Champaign County
Department of
PLANNING &
ZONING

**Brookens Administrative Center**
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Urbana, Illinois 61802

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# *CASE NO. 130-AT-24*

*PRELIMINARY MEMORANDUM*
*March 20, 2024*

**Petitioner:** Zoning Administrator

**Request:** Amend the Champaign County Zoning Ordinance to add "Battery Energy Storage System" as a new principal use under the category "Industrial Uses: Electric Power Generating Facilities" and indicate that a Battery Energy Storage System may be authorized by a Special Use Permit in the AG-1 Agriculture, AG-2 Agriculture, B-1 Rural Trade Center, B-4 General Business, I-1 Light Industry and I-2 Heavy Industry Zoning Districts; add requirements and fees for "Battery Energy Storage Systems"; add any required definitions, and make certain other revisions to the Ordinance as detailed in the full legal description in Attachment A.

**Location**: Unincorporated Champaign County

**Time Schedule for Development:** As soon as possible

**Prepared by**: **Susan Burgstrom**
Senior Planner

**John Hall**
Zoning Administrator

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## BACKGROUND

Battery Energy Storage Systems (BESS) are increasing in demand, particularly in combination with PV Solar Farms or as standalone facilities to bolster the energy grid. Champaign County has received several informal inquiries for BESS and there are no regulations established in the Zoning Ordinance for BESS. Further, there is no model BESS ordinance for Illinois communities.

The Champaign County Environment and Land Use Committee discussed this proposed amendment at the January 4, 2024 meeting and approved opening a ZBA public hearing for the amendment at the February 8, 2024 meeting. Based on ELUC input, one addition was made to the proposed text amendment by adding new subparagraph 6.1.8 D.(7). The proposed amendment (annotated) indicates the changes made following the February 8, 2024, ELUC meeting – see Attachment R starting on page 18.

## OVERVIEW OF A BATTERY ENERGY STORAGE SYSTEM

According to the National Renewable Energy Laboratory (NREL), "Battery storage is a technology that enables power system operators and utilities to store energy for later use. A battery energy storage system (BESS) is an electrochemical device that charges (or collects energy) from the grid or a power plant and then discharges that energy at a later time to provide electricity or other grid services when needed" (See Attachment E: *Grid-Scale Battery Storage Frequently Asked Questions*).

BESS can be used to supplement renewable energies such as solar and wind farms to allow "users to take advantage of the electricity that is generated when the renewable energy technologies are not producing electricity." They can also be used to "draw power from the batteries during the higher-

cost daytime hours then recharging during the lower-cost nighttime hours." They can also provide an uninterruptible power supply (See Attachment C: Energy Storage Systems Safety Fact Sheet).

Lithium-ion batteries are the most common type of batteries currently used in BESS. According to the New York State Energy Research and Development Authority (NYSERDA), lithium-ion batteries are the most commonly used because:

- They store the most energy per unit weight or volume of any battery
- They have essentially minimal maintenance cost (computer monitored)
- They are readily available; billions made per year
- Their cost is dropping all the time – lifetime cost probably lowest
- They are "portable" – utilities can move them as desired (typically in containers)

(See Attachment H: *BESS 101*).

Like solar and wind farms, BESS has no need for parking, water, or waste collection.

**BENEFITS OF BESS**

According to NYSERDA, there are a number of benefits that can be achieved with BESS:

- Defer costly upgrades to transmission and distribution infrastructure
- Provide key ancillary grid services
- Support integration of renewable energy generators, including solar and wind
- Alleviate congestion in the grid (reducing brownouts and blackouts)
- Electric bill management, backup power for homes and businesses

Installation of BESS would promote the State of Illinois renewable energy goals, although no specific goals or policies have been formally approved by the State regarding BESS.

**POTENTIAL BUT RARE IMPACTS OF BESS DEVELOPMENT**

Varying levels of concern have been raised about BESS and this has affected how states, counties, and municipalities have regulated BESS to date. In researching BESS ordinances, P&Z Staff found degrees of difference related to requirements for topics such as setbacks from nearby structures, appropriate zoning districts, safety, and noise.

Some potential but rare impacts of BESS development have been identified in the following documents:

A. From the *Energy Storage Systems Safety Fact Sheet* (Attachment C):

(1) Thermal runaway: "Thermal runaway is a term used for the rapid uncontrolled release of heat energy from a battery cell; it is a condition when a battery creates more heat than it can effectively dissipate. Thermal runaway in a single cell can result in a chain reaction that heats up neighboring cells. As this process continues, it can result in a battery fire or explosion. This can often be the ignition source for larger battery fires."

(2) Stranded energy: "As with most electrical equipment there is a shock hazard present, but what is unique about ESS is that often, even after being involved in a fire, there is still energy within the ESS. This is difficult to discharge since the

terminals are often damaged and presents a hazard to those performing overhaul after a fire. Stranded energy can also cause reignition of the fire hours or even days later."

B. From the *First Responder's Guide to BESS Incidents* (Attachment D):

(1) Toxic chemicals: "Toxic chemicals, including hydrogen fluoride, hydrogen chloride, hydrogen cyanide, and carbon monoxide, may be released during an incident. Spraying water on smoke or vapor released from the battery, whether burning or not, may cause skin or lung irritation and contaminated run-off similar to plastic fires. This is one additional reason for allowing the battery to burn in a controlled manner. The site perimeter should be entered only by trained firefighters wearing full protective gear and using self-contained breathing apparatus (SCBA)."

**PUBLIC ACT 102-1123**

Public Act 102-1123 was passed in January 2023 by the State of Illinois and required Illinois counties to amend their wind and solar farm zoning ordinances to be no stricter than what P.A. 102-1123 allows. P.A. 102-1123 does not make direct mention of Battery Energy Storage Systems. However, there is a definition of "supporting facilities," which are "the transmission lines, substations, access roads, meteorological towers, storage containers, and equipment associated with the generation and storage of electricity by the commercial wind energy facility or commercial solar energy facility."

Section (g) of P.A. 102-1123 states, "A county may not place any restriction on the installation or use of a commercial wind energy facility or a commercial solar energy facility unless it adopts an ordinance that complies with this Section. A county may not establish siting standards for supporting facilities that preclude development of commercial wind energy facilities or commercial solar energy facilities."

In other words, integration of a BESS within a solar or wind farm development cannot be the reason a permit is denied for a solar or wind farm.

**ATTACHMENTS**

A Legal advertisement

B ELUC Memorandum dated December 22, 2024, with attachment:
- Draft BESS Text Amendment to the Champaign County Zoning Ordinance

C National Fire Protection Association (NFPA). (June 2020) *Energy Storage Systems Safety Fact Sheet*. https://www.nfpa.org.

D The American Clean Power Association. (July 2023) *First Responder's Guide to Lithium-Ion Battery Energy Storage System Incidents*. https://cleanpower.org/resources/first-responders-guide-to-bess-incidents/

E National Renewable Energy Laboratory (NREL). (September 2019). *Grid Scale Battery Storage Frequently Asked Questions*. https://www.nrel.gov

F DeKalb County. (March 15, 2023) Ordinance O2023-009: An ordinance amending Section 52-E-12, "Sustainable Energy Systems," of the Dekalb County Code to add a new subsection C, "Battery Energy Storage Systems." https://dekalbcounty.org/

G Exeter Associates. (February 2022) *Siting and Safety Best Practices for Battery Energy Storage Systems*.

H New York State Energy Research and Development Authority (NYSERDA). (May 2021) *Battery Energy Storage Systems 101* presentation. https://www.nyserda.ny.gov *(on ZBA meetings website)*

I New York State Energy Research and Development Authority (NYSERDA). (October 2020) *New York Battery Energy Storage System Guidebook for Local Governments*. https://www.nyserda.ny.gov *(on ZBA meetings website)*

J Velocity EHS. (July 2021) *Morris Lithium Battery Fire Highlights Emergency Planning, Hazardous Chemical Management*. https://www.ehs.com *(on ZBA meetings website)*

K Michael Urbanec. (July 2021) *No evacuation for battery fire at energy storage facility east of Grand Ridge*. https://www.shawlocal.com. *(on ZBA meetings website)*

L Julian Spector. (August 2020) *What Sparked the Arizona Battery Fire? LG Chem has a different version*. https://www.greentechmedia.com *(on ZBA meetings website)*

M Andy Colthorpe. (February 2022) *World's biggest lithium battery storage now completely offline*. https://www.energy-storage.news *(on ZBA meetings website)*

N Pacific Northwest National Laboratory. (October 2023) *Energy Storage in Local Zoning Ordinances*. https://www.pnnl.gov/publications/energy-storage-local-zoning-ordinances *(on ZBA meetings website)*

O Comments received regarding the proposed text amendment as of March 18, 2024

P Photos of BESS facilities compiled by P&Z Staff on March 18, 2024

Q Land Resource Management Plan (LRMP) Goals & Objectives
*(provided on the ZBA meetings website)*

R Preliminary Finding of Fact, Summary Finding of Fact, and Final Determination for Case 130-AT-24 dated March 28, 2024, with attachment:
- Exhibit A: Proposed Amendment dated March 28, 2024

**LEGAL PUBLICATION: WEDNESDAY, MARCH 13, 2024 CASE: 130-AT-24**

**NOTICE OF PUBLIC HEARING IN REGARD TO AN AMENDMENT TO THE TEXT OF THE CHAMPAIGN COUNTY ZONING ORDINANCE**

CASE 130-AT-24

The Champaign County Zoning Administrator, 1776 East Washington Street, Urbana, has filed a petition to amend the text of the Champaign County Zoning Ordinance. The petition is on file in the office of the Champaign County Department of Planning and Zoning, 1776 East Washington Street, Urbana, IL.

A public hearing will be held **Thursday, March 28, 2024 at 6:30 p.m.** prevailing time in the Shields-Carter Meeting Room, Brookens Administrative Center, 1776 East Washington Street, Urbana, IL, at which time and place the Champaign County Zoning Board of Appeals will consider a petition for the following:

Amend the Champaign County Zoning Ordinance as follows regarding Battery Energy Storage Systems (BESS):

1. Add the following definitions to Section 3.0 Definitions: BATTERY ENERGY STORAGE MANAGEMENT SYSTEM (BESMS), BATTERY ENERGY STORAGE SYSTEM (BESS), TIER-1 BATTERY ENERGY STORAGE SYSTEMS, TIER-2 BATTERY ENERGY STORAGE SYSTEMS.

2. Add new paragraph 4.2.1 C.8. to provide that a BATTERY ENERGY STORAGE SYSTEM may be authorized as a SPECIAL USE Permit in the AG-1 and AG-2 Agriculture Districts as a second PRINCIPAL USE on a LOT with another PRINCIPAL USE.

3. Amend Section 5.2 as follows:
   a. Add "BATTERY ENERGY STORAGE SYSTEM" to be allowed by Special Use Permit in the AG-1 Agriculture, AG-2 Agriculture, B-1 Rural Trade Center, B-4 General Business, I-1 Light Industry and I-2 Heavy Industry Zoning Districts.
   b. Add Footnotes 32 and 33 regarding TIER-1 and TIER-2 requirements.

4. Add new Section 6.1.8 TIER-2 BATTERY ENERGY STORAGE SYSTEMS to establish regulations including but not limited to:
   a. General standard conditions
   b. Minimum lot standards
   c. Minimum separations
   d. Standard conditions for design and installation
   e. Standard conditions to mitigate damage to farmland
   f. Standard conditions for use of public streets
   g. Standard conditions for coordination with local fire protection district
   h. Standard conditions for allowable noise level
   i. Standard conditions for endangered species consultation
   j. Standard conditions for historic and archaeological resources review
   k. Standard conditions for acceptable wildlife impacts
   l. Screening and fencing
   m. Standard condition for liability insurance

n. Operational standard conditions
o. Standard conditions for Decommissioning and Site Reclamation Plan
p. Complaint hotline
q. Standard conditions for expiration of Special Use Permit
r. Application requirements

5. Regarding BATTERY ENERGY STORAGE SYSTEMS fees, revise Section 9 as follows:
   a. Add new paragraph 9.3.1 K. to add application fees for a BATTERY ENERGY STORAGE SYSTEMS Zoning Use Permit.

   b. Add new subparagraph 9.3.3 B.(9) to add application fees for a BATTERY ENERGY STORAGE SYSTEMS SPECIAL USE permit.

All persons interested are invited to attend said hearing and be heard. The hearing may be continued and reconvened at a later time. Meeting materials can be found online about one week before the meeting at: http://www.co.champaign.il.us/CountyBoard/meetings_ZBA.php. If you would like to submit comments or questions before the meeting, please call the P&Z Department at 217-384-3708 or email zoningdept@co.champaign.il.us no later than 4:30 pm the day of the meeting.

Ryan Elwell, Chair
Champaign County Zoning Board of Appeals

**TO BE PUBLISHED: WEDNESDAY, MARCH 13, 2024, ONLY**

Send bill and one copy to: Champaign County Planning and Zoning Dept.
Brookens Administrative Center
1776 E. Washington Street
Urbana, IL 61802
Phone: 384-3708

Our News Gazette account number is 99225860.

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TO: **Environment and Land Use Committee**

FROM: **John Hall, Zoning Administrator**
**Susan Burgstrom, Senior Planner**

DATE: **December 22, 2023**

RE: **Authorization for Public Hearing on Proposed Zoning Ordinance Text Amendment to Add Requirements for Battery Energy Storage Systems (BESS)**

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## BACKGROUND

Battery Energy Storage Systems (BESS) are increasing in demand, particularly in combination with PV Solar Farms or as standalone facilities to bolster the energy grid. Champaign County has received two informal inquiries for BESS and there are no regulations established in the Zoning Ordinance for BESS.

A BESS can be defined as "an electrochemical device that charges (or collects energy) from the grid or a power plant and then discharges that energy at a later time to provide electricity or other grid services when needed" (*Grid-Scale Battery Storage: Frequently Asked Questions*, National Renewable Energy Laboratory).

The major uses and benefits of a BESS are:

- Balancing grid supply and demand and improving quality and reliability
- Peak electricity demand shaving and price arbitrage opportunities
- Storing and smoothing renewable electricity generation
- Deferring electricity infrastructure investments
- Back-up power
- Reducing end-user demand and demand charges
- Integration with microgrids

(Source: US Energy Information Administration)

### BESS in Illinois

The State of Illinois has prioritized BESS through the Clean Energy and Jobs Act (CEJA) of 2021, but so far the State has a very limited set of incentives to offer energy storage developers. P&Z Staff have found no regulations or guidance from the State of Illinois in implementing these systems.

Other counties and municipalities in Illinois have adopted BESS regulations in their ordinances. In developing the proposed amendment for Champaign County, P&Z Staff took other jurisdictions' ordinances into consideration.

## LITHIUM-ION BATTERIES

Lithium-ion batteries are the most commonly used type in a BESS. According to New York State Energy Research and Development Authority (NYSERDA), lithium-ion batteries are preferred because:

- They store the most energy per unit weight or volume of any battery;

- They have a minimal maintenance cost;
- They are readily available – millions are made each year;
- Their cost is dropping; and
- They are portable – utilities can move them as desired.

Lithium-ion batteries also have disadvantages that must be planned for and mitigated if used in a BESS:

- They need protection from overcharge/discharge to avoid thermal runaway, which is an uncontrolled temperature rise that can result in damage to other battery cells, fire, and/or explosion.
- They need temperature control, usually through air-conditioned containers and fans.

Improving technology, stricter engineering certifications, new guidelines from the National Fire Protection Association (NFPA), and appropriate local regulations have contributed to making a BESS much safer than even a few years ago.

## PROPOSED TEXT AMENDMENT

An outline of the proposed amendment is attached.

## TEXT AMENDMENT PUBLIC HEARING TIMELINE

The public hearing requires a legal advertisement in the newspaper and notice provided to all relevant municipalities. If the public hearing is authorized by ELUC on January 4, 2024, the anticipate timeline (*earliest possible dates) is as follows:

| | | |
|---|---|---|
| 1. | Public Hearing opens at the Champaign County Zoning Board of Appeals (CCZBA) | **Thursday, March 14, 2024** |
| 2. | Public Hearing closes at CCZBA and the CCZBA makes recommendations to the Champaign County Board | ***Thursday, April 11, 2024** |
| 3. | Environment and Land Use Committee of the Champaign County Board (ELUC) affirms or amends CCZBA's recommendation | ***Thursday, May 9, 2024** |
| 4. | Environment and Land Use Committee of the Champaign County Board makes a recommendation to the Champaign County Board | ***Thursday, June 6, 2024** |
| 5. | Champaign County Board makes a final determination | ***Thursday, June 20, 2024** |

*earliest anticipated dates of action

## ATTACHMENTS

A Draft BESS Text Amendment to the Champaign County Zoning Ordinance

## EXHIBIT A: PROPOSED AMENDMENT

**1. Add the following to Section 3. Definitions:**

BATTERY ENERGY STORAGE MANAGEMENT SYSTEM (BESMS): An electronic system that protects energy storage systems from operating outside of their safe operating parameters and disconnects electrical power to the energy storage system or places it in a safe condition if potentially hazardous temperatures or other conditions are detected.

BATTERY ENERGY STORAGE SYSTEM (BESS): an energy storage power station that collects energy from the electrical grid and then discharges that energy at a later time to provide electricity when needed.

A. TIER-1 BATTERY ENERGY STORAGE SYSTEMS have an aggregate energy capacity less than or equal to 600kWh and, if in a room or enclosed area, consist of only a single energy storage system technology.

B. TIER-2 BATTERY ENERGY STORAGE SYSTEMS have an aggregate energy capacity greater than 600kWh or are comprised of more than one storage battery technology in a room or enclosed area.

**2. Add new paragraph 4.2.1 C.8. as follows:**

4.2.1 CONSTRUCTION and USE

C. It shall be unlawful to erect or establish more than one MAIN or PRINCIPAL STRUCTURE or BUILDING per LOT or more than one PRINCIPAL USE per LOT in the AG-1, Agriculture, AG-2, Agriculture, CR, Conservation-Recreation, R-1, Single Family Residence, R-2, Single Family Residence, and R-3, Two Family Residence DISTRICTS other than in PLANNED UNIT DEVELOPMENTS except as follows:

8. A BATTERY ENERGY STORAGE SYSTEM may be authorized as a SPECIAL USE Permit in the AG-1 Agriculture and AG-2 Agriculture Zoning Districts as a second PRINCIPAL USE on a LOT with another PRINCIPAL USE."

**3. Amend Section 5.2 as follows:**

**SECTION 5.2 TABLE OF AUTHORIZED PRINCIPAL USES**

- BATTERY ENERGY STORAGE SYSTEM would be a new land use allowed by Special Use Permit in the AG-1 Agriculture, AG-2 Agriculture, B-1 Rural Trade Center, B-4 General Business, I-1 Light Industry and I-2 Heavy Industry Zoning Districts, as shown in the table below.

| Principal USES | Zoning DISTRICTS | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | CR | AG-1 | AG-2 | R-1 | R-2 | R-3 | R-4 | R-5 | B-1 | B-2 | B-3 | B-4 | B-5 | I-1 | I-2 |
| BATTERY ENERGY STORAGE SYSTEM, TIER-1[32] | | | | | | | | | | | | | | | |
| BATTERY ENERGY STORAGE SYSTEM, TIER-2[33] | | S | S | | | | | | S | | | S | | S | S |

## EXHIBIT A: PROPOSED AMENDMENT

| | |
|---|---|
| S | = Permitted on individual LOTS as a Special Use Permit |
| | = Permitted by right |

**4. Add new Footnotes 32 and 33 under Section 5.2 as follows:**

32. A TIER-1 BATTERY ENERGY STORAGE SYSTEM is permitted by-right in all zoning districts, subject to the setback and yard requirements in Section 5.3 of the Zoning Ordinance. No Zoning Use Permit shall be required if the area occupied by the TIER-1 BESS is less than 150 square feet.

33. A TIER-2 BATTERY ENERGY STORAGE SYSTEM is subject to the requirements of Section 6.1.8 of the Zoning Ordinance.

**5. Add new Section 6.1.8 as follows:**

### 6.1.8 TIER-2 BATTERY ENERGY STORAGE SYSTEMS

A TIER-2 BATTERY ENERGY STORAGE SYSTEM SPECIAL USE Permit may only be authorized in the AG-1 Agriculture Zoning DISTRICT, the AG-2 Agriculture Zoning DISTRICT, B-1 Rural Trade Center, B-4 General Business, I-1 Light Industry Zoning District, or the I-2 Heavy Industry Zoning District subject to the following standard conditions.

A. General Standard Conditions

(1) Right to farm

a. The owners of the subject property and the Applicant, its successors in interest, and all parties to the decommissioning plan and site reclamation plan hereby recognize and provide for the right of agricultural activities to continue on adjacent land consistent with the Right to Farm Resolution 3425.

B. Minimum LOT Standards

(1) There are no minimum LOT AREA, AVERAGE LOT WIDTH, or maximum LOT COVERAGE requirements for a TIER-2 BATTERY ENERGY STORAGE SYSTEM.

(2) There is no maximum LOT AREA requirement on BEST PRIME FARMLAND.

C. Minimum Standard Conditions for Separations for a TIER-2 BATTERY ENERGY STORAGE SYSTEMS from adjacent USES and STRUCTURES

The location of each TIER-2 BATTERY ENERGY STORAGE SYSTEM shall provide the following required separations as measured from the BATTERY ENERGY STORAGE SYSTEM fencing:

(1) The perimeter fencing shall be at least 50 feet from the RIGHT OF WAY of any STREET.

(2) The perimeter fencing shall be at least 200 feet from the nearest point on any property line.

(3) There shall be at least 500 feet of separation from any existing DWELLING or existing PRINCIPAL BUILDING. This separation may be reduced to no less than 200 feet upon submission of a PRIVATE WAIVER signed by the owner of said DWELLING or PRINCIPAL BUILDING.

(4) Additional separation may be required to ensure that the noise level required by *35 Ill. Admin. Code Parts 900, 901 and 910* is not exceeded or for other purposes deemed necessary by the BOARD.

(5) When a TIER-2 BATTERY ENERGY STORAGE SYSTEM is included in a PV SOLAR FARM or a SOLAR ARRAY or a WIND FARM, the separations required in Sections 6.1.8 (2) and (3) shall only apply to the TIER-2 BATTERY ENERGY STORAGE SYSTEM, except for the interconnection point and driveway for the TIER-2 BATTERY ENERGY STORAGE SYSTEM, and shall not apply to any part of the PV SOLAR FARM or a SOLAR ARRAY or a WIND FARM.

D. Standard Conditions for Design and Installation of any TIER-2 BATTERY ENERGY STORAGE SYSTEM.

(1) Any building that is part of a TIER-2 BATTERY ENERGY STORAGE SYSTEM shall include as a requirement for a Zoning Compliance Certificate, a certification by an Illinois Professional Engineer or Illinois Licensed Structural Engineer or other qualified professional that the constructed building conforms to Public Act 101-369 regarding building code compliance and conforms to the Illinois Accessibility Code.

(2) Electrical Components

a. All electrical components of the TIER-2 BATTERY ENERGY STORAGE SYSTEM shall conform to the National Electrical Code as amended.

b. All on-site utility lines shall be placed underground to the extent feasible and as permitted by the serving utility, with the exception of the main service connection at the utility company right-of-way and any new interconnection equipment, including without limitation any poles, with new easements and right-of-way. Source: NY BESS Guidebook for Local Governments

(3) Maximum Height. The height limitation established in Section 5.3 shall not apply to a TIER-2 BATTERY ENERGY STORAGE SYSTEM. The maximum height of all above ground STRUCTURES shall be identified in the application and as approved in the SPECIAL USE Permit.

(4) Warnings

a. A reasonably visible warning sign shall be installed and shall include the type of technology associated with the battery energy storage systems, any special hazards associated, the type of suppression system installed in the area of battery energy storage systems, and 24-hour emergency contact information, including reach-back phone number. Source: NY BESS Guidebook for Local Governments

b. As required by the National Electric Code (NEC), disconnect and other emergency shutoff information shall be clearly displayed on a light reflective surface. A clearly visible warning sign concerning voltage shall be placed at the base of all pad-mounted transformers and substations. Source: NY BESS Guidebook for Local Governments

(5) No construction may intrude on any easement or right-of-way for a GAS PIPELINE or HAZARDOUS LIQUID PIPELINE, an underground water main or sanitary sewer, a drainage district ditch or tile, or any other public utility facility unless specifically authorized by a crossing agreement that has been entered into with the relevant party.

(6) Safety

a. System Certification. Battery energy storage systems and equipment shall be listed by a Nationally Recognized Testing Laboratory to UL 9540 (Standard for battery energy storage systems and Equipment) with subcomponents meeting each of the following standards as applicable:

(a) IEEE 1578 (Institute of Electrical and Electronics Engineers; Recommended Practice for Stationary Battery Electrolyte Spill Containment and Management);

(b) NFPA 13 (Standard for Installation of Sprinkler Systems);

(c) NFPA 68 (Standard on Explosion Prevention by Deflagration Venting);

(d) NFPA 69 (Standard on Explosion Prevention Systems);

(e) UL 1973 (Standard for Batteries for Use in Stationary, Vehicle Auxiliary Power and Light Electric Rail Applications);

(f) UL 1642 (Standard for Lithium Batteries);

**EXHIBIT A: PROPOSED AMENDMENT**

(g) UL 1741 or UL 62109 (Inverters and Power Converters);

(h) Certified under the applicable electrical, building, and fire prevention codes as required;

(i) Alternatively, field evaluation by an approved testing laboratory for compliance with UL 9540 and applicable codes, regulations and safety standards may be used to meet system certification requirements.

b. BATTERY ENERGY STORAGE MANAGEMENT SYSTEM.

(a) A TIER-2 BESS shall include a BATTERY ENERGY STORAGE MANAGEMENT SYSTEM to protect the energy storage systems from operating outside of the safe operating parameters and that will disconnect electrical power to the energy storage system or place it in a safe condition if potentially hazardous temperatures or other conditions are detected.

(b) The application shall include a description of the proposed BATTERY ENERGY STORAGE MANAGEMENT SYSTEM by an Illinois Licensed Professional Engineer.

c. Hazard detection systems.

(a) A TIER-2 BESS shall include appropriate hazard detection systems including smoke and heat detectors and gas meters that are monitored by a control center and used to alert operators to emergency situations.

(b) The application shall include a description of the hazard detection systems and the control center by an Illinois Licensed Professional Engineer.

d. Fire suppression

(a) Safe access to the TIER-2 BESS by the relevant Fire Protection Department shall be considered in the site plan design.

(b) Sprinklers should be installed per NFPA 13 but in-rack fire suppression shall also be included. An onsite water source shall be provided that is acceptable to the relevant Fire Protection Department. The sizing of the water source shall be specified in the application by an Illinois Licensed Professional Engineer.

**EXHIBIT A: PROPOSED AMENDMENT**

(c) Containment around the TIE-2 BESS structure shall be provided to capture sprinkler system run-off. The sizing of the containment area shall be specified in the application by an Illinois Licensed Professional Engineer and the containment area shall be detailed on the site plan.

(d) Gaseous suppression agents may be used against incipient fires but shall not be the only suppression agent.

e. Ground-fault protection

(a) Three-phase installations shall have adequate ground-fault protection and the application shall include a discussion of the adequacy of the proposed ground fault protection by an Illinois Licensed Professional Engineer.

(b) Systems with little or no impedance shall be designed to trip off-line automatically.

(c) In systems that have high levels of impedance the overvoltage shall be controlled with grounding banks, other forms of impedance grounding, or surge arresters. The electrical components at risk of overvoltage shall also have phase-to-phase level insulation.

(d) The application shall include a description of the ground-fault protection by an Illinois Licensed Professional Engineer.

f. Control of electrolyte spill. The application shall include a discussion by an Illinois Licensed Professional Engineer regarding possible electrolyte spill and the adequacy of the proposed control of electrolytes in the event of a spill.

g. Ventilation

(a) For TIER-2 BESS that is located inside a habitable building, the ventilation of the TIER-2 BESS should take the building ventilation systems into account to prevent any hazardous gases from being drawn into habitable rooms and putting building occupants at risk.

(b) The application shall include a narrative written by an Illinois Licensed Professional Engineer addressing gas production in the TIER-2 BESS under thermal runaway conditions and the safeguards included to control and/or respond to gas production. The safeguards shall include a series of safeguards including fire suppression, ventilation, and explosion mitigation.

**EXHIBIT A: PROPOSED AMENDMENT**

E. Standard Conditions to Mitigate Damage to Farmland

(1) All underground wiring or cabling for the TIER-2 BATTERY ENERGY STORAGE SYSTEM shall be at a minimum depth of 5 feet below grade or deeper if required to maintain a minimum one foot of clearance between the wire or cable and any agricultural drainage tile.

(2) Protection of agricultural drainage tile

a. The applicant shall endeavor to locate all existing agricultural drainage tile prior to establishing any construction staging areas, construction of any necessary TIER-2 BATTERY ENERGY STORAGE SYSTEM access lanes or driveways, construction of any TIER-2 BATTERY ENERGY STORAGE SYSTEM STRUCTURES, any equipment, underground wiring, or cabling. The applicant shall contact affected landowners and tenants and the Champaign County Soil and Water Conservation District and any relevant drainage district for their knowledge of tile line locations prior to the proposed construction. Drainage districts shall be notified at least two weeks prior to disruption of tile.

b. The location of drainage district tile lines shall be identified prior to any construction and drainage district tile lines shall be protected from disturbance as follows:

(a) All identified drainage district tile lines and any known existing drainage district tile easement shall be staked or flagged prior to construction to alert construction crews of the presence of drainage district tile and the related easement.

(b) Any drainage district tile for which there is no existing easement shall be protected from disturbance by a 30 feet wide no-construction buffer on either side of the drainage district tile. The no-construction buffer shall be staked or flagged prior to the start of construction and shall remain valid for the lifetime of the TIER-2 BATTERY ENERGY STORAGE SYSTEM SPECIAL USE Permit and during any deconstruction activities that may occur pursuant to the TIER-2 BATTERY ENERGY STORAGE SYSTEM SPECIAL USE Permit.

(c) Construction shall be prohibited within any existing drainage district easement and also prohibited within any 30 feet wide no-construction buffer on either side of drainage district tile that does not have an existing easement unless specific construction is authorized in writing by all commissioners of the relevant drainage district. A copy of the written

authorization shall be provided to the Zoning Administrator prior to the commencement of construction.

c. Any agricultural drainage tile located underneath construction staging areas, access lanes, and driveways shall be replaced as required in Section 6.3 of the Champaign County Storm Water Management and Erosion Control Ordinance.

d. Any agricultural drainage tile that must be relocated shall be relocated as required in the *Champaign County Storm Water Management and Erosion Control Ordinance*.

e. Conformance of any relocation of drainage district tile with the *Champaign County Storm Water Management and Erosion Control Ordinance* shall be certified by an Illinois Professional Engineer. Written approval by the drainage district shall be received prior to any backfilling of the relocated drain tile and a copy of the approval shall be submitted to the Zoning Administrator. As-built drawings shall be provided to both the relevant drainage district and the Zoning Administrator of any relocated drainage district tile.

f. All tile lines that are damaged, cut, or removed shall be staked or flagged in such manner that they will remain visible until the permanent repairs are completed.

g. All exposed tile lines shall be screened or otherwise protected to prevent the entry into the tile of foreign materials, loose soil, small mammals, etc.

h. Permanent tile repairs shall be made within 14 days of the tile damage provided that weather and soil conditions are suitable or a temporary tile repair shall be made. Immediate temporary repair shall also be required if water is flowing through any damaged tile line. Temporary repairs are not needed if the tile lines are dry and water is not flowing in the tile provided the permanent repairs can be made within 14 days of the damage.

i. All damaged tile shall be repaired so as to operate as well after construction as before the construction began.

j. Following completion of the TIER-2 BATTERY ENERGY STORAGE SYSTEM construction, the applicant shall be responsible for correcting all tile line repairs that fail, provided that the failed repair was made by the Applicant.

(3) All soil conservation practices (such as terraces, grassed waterways, etc.) that are damaged by TIER-2 BATTERY ENERGY STORAGE SYSTEM construction, maintenance, and/or decommissioning shall be restored by the

applicant to the pre- TIER-2 BATTERY ENERGY STORAGE SYSTEM construction condition.

(4) Topsoil replacement

For any open trenching required pursuant to TIER-2 BATTERY ENERGY STORAGE SYSTEM construction, the topsoil shall be stripped and replaced as follows:

a. The top 12 inches of topsoil shall first be stripped from the area to be trenched and from an adjacent area to be used for subsoil storage. The topsoil shall be stored in a windrow parallel to the trench in such a manner that that it will not become intermixed with subsoil materials.

b. All subsoil material that is removed from the trench shall be placed in the second adjacent stripped windrow parallel to the trench but separate from the topsoil windrow.

c. In backfilling the trench, the stockpiled subsoil material shall be placed back into the trench before replacing the topsoil.

d. The topsoil must be replaced such that after settling occurs, the topsoil's original depth and contour (with an allowance for settling) will be restored.

(5) Mitigation of soil compacting and rutting

a. The Applicant shall not be responsible for mitigation of soil compaction and rutting if exempted by the TIER-2 BATTERY ENERGY STORAGE SYSTEM lease.

b. Unless specifically provided for otherwise in the TIER-2 BATTERY ENERGY STORAGE SYSTEM lease, the Applicant shall mitigate soil compaction and rutting for all areas of farmland that were traversed with vehicles and construction equipment or where topsoil is replaced in open trenches.

(6) Land leveling

a. The Applicant shall not be responsible for leveling of disturbed land if exempted by the TIER-2 BATTERY ENERGY STORAGE SYSTEM lease.

b. Unless specifically provided for otherwise in the TIER-2 BATTERY ENERGY STORAGE SYSTEM lease, the Applicant shall level all disturbed land as follows:

**EXHIBIT A: PROPOSED AMENDMENT**

(a) Following the completion of any open trenching, the applicant shall restore all land to its original pre-construction elevation and contour.

(b) Should uneven settling occur or surface drainage problems develop as a result of the trenching within the first year after completion, the applicant shall again restore the land to its original pre-construction elevation and contour.

(7) Permanent Erosion and Sedimentation Control Plan

a. Prior to the approval of any Zoning Use Permit, the Applicant shall provide a permanent soil erosion and sedimentation plan for the TIER-2 BATTERY ENERGY STORAGE SYSTEM including any access road that conforms to the relevant Natural Resources Conservation Service guidelines and that is prepared by an Illinois Licensed Professional Engineer.

b. As-built documentation of all permanent soil erosion and sedimentation improvements for the TIER-2 BATTERY ENERGY STORAGE SYSTEM including any access road prepared by an Illinois Licensed Professional Engineer shall be submitted and accepted by the Zoning Administrator prior to approval of any Zoning Compliance Certificate.

(8) Retention of all topsoil

No topsoil may be removed, stripped, or sold from the proposed SPECIAL USE Permit site pursuant to or as part of the construction of the TIER-2 BATTERY ENERGY STORAGE SYSTEM.

(9) Minimize disturbance to BEST PRIME FARMLAND

a. Any TIER-2 BATTERY ENERGY STORAGE SYSTEM to be located on BEST PRIME FARMLAND shall minimize the disturbance to BEST PRIME FARMLAND as follows:

(a) The disturbance to BEST PRIME FARMLAND caused by construction and operation of the TIER-2 BATTERY ENERGY STORAGE SYSTEM shall be minimized at all times consistent with good engineering practice.

