FINAL

The Commission to Advance Lithium-Ion Battery Safety in Maryland; SB532 /CH950

Thursday, May 8 · 10:00am – 12:00pm

Google Meet joining info

Video call link: https://meet.google.com/wjk-rvxu-rtc

Or dial: (US) +1 609-483-6097 PIN: 523 921 566#

More phone numbers: https://tel.meet/wjk-rvxu-rtc?pin=7129267368931

Commission members attending the meeting in person were marked present as follows: Chairman Emil Nusbaum, Vincent Baker, Michael Cox, Geoffrey Donahue, and Kitty McIlroy,

Commission members attending the meeting virtually were marked present as follows: Taiwo Alo, Marc Boolish, Ivan Browning, Garrett Fitzgerald, Haley Kotzker, Christopher Neidhart, Chris Pilzer, Nicholas Rodricks and Justin Short.

Absent Commission Members: David Black, Tessa Sanchez, Ginny Rogers, Robert Whittlesey and DeAndre Wilson.

Members of the public were in attendance.

Staff in attendance: Ken Bush, MSP and Penny Doty, MSP

Presenters: Freeman Hall CEO & Co-Founder, B2U Storage Solutions Inc., and
Geoffrey Donahue, Director, Office of Emergency Preparedness & Response, Maryland Department of the Environment

The meeting was called to order by Commission Chairman Emil Nusbaum at 10:05 a.m. Chairman Nusbaum welcomed everyone and provided the attendees with a mission synopsis of the Commission. Chairman Nusbaum reported the General Assembly has mandated the Commission to compile recommendations and standards to reduce the risk of thermal events extending from lithium-ion batteries in order to protect the public. The Commission is reviewing best practices, policies and standards for mid to small formats, EVs and large format battery systems, with extension to producer responsibility policy. The final recommendations must be compiled in a final report and submitted to the Maryland General Assembly by the end of December 2025.

Roll call was completed by the Commission staff. Staff confirmed there was a majority present.

Chairman Nusbaum motioned for the Commission to review and approve the submitted Minutes from the April 10, 2025 meeting. The Minutes were approved as submitted by the Commission with no objections raised.

Chairman Nusbaum introduced the first presenter, Freeman Hall, B2U Storage Solutions Inc. with his biography shared as follows: Mr. Hall is the co-founder and CEO of B2U Storage Solutions, which uses patented EPS technology to reuse EV batteries in large-scale energy storage systems without incurring repurposing costs. Mr. Hall launched B2U in 2019 from Solar Electric Solutions, a solar project development

company Mr. Hall founded in 2008, and which developed 100 MW of PV across 11 project sites in California. Mr. Hall led the investment strategy into renewables and acquisition of solar developer, DT Solar, for Ted Turner's Turner Enterprises in 2006. He joined the operating business, and renamed Turner Renewable Energy to grow the business. TRE was sold to First Solar in 2007 for a significant multiple from the prior acquisition price. Earlier in his career, Mr. Hall was Product Manager for Ecos Technologies, a cloud-based enterprise software provider for EHS data. Mr. Hall was a consultant at Anderson Consulting's Strategic Services practice and previously it's technology services practice. Mr. Hall received an MBA with distinction from Kellogg Business School and a BA from Duke University". Mr. Hall's B2U Solutions – B2U's EPS Energy Storage System for EV Battery Repurposing presentation highlights and/or topics can be summarized as follows:

