

Overview of Services and Offerings (North America)

CES Consulting

NAATBatt 2025



**Customized
Energy Solutions**

Analyze · Simplify · Implement

Rishi Diwan

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CES-LTD.COM

About CES

Customized Energy Solutions is a leading energy advisory and service company headquartered in **Philadelphia, USA**. Established in **1998**, CES's consulting services enable market participants, project developers, investors, technology providers, marketers, utilities and customers to prosper through change, by turning information into actionable intelligence

CES has steadily expanded its best-in-class hosted market operations platforms and services portfolio globally and is now serving more than 500 customers operating in the United States, Canada, India, Japan, and Mexico.

500+ Global Clients

24x7 Market Operations

29 GW+ Assets Managed

350+ Associates

Advanced Software Platforms

1 GW+ Energy Storage Managed

Customized Across the Globe



CES is proud to have been recognized 11 times in Inc. 5000 as one of the most successful companies in the US

CES Business Lines

MARKET INTELLIGENCE

CES MarketIQ keeps you ahead of the game on ISO rules changes, freeing you from the labor-intensive process of attending multiple meetings and analyzing ISO trends and activities

WHOLESALE SERVICES

Our **24-hour Market Operations Center** (“MOC”) and Operations Control Center (“OCC”) provides options to customers that need a full-service scheduling coordinator or a more specific asset monitoring service

RETAIL SERVICES

CES offers a series of hosted platforms specializing in competitive energy market entry and operations, state and regional grid registration, renewable compliance and market intelligence

FUTURE GRID

CES serves customers in a variety of areas in the DER space including demand response, EV charging, peak load management, and management of bidding for energy and capacity in major ISOs/RTOs in North America

CES CONSULTING

CES provides a wide spectrum to consulting services to help clients understand complex rules, identify key drivers and opportunities for energy storage, e-mobility, hydrogen projects, forecast project revenues and optimize investments

CES CONSULTING

CES has developed an integrated ecosystem spanning market intelligence, policy expertise, modeling and optimization software platforms, technical capabilities and market operations to support our clients in three key focus areas

ENERGY STORAGE



Market Advisory

Overviews and detailed intelligence from across all North American ISO/RTO regions to help clients navigate through competitive markets

Hybrid/RE Generation



Revenue Forecasts

Powered by CES CoMETS, our revenue modeling services help clients make the right investment decisions with their projects

EV / Green H2



Financial Services

Financial Modeling, Project Valuation, Due Diligence and Bid support services to help clients compete in solicitations

SUPPLY CHAIN



Technology & Cost Benchmarking

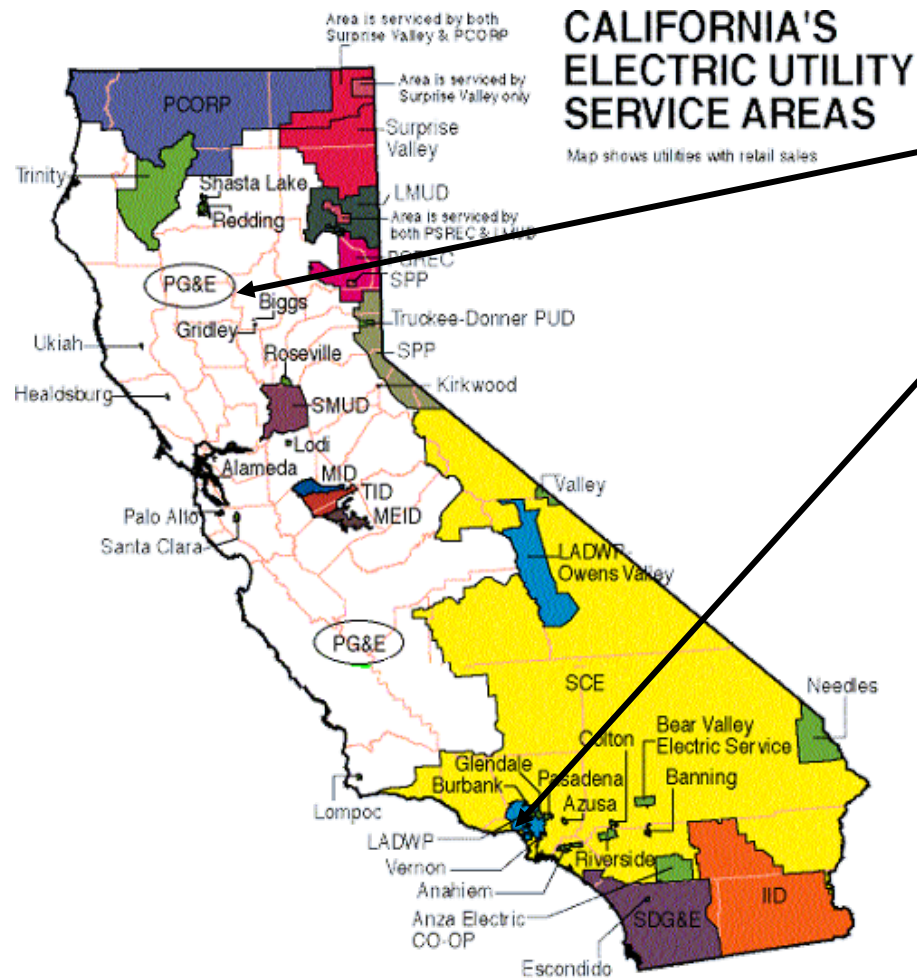
Technical Due Diligence, Testing, Benchmarking Performance Validation, Recommendations for battery cells, packs and associated systems

