July 31, 2023

To: Grid Deployment Office, Department of Energy

Subject: Designation of National Interest Electric Transmission Corridors

The Institute for Policy Integrity (Policy Integrity) at New York University School of Law respectfully submits the following comments to the Department of Energy (DOE) regarding the *Notice of Intent and Request for Information: Designation of National Interest Electric Transmission Corridors* (RFI).[1] Policy Integrity is a non-partisan think tank dedicated to improving the quality of government decisionmaking through advocacy and scholarship in the fields of administrative law, economics, and public policy.[2]

DOE seeks input on program design elements for the development of guidelines, procedures, and evaluation criteria for an applicant-driven National Interest Electric Transmission Corridor (NIETC) designation process.[3] Under this process, DOE would—at an applicant's request—designate relatively narrow, route-specific NIETCs associated with specific transmission projects already under active development.[4] The RFI focuses primarily on two points.

First, it seeks feedback on what information applicants should submit to enable DOE to evaluate potential NIETCs under (1) the statutory designation criteria from Section 216(a)(4) of the Federal Power Act (FPA) and (2) the National Environmental Policy Act (NEPA).[5] DOE recognizes that—because projects within a NIETC become eligible for a backstop-siting permit from the Federal Energy Regulatory Commission (FERC or the Commission) under FPA Section 216(b)—it would be more efficient if applicants submitted information to DOE that would enable both agencies to conduct a coordinated NEPA analysis.[6] FERC's recent Notice of Proposed Rulemaking (NOPR), *Application for Permits to Site Interstate Electric Transmission Facilities*, describes the information that the Commission proposes to require for backstop-siting applications.[7]

Second, the RFI focuses on what processes DOE should use to collect and assess applications for NIETC designations, mindful of the fact that a designation not only enables backstop-siting authority but also unlocks financial assistance for projects serving the national interest.[8]

Regarding the RFI's proposed applicant-driven process, these comments recommend:

- **DOE should require applicants to estimate how the project under development would cause power plants (including plants that have not yet been built or interconnected) to increase or decrease air pollution emissions in response to the new transmission capacity.** These data—which would be relatively easy for a developer to provide—relate to DOE's obligations under FPA Section 216(a)(4) and NEPA.

[1] *Notice of Intent and Request for Information: Designation of National Interest Electric Transmission Corridors*, 88 Fed. Reg. 30956 (Apr. 15, 2023) [hereinafter RFI].
[2] These comments do not purport to represent the views, if any, of New York University School of Law.
[3] RFI, 88 Fed. Reg. at 30,957.
[4] *Id.*
[5] *Id.* at 30,960; *see also* 16 U.S.C. § 824p(a)(4) (FPA); 42 U.S.C. § 4332(c) (NEPA).
[6] RFI, 88 Fed. Reg. at 30,961–62.
[7] *Application for Permits to Site Interstate Electric Transmission Facilities*, 182 FERC ¶ 61020 (proposed Jan. 17, 2023) [hereinafter NOPR].
[8] RFI, 88 Fed. Reg. at 30,962.

- **DOE should be more specific about how applicants should identify Communities of Interest, a phrase that the RFI defines ambiguously.** In particular, DOE should require applicants to use the Council on Environmental Quality's Climate & Economic Justice Screening Tool to identify disadvantaged communities, which DOE lists as a type of Community of Interest. For communities that are not identified as disadvantaged under DOE's eventual methodology, DOE should establish a mechanism to receive and evaluate communities' evidence that they are disadvantaged.

- **DOE should clarify that applicants need to do more than identify Communities of Interest that may be affected by the proposed NIETC; they should have to describe what those effects would be.** Applicants should also be required to analyze the proposed NIETC's cumulative impacts on Communities of Interest. In service of this goal, DOE should provide applicants with additional guidance on how to conduct cumulative-impacts analyses. This guidance should include definitions of key terms and descriptions of authoritative resources for how to perform such an analysis.

- **Instead of processing applications on a first-come, first-served basis, DOE should specify a reasonable window for applications and then analyze an entire class of applications.** A first-come, first-served process might lead to the quick designation of a NIETC that would preclude the establishment of an even more impactful corridor. For example, the establishment of one corridor could destroy the business-case for a different application that would have done more to reduce congestion and emissions. Moreover, analyzing the applications as a set would allow DOE to designate the suite of NIETCs that—in combination—would best promote the national interest. Given the interdependent quality of the electric grid, the true benefits of a project are best revealed by studying it in combination with other additions of transmission capacity.

- **To allow DOE to better compare applications and study them in combination, it should specify certain modeling techniques that best account for uncertainty, approaches to addressing the operational uncertainties caused by climate change, and sensitivity scenarios to address harder-to-quantify sources of uncertainty.** This would allow DOE to conduct apples-to-apples comparisons across applications.

Notwithstanding DOE's interest in an applicant-driven process, the RFI contemplates that, "[i]n the future, DOE may . . . evaluate routes for NIETC designation that are not necessarily associated with any particular project under development, provided that such a route would facilitate the development of future transmission projects in the national interest."[9] Regarding this possibility, these comments recommend:

- **DOE should eventually identify corridors where additional transmission capacity would best promote the national interest and then solicit competing applications from developers.** While the forthcoming National Transmission Needs Study might lack the granularity needed to identify the right corridors, the separate National Transmission Planning Study would likely be sufficient.

- **To ensure that the National Transmission Planning Study is maximally useful for this purpose, DOE should ensure that it explicitly accounts for externalities from greenhouse gases and local air pollutants, as well as the benefits from additional resilience within any**

[9] *Id.* at 30,957 n.1.

optimization model. Doing so would ensure that these externalities are not a standalone qualitative overlay on a least-cost output, but rather part of the modeling itself.

Below we identify and group together DOE's RFI questions relating to these points, followed by sections expounding on these bulleted recommendations.

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In the sections that follow, we provide the specific question from the RFI that we are answering then our response.

I. To Enable DOE and FERC to Apply Section 216 and NEPA, and to Coordinate Their NEPA Reviews, DOE Should Require Applicants to Estimate Changes to Power-System Emissions and Describe Environmental Justice Impacts

3. Is there other information or types of information not listed in Section II.A.iii that should be requested to inform the evaluation and designation of NIETCs?

10(b). Is there additional information that DOE should request in its NIETC application beyond the information listed in Section II.A.iii? Is additional information beyond the information listed in Section II.A.iii, necessary to develop a record consistent with that which FERC would require to meet its responsibilities under section 216(b) and NEPA?

The RFI focuses on ensuring that applicants will submit the information DOE will need to evaluate projects using Section 216's criteria and to comply with NEPA. Further, because "DOE intends to coordinate to the maximum extent practicable with FERC in cases where an Applicant also intends to seek permits from FERC, . . . DOE intends to request a scope and level of detail similar to what FERC would require pursuant to its responsibilities."[10] As explained below, both DOE and FERC need to collect information about impacts to power-system emissions and environmental justice communities. To ensure that DOE and FERC can meaningfully consider these effects, DOE should clarify that applicants must specifically model how their projects would affect air pollution emissions from the power system. Regarding environmental justice, DOE should also provide actionable instructions for identifying Communities of Interest. Finally, DOE should clarify that applicants must detail anticipated impacts to Communities of Interest, not just identify the communities.

A. DOE and FERC must consider changes to power-system emissions and environmental justice impacts

Used appropriately, DOE's and FERC's authority to promote transmission can help the United States effectuate the national policy of decarbonizing the grid; but whether any particular transmission project would do so depends on project-specific factors.[11] A particular line could actually increase power-system emissions.[12] Or a line could decrease emissions, but by less than a plausible alternative route. Moreover, for the United States to ensure that decarbonization happens equitably, it is essential that DOE and FERC consider the impacts, including air pollution effects, that constructing different transmission lines would have on environmental justice communities.

1. DOE and FERC have authority to consider power-system emissions impacts

Congress empowered DOE to weigh the emissions implications of potential NIETCs by authorizing it to consider whether "the designation would be in the interest of national energy policy."[13] As the RFI notes,

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[10] RFI, 88 Fed. Reg. at 30961–62.

[11] JUDY W. CHANG ET AL., BRATTLE GRP., THE BENEFITS OF ELECTRIC TRANSMISSION: IDENTIFYING AND ANALYZING THE VALUE OF INVESTMENTS 54 (2013), https://perma.cc/Y3N6-TEMW ("Not every proposed transmission project will necessarily provide environmental benefits. Some transmission investments can be environmentally neutral or even displace clean but more expensive generation (e.g., displacing natural gas-fired generation when gas prices are high) with lower-cost but higher-emission generation.").

[12] *Id.*

[13] 16 U.S.C. § 824p(a)(4)(D).

national energy policy—as articulated by the Biden Administration—includes fully decarbonizing the electricity sector by 2035.[14] Emissions impacts are implicated by at least one other statutory criterion. DOE may consider how "the designation would enhance the ability of facilities that generate firm or intermittent energy to connect to the electric grid."[15] This factor is inextricably related to how a transmission line would affect emissions.

