MAP-23-0007 (Stella B.E.S.S.)

Requests	Hold a public hearing and make a recommendation to: 1. Rezone approximately 1.7 acres from "CG" (General Commercial) to "PS" (Public / Semi-Public). 2. Consider a Special Use Permit for a *Private Utility* use, to operate a B.E.S.S. site on a 1.7-acre property zoned "PS."
Applicant	Stella Energy Solutions, LLC.
Owner	MLH Land Holdings, LLC.
City Council	Public Hearing & First Reading – *March 26, 2024; Second Reading – April 9, 2024*
Location	Generally located along the east side of Caroline Street and south of Farm to Market Road 646.
Citizen Response	4 – Notices Mailed to Property Owners within 200 feet 0 – Communications of Support Received 0 – Communications of Opposition Received
Attachments	1. Zoning Map 2. Aerial Map 3. Proposed Site Exhibits for B.E.S.S. Facility 4. Proposed Site Illustrations 5. Applicant Letter

The Commission should consider the following findings in its deliberation, which shall be utilized to substantiate its decision. To determine the extent to which the proposed zonings would be compatible with surrounding properties, the surrounding land uses and the performance impacts should be considered.

Background

August 10, 1999 – The property was initially zoned as "SDR" (Suburban Development District - Residential).
August 30, 2005 – The property was zoned "CO-PUD" (Office Commercial within a Planned Unit Development Overlay District) as part of the City's Zoning Map and Ordinance revisions of 2005.
April 11, 2006 – The property was zoned from "CO-PUD" to "CG."
August 31, 2023 – The applicant held a neighborhood meeting at the Johnnie Arolfo Civic Center in League City. The sign-in sheet indicates no residents or owners attended the meeting.
September 11, 2023 – The applicant submitted a Rezoning and SUP request to the Planning Department.
January 31, 2024 – A public hearing notice was published in the newspaper, a sign was posted on the property and notices were mailed to the surrounding property owners.
February 19, 2024 - Planning & Zoning Commission is scheduled to conduct a public hearing and make a recommendation to City Council.
March 26, 2024 – City Council is scheduled to conduct a public hearing and consider the request on first reading.
April 9, 2024 – If approved on first reading, City Council will consider the second reading of the request.

Proposal

The request is being made to rezone approximately 1.7 acres to "PS" (Public / Semi-Public) with a Special Use Permit (SUP) for the purpose to operate a 10-Megawatt (MW) B.E.S.S. (**B**attery **E**nergy **S**torage **S**ystem) facility on the property. According to the Electric Reliability

Council of Texas (ERCOT), one (1) megawatt of electricity can power approximately 200 Texas homes during periods of peak demand.

The requested area is part of a larger 5.568-acre tract of land that was purchased for the project. The remaining 3.87 acres that is closer to Caroline Street, is to remain "CG" with the intent to be developed for commercial purposes.

In general, a B.E.S.S. system is defined as one or more devices (i.e. group of batteries), assembled together capable of storing energy in order to supply electrical energy at a future date. B.E.S.S. facilities will receive electricity from the electrical grid when there is excess electrical power, store it in a series of batteries and then return it to the grid when additional electricity is needed during extreme weather conditions. This can help stabilize the grid.

The use is classified in the Unified Development Code (UDC) as a *Private Utility* use and is only permitted by-right in the "IG" (General Industrial) zoning district and requires an SUP in the "IL" (Limited Industrial), "PS" (Public/Semi-Public), and "OS" (Open Space) zoning districts. However, it should be noted that League City does not have any properties zoned "IG" at this time.

Neighborhood Meeting

A neighborhood meeting was held by the Applicant on August 31, 2023, at the Johnnie Arolfo Civic Center in League City. The Applicant indicates that none of the surrounding property owners attended the meeting.

Site and Surrounding Area

The property is currently undeveloped with natural scrub grass and pockets of trees. There are no protected trees on the property.

Direction	Surrounding Zoning	Surrounding Land Use
North	ROW and "CG-PUD"	FM 646 and Gas Station and Undeveloped Property
South	City Limits / ETJ	City Limits of League City
East	"CG"	Undeveloped Property
West	ROW and "CG"	Caroline Street and Undeveloped Property

Conformity with Comprehensive Plan

The proposed zoning conforms to the 2035 Comprehensive Plan's Future Land Use Map, which identifies the area as "Enhanced Auto Dominant Commercial". Additionally, Section 10 of the City's Comprehensive Plan, entitled Infrastructure states, "Infrastructure systems serve as the physical backbone of a community and provide households and businesses with the basic requirements to function on a daily basis."

In keeping with the Comprehensive Plan, utility facilities are intended to be setback away from roadways to maximize the value of the commercial frontage and minimize their impacts on the surrounding environment, currently and in the future. The proposed battery site would be approximately 330 feet south of Farm to Market Road 646 and approximately 700 feet east of Caroline Street.

Zoning Analysis

Background

Over the last two years, City staff has met with at least eight different companies interested in developing B.E.S.S. sites within League City and its ETJ. All the facilities we have spoken with, to date, have all proposed a lithium-ion battery system within a series of storage "modules" which are located in a grid pattern and interlinked into one system. The proposed locations of these facilities have been near public utility substations. Currently, League City has only one, 10 MW facility, located on Floyd Road on the west side of League City.

Zoning
The "PS" zoning district is intended to provide for a range of public and institutional development, including governmental facilities, park and recreation facilities, hospitals, educational facilities, cultural and institutional facilities, and other similar and supporting uses. Additionally, many of the public electrical substations around the city are located on properties zoned "PS."

Nonconformances
Based on the request, approval of the proposed zoning district would not create any nonconformances on the subject property or immediately surrounding properties/uses.

Life Safety
While lithium-ion batteries have a benefit of having a high energy density. There is risk associated with the technology due to the potential for fire and the concerns for releasing toxic materials into the air and/or the ground.

The Fire Marshal's Office has been an active participant in staff's discussions with B.E.S.S. proposals. The Fire Marshal's Office has discussed key requirements such as Chapter 12 of the 2021 IFC (International Fire Code) and the NFPA (National Fire Protection Association) 855, water runoff retention, air monitoring, water fire flow analysis, 24/7 monitoring with the ability to detect abnormalities, necessary equipment, annual training, and an Emergency Action Plan (EAP) with annually updated contacts. If approved, this site will be required to meet those standards and be confirmed during the permitting phase. Staff has recommended that these requirements be codified in the conditions adopted with this SUP.

Environmental Impacts
The primary risk of environmental impacts is during an abnormal or emergency event that will be addressed with the Fire Department and Fire Marshal's Office.

Nuisances - Visual & Noise Impacts
In researching battery storage facilities, the most common facilities containerize the lithium-ion batteries, which are then assembled in a modular grid pattern. The containers are elevated off the ground to avoid any flooding concerns as well as to minimize the impervious coverage of the site. Any visual impacts can be resolved by screening the facility from view.

Research has indicated that B.E.S.S. sites have three main sources of noise, which are 1) the result of inverters, 2) the result of electrical transformers and 3) the result of ventilation and cooling of the batteries. The Applicant indicates, at peak usage, sound levels would be around 85 decibels. Recently, staff visited the existing B.E.S.S. site with a sound meter and observed the ambient noise level was between 50 and 54 decibels. Additionally, the only discernable sound emanating from the facility was similar to an air conditioner unit for a house. When combined with visual screening, the visual and auditory impacts will be minimized.

As a result, the Stella site proposes to provide a 20-foot-wide landscaped buffer yard with 8 trees for every 100 linear feet, a contiguous hedge of shrubs and a masonry screening wall on the north, east and west sides at least as high as the battery module containers. A buffer yard is not needed along the south side since the site backs up to the high-power transmission corridor, located outside of the city limits.

Decommissioning
At the end of the life of the storage facility, the site should be decommissioned where the operations are powered down, disassembled, removed from the site, and transported off site for appropriate disposal, reuse, or recycling of various components. The site should then also be remediated and restored to a safe condition. Staff is recommending several conditions where

the Owner will be required provide a Decommissioning Plan, return the site to its previous pre-developed condition, and provide the insurance / bonding for the facility.

Surety: Insurance & Decommissioning Bond
While there are currently no specific requirements for B.E.S.S. facilities in the League City Code of Ordinance. The closest comparable regulation are the Oil & Gas regulations based on these industries being operated independently and regulated at the state and federal levels. Below is a comparison table between the proposed B.E.S.S. site and the insurance requirements for oil and gas sites in League City.

	Proposed B.E.S.S.	**O&G Regs**	**Instance**
Commercial General Liability	1,000,000	Min. $1,000,000	Per Occurrence
Excess or Umbrella Policy	$5,000,000	Min $10,000,000	
Environmental Pollution Policy	$2,000,000	Min. $5,000,000	Per Loss
Control of Well Coverage	N/A	$10,000,000 / $500,000	Per occurrence / Sublimit endorsement
Worker's Comp	None Identified	Texas Statutory Limits	
Employer's Liability	None Identified	$500,000	Per Accident
Automobile Liability	$1,000,000	$1,000,000	Per Occurrence (combined single limit)
Professional Liability	$1,000,000	N/A	Each Employee
	$1,000,000	N/A	Aggregate
	$10,000	N/A	Per Claim

Like insurance, a bond will be required to cover the costs of decommissioning the site, should the operator no longer be able to properly decommission the site.

Currently, no known B.E.S.S. facilities have reached the end of their life, if not repowered, a site is estimated to have a life span of 20 to 25 years. It was determined that the best cost estimate should be based on today's dollars with the consideration of inflation. The inflation rate is based on the Consumer Price Index by the United States Bureau of Labor's Statistics. The average inflation rate of past 10 years is approximately 2.73%. Staff is recommending a Decommissioning Bond with a 2.73% annual escalator be provided as a condition of approval.

Taxable Value
In Texas, stand-alone B.E.S.S. sites are subject to property tax. The B.E.S.S. sites in Galveston County range between 10 and 15 MW of battery storage have taxable values between 2.59 and 3.6 million dollars. For larger 100 to 260 MW sites in Texas, the value ranges between 48 and 84 million dollars in taxable value. Overall, the average taxable value of existing B.E.S.S. sites in Texas currently ranges between approximately $200,000 and $300,000 per MW of battery storage power. Based on this information, it is estimated the 1.7-acre site would have a total taxable value between 2.0 and 4.5 million dollars, or between approximately 1.17 million and 2.64 million dollars per acre. This does not include the value added when the remaining 3.87 acres is developed for commercial purposes.

In comparison, the 2023 tax valuation of a random sample of 35 commercial properties (ranging from 1.97 to 26.98 acres) across League City with uses such as business parks, restaurants, grocery stores, hotels, and hospitals, is approximately 1.1 million dollars per acre.

Access and Traffic Impacts

Direct access to the properties is provided from Caroline Street. In conjunction with the development of the B.E.S.S. facility, a curbed concrete roadway from Caroline Street to the perimeter of the facility would be constructed, also providing access / cross access for the future commercial development on the site.

Caroline Street

	Existing Conditions	**Proposed Conditions – 2018 Master Mobility Plan**
Roadway Type	Local	Local
ROW Width	60 Feet	60 Feet
Pavement Width and Type	2-lanes, undivided, 12-foot-wide concrete travel lanes with drainage ditches on either side.	2-lanes, undivided, 12-foot-wide concrete travel lanes with concrete curb and gutter.

The site will be monitored and operated remotely. A technician is dispatched on-site during normal maintenance for no more than 8 hours, once a month. As a result, traffic to the B.E.S.S. site will be non-existent. The traffic impact of the commercial side of the site will be addressed during the development phase for the commercial development.

Utilities

Water

The nearest available water is accessible through a 12-inch water line crossing to the south side of Farm to Market Road 646, approximately 185 feet east of the intersection of Farm to Market Road 646 and South Shore Boulevard / Caroline St. The project is required to extend water to the facility for fire protection purposes.

Sewer

A 12-inch sanitary sewer line also crosses Farm to Market Road 646 approximately 50 feet further to the east. While sanitary sewer services will not be required for the B.E.S.S. facility given the nature of the facility, sanitary sewer will be required to be extended in the future as the commercial portion of the property is developed.

Electrical Utility Services

The Applicant is requesting a variance to allow wooden poles with pole mounted transformers along the southern boundary of the property, since the property backs up to a high-power electrical transmission corridor. The applicant adds that pole mounted transformers are requested due to supply chain issues which would significantly delay the project. However, concrete poles shall be provided for any new poles for and/or as a result of this project along any rights-of-way.