Energy Storage Consulting

CES has developed an integrated ecosystem spanning market intelligence, policy expertise, modeling and optimization software platforms, technical capabilities and market operations to support our clients in three key focus areas



Market Structure & Policy Consulting



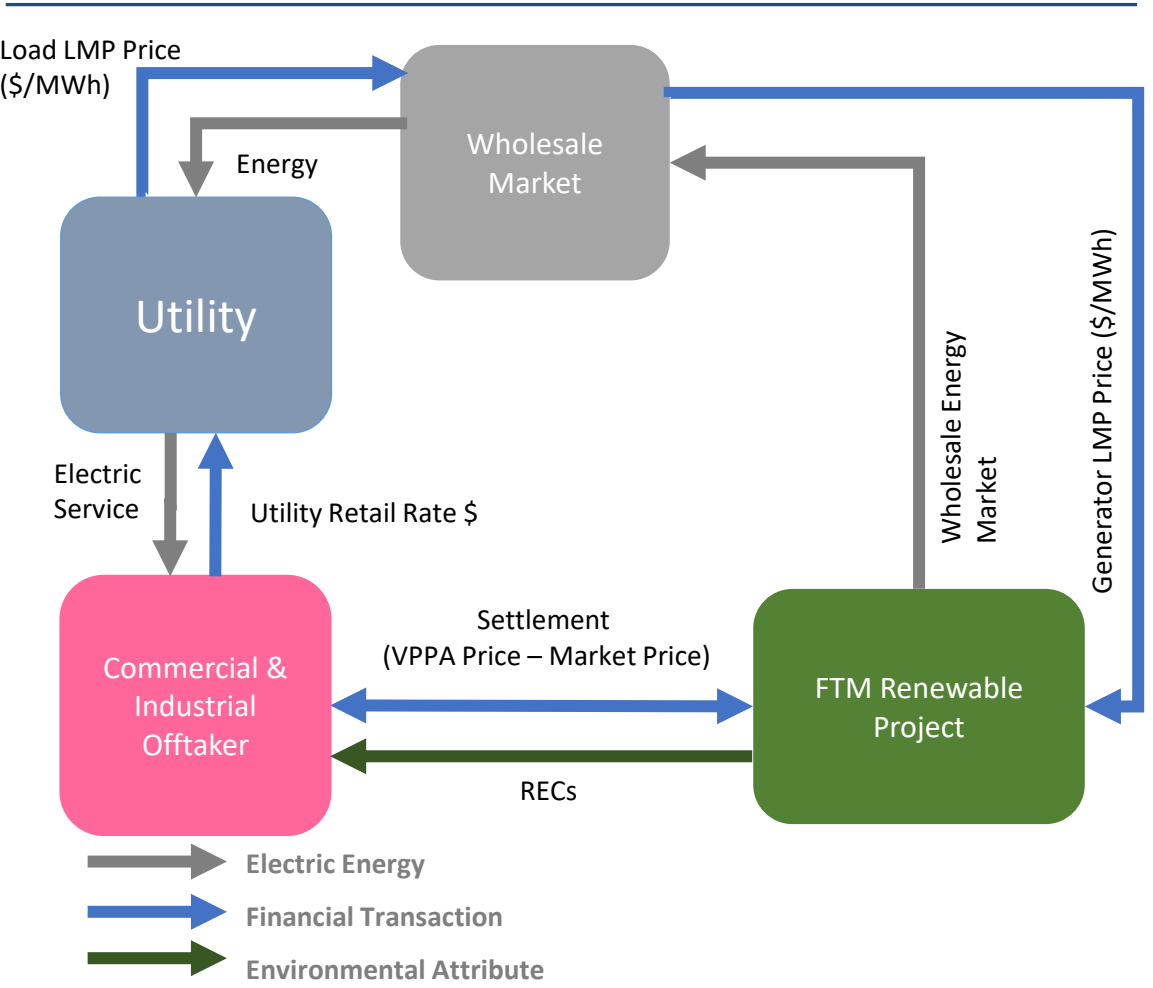
Landscape of Load Serving Entities

- Investor-Owned Utilities (IOUs): Many California end use customers are served primarily by one of the three largest IOUs - Pacific Gas and Electric (PG&E), Southern California Edison (SCE), and San Diego Gas and Electric (SDG&E).
- Public-Owned Utilities (POUs): Municipal utilities such as Los Angeles Department of Water and Power (LADWP) and Sacramento Municipal Utilities District (SMUD).
 - POU's sometimes develop their own projects or go for 50% in utility-owned land/infrastructure
- Community Choice Aggregators (CCAs), some might overlap with POU's. An increasing number of customers are folded into Community Choice Aggregators (CCA), which are community (often county level) entities responsible for local electricity supply but that have delivery responsibility to the local utility.
- Direct Access is technically an option to sell to C&I customers, but there is limited opportunity for developers given the limited availability and additional requirements for the customer.
- The California Independent System Operator (CAISO) centrally dispatches generation and coordinates the movement of wholesale electricity in California and a portion of Nevada. CAISO's markets include energy (day ahead and real time), ancillary services, and congestion revenue rights. The CAISO also operates an Energy Imbalance Market (EIM), which currently includes the CAISO and other Balancing Authority Areas in the Western United States.