Moreover, absent DOE requiring NIETC applicants to provide this modeling, it would be hard-pressed to coordinate, much less streamline, NEPA reviews with FERC for projects seeking backstop-siting authority. The same power-system emissions are an essential component of the Commission's decisionmaking under Section 216(b)(1)(C), and thus are necessary aspect of NIETC applications because DOE aspires to create "a record consistent with that which FERC would require to meet its responsibilities under section 216(b) and NEPA."[16] Congress directed FERC to ensure that backstop-siting permits are "consistent with the public interest."[17] The Supreme Court has determined that, for the FPA, the "public interest" includes environmental effects.[18] D.C. Circuit decisions—most notably *Sierra Club v. FERC* (known colloquially as *Sabal Trail*)—confirm that the Commission must consider environmental impacts generally, and indirect emissions specifically, in permitting decisions.[19]

Moreover, power-system emissions are relevant to two other items that FERC must consider under its Section 216 authority: whether "the proposed construction or modification . . . protects or benefits consumers" and "is consistent with sound national energy policy."[20] The health and climate impacts of emissions are externalities, i.e., costs of power generation that producers impose on others (including consumers, in this instance).[21] And, again, the Biden Administration's national energy policy includes fully decarbonizing the electricity sector by 2035.[22]

2. DOE and FERC have authority to consider environmental justice impacts

Congress authorized DOE to consider whether "the designation would be in the interest of national energy policy,"[23] and national energy policy includes "a Government-wide approach that reduces climate pollution in every sector of the economy . . . [while] deliver[ing] environmental justice . . . , especially

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[14] RFI, 88 Fed. Reg. at 30,957 (citing Exec. Order No. 14008 § 205, 86 Fed. Reg. 7619, 7624 (Jan. 27, 2021)); *see also* U.S. OF AM., NATIONALLY DETERMINED CONTRIBUTION: REDUCING GREENHOUSE GASES IN THE UNITED STATES: A 2030 EMISSIONS TARGET 1 (2021), https://perma.cc/7X3N-8Q89 (articulating the United States' pledge under the Paris Agreement to "reduc[e] its net greenhouse gas emissions by 50-52 percent below 2005 levels in 2030").

[15] 16 U.S.C. § 824p(a)(4)(F).

[16] RFI, 88 Fed. Reg. at 30,962.

[17] 16 U.S.C. § 824p(b)(3).

[18] NAACP v. Fed. Power Comm'n, 425 U.S. 662, 669 & n.6 (1976).

[19] 867 F.3d 1357 (D.C. Cir. 2017). In this case, the court addressed the factors that FERC should weigh under the NGA when issuing certificates of public convenience and necessity to natural-gas-pipeline developers. *Id.* at 1373. Because FERC must "find[] that the project will serve the public interest," the D.C. Circuit held that "FERC could deny a pipeline certificate on the ground that the pipeline would be too harmful to the environment" in light of the indirect emissions from burning the pipeline's gas. *Id.* at 1364, 1373.

[20] 16 U.S.C. § 824p(b)(4)–(5).

[21] *See* PAUL KRUGMAN & ROBIN WELLS, MICROECONOMICS 437 (2d ed. 2009) ("An externality is an uncompensated cost that an individual or firm imposes on others."); ENV'T PROT. AGENCY, EPA EXTERNAL REVIEW DRAFT OF REPORT ON THE SOCIAL COST OF GREENHOUSE GASES: ESTIMATES INCORPORATING RECENT SCIENTIFIC ADVANCES (2022), https://perma.cc/C73G-LLVE (providing updated, draft estimates of the net harm that an additional metric ton of different greenhouse gases would impose on society).

[22] *Supra* note 14.

[23] 16 U.S.C. § 824p(a)(4)(D).

through . . . deployment of clean energy technologies and infrastructure."[24] Environmental justice impacts are also integral to DOE's authority under the FPA to consider whether the designation "avoids and minimizes, to the maximum extent practicable, and offsets to the extent appropriate and practicable, sensitive environmental areas."[25] Environmental justice communities are environmentally sensitive locations because they are home to communities that suffer disproportionate environmental burdens and, as such, are especially sensitive to additional incremental environmental harms.[26] Additionally, DOE has authority to consider environmental justice impacts that are mediated through electricity costs or access, such as high energy burdens.[27]

Several Executive Orders also call on agencies to consider the impacts of their decisions on environmental justice. Under Executive Order 12898, each federal agency "shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations."[28] Executive Order 14008 similarly called on agencies to "address the disproportionately high and adverse human health, environmental, climate-related and other cumulative impacts on disadvantaged communities."[29] President Biden's recent Executive Order 14096 states that agencies "must advance environmental justice for all . . . by preventing pollution, addressing climate change and its effects, and working to clean up legacy pollution that is harming human health and the environment."[30] Moreover, this order added that agencies should "consider adopting or requiring measures to avoid, minimize, or mitigate disproportionate and adverse human health and environmental effects . . . on communities with environmental justice concerns, to the maximum extent practicable."[31]

Further, returning to DOE's desire to require NIETC applicants to provide all info necessary for a backstop-siting determination from the Commission, the Commission's backstop-siting NOPR appropriately recognizes that environmental justice impacts are an essential aspect of evaluating backstop-siting applications. The NOPR proposes to require applicants to submit an environmental justice report that "[i]dentif[ies] environmental justice communities within the area of potential project impacts"; "[d]escribe[s] the impacts," including "cumulative impacts"; and "[i]dentif[ies] any disproportionately high and adverse impacts."[32] This request aligns with the D.C. Circuit's holding that, when FERC applies its public interest test, it may base "determinations of public interest" in part on "impacts on . . . environmental justice communities."[33] Indeed, Acting Chairman Phillips recognized this at the

[24] Exec. Ord. No. 14008 § 201, 86 Fed. Reg. 7619 (Feb. 1, 2021).
[25] 16 U.S.C. § 824p(a)(4)(G).
[26] *See* EPA, TECHNICAL GUIDANCE FOR ASSESSING ENVIRONMENTAL JUSTICE IN REGULATORY ANALYSIS 15–19 (2016), https://perma.cc/4GLL-KNEE.
[27] 16 U.S.C. § 824p(a)(4)(A), (H) (listing whether "the economic vitality and development of the corridor, or the end markets served by the corridor, may be constrained by lack of adequate or reasonably priced electricity" and whether "the designation would result in a reduction in the cost to purchase electric energy for consumers").
[28] Exec. Ord. No. 12898 § 1-101, 59 Fed. Reg. 7629 (Feb. 11, 1994).
[29] Exec. Ord. No. 14008 § 219, 86 Fed. Reg. 7619 (Feb. 1, 2021).
[30] Exec. Ord. No. 14096, 88 Fed. Reg. 25251 (Apr. 21, 2023).
[31] *Id.* It is notable to acknowledge that the new order amends the previous Executive Order 12898 by replacing the phrase "disproportionately high and adverse" with "disproportionate and adverse" to eliminate any potential misunderstanding that agencies should only be considering large disproportionate effects.
[32] NOPR, *supra* note 7, at 41.
[33] Vecinos para el Bienestar de la Comunidad Costera v. FERC, 6 F.4th 1321, 1331 (D.C. Cir. 2021).

Roundtable on Environmental Justice and Equity in Infrastructure Permitting, confirming that "[e]nvironmental justice has always and will be a part of my public interest determination."[34]

3. NEPA requires DOE and FERC to consider power-system emissions impacts and environmental justice impacts

Because Section 216 authorizes both DOE and FERC to consider power-system emissions and environmental justice impacts, NEPA obligates each agency to review these factors for potential NIETCs and backstop-siting applications. Per the D.C. Circuit, the general rule is this: An agency must gather information about and consider reasonably foreseeable environmental effects under NEPA unless "it has no statutory authority to act on that information."[35] Applying that rule in *Sabal Trail*, the D.C. Circuit held that FERC needed to assess reasonably foreseeable greenhouse gas emissions that would indirectly result from approving a natural gas pipeline because FERC could deny (or modify, or condition) a pipeline certificate on the basis of these indirect emissions.[36]

Indeed, if DOE or FERC were to designate a NIETC or approve a backstop-siting permit without requesting power-system emissions data from the applicant or otherwise obtaining it, the decision would be legally vulnerable. According to the D.C. Circuit, when an initial lack of record evidence prevents an agency from considering an environmental impact, "NEPA . . . requires [it] to at least *attempt* to obtain the information necessary to fulfill its statutory responsibilities" through "further developing the record by requesting additional data from the project applicant."[37] DOE should implement Section 216 efficiently by requiring this information from applicants on the front end, rather than in response to commenters' objections.

In sum, power-system emissions and environmental justice are relevant to both DOE's and FERC's analyses under Section 216 and NEPA. Accordingly, DOE should take steps to ensure that applications enable it and FERC to meaningfully consider these factors. Doing so would clarify applicants' obligations and ensure that DOE and FERC have a robust administrative record supporting their determinations under Section 216 and NEPA. If DOE and FERC fail to consider these critical factors, they would be exposing projects to legal risk and potentially entangling them in litigation. Additionally, alienating or ignoring impacted environmental justice communities is likely to result in transmission projects languishing because applicants failed to appreciate the concerns of stakeholders who were left out of important siting conversations and impacts analyses.[38] This concern holds true whether the NIETC contains state- or FERC-jurisdictionally sited projects.

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[34] Transcript of the March 29, 2023 Roundtable on Environmental Justice and Equity in Infrastructure Permitting at 206:21–22, *Environmental Justice & Equity in Infrastructure Permitting Roundtable*, Docket No. AD23-5-000 (Apr. 5, 2023) (Accession No. 20230405-4001) (Statement of Acting Chair Phillips).

[35] *Sabal Trail*, 867 F.3d at 1372 (emphasis omitted).

[36] *Id.* at 1373–74.