Floodplain

The property is located within the "AE" flood zone, a Special Flood Hazard Area (SFHA). The site will be required to conform to the City's floodplain requirements (Chapter 50 of the League City Code of Ordinances) during the permitting phase, should the request be approved.

Staff Findings

Based upon the information provided, staff has determined:

- The proposed location of the rezone / SUP request is setback away from Caroline Street and Farm to Market Road 646 to support the nearby residential and commercial development.
- The proposed rezoning is consistent with League City Comprehensive Plan's Future Land Use Map.
- The proposed SUP could provide additional support to the local electrical grid.
- The exhibits for the facility propose to screen the site from the adjacent properties to the west, north and east with a wall and landscaping.
- There will be no discernable effect on traffic.

- The estimated taxable value of the proposed facility, on a per acre basis, is comparable to that of commercial development across the city.

Recommendation

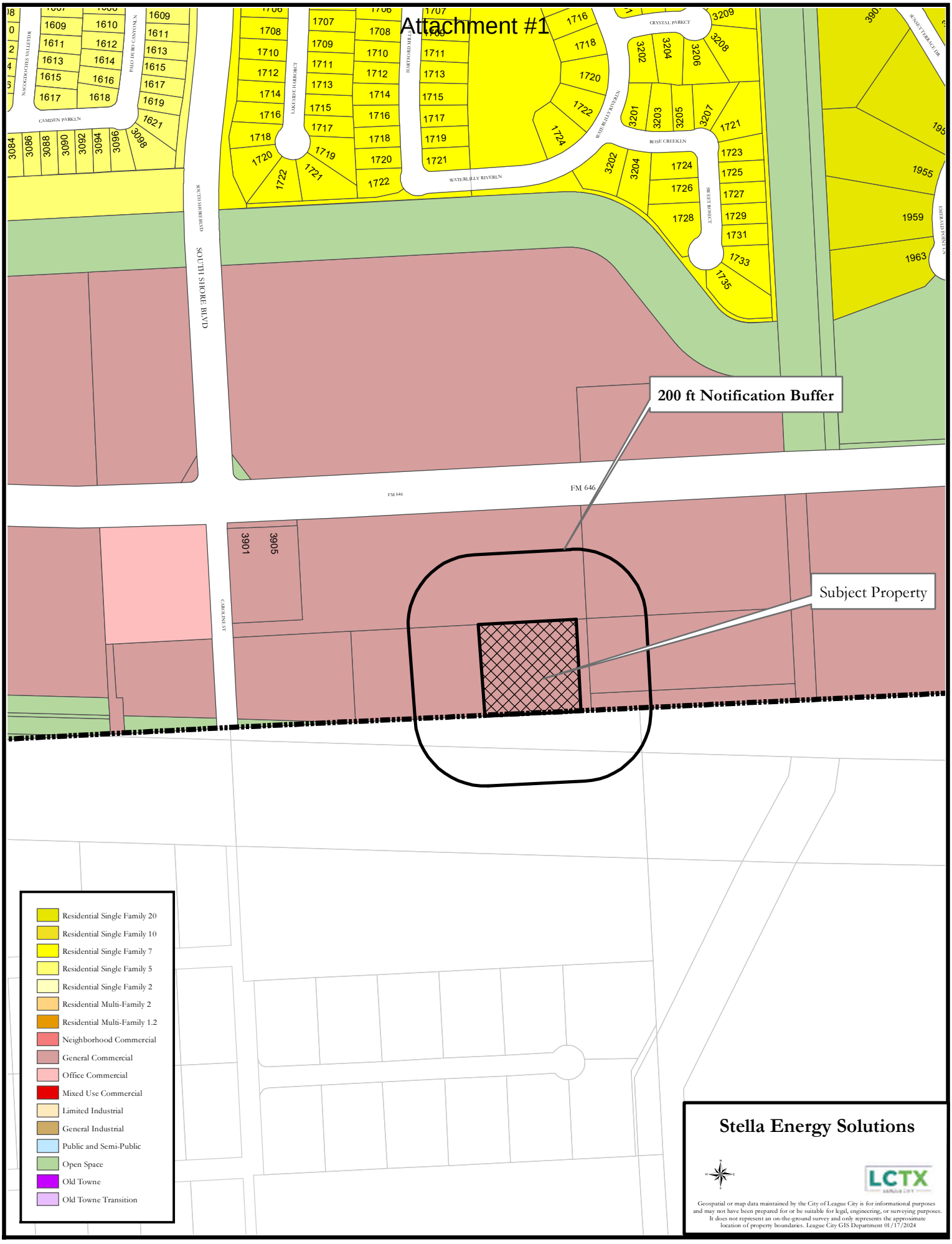
Based on the criteria listed above, staff recommends rezoning the approximate 1.7 acres and the SUP subject the following conditions:

1. An SUP associated with a B.E.S.S. development should expire after a period of 24 months beginning upon the date of adoption of the SUP ordinance by City Council if no formal application is submitted to the City of the development of the site.
2. The only use permitted by this SUP is the *Private Utilities* use, specifically a B.E.S.S. (Battery Energy Storage System) facility operated by Stella Energy Solutions, LLC.
3. The site shall be developed in accordance with the League City Code of Ordinances:
    a. The site layout shall be substantially similar to what is shown in Attachments #3 and #4.
    b. To buffer the site from the surrounding area, the site shall provide the following screening:
        i. A screening masonry wall located along the perimeter of the site that is as high as or higher than the height of the battery modules so as to be fully screened from view.
        ii. A 20-foot-wide Landscaped Buffer Yard shall be provided along the east, north, and west sides along the outside perimeter wall consisting of:
            1. Eight (8) trees provided for each 100 linear feet with half of them being oak trees and half being eastern white pine trees.
            2. A continuous hedge of shrubs not less than 3 or more than 4 feet in height.
    c. The roadway leading from the public roadway to the entrance of the site, shall be a concrete roadway designed and constructed to League City standards.
4. The site shall comply with all applicable fire codes and actions, but not limited, to the following:
    a. 2021 IFC, Chapter 12 and the listed NFPA references with Chapter 12
    b. NFPA 855: Standard for the Installation of Stationary Energy Storage Systems
    c. An Environmental site plan shall be provided to include firefighting water runoff retention.
    d. There shall be some form of air monitoring system for vapor detection.
    e. A Water fire flow analysis shall be provided at the permitting phase to ensure the existing water infrastructure can support the firefighting demands.
    f. There shall be 24/7 site monitoring with the ability to detect and prevent thermal runaway.
    g. A technician shall respond within 1 hour of being notified by the Fire Department in the event of an emergency incident at the site.
    h. The company shall provide the Fire Department with the equipment needed to monitor and test the air and the water for any hazards at these sites during emergencies.
    i. Provide the Fire Department with a Plume model on a satellite image of the area they plan on doing the installation.
    j. Provide annual training to the fire department for hazards and responses.
    k. Provide an emergency procedure guide and emergency contacts that shall be updated annually or when significant changes are made whichever is earlier.
5. Prior to the City's authorization to operate the facility, the Applicant shall:
    a. Provide and receive approval from The Office of Emergency Management, a finalized Emergency Action Plan (EAP) for the site. Any future updates to the EAP shall be provided within 60 days of the update.
    b. Provide a Decommissioning Plan of the facility to the Planning Department. Any additional updates shall be provided within 60 days of the update.
    c. Provide a Decommissioning Bond, with the Applicant as the Principal and the instrument shall run to the City, as oblige, and shall become effective on or before the

beginning of operations at the site and shall remain in force until the property is restored. The amount shall be based on a Professional Engineer's signed and sealed estimate of today's costs to decommission the site, at build out, with an adjusted inflation rate of 2.73% each year for the next 20 years.

6. Upon the ceasing of operations or the end of life of the facility, whichever comes first, the site shall be decommissioned based on the following criteria:
   a. All above and below ground features (i.e. containers, underground utilities, foundations, gravel, etc.) shall be removed from the site with the exception of the drainage improvements and access road with the site returned to its natural pre-construction ground state.
   b. All material removed from the site shall be disposed, reused, and recycled in accordance with state and federal requirements.
   c. Any adverse substances that may have entered the ground during the course of the operations shall be removed from the property and properly disposed of.
   d. The Operator of the facility shall maintain, at a minimum, the amount of insurance that is currently provided.
7. Shall allow a variance to permit on-site overhead lines with electrical poles and pole mounted transformers to be provided along the southern property line, adjacent to the high-power line corridor. All other poles installed along the rights-of-way shall be concrete.

For additional information, you may contact Mark Linenschmidt, Planning Manager at 281-554-1078 or at mark.linenschmidt@leaguecitytx.gov.


Attachment #1
200 ft Notification Buffer
Subject Property
FM 646
SOUTH SHORE BLVD
CAROLINE ST
CAMDEN PARK LN
CRYSTAL PARK CT
ROSE CREEK LN
WATERLILLY RIVER LN
LAKESIDE HARBOR CT
Residential Single Family 20
Residential Single Family 10
Residential Single Family 7
Residential Single Family 5
Residential Single Family 2
Residential Multi-Family 2
Residential Multi-Family 1.2
Neighborhood Commercial
General Commercial
Office Commercial
Mixed Use Commercial
Limited Industrial
General Industrial
Public and Semi-Public
Open Space
Old Towne
Old Towne Transition
Stella Energy Solutions
LCTX
Geospatial or map data maintained by the City of League City is for informational purposes and may not have been prepared for or be suitable for legal, engineering, or surveying purposes. It does not represent an on-the-ground survey and only represents the approximate location of property boundaries. League City GIS Department 01/17/2024

Attachment #2
200 ft Notification Buffer
FM 646
Subject Property
SCOTTS MOOR BLVD
Stella Energy Solutions
LCTX
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Attachment #3

N

50 25 0 50

SCALE: 1"= 50'

FLOODPLAIN NOTES

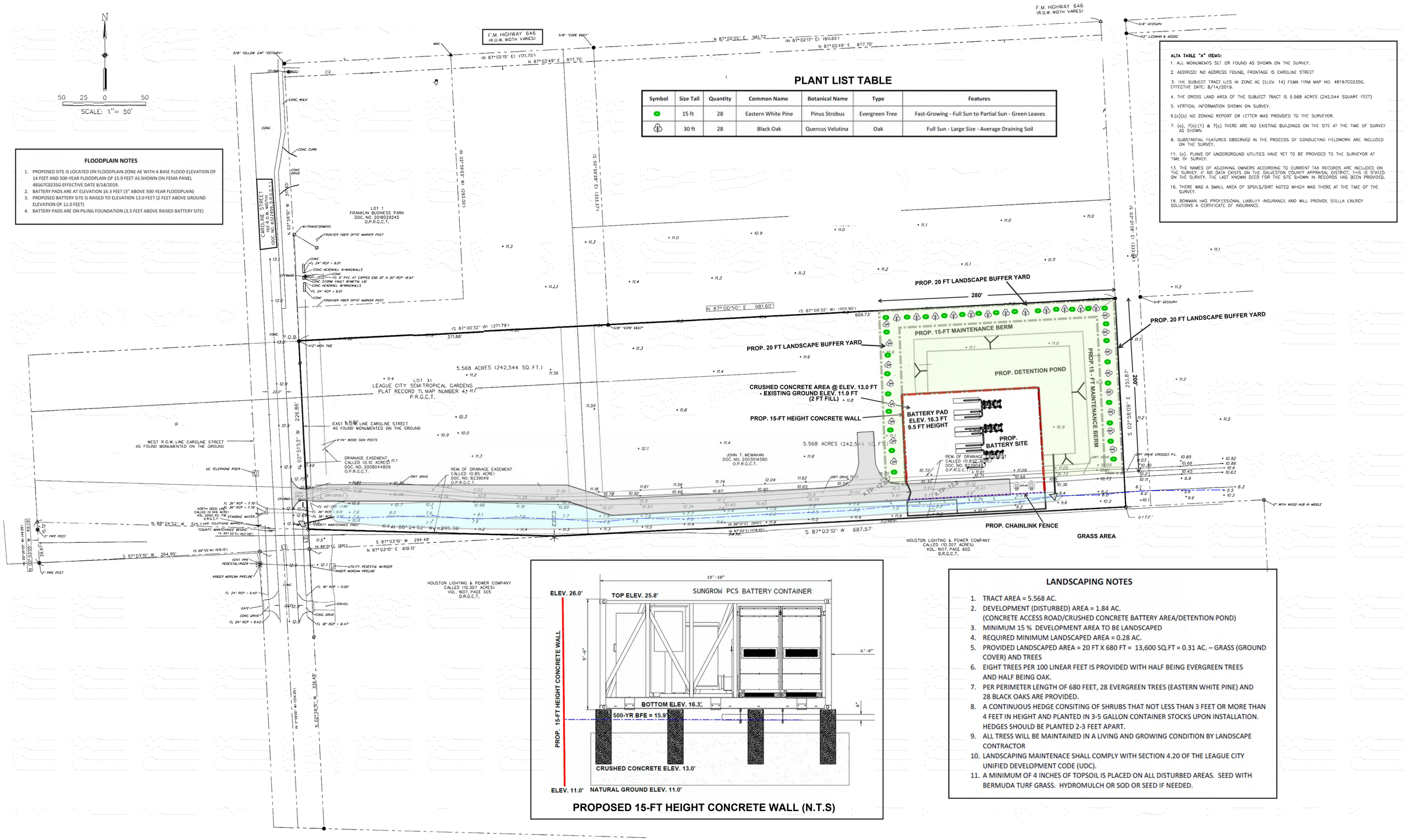
1. PROPOSED SITE IS LOCATED ON FLOODPLAIN ZONE AE WITH A BASE FLOOD ELEVATION OF 14 FEET AND 500-YEAR FLOODPLAIN OF 15.9 FEET AS SHOWN ON FEMA PANEL 48167C0235G EFFECTIVE DATE 8/14/2019.
2. BATTERY PADS ARE AT ELEVATION 16.3 FEET (3" ABOVE 500-YEAR FLOODPLAIN)
3. PROPOSED BATTERY SITE IS RAISED TO ELEVATION 13.0 FEET (2 FEET ABOVE GROUND ELEVATION OF 11.0 FEET)
4. BATTERY PADS ARE ON PILING FOUNDATION (3.3 FEET ABOVE RAISED BATTERY SITE)

