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PROJECT NO. 38578



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| ENERGY EFFICIENCY IMPLEMENTATION PROJECT UNDER 16 TAC §25.181 | § § § | BEFORE THE PUBLIC UTILITY COMMISSION OF TEXAS |

# PETITION OF THE STEERING COMMITTEE OF CITIES SERVED BY ONCOR TO CHALLENGE THE AVOIDED COST OF CAPACITY PURSUANT TO 16 TAC §25.181(d)(2)(A)(iii)

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ATTACHMENT 1: Table 1: Present Value of Avoided Capacity Cost and Annual Average Avoided Capacity Cost for EE Measures with Useful Lives Ranging from 1 to 29 Years

WORKPAPERS provided on PUC Interchange

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| **ENERGY EFFICIENCY** | § | **BEFORE THE** |
| **IMPLEMENTATION PROJECT** | § | **PUBLIC UTILITY COMMISSION** |
| **UNDER 16 TAC §25.181** | § | **OF TEXAS** |

**PETITION OF THE STEERING COMMITTEE OF CITIES SERVED BY ONCOR TO CHALLENGE THE AVOIDED COST OF CAPACITY PURSUANT TO 16 TAC §25.181(d)(2)(A)(iii)**

TO THE HONORABLE PUBLIC UTILITY COMMISSION OF TEXAS:

COMES NOW the Steering Committee of Cities Served by Oncor (Cities), and files this petition challenging the avoided cost of capacity published on the Public Utility Commission of Texas' (Commission) website on November 12, 2018. 16 Tex. Admin. Code (TAC) § 25.181(d)(2)(A)(iii) allows parties to challenge the avoided cost of capacity calculated by Commission Staff by filing a petition within 45 days of the date the avoided cost of capacity is posted on the Commission's website.[1] Therefore, this petition is timely filed.

## I. INTRODUCTION

The Commission's Energy Efficiency Rule (EE Rule) is intended to ensure that each electric utility annually provides incentives to customers to install cost-effective, energy efficient technologies in their homes and places of business. Such installations are often referred to "energy efficiency measures" or "EE measures."

The EE Rule requires that EE measures be cost-effective. The cost-effectiveness of an EE measure is determined in part by the cost of generation capacity deferred through the implementation of an EE measure. For use in quantifying the economic benefit of deferring a generation capacity investment, the Commission annually posts an avoided cost of capacity based on criteria set out in the EE Rule. However, § 25.181(d)(2)(A)(iii) of the EE Rule specifically

[1] 16 Tex Admin Code § 25.181(d)(2)(A)(iii) (TAC).

provides that a party may protest the calculation by filing a petition within 45 days of the date Staff posts the avoided cost of capacity on the Commission's website.[2]

This petition challenges the avoided cost of capacity of $80 per kW per year proposed by Staff for program year 2019.[3] Cities propose an avoided cost of capacity of $50.94 per kW per year for program year 2019.

## II. JUSTIFICATION

The avoided cost of capacity is a critical input in the determination of the energy efficiency costs borne by ratepayers in any given program year. The avoided cost of capacity directly affects the net benefits calculation, and therefore also directly impacts the bonus calculation. The bonus is calculated using net benefits,[4] so the net benefits calculation, and therefore the bonus, are directly reduced when the avoided cost of capacity is reduced.[5] Additionally, because the EE Rule prohibits a program's incentive payments exceeding the avoided costs of the program,[6] lowering the avoided cost limits the level of incentive payments that a utility may receive. Lastly, because a program must pass a cost-benefit test wherein the benefits must exceed the costs,[7] decreasing the calculated benefits of a program exposes uneconomical programs, which will result in a weeding out of underperforming programs, improving the quality of the overall portfolio, and at the same time lowering the amount of EE costs to be borne by ratepayers.

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[2] Commission Staff has issued a proposal for publication that will amend TAC § 25.181(d)(2)(A)(iii). As of the date of this filing, the Proposal for Publication has not been issued in the Texas Register. Therefore, this petition will address the current version of the rule.

[3] *Energy Efficiency Implementation Project Under 16 TAC § 25.181*, Project No. 38578, https://www.puc.texas.gov/industry/projects/electric/38578/38578.aspx (last visited Dec. 19, 2018).

