

ORAL ARGUMENT NOT YET SCHEDULED

**IN THE UNITED STATES COURT OF APPEALS FOR THE DISTRICT
OF COLUMBIA CIRCUIT**

Case Nos. 20-1016 and 20-1017 (Consolidated)

**ENVIRONMENTAL DEFENSE FUND,
Petitioner,
v.**

**FEDERAL ENERGY REGULATORY COMMISSION,
Respondent.**

**ON PETITIONS FOR REVIEW OF ORDERS OF THE FEDERAL
ENERGY REGULATORY COMMISSION**

**BRIEF OF DR. SUSAN TIERNEY AS AMICUS CURIAE IN SUPPORT OF
PETITIONERS THE ENVIRONMENTAL DEFENSE FUND IN SUPPORT
OF REVERSAL OF THE CHALLENGED ORDERS**

*Jennifer Danis, Esq.
Edward Lloyd, Esq.
Morningside Heights Legal Services
Columbia Law School
435 W. 116th Street
New York, NY 10027
(212) 854-4291
jdanis@law.columbia.edu
elloyd@law.columbia.edu*

Counsel for Dr. Susan Tierney

Dated: July 1, 2020

**CERTIFICATE AS TO PARTIES, RULINGS UNDER REVIEW, AND
RELATED CASES**

A. Certificate as to Parties

Per D.C. Circuit Rule 28(a)(1)(A), Dr. Tierney submits that all parties and intervenors appearing in this court are listed in the Initial Brief of the Environmental Defense Fund. Dr. Tierney understands one or more entities may also seek to participate as amicus curiae. However, as of the time of this brief, no entity has filed a notice of intent or motion for leave to file.

B. Certificate as to Rulings under Review

Per D.C. Circuit Rule 28(a)(1)(B), the rulings under review are the following orders of the Federal Energy Regulatory Commission:

- *Spire STL Pipeline LLC, Order Issuing Certificates, Docket No. CP17-40-000, 164 FERC ¶ 61,085 (August 3, 2018); and*
- *Spire STL Pipeline LLC, Order On Rehearing, Docket No. CP17-40-002, 169 FERC ¶ 61,134 (November 21, 2019).*

C. Certificate as to Related Cases

Undersigned counsel are not aware of any related cases as defined by D.C. Circuit Rule 28(a)(1)(C).

Respectfully Submitted,

/s/ Jennifer Danis

Jennifer Danis, Esq.
Edward Lloyd, Esq.
Morningside Heights Legal Services
Columbia Law School
435 W. 116th Street
New York, NY 10027
(212) 854-4291
jdanis@law.columbia.edu

Counsel for Dr. Susan Tierney

Dated: July 1, 2020

RULE 26.1 CORPORATE DISCLOSURE STATEMENT

Pursuant to Rule 26.1 of the Federal Rules of Appellate Procedure and Rule 26.1 of the Circuit Rules for the United States Court of Appeals for the District of Columbia Circuit, Dr. Tierney is an individual and not a company that issues stock to the public.

Respectfully Submitted,

/s/ Jennifer Danis

Jennifer Danis, Esq.

Edward Lloyd, Esq.

Morningside Heights Legal Services

Columbia Law School

435 W. 116th Street

New York, NY 10027

(212) 854-4291

jdanis@law.columbia.edu

Counsel for Dr. Susan Tierney

Dated: July 1, 2020

RULE 29(a)(4)(E) STATEMENTS

Per D.C. Circuit Rule 29(a)(4)(E), I certify that: (1) the party's counsel authored this brief in whole; (2) no party or party's counsel contributed money that was intended to fund preparing or submitting this brief; and (3) no person contributed money that was intended to fund preparing or submitting this brief.

Respectfully Submitted,

/s/ Jennifer Danis

Jennifer Danis, Esq.

Edward Lloyd, Esq.

Morningside Heights Legal Services

Columbia Law School

435 W. 116th Street

New York, NY 10027

(212) 854-4291

jdanis@law.columbia.edu

Counsel for Dr. Susan Tierney

Dated: July 1, 2020

CERTIFICATE FOR SEPARATE BRIEF

To the best of her knowledge, information, and belief, Dr. Susan Tierney is aware that the American Antitrust Institute intends to file a brief as amicus curiae challenging the Respondent Federal Energy Regulatory Commission's authorization for Spire STL Pipeline LLC, in support of Petitioner Environmental Defense Fund. Dr. Tierney became aware of their interest in doing so on June 24, 2020. She understands that the American Antitrust Institute intends to leverage analytical principles from antitrust law to bolster Federal Energy Regulatory Commission reviews. In contrast to that support, Dr. Tierney's amicus curiae brief addresses issues specific to her professional expertise in gas industry regulation, environmental regulation, and interest in ensuring that the Federal Energy Regulatory Commission properly applies its public convenience and necessity test to account for long-term adverse economic and environmental impacts. Due to the short time between learning of the American Antitrust Institute's intent and the date on which amicus briefs are due, Dr. Tierney cannot practicably join it in briefing. Consequently, Dr. Tierney respectfully files this certificate per D.C. Circuit Rule 29(d) and submits that joining with the other potential amicus in a single brief is not practicable. Dr. Tierney's conclusion that her separate amicus curiae brief is necessary is not based on (i) a desire to exceed the allowable length of briefs, (ii) counsel's

difficulty or inability to coordinate due to geographical dispersion, or (iii) a claim that separate presentations were allowed in the proceeding below.

Respectfully Submitted,

/s/ Jennifer Danis

Jennifer Danis, Esq.

Edward Lloyd, Esq.

Morningside Heights Legal Services

Columbia Law School

435 W. 116th Street

New York, NY 10027

(212) 854-4291

jdanis@law.columbia.edu

Counsel for Dr. Susan Tierney

Dated: July 1, 2020

TABLE OF CONTENTS

CERTIFICATE AS TO PARTIES, RULINGS UNDER REVIEW, AND RELATED CASES	i
RULE 26.1 CORPORATE DISCLOSURE STATEMENT.....	iii
RULE 29(a)(4)(E) STATEMENTS	iv
CERTIFICATE FOR SEPARATE BRIEF.....	v
TABLE OF AUTHORITIES.....	ix
GLOSSARY OF ABBREVIATED TERMS AND TERMS OF ART	xii
STATEMENT OF IDENTITY	1
INTEREST IN CASE.....	1
SOURCE OF AUTHORITY TO FILE	2
SUMMARY OF ARGUMENT.....	2
ARGUMENT.....	5
I. The Gas Act Requires the Commission to Protect the Public Interest and Promote the Orderly Development of Natural Gas at Reasonable Prices.	5
II. Regulated Affiliate-Supported Projects Are the New Face of Corporate Abuse.	10
III. The Commission’s Reliance on Regulated Affiliate Contracts Contravenes the Gas Act’s Public Convenience and Necessity Standard.....	12
A. Projects that require subsidization by existing customers do not meet the Gas Act standard.....	12
B. The Commission must apply heightened scrutiny to Regulated Affiliate contracts when determining public benefit, and require alternative evidence on the existence, or lack thereof, of public benefits.....	14
C. After relying on Regulated Affiliate contracts to establish public benefit, the Commission uses them to create an insurmountable	

weight when “balancing” public benefit against adverse impacts.
..... 20

IV. The Commission’s Treatment of Other Adverse Impacts Is Not the Product of Reasoned Decision Making, and Fails to Protect the Public Interest. 22

V. The Commission, Not State Regulators, Is the Entity Best Positioned to Prevent These Abuses. 24

VI. Conclusion 29

CERTIFICATE OF COMPLIANCE 30

STATUTORY ADDENDUM..... 31

EXHIBIT A: DR. TIERNEY'S C.V...... 33

CERTIFICATE OF SERVICE

TABLE OF AUTHORITIES

Court Cases

<i>Allegheny Defense Project v. FERC</i> , No. 17-1098, 2020 WL 3525547 (D.C. Cir. June 30, 2020)	16
<i>Cascade Natural Gas Corp. v. FERC</i> , 955 F.2d 1412 (10th Cir. 1992)	7
<i>City of Oberlin, Ohio v. FERC</i> , 937 F.3d 599 (D.C. Cir. 2019).....	15
<i>FPC v. Hope Nat. Gas Co.</i> , 320 U.S. 591 (1944)	7
<i>Henry v. FPC</i> , 513 F.2d 395 (D.C. Cir. 1975).....	7
<i>Missouri v. Kansas Natural Gas Co.</i> , 265 U.S. 298 (1923)	5
<i>NAACP v. FPC</i> , 425 U.S. 662 (1976)	7
<i>O'Keefe v. Chicago Rys. Co.</i> , 188 N.E. 815 (Ill. 1933).....	6

Administrative Decisions

<i>Adelphia Gateway, LLC</i> , 169 FERC ¶ 61,220 (2019).....	16
<i>Certification of New Interstate Nat. Gas Facilities,[NOI]</i> 163 FERC ¶ 61042 (2018).....	11,12,15
<i>Certification of New Interstate Pipeline Facilities</i> 90 FERC ¶ 61,128 (2000)	8, 13
<i>Cheniere Corpus Christi Pipeline, L.P.</i> ,	

169 FERC ¶ 61,135 (2019).....	4
<i>Del-Mar Energy Pathway Project,</i> 169 FERC ¶ 61,228 (2019).....	4
<i>Driftwood Pipeline LLC,</i> 167 FERC ¶ 61,054 (2019).....	4
<i>In the Matter of Application of Piedmont Nat. Gas Co., Inc., for Authorization to Enter into Affiliate Agreements & Related Redelivery Agreement Amendments, No. G-6, 2014 WL 5500869 (N.C.U.C. Oct. 28, 2014)</i>	25
<i>In the Matter of Michigan-Wisconsin Pipeline Co.,</i> 6 FPC 1 (1947)	7
<i>Jordan Cove Energy Project, L.P.,</i> 154 FERC ¶ 61,190 (2016).....	21
<i>Jordan Cove Energy Project, L.P.,</i> 171 FERC ¶ 61,136 (2020).....	5,13,17
<i>Kansas Pipeline & Gas Co. and North Dakota Consumers Gas Co.,</i> 2 FPC 29 (1939)	7
<i>National Fuel Gas Supply Corporation, Empire Pipeline, Inc.,</i> 158 FERC ¶ 61,145 (2017).....	14, 17
<i>PennEast Pipeline Co., LLC,</i> 162 FERC ¶ 61,053 (2018).....	18
<i>PennEast Pipeline Co., LLC,</i> 164 FERC ¶ 61,098 (2018).....	23,24
<i>Rio Bravo Pipeline,</i> 170 FERC ¶ 61,046	4
<i>Spire STL Pipeline LLC,</i> 169 FERC ¶ 61,134 (2019).....	24, 26
<i>Spire STL Pipeline LLC,</i> 164 FERC ¶ 61,085 (2018).....	13

Statement of Policy, 88 FERC ¶ 61,227 (1999).....	7, 8, 13, 15, 16, 20
<i>Texas LNG Brownsville LLC</i> , 170 FERC ¶ 61,139 (2020).....	23
<i>TransCameron Pipeline, LLC</i> , 166 FERC ¶ 61,144 (2019).....	4
<i>Turtle Bayou Gas Storage Company, LLC</i> , 135 FERC ¶ 61,233 (2011).....	21

Federal Statutes

15 U.S.C. § 717a	6
15 U.S.C. § 717b.....	3
15 U.S.C. § 717f(c)(1)(A).....	6
15 U.S.C. § 717f(e).....	3, 6
15 U.S.C. § 717f(h).....	6

Other Authorities

Regulation of Interstate Natural Gas Transportation Services, 63 Fed. Reg. 42974-01, 42980 (July 29, 1998).....	7
<i>Narragansett Update: From Washington Gas Light to Nantahala</i> , 7 Energy L.J. 333 (1986).....	11, 26
Origins of the Certificate of Public Convenience and Necessity: Developments in the States 1870–1920, 79 Columbia L. Rev. 426 (1979).....	6
Pub. L. No. 75-688	6
S. J. Res 115.....	5
S. Rep. No. 1162.....	5
S. Res. 83	5

GLOSSARY OF ABBREVIATED TERMS AND TERMS OF ART

Term	Description
1999 Policy Statement	Statement of Policy, 88 FERC ¶ 61,227, No. PL99-3-000 (Sept. 15, 1999)
Captive customers	Captive customers are those who may only purchase gas from one source because they lack access to any alternatives and therefore cannot avoid charges. Captive customers may also be retail customers of an electric utility whose rates include the costs of operating a gas-fired power plant.
Certificate	Certificate of Public Convenience and Necessity, Issued under 15 U.S.C. 717f of the Natural Gas Act
Certificate Policy	Certification of New Interstate Natural Gas Pipeline Facilities, 88 FERC ¶ 61,227, 61,747 (Sept. 15, 1999), clarified, 90 FERC ¶ 61,128 (Feb. 9, 2000), further clarified, 92 FERC ¶ 61,094, 61,373 (July 28, 2000) (collectively)
Commission (or FERC)	Federal Energy Regulatory Commission
EDF	Environmental Defense Fund
EIA	Energy Information Administration
LDC	Local Distribution Company

Missouri Commission	Missouri Public Service Commission
NOI	Notice of Inquiry, <i>Certification of New Interstate Nat. Gas Facilities</i> , 163 FERC ¶ 61,042 (Apr. 19, 2018)
PUC	State public utility commission (also known in some states, such as Missouri, as the public service commission)
Regulated Affiliate	Utility companies subject to state rate regulation and affiliated with a pipeline company within a common corporate ownership structure. Such utilities could include natural-gas LDCs and electric utilities owning gas-fired power plants whose operating costs are recovered in state-regulated retail rates.
Section 7	15 U.S.C. 717f (2018)
Shipper	A customer of a pipeline who purchases transportation service for delivery of natural gas
<i>Spire</i>	The Spire STL pipeline, as approved through <i>Spire STL Pipeline LLC</i> , 169 FERC ¶ 61,134 (2019) and <i>Spire STL Pipeline LLC</i> , 164 FERC ¶ 61,085 (2018), collectively.

STATEMENT OF IDENTITY

Dr. Susan Tierney is an expert on energy economics, regulation, and policy, particularly in the electric and gas industries. She served as Assistant Secretary for Domestic and International Energy Policy in the U.S. Department of Energy and, in Massachusetts, as Secretary of Environmental Affairs, Executive Director of the Energy Facilities Siting Council, and Commissioner at the Department of Public Utilities. For over 25 years, Dr. Tierney has consulted with businesses, federal and state governments, tribes, and others, on energy projects and markets, and economic and environmental regulation. She is deeply familiar with issues in energy markets, including natural gas, wholesale and retail market design, electric and gas infrastructure project siting, and utility ratemaking. Her curriculum vitae is attached as Exhibit A.

INTEREST IN CASE

As an expert on energy infrastructure and sound state and federal regulation of private energy markets, Dr. Tierney has observed troubling trends in federal gas pipeline approvals. She previously provided the Federal Energy Regulatory Commission (the “Commission”) with recommendations to realign its current pipeline certification practices with the Natural Gas Act (the “Gas Act”), detailing

the public harm from its current practices. Commission inaction and the stunning facts of this case spurred Dr. Tierney to participate as amicus curiae, recognizing that this Court has an opportunity to serve justice by setting the Commission back on the correct course. As amicus curiae, she will use her expertise to assist the Court in understanding the significant harms resulting from the Commission misapplying the Gas Act. The Commission's *Spire* approval perfectly elucidates these harms and underscores the critical importance of this Court's intervention. *Spire* is what happens when the Commission fails its Gas Act obligations, and threatens to become a new industry norm absent the Court's enforcement of that law.

SOURCE OF AUTHORITY TO FILE

Pursuant to D.C Circuit Rule 29(b), undersigned counsel represents that all parties have consented to filing this brief and further certifies that a separate brief is necessary.

SUMMARY OF ARGUMENT

The court must act to ensure that the Commission fulfills its statutory duty to protect the public interest. Congress enacted the Gas Act expressly to protect the public while fostering adequate access to reasonably priced gas. Gas Act Section 7

instructs the Commission to deny gas pipeline certification unless the applicant affirmatively demonstrates that the pipeline is required by the public convenience and necessity.¹ The Commission no longer adheres to these requirements; it has transformed its public need analysis into a singular inquiry: does the project have at least one shipping contract? If so, the requisite searching public convenience and necessity review simply ends. The Commission ignores market studies, economic data, and capacity analyses. But those other data are critically important to assessing public benefit, particularly when the shipping contracts are between affiliated entities able to pass risks and costs to captive customers.

The Commission's lack of scrutiny deeply harms the public. Pipeline companies only make significant profits on capital investments, so they have an incentive to build new capacity regardless of public need.² Their ability to keep this profit within a corporate family incentivizes affiliates to turn back capacity on legacy pipelines in favor of contracting for this newly proposed capacity, particularly when, as for Regulated Affiliate shippers, the cost of new capacity will be passed through to the public. This creates unchecked potential for -- or in this case, fully-realized -- gas infrastructure over-building because the Commission

¹ Unlike the presumptive public interest accorded Section 3 projects, Section 7 applicants bear the burden of proving public interest. *Compare* 15 U.S.C. § 717b (2018) *with* 15 U.S.C. § 717f(e) (2018).

² *See* Part IV, *infra*.

fails to address the Gas Act's fundamental question: does the public need new capacity? This failure produces projects like *Spire*: new construction imposing real public costs -- condemnation, increased transportation costs from new pipeline investment, and environmental destruction -- but benefitting only private parties.

The court must act to remedy this situation by compelling the Commission to engage in a critical and fulsome review of the public interest. At a minimum, the court should require the Commission to grapple seriously with additional and contrary evidence of public benefit, and to balance any substantiated public benefit against the adverse impacts it now arbitrarily ignores, finding that the Commission cannot predicate Gas Act findings of public convenience and necessity solely on Regulated Affiliate contracts. The Commission is fully capable of such review, and has an existing roadmap for implementing the Gas Act's public convenience and necessity standard.³ The stakes of the Commission abdicating its responsibilities are high, and *Spire*, although alarming, is not atypical.⁴ With this case, the court has an important opportunity to protect consumers and the public interest.

³ See *infra* nn. 20-25 and accompanying text.

⁴ See *e.g.*, *Del-Mar Energy Pathway Project*, 169 FERC ¶ 61,228, Certificate Order (Dec. 19, 2019); *Rio Bravo Pipeline Project*, 170 FERC ¶ 61,046, Order on Rehearing & Stay, p. 6, P 12 (Jan. 23, 2020); *Cheniere Corpus Christi Pipeline, L.P.*, 169 FERC ¶ 61,135, Order Granting Authorizations Under Sections 3 and 7 of the NGA (Nov. 22, 2019); *Driftwood Pipeline LLC*, 167 FERC ¶ 61,054, Order Granting Authorizations Under Sections 3 and 7 of the NGA (Apr. 18, 2019); *TransCameron Pipeline, LLC*, 166 FERC ¶ 61,144, Order Granting Authorizations

ARGUMENT

I. The Gas Act Requires the Commission to Protect the Public Interest and Promote the Orderly Development of Natural Gas at Reasonable Prices.

The Gas Act was Congress's response to corporate abuse. In the 1930s, large utility holding companies exerted unacceptable monopoly power over gas markets. State regulators were unable to restrain them,⁵ so Congress acted. After ordering a comprehensive investigation,⁶ it discovered the depth of industry exploitation.⁷ Utility companies were charging exorbitant rates, and employing "unsound and/or needless financial structures and practices which [were] a detriment and frequently

Under Sections 3 and 7 of the NGA (Feb. 21, 2019); *Jordan Cove Energy Project*, 171 FERC ¶ 61,136, Order on Rehearing and Stay (May 20, 2020).

⁵ S. Rep. No. 1162, 75th Cong., 1st Sess. (1937). *See, e.g., Missouri v. Kansas Natural Gas Co.*, 265 U.S. 298, 308-09 (1923).

⁶ *See* S. Res. 83, 70th Cong., 1st Sess., approved February 15, 1928 (as extended by S. J. Res 115, 73d Cong., 2d Sess., approved June 26, 1934).