PLANT LIST TABLE

Symbol	Size Tall	Quantity	Common Name	Botanical Name	Type	Features
	15 ft	28	Eastern White Pine	Pinus Strobus	Evergreen Tree	Fast-Growing - Full Sun to Partial Sun - Green Leaves
	30 ft	28	Black Oak	Quercus Velutina	Oak	Full Sun - Large Size - Average Draining Soil

ALTA TABLE "A" ITEMS:

1. ALL MONUMENTS SET OR FOUND AS SHOWN ON THE SURVEY.
2. ADDRESS: NO ADDRESS FOUND, FRONTAGE IS CAROLINE STREET
3. THE SUBJECT TRACT LIES IN ZONE AE (ELEV. 14) FEMA FIRM MAP NO. 48167C0235G, EFFECTIVE DATE: 8/14/2019.
4. THE GROSS LAND AREA OF THE SUBJECT TRACT IS 5.568 ACRES (242,544 SQUARE FEET)
5. VERTICAL INFORMATION SHOWN ON SURVEY.
6.(a)(b) NO ZONING REPORT OR LETTER WAS PROVIDED TO THE SURVEYOR.
7. (a), 7(b).(1) & 7(c) THERE ARE NO EXISTING BUILDINGS ON THE SITE AT THE TIME OF SURVEY AS SHOWN.
8. SUBSTANTIAL FEATURES OBSERVED IN THE PROCESS OF CONDUCTING FIELDWORK ARE INCLUDED ON THE SURVEY.
11. (a). PLANS OF UNDERGROUND UTILITIES HAVE YET TO BE PROVIDED TO THE SURVEYOR AT TIME OF SURVEY.
13. THE NAMES OF ADJOINING OWNERS ACCORDING TO CURRENT TAX RECORDS ARE INCLUDED ON THE SURVEY. IF NO DATA EXISTS ON THE GALVESTON COUNTY APPRAISAL DISTRICT, THIS IS STATED ON THE SURVEY. THE LAST KNOWN DEED FOR THE SITE SHOWN IN RECORDS HAS BEEN PROVIDED.
16. THERE WAS A SMALL AREA OF SPOILS/DIRT NOTED WHICH WAS THERE AT THE TIME OF THE SURVEY.
19. BOWMAN HAS PROFESSIONAL LIABILITY INSURANCE AND WILL PROVIDE STELLA ENERGY SOLUTIONS A CERTIFICATE OF INSURANCE.



PROPOSED 15-FT HEIGHT CONCRETE WALL (N.T.S)

LANDSCAPING NOTES

1. TRACT AREA = 5.568 AC.
2. DEVELOPMENT (DISTURBED) AREA = 1.84 AC. (CONCRETE ACCESS ROAD/CRUSHED CONCRETE BATTERY AREA/DETENTION POND)
3. MINIMUM 15 % DEVELOPMENT AREA TO BE LANDSCAPED
4. REQUIRED MINIMUM LANDSCAPED AREA = 0.28 AC.
5. PROVIDED LANDSCAPED AREA = 20 FT X 680 FT = 13,600 SQ.FT = 0.31 AC. – GRASS (GROUND COVER) AND TREES
6. EIGHT TREES PER 100 LINEAR FEET IS PROVIDED WITH HALF BEING EVERGREEN TREES AND HALF BEING OAK.
7. PER PERIMETER LENGTH OF 680 FEET, 28 EVERGREEN TREES (EASTERN WHITE PINE) AND 28 BLACK OAKS ARE PROVIDED.
8. A CONTINUOUS HEDGE CONSITING OF SHRUBS THAT NOT LESS THAN 3 FEET OR MORE THAN 4 FEET IN HEIGHT AND PLANTED IN 3-5 GALLON CONTAINER STOCKS UPON INSTALLATION. HEDGES SHOULD BE PLANTED 2-3 FEET APART.
9. ALL TRESS WILL BE MAINTAINED IN A LIVING AND GROWING CONDITION BY LANDSCAPE CONTRACTOR
10. LANDSCAPING MAINTENACE SHALL COMPLY WITH SECTION 4.20 OF THE LEAGUE CITY UNIFIED DEVELOPMENT CODE (UDC).
11. A MINIMUM OF 4 INCHES OF TOPSOIL IS PLACED ON ALL DISTURBED AREAS. SEED WITH BERMUDA TURF GRASS. HYDROMULCH OR SOD OR SEED IF NEEDED.

NO.	DATE	DESCRIPTION	APPROVED
1	02/13/24	Issued for Construction	

REVISIONS

DESIGNED DN
DRAWN SSB
CHECKED
DATE

AL&B ENGINEERING SERVICES, LLC
9119 Highway 6, Suite 230 #233
Missouri City, Texas 77459
Phone : (979)264 –3510
Firm Registration Number: F-13495

STATE OF TEXAS DONG H. NGUYEN 93048 REGISTERED PROFESSIONAL ENGINEER

The seal appearing on this document was authorized by DONG H. NGUYEN, P.E. 93048
Date: February 13, 2024

OWNER:
STELLA ENERGY SOLUTIONS, LLC.
9595 SIX PINES DR., SUITE 8210
THE WOODLANDS, TX 77380

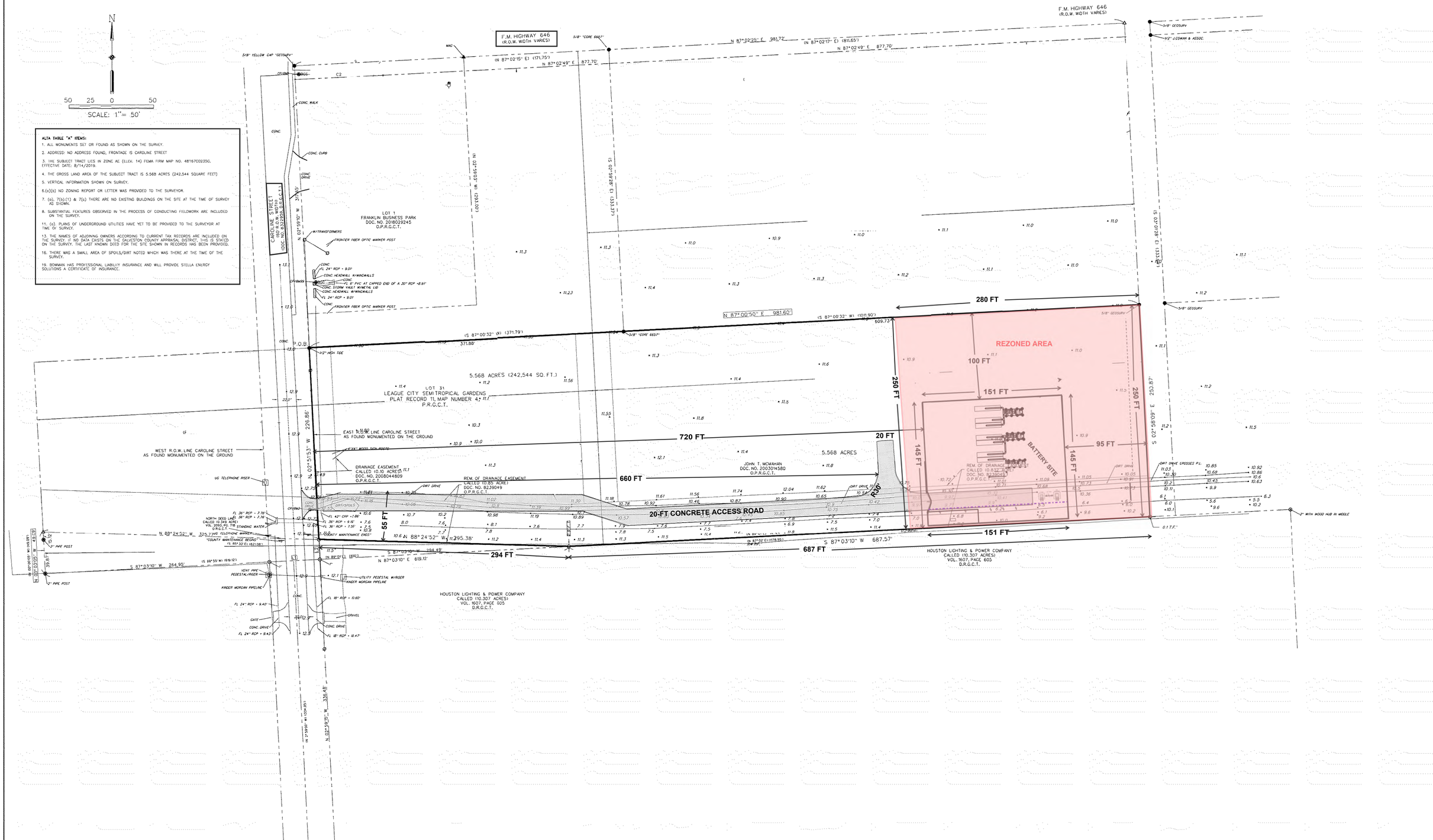
PLAN:
PROFILE:
HORIZONTAL:
VERTICAL:

PROPOSED
HIDDEN LAKES BESS
FM 646 AND CAROLINE STREET
LEAGUE CITY, TX 77573

LANDSCAPE PLAN

C-6

Attachment #3



NO.	DATE	DESCRIPTION	APPROVED
1	02/13/24	Issued for Construction	

REVISIONS

DESIGNED DN
DRAWN SSB
CHECKED
DATE

AL&B ENGINEERING SERVICES, LLC
9119 Highway 6, Suite 230 #233
Missouri City, Texas 77459
Phone : (979)264 -3510
Firm Registration Number: F-13495

STATE OF TEXAS
DONG H. NGUYEN
93048
REGISTERED PROFESSIONAL ENGINEER

The seal appearing on this document was authorized by DONG H. NGUYEN P.E. 93048

Date: February 13, 2024

OWNER:
STELLA ENERGY SOLUTIONS, LLC.
9595 SIX PINES DR., SUITE 8210
THE WOODLANDS, TX 77380

PLAN:
PROFILE:
HORIZONTAL:
VERTICAL:

PROPOSED
HIDDEN LAKES BESS
FM 646 AND CAROLINE STREET
LEAGUE CITY, TX 77573

DIMENSIONAL EXHIBIT

C-7

Attachment #3

NOTES

1. POLE LABELED XX WAS NOT ACCOUNTED FOR IN TNMP DRAWING RECEIVED. PLEASE ADVISE IF POLE IS REQUIRED.
2. WL12 SHOWS 3-100 kVA TRANSFORMERS, THIS SITE REQUIRES 500 kVA OR 3-167 kVA TRANSFORMERS.
3. FOR INFORMATION ONLY, NOT FOR CONSTRUCTION.