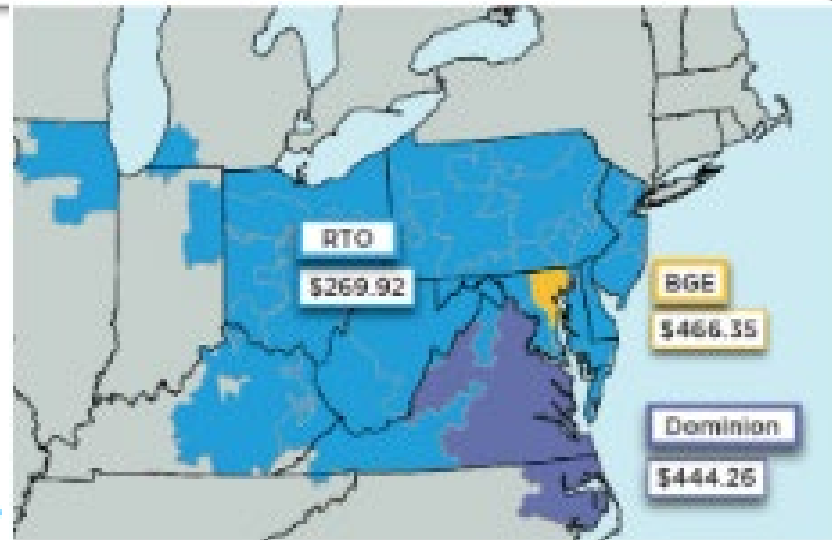
California : Types of Off-takers

Market Structure & Policy Consulting

VPPA in EDAM



CES's Comments: PJM reports record-high capacity pricing; drivers include fossil retirements, increased load, and market reforms



