centrii

The grid's balancing layer is now a financial risk.

A Monte Carlo risk assessment of coordinated cyber-physical attacks on battery energy storage systems (BESS) through 2031.

92% probability of a major attack on battery storage infrastructure by 2031 — **at today's industry-average security posture.** Based on 10,000 Monte Carlo simulations across 3 security postures.

01 MECHANISM — ATTACK CHAIN

Generation is fine. The frequency-balancing layer becomes the weapon.

1. **Entry**
   Cloud platform or remote access compromise across battery control systems.
2. **Coordination**
   Synchronized charge/discharge or delayed response across compromised units.
3. **Frequency drift**
   Grid frequency pushed outside safe operating limits.
4. **Cascading failure**
   Protective relays trip in sequence; blackout follows.

40–120 seconds from coordinated action to cascading blackout

02 EXPOSURE — TWO GRIDS

Two grids. Two very different profiles. Same underlying math.

Texas — ERCOT		Great Britain	
Units to compromise	**5.4%** (1,500 units)	Units to compromise	**29%** (400 units)
People affected	**30M**	People affected	**67M**
Economic damage	**$12B–$65B**	Economic damage	**£2B–£10B**

03 PROBABILITY — SECURITY POSTURE

Security investment doesn't eliminate the risk. It buys time.

1. **Baseline — current posture** — Today's industry-average security controls across battery storage operators. — **92%** attack probability
2. **Moderate — voluntary controls** — Industry best-practice guidance adopted voluntarily, without regulatory mandate. — **78%** attack probability
3. **Aggressive — mandatory IEC 62443** — Enforced compliance with IEC 62443 across all connected battery control systems. — **61%** attack probability

04 ECONOMICS — COST OF PREVENTION

The cost of prevention is a fraction of the cost of an event.

Great Britain	£400M–£1B to secure vs. £2B–£10B per attack	**5×–25×**
Texas — ERCOT	$800M–$2.8B to secure vs. $12B–$65B per attack	**15x - 80x**

Read the full peer-reviewed research

Complete Monte Carlo methodology, input parameters, and academic citations behind these findings.

Download the GRIDLOCK report