ISSUED
JANUARY 18, 2024
FOR PERMITTING

0 16' 32' 64'

© 2024 Microsoft Corporation © 2023 Maxar ©CNES (2023) Distribution Airbus DS

REVISIONS

REV	DATE	DESCRIPTION	DWN	CHK	APP
A	13NOV2023	ISSUED FOR PERMITTING	AQG	DR	JCD

REFERENCE DRAWINGS/DOCUMENTS

DOCUMENT NO.	TITLE	DOCUMENT NO.	TITLE

THIS DRAWING AND THE INFORMATION CONTAINED HEREIN ARE THE EXCLUSIVE PROPERTY OF SABER POWER SERVICES, LLC. THE DRAWING OR ITS INFORMATION SHALL NOT BE USED, DUPLICATED, OR DISSEMINATED WITHOUT THE EXPRESS WRITTEN CONSENT OF SABER POWER SERVICES, LLC.

AUTHORIZED BY JACOB C DURBIN, P.E. #135007
THIS DAY 18JAN2024 CURRENT REVISION ONLY

STATE OF TEXAS
JACOB C DURBIN
135007
LICENSED
PROFESSIONAL ENGINEER

Saber Power
9841 SABER POWER LN.
ROSHARON TX 77583
www.saberpower.com
Texas License #15810

Stella Energy Solutions LLC

STELLA ENERGY
HIDDEN LAKES 9.9MW BESS
EXPANDED UTILITY POLE VIEW

League City, TX

DRAWN	CHECKED	APPROVED	DRAWING NUMBER	SCALE:1/32" = 1'	REV
AQG	DR	JCD	2308CG282-E-8005	SHEET: 1 OF 1	A
DATE 13NOV2023	DATE 13NOV2023	DATE 13NOV2023			

2308CG282-E-8005-REV-A-SHEET-1 OF 1 (ID 130555) LAST SAVED BY: aidan.goembel DATE: 1/18/2024

Attachment #4

Attachment #4

Attachment #5

City Planning Letter

Attn: City of League City – Planning Department

Re: Proposed Battery Energy Storage System - FM646 & Caroline St.

Stella Energy Solutions LLC is proposing a development of a Battery Energy Storage System (BESS) at a specific property located South of FM646 and East of Caroline St (see Attachment A). In order to support this development, we have consulted with City Engineering, Planning and Economic Development and are submitting for both a Special Use Permit and Rezoning of the property from "CG" to "PS", as suggested by staff. Having completed many of these projects in Texas, including one already located in League City, we are excited about the opportunity to provide additional reliability infrastructure into your community.

Stella Energy Solutions LLC is a Veteran- Owned Development and Construction company with a long history or providing energy projects connected to the ERCOT managed electric grid. We are a Texas based company, headquartered in The Woodlands, TX and focused on the Texas energy market. As we have all seen over the past decade, especially over the past serval years, the continued growth of the renewable energy market, paired with the commercial and residential growth in Texas, has created challenges to provide reliable and cost effective energy to all customers. BESS projects allow for the excess energy generated by both traditional methods as well as renewable sources to be stored and discharged into the ERCOT market rather than let them go to waste through curtailment. This reserve energy can then be sent into the grid during periods of high demand rather than forcing the grid operators to reduce the electric load in their service areas. Additionally, the BESS projects are able to fulfill reliability requirements, providing frequency response and voltage regulation services when called upon by ERCOT. They are absolutely fundamental for the continued growth and reliability of the grid.

Our team is responsible for the land development, coordination with ERCOT and TNMP, procurement, testing, construction, commissioning and maintenance of these projects. We're invested in this market and keenly interested in working with our partners in the communities where we develop and operate.

It is a pleasure to be working with the City of League City again and I would like to extend my appreciation for your consideration of both the Special Use Permit and the Re-Zoning applications in support of this project. Our full presentation, including reference projects and team experience, is included in our submission and we are available to answer any questions that you might have regarding this proposed project.

All the Best,

BY

Brian Yarbrough

SVP - Development

Contacts for Project

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Stella Energy Solutions LLC
9595 Six Pines Drive Suite 8210
The Woodlands TX 77380
Brian Yarbrough – SVP Development
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832-671-0564

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Curtis Watts
cwatts@bowman.com

Attachment #5

STELLA

ENERGY SOLUTIONS

Simply Better

Clean, Resilient Solutions that Power the Energy Transition

Attachment #5

Introduction

Battery Energy Storage Systems (“BESS”) have emerged as a groundbreaking solution in modern energy management.

- These systems harness cutting-edge battery technologies to store electrical energy efficiently, enabling us to bridge the gap between energy generation and consumption.
- BESS plays a pivotal role in stabilizing power grids, integrating renewable energy sources, and optimizing energy usage, propelling us towards a greener and more sustainable future.

In this short introduction, we will explore the fundamental principles and significance of Battery Energy Storage Systems in revolutionizing the way we approach energy storage and distribution.

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Attachment #5

Introduction

Stella elevates America's electric infrastructure. Stella is a leading utility-scale clean energy platform that builds the energy storage and solar infrastructure that is modernizing electric power generation.

Company Overview

- **Description:** Stella Energy Solutions ("Stella") is an American veteran-owned developer, builder, and owner of utility scale energy storage and solar projects across the United States.
- **Founded:** Q4 2021, based in The Woodlands, Texas

Track Record

Stella's team is lead by experienced energy storage project experts:

2,694
Energy Storage Designed (MWh)

1,254
Commissioned Experience (MW)

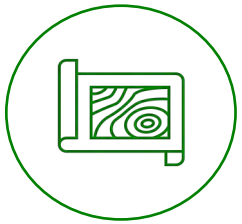
100+
Years of Team Experience

23
U.S. States Experience

Differentiation Built on a History of Energy Storage Leadership

- **Integration Expertise**
- **Commercial Flexibility**
- **Deep Industry Relationships**

Strategies: (1) Develop/Own/Operate, and (2) Build-Transfer

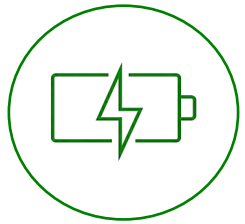


Develop

- Site Control
- Permitting
- Interconnection

Build

- Engineer & Procure Major Equipment
- Construct & install
- Commission site



Operate

- Asset management
- Maintenance
- Grid Reliability

Stella's executes the following strategies:

- **Build-Transfer** agreements, where Stella builds an energy storage site or solar site on behalf of a utility.
- **Asset Ownership** of Stella fully developing a project through the project lifecycle and generating revenue at the site through a PPA, tolling agreement, or via merchant operation over a 10 to 25-year period.

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Noteworthy Team Experience

STELLA ENERGY SOLUTIONS

Stella team members were intimately involved in Development or Build of these milestone projects

15x 9.9MW/11MWh BESS
Largest Traded BESS Fleet
2020-2021
Broad Reach Power

537MW/2414 MWh BESS
World's largest BESS program
2021-2022
Southern California Edison

5x 6MW/21MWh BESS
Time of Day Shifting BESS
2021-2022
Midwest REMC

232MW+90MW/360MWh Solar + BESS
Nevada Solar + BESS
2022
Arevon / Skylar Resources

2x 100MW/110MWh BESS
Former Largest BESS in Texas
2021
Broad Reach Power

690MW+380MW/1520MWh Solar + BESS
World's largest Solar + BESS site
2022-23
Primergy Solar / NV Energy

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Team

Leadership

Alan Grosse | President
18 years experience
- COO & EVP of Sales & Business Development, FlexGen
- Senior Business Development Manager, GE Distributed Power
- Junior Officer Leadership Program, GE
- B.S., US Coast Guard Academy; MBA, Emory University

Staats Battle | SVP Operations
8 years Experience
- Corporate Strategy Associate, FlexGen
- Private Equity Associate, Plexus Capital
- Victory Scholar, Sport Changes Life Foundation
- B.S., North Carolina State University

Gabe Costello | SVP Project Execution
17 years Experience
- Director, Construction Services, Broad Reach Power
- Manager, Construction Services, FlexGen
- Offshore Admin & Logistics Coordinator, Noble Energy
- B.S., Texas Tech University

Jessica Sullivan | SVP Commercial Operations
16 years Experience
- Vice President, Rebu Resources
- Registered Nurse, Various Hospital Networks
- B.S. St. Louis University School of Nursing

Brian Yarborough | SVP Development
18 years Experience
- Director of Project Services, Broad Reach Power
- Director of Supply Chain Mgmt., Excelerate Energy
- B.S., University of Houston

Ted Ruzicka | VP Development Solutions
18 years Experience
- Senior Project Engineer, GE Renewable Energy
- Senior Market Intelligence Leader, GE Distributed Power
- Brigade and Battalion-Level Staff Officer
- B.S., US Military Academy; MBA, Duke University

Brian Hoeffler | VP Technical Services
24 years Experience
- Director, Customer Success, Fractal Energy Management
- Lead Field Software Project Engineer, FlexGen
- Surveyor, Lloyds Register
- Hardware / Controls Technician, Technip

Tracy Hodge | Senior Development Manager
20 years Experience
- Operations Project Manager, Benefits Science
- Supply Chain Manager, Excelerate Energy
- Principal, Hodges Hometown Grocery
- B.S., University of Texas, Austin

Brendan McKinnon | General Counsel & Sr. Dev Manager
18 years Experience
- Assistant District Attorney, Middlesex District Attorney's Office
- Massachusetts Office of the Attorney General
- USCG Force Protection Officer, Operation Iraqi Freedom
- B.S., US Coast Guard Academy; MPS, George Washington University; J.D., Boston College Law School

Ed Quinn | Senior Development Manager
18 years Experience
- President, Moonraker Coffee
- State & Local Tax (SALT), RSM US LLP
- USCG Judge Advocate General and Deck Watch Officer
- B.S., US Coast Guard Academy; J.D., Temple University School of Law; Master of Laws – LLM Tax Law/Taxation, Golden Gate University

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Sample of Team's Past Performance

Location	Jamestown, California	McCamey, Texas	Wheatfield, Indiana	Various, Texas	Fort Wayne, Indiana	Austin and Mason, Texas	Minneapolis, Kansas	Various, North Carolina	Panguitch, Utah
Description	10 MW / 47 MWh Distributed Energy Storage System	10 MW / 42 MWh Solar + Storage System	12.0 MW / 5.5 MWh Gas Turbine Black Start	150 MW / 165 MWh Distributed Energy Storage Systems	14.0 MW / 46.8 MWh, Distributed Energy Storage System	220 MW / 220 MWh Distributed Energy Storage Systems	1 MW / 5.1 MWh Transmission Deferral with Black Start	40 MW / 109 MWh Distributed Energy Storage Systems	1 MW / 5 MWh Transmission Deferral
Customer Segment	IPP	IPP	Utility	IPP	Utility (Co-Op)	IPP	Utility	Utility	Utility
Revenue Source	BESS-only	BESS-only	BESS-only	BESS-only	Turnkey EPC	BESS-only	Turnkey EPC	Turnkey EPC	BESS-only
BESS Solution	Standalone Storage	Solar + Storage	Turbine + Storage + Black Start	Standalone Storage	Standalone Storage	Standalone Storage	Standalone Storage + Black Start	Standalone Storage	Standalone Storage
COD	May 2022	Dec 2018	Dec. 2019	Jun 2020 – Jan 2022	Jul 2021	Jun 2021	Nov 2021	Jun 2022	Oct 2019

Additionally:

- Led successful commercial offtake contracting for 1.11GW / 3.07GWh (includes projects for Engie, NREMC, NCEMC and Ameresco/SCE currently under construction, but not fully COD), as well as procurement for all major equipment and design engineering.
- Led design, integration and commissioning for 448MW / 598MWh

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Energy Storage Market Overview