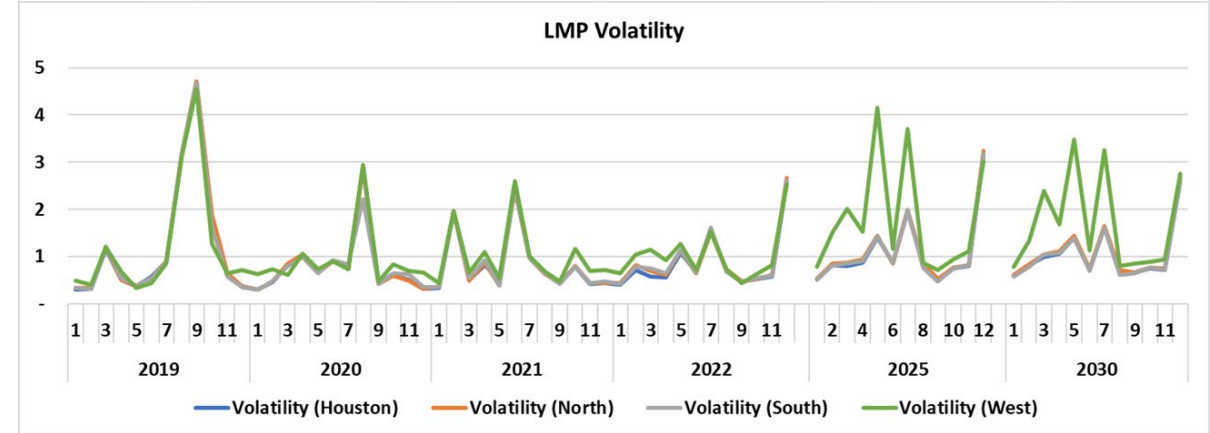
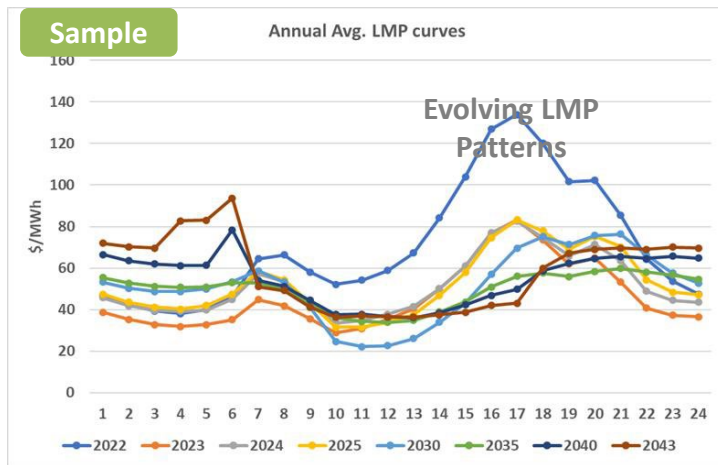
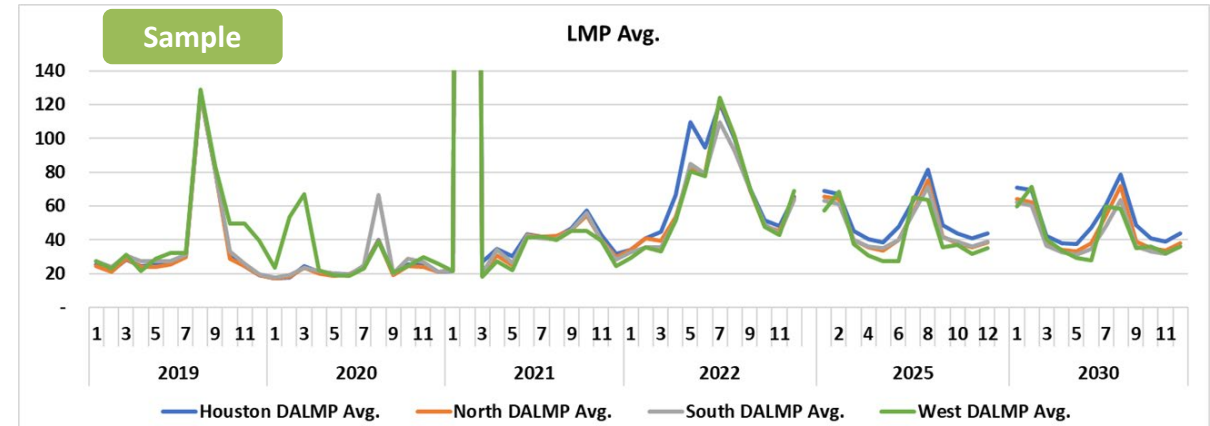
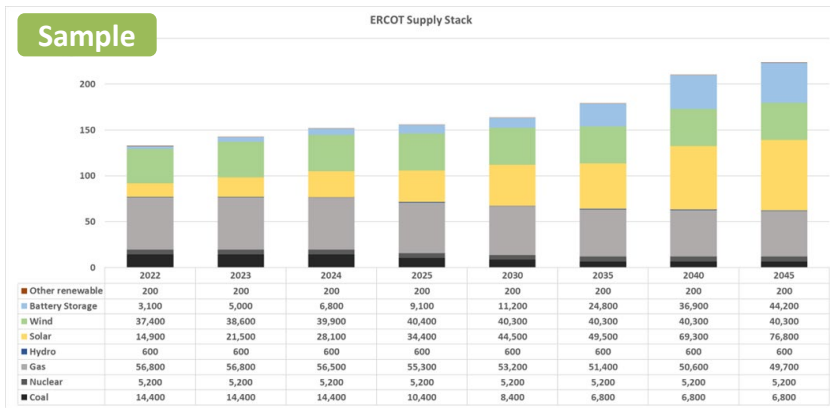
Why were prices high?

There are three primary drivers of these elevated prices:

- Decreased supply → 6,600 MW of recent/planned retirements
- Increased demand → 3,243 MW of new load since last auction
- Less Demand Response participation due to decreased ELCC rating → 1,311 MW less offered
- Recent market reforms which impacted the accreditation for capacity that certain resource types (particularly demand response and solar) can contribute, further reducing the supply

Market Price Forecasts

CES integrates key inputs on macroeconomic factors, market demand, interconnection queues, RE penetration, transmission topology, planned zonal capacities, expected ESS buildouts, fuel prices and other relevant inputs to project forward market prices



CES Project Revenue Model – Revenue Scenarios

Project Details		
Energy Storage System (ESS)		
	Unit	Value
Power Rating	MW	100
Duration	Hr	2
Energy Rating (at COD)	MWh	200
Round trip efficiency	-	85%
SOC Low (Usable)	%	0%
SOC High (Usable)	%	100%
COD		1-Jan-24
Investment Term	Years	21
Solar PV System		
Power Rating	MW	-
ESS		
Resource Adequacy (RA) Contract		
RA Contract	1: Yes, 2: No	2
RA Contract Price	\$/kW-month	\$5
RA Contract Period	Years	20
RA Capacity Participation	%	100%
Financing		
WACC	%	10%
Solar PV System		
Solar Revenue Scenario	1: Merchant, 2: PPA, 3: NA	3
Power Purchase Agreement (PPA)		
PPA Contract Price	\$/MWh	-
PPA Contract Price Annual Escalator	%	1%
Solar PPA Contract Start Date	mm/dd/yy	1-Jul-25
Solar PPA Contract End Date	mm/dd/yy	30-Nov-31

