

**CONSIDERATION OF NON-TRANSMISSION
ALTERNATIVES IN NEPA REVIEWS
OF ELECTRIC TRANSMISSION PROJECTS
(INTERIM GUIDANCE)**

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Contents

Introduction 1

Non-transmission Alternatives 1

Determining whether Non-Transmission Alternatives are Reasonable 2

Purpose and Need..... 2

Distributed Generation 3

Energy Efficiency and Conservation, including Demand Response 5

Energy Storage 6

References 7

Introduction

DOE prepared this interim guidance to discuss whether non-transmission alternatives are required to be analyzed in an environmental impact statement (EIS) for a proposed transmission line. This interim guidance does not establish new legal requirements. This guidance is intended to facilitate and enhance DOE's compliance with NEPA and existing regulations implementing NEPA (40 CFR Parts 1500–1508 and 10 CFR Part 1021). Even though this is interim guidance, DOE offices are nonetheless encouraged to consider it when preparing EISs for new transmission lines.

In an environmental impact statement (EIS), federal agencies must “[r]igorously explore and objectively evaluate reasonable alternatives to the proposed action, and, for alternatives that the agency eliminated from detailed study, briefly discuss the reasons for their elimination.” (40 CFR 1502.14(a)) Reasonable alternatives are a “reasonable range of alternatives that are technically and economically feasible, and meet the purpose and need for the proposed action.” (40 CFR 1508.1(hh)) CEQ explains, “The agency need not consider every conceivable alternative to a proposed action; rather, it shall consider a reasonable range of alternatives that will foster informed decision making.” (40 CFR 1502.14(a))

When DOE determines not to analyze one or more alternatives in detail, including alternatives suggested in public comments, DOE lists the alternatives (typically following the description of the analyzed alternatives) and briefly discusses why they are not analyzed in detail within the EIS.¹ The rationale generally involves one or more of five criteria.

1. The alternative does not meet the agency's purpose and need.
2. The alternative is similar enough to other alternatives analyzed in detail—either in design or in environmental effects—that it will not better inform decision making.
3. The alternative is not technically feasible.
4. The alternative is not economically feasible.
5. The effects of the alternative cannot be reasonably ascertained, or implementation of the alternative is remote or speculative.

Non-transmission Alternatives

One group of alternatives often suggested for evaluation in an EIS for a transmission project is “non-transmission alternatives,” also known as “non-wire alternatives.” Non-transmission alternatives include technologies and programs that would reduce electricity demand, improve the performance of existing transmission infrastructure, or otherwise reduce the need for new transmission lines. Examples of non-transmission alternatives discussed in this guidance are:

¹ An agency, at its discretion, may instead analyze any alternative if it determines that doing so would better inform decision making. This includes alternatives not within the jurisdiction of the lead agency. (40 CFR 1502.14(a))

- Distributed generation: Deployment of small-scale electricity generation resources, such as rooftop solar and community-based wind power, near the area of electricity demand to eliminate or reduce the need for new electricity transmission.
- Energy efficiency and conservation, including demand response: Implementation of energy efficiency and conservation to reduce demand and, thereby, the need for new electricity transmission. Demand response refers to energy conservation programs that seek to change electricity use from its normal consumption pattern, often using incentives (e.g., lower rates in off-peak hours), to, among other things, reduce the burden on existing transmission systems.
- Energy storage: Deployment of energy storage systems (e.g., batteries) to improve grid flexibility by storing energy as it is generated and releasing it to the grid as needed.

Other alternatives to new transmission lines may be suggested during NEPA review, such as use of dynamic line rating, advanced power flow control devices, and replacing wires (conductors) with advanced conductors (advanced reconductoring). Consideration of these alternatives may involve similar issues to those raised in this guidance.

Determining whether Non-Transmission Alternatives are Reasonable

DOE determines whether any non-transmission alternative is reasonable within the context of a specific EIS. However, as the examples described below illustrate, non-transmission alternatives typically have not been analyzed in detail by DOE or other federal agencies in the EISs prepared for proposed transmission lines.

In an assessment of current and near-term future transmission needs through 2040 (National Transmission Needs Study), DOE concluded that while non-transmission alternatives can be helpful in deferring new transmission investments by several years, they will “almost certainly fail to meet the full scope of transmission needs.” (DOE, 2023) Even though non-transmission alternatives are unlikely to be reasonable alternatives in an EIS for a proposed transmission line, the technologies and approaches are integral to the Nation’s electric grid. DOE and other federal and state agencies have programs that support development and deployment of non-transmission alternatives. These can be discussed in an EIS for a proposed transmission line to provide broader context and to respond to comments, even when non-transmission alternatives do not require detailed analysis.

