

## 2021 ITP Adjusted Production Cost (APC) Calculation Details

This document details the APC calculations for SPP and external regions on both a regional and zonal basis. The 1-year and 40-year SPP regional APC benefit is used to evaluate solution(s) in the 2021 ITP study. Stakeholders can refer to the SPP Benefit Metric Manual benefit metrics posted at <https://spp.org/Documents/44031/Benefit%20Metrics%20Manual%2020201106.docx> for more details on the APC savings benefit metric and calculation of 40-year benefits.

## APC Zonal Calculation

The parameters in **bold** below are PROMOD output reporting parameters, with filters applied as indicated.

Adjusted Production Cost (APC) = Production Cost \$ + Purchases \$ - Sales \$

- Production Cost \$ = **Unit Cost (\$)** + **Billing Cost (\$)** + (\$1000)\* **Emergency Energy (MW)**, by hour, by zone
  - Remove “PowerBase Tariffs” from Billing Cost (\$)
  - The \$1000 is the soft constraint for emergency generation in the 2019 ITP
- Sales \$ = Sales (MW) \* GLMP, by hour, by zone
  - Sales (MW) = **Unit Gen (MW)** + **Contract Participation Energy1 (MW)** + **Emergency Energy (MW)** – **Area Native Load (MW)** – **Pumping Energy (MW)** – **Dump Energy (MW)**
    - Remove “PowerBase Tariffs” from Contract Participation Energy1 (MW)
    - If negative, set Sales (MW) to zero for that hour (net purchases).
  - GLMP = (**Unit Revenue (\$)** + **Transaction Market Value (\$)**) / (**Unit Gen (MW)** + **Contract Participation Energy2 (MW)**)
    - For Transaction Market Value (\$), remove “PowerBase Tariffs”, and include only “Purchases”, exclude “Sales” (PurchSale is the name of the field in Report Agent)
    - For Contract Participation Energy2 (MW), remove “PowerBase Tariffs”, and include only “Purchases”, exclude “Sales” (PurchSale is the name of the field in Report Agent). *Note that this is different than the Contract Participation Energy1 from Sales MW calculation, though same query from PROMOD output files.*
  - \$1000 is the soft constraint in PROMOD used for emergency energy. This is set equal to the safety-net energy offer cap in SPP’s Integrated Marketplace.
- Purchases \$ = Purchases (MW) \* LLMP, by hour, by zone
  - Purchases (MW) = **Area Native Load (MW)** + **Pumping Energy (MW)** + **Dump Energy (MW)** – **Unit Gen (MW)** – **Contract Participation Energy1 (MW)** – **Emergency Energy (MW)**
    - Remove “PowerBase Tariffs” from Contract Participation Energy1 (MW)
    - If negative, set Purchases (MW) to zero for that hour (net sales).
  - LLMP is automatically calculated by PROMOD for each area – it is the hubs that begin with LS.

## APC Calculation for SPP Region

SPP Market Economic Model Region	SPP APC Pricing Zone(s) / "SPP MAIN"	SPP Zone(s) with Load / "SPP INFORMATIONAL"	SPP Zone(s) without Load* / "SPP OTHER"
SPP	AEPWALL EMDEALL GMOALL GRDA IS (UMZ) KACY KCPLALL LES MIDWALL NPPDALL OKGEALL OPPDALL SPCIUT (CUS) SUNCALL SWPAALL SWPSALL WESTALL WFECALL	(none)	OTHSPP – Includes Merchant Generation without contractual arrangements with load serving entities and additional Renewable Resource Plan Wind and Battery Storage Resources

**SPP Regional APC Calculation\$ = SPP MAIN\$ + SPP INFORMATIONAL\$**

\*The SPP OTHER zone includes Battery Storage assumptions in years 5 and 10 for the 2021 ITP. There is currently no load hub assigned to the zone to account for charging operation to calculate a zonal load LMP in the event that the zone is purchasing.

## APC Calculation for External Regions

<b>Economic Model Region</b>	<b>APC Zone(s)</b>	<b>Region APC Calculation</b>
<b>AECI</b>	AECI	AECI Regional APC\$ = AECI APC Zone\$
<b>MISO</b>	LRZ 01 LRZ 02 LRZ 03 LRZ 04 LRZ 05 LRZ 06 LRZ 07 LRZ 08 LRZ 09 LRZ 10 MISO Unknown Owner	MISO Regional APC\$ = Sum of MISO APC Zones\$ (excluding MISO Unknown Owner)
<b>MH</b>	MHEB	MH Regional APC\$ = MHEB APC Zone\$
<b>SK-CAN</b>	SPC	SK-CAN Regional APC\$ = SPC APC Zone\$
<b>TVA</b>	TVA	TVA Regional APC\$ = TVA APC Zone\$

## **SPP Regional APC Benefit Calculation**

1-year SPP Regional APC Benefit\$ of solution = SPP Regional APC\$ before solution addition – SPP Regional APC\$ after solution addition