NORTH CAROLINA
UTILITIES COMMISSION
RALEIGH

DOCKET NO. E-100, SUB 169

BEFORE THE NORTH CAROLINA UTILITIES COMMISSION

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| In the Matter of |) | |
| Request for Declaratory Judgment that |) | <u>PETITIONERS'</u> |
| Modifications Adding Gas-Fired Generation |) | <u>INITIAL COMMENTS</u> |
| to Coal Units Require a Certificate of |) | |
| Public Convenience and Necessity |) | |

Petitioners NC WARN, Center for Biological Diversity and Appalachian Voices, (collectively, “Petitioners”), through undersigned counsel, pursuant to the N.C. Utilities Commission’s (the “Commission” or “NCUC”) Order Requesting Comments entered in the above-captioned docket on August 14, 2020, provide the following initial comments:

I. INTRODUCTION

As this Commission is aware, “no public utility or other person shall begin the construction of any steam, water, or other facility for the generation of electricity . . . without first obtaining from the Commission a certificate that the public convenience and necessity requires, or will require, such construction.” N.C. Gen. Stat. § 62-110.1(a). In violation of this statute, Duke Energy Carolinas, LLC (“DEC”) has recently spent hundreds of millions of dollars installing certain modifications to coal-fired units without seeking the required certificates of public convenience and necessity (“CPCN”).¹ Considering the

¹ NCUC Docket No. E-7, Sub 1214, Transcript Vol. 12, p. 83:4-8 (Q: “And for these DFO projects, what is the amount of money for which DEC is requesting reimbursement in this rate case?” A: “It’s—approximately \$125 million was the cost to implement at those three units you referenced, Cliffside 5, 6, and Belews Creek 1; and then about another about \$120 million associated with the capital pipelines.”)

statutory language and importance of these modifications, a CPCN process is appropriate and should be mandatory.

The modifications at issue in this docket come in at least two types: (1) a “co-fired modification” which allows the subject unit to be fired with either natural gas or coal, or a simultaneous combination of the two; or (2) a “conversion modification” which completely modifies a coal-fired unit into a natural gas-fired unit. For ease of reference, the present Comments refer to the co-fired modification and conversion modification simply as “modifications.”

These modifications create a brand-new means of generating electricity and increase the public utility’s natural gas capacity. In the words of the applicable statute, these modifications constitute “the construction of . . . [a] facility for the generation of electricity.” N.C. Gen. Stat. § 62-110.1(a). Therefore, the Public Utilities Act requires that a public utility obtain a CPCN as a condition precedent to the construction of such modifications.

Yet, as discussed below, the established practice by public utilities is to not seek the mandatory CPCN. Accordingly, the Commission and stakeholders are being deprived of their right to evaluate whether these modifications are required by the public convenience and necessity.

In fact, these modifications are subject to almost no advanced scrutiny at all. As described below, a review of prior Integrated Resource Plan (“IRP”) filings reveals that few details are provided to the Commission and stakeholders prior to the construction of these modifications.

Because a proper pre-construction review is not being conducted, there is no meaningful opportunity to determine whether the modifications are cost-effective. Yet the cost-effectiveness of these modifications is questionable at best. During its most recent rate case, DEC requested approximately \$125 million for the cost to implement modifications at Cliffside Units 5 and 6 and Belews Creek Unit 1, in addition to approximately \$120 million in associated capital pipelines.²

It is presently more important than ever to fully vet the public convenience and necessity of these modifications. Human-caused climate change poses devastating risks, including from both coal- and natural-gas fired generation at issue with these modification. Moreover, DEC's present reserve margin is excessive, and therefore, the need for these modifications is dubious. For all of these reasons, a CPCN process is crucial.

These Comments are organized into the following sections: (1) DEC's past and future construction of modifications will be discussed, which will illustrate that neither the Commission nor stakeholders are being provided meaningful information about these modifications prior to construction; (2) the law applicable to CPCNs will be discussed, which will establish that the Public Utilities Act requires a CPCN prior to construction of a modifications; and (3) as a means of illustrating the importance of a CPCN process, and to provide context, these Comments will discuss (a) the current climate crisis both globally and in North Carolina, including the ramifications of natural gas-powered generation, and (b) the lack of need for these modifications in light of DEC's excessive reserve margins.

² *Id.*

II. DEC’S HISTORY OF CONSTRUCTING MODIFICATIONS WITHOUT MEANINGFUL PRE-CONSTRUCTION SCRUTINY.

There is a regrettable trend of at least one public utility, DEC, constructing modifications without any meaningful advanced scrutiny. The following historical review of DEC’s construction of modifications reveals the lack of advanced scrutiny and therefore the importance of requiring a CPCN process prior to construction of a modification.

A. Lee Unit 3

Upon information and belief, the earliest pertinent modification involves DEC’s W.S. Lee Station in Anderson County, South Carolina (“Lee”). Lee was originally a three-unit coal-fired power plant. As of April 2015, DEC retired Units 1 and 2 of Lee, and DEC installed a modification which converted Unit 3 from coal-fired to natural gas-fired.³

DEC did not seek a CPCN for the modification to Lee Unit 3.⁴ Indeed, this modification to Lee Unit 3 received almost no advanced scrutiny, and certainly no advanced scrutiny regarding the public convenience and necessity. During the years preceding construction of the modification, DEC’s IRPs contained only brief references—

³ See, e.g., *DEC’s 2015 IRP*, NCUC Docket No. E-100, Sub 141, p 44.

⁴ Since Lee Unit 3 is located in South Carolina, a CPCN application would be the subject of review by the South Carolina Public Service Commission (the “SC PSC”). In fact, DEC filed a petition with the SC PSC to avoid the requirement of seeking a CPCN for Lee Unit 3. The SC PSC granted that petition in an order dated January 16, 2014. *Declaratory Order on Status of Conversion and Repowering the 170 MW Lee Unit 3 from Coal to Natural Gas*, SC PSC, Docket No. 2013-430-E, Order No. 2014-118. Importantly, the SC PSC waived the requirement of a CPCN because of a South Carolina statute, namely S.C. Code Ann. § 58-33-110(1), which states that utilities are not required to seek a CPCN for the construction of a “like facility.” Of course, no such statute exists in North Carolina; in fact, the General Statutes expressly require a CPCN “even though the facility be for furnishing the service already being rendered.” N.C. Gen. Stat. § 62-110.1(a). Hence, the SC PSC’s analysis is completely inapplicable to the present Petition. What is significant, however, is that DEC felt the need to seek permission from the SC PSC to avoid its generally applicable obligation to seek a CPCN.

typically one sentence, never more than a paragraph—to DEC’s intent to construct the modification.⁵

Typical of the terse treatment given by DEC’s IRPs to the modification at Lee Unit 3 is the following single-sentence reference in DEC’s 2014 IRP: “The following assumptions impacted the 2014 resource plan: Conversion of 170 MW of Lee Unit 3 to natural gas in April 2015.”⁶

DEC’s IRPs provided neither cost information nor construction information on the modification to Lee Unit 3. Of course, such crucial information would be necessary exhibits to an application for a CPCN. NCUC Rule R8-61(b)(2)-(4). In fact, the modification to Lee Unit 3 received no meaningful pre-construction scrutiny.

B. The Cliffside DFO

Another prominent example is DEC’s modification project entitled Cliffside Dual Fuel Optimization (“Cliffside DFO”). The Cliffside DFO project “enable[d] up to 100% gas co-firing on Unit 6 and up to 10% gas co-firing on Unit 5 when the units are running simultaneously.”⁷ The Cliffside DFO was completed in 2018.⁸ As this Commission is aware, no CPCN was sought or obtained for the Cliffside DFO.