[37] Birckhead v. FERC, 925 F.3d 510, 519–20 (D.C. Cir. 2019); *accord* Food & Water Watch v. FERC, 28 F.4th 277, 285 (D.C. Cir. 2022) ("[A]n initial lack of information does not afford an agency carte blanche to disregard indirect effects. . . . [T]he Commission must attempt to gather the information necessary to assess the project's potential indirect effects."); *National Environmental Policy Act Guidance on Consideration of Greenhouse Gas Emissions and Climate Change*, 88 Fed. Reg. 1,196, 1,202 (Jan. 9, 2023) ("[A]gencies should seek to obtain the information needed to quantify [greenhouse gas] emissions, including by requesting or requiring information held by project applicants or by conducting modeling when relevant.").

[38] *Cf. Texas LNG Brownsville LLC*, 183 FERC ¶ 61047, at PP 8, 13 (2023) (Clements, Comm'r, dissenting) ("Failing to allow meaningful public participation [of environmental justice communities] . . . not only violate[s] NEPA, but also undermine[s] the Commission's ability to engage in reasoned decision-making, as it is required to do under the Administrative Procedure Act . . . . In failing to meet its statutory and regulatory obligations, the Commission invites litigation . . . , potentially leading to further delay.").

B. DOE should require applicants to estimate changes power-system emissions, which would be relatively simple for applicants to do

Given that power-system emissions impacts are important for both DOE's and FERC's determinations under Section 216 and NEPA, DOE should require this information in NIETC applications. The RFI does not explicitly do so. Instead, DOE proposes that an application should describe the proposed NIETC's effect on "the achievement of national energy policy goals, including the development of low and zero carbon generation capacity resources; the ability to interconnect new firm or intermittent energy resources[;] and[] reductions in electric energy costs for consumers."[39] The RFI does, however, imply that one factor DOE plans to weigh when evaluating proposed corridors is "[r]educing greenhouse gas emissions."[40] DOE's final guidelines should be crystal clear: Applicants must estimate impacts of proposed NIETCs on power-system emissions.

Fortunately, this would be a relatively modest addition to NIETC application materials. Historically, FERC has required, and both DOE and FERC have received, such emissions estimates from transmission developers. Power-system emissions estimates are applicant- and DOE-accessible through readily available modeling software that closely resembles (or is identical to) what applicants will deploy to generate other information required by the RFI.

1. Developers have provided DOE and FERC with estimates of power-system emissions impacts from transmission projects

In the past, developers have modeled power-system emissions impacts and submitted these data and analyses to both DOE and FERC. For example, in 2015, DOE received information about the emissions impacts of the Plains & Eastern Clean Line, a proposed transmission project stretching from Oklahoma to Tennessee.[41] This project aimed to bring electricity generated from wind farms in the central United States to load centers in the South and Southeast.[42] The developer submitted modeling results of the estimated impacts on SO_2, NO_X, CO_2, and mercury emissions, broken out by Tennessee, Arkansas, and the rest of the Eastern Interconnection.[43]

And, despite having had little opportunity to exercise transmission-siting authority, FERC also has a history of requesting and receiving estimates of power-system emissions impacts from transmission project developers. In 2008, an applicant asked FERC to exercise Section 216 backstop-siting authority for the proposed Devers-Palo Verde No. 2 Project, which involved building a transmission line from California to Arizona.[44] The Commission requested additional environmental information from the applicant, including "[a]ir emission levels (e.g., carbon dioxide, oxides of nitrogen, and particulates) based upon the expected changes in the type, level, and location of electric generation associated with the

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[39] RFI, 88 Fed. Reg. at 30,960.
[40] *Id.* at 30,962.
[41] CLEAN LINE ENERGY PARTNERS, PLAINS & EASTERN CLEAN LINE: 1222 PROGRAM – PART 2 APPLICATION, 1-1, 3-8 to 3-10 (2015), https://perma.cc/WC2H-4VRY [hereinafter PLAINS & EASTERN CLEAN LINE APPLICATION]. This project was not proposed pursuant to Section 216; instead, a developer proposed it in response to a Department of Energy request for proposals under 42 U.S.C. 16421. *See Plains & Eastern Clean Line Transmission Line*, DEP'T OF ENERGY, https://perma.cc/6W6A-T35D.
[42] PLAINS & EASTERN CLEAN LINE APPLICATION, *supra* note 41, at 2-1.
[43] LEIDOS ENGINEERING LLC, PLAINS & EASTERN CLEAN LINE BENEFIT ANALYSIS 2 (2015), https://perma.cc/23TH-Y8R9.
[44] Initial Filing of Southern California Edison Company for the Devers-Palo Verde No. 2 Project at 1, *Pre-Filing and Application for Electric Transmission Facilities*, Docket No. PT08-1-000 (May 16, 2008) (Accession No. 20080516-4009).

project."[45] FERC cautioned that "[t]his information is necessary for the Commission to conduct its environmental review of the proposed facility as required by [Section 216 of the FPA]" and, "[w]ithout this information, the pre-filing phase of the proceeding will be incomplete."[46] The applicant complied with FERC's request by submitting modeling results showing how the project would cause power plants in California and Arizona to increase or decrease their output and how these shifts would affect emissions of SO_2, NO_X, and CO_2.[47]

These historical examples demonstrate that power-system emissions impacts from proposed transmission projects are foreseeable for developers and relevant to determining whether projects will serve the national interest.

2. Readily available modeling software can estimate power-system emissions impacts from transmission projects

Developers were able to provide estimates of power-system emissions for the aforementioned projects because software with these modeling capabilities is readily available. Both production-cost models and capacity-expansion models can generate these estimates. Each type of model is capable of forecasting how adding new transmission capacity would affect power generation and emissions throughout the grid.

Production-cost models simulate the operation of the power system by computing the least-cost dispatch scenarios that meet anticipated load.[48] In other words, they reveal which power plants would be generating electricity and how much. Outputs from this family of models include sub-hourly unit-level generation and the resulting emissions, which the models produce by applying plant-specific emission factors to the dispatch scenarios.[49] Because these emissions estimates are a simple extension of the predicted dispatch scenarios, they are as credible as the models' other outputs that flow from anticipated dispatch scenarios, such as locational marginal prices and reliability.

Moreover, production-cost models would allow developers to estimate emissions impacts that reflect not only the existing generation fleet, but also the generation resources that would be built or become interconnected to the grid as a result of a proposed transmission project. To do this, the developer would generate scenarios of the resources expected to be built or interconnected and plug the resources into the production-cost model as additional inputs. For example, a developer could reasonably anticipate (and then feed into a production-cost model) that a transmission project built between a load center and an area with an excellent wind resource would enable the development of wind turbines, in an amount that reflects the transmission capacity of the proposed project.[50] Or a developer could look at the interconnection queue to see which projects are planned.

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[45] Pre-Filing Request for Additional Information at 18, *Pre-Filing and Application for Electric Transmission Facilities*, Docket No. PT08-1-000 (Dec. 8, 2008) (Accession No. 20081208-3038).
[46] *Id.* at 1.
[47] Responses to Request Dated December 8, 2008, Enclosure 2, at 2, 9–231, *Pre-Filing and Application for Electric Transmission Facilities*, Docket No. PT08-1-000 (Feb. 6, 2009) (Accession No. 20090218-0134).
[48] DEP'T OF ENERGY, POWER SECTOR MODELING 101 at 19, https://perma.cc/7ZUS-ZVPT [hereinafter POWER SECTOR MODELING 101].
[49] *Id.* at 20.
[50] *E.g.*, PLAINS & EASTERN CLEAN LINE APPLICATION, *supra* note 41, at 2-2 ("The increased demand for transmission capacity on the Project proposed by Clean Line is unquestionable. Clean Line recently conducted an open solicitation for transmission service requests over the Project. Clean Line received 29 requests from 15 different transmission customers. Together, these customers requested 17,091 MW of transmission service, or 392% of the Project's total 4,355 MW of West-East transfer capacity. The increased demand for interregional capacity to connect wind-rich zones with load-centers exists today." (emphases omitted)).

Alternatively, a developer could use one of the many available capacity-expansion models to simulate the optimal build-out of generation resources in light of the new transmission line and use these results as inputs for a production-cost model. Capacity-expansion models jointly minimize investment costs and expected production costs given assumptions about technology costs and performance, fuel costs, electricity demand, and other variables.[51] Put more simply, they compute the cheapest way to meet the demand for electricity, including through the build-out of new generation resources. It would also be possible to estimate power-system emissions impacts from a transmission project using only a capacity-expansion model that includes dispatch scenarios and emissions factors, without the need for a production-cost model.[52]

Two examples of commercially available production-cost models are PROMOD and PLEXOS.[53] The Midcontinent Independent System Operator (MISO) uses both to analyze grid operations under different economic and policy-driven scenarios.[54] MISO recently forecasted (through these models or others) that a tranche of proposed transmission lines would result in billions of dollars of benefits from reduced CO_2 emissions.[55] PJM Interconnection uses PROMOD to model the benefits of transmission expansion.[56] Capacity-expansion models include the Environmental Protection Agency's (EPA) Integrated Planning Model, the National Renewable Energy Laboratory's Regional Energy Deployment System (which is open source), GenX (also open source), and Hitachi Energy's Capacity Expansion.[57] PLEXOS, one of the production-cost models described above, also has capacity-expansion capabilities.[58] Capacity expansion models are a reputable way to forecast outcomes in the power system; for example, in EPA's recent proposed rule on emissions standards for light- and medium-duty vehicles, the agency used the Integrated Planning Model to estimate power-system emissions from increased adoption of electric vehicles.[59]

These modeling tools are widely available and readily deployable. They confirm that Section 216 applicants seeking to show that their projects serve the national interest can readily do so by submitting these analyses, and also that NEPA requires DOE to consider these foreseeable emissions impacts.

