WEBINAR

WHAT TO CONSIDER WHEN PURCHASING BESS FOR PROJECTS IN EUROPE

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ACCURE
Battery Intelligence

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WHY BENCHMARKING MATTERS

How contract language shapes millions in value

Here are the examples we'll discuss today:

- Two letters in a test = **$2M CapEx overpayment**
- One parameter change = **IRR down 1%, payback +1 year**
- Ambiguous contract = **40% revenue lost, no liquidated damages**

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ABOUT

Introduction

Ed Mulloy

Solution Engineer at ACCURE

- Bridges technical and commercial aspects
- Ex- Northvolt, focusing on BESS design & contracts

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WHY BENCHMARKING MATTERS

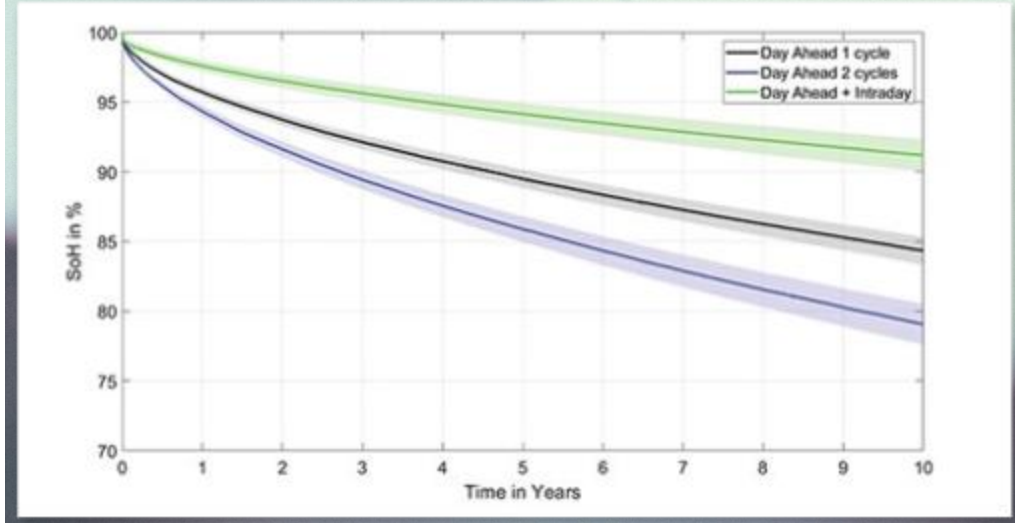
Where risk hides

Problems

- Contract terms often favour vendors
- No standard definitions
- Complexity hides financial risk

Hidden costs

- Look beyond $/kWh
- Who carries the risk?
- What is fair allocation of risk?



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EXPERIENCE MATTERS

Level The Playing Field With ACCURE

> 25 OEMs & Integrators

- BYD
- CATL
- Powin
- Fluence
- Canadian Solar
- Envision
- Sungrow
- Nidec
- Trina
- Honeywell

... and more

> 30 Cell Suppliers

- BYD
- CATL
- LG
- EVE
- Samsung SDI
- Panasonic
- REPT
- Gotion
- Hithium
- AESC

... and more

> 15Markets & Regions

- ERCOT
- CAISO
- PJM
- MISO
- UK
- Australia
- Chile
- France
- Germany
- Belgium