F. Standard Conditions for Use of Public Streets

Any TIER-2 BATTERY ENERGY STORAGE SYSTEM applicant proposing to use any County Highway or a township or municipal STREET for the purpose of transporting TIER-2 BATTERY ENERGY STORAGE SYSTEM equipment for construction, operation, or maintenance of the TIER-2 BATTERY ENERGY

**EXHIBIT A: PROPOSED AMENDMENT**

STORAGE SYSTEM shall identify all such public STREETS and pay the costs of any necessary permits and the costs to repair any damage to the STREETS caused by the TIER-2 BATTERY ENERGY STORAGE SYSTEM construction, as follows:

(1) Prior to the close of the public hearing before the BOARD, the Applicant shall enter into a Roadway Upgrade and Maintenance agreement approved by the County Engineer and State's Attorney; or Township Highway Commissioner; or municipality where relevant, except for any TIER-2 BATTERY ENERGY STORAGE SYSTEM for which the relevant highway authority has agreed in writing to waive the requirements of subparagraphs 6.1.8 F.1, 6.1.8 F.2, and 6.1.8 F.3, and the signed and executed Roadway Upgrade and Maintenance agreements must provide for the following minimum conditions:

a. The applicant shall agree to conduct a pre- TIER-2 BATTERY ENERGY STORAGE SYSTEM construction baseline survey to determine existing STREET conditions for assessing potential future damage including the following:

(a) A videotape of the affected length of each subject STREET supplemented by photographs if necessary.

(b) Pay for costs of the County to hire a consultant to make a study of any structure on the proposed route that the County Engineer feels may not carry the loads likely during the TIER-2 BATTERY ENERGY STORAGE SYSTEM construction.

(c) Pay for any strengthening of STREET structures that may be necessary to accommodate the proposed traffic loads caused by the PV SOLAR FARM construction.

b. The Applicant shall agree to pay for costs of the County Engineer to hire a consultant to make a study of any structure on the proposed route that the County Engineer feels may not carry the loads likely during the TIER-2 BATTERY ENERGY STORAGE SYSTEM construction and pay for any strengthening of structures that may be necessary to accommodate the proposed traffic loads caused by the TIER-2 BATTERY ENERGY STORAGE SYSTEM construction.

c. The Applicant shall agree upon an estimate of costs for any other necessary roadway improvements prior to construction.

d. The Applicant shall obtain any necessary approvals for the STREET improvements from the relevant STREET maintenance authority.

**EXHIBIT A: PROPOSED AMENDMENT**

e. The Applicant shall obtain any necessary Access Permits including any required plans.

f. The Applicant shall erect permanent markers indicating the presence of underground cables.

g. The Applicant shall install marker tape in any cable trench.

h. The Applicant shall become a member of the Illinois statewide One-Call Notice System (otherwise known as the Joint Utility Locating Information for Excavators or "JULIE") and provide JULIE with all of the information necessary to update its record with respect to the TIER-2 BATTERY ENERGY STORAGE SYSTEM.

i. The Applicant shall use directional boring equipment to make all crossings of County Highways for the cable collection system.

j. The Applicant shall notify the STREET maintenance authority in advance of all oversize moves and crane crossings.

k. The Applicant shall provide the County Engineer with a copy of each overweight and oversize permit issued by the Illinois Department of Transportation for the TIER-2 BATTERY ENERGY STORAGE SYSTEM construction.

l. The Applicant shall transport the TIER-2 BATTERY ENERGY STORAGE SYSTEM loads so as to minimize adverse impact on the local traffic including farm traffic.

m. The Applicant shall schedule TIER-2 BATTERY ENERGY STORAGE SYSTEM construction traffic in a way to minimize adverse impacts on emergency response vehicles, rural mail delivery, school bus traffic, and local agricultural traffic.

n. The Applicant shall provide as much advance notice as in commercially reasonable to obtain approval of the STREET maintenance authority when it is necessary for a STREET to be closed due to a crane crossing or for any other reason. Notwithstanding the generality of the aforementioned, the Applicant will provide 48 hours notice to the extent reasonably practicable.

o. The Applicant shall provide signs indicating all highway and STREET closures and work zones in accordance with the Illinois Department of Transportation Manual on Uniform Traffic Control Devices.

p. The Applicant shall establish a single escrow account and a single Irrevocable Letter of Credit for the cost of all STREET upgrades and

**EXHIBIT A: PROPOSED AMENDMENT**

repairs pursuant to the TIER-2 BATTERY ENERGY STORAGE SYSTEM construction.

q. The Applicant shall notify all relevant parties of any temporary STREET closures.

r. The Applicant shall obtain easements and other land rights needed to fulfill the Applicant's obligations under this Agreement.

s. The Applicant shall agree that the County shall design all STREET upgrades in accordance with the most recent edition of the IDOT Bureau of Local Roads and Streets Manual.

t. The Applicant shall provide written Notice to Proceed to the relevant STREET maintenance authority by December 31 of each year that identifies the STREETS to be upgraded during the following year.

u. The Applicant shall provide dust control and grading work to the reasonable satisfaction of the County Engineer on STREETS that become aggregate surface STREETS.

v. The Applicant shall conduct a post- TIER-2 BATTERY ENERGY STORAGE SYSTEM construction baseline survey similar to the pre- TIER-2 BATTERY ENERGY STORAGE SYSTEM construction baseline survey to identify the extent of repairs necessary to return the STREETS to the pre- TIER-2 BATTERY ENERGY STORAGE SYSTEM construction condition.

w. The Applicant shall pay for the cost of all repairs to all STREETS that are damaged by the Applicant during the construction of the TIER-2 BATTERY ENERGY STORAGE SYSTEM and restore such STREETS to the condition they were in at the time of the pre-TIER-2 BATTERY ENERGY STORAGE SYSTEM construction inventory.

x. All TIER-2 BATTERY ENERGY STORAGE SYSTEM construction traffic shall exclusively use routes designated in the approved Transportation Impact Analysis.

y. The Applicant shall provide liability insurance in an acceptable amount to cover the required STREET construction activities.

z. The Applicant shall pay for the present worth costs of life consumed by the construction traffic as determined by the pavement management surveys and reports on the roads which do not show significant enough deterioration to warrant immediate restoration.

aa. Provisions for expiration date on the agreement.

bb. Other conditions that may be required.

(2) A condition of the County Board SPECIAL USE Permit approval shall be that the Zoning Administrator shall not authorize a Zoning Use Permit for the TIER-2 BATTERY ENERGY STORAGE SYSTEM until the County Engineer and State's Attorney, or Township Highway Commissioner, or municipality where relevant, has approved a Transportation Impact Analysis provided by the Applicant and prepared by an independent engineer that is mutually acceptable to the Applicant and the County Engineer and State's Attorney, or Township Highway Commissioner, or municipality where relevant, that includes the following:

a. Identify all such public STREETS or portions thereof that are intended to be used by the Applicant during construction of the TIER-2 BATTERY ENERGY STORAGE SYSTEM as well as the number of loads, per axle weight of each load, and type of equipment that will be used to transport each load.

b. A schedule of the across road culverts and bridges affected by the project and the recommendations as to actions, if any, required with respect to such culverts and bridges and estimates of the cost to replace such culverts and bridges.

c. A schedule of the anticipated STREET repair costs to be made in advance of the TIER-2 BATTERY ENERGY STORAGE SYSTEM construction and following construction of the TIER-2 BATTERY ENERGY STORAGE SYSTEM.

d. The Applicant shall reimburse the County Engineer, or Township Highway Commissioner, or municipality where relevant, for all reasonable engineering fees including the cost of a third-party consultant, incurred in connection with the review and approval of the Transportation Impact Analysis.

(3) At such time as decommissioning takes place, the Applicant or its successors in interest shall enter into a Roadway Use and Repair Agreement with the appropriate highway authority.

G. Standard Conditions for Coordination with Local Fire Protection District

(1) The Applicant shall submit to the local fire protection district a copy of the site plan.

(2) The Owner or Operator shall cooperate with the local fire protection district to develop the fire protection district's emergency response plan. The emergency response plan shall include the following information:

a. Procedures for safe shutdown, de-energizing, or isolation of equipment and systems under emergency conditions to reduce the risk of fire, electric shock, and personal injuries, and for safe start-up following cessation of emergency conditions.

b. Procedures for inspection and testing of associated alarms, interlocks, and controls.

c. Procedures to be followed in response to notifications from the TIER-2 BATTERY ENERGY STORAGE MANAGEMENT SYSTEM, when provided, that could signify potentially dangerous conditions, including shutting down equipment, summoning service and repair personnel, and providing agreed upon notification to fire department personnel for potentially hazardous conditions in the event of a system failure.

d. Emergency procedures to be followed in case of fire, explosion, release of liquids or vapors, damage to critical moving parts, or other potentially dangerous conditions. Procedures can include sounding the alarm, notifying the fire department, evacuating personnel, de-energizing equipment, and controlling and extinguishing the fire.

e. Response considerations similar to a safety data sheet (SDS) that will address response safety concerns and extinguishment when an SDS is not required.

f. Procedures for dealing with TIER-2 BATTERY ENERGY STORAGE SYSTEM equipment damaged in a fire or other emergency event, including maintaining contact information for personnel qualified to safely remove damaged TIER-2 BATTERY ENERGY STORAGE SYSTEM equipment from the facility.

g. Other procedures as determined necessary by the relevant Fire Protection District to provide for the safety of occupants, neighboring properties, and emergency responders.

h. Procedures and schedules for conducting drills of these procedures and for training local first responders on the contents of the plan and appropriate response procedures.

Source: NY BESS Guidebook for Local Governments

(3) Nothing in this section shall alleviate the need to comply with all other applicable fire laws and regulations.

H. Standard Conditions for Allowable Noise Level

**EXHIBIT A: PROPOSED AMENDMENT**

(1) Noise levels from any TIER-2 BATTERY ENERGY STORAGE SYSTEM shall be in compliance with the applicable Illinois Pollution Control Board (IPCB) regulations (*35 Illinois Administrative Code*, Subtitle H: Noise, Parts 900, 901, 910).

(2) The Applicant shall submit manufacturer's sound power level characteristics and other relevant data regarding noise characteristics of proposed TIER-2 BATTERY ENERGY STORAGE SYSTEM equipment necessary for a competent noise analysis.

(3) The Applicant, through the use of a qualified professional, as part of the siting approval application process, shall appropriately demonstrate compliance with the above noise requirements as follows:

a. The SPECIAL USE Permit application for a TIER-2 BATTERY ENERGY STORAGE SYSTEM shall include a noise analysis that includes the following:

(a) The pre-development 24-hour ambient background sound level shall be identified at representative locations near the site of the proposed TIER-2 BATTERY ENERGY STORAGE SYSTEM.

(b) Computer modeling shall be used to generate the anticipated sound level resulting from the operation of the proposed TIER-2 BATTERY ENERGY STORAGE SYSTEM within 1,500 feet of the proposed TIER-2 BATTERY ENERGY STORAGE SYSTEM.

(c) Results of the ambient background sound level monitoring and the modeling of anticipated sound levels shall be clearly stated in the application and the application shall include a map of the modeled noise contours within 1,500 feet of the proposed TIER-2 BATTERY ENERGY STORAGE SYSTEM.

(d) The application shall also clearly state the assumptions of the computer model's construction and algorithms so that a competent and objective third party can as simply as possible verify the anticipated sound data and sound levels.

(4) After construction of the TIER-2 BATTERY ENERGY STORAGE SYSTEM, the Zoning Administrator shall take appropriate enforcement action as necessary to investigate noise complaints in order to determine the validity of the complaints and take any additional enforcement action as proves warranted to stop any violation that is occurring, including but not limited to the following:

a. The Zoning Administrator shall make the Environment and Land Use Committee aware of complaints about noise.

b. If the Environment and Land Use Committee determines that the noise is excessive, the Environment and Land Use Committee shall require the Owner or Operator to take responsible steps to mitigate the excessive noise.

I. Standard Conditions for Endangered Species Consultation

The Applicant shall apply for consultation with the Endangered Species Program of the Illinois Department of Natural Resources. The Application shall include a copy of the Agency Action Report from the Endangered Species Program of the Illinois Department of Natural Resources or, if applicable, a copy of the Detailed Action Plan Report submitted to the Endangered Species Program of the Illinois Department of Natural Resources and a copy of the response from the Illinois Department of Natural Resources.

J. Standard Conditions for Historic and Archaeological Resources Review

The Applicant shall apply for consultation with the State Historic Preservation Officer of the Illinois Department of Natural Resources. The Application shall include a copy of the Agency Action Report for the State Historic Preservation Officer of the Illinois Department of Natural Resources.

K. Standard Conditions for Acceptable Wildlife Impacts

The TIER-2 BATTERY ENERGY STORAGE SYSTEM shall be located, designed, constructed, and operated so as to avoid and if necessary mitigate the impacts to wildlife to a sustainable level of mortality.

L. Screening and Fencing

(1) Perimeter fencing

a. TIER-2 BATTERY ENERGY STORAGE SYSTEM equipment and structures shall be fully enclosed and secured by a fence with a minimum height of 7 feet.

b. Knox boxes and keys shall be provided at locked entrances for emergency personnel access.

c. Vegetation between the fencing and the LOT LINE shall be maintained such that NOXIOUS WEEDS are controlled or eradicated consistent with the Illinois Noxious Weed Law (505 *ILCS* 100/1 *et. seq.*). Management of the vegetation shall be explained in the application.

**EXHIBIT A: PROPOSED AMENDMENT**

(2) Screening

a. Areas within 10 feet on each side of the TIER-2 BATTERY ENERGY STORAGE SYSTEM shall be cleared of combustible vegetation and other combustible growth. Source: DeKalb County draft ordinance

b A visual screen shall be provided around the perimeter of the TIER-2 BATTERY ENERGY STORAGE SYSTEM as follows:

(a) The visual screen shall be provided for any part of the TIER-2 BATTERY ENERGY STORAGE SYSTEM that is visible to and located within 1,000 feet of an existing DWELLING or residential DISTRICT except that the visual screen may not be required within the full 1,000 feet of an existing DWELLING or residential DISTRICT provided the Applicant submits a landscape plan prepared by an Illinois Registered Landscape Architect and the BOARD finds that the visual screen in the landscape plan provides adequate screening. However, the visual screen shall not be required if the TIER-2 BATTERY ENERGY STORAGE SYSTEM is not visible to a DWELLING or residential DISTRICT by virtue of the existing topography.

(b) The visual screen shall be waived if the owner(s) of a relevant DWELLING(S) have agreed in writing to waive the screening requirement and a copy of the written waiver is submitted to the BOARD or GOVERNING BODY.

(c) The visual screen shall be a vegetated buffer as follows:

i. A vegetated visual screen buffer that shall include a continuous line of native evergreen foliage and/or native shrubs and/or native trees and/or any existing wooded area and/or plantings of tall native greases and other native flowering plants and/or an area of agricultural crop production that will conceal the TIER-2 BATTERY ENERGY STORAGE SYSTEM from view from adjacent abutting property may be authorized as an alternative visual screen subject to specific conditions.

ii. Any vegetation that is part of the approved visual screen buffer shall be maintained in perpetuity of the TIER-2 BATTERY ENERGY STORAGE SYSTEM. If the evergreen foliage below a height of 7 feet disappears over time, the screening shall be replaced.

iii. The continuous line of native evergreen foliage and/or native shrubs and/or native trees shall be planted at a minimum height of 5 feet tall and shall be planted in multiple rows as required to provide a 50% screen within 2 years of planting. The planting shall otherwise conform to Natural Resources Conservation Service Practice Standard 380 Windbreak/Shelterbreak Establishment except that the planting shall be located as close as possible to the PV SOLAR FARM fence while still providing adequate clearance for maintenance.

iv. A planting of tall native grasses and other native flowing plants may be used as a visual screen buffer provided that the width of planting shall be authorized by the BOARD and the planting shall otherwise be planted and maintained per the recommendations of the Natural Resources Conservation Service Practice Standard 327 Conservation Cover and further provided that the PV SOLAR FARM perimeter fence is opaque.

v. An area of agricultural crop production may also be authorized by the BOARD as an alternative visual screen buffer with a width of planting as authorized by the BOARD provided that the TIER-2 BATTERY ENERGY STORAGE SYSTEM perimeter fence is opaque. Any area of crop production that is used as a vegetated visual screen shall be planted annually and shall be replanted as necessary to ensure a crop every year regardless of weather or market conditions.

vi. Any vegetated screen buffer shall be detailed in a landscape plan drawing that shall be included with the TIER-2 BATTERY ENERGY STORAGE SYSTEM SPECIAL USE Permit application.



M. Standard Condition for Liability Insurance

(1) The Owner or Operator of the TIER-2 BATTERY ENERGY STORAGE SYSTEM shall maintain a current general liability policy covering bodily injury and property damage with minimum limits of at least $5 million per occurrence and $5 million in the aggregate.

(2) The general liability policy shall identify landowners in the SPECIAL USE Permit as additional insured.

N. Operational Standard Conditions

**EXHIBIT A: PROPOSED AMENDMENT**

(1) Maintenance

a. Any physical modification to the TIER-2 BATTERY ENERGY STORAGE SYSTEM that increases the number of batteries or structures and/or the land area occupied by the TIER-2 BATTERY ENERGY STORAGE SYSTEM shall require a new SPECIAL USE Permit. Like-kind replacements shall not require recertification nor will replacement of equipment provided replacement is done in fashion similar to the original installation.

(2) Materials Handling, Storage and Disposal

a. All solid wastes related to the construction, operation and maintenance of the TIER-2 BATTERY ENERGY STORAGE SYSTEM shall be removed from the site promptly and disposed of in accordance with all Federal, State and local laws.

b. All hazardous materials related to the construction, operation, maintenance, and decommissioning of the TIER-2 BATTERY ENERGY STORAGE SYSTEM shall be handled, stored, transported and disposed of in accordance with all applicable local, State and Federal laws.

(3) Vegetation management

a. The TIER-2 BATTERY ENERGY STORAGE SYSTEM SPECIAL USE Permit application shall include a weed control plan for the total area of the SPECIAL USE Permit including areas both inside of and outside of the perimeter fencing.

b. The weed control plan shall ensure the control and/or eradication of NOXIOUS WEEDS consistent with the Illinois Noxious Weed Law (55 *ILCS* 100/1 *et. seq.*).

c. The weed control plan shall be explained in the application.

O. Standard Condition for Decommissioning and Site Reclamation Plan

(1) The Applicant shall submit a signed decommissioning and site reclamation plan conforming to the requirements of paragraph 6.1.1A.

(2) In addition to the purposes listed in subparagraph 6.1.1A.4., the decommissioning and site reclamation plan shall also include provisions for anticipated repairs to any public STREET used for the purpose of reclamation of the TIER-2 BATTERY ENERGY STORAGE SYSTEM and all costs related to removal of access driveways.

**EXHIBIT A: PROPOSED AMENDMENT**

(3) The decommissioning and site reclamation plan required in paragraph 6.1.1A. shall also include the following:

a. A stipulation that the applicant or successor shall notify the GOVERNING BODY by certified mail of the commencement of voluntary or involuntary bankruptcy proceeding, naming the applicant as debtor, within ten days of commencement of proceeding.

b. A stipulation that the applicant shall agree that the sale, assignment in fact or law, or such other transfer of applicant's financial interest in the TIER-2 BATTERY ENERGY STORAGE SYSTEM shall in no way affect or change the applicant's obligation to continue to comply with the terms of this plan. Any successor in interest, assignee, and all parties to the decommissioning and site reclamation plan shall assume the terms, covenants, and obligations of this plan and agrees to assume all reclamation liability and responsibility for the TIER-2 BATTERY ENERGY STORAGE SYSTEM.

c. Authorization for the GOVERNING BODY and its authorized representatives for right of entry onto the TIER-2 BATTERY ENERGY STORAGE SYSTEM premises for the purpose of inspecting the methods of reclamation or for performing actual reclamation if necessary.

d. A stipulation that at such time as decommissioning takes place the Applicant, its successors in interest, and all parties to the decommissioning and site reclamation plan are required to enter into a Roadway Use and Repair Agreement with the relevant highway authority.

e. A stipulation that the Applicant, its successors in interest, and all parties to the decommissioning and site reclamation plan shall provide evidence of any new, additional, or substitute financing or security agreement to the Zoning Administrator throughout the operating lifetime of the project.

f. A stipulation that the Applicant, its successors in interest, and all parties to the decommissioning and site reclamation plan shall be obliged to perform the work in the decommissioning and site reclamation plan before abandoning the TIER-2 BATTERY ENERGY STORAGE SYSTEM or prior to ceasing operations of the TIER-2 BATTERY ENERGY STORAGE SYSTEM, after it has begun, other than in the ordinary course of business. This obligation shall be independent of the obligation to pay financial assurance and shall not be limited by the amount of financial assurance. The

obligation to perform the reclamation work shall constitute a covenant running with the land.

g. The decommissioning and site reclamation plan shall provide for payment of any associated costs that Champaign COUNTY may incur in the event that decommissioning is actually required. Associated costs include all administrative and ancillary costs associated with drawing upon the financial assurance and performing the reclamation work and shall include but not be limited to: attorney's fees; construction management and other professional fees; and, the costs of preparing requests for proposals and bidding documents required to comply with State law or Champaign COUNTY purchasing policies.

h. Provisions for the removal of structures, debris, cabling, and associated equipment on the surface and to a level of not less than five feet below the surface, and the sequence in which removal is expected to occur. Source: Sangamon County, IL

i. A stipulation that should the decommissioning and site reclamation plan be deemed invalid by a court of competent jurisdiction the TIER-2 BATTERY ENERGY STORAGE SYSTEM SPECIAL USE Permit shall be deemed void.

j. A stipulation that the Applicant's obligation to complete the decommissioning and site reclamation plan and to pay all associated costs shall be independent of the Applicant's obligation to provide financial assurance.

k. A stipulation that the liability of the Applicant's failure to complete the decommissioning and site reclamation plan or any breach of the decommissioning and site reclamation plan requirement shall not be capped by the amount of financial assurance.

l. If the Applicant desires to remove equipment or property credited to the estimated salvage value without the concurrent replacement of the property with property of equal or greater salvage value, or if the Applicant installs equipment or property increasing the cost of decommissioning after the TIER-2 BATTERY ENERGY STORAGE SYSTEM begins operations, at any point, the Applicant shall first obtain the consent of the Zoning Administrator. If the Applicant's lien holders remove equipment or property credited to the salvage value, the Applicant shall promptly notify the Zoning Administrator. In either of these events, the total financial assurance shall be adjusted to reflect any change in total salvage value and total decommissioning costs resulting from any such removal or installation.

m. A listing of any contingencies for removing an intact operational energy storage system from service, and for removing an energy storage system from service that has been damaged by a fire or other event.

(4) To comply with paragraph 6.1.1A.5., the Applicant shall provide financial assurance in the form of an irrevocable letter of credit as follows:

a. At the time of SPECIAL USE Permit approval, the amount of financial assurance to be provided for the decommissioning and site reclamation plan shall be 125% of the decommissioning cost as determined in the independent engineer's cost estimate to complete the decommissioning work described in Section 6.1.1A.4.a. and 6.1.1A.4.b., and 6.1.1A.4c. and shall otherwise be compliant with Section 6.1.1A.5. except that if the TIER-2 BATTERY ENERGY STORAGE SYSTEM has a limited power warranty to provide not less than 80% nominal power output up to 25 years and proof of that warranty is provided at the time of Zoning Use Permit approval, financial assurance may be provided for the decommissioning and site reclamation plan as follows:

(a) No Zoning Use Permit to authorize construction of the TIER-2 BATTERY ENERGY STORAGE SYSTEM shall be authorized by the Zoning Administrator until the TIER-2 BATTERY ENERGY STORAGE SYSTEM owner shall provide the COUNTY with financial assurance to cover 10% of the decommissioning cost as determined in the independent engineer's cost estimate to complete the decommissioning work described in Sections 6.1.1A.4.a. and 6.1.1A.4.b. and 6.1.1A.4.c. and otherwise compliant with Section 6.1.1A.5.

(b) On or before the sixth anniversary of the Commercial Operation Date, the TIER-2 BATTERY ENERGY STORAGE SYSTEM Owner shall provide the COUNTY with Financial Assurance to cover 50% of the decommissioning cost as determined in the independent engineer's cost estimate to complete the decommissioning work described in Sections 6.1.1A.4.a. and 6.1.1A.4.b. and 6.1.1A.4.c. and otherwise compliant with Section 6.1.1A.5.

(c) On or before the eleventh anniversary of the Commercial Operation Date, the TIER-2 BATTERY ENERGY STORAGE SYSTEM Owner shall provide the COUNTY with Financial Assurance to cover 100% of the decommissioning cost as determined in the independent engineer's cost estimate to complete the decommissioning

work described in Sections 6.1.1A.4.a. and 6.1.1A.4.b. and 6.1.1A.4.c. and otherwise compliant with Section 6.1.1A.5.

b. Net salvage value may be deducted for decommissioning costs as follows:

(a) One of the following standards shall be met:

i. The Applicant, its successors in interest, and all parties to the decommissioning and site reclamation plan shall maintain the TIER-2 BATTERY ENERGY STORAGE SYSTEM free and clear of liens and encumbrances, including financing liens and shall provide proof of the same prior to issuance of the SPECIAL USE Permit; or

ii. The Applicant, its successors in interest, and all parties to the decommissioning and site reclamation plan shall deduct from the salvage vale credit the amount of any lien or encumbrance on the TIER-2 BATTERY ENERGY STORAGE SYSTEM; or

iii. Any and all financing and/or financial security agreements entered into by the Applicant, its successors in interest, and all parties to the decommissioning and site reclamation plan shall expressly provide that the agreements are subject to the covenant required by Section 6.1.1A.2 that the reclamation work be done.

(b) The Applicant, its successors in interest, and all parties to the decommissioning and site reclamation plan shall provide proof of compliance with paragraph 6.1.8 O.(4).b.(a) prior to the issuance of any Zoning Use Permit and upon every renewal of the financial assurance and at any other time upon the request of the Zoning Administrator.

(c) The Applicant, its successors in interest, and all parties to the decommissioning and site reclamation plan shall provide in the decommissioning and site reclamation plan for legal transfer of the STRUCTURE to the demolisher to pay the costs of reclamation work, should the reclamation work be performed.

(d) The net estimated salvage value that is deducted from the estimated decommissioning costs shall be the salvage value that results after all related costs for demolition and any required preparation for transportation for reuse or recycling

or for simple disposal and other similar costs including but not limited to the decommissioning of the TIER-2 BATTERY ENERGY STORAGE SYSTEM STRUCTURES, equipment, and access roads.

(e) Estimated salvage value shall be based on the average salvage price of the past five years as published in a reputable source for salvage values and shall reflect sound engineering judgement as to anticipated changes in salvage prices prior to the next update of estimated net salvage value.

(f) The total financial assurance after deduction of the net estimated salvage value shall not be less than $1,000 per acre.

(g) The credit for net estimated salvage value attributable to any TIER-2 BATTERY ENERGY STORAGE SYSTEM may not exceed the estimated cost of removal of the above-ground portion of that TIER-2 BATTERY ENERGY STORAGE SYSTEM on the subject site.

c. The GOVERNING BODY has the right to require multiple letters of credit based on the regulations governing federal insurance for deposits.

d. The Applicant, its successors in interest, and all parties to the decommissioning and site reclamation plan shall adjust the amount of the financial assurance to ensure that it reflects current and accurate information as follows:

(a) On the tenth anniversary of the financial assurance and at least once every five years thereafter, the Applicant, its successors in interest, and all parties to the decommissioning and site reclamation plan shall use an independent Illinois Licensed Professional Engineer to provide updated estimates of decommissioning costs and salvage value, by including any changes due to inflation and/or change in salvage price. The Applicant, its successors in interest, and all parties to the decommissioning and site reclamation plan shall, upon receipt, provide a copy of the adjusted Professional Engineer's report to the Zoning Administrator.

(b) At all times, the value of the irrevocable letter of credit shall equal or exceed the amount of the independent engineer's cost estimate as increased by known and documented rates of inflation based on the Consumer Price Index since the TIER-

2 BATTERY ENERGY STORAGE SYSTEM was approved.

e. The long term corporate debt (credit) rating of the letter of credit issuing financial institution by both Standard & Poor's Financial Services LLC (S&P) and Moody's Investors Service (Moody's) shall be equal to or greater than the minimum acceptable long term corporate debt (credit) rating, as follows:

(a) The Zoning Administrator shall verify the long term corporate debt (credit) rating of the proposed financial institution by Standard and Poor's Financial Services LLC (S&P) and/or Moody's Investors Service (Moody's) and/or the Kroll Bond Rating Agency.

(b) The minimum acceptable long term corporate debt (credit) rating of the proposed financial institution shall be a rating of "A-" by S&P or a rating of "A3" by Moody's, or a rating of "A-" by Kroll Bond Rating Agency.

(c) Whenever the most current long term corporate debt (credit) rating of the proposed financial institution by either S&P, Moody's, or Kroll Bond Rating Agency is lower than the minimum acceptable long term corporate debt (credit) rating, the letter of credit shall be replaced with a new irrevocable letter of credit from an issuing financial institution whose most current long term corporate debt (credit) rating by either S&P, Moody's, or Kroll Bond Rating Agency meets or exceeds the minimum acceptable long term corporate debt (credit) rating.

f. Should the salvage value of components be adjusted downward or the decommissioning costs adjusted upward pursuant to paragraph 6.1.8 O.(4)d., the amount of the irrevocable letter of credit pursuant to this paragraph 6.1.8 O.(4) shall be increased to reflect the adjustment, as if the adjusted estimate were the initial estimate.

g. Unless the Governing Body approves otherwise, the Champaign County State's Attorney's Office shall review and approve every Letter of Credit prior to acceptance by the Zoning Administrator.

(5) In addition to the conditions listed in subparagraph 6.1.1A.9. the Zoning Administrator may also draw on the funds for the following reasons:

a. In the event that any TIER-2 BATTERY ENERGY STORAGE SYSTEM or component thereof ceases to be functional for more than six consecutive months after it starts producing electricity and

the Owner is not diligently repairing such TIER-2 BATTERY ENERGY STORAGE SYSTEM or component.

b. In the event that the Owner declares the TIER-2 BATTERY ENERGY STORAGE SYSTEM or any TIER-2 BATTERY ENERGY STORAGE SYSTEM component to be functionally obsolete for tax purposes.

c. There is a delay in the construction of any TIER-2 BATTERY ENERGY STORAGE SYSTEM of more than 6 months after construction on that TIER-2 BATTERY ENERGY STORAGE SYSTEM begins.

d. Any TIER-2 BATTERY ENERGY STORAGE SYSTEM or component thereof that appears in a state of disrepair or imminent collapse and/or creates an imminent threat to the health or safety of the public or any person.

e. Any TIER-2 BATTERY ENERGY STORAGE SYSTEM or component thereof that is otherwise derelict for a period of 6 months.

f. The TIER-2 BATTERY ENERGY STORAGE SYSTEM is in violation of the terms of the TIER-2 BATTERY ENERGY STORAGE SYSTEM SPECIAL USE Permit for a period exceeding ninety (90) days.

g. The Applicant, its successors in interest, and all parties to the decommissioning and site reclamation plan has failed to maintain financial assurance in the form and amount required by the SPECIAL USE Permit or compromised the COUNTY's interest in the decommissioning and site reclamation plan.

h. The COUNTY discovers any material misstatement of fact of misleading omission of fact made by the Applicant in the course of the SPECIAL USE Permit Zoning Case.

i. The Applicant has either failed to receive a copy of the certification of design compliance required by paragraph 6.1.8 D. or failed to submit it to the COUNTY within 12 consecutive months of receiving a Zoning Use Permit regardless of the efforts of the Applicant to obtain such certification.

(6) The Zoning Administrator may, but is not required to, deem the TIER-2 BATTERY ENERGY STORAGE SYSTEM abandoned, or the standards set forth in Section 6.1.8 O.(5) met, with respect to some, but not all, of the TIER-2 BATTERY ENERGY STORAGE SYSTEM. In that event, the Zoning Administrator may draw upon the financial assurance to perform the

**EXHIBIT A: PROPOSED AMENDMENT**

reclamation work as to that portion of the TIER-2 BATTERY ENERGY STORAGE SYSTEM only. Upon completion of that reclamation work, the salvage value and reclamation costs shall be recalculated as to the remaining TIER-2 BATTERY ENERGY STORAGE SYSTEM.

(7) The decommissioning and site reclamation plan shall be included as a condition of approval by the Board and the signed and executed irrevocable letter of credit and evidence of the escrow account must be submitted to the Zoning Administrator prior to any Zoning Use Permit approval.

P. Complaint Hotline

(1) Prior to the commencement of construction on the TIER-2 BATTERY ENERGY STORAGE SYSTEM and during the entire term of the COUNTY Board SPECIAL USE Permit and any extension, the Applicant and Owner shall establish a telephone number hotline for the general public to call with any complaints or questions.

(2) The telephone number hotline shall be publicized and posted at the operations and maintenance center and the construction marshalling yard.

(3) The telephone number hotline shall be manned during usual business hours and shall be an answering recording service during other hours.

(4) Each complaint call to the telephone number hotline shall be logged and identify the name and address of the caller and the reason for the call.

(5) All calls shall be recorded and the recordings shall be saved for transcription for a minimum of two years.

(6) A copy of the telephone number hotline log shall be provided to the Zoning Administrator on a monthly basis.

(7) The Applicant and Owner shall take necessary actions to resolve all legitimate complaints.

Q. Standard Conditions for Expiration of TIER-2 BATTERY ENERGY STORAGE SYSTEM SPECIAL USE Permit

A TIER-2 BATTERY ENERGY STORAGE SYSTEM SPECIAL USE Permit designation shall expire in 10 years if no Zoning Use Permit is granted.

R. Application Requirements

(1) In addition to all other information required on the SPECIAL USE Permit application and required by Section 9.1.11A.2., the application shall contain or be accompanied by the following information:

that shall be required for any Zoning Use Permit. Greater separation and somewhat different locations may be provided in the approved site plan for the Zoning Use Permit provided that the greater separation does not increase the noise impacts that were approved in the TIER-2 BATTERY ENERGY STORAGE SYSTEM SPECIAL USE Permit.

d. An electrical diagram detailing the TIER-2 BATTERY ENERGY STORAGE SYSTEM layout, associated components, and electrical interconnection methods, with all National Electrical Code compliant disconnects and overcurrent devices. Source: Johnson County, IA

e. All other required studies, reports, certifications, and approvals demonstrating compliance with the provisions of this Ordinance.

(2) The Applicant shall notify the COUNTY of any changes to the information provided above that occurs while the SPECIAL USE Permit application is pending.

**6. Add new Section 9.3.1 K. as follows:**

K. TIER-1 BATTERY ENERGY STORAGE SYSTEM.....no fee

TIER-2 BATTERY ENERGY STORAGE SYSTEM.....$1800 per megawatt

**7. Add new Section 9.3.3 B.(9) as follows:**

(9) TIER-1 BATTERY ENERGY STORAGE SYSTEM.....no fee

TIER-2 BATTERY ENERGY STORAGE SYSTEM.....$1,320 per megawatt

FACT SHEET


# ENERGY STORAGE SYSTEMS SAFETY FACT SHEET

Because of the growing concerns surrounding the use of fossil fuels and a greater demand for a cleaner, more efficient, and more resilient energy grid, the use of energy storage systems, or ESS, has increased dramatically in the past decade. Renewable sources of energy such as solar and wind power are intermittent, and so storage becomes a key factor in supplying reliable energy. ESS also help meet energy demands during peak times and can supply backup power during natural disasters and other emergencies. However, the rise in the number of ESS installations requires the need for a heightened understanding of the hazards involved and more extensive measures to reduce the risks.

