

Slide 1



**Transmission Investment
Metrics**

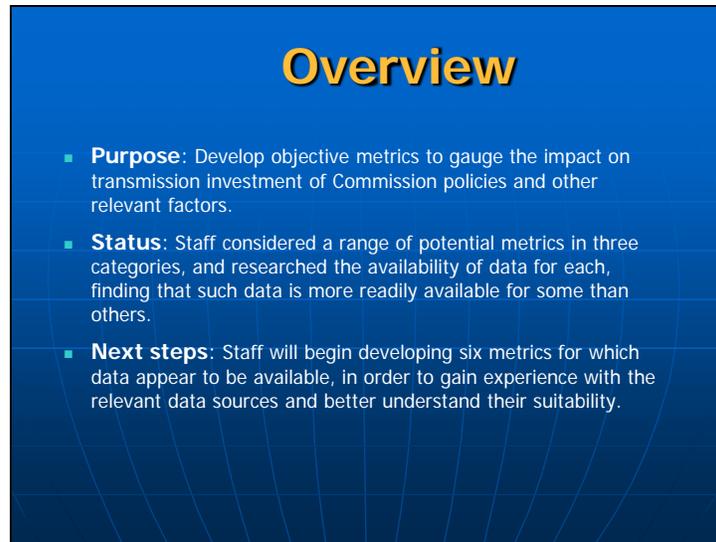
Docket No. AD15-12

April 16, 2015

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Good morning, Chairman and Commissioners.

- Item A-3 is staff's presentation regarding work we have begun to help the Commission assess transmission infrastructure investment.

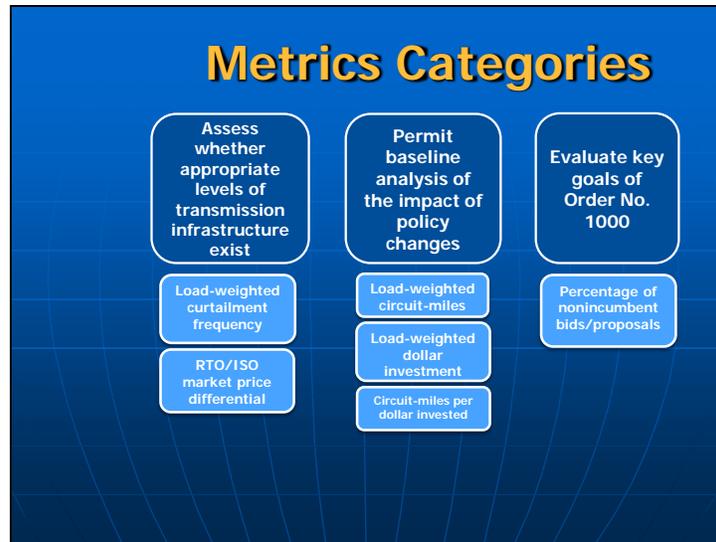


Overview

- **Purpose:** Develop objective metrics to gauge the impact on transmission investment of Commission policies and other relevant factors.
- **Status:** Staff considered a range of potential metrics in three categories, and researched the availability of data for each, finding that such data is more readily available for some than others.
- **Next steps:** Staff will begin developing six metrics for which data appear to be available, in order to gain experience with the relevant data sources and better understand their suitability.