Despite a completion date of 2018,⁹ upon information and belief, the first disclosure of the Cliffside DFO to the Commission was a filing by DEC on October 11, 2016, in

⁵ See, e.g., *DEC’s 2014 IRP*, NCUC Docket No. E-100, Sub 141, pp 34, 36, 43, 48, & 68; *DEC’s 2013 IRP*, NCUC Docket No. E-100, Sub 137, pp 31, 38, & 61; *DEC’s 2012 IRP*, NCUC Docket No. E-100, Sub 137, pp 10, 14, 53, 56, 91, 95, & 104.

⁶ *DEC’s 2014 IRP*, NCUC Docket No. E-100, Sub 141, p 48.

⁷ *DEC’s 2017 IRP*, NCUC Docket No. E-100, Sub 147, p 59.

⁸ *DEC’s 2019 IRP*, NCUC Docket No. E-100, Sub 157, p 73.

⁹ *Id.*

which DEC baldly, and wrongly, stated that it was not required to seek a CPCN for the modification.¹⁰

Since DEC's filing was made on October 11, 2016, the Commission had no meaningful opportunity to review DEC's plans to complete the "engineering phase . . . by year-end 2017" and "begin construction in 1Q2018."¹¹

DEC's IRPs provided neither cost information¹² nor construction information on the Cliffside DFO modification. Of course, such crucial information would be necessary exhibits to an application for a CPCN. NCUC Rule R8-61(b)(2)-(4). In fact, the Cliffside DFO modification received no meaningful pre-construction scrutiny, and certainly no advanced scrutiny regarding the public convenience and necessity.

C. Belews Creek and Marshall

Further examples of expensive modifications without meaningful preconstruction review are DEC's Belews Creek Coal Units 1 and 2 and Marshall Coal Units 1 through 4.

DEC's 2019 IRP described the Belews Creek and Marshall modifications as follows:

. . . DEC is moving forward with modifications to Belews Creek Coal Units 1 and 2 and Marshall Coal Units 1 – 4. The Belews Creek project will enable 50% natural gas co-firing on each unit. The Marshall Project will enable 50% co-firing on Units 3 & 4 and up to 40% co-firing on Units 1&2. . . . Based on the current schedule, COD [*i.e.*, Commercial Operation Date] for Belews Creek Unit 1 is December 2019 and Belews Creek Unit 2 is December 2020. COD for

¹⁰ NCUC Docket No. E-7, Sub 790 (October 11, 2016). In the Petition filed in the present docket, Petitioners mistakenly stated that the first notification by DEC to the Commission of the Cliffside DFO was in DEC's 2017 IRP.

¹¹ *DEC's 2017 IRP*, NCUC Docket No. E-100, Sub 147, p 59.

¹² In its most recent rate case, DEC requested reimbursement for the modifications at Cliffside Units 5 and 6 and Belews Creek Unit 1 in the approximate amount of \$245 million. NCUC Docket No. E-7, Sub 1214, Transcript Vol. 12, p. 83:4-8

Marshall Unit 3 is September 2020, Unit 4 is November 2020, and Units 1&2 are December 2021.¹³

As the Commission is aware, the modification at Belews Creek Unit 1 is completed and operational and was the subject of a reimbursement request in DEC's most recent rate case. The other modifications at Belews Creek and Marshall are imminent with anticipated operational dates ranging from September 2020 through December 2021.¹⁴

Upon information and belief, the earliest disclosure to the Commission of the Belews Creek modifications appeared in DEC's 2017 IRP, filed on September 1, 2017.¹⁵ Upon information and belief, DEC did not make any disclosure of the modification at Marshall until September 3, 2019 in its 2019 IRP.¹⁶

DEC's 2018 IRP is especially illustrative of the lack of disclosure of the significant modification projects. Even though DEC acknowledged the potential Belews Creek modification in its 2017 IRP and must surely have been actively analyzing the potential modification at Marshall, DEC's 2018 IRP omitted any disclosure whatsoever concerning these modifications and instead vaguely stated that it was investigating "new projects to enable gas to be co-fired at coal burning stations."¹⁷ No other details were provided, including even where such modifications would be performed.

None of DEC's preconstruction disclosures concerning modifications at Belews Creek or Marshall included cost or construction information. Of course, such crucial information would be necessary exhibits to an application for a CPCN. NCUC Rule R8-

¹³ *DEC's 2019 IRP*, NCUC Docket No. E-100, Sub 157, p 73.

¹⁴ *Id.*

¹⁵ *DEC's 2017 IRP*, NCUC Docket No. E-100, Sub 147, pp 59-60.

¹⁶ *DEC's 2019 IRP*, NCUC Docket No. E-100, Sub 157, p 73.

¹⁷ *DEC's 2018 IRP*, NCUC Docket No. E-100, Sub 157, p 167.

61(b)(2)-(4). In fact, the modification projects at Belews Creek and Marshall have received no meaningful pre-construction scrutiny, and certainly no advanced scrutiny regarding the public convenience and necessity.

III. PUBLIC UTILITIES ARE REQUIRED TO OBTAIN A CPCN BEFORE CONSTRUCTING A MODIFICATION.

A. Analysis of N.C. Gen. Stat. § 62-110.1(a)

According to the Public Utilities Act, N.C. Gen. Stat. §§ 62-1 *et seq.*, public utilities shall not construct any facility for the generation of electricity without first obtaining a CPCN. The pertinent statute states, in relevant part, the following:

[N]o public utility or other person shall begin the construction of any steam, water, or other facility for the generation of electricity to be directly or indirectly used for the furnishing of public utility service, even though the facility be for furnishing the service already being rendered, without first obtaining from the Commission a certificate that public convenience and necessity requires, or will require, such construction.

N.C. Gen. Stat. § 62-110.1(a).

The plain language of the applicable statute requires that a public utility must seek a CPCN before beginning “the construction of any . . . facility for the **generation of electricity.**” *Id.* (emphasis added). Manifestly, the modifications addressed in the present petition are “for the generation of electricity.” By way of example, DEC’s 2013 IRP characterized the modification of Lee Unit 3 as a “Capacity Addition[.]” which added natural gas-fired generation capacity in the amount of “170 MW.”¹⁸

Presumably, DEC would argue that it was not required to seek a CPCN for the subject modifications because overall nameplate capacity is not being increased; instead,

¹⁸ DEC’s 2013 IRP, NCUC Docket No. E-100, Sub 137, p 31.

supposedly there is only a change in the means of generating that electricity. This argument fails for at least four reasons.

First, this argument was already evaluated and rejected by the General Assembly. The pertinent statute expressly requires a CPCN “**even though** the facility be for furnishing the service **already being rendered.**” N.C. Gen. Stat. § 62-110.1(a) (emphasis added).

Second, that argument violates the plain language of the Public Utilities Act. The pertinent statute clearly states that “**any . . . facility for the generation of electricity**” must be the subject of a CPCN proceeding. N.C. Gen. Stat. § 62-110.1(a) (emphasis added). These modifications clearly fall within the broad category of *any facility*, and these modifications self-evidently *generate electricity*, and therefore, the Public Utilities Act mandates the utilities seek a CPCN before constructing a modification.

Third, these modifications increase the natural gas-fired capacity of a utility. Indeed, in its 2013 IRP, DEC characterized Lee Unit 3 in the following manner: “Capacity Additions include the conversion of Lee Steam Station unit 3 from coal to natural gas in 2015 (170 MW).”¹⁹

Fourth, CPCN proceedings are not intended merely to evaluate the raw increase in overall generation capacity, but must also address the suitability of the particular generation method proposed by the utility. This Commission has aptly stated that, when evaluating an application for a CPCN, “the Commission must also determine if the public convenience and necessity are best served by the **generation option being proposed.**”²⁰ Accordingly,

¹⁹ *DEC’s 2013 IRP*, NCUC Docket No. E-100, Sub 137, p 31.