## What Is an ESS?

An energy storage system, often abbreviated as ESS, is a device or group of devices assembled together, capable of storing energy in order to supply electrical energy at a later time. Battery ESS are the most common type of new installation and are the focus of this fact sheet.

**DID YOU KNOW?**

According to the US Department of Energy, in 2019, about 18 percent of electricity generated at utility-scale electricity generation facilities in the United States was from renewable energy sources.

## What Are the Advantages?

ESS have many useful applications.

### Supplement Renewables

Renewable energies such as solar panels or wind turbines only produce electricity when the sun is out or the wind is blowing. Supplementing these with ESS allows users to take advantage of the electricity that is generated when the renewable energy technologies are not producing electricity.

### Peak Shaving

ESS allows a user to shift where their electricity comes from by drawing power from the batteries during the higher-cost daytime hours then recharging during the lower-cost nighttime hours. This practice is referred to as peak shaving.

### Load Leveling

When power generation facilities ramp up and ramp down to keep up with the changing demand for electricity, it puts stress on the system. ESS can help flatten out the demand curve by charging when electrical demand is low and discharging when it is high.

### Uninterruptible Power Supply

ESS can provide near instantaneous protection from power interruptions and are often used in hospitals, data centers, and homes.

## What Are Some of the Hazards?

### Thermal Runaway

Thermal runaway is a term used for the rapid uncontrolled release of heat energy from a battery cell; it is a condition when a battery creates more heat than it can effectively dissipate. Thermal runaway in a single cell can result in a chain reaction that heats up neighboring cells. As this process continues, it can result in a battery fire or explosion. This can often be the ignition source for larger battery fires.

### Stranded Energy

As with most electrical equipment there is a shock hazard present, but what is unique about ESS is that often, even after being involved in a fire, there is still energy within the ESS. This is difficult to discharge since the terminals are often damaged and presents a hazard to those performing overhaul after a fire. Stranded energy can also cause reignition of the fire hours or even days later.

FACT SHEET

# ENERGY STORAGE SYSTEMS SAFETY FACT SHEET *CONTINUED*

## Toxic and Flammable Gases Generated

Most batteries create toxic and flammable gases when they undergo thermal runaway. If the gases do not ignite before the lower explosive limit is reached, it can lead to the creation of an explosive atmosphere inside of the ESS room or container.

## Deep Seated Fires

ESS are usually comprised of batteries that are housed in a protective metal or plastic casing within larger cabinets. These layers of protection help prevent damage to the system but can also block water from accessing the seat of the fire. This means that it takes large amounts of water to effectively dissipate the heat generated from ESS fires since cooling the hottest part of the fire is often difficult.

## Failure Modes

These are ways the batteries can fail, often leading to thermal runaway and subsequent fires or explosions.

## Mechanical Abuse

Mechanical abuse is when a battery is physically compromised by either being dropped, crushed, or penetrated.

## Thermal Abuse

Thermal abuse can occur when a battery is exposed to external heat sources.

## Electrical Abuse

Electrical abuse can happen when the battery is overcharged, charged too rapidly or at high voltage, or discharged too rapidly.

## Environmental Impacts

Environmental impacts that can lead to battery failure include seismic activity, rodent damage to wiring, extreme heat, and floods.

## How Do We Help Keep People and Property Safe?

### For the Designer/Installer:

**Explosion Protection/Prevention**

If there are enough batteries in a room to create an explosive atmosphere, then explosion prevention systems or deflagration venting should be installed per NFPA 69, *Standard on Explosion Prevention Systems,* and NFPA 68, *Standard on Explosion Protection by Deflagration Venting.*

**Fire Suppression System**

Testing has shown water to be the most effective medium for cooling an ESS fire. A sprinkler system that complies with NFPA 13, *Standard for the Installation of Sprinkler Systems,* should be installed in buildings where an ESS is installed.

**Battery Management System**

A system that monitors, controls, and optimizes performance of an individual or multiple battery modules in an ESS and can control the disconnection of the module(s) from the system in the event of abnormal conditions.

**Spacing**

ESS units should be grouped into small segments limited to certain kilo-watt hours (kWh) and spaced from other segments and walls to prevent horizontal propagation. The table below, which summarizes information from a Fire Protection Research Foundation (FPRF) report, "Sprinkler Protection Guidance for Lithium-Ion Based Energy Storage Systems" (2019), demonstrates the recommended spacing for the testing for specific chemistries and arrangements.

**Recommended Separation of Lithium-Ion Battery Energy Storage Systems**

| ESS Type & Capacity | Object Combustibility | Sprinklered | Nonsprinklered |
|---|---|---|---|
| LFP 83 kWh | Combustible | – | 1.8 m (6 ft) |
| | Noncombustible | – | 1.2 m (4 ft) |
| NMC 47 kWh | Combustible | 2.7 m (9 ft) | 4.0 m (13 ft) |
| | Noncombustible | 1.8 m (6 ft) | 2.4 m (8 ft) |
| NMC 125 kWh | Combustible | – | 1.2 m (4 ft) |
| | Noncombustible | – | < 0.9 m (< 3 ft) |
| LFP 31 kWh | Combustible | 1.5 m (5 ft) | 1.8 m (6 ft) |
| | Noncombustible | 0.9 m (3 ft) | 1.2 m (4 ft) |

### For the AHJ:

**Permitting Checklist**

Permits should be issued by and in accordance with the procedures of all authorities having jurisdiction and should bear the name and signature of each authority having jurisdiction or their designated representative(s). In addition, the permit should indicate the following:

1. Purpose of the ESS for which the permit is issued

FACT SHEET

# ENERGY STORAGE SYSTEMS SAFETY FACT SHEET *CONTINUED*

2. Type of ESS, size, weight broken down by subcomponents or subsystems, type, and amount of any hazardous materials, general arrangement of the system, and extent of work to be performed
3. Address where the ESS is to be installed and operated
4. Name and address of the permittee
5. Permit number and date of issuance
6. Period of validity of the permit
7. Inspection requirements

## For the Fire Service:

**Pre-Incident Planning**

The fire department should develop a pre-incident plan for responding to fires, explosions, and other emergency conditions associated with the ESS installation, and the pre-incident plan should include the following elements:

1. Understanding the procedures included in the facility operation and emergency response plan described
2. Identifying the types of ESS technologies present, the potential hazards associated with the systems, and methods for responding to fires and incidents associated with the particular ESS
3. Identifying the location of all electrical disconnects in the building and understanding that electrical energy stored in ESS equipment cannot always be removed or isolated
4. Understanding the procedures for shutting down and de-energizing or isolating equipment to reduce the risk of fire, electric shock, and personal injury hazards
5. Understanding the procedures for dealing with damaged ESS equipment in a post-fire incident, including the following:
   a. Recognizing that stranded electrical energy in fire-damaged storage batteries and other ESS has the potential for reignition long after initial extinguishment
   b. Contacting personnel qualified to safely remove damaged ESS equipment from the facility (This contact information is included in the facility operation and emergency response plan.)

**Emergency Operations Planning**

An emergency operations plan should be created and contain elements such as procedures to safely shut down the system, procedures for the removal of damaged ESS, general emergency procedures, and annual staff training.

### CASE STUDY: Kahuku Wind Farm Fire

A fire broke out at the Kahuku wind farm in the north shore of Oahu, Hawaii in the summer of 2012. This was a 10,000 ft$^2$ battery warehouse where a 15 mega-watt system containing approximately 12,000 lead acid batteries was located. The fire was a challenge to extinguish, burning for over 13 hours and smoldering for over 36 hours. Extensive damage was caused to the system. This event demonstrated the need for first responders to have more education in this area.

## Frequently Asked Questions About Battery ESS

**Q:** Which NFPA standard covers the installation of ESS?

**A:** If you are installing ESS for either new construction or a renovation, you should review the requirements of NFPA 855, *Standard for the Installation of Energy Storage Systems.*

**Q:** What is the best extinguishing agent for a fire in a battery ESS?

**A:** Testing has shown that water is the most effective agent for cooling for a battery ESS. For this reason, a sprinkler system designed in accordance with NFPA 13, *Standard for the Installation of Sprinkler Systems,* is required by NFPA 855, *Standard for the Installation of Energy Storage Systems.*

**Q:** I've heard that an ESS can reignite several days after a fire has been extinguished, is this true?

**A:** Lithium-ion batteries have shown they can ignite, or reignite, long after they have been damaged or involved in a fire—hours, days, or even weeks later.

**Q:** Is it OK to use a fire hose to extinguish a lithium-ion battery fire?

**A:** The UL study "Firefighter Safety and Photovoltaic Installations Research Project" (2011) showed that for voltages up to 1000 volts dc, water can be safely applied given the right conditions. This study demonstrated that using an adjustable nozzle at a minimum of a 10 degree fog pattern allowed for the safe application of water at a distance of 5 ft from the 1000 volts dc electrical source; however, due to the potential conductivity of pooling water, contact with it may expose you to shock.

FACT SHEET

# ENERGY STORAGE SYSTEMS SAFETY FACT SHEET *CONTINUED*

## NEXT STEPS

- ✔ Visit nfpa.org/ess to learn more and to access the latest research and reports.
- ✔ Take Energy Storage and Solar Systems Safety Online Training for fire service personnel.

## RESOURCES

**US Department of Energy**
Energy Storage System Safety: Plan Review and Inspection Checklist (2017)

**Underwriters Laboratories Inc.**
Firefighter Safety and Photovoltaic Installations Research Project (2011)

**FPRF Reports**
Projects currently underway:

Stranded Energy within Lithium-Ion Batteries

Firefighter Safety in Battery Energy Storage System Fires (advisory project with the University of Texas)

Report: Energy Storage System Research and Design Challenge (2019)

Report: Sprinkler Protection Guidance for Lithium-Ion Based Energy Storage Systems (2019)

Reports: Lithium ion batteries hazard and use assessment Phase I (2011), Phase II (2013), Phase III (2016).

Report: Hazard Assessment of Lithium Ion Battery Energy Storage Systems (February 2016)

Report: Development of Fire Mitigation Solutions for Photovoltaic (PV) Systems Installed on Building Roofs (2016)

Report: Commercial Roof-Mounted Photovoltaic System Installation Best Practices Review and All Hazard Assessment (2014)

Report: Property Insurance Research Group Forum on PV Panel Fire Risk (2014)

Workshop: Energy Storage Systems and the Built Environment (November 2015)

Report: Emergency Response to Incident Involving Electric Vehicle Battery Hazards (July 2013)

**NFPA Information Sheets**
Energy Storage Systems: Is Your Community Ready?

Lithium Ion Battery Safety for Consumers

**Relevant NFPA Standards**
Get free access to NFPA codes and standards at nfpa.org.

- NFPA 1, *Fire Code,* 2018 edition
- NFPA 13, *Standard for the Installation of Sprinkler Systems,* 2019 edition
- NFPA 68, *Standard on Explosion Protection by Deflagration Venting,* 2018 edition
- NFPA 69, *Standard on Explosion Prevention Systems,* 2019 edition
- NFPA 70®, *National Electrical Code®,* 2020 edition
- NFPA 110, *Standard for Emergency and Standby Power Systems,* 2019 edition
- NFPA 111, *Standard on Stored Electrical Energy Emergency and Standby Power Systems,* 2019 edition
- NFPA 855, *Standard for the Installation of Energy Storage Systems,* 2020 edition
- NFPA 1620, *Standard for Pre-Incident Planning,* 2020 edition

IT'S A BIG WORLD.
LET'S PROTECT IT TOGETHER.®

# First Responders Guide to Lithium-Ion Battery Energy Storage System Incidents

## 1 Introduction

This document provides guidance to first responders for incidents involving energy storage systems (ESS). The guidance is specific to ESS with lithium-ion (Li-ion) batteries, but some elements may apply to other technologies also. Hazards addressed include fire, explosion, arc flash, shock, and toxic chemicals. For the purposes of this guide, a facility is assumed to be subject to the 2023 revision of NFPA 855 [B8][1] and to have a battery housed in a number of outdoor enclosures with total energy exceeding 600 kWh, thus triggering requirements for a hazard mitigation analysis (HMA), fire and explosion testing in accordance with UL 9540A [B14], emergency planning, and annual training. (The 2021 International Fire Code (IFC) [B2] has language that has been largely harmonized with NFPA 855, so the requirements are similar.)

This guide provides recommendations for pre-incident planning and incident response. Additional tutorial content is provided for each of the hazard categories. The Bibliography provides references to applicable codes and standards, and other documents of interest.

## 2 Abbreviations and acronyms

| | |
|---|---|
| AHJ | authority having jurisdiction |
| BMS | battery management system |
| ERP | emergency response plan (designated in NFPA 855 as ‘emergency operations plan’) |
| ESS | energy storage system |
| HMA | hazard mitigation analysis |
| IDLH | immediately dangerous to life and health |
| LEL | lower explosive limit |
| LFL | lower flammable limit |
| LFP | lithium iron phosphate battery |
| Li-ion | lithium-ion |
| NCA | lithium nickel-cobalt-aluminum oxide |
| NFPA | National Fire Protection Association |
| NMC | lithium nickel-manganese-cobalt oxide |
| PPE | personal protective equipment |
| SCBA | self-contained breathing apparatus |
| SDS | safety data sheet |
| SME | subject-matter expert |
| UFL | upper flammable limit |
| UL | Underwriters Laboratories |

[1] References in square brackets are to the Bibliography at the end of this guide.

# 3 Pre-incident planning

## 3.1 General

The pre-incident plan is used by first responders in effectively managing emergencies. It is required to be available to the incident commander during an event. The plan should be in accordance with the newly released NFPA 1660 [B9]. From the front matter of this new document: "The 2024 edition of NFPA 1660 integrates NFPA 1600, NFPA 1616, and NFPA 1620 into a single standard that establishes a common set of criteria for emergency management and business continuity programs; mass evacuation, sheltering, and re-entry programs; and the development of pre-incident plans for emergency response personnel." Pre-incident planning, formerly in NFPA 1620, is in Chapters 17 through 23.

Additional ESS-specific guidance is provided in the NFPA Energy Storage Systems Safety Fact Sheet [B10]. NFPA 855 requires several submittals to the authority having jurisdiction (AHJ), all of which should be available to the pre-incident plan developer. These include:

- Results of fire and explosion testing conducted in accordance with UL 9540A
- Hazard mitigation analysis (HMA)
- Emergency response plan (ERP)

While the main document for development of the pre-incident plan is the ERP, the UL 9540A test results and HMA may provide useful additional information for the plan and associated training.

## 3.2 UL 9540A test results

Testing to UL 9540A provides information at a level of detail that may not be included in the ERP (see 3.4). Cell-level testing provides a breakdown of the composition of vented gas from cells in thermal runaway, including flammable gases and vapors. Potentially significant concentrations of highly toxic hydrogen fluoride may also be produced. Video recordings are made of testing at unit (rack) and installation levels (if the latter is performed). These test results and videos can be used in first-responder training (see 3.6) since they provide insight into system behavior in a thermal runaway event that cannot be gained from outside the enclosure.

## 3.3 HMA

While testing to UL 9540A is valuable, it involves initiation of thermal runaway in a limited number of cells. This method does not address larger-scale failures that could occur, for example, with a loss of insulation and subsequent arcing, or with mechanical damage potentially caused by vehicle impacts or flying debris. Such failures could result in a fire that consumes the entire enclosure. The HMA should address such an occurrence and should assess, at least by simulation or calculation, the maximum temperature rise of cells in adjacent enclosures. This information is used to justify limited spacing between enclosures and can also be used to determine whether first responders should intervene.

## 3.4 ERP

The ERP forms the basis for pre-incident planning. Among other information, the ERP should include details on the following:

- Site overview and ESS nameplate information
- Potential hazards
- Fire protection and safety systems
- Emergency response recommendations

- Emergency contacts, including subject-matter expert (SME)
- Safety data sheets (SDS)
- PPE

The firefighting philosophy should be outlined, whether that be to suppress the fire using built-in systems or to let it burn out safely (and in some cases, to make it burn. See 5.1.)

### 3.5 Availability of battery management system data

Access to battery management system (BMS) data is critical for informed incident response. Depending on the severity of the incident, it may be possible to observe the current conditions within the enclosure where the incident began, such as module temperatures and readings for any gas sensing systems that may be installed. If a fire is in progress, it is important to monitor module temperatures in adjacent enclosures, to determine whether additional actions should be taken.

BMS access may be direct, such as using a first responder's computer to access the local human-machine interface or a remote digital twin, or it may be indirect, such as through a voice connection to a network operations center or SME. Data may also be available on a screen local to each enclosure, but this should not be accessed if there is any danger of fire, explosion, or toxic emissions.

### 3.6 Training

NFPA 855 mandates initial and annual refresher training for facility staff (see section 4.3.2.2). First responders should be included in such training, either in person or via video recordings of the training sessions. Trainees should be familiar with the site layout, installed equipment, SDS contents, and emergency response recommendations of the ERP.

## 4 Incident response

### 4.1 General

An incident command system should be established immediately on arrival, and an appropriate incident command individual should have access to BMS data (see 3.5). Working with facility personnel, the scene should be assessed, and potential hazards should be communicated to all responders.

### 4.2 Personal protective equipment (PPE)

Full firefighter protective gear should be worn where there is any possibility of fire or explosion, including proper use of self-contained breathing apparatus (SCBA). If there is no risk of fire or explosion per the project incident command, protective clothing for arc-flash and shock hazards should be worn by anyone operating within the arc-flash boundary (see 4.5). Jewelry and other metallic items should be removed.

### 4.3 Fire

If a fire is in progress, flammable gases will be consumed as they are released, and an explosion is unlikely. The safest approach is to allow the enclosure to burn in a controlled manner, so that all fuel is consumed and the possibility of reignition is minimized. BMS data from adjacent enclosures should be monitored to verify that module temperatures remain at safe levels (typically up to around 80 °C/180 °F). Application of water should be limited to cooling and protecting nearby exposures (and adjacent enclosures if module temperatures are above thresholds identified in the ERP).

Once the fire has self-extinguished, there may be ongoing releases of flammable or toxic gases. Full protective gear and SCBA should continue to be used until releases (such as carbon monoxide) are measured to be at a safe level.

If an earlier fire has been extinguished by the enclosure's fire suppression system, there is a potential for ongoing release of flammable gases, with a corresponding explosion risk (see 4.4). See 5.1 for additional discussion of fire hazards.

## 4.4 Explosion

If system sensors (temperature, smoke, heat, and/or flammable gas) indicate that a thermal runaway event occurred, but there is no sign of fire, it should be assumed that an explosion risk is present. Personnel should be stationed outside the potential blast radius, at an angle to the doors, and upwind of the enclosure. The enclosure should be inspected from a distance using BMS data to determine the status of the system, including module temperatures, gas sensing, and ventilation systems for gas exhaust. If the BMS is not functioning because of system damage, thermal scanning may provide an indication of ongoing thermal issues. However, responders should be aware that enclosure insulation may make it difficult to make an accurate assessment of internal temperature.

If the enclosure has been vented by automatic door or panel opening and there is no indication of high temperatures, the enclosure may be approached by responders using continuous gas monitoring to warn of any residual atmospheric risk.

If the enclosure appears to be sealed – for example, if gas venting is accomplished through a magnetic flap or if there is no provision for gas venting – BMS data and external visual assessment should be reviewed with the SME before attempting to open the enclosure.

See 5.2 for additional discussion of explosion hazards.

## 4.5 Arc flash and electric shock

Even when disconnected from external circuits, batteries retain their stored energy and should be considered to be energized. A battery may be partially destroyed by fire yet retain stranded energy at hazardous levels. All batteries, whatever their visual condition, should be treated as fully charged with respect to arc flash and electric shock hazards.

Appropriate PPE should be worn by properly trained individuals when working within the arc flash boundary. See 5.3 for additional discussion of arc flash and shock hazards.

## 4.6 Toxic chemicals

Toxic chemicals, including hydrogen fluoride, hydrogen chloride, hydrogen cyanide, and carbon monoxide, may be released during an incident. Spraying water on smoke or vapor released from the battery, whether burning or not, may cause skin or lung irritation and contaminated run-off similar to plastic fires [B1]. This is one additional reason for allowing the battery to burn in a controlled manner. The site perimeter should be entered only by trained firefighters wearing full protective gear and using SCBA. See 5.4 for additional discussion of toxic chemical hazards.

# 5 Discussion of Li-ion hazards

## 5.1 Fire

There is ongoing debate in the energy storage industry over the merits of fire suppression in outdoor battery enclosures. On one hand, successful deployment of clean-agent fire suppression in response to a limited event (for example, an electrical fire or single-cell thermal runaway with no propagation) can limit damage to the system, which can then be expeditiously returned to service. On the other hand, actuation of the same system in response to a large event, such as a multicell arcing fault, may knock out or prevent a fire but allow ongoing release of flammable gases, thus creating an explosion hazard.

Some ESS designs employ a 'make it burn' strategy, in which a sparker ignites flammable gas when the lower flammable limit (LFL) is exceeded but before the lower explosive limit (LEL) is reached. Such designs do not include fire suppression, on the basis that the loss of an enclosure through controlled burning is preferable to increasing the risk of an explosion. This strategy can be effective for Li-ion technologies based on transition metal oxides, such as lithium nickel-cobalt-aluminum oxide (NCA) and lithium nickel-manganese-cobalt oxide (NMC) materials, which release oxygen during thermal runaway, thus maintaining a flammable gas mixture. The same arrangement would potentially be less effective for batteries using lithium iron phosphate (LFP) material, as discussed in 5.2.

There are pros and cons to each of the common fire-suppression media in use today, including clean agents, inert gases, aerosols, and water.

- Clean agents, such as Novec 1230®, and inert gases, such as nitrogen, will extinguish small fires without causing extensive damage within the enclosure; they also have a cooling effect, which can assist in limiting thermal runaway propagation. In a larger-scale event, such as a multi-cell arcing fault, their effect may be temporary and may result in ongoing propagation with the risk of reignition or explosion. Also, inert gases are oxygen-depleting and cannot be used in structures where personnel may be present.
- Aerosol devices, such as Stat-X®, can be self-actuating, releasing based on elevated temperature without the need for control systems. They are effective on small fires and can help to limit initiation of thermal runaway. The aerosol itself is typically alkaline and may damage BMS and other electronic components in the enclosure. These devices are unlikely to be effective in larger-scale events or when thermal runaway is freely propagating between cells or modules.
- Water is the most efficient medium for cooling cells below the level at which thermal runaway can occur. However, to be effective, the water must be able to reach cells that may be otherwise shielded within closely spaced modules. This means that directed spray across the top of each module is more likely to achieve full extinguishing and arresting of propagation than can be realized with ceiling-mounted sprinklers, and this precise coverage may not always be feasible to achieve. Liberal use of water may also serve as the initiator for electrical arcing that may cause thermal runaway in otherwise unaffected modules. Additionally, the combination of water and highly energized battery systems could electrolytically generate more explosive hydrogen gas. Finally, similar to plastics fires [B1] use of water for directly targeting a fire will also create contaminated run-off [B11], which must be contained and removed for treatment.

## 5.2 Explosion

Venting of all Li-ion cells results in the release of a gas mixture with high levels of hydrogen, carbon monoxide, and carbon dioxide. Depending on the circumstances, there may also be a fog of unreacted flammable organic compounds, and hydrogen fluoride (normally in trace amounts, but can be higher). The volume of gas released is typically orders of magnitude greater than the cell volume. In the absence of fire, this gas mixture poses an explosion risk.

NFPA 855 requires design provisions for either explosion prevention in compliance with NFPA 69 [B5], or explosion management according to NFPA 68 [B4]. However, systems only complying with NFPA 68 can present explosion hazards to first responders if the following conditions are met: 1) the atmosphere in the enclosure is above the upper flammable limit (UFL), 2) the system has no remote means to ventilate its contents, 3) and a door is opened. Caution and deliberation with the project SME should be taken in situations where gas has accumulated, and automatic ventilation is either not present or not functioning.

The '**make** it burn' strategy for explosion prevention is discussed in 5.1. This approach may be less effective for batteries using LFP technology, from which minimal amounts of oxygen are released during thermal runaway. In a multi-cell arcing fault and in the absence of emergency ventilation with outside air, the available oxygen in the enclosure would be quickly consumed. Further cell venting would drive the gas concentration above the UFL, creating the same hazard described in the previous paragraph.

Ventilation for explosion prevention may be accomplished by the automatic opening of doors or other panels. While this measure is unlikely to meet the requirements of NFPA 69, it addresses the intent of the standard and can be important for protecting first responders. It should be noted that this procedure will reduce the effectiveness of airborne fire suppressants and is more compatible with a 'let it burn' philosophy.

## 5.3 Arc flash and shock

Battery strings in an enclosure involved in an incident should have been tripped by the BMS, but as detailed in 4.5, they can continue to present arc-flash and shock hazards. Many ESS designs now operate at dc voltages up to 1500 V, representing a significant risk to untrained personnel. At the time of preparing this guide, there is ongoing work on characterization of dc arc-flash hazards, and it is likely that this work will inform future changes to NFPA 70E [B7].

## 5.4 Toxic chemicals

Recommendations for first responders are detailed in 4.6. Emissions from battery fires vary by battery chemistry and state of charge. Toxicity issues are discussed at length in [B1], where it is stated that hydrogen chloride is the chemical that reaches its IDLH (immediately dangerous to life and health) value fastest. In terms of 30-minute average release rates as a function of IDLH, the greatest concern is with hydrogen fluoride, followed by hydrogen cyanide, hydrogen chloride, and carbon monoxide.

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[B3] NFPA 1, Fire Code, 2021

[B4] NFPA 68, Standard on Explosion Protection by Deflagration Venting, 2018

[B5] NFPA 69, Standard on Explosion Prevention Systems, 2019

[B6] NFPA 70, National Electrical Code, 2023

[B7] NFPA 70E, Standard for Electrical Safety in the Workplace, 2021

[B8] NFPA 855, Standard for the Installation of Stationary Energy Storage Systems, 2023

[B9] NFPA 1660, Standard for Emergency, Continuity, and Crisis Management: Preparedness, Response, and Recovery, 2024

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[B11] Quant, M., Willstrand, O., Mallin, T., Hynynen, J., Ecotoxicity Evaluation of Fire-Extinguishing Water from Large-Scale Battery and Battery Electric Vehicle Fire Tests. *Environ. Sci. Technol.* https://doi.org/10.1021/acs.est.2c08581

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Greening the Grid

GRID INTEGRATION TOOLKIT

# Grid-Scale Battery Storage

## Frequently Asked Questions

### What is grid-scale battery storage?

Battery storage is a technology that enables power system operators and utilities to store energy for later use. A battery energy storage system (BESS) is an electrochemical device that charges (or collects energy) from the grid or a power plant and then discharges that energy at a later time to provide electricity or other grid services when needed. Several battery chemistries are available or under investigation for grid-scale applications, including lithium-ion, lead-acid, redox flow, and molten salt (including sodium-based chemistries).[1] Battery chemistries differ in key technical characteristics (see *What are key characteristics of battery storage systems?*), and each battery has unique advantages and disadvantages. The current market for grid-scale battery storage in the United States and globally is dominated by lithium-ion chemistries (Figure 1). Due to technological innovations and improved manufacturing capacity, lithium-ion chemistries have experienced a steep price decline of over 70% from 2010-2016, and prices are projected to decline further (Curry 2017).

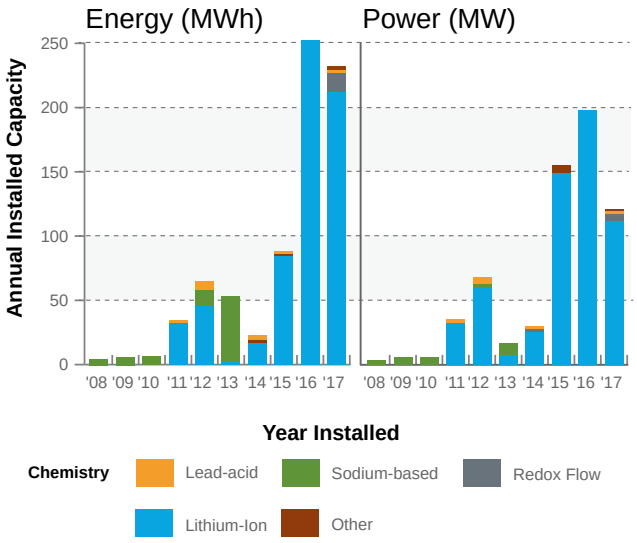


**Figure 1: U.S. utility-scale battery storage capacity by chemistry (2008-2017).** *Data source: U.S. Energy Information Administration, Form EIA-860, Annual Electric Generator Report*

Increasing needs for system flexibility, combined with rapid decreases in the costs of battery technology, have enabled BESS to play an increasing role in the power system in recent years. As prices for BESS continue to decline and the need for system flexibility increases with wind and solar deployment, more policymakers, regulators, and utilities are seeking to develop policies to jump-start BESS deployment.

### Is grid-scale battery storage needed for renewable energy integration?

Battery storage is one of several technology options that can enhance power system flexibility and enable high levels of renewable energy integration. Studies and real-world experience have demonstrated that interconnected power systems can safely and reliably integrate high levels of renewable energy from variable renewable energy (VRE) sources without new energy storage resources.[2] There is no rule-of-thumb for how much battery storage is needed to integrate high levels of renewable energy. Instead, the appropriate amount of grid-scale battery storage depends on system-specific characteristics, including:

- The current and planned mix of generation technologies
- Flexibility in existing generation sources
- Interconnections with neighboring power systems
- The hourly, daily, and seasonal profile of electricity demand, and
- The hourly, daily, and seasonal profile of current and planned VRE.

In many systems, battery storage may not be the most economic resource to help integrate renewable energy, and other sources of system flexibility can be explored. Additional sources of system flexibility include, among others, building additional pumped-hydro storage or transmission, increasing conventional generation flexibility, and changing operating procedures (Cochran et al. 2014).

1. For information on battery chemistries and their relative advantages, see Akhil et al. (2013) and Kim et al. (2018).
2. For example, Lew et al. (2013) found that the United States portion of the Western Interconnection could achieve a 33% penetration of wind and solar without additional storage resources. Palchak et al. (2017) found that India could incorporate 160 GW of wind and solar (reaching an annual renewable penetration of 22% of system load) without additional storage resources.

## What are the key characteristics of battery storage systems?

- **Rated power capacity** is the total possible instantaneous discharge capability (in kilowatts [kW] or megawatts [MW]) of the BESS, or the maximum rate of discharge that the BESS can achieve, starting from a fully charged state.
- **Energy capacity** is the maximum amount of stored energy (in kilowatt-hours [kWh] or megawatt-hours [MWh])
- **Storage duration** is the amount of time storage can discharge at its power capacity before depleting its energy capacity. For example, a battery with 1 MW of power capacity and 4 MWh of usable energy capacity will have a storage duration of four hours.
- **Cycle life/lifetime** is the amount of time or cycles a battery storage system can provide regular charging and discharging before failure or significant degradation.
- **Self-discharge** occurs when the stored charge (or energy) of the battery is reduced through internal chemical reactions, or without being discharged to perform work for the grid or a customer. Self-discharge, expressed as a percentage of charge lost over a certain period, reduces the amount of energy available for discharge and is an important parameter to consider in batteries intended for longer-duration applications.
- **State of charge,** expressed as a percentage, represents the battery's present level of charge and ranges from completely discharged to fully charged. The state of charge influences a battery's ability to provide energy or ancillary services to the grid at any given time.
- **Round-trip efficiency**, measured as a percentage, is a ratio of the energy charged to the battery to the energy discharged from the battery. It can represent the total DC-DC or AC-AC efficiency of the battery system, including losses from self-discharge and other electrical losses. Although battery manufacturers often refer to the DC-DC efficiency, AC-AC efficiency is typically more important to utilities, as they only see the battery's charging and discharging from the point of interconnection to the power system, which uses AC (Denholm 2019).

## What services can batteries provide?

**Arbitrage:** Arbitrage involves charging the battery when energy prices are low and discharging during more expensive peak hours. For the BESS operator, this practice can provide a source of income by taking advantage of electricity prices that may vary throughout the day. One extension of the energy arbitrage service is **reducing renewable energy curtailment**. System operators and project developers have an interest in using as much low-cost, emissions-free renewable energy generation as possible; however, in systems with a growing share of VRE, limited flexibility of conventional generators and temporal mismatches between renewable energy supply and electricity demand (e.g., excess wind generation in the middle of the night) may require renewable generators to curtail their output. By charging the battery with low-cost energy during periods of excess renewable generation and discharging during periods of high demand, BESS can both reduce renewable energy curtailment and maximize the value of the energy developers can sell to the market. Another extension of arbitrage in power systems without electricity markets is **load-leveling**. With load-levelling, system operators charge batteries during periods of excess generation and discharge batteries during periods of excess demand to more efficiently coordinate the dispatch of generating resources.

**Firm Capacity or Peaking Capacity:** System operators must ensure they have an adequate supply of generation capacity to reliably meet demand during the highest-demand periods in a given year, or the peak demand. This peak demand is typically met with higher-cost generators, such as gas plants; however, depending on the shape of the load curve, BESS can also be used to ensure adequate peaking generation capacity. While VRE resources can also be used to meet this requirement, these resources do not typically fully count toward firm capacity, as their generation relies on the availability of fluctuating resources and may not always coincide with peak demand. But system operators can improve VRE's ability to contribute to firm capacity requirements through pairing with BESS. Pairing VRE resources with BESS can enable these resources to shift their generation to be coincident with peak demand, improving their capacity value (see text box below) and system reliability.

**Firm Capacity, Capacity Credit, and Capacity Value are important concepts for understanding the potential contribution of utility-scale energy storage for meeting peak demand.**

**Firm Capacity (kW, MW):** The amount of installed capacity that can be relied upon to meet demand during peak periods or other high-risk periods. The share of firm capacity to the total installed capacity of a generator is known as its **capacity credit (%)**.[3]

**Capacity Value ($):** The monetary value of the contribution of a generator (conventional, renewable, or storage) to balancing supply and demand when generation is scarce.

**Operating Reserves and Ancillary Services:** To maintain reliable power system operations, generation must exactly match electricity demand at all times. There are various categories of operating reserves and ancillary services that function on different timescales, from subseconds to several hours, all of which are needed to ensure grid reliability. BESS can rapidly charge or discharge in a fraction of a second, faster

3. See Mills and Wiser (2012) for a general treatment on the concept of capacity credit.

than conventional thermal plants, making them a suitable resource for short-term reliability services, such as Primary Frequency Response (PFR) and Regulation. Appropriately sized BESS can also provide longer-duration services, such as **load-following and ramping** services, to ensure supply meets demand.

**Transmission and Distribution Upgrade Deferrals:** The electricity grid's transmission and distribution infrastructure must be sized to meet peak demand, which may only occur over a few hours of the year. When anticipated growth in peak electricity demand exceeds the existing grid's capacity, costly investments are needed to upgrade equipment and develop new infrastructure. Deploying BESS can help defer or circumvent the need for new grid investments by meeting peak demand with energy stored from lower-demand periods, thereby reducing congestion and improving overall transmission and distribution asset utilization. Also, unlike traditional transmission or distribution investments, mobile BESS installations can be relocated to new areas when no longer needed in the original location, increasing their overall value to the grid.

**Black Start:** When starting up, large generators need an external source of electricity to perform key functions before they can begin generating electricity for the grid. During normal system conditions, this external electricity can be provided by the grid. After a system failure, however, the grid can no longer provide this power, and generators must be started through an on-site source of electricity, such as a diesel generator, a process known as black start. An on-site BESS can also provide this service, avoiding fuel costs and emissions from conventional black-start generators. As system-wide outages are rare, an on-site BESS can provide additional services when not performing black starts.

