



Working to Perfect the Flow of Energy

PJM Manual 15:
Cost Development Guidelines

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Prepared by

Cost Development Subcommittee

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Section 5: Combined Cycle (CC) Cost Development

5.6 Maintenance Cost

Note: The information in Section 2.6 contains basic Maintenance Cost information relevant for all unit types. The following additional information only pertains to combined cycle units.

Combined Cycle - Maintenance Adder – The dollars per unit of fuel (or heat) as derived from FERC Accounts 512, 513, and 553. If submitting as a simple cycle combustion turbine, use total dollars from FERC Account 553 divided by Equivalent Service Hours (ESH).

~~Combustion Turbine and Combined Cycle Plant major inspection and overhaul costs categories include but are not limited to the following:~~

- ~~• Combustion Turbine Generator Inlet Air System~~
- ~~• Inlet Air Filter Replacement~~
- ~~• Evaporative cooling system media replacement~~
- ~~• Mechanical inlet air cooling chiller and pump inspection and overhaul~~
- ~~• Fuel System~~
- ~~• Fuel Gas Compressors Inspection and Overhaul~~
- ~~• Distillate Fuel Pumps Inspection and Overhaul~~
- ~~• Water Treatment~~
- ~~• Resin Replacement~~
- ~~• RO Cartridges Replacement~~
- ~~• Environmental~~
- ~~• SCR and/or CO Reduction Catalyst Replacement~~
- ~~• Combustion Turbine Generator ("CTG")~~
- ~~• Combustion Inspections including Parts, Labor, Rentals and Specialized technical expertise and support~~
- ~~• Hot Gas Path Inspection including Parts, Labor, Rentals and Specialized technical expertise and support~~
- ~~• Major Overhauls including Parts, Labor, Rentals and Specialized technical expertise and support~~
- ~~• Electric Generator Inspection and Overhaul including Parts, Labor, Rentals and Specialized technical expertise and support~~
- ~~• Heat Recovery Steam Generator ("HRSG")~~
- ~~• Chemical Cleaning or Hydro-Blasting of Heat Transfer Surfaces~~

- ~~BFW Pump Inspection and Overhaul~~
- ~~Heat Transfer Surface Replacements~~
- ~~Casing Repair and Replacements~~
- ~~Steam Turbine Generator ("STG") Major Overhaul including Parts, Labor, Rentals and Specialized technical expertise and support~~
- ~~Surface Condenser~~
- ~~Chemical Cleaning or Hydro-Blasting of Heat Transfer Surfaces~~
- ~~Condensate Pump Inspection and Overhaul~~
- ~~Heat Transfer Surface Replacements~~
- ~~Cooling Tower~~
- ~~Circulation Pump Inspection and Overhaul~~
- ~~Cooling Tower Fan Motor and Gearbox Inspection and Overhaul~~
- ~~Replacement of Cooling Tower Fill and Drift Eliminators~~

5.6.1 Combined Cycle / Combustion Turbine Long Term Service Contract Cost Recovery

A generation owner that has a currently in effect Long Term Service Contract (LTSA) with a third party vendor to provide overhaul and maintenance work on a Combustion Turbine (CT) either as part of a Combined Cycle (CC) plant or as a stand-alone CT, may file with the PJM MMU or PJM for inclusion of any variable long term maintenance costs in cost based offer bids pursuant to the Cost Methodology Approval Process, if the following conditions are met:

- The included variable long-term maintenance costs are consistent with the definition of such costs in the Cost Development Guidelines
- And the dollar value of each component of the variable long-term maintenance costs is set specifically in the LTSA.

5.6.2 Long Term Maintenance Expenses

Long Term Maintenance Expenses - Combustion Turbine and Combined Cycle Plant major inspection and overhaul expenses may not be included in variable maintenance expenses regardless of accounting methodology if they meet specific criteria.

In order to be included in variable maintenance expenses, these costs must represent actual expenditures that are due to incremental degradation of generating equipment directly related to generation, starts or a combination of both. Expenditures that are not directly related to such operation may not be included in variable maintenance expense. It must be clear that these costs would have been included in the appropriate FERC Accounts as described in this section. A detailed listing of all proposed long term maintenance costs must be submitted to the PJM MMU for evaluation and final approval pursuant to the Cost and Methodology Approval Process.

Long Term Maintenance Expenses cannot be counted if they are included elsewhere in VOM as part of the cost based energy offer. Previously approved Long Term Maintenance

Expenses may be included in-will be removed from the maintenance history as of June 1, 2015.