²⁰ *In re Application of DEC for Approval for an Electric Generation CPCN to Construct Two Units at Cliffside*, Order Granting CPCN with Conditions, NCUC Docket No. E-7, Sub 790, p 10 (emphasis added).

a public utility's decision to add natural gas-fired generation to a coal-fired unit is a matter for review in a CPCN proceeding to assess whether public convenience and necessity are best served.

B. DEC's Failure to Seek a CPCN Before Undertaking the Modifications at Issue in this Docket Is Not Authorized by Statutes, Regulation, or Prior Commission Precedent.

As noted, the plain language of the relevant statute demonstrates that DEC must obtain a CPCN before undertaking these modifications. Moreover, no prior Commission regulation, guidance, or ruling directs otherwise.

To be sure, in a single prior decision concerning Cliffside, the Commission declined to take retroactive action concerning one of these conversions.²¹ However, that ruling on a single conversion has no bearing on this Petition.

In particular, on June 2, 2006, DEC filed an Application for CPCN concerning two coal-fired units at Cliffside (the "Cliffside CPCN docket").²² A CPCN was eventually issued on March 21, 2007. Ten years later, on October 11, 2016, DEC filed a letter in the same docket, NCUC Docket No. E-7, Sub 790, providing notice of its intent to convert Cliffside Units 5 and 6 to co-fire coal and natural gas. On November 22, 2016, NC WARN filed a Motion for Hearing on Amendment to Certificate. NC WARN argued that a hearing was appropriate under the Commission's authority to "modify or revoke" a CPCN under N.C. Gen. Stat. § 62-110.1(e1).²³

²¹ NCUC Docket No. E-7, Sub 790.

²² *Id.*

²³ *NC WARN's Motion for Hearing on Amended to Certificate*, NCUC Docket No. E-7, Sub 790, p 4, ¶ 9.

In the prior Cliffside CPCN docket, the Commission entered an Order Denying Motion for Evidentiary Hearing on January 17, 2017.²⁴ However, for several reasons, the Commission's Order Denying Motion for Evidentiary Hearing in the prior Cliffside DFO docket has no bearing on the merits of the Petition at issue here.

First, in the prior Cliffside CPCN docket, NC WARN requested only the following relief: "NC WARN prays, that based on the foregoing, the Commission initiate a new proceeding to determine whether the new natural gas option at Cliffside Units 5 and 6 is in the public interest."²⁵ In other words, NC WARN requested only a hearing in an existing docket. NC WARN did *not* request the relief that is sought by Petitioners in the present docket: namely, that the Commission declare that modifications require an application for a CPCN. Hence, the Commission's Order Denying Motion for Evidentiary Hearing in the prior Cliffside CPCN docket was far more narrow than the present docket. Simply put, the circumstances between the present Petition and the prior Cliffside CPCN docket are entirely different.

Second, the Petition in the present docket involves two types of modifications: (1) "co-fired modifications" which allows the subject unit to be fired with either natural gas or coal, or a simultaneous combination of the two; or (2) "conversion modifications" which completely modifies a coal-fired unit into a natural gas-fired unit. Conversely, the Cliffside DFO involves only the first type of modification.²⁶ Accordingly, modifications which completely change a unit from coal- to natural gas-fired cannot be governed by the

²⁴ *Order Denying Motion for Evidentiary Hearing*, NCUC Docket No. E-7, Sub 790 (January 17, 2017).

²⁵ *Id.* at 5.

²⁶ *DEC's 2017 IRP*, NCUC Docket No. E-100, Sub 147, p 59.

Commission's analysis in the prior Cliffside CPCN docket. Indeed, the Commission's Order Denying Motion for Evidentiary Hearing in the prior Cliffside CPCN docket expressly stated that "the CPCN requirements in Chapter 62 at issue in this case is that they address the need to add generating capacity, **not the addition of another fuel source option for production of capacity.**"²⁷ The "conversion modifications" at issue in the present docket, such as at Lee, are not merely the "addition of another fuel source" as stated in the Commission's prior Cliffside DFO docket; instead, the "conversion modifications" completely alter the fuel source altogether from coal to natural gas. Hence, the Order Denying Motion for Evidentiary Hearing in the prior Cliffside DFO docket is distinguishable and inapplicable.

Third, DEC has characterized its modifications at Lee as adding generating capacity. In its 2013 IRP, DEC characterized Lee Unit 3 in the following manner: "**Capacity Additions** include the conversion of Lee Steam Station unit 3 from coal to natural gas in 2015 (170 MW)."²⁸ As noted, in its Order Denying Motion for Evidentiary Hearing in the prior Cliffside CPCN docket, the Commission expressly stated that "the CPCN requirements in Chapter 62 . . . **address the need to add generating capacity . . .**"²⁹ Therefore, by the terms of the Commission's Order Denying Motion for Evidentiary Hearing in the prior Cliffside DFO docket, the modification of Lee would be subject to a

²⁷ *Order Denying Motion for Evidentiary Hearing*, NCUC Docket No. E-7, Sub 790, p 3 (emphasis added).

²⁸ *DEC's 2013 IRP*, NCUC Docket No. E-100, Sub 137, p 31.

²⁹ *Order Denying Motion for Evidentiary Hearing*, NCUC Docket No. E-7, Sub 790, p 3 (emphasis added). The full quote is as follows: "The Commission's reading of the CPCN requirements in Chapter 62 at issue in this case is that they address the need to add generating capacity, not the addition of another fuel source option for production of capacity at an electric generating unit previously constructed and having operated for a number of years pursuant to a Commission authorized CPCN." *Id.*

CPCN process because DEC previously acknowledged that the modification of Lee constituted a “Capacity Addition[.]”³⁰

Fourth, at the conclusion of its Order Denying Motion for Evidentiary Hearing, this Commission stated that it would consider similar challenges in the future:

Moreover, the Commission’s decision **does not prevent** the Commission in the exercise of its general supervisory oversight of public utilities like DEC from initiating a hearing in the future upon notification of intended major modifications of generation facilities based upon facts different from those presented here on the issue of public convenience and necessity.³¹

Indeed, the present circumstances are quite different from those at issue in the prior Cliffside CPCN docket. Petitioners have already discussed above that Lee is a different, and more drastic, modification than the Cliffside DFO, as the Lee modification is a complete conversion to natural gas. Moreover, as described more fully above, DEC has now showcased a widespread practice of engaging in these modifications at numerous generating facilities, including Cliffside, Lee, Marshall, and Belews Creek. Hence, the present docket is quite dissimilar from the one-off, narrow Cliffside CPCN docket. Therefore, the prior docket is no barrier to the relief sought in this Petition.

IV. PUBLIC POLICY DICTATES THAT MODIFICATIONS SHOULD RECEIVE THE SCRUTINY OF A CPCN PROCEEDING.

Obviously the Public Utilities Act will principally decide the outcome of the present docket. However, it is important that this docket, and the legal issues therein, be placed in context. There are devastating risks posed by human-caused climate change. Yet these modifications will burn coal and/or natural gas, which are both significant drivers of

³⁰ *DEC’s 2013 IRP*, NCUC Docket No. E-100, Sub 137, p 31.

³¹ *Id.* at 3-4 (emphasis added).

climate change. Moreover, given DEC's excessive reserve margins, the need for these modifications is dubious. All of these issues would be pertinent to a CPCN process and illustrate the importance of a CPCN process.

Therefore, the remainder of these Comments will discuss (a) the current climate crisis both globally and in North Carolina, including the ramifications of natural gas-powered generation, and (b) the lack of need for these modifications in light of DEC's excessive reserve margins.