Purpose and Need

Federal agencies have regularly concluded that non-transmission alternatives are not reasonable alternatives because they do not meet the purpose and need for the proposed action. The purpose and need is the underlying reason for the proposed agency action. For example, Congress may appropriate funds for DOE to provide financial assistance for the construction of new transmission lines. DOE’s purpose and need would then be to implement the program funded by Congress by providing financial assistance to applicants proposing transmission line projects. For land management agencies, their purpose and need commonly is to respond to applications by

developers for authorization to locate a transmission line on federal lands. In defining the purpose and need, agencies also may consider other criteria, such as the applicant’s goals or the agency’s policy objectives.² However, Courts have occasionally found that an agency’s purpose and need statement did not comply with NEPA where it unreasonably limited the agency’s consideration of alternatives so that the agency’s decision was preordained.³

Non-transmission alternatives typically would not meet the purpose and need for a proposed agency action considering a federal approval for a transmission project. Failure to meet the purpose and need is sufficient reason to determine that an alternative is not reasonable and need not be considered in detail. Still, there may be other reasons that an agency can point to as explanation why an alternative has been eliminated from detailed study. Below are examples of conclusions reached in several EISs that excluded non-transmission alternatives from detailed analysis.

Distributed Generation

Distributed generation has been suggested as an alternative to a proposed new transmission line. This alternative would rely on local or regional electricity generation (often using renewable energy sources) to provide power to end users without the need for electricity transmission over long distances. However, regional and local electricity generation may not be available in the area that would be served by the proposed transmission line at a scale adequate to meet needs. Adding sufficient local or regional capacity may not be practical and could be economically infeasible.

The Bureau of Land Management’s (BLM) Gateway South EIS considered new and distributed generation resources but eliminated them from further analysis because “none of the currently proposed facilities would meet the load-growth demands in southern and central Utah and, therefore, would not meet the Project’s purpose and need.” (BLM, 2016a) “In addition to these limitations, new and distributed generation resources did not meet the agencies’ purpose and need, which is to analyze the Applicant’s application for a utility-scale transportation system on federal lands and, therefore, were eliminated from further consideration for this Project.” (BLM, 2016a)

Similarly, the U.S. Forest Service’s (USFS) Kake to Petersburg EIS considered alternative energy sources but eliminated them from further analysis. The EIS states, “The purpose of this EIS is for the Forest Service to decide whether to authorize the applicant to construct, operate, and maintain the

² CEQ explains, “In addition to the applicant’s stated goals and the agency’s authorities, Federal agencies may identify other relevant factors to establishing a statement of purpose and need. Those other factors may include the policies and goals of NEPA as articulated by section 101, including fostering and promoting the general welfare.” Council on Environmental Quality, 2022. National Environmental Policy Act Implementing Regulations Revision Phase 1 Response to Comments. <https://www.regulations.gov/document/CEQ-2021-0002-39427>

³ See, e.g., *Simmons v. U.S. Army Corps of Engineers*, 120 F.3d 664, 668-670 (7th Cir. 1997); *Nat’l Wildlife Refuge Assoc. v. Rural Utils. Serv.*, 580 F. Supp.3d 588, 610-13 (W.D. Wis. 2022), *vac’d on other grounds sub nom. Driftless Area Land Conservancy v. Rural Utils. Serv.*, 74 F.4th 489 (7th Cir. 2023); *Backcountry Against Dumps v. Chu*, 215 F. Supp. 3d 966, 977-79 (S.D. Cal. 2015).

proposed KPI [Kake to Petersburg Transmission Line Intertie] Project across NFS [National Forest System] lands. The need for this action is established by the Forest Service's responsibility under FLPMA [Federal Land Policy and Management Act] to respond to an application for a right-of-way. . . . Development of a renewable energy project near Kake would not meet the purpose and need of this project." (USFS, 2016)

DOE's Great Northern EIS explains, "Non-transmission alternatives were considered but eliminated from detailed analysis because they are outside the scope of the purpose of and need for DOE's federal action, which is to decide whether to issue a Presidential permit" for Minnesota Power to cross an international border into Canada. (DOE, 2017a) Similarly, DOE's Energia Sierra Juarez EIS states, "Alternative approaches for energy generation are outside the scope of the EIS because they do not respond to DOE's purpose and need, which is to respond to the ESJ [Energia Sierra Juarez] request for a Presidential permit." (DOE, 2012)