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[51] POWER SECTOR MODELING 101, *supra* note 48, at 10.
[52] *See id.* at 11.
[53] *Id.* at 21; *see PROMOD*, HITACHI ENERGY, https://www.hitachienergy.com/us/en/products-and-solutions/energy-portfolio-management/enterprise/promod (last visited July 26, 2023); *PLEXOS*, ENERGY EXEMPLAR, https://perma.cc/H8R7-QAKP.
[54] MIDCONTINENT INDEPENDENT SYSTEM OPERATOR, PLANNING MODELS USED BY MISO 14 (2018), https://perma.cc/6SYS-P5LM.
[55] MIDCONTINENT INDEPENDENT SYSTEM OPERATOR, MISO TRANSMISSION EXPANSION PLAN: MTEP21 ADDENDUM - LRTP TRANCHE 1 REPORT OVERVIEW 13 (2022), https://perma.cc/A5NQ-6FHR.
[56] PJM INTERCONNECTION, MARKET EFFICIENCY STUDY PROCESS AND RTEP WINDOW PROJECT EVALUATION TRAINING 7, 16 (2022), https://perma.cc/K8FU-K62P.
[57] POWER SECTOR MODELING 101 at 12; *Post-IRA 2022 Reference Case*, ENV'T PROT. AGENCY (Apr. 5, 2023), https://www.epa.gov/power-sector-modeling/post-ira-2022-reference-case; *Regional Energy Development System Model*, NAT'L RENEWABLE ENERGY LAB'Y, https://www.nrel.gov/analysis/reeds/ (last visited July 26, 2023); *GenX Documentation*, MIT ENERGY INITIATIVE AND PRINCETON UNIVERSITY ZERO LAB, https://genxproject.github.io/GenX/dev/ (last visited July 26, 2023); *Capacity Expansion*, HITACHI ENERGY, https://www.hitachienergy.com/us/en/products-and-solutions/energy-portfolio-management/enterprise/capacity-expansion (last visited July 26, 2023).
[58] *PLEXOS*, ENERGY EXEMPLAR, https://perma.cc/H8R7-QAKP.
[59] *Multi-Pollutant Emissions Standards for Model Years 2027 and Later Light-Duty and Medium-Duty Vehicles*, 88 Fed. Reg. 29184, 29303 (proposed May 5, 2023).

3. Given the other information that DOE proposes to require, estimates of power-system emissions impacts would be especially easy to provide

The RFI already requires applicants to explain "how the potential NIETC would address existing or expected future electric energy transmission capacity constraints or congestion."[60] Accordingly, requiring applicants to estimate their proposed projects' power-system emissions impacts would not materially alter the burden imposed by the RFI. To do this rigorously, an applicant would model dispatch scenarios, perhaps using one of the models discussed above. Once dispatch scenarios have been determined,[61] it would be simple to calculate emissions using plant-specific emissions factors (if the model does not already provide emissions as an output).

C. DOE should provide additional guidance on how applicants should describe the environmental justice impacts of proposed NIETCs

Because environmental justice impacts are also a critical aspect of DOE's and FERC's decisionmaking under Section 216 and NEPA,[62] DOE should take steps to ensure that applicants provide accurate information that enables the agencies to meaningfully weigh these effects. The RFI does not explicitly propose to require applicants to describe environmental justice impacts, but it does propose that they summarize "known information about the presence of Communities of Interest . . . that could be affected by the NIETC."[63] As defined by the RFI, "Communities of Interest" are "any community that has been historically marginalized, including, but not limited to, disadvantaged communities, fossil energy communities, rural communities, minority communities, indigenous peoples, or other geographically proximate communities that could be affected by a NIETC."[64] The RFI also indicates that DOE plans to weigh whether a corridor would "[i]mprov[e] energy equity and achiev[e] environmental justice goals."[65]

DOE's definition of "Communities of Interest" evinces its interest in environmental justice impacts, but the definition is ambiguous in ways that will hamper the DOE's work under Section 216(a)(4) and NEPA. DOE should work to ensure that NIETC designations promote environmental justice by providing additional guidance on how to identify Communities of Interest. DOE should also clarify that applicants cannot merely identify which communities are present; applicants must also describe how proposed NIETCs would affect Communities of Interest, including cumulative impacts.

1. DOE should explain how applicants can identify Communities of Interest

To ensure that applicants appropriately identify Communities of Interest, DOE should establish administrable criteria that would allow applicants to easily identify the relevant communities. Again, "Community of Interest means any community that has been historically marginalized, including, but not limited to, disadvantaged communities, fossil energy communities, rural communities, minority communities, indigenous peoples, or other geographically proximate communities that could be affected by a NIETC."[66] But what is a disadvantaged community? A fossil energy community? A minority community? Do historically marginalized groups encompass low-income populations (who are not explicitly mentioned)? Does "Communities of Interest" include any community that is geographically

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[60] RFI, 88 Fed. Reg. at 30,960.
[61] *See* Section II(B) below for a discussion on the importance of DOE prescribing specific criteria for applicants' modeling and inputs. Here, we note simply that dispatch scenarios should be based on standardized inputs, constraining developers' ability to cherry-pick data.
[62] *See* Section I(A)(2)–(3).
[63] RFI, 88 Fed. Reg. at 30,961.
[64] *Id.* at 30,959 n.15.
[65] *Id.* at 30,962.
[66] *Id.* at 30,959 n.15.

proximate to a NIETC, or only historically marginalized ones? To avoid the problem of applicants submitting inaccurate or perfunctory environmental justice analyses—which could, in turn, become the basis for legally inadequate environmental reviews—DOE should answer these questions. Although all of these questions merit attention from DOE, this section focuses on how applicants should identify "disadvantaged" communities, which, under DOE's definition, are a subset of Communities of Interest.

a. DOE should require applicants to use CEJST to identify disadvantaged communities

In Executive Order 14008, President Biden announced "the policy of [his] Administration to secure environmental justice and spur economic opportunity for *disadvantaged communities* that have been historically marginalized and overburdened by pollution and underinvestment."[67] The order further directed the Council on Environmental Quality (CEQ) to develop the Climate & Economic Justice Screening Tool (CEJST) to identify these disadvantaged communities.[68] The White House has since instructed agencies to use CEJST to the maximum extent possible to identify disadvantaged communities for the Justice40 Initiative, which aims to deliver 40% of benefits from certain investments to disadvantaged communities.[69] Relevant here, the White House also requests that agencies "encourage use of . . . CEJST" in order "to promote uniformity across the government" with regard to "the identification of communities that are disadvantaged, marginalized, overburdened, and underserved."[70]

CEJST identifies census tracts as "disadvantaged" if they (1) meet certain thresholds in at least one of the tool's eight categories of burden; (2) are completely surrounded by disadvantaged tracts and are at or above the 50th percentile for low income; or (3) are on land within the boundaries of a federally recognized Indian tribe.[71] The eight categories of burden are climate change, energy, health, housing, legacy pollution, transportation, waste and wastewater, and workforce development.[72] To qualify as burdened under one of these eight categories, a tract must satisfy certain combinations of thresholds, typically a combination of environmental and socioeconomic conditions (excluding race):

- **Climate Change:** (1) At or above the 90th percentile for expected agriculture loss rate, expected building loss rate, expected population loss rate, projected flood risk, *or* projected wildfire risk *and* (2) at or above the 65th percentile for low income.

- **Energy:** (1) At or above the 90th percentile for energy cost *or* $PM_{2.5}$ in the air *and* (2) at or above the 65th percentile for low income.

- **Health:** (1) At or above the 90th percentile for asthma, diabetes, heart disease, *or* low life expectancy *and* (2) at or above the 65th percentile for low income.

- **Housing:** (1) At or above the 90th percentile for housing cost, lack of green space, lack of indoor plumbing, *or* lead paint *or* experienced historic underinvestment based on redlining maps created by the federal government's Home Owners' Loan Corporation between 1935 and 1940 *and* (2) at or above the 65th percentile for low income.

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[67] Exec. Order No. 14008 § 219, 86 Fed. Reg. 7619, 7629 (Jan. 27, 2021) (emphasis added).
[68] *Id.* § 222(a), 86 Fed. Reg. 7619, 7631.
[69] Memorandum from Shalanda D. Young, Director, Off. of Mgmt. & Budget, et al. to the Heads of Executive Departments and Agencies 1–2, M-23-09 (Jan. 27, 2023), https://perma.cc/NQ7V-5CW6.
[70] *Id.* at 2 n.1.
[71] *Methodology*, COUNCIL ON ENV'T QUALITY, https://perma.cc/ND9H-6PS6.
[72] *Id.*

- **Legacy Pollution:** At or above the 90th percentile for proximity to hazardous waste facilities, proximity to Superfund sites, *or* proximity to Risk Management Plan facilities *or* have at least one abandoned mine land *or* have at least one Formerly Used Defense Site *and* (2) at or above the 65th percentile for low income.

- **Transportation:** (1) At or above the 90th percentile for diesel particulate matter exposure, transportation barriers, *or* traffic proximity and volume *and* (2) at or above the 65th percentile for low income.

- **Water and Wastewater:** (1) At or above the 90th percentile for underground storage tanks and releases *or* wastewater discharge *and* (2) at or above the 65th percentile for low income.