A. The Climate Crisis Illustrates the Importance of a Meaningful CPCN Process.

As this Commission is aware, North Carolina Governor Roy Cooper's Executive Order 80 set several goals designed to address climate change and transition to clean energy. For instance, Executive Order 80 set a goal to reduce statewide greenhouse gas emissions to 40% below 2005 levels by 2025. Similarly, the Public Utilities Act provides that "the policy of the State of North Carolina" is "[t]o encourage and promote harmony between public utilities, their users and the environment." N.C. Gen. Stat. § 62-2(a)(5). In light of these statewide goal, this Commission has correctly observed that the CPCN process must evaluate whether "the public convenience and necessity are best served by the **generation option being proposed.**"³² Because DEC's modifications involve the burning of greenhouse gases which exacerbate climate change, it is necessary to consider the current climate crisis as a means of illustrating the importance of CPCN scrutiny of modifications.

³² *In re Application of DEC for Approval for an Electric Generation CPCN to Construct Two Units at Cliffside*, Order Granting CPCN with Conditions, NCUC Docket No. E-7, Sub 790, p 10 (emphasis added).

i. The Devastating Risks Posed By Human-Caused Climate Change.

In its authoritative National Climate Assessments (“NCA”) – scientific syntheses prepared by hundreds of scientific experts and reviewed by the National Academy of Sciences and federal agencies – the U.S. federal government has repeatedly recognized that human-caused climate change is causing widespread and intensifying harms across the country. Most recently, the Fourth NCA, comprised of the 2017 *Climate Science Special Report* (Volume I)³³ and the 2018 *Impacts, Risks, and Adaptation in the United States* (Volume II),³⁴ concluded that “there is no convincing alternative explanation” for the observed warming of the climate over the last century other than human activities.³⁵ It found that “evidence of human-caused climate change is overwhelming and continues to strengthen, that the impacts of climate change are intensifying across the country, and that climate-related threats to Americans’ physical, social, and economic well-being are rising.”³⁶

Similarly, in 2009, the U.S Environmental Protection Agency found that the then-current and projected concentrations of greenhouse gas pollution endanger the public health and welfare of current and future generations, based on robust scientific evidence of the harms from climate change.³⁷ A 2018 study reviewed the scientific evidence that has

³³ U.S. Global Change Research Program, *Climate Science Special Report: Fourth National Climate Assessment*, Vol. I (2017), <https://science2017.globalchange.gov/>.

³⁴ U.S. Global Change Research Program, *Impacts, Risks, and Adaptation in the United States*, Fourth National Climate Assessment, Volume II (2018).

³⁵ U.S. Global Change Research Program, *Climate Science Special Report: Fourth National Climate Assessment*, Vol. I (2017), <https://science2017.globalchange.gov/> at 10.

³⁶ U.S. Global Change Research Program, *Impacts, Risks, and Adaptation in the United States*, Fourth National Climate Assessment, Volume II (2018) at 36.

³⁷ U.S. EPA [U.S. Environmental Protection Agency], *Endangerment and Cause or Contribute Findings for Greenhouse Gases Under Section 202(a) of the Clean Air Act*;

emerged since 2009 and concluded that this evidence “lends increased support” for EPA’s endangerment finding.³⁸ The study by 16 prominent scientists examined the topics covered by the endangerment finding and concluded that “[f]or each of the areas addressed in the [endangerment finding], the amount, diversity, and sophistication of the evidence has increased dramatically, clearly strengthening the case for endangerment.” The study also found that the risks of some impacts are even more severe or widespread than anticipated in 2009.

The Fourth NCA also makes clear that the harms of climate change are long-lived, and the choices we make now to reduce – or not reduce – greenhouse gas pollution will affect the severity of the climate change damages that will be suffered in the coming decades and centuries: “[t]he impacts of global climate change are already being felt in the United States and are projected to intensify in the future—but the severity of future impacts will depend largely on actions taken to reduce greenhouse gas emissions.”³⁹ As the Fourth NCA explains: “[m]any climate change impacts and associated economic damages in the United States can be substantially reduced over the course of the 21st century through global-scale reductions in greenhouse gas emissions.”⁴⁰ Similarly, as highlighted by the National Research Council, “emission reduction choices made today matter in determining

Final Rule, 74 Federal Register 66496 (2009).

³⁸ Duffy, Philip B. et al., Strengthened Scientific Support for the Endangerment Finding for Atmospheric Greenhouse Gases, 363 Science 1 (2019) at 1.

³⁹ U.S. Global Change Research Program, Impacts, Risks, and Adaptation in the United States, Fourth National Climate Assessment, Volume II (2018), <https://nca2018.globalchange.gov/> at 34.

⁴⁰ U.S. Global Change Research Program, Impacts, Risks, and Adaptation in the United States, Fourth National Climate Assessment, Volume II (2018), <https://nca2018.globalchange.gov/> at 1347.

impacts experienced not just over the next few decades, but in the coming centuries and millennia.”⁴¹

In 2018, the Intergovernmental Panel on Climate Change (IPCC) *Special Report on Global Warming of 1.5°C* provided overwhelming scientific evidence for the necessity of immediate, deep greenhouse gas reductions across all sectors to avoid devastating climate change-driven damages, and underscored the high costs of inaction or delays, particularly in the next crucial decade, in making these cuts. First, the IPCC *Special Report* quantified the devastating harms that would occur at 2°C warming compared with 1.5°C warming, and highlighted the necessity of limiting warming to 1.5°C to avoid catastrophic impacts to people and life on Earth.⁴² According to the IPCC’s analysis, the damages that would occur at 2°C warming compared with 1.5°C are stark, including significantly more deadly heatwaves, drought and flooding; 10 centimeters of additional sea level rise within this century, exposing 10 million more people to flooding; a greater risk of triggering the collapse of the Greenland and Antarctic ice sheets with resulting multi-meter sea level rise; dramatically increased species extinction risk, including a doubling of the number of vertebrate and plant species losing more than half their range, and the virtual elimination of coral reefs; 1.5 to 2.5 million more square kilometers of thawing permafrost area with the associated release of methane, a potent greenhouse gas; a tenfold increase in the

⁴¹ National Research Council, *Climate Stabilization Targets: Emissions, Concentrations, and Impacts over Decades to Millennia* (2011) at 3.

⁴² Intergovernmental Panel on Climate Change, *Global Warming of 1.5°C, An IPCC special report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty* (2018).

probability of ice-free Arctic summers; a higher risk of heat-related and ozone-related deaths and the increased spread of mosquito-borne diseases such as malaria and dengue fever; reduced yields and lower nutritional value of staple crops like corn, rice, and wheat; a doubling of the number of people exposed to climate change-induced increases in water stress; and up to several hundred million more people exposed to climate-related risks and susceptible to poverty by 2050.⁴³

Chief among its harms, human-caused climate change poses serious threats to public health and well-being.⁴⁴ The Fourth NCA concluded that “[t]he health and well-being of Americans are already affected by climate change, with the adverse health consequences projected to worsen with additional climate change.”⁴⁵ The health impacts from climate change include increased exposure to heat waves, floods, droughts, and other extreme weather events; increases in infectious diseases; decreases in the quality and safety of air, food, and water including rising food insecurity and increases in air pollution; displacement; and stresses to mental health and well-being.⁴⁶ Although everyone is

⁴³ IPCC, 2018: Summary for Policymakers. In: Global Warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty [Masson-Delmotte, V. et al. (eds.)] at 7-11.

⁴⁴ U.S. Global Change Research Program, Impacts, Risks, and Adaptation in the United States, Fourth National Climate Assessment, Volume II (2018), <https://nca2018.globalchange.gov/> at 540; U.S. Global Change Research Program, The Impacts of Climate Change on Human Health in the United States: A Scientific Assessment (2016).

⁴⁵ U.S. Global Change Research Program, Impacts, Risks, and Adaptation in the United States, Fourth National Climate Assessment, Volume II (2018), <https://nca2018.globalchange.gov/> at 540.