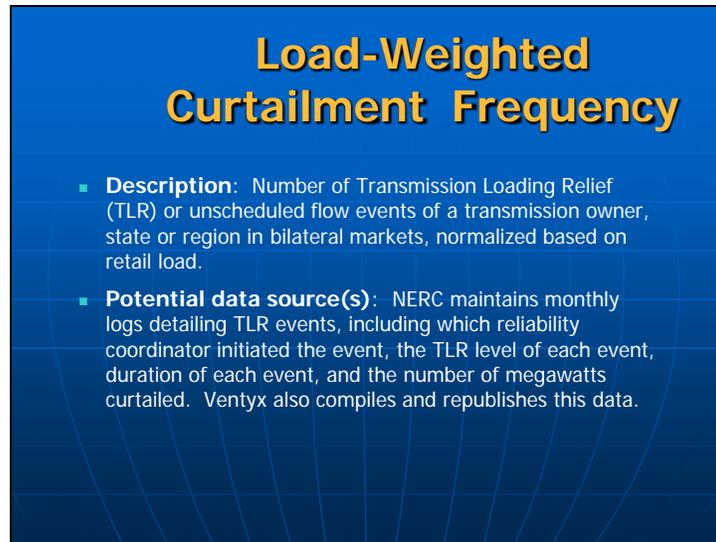
Overview

- Broadly speaking, the Commission has long had and continues to pursue the goal of achieving appropriate levels of transmission investment to address reliability, economic, and public policy concerns, while maintaining just and reasonable rates as required by the Federal Power Act.
- In order to help assess the effectiveness of the Commission's policies in achieving its goals, staff proposed to identify objective metrics that could be useful for gauging the impact of Commission policies on timely and cost-effective transmission investment.
- Staff considered a range of potential metrics and researched the availability of data for each, finding that data are more readily available for some than others.
- As will be discussed in more detail in a moment, staff developed and will begin using six metrics for which data appear to be available, in order to gain experience with the relevant data sources and better understand their suitability.
- It should be noted that the goal of this project differs from the goal of the August 26, 2014 Commission Staff Report on Common Metrics in Docket No. AD14-15-000, which was instead focused more broadly on metrics to measure reliability, operations and market performance across the industry.



Metrics Categories

- Staff considered a range of potentially relevant metrics in three broad categories: metrics designed to indicate whether appropriate levels of transmission infrastructure exist in a particular region; metrics designed to permit analysis of the impact of Commission policy changes by comparing key parameters before and after changes take place; and metrics designed to evaluate key goals of Order No. 1000.
- Of the range of possible metrics staff considered in each category, staff proposes to begin with six, based on an initial assessment of the availability of relevant data.



Load-Weighted Curtailment Frequency

- **Description:** Number of Transmission Loading Relief (TLR) or unscheduled flow events of a transmission owner, state or region in bilateral markets, normalized based on retail load.
- **Potential data source(s):** NERC maintains monthly logs detailing TLR events, including which reliability coordinator initiated the event, the TLR level of each event, duration of each event, and the number of megawatts curtailed. Ventyx also compiles and republishes this data.

Load Weighted Curtailment Frequency

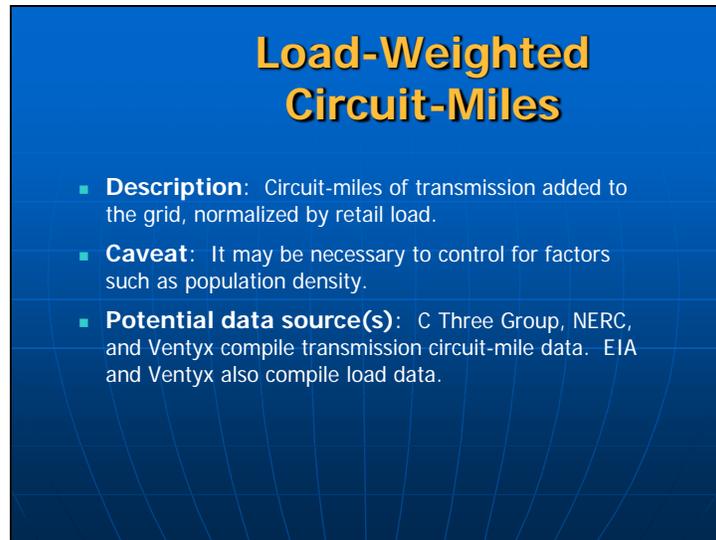
- Staff has developed two metrics that attempt to identify and measure persistent costly congestion, which staff believes is an indirect measure of whether appropriate levels of transmission investment have been achieved, from both a reliability and economic perspective.
- While short periods of transmission congestion may be perfectly reasonable market outcomes that do not necessarily indicate a need for transmission upgrades, persistent congestion that leads to significantly large market price differentials between the two sides of a congested interface may indicate an unfulfilled need for transmission upgrades.
- The first metric, applicable in bilateral markets, would be based on the Transmission Loading Relief or unscheduled flow events of a transmission owner, state or region in a given year, and will be normalized based on retail load.
- Specifically, the metric would be calculated by dividing the number of Transmission Loading Relief events in the region and year by the kWh of retail load of the relevant region for the same year.