[4] 16 TAC § 25.181(h)(2)-(3): Net benefits shall be calculated as the sum of total avoided cost associated with the eligible programs administered by the utility minus the sum of all program costs. Total avoided costs and program costs shall be calculated in accordance with this section. Beginning with the 2012 program year, a utility that exceeds 100% of its demand and energy reduction goals shall receive a bonus equal to 1% of the net benefits for every 2% that the demand reduction goal has been exceeded, with a maximum of 10% of the utility's total net benefits.

[5] Ex. Impact on ONCOR's 2017 bonus using Cities' proposed avoided cost of capacity calculation: If the avoided cost of capacity were lowered from $80 to $50 in accordance with Cities' estimate of a reasonable value, the dollar impact on ONCOR's 2017 shareholder bonus would be a reduction of $2.1 million, or 27.2% on a percentage basis, from $7.8 million to $5.7 million. Across all regulated utilities with EECRFs, Cities estimate a total savings of $7–$8 million annually.

[6] 16 TAC § 25.181(g): Incentive payments. The incentive payments for each customer class shall not exceed 100% of avoided cost, as determined in accordance with this section.

[7] 16 TAC § 25.181(d): An energy efficiency program is deemed to be cost-effective if the cost of the program to the utility is less than or equal to the benefits of the program.

The Commission adopted the EE Rule in Project No. 21074.[8] In the original Order of Adoption, the Commission references variables that were used to calculate the avoided cost of capacity, although the Order does not discuss the mechanics of the calculations that were performed using the variables.[9] For example, a discount rate of 10% was used in the original Order of Adoption (2000 EE Rule), though exactly how that discount rate fits in the calculation is unknown. The Commission adopted the current value of $80 per kilowatt (kW) per year[10] for avoided cost of capacity in Project No. 33487, but did not address the calculations or update inputs in that project.[11]

Additionally, some of the values of the variables adopted in the 2000 EE Rule are stale and no longer valid. As discussed above, the Order of Adoption uses a 10% discount rate in its calculation of avoided capacity costs.[12] However, § 25.181(h)(5) of the EE Rule proscribes a discount rate equal to a utility's weighted average cost of capital (WACC) and an escalation rate of 2%.[13] Cities therefore propose that the appropriate discount rate to use to discount avoided costs is the utility's WACC, or authorized rate of return on invested capital. Utilities' current authorized WACC are in the range of 7.5%–8%. This variable has a significant effect on the economic impact of an energy efficiency program, as higher discount rates increase the value derived by pushing out a capacity investment into later years that otherwise would have been required. Likewise, the inflation rate of 3% used in the original rulemaking is no longer reflective

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[8] *Energy Efficiency Programs*, Project No. 21074, Adopting New §25.181 Relating to Energy Efficiency Goal as Approved at the March 1, 2000 Open Meeting and Submitted to the Secretary of State (Mar. 22, 2018) (Order of Adoption).

[9] *Id.* at 67: "The commission finds that to streamline the April 1, 2000 cost unbundling proceedings, it is preferable to establish an avoided cost proxy in the rule. The estimated construction cost of a new gas turbine is $400/kW. Taking into account a 30-year life, 10% discount rate and a 3.0% inflation rate, the commission therefore sets the annualized capacity cost at $66/kW. The commission further finds that the avoided cost for energy should be based on the recent off-peak value of 2.5 cents/kWh. The commission finds that line losses of 7.0% (based on an approximate average for Texas utilities) should be included in the calculation of avoided energy and capacity costs and that reserve margins of 12% should be included in the calculation of avoided capacity costs for energy savings measured at the customer's meter. Other ancillary services and T&D avoided costs should not be included. The commission therefore concludes that the "cost effectiveness" cap for the purposes of this statute shall be a proxy of total avoided capacity cost of $78.5/kW (($66)(1+7%+12%))."

[10] 16 TAC § 25.181(d)(2)(A)(ii).

[11] *Amendments to Energy Efficiency Rules and Templates*, Project No. 33487, Order Adopting the Repeal of §25.181 and §25.184 and of New §25.181 as Approved at the March 26, 2008 Open Meeting at 37-41 (Apr. 14, 2008).

[12] Project No. 21074, Order of Adoption at 67.