Table 1 below summarizes the potential applications for BESS in the electricity system, as well as whether the application is currently valued in U.S. electricity markets (Denholm 2018). Figure 2 shows the cumulative installed capacity (MW) for utility-scale storage systems in the United States in 2017 by the service the systems provide.

Most storage systems in the United States provide operating reserves and ancillary services. Despite this current focus, the total U.S. market for these services is limited, and utility-scale storage may begin providing more firm and peak capacity in the near future.

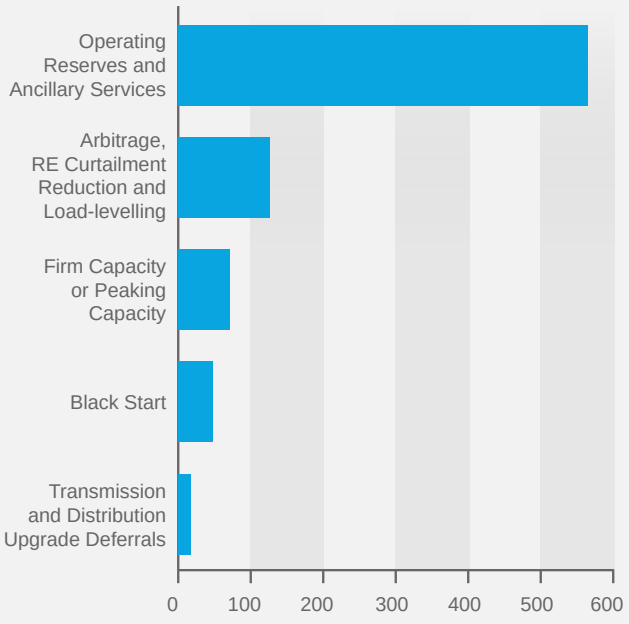


**Figure 2: U.S. Utility-scale battery storage capacity by service.** *Data source: U.S. Energy Information Administration, Form EIA-860, Annual Electric Generator Report*

## Where should batteries be located?

Utility-scale BESS can be deployed in several locations, including: 1) in the transmission network; 2) in the distribution network near load centers; or 3) co-located with VRE generators. The siting of the BESS has important implications for the services the system can best provide, and the most appropriate location for the BESS will depend on its intended-use case.

In many cases, a BESS will be technically capable of providing a broad range of services in any of the locations described in the next section. Therefore, when siting storage, it is important to analyze the costs and benefits of multiple locations to determine the optimal siting to meet system needs. Considering all combinations of services the BESS can provide at each potential site will provide a better understanding of the expected revenue streams (see *What is value-stacking?*) and impact on the grid.

### *In the Transmission Network*

BESS interconnected to the transmission system can provide a broad range of ancillary and transmission-related services. These systems can be deployed to replace or defer investments of peaking capacity, provide operating reserves to help respond to changes in generation and demand, or they can be used to defer transmission system upgrades in regions experiencing congestion from load or generation growth. Figure 3 below shows the configuration of a utility-scale storage system interconnected at the transmission substation level.

### *In the Distribution Network Near Load Centers*

Storage systems located in the distribution network can provide all of the services as transmission-sited storage, in addition to several services related to congestion and power quality issues. In many areas, it may be difficult to site a conventional generator near load in order to provide peaking capacity, due to concerns about emissions or land use. Due to their lack of local emissions and their scalable nature, BESS systems can be co-located near load with fewer siting challenges than conventional generation. Placing storage near load can reduce transmission and distribution losses and relieve congestion, helping defer transmission and distribution upgrades. Distribution-level BESS systems can also provide local power quality services and support improved resilience during extreme weather events.

**Table 1: Applications of Utility-Scale Energy Storage**

| Application | Description | Duration of Service Provision | Typically Valued in U.S. Electricity Markets? |
|---|---|---|---|
| Arbitrage | Purchasing low-cost off-peak energy and selling it during periods of high prices. | Hours | Yes |
| Firm Capacity | Provide reliable capacity to meet peak system demand. | 4+ hours | Yes, via scarcity pricing and capacity markets, or through resource adequacy payments. |
| Operating Reserves | | | |
| • Primary Frequency Response | Very fast response to unpredictable variations in demand and generation. | Seconds | Yes, but only in a limited number of markets. |
| • Regulation | Fast response to random, unpredictable variations in demand and generation. | 15 minutes to 1 hour | Yes |
| • Contingency Spinning | Fast response to a contingency such as a generator failure. | 30 minutes to 2 hours | Yes |
| • Replacement/ Supplemental | Units brought online to replace spinning units. | Hours | Yes, but values are very low. |
| • Ramping/Load Following | Follow longer-term (hourly) changes in electricity demand. | 30 minutes to hours | Yes, but only in a limited number of markets. |
| Transmission and Distribution Replacement and Deferral | Reduce loading on T&D system during peak times. | Hours | Only partially, via congestion prices. |
| Black-Start | Units brought online to start system after a system-wide failure (blackout). | Hours | No, typically compensated through cost-of-service mechanisms. |

***Co-Located with VRE Generators***

Renewable resources that are located far from load centers may require transmission investments to deliver power to where it is needed. Given the variable nature of VRE resources, the transmission capacity used to deliver the power may be underutilized for large portions of the year. A BESS can reduce the transmission capacity needed to integrate these resources and increase the utilization of the remaining capacity by using storage to charge excess generation during periods of high resource availability and discharge during periods of low resource availability. The same BESS can be used to reduce the curtailment of VRE generation, either due to transmission congestion or a lack of adequate demand, as well as provide a broad range of ancillary services.

## What is value-stacking? What are some examples of value-stacking opportunities and challenges?

BESS can maximize their value to the grid and project developers by providing multiple system services. As some services are rarely called for (i.e., black start) or used infrequently in a given hour (i.e., spinning reserves), designing a BESS to provide multiple services enables a higher overall battery utilization. This multi-use approach to BESS is known as **value-stacking**. For example, a BESS project can help defer the need for new transmission by meeting a portion of the peak demand with stored energy during a select few hours in the year. When not meeting peak demand, the BESS can earn revenue by providing operating reserve services for the transmission system operator.

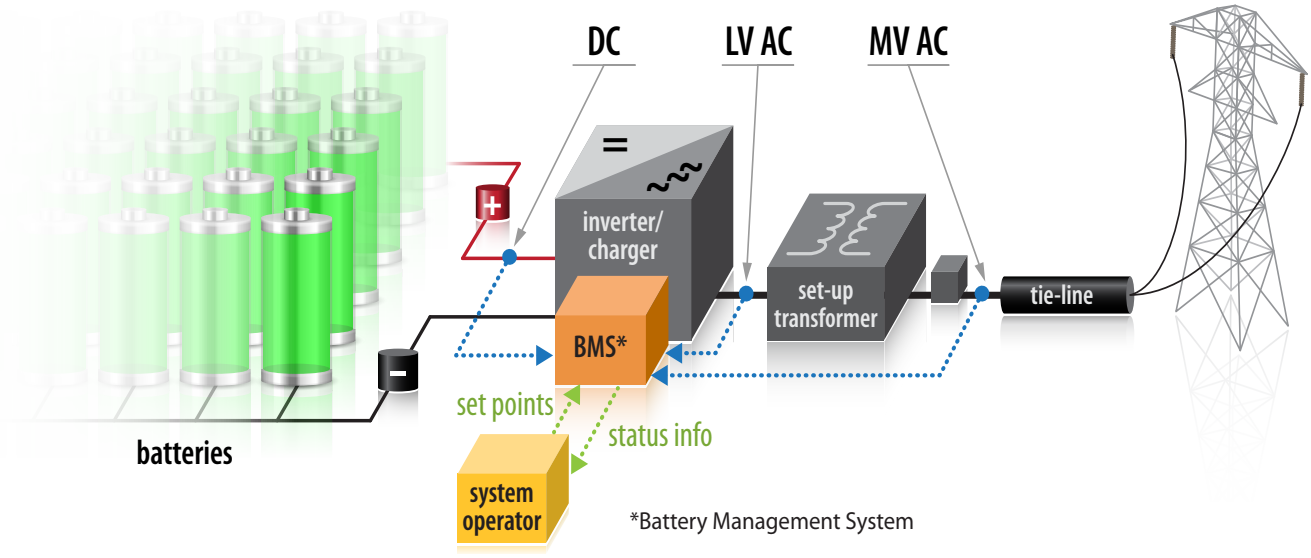


**Figure 3: Key components of BESS interconnected at the transmission substation level. LV AC represents a low-voltage AC connection, while MV AC represents a medium-voltage AC connection.**[4] *Source: Denholm (2019)*

Some system services may be mutually exclusive depending on the BESS design (e.g., a short duration storage device used to supply regulating reserves would have limited value for deferring transmission or distribution upgrades). Even if a BESS is technically capable of providing multiple services, the additional cycling of the battery (charging and discharging) may degrade the battery and shorten its lifetime and economic viability. Finally, a BESS can only provide a limited duration of any set of services before it runs out of charge, which means batteries must prioritize the services they provide.

Regulators have a variety of options to enable BESS to maximize its economic potential through value-stacking. For example, the California Public Utilities Commission (CPUC) developed categories of services BESS can provide based on their importance for reliability and location on the grid, as well as 12 rules for utilities when procuring services from BESS (CPUC 2018). The CPUC rules:

- Dictate that BESS projects can only provide services at the voltage level to which they are interconnected or higher, but not lower[5];
- Prioritize reliability services over non-reliability services and ensure storage cannot contract for additional services that would interfere with any obligation to provide reliability services;
- Require that a BESS project comply with all performance and availability requirements for services it provides and that noncompliance penalties be communicated in advance;
- Require that a BESS project inform the utility of any services it currently provides or intends to provide; and
- Take measures to prevent double compensation to BESS projects for services provided.

These CPUC rules are just one example of how regulators can help ensure BESS projects can select the most cost-effective combinations of services to provide without negatively impacting the reliability of the grid.

## How are BESS operators compensated?

BESS operators can be compensated in several different ways, including in the wholesale energy market, through bilateral contracts, or directly by the utility through a cost-of-service mechanism. In a wholesale energy market, the BESS operator submits a bid for a specific service, such as operating reserves, to the market operator, who then arranges the valid bids in a least-cost fashion and selects as many bids as necessary to meet the system's demands. If the BESS operator's bid is selected and the BESS provides the service, the operator will receive compensation equal to the market price. This process ensures transparent prices and technology-agnostic consideration; however, many services are currently not available in the market, such as black start or transmission and distribution upgrade deferrals. Alternatively, BESS operators can enter into bilateral contracts for services directly with energy consumers, or entities which procure energy for end-consumers. This process does not ensure transparency and contracts can differ widely in both prices and terms. Finally, some BESS are owned directly by the utilities to whom they provide services, such as upgrade deferrals. In these cost-of-service cases, the utility pays the BESS operator at the predetermined price and recovers the payments through retail electricity rates. In some jurisdictions, however, BESS may be prevented from extracting revenues through both wholesale markets and cost-of-service agreements (Bhatnagar et al. 2013).

4. ANSI C84.1: Electric Power Systems and Equipment–Voltage Ratings (60 Hz) defines a low-voltage system as having a nominal voltage less than 1 kV and medium voltage as having a nominal voltage between 1 kV and 100 kV.
5. BESS interconnected at the distribution level can provide distribution or transmission level services, but BESS interconnected at the transmission level can only provide transmission-level services.

## How does the value of batteries change with renewable energy deployment and increased VRE penetration?

The amount of renewable energy on the grid can influence the value and types of the services provided by a BESS. Increased levels of renewable energy may increase the need for frequency control services to manage increased variability and uncertainty in the power system. Increased levels of VRE penetration can also change the shape of the net load, or the load minus the VRE generation, influencing BESS projects that provide load following, arbitrage, peaking capacity, or similar services.

Models of the California system have shown a strong relationship between solar PV deployment and BESS' ability to replace conventional peaking capacity, also known as the BESS capacity credit (Denholm and Margolis 2018). As the shape of the load curve affects the ability of storage to provide peaking capacity, resources such as PV that cause load peaks to be shorter will enable shorter duration batteries, which are less expensive, to displace conventional peaking capacity.

Initially, low levels of PV penetration may flatten the load curve, reducing BESS' ability to cost-effectively offset the need for conventional peaking plants.[6] At higher levels of solar PV penetration, however, the net load curve becomes peakier, increasing the ability and value of BESS to reduce peak demand. Figure 4 illustrates how increasing levels of PV generation change the shape of the net load, causing it to become peakier. The shaded areas above and under the net load curves indicate BESS charging and discharging, while the text boxes show the amount of net load peak reduction (MW) and the total amount of energy met by BESS during the net load peak (MWh).

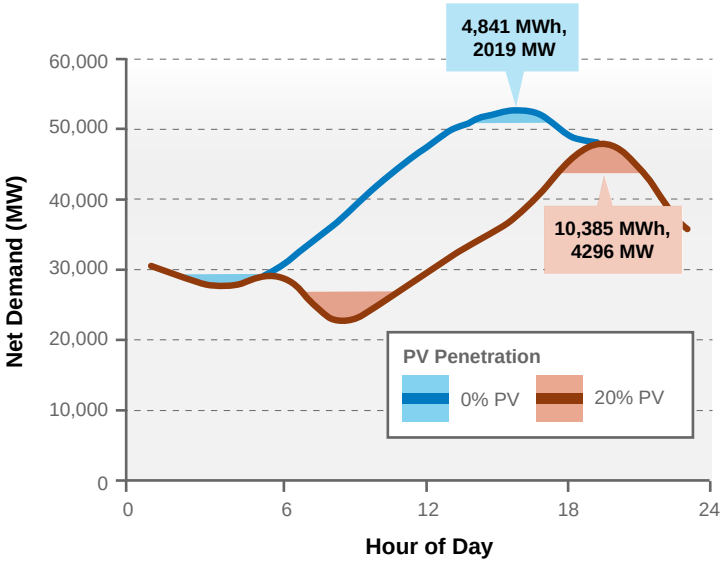


**Figure 4: Change in California net load shape due to PV.**
*Adapted from Denholm and Margolis (2018)*

## What are the key barriers to BESS deployment?

Barriers to energy storage deployment can be broadly grouped into three different categories: regulatory barriers, market barriers, and data and analysis capabilities.

### *1. Regulatory Barriers*

- **Lack of rules and regulations to clarify the role of BESS.** Although storage may be technically able to provide essential grid services, if no regulations or guidelines explicitly state that storage can provide these services, utilities and market operators may be unwilling to procure services from BESS. Furthermore, without a guarantee that services provided by a BESS project will be compensated, storage developers and financing institutions may be unwilling to make the necessary capital investments. Federal Energy Regulatory Commission (FERC) Order 841 addressed this issue in U.S. wholesale markets and directed market operators to develop rules governing storage's participation in energy, capacity, and ancillary service markets. Among other requirements, the rules must ensure open and equal access to the market for storage systems, taking into consideration their unique operating and technical characteristics (FERC 2018).

- **Restrictions or lack of clarity around if and how storage can be used across generation, transmission, and distribution roles.** The variety of different services storage can provide often cuts across multiple markets and compensation sources. For instance, frequency regulation may be compensated in a wholesale market, but transmission or distribution investment deferrals may be compensated as a cost of service by the utility or system operator. In some jurisdictions, providing services across different compensation sources is restricted by regulation. Limiting the services batteries can provide based on where the service is provided or how it is compensated can influence how often they are utilized and whether they remain an economic investment (Bhatnagar 2013).

### *2. Market Barriers*

- **Lack of markets for system services.** A lack of markets for services that batteries are uniquely suited to provide can make it difficult for developers to include them as potential sources of income when making a business case, deterring investment. For example, in most U.S. Independent System Operator (ISO) markets, generators are currently expected to provide inertial and governor response during frequency excursions without market compensation. Although BESS can provide the same services, currently there is no way for BESS to seek market compensation for doing so. Furthermore, the price formation for a service may have evolved for conventional generators, meaning the presence

6. This is demonstrated by Denholm and Margolis (2018) for the California system.

of batteries in the market could distort prices, affecting storage systems and conventional generators alike (Bhatnagar 2013).

- **Lack of discernment in quality and quantity of services procured.** For some services, such as frequency regulation, the speed and accuracy of the response is correlated to its overall value to the system. Battery systems can provide certain services much faster and more accurately than conventional resources, which may not be reflected in compensation for the service. Markets can provide fair compensation to BESS by aligning compensation schemes with the quality of service provided, as is mandated by FERC Order 755, which requires compensation for frequency regulation that reflects "the inherently greater amount of frequency regulation service being provided by faster-ramping resources" (FERC 2011). Similarly, BESS can be uniquely suited to provide up- or down-regulation, given their larger operating range over which to provide regulating reserves (due to their lack of a minimum stable level and ability to provide up- and down-regulation in excess of their nameplate capacity, based on whether they are charging or discharging) (Denholm 2019). These unique features of BESS are not necessarily reflected in the procurement requirements and compensation of such services, diminishing BESS' economic viability.

### *3. Data and Analysis Capabilities*

Battery storage systems are an emerging technology that exhibit more risk for investors than conventional generator investments. These risks include the technical aspects of battery storage systems, which may be less understood by stakeholders and are changing faster than for other technologies, as well as potential policy changes that may impact incentives for battery deployment. Given the relatively recent and limited deployment of BESS, many stakeholders may also be unaware of the full capabilities of storage, including the ability of a BESS to provide multiple services at both the distribution and transmission level. At the same time, traditional analysis tools used by utilities may be inadequate to fully capture the value of BESS. For example, production cost models typically operate at an hourly resolution, which does not capture the value of BESS' fast-ramping capabilities. The gaps in data and analysis capabilities and lack of adequate tools can deter investments and prevent battery storage from being considered for services that can be provided by better understood conventional generators (Bhatnagar et al. 2013).

## What are some real-world examples of batteries providing services and value-stacking?

There are several deployments of BESS for large-scale grid applications. One example is the Hornsdale Power Reserve, a 100 MW/129 MWh lithium-ion battery installation, the largest lithium-ion BESS in the world, which has been in operation in South Australia since December 2017. The Hornsdale Power Reserve provides two distinct services: 1) energy arbitrage; and 2) contingency spinning reserve. The BESS can bid 30 MW and 119 MWh of its capacity directly into the market for energy arbitrage, while the rest is withheld for maintaining grid frequency during unexpected outages until other, slower generators can be brought online (AEMO 2018). In 2017, after a large coal plant tripped offline unexpectedly, the Hornsdale Power reserve was able to inject several megawatts of power into the grid within milliseconds, arresting the fall in grid frequency until a gas generator could respond. By arresting the fall in frequency, the BESS was able to prevent a likely cascading blackout.

Another example of value-stacking with grid-scale BESS is the Green Mountain Power project in Vermont. This 4 MW lithium-ion project began operation in September 2015 and is paired with a 2 MW solar installation. The installation provides two primary functions: 1) backup power and micro-grid capabilities; and 2) demand charge reductions. The solar-plus-storage system enables the utility to create a micro-grid, which provides power to a critical facility even when the rest of the grid is down. The utility operating the BESS also uses it to reduce two demand charges: an annual charge for the regional capacity market and a monthly charge for the use of transmission lines. Sandia National Laboratories estimated that reducing the annual demand charge for a single year saved the utility over $200,000 (Schoenung 2017).

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**ORDINANCE**
**O2023-009**

**AN ORDINANCE AMENDING SECTION 52-E-12, "SUSTAINABLE ENERGY SYSTEMS," OF THE DEKALB COUNTY CODE TO ADD A NEW SUBSECTION C, "BATTERY STORAGE SYSTEMS".**

WHERAS, the Planning and Zoning Committee of the DeKalb County Board has determined the need for regulations governing the construction, installation, and operation of battery energy storage systems; and

WHEREAS. the Planning and Zoning Committee of the DeKalb County Board has drafted a Battery Energy Storage System Ordinance to address this need; and

WHERAS, the DeKalb County Community Development Department, under the direction of the Planning and Zoning Committee of the DeKalb County Board, has prepared and submitted an application for a Zoning Text Amendment for the adoption of a Battery Energy Storage System Ordinance; and

WHEREAS, following due and proper notice by publication in the Daily Chronicle not less than fifteen (15) nor more than thirty (30) days prior thereto, the DeKalb County Hearing Officer conducted two public hearings on September 15, 2021, at 2:00 pm and 6:00 pm, regarding the proposed Text Amendment; and

WHEREAS, based on the testimony given at the public hearings, the Hearing Officer has forwarded to the Planning and Zoning Committee findings and a recommendation that the amendment be approved, with several recommended changes for the County Board to consider, as set forth in the Findings of Fact and Recommendation of the DeKalb County Hearing Officer; and

WHEREAS, the Planning and Zoning Committee of the DeKalb County Board has reviewed the testimony and exhibits presented at the public hearing, and having considered the Findings and Recommendation of the Hearing Officer, and further recommendations from staff, determined that proposed text be further amended to incorporate several of these recommendations; and

WHEREAS, the Committee has forwarded a recommendation to the DeKalb County Board that the amended proposed text be adopted, as set forth below; and

WHEREAS, the DeKalb County Board has considered the Report of Proceedings and Recommendation of the Hearing Officer and the recommendation of the Planning and Zoning Committee, and has determined that the matter needed to be sent back to Committee for further review;

WHEREAS, the Planning and Zoning Committee of the DeKalb County Board having reconsidered the testimony and exhibits from the public hearing, having reconsidered the findings of fact and recommendation of the Hearing Officer, and having considered testimony presented at

the County Board, and further recommendations from staff, determined that proposed text be further amended to incorporate said recommendations; and

WHEREAS, the Committee has forwarded a recommendation to the DeKalb County Board that the amended proposed text be adopted, as set forth below; and

WHEREAS, the DeKalb County Board has determined that it is in the best interests of the citizens of the County to amend the DeKalb County Zoning Ordinance in accordance with the amended proposed text;

NOW, THEREFORE, BE IT ORDAINED BY THE COUNTY BOARD OF DEKALB COUNTY, ILLINOIS, as follows:

SECTION ONE: The Findings of Fact and Recommendation of the DeKalb County Hearing Officer, Exhibit "A", attached hereto, is hereby adopted as the findings of fact and conclusions of the DeKalb County Board; and

SECTION TWO: The DeKalb County Code, Section 53-E-12 of the DeKalb County Code, is hereby amended as follows:

**Amend Section 53-E-12 to add the following text as a new sub section C:**

**C. Battery Storage Systems**

1. **Purpose:** The purpose of this Section is to provide regulations for the construction, installation, and operation Battery Energy Storage Systems (BESS) in unincorporated DeKalb County, while ensuring the health, safety, and welfare of the residents of DeKalb County. This ordinance shall not be deemed to nullify any provision of local, state, or federal law. The contents of this Section shall apply to all BESS installations in unincorporated DeKalb County.
2. **Definitions:** The following words, terms, and phrases, when use in this Section, shall have the meanings ascribed to this Section except when the context clearly indicates a different meaning.

   Battery Energy Storage Management System: An electronic system that protects energy storage systems from operating outside of their safe parameters and disconnects electrical power to the energy storage system or places it in a safe condition if potentially hazardous temperatures or other conditions are detected.

   Battery Energy Storage System (BESS): One or more devices, assembled together, capable of receiving electrical energy from the grid or other electrical resource and storing it for later injection back to the grid.

   BESS Commissioning: A systematic process that provides documented confirmation that a BESS functions according to the intended design criteria and complies with applicable code requirements.

   BESS Dedicated-Use Building: A building or structure that is built for the primary intention of housing BESS equipment, is classified as Group F-1 occupancy, as defined in the International Building Code, and complies with the following:

1: The building's only use is battery energy storage, energy generation, and other electrical grid-related operations.
2: No other occupancy types are permitted in the building.
3: Occupants in the rooms and areas containing BESS are limited to personnel that operate, maintain, service, test, and repair the BESS and other energy systems.

BESS Participating Property: A BESS host property or any real property that is the subject of an agreement that provides for the payment of monetary compensation to the landowner from the BESS owner (or affiliate) regardless of whether any part of a BESS is constructed on the property.

BESS, Tier 1: Tier 1 BESS have an aggregate energy capacity less than or equal to 600kWh and, if in a room or enclosed area, consist of only a single energy storage system technology.

BESS, Tier 2: Tier 2 BESS have an aggregate energy capacity greater than 600kWh or are comprised of more than one storage battery technology in a room or enclosed area.

3. **Types of BESS:**
   a. **Tier 1 BESS**: A Tier 1 BESS shall be permitted as an accessory use in all zoning districts and shall be subject to the regulations for accessory uses.
      1). Tier 1 BESS incorporated into the primary structure or building shall be considered an addition/alteration said structure, and subject to all regulations governing said structure.
      2). Intermodal storage containers may not serve as the dedicated-use building for Tier 1 BESS in a residential district.
   b. **Tier 2 BESS**: A Tier 2 BESS is allowed as a Special Use in the A-1 and MC Zoning Districts, and shall require a Special Use Permit. Except as otherwise noted in this Section, a Tier 2 BESS must comply with all standards for structures un the district in which the system is located.
      1). **Ground Cover, Screening, and Buffer Areas**:
         1. Areas within ten (10) feet on each side of the BESS shall be cleared of combustible vegetation and other combustible growth.
         2. Any part of the BESS that is within five hundred (500) feet of a property line or right-of-way, or within one thousand five hundred (1,500) feet of an occupied structure, shall be screened. Additional screening may also be required, if the County Board deems such is necessary.
         3. Required screening shall consist of native trees, shrubs, berms, or a combination thereof.
         4. All screening must be installed prior to the commencement of construction of the BESS.
         5. All screening shall be maintained by the BESS owner for the life of the facility, with replacement plantings and/or berm maintenance conducted as necessary. Failure to do so will be a violation of the special use ordinance.
      2). **Power and Communication Lines**. Power and communication lines running to and from the BESS shall be buried underground, except at the interconnection point

to the electrical grid. Exemptions may be granted by DeKalb County in instances where shallow bedrock, water courses, or other elements of the natural landscape interfere with the ability to bury lines, or distance makes undergrounding infeasible, at the discretion of the Director of Community Development. In addition, the Illinois Department of Agriculture (IDOA) has established standards and policies in the Agricultural Impact Mitigation Agreements (AIMA) regarding the construction or burial of electric transmission lines which should be agreed to and adhered to between the landowner and the developer.

**3). Setbacks:**

1. All components of the BESS shall be setback at least two hundred (200) feet from a property line or right-of-way.
2. All components, except the interconnection point, installed as part of the BESS shall be setback at least five (500) hundred feet from the nearest outer wall of an occupied structure not located on the subject property. However, if the developer of the facility can obtain and record with the DeKalb County Recorder a written, signed, and notarized statement from the owner of the property containing said structure waiving this setback, the minimum setback from said structure shall be reduced to two hundred (200) feet.
3. If the BESS is to be installed in conjunction to a new solar farm or solar garden, the BESS shall be sited so as to be located within the interior of said facility, with the banks of solar panels lying between the BESS and the edges of the facility.

4). **Interconnection Point.** The interconnection point to the electrical grid shall be located no further than twenty (20) feet from a right-of-way or existing power line. Any poles used as part of the interconnection point shall be placed such that they run parallel to said right-of-way or existing power line. A variation from this standard may be granted by the DeKalb County Board, provided the applicant can adequately demonstrate the unique circumstances and particular hardships that would merit such a variation being granted

5). **AIMA**. A signed copy of the Agricultural Impact Mitigation Agreement shall be submitted prior to the issuance of any building permits.

4. **Content of a BESS Special Use Permit Application:** In addition to those requirements listed under Article 9: Special Use Permit Procedures, a Special Use Permit application shall also require the following:
   a. The application shall include two (2) printed copies and one electronic copy of the entire application (including: the application forms and any attachments or other submittals included therein).
   b. **Site Plan.** A detailed site plan for both existing and proposed conditions must be submitted, showing location of the BESS, other structures, property lines, rights-of-way, service roads, floodplains, wetlands and other protected natural resources, topography, farm tile, electric equipment, fencing, and screening materials and all other characteristics requested by DeKalb County.

c. **Endangered Species and Wetlands**. A BESS developer shall be required to initiate a natural resource review consultation with the Illinois Department of Natural Resources (IDNR) through the department's online, EcoCat program. Areas reviewed through this process will be endangered species and wetlands. The cost of the EcoCat consultation will be borne by the developer.

d. **Legal Descriptions:** Two (2) legal descriptions shall be submitted: the first will be of the subject property(s) on which the facility will be located, which will be used for the public notice; and, the second will be of the specific leased/purchased area(s) to be occupied by the BESS.

e. **Tile Investigation Report.** A BESS developer must submit a Tile Investigation Report for the entire area of the BESS, identifying all drain tiles located therein. The BESS developer shall maintain and protect all drain tiles located within the project area, and shall repair or replace any drain tiles damaged as a consequence of the installation or removal of the BESS.

f. **Landscape Plan:** A detailed Landscape Plan providing specific information about the native species that are proposed for the screening, where they will be located, and how they will be installed and established, shall be submitted to the DeKalb County Soil and Water Conservation District for review and approval.

g. **Fire Safety Compliance Plan.** Such plan shall document and verify that the system and its associated controls and safety systems are in compliance with Code.

h. **Emergency Operations Plan.** A copy of the approved Emergency Operations Plan shall be given to the system owner, the local fire department, and local fire code official. A permanent copy shall also be placed in an approved location to be accessible to facility personnel, fire code officials, and emergency responders. The emergency operations plan shall include the following information:

   1). Procedures for safe shutdown, de-energizing, or isolation of equipment and systems under emergency conditions to reduce the risk of fire, electric shock, and personal injuries, and for safe start-up following cessation of emergency conditions.

   2). Procedures for inspection and testing of associated alarms, interlocks, and controls.

   3). Procedures to be followed in response to notifications from the BESS Management System, when provided, that could signify potentially dangerous conditions, including shutting down equipment, summoning service and repair personnel, and providing agreed upon notification to fire department personnel for potentially hazardous conditions in the event of a system failure.

   4). Emergency procedures to be followed in case of fire, explosion, release of liquids or vapors, damage to critical moving parts, or other potentially dangerous conditions. Procedures can include sounding the alarm, notifying the fire department, evacuating personnel, de-energizing equipment, and controlling and extinguishing the fire.

   5). Response considerations similar to a safety data sheet (SDS) that will address response safety concerns and extinguishment when an SDS is not required.

6). Procedures for dealing with BESS equipment damaged in a fire or other emergency event, including maintaining contact information for personnel qualified to safely remove damaged battery energy storage system equipment from the facility.

7). Other procedures as determined necessary by the County to provide for the safety of occupants, neighboring properties, and emergency responders.

8). Procedures and schedules for conducting drills of these procedures and for training local first responders on the contents of the plan and appropriate response procedures.

i. **Emergency Operations Training**. The developer shall be responsible for training and preparing the local fire departments, local fire code officials, and emergency responders to implement the Emergency Operations Plan. The developer shall be responsible for bearing the costs of the training, and for providing the necessary equipment needed to implement the Emergency Operations Plan. This training must be substantially completed and the equipment provided for use prior to the facility coming online

**5. Design and Installation Requirements:**

**a. Setback Requirements**

**1).** No BESS shall be allowed in the front yard of any residentially used or zoned property.

**b. Height Requirements**

**1).** A BESS shall not exceed the maximum height for the zoning district in which it is located.

**c. Stormwater and NPDES.** BESS are subject to DeKalb County's Stormwater Management regulations, erosion and sediment control provisions and NPDES permit requirements.

**d. Standards and Codes:** All BESS shall be in compliance with all applicable local, state and federal regulatory codes, including, but not limited to: the State of Illinois Plumbing Code; The State of Illinois Electric Code; The State of Illinois Energy Code; the State of Illinois Uniform Building Code, as amended; the National Electric Code, as amended; the most current version, or successor language thereof, of the National Fire Protection Association (NFPA) 855, 1142, and 2001; and, all DeKalb County Health Department requirements.

**e.** In all undeveloped areas, the BESS developer will be required to complete a consultation with both the Illinois Historic Preservation Agency (IHPA) and the Illinois Department of Natural Resources (IDNR) through the Department's online EcoCat Program. The cost of this consultation shall be at the developer's expense. The final certificate from EcoCat shall be provided to the DeKalb County Community Development Department. before a permit or Special Use Permit will be issued.

**f. Fencing.** Tier 2 BESS, including all mechanical equipment, shall be enclosed in fencing, with a maximum height of eight (8) feet with a self-locking gate, and shall

be a primarily woven wire or agricultural style fencing. The fence shall contain appropriate warning signage that is posted such that is clearly visible on the site.

**1).** The warning signage shall include the type of technology associated with the BESS, any special hazards associated, the type of suppression system installed in the area of the BESS, and 24-hour emergency contact information, including reach-back phone number.

**g. Lighting.** Any lighting for BESS shall be installed for security and safety purposes only. All lighting shall be shielded so that no glare extends substantially beyond the boundaries of the facility.

**h. Approved BESS Components.** Electric BESS components must have a UL listing, or approved equivalent.

**i. Noise.** The one (1) hour average noise generated by from the BESS, components, and assoiated ancillary equipment shall not exceed a noise level of sixty (60) dBA as measured at the outside wall of any non-participating occupied building. Applicants may submit equipment and component manufacturers noise ratings to demonstrate compliance. The applicant may be required to provide Operating Sound Pressure Level measurements from a reasonable number of sampled locations at the perimeter of the BESS to demonstrate compliance with the standard.

**j. Utility Notification:** All grid-intertie BESS shall comply with the interconnection requirements of the electric utility. Off-grid systems are exempt from this requirement.

**k. Plan Approval Required**: All solar energy systems shall require administrative plan approval by the DeKalb County Building official via the review of the application for a building permit

**1).** Plan Applications. Plan applications for BESS shall be accompanied by horizontal and vertical (elevation) drawings. The drawings must show the location of the system on the property, including the property lines.

**1).** Plan Approvals. Applications that meet the design requirements of this ordinance, and do not require an administrative variance, shall be granted administrative approval by the Director of Community Development and shall not require Planning and Zoning Committee review. Plan approval does not indicate compliance with Building Code or Electric Code.

**l.** Road Use Agreements shall be established with all appropriate road authorities prior to the issuance of a building permit.

**6. Operation and Maintenance**

**a.** Upon request from the DeKalb County Community Development Department, an owner of a commercial BESS must provide documentation, within thirty (30) days, that the BESS is still in use. If it is not, the owner of the System will have 180 days, after notification from the Zoning Department, to remove the BESS from the property.

**b.** Upon request from the DeKalb County Community Development Department, the owner or operator of a BESS must submit, within 14 days, a current operation and maintenance report to the Department.