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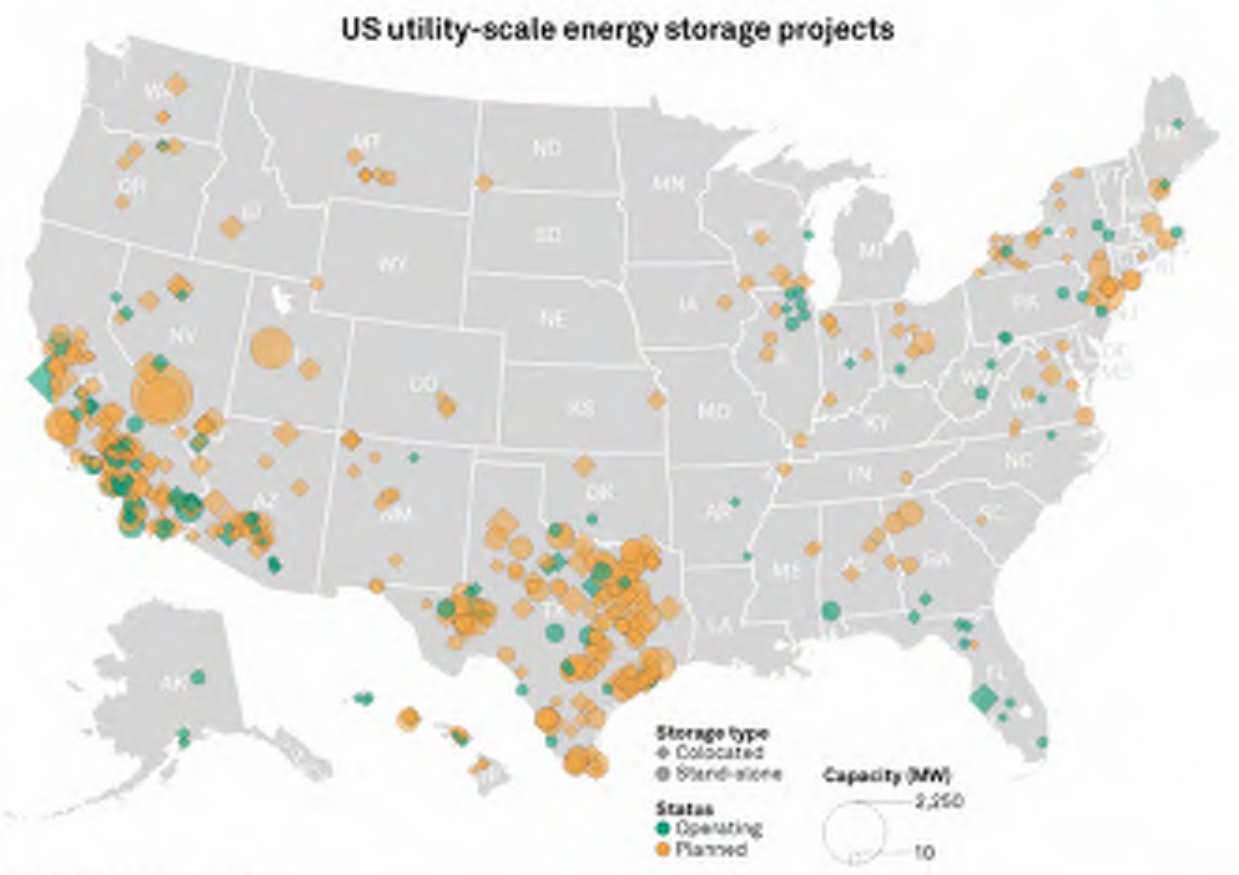
Battery Energy Storage in the United States (1 of 2)



Data compiled Nov. 7, 2022.
Excludes projects classified as pumped storage, projects with less than 10 MW in capacity and projects with no available in-service year.
Excludes projects with no available geographic coordinates.
Map credit: Ciarralou Agpalo Palicpic.
Source: S&P Global Market Intelligence.
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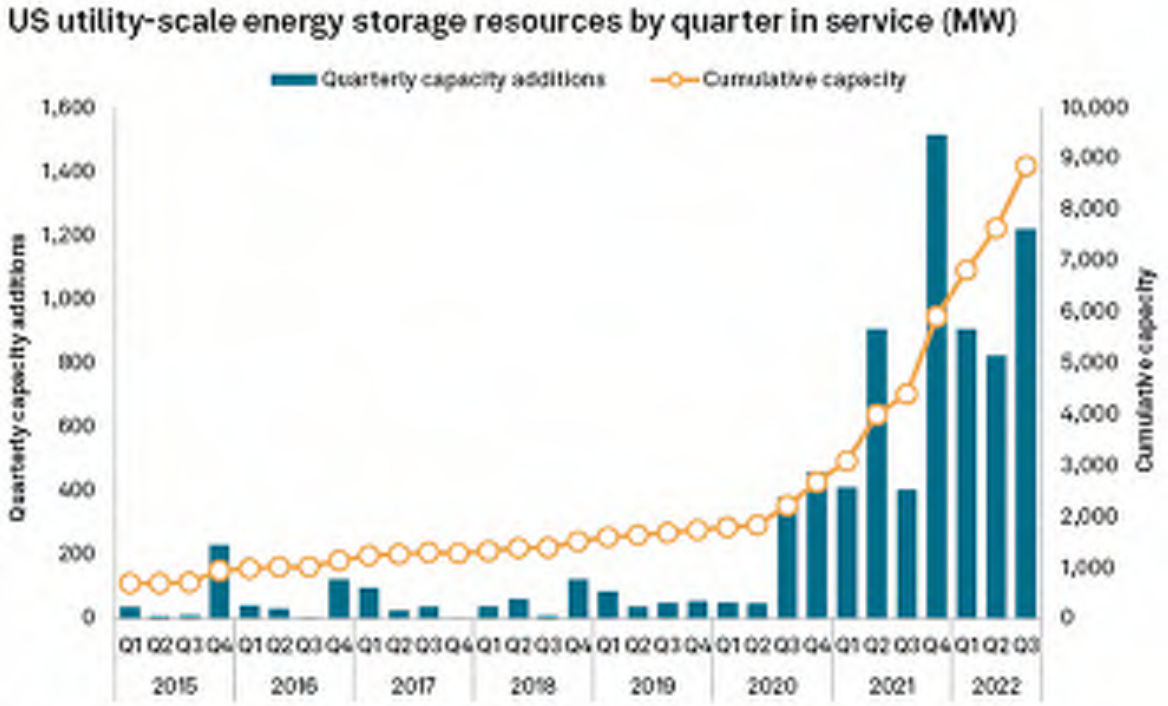

Data compiled Nov. 7, 2022.
Analysis includes stand-alone and colocated storage resources. Projects classified as pumped storage are excluded.
Source: S&P Global Market Intelligence.
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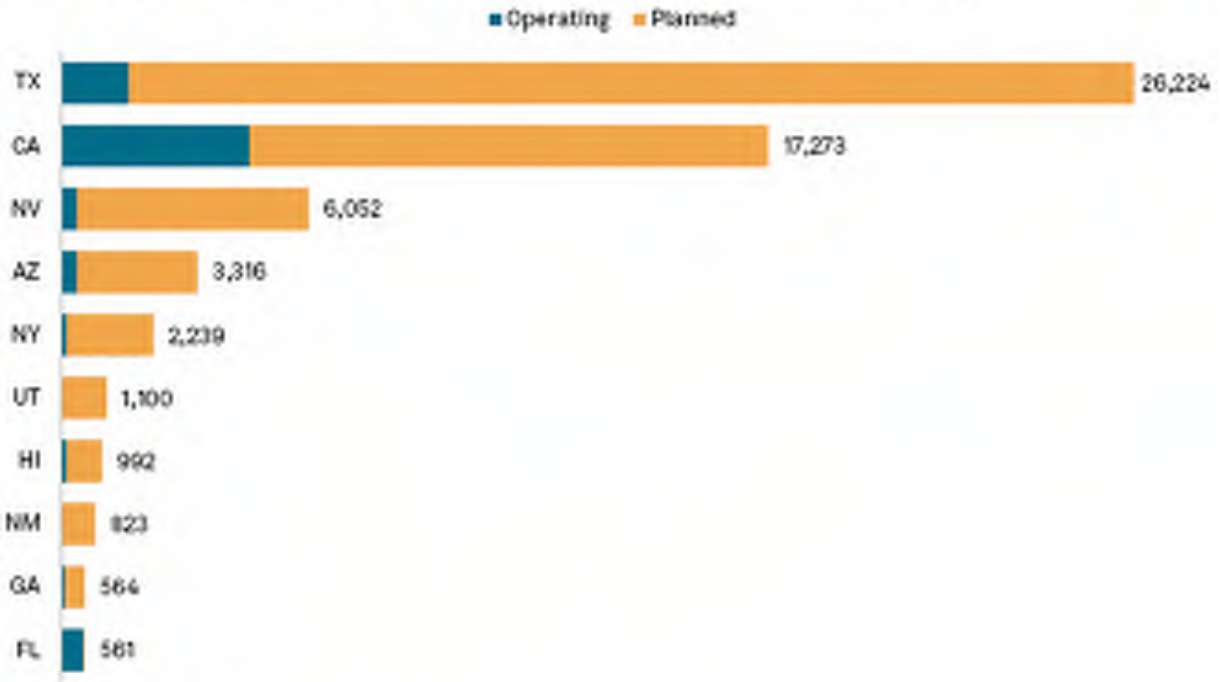
Battery Energy Storage in the United States (2 of 2)

STELLA ENERGY SOLUTIONS

States with largest utility-scale energy storage resources (MW)



Data compiled Nov. 7, 2022.
Analysis includes stand-alone and colocated storage resources.
Excludes projects classified as pumped storage and those with no available in service year.
Source: S&P Global Market Intelligence.
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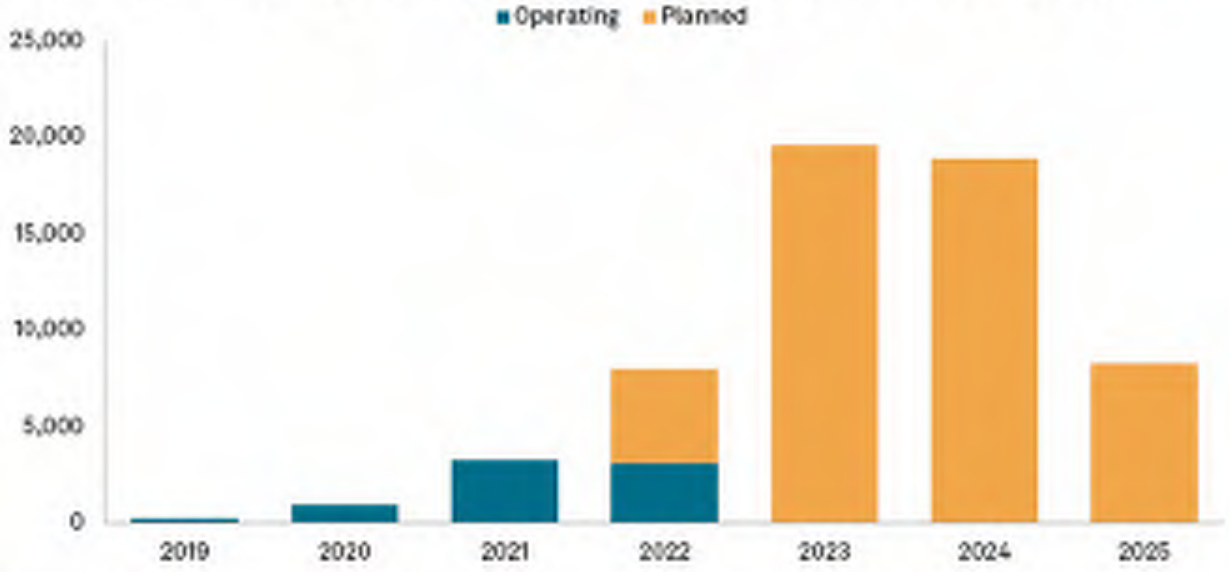
US utility-scale energy storage projects by status, year in service (MW)