[13] 16 TAC § 25.181(h)(5).

of market conditions. The current rule's escalation rate of 2% is more appropriate. Finally, the inputs for reserve margins and line losses are also stale and require updating to reflect the current market.

Additionally, the current value in the EE Rule, $80/ kW-year is unsupported. Despite the critical impact the avoided cost of capacity makes in determining EE costs borne by ratepayers, the Commission Staff has never provided any workpapers supporting its calculation, including in all prior projects. The Commission should update the inputs from the 2000 EE Rule and revise the calculation to reflect an accurate value for the avoided cost of capacity.

## III. RECOMMENDATION

Cities recommend that:

- the avoided cost of capacity for program year 2019 be set to $50.94 per kW per year for an EE measure with one-year useful life, and also, as necessary, set to progressively lower values for measures with higher useful lives, as shown in Attachment 1; and
- the Commission update Cities' proposed calculations in future program years based on the values of the inputs in those years.

Because the EE Rule uses a single avoided cost of capacity value, Cities recommend the Commission use the value corresponding with a one-year deferral of generation capacity ($50.94 per kW per year). This conservative value is most favorable to the EE Rule's cost-effectiveness test for a given EE measure.[14]

## IV. METHODOLOGY AND SUPPORTING DATA

Cities' calculation methodology includes the following steps, each of which is discussed at greater length below:

1. Identify the type of generation plant to use as a proxy for the generation capacity investment that is deferred when an EE measure is implemented; and, identify its overnight cost per kW;
2. Inflate the overnight cost per kW as necessary to state its expected value in a future year using the escalation rate provided in the EE Rule;

[14] Attachment 1 and Cities' workpapers reflect the annual impact of avoided costs by delaying construction of a generation asset. However, consisted with the EE Rule, Cities propose to use just 1 year of avoided costs.

3. Adjust the overnight cost per kW to account for line losses from the generator's source to the customer's meter;

4. Adjust the overnight cost per kW to provide for an adequate reserve margin;

5. Identify lifecycle costs of the generation plant;

6. For each year that the generation plant could be installed, beginning in year 1:

   a. Develop an annual revenue requirement for each year of the useful life of the plant;

   b. Calculate the present value of each annual revenue requirement by discounting the revenue requirement at the weighted average cost of capital;

   c. Sum the present values of the annual revenue requirements over the plant's useful life;

7. Calculate the avoided cost of capacity of an EE measure as the difference between (a) the present value of annual revenue requirements if the generation plant is installed in year 1; and, (b) the present value of annual revenue requirements if the plant is installed in the year following the end of the useful life of the EE measure; and

8. Calculate an average avoided cost of capacity for each year of the EE measure's useful life by dividing the measure's total avoided cost of capacity from Step 7. by the useful life of the measure, resulting in $ per kW per year. Note that this value is different for each number of years of the useful life of an EE measure.

**Step 1: Overnight Cost**

The starting point in the avoided cost of capacity analysis is determining the overnight cost of a generating plant. The EE Rule provides that the avoided cost of capacity be calculated from the base overnight cost using the lower of a new conventional combustion turbine or a new advanced combustion turbine, as reported by the United States Department of Energy's Energy Information Administration's (EIA) Cost and Performance Characteristics of New Central Station Electricity Generating Technologies associated with EIA's Annual Energy Outlook.[15] Cities accept this approach for the identification of the relevant generating plant within ERCOT. For the ERCOT region, the EIA reports the following overnight costs for the two specified types of generation:

[15] 16 TAC § 25.181(d)(2)(A)(i).

| Generation type | Total overnight capital cost per kilowatt |
|---|---|
| Conventional Combustion Turbine | $1,063 |
| Advanced Combustion Turbine | $661 |
| Source: Energy Information Administration, Annual Energy Outlook 2018, Cost and Performance Characteristics of New Generating Technologies. | |

The lower overnight cost is for an Advanced Combustion Turbine.

**Step 2: Escalation**

Inflation causes costs to increase over time. For example, the cost of steel used in the fabrication of an Advanced Combustion Turbine will probably increase in future years. The EE Rule currently provides for an escalation rate of 2% per year.[16] Cities adopt this inflation rate for use in calculating the overnight cost of an Advanced Combustion Turbine.

