CTC GLOBAL

UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

Electric Transmission Incentives Policy Under Section 219 of the Federal Power Act	**)**	**Docket No. RM20-10-000**

COMMENTS OF CTC GLOBAL CORPORATION

Summary

CTC Global Corporation ("CTC Global") appreciates the opportunity to comment on the Federal Energy Regulatory Commission's ("Commission") March 20, 2020 Notice of Proposed Rulemaking ("NOPR") in the above-captioned proceeding. As a leading U.S.-based developer of high-performance transmission conductors (sometimes referred to as advanced conductors) and manufacturer of the composite core component, we have focused our comments on those areas that directly affect our ability to fairly compete in the marketplace for transmission upgrade and new construction projects. Our comments offer two specific recommendations:

1. The Commission should include high-performance transmission conductors that enhance reliability, efficiency, capacity, and improve the operation of new or existing transmission facilities as "eligible transmission technologies" for purposes of Incentives for Transmission Technology treatment[1]; and
2. The Commission should advise transmission planners to consider additional benefits beyond capacity and reliability, notably improvements in Transmission Energy Efficiency[2], for purposes of: (a) evaluating a transmission project's benefit-cost ratio in a regional transmission planning process; and (b) determining the benefits of projects and advanced transmission technologies when awarding incentives.

I. Introduction

CTC Global Corporation (www.ctcglobal.com), headquartered in Irvine, California, developed, tested, and manufactures the carbon fiber composite core used in ACCC® Conductor[3], a high-performance overhead high-voltage conductor that has been installed in a wide range of transmission and distribution applications in more than 800 projects worldwide

[1] NOPR20-10-000, 170 FERC ¶ 61,204 at 100-113.
[2] Transmission Energy Efficiency, in these comments, means increased transmission system efficiency improvements that result in reduced transmission line losses, reduced air and water emissions from reduced generation production requirement, and reduced generation capacity required to reliably serve electric load.
[3] ACCC is a CTC Global registered trademark.

and in 52 countries. Finished ACCC Conductor is produced and sold by 34 international manufacturing partners under license agreements with CTC Global.

ACCC Conductor leverages the unique properties of advanced carbon fiber technology to significantly improve the reliability, capacity, efficiency, and resiliency[4] of high-voltage networks. The specific benefits provided by ACCC Conductor's technology[5] versus traditional conductor technology directly support the Commission's stated goals in the NOPR[6]: up to 2X capacity; dramatically reduced thermal sag to improve clearances, higher strength, and resistance to corrosion all which improve reliability; and greater energy efficiency due to lower electrical resistance with reduced line losses. ACCC Conductor typically reduces line losses by 25 to 40% when compared with conventional overhead transmission conductors of the same size[7]. Reducing line losses saves money for electricity consumers by reducing energy production costs and reducing generation capacity requirements for reliable service. Reducing line losses benefits the environmental and public policy goals by eliminating the emissions associated with the avoided electricity generation.

II. High-Performance (advanced) conductors that enhance reliability, efficiency, capacity, and improve the operation of new or existing transmission facilities should be considered "eligible transmission technologies" for purposes of Incentives for Transmission Technologies[8].

CTC Global commends the Commission's efforts to encourage advanced transmission technology use by providing ROE and other financial incentives, but the proposal to limit eligibility for incentive treatment to a narrow group of transmission technologies: (1) unfairly puts excluded technologies at a competitive disadvantage even when delivering similar benefits as eligible technologies; and (2) is inconsistent with the NOPR's stated goal of providing incentives for technologies that "enhance reliability, efficiency, and capacity, and improve the operation of new or existing transmission facilities."[9]