RTO/ISO Market Price Differential

- **Description:** Persistence, in years, of RTO/ISO market nodal and market-to-market price differentials (LMPs for defined zonal or nodal pairs; forward capacity prices for defined capacity zonal or nodal pairs; and trading hub prices for defined hub pairs).
- **Caveat:** Lack of available transmission capacity between nodes or between markets may not be the only cause of persistent price differentials.
- **Potential data source(s):** Ventyx compiles and republishes market price data produced by the RTOs/ISOs. EIA compiles and republishes trading hub price data from the Intercontinental Exchange (ICE).

RTO/ISO Market Price Differential Metric

- Because RTO/ISO markets generate explicit congestion prices, and tend not to rely on Transmission Loading Relief events to manage congestion, staff developed a second metric for RTO/ISO markets.
- This metric shows the persistence, in years, of RTO/ISO market nodal and market-to-market price differentials, including those differentials that result from persistent negative prices on one side of a constraint.
- While available transmission capacity between nodes or between markets, and the associated transmission investment that maintains that capacity, may not be the only variables relevant to persistent costly transmission congestion, staff believes that it is more likely that an area has maintained appropriate levels of transmission infrastructure if that area shows fewer years of persistent costly congestion than if it shows more years of persistent costly congestion.
- The specific price differentials on which staff would base this metric include: 1) Locational Marginal Prices (LMPs) for defined zonal or nodal pairs; 2) forward capacity prices for defined capacity zonal or nodal pairs; and 3) trading hub prices for defined hub pairs.



Load-Weighted Circuit-Miles

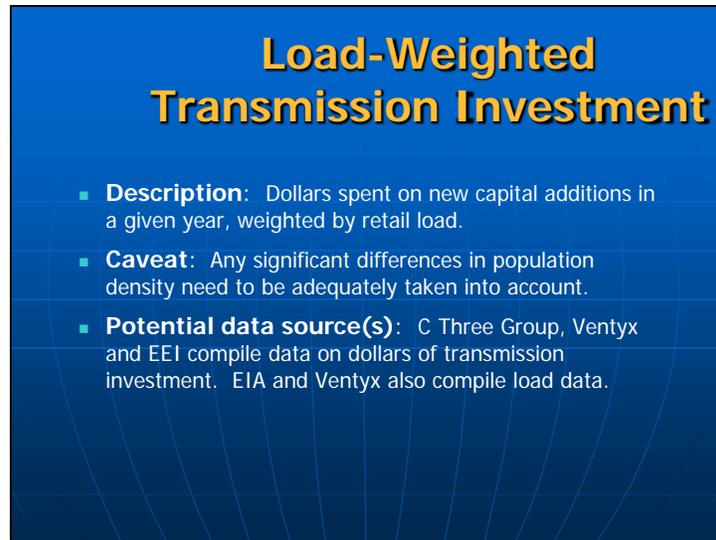
- **Description:** Circuit-miles of transmission added to the grid, normalized by retail load.
- **Caveat:** It may be necessary to control for factors such as population density.
- **Potential data source(s):** C Three Group, NERC, and Ventyx compile transmission circuit-mile data. EIA and Ventyx also compile load data.