⁴⁶ U.S. Global Change Research Program, Impacts, Risks, and Adaptation in the United States, Fourth National Climate Assessment, Volume II (2018), <https://nca2018.globalchange.gov/> at 540; U.S. Global Change Research Program, The

vulnerable to health harms from climate change, populations experiencing greater health risks include children, older adults, low-income communities, some communities of color, immigrant groups, and persons with disabilities and pre-existing medical conditions.⁴⁷ The 2015 Lancet Commission on Health and Climate Change warned that climate change is causing a global medical emergency, concluding that “the implications of climate change for a global population of 9 billion people threatens to undermine the last half century of gains in development and global health.”⁴⁸

Climate change-driven health impacts are already occurring in the United States, particularly from illnesses and deaths caused by extreme weather events which are increasing in frequency and intensity.⁴⁹ Heat is the leading cause of weather-related deaths in the U.S., and extreme heat is projected to increase future mortality on the scale of thousands to tens of thousands of additional premature deaths per year across the U.S. by the end of this century.⁵⁰ Hot days have been conclusively linked to an increase in heat-related deaths and illnesses—particularly among older adults, pregnant women, and children—including cardiovascular and respiratory complications, renal failure, electrolyte

Impacts of Climate Change on Human Health in the United States: A Scientific Assessment (2016).

⁴⁷ U.S. Global Change Research Program, Impacts, Risks, and Adaptation in the United States, Fourth National Climate Assessment, Volume II (2018), <https://nca2018.globalchange.gov/> at 548; U.S. Global Change Research Program, The Impacts of Climate Change on Human Health in the United States: A Scientific Assessment (2016).

⁴⁸ Watts, Nick et al., Health and climate change: policy responses to protect public health, 386 *The Lancet* 1861 (2015) at 1861.

⁴⁹ U.S. Global Change Research Program, Impacts, Risks, and Adaptation in the United States, Fourth National Climate Assessment, Volume II (2018), <https://nca2018.globalchange.gov/> at 541.

⁵⁰ U.S. Global Change Research Program, The Impacts of Climate Change on Human Health in the United States: A Scientific Assessment (2016).

imbalance, kidney stones, negative impacts on fetal health, and preterm birth.⁵¹ One study estimated that nearly one-third of the world's population is currently exposed to a deadly combination of heat and humidity for at least 20 days a year, and that percentage is projected to rise to nearly three-quarters by the end of the century without deep cuts in greenhouse gas pollution, with particular impacts to the southeastern U.S.⁵²

Air pollutants—particularly ozone, particulate matter, and allergens—are expected to increase with climate change.⁵³ Climate-driven increases in ozone will cause more premature deaths, hospital visits, lost school days, and acute respiratory symptoms.⁵⁴ In 2020, projected climate-related increases in ground-level ozone concentrations could lead to an average of 2.8 million more occurrences of acute respiratory symptoms, 944,000 more missed school days, and over 5,000 more hospitalizations for respiratory-related problems.⁵⁵ The continental U.S. could pay an average of \$5.4 billion (2008\$) in health impact costs associated with climate-related increases in ozone in 2020.⁵⁶

⁵¹ U.S. Global Change Research Program, Impacts, Risks, and Adaptation in the United States, Fourth National Climate Assessment, Volume II (2018), <https://nca2018.globalchange.gov/> at 544-545.

⁵² Mora, Camilo et al., Global risk of deadly heat, 7 Nature Climate Change 501 (2017).

⁵³ U.S. Environmental Protection Agency, Endangerment and Cause or Contribute Findings for Greenhouse Gases Under Section 202(a) of the Clean Air Act; Final Rule, 74 Federal Register 66496 (2009); U.S. Global Change Research Program, The Impacts of Climate Change on Human Health in the United States: A Scientific Assessment, (2016).

⁵⁴ U.S. Global Change Research Program, The Impacts of Climate Change on Human Health in the United States: A Scientific Assessment (2016).

⁵⁵ Union of Concerned Scientists, Rising Temperatures and Your Health: Rising Temperatures, Worsening Ozone Pollution (2011).

⁵⁶ Union of Concerned Scientists, Rising Temperatures and Your Health: Rising Temperatures, Worsening Ozone Pollution (2011).

Numerous studies have also emphasized that many lives could be saved with rapid reductions in greenhouse gas pollution.⁵⁷ The Fourth NCA concludes that “reducing greenhouse gas emissions would benefit the health of Americans in the near and long term.”⁵⁸ The Assessment projects that “by the end of this century, thousands of American lives could be saved and hundreds of billions of dollars in health-related economic benefits gained each year under a pathway of lower greenhouse gas emissions.”⁵⁹ Another 2018 study reported that faster reductions in carbon pollution will prevent millions of premature deaths globally: compared with a 2°C pathway, a 1.5°C pathway is projected to result in 153 million fewer premature deaths worldwide due to reduced PM 2.5 and ozone exposure, including 130,000 fewer premature deaths in Los Angeles and 120,000 in the New York metropolitan area.⁶⁰ The Fourth NCA makes clear that human-caused climate change is already leading to substantial economic losses in the U.S. and that these losses will be much more severe under higher emissions scenarios, impeding economic growth: “Without substantial and sustained global mitigation and regional adaptation efforts, climate change

⁵⁷ Gasparrini, Antonio et al., Projections of temperature-related excess mortality under climate change scenarios, 1 *Lancet Planet Health* e360 (2017); Hsiang, Solomon et al., Estimating economic damage from climate change in the United States, 356 *Science* 1362 (2017); Silva, Raquel A. et al., Future global mortality from changes in air pollution attributable to climate change, 7 *Nature Climate Change* 647 (2017); Burke, Marshall et al., Higher temperatures increase suicide rates in the United States and Mexico, 8 *Nature Climate Change* 723 (2018); Shindell, Drew et al., Quantified, localized health benefits of accelerated carbon dioxide emissions reductions, 8 *Nature Climate Change* 723 (2018).

⁵⁸ U.S. Global Change Research Program, *Impacts, Risks, and Adaptation in the United States*, Fourth National Climate Assessment, Volume II (2018) at 541.

⁵⁹ U.S. Global Change Research Program, *Impacts, Risks, and Adaptation in the United States*, Fourth National Climate Assessment, Volume II (2018) at 541.

⁶⁰ Shindell, Drew et al., Quantified, localized health benefits of accelerated carbon dioxide emissions reductions, 8 *Nature Climate Change* 291 (2018).

is expected to cause growing losses to American infrastructure and property and impede the rate of economic growth over this century.”⁶¹

The Fourth NCA also warns:

In the absence of more significant global mitigation efforts, climate change is projected to impose substantial damages on the U.S. economy, human health, and the environment. Under scenarios with high emissions and limited or no adaptation, annual losses in some sectors are estimated to grow to hundreds of billions of dollars by the end of the century. It is very likely that some physical and ecological impacts will be irreversible for thousands of years, while others will be permanent.⁶²

By the end of the century, the Fourth NCA estimates that warming on our current trajectory would cost the U.S. economy hundreds of billions of dollars each year and up to 10 percent of U.S. gross domestic product due to damages including lost crop yields, lost labor, increased disease incidence, property loss from sea level rise, and extreme weather damage.⁶³ Ultimately, the magnitude of financial burdens imposed by climate change depends on how effectively we curb emissions. Across sectors and regions, significant reductions in emissions will substantially lower the costs resulting from climate change damages.⁶⁴ For example, annual damages associated with additional extreme temperature-related deaths are projected at \$140 billion (in 2015 dollars) under the higher RCP 8.5

⁶¹ U.S. Global Change Research Program, Impacts, Risks, and Adaptation in the United States, Fourth National Climate Assessment, Volume II (2018), <https://nca2018.globalchange.gov/> at 25.