- In 2030, 2M post-automotive EV batteries available for repair, recycling or repurposing, excluding recalled and out of spec batteries
  - In 2030 an estimated 2,000,000 EV batteries are available for Repair, Repurpose, Recycle in North America, of which 335,000 (16 GWh) are prime candidates for repurposing, a $2.5B market value. The estimate excludes recalled and out of spec batteries
- Reuse before recycling generates substantially more value than direct recycling which is often a net cost depending on commodity prices of recycled materials
  - Reuse generates significant value from remaining energy capacity – Battery Reuse Value Below ($/kWh):
    - Total Cost – Negative $101
    - NPV Revenue - $268
    - Net Re-Use Value – 167
  - Recycling value depends on battery chemistry – Net Value of Recycling Battery ($/kWh equivalent)
    - NMC – Negative $6.4
    - NCA – Negative $9.5
    - LFP – Negative $28.7
    - LMO – Negative $30.5
- Using patented EPS technology, B2U is commercializing a proprietary energy storage system (ESS) engineered to utilize EV batteries in large-scale storage applications
  - B2U's patented EV Pack Storage (EPS Systems deploys 2nd life batteries from EVs, reusing the entire battery pack, eliminating repurposing costs
  - Uniquely engineered to achieve effective yields despite variance in capacity from large volumes of batteries
  - Delivers a superior CapEx and Levelized Cost of Storage (LCOS) advantage
  - EPS System is configurable for any EV batter, Nissan, Honda, Ford, GM, Tesla batteries operating at Lancaster facility
  - 28 MWh capacity, operations began in May 2020, selling into CAISO wholesale market as a merchant resource
- B2U's EPS technology enables EV pack reuse that avoids expensive repurposing costs.
  - EPS Enables Reuse of the EV Pack Avoiding Repurposing Costs
    - Reuse of Native BMS, Road-rated Enclosure, Sensors & Wiring.
    - Scalable w/ low O&M
    - Reduces risk from OEM perspective
    - Avoids assembly & disassembly costs and risks
    - Speeds deployment & servicing

- Provides superior tracking and logistics

❖ B2U's EPS system has numerous safety features to mitigate risk in battery deployment
- ➢ Internet
- ➢ Communication
- ➢ Power
- ➢ Battery Energy System (BESS)
  - B2U EV Pack Storage (EPS) System
    - 1 – EPS Cabinet
    - 2 – EPS Pack Interface (EP1)
    - 3 – EPS Cabinet Controller (ECC)
    - 4 – Smart Combiner
    - 5 – Energy Management System (EMS)
    - 6 – Environmental Controls
    - Hazard Detection
    - Balancer
    - Smart Cabinet
    - Market Operations System
  - SCADA
  - Metering
  - Inverter

❖ B2U EPS System Safety Features and Procedures: Pack and Cabinet Level Safety
- ➢ EV pack Level
- ➢ Enclosed Cabinet Level
- ➢ Open Mesh Cabinet Level

❖ B2U EPS System Safety Features and Procedures: Project Design & Operation
- ➢ B2U has the most operational expertise and experience repurposing EV batteries, and is the only company with grid-deployed systems
  - B2U's SEPV Sierra facility in Lancaster, CA (Operational since April 2020)
  - B2U's SEPV Cuyama facility in Santa Barbara, CA (Operational since November 2023)
    - Zero safety incidents since 2020, w/ 2,000 EV batteries (40MWh) from Honda, Ford, Nissan, Tesla and GM
    - Team has long history of project design and development and understands the importance of proper project design, siting, permitting and certification
    - Projects permitted through appropriate AHJs achieving UL9540 certification required for Energy Storage Systems, and all components of EPS ESS receive UL certification conducted by a Nationally Recognized Testing Lab (NRTL)
    - UL9540 certification includes UL9540A fire testing

❖ B2U EPS System Safety Features and Procedures; Real Time Battery Monitoring – 24 packs per cabinet, 4 cabinets per DC-DC converter, 6 DC-DC converters per inverter, 3 inverters in operation
- ➢ B2U's EPS software monitors real time data of each battery's cell voltages, module temperatures, and pack current. Guardrails are set at levels within each battery's operational specs.
- ➢ If a guardrail parameter is exceeded, the EPS software automatically disconnects the battery from the system.
- ➢ Solid square in each cabinet represent an EV battery; green light indicates the battery is connected; red light indicates an error

- Alerts built into system notify us of faults exceeded settings; most faults are cleared automatically.

❖ B2U EPS System Safety Features and Procedures: Real Time Battery Monitoring
- B2U's EPS software monitors each battery packs cell voltage, COC, temperature and current in real time, w/ guardrails for each parameter. If a guardrail parameter is exceeded, the battery is automatically disconnected from the system w/o significantly impacting cabinet or system performance.
- EPS Cabinet Controller Functionality enabled by real time monitoring
  - Packs reach the max cell voltage, cell temp or SOC guardrail parameters will be disconnected, allowing the other packs in the system to fully charge
  - Before disconnecting packs, charge current is reduced as needed to stay below the maximum programed pack current
  - Packs disconnect when reaching low and voltage parameters, down to a programmed minimum number of connected strings
  - Enables packs w/ different capacities to charge and discharge efficiently, where weaker or non- performing batteries don't restrict performance or stronger batteries
- B2U's EP energy storage system mitigates the risks of repurposing EV batteries
  - B2U's approach to EV battery repurposing mitigates risk through our large-scale storage system operations and permitting
  - EV Pack Level – B2U's technology preserves and utilizes the built-in safety features of the EV pack
  - Cabinet Level – Each cabinet isolates, monitors, and controls each individual EV pack in a climate-controlled environment
  - Plant Level – Redundant monitoring and control is provided at plant level