⁷ Annual Report of the Federal Trade Commission for the Fiscal Year ended June 30, 1949 at p. 135

(https://books.google.com/books?id=y8YjiMY2400C&pg=RA1-PA69&lpg=RA1-PA69&dq=ftc+investigation+of+utility+holding+companies+1935&source=bl&ots=X46NabRDed&sig=ACfU3U3QdLheqEI48LBhc5-4mh_P4H9lqg&hl=en&sa=X&ved=2ahUKEwjmg8e2gc3pAhUQJt8KHbkoAwgQ6AEwB3oECAoQAQ#v=onepage&q=ftc%20investigation%20of%20utility%20holding%20companies%201935&f=false).

a menace to the investor or the consumer.”⁸ Congress passed the Gas Act to protect consumers from such abuse,⁹ instituting a searching certification inquiry that only permits approval of projects that the public needs and will serve the public interest: The Gas Act stipulates that no interstate gas facility may be constructed unless the Commission certifies that it is *required* by the public convenience and necessity.¹⁰ If an applicant demonstrates its project is required, it receives a certificate of public convenience and necessity (a “Certificate”), securing delegated federal eminent domain power to seize privately-owned land necessary for pipeline construction.¹¹

The history of the public convenience and necessity standard demonstrates that the standard requires a searching review of a proposed project’s public impact. States created it to prevent applicants from proceeding with projects that would result in infrastructure duplication, unfair competition, or community harm.¹² The

⁸ Annual Report of the Federal Trade Commission for the Fiscal Year ended June 30, 1935 at p. 26

(https://www.ftc.gov/sites/default/files/documents/reports_annual/annual-report-1935/ar1935_0.pdf at 26-27) [hereinafter “1935 Report”].

⁹ See Natural Gas Act, Pub. L. No. 75-688, § 1(a), 52 Stat. 821 (1938) (codified at 15 U.S.C. § 717(a)) (noting that regulation of interstate natural gas was in the public interest “as disclosed in the reports of the Federal Trade Commission”).

¹⁰ See 15 U.S.C. § 717f(c)(1)(A) (2018); 15 U.S.C. § 717f(e) (2018).

¹¹ See 15 U.S.C. § 717f(h) (2018).

¹² William K. Jones, *Origins of the Certificate of Public Convenience and Necessity: Developments in the States 1870–1920*, 79 *Columbia L. Rev.* 426, 428 (1979). *O’Keefe v. Chicago Rys. Co.*, 188 N.E. 815, 817 (Ill. 1933) (“The convenience and necessity required to support an order of the commission are those of the public and not of the individual. . .”).

standard required a fulsome analysis considering externalities like public safety impacts and environmental harm.¹³ Both courts and the Commission understood that Congress adopted this conception of the standard in the Gas Act.¹⁴ The Supreme Court found that the Gas Act's purpose is "to protect consumers against exploitation at the hands of natural gas companies,"¹⁵ while ensuring "orderly development of plentiful supplies of electricity and natural gas at reasonable prices."¹⁶ To implement this core purpose, the Commission is "required to" evaluate *all* factors bearing on the public interest.¹⁷

The Commission purports to meet this standard by following the framework it created in 1999¹⁸ to ensure "proper incentives for pipelines to invest in new facilities that are needed to meet increased demand, and avoid problems of excess capacity that may be caused by construction of facilities to compete for existing market share."¹⁹ This framework commands a three step analysis. First, the project

¹³ Jones, *supra*, at 428 (collecting cases).

¹⁴ See, e.g., *Kansas Pipeline & Gas Co. and North Dakota Consumers Gas Co.*, 2 FPC 29 (1939) (citing state regulatory and court adjudicating fulsome standard); *In the Matter of Michigan-Wisconsin Pipeline Co.*, 6 FPC 1 (1947) (same).

¹⁵ *FPC v. Hope Nat. Gas Co.*, 320 U.S. 591, 610 (1944).

¹⁶ *NAACP v. FPC*, 425 U.S. 662, 669-70 (1976).

¹⁷ *Henry v. FPC*, 513 F.2d 395, 403 (D.C. Cir. 1975); *Cascade Natural Gas Corp. v. FERC*, 955 F.2d 1412, 1421 (10th Cir. 1992).

¹⁸ Certificate Policy.

¹⁹ Regulation of Interstate Natural Gas Transportation Services, 63 Fed. Reg. 42974-01, 42980 (July 29, 1998).

cannot depend on subsidies from the applicant's existing customers.²⁰ Second, if, and only if, that test is met, the Commission must weigh the project's public benefits against its adverse economic impacts on three groups: the applicant's existing customers, competing existing pipelines and their captive customers, and landowners and surrounding communities.²¹ Then, if the public benefits outweigh any adverse economic impacts that remain after the applicant's efforts to mitigate them, the Commission proceeds to a final step:²² a *second* cost-benefit analysis. The public benefits the Commission considers at this stage are the ones identified in the preceding stage, but the scope of adverse impacts expands to include *all* adverse project impacts.²³ The animating force behind each step of the Commission's certification process is its Gas Act mandate to serve the public and shield it from energy companies' abusive practices.

²⁰ 1999 Policy Statement, at ¶ 61,744-45. The no-subsidization requirement was necessary to preclude "wrong price signals" that could result in "overbuilding of capacity," limitations on competition and customer choice, "inefficient investment and contracting decisions" that could "exacerbate adverse environmental impacts, distort competition between pipelines for new customers, and financially penalize existing customers of expanding pipelines and of pipelines affected by the expansion." *Id.*

²¹ *Id.* at ¶ 61,745.

²² *Id.*, at ¶ 61,745-46.

²³ Costs of adverse environmental impacts, *inter alia*, are to be weighed in this step. *Certification of New Interstate Pipeline Facilities*, 90 FERC ¶ 61,128, 61,397-98 (Feb. 9, 2000).

The Commission's Gas Act implementation yielded a robust interstate pipeline system. By 1999, there was a large gas pipeline system serving customers around the country.²⁴ Since then, there has been dramatic expansion. Incredibly, the amount of capacity approved since 1999 is nearly **double** the all-time record for gas use in a single day.²⁵ From 1999 to 2017, the Commission added 180 billion cubic feet per day (bcf/d) of pipeline capacity; this is equivalent to **193%** of the capacity used (on average) during a month with seasonally high use, and 131% of the capacity used during the all-time peak-day (a 2014 polar vortex occurrence).²⁶ Although some regions may still experience wintertime peak day gas-transportation constraints (and resulting pricing impacts),²⁷ building expensive

²⁴ See James Tobin, About Natural Gas Pipelines, Energy Information Administration (EIA), Powerpoint Presentation on "Major Changes in Natural Gas Pipeline Transportation Capacity, 1998-2008," https://www.eia.gov/naturalgas/archive/analysis_publications/ngpipeline/compare_mapm.pps.

²⁵ See Tierney Testimony Before the U.S. House Subcommittee on Energy of the Committee on Energy and Commerce Subcommittee Hearing on "Modernizing the Natural Gas Act to Ensure It Works for Everyone," at 2, Feb. 5, 2020 [hereinafter "Tierney Testimony"].

²⁶ See Susan F. Tierney, Analysis Group, Natural Gas Pipeline Certification: Policy Considerations for a Changing Industry 1-2 (2017); see also EIA, *Natural Gas Monthly* (Mar. 31, 2017), https://www.eia.gov/naturalgas/monthly/archive/2017/2017_03/ngm_2017_03.php; EIA, *Record winter withdrawals create summer storage challenges* (June 12, 2014),

https://www.eia.gov/naturalgas/review/winterlookback/2013/#tabs_Consumption-4

²⁷ Marie Cusick, *Northeast needs more gas pipelines, says new report*, Pennsylvania State Impact, April 25, 2017, <https://stateimpact.npr.org/pennsylvania/2017/04/25/northeast-needs-more-gas->

pipelines is often the least economic and most environmentally damaging means of meeting demand occurring only a few days per year. Excess capacity renders many pipelines underutilized or assets that are stranded long before their useful life ends, a cost the public bears.²⁸ There is currently far more pipeline capacity than needed.

How did the Gas Act's mandate to ensure *adequate* gas capacity allow for an amount nearly *double* the one-day usage record to be added to an already robust system? The cause of this dramatic overbuilding lies in the Commission's dereliction of its Gas Act duties.

II. Regulated Affiliate-Supported Projects Are the New Face of Corporate Abuse.

The threat of “needless financial structures and practices”²⁹ still exists, but now comes in the form of Regulated Affiliate coordination. *Spire* demonstrates

pipelines-says-new-report/; Alan Kovski, *Fast Growth Coming for Northeast Shale Gas Pipelines*, Bloomberg BNA, March 5, 2017, <https://www.bna.com/fast-growth-coming-n57982084782/>.

²⁸ For gas pipelines, stranded assets are those whose investment costs are no longer recoverable. Overbuilding and concurrent cost reductions for clean energy alternatives will create significant stranded assets in gas infrastructure. See Mark Dyson, *A Bridge Backward? The Risky Economics of New Natural Gas Infrastructure in the United States*, Rocky Mountain Institute (Sept. 9, 2019), <https://rmi.org/a-bridge-backward-the-risky-economics-of-new-natural-gas-infrastructure-in-the-united-states/>; see also J. Shelor, *Marcellus/Utica On Pace for Pipeline Overbuild*, *Says Braziel*, Natural Gas Intelligence (June 8, 2016), <http://www.naturalgasintel.com/articles/106695-marcellusutica-on-pace-for-pipeline-overbuild-says-braziel>.

²⁹ 1935 Report, *supra*, at 26-27.

that such coordination is one of the most egregious causes of gas infrastructure overbuilding and public harm. Recent applications often rely on contracts (precedent agreements) with the project applicant's Regulated Affiliate.³⁰

Precedent agreements can be grouped into three categories: (1) agreements with third-parties unrelated to the applicant; (2) agreements with shipping companies owned by the same corporate parent as the applicant but are not state-regulated utilities; and (3) agreements with companies that are both owned by the same corporate parent as the applicant and are state-regulated utilities (such as Regulated Affiliates). To support its project, *Spire* relies entirely on one Regulated Affiliate contract.³¹ Regulated Affiliates are unique pipeline customers because they have a legally protected right to bill their own customers for the costs they are charged by a pipeline operator in Commission-approved rates.³²

The Commission admits it does not require evidence of public need beyond these private agreements, accepting all three types as unassailable evidence of

³⁰ See NOI, at 47 (noting the “increase in the number of shippers that are affiliated with pipeline companies”).

³¹ Initial Opening Brief of Petitioner Environmental Defense Fund at 2, EDF v. FERC, No. 20-1016 (D.C. Cir. filed June 26, 2020).

³² See e.g., Andrea J. Ercolano & Peter C. Lesch, *Narragansett Update: From Washington Gas Light to Nantahala*, 7 Energy L.J. 333, 333 (1986) (“the so-called ‘Narragansett doctrine’ ... provides that state regulatory commissions, in setting retail rates, must allow recovery of the interstate wholesale utility rates that have been made effective by [FERC] in the exercise of its exclusive jurisdiction over the regulation of such rates.”).

public need and public benefit.³³ While the four corners of Regulated Affiliate contracts bear no hallmarks of abuse, the Commission's practice of relying on such agreements alone nonetheless violates the Gas Act, imposing public harm.

III. The Commission's Reliance on Regulated Affiliate Contracts Contravenes the Gas Act's Public Convenience and Necessity Standard.

To understand how Regulated Affiliate-backed projects can yield authorizations for unnecessary pipelines, this Part explains the harm the Commission misses by refusing to look beyond contracts. Part III.A. describes why Regulated Affiliate-backed projects evade the public convenience and necessity threshold screening test. Part III.B. describes how relying on contracts alone limits the Commission's ability to adequately weigh these project's benefits against their adverse impacts. Part III.C. reviews the Commission's failure to weigh landowner's adverse impacts when determining public interest.

A. Projects that require subsidization by existing customers do not meet the Gas Act standard.

³³ "In practice, the Commission does not look 'behind' or 'beyond' precedent agreements when making a determination about the need for new projects or the needs of the individual shippers." NOI, at 46. "To date, the Commission has not distinguished between affiliate and non-affiliate precedent agreements in considering the need for a proposed project." *Id.*, at 47.

The public convenience and necessity standard first demands that existing customers not subsidize newly proposed projects.³⁴ Recent pipeline applicants -- like Spire STL Pipeline LLC -- are often newly-created entities, owned by the same corporate parent as the Regulated Affiliates that are their only committed customers.³⁵ As such, the applicants by definition do not have existing customers. But the Commission's reasoning that there can be no subsidization because there are no existing customers³⁶ ignores the economic reality of such affiliate arrangements. The Commission created the no-subsidization requirement to prevent pipeline companies from passing project costs onto customers that would not benefit therefrom, because doing so runs counter to the public interest.³⁷ Yet creating a new company does not eliminate the possibility that consumers subsidize pipelines from which they derive no benefit. Indeed, the captive customers of pipelines' Regulated Affiliate shippers are quite likely to end up subsidizing the project.

Here's how. The Commission sets the initial rate that a new pipeline company may charge shippers. When those shippers are Regulated Affiliates, they will subsequently appear before PUCs to include the new pipeline's costs in retail

³⁴ 1999 Policy Statement, at ¶ 61,745.

³⁵ See, e.g., *Jordan Cove Energy Project, LP*, 171 FERC ¶ 61,136, Order on Rehearing and Stay (May 22, 2020) (Glick, Comm'r, dissenting at P 13).

³⁶ *Spire STL Pipeline LLC*, 164 FERC ¶ 61,085, P 28-34 (August 3, 2018).

³⁷ *Certification of New Interstate Pipeline Facilities, supra*, at ¶ 61,391-96.

rates to customers. For reasons explained below,³⁸ PUCs feel compelled to approve recovery of such costs in retail rates. The result is assured cost-recovery throughout the affiliated supply chain, leading to ordinary gas consumers subsidizing projects.

Furthermore, because the pipeline company may go back to the Commission for a rate increase over time, the original economic impacts on captive customers may not reflect the whole harm; the pipeline may increase its rates after project construction, costing consumers even more. Such an exercise of vertical market power is a technical evasion of a requirement supposed to protect against just such a result. Projects like *Spire* do not pass even the first step of the Commission's own articulation of the Gas Act's requirements. The Commission's current implementation leaves customers deeply vulnerable to shouldering post-approval cost-subsidization, violating the Gas Act's requirement to protect the public interest.

B. The Commission must apply heightened scrutiny to Regulated Affiliate contracts when determining public benefit, and require alternative evidence on the existence, or lack thereof, of public benefits.

After essentially discarding the no-subsidization requirement, the Commission treats Regulated Affiliate contracts as conclusive evidence that a project has public benefit.³⁹ Regulated Affiliate-backed projects must receive

³⁸ See Part V, *supra*.

³⁹ The Certificate Policy stipulates that no single factor be determinative. See, e.g., *National Fuel Gas Supply Corporation, Empire Pipeline, Inc.*, 158 FERC ¶ 61,145

greater scrutiny, with the Commission considering alternative evidence of a project's *actual public* benefit. The Commission admits that there have been significant changes in the twenty years since the Policy Statement, such as applicants using "precedent agreements as applicants' principal evidence of the need for their projects."⁴⁰

The Commission acknowledges that it fails to weigh other critical data demonstrating that the public may not benefit from the project, and in fact be *harmed* by the proposed project. Neither the Commission nor this court have to "look behind precedent or service agreements to make judgments about the needs of individual shippers,"⁴¹ and no one disputes that contracts signed between two arm's-length parties can provide some evidence of market demand. The Commission appropriately considers such contracts to be "important evidence of demand for a project."⁴² And serving unmet demand is one public benefit that can be credited to applications.⁴³ But the public convenience and necessity standard does not support giving one factor -- and certainly not Regulated Affiliate contracts

(Feb. 3, 2017) (Bay, Comm'r, Separate Statement at P 3) ("The certificate policy statement, which was issued in 1999, lists a litany of factors for the Commission to consider in evaluating need. Yet, in practice, the Commission has largely relied on the extent to which potential shippers have signed precedent agreements for capacity on the proposed pipeline." (internal citation omitted)).

⁴⁰ See NOI, at 2 (Apr. 19, 2018).

⁴¹ *City of Oberlin, Ohio v. FERC*, 937 F.3d 599, 606 (D.C. Cir. 2019).

⁴² 1999 Policy Statement, at ¶ 61,748.

⁴³ *Id.*

-- dispositive weight when determining a project's public benefit.⁴⁴ The standard requires that the Commission conduct a *holistic* application review to determine public benefit.⁴⁵

The Commission's Certificate Policy recognizes the insufficiency of contracts alone, and dictates that market studies, which show whether there is in fact unmet demand, be considered.⁴⁶ Nor does the Gas Act contemplate reliance on contracts; it uses the fulsome public convenience and necessity standard, and not a ministerial requirement that the Commission ensure the project has contracts. Given the Commission's monolithic reliance on Regulated Affiliate contracts as a proxy for public benefit, public commenters have assumed the burden of introducing evidence demonstrating that proposed projects will not serve unmet demand.⁴⁷ The Commission does not require applicants to submit market studies,⁴⁸

⁴⁴ Nor does the Commission's own policy statement support this abdication of a fulsome public convenience and necessity analysis. *Id.* at ¶ 61,747.

⁴⁵ *Id.*

⁴⁶ *Id.*, at ¶ 61,748. *Accord Allegheny Defense Project v. FERC*, No. 17-1098, 2020 WL 3525547, at *15 (D.C. Cir. June 30, 2020) (affirming FERC's reliance on precedent agreements because its market need determination was also grounded on a study reinforcing domestic demand for gas shipments).

⁴⁷ Out of 29 projects approved since 2019, only five had an application or order *mentioning* evidence other than contracts. For those, the Commission did not seriously consider countervailing evidence of need. *See, e.g., Adelpia Gateway, LLC*, Order Issuing Certificates, 169 FERC ¶ 61,220, p. 15, ¶ 36 (Dec. 20, 2019) (dismissing market study negating applicant's vague and unsubstantiated assertions of need).

⁴⁸ The Certificate Policy finds that market studies are valuable for establishing public benefit. 1999 Policy Statement, at ¶ 61,748. It noted that the Commission's

demand forecasts, data regarding existing pipeline capacity, or monetized landowner and local community impacts. Three Commissioners have recognized that the Commission's practices are inappropriate, stating that near-exclusive reliance on precedent agreements improperly undervalues myriad factors relevant to determining a pipeline's potential public benefit.⁴⁹ But as it did in *Spire*, the Commission routinely ignores countervailing data.⁵⁰

Spire is perhaps the most egregious example of this behavior. Here, the Commission relied on Regulated Affiliate agreements exclusively to support public need, ignoring significant evidence of overbuilding, unprecedented opposition from a competitor pipeline, and a market with existing excess capacity.⁵¹ Even

prior review process relied too heavily on contracts to demonstrate market demand. *Id.* at ¶ 61,744.

⁴⁹ See *Jordan Cove Energy Project, LP*, Order on Rehearing and Stay, 171 FERC ¶ 61,136 (May 20, 2020) (Glick, Comm'r, dissenting at P 13); Hearing on "Modernizing the Natural Gas Act to Ensure it Works for Everyone," Before H. Comm. on Energy & Commerce, Subcomm. on Energy, 116th Cong. (Feb. 5, 2020) (written testimony of Cheryl A. LaFleur, former Federal Energy Regulatory Commission Comm'r); Representatives National Fuel Gas Supply Corporation, Empire Pipeline, Inc., 158 FERC ¶ 61,145 (Feb. 3, 2017) (Bay, Comm'r, Separate Statement).

⁵⁰ See, e.g., *Jordan Cove Energy Project, LP*, 171 FERC ¶ 61,136, Order on Rehearing and Stay (May 20, 2020) (finding single affiliate contract sufficient to establish public need and ignoring studies showing project's cost disadvantages compared to competitors').

⁵¹ Request for Rehearing of the Environmental Defense Fund, FERC Docket Nos. CP17-40-000 and CP17-40-001, at 4.

worse, the *Spire* record contained evidence that Spire Missouri turned back lower-cost legacy capacity in favor of its affiliate.⁵²

The Commission's approach to Regulated Affiliate contracts is also problematic because it ignores an important element of a typical arms-length relationship absent between affiliates: the discipline of the market on rates.⁵³ The Commission dismisses concerns that affiliated-shipper contracts are not true indicators of market demand because the contracts reflect no improper business dealings.⁵⁴ This ignores the fact that the rate impacts of non-arms-length business dealings between affiliated shippers and a project operator may only appear *after* project construction. Typically, the rates gas pipeline operators can charge are determined initially during the Certificate process.⁵⁵ Thereafter, the pipeline must file with the Commission if it wishes to increase its rates (Section 4 rate cases).⁵⁶

⁵² *Id.*

⁵³ Although *Spire* involves a Regulated Affiliate contract, the problem highlighted here also affects unregulated affiliate contracts.