Load-Weighted Circuit-Miles

- Staff has developed three metrics that focus on measures of relative transmission investment and the cost-effectiveness of that investment.
- The first metric would focus on circuit-miles of transmission added to the grid.
- The metric will be normalized based on the total retail load of the relevant transmission owner, state, or region in order to permit comparisons between entities or regions of different sizes.
- The metric may be structured either as a cumulative or incremental measure of retail load-weighted circuit miles.
- The cumulative version would be based on the total of all circuit-miles of transmission controlled by an entity as of a given year, irrespective of when such transmission was added.
- The incremental version of this metric would only consider the circuit-miles added in a given year.
- The purpose of this metric is to indicate the level of transmission infrastructure used by an entity to serve its customers.
- For example, to begin assessing what impact has been felt due to the Commission's efforts to promote independent operation of transmission coupled with organized

energy markets, it could be informative to compare the load-weighted circuit-miles of transmission owners in bilateral markets with those in RTO/ISO markets.

- Of course it may be necessary to control for other factors such as population density when making such comparisons.

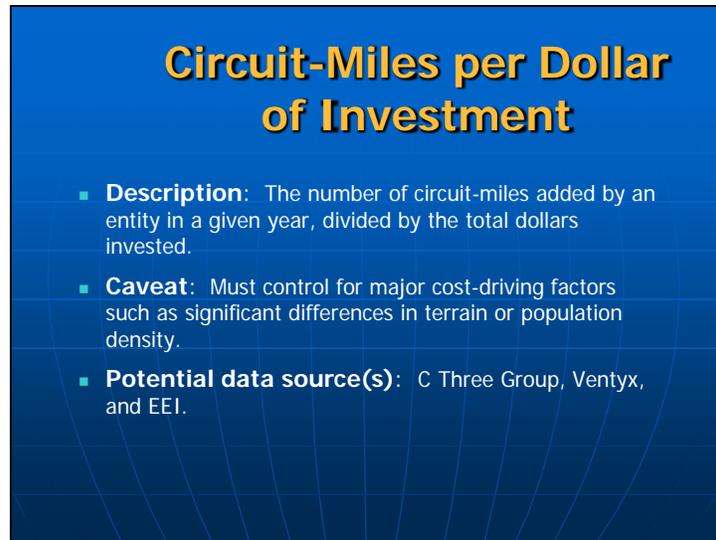


Load-Weighted Transmission Investment

- **Description:** Dollars spent on new capital additions in a given year, weighted by retail load.
- **Caveat:** Any significant differences in population density need to be adequately taken into account.
- **Potential data source(s):** C Three Group, Ventyx and EEI compile data on dollars of transmission investment. EIA and Ventyx also compile load data.

Load-Weighted Dollar Value

- The second metric for measuring relative transmission investment will be structured as an incremental measure of the load-weighted dollar value of transmission investment in a given year.
- This metric will be based on dollars spent on new capital additions to transmission in a given year, permitting direct comparison of a particular entity's load-weighted transmission investment over time and across relevant changes in Commission policy.
- As with the prior metric, it may be necessary to control for factors such as population density when attempting to make comparisons using this metric.

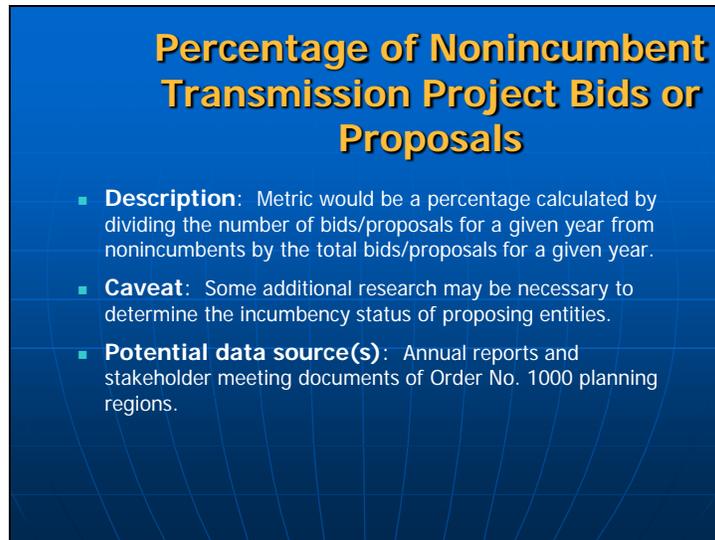


Circuit-Miles per Dollar of Investment

- **Description:** The number of circuit-miles added by an entity in a given year, divided by the total dollars invested.
- **Caveat:** Must control for major cost-driving factors such as significant differences in terrain or population density.
- **Potential data source(s):** C Three Group, Ventyx, and EEI.