... and more

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Agenda

Introduction

Deep Dive: Common pitfalls

Takeaways

Q&A

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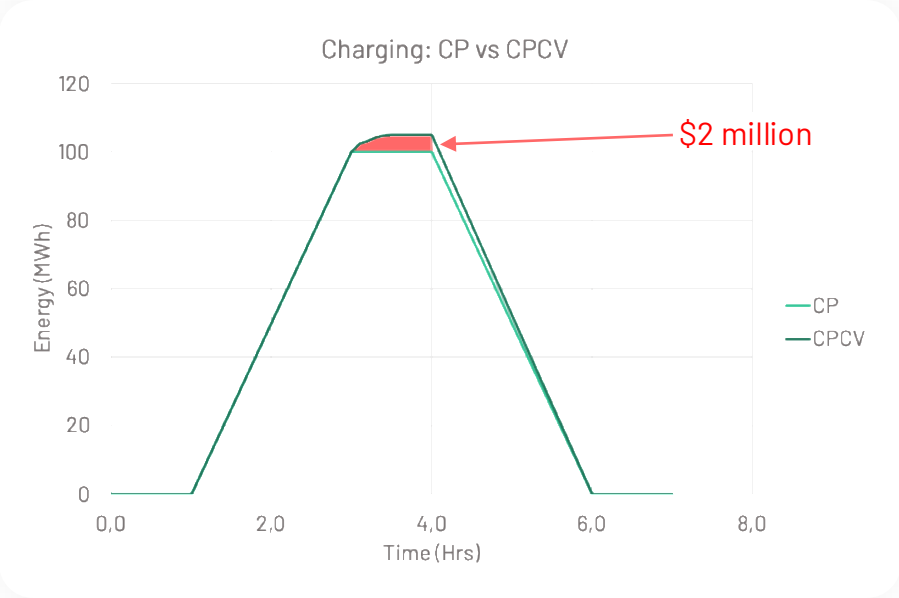
DEEP DIVE: COMMON PITFALLS

Capacity test

Example: CPCV vs CP charging can inflate results by ~5%

- 5% of 200 MWh = 10 MWh
- At $200/kWh → +$2m CapEx



What you should do

- Fully define test procedure
- Match real operations

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DEEP DIVE: COMMON PITFALLS

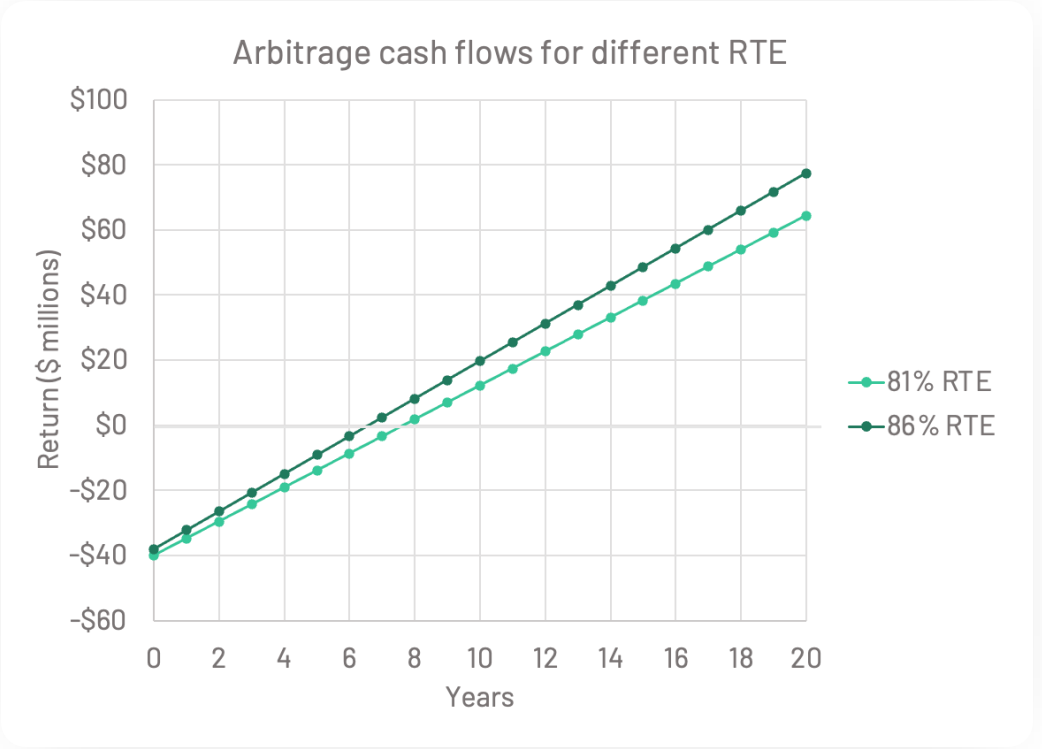
Round-trip efficiency (RTE)