**c.** All active BESS shall meet approval of county building code officials, consistent with the State of Illinois Building Code. Any county adopted building codes will apply and take precedence where applicable

7. **Decommissioning or Abandonment of the BESS and Site Reclamation Plan Requirements:** At the time of the Special Use application, the County and the applicant, owner, and/or operator must formulate a decommissioning and site reclamation plan to ensure that the BESS project is properly decommissioned. The decommissioning and site reclamation plan shall be binding upon all successors of title to the land. A signed decommissioning and site reclamation plan must be submitted to the Community Development Director prior to the granting of the Special Use Permit. The applicant or subsequent project operator shall ensure that the BESS facilities are properly decommissioned within six (6) months of the end of the project life or the facility abandonment. The applicant or subsequent project operator's obligations shall include removal of all equipment and physical materials (concrete, rebar, etc., but excluding fill), negotiable by the landowner with a minimum equal to the amount set in the signed AIMA agreement, and the restoration of the area as near as practicable to the same condition prior to construction.

   a. **A decommissioning and site reclamation plan shall be prepared by an independent Illinois Certified Professional Engineer and shall include:**
      1) Provisions describing the triggering events for decommissioning the project;
      2) A description of the methodology and cost to remove all above ground and below ground facilities of the approved Special Use Permit;
      3) Provisions for the removal of all above ground and below ground facilities of the approved Special Use Permit;
      4) Methodology and cost to restore all areas used for construction, operation, and access to a condition equivalent to the land prior to the BESS construction;
      5) A work schedule and a permit list necessary to accomplish the required work;
      6) Methodology to identify and manage any hazardous or special materials;
      7) Proof that the necessary amount and form of financial security has been received by the County in the form of an escrow account that names DeKalb County as the Beneficiary. The amount of security shall be equal to the positive difference between the total cost of all decommissioning and restoration work and the net salvage value of all removed BESS equipment or materials, plus a twenty-percent contingency. To determine that amount, the BESS owner and the DeKalb County Board shall:
         a) Obtain bid specifications provided by a professional structural engineer;
         b) Request estimates from construction/demolition companies capable of completing the decommissioning of the BESS project; the DeKalb County Engineer, and an independent engineer of the County's choosing, the

Director of Community Development will review all estimates and make a recommendation to the DeKalb County Board for an acceptable estimate. DeKalb County reserves the right to pursue other estimates;

c) Certification of the selected estimate by a professional structural engineer. All costs to secure the estimates will be funded by the BESS owner.

8) A provision that the terms of the decommissioning plan shall be binding upon the BESS owner or operator and any of their successors, assigns, or heirs;
9) Confirmation by affidavit that the obligation to decommission the BESS facilities is included in the lease agreement for every parcel included in the Special Use application. A list of all landowners should be kept current and affidavits shall be secured from future BESS owners and landowners stating their financial understanding;
10) A provision that allows the County to have legal right to transfer applicable BESS material to salvage firms;
11) Identification of and procedures for DeKalb County to access the financial assurances; and
12) A provision that DeKalb County shall have access to the site, pursuant to reasonable notice to affect or complete decommissioning. A portion of the escrow account will be required to be held for one year past the decommissioning to settle any potential disputes.

b. **Provisions triggering the decommissioning of any portion of the BESS project due to abandonment:**
   1) Inactive construction for six (6) consecutive months or if there is a delay in obtaining electrical certification for six (6) consecutive months, unless a signed document is provided by the utility company claiming responsibility for the delay.
   2) The company dissolves or chooses to walk away from the project.
   3) The principal company dissolves or chooses to walk into disrepair, is in threat of collapsing or any other health and safety issue.
c. **Provisions for the removal of structures, debris, and cabling; both above and below the soil surface:**
   1) Items required to be removed include, but are not limited to: panels; inverters; foundation pads; electrical collection systems and transporters; underground cables; fencing; access roads and culverts. A landowner must sign an agreement if they wish for the access roads or culverts to remain.
d. **Provisions for the restoration of soil and vegetation:**
   1) All affected areas shall be inspected, thoroughly cleaned, and all construction related debris shall be removed.
   2) Items required to be restored include but are not limited to: windbreaks; waterways; site grading; drainage tile systems; and, topsoil to former productive levels.

a) The below-surface excavation area shall be filled with clean sub-grade material of similar quality to that in the immediate surrounding area.
b) All sub-grade material will be compacted to a density similar to surrounding grade material.
c) All unexcavated areas compacted by equipment used in decommissioning shall be de-compacted in a manner that adequately restores the topsoil and sub-grade material to the proper density consistent and comparable with the surrounding area.
d) Where possible, the topsoil shall be replaced to its original depth and surface contours.
e) Any topsoil deficiency and trench settling shall be mitigated with imported topsoil that is consistent with the quality of the effective site.

3) Disturbed areas shall be reseeded to promote re-vegetation of the area to a condition reasonably similar to the original condition. A reasonable amount of wear and tear is acceptable.
4) Restoration measurements shall include: leveling, terracing, mulching, and other necessary steps to prevent soil erosion; to ensure establishment of suitable grasses and forbs; and to control noxious weeds and pests.
5) Items required to be repaired after decommissioning include but are not limited to: roads; bridges; and culverts.
6) An independent drainage engineer shall be present to ensure drainage tiles, waterways, culverts, etc. are repaired as work progresses.
7) A soil erosion control plan shall be approved by the County Engineer and the DeKalb County Soil and Water Conservation District.
8) All stormwater management, floodplain, and other surface water codes and ordinances shall be followed.

e. **Estimating the Costs of Decommissioning:**

1) Costs shall include but not be limited to engineering fees, legal fees, accounting fees, insurance costs, decommissioning and site restoration.
2) When factoring the BESS salvage value into decommissioning costs, the authorized salvage value may be deducted from decommissioning costs if the following standards are met:
a) The net salvage value shall be based on the average salvage price of the past five (5) consecutive years, this includes any devaluation costs.
b) The maximum allowable credit for the salvage value of any BESS shall be no more than the estimated decommissioning costs of removal of the above ground portions of that individual BESS or up to seventy percent (70%) of the total estimated decommissioning costs, whichever is greater.
3) Adjustments to the financial assurance amount that reflect changes in the decommissioning costs and salvage values shall be resubmitted every five (5) years and shall be adjusted for inflation and other factors. The escrow account

shall be adjusted accordingly within six (6) months of receiving the updated information as determined by an Illinois professional engineer. Failure to provide financial assurance as outlined herein shall be considered a cessation of operation.

4) When determining salvage values – demolition costs, transportation costs, and road permits shall be a consideration.
5) If salvage value items are removed prior to decommissioning, then the escrow account must be credited.

f. **Financial Assurance:**

1) The County shall have access to the decommissioning fund secured by the escrow account in a bank of the County's choosing if:
   a) The BESS operator fails to address a health and safety issue in a timely manner; or
   b) The BESS operator fails to decommission the BESS project in accordance with the decommissioning and site reclamation plan.
2) The applicant and/or BESS owner shall grant perfected security in the escrow account by use of a control agreement establishing the County as an owner of record pursuant to the Secured Transit Article of the Uniform Commercial Code, 810 ILCS 9/101 et seq.
3) The escrow agent shall release the decommissioning funds when the BESS owner or operator has demonstrated and DeKalb County concurs that decommissioning has been satisfactorily completed, or upon written approval of the County to implement the decommissioning plan. Ten percent of the fund shall be retained one (1) year past the decommissioning date to settle any outstanding concerns.
4) Any interest accrued on the escrow account that is over and above the total value as determined by the Illinois professional structural engineer shall go to the BESS owner.
5) The applicant shall identify procedures for DeKalb County to assess the financial assurances, particularly if it is determined that there is a health and/or safety issue with the BESS and the principal company fails to adequately respond as determined by the County Board.
6) The County shall be listed as a debtor but shall not be responsible for any claims against the BESS owner and/or operator.
7) The applicant shall agree that the sale, assignment in fact or at law, or other transfer of the applicant's financial interest in the BESS shall in no way effect or change the applicant's obligation to continue to comply with the terms, covenants, and obligations of this agreement and agrees to assume all reclamation liability and responsibility.

8) DeKalb County and its authorized representatives have the right of entry onto the BESS premises for the purpose of inspecting the methods of reclamation or for performing actual reclamation if necessary.

g. **Remedies:**
   1) The applicant's, owner's, or operator's failure to materially comply with any of the above provisions shall constitute a default under this ordinance.
   2) Prior to implementation of the existing County procedures for the resolution of such default(s), the appropriate county body shall first provide written notice to the owner and operator, setting forth the alleged default(s). Such written notice shall provide the owner and operator a reasonable time period, not to exceed sixty (60) days, for good faith negotiations to resolve the alleged default(s).
   3) If the County determines in its discretion, that the parties cannot resolve the alleged default(s) within the good faith negotiation period, the existing county ordinance provisions addressing the resolution of such default(s) shall govern.

h. **Future Operators:** Future operators, successors, assignees, or heirs shall agree in writing to accept and to conform to all provisions of the Special Use Permit. Prior notice to the County of the intent to sell or transfer ownership shall be done in a timely manner. Such agreement shall be filed with and accepted by the County before the transfer to a new operator, successor, assignees, or heirs shall be effective.

**8. Liability Insurance and Indemnification**

a. For BESS, commencing with the issuance of building permits, the Applicant, Owner, or Operator shall maintain a current general liability policy covering bodily injury and property damage with limits of at least $3 million per occurrence and $5 million in the aggregate. Such insurance may be provided pursuant to a plan of self-insurance, by a party with a net worth of $20 million or more. The County shall be named as an individual insured on the policy to the extent the county is entitled to indemnification.

b. For Private / Individual BESS, commencing with the issuance of building permits, the Applicant or Owner shall maintain a current liability policy covering bodily injuries and any damage that may occur, on their home owner's policy or other applicable policy as approved by the Director of Community Development.

c. Any BESS, Applicant, Owner, or Operator, whether individual or commercial, shall defend, indemnify, and hold harmless the County and its officials, employees, and agents (collectively and individually, the "Indemnified Parties") from and against any and all claims, demands, losses, suits, causes of actions, damages, injuries, costs, expenses, and liabilities whatsoever, including reasonable attorney's fees, except to the extent arising in whole or part out of negligence or intentional acts of such Indemnified Parties ( such liabilities together known as "liability") arising out of Applicant, Owner, or Operators selection, construction, operation, and removal of the BESS and affiliated equipment including, without limitation, liability for property damage or personal injury (including death), whether said

liability is premised on contract or on tort (including without limitation strict liability or negligence). This general indemnification shall not be construed as limited or qualifying the county's other indemnification rights available under the law.

SECTION THREE: This Ordinance shall be in full force and effect upon its adoption by the County Board of DeKalb County, Illinois.

PASSED BY THE COUNTY BOARD THIS 15TH DAY OF MARCH, 2023, A.D.

Suzanne Willis, Chair
DeKalb County Board

ATTEST:

Tasha Sims
DeKalb County Clerk

**Exhibit "A"**

**Solar Text Amendment - Report and Recommendations**
**Petition DC-22-15**

Date of Hearing: September 15, 2022
Time(s): 2:00 p.m. and 6:00 p.m.

Location: DeKalb County Legislative Center, Gathertorium, Sycamore, IL

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I. **Text Amendment Proposal**

The County has submitted a proposal to amend and update the solar energy systems ordinance and further to establish battery energy storage regulations. The proposed text amendment provides for the following, generally, in addition to other changes:

A. Changes to Definitions

B. Additions to Ground Cover requirements

C. Codification of Set-Back requirements and provisions for landowner waivers

D. Extensive Decommissioning changes with increased requirements

E. Landscape maintenance and monitoring provisions

F. New Section 52-12 C - Battery Storage Systems regulation and operation

Prior to and during the hearing, the following was received into the record:

1. Public Notice, duly published within the time required by law;

2. Draft Copy of the proposed text amendment, and Staff comments relating thereto, including a red-line version of proposed changes to the existing ordinance;

3. Correspondence from members of the public concerning the elements of the draft ordinance, as well as general comments in favor and/or opposed to the proposed language in the draft text, and third-party source materials referenced in some of the public comments provided by speakers at the hearing.

After admonishing those present to swear and affirm that the information they will be providing will be, to the best of their information and belief, the truth, the hearings commenced at their scheduled times pursuant to the public notice.

## II. County Introduction and Brief History

Director Hiland described the many months of discussions by stakeholders and interested members of the public who attended the various committee meetings on this important matter. He described the current proposed text language as a product of those discussions, the learned experiences of prior solar projects that underwent the public hearing process, and an examination of common conditions for approval as well as continued public concerns.

## III. Public Comments

**2:00 p.m. Hearing:**

Michael Haines, Kingston Township: stated that he has had solar on his barn for private use, and has 113 acres, 40 acres of which abuts a solar array. He stated that the solar array is not displeasing aesthetically or otherwise, and he is in support of solar farming. He stated he would oppose any amendment change that would make it more difficult to develop solar. In his view, both solar and agriculture "borrow" the land to make money, but solar generation allows the land to rest and renew for a period of time while industrial agriculture tends to leave the land in such shape that it requires outside inputs and chemicals to continue to allow it to be useful.

Courtney Gallaher from NIU, presented a letter in support: She stated that other NIU representatives were present at hearing as well and that it is important to act on climate change. She stated that NIU is very committed to transitioning to green energy sources and she and others at NIU have concerns that the ordinance will have economic disincentives to allowing producers to produce solar and actually discourage solar development. She stated they are very concerned that the ordinance limits development and places the county at an economic disadvantage as compared to other counties in solar development. She requested that the County pause voting until a more comprehensive economic and impact study can be done.

Marie Rita Nelson, President League of Women Voters, DeKalb Township: presented a supporting petition that urges leaders to support development of solar energy development, and cited solar's many benefits. She stated the petition has gathered over 1100 verified signatures not to support any one solar company, but rather solar development and green energy production in the County.

Nancy Proesel - Kishwaukee District 350.org – She stated that the County needs to be really careful about not restricting where the solar panels can be, and she cited the 300 ft set-back in particular. She stated that we need to be able to get local solar power where needed and the County needs to have more people able to develop solar.

Christy Slavenas, Genoa Township: citizen who appreciates what the County board has done in being sustainable in the county. She stated she has been a teacher for 36 years and uses science time to allow students to explore different ways of producing energy. In her opinion, she stated, the young people are concerned, but also very excited about making a better future for our world and preserving the soil in DeKalb County. She stated that our county has very good soil but that development and agriculture will reduce that quality, whereas solar panels are good and they provide rest time for the soil.

Linda Timm, DeKalb Township: Ms. Timm submitted written comments as part of the record, and also read them verbatim into the record.- see submission. She stated that she can't support it as it is written today, for the reasons stated in her written submission.

Louise Lanan, Mayfield Township: She stated that she does not support the ordinance as written. She noted that the ordinance is very improved but not what she could support at present. She stated that she lives on Johnson Road and it has been proposed that there will be 15ft panels on 3 sides of her home and she would very much like to not have to look at those as they will be an eyesore.

Kevin Adelman, Leeward Energy, DeKalb County: Stated that he has worked in solar development for over 10 years and that the County and Director Hiland have worked hard in revising the ordinance. He stated that he still has some concerns that he believes need additional changes. For example, he noted that the prior ordinance allowed for letters of credit to suffice, but that the proposed draft will require cash, prior to knowing if the project is approved and that adds additional burdens to developers and the County to monitor, but in reality, doesn't really add to the additional security intended. He stated that the opponents to solar production are the "same few dozen people", and that in his opinion there are thousands of others who support solar.

Marie Rita Nelson, on her individual behalf - She stated that letters of credit are common in the trade and a cash bond requirement will kill a big project if required, in her opinion.

**6:00 P.M. Hearing:**

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Brad Belanger, South Grove Township: Mr. Belanger stated that he wants clarification / guidance in the ordinance, as to what is the intent, and by way of example noted the following:

1. Set-back requirements in the draft use different reference points, i.e., property line or outer wall;
2. Site-plan portion needs clarification as to when to be submitted, and public input;
3. The draft ordinance mentions standards and codes, but doesn't identify which professional standard or code for reference;
4. The draft ordinance needs further information as to landscaping requirements as to expense, and the need for intergovernmental agreements;
5. With respect to the new section relating to Batteries, he had a number of concerns.
   A. The draft mentions a BES Special Use Permit - but does not identify if it is a separate special use permit application and process;
   B. Fire Safety Compliance Plan reference - to what code or codes is the draft ordinance referring, and there needs to be clarification/coordination as to the various potential responding agencies to a fire hazard situation.
6. Provided a copy of the NFPA 855 Standard for the Installation of Stationary Energy Storage Systems, containing highlighted material with concerns as to standards. Does not support the ordinance as drafted - listed the 8 areas of concerns.
7. Provided a copy of a report documenting the injury of four firefighters who were injured in a battery energy storage system explosion in Arizona.

Mr. Belanger noted he is a firefighter, and was speaking on his own behalf and not that of his organization, but that he has concerns with how quickly temperatures escalate when a battery energy storage system fails and catches fire, and the potential for serious injury, and the need for specified standards, training, and coordination with overlapping agencies. He detailed a timeline for the incident described in his submission and how quickly it escalated.

John Lageman, Mayfield Township: Mr. Lageman made a general request that non-county resident statements be stricken. Thereafter, Mr. Lageman detailed what he believes are the faults with the proposed draft ordinance changes. He provided a lengthy written submission, which detailed his concerns, but in general stated the following:

1. The draft ordinance still appears to permit "daisy-chaining" of several separate but contiguous projects;
2. The screening that should be required should block 100% of the view of the solar farm from anywhere on the non-participating landowner's property;

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3. The building permit stage should be open to public comment, as with the application for special use process;

4. Fire and safety issues with the battery energy storage system draft language;

5. The current solar ordinance draft is too industry-friendly, and not protective enough of the rights of non-participating landowners.

He then summarized his position on the various aspects of the draft ordinance as follows:

6. The County has a luxury in that lots of people are involved in various areas of concerns that touch on these matters, such as firefighters, professionals engaged in natural resources, and others;

7. This public hearing is a product of deficiencies in the prior ordinance and does not address the concerns of citizens raised over the last 4 years and he believes board members want it passed before they leave office;

8. The ordinance, in his opinion, does not establish useful metrics, or require environmental monitoring to evaluate water quality, or adequately protect life and property;

9. The ordinance does not address the photovoltaic heat effect which, he stated, can result in 38 degrees higher than ambient temperature, or the issue of potentially harmful stray voltage;

10. The ordinance should have scalable setbacks, and he agrees with the 100:3 setback general rule discussed by others. This will allow for larger setbacks to correlate as the size of the solar panels increase;

11. Need to reinstate solar garden definition;

12. Comprehensive Unified Plan and Future Land Use Plan establishes intents and goals for the County and the ordinance, in his opinion, as drafted, does not coordinate or comply with those published plans.

13. He summarized that he believes this process is all about money but decisions need to be made using logic and rational thought, he stated.

In his opinion, the ordinance is unacceptable, and the expense and impact to non-participating landowners is unacceptable, he stated.

John Lyon, Mayfield Township: he stated that he finds fault with the proposed changes and expressed his concerns in a detailed written submission received into the record. His written submission correlates to the redlined version that came out of the County committee.

In brief summary, his concerns were as follows:

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1. The solar garden, 20-acre definition was removed and leaves an interpretation open to "daisy-chaining" of various adjacent projects;
2. The vegetation/screening provisions state only 80% coverage, leaving 20% open;
3. There are no defined penalties for non-compliance with certain important provisions;
4. He has numerous fire and safety concerns.

He stated that his family does not support the ordinance as it is drafted today and he believes it is too supportive of the solar industry. He further stated that the required screening should be 100% blockage of view and that the building permit process should be subject to public input and comment as well. He stated that he will photocopy and send in his red-lined version and provide a copy to county staff

Katherine Andraski, Kingston Township: She stated that she opposed the solar ordinance as proposed, and believes that industrial solar is a bad idea. She was in favor of scalable setbacks in a 100:3 ratio, and that non-participating landowners would like 100% blockage regarding screening. She stated that solar installations negatively affect property values and that to properly evaluate one needs to evaluate housing density around the solar installation. She noted that Kevin Adelman of Leeward proposed 500-foot property line setbacks (not merely 500 ft from a structure) in a Pueblo Colorado project which was ultimately rejected by that municipality and DeKalb should demand no less. She stated that solar energy providers should provide all appropriate state certifications regarding the use of hazardous chemicals. She stated that more care and consideration should be given to the Kishwaukee watershed and that real thought should be given to a project's proximity to water sources. She also had concerns regarding "stray voltage" issues. In her opinion, she stated, battery storage should be a separate, stand-alone ordinance, and not part of the solar ordinance to properly address and regulate that subject.

She stated that her primary concerns involved decommissioning, leakage, damage to water sources, "daisy-chaining" of solar gardens, battery storage, internet line-of-site for internet connectivity, permit extensions, nomenclature, enforcement and approval mechanisms.

Meryl Bomina, DeKalb Township: She stated that it is really important that we welcome solar installations and community solar, and that we retain appropriate setbacks. She noted that other forms of energy production - coal, oil, and others - result in large areas of land that are ruined and difficult or impossible to restore. She stated that solar panels do not cause long-term damage and the land improves over the project life, especially with proper vegetation requirements, as compared to other energy extraction methods. She stated that fossil fuels require transportation, the use of chemicals, and release carbon into the atmosphere causing global earth temperatures to warm. She stated that the resulting extreme weather events cause great damage and great government expense to restore.

Cordelia Parham, DeKalb, life-long resident: She expressed her support and wanted to thank the County for consideration of solar farms in DeKalb. She stated that we need to embrace and make solar feasible, and should not be throwing up barriers to the production of solar energy as we are in a state of rapid climate change. She stated we need to look at the big picture and the benefits of solar outweigh the negatives. She stated that solar panels are compatible with dairy farms and goats to graze the land and that solar panels are not antithetical to agriculture.

She noted that there is a lobby named "ALEC" which provides planted information to the media to discourage solar farms because there is more money in fossil fuels. She stated we need to ignore the propaganda and look at the facts. She is very supportive of reasonable policies that do not inhibit solar production (i.e., reasonable setbacks that do not become a barrier, in her opinion).

Tim Hakes, Mayfield Township: He provided a written submission and does not support the current solar ordinance as presented today. He stated that the recommendations from prior hearings are not being honored in his opinion. He also stated his support for a 100:3 scalable setback standard, and to use property lines for setting the setbacks, as is done for all other projects. He believes that solar projects do affect home property values and will reduce tax revenue to the County. He had concerns about fires with battery storage systems, and discussed comparisons with car batteries that burn with extreme heat. He stated that the fossil needed to produce solar panels are such that it will not equal out the energy created by the panels in his opinion. He stated that the panels used in solar production use materials made from China and that China uses forced labor and persecuted Muslim minorities for their production. He wants panel sources certified that they did not come from China. He also had concerns about disposal issues with expired or non-functioning panels. He believes that nuclear energy is a more viable alternative.

Beth Evans, South Grove Township: She stated that she is not going to repeat other statements because she agreed with many of the points made at hearing. She stated that she loves rural DeKalb County and does not want to see DeKalb go the way of Compton, Illinois with the wind farms down there. She stated that foreigners coming into the country from who knows where are involved and she thinks it's a big scam for corporations to make a lot of money and in the end, taxpayers will bear the burden.

Rhonda Henke, Mayfield Township - She stated that she does not support the draft ordinance as written. She stated that fire safety and training need to be provided by the applicants so that no one gets harmed or suffers loss of life. She stated that all battery storage language should be stricken and made into a separate ordinance as it is too big a concern to be lumped into this ordinance. She stated that she is in favor of scalable setbacks as mentioned before, in the 100:3

ratio, to protect non-participating homeowners and allow them to enjoy their property to the best of their ability and to enjoy their property views and recreational activities.

**IV. Public Written Submissions:**

1. Anita Zurbrugg - email correspondence with attached petition and signatures in support of solar energy development in DeKalb County.
2. Rhonda Henke - Article detailing a CNBC report discussing the rate of unacceptable dangerous incidents involving rooftop solar installations.
3. Brad Belanger - Written summations of his comments at hearing, including the need for NFPA 855 firefighting standards in the ordinance; copy of the battery fire that injured firefighters that he referenced in his public comments; a copy of the NFPA 855 Standards publication; a copy of the proposed ordinance with his highlighted areas of concern.
4. Tim and Elena Hakes - written submission outlining concerns involving setbacks, property values, panel disposal, and battery storage.
5. Meryl Domina from the League of Women Voters - written submission in favor of solar energy development;
6. Katherine Andaski - written submission opposing the current draft of the solar ordinance for the reasons she stated on the record, including loss of cropland, decreased farm production and the loss of jobs, reduction in property values, the "daisy-chaining" of multiple projects, and the number of acres already approved in the County for solar production.
7. John Lyon - written submission with detailed paragraph by paragraph requested language changes or concerns correlating to the presently drafted ordinance under consideration, with particular emphasis on lack of safety standards, lack of protection for non-participating landowners, setbacks, lack of public input after the special use application and hearing process, and other concerns.
8. Nancy Proesel - written submission as a member of DeKalb County 350, detailing her support of solar energy production in the County.
9. Mary Rita Nelson- President of League of Women Voters of DeKalb County - a copy of a petition with attached signatures in support of solar energy production in DeKalb County.
10. Jonathan Lageman - written submission and supplemental addition detailing his concerns with the present ordinance that he stated in the public comment portion of the hearing, with citations to several sources outlined in his submission, concerning metals production and pricing, the DeKalb County's Comprehensive Plan document, the City of DeKalb Comprehensive Plan document, Daily Chronicle article, Wisconsin Public Radio report concerning stray voltage, storm damage to a constructed solar facility in Jasper County, Metroplanning article on the increased number and intensity of storms, an article on the photovoltaic heat effect, an article on property values impacted by solar development, a county-by-county comparison of setback requirements.

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11. Kevin Adelman on behalf of Leeward Energy - written submission detailing proposed changes/modifications to the draft ordinance, many involving the increased costs to be incurred by a prospective developer prior to the developer even being issued a building permit.
12. Linda Timm - written submission detailing concerns, including the need to use the property line for setback determination, need for environmental monitoring, safety issues with the battery storage proposal, and property value impacts.
13. Courtney Gallaher - written submission on behalf of NIU in her capacity as Director of Campus Sustainability, describing support for solar energy production as good and beneficial land use, clean energy, and important and secure revenue for landowners.
14. Christie Hardt, of B & C Kennels - written submission detailing her concerns about solar production, construction noise, proximity to her land, impact on her operations, and environmental concerns.
15. Catherine Harned - written submission in support of reasonable solar production including reasonable but not prohibitive setbacks, and noting that much of the corn produced is for ethanol and not food consumption, and solar's ability to preserve farmland for future use.

## V. Discussion and Recommendations

Both hearing times were well-attended and there was much participation from the public in both public comment and the written submissions. There is a lot of support for solar energy production in general, based on the comments, as well as very vocal concerns by many citizens as to how and under what circumstances that production should occur going forward.

With respect to the ordinance draft itself, several areas received much public input and discussion.

### A. Setbacks

The primary areas of public concern appear to be the setback issue with regards to two important components - first, the demarcation starting point for the setbacks, and second, whether the setbacks can or should vary based on the panel height of any solar panels for an approved project. There was much discussion about the need for consistency with other County regulations, and to therefore use the property line as the setback point. However, unlike a single, fixed building or other form of construction, in which the setback line is a minimum standard from a fixed property line or roadway so as not to encroach on a neighbor, the purposes for a solar setback demarcation are multiple. The setback serves as a minimum distance for the project edge and thus vegetation screening and fencing, similar to a building setback, but also serves to protect the visual line of sight from occupied structures of non-participating landowners. To serve both purposes, the different demarcations appear to be rationally based.

For example, a neighboring property's residential structure may be a quarter-mile or more away from the property line, or it may be very close to the property line adjacent to a proposed solar production project. Using the residential structure as the setback line for panels, and the property line setback as a minimum for physical production structures such as fencing or other production structures appears rationally based to serve both purposes and intended protections for non-participating landowners, while providing reasonable production and land-use capabilities for a proposed solar production project developer.

With respect to scalability, there was significant discussion and, at least in the public comments, significant support for a ratio of setback needed versus the 3ft incremental height of various solar panels. Many members of the public were rightly concerned about the increase in size of various panels that have come before this hearing officer and the County. Panel heights, at their highest point of axis, are approaching or exceeding 14 ft, while many of the earlier County-approved projects had panel heights of approximately 7-9 feet at their highest axis point. It seems rational to have some standard that may account for perhaps an even greater future increase in panel height that may become commonplace.

B. Developer Requirements

1. Decommissioning Plan and Costs

There was much discussion as to the requirement for a cash escrow for decommissioning, rather than some form of verified commercial paper such as a letter of credit or other financial assurance. The prior ordinance permitted a letter of credit, as does the sample State model ordinance. Letters of credit and/or other financial assurance papers from accredited institutions and entities are commonplace and secure, though not sometimes not well-understood by the general public. Cash escrow is something everyone understands. However, for large-scale developments, especially, it is uncommon and may greatly discourage future solar development.

With respect to a decommissioning timeline, the ordinance provides for a six-month timeframe, while the State model provides for 12 months.

2. Drain Tile Surveys

There was discussion as to the need to protect and preserve drain tiles, as well as the process to ensure that protection in the development of a solar energy project. Everyone recognizes that need, and landowners depend on and hold each other accountable for this important matter. The language in the draft ordinance is again more prohibitive, rather than protective. The

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substantial cost should only be required as part of the later building permit process after approval of a project.

C. Public Input in Site Permit and Building Permit Process

There was substantial discussion as to the lack of the public's ability to participate in the final approvals and development stages of solar production projects. The public rightly notes that under the current ordinance, some of the applications are "bare-bones" and providing only the amount of information necessary to fulfill the minimum disclosure requirements of the present ordinance. While the draft ordinance, if passed in substantially the same form, will increase the disclosure of more detailed plans, there remain very few avenues for public input in the final processes for the site development permit and building permit.

While that is ordinarily the norm for ordinary building permits, i.e., pole barns or attached garages, there are substantial details yet to be determined in a solar energy project after initial approval of a special use application by the County under the current and even the proposed solar ordinance. Some public notification or ability of the public to comment on a published site permit or building permit application may be needed as the impacts of an energy production facility on adjacent landowners may be substantial.

D. Battery Energy Storage Systems

1. Safety Concerns

There was much public discussion on this topic as well. There is a high level of safety concern by many members of the public if Battery Energy Storage Systems become part of the larger-scale solar projects anticipated in the future. There exists a dangerous failure/safety issue as has been demonstrated. Though these occurrences appear rare, they are possible and potentially quite injurious, and need to be addressed. A code reference in the draft ordinance to a particular and relevant published safety code and some mechanism to review, approve, and enforce that safety code, appears rational and reasonable.

2. Need for a Separate BESS Ordinance

There was also much discussion on the need for a separate Battery Energy Storage System Ordinance. While many of the requirements overlap, such as provisions regarding setbacks and the placement of underground lines and connection points, there is much that surely is stand-alone

and necessary. The BESS section of the draft ordinance outlining the requirements for a special use application for a BESS is complicated, and substantial.

**VI. Summary**

The draft ordinance submitted by the County is reflective of the accumulated learned experiences of previously approved projects, and the substantial public input that has taken place at the committee level, board meetings, and prior public hearings on previous solar special use applications. The County's work to address many of the public's expressed concerns, as well as to ensure compliance by solar energy producers with the County's Comprehensive Plan has been substantial, while attempting to also not unduly burden the production of this needed energy resource.

Accordingly, subject to such revision as the committee may see fit after further comment, and consideration of the concerns and comments submitted at public hearing, I recommend approval of the draft ordinance.

Respectfully submitted,

Dale J. Clark
Hearing Officer

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# Siting and Safety Best Practices for Battery Energy Storage Systems

Exeter Associates
February 2020

## Summary

The following document summarizes safety and siting recommendations for large battery energy storage systems (BESS), defined as 600 kWh and higher, as provided by the New York State Energy Research and Development Authority (NYSERDA), the Energy Storage Association (ESA), and DNV GL, a consulting company hired by Arizona Public Service to investigate the cause of an explosion at a 2-MW/2-MWh battery facility in 2019 and provide recommendations for mitigating this threat in the future. Exeter thanks Matthew Paiss (Technical Advisor, Battery Materials & Systems, Pacific Northwest National Laboratory) for his review of this document.

More detail is provided below, but briefly put, BESS should meet national codes and standards promulgated by the National Fire Protection Association (NFPA), the American National Standards Institute (ANSI), the Institute of Electrical and Electronics Engineers (IEEE) and national laboratory standards. However, the DNV GL report concluded that the most commonly relied-upon standards for battery safety are insufficient to address the threat of thermal runaway (described herein) and explosion. The report recommends additional steps that should be taken, and these are included in the summary below. Finally, state and local building, fire, and zoning requirements should also be met.

For the purposes of CPCN review and approval, we recommend that future CPCN applicants with battery storage systems be required to submit plans for battery siting, safety, and decommissioning to the PSC, for review and approval, before construction begins.

- The siting plan should address: undergrounding on-site utility lines; maintaining the site free of vegetation; following noise, height, and setback requirements; fencing or enclosing the site; and installing screening or other measures to minimize visibility impacts.
- The safety plan should include: hazard detection systems; means of protecting against incipient fires; and ventilation and/or cooling strategies for protecting against thermal runaway, fires, and explosions. As a corollary, sound training must be provided to local responders so that they are equipped to handle any of these potential emergencies—which require substantially different tactics—as safely as possible. BESS should have plans to address extreme weather, earthquakes, or other environmental threats that may occur.
- The decommissioning plan should include: descriptions of the steps that will be taken, a cost estimate, a funding plan, and a contingency plan for handling damaged batteries.

## Siting

NYSERDA published the Battery Energy Storage System Guidebook, most-recently updated in December 2020, which contains information and step-by-step instructions to support local governments in New York in managing the development of residential, commercial,

and utility-scale BESS in their communities. The guidebook includes a Model Law which describes the recommended siting requirements for a BESS.

- Utility lines: Whenever possible, utility lines at the site should be installed underground. However, this does not apply to the main service connection at the utility company right-of-way or to new interconnection equipment.
- Vegetation and tree-cutting: A 10-foot buffer surrounding the BESS should be cleared of combustible vegetation. Beyond this, it is preferable to maintain any vegetation that is not fire-prone.
- Noise: Noise produced by the BESS and associated equipment must be kept below a 1-hour average of 60 A-weighted decibels (dBA), based on measurements taken at the outside wall of any nearby unaffiliated building that is in current use.
- Setbacks: Any setback requirements for primary structures in applicable zoning regulations should be applied to the BESS.
- Height: Any building height limits in applicable zoning regulations should be applied to the BESS.
- Fencing/enclosure: Unless secured within a dedicated-use building, all BESS components and mechanical equipment should be protected by a 7-foot-high fence with a self-locking gate.
- Screening and visibility: The BESS should be screened from adjacent properties using architectural features, earth berms, landscaping, or other methods that complement the character of the area without compromising BESS ventilation.

Safety

In addition to NYSERDA's BESS Guidebook, ESA issued the U.S. Energy Storage Operational Safety Guidelines in December 2019 to provide the BESS industry with a guide to current codes and standards applicable to BESS and provide additional guidelines to plan for and mitigate potential operational hazards. In April 2020, DNV GL issued its report focused on mitigating the risk of thermal runaway and battery explosions, McMicken Battery Energy Storage System Event Technical Analysis and Recommendations.[1]

In general, both ESA and NYSERDA recommend that a BESS and its subcomponents should meet the requirements of the applicable NFPA codes, ANSI standards, IEEE standards, and the Nationally Recognized Testing Laboratory standards for BESS and equipment (UL 9540, UL 1642, UL 1973, UL 1741, and UL 62109). These national codes and standards, and those referenced below, are defined in the appendix to this document. In addition to the national codes and standards, ESA and NYSERDA also concur that a BESS should meet the requirements of the building, fire, and zoning codes of the state and locality in which it is located. As noted earlier, DNV GL advocates for additional safety measures beyond those currently included in the most commonly used codes and standards.

The potential for thermal, weather, environmental, and other operational hazards varies significantly by the type of BESS technology. Nevertheless, the following recommendations from DNV GL, ESA, and NYSERDA serve as best practices in most scenarios at this time.

[1] DNV GL, *McMicken Battery Energy Storage System Event Technical Analysis and Recommendations,* July 18, 2020, https://www.aps.com/-/media/APS/APSCOM-PDFs/About/Our-Company/Newsroom/McMickenFinalTechnicalReport.ashx?la=en&hash=50335FB5098D9858BFD276C40FA54FCE.