DOE's Plains and Eastern EIS eliminated local generation and distribution, as well as energy conservation programs, from further analysis as alternatives. The EIS states, "Section 1222 of the EAct [Energy Policy Act of 2005] does not authorize the Secretary of Energy to participate with other entities in distributed generation, and the alternative does not meet the DOE-issued RFP [Request for Proposal] for new or upgraded transmission projects. As such, the alternative would not meet the purpose and need for agency action because distributed generation as studied by DOE does not meet the utility-scale generation required." The EIS further states that "Section 1222 of the EAct does not authorize the Secretary of Energy to participate with other entities in energy conservation programs. As such, the alternative would not meet the purpose and need for agency action because energy conservation programs, as studied by DOE, would not meet the utility-scale generation required." (DOE, 2015)

The U.S. Department of Agriculture's Rural Utilities Service (RUS) concluded in reviewing the proposed Cardinal-Hickory transmission line that meeting project goals would require either 246,000 residential solar projects, or a minimum of 9,850 acres of land with 4.432 million solar panels. (RUS, 2019) Moreover, distributed generation projects may require additional or upgraded transmission infrastructure for interconnection that would offset some of the benefits from not proceeding with the proposed transmission line. (RUS, 2019; DOE, 2015; BLM, 2015; BLM, 2014; USFS, 2013) BLM's Boardman to Hemingway (B2H) EIS stated that "considering alternative forms of energy would not respond to BLM's purpose and need to address the application in front of us for review. Moreover, analyzing such energy development as an alternative to the B2H Project would be remote and speculative." (BLM, 2016b) Generation was consistently considered but eliminated from detailed study.

In the EIS for the Jack Rabbit to Big Sky Meadow Village 161kV Transmission Line Upgrade, USFS stated that "to meet the [energy] demand, a minimum of 30 megawatts (MW)" would be required. They determined that meeting this demand through wind generation "would require approximately 15 to 20 turbines A wind facility of this magnitude would require a minimum of 500 acres." To meet the demand through solar generation "would require approximately 4,000 residential roof

tops or approximately 180 acres.” (USFS, 2013) Moreover, these potential generation projects still may require additional or upgraded transmission infrastructure for interconnection.

Some agencies also considered and subsequently eliminated hydroelectric resources, geothermal, biomass, tidal, and conventional (i.e., fossil fuel) generation as alternatives. For example, USFS’s Jack Rabbit EIS eliminated hydropower and other renewable energy resources from further consideration as alternatives, stating that those alternatives would not meet the purpose and need of the proposed project to meet peak load demands and improve reliability. (USFS, 2013)

Energy Efficiency and Conservation, including Demand Response

Energy efficiency and conservation measures also may be suggested as an alternative to a new transmission line. However, the demand reduction from energy efficiency and conservation is unlikely to be substantial enough to offset the need for new transmission. DOE concluded in reviewing the proposed Champlain-Hudson Power Express transmission line that energy efficiency and conservation measures would not address the increasing demand for electricity that was the applicant’s reason for proposing the project. DOE concluded that “energy-efficiency and conservation measures alone would not address southeastern New York’s increasing demand for electricity and that a mix of energy efficiency, demand reduction, and new generation would be required to meet future energy demand. Therefore, DOE determined that the conservation and demand-reduction measures alternative alone is not a reasonable alternative.” (DOE, 2014)

Several agencies also considered demand response or energy conservation programs as a non-transmission alternative, such as RUS’s Cardinal Hickory EIS and the Forest Service’s Bordertown to California EIS. (RUS, 2019; USFS, 2018) However, agencies have often determined that an increase in energy efficiency substantial enough to offset the need for new transmission would not be possible. Agencies consistently excluded from further consideration alternatives centered on energy efficiency as they would fail to address reliability issues, manage growth in demand, expand access to transmission systems, support a changing generation mix, reduce power transfer loss, and respond to transmission-related public policy goals. Likewise, agencies have not performed detailed analysis of demand response as an alternative to new transmission capacity because it would not adequately address reliability issues, improve transfer capacity and congestion, meet demand, expand access to the transmission system, support a changing generation mix, reduce power transfer losses, or respond to transmission-related public policy goals.