⁵⁴ See, e.g., *PennEast Pipeline Co., LLC*, 162 FERC ¶ 61,053 (Jan. 19, 2018), Certificate Order, at P 33.

⁵⁵ Cost-of-Service Rate Filings, Federal Energy Regulatory Commission, <https://www.the Commission.gov/industries/gas/gen-info/rate-filings.asp> (last updated Apr. 24, 2019). See e.g., Sean Sullivan, *Spire STL Pipeline can adjust rates to account for construction challenges*, S&P Global Market Intelligence, October 29, 2019, https://www.spglobal.com/marketintelligence/en/news-insights/trending/yct6xtkz4-b7s_lngc_1-a2.

⁵⁶ Cost-of-Service Rate Filings, FERC, <https://www.the Commission.gov/industries/gas/gen-info/rate-filings.asp> (last updated Apr. 24, 2019).

Additionally, the Commission may initiate a proceeding to determine if the operator's rates are "just and reasonable," or a third party may submit a complaint alleging that the rates are not "just and reasonable" (Section 5 rate cases).⁵⁷ The Commission's current practice is to determine that rates are just and reasonable if they reflect the actual cost of providing service.⁵⁸ A pipeline's customers are thus a key participant in both kinds of rate cases, where they can challenge the operator's proposed rates if inappropriately high. But if the operator's shipper-customer is in fact part of *the same corporate family*, there is no incentive for the customer to challenge the proposed rates. The logic of the market -- that customers can refuse to transact when they think prices are inefficient or uncompetitive -- is absent when pipelines rely on Regulated Affiliates as their shipper-customers. Operators can file for rate increases without fear they will be challenged, and the increased rates will be passed along as additional costs for the customers of Regulated Affiliate shippers. The potential for this abuse is particularly present in *Spire*; the *only customer* for the proposed pipeline is a Regulated Affiliate. There is no third-party entity that will ensure that Spire STL is building and operating its project in an economically efficient manner. This indicates that Regulated Affiliate contracts cannot be given substantial weight in determining public benefit.

⁵⁷ *Id.*

⁵⁸ *Id.*

Fundamentally, affiliate agreements are inadequate evidence of public need because they reflect only the private interests of two parties and therefore cannot *alone* demonstrate that a pipeline project is needed by the public. The Commission has previously recognized this, stating that using “contracts as the primary indicator of market support for the proposed pipeline project also raises additional issues when the contracts are held by pipeline affiliates,”⁵⁹ and yet now seems to ignore such concerns. The court must step in to remedy this situation, requiring the Commission to give greater weight to state regulators’ opinions, substantiated demand forecasts, and evidence of shippers turning back capacity from another pipeline.

C. After relying on Regulated Affiliate contracts to establish public benefit, the Commission uses them to create an insurmountable weight when “balancing” public benefit against adverse impacts.

If the Commission determines that a project has public benefit, it must weigh that benefit against residual harms.⁶⁰ Accordingly, the “amount of evidence necessary to establish the need for a proposed project will depend on the potential adverse effects of the proposed project on the relevant interests.”⁶¹ This should be a crucial analytical step, with public benefit data increasing as adverse impacts

⁵⁹ 1999 Policy Statement, at ¶ 61,744.

⁶⁰ *Id.* at ¶ 61,749.

⁶¹ *Id.* at ¶ 61,748.

increase.⁶² But the Commission exclusively relies on regulated affiliate contracts rather than requiring more evidence of need.

While the Commission does not quantify the weight it assigns such contracts, they eliminate public interest balancing. Since 1999, the Commission has **never** rejected an application supported by contracts.⁶³ “Benefit” is a binary finding (i.e., is there a contract or not), and contracts outweigh all adverse impacts, regardless of character or magnitude. For *Spire*, a single regulated affiliate contract outweighed a project impacting over 1,000 acres, causing significant damage, massive land condemnation, significant evidence of overbuilding, unprecedented opposition from a competitor pipeline, and a market with existing excess capacity (including lower cost legacy capacity Spire Missouri turned back in favor of its

⁶² *Id.*

⁶³ FERC reports that there have been 493 pipeline approvals since 1999 (based on raw listings of pipeline approvals). Approved Major Pipeline Projects (2015-Present), <https://www.ferc.gov/industries-data/natural-gas/approved-major-pipeline-projects-2015-present> (last visited June 27, 2020). Two applications were rejected since the Certificate Policy’s adoption (Jordan Cove and Turtle Bay). See Tierney Testimony, at 2, n. 6 (updated with additional pipeline approvals as of May 12, 2020). Neither was supported by any precedent agreements. See *Jordan Cove Energy Project, L.P.*, Order Denying Applications for Certificate and Section 3 Authorization, 154 FERC ¶ 61,190, at P 13-18 (Mar. 11, 2016) (describing the lack of signed precedent agreements to support the proposed project); *Turtle Bayou Gas Storage Company, LLC*, Order Denying Application for Certificate Authorizations, 135 FERC ¶ 61,233, 62,297 (June 16, 2011) (same). Since Dr. Tierney testified on the Commission’s pipeline project review record, it has approved six additional pipeline projects. Approved Major Pipeline Projects (2015-Present), FERC (June 17, 2020), <https://www.ferc.gov/industries-data/natural-gas/approved-major-pipeline-projects-2015-present>.

affiliate).⁶⁴ The Commission assigns precedent agreements unquantified public benefit outweighing these significant and quantifiable impacts. The Certificate Policy, the Gas Act, and the Constitution all demand that the Commission give actual weight to the disparate burden of infrastructure development placed on landowners and communities. The Commission recognizes the significant public harm from condemnation, finding that “the dollar amount received as a result of eminent domain may not provide a satisfactory result to the landowner and this is a valid factor to consider in balancing the adverse effects of a project against the public benefits.”⁶⁵ But it accepts a single Regulated Affiliate contract as enough evidence of need to outweigh harm from massive exercises of eminent domain. This strains credulity.

IV. The Commission’s Treatment of Other Adverse Impacts Is Not the Product of Reasoned Decision Making, and Fails to Protect the Public Interest.

Pipelines supported by Regulated Affiliates -- when there is no capacity construction or forecasted load growth -- create government-sanctioned profit

⁶⁴ Request for Rehearing of the Environmental Defense Fund, the Commission Docket Nos. CP17-40-000 and CP17-40-001, at 4.

⁶⁵ *Certification of New Interstate Nat. Gas Pipeline Facilities*, 90 FERC ¶ 61128, 61398 (Feb. 9, 2000).

generation for projects providing no public benefit, but significant public costs.⁶⁶ Beyond ignoring substantial market, industry, ratepayer, consumer and landowner harms from regulated affiliate-supported projects, the Commission also subverts the Gas Act's public interest standard by discounting adverse environmental and health impacts. This exponentially compounds the harms from Regulated Affiliate-supported projects. It also infects the Commission's Gas Act implementation for all projects, because it fails to put environmental and health impacts on the public interest scale. For example, when certifying LNG facilities, after reciting significant environmental impacts to environmental justice communities, "the Commission basically shrugs its shoulders, concludes that the impacts on environmental justice communities are inevitable, and moves on."⁶⁷ Naming is not weighing, and the Gas Act requires more than disclosure. Worse, the Commission has determined that Regulated Affiliate projects serve the public interest when

⁶⁶ See *PennEast Pipeline Co., LLC*, Order on Rehearing, 164 FERC ¶ 61,098, at 13 (Aug. 10, 2018) (Glick, Comm'r, dissenting) (the Commission did not account for environmental impacts when approving the affiliate-supported project and "cannot legitimately suggest it is fulfilling its obligations under the NGA to 'evaluate all factors bearing on the public interest' while simultaneously relying solely on economic factors in its determination.").

⁶⁷ *Texas LNG Brownsville LLC*, 170 FERC ¶ 61,139 (Feb. 21, 2020), at P. 15 (Glick, Comm'r, dissenting). That same decision similarly disposed of "significant adverse impact on endangered species" concerns by "simply recit[ing] the potential harm and then proceed[ing], post haste, to make a public interest determination without further discussion." *Id.*, at 16.

significant environmental harms have yet to be identified, much less weighed, completely negating any pretense of balancing them against benefit.⁶⁸

V. The Commission, Not State Regulators, Is the Entity Best Positioned to Prevent These Abuses.

Even though Congress established that the Commission should be responsible for determining whether new gas pipelines are needed, the Commission believes that these problems should be addressed, if they must be addressed at all, by state regulators. This belief stems from a fundamental misunderstanding of state regulators' role in regulating LDCs. The Commission's rationale for declining to require data in addition to LDC-affiliate contracts partially relies on the idea that state regulators will conduct a pipeline prudence and/or cost recovery review.⁶⁹ This is wrong. State prudence reviews -- in which a PUC reviews whether it was prudent for an LDC to take service from a new or existing pipeline -- do not necessarily occur prior to the construction of a pipeline and, once that pipeline is built, take Commission-approved rates as a given and cannot undo a Commission approval for such construction.⁷⁰ In fact, the Missouri Commission specifically requested the Commission conduct a need determination

⁶⁸ See *PennEast Pipeline Co., LLC*, *supra* note 66.

⁶⁹ *Spire STL Pipeline*, 169 FERC ¶ 61,134, at P 19, Order on Rehearing (Nov. 21, 2019) (Glick, Comm'r, dissenting).

⁷⁰ *Id.* See e.g., Missouri State Regulations 4 CSR 240-20.045(2)(C).

review, belying the Commission's assertion that doing so would step on state regulators' toes.⁷¹ The Missouri Commission itself lacks authority to pre-approve contracts.⁷² This limitation is not unique to Missouri; most PUCs lack such authority.⁷³ Nor could any of the few states authorized to do so satisfy the *Commission's* Gas Act mandate. Instead, most PUCs may only review pipeline activity through safety monitoring and rate cases, but these all occur after land has

⁷¹ Missouri PSC February 27, 2017 Protest, at 4-5 (“request[ing] the Commission thoroughly examine all of the circumstances and impacts of the proposed pipeline as the Commission determines whether Spire has shown that construction of the pipeline is in the public interest” and stating that “it is not clear that there is need for the project”).

⁷² “Missouri utilities are subject to an Affiliate Transactions Rule, but this rule is applied only on a retroactive basis and as such is insufficient to protect the interests of utility gas customers. The state’s prudency review, which will take place in a future . . . process, is similarly after-the-fact, whereby the [Missouri Commission] will be limited to reviewing whether Laclede was prudent in contracting with Spire when compared to other alternatives.” Motion to Lodge of the Environmental Defense Fund, before the Federal Energy Regulatory Commission, Spire STL Pipeline, LLC, Nos. CP17-40-000 and CP17-40-001, January 9, 2018, at 7-8 (internal citations omitted).

⁷³ For those few with authority, review is permissive, at LDC request. *See, e.g.*, Order No. PSC-13-0505-PAA-EI (October 28, 2013), <http://www.floridapsc.com/library/filings/2013/06488-2013/06488-2013.pdf> (“FPL is not obligated by law to obtain our approval to enter into a long-term gas transportation contracts for the projects, as both contracts are governed by [FERC]). Some states may require Regulated Affiliates to file contracts for approval, but the PUC’s review does not comprise a need analysis. *See, e.g., In the Matter of Application of Piedmont Nat. Gas Co., Inc., for Authorization to Enter into Affiliate Agreements & Related Redelivery Agreement Amendments*, No. G-9, 2014 WL 5500869, at *6 (N.C.U.C. Oct. 28, 2014) (unpublished).

been condemned and the pipeline built, and cannot substitute for a prior-approval determination.

Moreover, during post hoc cost recovery proceedings, state regulators' hands are tied by two factors. First, states cannot undo a Commission-approved rate when the states incorporate the costs, like gas transportation service, as part of retail rates.⁷⁴ Second, any attempt to deny cost recovery results in lowering the LDCs' credit rating,⁷⁵ which raises their costs of equity capital or debt for all capital investments and will result in higher charges to consumers to cover this cost. Thus, the Commission's attempt to duck a fulsome Gas Act review -- which it portrays as necessary to avoid trammeling PUCs' jurisdiction -- is backwards.⁷⁶ In fact, PUCs' reliance on the Commission to conduct its statutorily mandated need determination is another compelling reason for the Court to ensure that the Commission begins doing just that. *Spire* lays bare this truth; the state regulators apprised the Commission of their limited regulatory reach, and the Commission again abdicated its Gas Act mandate to protect the public interest.

⁷⁴ This is the "Narragansett Doctrine." See Ercolano & Lesch, *supra* note 33.

⁷⁵ Regulated Electric and Gas Utilities 6, 15, Moody's Investor Service, <https://www.xcelenergy.com/staticfiles/xeresponsive/Company/Rates%20&%20Regulations/Rate%20Cases/Attachment-MPS-4.pdf> (describing that ability to recover costs through regulatory processes is a key metric in credit ratings for regulated utilities).

⁷⁶ *Spire STL Pipeline*, 169 FERC ¶ 61,134, at P 16, Order on Rehearing (Nov. 21, 2019).

The Commission is also better resourced and positioned than most PUCs to conduct comprehensive public need analyses for new gas pipelines. As in Missouri, many PUCs lack capacity to engage in a fulsome need review. The Commission, however, unquestionably is capable of doing the requisite comprehensive public benefit analysis;⁷⁷ it has a history of exercising vigilance in addressing the risk that affiliates will exercise horizontal⁷⁸ or vertical⁷⁹ market power. The Commission staff conducts detailed market assessments,⁸⁰ state-of-the-market reports,⁸¹ and, as part of the agency's enforcement responsibilities, complex analyses of market manipulation.⁸² It also conducts technical analyses to monitor physical and cybersecurity risks to energy infrastructure.⁸³ If the Commission

⁷⁷ Comments of Susan F. Tierney, Ph.D. (July 25, 2018), *Certification of New Natural Gas Facilities*, No. PL18-1-000, at 34.

⁷⁸ Horizontal Market Power, FERC (June 15, 2020), <https://www.ferc.gov/horizontal-market-power>.

⁷⁹ Vertical Market Power, FERC (June 15, 2020), <https://www.ferc.gov/vertical-market-power>.

⁸⁰ Office of Electric Reliability, FERC, Summer Energy Market and Reliability Report 2020 (May 21, 2020), <https://www.ferc.gov/sites/default/files/2020-06/2020-summer-assessment.pdf>; FERC, Energy Primer: A Handbook for Energy Basics (Apr. 2020), https://www.ferc.gov/sites/default/files/2020-06/energy-primer-2020_0.pdf; Office of Enforcement, FERC, OE Energy Market Snapshot (Apr. 2019), <https://www.ferc.gov/sites/default/files/2020-05/May2019NationalVersion.pdf>.

⁸¹ Office of Energy Policy and Innovation, FERC, State of the Markets (2019), <https://www.ferc.gov/sites/default/files/2020-05/2019-som.pdf>.

⁸² See, e.g., Office of Enforcement, FERC, 2019 Report on Enforcement (2019), <https://www.ferc.gov/sites/default/files/2020-05/11-21-19-enforcement.pdf>.

⁸³ See e.g., Office of Energy Infrastructure Security, FERC (June 20, 2020), <https://ferc.gov/about/offices/office-energy-infrastructure-security-oeis>; Office of

presently lacks capability to conduct fulsome analyses of whether proposed pipeline projects are needed, it is by choice. Regardless, the Gas Act requires the Commission to do this review; it cannot fulfil its own statutory duties by passively delegating them to state regulators or to the sole metric of the existence of contracts.

Electric Reliability (OER), FERC (June 25, 2020),
<https://ferc.gov/about/offices/office-electric-reliability-oer>.

VI. Conclusion

For all the foregoing reasons, the Court should vacate the Federal Energy Regulatory Commission's orders.

Respectfully Submitted,

/s/ Jennifer Danis

Jennifer Danis, Esq.

Edward Lloyd, Esq.

Morningside Heights Legal Services

Columbia Law School

435 W. 116th Street

New York, NY 10027

(212) 854-4291

jdanis@law.columbia.edu

Counsel for Dr. Susan Tierney

Dated: July 1, 2020

CERTIFICATE OF COMPLIANCE

Per Fed. R. App. P. 29(a)(4)(G), Fed. R. App. P. 29(a)(5), I certify that this amicus brief complies with the type-volume limitations because its textual portions, including headings, footnotes, and quotations contain 6488 words, as counted by the “Word Count” feature of Microsoft Word for Mac license 2019, version 16.36, the program with which this brief was prepared. This word count excludes: (1) the cover page; (2) the table of contents; (3) the Rule 26.1 corporate disclosure statement; (4) certificates; (5) the glossary of abbreviated terms and terms of art; and (6) the signature block.

Respectfully Submitted,

/s/ Jennifer Danis

Jennifer Danis, Esq.

Edward Lloyd, Esq.

Morningside Heights Legal Services

Columbia Law School

435 W. 116th Street

New York, NY 10027

(212) 854-4291

jdanis@law.columbia.edu

Counsel for Dr. Susan Tierney

Dated: July 1, 2020

STATUTORY ADDENDUM

15 USCS § 717a-b

Current through Public Law 116-145, approved June 17, 2020.

United States Code Service > TITLE 15. COMMERCE AND TRADE (Chs. 1 — 116) > CHAPTER 15B. NATURAL GAS (§§ 717 — 717z)

§ 717. Regulation of natural gas companies

(a) Necessity of regulation in public interest. As disclosed in reports of the Federal Trade Commission made pursuant to S. Res. 83 (Seventieth Congress, first session) and other reports made pursuant to the authority of Congress, it is hereby declared that the business of transporting and selling natural gas for ultimate distribution to the public is affected with a public interest, and that Federal regulation in matters relating to the transportation of natural gas and the sale thereof in interstate and foreign commerce is necessary in the public interest.

(b) Transactions to which provisions of [15 USCS § § 717](#) et seq. applicable. The provisions of this Act [[15 USCS §§ 717](#) et seq.] shall apply to the transportation of natural gas in interstate commerce, to the sale in interstate commerce of natural gas for resale for ultimate public consumption for domestic, commercial, industrial, or any other use, and to natural-gas companies engaged in such transportation or sale, and to the importation or exportation of natural gas in foreign commerce and to persons engaged in such importation or exportation, but shall not apply to any other transportation or sale of natural gas or to the local distribution of natural gas or to the facilities used for such distribution or to the production or gathering of natural gas.

EXHIBIT A
DR. SUSAN TIERNEY'S
C.V.

SUSAN F. TIERNEY, Ph.D.
Analysis Group

Office: 617 425 8114
Mobile: 617 901 6921
susan.tierney@analysisgroup.com

1900 16th Street
Suite 1100
Denver, CO, 80202

Dr. Tierney, a Senior Advisor at Analysis Group, is an expert on energy economics, regulation, and policy, particularly in the electric and gas industries. She has consulted to businesses, federal and state governments, tribes, environmental groups, foundations, and other organizations on energy markets, economic and environmental regulation and strategy, and energy projects. Her expert witness and consulting services have involved market analyses, wholesale and retail market design, contract disputes, resource planning and procurements, regional transmission organizations, the siting of electric and gas infrastructure projects, electric system reliability, ratemaking for electric and gas utilities, clean energy resources, climate change and carbon-emission-reduction policy, and other environmental policy and regulation. She has participated as an expert in civil litigation cases, regulatory proceedings before state and federal agencies, and business consulting engagements.

Previously, she served as the Assistant Secretary for Policy at the U.S. Department of Energy. She was the Secretary of Environmental Affairs in Massachusetts, Commissioner at the Massachusetts Department of Public Utilities, Chairman of the Board of the Massachusetts Water Resources Authority, and Executive Director of the Massachusetts Energy Facilities Siting Council.