Combustion Turbine and Combined Cycle Plant major inspection and overhaul costs categories include but are not limited to the following:

- ~~Combustion Turbine Generator Inlet Air System~~
- ~~Inlet Air Filter Replacement~~
- ~~Evaporative cooling system media replacement~~
- ~~Mechanical inlet air cooling chiller and pump inspection and overhaul~~
- ~~Fuel System~~
- ~~Fuel Gas Compressors Inspection and Overhaul~~
- ~~Distillate Fuel Pumps Inspection and Overhaul~~
- ~~Water Treatment~~
- ~~Resin Replacement~~
- ~~RO Cartridges Replacement~~
- ~~Environmental~~
- ~~SCR and/or CO Reduction Catalyst Replacement~~
- ~~Combustion Turbine Generator ("CTG")~~
- ~~Combustion Inspections including Parts, Labor, Rentals and Specialized technical expertise and support~~
- ~~Hot Gas Path Inspection~~
- ~~Major Overhaul~~
- ~~Electric Generator Inspection and Overhaul~~
- ~~Heat Recovery Steam Generator ("HRSG")~~
- ~~Chemical Cleaning or Hydro-Blasting of Heat Transfer Surfaces~~
- ~~BFW Pump Inspection and Overhaul~~
- ~~Heat Transfer Surface Replacements~~
- ~~Casing Repair and Replacements~~
- ~~Steam Turbine Generator ("STG")~~
- ~~Surface Condenser~~
- ~~Condensate Pump Inspection and Overhaul~~
- ~~Cooling Tower~~
- ~~Circulation Pump Inspection and Overhaul~~
- ~~Cooling Tower Fan Motor and Gearbox Inspection and Overhaul~~
- ~~Replacement of Cooling Tower Fill and Drift Eliminators~~

Section 6: Combustion Turbine (CT) and Diesel Engine Costs

6.6 Maintenance Cost

Note: The information in Section 2.6 contains basic Maintenance Cost information relevant for all unit types. The following additional information only pertains to CT and diesel engine units.

Combustion Turbine - Maintenance Adder – The total dollars from FERC Account 553 divided by Equivalent Service Hours (ESH).

Industrial Combustion Turbine – This is a combustion turbine developed specifically for power generation.

Aircraft - Type Combustion Turbine – These are combustion turbines originally designed for aircraft and modified for power generation.

Diesel - Maintenance Adder – The total dollars from FERC Account 553 divided by total fuel burned (in MBTUs).

Combustion Turbine Start – For calculating combustion turbine maintenance cost, only the number of successful starts to synchronization shall be used. Successful starts should include those at the direction of PJM and for company tests.

Long Term Maintenance Expenses – Combustion Turbine and Combined Cycle Plant major inspection and overhaul expenses may not be included in variable maintenance expenses regardless of accounting methodology if they meet specific criteria.

In order to be included in variable maintenance expenses, these costs must represent actual expenditures that are due to incremental degradation of generating equipment directly related to generation, starts or a combination of both. Expenditures that are not directly related to such operation may not be included in variable maintenance expense. It must be clear that these costs would have been included in the appropriate FERC Accounts as described in this section. A detailed listing of all proposed long-term maintenance costs must be submitted to the PJM MMU for evaluation and final approval pursuant to the Cost and Methodology Approval Process. Previously approved Long Term Maintenance Expenses may be included in will be removed from the maintenance history as of June 1, 2015.

Combustion Turbine and Combined Cycle Plant major inspection and overhaul costs categories include but are not limited to the following:

Combustion Turbine Generator Inlet Air System

Inlet Air Filter Replacement

Evaporative cooling system media replacement

Mechanical inlet air cooling chiller and pump inspection and overhaul



~~Fuel System—~~

~~Fuel Gas Compressors Inspection and Overhaul~~

~~Distillate Fuel Pumps Inspection and Overhaul~~

~~Water Treatment~~

~~Resin Replacement~~

~~RO Cartridges Replacement~~

~~Environmental~~

~~SCR and/or CO Reduction Catalyst Replacement—~~

~~Combustion Turbine Generator ("CTG")———~~

~~Combustion Inspections including Parts, Labor, Rentals and Specialized technical expertise and support~~

~~Hot Gas Path Inspection———~~

~~Major Overhaul———~~

~~Electric Generator Inspection and Overhaul—~~

~~Cooling Tower~~

~~Circulation Pump Inspection and Overhaul~~

~~Cooling Tower Fan Motor and Gearbox Inspection and Overhaul~~

~~Replacement of Cooling Tower Fill and Drift Eliminators~~