

Manual 15 Cost Development Guideline

1.7.2 Start-up Cost

Start-up Costs are defined as the unit costs to bring the boiler, turbine and generator from shutdown conditions to the point after breaker closure which is typically indicated by telemetered or aggregated state estimator MWs greater than zero and is determined based on the cost of start fuel, total fuel-related cost, performance factor, electrical costs (station service), start maintenance adder, and additional labor cost if required above normal station manning. Start-up Costs can vary with the unit offline time being categorized in three unit temperature conditions: hot, intermediate and cold. Start-up Cost is a dollar cost and is incurred once each time the unit operates regardless of the period of operation. See Start-up Cost in Section 2.4

1.7.3 Soak Cost

Soak Costs are defined as the unit costs to bring the boiler, turbine and generator from the point after breaker closure which is typically indicated by telemetered or aggregated state estimator MWs greater than zero to the point when the unit is dispatchable. Soak Costs can vary with the unit offline time being categorized in three unit temperature conditions: hot, intermediate and cold.

2.5 Soak Cost

2.5.1 Soak Cost Definitions

- **Soak Cost (\$/MWh)** – the hourly hot, intermediate, and cold temperature state costs to operate a the boiler, turbine, and generator during the soak period after breaker closure to dispatchable and is determined based on the unit's soak heat input, total fuel-related cost, Performance Factor, Soak MWh, maintenance adder, operating costs, and emissions adders.

SoakCost (\$/Start)_h=

$$\frac{\{ \text{SoakHeatInput (Mbtu)/(hr)}_h * \text{PerformanceFactor} + \text{MaintenanceAdder}(\$/\text{Mbtu}) + \text{OperatingCost}(\$/\text{Mbtu}) \} * \text{TFRC}(\$/\text{Mbtu}) + \text{MaintenanceAdder}(\$/\text{Hr})}{\text{Soak MWh}_h} + [\text{MaintenanceAdder}(\$/\text{MWh}) + \text{OperatingCost}(\$/\text{MWh}) + \text{EmissionsCosts}(\$/\text{MWh})]$$

- **Soak Heat Input** – Hourly fuel consumed from breaker closing to unit dispatchable
- **Soak MWh** – Hourly MWh produced from breaker closing to unit dispatchable
- **Maintenance Adder** – See Section 2.6
- **Operating Cost** – See Section 2.3.7
- **Emissions Costs** – See Section 2.3.5.

Manual 15 Cost Development Guideline

3.5 Soak Costs

Note:

The information in Section 2.5 contains basic Soak Cost information relevant for all unit types. The following information only pertains to nuclear units.

4.5 Soak Costs

Note:

The information in Section 2.5 contains basic Soak Cost information relevant for all unit types. The following information only pertains to fossil steam units.

5.4 Start-up Cost

Start-up Costs for Combined Cycle (CC) plants shall include only the following components and shall never be less than zero:

TFRC = Total Fuel Related Cost

Start up Cost (\$/Start)=

~~((Start Fuel Consumed (MMBtu/Start)*TFRC(\$/MMBtu)*Performance Factor)~~

~~+(Station Service (MWh)*Station Service Rate (\$/MWh))~~

~~+ Start Maintenance Adder (\$/Start)+Start Incremental Labor Cost (\$/Start)~~

Start Fuel Consumed Cost is the cost of start fuel (basic fuel cost plus fuel handling and other fuel-related costs) from first CT fire to first CT breaker closing ~~closure for the steam turbine generator, as measured during a normal start sequence,~~ and the cost of shutdown fuel from last breaker opening to fuel valve closure. ~~Additionally, this includes the cost of start fuel from CT first fire to the point where heat recovery steam generator (HRSG) steam pressure matches steam turbine inlet pressure, for any CT unit/HRSG combinations started after synchronization of the steam turbine generator.~~

Station Service is included from initiation of start sequence of initial CT to breaker closing of the steam turbine generator (total station use minus normal base station use) priced at the Station Service Rate.

Add to this (+) station service after breaker opening of the last component when finished operating as a CC unit, priced at the Station Service rate. (Station service during shutdown should be that associated with the normal unit auxiliary equipment operated during shutdown in excess of base unit use. This station service is not to include maintenance use or non-normal uses.)

~~Minus (-) the integration of net generation from CT synchronization to steam turbine generator synchronization or to HRSG steam output at line pressure, priced at the actual cost of the unit.~~

~~Minus (-) the integration of net generation during the shutdown period, priced at the actual cost of the unit.~~

Incremental labor costs in excess of normal station manning requirements (only when necessary to start the CC unit).

Manual 15 Cost Development Guideline

Start Maintenance Adder. This quantity includes both the previously defined CT Starting Maintenance Cost

5.5 Soak Cost

Soak Costs for Combined Cycle (CC) plants shall include only the following components and shall never be less than zero:

$$\begin{aligned} \text{SoakCost (\$/Start)} = & \\ & [\text{SoakHeatInput (Mbtu/hr)} * \text{TFRC (\$/MBtu)} * \text{PerformanceFactor}] \\ & + [\text{MaintenanceAdder (\$/MWh)} + \text{OperatingCost (\$/MWh)}] \\ & + \text{EmissionsCosts (\$/MWh)} \end{aligned}$$

Soak Heat input – is the hourly cost of soak fuel (basic fuel cost plus fuel handling and other fuel-related costs) from first CT breaker closure to unit dispatchable. Additionally, this includes the cost of soak fuel from CT first fire to the point where heat recovery steam generator (HRSG) steam pressure matches steam turbine inlet pressure, for any CT unit/HRSG combinations started after synchronization of the steam turbine generator.

Maintenance Adder – See Section 2.6

Operating Costs – See Section 2.3.7

Emissions Costs – See Section 2.3.5.

6.5 Soak Costs

Note:

The information in Section 2.5 contains basic Soak Cost information relevant for all unit types. The following information only pertains to CT and diesel engine units.

7.5 Soak Costs

Note:

The information in Section 2.5 contains basic Soak Cost information relevant for all unit types. The following information only pertains to Hydro units.

Hydro units do not have Soak Costs.

Manual 15 Cost Development Guideline

9.5 Soak Costs

Note:

The information in Section 2.5 contains basic Soak Cost information relevant for all unit types. The following information only pertains to Wind units.

Wind units do not have Soak Costs.

10.5 Soak Costs

Note:

The information in Section 2.5 contains basic Soak Cost information relevant for all unit types. The following information only pertains to Solar units.

Solar units do not have Soak Costs.

11.5 Soak Costs

Note:

The information in Section 2.5 contains basic Soak Cost information relevant for all unit types. The following information only pertains to Energy Storage units.

Energy Storage units do not have Soak Costs.