Dr. Tierney has authored numerous articles and speaks frequently at industry conferences. She serves on a number of boards of directors and advisory committees, including chairing the Board of ClimateWorks Foundation and the Board of Resources for the Future. She is a trustee of the Barr Foundation, and a director of the World Resources Institute and the Energy Foundation. She is a member of the advisory councils at New York University's Policy Integrity Institute, Duke University's Nicholas Institute for Environmental Policy Solutions, and the New York Independent System Operator (NYISO). She is a member of the National Academies of Sciences' Committee on the Modernization of the Electric Grid and of the Advisory Committee on NAS's Climate Communications Initiative, and was a member of the NAS's Committee on Enhancing the Resilience of the Nation's Electric Power Transmission and Distribution System. She chairs the External Advisory Council of the National Renewable Energy Laboratory (NREL) and recently chaired the Department of Energy's Electricity Advisory Committee. She was co-lead author of the energy chapter of the National Climate Assessment. She was recently a Visiting Fellow in Policy Practice at the University of Chicago's Energy Policy Institute. She chaired the Policy Subgroup of the National Petroleum Council's *Prudent Development* study of the natural gas and oil resource base in North America, and served on the U.S. Secretary of Energy Advisory Board. Previously, she chaired or co-chaired several non-profit organizations (the National Commission on Energy Policy) and was formerly a director of several public companies (EnerNOC; Evergreen Solar; Zegen; Catalytica Energy Systems).

She taught at the Department of Urban Studies and Planning at MIT and at the University of California at Irvine, and has lectured at Harvard University, Yale University, New York University, Tufts University, Northwestern University, and University of Michigan. She received NARUC's Mary Kilmarx Award in 2015, and in 2020 was designated as a National Associate of the National Research Council of the Academies of Sciences, Engineering and Medicine. She earned her Ph.D. and M.A. in regional planning at Cornell University and her B.A. at Scripps College.

EDUCATION

- 1980 Ph.D., regional planning, Cornell University
- 1976 Masters of Regional Planning, Cornell University
- 1973 B.A., art history, Scripps College
Studied political science at L'Institut d'Etudes Politiques, Paris, France

PROFESSIONAL EXPERIENCE

- 2003–Present Analysis Group, Inc., Boston, MA and Denver, CO
Senior Advisor (April 2014–Present)
Managing Principal (July 2003–March 2014)
- 1999–2003 Lexecon, Inc., Cambridge, MA (formerly The Economics Resource Group, Inc.)
Senior Vice President
- 1995–1999 Economics Resource Group, Inc., Cambridge, MA
Principal and Managing Consultant
- 1993–1995 U.S. Department of Energy, Washington, D.C.
Assistant Secretary for Policy
- 1991–1993 Commonwealth of Massachusetts, Executive Office of Environmental Affairs, Boston
Secretary of Environmental Affairs
- 1988–1991 Commonwealth of Massachusetts, Department of Public Utilities, Boston, MA
Commissioner
- 1984–1988 Commonwealth of Massachusetts, Energy Facilities Siting Council, Boston, MA
Executive Director
- 1983–1984 Commonwealth of Massachusetts, Executive Office of Energy Resources, Boston, MA
Senior Economist
- 1982–1983 Commonwealth of Massachusetts, Energy Facilities Siting Council, Boston, MA
Policy Analyst
- 1982 National Academy of Sciences, Washington, D.C.
Researcher
- 1978–1982 University of California at Irvine, Irvine, CA
Assistant Professor

SELECTED CONSULTING EXPERIENCE

- **Various Confidential Engagements**
Including power sales agreements, fuel contracts, investment strategy, project development, and other electric and gas industry matters.
- **La Plata Electric Association**
Prepared testimony before the Colorado Public Utilities Commission regarding the complaints by La Plata Electric and United Power of the exit fee to be charged by Tri-State Generation and Transmission Association for La Plata's and United's potential withdrawal from the Tri-State system.
- **Natural Resources Defense Council**
Prepared a white paper on comments filed in the Federal Energy Regulatory Commission docket on whether to modify its Policy Statement related to certification of new gas pipelines (2019).
- **Delta-Montrose Electric Association**
Provided testimony before the Colorado Public Utilities Commission regarding the complaint by Delta-Montrose of the exit fee being charged by Tri-State Generation and Transmission Association for Delta Montrose to withdraw from participation in the Tri-State system.
- **Transource**
Provided testimony before the Maryland Public Service Commission regarding regulatory standards for reviewing transmission proposals that emanate from the regional transmission-planning process administered by a Regional Transmission Organizations.
- **New York ISO (NYISO)**
Prepared a white paper on the impacts on New York of the introduction of a carbon pricing mechanism into NYISO wholesale markets (2019).
- **Salt River Project**
Wrote white paper on utility ratemaking processes and principles (2019).
- **Attorney General of New York State, on behalf of a coalition of state Attorneys General**
Preliminary assessment of the U.S. Environmental Protection Agency's proposed Affordable Clean Energy (ACE) rule with changes in the New Source Review program (2018-2019).
- **Xcel Energy (Northern States Power - Minnesota)**
Facilitated stakeholder meetings and outreach related to NSPM's integrated resource plan (2018-2019).
- **Commonwealth Edison (ComEd)**
Provided expert testimony before the Illinois Commerce Commission on regulatory policy issues related to proposed pilot projects involved battery energy storage systems (2018).
- **Pacific Gas & Electric Company, San Diego Gas & Electric Company, Southern California Edison Company**
Prepared white paper on a future structure for California's resource-adequacy and wholesale market structure in a low-carbon power system (2018).
- **Analysis Group, Inc.**
Prepared a white paper about the rebound effect in estimating the impacts of changes in federal fuel economy and greenhouse-gas-emissions standards (2017-2018).
- **Merck Family Foundation**

Analyzed the economic impacts of the Regional Greenhouse Gas Initiative's third compliance period (2015-2017) (2018).

- **Commonwealth Edison (ComEd)**
Provided expert testimony before the Illinois Commerce Commission on regulatory policy issues related to a proposed microgrid pilot project (2017).
- **Natural Resources Defense Council**
Prepared a white paper on changes in the natural gas industry since 1999 when the Federal Energy Regulatory Commission issued its Policy Statement related to certification of new gas pipelines (2017).
- **New York State Research and Development Administration**
Provided support to NYSERDA and the New York Department of Public Service on issues relevant to the New York "REV" proceeding (2017-present).
- **Hewlett Foundation**
Supported strategy development for the Foundation's Environment Program (2017).
- **Advanced Energy Economy Foundation and American Wind Energy Association**
Co-authored a white paper on wholesale power markets and electric system reliability and resilience (2017).
- **Entergy Vermont Yankee**
Provided expert testimony before the Vermont Public Service Board on the public benefits of the proposed sale of Vermont Yankee to NorthStar (2016-2018).
- **Dominion Energy**
Analyzed the implications for carbon emissions and consumer costs of a hypothetical shutdown of the Millstone Nuclear Station in Connecticut, and proposed testimony in support of Dominion filings before state agencies related to Millstone and a potential long-term power sales agreement for zero-carbon supply (2017-Present).
- **Protect the Granite State**
Analyzed the economic implications of the proposed Northern Pass Transmission project for New Hampshire and New England (2017).
- **Environmental Defense Fund**
Authored a white paper on challenges facing the U.S. coal industry in the 21st Century (2016).
- **Merck Family Fund**
Co-authored a white paper on potential design issues relating to trading of carbon-emission credits between RGGI states and other states under the U.S. EPA's Clean Power Plan (2016).
- **Consolidated Edison and Southern California Edison**
Authored a white paper on the role of distributed energy resources in distribution utility planning and operations (2016).
- **Hawaii Gas Company**
Provided expert testimony before the Hawaii Public Utilities Commission on issues related to the proposed merger of the Hawaii Electric Companies and NextEra (2015-2016).
- **The Energy Foundation and Merck Family Fund**
Co-authored report on the economic impacts of the Regional Greenhouse Gas Initiative's (RGGI's) second three years of implementation during 2012-2014. (2015).
- **State of Delaware**
Provided expert testimony before the Delaware Superior Court on issues related to the impact of the

RGGI program on electricity customers and the economy in Delaware (2015–2016).

- **NEXUS Gas Transmission**
Co-authored a report on the market for natural gas in the state of Ohio (2015).
- **Electric Power Supply Association**
Co-authored a report for EPSA on the design of State Plans to align with organized wholesale markets in response to the U.S. Environmental Protection Agency's Proposed Clean Power Plan (2015).
- **Baltimore Gas and Electric, Pepco Holdings Inc. and PHI's affiliates Pepco, Delmarva Power, and Atlantic City Electric**
Provided expert testimony before the Federal Energy Regulatory Commission on the need for and risks associated with transmission investment (2015).
- **Exelon Generating Company LLC**
Analyzed alternative generation technologies and the consistency of Exelon's proposal to construct a natural-gas fired peaking unit with Massachusetts energy and environmental policies (2015).
- **The Energy Foundation**
Co-authored reports on reliability issues related to the U.S. Environmental Protection Agency's proposed Clean Power Plan. (2014–2015).
- **New England Power Generators Association**
Analyzed the impact of legislative proposals in Massachusetts to direct electric utilities to enter into long-term power supply agreements with Canadian hydropower companies. (2014, 2015).
- **Spectra Energy**
Provided expert report in Maine regulatory proceeding related to the potential for the State of Maine to enter into a contract to support natural gas pipeline infrastructure in New England (2014).
- **The Energy Foundation and Merck Family Fund**
Co-authored report on the consumer impacts of the U.S. EPA's proposed Clean Power Plan. (2014).
- **Exelon Corporation and Pepco Holdings, Inc.**
Analyzed customer and state economic benefits of the proposed merger (2014–2015).
- **Major electric utility**
Conducted independent review of the company's internal customer and shareholder analyses of long-term resource options (2014).
- **Major merchant generating company**
Conducted valuation of assets (2014).
- **Entergy Wholesale Commodities**
Provided strategic advice on wholesale and retail market issues in the Northeast power markets (2013–2016).
- **Hualapai Tribe**
Provided strategic advice regarding energy resource development and valuation of electric transmission rights of way (2014–2018).
- **Barr Foundation**
Prepared a report on the impacts of the Massachusetts Green Communities Act of 2008 on the Massachusetts economy. (2013–2014).

- **Five California Utilities (LADWP, PG&E, SCE, SDG&E, SMUD)**
Served on the four-person expert independent advisory panel for the third-party study of integration of renewable energy into California's Electric System. Contributed to report titled "Investigating a Higher Renewables Portfolio Standard in California" (2013–2014).
- **State of Colorado**
Prepared expert report on behalf of the three public utility commissioners in Colorado, in support of the complaint against them on implementing Colorado's renewable energy standard under alleged violations of the interstate commerce clause (2013–2014).
- **Energy Foundation**
Wrote white paper on the implications for electric system reliability of the Environmental Protection Agency's implementation of its authority under Section 111(d) of the Clean Air Act, to regulate greenhouse gas emissions from existing power plants (2013–2014).
- **Major engineering, construction and project management company**
Prepared an expert report on electric market conditions in a dispute surrounding cancellation of a major power plant (2012–2017).
- **Ambri (battery company)**
Analyzed energy system issues related to integration of renewables on a military base (2013–2014).
- **Advanced Energy Economy Institute**
Facilitated workshop for state utility commissioners in Midwest states, on advanced energy technologies and related regulatory issues (2013).
- **Environmental Defense Fund – North Carolina**
Testified on energy efficiency program design issues (2013).
- **Advanced Energy Economy Institute (with the New England Clean Energy Council and the New England Conference of Regulatory Utility Commissioners)**
Supported workshop on advanced energy technologies and related regulatory issues (2013)
- **Lawrence Berkeley National Laboratory Energy Program**
Provided regulatory policy support at the NJ Board of Public Utilities on smart grid workshop (2013).
- **Advanced Energy Economy Ohio**
Provided testimony before the Ohio Senate Public Utilities Committee in support of the Ohio Energy Efficiency Resource Standard (2013).
- **Pepco Holdings Inc., and its operating affiliates, Potomac Electric Power Company, Delmarva Power & Light Company, and Atlantic City Electric Company**
Provided testimony in support of appropriate incentives for investment in electric transmission (2013)
- **Baltimore Gas and Electric Company**
Provided testimony in support of appropriate incentives for investment in electric transmission (2013).
- **Advanced Energy Economy Institute**
Survey of CEOs of advanced energy companies doing business in California, with regard to the state's energy and environmental policies (2012–2013).
- **NSTAR and Cape Wind**
Provided testimony in support of the long-term power contract of NSTAR and Cape Wind (2012).
- **Energy Foundation**
Conducted strategic planning for the China Sustainable Energy Program (2012).
- **Pacific Gas & Electric Company**

Provided testimony on ratemaking issues for PG&E's proposed pipeline safety enhancement plan (2012).

- **COMPETE Coalition**
Provided testimony on energy efficiency as part of the performance of state and wholesale electric markets in New Jersey (2011).
- **Compressed Air Energy Storage Company**
Confidential engagement to analyze regional wholesale markets for baseload and renewable energy power generation (2011).
- **Merck Family Foundation**
Analyzed the economic impacts of the funds collected through the auction of allowances under the Regional Greenhouse Gas Initiative (2011).
- **American Clean Skies Foundation Corporation**
Analyzed the reliability and air emission issues associated with potential retirement of the Potomac River Generating Station (2011).
- **Colorado Public Utilities Commission**
Analyzed the Colorado solar photovoltaic incentive program (2011).
- **Exelon Corporation and Constellation Energy (Baltimore Gas & Electric)**
Analyzed the economic impacts on the Maryland economy associated with the proposed clean- energy commitments tied to the proposed merger of Exelon and Constellation Energy (2011–2012).
- **New England Power Generators Association**
Analyzed competition issues in the proposed merger of Northeast Utilities and NSTAR (2011).
- **Dominion Generation**
Analyzed the proposed state tax on output from in-state power generation (2011).
- **Exelon Corporation and Clean Energy Group**
Analyzed electric industry issues involved in responding to the U.S. EPA's air regulations (2010-2015).
- **Major electric distribution company and independent power producer**
Analyzed (modeled) the net benefits of retiring several generating units and replacing them with a long-term contract to provide power from a gas-fired power plant (2010).
- **Major electric utility company**
Analyzed changing fuel-market conditions affecting the value of gas-fired power generation in the context of litigation (2010).
- **Commonwealth Edison Company**
Analyzed the ratemaking issues for an electric distribution utility with respect to energy efficiency program effects in Illinois (2010–2011).
- **National Grid – Massachusetts electric distribution companies**
Analyzed the market for the long-term contract for power from the Cape Wind project (2010).
- **Spectra Energy (with the Interstate Natural Gas Association of America)**
Analyzed the markets for natural gas, and analysis of the implications of the U.S. EPA's Advanced Notice of Proposed Rulemaking on PCBs (2010–2011).
- **Renewable energy company**
Analyzed transmission access, planning, cost allocation and siting conditions in US regions (2010-2011).
- **Indian tribe in Midwest**
Analyzed the value of an oil pipeline right-of-way (2010).

- **Dominion Generation**
Analyzed the proposed legislation in Connecticut to establish a windfall profits tax on all generating assets located in the state (2010).
- **Transmission consortium**
Analyzed cost-allocation models for an interstate transmission project involving transmission utilities and merchant transmission companies (2009–2010).
- **Massachusetts renewable energy trust**
Analyzed transmission-related approaches to the development of offshore renewable energy (2009).
- **Major electric utility**
Developed business models and approaches for deploying energy efficiency within the context of the American Climate and Energy Security Act framework (2009).
- **Major industrial electricity consumer**
Assisted in analyzing the implications of the American Climate and Energy Security Act for the company, in light of impacts on energy prices and trade considerations (2009).
- **National Grid**
Assisted in developing a revenue decoupling mechanism for retail distribution service, and testifying in electric and natural gas distribution rate cases in Massachusetts, Rhode Island, New York, and New Hampshire (2009–2011).
- **Sandia Pueblo**
Assisted in valuing a transmission corridor on tribal reservation land (2008–2011).
- **Major electric and gas company**
Provided analytic and strategic support for company's development of a business plan for energy efficiency and other energy-related investments on the customer side of the meter (2008).
- **AEP Transmission**
Prepared a white paper on the design and cost allocation framework for a high-voltage transmission system designed to support renewable and other resources (2008).
- **Reliant**
Prepared study assessing competition in the wholesale and retail electricity markets in ERCOT (2008).
- **Major environmental organization**
Analytic and strategic support for utility ratemaking policies for advancing energy efficiency in many states (2008–2012).
- **New York Independent System Operator**
Supported strategic planning and assessment for the Board of Directors (2008–2010).
- **Commonwealth Edison Company**
Provided testimony on ratemaking policy issues relating to regulatory lag (2008).
- **Energy Association of Pennsylvania (EGA)**
Analyzed of proposed legislation to cap retail electricity rates in Pennsylvania after the expiration of rate caps (2008).
- **National Association of Regulatory Utility Commissioners (NARUC)**
Prepared study on best practices relating to state regulatory agency policies and utility practices on competitive procurement of resources to serve retail electricity customers (2007).
- **KeySpan/Boston Gas**

Analyzed of the implications of utility ratemaking for valuation of utility assets for property taxation purposes (2008).

- **Electric company**
Analyzed of state's retail and wholesale power market structure (2008).
- **Electric company**
Prepared expert report on electric industry structure in the 1990s and 2000s (2007–2008).
- **Major electric company**
Provided analytic support for company's development of strategic plan for company-wide GHG-reduction commitments (2008).
- **Sierra Pacific Power Company**
Provided testimony on policy issues relating to the use of historic, future, and hybrid test years in state utility rate cases (2007–2008).
- **Harvard University**
Provided strategic assistance relating to regulatory issues affecting the planning and design of Harvard's "green campus" development in Allston Landing (2007–2008).
- **Public Service Gas & Electric Company of New Jersey (PSEG)**
Provided assistance in facilitating the development of a policy to address "leakage" of CO₂ emissions associated with the adoption of the RGGI cap-and-trade program (2007).
- **Electric Power Supply Association**
Prepared white paper on economic, environmental, and regulatory trends in the electric industry (2007).
- **Sempra Energy Company – San Diego Gas & Electric Company and SoCalGas Company**
Provided testimony on policy issues relating to the provision of financial incentives to electric and gas utilities for the successful provision of energy efficiency programs (2007).
- **PECO Energy Company**
Provided advice and testimony on various economic and policy issues relating to electric industry restructuring policy (2007).
Provided testimony on issues relating to the market for alternative energy credits and the proposal of PECO to voluntarily solicit, procure, and bank alternative energy credits (2007).
- **Commonwealth Edison Company**
Provided testimony on issues relating to the relationship of auctions for wholesale supply for basic service customers and alternative proposals for utility resource procurement (2007).
- **ISO New England**
Assisted in scenario planning for transmission and other alternatives (2006–2007).
- **PJM**
Preparing report on market monitoring functions performed under various federal regulatory agencies with responsibility to oversee electricity and energy markets (i.e., the Federal Energy Regulatory Commission and the Commodities Futures Trading Commission) (2006–2007).
- **Major Industrial and Power Plant Company**
Assisted company in analyzing market and negotiating the price and other terms and conditions for long-term gas supply and in valuing a power plant asset (2006–2007).
- **State of North Carolina**

Provided expert witness services on electric utility economics and regulatory issues, on behalf of the Attorney General in a nuisance lawsuit to require the Tennessee Valley Authority to put in place air pollution control equipment on coal-fired power plants in TVA's system. (2006–2008)

▪ **Major Regional Transmission Organization**

Performed analysis of market conditions and trends, and benchmarking market rules and reliability performance with other comparable organizations (2006–2007).

▪ **Special LNG Committee, Commonwealth of Massachusetts**

Prepared *pro-bono* report on the need for natural gas and liquefied natural gas in the Northeast (2006).

▪ **Ute Indian Tribe of the Uintah and Ouray Reservation**

Prepared a report on economic and policy issues relating to use of tribal lands for energy rights-of-way, as called for in Section 1813 of the Energy Policy Act of 2005 (2006).

▪ **New York ISO**

Prepared white paper on fuel diversity issues in the New York market (2008).

Prepared white papers on long-term contracting issues in states with restructured electric industries, and on the economic foundations for single-clearing-price markets versus pay-as-bid markets (2007).

Performed economic benefit/cost study of wholesale competition into the region's wholesale electric market (2006–2007).