Thermal Runaway, Fires, and Explosions

In addition to standard fires, which require fuel, heat, and oxygen to continue burning, lithium-ion (Li-ion) battery cells can experience a chemical reaction known as thermal runaway, which does not require oxygen or a visible flame, if it occurs within a tightly packed cell assembly. If not addressed by system protection devices, this process can continue to drive up temperature and pressure until the battery cell ruptures, which in turn can release explosive gases. If thermal runaway propagates through a module, flammable gases may build up within the BESS, creating the conditions for an explosion to occur. Thermal runaway can also be caused by exposure to overheating from traditional fires.

It is important to note that a standard approach to minimizing conventional fires—turning off ventilation and using clean fire suppression agents to cool or starve a fire of oxygen—may worsen the threat of an explosion by allowing explosive gas concentrations to increase. Thus, DNV GL recommends that emergency systems and emergency response protocols be designed to extinguish fires *and* ventilate enclosures, as needed, before entry.

1. Hazard Detection Systems:

    a. BESS should include appropriate hazard detection systems, such as smoke and heat detectors, as well as gas meters, which would be monitored by control centers and alert operators to emergency situations.

2. Thermal Runaway Prevention:

    a. For Li-ion battery cells, there are several technologies, such as current interrupt devices (CIDs), ceramic-coated separators, and solid polymer electrolytes, that could prevent the overheating that leads to thermal runaway. (However, it may not be possible for a system owner to determine the presence of these technologies.)

    b. For battery systems, specialized heating, ventilation and air conditioning (HVAC) systems and the continuous monitoring of temperature, current, and voltage are effective in protecting BESS from thermal runaway.

    c. For enclosed BESS containers, protection from thermal runaway should also take into account external sources of heat, such as high ambient temperatures in the summer or wildfires encroaching on the site.

    d. The battery should include a failsafe protection that provides for forced shutdown, should all other countermeasures fail to prevent thermal runaway.

    e. The UL 9540 listing ensures BESS are designed to provide system-level thermal runaway mitigation through detection, suppression, and/or containment measures.

3. Fire Suppression:

    a. Sprinklers should be installed. NFPA 13 standards may not be adequate. Overhead pendant nozzles may not direct enough water into racks to prevent module-to-module propagation. Consideration should be given to in-rack suppression system designs.

    b. Because water is readily available and has useful cooling properties, it is a well-regarded tool for extinguishing Li-ion battery fires. However, it is

important to assess whether water could react with the chemicals in a BESS. A water-based fire suppression system should be designed to avoid creating short circuits in adjacent equipment. Also, while it may be too costly to prevent any water used for fire suppression from exiting a BESS, consideration should given to minimizing run-off, since this liquid may contain toxic chemicals.

c. DNV GL notes that many BESS have a "dry pipe" system. This provides an exterior point of connection through which water can be directed into a BESS without opening the enclosure.

d. Gaseous suppression agents, such like FM-200 or Novec 1230, should be considered for use against incipient fires. (However, these cannot prevent and may not be able to stop thermal runaway.)

4. Electrical Components:

a. BESS and its subcomponents and associated ancillary equipment should be in compliance with NFPA 70®, the National Electric Code® (NEC) and ANSI Standard C2, the National Electrical Safety Code® (NESC). Under these codes and in relation to the prevention and mitigation of a thermal event, BESS are required to:

i. Have required working space clearances; and

ii. Weatherproof enclosures for electrical circuitry.

5. Ground Fault Protection:

a. Ground faults have the potential to cause fire or thermal runaway from high or continuous currents and pose a safety hazard due to overvoltages. In addition to proper insulation for all electrical equipment, additional protection is required for three-phase installations depending on the type of grounding.

i. In systems that are grounded with little to no impedance (reactors, resistors), ground currents can be substantial. These systems should be designed to trip off-line automatically, in order to clear ground faults.

ii. In systems that are ungrounded or have high levels of impedance, overvoltages pose a safety risk. Ensure that any overvoltages will be controlled with grounding banks, other forms of impedance grounding, or surge arresters. The electrical components at risk of overvoltage should also have phase-to-phase level insulation.

6. Electrolyte Spill:

a. For lead acid and nickel-cadmium (NiCd) batteries that have acidic/basic (sulfuric acid or potassium hydroxide) aqueous electrolytes in liquid form, electrolyte spills should be contained by following IEEE 1578 standards. Flow batteries should be listed to UL 9540 and include secondary spill containment.

7. Ventilation:

    a. Lead-acid and NiCd batteries produce gases during normal charging. Li-ion batteries do not. Adherence to standard ventilation codes will address the production of gases during regular operating conditions. For BESS that are located inside a building, storage venting systems should take building ventilation systems into account so that any hazardous gases are not drawn into other rooms, putting building occupants at risk.

        To address gas production under abnormal (thermal runaway) conditions, a system should be designed to provide a series of safeguards progressing from fire suppression, to ventilation, to explosion mitigation. For example, if smoke is detected, and a so-called clean agent suppression system is present (for example, Novec™ 1230), the agent will be released to help suppress an incipient fire by lowering oxygen levels and/or temperatures in the enclosure. If heat is still detected after the clean agent has been introduced, this is an indication that thermal runaway may be occurring, and secondary suppression and emergency ventilation systems should be activated. Finally, if high concentrations of explosive gases are detected, DNV GL typically recommends the use of deflagration panels, which are designed to open in the event of an explosion, thus decreasing its severity (see next bullet as well).

8. Explosion Study:

    a. For BESS within a container or enclosure, a (manufacturer-provided) UL 9540A test report on the battery can be used to determine what gas constituents would be expected during thermal runaway and what gas levels are likely to be explosive. This information is used by fire protection engineers to design a deflagration prevention system NFPA 69 (exhaust) or deflagration venting system NFPA 68 (blow-out panels), or a combination of both.

<u>First Responder Training and Status Assessment Tools</u>

It is imperative that first responders be included early in the planning of BESS installations and given the training and real-time information necessary to gauge conditions at a battery facility and respond accordingly. Training should include any jurisdictions that may be asked to assist the primary fire department. Periodic update trainings should be given to address turnover. DNV GL states that training materials can be created by the system integrator or the engineering, procurement and construction (EPC) contractor for all those who would benefit.

- Procedures: Establish a protocol for extinguishing, ventilation, and entry, in that order.
- Roles: Establish a hierarchy and specific responsibilities for operations and maintenance (O&M) personnel, emergency responders, and staff of the owner organization.
- Qualified Support Personnel: A trained individual, knowledgeable on the BESS, should be made available to fire department personnel in the event of an incident to support the timely turnover of the site to a knowledgeable person for hazard monitoring.

- Training: Provide training to the relevant fire department(s) before and during project commissioning. Include information on the range of hazards that may be present, how to assess conditions inside a BESS, and what steps to take.
    - Explicitly address explosion risks, indicating what gases may accumulate on site and how to detect and ventilate them.
- Complementary Training: Train appropriate members of the owner's organization and any third-party contractors working on the project.
- Informational Technologies: Set up a remote display for first responders to monitor trending metrics such as state of charge, module temps, ambient temps, gas levels, etc. This station could also contain exhaust ventilation controls and the dry pipe fire department connection. Battery management systems should be provided with auxiliary backup to ensure communications in the event that an emergency triggers isolation of the entire BESS.

Extreme Weather, Geological, and Environmental Hazards

For potential extreme weather events, natural disasters, and environmental hazards, the BESS site should be secured and have plans in place to prevent or mitigate dangerous situations that could impact personnel or damage equipment and the surrounding environment.

- Monitoring, preparation, and response strategies: Each BESS should have plans to monitor and mitigate extreme weather and natural disasters. These plans should provide communication protocols for all key parties, identify which personnel should remain on site, and specify shutdown protocols.
- Designing resilient systems: BESS should be designed to withstand environmental hazards that may arise in the area. Examples of design resiliency include:
    - Isolating electronics;
    - Designing physical enclosures, buildings, and drainage systems so that they meet local building code requirements regarding wind speed, snow load, snow shed, standing water, and flashfloods;
    - Seismic hardening sites in earthquake-prone regions as per local building codes and IEEE 693;
    - Shielding equipment from lightning strikes and/or affixing lightning rods to taller structures as per NFPA 70, NFPA 780, CSA C22.1, or IEEE C2, as applicable;
    - Controlling temperatures and protecting against excess humidity, salinity, and dust; and
    - Designing enclosures to prevent animals and plants from entering.

Additional Design Elements

- Site Access:
    - O&M workers should have ready access to the site at all times and regardless of the BESS's operating state.
- Lighting:
    - For indoor BESS, emergency lighting based on building codes should be available to facilitate any emergency response activities or unscheduled maintenance.
- Signage:
    - Signage should meet ANSI Z535, NFPA 70, and NFPA 855 standards.
    - Signage should list: the type of technology associated with the BESS; potential and specific hazards; Personal Protective Equipment (PPE) requirements; the type of suppression system installed in the area of the BESS; 24-hour emergency contact information; information related to the disconnection and emergency shutoff of the BESS; evacuation routes; and muster points.
    - The BESS signage should be clearly displayed on a light-reflective surface. A clearly visible warning sign concerning voltage should be placed at the base of all pad-mounted transformers and substations.
- Cybersecurity:
    - BESS developers should rely on experienced suppliers who can ensure the integrity of all equipment and routinely update security software.
    - Only vetted, trained personnel should have access to the BESS. Likewise, connections between the BESS and other web-based systems should be kept at a minimum.

Decommissioning

Decommissioning is especially important for Li-ion batteries, given that they contain hazardous materials. Indeed, under the Resource Conservation and Recovery Act (RCRA), used Li-ion batteries are considered hazardous waste that must be disposed of in accordance with U.S. Environmental Protection Agency (EPA) rules. Damaged Li-ion batteries that have not been fully discharged present a stranded energy hazard and are still considered batteries. The decommissioning process must take into consideration the full discharge of all power prior to being considered hazardous waste. It should be noted that even if a contract places the onus for decommissioning on a third-party operator, RCRA holds the owner of hazardous waste liable for its proper disposal.

One possible example to draw from is NYSERDA's sample decommissioning rule, which was developed to provide local governments with an option to adopt it as a local requirement. Under the sample rule, the decommissioning plan must include descriptions of the steps that will be taken, a cost estimate, a funding plan, and a contingency plan for handling damaged batteries.

# APPENDIX

## Applicable Safety Standards and Codes for BESS

- ANSI Z535 (Standards for Safety Signs and Colors): Provides the specifications and requirements to establish uniformity of safety color coding, environmental/facility safety signs and communicating safety symbols.
- IEEE 693 (Recommended Practice for Seismic Design of Substations): Provides seismic design recommendations for substations, including qualification of different equipment types.
- IEEE 1578 (Recommended Practice for Stationary Battery Electrolyte Spill Containment and Management): Provides descriptions of products, methods, and procedures relating to stationary batteries, battery electrolyte spill mechanisms, electrolyte containment and control methodologies, and firefighting considerations.
- NFPA 13 (Standard for the Installation of Sprinkler Systems): Addresses sprinkler system design approaches, system installation, and component options to prevent fire deaths and property loss.
- NFPA 69 (Standard on Explosion Prevention Systems): Provides requirements for installing systems for the prevention and control of explosions in enclosures that contain flammable concentrations of flammable gases, vapors, mists, dusts, or hybrid mixtures.
- NFPA 68 (Standard on Explosion Protection by Deflagration Venting): Addresses the installation and use of devices and systems that vent the combustion gases and pressures resulting from a deflagration within an enclosure, so that structural and mechanical damage is minimized.
- NFPA 70 (National Electrical Code (NEC)): Provides the benchmark for safe electrical design, installation, and inspection to protect people and property from electrical hazards.
- NFPA 704 (Standard System for the Identification of the Hazards of Materials for Emergency Response): Presents a simple, readily recognized, and easily understood system of markings (commonly referred to as the "NFPA hazard diamond") that provides an immediate general sense of the hazards of a material and the severity of these hazards as they relate to emergency response.
- NFPA 780 (Standard for the Installation of Lightning Protection Systems): Provides lightning protection system installation requirements in buildings to safeguard people and property from fire risk and related hazards associated with lightning exposure.
- NFPA 855 (Standard for the Installation of Stationary Energy Storage Systems): Provides the minimum requirements for mitigating the hazards associated with BESS.
- UL 1973 (Standard for Batteries for Use in Stationary, Vehicle Auxiliary Power and Light Electric Rail (LER) Applications): Provides requirements for battery systems as defined by this standard for use as energy storage for stationary applications such as for PV, wind turbine storage or for UPS, etc. applications.

- UL 1642 (Standard for Lithium Batteries): Provides requirements for primary, i.e., non-rechargeable, and secondary, i.e., rechargeable, lithium batteries for use as power sources in products.
- UL 1741 (Standard for Inverters, Converters, Controllers and Interconnection System Equipment for Use with Distributed Energy Resources): Provides requirements for inverters, converters, charge controllers, and interconnection system equipment intended for use in standalone (not grid-connected) or utility-interactive (grid-connected) power systems.
- UL 9540 (Standard for Energy Storage Systems and Equipment): Provides requirements for energy storage systems that are intended to receive electric energy and then store the energy in some form so that the energy storage system can provide electrical energy to loads or to the local/area electric power system (EPS) up to the utility grid when needed.
- UL 62109 (Standard for Safety of Power Converters for Use in Photovoltaic Power Systems): Provides requirements for the design and manufacture of power conversion efficiency (PCE) for protection against electric shock, energy, fire, mechanical, and other hazards.

Attachments H through N can be found online at:

http://www.co.champaign.il.us/CountyBoard/meetings_ZBA.php

- H New York State Energy Research and Development Authority (NYSERDA). (May 2021) Battery Energy Storage Systems 101 presentation. https://www.nyserda.ny.gov
- I New York State Energy Research and Development Authority (NYSERDA). (October 2020) New York Battery Energy Storage System Guidebook for Local Governments. https://www.nyserda.ny.gov
- J Velocity EHS. (July 2021) Morris Lithium Battery Fire Highlights Emergency Planning, Hazardous Chemical Management. https://www.ehs.com
- K Michael Urbanec. (July 2021) No evacuation for battery fire at energy storage facility east of Grand Ridge. https://www.shawlocal.com.
- L Julian Spector. (August 2020) What Sparked the Arizona Battery Fire? LG Chem has a different version. https://www.greentechmedia.com
- M Andy Colthorpe. (February 2022) World's biggest lithium battery storage now completely offline. https://www.energy-storage.news
- N Pacific Northwest National Laboratory. (October 2023) Energy Storage in Local Zoning Ordinances. https://www.pnnl.gov/publications/energy-storage-local-zoning-ordinances

## Comments received from Bay-wa r.e. staff on March 7, 2024

**Page B-1, under Item 2, end of paragraph C.8.:**
Typo – remove parentheses at end

**Page B-3, paragraph C.(2) at top:**
200 feet from a property line is excessive, suggest reducing to 100 feet. Perhaps it can be modified to be 200 feet from property line that includes residential structure.

**Page B-3, paragraph D.(1):**
Noting that this seems appropriate for PE stamp prior to the Zoning Compliance Certificate, which will be applied for once design has advanced. See additional notes regarding PE stamp on application designs.

**Page B-5, paragraph D.(6)b.(b):**
Conceptual designs used at the time of SUP application typically don't contain this level of detail. These safety systems will be included, as required, but in order for a PE to stamp, the design will need to be at a very advanced stage.

From the time of application submittal to the procurement and construction of the BESS equipment, technological advances and battery configurations will likely change. Suggest that this requirement be conditioned in the SUP, but not required in the application.

**Page B-5, paragraph D.(6)c.(b):**
Same as above. Conceptual designs used at the time of SUP application typically don't contain this level of detail. These safety systems will be included, as required, but in order for a PE to stamp, the design will need to be at a very advanced stage.

From the time of application submittal to the procurement and construction of the BESS equipment, technological advances and battery configurations will likely change. Suggest that this requirement be conditioned in the SUP, but not required in the application.

**Page B-5, paragraph D.(6)d.(b):**
Same as above. Conceptual designs used at the time of SUP application typically don't contain this level of detail. These safety systems will be included, as required, but in order for a PE to stamp, the design will need to be at a very advanced stage.

From the time of application submittal to the procurement and construction of the BESS equipment, technological advances and battery configurations will likely change. Suggest that this requirement be conditioned in the SUP, but not required in the application.

**Page B-6, paragraph D.(6)d.(c):**
Are there specific design guidelines for applicants to reference or examples of what is intended to be designed for this statement? In our experience, this is not a typical request. Is the intent to have a containment wall/curb around each BESS container or to drain the potential sprinkler water runoff to a designed basin on site, or something else? This containment wall design could

**Comments received from Bay-wa r.e. staff on March 7, 2024**

cause stormwater issues around the BESS containers as an unintended consequence, further increasing the overall footprint required for the BESS specific project/area. Suggest that a secondary containment requirement be satisfied if manufacturer specs, confirm they are designed to capture any potential sprinkler runoff inside the containers themselves.

Same as above. Conceptual designs used at the time of SUP application typically don't contain this level of detail. These safety systems will be included, as required, but in order for a PE to stamp, the design will need to be at a very advanced stage.

From the time of application submittal to the procurement and construction of the BESS equipment, technological advances and battery configurations will likely change. Suggest that this requirement be conditioned in the SUP, but not required in the application.

**Page B-6, paragraph D.(6)e.(d):**
Suggest conditioning SUP or Zoning Compliance Certificate, not requiring PE stamp on application materials.

**Page B-6, paragraph D.(6)f.:**
Agree with application including a discussion of possible electrolyte spill and controls, but not by PE.

**Page B-6, paragraph D.(6)g.(b):**
Remove "written by an Illinois Licensed Professional Engineer."

**Page B-7, paragraph E.(2)b.(b):**
If all district drain tile locations are known and publicly available data, then this may work. But if that data is publicly available, then this does not match the level of siting and design detail being requested from the application for the SUP stage for the BESS facility. If secondary containment structures are sites and designed for the BESS facility, at the early SUP stage, then this drainage district tile data will need to be readily accessible to avoid having siting issues at the forefront.

**Page B-12, paragraph F.(1)a.(c):**
Should be "TIER 2 BESS" instead of "PV SOLAR FARM"

**Page B-12, paragraph F.(1)b.:**
Same as a) and b) above

**Page B-19, paragraph L.(2)b.(c)iii:**
Should be "TIER 2 BESS" instead of "PV SOLAR FARM"

**Page B-19, paragraph L.(2)b.(c)iv:**
Should be "TIER 2 BESS" instead of "PV SOLAR FARM"

The Village of SIDNEY ILLINOIS

**Village President**
**Jason Arrasmith**
**PO Box 77**
**Sidney, IL 61877**



**March 5, 2024**

To whom it may concern:

The Village Board of Trustees has considered the proliferation of the solar power in Champaign County. The Village recognizes that current solar panels frequently contain varying amounts of lead, copper, polyvinyl fluoride, silicon tetra chloride and cadmium, which could be considered hazardous waste. As a result, upon retirement, these panels would not be disposable in area landfills.

The Village of Sidney hereby requests that the County of Champaign only allow "clean" solar panels free of toxic chemicals and hazardous waste which would otherwise be environmentally safe for disposal in area landfills and otherwise prohibit the use of solar panels containing hazardous materials.

Village President

Village Clerk

3-5-2024

TRUSTEES
Leroy Schluter
Dan Gadeken
Donna Hooker
Bret Harris
Matt Laurent
Tyler Bickers

The Village of SIDNEY ILLINOIS

**Village President**
**Jason Arrasmith**
**PO Box 77**
**Sidney, IL 61877**



**March 5, 2024**

To whom it may concern:

The Village of Sidney Board of Trustees has discussed the County proposal to add Battery Energy Storage System as a Special Use.

The Board has considered the current special use hearing notification of 250' and find that in the case of a battery energy storage system special use permit require that the notification of the hearing process be increased from 250' to 1 mile from the subject property. The added notice range is intended to allow neighboring properties the opportunity to participate in the special use permit process given the fire, chemical or other hazards that are potentially associated with the current battery technology.

Village President

~~Village~~ Clerk

3-5-2024

TRUSTEES
Leroy Schluter
Dan Gadeken
Donna Hooker
Bret Harris
Matt Laurent
Tyler Bickers

# Examples of BESS facilities

*This utility-scale ESS in Vermont is using li-ion batteries to provide peak reduction and frequency regulation services.* Photo courtesy of WEG. Source: Energy Storage Systems based on the IBC, IFC, IRC, and NEC, International Code Council, January 2022

Battery Energy Storage – 20 MW in Saratoga County, NY
Source: New York State Energy Research and Development Authority (NYSERDA). (May 2021) Battery Energy Storage Systems 101 presentation. https://www.nyserda.ny.gov

# Examples of BESS facilities

Source: Butler, Phillip. “To BESS, or Not to BESS? The Emergence of Battery Storage Systems on Long Island” January 25, 2023

An integrated with wholesale energy battery system at the Beacon Solar Plant in eastern Kern County, California (Photo by Dennis Schroeder, NREL 50688)

Attachment Q: **LRMP Goals, Objectives and Policies**

can be found online at: http://www.co.champaign.il.us/CountyBoard/meetings_ZBA.php

***PRELIMINARY DRAFT***

**130-AT-24**

**FINDING OF FACT**
**AND FINAL DETERMINATION**
**of**
**Champaign County Zoning Board of Appeals**

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Final Determination: ***{RECOMMEND ENACTMENT/RECOMMEND DENIAL}***

Date: ***{March 28, 2024}***

Petitioner: **Zoning Administrator**

Request: **Amend the Champaign County Zoning Ordinance as follows regarding Battery Energy Storage Systems (BESS):**

1. **Add the following definitions to Section 3.0 Definitions: BATTERY ENERGY STORAGE MANAGEMENT SYSTEM (BESMS), BATTERY ENERGY STORAGE SYSTEM (BESS), TIER-1 BATTERY ENERGY STORAGE SYSTEMS, TIER-2 BATTERY ENERGY STORAGE SYSTEMS.**

2. **Add new paragraph 4.2.1 C.8. to provide that a BATTERY ENERGY STORAGE SYSTEM may be authorized as a SPECIAL USE Permit in the AG-1 and AG-2 Agriculture Districts as a second PRINCIPAL USE on a LOT with another PRINCIPAL USE.**

3. **Amend Section 5.2 as follows:**
   a. **Add "BATTERY ENERGY STORAGE SYSTEM" to be allowed by Special Use Permit in the AG-1 Agriculture, AG-2 Agriculture, B-1 Rural Trade Center, B-4 General Business, I-1 Light Industry and I-2 Heavy Industry Zoning Districts.**
   b. **Add Footnotes 32 and 33 regarding TIER-1 and TIER-2 requirements.**

4. **Add new Section 6.1.8 TIER-2 BATTERY ENERGY STORAGE SYSTEMS to establish regulations including but not limited to:**
   a. **General standard conditions**
   b. **Minimum lot standards**
   c. **Minimum separations**
   d. **Standard conditions for design and installation**
   e. **Standard conditions to mitigate damage to farmland**
   f. **Standard conditions for use of public streets**
   g. **Standard conditions for coordination with local fire protection district**
   h. **Standard conditions for allowable noise level**
   i. **Standard conditions for endangered species consultation**
   j. **Standard conditions for historic and archaeological resources review**
   k. **Standard conditions for acceptable wildlife impacts**

**l. Screening and fencing**
**m. Standard condition for liability insurance**
**n. Operational standard conditions**
**o. Standard conditions for Decommissioning and Site Reclamation Plan**
**p. Complaint hotline**
**q. Standard conditions for expiration of Special Use Permit**
**r. Application requirements**

**5. Regarding BATTERY ENERGY STORAGE SYSTEMS fees, revise Section 9 as follows:**
**a. Add new paragraph 9.3.1 K. to add application fees for a BATTERY ENERGY STORAGE SYSTEMS Zoning Use Permit.**
**b. Add new subparagraph 9.3.3 B.(9) to add application fees for a BATTERY ENERGY STORAGE SYSTEMS SPECIAL USE permit.**

## CONTENTS

## FINDING OF FACT

From the documents of record and the testimony and exhibits received at the public hearing conducted on **March 28, 2024,** the Zoning Board of Appeals of Champaign County finds that:

1. The petitioner is the Zoning Administrator.

2. The proposed amendment is intended to introduce requirements for BATTERY ENERGY STORAGE SYSTEMS in the Zoning Ordinance.

3. Municipalities with zoning and townships with planning commissions have protest rights on all text amendments and they are notified of such cases.

***SUMMARY OF THE PROPOSED AMENDMENT***

4. The proposed amendment is attached to this Finding of Fact as it will appear in the Zoning Ordinance.

***GENERALLY REGARDING THE LRMP GOALS, OBJECTIVES, AND POLICIES***

5. The *Champaign County Land Resource Management Plan* (LRMP) was adopted by the County Board on April 22, 2010. The LRMP Goals, Objectives, and Policies were drafted through an inclusive and public process that produced a set of ten goals, 42 objectives, and 100 policies, which are currently the only guidance for amendments to the *Champaign County Zoning Ordinance*, as follows:

   A. The Purpose Statement of the LRMP Goals, Objectives, and Policies is as follows:

      "It is the purpose of this plan to encourage municipalities and the County to protect the land, air, water, natural resources and environment of the County and to encourage the use of such resources in a manner which is socially and economically desirable. The Goals, Objectives and Policies necessary to achieve this purpose are as follows:…"

   B. The LRMP defines Goals, Objectives, and Policies as follows:
      (1) Goal: an ideal future condition to which the community aspires
      (2) Objective: a tangible, measurable outcome leading to the achievement of a goal
      (3) Policy: a statement of actions or requirements judged to be necessary to achieve goals and objectives

   C. The Background given with the LRMP Goals, Objectives, and Policies further states, "Three documents, the *County Land Use Goals and Policies* adopted in 1977, and two sets of *Land Use Regulatory Policies*, dated 2001 and 2005, were built upon, updated, and consolidated into the LRMP Goals, Objectives and Policies.

***REGARDING LRMP GOALS***

6. LRMP Goal 1 is entitled "Planning and Public Involvement" and states that as follows:

   **Champaign County will attain a system of land resource management planning built on broad public involvement that supports effective decision making by the County.**

Goal 1 has 4 objectives and 4 policies. The proposed amendment ***WILL NOT IMPEDE*** the achievement of Goal 1.

7. LRMP Goal 2 is entitled "Governmental Coordination" and states as follows:

**Champaign County will collaboratively formulate land resource and development policy with other units of government in areas of overlapping land use planning jurisdiction.**

Goal 2 has two objectives and three policies. The proposed amendment ***WILL NOT IMPEDE*** the achievement of Goal 2.

8. LRMP Goal 3 is entitled "Prosperity" and states as follows:

**Champaign County will encourage economic growth and development to ensure prosperity for its residents and the region.**

Goal 3 has three objectives and no policies. Objective 3.1 is most relevant to the proposed text amendment. The proposed amendment will ***HELP ACHIEVE*** Goal 3 as follows:

A. Objective 3.1 states, "Champaign County will seek to ensure that it maintains comparable tax rates and fees, and a favorable business climate relative to similar counties."

The proposed amendment will ***HELP ACHIEVE*** Objective 3.1 as follows:

(1) The proposed text amendment will allow further development of renewable energy, which will allow newer technologies to improve Champaign County's business climate.

9. LRMP Goal 4 is entitled "Agriculture" and states as follows:

**Champaign County will protect the long-term viability of agriculture in Champaign County and its land resource base.**

Goal 4 has 9 objectives and 22 policies. Objectives 4.4, 4.5, 4.7, 4.8 and their policies do not appear to be relevant to the proposed text amendment. The proposed amendment will ***HELP ACHIEVE*** Goal 4 for the following reasons:

A. Objective 4.1 states as follows: **"Champaign County will strive to minimize the fragmentation of the County's agricultural land base and conserve farmland, generally applying more stringent development standards on *best prime farmland*."**

The proposed amendment will ***HELP ACHIEVE*** Objective 4.1 for the following reasons:

(1) The proposed amendment ***WILL NOT IMPEDE*** the achievement of Policies 4.1.2, 4.1.3, 4.1.4, 4.1.5, 4.1.7, 4.1.8, and 4.1.9.

(2) Policy 4.1.1 states: "**Commercial agriculture is the highest and best use of land in the areas of Champaign County that are by virtue of topography, soil and drainage, suited to its pursuit. The County will not accommodate other land uses except under very restricted conditions or in areas of less productive soils**."

The proposed amendment will ***HELP ACHIEVE*** Policy 4.1.1 for the following reasons:

a. The standard conditions for BATTERY ENERGY STORAGE SYSTEMS will ensure the following:

(a) The proposed amendment requires minimum separations between any BATTERY ENERGY STORAGE SYSTEM and existing adjacent use to minimize issues of land use compatibility.

(b) No BATTERY ENERGY STORAGE SYSTEM shall interfere with agricultural operations (see Objective 4.2).

(c) No BATTERY ENERGY STORAGE SYSTEM shall be located at any location that is not well-suited for that BATTERY ENERGY STORAGE SYSTEM (see Objective 4.3).

(d) The proposed amendment establishes standard conditions to ensure that the allowable noise level created by a BATTERY ENERGY STORAGE SYSTEM is consistent with the Illinois Pollution Control Board regulations that are the same for all rural land uses.

(e) The proposed amendment requires BATTERY ENERGY STORAGE SYSTEMS to have an approved Decommissioning and Site Reclamation Plan to ensure that funds will be available to remove a BATTERY ENERGY STORAGE SYSTEM should it ever become non-functional.

(3) Policy 4.1.6 states: **"Provided that the use, design, site and location are consistent with County policies regarding:**

**i. Suitability of the site for the proposed use;**
**ii. Adequacy of infrastructure and public services for the proposed use;**
**iii. Minimizing conflict with agriculture;**
**iv. Minimizing the conversion of farmland; and**
**v. Minimizing the disturbance of natural areas; then**

**a) On best prime farmland, the County may authorize discretionary residential development subject to a limit on total acres converted which is generally proportionate to tract size and is based on the January 1, 1998 configuration of tracts, with the total amount of acreage converted to residential use (inclusive of by-right development) not to exceed three acres plus three acres per each 40 acres (including any existing right-of-way), but not to exceed 12 acres in total; or**

**b) On best prime farmland, the County may authorize non-residential discretionary development; or**

**c) The County may authorize discretionary review development on tracts consisting of other than best prime farmland."**

The proposed amendment will ***HELP ACHIEVE*** Policy 4.1.6 for the following reasons:

a. The ZBA has recommended that the proposed amendment will ***HELP ACHIEVE*** Objective 4.3 regarding location at a suitable site and adequacy of infrastructure and public services.

b. The ZBA has recommended that the proposed amendment will ***HELP ACHIEVE*** Objective 4.2 regarding no interference with agricultural operations.

c. The proposed amendment will ***HELP ACHIEVE*** the County's policies regarding minimizing the conversion of best prime farmland as follows:

(a) The only policy regarding conversion of best prime farmland by non-residential discretionary development is Policy 4.1.6b., which states, "On best prime farmland the County may authorize non-residential development." Policy 4.1.6.b. has no limit on the conversion of best prime farmland for non-residential discretionary development and is merely a statement of fact and therefore, the proposed amendment does help achieve Policy 4.1.6b.

B. Objective 4.2 is entitled "Development Conflicts with Agricultural Operations" and states, "Champaign County will require that each *discretionary review* development will not interfere with agricultural operations."

The proposed amendment will ***HELP ACHIEVE*** Objective 4.2 because of the following:

(1) **Policy 4.2.1 states, "The County may authorize a proposed business or other non-residential *discretionary review* development in a rural area if the proposed development supports agriculture or involves a product or service that is better provided in a *rural* area than in an urban area."**

The proposed amendment will ***HELP ACHIEVE*** Policy 4.2.1 for the following reasons:

a. The Land Resource Management Plan (LRMP) provides no guidance regarding what products or services are better provided in a rural area and therefore that determination must be made in each zoning case.

b. BATTERY ENERGY STORAGE SYSTEMS ***ARE*** services better provided in a rural area as evidenced by the following:

(a) BATTERY ENERGY STORAGE SYSTEMS do not require access to most utilities.

(b) BATTERY ENERGY STORAGE SYSTEMS are not compatible with principal structures within the minimum separation distance established by the Zoning Ordinance.

(2) **Policy 4.2.2 states, "The County may authorize *discretionary review* development in a rural area if the proposed development:**

**a) is a type that does not negatively affect agricultural activities; or**

**b) is located and designed to minimize exposure to any negative affect caused by agricultural activities; and**

**c) will not interfere with agricultural activities or damage or negatively affect the operation of agricultural drainage systems, *rural* roads, or other agriculture-related infrastructure."**

The proposed amendment will ***HELP ACHIEVE*** Policy 4.2.2 for the following reasons:

a. The proposed Special Use Permit requirements for BATTERY ENERGY STORAGE SYSTEMS include required minimum separations, standard conditions to mitigate damage to farmland, a signed Roadway Upgrade and Maintenance agreement, and a Decommissioning and Site Reclamation Plan.

(3) Policy 4.2.3 states, **"The County will require that each proposed discretionary development explicitly recognize and provide for the right of agricultural activities to continue on adjacent land."**

The proposed amendment will ***HELP ACHIEVE*** Policy 4.2.3 for the following reason:

a. The proposed Special Use Permit requirements for BATTERY ENERGY STORAGE SYSTEMS include required minimum separations and standard conditions to mitigate damage to farmland.

(4) Policy 4.2.4 states, "**To reduce the occurrence of agricultural land use and non-agricultural land use nuisance conflicts, the County will require that all discretionary review consider whether a buffer between existing agricultural operations and the proposed development is necessary.**"

The proposed amendment will ***HELP ACHIEVE*** Policy 4.2.4 for the following reason:

a. The proposed amendment requires minimum separations from adjacent uses and structures as a standard condition.

C. Objective 4.3 is entitled "Site Suitability for Discretionary Review Development" and states: "Champaign County will require that each discretionary review development is located on a suitable site."

The proposed amendment will ***HELP ACHIEVE*** Objective 4.3 because of the following:

(1) **Policy 4.3.1 states "On other than best prime farmland, the County may authorize a discretionary review development provided that the site with proposed improvements is suited overall for the proposed land use."**

The proposed amendment will ***HELP ACHIEVE*** Policy 4.3.1 for the following reasons:

a. See the discussion under Policy 4.3.2 regarding achievement of Policy 4.3.2. If the proposed amendment achieves Policy 4.3.2, it will also achieve Policy 4.3.1.

(2) **Policy 4.3.2 states, "On best prime farmland, the County may authorize a discretionary review development provided the site with proposed improvements is well-suited overall for the proposed land use.**

The proposed amendment will ***HELP ACHIEVE*** Policy 4.3.2 for the following reasons:

a. Because so much of Champaign County consists of best prime farmland soils, any development of a BATTERY ENERGY STORAGE SYSTEM is likely to be on best prime farmland.

b. Standard conditions for BATTERY ENERGY STORAGE SYSTEMS will ensure that they shall not be approved on any location that is not well-suited as follows:

(a) The proposed amendment identifies areas where BATTERY ENERGY STORAGE SYSTEMS should not be located.

(b) The proposed amendment requires and Endangered Species Consultation with the IDNR and IDNR recommendations will be included in the Agency Action Report submitted with the Special Use Permit Application.

(c) The proposed amendment requires consultation with the State Historic Preservation Officer of IDNR and IDNR recommendations will be included in the Agency Action Report submitted with the Special Use Permit Application.