- **Workforce Development:** (1) At or above the 90th percentile for linguistic isolation, low median income, poverty, *or* unemployment *and* (2) less than 10% of people ages twenty-five or older have a high school education.[73]

Using this tool, it is possible to see exactly which combination of circumstances causes a tract to be labeled as disadvantaged, as well as whether more than one set of conditions has been satisfied.[74]

An advantage of using CEJST to help identify disadvantaged communities is that it combines environmental and socioeconomic proxies for marginalization and environmental burden. Additionally, by including all land within the boundaries of federally recognized Indian tribes, CEJST accords with DOE's inclusion of indigenous peoples in the definition of "Communities of Interest."[75] Because CEJST does not use race as an indicator for identifying communities (in contrast to EPA's Environmental Justice Screening and Mapping Tool, DOE's Energy Justice Mapping Tool, and FERC's methodology for identifying environmental justice communities), any decision by DOE to reject a proposed corridor due to impacts to a disadvantaged community identified by CEJST may accord better with the Supreme Court's evolving jurisprudence on constitutional uses of race-based considerations.[76] Using CEJST would also adhere to the White House's request that agencies use CEJST "to promote uniformity across the government" with regard to "the identification of communities that are disadvantaged, marginalized, overburdened, and underserved."[77] Finally, CEQ has already selected the thresholds within CEJST that dictate when a community qualifies as disadvantaged, which would relieve DOE from independently needing to select thresholds.

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[73] *Id.*

[74] *See Explore the Map,* COUNCIL ON ENV'T QUALITY, https://screeningtool.geoplatform.gov/en/#3/33.47/-97.5 (last visited July 26, 2023).

[75] RFI, 88 Fed. Reg. at 30,959 n.15.

[76] *See* Students for Fair Admissions, Inc. v. President & Fellows of Harvard Coll., No. 20-1199, 2023 WL 4239254, at *12 (U.S. June 29, 2023); *see also* Vitolo v. Guzman, 999 F.3d 353, 366 (6th Cir. 2021) (enjoining the Small Business Administration from prioritizing applications for relief funding based upon the race or sex of the applicant); Faust v. Vilsack, 2021 WL 2409729 (E.D. Wis. June 10, 2021) (issuing a temporary restraining order blocking the Department of Agriculture from administering a loan-forgiveness program based on the applicant's race); Wynn v. Vilsack, 2021 WL 2580678 (M.D. Fla. June 23, 2021) (same). For the same reason, DOE should scrutinize the inclusion of "minority communities" within the definition of "Communities of Interest." *But see* Robert D. Bullard et al., Comments on the CEQ's Climate and Economic Justice Screening Tool (Apr. 22, 2022), https://perma.cc/3QDA-VU49 (critiquing CEJST for not using race as a socioeconomic indicator because "decades of statistical studies . . . show that race has an independent effect on the distribution of environmental burdens from other socioeconomic factors and is indeed the most potent and consistent predictor of where pollution and other environmental burdens are concentrated").

[77] Memorandum from Shalanda D. Young, Director, Off. of Mgmt. & Budget, et al. to the Heads of Executive Departments and Agencies 2 n.1, M-23-09 (Jan. 27, 2023), https://perma.cc/NQ7V-5CW6.

There are multiple ways that DOE could require applicants to use CEJST. The simplest option would be for the agency to declare that tracts identified as disadvantaged by CEJST (or the constituent block groups of these tracts) are disadvantaged communities. Alternatively, DOE might use CEJST but look at only certain categories of burdens (e.g., those that relate the most to energy infrastructure). DOE could also select its own burden thresholds within the data categories that CEJST reports, instead of using CEQ's thresholds.

In short, DOE correctly included disadvantaged communities with its definition of Communities of Interest, and DOE should require applicants to use CEJST to help identify them.

b. DOE should establish a self-identification mechanism for communities to identify as disadvantaged

Although screening tools like CEJST are helpful in identifying communities facing intersecting environmental, economic, and health burdens, no tool can comprehensively reflect the circumstances of any given community, especially when data are systematically lacking or communities face burdens that cannot be easily quantified.[78] CEJST does not capture all conceivable ways in which a community might be disadvantaged, only the ones outlined above. CEJST also uses census tracts, a relatively large unit of analysis that may mask the existence of smaller disadvantaged communities within tracts that are not labeled as disadvantaged.[79] Measurement inaccuracies, especially in areas with smaller populations, may not reflect local-level realities if taken at face value.[80] As such, a screening tool like CEJST should not be the final arbiter of whether an applicant or DOE identifies a community as disadvantaged.

Instead, DOE should consider allowing communities to self-identify as disadvantaged (or another type of Community of Interest), as the innovative Illinois Solar for All initiative does for environmental justice communities.[81] The Solar for All program allows communities to use a variety of data sources to demonstrate eligibility, including expert testimony, community organizing, and news articles.[82] Historical events are also eligible data sources, which is important given that many existing screening tools are limited in their ability to assess prior environmental damage. Allowing communities to self-identify, or, at the very least, to petition for their designations, ensures that communities are not excluded because the existing identification tools or methods are unable to capture localized harms.

In the context of Section 216, this could mean establishing a procedure in which communities could petition DOE to be considered disadvantaged, notwithstanding the fact that they would not be identified as such using DOE's chosen identification methodology (e.g., CEJST). For example, a community might submit evidence that census tract boundaries do not accurately demarcate the community's borders and that, if the correct boundary line were used, the community would in fact satisfy DOE's criteria. Or a community might submit evidence of a disproportionate environmental burden that is not reflected in CEJST. It would be most appropriate for DOE, not the applicant, to adjudicate whether a community should be considered a disadvantaged community in light of the submitted evidence.

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[78] *See* James Sadd et al., *The Truth, the Whole Truth, and Nothing but the Ground-Truth: Methods to Advance Environmental Justice and Researcher-Community Partnerships*, 41 HEALTH EDUC. BEHAV. 281, 288 (2014).
[79] JACK LIENKE ET AL., INST. FOR POL'Y INTEGRITY, MAKING REGULATIONS FAIR: HOW COST-BENEFIT ANALYSIS CAN PROMOTE EQUITY AND ADVANCE ENVIRONMENTAL JUSTICE 6–7 (2021).
[80] CORIANNE PAYTON SCALLY, ET AL., URB. INST., IN SEARCH OF "GOOD" RURAL DATA 14–31 (2020), https://perma.cc/3L2M-84MS.
[81] *See* 20 Ill. Comp. Stat. Ann. 3855/1-56.
[82] *ILSFA Environmental Justice Community Self-Designation Application*, ILL. POWER AGENCY, https://www.illinoissfa.com/designate-your-community/ (last visited July 26, 2023).

2. DOE should instruct applicants to describe impacts, including cumulative impacts, to Communities of Interest, not just identify the communities

The RFI proposes that applicants would need to submit a "[s]ummary of known information about the presence of Communities of Interest . . . that could be affected by the NIETC"; however, it does not clearly state that applicants need to describe what the effects would be.[83] DOE should require applicants to analyze these impacts. Doing so would encourage applicants to think through impacts to Communities of Interest when conceptualizing their projects and also would provide DOE with critical information for its determinations under Section 216(a)(4) and NEPA. Additionally, DOE should (as FERC does for environmental justice communities in the NOPR) instruct applicants to analyze cumulative impacts of the proposed NIETC plus existing stressors. If DOE does so, it should also provide additional guidance for applicants on cumulative impacts to ensure that this aspect of their applications does not become a mere box-checking exercise for applicants.

a. DOE should define key terms

A first step would be for DOE to adopt EPA's Office of Research and Development's (EPA ORD) definitions of "cumulative impacts," "cumulative impact assessment," and "stressor" and to specifically require that applicants perform a "cumulative impact assessment":

- Cumulative Impacts are defined as the totality of exposures to combinations of chemical and nonchemical stressors and their effects on health, well-being, and quality of life outcomes. Cumulative impacts include contemporary exposures to multiple stressors as well as exposures throughout a person's lifetime. They are influenced by the distribution of stressors and encompass both direct and indirect effects to people through impacts on resources and the environment. Cumulative impacts can be considered in the context of individuals, geographically defined communities, or definable population groups. Cumulative impacts characterize the potential state of vulnerability or resilience of a community.[84]

- Cumulative Impact Assessment is defined as a process of evaluating both quantitative and qualitative data representing cumulative impacts to inform a decision. Cumulative impact assessment requires a systematic approach to characterize the combined effects from exposures to both chemical and non-chemical stressors over time across the affected population group or community. It evaluates how stressors from the built, natural, and social environments affect groups of people in both positive and negative ways. The posited elements of a cumulative impact assessment include community role throughout the assessment, such as identifying problems and potential intervention decision points to improve community health and well-being; combined impacts across multiple chemical and non-chemical stressors; multiple sources of stressors from the built, natural, and social environments; multiple exposure pathways across media; community vulnerability, sensitivity, adaptability, and resilience; exposures to stressors in the relevant past and future, especially during vulnerable lifestages; distribution of environmental burdens and benefits; individual variability and behaviors; health and well-being benefits/mitigating factors;

[83] RFI, 88 Fed. Reg. at 30,961.

