

ERCOT: Transmission Planning Improvements For Valuation of GTC Exit Solutions

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Executive Summary

- GTCs are economic limitations used to resolve stability problems
- There are evaluation criteria and modeling changes ERCOT should consider on the short term to improve accuracy of GTC assessments
- GTC exit solutions have additional benefits beyond production cost savings since they solve reliability problems
- PUCT allows for indirect benefits to be accounted for
- ERCOT should widen the benefits for evaluating GTC exit solutions – this can be enabled by additional language in the Regional Planning Guide



GTC Exit Solutions – Current Approach

- Stability/voltage/non thermal limitations are implemented via an interface with a thermal limit in the market engine
 - Identified GTC exit solutions need to meet **economic criteria** in ERCOT's annual Regional Transmission Process (RTP)
 - The RTP study is a view 2-6 years into the future
 - Annual Production Cost (PC) savings need to exceed the first-year annual revenue requirement for the project
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- Current approach effectively means that market congestion needs to become bad enough on the near term for a reliability problem to be addressed
 - Realizing enough production cost savings to pass PC test doesn't necessarily mean a transmission project is cost-effective on the long run

GTC Exit Solutions – Proposed Criteria and Modeling Changes

Short Term:

- Regular re-evaluation of the revenue requirement considering current COVID19 environment with low interest rates (e.g. as recently done by ERCOT with 14% to be reduced to 13.1%)
- Utilize actual bids from real time data for wind units in particular, versus default \$0/MWh bid for wind and solar: this will increase the nominal PC savings given a good portion of the ERCOT wind fleet is bidding negative in the market
- Are there reliability projects that could be deferred or avoided by a GTC exit solution?

Longer term:

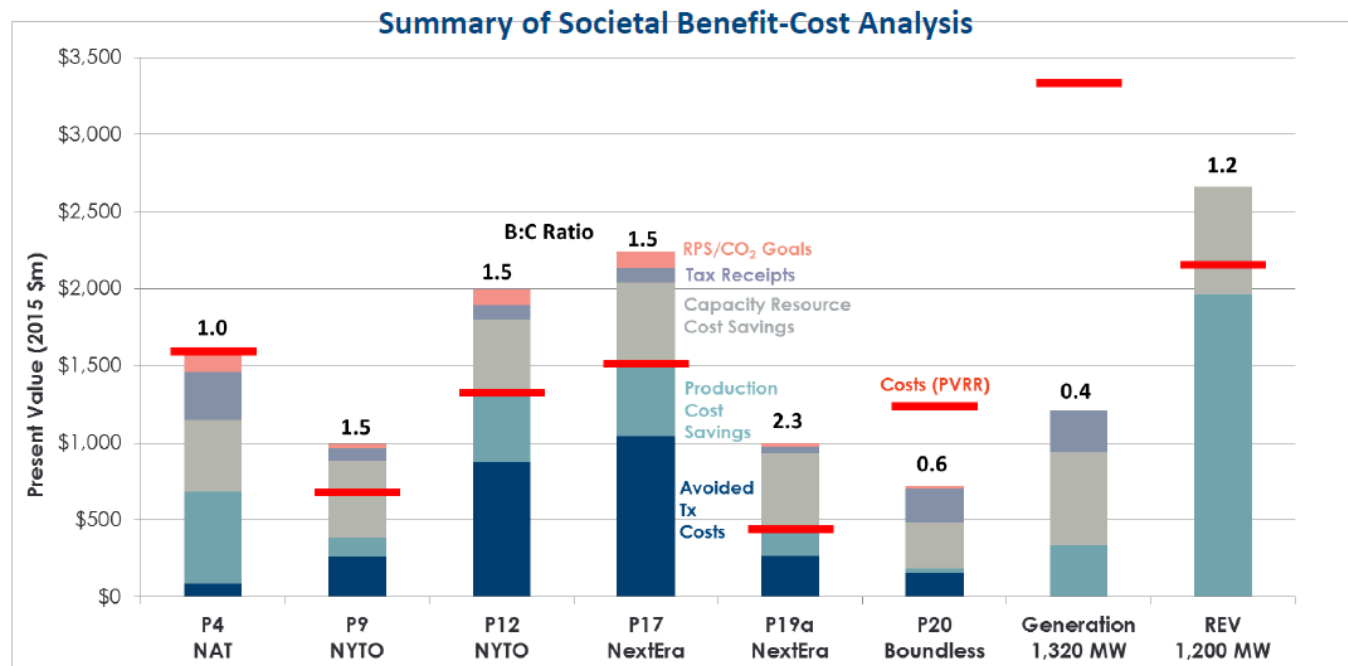
- ERCOT to analyze which approach is the most appropriate: first year requirement vs Net Present Value or levelized approach for potential change at PUC
 - Economic benefits tend to go up over time as LTSA projections tend to show
 - Transmission has a lifespan of > 40 years -> costs go down over time as depreciation is accounted for

Proposed Changes –Account For Additional Benefits of GTC Solutions

- GTCs are addressing reliability problems!
- Just because something is hard to measure/quantify doesn't mean ERCOT can neglect to include it or a reasonable approximation of it
 - E.g. A benefit-cost analysis of proposed NY AC transmission upgrades conducted by Brattle in 2015 identified that production cost savings (blue bar) generally represent a small portion of total benefits

Use of GTCs in ERCOT –July 2020

- “Ultimate goal of a GTC is to provide a market solution to a reliability problem”
- “This translation of non-thermal limits into GTCs, and then the use of market mechanisms to control the GTCs ensures that the stability and other non-thermal constraints on the system are managed in an efficient manner”



Source: 2015 Brattle NY AC Assessment



Proposed Changes –Account For Additional Benefits of GTC Solutions

- **PUC language** already recognizes and allows for indirect costs and benefits of transmission solutions
 - **Indirect and direct benefits** should be included to fully capture the actual system benefits for society, all market segments, and stakeholders

“The applicant must present an economic cost-benefit study that includes an analysis that shows that the levelized ERCOT wide annual production cost savings attributable to the proposed project are equal to or greater than the first-year annual revenue requirement of the proposed project of which the transmission line is a part. Indirect costs and benefits to the transmission system may be included in the cost-benefit study. The commission shall give great weight to such a study if it is conducted by the ERCOT independent system operator.”