Example: 81% vs 86% efficiency

- 5% more energy purchased every time you cycle
- 200 MWh at 1 cycle per day for 20 years
  - 45 GWhs difference in purchased energy through project lifetime
- Bring payback period forward by one year
- Internal Rate of Return improved by 1%

What you should do

- Don't rely on quoted values
- Every clause has a cost
- Benchmarking (or expert review) pays off



DEEP DIVE: COMMON PITFALLS

Availability

Example: An availability guarantee from a Tier 1 OEM

- 25 variables
- Ambiguous
- Requires manual data manipulation

ACCURE's analysis

- Using one year of anonymized operational data from the same market: **Downtime could be interpreted between 91 % and 98 % availability.**

$$Availability_{offpeak}\ (At) = 1 - ([\int_{6}^{19} \frac{|P_{EMS} - P_{BESS\ (Real\ AC)}|}{P_{EMS}} \times \Delta t]_{charge} + [\int_{6}^{19} \frac{|P_{EMS} - P_{BESS\ (Real\ AC)}|}{P_{EMS}} \times \Delta t]_{discharge} + [\int_{6}^{19} Tps_{Intervention\ \ O\&M}]) \times \frac{1}{13h}$$

$$Availability_{peak}\ (At) = 1 - ([\int_{19}^{21} \frac{|P_{EMS} - P_{BESS\ (Real\ AC)}|}{P_{EMS}} \times \Delta t]_{discharge} + [\int_{6}^{19} Tps_{Intervention\ \ O\&M}]) \times \frac{1}{2h}$$