[84] ENV'T PROT. AGENCY OFF. OF RSCH. & DEV., CUMULATIVE IMPACTS RESEARCH: RECOMMENDATIONS FOR EPA'S OFFICE OF RESEARCH AND DEVELOPMENT 4–5 (2022) [hereinafter EPA ORD CUMULATIVE IMPACTS RECOMMENDATIONS], https://perma.cc/9BE8-TAB2; *see also id.* at 5 nn.5–7 (defining "health," "well-being," and "quality of life").

uncertainty and variability associated with the data and information; and an approach for how to integrate data and information to assess cumulative impacts.[85]

- Stressors are defined as any physical, chemical, social, or biological entity that can induce a change (either positive or negative) in health, well-being, and quality of life (either now or into the future).[86] Chemical stressors are defined as exogenous environmental compounds.[87] Chemical stressors change or damage living organisms or ecosystems and are released into the environment by waste, emissions, pesticide use, or uses of formulated compounds like pharmaceuticals.[88] Non-chemical stressors are factors found in the built, natural, and social environments including physical factors such as noise, temperature, and humidity and psychosocial factors (e.g., poor diet, smoking, and illicit drug use).[89]

EPA ORD developed these definitions through research into previous definitions, workshops and listening sessions, internal discussions, and input from EPA's Science Advisory Board.[90] Adopting them would provide greater clarity as to the scope and depth of the required cumulative-impacts analysis while increasing the likelihood that applicants accurately assess cumulative impacts to Communities of Interest, to provide DOE with a sound basis on which to conduct its own Section 216(a)(4) and NEPA analyses.

b. DOE should identify authoritative resources or principles

DOE should also direct applicants to specific sources of federal guidance outlining how to conduct a cumulative-impacts analysis, or the agency should distill the lessons from these documents and write its own guidelines to ensure that it has a robust and legally defensible administrative record on which to base its designation decisions. Below we review several existing tools that DOE could direct applicants to deploy in conducting legally sufficient cumulative impacts analyses.

EPA ORD's *Cumulative Impacts Research: Recommendations for EPA's Office of Research and Development* lists key questions for the development of a cumulative-impacts analysis, including "What is the baseline condition for the identified population/community? This should include socioeconomic, environmental, and health data as available, including information on pre-existing vulnerabilities and historical exposures."; "What are the impacts (positive or negative) of the decision?"; and "Does the decision increase or decrease identified racial/ethnic and income gaps in health and environmental impacts/risks? If so, how much?"[91]

EPA's *Technical Guidance for Assessing Environmental Justice in Regulatory Analysis* addresses the simultaneous need to assess how environmental justice communities already face higher exposures to given environmental stressors and how members of these communities may also be more susceptible to adverse outcomes given vulnerabilities caused by other stressors.[92]

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[85] *Id.* at 5.
[86] *Id.* at 1 n.3.
[87] *Id.* at 1 n.1.
[88] *Id.*
[89] *Id.* at 1 n.2.
[90] *Id.* at 4.
[91] *Id.* at 10–11.
[92] ENV'T PROT. AGENCY, TECHNICAL GUIDANCE FOR ASSESSING ENVIRONMENTAL JUSTICE IN REGULATORY ANALYSIS 15–19, 23–24 (2016), https://perma.cc/C964-NH9N [hereinafter EPA EJ TECHNICAL GUIDANCE].

Most comprehensively, EPA's *Framework for Cumulative Risk Assessment* provides a detailed walkthrough of the three main phases of a cumulative-risk assessment: planning, scoping, and problem formulation; analysis; and risk characterization.[93] In brief:

> In the first phase, a team of risk managers, risk assessors, and other stakeholders establishes the goals, breadth, depth, and focus of the assessment. The end products of this phase are a conceptual model and an analysis plan. The conceptual model establishes the stressors to be evaluated, the health or environmental effects to be evaluated, and the relationships among various stressor exposures and potential effects. The analysis plan lays out the data needed, the approach to be taken, and the types of results expected during the analysis phase.
>
> The analysis phase includes developing profiles of exposure, considering interactions (if any) among stressors, and predicting risks to the population or populations assessed. It is in this phase that difficult technical issues such as the toxicity of mixtures, the vulnerability of populations, or the interactions among stressors that may be chemical or nonchemical are addressed and, hopefully resolved. The end product of this phase is an analysis of the risks associated with the multiple stressors to which the study population or populations are exposed.
>
> The third phase, risk characterization (interpretation), puts the risk estimates into perspective in terms of their significance, the reliability of the estimates, and the overall confidence in the assessment. It is also in this phase that an evaluation is made of whether the assessment met the objectives and goals set forth in phase one.[94]

Although there are subtle distinctions between cumulative-risk assessment and cumulative-impacts analysis,[95] EPA nonetheless advises that this document "provides guidance on planning and undertaking an assessment of cumulative impacts when evaluating the range of both chemical and non-chemical stressors that may be relevant to potential EJ concerns."[96] DOE should consider instructing applicants to use these guidelines, or provide its own.

II. DOE Should Review Classes of Applications Together and Require Applicants to Use Certain Common Modeling Techniques and Assumptions

In Section A, we outline why grouping several NIETC applications and considering the applications in combination may be preferable over a first-come, first-served designation strategy. In Section B, we provide recommendations for how DOE can establish and clearly communicate standardized metrics and methods for applicants to use when preparing NIETC applications, as well as for DOE's use in evaluating those applications. In Section C, we recommend ways to ensure that DOE and all stakeholders in a

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[93] ENV'T PROT. AGENCY, FRAMEWORK FOR CUMULATIVE RISK ASSESSMENT 14–71 (2003), https://perma.cc/64W7-T6HL.
[94] *Id.* at 18.
[95] EPA ORD CUMULATIVE IMPACTS RECOMMENDATIONS, *supra* note 84, at vii; *see also* ENV'T PROT. AGENCY SCI. ADVISORY BD., CONSULTATION ON CUMULATIVE IMPACTS ASSESSMENTS (2022), https://sab.epa.gov/ords/sab/f?p=100:18:9230939263227:::RP,18:P18_ID:2615#doc (last visited July 26, 2023) (scroll to "Final Report(s)") (containing each member of the Science Advisory Board's answers to question 2 about the distinction between cumulative impact assessment and cumulative risk assessment).
[96] EPA EJ TECHNICAL GUIDANCE, *supra* note 92, at 18.

NIETC designation proceeding are able to access the data and assumptions that underpin the relevant analyses.

A. DOE could better promote the national interest by examining a class of applications together, rather than on a first-come, first-served basis

7. Should DOE accept proposals or recommendations for NIETCs on an annual basis, on some other defined frequency, or on a rolling basis? How long should defined request periods be open?

To the extent possible, DOE should consider proposals or recommendations for NIETCs in batches. These batches could include all of the NIETC applications that DOE receives from applicants during a predetermined submission window (or, in the context of an eventual DOE-led process, all of the applications submitted in response to a specific identified need for transmission capacity). Batching is important because corridors are bulky and local market conditions are likely to change in response to the transmission upgrades that follow NIETC designations. Therefore, the benefits of a particular proposed NIETC designation may depend on the success of competing NIETC applications, such that considering each application in isolation would be a sub-optimal approach. Put simply, establishing one corridor could destroy the business-case for a different project that would have done more to reduce congestion and emissions, an outcome that could have been avoided if DOE had considered the applications in conjunction. Relatedly, one potential NIETC designation might look superior when viewed in isolation, but a combination of other NIETC applications might be superior when viewed in combination.

The following simplified example helps to clarify how the benefits of one particular proposed transmission expansion project (and associated NIETC designation) depend on previous and future projects.[97] Consider a region with a low-cost energy supply (Region A) that will be connected to another region with a more expensive energy supply (Region B). Assuming that local markets are competitive, a transmission upgrade between the two regions will create opportunities for the Region A to export energy to Region B, which, in turn, will lead to a price increase in Region A and to a price decrease in Region B. This opportunity, however, is a function of the extant transmission infrastructure, specifically the absence of sufficient transmission capacity between the regions. Further, even after the hypothetical line has been built, its benefits could be eroded by a future line that also affects the price differential.

Given these relationships, DOE's approval of a NIETC and the construction of the associated project(s) could alter the benefits for other proposed NIETCs with a grid-interconnected relationship. Accordingly, applications' benefits, should be assessed for several transmission upgrade options simultaneously to determine the best set of projects to receive NIETC designations. In practice, this would mean that, instead of processing applications on a first-come, first-served basis, DOE would specify a reasonable window for applications, and then analyze the entire class of applications to identify interactions.[98] For applications that interact with one another, DOE would study different combinations to identify the optimal set of designations. The application window length should strike a balance between enabling rapid NIETC designation to facilitate transmission buildout and ensuring that DOE has enough applications that it can view them comparatively and conjunctively, in order to maximally achieve the goals of Section 216.

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[97] *See* William W. Hogan, *A Primer on Transmission Benefits and Cost Allocation*, 7 ECON. ENERGY & ENV'T POL'Y 25, 29–31 (2018).

[98] When DOE's National Transmission Planning Study is released, its results can be used to solicit project to meet the particularized highest needs it identifies, and DOE can shift towards a more targeted designation process than simply a developer-driven one. *See* Section III below.

B. To allow DOE to more accurately compare applications and study their combined effects, it should provide applicants with certain modeling techniques and assumptions

4. For any of the information listed in Section II.A.iii or suggested in response to the question above, what metrics and methods are available for evaluating how that information meets the statutory requirements for a NIETC described in Section I.C?