(3) **Policy 4.3.3 states, "The County may authorize a discretionary review development provided that existing public services are adequate to support to the proposed development effectively and safely without undue public expense."**

The proposed amendment will ***HELP ACHIEVE*** Policy 4.3.3 for the following reason:

a. A BESS is only ever allowed as a Special Use Permit and it is assumed that a Special Use Permit will not be allowed if there is any undue public expense.

(4) **Policy 4.3.4 states, "The County may authorize a discretionary review development provided that existing public infrastructure, together with proposed improvements, is adequate to support the proposed development effectively and safely without undue public expense."**

The proposed amendment will ***HELP ACHIEVE*** Policy 4.3.4 for the following reasons:

a. The proposed amendment requires a Roadway Upgrade and Maintenance Agreement with the relevant highway authority.

(5) **Policy 4.3.5 states, "On best prime farmland, the County will authorize a business or other non-residential use only if:**

**a. It also serves surrounding agricultural uses or an important public need; and cannot be located in an urban area or on a less productive site; or**

**b. the use is otherwise appropriate in a rural area and the site is very well suited to it."**

The proposed amendment will ***HELP ACHIEVE*** Policy 4.3.5 for the following reasons:

a. As reviewed for Policy 4.2.1 in this Finding of Fact:
   (a) BATTERY ENERGY STORAGE SYSTEMS ***ARE*** services better provided and therefore ***ARE*** appropriate in a rural area.

b. Regarding location of a BATTERY ENERGY STORAGE SYSTEM on a less productive site, the following is reviewed under Policy 4.3.2 in this Finding of Fact:
   (a) It is unlikely that a BATTERY ENERGY STORAGE SYSTEM in Champaign County will be located on less than best prime farmland.

10. LRMP Goal 5 is entitled "Urban Land Use" and states as follows:

**Champaign County will encourage urban development that is compact and contiguous to existing cities, villages, and existing unincorporated settlements.**

Goal 5 has 3 objectives and 15 policies. The proposed amendment will ***NOT IMPEDE*** Goal 5 in general.

11. LRMP Goal 6 is entitled "Public Health and Safety" and states as follows:

**Champaign County will ensure protection of the public health and public safety in land resource management decisions.**

Goal 6 has 4 objectives and 7 policies. Objectives 6.2, 6.3, and 6.4 are not relevant to the proposed amendment. The proposed amendment will ***HELP ACHIEVE*** Goal 6 for the following reasons:

A. Objective 6.1 states, "Champaign County will seek to ensure that development in unincorporated areas of the County does not endanger public health or safety." Objective 6.1 has four subsidiary policies, and none are relevant to the proposed text amendment.

The proposed amendment will ***HELP ACHIEVE*** Objective 6.1 because of the following:
(1) The Board considers public health and safety for any Special Use Permit.

12. LRMP Goal 7 is entitled "Transportation" and states as follows:

**Champaign County will coordinate land use decisions in the unincorporated area with the existing and planned transportation infrastructure and services.**

Goal 7 has 2 objectives and 7 policies. The proposed amendment is ***NOT RELEVANT*** to Goal 7 in general.

13. LRMP Goal 8 is entitled "Natural Resources" and states as follows:

**Champaign County will strive to conserve and enhance the County's landscape and natural resources and ensure their sustainable use.**

Goal 8 has 9 objectives and 36 policies. Objectives 8.1, 8.3, 8.5, 8.6, 8.7, 8.8, and 8.9 and their policies do not appear to be relevant to the proposed text amendment. The proposed amendment will ***HELP ACHIEVE*** Goal 8 for the following reasons:

A. Objective 8.2 is entitled "Soil" and states, "Champaign County will strive to conserve its soil resources to provide the greatest benefit to current and future generations."

The proposed amendment will ***HELP ACHIEVE*** Objective 8.2 because of the following:

(1) **Policy 8.2.1 states, "The County will strive to minimize the destruction of its soil resources by non-agricultural development and will give special consideration to the protection of best prime farmland. Best prime farmland is that comprised of soils that have a Relative Value of at least 91 and includes land parcels with mixed soils that have a Land Evaluation score of 91 or greater as defined in the LESA."**

The proposed amendment will ***HELP ACHIEVE*** Policy 8.2.1 for the following reason:

a. The Board considers soil resources for any Special Use Permit.

B. Object 8.4 is entitled "Surface Water Protection" and states, "Champaign County will work to ensure that new development and ongoing land management practices maintain and improve surface water quality, contribute to stream channel stability, and minimize erosion and sedimentation."

The proposed amendment will ***HELP ACHIEVE*** Objective 8.4 because of the following:

(1) **Policy 8.4.2 states, "The County will require stormwater management designs and practices that provide effective site drainage, protect downstream drainage patterns, minimize impacts on adjacent properties and provide for stream flows that support healthy aquatic ecosystems."**

The proposed amendment will ***HELP ACHIEVE*** Policy 8.4.2 for the following reason:

a. The Board considers surface water protection for any Special Use Permit.

14. LRMP Goal 9 is entitled "Energy Conservation" and states as follows:

**Champaign County will encourage energy conservation, efficiency, and the use of renewable energy sources.**

Goal 9 has 5 objectives and 5 policies. Objectives 9.1, 9.2, 9.3, and 9.4 and their policies do not appear to be relevant to the proposed text amendment. The proposed amendment will ***HELP ACHIEVE*** the achievement of Goal 9 for the following reason:

A. Objective 9.5, which has no subsidiary policies, states, **"Champaign County will encourage the development and use of renewable energy sources where appropriate and compatible with existing land uses."**

The proposed amendment will ***HELP ACHIEVE*** Objective 9.5 as follows:

(1) BESS integrated within PV SOLAR FARMS can optimize use of renewable energy while achieving the desired setbacks that PV SOLAR FARMS already provide through the Zoning Ordinance.

15. LRMP Goal 10 is entitled "Cultural Amenities" and states as follows:

**Champaign County will promote the development and preservation of cultural amenities that contribute to a high quality of life for its citizens.**

Goal 10 has 1 objective and 1 policy. The proposed amendment is ***NOT RELEVANT*** to Goal 10 in general.

***REGARDING THE PURPOSE OF THE ZONING ORDINANCE***

16. The proposed amendment will ***HELP ACHIEVE*** the purpose of the Zoning Ordinance as established in Section 2 of the Ordinance for the following reasons:

A. Paragraph 2.0 (a) of the Ordinance states that one purpose of the zoning regulations and standards that have been adopted and established is to secure adequate light, pure air, and safety from fire and other dangers.

The proposed amendment is consistent with this purpose.

B. Paragraph 2.0 (b) of the Ordinance states that one purpose of the zoning regulations and standards that have been adopted and established is to conserve the value of land, BUILDINGS, and STRUCTURES throughout the COUNTY.

The proposed amendment is consistent with this purpose.

C. Paragraph 2.0 (c) of the Ordinance states that one purpose of the zoning regulations and standards that have been adopted and established is to lessen and avoid congestion in the public STREETS.

The proposed amendment is not directly related to this purpose.

D. Paragraph 2.0 (d) of the Ordinance states that one purpose of the zoning regulations and standards that have been adopted and established is to lessen and avoid hazards to persons and damage to property resulting from the accumulation of runoff of storm or flood waters.

The proposed amendment is not directly related to this purpose.

E. Paragraph 2.0 (e) of the Ordinance states that one purpose of the zoning regulations and standards that have been adopted and established is to promote the public health, safety, comfort, morals, and general welfare.

The proposed amendment is consistent with this purpose.

F. Paragraph 2.0 (f) of the Ordinance states that one purpose of the zoning regulations and standards that have been adopted and established is to regulate and limit the height and bulk of BUILDINGS and STRUCTURES hereafter to be erected.

The proposed amendment is consistent with this purpose.

G. Paragraph 2.0 (g) of the Ordinance states that one purpose of the zoning regulations and standards that have been adopted and established is to establish, regulate, and limit the building or setback lines on or along any street, trafficway, drive or parkway.

The proposed amendment is consistent with this purpose.

H. Paragraph 2.0 (h) of the Ordinance states that one purpose of the zoning regulations and standards that have been adopted and established is to regulate and limit the intensity of the use of LOT areas, and regulating and determining the area of open spaces within and surrounding BUILDINGS and STRUCTURES.

The proposed amendment is consistent with this purpose.

I. Paragraph 2.0 (i) of the Ordinance states that one purpose of the zoning regulations and standards that have been adopted and established is to classify, regulate, and restrict the location of trades and industries and the location of BUILDINGS, STRUCTURES, and land designed for specified industrial, residential, and other land USES.

The proposed amendment is consistent with this purpose.

J. Paragraph 2.0 (j) of the Ordinance states that one purpose of the zoning regulations and standards that have been adopted and established is to divide the entire County into DISTRICTS of such number, shape, area, and such different classes according to the USE of land, BUILDINGS, and STRUCTURES, intensity of the USE of LOT area, area of open spaces, and other classification as may be deemed best suited to carry out the purpose of the ordinance.

The proposed amendment is not directly related to this purpose.

K. Paragraph 2.0 (k) of the Ordinance states that one purpose of the zoning regulations and standards that have been adopted and established is to fix regulations and standards to which BUILDINGS, STRUCTURES, or USES therein shall conform.

The proposed amendment is consistent with this purpose.

L. Paragraph 2.0 (l) of the Ordinance states that one purpose of the zoning regulations and standards that have been adopted and established is to prohibit USES, BUILDINGS, or STRUCTURES incompatible with the character of such DISTRICTS.

The proposed amendment is consistent with this purpose.

M. Paragraph 2.0 (m) of the Ordinance states that one purpose of the zoning regulations and standards that have been adopted and established is to prevent additions to and alteration or

remodeling of existing BUILDINGS, STRUCTURES, or USES in such a way as to avoid the restrictions and limitations lawfully imposed under this ordinance.

The proposed amendment is not directly related to this purpose.

N. Paragraph 2.0 (n) of the Ordinance states that one purpose of the zoning regulations and standards that have been adopted and established is to protect the most productive agricultural lands from haphazard and unplanned intrusions of urban USES.

The proposed amendment is consistent with this purpose.

O. Paragraph 2.0 (o) of the Ordinance states that one purpose of the zoning regulations and standards that have been adopted and established is to protect natural features such as forested areas and watercourses.

The proposed amendment is consistent with this purpose.

P. Paragraph 2.0 (p) of the Ordinance states that one purpose of the zoning regulations and standards that have been adopted and established is to encourage the compact development of urban areas to minimize the cost of development of public utilities and public transportation facilities.

The proposed amendment is not directly related to this purpose.

Q. Paragraph 2.0 (q) of the Ordinance states that one purpose of the zoning regulations and standards that have been adopted and established is to encourage the preservation of agricultural belts surrounding urban areas, to retain the agricultural nature of the County, and the individual character of existing communities.

The proposed amendment is consistent with this purpose.

R. Paragraph 2.0 (r) of the Ordinance states that one purpose of the zoning regulations and standards that have been adopted and established is to provide for the safe and efficient development of renewable energy sources in those parts of the COUNTY that are most suited to their development.

The proposed amendment is consistent with this purpose.

17. The proposed text amendment ***WILL*** improve the text of the Zoning Ordinance because it ***WILL*** provide:

A. A classification which allows BATTERY ENERGY STORAGE SYSTEMS to be developed while establishing minimum requirements that ensure the purposes of the Zoning Ordinance will be met.

B. A means to regulate an activity for which there is demonstrated demand.

**SUMMARY FINDING OF FACT**

From the documents of record and the testimony and exhibits received at the public hearing conducted on **March 28, 2024,** the Zoning Board of Appeals of Champaign County finds that:

1. The proposed Zoning Ordinance text amendment ***IS NECESSARY TO ACHIEVE*** the Land Resource Management Plan because:
   A. The proposed Zoning Ordinance text amendment will ***HELP ACHIEVE*** LRMP Goals 3, 4, 6, 8 and 9.

   B. The proposed Zoning Ordinance text amendment ***WILL NOT IMPEDE*** the achievement of LRMP Goals 1, 2 and 5.

   C. The proposed Zoning Ordinance text amendment is ***NOT RELEVANT*** to LRMP Goals 7 and 10.

2. The proposed text amendment ***WILL*** improve the Zoning Ordinance because it will:
   A. ***HELP ACHIEVE*** the purpose of the Zoning Ordinance (see Item 16).

   B. ***IMPROVE*** the text of the Zoning Ordinance (see Item 17).

**DOCUMENTS OF RECORD**

1. Legal advertisement for Case 130-AT-24

2. Preliminary Memorandum for Case 130-AT-24 dated March 20, 2024, with attachments:
   A Legal advertisement

   B ELUC Memorandum dated December 22, 2024, with attachment:
   - Draft BESS Text Amendment to the Champaign County Zoning Ordinance

   C National Fire Protection Association (NFPA). (June 2020) *Energy Storage Systems Safety Fact Sheet*. https://www.nfpa.org.

   D The American Clean Power Association. (July 2023) *First Responder's Guide to Lithium-Ion Battery Energy Storage System Incidents*. https://cleanpower.org/resources/first-responders-guide-to-bess-incidents/

   E National Renewable Energy Laboratory (NREL). (September 2019). *Grid Scale Battery Storage Frequently Asked Questions*. https://www.nrel.gov

   F DeKalb County. (March 15, 2023) Ordinance O2023-009: An ordinance amending Section 52-E-12, "Sustainable Energy Systems," of the Dekalb County Code to add a new subsection C, "Battery Energy Storage Systems." https://dekalbcounty.org/

   G Exeter Associates. (February 2022) *Siting and Safety Best Practices for Battery Energy Storage Systems*.

   H New York State Energy Research and Development Authority (NYSERDA). (May 2021) *Battery Energy Storage Systems 101* presentation. https://www.nyserda.ny.gov *(on ZBA meetings website)*

   I New York State Energy Research and Development Authority (NYSERDA). (October 2020) *New York Battery Energy Storage System Guidebook for Local Governments*. https://www.nyserda.ny.gov *(on ZBA meetings website)*

   J Velocity EHS. (July 2021) *Morris Lithium Battery Fire Highlights Emergency Planning, Hazardous Chemical Management*. https://www.ehs.com *(on ZBA meetings website)*

   K Michael Urbanec. (July 2021) *No evacuation for battery fire at energy storage facility east of Grand Ridge*. https://www.shawlocal.com. *(on ZBA meetings website)*

   L Julian Spector. (August 2020) *What Sparked the Arizona Battery Fire? LG Chem has a different version*. https://www.greentechmedia.com *(on ZBA meetings website)*

   M Andy Colthorpe. (February 2022) *World's biggest lithium battery storage now completely offline.* https://www.energy-storage.news *(on ZBA meetings website)*

   N Pacific Northwest National Laboratory. (October 2023) *Energy Storage in Local Zoning Ordinances.* https://www.pnnl.gov/publications/energy-storage-local-zoning-ordinances *(on ZBA meetings website)*

O Comments received regarding the proposed text amendment as of March 18, 2024

P Photos of BESS facilities compiled by P&Z Staff on March 18, 2024

Q Land Resource Management Plan (LRMP) Goals & Objectives
*(provided on the ZBA meetings website)*

R Preliminary Finding of Fact, Summary Finding of Fact, and Final Determination for Case 130-AT-24 dated March 28, 2024, with attachment:
- Exhibit A: Proposed Amendment dated March 28, 2024

**FINAL DETERMINATION**

Pursuant to the authority granted by Section 9.2 of the Champaign County Zoning Ordinance, the Zoning Board of Appeals of Champaign County recommends that:

The Zoning Ordinance Amendment requested in **Case 130-AT-24** should ***{BE ENACTED / NOT BE ENACTED}*** by the County Board in the form attached hereto.

The foregoing is an accurate and complete record of the Findings and Determination of the Zoning Board of Appeals of Champaign County.

SIGNED:

Ryan Elwell, Chair
Champaign County Zoning Board of Appeals

ATTEST:

Secretary to the Zoning Board of Appeals

Date

**EXHIBIT A: PROPOSED AMENDMENT AS OF MARCH 28, 2024**
Text added by ELUC at 1/4/24 meeting
Text added or ~~deleted~~ by P&Z Staff after ELUC meeting

**1. Add the following to Section 3. Definitions:**

BATTERY ENERGY STORAGE MANAGEMENT SYSTEM (BESMS): An electronic system that protects energy storage systems from operating outside of their safe operating parameters and disconnects electrical power to the energy storage system or places it in a safe condition if potentially hazardous temperatures or other conditions are detected.

BATTERY ENERGY STORAGE SYSTEM (BESS): an energy storage power station that collects energy from the electrical grid and then discharges that energy at a later time to provide electricity when needed.

A. TIER-1 BATTERY ENERGY STORAGE SYSTEMS have an aggregate energy capacity less than or equal to 600kWh and, if in a room or enclosed area, consist of only a single energy storage system technology.

B. TIER-2 BATTERY ENERGY STORAGE SYSTEMS have an aggregate energy capacity greater than 600kWh or are comprised of more than one storage battery technology in a room or enclosed area.

**2. Add new paragraph 4.2.1 C.8. as follows:**

4.2.1 CONSTRUCTION and USE

C. It shall be unlawful to erect or establish more than one MAIN or PRINCIPAL STRUCTURE or BUILDING per LOT or more than one PRINCIPAL USE per LOT in the AG-1, Agriculture, AG-2, Agriculture, CR, Conservation-Recreation, R-1, Single Family Residence, R-2, Single Family Residence, and R-3, Two Family Residence DISTRICTS other than in PLANNED UNIT DEVELOPMENTS except as follows:

8. A BATTERY ENERGY STORAGE SYSTEM may be authorized as a SPECIAL USE Permit in the AG-1 Agriculture and AG-2 Agriculture Zoning Districts as a second PRINCIPAL USE on a LOT with another PRINCIPAL USE.”

**3. Amend Section 5.2 as follows:**

**SECTION 5.2 TABLE OF AUTHORIZED PRINCIPAL USES**

- BATTERY ENERGY STORAGE SYSTEM would be a new land use allowed by Special Use Permit in the AG-1 Agriculture, AG-2 Agriculture, B-1 Rural Trade Center, B-4 General Business, I-1 Light Industry and I-2 Heavy Industry Zoning Districts, as shown in the table below.

| Principal USES | Zoning DISTRICTS | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | CR | AG-1 | AG-2 | R-1 | R-2 | R-3 | R-4 | R-5 | B-1 | B-2 | B-3 | B-4 | B-5 | I-1 | I-2 |
| BATTERY ENERGY STORAGE SYSTEM, TIER-1[32] | | | | | | | | | | | | | | | |
| BATTERY ENERGY STORAGE SYSTEM, TIER-2[33] | | S | S | | | | | | S | | | S | | S | S |

S = Permitted on individual LOTS as a Special Use Permit

= Permitted by right

**4. Add new Footnotes 32 and 33 under Section 5.2 as follows:**

32. A TIER-1 BATTERY ENERGY STORAGE SYSTEM is permitted by-right in all zoning districts, subject to the setback and yard requirements in Section 5.3 of the Zoning Ordinance. No Zoning Use Permit shall be required if the area occupied by the TIER-1 BESS is less than 150 square feet.

33. A TIER-2 BATTERY ENERGY STORAGE SYSTEM is subject to the requirements of Section 6.1.8 of the Zoning Ordinance.

**5. Add new Section 6.1.8 as follows:**

### 6.1.8 TIER-2 BATTERY ENERGY STORAGE SYSTEMS

A TIER-2 BATTERY ENERGY STORAGE SYSTEM SPECIAL USE Permit may only be authorized in the AG-1 Agriculture Zoning DISTRICT, the AG-2 Agriculture Zoning DISTRICT, B-1 Rural Trade Center, B-4 General Business, I-1 Light Industry Zoning District, or the I-2 Heavy Industry Zoning District subject to the following standard conditions.

A. General Standard Conditions

(1) Right to farm

a. The owners of the subject property and the Applicant, its successors in interest, and all parties to the decommissioning plan and site reclamation plan hereby recognize and provide for the right of agricultural activities to continue on adjacent land consistent with the Right to Farm Resolution 3425.

B. Minimum LOT Standards

(1) There are no minimum LOT AREA, AVERAGE LOT WIDTH, or maximum LOT COVERAGE requirements for a TIER-2 BATTERY ENERGY STORAGE SYSTEM.

(2) There is no maximum LOT AREA requirement on BEST PRIME FARMLAND.

C. Minimum Standard Conditions for Separations for a TIER-2 BATTERY ENERGY STORAGE SYSTEMS from adjacent USES and STRUCTURES

The location of each TIER-2 BATTERY ENERGY STORAGE SYSTEM shall provide the following required separations as measured from the BATTERY ENERGY STORAGE SYSTEM fencing:

(1) The perimeter fencing shall be at least 50 feet from the RIGHT OF WAY of any STREET.

(2) The perimeter fencing shall be at least 200 feet from the nearest point on any property line.

(3) There shall be at least 500 feet of separation from any existing DWELLING or existing PRINCIPAL BUILDING. This separation may be reduced to no less than 200 feet upon submission of a PRIVATE WAIVER signed by the owner of said DWELLING or PRINCIPAL BUILDING.

(4) Additional separation may be required to ensure that the noise level required by *35 Ill. Admin. Code Parts 900, 901 and 910* is not exceeded or for other purposes deemed necessary by the BOARD.

(5) When a TIER-2 BATTERY ENERGY STORAGE SYSTEM is included in a PV SOLAR FARM or a SOLAR ARRAY or a WIND FARM, the separations required in Sections 6.1.8 (2) and (3) shall only apply to the TIER-2 BATTERY ENERGY STORAGE SYSTEM, except for the interconnection point and driveway for the TIER-2 BATTERY ENERGY STORAGE SYSTEM, and shall not apply to any part of the PV SOLAR FARM or a SOLAR ARRAY or a WIND FARM.

D. Standard Conditions for Design and Installation of any TIER-2 BATTERY ENERGY STORAGE SYSTEM.

(1) Any building that is part of a TIER-2 BATTERY ENERGY STORAGE SYSTEM shall include as a requirement for a Zoning Compliance Certificate, a certification by an Illinois Professional Engineer or Illinois Licensed Structural Engineer or other qualified professional that the constructed building conforms to Public Act 101-369 regarding building code compliance and conforms to the Illinois Accessibility Code.

(2) Electrical Components

a. All electrical components of the TIER-2 BATTERY ENERGY STORAGE SYSTEM shall conform to the National Electrical Code as amended.

b. All on-site utility lines shall be placed underground to the extent feasible and as permitted by the serving utility, with the exception of the main service connection at the utility company right-of-way and any new interconnection equipment, including without limitation any poles, with new easements and right-of-way. Source: NY BESS Guidebook for Local Governments

(3) Maximum Height. The height limitation established in Section 5.3 shall not apply to a TIER-2 BATTERY ENERGY STORAGE SYSTEM. The maximum height of all above ground STRUCTURES shall be identified in the application and as approved in the SPECIAL USE Permit.

(4) Warnings

a. A reasonably visible warning sign shall be installed and shall include the type of technology associated with the battery energy storage systems, any special hazards associated, the type of suppression system installed in the area of battery energy storage systems, and 24-hour emergency contact information, including reach-back phone number. Source: NY BESS Guidebook for Local Governments

b. As required by the National Electric Code (NEC), disconnect and other emergency shutoff information shall be clearly displayed on a light reflective surface. A clearly visible warning sign concerning voltage shall be placed at the base of all pad-mounted transformers and substations. Source: NY BESS Guidebook for Local Governments

(5) No construction may intrude on any easement or right-of-way for a GAS PIPELINE or HAZARDOUS LIQUID PIPELINE, an underground water main or sanitary sewer, a drainage district ditch or tile, or any other public utility facility unless specifically authorized by a crossing agreement that has been entered into with the relevant party.

(6) Safety

a. System Certification. Battery energy storage systems and equipment shall be listed by a Nationally Recognized Testing Laboratory to UL 9540 (Standard for battery energy storage systems and Equipment) with subcomponents meeting each of the following standards as applicable:

(a) IEEE 1578 (Institute of Electrical and Electronics Engineers; Recommended Practice for Stationary Battery Electrolyte Spill Containment and Management);
(b) NFPA 13 (Standard for Installation of Sprinkler Systems);

(c) NFPA 68 (Standard on Explosion Prevention by Deflagration Venting);

(d) NFPA 69 (Standard on Explosion Prevention Systems);

(e) NFPA 855 (Standard for the Installation of Stationary Energy Storage Systems)

(f) UL 1973 (Standard for Batteries for Use in Stationary, Vehicle Auxiliary Power and Light Electric Rail Applications);

(g) UL 1642 (Standard for Lithium Batteries);

(h) UL 1741 or UL 62109 (Inverters and Power Converters);

(i) Certified under the applicable electrical, building, and fire prevention codes as required;

(j) Alternatively, field evaluation by an approved testing laboratory for compliance with UL 9540 and applicable codes, regulations and safety standards may be used to meet system certification requirements.

b. BATTERY ENERGY STORAGE MANAGEMENT SYSTEM.

(a) A TIER-2 BESS shall include a BATTERY ENERGY STORAGE MANAGEMENT SYSTEM to protect the energy storage systems from operating outside of the safe operating parameters and that will disconnect electrical power to the energy storage system or place it in a safe condition if potentially hazardous temperatures or other conditions are detected.

(b) The application shall include a description of the proposed BATTERY ENERGY STORAGE MANAGEMENT SYSTEM by an Illinois Licensed Professional Engineer.

c. Hazard detection systems.

(a) A TIER-2 BESS shall include appropriate hazard detection systems including smoke and heat detectors and gas meters that are monitored by a control center and used to alert operators to emergency situations.

(b) The application shall include a description of the hazard detection systems and the control center by an Illinois Licensed Professional Engineer.

d. Fire suppression

(a) Safe access to the TIER-2 BESS by the relevant Fire Protection Department shall be considered in the site plan design.

(b) Sprinklers should be installed per NFPA 13 but in-rack fire suppression shall also be included. An onsite water source shall be provided that is acceptable to the relevant Fire

Protection Department. The sizing of the water source shall be specified in the application by an Illinois Licensed Professional Engineer.

(c) Containment around the TIE-2 BESS structure shall be provided to capture sprinkler system run-off. The sizing of the containment area shall be specified in the application by an Illinois Licensed Professional Engineer and the containment area shall be detailed on the site plan.

(d) Gaseous suppression agents may be used against incipient fires but shall not be the only suppression agent.

e. Ground-fault protection

(a) Three-phase installations shall have adequate ground-fault protection and the application shall include a discussion of the adequacy of the proposed ground fault protection by an Illinois Licensed Professional Engineer.

(b) Systems with little or no impedance shall be designed to trip off-line automatically.

(c) In systems that have high levels of impedance the overvoltage shall be controlled with grounding banks, other forms of impedance grounding, or surge arresters. The electrical components at risk of overvoltage shall also have phase-to-phase level insulation.

(d) The application shall include a description of the ground-fault protection by an Illinois Licensed Professional Engineer.

f. Control of electrolyte spill. The application shall include a discussion by an Illinois Licensed Professional Engineer regarding possible electrolyte spill and the adequacy of the proposed control of electrolytes in the event of a spill.

g. Ventilation

(a) For TIER-2 BESS that is located inside a habitable building, the ventilation of the TIER-2 BESS should take the building ventilation systems into account to prevent any hazardous gases from being drawn into habitable rooms and putting building occupants at risk.

(b) The application shall include a narrative written by an Illinois Licensed Professional Engineer addressing gas production in the TIER-2 BESS under thermal runaway

conditions and the safeguards included to control and/or respond to gas production. The safeguards shall include a series of safeguards including fire suppression, ventilation, and explosion mitigation.

(7) Cooling of a TIER-2 BESS shall not use groundwater other than for closed-loop geothermal cooling. The application shall include a description of the proposed cooling system of the TIER-2 BESS.

E. Standard Conditions to Mitigate Damage to Farmland

(1) All underground wiring or cabling for the TIER-2 BATTERY ENERGY STORAGE SYSTEM shall be at a minimum depth of 5 feet below grade or deeper if required to maintain a minimum one foot of clearance between the wire or cable and any agricultural drainage tile.

(2) Protection of agricultural drainage tile

a. The applicant shall endeavor to locate all existing agricultural drainage tile prior to establishing any construction staging areas, construction of any necessary TIER-2 BATTERY ENERGY STORAGE SYSTEM access lanes or driveways, construction of any TIER-2 BATTERY ENERGY STORAGE SYSTEM STRUCTURES, any equipment, underground wiring, or cabling. The applicant shall contact affected landowners and tenants and the Champaign County Soil and Water Conservation District and any relevant drainage district for their knowledge of tile line locations prior to the proposed construction. Drainage districts shall be notified at least two weeks prior to disruption of tile.

b. The location of drainage district tile lines shall be identified prior to any construction and drainage district tile lines shall be protected from disturbance as follows:

(a) All identified drainage district tile lines and any known existing drainage district tile easement shall be staked or flagged prior to construction to alert construction crews of the presence of drainage district tile and the related easement.

(b) Any drainage district tile for which there is no existing easement shall be protected from disturbance by a 30 feet wide no-construction buffer on either side of the drainage district tile. The no-construction buffer shall be staked or flagged prior to the start of construction and shall remain valid for the lifetime of the TIER-2 BATTERY ENERGY STORAGE SYSTEM SPECIAL USE Permit and during any deconstruction activities that may occur pursuant to the

TIER-2 BATTERY ENERGY STORAGE SYSTEM SPECIAL USE Permit.

(c) Construction shall be prohibited within any existing drainage district easement and also prohibited within any 30 feet wide no-construction buffer on either side of drainage district tile that does not have an existing easement unless specific construction is authorized in writing by all commissioners of the relevant drainage district. A copy of the written authorization shall be provided to the Zoning Administrator prior to the commencement of construction.

c. Any agricultural drainage tile located underneath construction staging areas, access lanes, and driveways shall be replaced as required in Section 6.3 of the Champaign County Storm Water Management and Erosion Control Ordinance.

d. Any agricultural drainage tile that must be relocated shall be relocated as required in the *Champaign County Storm Water Management and Erosion Control Ordinance*.

e. Conformance of any relocation of drainage district tile with the *Champaign County Storm Water Management and Erosion Control Ordinance* shall be certified by an Illinois Professional Engineer. Written approval by the drainage district shall be received prior to any backfilling of the relocated drain tile and a copy of the approval shall be submitted to the Zoning Administrator. As-built drawings shall be provided to both the relevant drainage district and the Zoning Administrator of any relocated drainage district tile.

f. All tile lines that are damaged, cut, or removed shall be staked or flagged in such manner that they will remain visible until the permanent repairs are completed.

g. All exposed tile lines shall be screened or otherwise protected to prevent the entry into the tile of foreign materials, loose soil, small mammals, etc.

h. Permanent tile repairs shall be made within 14 days of the tile damage provided that weather and soil conditions are suitable or a temporary tile repair shall be made. Immediate temporary repair shall also be required if water is flowing through any damaged tile line. Temporary repairs are not needed if the tile lines are dry and water is not flowing in the tile provided the permanent repairs can be made within 14 days of the damage.

i. All damaged tile shall be repaired so as to operate as well after construction as before the construction began.

j. Following completion of the TIER-2 BATTERY ENERGY STORAGE SYSTEM construction, the applicant shall be responsible for correcting all tile line repairs that fail, provided that the failed repair was made by the Applicant.

(3) All soil conservation practices (such as terraces, grassed waterways, etc.) that are damaged by TIER-2 BATTERY ENERGY STORAGE SYSTEM construction, maintenance, and/or decommissioning shall be restored by the applicant to the pre- TIER-2 BATTERY ENERGY STORAGE SYSTEM construction condition.

(4) Topsoil replacement

For any open trenching required pursuant to TIER-2 BATTERY ENERGY STORAGE SYSTEM construction, the topsoil shall be stripped and replaced as follows:

a. The top 12 inches of topsoil shall first be stripped from the area to be trenched and from an adjacent area to be used for subsoil storage. The topsoil shall be stored in a windrow parallel to the trench in such a manner that that it will not become intermixed with subsoil materials.

b. All subsoil material that is removed from the trench shall be placed in the second adjacent stripped windrow parallel to the trench but separate from the topsoil windrow.

c. In backfilling the trench, the stockpiled subsoil material shall be placed back into the trench before replacing the topsoil.

d. The topsoil must be replaced such that after settling occurs, the topsoil's original depth and contour (with an allowance for settling) will be restored.

(5) Mitigation of soil compacting and rutting

a. The Applicant shall not be responsible for mitigation of soil compaction and rutting if exempted by the TIER-2 BATTERY ENERGY STORAGE SYSTEM lease.

b. Unless specifically provided for otherwise in the TIER-2 BATTERY ENERGY STORAGE SYSTEM lease, the Applicant shall mitigate soil compaction and rutting for all areas of farmland that were traversed with vehicles and construction equipment or where topsoil is replaced in open trenches.

(6) Land leveling

a. The Applicant shall not be responsible for leveling of disturbed land if exempted by the TIER-2 BATTERY ENERGY STORAGE SYSTEM lease.

b. Unless specifically provided for otherwise in the TIER-2 BATTERY ENERGY STORAGE SYSTEM lease, the Applicant shall level all disturbed land as follows:

(a) Following the completion of any open trenching, the applicant shall restore all land to its original pre-construction elevation and contour.

(b) Should uneven settling occur or surface drainage problems develop as a result of the trenching within the first year after completion, the applicant shall again restore the land to its original pre-construction elevation and contour.

(7) Permanent Erosion and Sedimentation Control Plan

a. Prior to the approval of any Zoning Use Permit, the Applicant shall provide a permanent soil erosion and sedimentation plan for the TIER-2 BATTERY ENERGY STORAGE SYSTEM including any access road that conforms to the relevant Natural Resources Conservation Service guidelines and that is prepared by an Illinois Licensed Professional Engineer.

b. As-built documentation of all permanent soil erosion and sedimentation improvements for the TIER-2 BATTERY ENERGY STORAGE SYSTEM including any access road prepared by an Illinois Licensed Professional Engineer shall be submitted and accepted by the Zoning Administrator prior to approval of any Zoning Compliance Certificate.

(8) Retention of all topsoil

No topsoil may be removed, stripped, or sold from the proposed SPECIAL USE Permit site pursuant to or as part of the construction of the TIER-2 BATTERY ENERGY STORAGE SYSTEM.

(9) Minimize disturbance to BEST PRIME FARMLAND

a. Any TIER-2 BATTERY ENERGY STORAGE SYSTEM to be located on BEST PRIME FARMLAND shall minimize the disturbance to BEST PRIME FARMLAND as follows:

(a) The disturbance to BEST PRIME FARMLAND caused by construction and operation of the TIER-2 BATTERY

ENERGY STORAGE SYSTEM shall be minimized at all times consistent with good engineering practice.

F. Standard Conditions for Use of Public Streets

Any TIER-2 BATTERY ENERGY STORAGE SYSTEM applicant proposing to use any County Highway or a township or municipal STREET for the purpose of transporting TIER-2 BATTERY ENERGY STORAGE SYSTEM equipment for construction, operation, or maintenance of the TIER-2 BATTERY ENERGY STORAGE SYSTEM shall identify all such public STREETS and pay the costs of any necessary permits and the costs to repair any damage to the STREETS caused by the TIER-2 BATTERY ENERGY STORAGE SYSTEM construction, as follows:

(1) Prior to the close of the public hearing before the BOARD, the Applicant shall enter into a Roadway Upgrade and Maintenance agreement approved by the County Engineer and State's Attorney; or Township Highway Commissioner; or municipality where relevant, except for any TIER-2 BATTERY ENERGY STORAGE SYSTEM for which the relevant highway authority has agreed in writing to waive the requirements of subparagraphs 6.1.8 F.1, 6.1.8 F.2, and 6.1.8 F.3, and the signed and executed Roadway Upgrade and Maintenance agreements must provide for the following minimum conditions:

a. The applicant shall agree to conduct a pre- TIER-2 BATTERY ENERGY STORAGE SYSTEM construction baseline survey to determine existing STREET conditions for assessing potential future damage including the following:

(a) A videotape of the affected length of each subject STREET supplemented by photographs if necessary.