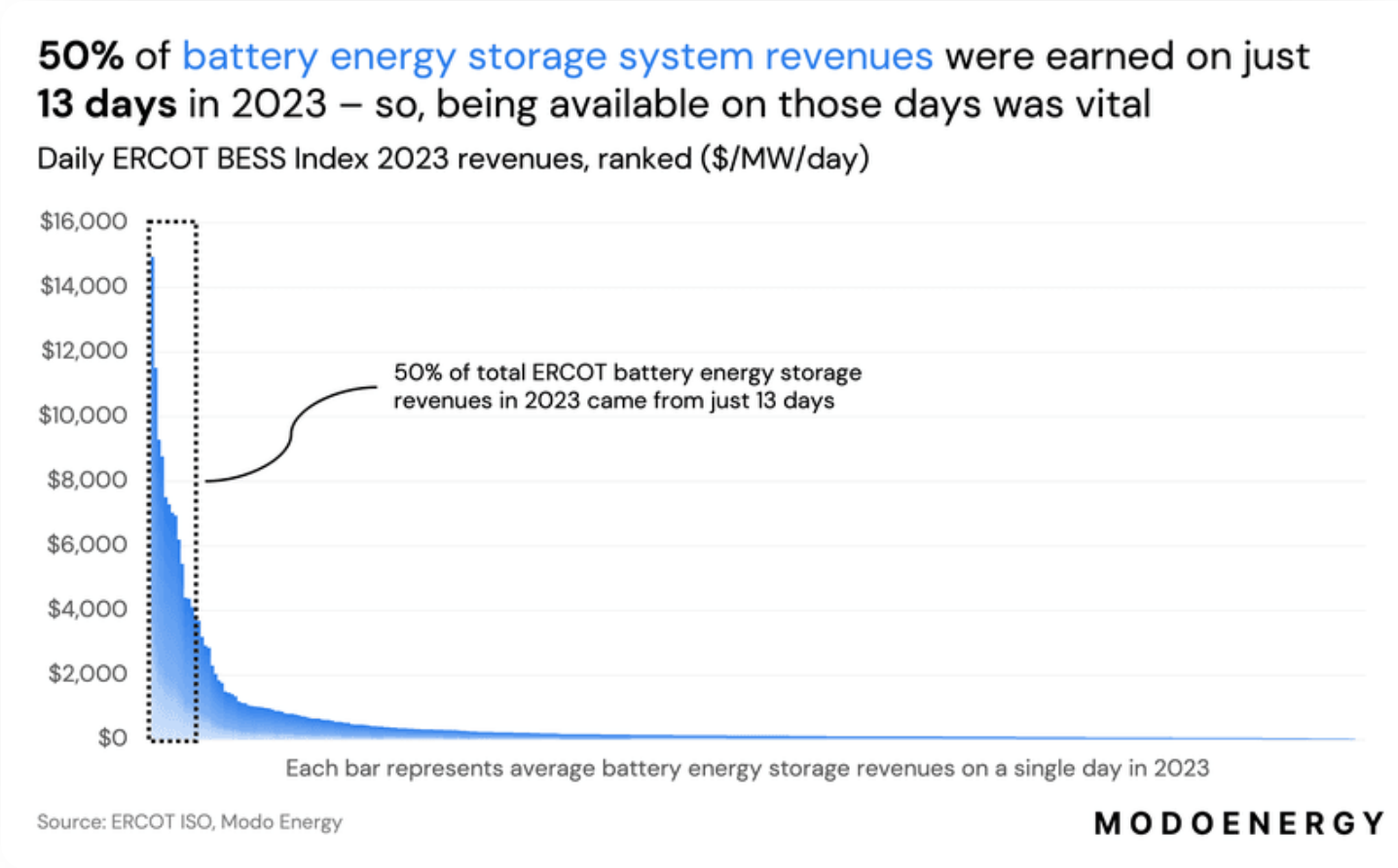
- Δt is expressed in hours
- Charge: $P_{EMS} \geq 0$ & Discharge: $P_{EMS} \leq 0$
- The P_{EMS} reference points must be adjusted according to the losses due to auxiliary consumption and the efficiency of the AC/AC storage system and the annual contractual degradations of the BESS system
- $Tps_{Intervention\ \ O\&M}$: Corrective Maintenance

DEEP DIVE: COMMON PITFALLS

Availability

7% difference in availability

- 7% fo the year is 25 days
- A 200Mwh BESS with an outage throughout August in 2023 would have lost:
  - $20M in ERCOT
  - $4M in CAISO
  - $2M in PJM



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DEEP DIVE: COMMON PITFALLS

Availability

Example: State of the art availability guarantee

- One line
- Industry standard
- Unambiguous

Availability Guarantee Calculation recommendation

The *Availability Percentage of the BESS for an operating year is calculated as follows:*

$$Availability\ Percentage = \frac{1}{TAG_{Period\ \_Hours}} * \sum_{h=1}^{TAG_{Period\ \_Hours}} AEP(h)$$

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DEEP DIVE: COMMON PITFALLS

Pitfalls continued

Data logging

- Define how missed data is handled
- Set reasonable data requirements

Data ownership

- Own and control system data
- Ensure full lifecycle access

SOC accuracy guarantee

- Push for SOC accuracy guarantees
- Avoid restrictive conditions

Maintenance

- Require preventative not reactive
- Approve timing around revenue spikes

Performance guarantee

- Demand clear testable terms
- Align with your use case
- Include flexibility

Liquidated damages (LDs)

- Define LDs tightly
- Watch for caps and carve outs

Balancing definition

- Insist on clear balancing procedures
- Define how balancing impacts availability and performance tests

Many, many more...

- Cell grading/batching
- Deductibles
- Reporting rates
- Excuse events
- Etc.

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Takeaways

Good contracts

1. are based on competitive benchmarked values
2. have clear definitions
3. are aligned to your individual use case
4. allow for flexibility in future use

2025 Energy Storage System Health & Performance Report

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Questions?

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2025 Energy Storage System
Health & Performance Report