**Step 3: Line Losses**

In Cities' analysis, the overnight cost is increased to account for line losses. The amount of generation capacity required to serve a customer must account for power that is lost along the feed path to the customer, referred to as "line losses." Power is lost as it flows through the system from the generator, through the transmission and distribution systems, to the customer's point of delivery. To serve one kilowatt in customer demand at the customer's meter, more than one kilowatt must be produced at the generator's source. Similarly, one kilowatt of demand avoided behind the meter, at the premises where the customer's EE measure is installed, results in more than one kilowatt of avoided generation capacity at the source.

Line losses are calculated using the most recent line loss studies for each vertically integrated investor-owned utility in Texas, weighted using 2017 actual sales at meters for utilities' EECRF customer classes. In 2017, average line losses were 10.54% for these EECRF classes. The 2000 EE Rule used a 7% line loss input.[17]

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[16] 16 TAC § 25.181(h)(5).

[17] Project No. 21074, Order of Adoption at 67.

**Step 4: Reserve Margin**

To ensure an adequate level of reliable electric service in the event of emergencies or other unforeseeable events, generation capacity is held in reserve. The economically optimum level of capacity to be held in reserve in ERCOT was recently studied by The Brattle Group, and its study's findings were used to increase the overnight cost to provide for a reserve margin of 10.25%.[18] The 2000 EE Rule used a reserve margin of 12%.[19]

**Step 5: Lifecycle Costs to Ratepayers**

For the purpose of this analysis, the lifecycle costs are considered within a regulatory context, as costs approved for recovery under regulated rates. Ratepayers will not bear the full overnight cost of a generating plant, such as an Advanced Combustion Turbine, in rates when it is installed. Instead, the costs of the plant will be borne by ratepayers throughout the plant's useful life. The following cost elements have been identified as lifecycle costs of the generating plant to ratepayers and quantified as follows:

- Return on Investment. Return on the undepreciated value of the plant at the WACC, where the WACC is calculated using the most recent Commission-adopted WACC for each utility subject to the EE Rule, weighted according to that utility's requested 2019 EECRF revenue requirement, resulting in a blended WACC of 7.73%. For each year, the plant balance used to calculate the return component for that year is the midpoint of the remaining plant balance at the beginning of the year and at the end of the year, multiplied by the WACC;
- Depreciation Expense. Return of the value of the plant in the form of depreciation expense, calculated using straight-line depreciation. For a 30-year useful life of the plant,[20] the depreciation rate is 1/30 or 3.33%;
- Operations and Maintenance (O&M) expense. Fixed O&M expense in the amount of $6.80 per kW per year for an Advanced Combustion Turbine plant, from the EIA's most recent report, Capital Cost Estimates for Utility Scale Electricity Generating Plants;

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[18] *Estimation of the Market Equilibrium and Economically Optimal Reserve Margins for the ERCOT Region*, The Brattle Group (Oct. 12, 2018).

[19] Project No. 21074, Order of Adoption at 67.

[20] A 30-year useful life is used for the Advanced Combustion Turbine, consistent with EIA standards. *See*, e.g., *2018 EIA Electricity Market Module* at 16 (April, 2018): "Capacity planning decisions in the EMM are based on a life-cycle cost analysis over a 30-year period."

- Property Insurance Expense. Calculated as $0.0011 per dollar of net plant based on the property insurance costs assigned to the production demand function in the most recent Commission-adopted cost of service studies for each vertically integrated investor-owned utility in Texas;
- Property Tax Expense. Calculated as $0.0093 per dollar of net plant based on the property tax costs assigned to the production demand function in the most recent Commission-adopted cost of service studies for each vertically integrated investor-owned utility in Texas; and
- Income Tax Expense. Calculated at a rate of 21% applied to the operating income from the plant in each operating year as developed internally within the model found in Cities' workpapers.

**Step 6.a.: Develop Annual Revenue Requirements**

The cost components of the revenue requirement are calculated for each year of the plant's 30-year useful life. The full 30-year suite of revenue requirements is calculated for each scenario in a separate worksheet in Cities' workpapers, where each scenario corresponds with the year of the required plant investment. For example, when an EE measure with a 10-year useful life expires, generation capacity will be required in year 11, and under this scenario annual revenue requirements are calculated for years 11 to 40 (i.e., the full useful life of the plant installed in year 11).

