

# Michigan Public Service Commission

## **MPSC Staff PURPA Technical Advisory Committee**

Staff Avoided Cost Methodology Strawman Proposal

February 10, 2016 PURPA TAC Meeting



MICHIGAN PUBLIC SERVICE COMMISSION

# Proposed Methodology

## Proxy Plant

- Methodology
  - Capacity Component
  - Energy Component
  - NGCC Energy Adjustment

Factor in Effective Load Carrying Capability (ELCC) for intermittent renewable generation like solar and wind, but not for hydro, biomass, landfill gas or CHP



# Capacity Component

- The capacity component is determined using a proxy natural gas combustion turbine (CT) or simple cycle plant.
- Staff's proposal uses only the fixed cost component of the CT.
- Represents the most cost-effective new entry into the energy market.



## Capacity Component Combustion Turbine Gas Plant w/Variable Costs Deducted

	CT No Variable	<i>notes</i>
Capacity MW	210	MW
Loading Factor	13.00%	The % of time the unit would be dispatched if available
Equivalent Avail.	90.00%	the % of time the unit would be available for dispatch.
Capacity Factor	11.70%	(Loading Factor)(Equivalent Availability)
Heat Rate Btu/kWh	9750	BTU/kWh
Fuel Cost \$/MMBtu	\$0.00	\$ per Million BTU
Total Cost MM no AFUDC	\$160.049	MM
AFUDC	\$20.34	MM
Total Cost MM	\$180.388	MM
Fixed Charge Rate	9.30%	% used to calculate fixed cost recovery component
Fixed O&M \$/kW	\$14.62	\$/kW
Annual Lev. Fixed Cost MM	\$16.78	MM
Total Annual Lev. Fixed Cost MM	\$19.85	MM
Fixed Cost \$/kWh	0.0922	\$/kWh
Fuel Cost \$/kWh	0.0000	\$/kWh
Var. O&M \$/kWh	0.0000	\$/kWh
Total Var. Cost	0.0000	\$/kWh
Total Cost \$/kWh	0.09221	\$/kWh
Total Cost (MM)		
Overnight Cost (MM) Inflated		
Total Cost (\$/kW)		
\$/MW-year	<b>\$94,505/MW-YR (Cost of CT Capacity w/o variable costs)</b>	

# Energy Component

- Energy Component Options:
  - MISO locational marginal price (LMP) at the appropriate node.
  - Levelization of projected LMP over the contract term.
  - Levelization of natural gas combined cycle (NGCC) plant variable costs over the contract term.
- An NGCC Energy Adjustment will be added to the Energy Component.



# NGCC Energy Adjustment

- To obtain the cheaper energy from a NGCC (as opposed to a CT) that is currently reflected in the LMP market, the additional capacity costs to build a NGCC are incurred over and above the cost to build a CT. This shifted “capacity” cost should be added to the energy payment for our proxy plant.
  - NGCC has lower energy cost, but higher capacity cost
  - The NGCC Energy Adjustment is calculated using the fixed capacity cost difference between a NGCC and a CT.



# NGCC Energy Adjustment

	NGCC
Capacity MW	400
Loading Factor	71.00%
Equivalent Avail.	87.00%
Capacity Factor	61.77%
Heat Rate Btu/kWh	6719
Fuel Cost \$/MMBtu	\$5.01
Total Cost MM no AFUDC	\$460.065
AFUDC	\$62.91
Total Cost MM	\$522.972
Fixed Charge Rate	9.30%
Fixed O&M \$/kW	\$14.62
Annual Lev. Fixed Cost MM	\$48.64
Total Annual Lev. Fixed Cost MM	\$54.48
Fixed Cost \$/kWh	0.0252
Fuel Cost \$/kWh	0.0337
Var. O&M \$/kWh	0.0031
Total Var. Cost	0.0368
Total Cost \$/kWh	0.06196
Overnight Cost (MM) Inflated	434.3215745
Total Cost (\$/kW)	\$1,085.80
\$/MW-year	\$335,259.05
\$/MW-year no variable	\$136,211.05
CC-CT \$/MW-year	(\$136,211 – \$94,505) \$41,705.11
Total Annual Lev. Fixed Cost MM Difference	\$16.68
Capitol Difference MM	\$354.08
Fixed Cost \$/kWh	<b>\$0.0077/kWh</b>

# Questions to consider

1. Should capacity be paid hourly, monthly, yearly and if the latter two, should there be a true up?
2. Should capacity be discounted by ELCC?
3. Should capacity be reduced to 75% of the full amount to account for “all or nothing” capacity need cycles?
4. Should LMPs be actual average hourly/monthly or should a projection be used and should there be a true up?
5. Who should own the RECs/CO2 attributes and if IPPs own RECs/CO2 attributes should there be a utility obligation to purchase?





**Staff Strawman Proposal – Preliminary Avoided Cost Calculation  
Example - 20 MW Generator Projects  
2016 Commercial Operation Date/Contract Renewals**

	Capacity Factor %	ELCC %	Capacity \$/MWh	Energy (Variable Cost Forecast of NGCC plant – Levelized through 2029) \$/MWh	NGCC Energy Adjustment \$/MWh	Total \$/MWh
			Annual \$			
Hydro	60%	N/A	\$17.49	\$43.00 (estimate)	\$7.71	<b>\$68.20</b>
			\$1,838,560			
Biomass	80%	N/A	\$13.12	\$43.00 (estimate)	\$7.71	<b>\$63.83</b>
			\$1,838,560			
Landfill Gas	85%	N/A	\$12.35	\$43.00 (estimate)	\$7.71	<b>\$63.06</b>
			\$1,838,560			
Solar	20%	43%	\$22.56	\$43.00 (estimate)	\$7.71	<b>\$73.27</b>
			\$790,581			
Wind	35%	15%	\$4.50	\$43.00 (estimate)	\$7.71	<b>\$55.21</b>
			\$275,784			