Because input assumptions determine model outputs, letting NIETC applicants decide freely which methods and inputs to use would allow them to exert significant influence over the results reported in their applications. Accordingly, if applicants have too much discretion over their modeling techniques and inputs, DOE's reliance on the proffered information may not yield the best NIETC designations. To protect against strategic modeling behavior, DOE should establish guardrails based on best practices. In particular, DOE should standardize: (1) the types of models that applicants use; (2) how applicants address various classes of uncertainty, including operational uncertainties and more difficult to model uncertainties, like long-term pathways; and (3) the scope and breadth of the selected models. Adopting these recommendations would enable DOE to better determine how NIETC applications would promote Section 216(a)(4)'s designation criteria and select among competing proposals to ensure that any designations truly serve the national interest.

1. DOE should prescribe types of models that applicants must use in preparing their NIETC corridor designation applications

Some modeling techniques handle uncertainty better than others, so DOE should provide applicants with directions on which techniques to deploy for the most robust results. In particular, stochastic programming[99] and robust optimization[100] models are considered state-of-the-art techniques for dealing with uncertainty.[101] DOE should consider directing applicants to use these classes of models. However, in part because there are different classes of uncertainties and capturing all of them may be too computationally expensive, we recommend that DOE clearly and carefully prescribe both inputs and scenario features as set out in the following subsections, in order to address uncertainty in a sufficient and computationally manageable manner.

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[99] Venkat Krishnan et al., *Co-Optimization of Electricity Transmission and Generation Resources for Planning and Policy Analysis: Review of Concepts and Modeling Approaches*, 7 ENERGY SYS. 297 (2015); Francisco D. Munoz et al., *An Engineering-Economic Approach to Transmission Planning Under Market and Regulatory Uncertainty: WECC Case Study*, 29 IEEE TRANSACTIONS ON POWER SYS. 307 (2014).

[100] *See, e.g.*, Álvaro García-Cerzo et al., *Robust Transmission Network Expansion Planning Considering Non-Convex Operational Constraints*, ENERGY ECON., June 2021; Cristina Roldán et al., *Robust Transmission Network Expansion Planning Under Correlated Uncertainty*, 34 IEEE TRANSACTIONS ON POWER SYS. 2071 (2019); Raquel García-Bertrand & Roberto Mínguez, *Dynamic Robust Transmission Expansion Planning*, 32 IEEE TRANSACTIONS ON POWER SYS. 2618 (2017).

[101] AHARON BEN-TAL ET AL., ROBUST OPTIMIZATION xv (2009) ("[B]oth Robust and Stochastic Optimization are aimed at answering the same question (albeit in different settings), the question of building an uncertainty-immunized solution to an optimization problem with uncertain data; . . ."). In stochastic programming models, some or all input parameters are assumed to be uncertain, but their probability distributions are known. Proponents of robust optimization argue that its primary advantage over stochastic programming is that it does not require knowledge of the probability distribution of uncertainties, which is difficult to obtain in practice, just a range of variation of the uncertain parameters. *See* R.A. Jabr, *Robust Transmission Network Expansion Planning with Uncertain Renewable Generation and Loads*, 28 IEEE TRANSACTIONS ON POWER SYS. 4558, 4559 (2013).

2. DOE should ensure use of appropriate modeling techniques that account for uncertainty

By its nature, assessing which transmission projects will produce which impacts involves managing many uncertainties. These uncertainties can be grouped into two different classes, with each class lending itself to different best modeling practices. The first class is operational uncertainties, which can fairly be addressed through DOE prescribing particular data inputs directly that applicants would need to plug into their models. The second class of uncertainties, which encapsulate divergent and broad future societal pathways for parameters including renewable energy deployment, load growth, and development of demand response, is arguably harder to quantify, and should be addressed as sensitivity analyses for the chosen model. For this second class of uncertainties, DOE should prescribe particular criteria for designated scenarios. Without standardization and guidance of modeling input data and pathways, DOE will have difficulty comparing "apples to apples" when evaluating various NIETC applications to determine which best serve the national interest.

a. To address operational uncertainties, DOE should provide guidance on how to account for climate change

Operational uncertainty of existing and future generation is often, but not always, weather- or climate-related. An example of this kind of operational uncertainty is the distribution of capacity factors for a specific technology at a particular location. Historical measurements of these capacity factors exist going back many years, allowing modelers to understand the historical distributions of capacity factors for different supply technologies in different locations. Similar data exists for historical load and generator and transmission outages.

A Lawrence Berkeley National Laboratory study demonstrates the importance of accurately representing the full distributions of operations factors when modeling the benefits of new transmission capacity. The study concluded that extreme conditions (both weather-related, and non-weather-related stressors, like concurrent generator outages) and high-value periods "play an outsized role in the value of transmission," with "50% of transmission's congestion value coming from only 5% of hours."[102] In other words, much of the value of transmission is dictated by relatively rare events in the distributions. This study also explained that—when modelers fail to adequately consider these possible extreme conditions how they would affect the value of transmission—the result is an underestimation of the benefits of regional and interregional transmission. Because the risk of resource non-performance rises under extreme weather conditions, having the option to import electricity in such a situation is particularly valuable.[103]

Relatedly, some operational risks from extreme weather are positively correlated, or a combination of operational risks might cause special harm, because the processes that cause extreme events can interact and are spatially or temporally dependent.[104] For example, a long heat wave might increase electricity demand while reducing water availability for electricity generation from hydroelectric units.

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[102] DEV MILLSTEIN ET AL., LAWRENCE BERKELEY NAT'L LAB'Y, EMPIRICAL ESTIMATES OF TRANSMISSION VALUE USING LOCATIONAL MARGINAL PRICES 3, 30 (Aug. 2022), https://perma.cc/AA8Q-6RTL.

[103] It is possible that an RTO/ISO may identify interregional transmission as a necessary mitigation in its corrective action plan that will be required under any new Reliability Standard developed under Order 896. There could be a strong correlation between projects DOE finds to be poised to meet such identified needs and Section 216's NIETC statutory considerations. Similarly, if the newly proposed Northeast States Collaborative on Interregional Transmission identifies particular needs, projects DOE finds will meet those needs may also neatly fit with Section 216 NIETC criteria.

[104] Jakob Zscheischler et al., *Future Climate Risk from Compounded Events*, 8 Nature Climate Change 469, 469, 474 (2018).

Despite having accurate historical measurements for operational variables, climate change increases the difficulty of assessing the value of transmission, which, again, is often driven by extreme weather. How NIETC applicants handle this issue will affect the apparent value of their proposed corridor designations, but regulators typically lack information about how transmission planners use historical data. For example, FERC is in the process of trying to collect information from transmission providers on what methods they use (if any) to account for extreme weather events.[105]

To ensure operational uncertainties are appropriately managed in light of climate change, DOE should direct applicants on whether and how to scale and adjust historical weather/climate data to compute temporal and spatial capacity factors for wind, solar, and other weather-dependent supply (e.g., non-dispatchable hydro), demand resources, and transmission and generation outages during their modeling. Because there are multiple ways to scale and adjust historic data (e.g., replacing a few historic "normal years" with data from historic extreme weather years, or changing the frequency or duration of these events based on guidance from academic literature),[106] and given how critical these data are in determining model output, DOE should provide specific directions to applicants on whether and how to use historical weather/climate data. A higher degree of prescription on such data usage will ensure that operational uncertainties are properly accounted for when applicants demonstrate their project's qualifications for NIETC designation.

b. To address harder-to-quantify uncertainties, DOE should require applicants to use sensitivity scenarios that reasonably capture possible future states of the world

The second class of uncertainties, which is arguably harder to quantify than operational uncertainties, involves how the future will look more broadly. Shifting government policies, changing costs, economic trends, electrification rates, EV adoption rates, technological change, market participants' strategic behavior, and likely many other variables create myriad possible trajectories with different implications for the value of new transmission capacity. From a modeling perspective, these uncertainties do not lend themselves to specific data inputs that DOE should require during transmission modeling; instead, they are better managed through the development of different sensitivity scenarios. For example, in its Transmission Planning Study, DOE proposes different scenarios for grid decarbonization, electrification, and other drivers of the value of transmission, including the cost of transmission, distributed rooftop solar adoption, and constrained renewable energy siting, among other scenarios.[107] Another important parameter to consider via a sensitivity analysis would be the growth of demand response.

Unless these uncertainties are considered, it would be difficult for DOE to ensure that any particular NIETC designation serves the national interest or to compare competing applications. But there is no exact way to characterize these long-term uncertainties, and it is likely that DOE would need to continually update any imperfect characterizations of these future pathways. Ideally, applicants would compute sensitivity scenarios for a variety of pathways and exogeneous parameters, such as those mentioned above. However, combinations of even a low/medium/high scenario for a few parameters

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[105] *One-Time Informational Reports on Extreme Weather Vulnerability Assessments Climate Change, Extreme Weather, and Electric System Reliability*, Order No. 897, 183 FERC 61,192 (2023).

[106] Planners could look at models from the climate sciences, meteorological sciences, and hydrological sciences. A summary of these models is provided in the 6th Intergovernmental Panel on Climate Change Report. *See* Sonia I. Seneviratne et al., Intergovernmental Panel on Climate Change (Working Grp. 1), *Weather and Climate Extreme Events in a Changing Climate*, *in* CLIMATE CHANGE 2021: THE PHYSICAL SCIENCE BASIS 1513 (2021), https://perma.cc/UEN9-XKHR.

[107] U.S. Dep't of Energy et al., Presentation on National Transmission Planning Study at the Modeling Subcommittee Meeting, at slide 21 (June 7, 2022), https://perma.cc/MEJ5-9JE6.

could easily lead to a large number of scenarios. For example, all combinations of low/medium/high scenarios of five parameters would lead to $3^5 = 243$ different scenarios to compute. Finally, making matters more complicated, climate change and more frequent extreme weather events can and will also impact these long-term uncertainties, albeit in different ways than they impact operational uncertainties. For example, an increased likelihood of extreme weather events will lead to increased electricity demand for heating and cooling.