**Steps 6.b.-c.: Sum of Present Value of Revenue Requirements**

The annual revenue requirements calculated in Step 6.a. must be discounted to their present value. The economic benefit of deferring the capacity investment is based on the financial concept of the time value of money. Discounting accounts for the lower economic burden imposed by an obligation to spend one dollar on capacity in the future, as compared to the burden of an obligation to spend a dollar on capacity today. The discounted annual revenue requirements are then summed, resulting in the present value of the lifecycle costs of the plant investment to ratepayers.

**Step 7: Avoided Cost of Capacity**

The avoided cost of capacity is calculated as the difference between (a) the present value of the revenue requirements if the generating plant is installed in year 1; and (b) the present value of the revenue requirements if the plant is installed in the year following the end of the useful life of an EE measure. The avoided cost calculation is performed for each year that the deferred plant investment would be necessary, corresponding with the year after the end of the useful life of the

corresponding energy-efficiency measure; that is, the EE measure that provided for the deferral of the capacity investment.

**Step 8: Annual Average Avoided Cost of Capacity**

Step 8 is only necessary if the avoided cost of capacity needs to be stated as an annual average value, consistent with the format used to state its value in the EE Rule. If desired, calculate an annual average avoided cost of capacity for each year of an EE measure's useful life by dividing the measure's total avoided cost of capacity (from Step 7) by the useful life of the measure, resulting in dollars per kW per year. Note that the annual average avoided cost of capacity will be different for each value of an EE measure's useful life, which departs from the current EE Rule's specification of a single annual average avoided cost of capacity, without regard to an EE measure's useful life. For each useful life of an EE measure. (a) the total avoided cost of capacity per kW, and (b) the annual average avoided cost of capacity per kW per year can be seen in Attachment 1.

## V. RELIEF REQUESTED

Cities respectfully request that the Commission adopt Cities' proposed avoided cost of capacity of $50.94/kW per year and update Cities' proposed calculations in future program years based on the revised values of the inputs in those years.

Dated: December 20, 2018

Respectfully submitted,

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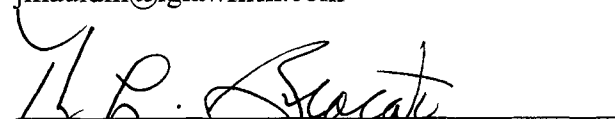

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ATTORNEYS FOR CITIES

Table 1: Present Value of Avoided Capacity Cost and Annual Average Avoided Capacity Cost for EE Measures with Useful Lives Ranging from 1 to 29 Years

| Measure life | Present Value of Avoided Capacity Cost (per kW) | Annual Average Avoided Capacity Cost (per kW per Year) |
|---|---|---|
| (c) | (a) | (b) = (a) ÷ (c) |
| 1 | $50.94 | $50.94 |
| 2 | $99.18 | $49.59 |
| 3 | $144.86 | $48.29 |
| 4 | $188.12 | $47.03 |
| 5 | $229.08 | $45.82 |
| 6 | $267.87 | $44.65 |
| 7 | $304.61 | $43.52 |
| 8 | $339.40 | $42.42 |
| 9 | $372.34 | $41.37 |
| 10 | $403.53 | $40.35 |
| 11 | $433.07 | $39.37 |
| 12 | $461.05 | $38.42 |
| 13 | $487.53 | $37.50 |
| 14 | $512.62 | $36.62 |
| 15 | $536.37 | $35.76 |
| 16 | $558.86 | $34.93 |
| 17 | $580.16 | $34.13 |
| 18 | $600.33 | $33.35 |
| 19 | $619.43 | $32.60 |
| 20 | $637.51 | $31.88 |
| 21 | $654.64 | $31.17 |
| 22 | $670.85 | $30.49 |
| 23 | $686.21 | $29.84 |
| 24 | $700.75 | $29.20 |
| 25 | $714.52 | $28.58 |
| 26 | $727.55 | $27.98 |
| 27 | $739.90 | $27.40 |
| 28 | $751.59 | $26.84 |
| 29 | $762.66 | $26.30 |