Revenue Scenarios			
Select Revenue Year	2026		
Scenario	BAU Case	Aggressive Cycling	Moderate Cycling
	1	2	3
Dispatch Strategy	BAU Case	Aggressive Cycling	Moderate Cycling
Market Services Provided			
Resource Adequacy	No	No	No
DA Energy	Yes	Yes	Yes
RT Energy	Yes	Yes	Yes
Energy Arbitrage	Yes	Yes	Yes
RRS	Yes	Yes	Yes
Frequency Regulation	Yes	Yes	Yes
Annual Revenues (Itemized)			
Solar PV System	1	2	3
2 Energy Discharge (DAM)	\$ -	\$ -	\$ -
3 Energy Discharge (RTM)	\$ -	\$ -	\$ -
4 Solar PPA Revenue	\$ -	\$ -	\$ -
Net Solar Revenue	\$ -	\$ -	\$ -
Energy Storage System	1	2	3
11 Resource Adequacy Payment	\$ -	\$ -	\$ -
12 Energy Discharge Revenue - ESS (DAM)	\$ 5,161,778	\$ 7,522,661	\$ 6,442,518
13 Energy Discharge Revenue - ESS (RTM)	\$ 7,086,556	\$ 9,180,742	\$ 8,267,177
14 RRS Reserves Revenue	\$ 5,335,451	\$ 4,874,483	\$ 5,096,257
15 Frequency Regulation Up Capacity Revenue	\$ 264,489	\$ 297,330	\$ 282,693
16 Frequency Regulation Down Capacity Revenue	\$ 120,989	\$ 117,903	\$ 122,002
17 Frequency Regulation Energy Revenue	\$ 144,506	\$ 170,893	\$ 158,390
18 Revenue from Utilized Clipped Solar PV Energy	\$ -	\$ -	\$ -

Sample

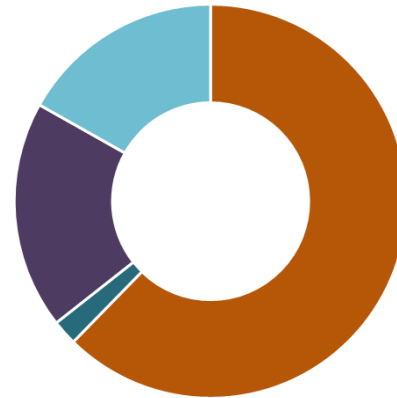
Energy Storage Projects : Revenue Model – Dashboard View

Dashboard provides a snapshot view of the following metrics for all modeled scenarios/cases:

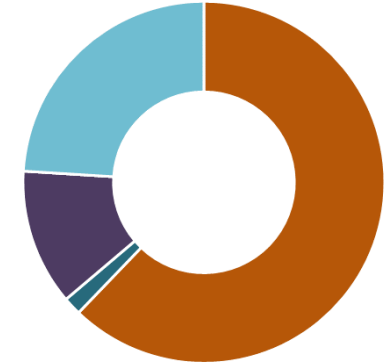
- Net Project Revenues
- Annualized Revenues
- Full Eq. Depth of Discharge (DoD) Cycles
- BESS Service Hours by each Market Product/Service

- ✓ Wholesale/ FTM
- ✓ Utility/Distribution Grid
- ✓ BTM / Microgrid BESS
- ✓ Second-Life of BESS assessments

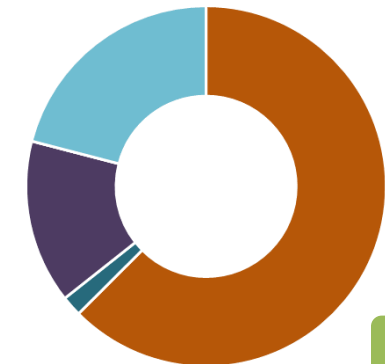
BAU Case - Annualized Revenues by Value Stream (\$/kW/Yr)



Aggressive Cycling- Annualized Revenues by Value Stream (\$/kW/Yr)



Moderate Cycling - Annualized Revenues by Value Stream (\$/kW/Yr)