[4] NOPR20-10-000, 170 FERC ¶ 61,204 at 73: consider projects that improve resilience in awarding reliability incentives with examples of resilience elements.
[5] ACCC Conductor is one of several "high-performance transmission conductors" and sometimes also called "advanced conductors" and "High Temperature, Low Sag (HTLS) conductors" currently available in the marketplace that deliver significant benefits when compared with older, more conventional overhead transmission conductors that use steel wire core structures, e.g. ACSR (Aluminum Conductor Steel Reinforced) and ACSS (Aluminum Conductor Steel Supported). While CTC Global's comments support adding the high-performance conductor class as an "eligible technology", performance among specific technologies in the class will differ.
[6] "ensuring reliability and reducing the cost of delivered power", NOPR20-10-000, 170 FERC ¶ 61,204 at 3.
[7] Same outside diameter (O.D.), which is an industry parameter for measuring and classifying overhead conductor sizes.
[8] NOPR20-10-000, 170 FERC ¶ 61,204 at 100-113.
[9] Id. at 101.

As the Commission states in the NOPR, "FPA section 219(b)(3) directs the Commission to encourage deployment of transmission technologies and other measures to increase the capacity and efficiency of existing transmission facilities and improve the operation of the transmission facilities"[10]. We support the utility's flexibility in selecting from a range of advanced technologies that can be deployed to innovatively meet these FPA directives. We also understand and support the Commission's interest in supporting categories of advanced network management technologies[11] that have not been a large part of traditional utility investments. However, the Commission's proposal to exclude from eligibility for incentive treatment "transmission system assets traditionally associated with the transportation of electric power, such as power lines, power poles, capacitors, and other substation equipment"[12] would appear to stipulate that no advanced technologies exist in any of these categories that would "increase the capacity and efficiency of existing transmission facilities and improve the operation of the transmission facilities"[13]. This places technologies, like high-performance conductors, in the excluded categories – that otherwise achieve the objectives of FPA section 219 – at a competitive disadvantage and withholds from utilities an incentive to apply high-performance (advanced) conductor technologies that could bring substantial benefits to electric consumers.

As stated in the Introduction above (and previously in CTC Global's comments on the Commission's Technical Conference on Grid-Enhancing Technologies[14]), ACCC Conductor delivers capacity, efficiency, and reliability benefits comparable or greater in magnitude than the benefits provided by the technologies highlighted as eligible for incentive treatment in the NOPR. ACCC Conductor's unique characteristics allow utilities to dramatically increase capacity (up to 2X) and reduce line losses (by 25-40 percent), even on existing structures, by replacing traditional conductors with ACCC Conductor of similar diameter and weight. And, for both "end-of-life" projects as well as for new "greenfield" projects, theses high-performance conductors enable optimization of the right-of-way.

Consequently, the potential benefits to consumers of incentivizing high-performance transmission conductors are substantial. For 2018, the U.S. Energy Information Administration estimated total annual transmission and distribution losses in the U.S. at 199 million MWh[15]. The use of high efficiency, advanced conductor, such as ACCC Conductor, could reduce the line losses by 25% - 40% over time. Since older, more conventional conductors that use steel wire

[10] NOPR20-10-000, 170 FERC ¶ 61,204 at 100.
[11] "(1) advanced line rating management; (2) transmission topology optimization; and (3) power flow control", Id. at 101.
[12] Id. 101.
[13] 16 U.S.C. 824s.
[14] Grid-Enhancing Technologies Workshop, Docket No. AD19-19, November 5 and 6, 2019.
[15] U.S. Energy Information Administration, State Electricity Profile released January 2020, 2018 data, Table 10, line 26, Estimated Losses.

core (e.g. ACSR and ACSS) account for the vast majority of the U.S. overhead installed conductor market, the Commission's proposal to exclude advanced conductors from eligibility for Transmission Technology Incentive treatment would forego a huge opportunity for transmission owners to truly modernize the transmission system, saving consumers money and reducing emissions while making the high voltage network more efficient, reliable, and resilient.

CTC Global supports the Commission's use of incentives to break down barriers to broader adoption of advanced transmission technologies. CTC Global appreciates that the electric utility industry's appropriate emphasis on reliability brings with it a deliberate approach to technological change. Some of the technologies specified as eligible technologies in the NOPR for technology incentive treatment have established track records of reliable performance over a decade or more.[16] Incentives are an effective tool to help individual utilities overcome the risks and challenges they associate with technologies that – though proven elsewhere – are still "new" to their systems. Technology incentives will be even more effective if coupled with clear direction to planners from the Commission to consistently and rigorously consider the benefits generated by these technologies, such as Transmission Energy Efficiency, as well as the added capacity, reliability, and resilience to the existing system.