⁶² U.S. Global Change Research Program, Impacts, Risks, and Adaptation in the United States, Fourth National Climate Assessment, Volume II (2018), <https://nca2018.globalchange.gov/> at 1357.

⁶³ U.S. Global Change Research Program, Impacts, Risks, and Adaptation in the United States, Fourth National Climate Assessment, Volume II (2018), <https://nca2018.globalchange.gov/> at 1358, 1360.

⁶⁴ U.S. Global Change Research Program, Impacts, Risks, and Adaptation in the United States, Fourth National Climate Assessment, Volume II (2018), <https://nca2018.globalchange.gov/> at 1349.

emissions scenario compared with \$60 billion under the lower RCP 4.5 scenario by 2090.⁶⁵ Annual damages to labor would be approximately \$155 billion under RCP 8.5, but reduced by 48 percent under RCP 4.5.⁶⁶ While coastal property damage would carry an annual cost of \$118 billion under RCP 8.5 in 2090, 22 percent of this cost would be avoided under RCP 4.5.⁶⁷

Further, the Fourth NCA concluded with very high confidence that continued warming increases the likelihood that the climate system will cross tipping points—large-scale shifts in the climate system—that could result in climate states wholly outside human experience and result in severe physical and socioeconomic impacts.⁶⁸ The IPCC Fifth Assessment Report similarly warned that “with increasing warming, some physical and ecological systems are at risk of abrupt and/or irreversible changes” and that the risk “increases as the magnitude of the warming increases.”⁶⁹

Evidence that the climate system is already close to crossing critical tipping points also highlights the urgency of implementing emissions cuts.⁷⁰ For example, research

⁶⁵ U.S. Global Change Research Program, Impacts, Risks, and Adaptation in the United States, Fourth National Climate Assessment, Volume II (2018), <https://nca2018.globalchange.gov/> at 552.

⁶⁶ U.S. Global Change Research Program, Impacts, Risks, and Adaptation in the United States, Fourth National Climate Assessment, Volume II (2018), <https://nca2018.globalchange.gov/> at 1349.

⁶⁷ U.S. Global Change Research Program, Impacts, Risks, and Adaptation in the United States, Fourth National Climate Assessment, Volume II (2018), <https://nca2018.globalchange.gov/> at 1349.

⁶⁸ U.S. Global Change Research Program, Climate Science Special Report: Fourth National Climate Assessment, Vol. I (2017), <https://science2017.globalchange.gov/> at 411.

⁶⁹ Intergovernmental Panel on Climate Change, Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change (2014) at 72-73.

⁷⁰ Intergovernmental Panel on Climate Change, Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the

indicates that a critical tipping point important to the stability of the West Antarctic Ice Sheet has been crossed. According to the Fourth NCA, “observational evidence suggests that ice dynamics already in progress have committed the planet to as much as 3.9 feet (1.2 m) worth of sea level rise from the West Antarctic Ice Sheet alone” and that “under the higher RCP8.5 scenario, Antarctic ice could contribute 3.3 feet (1 m) or more to global mean sea level over the remainder of this century, with some authors arguing that rates of change could be even faster.”⁷¹ Another analysis suggests the Earth System is at risk of crossing a planetary threshold that could lock in a rapid pathway toward much hotter conditions (“Hothouse Earth”) propelled by self-reinforcing feedbacks. This threshold could be crossed at 2°C temperature rise, and the risk will increase significantly with additional warming.⁷² A 2019 review of the risks from tipping points by prominent climate scientists concluded that “the evidence from tipping points alone suggests that we are in a state of planetary emergency: both the risk and urgency of the situation are acute.”⁷³

ii. Fossil Fuel Emissions, Including Emissions From DEC’s Gas Plants, Are A Principal Cause of Climate Change.

There is an overwhelming body of scientific evidence establishing that greenhouse gas emissions from fossil fuels are driving climate change. The 2018 Fourth NCA itself concluded that “fossil fuel combustion accounts for approximately 85 percent of total U.S.

Intergovernmental Panel on Climate Change (2014) at 73-74; Lenton, Timothy M. et al., Climate tipping points—too risky to bet against, 575 *Nature* 592 (2019).

⁷¹ U.S. Global Change Research Program, Climate Science Special Report: Fourth National Climate Assessment, Vol. I (2017), <https://science2017.globalchange.gov/> at 420.

⁷² Steffen, Will et al., Trajectories of the Earth System in the Anthropocene, 115 *PNAS* 33 (2018).

⁷³ Lenton, Timothy M. et al., Climate tipping points—too risky to bet against, 575 *Nature* 592 (2019).

greenhouse gas emissions,”⁷⁴ which is “driving an increase in global surface temperatures and other widespread changes in Earth’s climate that are unprecedented in the history of modern civilization.”⁷⁵ The Intergovernmental Panel on Climate Change (IPCC), the international scientific body for the assessment of climate change, stated in its Fifth Assessment Report that “[c]arbon dioxide concentrations have increased by 40% since pre-industrial times, primarily from fossil fuel emissions.”⁷⁶

In 2018, the IPCC issued a *Special Report on Global Warming of 1.5°C*, which estimated the remaining global carbon budget—the cumulative amount of carbon dioxide that can be emitted—for maintaining a likely chance of meeting the 1.5°C climate target under the Paris Agreement, providing clear benchmarks for global and U.S. climate action. The global carbon budget for a 66 percent probability of limiting warming to 1.5°C is approximately 420 GtCO₂ to 570 GtCO₂ from January 2018 onwards, depending on the temperature dataset used.⁷⁷ At the pre-pandemic global emissions rate of 42 GtCO₂ per year, this carbon budget would be expended in well under 20 years.

Given this limited remaining global carbon budget, the IPCC report concluded that 1.5°C pathways require global net anthropogenic CO₂ emissions to decline by about 45

⁷⁴ U.S. Global Change Research Program, *Impacts, Risks, and Adaptation in the United States, Fourth National Climate Assessment, Volume II* (2018), <https://nca2018.globalchange.gov/> at 60.

⁷⁵ *Id.* at 39.

⁷⁶ Intergovernmental Panel on Climate Change, *Summary for Policymakers, Climate Change 2013: The Physical Science Basis, Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* [Stocker, T.F. et al (eds.)] at 9.

⁷⁷ IPCC, 2018: *Summary for Policymakers*. In: *Global Warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty* [Masson-Delmotte, V. et al. (eds.)] at 12.

percent from 2010 levels by 2030, and to reach net zero around 2050.⁷⁸ According to the IPCC, this in turn will require “rapid and far-reaching transitions” across all sectors including electricity generation.⁷⁹ Indeed, a critical feature of 1.5°C-consistent pathways is that the power sector must be significantly clean by 2030 and achieve a “virtually full decarbonisation” around mid-century.⁸⁰

At the national level, research on the United States’ carbon budget establishes that the U.S. must make urgent, aggressive cuts in domestic fossil fuel emissions to avoid the worst dangers of climate change. The U.S. is the world’s largest historic emitter of greenhouse gas pollution, responsible for 25 percent of cumulative global CO₂ emissions since 1870, and is currently the world’s second highest emitter on an annual and per capita basis.⁸¹ Scientific studies have estimated the remaining U.S. carbon budget consistent with the 1.5°C Paris Agreement target is approximately 25 gigatons (Gt) CO₂eq to 57 GtCO₂eq on average,⁸² depending on the equity principles used to apportion the global budget across

⁷⁸ *Id.* at 12.

⁷⁹ *Id.* at 15.

⁸⁰ Rogelj, Joeri, et al., 2018: Mitigation Pathways Compatible with 1.5°C in the Context of Sustainable Development. In: Global Warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty [Masson-Delmotte, V., et al. (eds.)] (2018) at 112.