Data compiled Nov. 7, 2022.
Analysis includes stand-alone and colocated storage resources. Projects classified as pumped storage are excluded.
Source: S&P Global Market Intelligence.
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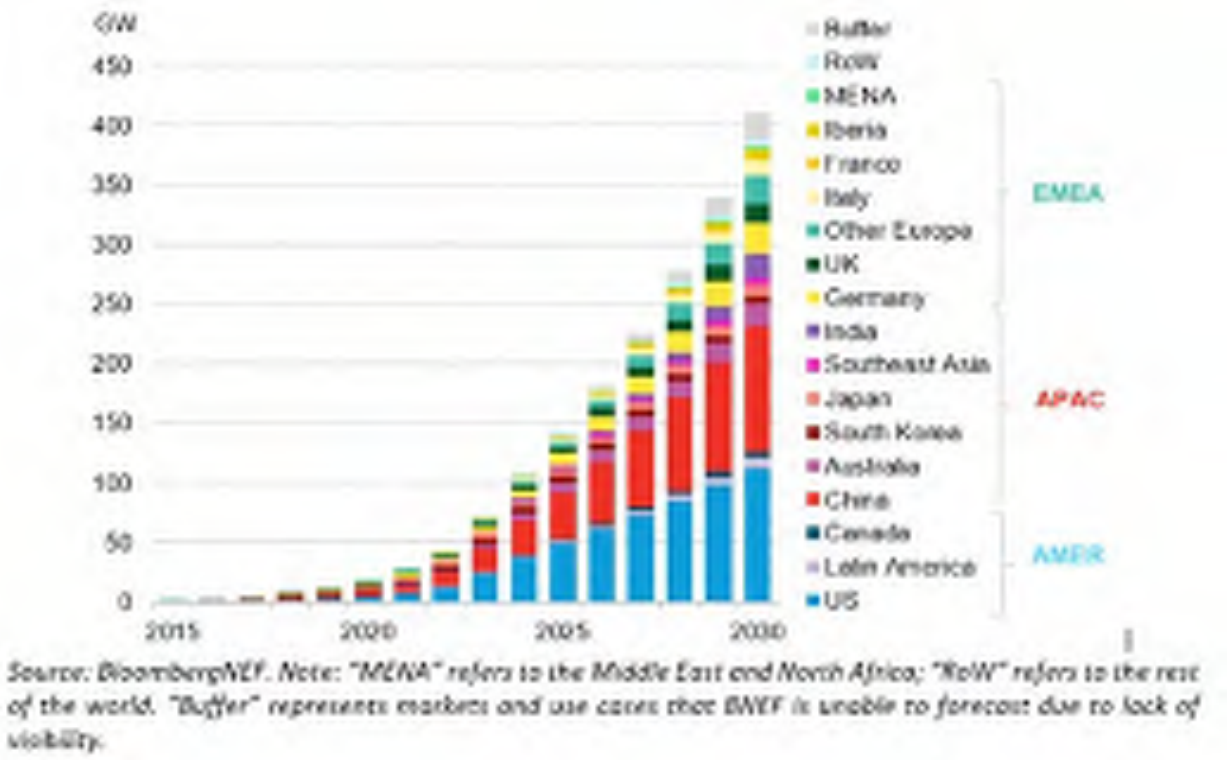
Global Energy Storage Market

Global Energy Storage Market to Grow 15-Fold by 2030.

Global Cumulative Energy Storage Installations, 2015-2030



Source: BloombergNEF. Note: "MENA" refers to the Middle East and North Africa; "RoW" refers to the rest of the world. "Buffer" represents markets and use cases that BNEF is unable to forecast due to lack of visibility.

Industry Momentum

- Energy storage installations around the world are projected to reach a cumulative **411GW** by the end of 2030, which is **15 times** the 27GW of storage that was online at the end of 2021.
- An estimated **387GW/1,143GWh** of new energy storage capacity will be added globally from **2022 to 2030**.
- The **United States and China** are set to remain **the two largest markets on energy storage**, representing over half of global storage installations by the end of 2030.
- According to Wood Mackenzie, new energy storage installations rose across the United States in Q2 of 2022, with 1,170 MW / 2,608 MWh installed. **Texas represented 60%** of the 2.6 GWh.

Source: BNEF

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Battery Fundamentals

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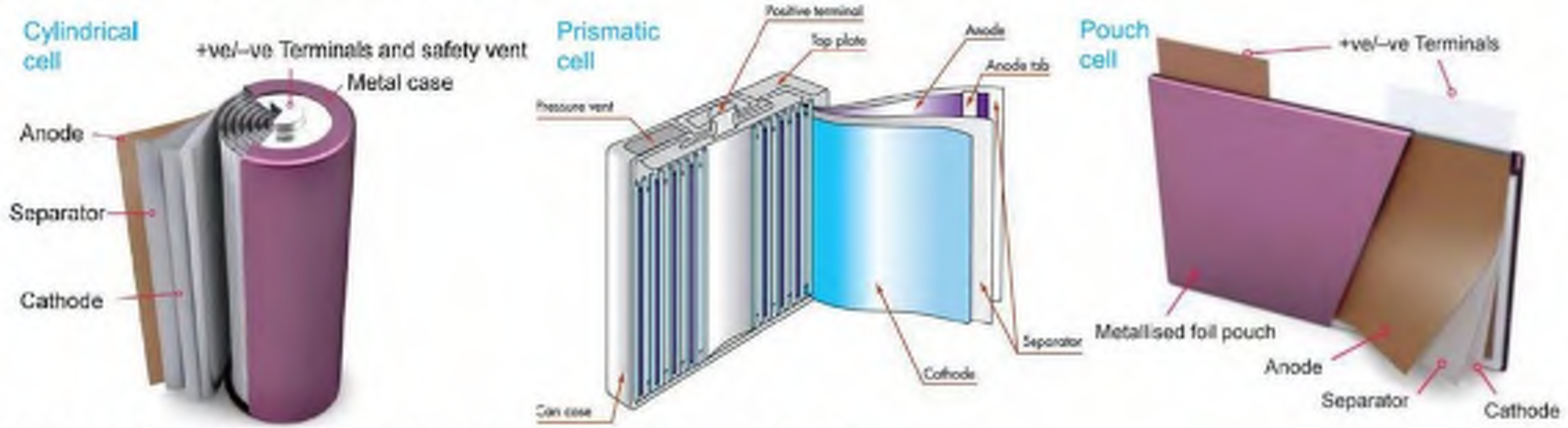
Battery Cell Design

There are three primary Lithium-ion cell designs: Cylindrical, Prismatic, and Pouch.

Figure 15: Lithium-ion battery cell design



Source left-to-right: Johnson Matthey, Seeking Alpha, Johnson Matthey

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Current Battery Enclosures

Each enclosure arrives fully assembled and populated (no on-site loading of battery modules into racks)

20ft x 8ft air-cooled enclosures

4.5ft x 4.5ft liquid-cooled enclosures

5ft x 5ft air-cooled enclosures

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Attachment #5

Current Battery Enclosures

Each enclosure arrives fully assembled and populated (no on-site loading of battery modules into racks).

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Proposed Project Site

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Attachment #5

Hidden Lakes

Site Details

Site is currently vacant – Parcel ID 232050

No direct proximity to business or residential

Short interconnection span to Texas New Mexico Power Hidden Lakes Substation

< 5 acres is more than enough land to accommodate the site layout and any additional landscaping and drainage requirements

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Attachment #5

Hidden Lakes

Site Details

- The Project Site was pushed back to accommodate commercial frontage use
- Overhead line route will follow TNMP existing utility easement

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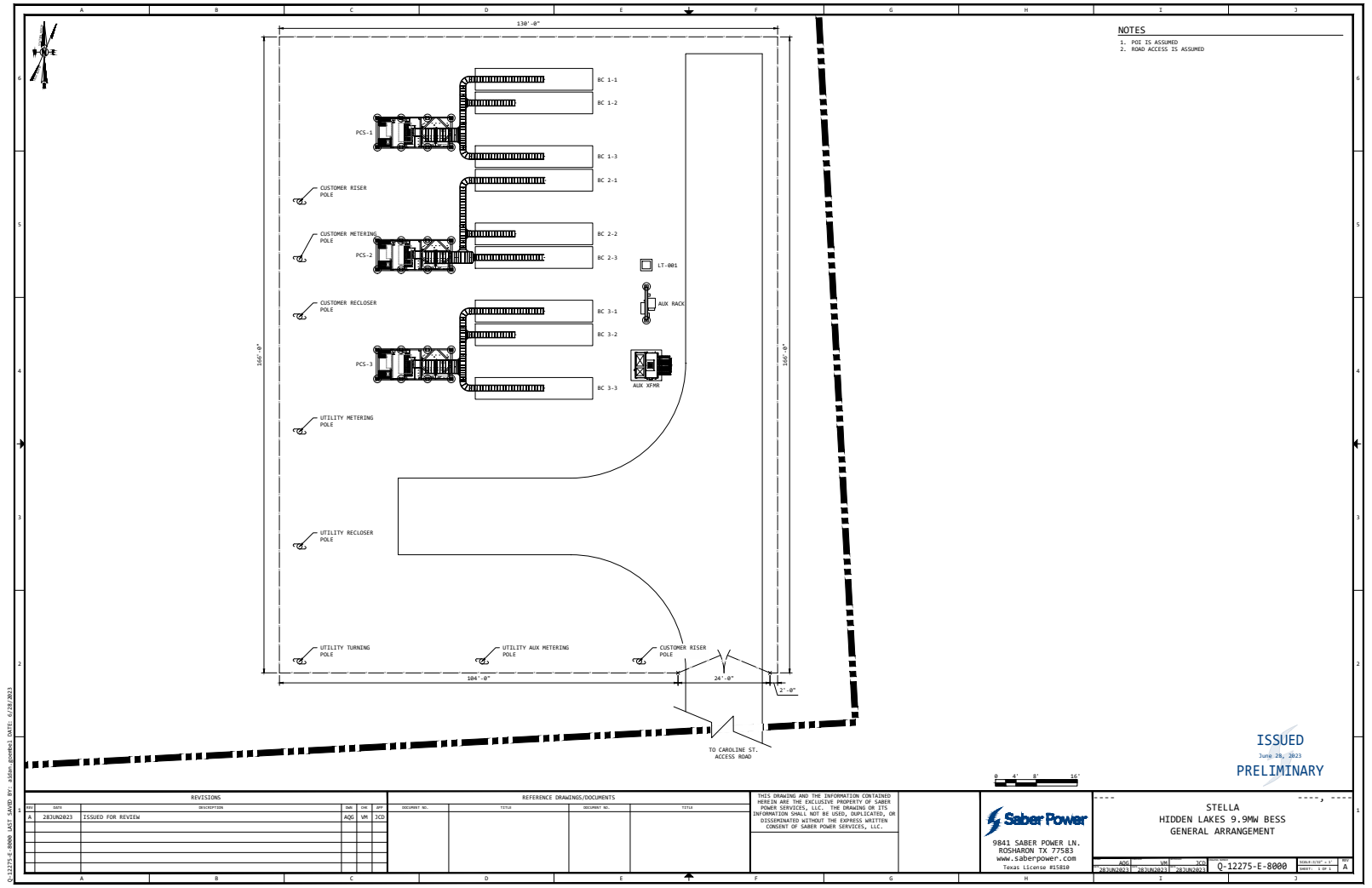
Attachment #5

Hidden Lakes

Site Details

- Layout contemplates minimal site disturbance
- Main Components are:
  - Battery Containers
  - Inverters
  - MV Transformers
- Aux Power Transformer
- Communications Equipment



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Attachment #5

Hidden Lakes

Overhead View Depiction

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Attachment #5

Hidden Lakes

Plan View Depiction

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Attachment #5

Hidden Lakes

Existing Site from FM 646

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Attachment #5

Hidden Lakes

Existing Site from Caroline St.