Advanced technologies in traditional transmission asset categories, like conductors, still face significant barriers to adoption by utilities. High-performance conductors like ACCC Conductor are often excluded from consideration, due to first cost concerns, until and unless a determination has been made in the project design stage that the minimum reliability or economic objectives of a project cannot be addressed using a utility's "standard"[17] conductor, almost universally older, more conventional conductor technologies. Utility transmission design engineers and project managers have neither the latitude nor any incentive to consider advanced technologies based on the superior benefit-cost results they would deliver to consumers via improved efficiency, reliability, resilience, and capacity. As a result, utilities choose ACCC Conductor over "standard" conductors in very limited circumstances: (1) reduces overall project costs (e.g. by increasing capacity on existing structures instead of replacing them with new ones); and/or (2) solves engineering problems that "standard" conductor technologies cannot address (e.g. restricted corridors, long spans, heavy ice loads, extreme wind, etc.). Technology incentives are a potentially powerful tool to overcome the unintended constraints of technology standards and unlock the creativity of engineers – *in the earliest stages of project design* – to deploy the full range of advanced technologies and thereby maximize broad benefits to electricity consumers.

[16] Dynamic Line Rating (DLR) pilots were first introduced in the 1990s, about a decade before the first commercial ACCC Conductor installation in 2005.

[17] Utility technology "standards" are established based on cost & performance, but do not generally look at opportunities to improve benefit-cost results for customers.

For these reasons, CTC Global respectfully asks the Commission to determine "eligible technology" for the Incentives for Transmission Technologies[18] be based on the technology's ability to generate consumer benefits, not on pre-determined and arbitrary categories. This approach would include high-performance (advanced) conductors, like ACCC Conductor, and would meet the Commission's stated objective in the NOPR of achieving closer alignment with the statutory language of FPA section 219, specifically:

1. Granting incentives to projects based on the benefits to consumers of transmission infrastructure investment while ensuring reliability and reducing the cost of delivered power by reducing transmission congestion; and
2. Encouraging deployment of transmission technologies that enhance reliability, efficiency, capacity, and improve the operation of new or existing transmission facilities.

III. The Commission should advise transmission planners to explicitly consider additional benefits, including Transmission Energy Efficiency, for purposes of: (a) evaluating a transmission project's benefit-cost ratio; and (b) awarding incentives.

CTC Global applauds the Commission's proposal to focus on benefits rather than risks and challenges, and we welcome the Commission's request to comment on which benefits should be considered, and how those benefits should be quantified. Transmission planning processes today include the use of production cost modeling as a primary tool for quantifying anticipated project benefits, calculating project benefit/cost ratios, and ranking competing projects. CTC Global urges the Commission in the proceeding to focus its attention, and by extension the attention of transmission planners, on significant categories of project benefits that are not properly accounted for in those processes today. We agree with comments in this record by Commissioner Glick "that incentives must actually incentivize something."[19] In this case, CTC Global recommends incentivizing actions that generate significant and broad benefits for consumers and the environment.

While CTC Global appreciates that there are many categories of benefits, we will focus our comments on large categories of Transmission Energy Efficiency benefits of particular relevance to high-performance conductors like ACCC Conductor: (1) consumer energy production cost savings and reduced power generation capacity requirement savings from reduced line losses (increased efficiency); and (2) emissions reductions associated with energy efficiency improvements (i.e. avoided power generation air and water emissions).

[18] NOPR20-10-000, 170 FERC ¶ 61,204 at 100-113.