For example, DOE’s Northern Pass EIS determined that energy conservation would not be a reasonable alternative “because it does not meet DOE’s purpose and need. It is also not reasonable because this alternative fails to meet the project objectives of diversifying the region’s fuel source for electric energy generation, and providing a significant source of non-intermittent (i.e., baseload) reliable supply of electric power to the region.” (DOE, 2017b)

Similarly, RUS’s Cardinal-Hickory Creek EIS found that that “the level of demand response needed to provide sufficient congestion relief to match the scope of the C-HC Project, is not known to currently exist” and that “demand response is not an alternative that is pertinent to the applications

to which the Federal agencies are responding.” (RUS, 2019) The EIS further states, “Similar to energy efficiency, . . . this alternative does not address reliability issues on the regional bulk transmission system at a scale commensurate with transmission, expand the access of the transmission system to additional resources, reduce the losses in transferring power, or respond to public policy objectives aimed at enhancing the nation’s transmission system and supporting the changing generation mix.” (RUS, 2019)

Demand-based approaches that are economically feasible are already being pursued by utilities in the course of their regular activities.

Energy Storage

Energy storage systems also are sometimes suggested as an alternative to a new transmission line. In the Cardinal-Hickory EIS, RUS assessed the potential of energy storage systems as a non-transmission alternative. RUS determined that “a tremendous amount of storage would be required to replace the increased transfer capability that would be provided the C-HC Project. That volume of storage could only be provided by pumped hydro, compressed air, or molten salt, none of which is available in Wisconsin due to the state’s geographic features.” (RUS, 2019) RUS found that battery storage would fail to address the project needs, including “addressing reliability issues at a scale commensurate with transmission, alleviating congestion, expanding access of the transmission system, reducing transmission losses, or responding to public policy objectives aimed at enhancing the nation’s transmission system.” (RUS, 2019) RUS concluded that “battery storage is not a technically feasible alternative at this time due to the large amount of storage capacity that would be required to match the beneficial impacts of the C-HC Project.” (RUS, 2019)

References

- Bureau of Land Management (BLM). 2016a. Energy Gateway South Transmission Project. <https://cdxapps.epa.gov/cdx-enepa-ll/public/action/eis/details?eisId=207986>
- Bureau of Land Management (BLM). 2016b. Proposed Land Use Plan Amendment for the Boardman to Hemingway Transmission Line Project. <https://cdxapps.epa.gov/cdx-enepa-ll/public/action/eis/details?eisId=222256>
- Bureau of Land Management (BLM). 2016c. West of Devers Upgrade Project. <https://cdxapps.epa.gov/cdx-enepa-ll/public/action/eis/details?eisId=212944>
- Department of Energy (DOE). 2023. National Transmission Needs Study. <https://www.energy.gov/gdo/national-transmission-needs-study>
- Department of Energy (DOE). 2017a. Great Northern Transmission Line Project. <https://cdxapps.epa.gov/cdx-enepa-ll/public/action/eis/details?eisId=180605>
- Department of Energy (DOE). 2017b. Northern Pass Transmission Line Project. <https://cdxapps.epa.gov/cdx-enepa-ll/public/action/eis/details?eisId=237163>
- Department of Energy (DOE). 2015. Plains and Eastern Clean Line Transmission Line Project. <https://www.energy.gov/nepa/articles/eis-0486-final-environmental-impact-statement>
- Department of Energy (DOE). 2014. Champlain Hudson Power Express. <https://cdxapps.epa.gov/cdx-enepa-ll/public/action/eis/details?eisId=88021>
- Department of Energy (DOE). 2012. Energia Sierra Juarez Transmission Project. <https://www.energy.gov/nepa/articles/eis-0414-final-environmental-impact-statement>
- Rural Utilities Service (RUS). 2019. Cardinal-Hickory Creek 345-kV Transmission Line Project. <https://cdxapps.epa.gov/cdx-enepa-ll/public/action/eis/details?eisId=282834>
- U.S. Forest Service (USFS). 2018. Bordertown to California 120kV Transmission Line. <https://cdxapps.epa.gov/cdx-enepa-ll/public/action/eis/details?eisId=251901>
- U.S. Forest Service (USFS). 2016. Kake to Petersburg Transmission Line Intertie Project. <https://cdxapps.epa.gov/cdx-enepa-ll/public/action/eis/details?eisId=210850>
- U.S. Forest Service (USFS). 2013. Jack Rabbit to Big Sky Meadow Village 161 kV Transmission Line Upgrade. <https://cdxapps.epa.gov/cdx-enepa-ll/public/action/eis/details?eisId=88095>