⁸¹ LeQuéré, Corinne et al., Global carbon budget 2018, 10 Earth System Science Data 2141 (2018) at Figure 5, 2167; Global Carbon Project, Global Carbon Budget 2018 (published on 5 December 2018) https://www.globalcarbonproject.org/carbonbudget/18/files/GCP_CarbonBudget_2018.pdf at 19 (Historical cumulative fossil CO₂ emissions by country).

⁸² Robiou du Pont, Yann et al., Equitable mitigation to achieve the Paris Agreement goals, 7 Nature Climate Change 38 (2017), and Supplemental Tables 1 and 2. Quantities measured in GtCO₂eq include the mass emissions from CO₂ as well as the other well-mixed greenhouse gases (CO₂, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons and SF₆) converted into CO₂-equivalent values, while quantities measured in GtCO₂ refer to mass emissions of just CO₂ itself.

countries.⁸³ As the U.S. emits around 6 GtCO₂eq each year, the remaining U.S. carbon budget compatible with the Paris climate targets is extremely small and is rapidly being expended, highlighting the urgent need for the U.S. to transition from fossil fuels to clean energy.

Accordingly, a 2019 study highlighted the importance of immediately halting all new fossil fuel infrastructure projects to preserve a livable planet. The study found that phasing out all fossil fuel infrastructure at the end of its design lifetime, starting immediately, preserves a 64 percent chance of keeping peak global mean temperature rise below 1.5°C.⁸⁴ This means replacing fossil fuel power plants, cars, aircraft, ships, and industrial infrastructure with zero carbon alternatives at the end of their lifespans, starting now.

In the meantime, the global average atmospheric carbon dioxide in 2019 was 409.8 parts per million (ppm), a level not seen for millions of years.⁸⁵ The last time CO₂ in Earth's atmosphere was at 400 ppm, global mean surface temperatures were 2 to 3°C warmer and

⁸³ Robiou du Pont et al. (2017) averaged across IPCC sharing principles to estimate the U.S. carbon budget from 2010 to 2100 for a 50 percent chance of returning global average temperature rise to 1.5°C by 2100, based on a cost-optimal model. The study estimated the U.S. carbon budget consistent with a 1.5°C target at 25 GtCO₂eq by averaging across four equity principles: capability (83 GtCO₂eq), equal per capita (118 GtCO₂eq), greenhouse development rights (-69 GtCO₂eq), and equal cumulative per capita (-32 GtCO₂eq). The study estimated the U.S. budget at 57 GtCO₂eq when averaging across five sharing principles, adding the constant emissions ratio (186 GtCO₂eq) to the four above-mentioned principles. However, the constant emissions ratio, which maintains current emissions ratios, is not considered to be an equitable sharing principle because it is a grandfathering approach that “privileges today’s high-emitting countries when allocating future emission entitlements.”

⁸⁴ Smith, Christopher J. et al., Current fossil fuel infrastructure does not yet commit us to 1.5°C warming, Nature Communications, doi.org/10.1038/s41467-018-07999-w (2019).

⁸⁵ See Climate.gov, available at <https://www.climate.gov/news-features/understanding-climate/climate-change-atmospheric-carbon-dioxide>.

the Greenland and West Antarctic ice sheets melted, leading to sea levels that were 10 to 20 meters higher than today.⁸⁶ The current atmospheric CO₂ concentration is nearly one and half times larger than the pre-industrial level of 280 ppm, and much greater than levels during the past 800,000.⁸⁷ The atmospheric concentrations of methane (CH₄) and nitrous oxide (N₂O), two other potent greenhouse gases, are 257 percent and 122 percent of their pre-industrial levels.⁸⁸ Global carbon emissions over the past 15 to 20 years have tracked the highest emission scenario used in IPCC climate projections, the RCP8.5 scenario⁸⁹ which is projected to lead to devastating impacts.⁹⁰

The electricity sector, in tandem with the transportation sector, is the leading source of U.S. greenhouse gas emissions, making up 28% of total greenhouse gas emissions in 2017.⁹¹ DEC's parent company, Duke Energy, is the largest electricity provider in the

⁸⁶ LeQuéré, Corinne et al., Global carbon budget 2018, 10 Earth Syst. Sci. Data 2141 (2018); World Meteorological Organization, WMO Greenhouse Gas Bulletin, No. 13, October 30, 2017 at 5.

⁸⁷ Intergovernmental Panel on Climate Change, Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change (2014) at 4, 44; World Meteorological Organization, WMO Greenhouse Gas Bulletin, No. 13, October 30, 2017 at 1, 4.

⁸⁸ World Meteorological Organization, WMO Greenhouse Gas Bulletin, No. 13, October 30, 2017 at 2.

⁸⁹ U.S. Global Change Research Program, Climate Science Special Report: Fourth National Climate Assessment, Volume Ix(2017), <https://science2017.globalchange.gov/> at 31, 133, 134, and 152 (e.g. “The observed increase in global carbon emissions over the past 15–20 years has been consistent with higher scenarios (e.g., RCP8.5) (*very high confidence*)” at 31.)

⁹⁰ Intergovernmental Panel on Climate Change, Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change (2014) at Figure 2.1.

⁹¹ U.S. Environmental Protection Agency, Sources of Greenhouse Gas Emissions (2019), <https://www.epa.gov/ghgemissions/sources-greenhouse-gas-emissions>.

country and one of the largest in the world.⁹² In terms of greenhouse gas emissions, Duke Energy ranks as the number one producer of CO₂ and NO_x emissions of all power providers in the country, emitting 104.6 million short tons of CO₂ emissions and 61.02 thousand short tons of NO_x pollution in 2017 alone.⁹³ In short, Duke Energy is a prominent contributor to the country's greenhouse gas emissions, and DEC, as part of the Duke Energy conglomerate, is a major contributor to total emissions.

iii. The Particular Threats Climate Change Poses To North Carolina.

Climate change poses significant threats to people, species, and the environment in North Carolina. As summarized in the March, 2020 North Carolina Climate Scientists Report – prepared by leading scientists across the state – North Carolina has already experienced 1 degree Fahrenheit of warming over the past 120 years, and given current emission trajectories, “North Carolina is projected to warm an additional six to ten degrees by 2100.”⁹⁴ Under these conditions “the state can expect disruptive sea level rise, increasingly hot nights, and more days with dangerous heat and extreme rainfall unless the global increase in heat-trapping gases is stopped.”⁹⁵

⁹² Bank of America et al., Benchmarking Air Emissions of the 100 Largest Electric Power Producers in the United States (June 2019), <https://www.ceres.org/resources/reports/benchmarking-air-emissions-2019>.

⁹³ M.J. Bradley and Associates, Benchmarking Air Emissions of the 100 Largest Power Producers in the United States: CO₂ Emissions and Emissions Rates – All-Source (2019), <https://www.mjbradley.com/content/emissions-benchmarking-emissions-charts>.

⁹⁴ Kunkel, K.E., *et al.*, *North Carolina Climate Science Report* at 1, N.C. Institute for Climate Studies, available at https://ncics.org/wp-content/uploads/2020/06/NC-Climate-Science-Report_Plain_Language_Summary_Final_March2020_small.pdf

⁹⁵ *Id.*

This is consistent with the findings of the North Carolina Climate Change Advisory Council, which, in a January, 2020 presentation detailed that climate change is likely to cause the following adverse impacts in the state:

- Very likely that NC temperatures will increase substantially in all seasons;
- Very likely increase in number of very warm nights;
- Likely increase in number of hot days;
- Likely decrease in number of cold days.⁹⁶

As regards sea level rise in particular the Council summarized that it is “virtually certain that sea level will continue to rise along North Carolina coast,” with high tide flooding becoming “nearly a daily occurrence by 2100,” at which point sea levels may have risen more than three feet at Wilmington, and almost four feet at Duck. *Id.* at 22.