(b) Pay for costs of the County to hire a consultant to make a study of any structure on the proposed route that the County Engineer feels may not carry the loads likely during the TIER-2 BATTERY ENERGY STORAGE SYSTEM construction.

(c) Pay for any strengthening of STREET structures that may be necessary to accommodate the proposed traffic loads caused by the ~~PV SOLAR FARM~~BATTERY ENERGY STORAGE SYSTEM construction.

b. The Applicant shall agree to pay for costs of the County Engineer to hire a consultant to make a study of any structure on the proposed route that the County Engineer feels may not carry the loads likely during the TIER-2 BATTERY ENERGY STORAGE SYSTEM construction and pay for any strengthening of structures that may be

necessary to accommodate the proposed traffic loads caused by the TIER-2 BATTERY ENERGY STORAGE SYSTEM construction.

c. The Applicant shall agree upon an estimate of costs for any other necessary roadway improvements prior to construction.

d. The Applicant shall obtain any necessary approvals for the STREET improvements from the relevant STREET maintenance authority.

e. The Applicant shall obtain any necessary Access Permits including any required plans.

f. The Applicant shall erect permanent markers indicating the presence of underground cables.

g. The Applicant shall install marker tape in any cable trench.

h. The Applicant shall become a member of the Illinois statewide One-Call Notice System (otherwise known as the Joint Utility Locating Information for Excavators or "JULIE") and provide JULIE with all of the information necessary to update its record with respect to the TIER-2 BATTERY ENERGY STORAGE SYSTEM.

i. The Applicant shall use directional boring equipment to make all crossings of County Highways for the cable collection system.

j. The Applicant shall notify the STREET maintenance authority in advance of all oversize moves and crane crossings.

k. The Applicant shall provide the County Engineer with a copy of each overweight and oversize permit issued by the Illinois Department of Transportation for the TIER-2 BATTERY ENERGY STORAGE SYSTEM construction.

l. The Applicant shall transport the TIER-2 BATTERY ENERGY STORAGE SYSTEM loads so as to minimize adverse impact on the local traffic including farm traffic.

m. The Applicant shall schedule TIER-2 BATTERY ENERGY STORAGE SYSTEM construction traffic in a way to minimize adverse impacts on emergency response vehicles, rural mail delivery, school bus traffic, and local agricultural traffic.

n. The Applicant shall provide as much advance notice as in commercially reasonable to obtain approval of the STREET maintenance authority when it is necessary for a STREET to be closed due to a crane crossing or for any other reason. Notwithstanding the generality of the aforementioned, the Applicant will provide 48 hours' notice to the extent reasonably practicable.

o. The Applicant shall provide signs indicating all highway and STREET closures and work zones in accordance with the Illinois Department of Transportation Manual on Uniform Traffic Control Devices.

p. The Applicant shall establish a single escrow account and a single Irrevocable Letter of Credit for the cost of all STREET upgrades and repairs pursuant to the TIER-2 BATTERY ENERGY STORAGE SYSTEM construction.

q. The Applicant shall notify all relevant parties of any temporary STREET closures.

r. The Applicant shall obtain easements and other land rights needed to fulfill the Applicant's obligations under this Agreement.

s. The Applicant shall agree that the County shall design all STREET upgrades in accordance with the most recent edition of the IDOT Bureau of Local Roads and Streets Manual.

t. The Applicant shall provide written Notice to Proceed to the relevant STREET maintenance authority by December 31 of each year that identifies the STREETS to be upgraded during the following year.

u. The Applicant shall provide dust control and grading work to the reasonable satisfaction of the County Engineer on STREETS that become aggregate surface STREETS.

v. The Applicant shall conduct a post- TIER-2 BATTERY ENERGY STORAGE SYSTEM construction baseline survey similar to the pre- TIER-2 BATTERY ENERGY STORAGE SYSTEM construction baseline survey to identify the extent of repairs necessary to return the STREETS to the pre- TIER-2 BATTERY ENERGY STORAGE SYSTEM construction condition.

w. The Applicant shall pay for the cost of all repairs to all STREETS that are damaged by the Applicant during the construction of the TIER-2 BATTERY ENERGY STORAGE SYSTEM and restore such STREETS to the condition they were in at the time of the pre-TIER-2 BATTERY ENERGY STORAGE SYSTEM construction inventory.

x. All TIER-2 BATTERY ENERGY STORAGE SYSTEM construction traffic shall exclusively use routes designated in the approved Transportation Impact Analysis.

y. The Applicant shall provide liability insurance in an acceptable amount to cover the required STREET construction activities.

z. The Applicant shall pay for the present worth costs of life consumed by the construction traffic as determined by the pavement management surveys and reports on the roads which do not show significant enough deterioration to warrant immediate restoration.

aa. Provisions for expiration date on the agreement.

bb. Other conditions that may be required.

(2) A condition of the County Board SPECIAL USE Permit approval shall be that the Zoning Administrator shall not authorize a Zoning Use Permit for the TIER-2 BATTERY ENERGY STORAGE SYSTEM until the County Engineer and State's Attorney, or Township Highway Commissioner, or municipality where relevant, has approved a Transportation Impact Analysis provided by the Applicant and prepared by an independent engineer that is mutually acceptable to the Applicant and the County Engineer and State's Attorney, or Township Highway Commissioner, or municipality where relevant, that includes the following:

a. Identify all such public STREETS or portions thereof that are intended to be used by the Applicant during construction of the TIER-2 BATTERY ENERGY STORAGE SYSTEM as well as the number of loads, per axle weight of each load, and type of equipment that will be used to transport each load.

b. A schedule of the across road culverts and bridges affected by the project and the recommendations as to actions, if any, required with respect to such culverts and bridges and estimates of the cost to replace such culverts and bridges.

c. A schedule of the anticipated STREET repair costs to be made in advance of the TIER-2 BATTERY ENERGY STORAGE SYSTEM construction and following construction of the TIER-2 BATTERY ENERGY STORAGE SYSTEM.

d. The Applicant shall reimburse the County Engineer, or Township Highway Commissioner, or municipality where relevant, for all reasonable engineering fees including the cost of a third-party consultant, incurred in connection with the review and approval of the Transportation Impact Analysis.

(3) At such time as decommissioning takes place, the Applicant or its successors in interest shall enter into a Roadway Use and Repair Agreement with the appropriate highway authority.

G. Standard Conditions for Coordination with Local Fire Protection District

(1) The Applicant shall submit to the local fire protection district a copy of the site plan.

(2) The Owner or Operator shall cooperate with the local fire protection district to develop the fire protection district's emergency response plan. The emergency response plan shall include the following information:

a. Procedures for safe shutdown, de-energizing, or isolation of equipment and systems under emergency conditions to reduce the risk of fire, electric shock, and personal injuries, and for safe start-up following cessation of emergency conditions.

b. Procedures for inspection and testing of associated alarms, interlocks, and controls.

c. Procedures to be followed in response to notifications from the TIER-2 BATTERY ENERGY STORAGE MANAGEMENT SYSTEM, when provided, that could signify potentially dangerous conditions, including shutting down equipment, summoning service and repair personnel, and providing agreed upon notification to fire department personnel for potentially hazardous conditions in the event of a system failure.

d. Emergency procedures to be followed in case of fire, explosion, release of liquids or vapors, damage to critical moving parts, or other potentially dangerous conditions. Procedures can include sounding the alarm, notifying the fire department, evacuating personnel, de-energizing equipment, and controlling and extinguishing the fire.

e. Response considerations similar to a safety data sheet (SDS) that will address response safety concerns and extinguishment when an SDS is not required.

f. Procedures for dealing with TIER-2 BATTERY ENERGY STORAGE SYSTEM equipment damaged in a fire or other emergency event, including maintaining contact information for personnel qualified to safely remove damaged TIER-2 BATTERY ENERGY STORAGE SYSTEM equipment from the facility.

g. Other procedures as determined necessary by the relevant Fire Protection District to provide for the safety of occupants, neighboring properties, and emergency responders.

h. Procedures and schedules for conducting drills of these procedures and for training local first responders on the contents of the plan and appropriate response procedures.

Source: NY BESS Guidebook for Local Governments

(3) Nothing in this section shall alleviate the need to comply with all other applicable fire laws and regulations.

H. Standard Conditions for Allowable Noise Level

(1) Noise levels from any TIER-2 BATTERY ENERGY STORAGE SYSTEM shall be in compliance with the applicable Illinois Pollution Control Board (IPCB) regulations (*35 Illinois Administrative Code*, Subtitle H: Noise, Parts 900, 901, 910).

(2) The Applicant shall submit manufacturer's sound power level characteristics and other relevant data regarding noise characteristics of proposed TIER-2 BATTERY ENERGY STORAGE SYSTEM equipment necessary for a competent noise analysis.

(3) The Applicant, through the use of a qualified professional, as part of the siting approval application process, shall appropriately demonstrate compliance with the above noise requirements as follows:

a. The SPECIAL USE Permit application for a TIER-2 BATTERY ENERGY STORAGE SYSTEM shall include a noise analysis that includes the following:

(a) The pre-development 24-hour ambient background sound level shall be identified at representative locations near the site of the proposed TIER-2 BATTERY ENERGY STORAGE SYSTEM.

(b) Computer modeling shall be used to generate the anticipated sound level resulting from the operation of the proposed TIER-2 BATTERY ENERGY STORAGE SYSTEM within 1,500 feet of the proposed TIER-2 BATTERY ENERGY STORAGE SYSTEM.

(c) Results of the ambient background sound level monitoring and the modeling of anticipated sound levels shall be clearly stated in the application and the application shall include a map of the modeled noise contours within 1,500 feet of the proposed TIER-2 BATTERY ENERGY STORAGE SYSTEM.

(d) The application shall also clearly state the assumptions of the computer model's construction and algorithms so that a competent and objective third party can as simply as possible verify the anticipated sound data and sound levels.

(4) After construction of the TIER-2 BATTERY ENERGY STORAGE SYSTEM, the Zoning Administrator shall take appropriate enforcement action as necessary to investigate noise complaints in order to determine the validity of the complaints and take any additional enforcement action as proves warranted to stop any violation that is occurring, including but not limited to the following:

a. The Zoning Administrator shall make the Environment and Land Use Committee aware of complaints about noise.

b. If the Environment and Land Use Committee determines that the noise is excessive, the Environment and Land Use Committee shall require the Owner or Operator to take responsible steps to mitigate the excessive noise.

I. Standard Conditions for Endangered Species Consultation

The Applicant shall apply for consultation with the Endangered Species Program of the Illinois Department of Natural Resources. The Application shall include a copy of the Agency Action Report from the Endangered Species Program of the Illinois Department of Natural Resources or, if applicable, a copy of the Detailed Action Plan Report submitted to the Endangered Species Program of the Illinois Department of Natural Resources and a copy of the response from the Illinois Department of Natural Resources.

J. Standard Conditions for Historic and Archaeological Resources Review

The Applicant shall apply for consultation with the State Historic Preservation Officer of the Illinois Department of Natural Resources. The Application shall include a copy of the Agency Action Report for the State Historic Preservation Officer of the Illinois Department of Natural Resources.

K. Standard Conditions for Acceptable Wildlife Impacts

The TIER-2 BATTERY ENERGY STORAGE SYSTEM shall be located, designed, constructed, and operated so as to avoid and if necessary mitigate the impacts to wildlife to a sustainable level of mortality.

L. Screening and Fencing

(1) Perimeter fencing

a. TIER-2 BATTERY ENERGY STORAGE SYSTEM equipment and structures shall be fully enclosed and secured by a fence with a minimum height of 7 feet.

b. Knox boxes and keys shall be provided at locked entrances for emergency personnel access.

c. Vegetation between the fencing and the LOT LINE shall be maintained such that NOXIOUS WEEDS are controlled or eradicated consistent with the Illinois Noxious Weed Law (505 *ILCS* 100/1 *et. seq.*). Management of the vegetation shall be explained in the application.

(2) Screening

a. Areas within 10 feet on each side of the TIER-2 BATTERY ENERGY STORAGE SYSTEM shall be cleared of combustible vegetation and other combustible growth. Source: DeKalb County draft ordinance

b A visual screen shall be provided around the perimeter of the TIER-2 BATTERY ENERGY STORAGE SYSTEM as follows:

(a) The visual screen shall be provided for any part of the TIER-2 BATTERY ENERGY STORAGE SYSTEM that is visible to and located within 1,000 feet of an existing DWELLING or residential DISTRICT except that the visual screen may not be required within the full 1,000 feet of an existing DWELLING or residential DISTRICT provided the Applicant submits a landscape plan prepared by an Illinois Registered Landscape Architect and the BOARD finds that the visual screen in the landscape plan provides adequate screening. However, the visual screen shall not be required if the TIER-2 BATTERY ENERGY STORAGE SYSTEM is not visible to a DWELLING or residential DISTRICT by virtue of the existing topography.

(b) The visual screen shall be waived if the owner(s) of a relevant DWELLING(S) have agreed in writing to waive the screening requirement and a copy of the written waiver is submitted to the BOARD or GOVERNING BODY.

(c) The visual screen shall be a vegetated buffer as follows:

i. A vegetated visual screen buffer that shall include a continuous line of native evergreen foliage and/or native shrubs and/or native trees and/or any existing wooded area and/or plantings of tall native greases and other native flowering plants and/or an area of agricultural crop production that will conceal the TIER-2 BATTERY ENERGY STORAGE SYSTEM from view from adjacent abutting property may be authorized as an alternative visual screen subject to specific conditions.

ii. Any vegetation that is part of the approved visual screen buffer shall be maintained in perpetuity of the TIER-2 BATTERY ENERGY STORAGE SYSTEM. If the evergreen foliage below a height of 7 feet disappears over time, the screening shall be replaced.

iii. The continuous line of native evergreen foliage and/or native shrubs and/or native trees shall be planted at a minimum height of 5 feet tall and shall be planted in multiple rows as required to provide a 50% screen within 2 years of planting. The planting shall otherwise conform to Natural Resources Conservation Service Practice Standard 380 Windbreak/Shelterbreak Establishment except that the planting shall be located as close as possible to the ~~PV SOLAR FARM~~BATTERY ENERGY STORAGE SYSTEM fence while still providing adequate clearance for maintenance.

iv. A planting of tall native grasses and other native flowing plants may be used as a visual screen buffer provided that the width of planting shall be authorized by the BOARD and the planting shall otherwise be planted and maintained per the recommendations of the Natural Resources Conservation Service Practice Standard 327 Conservation Cover and further provided that the ~~PV SOLAR FARM~~BATTERY ENERGY STORAGE SYSTEM perimeter fence is opaque.

v. An area of agricultural crop production may also be authorized by the BOARD as an alternative visual screen buffer with a width of planting as authorized by the BOARD provided that the TIER-2 BATTERY ENERGY STORAGE SYSTEM perimeter fence is opaque. Any area of crop production that is used as a vegetated visual screen shall be planted annually and shall be replanted as necessary to ensure a crop every year regardless of weather or market conditions.

vi. Any vegetated screen buffer shall be detailed in a landscape plan drawing that shall be included with the TIER-2 BATTERY ENERGY STORAGE SYSTEM SPECIAL USE Permit application.

M. Standard Condition for Liability Insurance

(1) The Owner or Operator of the TIER-2 BATTERY ENERGY STORAGE SYSTEM shall maintain a current general liability policy covering bodily injury and property damage with minimum limits of at least $5 million per occurrence and $5 million in the aggregate.

(2) The general liability policy shall identify landowners in the SPECIAL USE Permit as additional insured.

N. Operational Standard Conditions

(1) Maintenance

a. Any physical modification to the TIER-2 BATTERY ENERGY STORAGE SYSTEM that increases the number of batteries or structures and/or the land area occupied by the TIER-2 BATTERY ENERGY STORAGE SYSTEM shall require a new SPECIAL USE Permit. Like-kind replacements shall not require recertification nor will replacement of equipment provided replacement is done in fashion similar to the original installation.

(2) Materials Handling, Storage and Disposal

a. All solid wastes related to the construction, operation and maintenance of the TIER-2 BATTERY ENERGY STORAGE SYSTEM shall be removed from the site promptly and disposed of in accordance with all Federal, State and local laws.

b. All hazardous materials related to the construction, operation, maintenance, and decommissioning of the TIER-2 BATTERY ENERGY STORAGE SYSTEM shall be handled, stored, transported and disposed of in accordance with all applicable local, State and Federal laws.

(3) Vegetation management

a. The TIER-2 BATTERY ENERGY STORAGE SYSTEM SPECIAL USE Permit application shall include a weed control plan for the total area of the SPECIAL USE Permit including areas both inside of and outside of the perimeter fencing.

b. The weed control plan shall ensure the control and/or eradication of NOXIOUS WEEDS consistent with the Illinois Noxious Weed Law (55 *ILCS* 100/1 *et. seq.*).

c. The weed control plan shall be explained in the application.

O. Standard Conditions for Decommissioning and Site Reclamation Plan

(1) The Applicant shall submit a signed decommissioning and site reclamation plan conforming to the requirements of paragraph 6.1.1A.

(2) In addition to the purposes listed in subparagraph 6.1.1A.4., the decommissioning and site reclamation plan shall also include provisions for anticipated repairs to any public STREET used for the purpose of reclamation of the TIER-2 BATTERY ENERGY STORAGE SYSTEM and all costs related to removal of access driveways.

(3) The decommissioning and site reclamation plan required in paragraph 6.1.1A. shall also include the following:

a. A stipulation that the applicant or successor shall notify the GOVERNING BODY by certified mail of the commencement of voluntary or involuntary bankruptcy proceeding, naming the applicant as debtor, within ten days of commencement of proceeding.

b. A stipulation that the applicant shall agree that the sale, assignment in fact or law, or such other transfer of applicant's financial interest in the TIER-2 BATTERY ENERGY STORAGE SYSTEM shall in no way affect or change the applicant's obligation to continue to comply with the terms of this plan. Any successor in interest, assignee, and all parties to the decommissioning and site reclamation plan shall assume the terms, covenants, and obligations of this plan and agrees to assume all reclamation liability and responsibility for the TIER-2 BATTERY ENERGY STORAGE SYSTEM.

c. Authorization for the GOVERNING BODY and its authorized representatives for right of entry onto the TIER-2 BATTERY ENERGY STORAGE SYSTEM premises for the purpose of inspecting the methods of reclamation or for performing actual reclamation if necessary.

d. A stipulation that at such time as decommissioning takes place the Applicant, its successors in interest, and all parties to the decommissioning and site reclamation plan are required to enter into a Roadway Use and Repair Agreement with the relevant highway authority.

e. A stipulation that the Applicant, its successors in interest, and all parties to the decommissioning and site reclamation plan shall provide evidence of any new, additional, or substitute financing or security agreement to the Zoning Administrator throughout the operating lifetime of the project.

f. A stipulation that the Applicant, its successors in interest, and all parties to the decommissioning and site reclamation plan shall be obliged to perform the work in the decommissioning and site reclamation plan before abandoning the TIER-2 BATTERY ENERGY STORAGE SYSTEM or prior to ceasing operations of the TIER-2 BATTERY ENERGY STORAGE SYSTEM, after it has begun, other than in the ordinary course of business. This obligation shall be independent of the obligation to pay financial assurance and shall not be limited by the amount of financial assurance. The obligation to perform the reclamation work shall constitute a covenant running with the land.

g. The decommissioning and site reclamation plan shall provide for payment of any associated costs that Champaign COUNTY may incur in the event that decommissioning is actually required. Associated costs include all administrative and ancillary costs associated with drawing upon the financial assurance and performing the reclamation work and shall include but not be limited to: attorney's fees; construction management and other professional fees; and, the costs of preparing requests for proposals and bidding documents required to comply with State law or Champaign COUNTY purchasing policies.

h. Provisions for the removal of structures, debris, cabling, and associated equipment on the surface and to a level of not less than five feet below the surface, and the sequence in which removal is expected to occur. Source: Sangamon County, IL

i. A stipulation that should the decommissioning and site reclamation plan be deemed invalid by a court of competent jurisdiction the TIER-2 BATTERY ENERGY STORAGE SYSTEM SPECIAL USE Permit shall be deemed void.

j. A stipulation that the Applicant's obligation to complete the decommissioning and site reclamation plan and to pay all associated costs shall be independent of the Applicant's obligation to provide financial assurance.

k. A stipulation that the liability of the Applicant's failure to complete the decommissioning and site reclamation plan or any breach of the decommissioning and site reclamation plan requirement shall not be capped by the amount of financial assurance.

l. If the Applicant desires to remove equipment or property credited to the estimated salvage value without the concurrent replacement of the property with property of equal or greater salvage value, or if the Applicant installs equipment or property increasing the cost of decommissioning after the TIER-2 BATTERY ENERGY STORAGE SYSTEM begins operations, at any point, the Applicant shall first obtain the consent of the Zoning Administrator. If the Applicant's lien holders remove equipment or property credited to the salvage value, the Applicant shall promptly notify the Zoning Administrator. In either of these events, the total financial assurance shall be adjusted to reflect any change in total salvage value and total decommissioning costs resulting from any such removal or installation.

m. A listing of any contingencies for removing an intact operational energy storage system from service, and for removing an energy storage system from service that has been damaged by a fire or other event.

(4) To comply with paragraph 6.1.1A.5., the Applicant shall provide financial assurance in the form of an irrevocable letter of credit as follows:

a. At the time of SPECIAL USE Permit approval, the amount of financial assurance to be provided for the decommissioning and site reclamation plan shall be 125% of the decommissioning cost as determined in the independent engineer's cost estimate to complete the decommissioning work described in Section 6.1.1A.4.a. and 6.1.1A.4.b., and 6.1.1A.4c. and shall otherwise be compliant with Section 6.1.1A.5. except that if the TIER-2 BATTERY ENERGY STORAGE SYSTEM has a limited power warranty to provide not less than 80% nominal power output up to 25 years and proof of that warranty is provided at the time of Zoning Use Permit approval, financial assurance may be provided for the decommissioning and site reclamation plan as follows:

(a) No Zoning Use Permit to authorize construction of the TIER-2 BATTERY ENERGY STORAGE SYSTEM shall be authorized by the Zoning Administrator until the TIER-2 BATTERY ENERGY STORAGE SYSTEM owner shall provide the COUNTY with financial assurance to cover 10% of the decommissioning cost as determined in the independent engineer's cost estimate to complete the decommissioning work described in Sections 6.1.1A.4.a. and 6.1.1A.4.b. and 6.1.1A.4.c. and otherwise compliant with Section 6.1.1A.5.

(b) On or before the sixth anniversary of the Commercial Operation Date, the TIER-2 BATTERY ENERGY STORAGE SYSTEM Owner shall provide the COUNTY with Financial Assurance to cover 50% of the decommissioning cost as determined in the independent engineer's cost estimate to complete the decommissioning work described in Sections 6.1.1A.4.a. and 6.1.1A.4.b. and 6.1.1A.4.c. and otherwise compliant with Section 6.1.1A.5.

(c) On or before the eleventh anniversary of the Commercial Operation Date, the TIER-2 BATTERY ENERGY STORAGE SYSTEM Owner shall provide the COUNTY with Financial Assurance to cover 100% of the decommissioning cost as determined in the independent engineer's cost estimate to complete the decommissioning work described in Sections 6.1.1A.4.a. and 6.1.1A.4.b. and 6.1.1A.4.c. and otherwise compliant with Section 6.1.1A.5.

b. Net salvage value may be deducted for decommissioning costs as follows:

(a) One of the following standards shall be met:

i. The Applicant, its successors in interest, and all parties to the decommissioning and site reclamation plan shall maintain the TIER-2 BATTERY ENERGY STORAGE SYSTEM free and clear of liens and encumbrances, including financing liens and shall provide proof of the same prior to issuance of the SPECIAL USE Permit; or

ii. The Applicant, its successors in interest, and all parties to the decommissioning and site reclamation plan shall deduct from the salvage vale credit the amount of any lien or encumbrance on the TIER-2 BATTERY ENERGY STORAGE SYSTEM; or

iii. Any and all financing and/or financial security agreements entered into by the Applicant, its successors in interest, and all parties to the decommissioning and site reclamation plan shall expressly provide that the agreements are subject to the covenant required by Section 6.1.1A.2 that the reclamation work be done.

(b) The Applicant, its successors in interest, and all parties to the decommissioning and site reclamation plan shall provide proof of compliance with paragraph 6.1.8 O.(4).b.(a) prior to the issuance of any Zoning Use Permit and upon every renewal of the financial assurance and at any other time upon the request of the Zoning Administrator.

(c) The Applicant, its successors in interest, and all parties to the decommissioning and site reclamation plan shall provide in the decommissioning and site reclamation plan for legal transfer of the STRUCTURE to the demolisher to pay the costs of reclamation work, should the reclamation work be performed.

(d) The net estimated salvage value that is deducted from the estimated decommissioning costs shall be the salvage value that results after all related costs for demolition and any required preparation for transportation for reuse or recycling or for simple disposal and other similar costs including but not limited to the decommissioning of the TIER-2 BATTERY ENERGY STORAGE SYSTEM STRUCTURES, equipment, and access roads.

(e) Estimated salvage value shall be based on the average salvage price of the past five years as published in a reputable source for salvage values and shall reflect sound

engineering judgement as to anticipated changes in salvage prices prior to the next update of estimated net salvage value.

(f) The total financial assurance after deduction of the net estimated salvage value shall not be less than $1,000 per acre.

(g) The credit for net estimated salvage value attributable to any TIER-2 BATTERY ENERGY STORAGE SYSTEM may not exceed the estimated cost of removal of the above-ground portion of that TIER-2 BATTERY ENERGY STORAGE SYSTEM on the subject site.

c. The GOVERNING BODY has the right to require multiple letters of credit based on the regulations governing federal insurance for deposits.

d. The Applicant, its successors in interest, and all parties to the decommissioning and site reclamation plan shall adjust the amount of the financial assurance to ensure that it reflects current and accurate information as follows:

(a) On the tenth anniversary of the financial assurance and at least once every five years thereafter, the Applicant, its successors in interest, and all parties to the decommissioning and site reclamation plan shall use an independent Illinois Licensed Professional Engineer to provide updated estimates of decommissioning costs and salvage value, by including any changes due to inflation and/or change in salvage price. The Applicant, its successors in interest, and all parties to the decommissioning and site reclamation plan shall, upon receipt, provide a copy of the adjusted Professional Engineer's report to the Zoning Administrator.

(b) At all times, the value of the irrevocable letter of credit shall equal or exceed the amount of the independent engineer's cost estimate as increased by known and documented rates of inflation based on the Consumer Price Index since the TIER-2 BATTERY ENERGY STORAGE SYSTEM was approved.

e. The long term corporate debt (credit) rating of the letter of credit issuing financial institution by both Standard & Poor's Financial Services LLC (S&P) and Moody's Investors Service (Moody's) shall be equal to or greater than the minimum acceptable long term corporate debt (credit) rating, as follows:

(a) The Zoning Administrator shall verify the long term corporate debt (credit) rating of the proposed financial

institution by Standard and Poor's Financial Services LLC (S&P) and/or Moody's Investors Service (Moody's) and/or the Kroll Bond Rating Agency.

(b) The minimum acceptable long term corporate debt (credit) rating of the proposed financial institution shall be a rating of "A-" by S&P or a rating of "A3" by Moody's, or a rating of "A-" by Kroll Bond Rating Agency.

(c) Whenever the most current long term corporate debt (credit) rating of the proposed financial institution by either S&P, Moody's, or Kroll Bond Rating Agency is lower than the minimum acceptable long term corporate debt (credit) rating, the letter of credit shall be replaced with a new irrevocable letter of credit from an issuing financial institution whose most current long term corporate debt (credit) rating by either S&P, Moody's, or Kroll Bond Rating Agency meets or exceeds the minimum acceptable long term corporate debt (credit) rating.

f. Should the salvage value of components be adjusted downward or the decommissioning costs adjusted upward pursuant to paragraph 6.1.8 O.(4)d., the amount of the irrevocable letter of credit pursuant to this paragraph 6.1.8 O.(4) shall be increased to reflect the adjustment, as if the adjusted estimate were the initial estimate.

g. Unless the Governing Body approves otherwise, the Champaign County State's Attorney's Office shall review and approve every Letter of Credit prior to acceptance by the Zoning Administrator.

(5) In addition to the conditions listed in subparagraph 6.1.1A.9. the Zoning Administrator may also draw on the funds for the following reasons:

a. In the event that any TIER-2 BATTERY ENERGY STORAGE SYSTEM or component thereof ceases to be functional for more than six consecutive months after it starts producing electricity and the Owner is not diligently repairing such TIER-2 BATTERY ENERGY STORAGE SYSTEM or component.

b. In the event that the Owner declares the TIER-2 BATTERY ENERGY STORAGE SYSTEM or any TIER-2 BATTERY ENERGY STORAGE SYSTEM component to be functionally obsolete for tax purposes.

c. There is a delay in the construction of any TIER-2 BATTERY ENERGY STORAGE SYSTEM of more than 6 months after construction on that TIER-2 BATTERY ENERGY STORAGE SYSTEM begins.

d. Any TIER-2 BATTERY ENERGY STORAGE SYSTEM or component thereof that appears in a state of disrepair or imminent collapse and/or creates an imminent threat to the health or safety of the public or any person.

e. Any TIER-2 BATTERY ENERGY STORAGE SYSTEM or component thereof that is otherwise derelict for a period of 6 months.

f. The TIER-2 BATTERY ENERGY STORAGE SYSTEM is in violation of the terms of the TIER-2 BATTERY ENERGY STORAGE SYSTEM SPECIAL USE Permit for a period exceeding ninety (90) days.

g. The Applicant, its successors in interest, and all parties to the decommissioning and site reclamation plan has failed to maintain financial assurance in the form and amount required by the SPECIAL USE Permit or compromised the COUNTY's interest in the decommissioning and site reclamation plan.

h. The COUNTY discovers any material misstatement of fact of misleading omission of fact made by the Applicant in the course of the SPECIAL USE Permit Zoning Case.

i. The Applicant has either failed to receive a copy of the certification of design compliance required by paragraph 6.1.8 D. or failed to submit it to the COUNTY within 12 consecutive months of receiving a Zoning Use Permit regardless of the efforts of the Applicant to obtain such certification.

(6) The Zoning Administrator may, but is not required to, deem the TIER-2 BATTERY ENERGY STORAGE SYSTEM abandoned, or the standards set forth in Section 6.1.8 O.(5) met, with respect to some, but not all, of the TIER-2 BATTERY ENERGY STORAGE SYSTEM. In that event, the Zoning Administrator may draw upon the financial assurance to perform the reclamation work as to that portion of the TIER-2 BATTERY ENERGY STORAGE SYSTEM only. Upon completion of that reclamation work, the salvage value and reclamation costs shall be recalculated as to the remaining TIER-2 BATTERY ENERGY STORAGE SYSTEM.

(7) The decommissioning and site reclamation plan shall be included as a condition of approval by the Board and the signed and executed irrevocable letter of credit and evidence of the escrow account must be submitted to the Zoning Administrator prior to any Zoning Use Permit approval.

P. Complaint Hotline

(1) Prior to the commencement of construction on the TIER-2 BATTERY ENERGY STORAGE SYSTEM and during the entire term of the

COUNTY Board SPECIAL USE Permit and any extension, the Applicant and Owner shall establish a telephone number hotline for the general public to call with any complaints or questions.

(2) The telephone number hotline shall be publicized and posted at the operations and maintenance center and the construction marshalling yard.

(3) The telephone number hotline shall be manned during usual business hours and shall be an answering recording service during other hours.

(4) Each complaint call to the telephone number hotline shall be logged and identify the name and address of the caller and the reason for the call.

(5) All calls shall be recorded, and the recordings shall be saved for transcription for a minimum of two years.

(6) A copy of the telephone number hotline log shall be provided to the Zoning Administrator on a monthly basis.

(7) The Applicant and Owner shall take necessary actions to resolve all legitimate complaints.

Q. Standard Conditions for Expiration of TIER-2 BATTERY ENERGY STORAGE SYSTEM SPECIAL USE Permit

A TIER-2 BATTERY ENERGY STORAGE SYSTEM SPECIAL USE Permit designation shall expire in 10 years if no Zoning Use Permit is granted.

R. Application Requirements

(1) In addition to all other information required on the SPECIAL USE Permit application and required by Section 9.1.11A.2., the application shall contain or be accompanied by the following information:

a. A TIER-2 BATTERY ENERGY STORAGE SYSTEM Project Summary, including, to the extent available:

(a) A general description of the project, the maximum number and type of battery devices, the expected lifetime of the battery devices, and the potential equipment manufacturer(s).

(b) The specific proposed location of the TIER-2 BATTERY ENERGY STORAGE SYSTEM including all tax parcels on which the BATTERY ENERGY STORAGE SYSTEM will be constructed.

(c) A description of the Applicant, Owner and Operator, including their respective business structures.

b. The name(s), address(es), and phone number(s) of the Applicant(s), Owner and Operator, and all property owner(s) for the TIER-2 BATTERY ENERGY STORAGE SYSTEM SPECIAL USE Permit.

c. A site plan for the TIER-2 BATTERY ENERGY STORAGE SYSTEM indicating the following:

(a) The approximate planned location of all TIER-2 BATTERY ENERGY STORAGE SYSTEMS, property lines (including identification of adjoining properties), required separations, public access roads and turnout locations, access driveways, battery devices, electrical inverter(s), electrical transformer(s), electrical cabling, ancillary equipment, screening and fencing, third party transmission lines, maintenance and management facilities, and layout of all structures within the geographical boundaries of any applicable setback.

(b) The site plan shall clearly indicate the area of the proposed TIER-2 BATTERY ENERGY STORAGE SYSTEM SPECIAL USE Permit.

(c) The location of all below-ground wiring.

(d) The location, height, and appearance of all above-ground wiring and wiring structures.

(e) The separation of all TIER-2 BATTERY ENERGY STORAGE SYSTEM structures from adjacent DWELLINGS and/or PRINCIPAL BUILDINGS or uses shall be dimensioned on the approved site plan and that dimension shall establish the effective minimum separation that shall be required for any Zoning Use Permit. Greater separation and somewhat different locations may be provided in the approved site plan for the Zoning Use Permit provided that the greater separation does not increase the noise impacts that were approved in the TIER-2 BATTERY ENERGY STORAGE SYSTEM SPECIAL USE Permit.

d. An electrical diagram detailing the TIER-2 BATTERY ENERGY STORAGE SYSTEM layout, associated components, and electrical interconnection methods, with all National Electrical Code compliant disconnects and overcurrent devices. Source: Johnson County, IA

e. All other required studies, reports, certifications, and approvals demonstrating compliance with the provisions of this Ordinance.

(2) The Applicant shall notify the COUNTY of any changes to the information provided above that occurs while the SPECIAL USE Permit application is pending.

**6. Add new paragraph 9.3.1 K. as follows:**

K. TIER-1 BATTERY ENERGY STORAGE SYSTEM……no fee

TIER-2 BATTERY ENERGY STORAGE SYSTEM……$1800 per megawatt

**7. Add new subparagraph 9.3.3 B.(9) as follows:**

(9) TIER-1 BATTERY ENERGY STORAGE SYSTEM……no fee

TIER-2 BATTERY ENERGY STORAGE SYSTEM……..……$1,320 per megawatt