▪ **Commonwealth Edison Company**

Provided testimony on appropriate ratemaking principles for recovery of pension-related costs in proceeding to set rates to go into effect following the transition period (2006).

▪ **Commonwealth Edison Company**

Provided testimony on economic principles associated with single-price auction design versus pay-as-bid auction design (2006).

▪ **Exelon Corporation**

Provided analysis of designs of mandatory carbon control policies (2005–2007).

▪ **Sonosky, Chambers, Sachse, Endreson & Perry, LLP, on behalf of various Indian Tribes**

Provided analysis in support of comments filed with the Departments of Interior and Energy on energy rights of way on tribal land (as called for in Section 1813 of the Energy Policy Act of 2005) (2005–2006).

Provided analysis in support of various tribal negotiations with energy companies with respect to valuation of energy rights of way on tribal reservation lands (2007).

▪ **Electric utility company**

Performed independent evaluator services in procurement for power resources (2005–2006).

▪ **Power Generation Company**

Provided analysis of product market development in MidWest and Eastern RTOs (2005).

▪ **New England Energy Alliance**

Prepared a white paper on energy infrastructure needs in the New England states (2005).

▪ **Committee on Regional Electric Power Cooperation (of the Western Interstate Energy Board)**

Provides research on market monitoring for Western wholesale electric markets (2005–2007).

▪ **Southern California Edison Company**

Provided Independent Evaluator services for a competitive procurement of new long-term generation resources and renewable resources (2005).

▪ **LNG / Interstate Gas Pipeline project – Duke Energy/Excelerate project**

Prepared regional market study for the project proposed for Massachusetts (2004–2005).

▪ **Electric Generating Company**

In a contract dispute, provided expert witness services relating to whether changes in a region's wholesale power market rules nullified a power sales agreement (2004–2006).

▪ **Louisville Gas & Electric and Kentucky Utilities**

For two vertically integrated electric companies, provided expert witness services in a state investigation of which regional transmission approach satisfies state policy objectives (2004).

▪ **Independent Generating Company**

For a power company owned by commercial lenders in a Northeast power market, provided consulting services to monitor state regulatory policies and actions affecting power plants (2004).

▪ **Major Electric and Gas Company**

Performed confidential study of the benefits, costs and current conditions in certain wholesale and retail electric power markets (2004–2005).

▪ **Regional Transmission Organization**

For a confidential project, analyzed market monitoring and mitigation approaches (2004–2005).

▪ **Major Commercial Bank**

For a confidential project, advise with regard to electric industry restructuring and profitability of large energy marketer and trading organization (2004–2005).

▪ **Consumer Energy Council of America**

For a group of electric industry market participants, regulators, and interest groups, prepared white papers on the need for transmission enhancements in U.S. power markets (2004).

▪ **Retail electric company**

Provides confidential analysis of business models and regulation approaches for providing retail electric service in the state (2004).

▪ **Independent system operator**

Provided confidential analysis and research on aligning retail and wholesale market policies (2004).

▪ **California State attorney general**

Provided expert witness services with regard to state resource adequacy & planning practices (2004).

▪ **Pacific Gas & Electric Company**

Provided expert witness services relating to the public benefits of the settlement between PG&E and the California Public Utility Commission, to enable PG&E to emerge from bankruptcy (2003).

▪ **Independent power company**

Provided consulting advice on economics of compliance strategies for air and water permits (2003).

▪ **Major public utility company**

Advised on the pricing and other terms for a long-term purchase power agreement (2003).

▪ **Duke Power**

Provided expert advisory services relating to ratemaking and other regulatory practices (2003).

▪ **Exelon Generation**

Provided strategic advice and analytic services relating to market conditions in New England (2003).

▪ **Entergy Services Inc.**

Provided services as the independent monitor of Entergy's Fall 2002, Spring 2003 and Fall 2003 Requests for Proposals for Supply-Side Resources (2002–2005).

- **Power generation company in New England**
Provided expert testimony in contract dispute regarding allocation of uplift costs in an agreement concerning the supply of wholesale power for standard offer service (2002).
- **Connecticut Light and Power Company**
Provided expert testimony in contract dispute regarding allocation of congestion costs in an agreement concerning the supply of wholesale power for standard offer service (2002–2003).
- **Ocean State Power**
Provided arbitration services in a dispute regarding a gas purchase contract between Ocean State Power and ProGas Ltd. (2002–2003).
- **Regional independent system operator**
Provided strategic advice on regional market trends and strategy (2002).
- **PJM Interconnection**
Provided advice to the appointed mediator as part of the Alternative Dispute Resolution process, in a dispute involving PJM and a market participant (2002).
- **Duke Energy Corporation**
Provided analysis on strategic issues in gas and electric regulatory policy for Duke Energy's corporate office, including with regard to code of conduct issues and wholesale competition (2001–2002).
- **Pacific Gas and Electric Corporation**
Provided expert witness testimony in proceedings of the FERC on public benefits of the proposed restructuring of PG&E assets as part of its emergence from bankruptcy (2001–2002).
- **Massachusetts Renewables Trust**
Provided assistance in support of the Trust's renewables and power quality program (2001–2002).
- **Major electric holding company**
Prepared an analysis of the regulatory policies for reviewing merger applications in states where potential merger candidates are located (2001).
- **Western Massachusetts Electric Company**
Provided expert testimony in contract disputes regarding allocation of congestion costs in agreements concerning the supply of wholesale power for standard offer service (2001–2002).
- **Energy Foundation**
Researched and wrote a white paper on California's process for permitting new power plants (2001).
- **Cross-Sound Cable Company**
Provided expert testimony regarding public benefits of proposal to construct merchant transmission facility across Long Island Sound (2001–2002).
- **Major independent power company**
Served as expert witness in litigation surrounding power plant development project (2001–2004).
- **MASSPOWER Inc.**
Served as Mediator in a contract dispute involving pricing of power purchases (2001).
- **NRG Energy and Dynegy**
Provided expert witness support in regulatory proceeding to review these companies' acquisition of power plants being divested by Sierra Pacific and Nevada Power (2001).
- **Occidental Chemical Corporation**
Served as expert witness on vertical market power in electric utility's transmission practices (2000).

- **PP&L Global**
Provided economic and environmental analysis and expert witness support for proposal to build the Kings Park Energy power plant in Long Island, New York (2000).
- **Calpine Corporation**
Provided economic and environmental analysis and expert witness support for the Wawayanda power project in Rockland County, NY and for the Towantic power plant in Oxford, Connecticut (2001).
- **American National Power, Calpine, El Paso, NRG Energy, Sithe, Southern Energy**
Provided support for the development of a proposal for an RTO for New England (2000–2001)
- **Duke Energy/Maritimes and Northeast Pipeline**
Provided expert reports on the market and environmental impacts of new natural gas infrastructure and supply in New England (2000–2003).
- **Arkansas Electric Distribution Cooperatives and Arkansas Electric Cooperative Corporation**
Served as expert witness on economic and public policy issues associated with wholesale and retail competition in Arkansas (2000–2001).
- **TransÉnergie U.S.**
Served as expert witness on public benefits of a proposed merchant transmission facility (2000–2001).
- **Conectiv**
Provided strategic wholesale market analysis and support for procurement of supplies for distribution utility company's provision of Basic Generation Services to retail customers (2000).
- **SCS Energy Corp. – Astoria Energy**
Served as expert witness for proposal to build new power plant in New York City (2000–2001).
- **HEFA Power Options**
Provided strategic advice regarding wholesale power market for retail buyers' group (2000–2003).
- **Major real estate development company**
Provided analysis of electric and gas infrastructure for large mixed-use development (2000–2001).
- **Investment company**
Provided strategic advice to investment company with regard to potential investment in major electric generating equipment manufacturing company (2000)/
- **Major independent power company**
Provided economic and environmental support for company's application to construct a merchant power plant in Florida (2000).
- **Major railroad company**
Provided expert witness support on economic and regulatory policy issues for railroad in state regulatory proceeding on a proposed utility merger (2000).
- **Coalition of Wireless Telecommunications Carriers**
Prepared an expert report on economic benefits of wireless telecommunications (2000).
- **Major brownfield property developer**
Provided valuation of property as a site for new electric generating facility (2000).
- **Fitchburg Gas and Electric Company**
Provided litigation support for a gas and electric company on rate design policy (2000)/
- **Consortium of electric companies**

Provided economic analysis, contract review, and litigation support for a consortium of electric companies with power purchase agreements with PURPA projects (1999).

- **FirstEnergy Corp.**

Provided expert witness support regarding generation asset valuation and the impacts of a new electric industry restructuring law on the company (1999–2000).

- **Ozone Attainment Coalition**

Provided strategic analysis and advice on electric system reliability issues relating to electric companies' implementation of 2003 NOx requirements issued by the U.S. EPA (1999).

- **Municipal electric department**

Provided expert witness services and analysis of the economics and need for a new natural gas pipeline proposed to serve an existing electric power plant in Massachusetts (1998–2001).

- **Seneca Nation**

Provided expert analysis and strategic advice regarding the value of transmission rights of way, in a dispute with an electric utility company (1998–2000).

- **Major cable company**

Provided strategic advice in a series of regulatory and court cases involving inter-affiliate transactions of electric utility company entering into competitive telecommunications and cable markets (1998).

- **Major electric utility company**

Provided expert witness support regarding structural changes in the electric industry, in litigation pertaining to the company's restructuring plans (1998–1999).

- **Sithe Energies, Inc.**

Provided strategic advice and regulatory support on a variety of issues (market analysis, transmission and ISO issues, federal and state market rules, legislation, siting, environmental strategy) relating to the company's participation in the New England, New York, and PJM markets (1997–2003).

Provided transition assistance to the company in its acquisition and integration of approximately 2,000 MW of existing fossil fuel generation from Boston Edison Company (1997–1998).

Provided transition assistance to the company in its acquisition and integration of approximately 4,100 MW of existing fossil and hydroelectric generation capacity from GPU Genco (1998–1999).

Provided support for the company's participation in electricity product markets under development in New England, New York and PJM (1997–2002).

Provided strategic project development advice and expert witness support for the company's applications to construct three natural gas merchant power plants (totaling 2865 megawatts) in Everett, Weymouth, and Medway, Massachusetts. (1998–2001)

Provided strategic guidance and regulatory support regarding design of air quality improvement plan for existing fossil units at Mystic Station. (1998–2001)

Provided strategic guidance regarding company's natural gas-fired merchant power plant development projects in Ontario, Canada (2000–2001).

- **Natural Resources Canada**

Prepared a white paper on the implications for electric system reliability in Canada that are associated with restructuring the electric industry in the United States (1999).

- **Cummins Engine Company, Inc.**

Provided strategic analysis on implications of national energy and environmental policies for the Company's long-term business opportunities (1999).

- **Electric utility company**
Provided advice and regulatory support with regard to the economics and prudence of an existing long-term power purchase agreement (1998).
- **National Association of Regulatory Utility Commissioners (NARUC)**
Assisted the Executive Director and NARUC leadership in updating its strategic plan and in preparing a business plan for its implementation (1998).
- **State energy office**
Assisted in analyzing options for supporting renewable resource development in the state and in designing a market-based strategy to implement a new renewables portfolio standard (1997–1998).
- **U.S. Generating Company (now PG&E Generating Company)**
Provided analysis of and testimony on the economic, reliability, and environmental benefits to the host state and region of a new merchant power generation facility: the 360-megawatt Millennium project in Massachusetts (1996–1997).

Provided analysis of and testimony on the economic, reliability, and environmental benefits of a new merchant power generation facility: the 792-megawatt Lake Road Generating Project in Connecticut (1997–1998).
- **Pennsylvania Power & Light Company**
Provided strategic guidance, economic and policy analysis, and regulatory support for electric utility company as it developed and proposed its plan for restructuring its company for retail competition. Provided expert witness testimony on rate design policy issues (1996–1998).
- **Major diversified electric equipment company**
Provided strategic advice and analysis on market opportunities and risk in various regions of the U.S. electric industry, under numerous restructuring scenarios (1996–1997).
- **Major nationwide electricity consumer**
Conducted analysis of buying options and strategies for acquisition of electricity services in states with customer choice in retail generation markets(1997).
- **National Council on Competition in the Electric Industry**
Prepared a Briefing Paper on Regional Issues in Electric Industry Restructuring, for the NCCEI – a joint project of the National Association of Regulatory Utility Commissioners, the National Conference of State Legislatures, the U.S. DOE and the U.S. EPA (1997).
- **Major western coal company**
Analysis of western states’ electric industry restructuring policies and market prices for power in various states within the Western Systems Coordinating Council area (1996–1997).
- **Major gas pipeline company**
Provided analysis of market structures and prices for generation and delivery services in electric service territories where the gas pipeline would locate facilities that use electricity (1997).
- **Major electric supply company**
Provided analysis of regional electricity market conditions to support the company’s analysis of the value of various utility assets that were being divested as part of corporate restructuring (1997).
- **Massachusetts Division of Energy Resources**
Analyzed Boston Gas Company’s proposal for unbundling its retail service, its proposal for performance-based rates, and its plan for departing the merchant function (1996–1998).
- **Massachusetts Division of Energy Resources**

Assisted the state's energy office in developing policies for establishing a statewide fund to support renewable resource development as part of the state's electric industry restructuring plan (1997).

- **Massachusetts Water Resources Authority Advisory Board**
Analyzed opportunities for use of the Authority's energy-using and -producing assets, to position itself beneficially as a participant in a restructured retail electricity market in New England (1996–1997).
- **Coalition of marketers and independent power producers**
Analyzed state regulatory proposals for restructuring the electric industry (1996–1997).
- **Major independent power producer**
Analyzed market opportunities and risks for merchant plant development in a U.S. region (1996).
- **Major independent power producer**
Analyzed the expected market price of power in two regions of the U.S. electricity markets (1996).
- **Group of municipal electric companies in New York State**
Served as expert witness on cost allocation issues in litigation on wholesale power contracts (1996).

TESTIMONY

Many confidential expert reports, testimonies, declarations, affidavits, and depositions in confidential arbitrations and mediations.

- **On her own behalf**
Before the House Energy *Subcommittee of the House Energy and Commerce Committee*, at hearing on the Natural Gas Act, February 5, 2020.
- **La Plata Electric Association**
Before the *Colorado Public Utilities Commission*, in the matter of La Plata's and United Power's complaints that the Tri-State Generation and Transmission Association's exit fee is unjust, unreasonable and discriminatory, Proceeding Nos. 19F-0620E and 19F-0621E, Testimony, January 10, 2020.
- **Delta Montrose Electric Association**
Before the *Colorado Public Utilities Commission*, in the matter of Delta-Montrose's complaint that the Tri-State Generation and Transmission Association's exit fee is unjust, unreasonable and discriminatory, Proceeding No. 18F-0866E, Rebuttal Testimony, June 28, 2019.
- **Transource Maryland LLC**
Before the *Maryland Public Service Commission*, in the matter of Transource's request for a certificate of public convenience and necessity to construct new high-voltage transmission facilities in Maryland, Case No. 9471, rebuttal testimony, May 8, 2019, and testimony under cross-examination at hearing before the Maryland PSC, June 24, 2019.
- **On her own behalf**
Before the *Senate Energy and Natural Resources Committee*, at hearing on the electric industry in a changing climate, oral and written testimony, March 5, 2019.
- **Commonwealth Edison Company (ComEd)**
Before the *Illinois Commerce Commission*, in the matter of ComEd's petition concerning the annual formula rate update and revenue requirement (on regulatory policy issues relating to two battery energy storage systems proposed to be part of ComEd's distribution services), Docket No. 18-0808, surrebuttal testimony, August 29, 2018.
- **Pacific Gas & Electric Company, San Diego Gas & Electric Company, Southern California Edison Company**

Before the *California Public Utility Commission*, in the matter of the Order Instituting Rulemaking to Oversee the Resource Adequacy Program, Consider Program Refinements, and Establish Annual Local and Flexible Procurement Obligations for the 2019 and 2020 Compliance Years, Rulemaking 17-09-020, July 10, 2018.

▪ **Dominion Energy Nuclear Connecticut**

Before the *Connecticut Public Utilities Regulatory Authority*, in the matter of implementation of Public Act 17-3, Docket No. 18-05-04, May 2018; testimony under cross-examination, August 2018.

▪ **Dominion Energy Nuclear Connecticut**

Before the *Connecticut Department of Energy & Environmental Protection and Public Utilities Regulatory Authority*, in the matter of DEEP's and PURA's joint proceeding to implement the Governor's Executive Order Number 59, Docket No. 17-07-32; affidavit, January 8, 2018.

▪ **Commonwealth Edison Company (ComEd)**

Before the *Illinois Commerce Commission*, in the matter of ComEd's petition concerning the implementation of a demonstration distribution microgrid, Docket No. 17-0331, rebuttal testimony submitted October 27, 2017; surrebuttal testimony, November 20, 2017.

▪ **On her own behalf**

Before the *House Committee on Energy and Commerce, Subcommittee on Energy*, Hearing on "Powering America: Defining Reliability in a Transforming Electricity Industry, October 3, 2017 (testimony dated September 12, 2017, the original date of the hearing).

▪ **NorthStar Decommissioning Holdings, LLC, NorthStar Nuclear Decommissioning Company, LLC, NorthStar Group Services, Inc., LVI Parent Corp., NorthStar Group Holding, LLC, Entergy Nuclear Vermont Investment Company, and Entergy Nuclear Operations, Inc.**

Before the *Vermont Public Service Board*, in the matter of the Joint Petition to transfer ownership of Entergy Nuclear Vermont Yankee, LLC, Docket No. 8880, December 16, 2016.

▪ **Entergy Nuclear Indian Point 2, LLC, Entergy Nuclear Indian Point 3, LLC, Entergy Nuclear FitzPatrick, LLC, and Entergy Nuclear Operations, Inc.**

Before the *New York Public Service Commission*, in the matter of the Proceeding on Motion of the Commission to Implement a Large-Scale Renewable Program and a Clean Energy Standard, Case 15-E-0302, Affidavit of Susan Tierney Regarding the Staff White Paper on a Clean Energy Standard, April 21, 2016.

▪ **Environmental and Public Health Respondent-Intervenors (Natural Resources Defense Council, Environmental Defense Fund, Sierra Club, Center for Biological Diversity, American Lung Association, Clean Air Council, Clean Wisconsin, Conservation Law Foundation, and Ohio Environmental Council, West Virginia Highlands Conservancy, Ohio Valley Environmental Coalition, Coal River Mountain Watch, Kanawha Forest Coalition, Mon Valley Clean Air Coalition and Keepers of the Mountains Foundation)**

Before the *U.S. Court of Appeals for the District of Columbia Circuit*, Nos. 15-1365 and Consolidated Cases, in Re: West Virginia, et al., on Petitions for the U.S. Environmental Protection Agency, prepared declaration, December 8, 2015.

▪ **New England Power Generators Association (NEPGA)**

Before the *Massachusetts Joint Committee on Telecommunications, Utilities and Energy*, Hearing on Clean Energy Procurement, Transmission and Financing, Statement on SB 1965 (An Act relative to energy sector compliance with the Global Warming Solutions Act), September 29, 2015

▪ **Natural Resources Defense Council, Environmental Defense Fund, Sierra Club, Center for Biological Diversity, Clean Air Council, Clean Wisconsin, and Conservation Law Foundation** Before the *U.S.*

Court of Appeals for the District of Columbia Circuit, Nos. 15-1277 & 15-1284 in Re: West Virginia, et al., and in Re: Peabody Energy Corp., on Petitions for Extraordinary Writ, prepared declaration, August 31, 2015.