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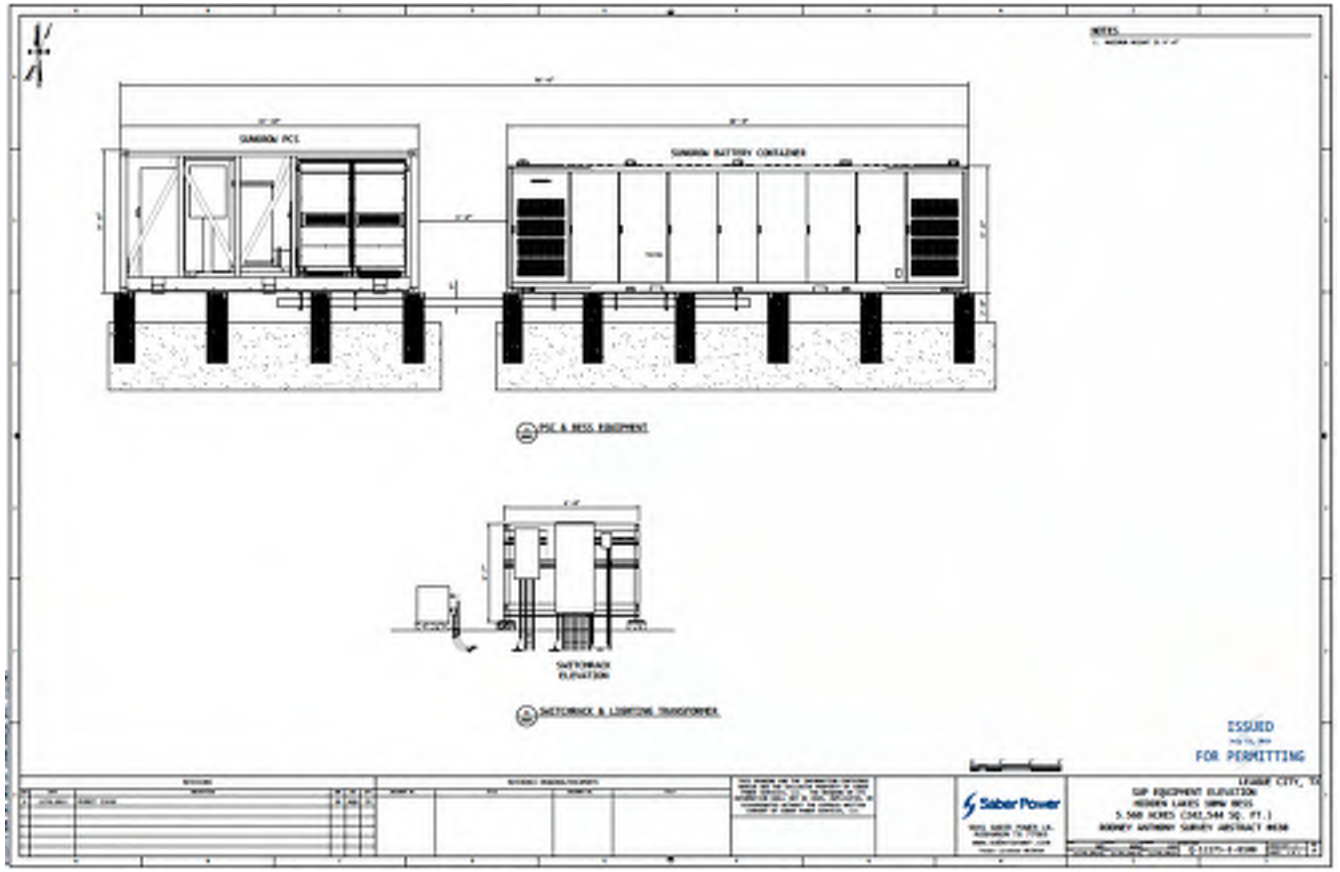
Attachment #5

Hidden Lakes

Equipment Design - Inverters



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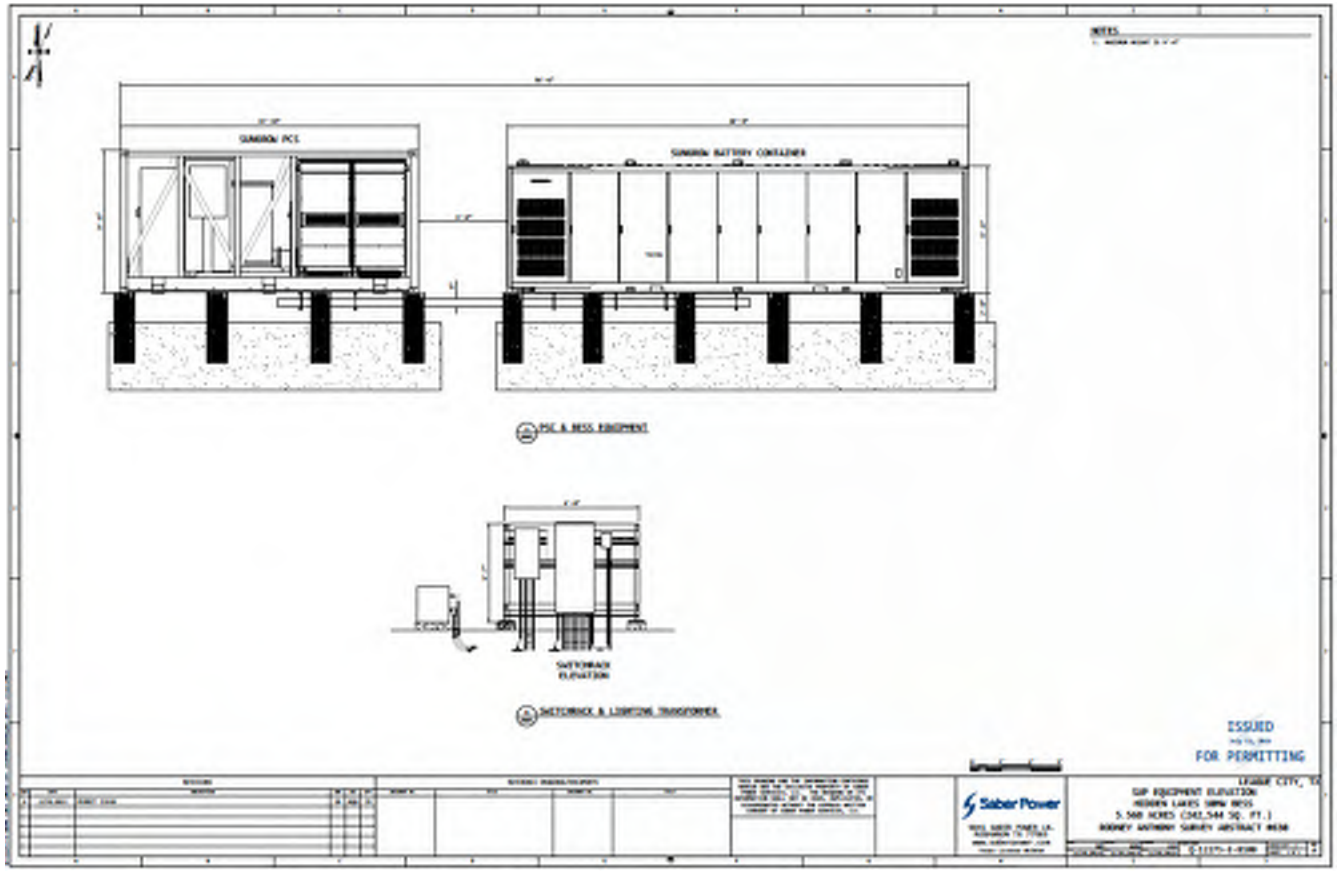
Attachment #5

Hidden Lakes

Equipment Design – Battery Containers



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Attachment #5

Hidden Lakes

Building Material Table

Item	Material	%
Driveway	Pavement / Asphalt	15
Site Base	Crushed Aggregate	30
Fence	Chain Link + Screening	10
Site Equipment	Steel	30
Landscaping	Per accepted design	15

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Battery Energy Storage System Safety

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Attachment #5

Design Standards

UL 9540A Report
Cell Level

Report Issued : 2021.09.14
Report Revised :

CELL TEST REPORT
UL 9540A
Test Method for Evaluating Thermal Runaway Fire Propagation in Battery Energy Storage Systems (ESS)

Project Number	4786586110
Date of issue	2021.09.14
Total number of pages	35
UL Report Office	UL(Changshou) Quality Technical Service Co., LTD
Applicant's name	Ballevolech Corporation Limited
Address	9855 Puwei Road, Fengxiang, Shanghai, 201417, CN
Test specification:	4th Edition, Section 7, November 12, 2019
Standard	UL 9540A, Test Method for Evaluating Thermal Runaway Fire Propagation in Battery Energy Storage Systems
Test procedure	7.1 + 7.8
Nonstandard test method	N/A

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General disclaimer:

The test results presented in this report relate only to the sample tested in the test configuration noted on the list of the attachments.

UL LLC did not select the sample(s), determine whether the sample(s) was representative of production samples, witness the production of the test sample(s), nor were we provided with information relative to the formulation or identification of component materials used in the test sample(s).

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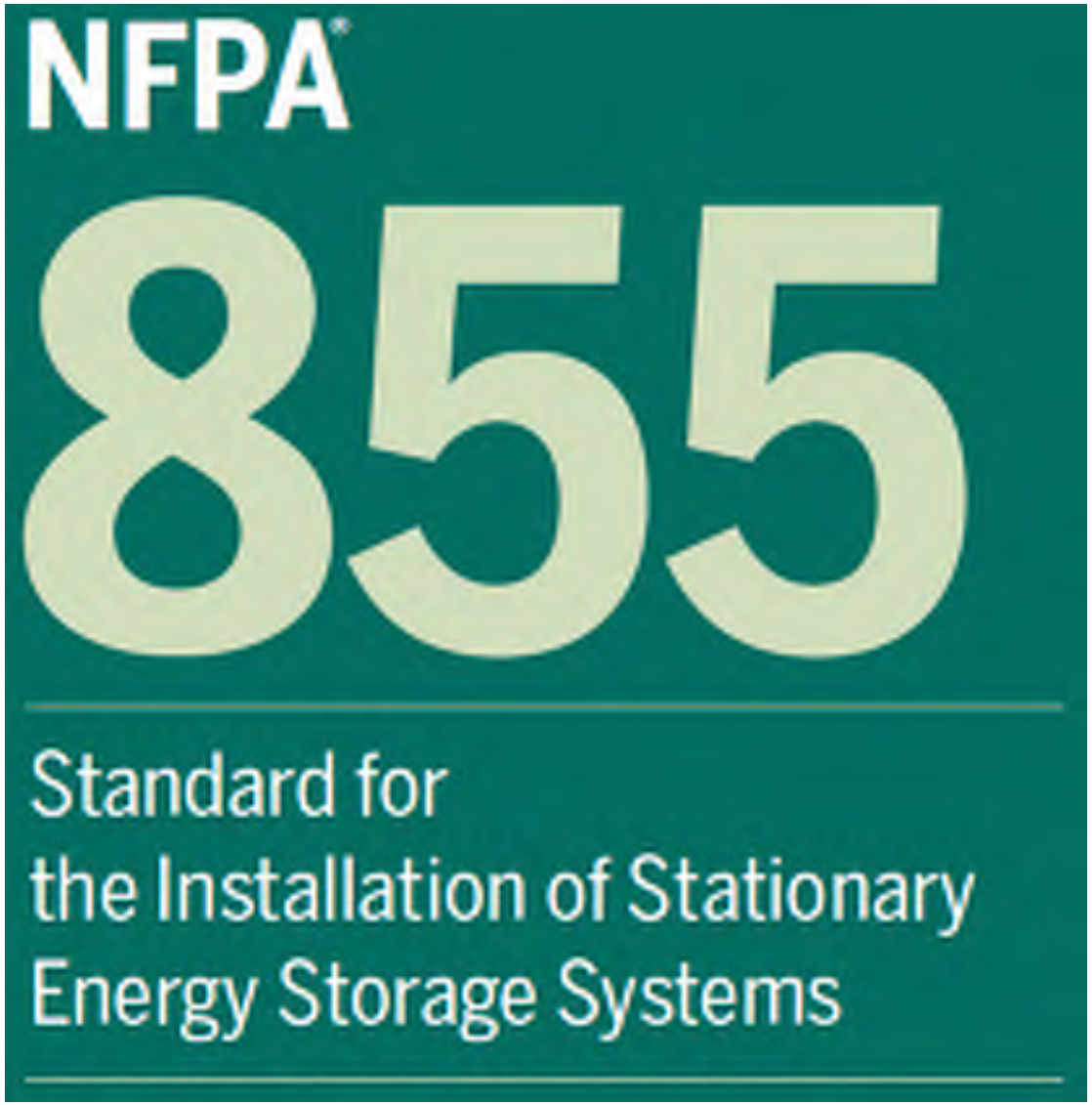