(Source: PUC Subst. R. 25.101(b)(3)(A)(i))

GTC Exit Solutions – Additional Benefits

- **Grid Benefits**

- **Improved security and operational reliability:**

- The consequence of stability overloads are more severe and harder to address within a short amount of time than a thermal constraint
- Reliability Benefits could be measured by:
 - # of GTCs removed, # line overloads solved etc, improvement in system strength
- Improved dynamic performance and grid stability during extreme events

- **Improvement in Reserves (Operating /Planning); Improved loss of load metrics**

- Renewable curtailed represents reduced deliverability of resources already online
 - Could be measured by reduction of Renewable Curtailment (% etc)
- GTC risks threaten development of future resources counted on in estimates of future reserve margins (see slide 9)
 - Could be measured by reduction in Congestion Rent, maintaining healthy reserve margins and lower load payments to ratepayers

GTC Exit Solutions – Additional Benefits (II)

- **Other Grid and Societal Benefits**

- Additional economic benefits from the long-term system assessment:
 - utilizing only first year of economic benefits denies the value a transmission project can have over the long term
- Transmission Losses including system losses and improvements in reactive losses

- Deferred investments because of the transmission including avoided costs of adding stat coms, shunt devices, deferred reliability projects
- Employment and Economic Stimulus Benefits:
 - Increased employment, economic activity and tax revenues (see slides 10)

Expanding Benefits Beyond PC

- **Reduced planning reserve margin:**

- Wind and solar make up a substantial amount of ERCOT's planned generator capacity, but the GTC risks threaten their development in the West zone.
- If less renewable buildout materializes in the future due to higher transmission cost risk, impact on reserve margins could be severe: e.g. 3-4.7% drop if 50% less West renewable projects than projected in the May 2020 CDR

ERCOT Reserve Margin Outlook Using May 2020 CDR						
Percent of Wind & Solar MW in the West & Panhandle zones with IA signed assumed to reach COD	2021	2022	2023	2024	2025	
100%	17.4%	20.7%	19.0%	16.9%	15.1%	Reference case - May 2020 CDR
↓	75%	15.9%	18.5%	16.7%	14.6%	12.9%
	Delta from Base	-1.5%	-2.2%	-2.3%	-2.3%	-2.2%
	% Reduction from Base	-8.6%	-10.6%	-12.1%	-13.6%	-14.6%
↓	50%	14.4%	16.2%	14.3%	12.3%	10.6%
	Delta from Base	-3.0%	-4.5%	-4.7%	-4.6%	-4.5%
	% Reduction from Base	-17.2%	-21.7%	-24.7%	-27.2%	-29.8%
↓	25%	12.9%	14.0%	12.0%	10.0%	8.4%
	Delta from Base	-4.5%	-6.7%	-7.0%	-6.9%	-6.7%
	% Reduction from Base	-25.9%	-32.4%	-36.8%	-40.8%	-44.4%
↓	0%	11.4%	11.8%	9.7%	7.8%	6.1%
	Delta from Base	-6.0%	-8.9%	-9.3%	-9.1%	-9.0%
	% Reduction from Base	-34.5%	-43.0%	-48.9%	-53.8%	-59.6%



Expanding Benefits Beyond PC

- **Increased employment, economic activity and tax revenues**

A 300MWac solar project will lead to a \$300Million capital investment and translate into a number of local benefits:

- **Property Taxes** – County, Hospital, School District including Maintenance & Operations (M&O) and Interest & Sinking (I&S) payments totaling ~\$32-49 million over 35-year project life
- **Landowner Payments** – rents totaling ~\$32 to \$64 million
- **Job Creation** – ~400 full time employees during construction phase with an average wage of ~\$52,500/yr. 1-2 full time employees during operations with a minimum annual wage of ~\$44,000/yr

- **Multiplying these numbers to solar MWs in the queue in the West assumed in the May 2020 CDR report at risk due to GTC developments, there are \$593Million to \$2,752 Million in local benefits from the development of up to about 6GW of solar.**

Potential Economic Losses If West Solar Projects (Forecast in the May 2020 CDR) Are Not Built			
2023 (cumulative)	25% of May 2020 CDR Capacity	50% of May CDR	75% of May CDR
Solar	2006 MW	4012 MW	6018 MW
Estimated Total Local Economic Loss	\$593-\$917 Millions	\$1,186-\$1,835 Millions	\$1,779-\$2,752 Millions

Next Steps

- Make language changes to the Section 3: Regional Planning Guide
 - Add a new sub-section for 3.1.3. Project Evaluation
 - 3.1.3.3 Economic-Driven Project Evaluation for transmission projects including related to GTC exit solutions. Sample language:

For GTC-exit solution projects, in addition to the expected ERCOT System production costs, additional criteria should be evaluated for inclusion for the economic project analysis such as improved security and operational stability, improved loss of load, employment and economic stimulus benefits.
- EDFR/Pattern or other parties to finalize draft language for filing of a PGRR
- ERCOT to propose metrics for quantification of benefits beyond production cost savings or engage 3rd party to propose metrics