Sample

Energy Arbitrage Revenue Frequency Regulation Revenue RRS Revenue Charging Cost

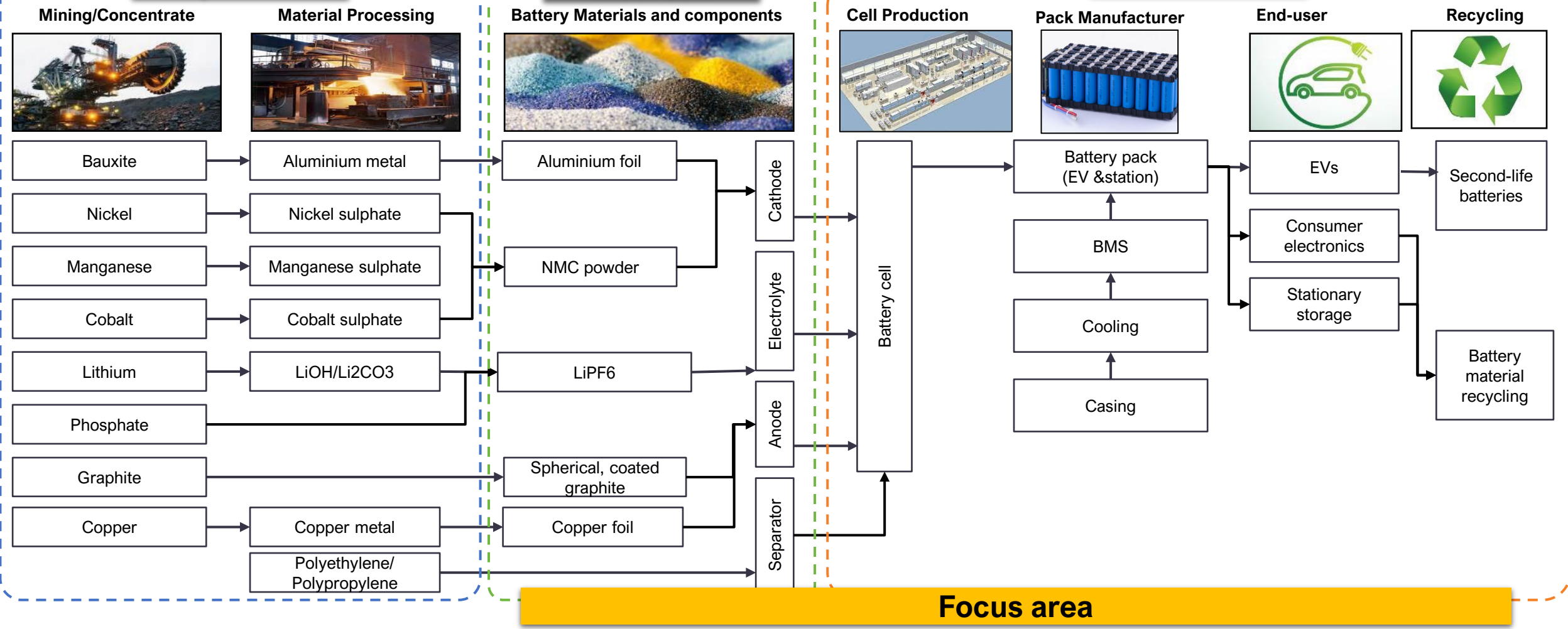
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Battery Value Chain

