

# WECC

### LDES Study Update

September 28, 2022

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# 80% Clean Case Setup

- Durations tested: 12 hr, 24 hr, 48 hr, 168 hr, 336 hr
- Cases were run with all the path ratings increased to 9999 and -9999 to address unserved energy
- Other case changes:
  - For 2040 hourly resources—solar profiles updated to 2030 profiles
  - Reduced size of 2040 thermal units to below 300 MW
  - Reduced size of storage units from ~1 GW to ~350 MW
  - Updated heat rates for 2040 thermal units
  - Update maintenance for 2040 thermal units
  - Recorded all the major path flows
  - Updated some reverse path ratings per the 2032 ADS case
  - Turned monitoring off for BCHA internal branches
  - Added generation in CFE—increased the capacity of added units



## 80% Clean Case Results





# **Battery Operation**



#### 12-hour duration

7-hour charge (10 a.m.-5 p.m.) and 7-hour discharge (7 p.m.-1 a.m.) operation

168-hour duration

6-8-hours charge (9 a.m.-5 p.m.) and 5-8 hours discharge (7 p.m.-4 a.m.) operation



## 80% Clean Case(s) Results—Average LMP (\$/MWh)



% increase in LMP between 12hr and 336hr is 0.602%



### 80% Clean Case(s) Results—Served Load with Losses (GWh)



% increase in served load including loses between 12hr and 336hr is 0.002%



## 80% Clean Case(s) Result—Total Spillage(GWh)



#### % decrease in Spillage between 12hr and 336hr is 2%

## **Challenges in Modeling**

### Look-ahead logic for battery modeling not in the GridView software

🔄, Battery							×
Generator Name:	2040_CA_Bat	tery-Fle					
Long Name:	BS		Commission Date: 1 / 1 /2025				-
Long ID:	NA		Retirement Date: 12/31/2050			)50	•
Bus ID:	30060		🔽 In servic				
Generator ID:	Y9		🔽 Save To				
Initial Dispatch:	0		▼ Use Charge and Discharge Price fo				r MIO
Max Energy:			3938.572			LR. 0	
						MWh	
reany max Energy Detenorate Hate:			199.99			%	
Initial Energy:			1969.286			MWh	
Charge Mode							
- Max Recharge Load:		328.2143		МW			
Charge Ramping Rate:		328.2143		MW/m	vinute		
charge namping nate.		10		m w / minute			
Max Charge Price:				\$/MWh			
Charge Efficiency:		0.9					
- Disebarga Mada-							
Max Depth Of Discharge:		5		%			
Max Depth of Discharge.		328 2143					
Max Discharge:		520.2140		MW			
Min Discharge Price:		50		\$/MWh			
Discharge Ramping Rate:		328.2143		MW/minute			
			OK		Can	cel	

General	Generation	Transmission	Load			
General Options –		Emission				
Commit All		Calculated Emission Cost Model 💌				
🔽 Generator Reser	ve Distribution	Group Option: Customiz	ed 💌			
🔽 Generator Exem	pt	Max Iter #(>=1): 1				
Generator Developn	nent Status:					
Future-Conceptual	<b>•</b>	L Calc Marginal Emissio	n Hate			
🔽 Ramp Rate Enfo	orced	GHG Model				
🔽 In Unit Com	mitment	I Enable				
☐ 30 Min Spir ☑ Quick Start Com	n Reserve mitment	GHG CO2 Rate(Ton/MWh)				
Fuel Switching L Ramping Rate F	.odic 'enalty	⊂ Generator Bid Markun				
🔽 Enable Spillage		Enable Setting	J			
🔽 Bank Hydro			<u>'</u>			
Ancillary Services		Hydro Dispatch Optior	ı ———			
AS Ramping Setting		2 - Region Load - Wind - Solar				
AS Selection Cont	rol					
Use Global AS Ramp and Penalty		Hydro Modeling				
🔽 Use Global Gen	erator AS Selection	Automatically Calculate K and p Face				
		Adjacent Hours For PLF	1			
Pumped Storage –			-			
4-Daily Schedule or	n Price 💌	Hydro Thermal Coordir	nation			
2-Fixed Weekly End	agy Pattern	🔽 Enable	Setting			
- 3-Daily Peak Shavii 4-Daily Schedule or	ng n Price					
5-User Defined Pric	es					
		Go	Cancel			



## **Open Discussion**

Future modeling options?

- 80% clean energy case with different levels of storage capacity (2x, 3x, 4x)?
- Apply more complex pricing logic—is it possible in the tool?
- Charge and dispatch price band sensitivities (\$10/\$100, \$10/\$90...)?
- Consider different tool with a look-ahead logic for battery storage?





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