[19] Commissioner Richard Glick Statement, March 25, 2020, Docket No RM20-10-000, Dissent in Part Regarding Electric Transmission Incentives Policy Under Section 219 of the Federal Power Act, https://www.ferc.gov/media/statements-speeches/glick/2020/03-25-20-glick-RM20.asp#.XryElmhKjIU

RTO/ISO and utility transmission planners typically proceed by: (1) identifying a transmission problem, most often a reliability concern or power flow constraint; (2) developing/soliciting potential solutions; and (3) selecting the most cost-effective project design that addresses the problem in question. Solutions may be ranked according to their benefit-cost ratios using production cost models and/or additional criteria, with heavy emphasis on first costs and whether the project resolves the problem. Benefits like increased Transmission Energy Efficiency are often ignored, so project engineers and developers have no incentive to offer designs or technologies that would deliver those benefits, and in fact a disincentive to include anything that would entail higher first costs. These constraints prevent the consideration of other project designs capable of delivering superior benefit-cost results to consumers – many of which incorporate advanced transmission technologies. The resulting missed opportunities for increased Transmission Energy Efficiency are especially costly for long-lived components of the system like overhead conductor, which has an expected service life of 30 years or more. The time to consider those alternate solutions with higher Transmission Energy Efficiency is at the project design stage.

Transmission system solutions that improve the Transmission Energy Efficiency deliver direct benefits to consumers by reducing their generation costs: reduced energy production costs; and reduced costs for generating capacity required to reliability serve electric loads. Both of these benefits arise from a reduction of transmission line losses (increased transmission efficiency). For example, ACCC Conductor is more energy efficient because it has about 28% more aluminum than traditional conductors of the same size. More aluminum means lower electrical resistance and lower operating temperature at every ampacity, and thus lower transmission line losses[20]. Lower line losses allow the same electric load to be reliably served with less power generation, reducing costs for consumers. Over time, this means that less generation capacity will need to be built to serve electric loads. This lower generation capacity cost is also a direct benefit to the electricity consumer. While the potential electrical efficiency benefits of technologies like ACCC Conductor are both large and cost effective in relation to their incremental cost, current transmission planning processes do not give transmission owners reason to consider line losses at the project design stage.

Transmission system solutions that reduce air and water emissions also deliver direct benefits to consumers. CTC Global recommends that the Commission advise planners to consider the emissions reduction benefits associated with Transmission Energy Efficiency in jurisdictions where they would serve public policy purposes. The NOPR recognizes that the nation's generation fleet is rapidly shifting away from large, central-station power plants and toward renewable resources, such as wind and solar in different locations. This shift is being

[20] Transmission line losses are directly proportional to electrical resistance.

driven largely by public policies, and by falling costs of wind and solar generation and customer preferences. Air and water emissions reductions associated with energy efficiency improvements have been recognized for decades as a significant benefit to electricity consumers and the public. Transmission planners should likewise be encouraged and incentivized by the Commission to take advantage of cost-effective opportunities to reduce emissions through energy efficiency improvements.

By incentivizing increased Transmission Energy Efficiency and the associated consumer cost reductions and emissions reductions, the Commission could encourage utilities to include efficiency/emissions measures, along with those for reliability and cost, as design/economic investment criteria. The Commission has proposed using a benefit-cost ratio that exceeds a specified value as a trigger for incentivizing a transmission project. This seems a reasonable approach provided that those benefits include and monetize Transmission Energy Efficiency, which is not adequately accounted for in current planning processes. To incentivize advanced transmission technologies, the benefit-cost ratio threshold should be lower than for the "standard" incentive cases, to adjust for the likely condition that the newer technology costs may not be as low, in the near-term, as the traditional technology even if the benefits are higher. CTC Global believes it is extremely important for the Commission to direct planners, with as much specificity as possible, which benefits to consider and how to measure and monetize them for inclusion in calculations of benefit-cost ratios. This is planning behavior worth incentivizing.

CTC Global thanks Chairman Chatterjee and the Commissioners for the opportunity to provide these comments and recommendations in this proceeding. We certainly would be responsive to any additional information request regarding CTC Global or its ACCC Conductor.

Respectfully Submitted,

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