Given these complexities, DOE should require applicants to use scenarios that reasonably capture possible future states of the world in order to support their assertions that their proposed designations would satisfy the Section 216(a)(4) criteria. In doing so, DOE may wish to select a subset of scenarios from those considered in its National Transmission Planning Study.[108] These scenarios account for different assumptions about the pace of decarbonization and electrification and the cost of transmission and generation.[109] Directing the applicants to use a prescribed number of specified scenarios, with DOE also committing to using a reasonable number of sensitivity scenarios in its application-evaluation process, would provide better certainty of any proposed NIETC's successful match with as many Section 216(a)(4) criteria as possible. Without a common framework for handling assumptions and sensitivity scenarios, applicants might rely on vastly different and incompatible assumptions, obscuring which NIETC applications truly serve the national interest rather than developers' financial interests.

3. DOE should specify the scope, breadth, and duration of modeling

In addition, DOE could further prevent strategic modeling behavior (and thus facilitate the comparison of NIETC applications) by providing standardized requirements for model specifications and modeling time horizons and discount rates.

Power-system models come in different granularities, and DOE can ensure that applicants use models that are as realistic as possible by standardizing certain model specifications. These specifications include: (1) the extent and bounds of the transmission network modeled and what assumptions the applicant is making on grid-enhancing technology; (2) how dispatchable units are modeled, for example, if the applicant models each unit separately, including their operational characteristics, or aggregates units by type; (3) how the applicant is accounting for demand-side flexibility, storage, and net imports; and (4) whether electricity infrastructure and gas infrastructure are jointly co-optimized, given the increasing interdependence between these two sectors.

Besides directing the scope and breadth of applicant modeling, and given the significant uncertainties being modeled and tested with sensitivity analyses, it is critical to standardize the time horizons over which these models are run. DOE should set a minimum time horizon of 20 years because using shorter timeframes can result in suboptimal investments in the long run. Using time horizons longer than 20-year horizons would be desirable given the longevity of these investments. DOE should also set appropriate discount rates for future benefits within these horizons. More specifically, DOE should require applicants to use the discount rates provided in Circular A-4,[110] and to use the discount rates from the updated Circular A-4 when finalized.[111]

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[108] *See id.*
[109] *Id.* (showing DOE plans to use four transmission topologies, nine variations on emissions, and fourteen sensitivities considering drivers like high transmission costs, high distributed PV adoption, constrained renewable energy siting, among others).
[110] Off. of Mgmt. & Budget, Circular A-4: Regulatory Analysis 33–34 (2003).
[111] *See* Off. of Mgmt. & Budget, Preamble: Proposed OMB Circular No. A-4, "Regulatory Analysis" 75–83 (Apr. 6, 2023).

C. DOE should alert applicants as to how it will evaluate their data and model submissions in its own independent consideration of applications

DOE should be transparent about how it will analyze each application's satisfaction of the myriad Section 216 NIETC designation considerations. If DOE were to delineate in advance how it proposes to evaluate accordance with each statutory consideration and how to weight them, this would increase the legal durability of NIETC decisions. One way to accomplish this could be announcing specific models and sensitivity scenarios that DOE itself would use to test the robustness of developers' inputs, assertions, and modeling results. DOE should also be clear about how it will consider the synergistic effects of other hypothetical or actual proposed NIETC corridors, for example, by signaling to applicants that it will run simulations accounting for these possibilities in scenarios. In the absence of DOE providing access to its own modeling or using open-source modeling,[112] these requirements would increase transparency and ensure that DOE is promoting the national interest with NIETC designations.

III. In the Future, DOE Should Solicit Competing NIETC Applications for the Areas Where New Transmission Capacity Would Most Serve the National Interest

1. Please comment on the approach to NIETC designation discussed in the NOI. What are the potential positive and negative impacts of such an approach? How could this process, especially how applications for designation are structured, be altered or improved?

A. DOE should solicit application in the areas where the forthcoming National Transmission Planning Study concludes it would be optimal to build new transmission capacity

As alluded to in the RFI, DOE should eventually identify corridors where additional transmission capacity would best promote the national interest and then solicit competing applications from developers. While the National Transmission Needs Study might lack the granularity needed to identify the right corridors, the separate National Transmission Planning Study would likely be sufficient. According to DOE, this study will "identify pathways for necessary large-scale transmission system buildouts that meet regional and national interests."[113] More specifically, it will "identify expansion options at several levels of granularity which could include increased transfer capacity between regions, increased transfer capacity between balancing areas, or potential new lines represented in a nodal (bus-branch) model."[114]

Once DOE releases this study, the transmission corridors it identifies could be used in the following ways. DOE could issue requests for proposals soliciting projects addressing the identified transmission needs. DOE might also use the study to coordinate transmission investment, such as DOE-developer partnerships.[115] DOE should also consider whether to use the study's outcomes (or the outcomes of other

[112] *See* Peter Fairley, E.U.: Climate-Proof Grids Require More Transparency; "Black box" U.S. energy planning hinders renewable energy development, https://perma.cc/Q96K-Z4QX ("[C]ommercial power and gas utilities—especially when pushing their own internal energy projects and products—often cloak their models and forecasts in proprietary data and plans inaccessible to those outside the utility. Such scrutiny-averting tactics, some experts say, lead to more costly infrastructure, squander opportunities for cleaner energy, and reduce public acceptance of system upgrades such as transmission lines and power plants.").

[113] *National Transmission Planning Study*, U.S. DEP'T OF ENERGY, https://perma.cc/TF3J-HMQS.

[114] *National Transmission Planning Study FAQs*, U.S. DEP'T OF ENERGY, https://perma.cc/PW9L-ZTZD.

[115] DOE designation of a NIETC is a necessary predicate to unlock a variety of financial tools for developers. *See* 42 U.S.C. § 18713(h) ("Public-private partnerships: The Secretary may participate with an eligible entity with respect to an eligible project under subsection (e)(1)(C) if the Secretary determines that the eligible project--

planning processes)[116] to create a rebuttable presumption against developers seeking NIETC designation for projects and needs not specifically identified therein. Given how robust DOE's Transmission Planning Study is poised to be, it may make sense for developers who submit NIETC applications not aligned with the study's results to be required to specifically provide significant evidence showing why a different NIETC corridor would be desirable.

B. To maximize the usefulness of the National Transmission Planning Study, DOE should ensure that it accounts for the negative externalities from air pollution and the positive externalities from additional resilience

Although not overtly the subject of this proceeding, the upcoming National Transmission Planning Study is of critical importance for, among other things, future NIETC designations. We therefore provide the following recommendations to ensure that it will be as robust and predictively accurate as possible. To the extent that DOE can influence the study to effect these recommendations, the study would become a better tool for DOE when it comes to soliciting future NIETC applications.

Traditionally, generation and transmission planning models have co-minimized annualized investment costs of transmission, generation, and storage, as well as the annual expected operating cost of the power system.[117] The outputs of these traditional planning models were cost-optimal investment decisions in transmission, generation, and storage for a given set of model assumptions and input data. However, these solutions failed to consider externalities and thus were not truly optimal. In practice, externalities, such as negative externalities from air pollution and CO2 emissions, and positive externalities from additional resilience, are relevant in the context of power-system operations and planning—as well as for NIETC corridor designations.

Therefore, a new suite of generation and transmission planning models explicitly incorporates externalities valued in dollars into their objective functions, resulting in a more accurate set of optimal investment decisions. Functionally, they are more aligned with national energy policy goals than models that simply minimize a more limited set of costs that ignore important aspects of transmission planning.

DOE's Transmission Planning Study uses three different CO_2 emission target scenarios (current policies, 90% by 2035, 100% by 2035)[118] that may or may not be enforced by states or the federal government. This model could be enhanced if externalities such as the CO2 emission externality valued in dollars using, e.g., the social cost of carbon estimate, were directly added to the planning model's objective function. The same is true for reliability, which can be monetized using the value of lost load.

To ensure that the National Transmission Planning Study is maximally useful for myriad purposes, including supporting NIETC designations, DOE should ensure that it explicitly accounts for externalities from greenhouse gases and local air pollutants, as well as the benefits from additional resilience. If the study accounts for these externalities, it would be an even better resource for DOE as the agency transitions to soliciting applications that serve identified transmission needs.

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(1)(A) is located in an area designated as a national interest electric transmission corridor pursuant to section 216(a) of the Federal Power Act. . .").

[116] As discussed in footnote 103 above, there are other ongoing processes for identifying transmission needs. Needs identified in these additional studies could also be used in a similar manner, so long as they are well-vetted through robust stakeholder and expert review processes.

[117] Venkat Krishnan et al., *Co-Optimization of Electricity Transmission and Generation Resources for Planning and Policy Analysis: Review of Concepts and Modeling Approaches*, 7 ENERGY SYS. 297 (2015); Francisco D. Munoz et al., *An Engineering-Economic Approach to Transmission Planning Under Market and Regulatory Uncertainty: WECC Case Study*, 29 IEEE TRANSACTIONS ON POWER SYS. 307 (2014).

[118] U.S. DEP'T OF ENERGY, NATIONAL TRANSMISSION PLANNING STUDY 24 (2022), https://perma.cc/7NZB-ASQR.

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