- **Pepco Holdings, Inc., and its operating affiliates, Potomac Electric Power Company, Delmarva Power & Light Company, and Atlantic City Electric Company**
Before the *Federal Energy Regulatory Commission*, in Delaware Division of Public Advocate, *et al.*, v. Baltimore Gas and Electric Company and Pepco Holdings Inc., Docket No. EL13-48-000, April 3, 2013; prepared answering testimony, June 2, 2015; and prepared cross-answering testimony, August 21, 2015.
- **Hawaii Gas Company**
Before the *Public Utilities Commission of Hawaii*, in the Matter of the Application of Hawaiian Electric Company, Inc., Hawaii Electric Light Company, Inc., Maui Electric Company, Limited, and NextEra Energy, Inc., for Approval of the Proposed Change of Control and Related Matters, Docket No. 2015-0022, answering and direct testimony filed July 20, 2015, rebuttal testimony, October 5, 2015. Cross-examination under oath, February 9, 2016.
- **Delaware Department of Natural Resources and Environmental Control**
Before the *Superior Court of the State of Delaware in and for Sussex County*, C.A. No. S13C-12-025 RFS, in Re: David T. Stevenson, et al., v. Delaware Department of Natural Resources and Environmental Control and David S. Small, prepared affidavit, July 15, 2015, prepared affidavit, September 8, 2016; prepared affidavit, June 7, 2016; prepared affidavit, June 2, 2017; deposition, August 9, 2017; testimony at trial, December 4, 2017.
- **On her own behalf**
Before the *House Committee on Science, Space and Technology*, Subcommittee on the Environment and Subcommittee on Energy, Hearing on the U.S. Energy Information Administration Report: Analysis of the EPA's Clean Power Plan, June 24, 2015.
- **Baltimore Gas and Electric, Pepco Holdings Inc. and PHI's affiliates Pepco, Delmarva Power, and Atlantic City Electric**
Before the *Federal Energy Regulatory Commission*, in the Matter of Delaware Division of the Public Advocate, *et. al.*, v. Baltimore Gas and Electric Company, *et al*, Docket Nos. EL13-48-001 and EL15-27-000 (Consolidated), June 2, 2015.
- **On her own behalf**
Before the *House Committee on Commerce and Energy*, Subcommittee on Energy and Power, Hearing to Examine EPA's Proposed 111(d) Rule for Existing Power Plants and the Proposed Ratepayer Protection Act, April 14, 2015.
- **Exelon Generating Company LLC**
Before the *Massachusetts Energy Facilities Siting Board* for Approval to Construct a 200 MW Simple Cycle Combustion Turbine Generating Facility in the Town of Medway, Massachusetts, Exelon West Medway, LLC/Exelon West Medway II, LLC, EFSB Docket No. 15-1/D.P.U. 15-25, March, 2015; cross-examination under oath, December 8, 9, and 14, 2015.
- **On her own behalf**
Before the *House Committee on Investigations and Government Oversight*, Subcommittee on Interior, Hearing to Examine the Impacts of EPA Air and Water Regulations on the States and the American People, February 26, 2015.
- **Exelon Corporation and Pepco Holdings, Inc.**
Before the *District of Columbia Public Service Commission*, In the Matter of the Merger of Exelon

Corporation and Pepco Holdings, Inc., prefiled direct testimony (June 18, 2014); rebuttal testimony (December 17, 2014); testimony under cross-examination (April 8, 2015); direct testimony in support of Settlement Agreement, October 20, 2015; testimony under cross-examination, December 4, 2015.

▪ **On her own behalf**

Before the *Federal Energy Regulatory Commission*, Technical Conference on Environmental Regulations and Electric Reliability, Wholesale Electricity Markets, and Energy Infrastructure, Docket No. AD15-4-000, February 19, 2015.

▪ **Exelon Corporation and Pepco Holdings, Inc.**

Before the *Maryland Public Service Commission*, In the Matter of the Merger of Exelon Corporation and Pepco Holdings, Inc., prefiled direct testimony (August 19, 2014); rebuttal testimony (January 7, 2015); testimony under cross-examination (January 26–27, 2015); post-settlement testimony (March 27, 2015); supplemental post-settlement testimony (April 14, 2015); testimony under cross-examination (April 15, 2015).

▪ **Algonquin Gas Transmission and Maritimes & Northeast Pipeline (Spectra Energy)**

Before the *Maine Public Utilities Commission*, Investigation of Parameters for Exercising Authority Pursuant to the Maine Energy Cost Reduction Act, 35-A M.R.S.A. § 1901, Docket No. 2014-00071, testimony under cross-examination, July 11, 2014, and August 8, 2014.

▪ **Exelon Corporation and Pepco Holdings, Inc.**

Before the *Delaware Public Service Commission*, In the Matter of the Merger of Exelon Corporation and Pepco Holdings, Inc., prefiled direct testimony (June 27, 2014), rebuttal testimony (January 12, 2015).

▪ **Exelon Corporation and Pepco Holdings, Inc.**

Before the *New Jersey Board of Public Utilities*, In the Matter of the Merger of Exelon Corporation and Pepco Holdings, Inc., prefiled direct testimony (June 27, 2014), rebuttal testimony (December 10, 2014)

▪ **Exelon Corporation and Pepco Holdings, Inc.**

Before the *District of Columbia Public Service Commission*, In the Matter of the Merger of Exelon Corporation and Pepco Holdings, Inc., prefiled direct testimony (June 18, 2014), rebuttal testimony (December 17, 2014).

▪ **On her own behalf**

Before the *Oregon State Legislature's* House Interim Committee on Revenue, Senate Interim Committee on Finance and Revenue, on "Consideration of the Feasibility and Implications of a Clean Air Tax or Fee in Oregon: Implementing Greenhouse Gas Emission Reduction Policies – Experience from Other States," January 15–16, 2014.

▪ **On her own behalf**

Before the *U.S. House of Representatives Energy and Commerce Subcommittee on Energy and Power*, "Hearing on EPA's Proposed GHG Standards for New Power Plants and H.R. 2100, Whitfield- Manchin Legislation," November 14, 2013.

▪ **Joshua Epel, James Tarpey, and Pamela Patton, et al.**

Before the *U.S. District Court of the State of Colorado*, on behalf of Joshua Epel, James Tarpey, and Pamela Patton (commissioners of the Colorado Public Utilities Commission), and Environment Colorado, Conservation Colorado Education Fund, Sierra Club, The Wilderness Society, Solar Energy Industries Association, and Interwest Energy Alliance, in re: *American Tradition Institute and Rod Lueck, v. Epel et al.*, Civil Action Number 11-cv-00859-WJM-BMB, expert report, November 7, 2013.

▪ **On her own behalf**

Before the *Federal Energy Regulatory Commission*, in the Matters of Centralized Capacity Markets in

Regional Transmission Organizations and Independent System Operators,” Docket No. AD13-7-000, re: considerations for the future, September 9, 2013.

- **On behalf of Entergy Nuclear Vermont Yankee**
Before the *U.S. District Court, District of Vermont*, in *Central Vermont Public Service Corporation and Green Mountain Power Corporation v. Entergy Nuclear Vermont Yankee*, Docket No. 2:12-cv-10- wks, expert report, May 8, 2013.
- **Environmental Defense Fund and North Carolina Sustainable Energy Association**
Before the *Public Utilities Commission of North Carolina*, Docket E-7, SUB 1032, August 7, 2013.
- **Advanced Energy Economy Ohio**
Before the *Ohio Senate Public Utilities Committee* in support of the Ohio Energy Efficiency Resource Standard, April 9, 2013.
- **Pepco Holdings, Inc., and its operating affiliates, Potomac Electric Power Company, Delmarva Power & Light Company, and Atlantic City Electric Company**
Before the *Federal Energy Regulatory Commission*, in *Delaware Division of Public Advocate, et. al., v. Baltimore Gas and Electric Company and Pepco Holdings Inc.*, Docket No. EL13-48-000, April 3, 2013.
- **Major engineering, construction and project-management company**
Prepared an expert report on electric market conditions in a dispute surrounding cancellation of a major power plant, 2012.
- **Baltimore Gas and Electric Company**
Before the *Federal Energy Regulatory Commission*, in *Delaware Division of Public Advocate, et al., v. Baltimore Gas and Electric Company and Pepco Holdings Inc.*, Docket No. EL13-48-000, April 3, 2013.
- **NSTAR Electric Company and Cape Wind LLC**
Before the *Massachusetts Department of Public Utilities*, in the *Petition of NSTAR Electric Company for Approval of a Proposed Long-Term Contract for Renewable Energy with Cape Wind Associates, LLC* Pursuant to St. 2008, c. 169, §83, Prefiled Direct Testimony, March 30, 2012; testimony under cross-examination, August 2, 2012.
- **Pacific Gas and Electric Company**
Before the *California Public Utilities Commission*, in the *Rulemaking on the Commission’s Own Motion to Adopt New Safety and Reliability Regulations for Natural Gas Transmission and Distribution Pipelines and Related Ratemaking Mechanisms*, Rulemaking 11-02-019, Rebuttal Testimony filed on February 28, 2012; testimony under cross-examination, March 20, 2012.
- **COMPETE Coalition**
Before the *New Jersey Board of Public Utilities*, In the Matter, In the Matter of the Board’s Investigation of Capacity Procurement and Transmission Planning, Docket No. EO11050309, October 14, 2011.
- **On her own behalf**
Before the *U.S. House Energy and Commerce Committee*, Subcommittee on Energy and Power, EPA Regulations and Electric System Reliability, September 14, 2011.
- **On her own behalf**
Before the *U.S. Senate Environment and Public Works Committee*, Subcommittee on Clean Air and Nuclear Safety, June 30, 2011, Oversight Hearing: Review of EPA Regulations Replacing the Clean Air Interstate Rule (CAIR) and the Clean Air Mercury Rule (CAMR).
- **Exelon Corporation and Constellation Energy Group**

Before the *Maryland Public Service Commission*, In the Matter of the Merger of Exelon Corporation and Constellation Energy Group, Case No. 9271, prefiled direct testimony (May 25, 2011); rebuttal testimony (October 12, 2011), supplemental testimony (December 15, 2011), testimony under cross-examination (November 10, 2011, January 25, 2012).

▪ **New England Power Generators Association**

Before the *Massachusetts Public Utilities Commission*, In the Matter of the Joint Petition for Approval of Merger [of Northeast Utilities and NSTAR] Pursuant to G.L. c. 164, § 96, Docket D.P.U. 10-170, prefiled direct testimony (May 20, 2011); testimony under cross-examination (July 15 and 18, 2011).

▪ **Commonwealth Edison Company**

Before the *Illinois Commerce Commission*, Investigation of Proposed General Increase in Electric Rates of Commonwealth Edison Company, Docket No. 10-0467, ComEd Exhibit 13.0, prefiled direct testimony (filed June 30, 2010); rebuttal testimony (filed November 22, 2010); surrebuttal testimony (filed January 2, 2011), testimony under cross-examination (January 18, 2011).

▪ **National Grid: Massachusetts Electric Company and Nantucket Electric Company**

Before the *Massachusetts Department of Public Utilities*, Investigation as to the Petition of Massachusetts Electric Company and Nantucket Electric Company each d/b/a National Grid for approval by the Department of Public Utilities of two long-term contracts to purchase wind power and renewable energy certificates, pursuant to G.L. c. 169, § 83 and 220 C.M.R. § 17.00 et seq. – Docket D.P.U. 10-54 (the Cape Wind contract proceeding), prefiled direct testimony (filed June 4, 2010), rebuttal testimony (filed September 1, 2010), testimony under cross examination (September 8, 13, 14, 23, 24, 2010).

▪ **National Grid: Boston Gas Company, Essex Gas Company, Colonial Gas Company**

Before the *Massachusetts Department of Public Utilities*, Investigation as to the Propriety of Proposed Tariff Changes, Docket No. D.P.U. 10-55, prefiled direct testimony (filed April 16, 2010); testified under cross-examination, June 28–29, 2010.

▪ **National Grid: EnergyNorth Natural Gas, Inc., d/b/a National Grid NH**

Before the *New Hampshire Public Utilities Commission*, Investigation as to the Propriety of Proposed Natural Gas Tariff Changes, Docket DG 10-017, prefiled direct testimony (filed February 26, 2010).

▪ **National Grid: Niagara Mohawk Power Corporation**

Before the *New York Public Service Commission*, Investigation as to the Propriety of Proposed Electric Tariff Changes, Docket No. 10-E-0050, prefiled direct testimony (filed January 29, 2009), rebuttal testimony (filed August 2010).

▪ **National Grid: Narragansett Electric Company**

Before the *Rhode Island Public Utilities Commission*, Investigation as to the Propriety of Proposed Tariff Changes, Docket No. R.I.P.U.C. 4065, prefiled direct testimony (filed June 1, 2009; testimony under cross-examination, November 4, 2009).

▪ **National Grid: Massachusetts Electric Company and Nantucket Electric Company**

Before the *Massachusetts Department of Public Utilities*, Investigation as to the Propriety of Proposed Tariff Changes, Docket No. D.P.U. 09-39, prefiled direct testimony (filed May 15, 2009; testimony under cross-examination, August 7 and 25, 2009, and September 8, 2009).

▪ **Amerada Hess Corp., et al.**

Before the *District Court of the United States for the Southern District of New York*, on behalf of Amerada Hess Corp., et al., in *City of New York v. Amerada Hess Corp. et al.*, Case No. 1:00-1898, testimony in deposition, May 12, 2009.

▪ **State of North Carolina**

Before the *District Court of the United States for the Western District of North Carolina*, on behalf of North

Carolina in *State of North Carolina, ex rel. Roy Cooper, Attorney General, v. Tennessee Valley Authority*, Case No. 1:06CV20, testimony in deposition, May 17, 2007; testimony at July 22, 2008.

▪ **KeySpan Energy Delivery (National Grid)**

Before the *Massachusetts Appellate Tax Board*, Boston Gas Company, d/b/a KeySpan Energy Delivery New England v. City of Boston, Docket No. F275055-F275056 (FY 2004), F279207-F279208 (FY 2005), F284088-F286194 (FY 2006), testimony and cross-examination, May 20–21, 28, June 4, 2008.

▪ **Commonwealth Edison Company**

Before the *Illinois Commerce Commission*, Investigation of Proposed General Increase in Electric Rates of Commonwealth Edison Company, Docket No. 07-0566, ComEd Exhibit 18.0, prefiled rebuttal testimony (filed April 12, 2008).

▪ **Sierra Pacific Power Company**

Before the *Public Utilities Commission of Nevada*, In the Matter of the Application of Sierra Pacific Power, filed pursuant to NRS 704.110(3), for authority to increase its general rates charged to all classes of electric customers to reflect an increase in annual revenue requirement, Docket No. 07-12 (filed December 3, 2007), Prefiled Direct Testimony; cross examination, April 17–18, 2008.

▪ **Amerada Hess Corp., et al.**

Before the *District Court of the United States for the Southern District of New York*, on behalf of Amerada Hess Corp., et al., in *County of Suffolk and Suffolk County Water Authority v. Amerada Hess Corp. et al.*, Case No. 1:00-1898, testimony filed October 1, 2007.

▪ **Sempra Energy Company – San Diego Gas & Electric Company and SoCalGas Company**

Before the *California Public Utility Commission*, Order Instituting Rulemaking to Examine the Commission's post-2005 Energy Efficiency Policies, Programs, Evaluation, Measurement and Verification and Related Issues, Rulemaking Docket 06-04-010 (Filed April 13, 2006), testimony filed May 3, 2007, cross examination, May 29, 2007.

▪ **Commonwealth Edison Company**

Before the *Illinois Commerce Commission*, Investigation of Rider CPP of Commonwealth Edison Company, and Rider MV of Central Illinois Light Company d/b/a AmerenCILCO, of Central Illinois Public Service Company d/b/a AmerenCIPS, and of Illinois Power Company d/b/a Ameren IP, pursuant to Commission Orders regarding the Illinois Auction, Docket No. 06-0800, testimony filed April 6, 2007; cross-examination, April 24, 2007.

▪ **PECO Energy Company**

Before the *Pennsylvania Public Utility Commission*, Petition of PECO for Approval of (1) a Process to Procure Alternative Energy Credits During the AEPS Banking Period, and (2) A Section 1307 Surcharge and Tariff to Recover AEPS Costs, Prefiled Direct Testimony, March 19, 2007.

▪ **Masspower**

Before the *Superior Court Department of Suffolk County, Massachusetts*, Massachusetts Municipal Wholesale Electric Company v. Masspower, et al., Civil No. 05-02710 (BLS1), on the changes in conditions in the electric industry in New England as they relate to Masspower's performance under its power supply agreement with MMWEC; Expert Report, September 11, 2006; oral testimony under cross examination at trial, October 16–17, 2006.

▪ **Commonwealth Edison Company**

Before the *Illinois Commerce Commission*, Proposed general increase in electric rates, general restructuring of rates, price unbundling of bundled service rates, and revision of other terms and conditions of service, Docket No. 05-0597, Rebuttal Testimony, January 30, 2006; Surrebuttal Testimony, March 14, 2006; oral testimony under cross-examination, March 23, 2006. Testimony on rehearing,

September 20, 2006.

- **Commonwealth Edison Company**
Before the *Illinois House of Representatives, Electric Utility Oversight Committee*, on the Pay-as-Bid versus Uniform Price Auction Approach To Procurement of Wholesale Power for ComEd's Full- Requirements Customers, January 18, 2006, Springfield, Illinois.
- **Louisville Gas & Electric Company and Kentucky Utilities Company**
Before the *Kentucky Public Service Commission*, Application of LG&E and KU to transfer functional control of their transmission assets, Direct Testimony, November 19, 2005.
- **Western Massachusetts Electric Company**
Before the *Superior Court Department of Norfolk County*, Massachusetts, Alternative Power Source, Inc., v. Western Massachusetts Electric Company, Civil Action No. 00-1967, on the allocation of costs related to transmission congestion in wholesale power contract for standard offer service. Expert Report, September 19, 2001; deposition, October 15, 2001; testimony at trial, July 15, 2005.
- **Entergy Louisiana, Inc. and Entergy Gulf States Inc.**
Before the *Louisiana Public Service Commission*, Application of Entergy Louisiana, Inc. for Approval of the Purchase of Electric Generating Facilities and Entergy Gulf States, Inc. for Authority to Participate in Contract for the Purchase of Capacity and Electric Power, Docket No. U27836, January 21, 2005.
- **Louisville Gas & Electric Company and Kentucky Utilities Company**
Before the *Kentucky Public Service Commission*, Investigation Into The Membership of Louisville Gas and Electric Company and Kentucky Utilities Company In The Midwest Independent Transmission System Operator, Inc., Case No. 2003-00266, September 29, 2004; Supplemental Rebuttal Testimony, January 10, 2005; testimony at hearing, June 2005.
- **Entergy Services Inc.**
Before the *Federal Energy Regulatory Commission*, Entergy Services Inc., et al., in support of the application for approval of market-based power purchase agreements under Section 205 of the Federal Power Act. Affidavit, February 28, 2003; Affidavit, March 31, 2003; Testimony, September 2003; Testimony at deposition, November 20, 2003; Rebuttal Testimony, May 11, 2004; Deposition, May 27, 2004, and June 10–11, 2004; Testimony under cross-examination, July 19–23, 26–27, 2004.
- **Pacific Gas & Electric Company**
Before the *California Public Utilities Commission*, In Re: Order Instituting Investigation into the ratemaking implications for Pacific Gas and Electric Company (PG&E) pursuant to the Commission's Alternative Plan of Reorganization under Chapter 11 of the Bankruptcy Code for PG&E, in the United States Bankruptcy Court, Northern District of California, San Francisco Division, In re Pacific Gas and Electric Company, Investigation 02-04-026, Pre-Filed Testimony, July 23, 2003, Testimony under cross-examination, September 12, 2003.
- **Entergy Louisiana, Inc.**
Before the *Louisiana Public Service Commission*, *Entergy Service*, In Re: Application of Entergy Louisiana, Inc., for Authorization to Enter into Certain Contracts for the Purchase of Capacity and Energy, Docket No. U-27136, Rebuttal Testimony, April 25, 2003.
- **Pacific Gas and Electric Company/PG&E Corporation**
Before the *Federal United States Bankruptcy Court, Northern District of California, San Francisco Division*, In Re: Pacific Gas and Electric Company, Debtor, Federal I.D. No. 94-0742640, on the public policy concerns raised by the proposed reorganization plan of PG&E Corporation. Expert report, November 8, 2002; rebuttal report, November 26, 2002.
- **PP&L Global**

Before the *New York Public Service Commission, Article X Siting Board*, on the economic and environmental benefits of the Kings Park Energy power plant. Prefiled direct testimony, January 2002; rebuttal testimony, October 23, 2002.

▪ **Connecticut Light & Power Company**

Before the *Federal United States District Court, District of Connecticut*, Connecticut Light & Power Company v. NRG Power Marketing Inc., on their standard offer service wholesale sales agreement. Expert report, August 30, 2002; deposition, September 27, 2002.