Upstream

Midstream

Downstream



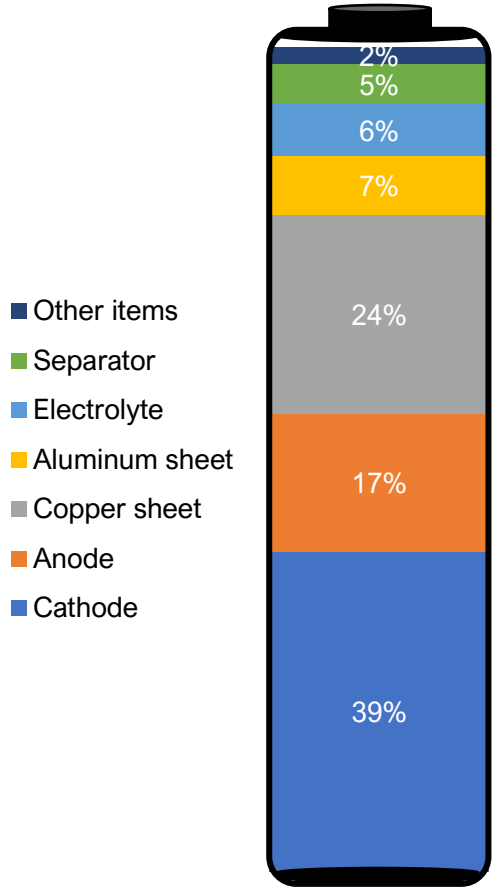
Source: IESA/CES research and analysis

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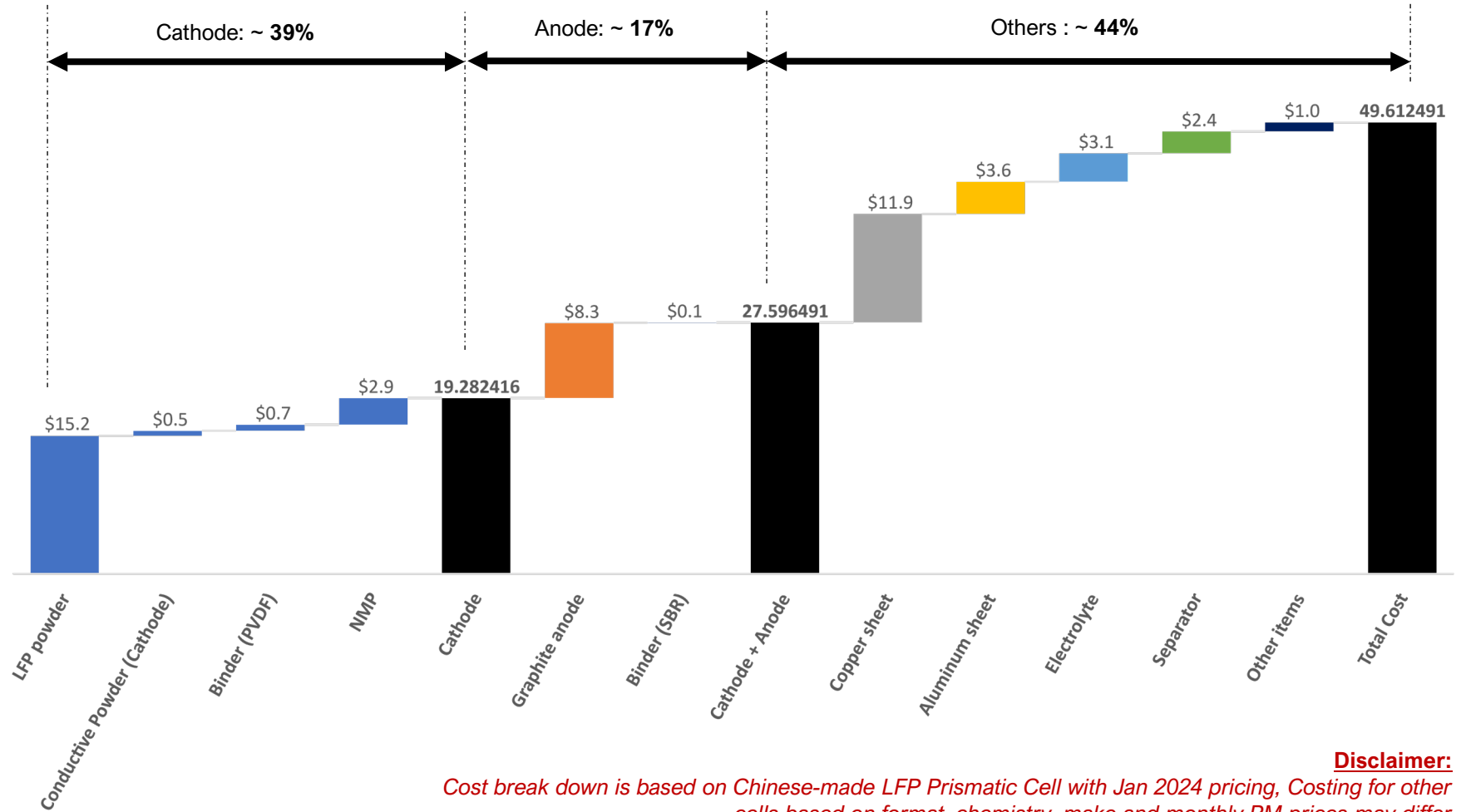
Supply Chain & Strategy Consulting

Raw Material Cost Benchmarking : Lithium-ion cell

Benchmarking for Competitive Advantage



- Other items
- Separator
- Electrolyte
- Aluminum sheet
- Copper sheet
- Anode
- Cathode