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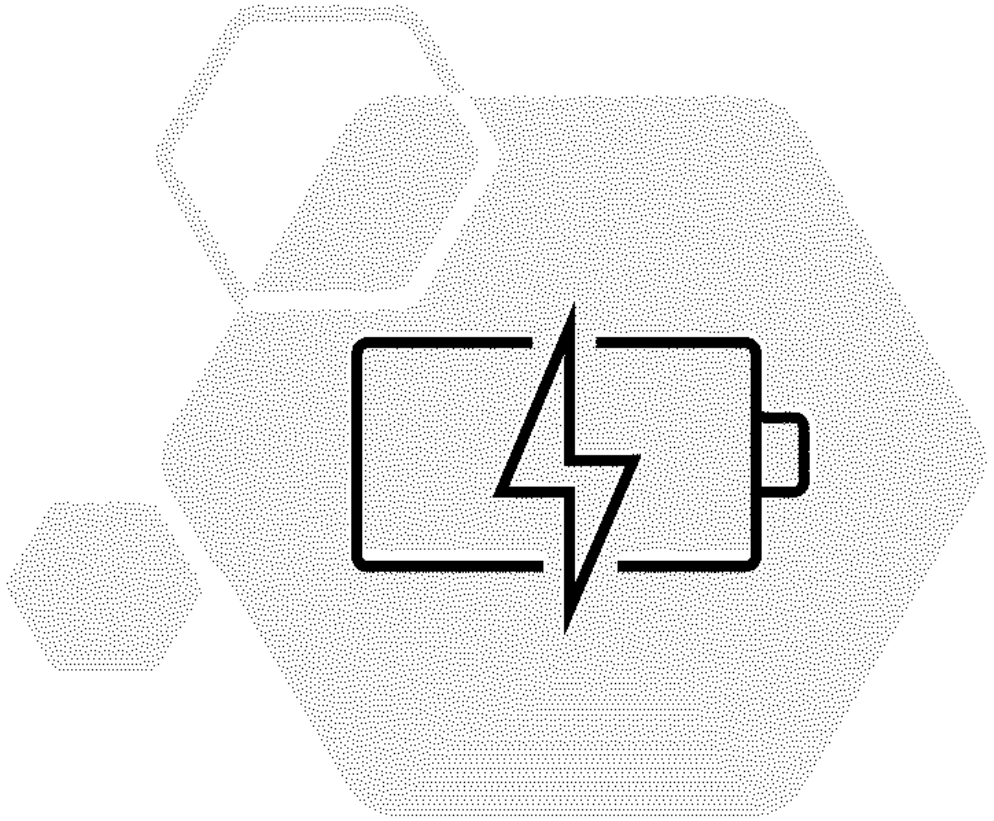
NMC vs LFP Chemistry

Both NMC and LFP are lithium-ion batteries, but the cathode material differs between the two.

NMC uses lithium, manganese, and cobalt oxide as cathode material while LFP uses a lithium iron phosphate chemistry.



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Attachment #5

Recent Lithium-Ion Battery Safety

Korea to tighten measures for ESS Safety as batteries catch fire (2020)

Vistra experiences 2nd BESS Fire Safety Event at Moss Landing, CA in 6 months (2022)

Root Causes:

1. Moss Landing 300MW/1200MWh Fire: Faulty HVAC system (NMC chemistry)

2. Moss Landing 100MW/400MWh: 10 racks melted; water hose leaks that caused some batteries to short and that led to smoke filling the building (NMC Chemistry)

PG&E's Tesla Moss Landing, CA 187MW/4hr (2022)

Tesla Battery Fire at PG&E Site Shuts Iconic California Highway

- PG&E says a single Tesla Megapack caught fire early morning
- Site has history of batteries overheating, shutting down

Batteries at a storage system in Moss Landing, California. *Photographer: David Paul Morris/Bloomberg*

Root Cause:

1. NMC chemistry

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Attachment #5

Recent Lithium-Ion Battery Safety

Appendix B. Korean fire incident project log

Table 4: Energy storage fires in South Korea

Project	MW	MWh	Application	Battery provider***	Installation date	Incident date
Daesung Industrial Gases Ulsan Energy Storage Project	10	46.7	Peak management	Samsung SDI	-*	Jan 2019
Jangsu Energy Storage Project	–	–	RE integration**	–	–	Jan 2019
KDWPS Yangsan factory Energy Storage Project Phase I	0.5	3.3	Peak management	LG Chem	Dec 2017	Jan 2019
Wando Shinji Energy Storage Project	–	–	RE integration	–	–	Jan 2019
Gangwon Samcheok Energy Storage Project	–	–	RE integration	LG Chem	–	Dec 2018
Asia Cement Jecheon Energy Storage Project	1.6	9.3	Peak management	LG Chem	–	Dec 2018
Mirae Solar Energy Mungyeong Energy Storage Project	–	–	RE integration	LG Chem	–	Nov 2018
Cheonan Dongnam Energy Storage Project	–	–	RE integration	LG Chem	–	Nov 2018
Gwanghyun Yeongju Energy Storage Project	–	–	RE integration	LG Chem	–	Nov 2018
KEPCO Shin-Yongin Energy Storage Project	24	16	Frequency regulation	Samsung SDI	–	Oct 2018
KEPCO Jeju Energy Storage Project	–	0.18	RE integration	–	–	Sep 2018
Taean Energy Storage Project	–	8	RE integration	Samsung SDI	Construction suspended	Sep 2018
Yeongdong Energy Storage Project	–	8	RE integration	LG Chem	–	Sep 2018
Asia Paper Sejong Energy Storage Project	–	16	Peak management	Samsung SDI	Construction suspended	July 2018
DaeMyoung GEC Geochang Energy Storage Project	9.8	9.8	RE integration	Samsung SDI	Dec 2016	July 2018
Haenam Songji Energy Storage Project	–	3	RE integration	LG Chem	May 2018	July 2018
CNPV Power Korea Gunsan Saemangeum Energy Storage Project	–	19	RE integration	LG Chem	Dec 2017	June 2018
DaeMyoung GEC Yeongam Energy Storage Project	4	15	RE integration	Samsung SDI	Dec 2015	June 2018
KEPCO Gyeongsan Energy Storage Project Phase II	24	8.6	Frequency regulation	Samsung SDI	Feb 2016	May 2018
MOTIE Geochang Energy Storage Pilot Project	2	4	RE integration	Top Battery	–	Aug 2017

*Source: BloombergNEF, industry sources Note: *Data is not available **Renewable energy integration ***All capacity lithium-ion.*

APS BESS Fire Safety- Surprise, AZ (Aug 2019)

Root Causes:

1. NMC Battery Chemistry
2. Building (confined space … man-enterable)
3. **"It's not like rushing into a fire—an offensive approach. This is going to have to be a far more defensive approach,"**

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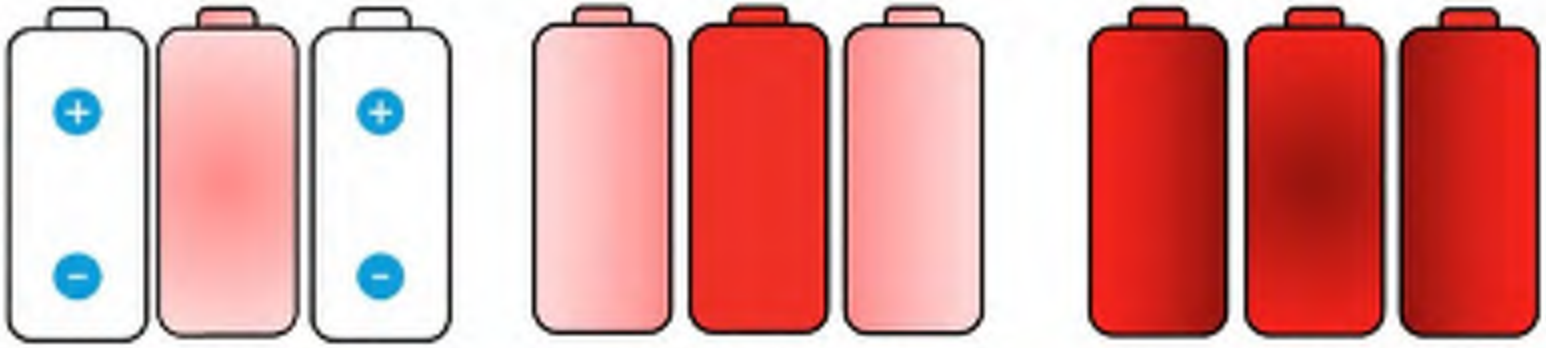
Attachment #5

Battery Safety

Figure 1: Propagation of thermal runaway



Source: BMW, BloombergNEF

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Attachment #5

Battery Safety

Table 1: Potential causes of fires as disclosed from preliminary investigation results

Potential cause of fire	Description
Exposure to humidity	Signs of condensation have been found at the bottom of some storage sites that were investigated. Storage systems built on damp or icy ground may have been exposed to high levels of humidity. Electrical equipment and water do not mix well and so this opens up a number of possibilities on the cause of fire.
Defective battery model	Local sources have pointed out that a number of damaged projects were equipped with a specific battery model. However, no additional information to prove the model's defect has been made available.
External shock during construction	For storage projects damaged by fire during construction, investigators have mentioned that external shock on the battery during installation is likely to have caused the fire.
Faulty battery management system	Some investigators have mentioned that the fires are likely to be the result of surges (i.e. electrical shocks) with the BMS in the damaged storage sites unable to manage them properly.

Source: BloombergNEF, industry sources

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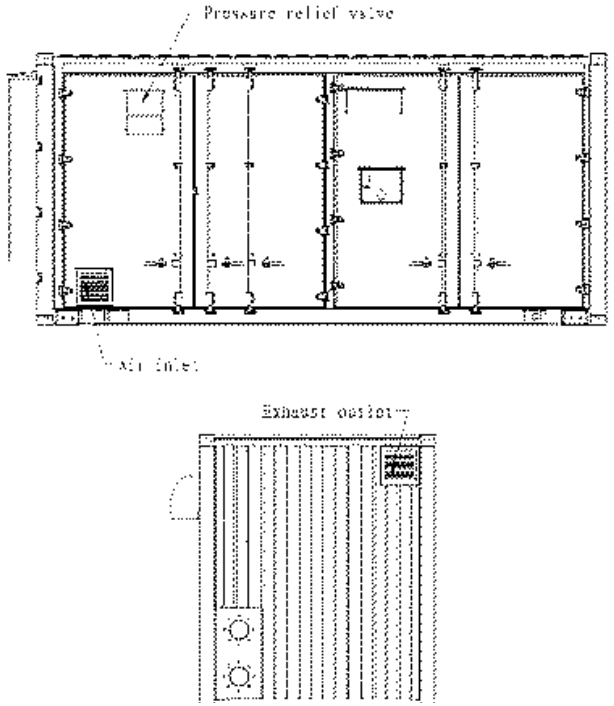
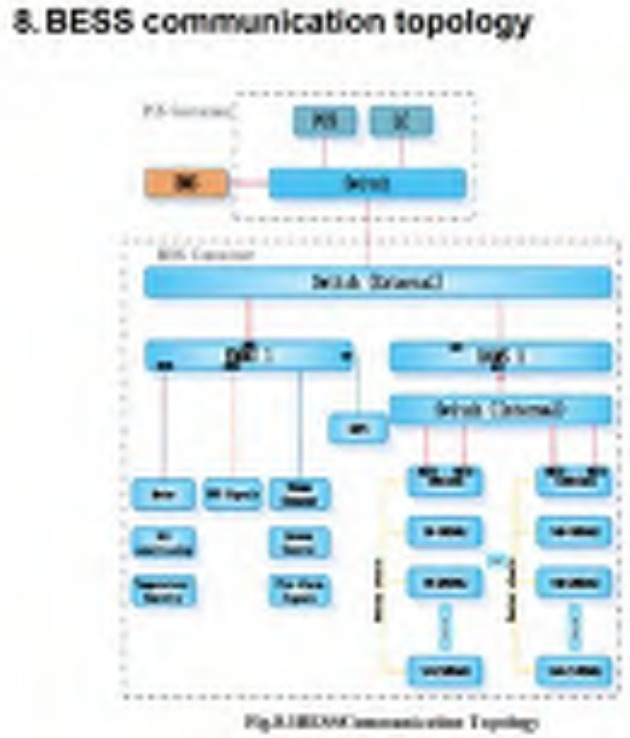
Attachment #5

Battery Energy Storage System Safety

- 24/7 energy and thermal monitoring (EMMU)
- Smoke detection for each battery cabinet
- Ability to remotely shut down batteries
- Pressure relief system
- Fire rating for containers
- FM-200 / Stat-X Dry Powder Suppression system
- First Responder Coordination

The following figure shows the installation positions of the pressure relief valve:





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Questions?

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