▪ **Pacific Gas and Electric Company/PG&E Corporation**

Before the *Federal Energy Regulatory Commission*, in the Matter of Pacific Gas and Electric Company, PG&E Corporation, on behalf of its Subsidiaries Electric Generation LLC, ETrans LLC, and GTrans LLC, on the public benefits of the application seeking approval under Section 203 of the Federal Power Act and Section 12 of the Natural Gas Act for various actions relating to restructuring of the company to emerge from bankruptcy, November 30, 2001.

▪ **Cross-Sound Cable Company LLC**

Before the *Connecticut Siting Council*, on the public benefits of the proposed Cross Sound Cable Project's Application for a Certificate of Environmental Compatibility and Public Need, Docket No. 208. Prepared direct testimony, July 23, 2001; oral testimony under cross-examination, October 24–26, 29–30, 2001.

▪ **Sithe New England (Sithe Edgar LLC, Sithe New Boston LLC, Sithe Framingham LLC, Sithe West Medway LLC, Sithe Mystic LLC)**

Before the *Federal Energy Regulatory Commission*, in the Matter of NSTAR Electric & Gas Corp., v. Sithe Edgar LLC, Sithe New Boston LLC, Sithe Framingham LLC, Sithe West Medway LLC, Sithe Mystic LLC, and PG&E Energy Trading, Docket No. EL01-79-000. Affidavit comparing historical cost recovery by Boston Edison for its fossil generation units (pre-divestiture) under rate regulation, versus Sithe's revenue recovery for these same units (post-divestiture) under market prices, June 5, 2001.

▪ **NRG Energy Inc. and Dynegy Holdings Inc.**

Before the *Public Utilities Commission of Nevada*, In Re: petition of the Attorney General's Bureau of Consumer Protection to issue an Order staying further proceedings regarding divestiture of Nevada's electric generation assets and to open a docket to consider whether to issue a moratorium on divestiture in Nevada. Supplemental prepared direct testimony on behalf of Valmy Power LLC, April 6, 2001; testimony under cross-examination.

Before the *Public Utilities Commission of Nevada*, In Re: petition of the Attorney General's Bureau of Consumer Protection to issue an Order staying further proceedings regarding divestiture of Nevada's electric generation assets and to open a docket to consider whether to issue a moratorium on divestiture in Nevada, prepared direct testimony on behalf of Reid Gardner Power LLC and Clark Power LLC, April 3, 2001; testimony under cross-examination.

▪ **Sithe New England, LLC**

Before the *Federal Energy Regulatory Commission*, In the Matter of Maine Public Utilities Commission and The United Illuminating Company v. ISO New England, Inc., affidavit on the role of price "spikes" in compensating generators for the services that they provide in the region, September 7, 2000.

▪ **Arkansas Electric Distribution Cooperatives**

Before the *Arkansas Public Service Commission*, In the Matter of a Generic Proceeding to Establish Uniform Policies and Guidelines for a Standard Service Package. Prepared joint reply testimony (with Janet Gail Besser), July 21, 2000; prepared joint surreply testimony (with Janet Besser), August 3, 2000.

▪ **TransEnergie U.S.**

Before the *Connecticut Siting Council*, on the public benefits of the proposed Cross Sound Cable Project.

Expert report, July, 2000; prepared direct testimony, September 20, 2000; oral testimony, September 27, 2000; supplemental written testimony, December 7, 2000; oral testimony under cross-examination, December 14, 2000; oral testimony January 9–11, 2001.

▪ **SCS Energy Corp.**

Before the *New York State Public Service Commission*, on the economic and environmental impact of a new combined cycle power plant in Queens, NY, June 19, 2000.

▪ **Reading Municipal Light Department**

Before the *Massachusetts Energy Facilities Siting Board*, Docket No. EFSB 97-4, on the economics and need for a new natural gas pipeline, June 19, 2000; testimony under cross-examination September 19, 2000, September 21–22, 2000, October 5, 2000, and October 17, 2000.

▪ **Fitchburg Gas and Electric Light Company**

Before the *Massachusetts Department of Telecommunications and Energy*, Docket D.T.E. 99-66, on gas and electric company rate design policy, testimony under cross-examination, January 14, 2000.

▪ **FirstEnergy Corp.**

Before the *Public Utilities Commission of Ohio*, In the Matter of the Application of FirstEnergy Corp. on behalf of Ohio Edison Company, the Toledo Edison Company, and The Cleveland Electric Illuminating Company: for Approval of an Electric Transition Plan and for Authorization to Recover Transition Revenues (Case No. 99-1212-EL-ETP); for Approval of New Tariffs (Case No. 99-1213-EL-ATA); for Certain Accounting Authority (Case No. 99-1214-EL-AAM), on recovery of transition costs and calculation of the market value of generation assets. Joint testimony (with Dr. Scott Jones), December 22, 1999; supplemental testimony (with Dr. Scott T. Jones), April 4, 2000; deposition, April 7, 2000.

▪ **Sithe New England, LLC**

Before the *Massachusetts Energy Facilities Siting Board*, Docket EFSB 98-10, in support of an application to construct a 540 MW gas-fired single cycle peaking power plant in Medway, Massachusetts. Prepared direct testimony, April 1999; oral testimony under cross-examination, July 27, 1999.

▪ **Village of Bergen, et al.**

Before the *Supreme Court of the State of New York*, Index No. 081556, Affidavit in Response to Defendant's Submission of February 25, 1999, in Village of Bergen, et al., Plaintiffs, v. Power Authority of the State of New York, Defendant, March 3, 1999.

Before the *Supreme Court of the State of New York*, Index No. 081556, Affidavit in Support of Petition to Correct Rates, in Village of Bergen, et al., Plaintiffs, v. Power Authority of the State of New York, Defendant, October 17, 1996.

▪ **Sithe New England, LLC**

Before the *Massachusetts Energy Facilities Siting Board*, Docket EFSB 98-7, in support of an application to construct a 750 MW gas-fired combined cycle power plant at the Fore River Station in Weymouth, Massachusetts (Edgar). Prepared direct testimony, February 10, 1999; oral testimony under cross-examination, July 26, 1999.

▪ **Sithe New England, LLC**

Before the *Massachusetts Energy Facilities Siting Board*, Docket EFSB 98-8, in support of an application to construct a 1500 MW gas-fired combined cycle power plant at the Mystic Station in Everett, Massachusetts. Prepared direct testimony, February 10, 1999; oral testimony under cross-examination, May 25, June 2, 1999.

▪ **U.S. Generating Company**

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"The Natural Gas/Electricity Nexus," Keystone Energy Board meeting, Keystone CO, February 9, 2018.

"Critical Aspects of Transitioning to Competitive Energy Markets from a Wholesale and Retail Perspective & Renewable Energy Procurement in Restructured Markets," Committee on Energy Choice, State of Nevada, Las Vegas, November 7, 2017.

"Firm With Trump Cabinet Ties Scores \$300M Puerto Rico Power Contract," On Point radio show on restoration of Puerto Rico's electric grid, WBUR/NPR, October 25, 2017.

"Beyond Baseload? Electricity Markets and Reliability," Keystone Energy Board meeting, Washington, D.C., October 24, 2017.

"The Future of Baseload in the West," Committee on Regional Electric Power Cooperation (CREPC), Reno, October 17, 2017.

"Regulatory Paths Forward for a Clean Grid," Harvard Law School, Cambridge, October 13, 2017.

"This Thing about Coal and Nukes," Grid Geeks Podcast, October 6, 2017.

"What Do Americans Think about the Direction of Energy and Climate Policy?" EPIC, University of Chicago, October 4, 2017.

"Preparing for the Future: Challenges and Opportunities of Modernizing the Grid," NextGrid Illinois conference, Chicago, September 28, 2017.

"Designing America's Energy Future," National Renewable Energy Laboratory's 40th Anniversary meeting on energy innovation, Golden, CO, September 20, 2017.

"The Future of Power Markets in a Low Marginal Cost World: Electricity Sector Overview," Resources for the Future, September 14, 2017.

"The National Academy of Sciences Report on Electric System Resiliency: Natural Gas and Electric System Interdependencies," NAESB, September 7, 2017.

"Valuing Distributed Energy Resources," Aspen Energy Policy Forum, July 2017.

"The Road from Paris: A Conversation with the Former Secretary of Energy Ernie Moniz," Aspen Ideas Festival, July 2017.

"How Policy Choices Today Will Impact the Future of Electric Power," Edison Electric Institute, Annual Meeting, Boston, MA, June 12, 2016.

"Big Think Presentations on the Future of Retail Electricity Service," California Public Utilities Commission and California Energy Commission, Joint En Banc on Changing Nature of Consumer and Retail Choice in California, Sacramento, CA, May 19, 2017.

"Energy Resources: The Right Mix – or Mix It Up? Is What We Need Compatible With The Region's Energy Goals?" Northeast Energy and Commerce Association, Mystic, CT, May 10, 2017.

"Comments at the FERC Technical Conference on Certain Matters Relating to State Policy Initiatives Affecting Wholesale Energy and Capacity Markets Operated by Eastern Regional Transmission Organizations (RTOs) and Independent System Operators (ISOs)," Washington, D.C, May 2, 2017.

"Utility of the Future: Valuing Distributed Energy Resources," Electric Power Research Institute (Research Advisory Committee), Tempe, AZ, March 7, 2017.

"Navigating the Energy and Environmental Policy Landscape," Nicholas School for the Environment, Duke University, Washington, D.C, February 15, 2017.

"What is Next for the EPA's Carbon Regulations for Existing Power Plants?" NARUC Electricity Committee and the Energy Resources and the Environment Committee, Washington, D.C., February 14, 2017.

"Carbon: A risk or an opportunity?" NARUC Energy Resources and the Environment Committee, Washington, D.C., February 14, 2017.

"Managing the Energy Transition: Exploring Pathways to Deep Decarbonization," Bipartisan Policy Center, Washington, D.C., December 8, 2016.

"The Clean Power Plan and Beyond: What to Expect in 2017..." NYU School of Law – Institute for Policy Integrity, New York, NY, November 15, 2016.

"Location, Location, Location, and the Value of Distributed Energy Resources," NARUC Annual Meeting, La Quinta, CA, November 14, 2016.

"Value of 'DER' to 'D': The role of distributed energy resources in local electric distribution system reliability," Presentation to NARUC Committee on Electricity, November 14, 2016, La Quinta, California.

"State Electric Industry Policies and Organized Wholesale Electricity Markets," Presentation to the NYISO Environmental Advisory Council, Albany, NY, November 4, 2016.

"Existing nuclear units and potential policy solutions: Approaches in other states beyond Illinois," Chicago, IL, October 18, 2016.

"Existing Nuclear Units – and New York's Clean Energy Standard," presentation to the NARUC Energy Resources and the Environment Committee – Monthly Conference Call, September 16, 2016.

"Understanding the Evolving Trends in the Eastern Interconnect: Implications for Environmental Policies & Investments," Duke Nicholas Institute for Environmental Policy Solutions/Great Plains Institute/Bipartisan Policy Center, I, Atlanta, September 13, 2016.

"What does the U.S. need to do to meet its climate goals? Why Nuclear? How Much and How Fast?" Aspen Institute Forum on the Future of Nuclear Energy, Aspen, August 10, 2016.

Testimony of Susan F. Tierney, Ph.D. Before the Democratic Platform Committee, U.S. Progress on Clean Energy Policy, Phoenix, June 17, 2016.

"Value of "DER" to "D": The Role of Distributed Energy Resources in Local Electric Distribution System Reliability," presentation to the MidAtlantic Conference of Regulatory Utility Commissioners (MACRUC), Williamsburg, VA, June 21, 2016.

"How does New Jersey Achieve a Low-Carbon Future?" New Jersey Spotlight conference, Trenton, NJ, June 3, 2016.

"Potential federal and state actions that could help address financial risks facing many existing nuclear power plants," U.S. Department of Energy's Summit on Improving the Economics of America's Nuclear Power Plants, Washington, D.C., May 19, 2016.

"New England's Electricity 'Restructuring': Successes, disappointments, and what's next," 150th meeting of the New England Electricity Restructuring Roundtable, Boston, MA, May 18, 2016.

"Clearing the Way: Pioneering New York's Clean Energy Standard," Albany, NY, May 11, 2016.

"Electricity markets in transition," Annual Energy Summit of Columbia University's Center for Global Energy Policy, New York, NY, April 27, 2016.

"Value of "DER" to "D": The Role of Distributed Energy Resources in Local Electric Distribution System Reliability," California Public Utility Commission's "Thought Leaders Forum," April 21, 2016.

"Transforming Power Systems: Challenges and Solutions," Annual meeting of the Joint Institute for Strategic Energy Analysis, NREL, Golden, CO, March 31, 2016.

"Background and Context: Eras of Electric Utility Industry (in 5 Minutes!)," New Orleans City Council/Entergy New Orleans Electricity Symposium, March 22, 2016.

"Affordability, Cost Containment, and Economic Development: Complying with the Clean Power Plan," 3-N meeting (NARUC, NASEO, NACAA) on How State Agencies Are Working Together, Washington D.C., February 11, 2016.

"Evaluating Clean Power Plan Pathways in a Dynamic Electricity Sector," Conference on Navigating the EPA's Clean Power Plan: Charting a Course for the Southeast, sponsored by Duke University Nicholas Institute for the Environment, Orlando, January 28, 2016.

NASEO/DOE/EIA, "2015 – 2016 Winter Energy Outlook Conference," National Press Club, Washington, D.C., October 6, 2015.

"Outlook for Energy," Clinton Foundation Global Initiative, New York, NY, September 28, 2015.

"Reactions to the Clean Power Plan," NARUC Electricity Committee, Arlington, VA, August 14, 2015.

"Trends in national climate policy," Institute for Sustainable Cities, June 18, 2015.

"EPA's Clean Power Plan and its potential effects on system reliability," Mid-American Regulatory Commissioners (MARC) Conference, Milwaukee, June 8, 2015.

"Proposed Reliability Mechanisms for the Clean Power Plan," Bipartisan Policy Center Workshop, National Press Club, Washington D.C., May 9, 2015.

"EPA's Proposed Clean Power Plan: Testing the fires, looking under the hood... How far does it take us toward a clean, modern electric system?" Cornell University, Ithaca, NY, November 2014.

"Readying States for New Greenhouse Gas Rules in the Electricity Sector," National Governors Association – Workshop for Governors' Energy Advisors, Washington, D.C., September 22, 2014,

"Natural Gas and Renewable Energy Synergies: Challenges and Opportunities," North American Energy Standards Board (NAESB), Board Meeting, Houston, September 10, 2014.

"America's Electricity Evolution: New Policies, Regulations, and Technologies Converging to Change the Future of Power Production and Use," 2014 NASEO Annual Meeting, Savannah, September 2014.

"Implications for Energy, Economy, and Environment Under the Proposal," Environmental Council of the States (ECOS), Washington D.C., July 31, 2014.

"Regional Options and Strategic Choices," NARUC Workshop on Regional Compliance Options for Sec. 111d, Washington D.C., July 28, 2014.

"111d in Big D: Compliance Options, Regional Approaches, and Where We Go from Here," NARUC, Dallas, July 16, 2014.

"The National Climate Assessment: What Risks Lie Ahead for the Energy Sector?" NARUC, Dallas, July 14, 2014.

"The EPA's new Clean Power Plan proposal: Some suggestions for state action now," National Association of Clean Air Agencies, Washington, D.C., July 13, 2014.

"Changing electric industry dynamics: The role of regulation," Aspen Institute Energy Policy Forum: Electricity Structure and Regulation, July 7, 2014.

"Natural Gas and Renewable Energy Synergies: Challenges and Opportunities," Synergies of Natural Gas and Renewable Energy: 360 Degrees of Opportunity, Center for the New Energy Economy (CNEE), Joint Institute for Strategic Energy Analysis (JISEA), Gas Technology Institute (GTI), Bloomberg New Energy Finance, New York, NY, July 1, 2014.

"EPA's Clean Power Plan," Bipartisan Policy Center, June 18, 2014.

"GHG Emission Reductions From Existing Power Plants Under Section 111(d) of the Clean Air Act: Options to Ensure Electric System Reliability," Electricity Advisory Committee, U.S. Department of Energy, May 8, 2014.

"Climate Solutions: The role of existing nuclear power," Center for Climate and Energy Solutions, Washington, D.C., April 28, 2014.

"Electric Power Systems: The Outlook for Electric Transmission: Where You Stand Depends Upon Where You Sit," Harvard Law School, March 20, 2014.

"Section 111(d) of the Clean Air Act: Drivers of Power Sector CO₂ Reductions," Bipartisan Policy Center Workshop on GHG Regulation of Existing Power Plants under the Clean Air Act: Policy Design and Impacts, Washington, D.C., December 6, 2013.

"The World of Abundant Natural Gas in the U.S.: Looking Ahead for Power-Sector Implications," presentation to the Keystone Energy Board, Washington, D.C., October 30, 2013.

"Energy: From the Last to the Next 150 years," keynote address to the Energy Forum of Boston College's Sesquicentennial Celebration, October 25, 2013.

"Capacity Markets in the Northeast: A Preview of Comments at the FERC Technical Conference on Centralized Capacity Markets in RTOs/ISOs," presentation to the Independent Power Producers of New York, Saratoga Springs, New York, September 10, 2013.

"Opportunities and Risks of Shale Gas Development," presentation to the Governors' Policy Forum on Shale Energy Development, National Governors Association, Denver, September 9, 2013.

"The National Climate Assessment (Draft): Chapter on Energy Supply and Use," presentation to the National Association of Regulatory Utility Commissioners, Denver, July 23, 2013.

"Climate Change Preparedness in New Jersey: Utilities – Leading Practices and Trends Nationally," presentation to the New Jersey Climate Adaptation Alliance, Rutgers University, May 21, 2013.

"Is New England Over-Reliant on Natural Gas?" presentation to the 20th Annual Energy Conference of the Northeast Energy and Commerce Association, Groton CT, May 21, 2013.

"Jevons' Boomerang: Is the rebound effect real? If so, is the effect negative or positive?" presentation to the EE Global Conference, Washington, D.C., May 20, 2013.

"Framing the Issues: Growing Tensions at the Interface of the Natural Gas and Electric Industries," presentation to the MIT Energy Initiative (MITEI) Symposium on "Growing Concerns, Possible Solutions: Gas/Electric Interdependence," April 16, 2013.

"Unconventional Natural Gas: The Fracking Debate," Northeast Gas Association, Providence RI, March 15, 2013.

"Unconventional Natural Gas: Trends, Opportunities, and Challenges with America's New Energy Resource, Center for the American West series on "FrackingSENSE: What We Know, What We Don't Know, and What We Hope to Learn about Natural Gas Development," Boulder, Colorado, March 5, 2013.

"Global Energy Security: Upcoming challenges and opportunities (from a U.S. vantage point)," Tufts University Energy Conference – Powering Global Energy Security, Medford, Massachusetts, March 3, 2013.

"Old Made New – Conventional Resource Innovation in the 21st Century," MIT Energy Conference, Boston, March 2, 2013.

"The Evolving Energy Landscape: Standing at the Crossroads in 2013," Keynote Address, Kellogg School of Management Energy Conference, Northwestern University, Chicago, February 13, 2013.

"The Starting Point: Interconnection/Grid Planning in the Face of Diversity, Technical Complexity, Uncertainties, Challenges, Opportunities," NARUC/DOE, Washington D.C., February 6, 2013.

"Electric Power Systems: The Outlook for Electric Transmission: Where You Stand Depends Upon Where You Sit," Yale University School of Forestry/Management, February 5, 2013.

"Electric Power Systems: The Outlook for Electric Transmission: Where You Stand Depends Upon Where You Sit," New York University Law School, February 4, 2013.

"The Future of Energy," DOE Energy All Stars, Department of Energy, January 19, 2013.

"The Economic Impacts of RGGI's First Three Years," Columbia University Law School – Center for Climate Change Law, Conference on the Future of the Regional Greenhouse Gas Initiative, New York, City, October 22, 2012.

"Reality Check on Energy Conditions," New Hampshire Energy Summit, Concord, NH, October 22, 2012.

Natural gas and renewables: Curious bedfellows," Renewable Energy Law & Policy Summit, University of Denver Sturm College of Law, October 19, 2012.