Circuit-Miles per Dollar

- The third metric for measuring relative transmission investment addresses the cost-effectiveness of that investment, and would divide circuit-miles of transmission added in a year by the associated investment dollars to yield a single circuit mile/dollar figure.
- Gauging the cost-effectiveness of different transmission investments is difficult because much of the cost of a project is driven by the highly variable geographic and regulatory challenges that are particular to each project or developer.
- For example, otherwise identical transmission projects, one built over flat terrain and the other built over the same distance of hilly terrain, will likely incur very different costs per mile, but this difference would probably not by itself indicate any need to improve the cost-effectiveness of the project over hilly terrain.
- Nevertheless, staff believes that such a metric could be useful in appropriately defined circumstances, such as by controlling for differences in key cost drivers like population density and terrain.
- As with the prior metric, this metric will be structured as an incremental measure of circuit-miles per dollar for a given year, in order to avoid issues with accounting for depreciation and inflation.

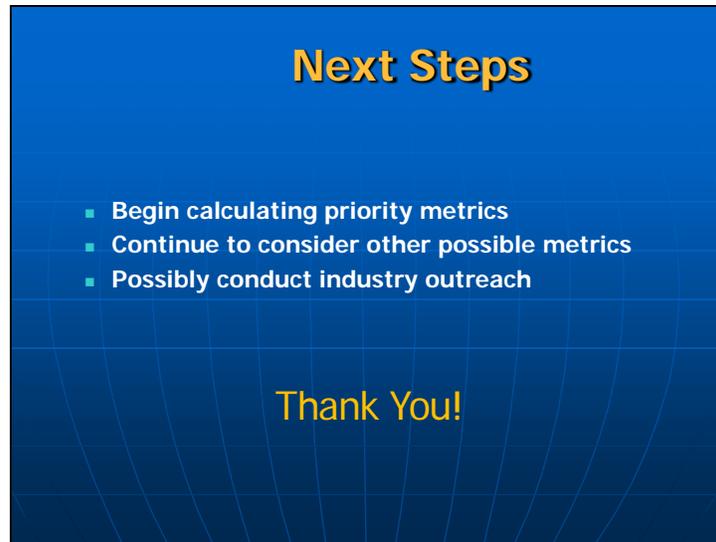


Percentage of Nonincumbent Transmission Project Bids or Proposals

- **Description:** Metric would be a percentage calculated by dividing the number of bids/proposals for a given year from nonincumbents by the total bids/proposals for a given year.
- **Caveat:** Some additional research may be necessary to determine the incumbency status of proposing entities.
- **Potential data source(s):** Annual reports and stakeholder meeting documents of Order No. 1000 planning regions.

Percentage of Nonincumbent Bids/Proposals

- Finally, staff will focus on one of the major aspects of Order No. 1000 - supporting competition in transmission development.
- Staff developed a metric intended to initially assess participation in the regional transmission planning process by nonincumbent developers of transmission for which regional cost allocation will apply.
- Specifically, staff will begin measuring the percentage of bids or proposals on projects, by Order No. 1000 region, that come from nonincumbent developers.



Next Steps

- Begin calculating priority metrics
- Continue to consider other possible metrics
- Possibly conduct industry outreach

Thank You!

Next Steps and Thank You

- Staff will begin calculating the six identified metrics and may also perform targeted outreach related to this effort.
- In addition, staff will continue to consider whether additional metrics would be useful.
- Thank you, Chairman and Commissioners; this concludes our presentation and we welcome any questions or comments you may have.