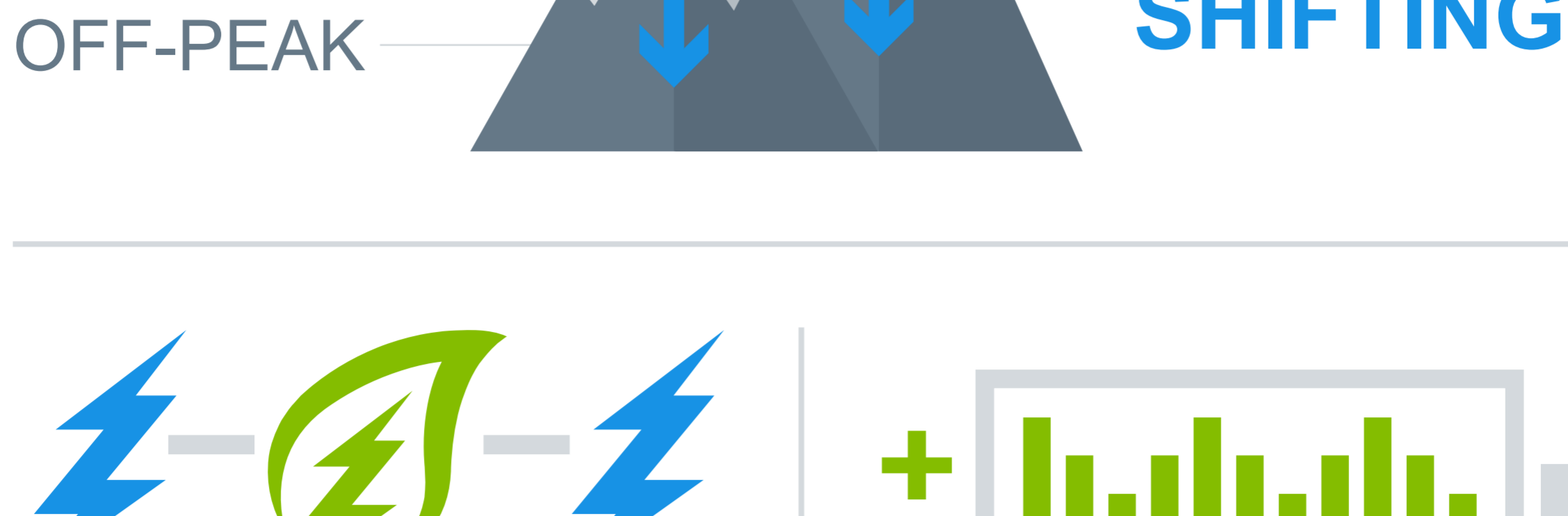


BURNING TRUTHS ABOUT LI-ION BATTERY FIRES

LI-ION BATTERY STORAGE: THE ANSWER TO GREEN, SMART GRIDS



BUT THE THREAT IS REAL

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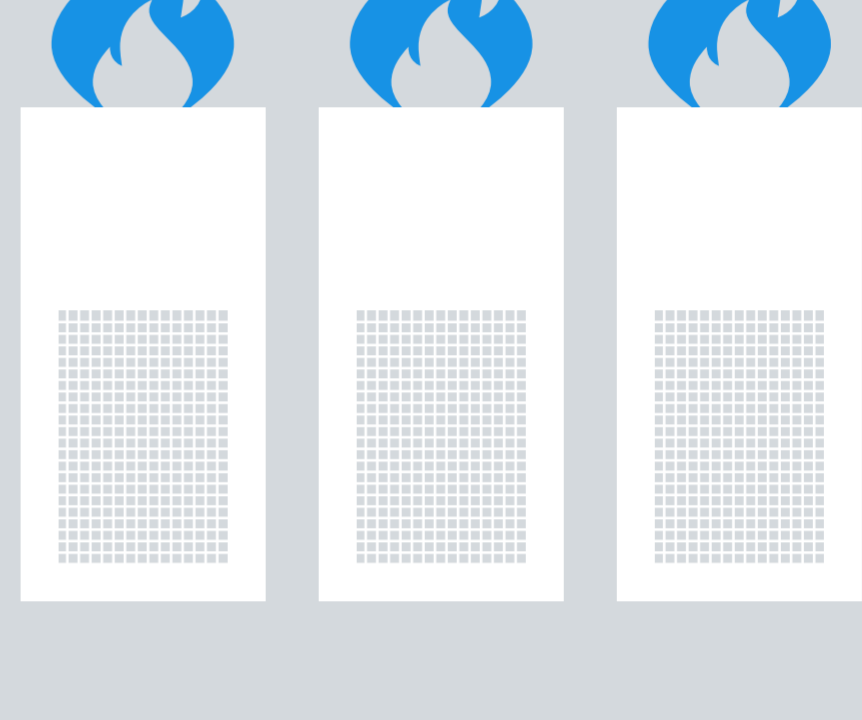
LI-ION BATTERY ENERGY STORAGE SYSTEM (BESS) FIRES IN SOUTH KOREA (2017-2018)¹

4

FIREFIGHTERS SEVERELY INJURED BY BESS EXPLOSION IN ARIZONA, US (2019)²

20MW

BESS DESTROYED BY FIRE IN LIVERPOOL, UK (2020)³



LI-ION BESS FIRES HAPPEN IN 4 STAGES

1 | **ABUSE FACTOR** (ELECTRICAL/THERMAL/MECHANICAL)

2 | **BATTERY ELECTROLYTE SOLVENT VAPORS**

3 | **SMOKE**

4 | **FIRE (THERMAL RUNAWAY)**

KEY RISKS AND CHALLENGES INCLUDE:

FORMATION OF EXPLOSIVE GAS/ VAPOUR MIXTURES

FORMATION AND DISPERSION OF TOXIC GAS CLOUDS

INTENSE HEAT FIRES (DIFFICULT TO EXTINGUISH)

EXISTING TECHNOLOGY CANNOT:

MONITOR SINGLE CELL TEMPERATURES/ VOLTAGES (BMS)

ACTIVATE UNTIL THERMAL RUNAWAY HAS OCCURRED (FIRE DETECTION/ SUPPRESSION)

ELECTROLYTE VAPOR DETECTION, THE OPTIMUM LI-ION BESS FIRE PREVENTION TECHNOLOGY

ELECTROLYTE VAPOR SENSOR AVERAGE ACTIVATION TIMES⁴:

00:00 BEFORE THERMAL RUNAWAY

MINS SECS

00:00 BEFORE CELL VOLTAGE SENSORS

MINS SECS

00:00 BEFORE LEL SENSORS

MINS SECS

FOR MORE ON THIS TOPIC DOWNLOAD THE ULTIMATE GUIDE TO FIRE PREVENTION IN LITHIUM-ION BATTERY ENERGY STORAGE SYSTEMS [HERE](#).

1. <http://www.businesskorea.co.kr/news/articleView.html?idxno=41012>
 2. https://firefightersafety.org/docs/Four_Firefighters_Injured_in_Lithium_Ion_Battery_ESS_Explosion_Arizona.pdf
 3. <https://www.energy-storage-news.com/news/fire-at-20mw-uk-battery-storage-plant-in-liverpool--text-Carriage%20Road%20BESS%20m%20Liverpool%20when%20completed%20in%20early%202019>
 4. <https://www.dnvgl.com/maritime/publications/Technical-Reference-for-Li-Ion-Battery-Explosion-Risk-and-Fire-Suppression-report-download.html>