"Smart Grid and Air Emissions," Gridweek, Washington D.C., October 4, 2012.

"C3E Women in Clean Energy Symposium," Keynote Address, Boston, September 28, 2012.

"Natural Gas: Risks and Opportunities – Shale Gas, Hydraulic Fracturing, and Other Facts," EPA Region 1 seminar, Boston, MA, September 27, 2012.

"Finding the Sensible Middle: Policies and Institutional Roles in Unconventional Gas Development," Unconventional Gas Research Forum, Board on Energy and Environmental Systems, National Academy of Sciences, Washington D.C., September 11, 2012.

"Unlocking the Potential of Regional Collaboration," California ISO Stakeholders Symposium, Sacramento, September 6, 2012.

"The Context for Compliance with EPA Air Regulations: Power Market Conditions," EPA/DOE/NETL/EPRI/AWMA Power Plant Air Pollution Control Mega-Symposium, Baltimore, August 20, 2012.

"Finding the Sensible Middle: Unconventional Gas Development," 24th Annual Natural Gas Strategy Conference & Executive Forum, August 15, 2012.

Intelligence Squared U.S. debate: "No fracking way: The natural gas boom has done more harm than good," against the proposition (with team mate, Joe Nocera (*New York Times*)), Aspen, Colorado, July 1, 2012.

"What, Me, Worry? The New Outlook for Natural Gas in New England - How Will Natural Gas Impact New England's Electricity Markets and Reliability," New England Restructuring Roundtable – June 15, 2012.

"China's Energy Challenges and Policy Responses: Observations from a U.S. Vantage Point," Connecticut College Vietnam Program, June 15, 2012.

"Economic Impacts of RGGI: Following the Dollars," presentation to the RGGI Board, June 2012.

"The Energy Scene: Update on a Few Key Issues," presentation to the Ozone Transport Commission, April 23, 2012.

"Shale Gas: Analyzing Risks and Opportunities," Society for Risk Assessment, Boston University – April 9, 2012.

"Sustainable Energy Highway," New York State Energy Highway Summit, April 4, 2012.

"Electric and Natural Gas Markets – Interactions, Opportunities, Challenges (with a focus on Texas)," Gulf Coast Power Association Spring Meeting, April 3, 2012.

"Natural Gas: Risks and Opportunities – Shale Gas, Hydraulic Fracturing, and Other Facts," Tufts University – Fletcher School, March 29, 2012.

"Fracking and Shale Gas, Part I: Impacts on Energy Markets and Massachusetts," Boston Bar Association, March 6, 2012.

"Electric Power Systems: "The Outlook for Electric Transmission: Where You Stand Depends Upon Where You Sit," Harvard Law School, February 16, 2012.

"Natural Gas: Policy Recommendations of the NPC, SEAB, and BPC," Energy, Utility and Environment Conference 2012, January 30, 2012.

"Economic Impacts of RGGI: Following the Dollars," Energy, Utility and Environment Conference 2012, January 30, 2012.

"Electric Power Systems: "The Outlook for Electric Transmission: Where You Stand Depends Upon Where You Sit," Yale University School of Forestry and Environmental Studies, January 24, 2012.

"U.S. Renewable Energy Policy: Overview, with comparisons to European approaches," presentation to the Wharton School, January 3, 2012.

"The Truth about Fracking," presentation to the New York Energy Forum, December 19, 2011.

"The Clean Energy Economy," presentation to the Environmental Lawyers, Environmental League of Massachusetts," November 30, 2011.

"Outlook for the Electric Generating Fleet: Effects of the Upcoming EPA Regulations," presentation to the Harvard Kennedy School Energy Policy Series, November 28, 2011.

"The National Petroleum Council's "Prudent Development: Realizing the Potential of North America's Abundant Natural Gas and Oil Resources," NARUC Annual Meeting, St. Louis, November 15, 2011.

"The Future of U.S. Energy Policy: What happens when we assume no changes in the near term...?" Wharton Energy Conference – Energy Frontiers: A Global Perspective, Philadelphia, October 28, 2011.

"Natural Gas: Risks and Opportunities (* with an emphasis on shale gas developments)," Harvard University Center for the Environment – Future of Energy Series, Cambridge, October 26, 2011.

"An Expanded Toolkit – Environmental Regulations, Natural Gas, and Modernizing the U.S. Generating Fleet," Great Lakes Symposium on Smart Grid and the New Energy Economy, Chicago, October 19, 2011.

"Pricing in a Western Energy Imbalance Market: Market Clearing Price versus Pay-As-Bid Pricing." Western Interstate Energy Board – Webinar on the Energy Imbalance Market," October 18, 2011.

"Federal and State Legislative and Regulatory Outlook: Connecting the Dots: Options for Upcoming Electric Resources," Emerging Issues Policy Forum, Amelia Island, October 9, 2011.

"Environmental Challenges Associated with Meeting Future Energy Needs: The role of shale gas?" National Association of Clean Air Agencies, Cleveland, October 4, 2011.

"Facing tough realities: Upcoming Energy and Environmental Issues – With a Focus on Electricity and Natural Gas," National Association of Clean Air Agencies, Cleveland, October 4, 2011.

"Assessing Natural Gas' New Promises and Controversies: Strategies to Improve the Safety & Environmental Performance of Shale Gas Extraction," Wisconsin Public Utilities Institute, University of Wisconsin at Madison, October 3, 2011.

"The Outlook for Natural Gas: Role of Shale Gas," EnergySMART Conference, Boston, September 27, 2011.

"The Outlook for Natural Gas: What does shale gas look like?" NECA Fuels Conference, Marlboro, MA, September 27, 2011.

"Facing tough realities: Upcoming Energy and Environmental Issues – With a Focus on Electricity and Natural Gas," Environmental Council of the States, Indianapolis, September 25, 2011.

"Electric Reliability Under EPA's New Air Regulations: What We Know, and What We Can Do About What We Don't Yet Know," National Association of State Energy Offices, September 12, 2011.

"The Future of Electricity Generation in the U.S. – A Modest Set of Observations," 19th Annual MIT-NESCAUM Endicott House Symposium, August 18, 2011.

"Unconventional Approaches: Part of the Electric Industry's Response to Upcoming EPA Regulations," panel on Infrastructure Reliability and Adequacy at the Aspen Energy Policy Forum, Aspen, July 5, 2011.

"What we know, what we might know, and what we know we don't know yet," joint meeting of the NARUC, NASEO, and NACAA states, Baltimore, June 23, 2011.

"Facing tough realities: Energy and environmental issues in 2011 and beyond," joint meeting of the NARUC, NASEO, and NACAA states, Baltimore, June 23, 2011.

"China's Energy Challenges and Policy Responses: Observations from a U.S. Vantage Point," Connecticut College Vietnam Program, June 16, 2011.

"Strategies for Addressing Change at FERC and the RTOs: A new lens on responding to near-term changes," FERC/RTO Training Session, Institute Policy Integrity, New York, NY, July 15, 2011.

"May you live in interesting times...': The Regulators' Tool-Kit in an Era of Uncertainty," Western Conference of Public Service Commissioner, Denver, June 14, 2011.

"Dirty to Clean? The Future of Electric Power in America," CERES Conference 2011, Oakland, CA, May 12, 2011.

"EPA Regulations, Power Generation Capacity & Reliability," MIT Center for Energy & Environmental Policy Research Workshop, Cambridge, MA, May 5, 2011.

"The Electric Industry's Response to EPA's Upcoming Regulations: Options for Owners and Others," Energy Bar Association, Panel on Environmental Regulations, Washington, D.C., May 4, 2011.

"Framing the Issues: Energy & the Environment," keynote address, Health Effects Institute, Boston, May 2, 2011.

"Federal Air Pollution Regulations Affecting Fossil Power Plants: Current issues, implications, strategies," Annual Conference on Tribal Energy in the Southwest, Law Seminars International, Phoenix, April 29, 2011.

"China and U.S. Energy and Environmental Policy Challenges: Learning from Each Other, In It Together," presentation to China Energy & Environment Conference, Harvard University, April 9, 2011.

"EPA's MACT, Water Cooling Intake and Transport Rules: What now for power generation?" presentation to SNL Energy Webinar, April 12, 2011.

"Policies for a Secure Energy Future: Issues in Supply and Demand," Aspen Institute Congressional Program (meeting on Energy Security: Policy Considerations in the New Congress), Puerto Rico, February 22-27, 2011.

"EPA's Regulations Affecting Coal Plants: Using a 21st Century Toolkit (or, upgrading to the "Champ" from the "Classic")," DOE/NARUC National Electricity Forum, Washington, D.C., February 16, 2011.

"Responding to EPA's Regulations Affecting Coal Plants: Using a 21st Century Toolkit (or, upgrading to the "Champ" from the "Classic")," NARUC Winter Meeting, Washington, D.C., February 14, 2011.

"Local, State and Regional Coordination and Solutions: Non-conventional capacity and energy resources," Bipartisan Policy Center's Workshop on Power Sector Environmental Regulations, Washington, D.C., January 19, 2011.

"Renewable Energy in New England," New Hampshire Business and Industry Conference, Concord, New Hampshire, December 7, 2010.

"Framing the Issues: Energy and the Environment," National Academy of Public Administration, Washington, D.C., November 18, 2010.

"Toolkit for Ensuring Reliable, Economic Responses to EPA's Proposed Air Regulations," NARUC Meeting, Atlanta, Georgia, November 17, 2010.

"Challenges for Recovering Costs During a Push for Cleaner Generation and More Efficient Energy Use," Law Seminars International conference (Utility Rate Cases), Boston, November 9, 2010.

"Public Policy for Advanced Energy Technology," New York Advanced Energy Technology Conference, New York, NY, November 8, 2010.

"Energy Future: Bridging the Gap," Wharton Energy meeting, Philadelphia, October 28, 2010.

"Upcoming Power Sector Environmental Regulations: Framing the issues about potential reliability/ cost impacts," National Commission on Energy Policy Workshop on Power Sector Environmental Regulations, Washington, D.C., October 22, 2010.

"Vulnerability of the Gulf Coast Energy Infrastructure," America's Energy Coast Policy Forum on The Future of the U.S. Gulf Coast Energy Infrastructure in the Face of Changing Climate, New Orleans, October 20, 2010.

"Today's Energy Landscape: Scanning the terrain – with tips for a safe journey," presentation to the annual meeting of the National Association of State Energy Officials, September 30, 2010.

"2020: What can we expect? Where we are now, and how it influences where we'll be a decade from now," Law Seminars International conference, "Energy in the Northeast," September 29, 2010.

"Today's Energy Landscape: Exploring economic, environmental and technological trends," annual meeting of the Independent Power Producers of New York, September 22, 2010.

"Transforming America's Energy Systems: Challenges and opportunities along the nation's coastal and marine environments," Annual Lecture at the Metcalf Institute, University of Rhode Island, June 8, 2010.

"New England at the Crossroads: The Intersection between Regulatory Policy and Future Energy Supply," presentation to the Northeast Energy and Commerce Association, 17th New England Energy Conference, Green Thumb on the Scale: Impact on Future Energy Choices, June 8, 2010.

"Is Competition Dead?" Annual Meeting of the New England Conference of Public Utility Commissioners, May 17, 2010.

"Why it is so Darn Hard to Adopt Advanced Energy Technologies, But So Worth the Effort," presentation to the Tufts University Energy Conference, "The Evolution of Energy," April 17, 2010.

"The Prospects for Natural Gas, Coal, and Nuclear Power in America's Energy Future," discussions with members of Congress at the Aspen Institute's Congressional Program on Energy Security and Climate Change: Policy Challenges for the Congress, April 6–10, 2010.

"Why is Modernizing Our Energy Technologies So Darn Hard, But Worth the Effort?" presentation to the MIT Energy Initiative Lecture Series, February 2, 2010.

SERVICE ON BOARDS OF DIRECTORS (PUBLIC COMPANIES, PRIVATE COMPANIES, NON-GOVERNMENTAL ORGANIZATIONS)

Chair, Resources for the Future Board of Directors (2018–Present); Member of the Board (2014–Present)

Trustee, Barr Foundation (2016–Present)

Chair, ClimateWorks Foundation Board of Directors (2013–Present)

Member and Vice-Chairman, World Resources Institute Board of Directors (2009–Present)

Chair, Energy Foundation Board of Directors (2000–2011); Vice-Chair (1999–2000); Director (1997–2011); Director (2013–Present)

Member, Keystone Board of Directors (and Member, Keystone Energy Board) (2016–2019)

Member, Alliance to Save Energy Board of Directors (2011–2018)

Member, EnerNOC, Inc. Board of Directors (February 2010–May 2013)

Member, Evergreen Solar, Inc. Board of Directors, 2008–2011)

Member, Ze-gen Inc. Board of Directors, 2009–2011)

Member, Renegy Holdings Board of Directors, 2007–2009)

Member, Clean Air Task Force Board of Directors, 2008–2013)

Member, Catalytica Energy Systems Inc. Board of Directors (2001–2007)

Member, Climate Policy Center Board of Directors (2001–2007)

Member, NorthEast States Center for a Clean Air Future, Board of Directors (1998–2010)

Chair, Clean Air–Cool Planet / Climate Policy Center Board of Directors (2004–2009); Director (1999–2014)

Member, ACORE (American Council on Renewable Energy) Board of Directors (2006–2007)

Member, Electric Power Research Institute (EPRI) Board of Directors (1998–2003, 2005–2006)

Chair, Electricity Innovations Institute, Board of Directors, (2002–2004); Director (2001–2002)

Director, The Randers Group (subsidiary of Thermo TERRATEK) Board of Directors (1997–2000)

Director, Thermo ECOTEK Corporation Board of Directors (1996–1999)

OTHER PROFESSIONAL ACTIVITIES

Member, Committee on the Modernization of the Electric Grid, National Academy of Sciences, Engineering & Medicine, Climate Communications Initiative (2019-present).

Member, Advisory Committee of the National Academy of Sciences, Engineering & Medicine, Climate Communications Initiative (2018-present).

Chair, Computational Sciences and Energy Analysis Technical Review Panel, NREL (2018-2019)

Visiting Fellow in Policy Practice at the Energy Policy Institute at the University of Chicago (EPIC) (2017–2018)

Chair, External Advisory Council, National Renewables Energy Laboratory (2009–2018)

Member, Columbia University, Center for Global Energy Policy (2014–2018)

Member, New York Independent System Operator, Environmental /Advisory Council (2004–Present)

Chair and Member, Electricity Advisory Committee (Department of Energy) (2015–2017)

Member, National Academy of Sciences Committee on Enhancing the Resiliency of the Nation’s Electric Power Transmission and Distribution System (2015–2017)

Chair, Aspen Institute Energy Policy Forum (2015)

Member, Innovation Review Panel, “51st State” Initiative of the Solar Electric Power Association (2015)

Chair, External Review Panel for the Clean Energy Ministerial (2015)

Chair, Aspen Institute Energy Policy Forum (2014)

Participant in studies of the Colorado State University’s Center for Clean Energy Economy (“*Powering Forward: Presidential and Executive Agency Actions to Drive Clean Energy in America*”) (January 2014)

Co-Lead Convening Author, Energy Supply and Use Chapter, National Climate Assessment (2012–2014)

Member, Committee on Risk Management and Government Issues in Shale Gas Development, of the National Academy of Sciences, Board on Environmental Change and Society (of the Division of Behavioral and Social Sciences and Education) (2013–2014)

Co-chair, Bipartisan Policy Center's Cyber-security and the Electric Grid project (2013–2014)

Co-chair, National American Energy Standards Board (NAESB) Gas-Electric Harmonization Committee (2012, 2014)

Alliance Commission on National Energy Efficiency Policy (2012–2013): Report "Energy 2030: Doubling Energy Productivity by 2030" (February 2013)

Bipartisan Policy Center – Energy Project (2011–Present): Report ("America's Energy Resurgence: Sustaining Success, Confronting Challenges" (February 2013)

U.S. Secretary of Energy Advisory Board (July 2010–May 2013). Member of the Natural Gas Subcommittee examining shale gas development. (2011–2013)

Chair, Policy Subgroup of the National Petroleum Council's study on North American Gas and Oil Resource Development (2010–2011)

Visiting Professor, Department of Urban Studies & Planning, Massachusetts Institute of Technology (Spring 2010)

Massachusetts Clean Energy Grand Prize Judge (2010)

World Resources Institute: Chair of Presidential Search Committee (2011)

Co-Lead, Department of Energy Agency Review Team, Obama/Biden Presidential Transition Team, Washington D.C., while on full-time leave for four months from Analysis Group (2008–2009)

Chair, Massachusetts Ocean Advisory Commission (2008–2010)

Member, Blue Ribbon Commission on Cost-Allocation Issues for Transmission Investment, WIRES (2007)

Member, National Academy of Sciences Committee on Enhancing the Robustness and Resilience of Electrical Transmission and Distribution in the United States to Terrorist Attack (2005–2008)

Member, National Commission on Energy Policy, Member (2002–2011); Co-chair (2009–2011)

Member, Advisory Committee, Carnegie Mellon Electricity Industry Center (2001–2009)

Member, Policy Advisory Committee, China Sustainable Energy Project–A Joint Project of The Packard Foundation and The Energy Foundation (1999–2014)

Co-Chair, Energy/Environment Working Group, Governor Deval Patrick Transition Team (2006–2007)

Presenter, Economic Issues, National LNG Forums, U.S. Department of Energy, Boston Massachusetts; Astoria, Oregon (2006)

Chair of the Technical Review Panel, Critical Infrastructure Protection Decision Support Systems (CIP- DSS), Argonne, Los Alamos and Sandia National Laboratories (2006)

Advisory Council member, New England Energy Alliance (2005–2006)

Chair of the Laboratory Direction's Division Review Panel for the Environmental Energy Technologies Division, Lawrence Berkeley National Laboratory (2005)

Chair, Ocean Management Task Force, Commonwealth of Massachusetts (2003–2004)

Co-Chair, RTO Futures: Regional Power Working Group (2001–2002)

Member, Florida Energy 2020 Study Commission, Environmental Technical Advisory Committee (2001)

Technical Advisor, Mid-Atlantic Area Council/PJM, Dispute Resolution Procedure (1998–2008)

Member, "ISO-New England" (Independent System Operator) Advisory Committee (1998–2003)

Member, United States Department of Energy, Electricity Reliability Task Force (1996–1998)

Member, Harvard Electricity Policy Group (1993–2005)

HONORS AND AWARDS

Lifetime National Associate of the National Research Council of the National Academies of Sciences, Engineering and Medicine (January 2020)

Mary Kilmarx Award for lifetime work on good government, clean energy and the environment, presented by NARUC's Committee on Energy Resources and the Environment (November 2015)

Lifetime Achievement Award, U.S. Department of Energy/MIT/Clean Energy Ministerial C3E (Clean Energy Education & Empowerment) Initiative (2014)

Champions Award, Charles River Watershed Association (2013)

Leadership Award, New England Women in Energy and the Environment (2013)

Clean Energy Hall of Fame, New England Clean Energy Council (2012)

DOE Women in Clean Energy Initiative, C3 Ambassador (2012)

Climate Champion Award, Clean Air – Cool Planet (2009)

Distinguished Alumna Award, Scripps College, Claremont, CA (1998)

Award for Individual Leadership in Public Service, *The Energy Daily* (1995)

Special Recognition Award, Outstanding Contribution to the Industry, Assn of Energy Engineers (1994)

Leadership Award, National Association of State Energy Officials (1994)

Commencement Speaker and Honorary Doctorate of Laws, Regis College, Weston, MA (1992)

CERTIFICATE OF SERVICE

Pursuant to Rule 25(d) of the Federal Rules of Appellate Procedures, I hereby certify that I have this 1st day of July, 2020, served the foregoing Amicus Brief of Dr. Tierney, by first class mail, postage prepaid or electronic mail through the Court's CM/ECF system upon the parties to the proceeding below as listed in the Service Preference Report.

Respectfully Submitted,

/s/ Jennifer Danis

Jennifer Danis, Esq.

Edward Lloyd, Esq.

Morningside Heights Legal Services

Columbia Law School

435 W. 116th Street

New York, NY 10027

(212) 854-4291

jdanis@law.columbia.edu

Counsel for Dr. Susan Tierney

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