After opening floor to members and participants for questions and comments for Mr. Hall, the next presenter, Commission member Geoffrey Donahue, Director, Office of Emergency Preparedness & Response, Emergency Response Division, was introduced by Chairman Nusbaum. Commissioner Donahue began his career with MDE in 2004 as Chief of the Emergency Response Division. Throughout his career, Mr. Donahue has responded to countless major incidents, including major fires, hazardous material incidents, highway transportation incidents, aviation incidents, train derailments and maritime incidents. Commissioner Donahue served as a member of the Unified Command for the Key Bridge collapse and for the grounding of the container ship in the Chesapeake Bay. Commissioner Donahue's experience includes firefighting, hazardous materials response, and technical rescue. He also serves as a field instructor for the Maryland Fire and Rescue Institute, teaching in the firefighting and hazardous materials, rescue and management disciplines. Mr. Donahue received an MBA from Loyola University and a BA from Washington College. Commissioner Donahue is certified as a fire officer for hazardous materials technology, hazmat incident safety, health and safety, and shipboard firefighting. Commission member Donohue's MDE presentation can be summarized/highlighted as follows:

❖ Mission is to Protect Human Health and Environment
❖ Responsible for developing, coordinating and supporting regulatory environmental policies
❖ MDE is the lead State agency in response to the following: oil spills, hazardous material incidents, and radiological incidents. Specifically, MDE is the State Environmental Regulatory Agency, Lead State Agency for HAZMAT Response, Lead State Agency for Radiation Emergency Response, State On-Scene Coordinator under the National Response Plan, and Supports Local Responders
❖ MDE Response Capability
- Hazardous Materials Response

- Oil Spill Response
- Radiological Emergency Response
- Technical Consultation and Assistance

- OEPR Staffing
  - Director, Office of Emergency Preparedness & Response
  - Division Chief, Emergency Response & Preparedness
  - Seven (7) Hazardous Materials Specialists
    - One (1) Hazmat Response Supervisors
    - Six (6) Hazmat Response Officer IIs
  - Two (2) Radiological Health Physicists
  - Six (6) Materials Transportation Compliance Specialists
- Between Reporting periods 2004 and 2016, a total of 36,164 spill responses and a total of 7,90t ERD responses were recorded.
- Equipment Capabilities – Overview
  - Light Response Vehicles
  - Heavy Response Vehicles
  - Specialty Vehicles
  - Containment Boom Trailers
  - Special Hazards Operations Trailer
  - Corrosive Transfer System
    - 2-2" Kynar double diaphragm pumps
    - 300' Teflon lined 2" hose w/ all Kynar accessories
    - 3-state Air Purification System
    - 250 cfm Air Compressor
    - Soda Ash
    - Stainless Steel 407 off-loaders
  - 4 Local Spill Trailers
  - Bobcat
  - Watercraft
    - (2) 22' Boston Whaler Oil Spill Response Boats
    - (1) 25' Maritime Voyager Oil Spill Response Boat
    - (1) 25' Boston Whaler Oil Spill Response Boat
    - (1) 14' Jon Boat
- Specialty Equipment
  - Remote Drum Punch
  - Elemental Mercury Responses
  - Chlorine Emergencies
  - Propane Flair – (3/4, 1 & 2 inch)
  - Water Injection Kit
  - CellBlockEx
- MDE Capabilities
  - Hamat Buckets, Barrels and CellBlockEX
- Instruments and Mitigation
  - Photoionization Detectors
  - 4-Gas Air Monitors – LEL, O2, H2S, CO
  - Air Sampling Tubes
  - Drum Sampling Tubes
  - Mercury Vapor Detectors (Lumex & Jerome) and Vacs
  - WMD Detection Equipment