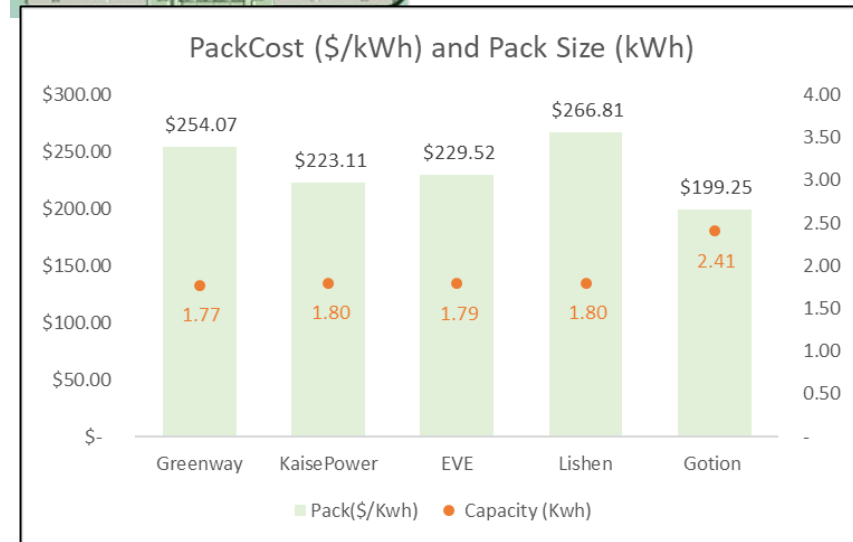
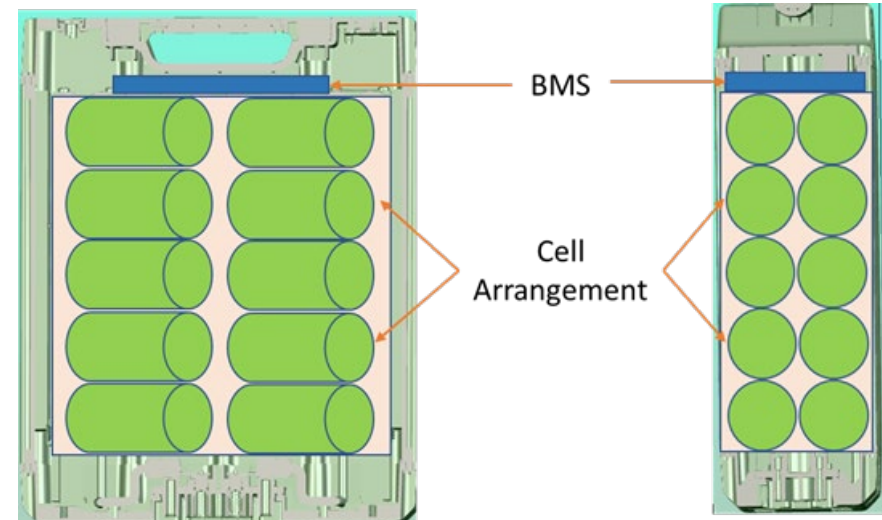
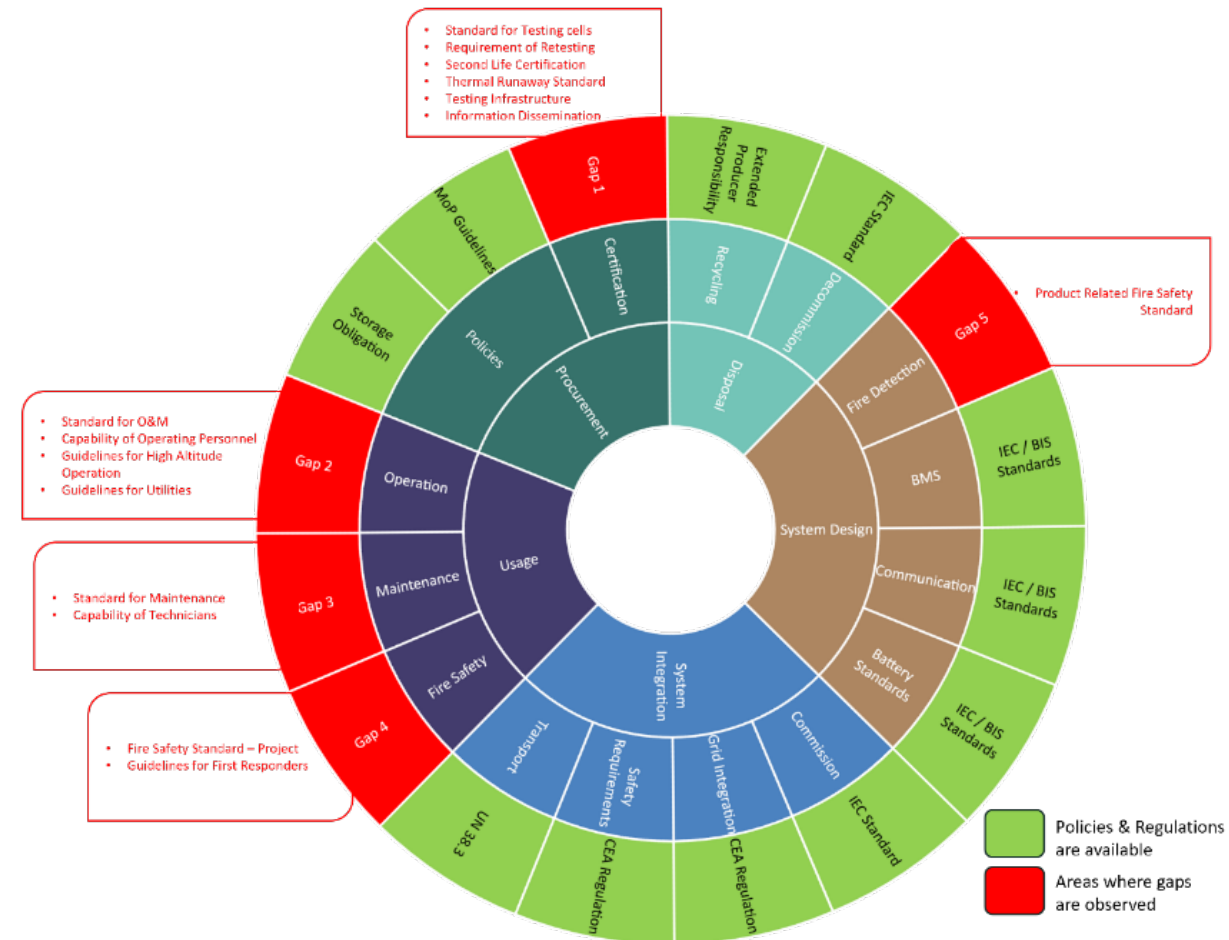
Disclaimer:
 Cost break down is based on Chinese-made LFP Prismatic Cell with Jan 2024 pricing, Costing for other cells based on format, chemistry, make and monthly RM prices may differ

Private & Confidential

Project References

World Bank - Grid Connect BESS Safety

Battery pack development support for e2W



- Study and identify the gaps in the existing grid connected BESS safety framework
- CES team leads with UL as collaborator



Energy Markets & Project Consulting

- ✓ **Market Structures & Policy**
- ✓ **LMP & Ancillary Price Forecasts**
- ✓ **Project Revenue Modelling**
- ✓ **Financial Models - Project Returns & Valuations**
- ✓ **Due-Diligence for M&A**
- ✓ **Reliance Letters & Investments Support**
- ✓ **PPA / VPPA Analysis**

Corporate & Strategy Consulting

- ✓ **Market Size Assessment**
- ✓ **Technology & Cost Benchmarking**
- ✓ **Supply Chain : Competitive Advantage**
- ✓ **Market Entry Strategy**
- ✓ **Second-life for Energy storage**
- ✓ **LDES use cases**
- ✓ **Manufacturing & Policy Advisory**

Thank You.

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