As for hurricanes, the Council found the, “[I]ntensity of strongest hurricanes likely to increase,” and although the number of hurricanes is less certain, where hurricanes do occur in North Carolina, an increase in heavy precipitation is “very likely.” *Id.* at 26. At the other extreme, the Council also found it, “Likely that severe droughts will be more intense,” and a “likely increase in the frequency of climate conditions conducive to wildfires.” *Id.* at 30.

Summing up its findings, the Council explained that we can anticipate “Large future climate changes for North Carolina if our current reliance on fossil fuels for energy continues,” including (a) “Temperatures outside of historical envelope”; (b) “Disruptive

⁹⁶ The presentation is available at <https://files.nc.gov/ncdeq/climate-change/interagency-council/Jan-22-2020--Interagency-Climate-Council-presentation-rev.pdf>

sea level rise”; (c) “Increases in intensity and frequency of extreme rainfall”; (d) “More intense hurricanes”; and (e) “Higher absolute humidity levels.” *Id.* at 45.

The conclusions of these North Carolina scientists are also consistent with the findings in Volume II of the Fourth NCA, which focuses on the regional effects of climate change, including a specific chapter on the Southeast. That Volume concludes that “southern and midwestern populations are likely to suffer the largest losses from future climate changes in the United States,” and that, “[a]lready poor regions, including those found in the Southeast, are expected to continue incurring greater losses than elsewhere in the United States.”⁹⁷ The Report further detailed that in the Southeast “dangerous high temperatures, humidity, and new local diseases are expected to become more significant in the coming decades”; “[t]he number of extreme rainfall events is increasing”; and “[f]uture temperature increases are projected to pose challenges to human health.” *Id.*

B. DEC’s Reserve Margins Are Inflated, and Therefore, a CPCN Process Is Important to Ascertain Whether these Modifications Are Needed.

According to the N.C. Court of Appeals, “The primary purpose of the [CPCN] statute is to provide for the orderly expansion of the State’s electric generating capacity in order to create the most reliable and economical power supply possible **and to avoid the costly overbuilding of generation resources.**” *State ex rel. Utilities Commission v. Empire Power Co.*, 112 N.C. App. 265, 278, 435 S.E.2d 553, 560 (1993) (emphasis added). Accordingly, a CPNC process may reveal that DEC’s modifications are unnecessary in light of its excessive reserve margins.

⁹⁷ U.S. Global Climate Change Research Program, “Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, Volume II” (November 23, 2018) at 746.

The evidence shows that the modifications to Belews Creek (Unit 1) and Cliffside (Units 5 and 6) were completely unnecessary to meet DEC's reserve margin. The modification of Belews Creek provided a 1,110 MW total capacity addition of gas-fired generation,⁹⁸ and the modification of Cliffside provided a 1,395 MW total capacity addition of gas-fired generation,⁹⁹ for a combined total of 2,505 MW. However, DEC has two combustion turbine plants, namely Lincoln and Mill Creek, with 24 total units and a combined capacity of 2,322 MW that are almost never used, and in fact were effectively not used at all in 2019.¹⁰⁰ A third plant, Rockingham, which has a capacity of 895 MW, is used sparingly.¹⁰¹ These three plants - Lincoln, Mill Creek and Rockingham - have a combined total of 3,217 MW of capacity and yet are rarely used.¹⁰²

Instead of installing modifications at Belews Creek and Cliffside, which added 2,505 MW total, DEC would be better served relying upon Lincoln, Mill Creek and Rockingham, which have 3,217 MW total. When these CT plants are operated a substantial number of hours in a year, such as Rockingham in 2018 and 2019, the CT cost-of-production is similar to that of coal-firing at Belews Creek, Cliffside, or Marshall, with all

⁹⁸ *DEC's 2019 IRP*, NCUC Docket No. E-100, Sub 157, p 79.

⁹⁹ *Id.*

¹⁰⁰ 2019 DEC FERC Form 1, p. 403.2. 1,565 MW Lincoln megawatt-hours (MWh) of output in 2019 = 24,505 MWh (line 12). Therefore, 2019 Lincoln capacity factor = $(24,505 \text{ MWh}) / (1,565 \text{ MW} \times 8,760 \text{ hr}) = 0.0018$ (0.18 percent). p. 403.3, Mill Creek: 757MW Mill Creek megawatt-hours (MWh) of output in 2019 = 73,101 MWh (line 12). Therefore, 2019 Mill Creek capacity factor = $(73,101 \text{ MWh}) / (757 \text{ MW} \times 8,760 \text{ hr}) = 0.011$ (1.10 percent). *See also DEC's 2019 IRP*, NCUC Docket No. E-100, Sub 157, p 80.

¹⁰¹ 2019 DEC FERC Form 1, p. 403.3. 895 MW Rockingham megawatt-hours (MWh) of output in 2019 = 959,484 MWh (line 12). Therefore, 2019 Rockingham capacity factor = $(959,484 \text{ MWh}) / (895 \text{ MW} \times 8,760 \text{ hr}) = 0.122$ (12.2 percent). The Rockingham 2019 cost-of-production, at \$0.0420/kWh (line 35), was lower than the average cost-of-production at Marshall of \$0.0423/kWh (p. 402, line 35). *See also DEC's 2019 IRP*, NCUC Docket No. E-100, Sub 157, p 80.

¹⁰² FERC Form 1, 2019, pp 403.2 and 403.3.

coal plants at a production cost of about \$0.04/kWh.¹⁰³ Said another way, the capital cost of the Cliffside DFO is not economically justified because equally low-cost, or lower-cost, electricity could be obtained by 1) generating the same amount of electricity at existing DEC natural gas-fired CT plants, or 2) importing low-cost merchant combined-cycle power from the adjacent PJM control area. Much of this DEC CT capacity is rarely if ever used - and therefore is available to provide what would otherwise be generated at Belews Creek or Cliffside - because DEC has sufficient reserves without these CT plants. Significantly, these alternatives would require no capital investment. For example, Petitioners estimate the *de facto* 2019 reserve margin in DEC service territory was about 33 percent, based on the actual 2019 DEC winter peak.¹⁰⁴ This translates into about 2,600 MW of available generation beyond what is necessary to meet the 17 percent reserve margin target.¹⁰⁵

Given this unnecessary capacity, it is doubtful that DEC's modifications advance the public convenience and necessity. Hence, sound public policy would be furthered by engaging in a CPCN process regarding modifications.

V. CONCLUSION

Not only are utilities required by statute to seek a CPCN for modifications, but sound public policy dictates that utilities seek CPCNs for modifications. Therefore, Petitioners respectfully request that this Commission enter a judgment declaring that, in

¹⁰³ *Id.*, p. 402, p. 403.1. Cost-of-production at Belews Creek in 2019 = \$0.0406/kWh. Cost-of-production at Cliffside in 2019 = \$0.0398/kWh.

¹⁰⁴ DEC 2018 IRP, Table 12-E, p. 61. Available capacity with DSM = 22,229 MW. Adjusted DEC system 2019 winter peak forecast = 17,905 MW. Forecast reserve margin = 22,229 MW/17,905 MW = 0.241 (24.1 %). Actual DEC 2019 winter peak load = 16,739 MW [DEC 2019 FERC Form 1, p. 401b, April 14, 2020]. Therefore, actual DEC 2019 reserve margin = 22,229 MW/16,739 MW = 0.328 (32.8%).

¹⁰⁵ 22,229 MW - (16,739 MW x 1.17) = 2,644 MW.

the future, modifications by DEC or any other electric public utility shall be treated as subject to N.C. Gen. Stat. § 62-110.1(a).

This the 30th day of October, 2020.

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CERTIFICATE OF SERVICE

The undersigned hereby certified that on today's date a copy of the foregoing document was served by electronic mail by all parties to this docket.

This the 30th day of October, 2020.

/s/ Matthew D. Quinn_____

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