- Chlorine A Kit
- Chlorine B, C Kits
- Chlorine Cylinder Recovery Vessels
- Remote Drum Punch
- Sorbents and Oil Containment Boom
- Portable Infrared Spectrometer (TravelIR & HazMad ID)
- Raman Spectroscopy (Ahura First Defer & RespondeR RCI)
- Mildand Tankcar Emergency Response Kits

- Logistical Support to Local Jurisdictions – Supply Local Fire Departments with the following:
  - Particulate Absorbent
  - Sorbent pads, boom and sweep
  - Recovery Drums
- Communications
  - 700/800 Mhz Portable Radios (Interoperable with Local Jurisdictions)
  - Marine VHF
- Incidents
  - Where and What
    - Residential
    - Fixed Facility
    - Maritime/Terminal
    - Shipboard
    - Highway Transportation
      - Leaking Drum
      - Overturned Diesel Tanker
      - Tank Truck Transfer Operation
      - Chemical Tanker Product Transfer
      - Overturned Asphalt Tanker
    - Susquehanna River and Chesapeake Bay
    - Rail Transportation Incidents
    - Pipeline Incidents
    - Propane Incidents
    - Airport Incidents
    - Aircraft Incidents
    - Weather Related
    - Midnight Dumping
    - Mercury Spills
- EV's and Lithium-Ion Battery Related Incidents
  - E-Scooter Fires
  - PPV Fan Battery Fires
  - Laptop Battery Fires
  - Consumer Electronics (Damaged, Defective, Returned - DDR) Merchandise
  - Electric Vehicle Fires
- Training and Outreach
- Emergency Response Contact Line – 1-866-633-4686 (24 hours)

After a session of question and answers, Geoffrey Donahue was thanked by the Commission for sharing his wealth of knowledge and experience with the members.

Commissioner Ken Bush provided the Commission with an update regarding the State's adoption of the 2024 version of NFPA 1 Fire Code and NFPA 101 Safety Code for which both of the NFPA Codes reference the most current 2023 NFPA 855 Codes. Commissioner Bush reported that the State Fire Prevention Commission voted at the April 17th meeting to reject the version of the State Fire Prevention code that was approved by the Maryland State Police and presented during the public hearing process. The Commission then voted to repropose the original version of the code that included mandates referencing the 2024 editions of the model codes, but included issues that the State Police previously did not accept. If the reproposed original version moves forward from MSP, we have to go back through the process of the AELR Committee approval, public hearings and re-publication in the Maryland Register. Meaning, it will take some time to complete the process from beginning to end. Several workgroups are working to resolve the issue, but there are no guarantees that reproposed codes will move forward. Consequently, the State is still enforcing the 2018 editions of the model fire codes which do not include the references to NFPA 855. Commissioner Bush suggested the Commission consider including, in the Final Report, a recommendation that the updated standards be adopted for the protection of energy storage systems, particularly lithium-ion batteries as referenced in NFPA 855. Commissioner Bush discouraged recommending de-packaging of the standards as adopting the entire standards package is most optimal from a public safety standpoint.

Chairman Nusbaum reported to the Commission on the progress of the Subcommittees and their work in regards to the Final Report. The Subcommittees have adopted timeline deadlines for moving forward with the Report initiative recommendations. The draft Report will be completed by the end of September and ready to be presented to the full Commission at the October Commission meeting for further review, synthesizing and report framework structuring. The timeline is rather aggressive, but needed to be set in order to assure that objectives are met. The Subcommittees and Leaders will continue to meet and work together to accomplish the set timeline goals.

Chairman Nusbaum rallied the Subcommittee members to consult with and provide feedback to Subcommittee leaders, review the recommendations posted on their Subcommittee shared drives, forward suggested recommendations to Penny Doty so she can upload them to the drive, and attempt to fully participate in upcoming scheduled Subcommittee meetings.

The next in person Commission meeting was scheduled for Thursday, June 5, 2025 at 10:00 a.m. at MFRI in Classroom I.

Chair Emil Nusbaum asked if there was any additional business the group members wished to address, and upon hearing none, the meeting was adjourned at 12:06 p.m.

These meeting minutes are respectfully submitted by Penny L. Doty.