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Little Crow
Solar Park

Little Crow Solar Park, Scunthorpe

ENVIRONMENTAL STATEMENT: TECHNICAL APPENDICES

APPENDIX 4.7

OUTLINE BATTERY SAFETY MANAGEMENT PLAN

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On behalf of INRG Solar (Little Crow) Ltd

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OCTOBER 2020

OUTLINE BATTERY SAFETY MANAGEMENT PLAN

ON BEHALF OF INRG SOLAR (LITTLE CROW) LTD

CONTENTS:

1. INTRODUCTION

1.1 This Outline Battery Safety Management Plan ('OBSMP') has been prepared by INRG Solar (Little Crow) Limited ('INRG') to accompany the Development Consent Order ('DCO') application submitted for Little Crow Solar Park, Scunthorpe DN20 0BG ('The Development').

1.2 INRG has worked closely with G2 Energy ('g2E') in collating the technical and safety information used to form the detailed design of the BESS. g2E have completed 12 No. Battery Energy Storage Systems ('BESS') in the UK over the past 3 years with a total installed capacity of 300MW, with a further 400MW under construction. g2E are also in the final stages of completing the largest BESS in Europe at 100MW which will be extended to 150MW next year.

2. Purpose of Document

2.1 The OBSMP details the regulatory guidance reviewed by INRG to ensure that all safety concerns around the BESS element of the Development are addressed in so far as is reasonably practicable.

2.2 Battery storage technology is continuously evolving as are the regulations and guidance on the safe operation of a BESS. Whilst the current design is based on the latest regulations INRG will continue to review the regulations and also the manufacturers guidelines to ensure that the final design meets with best practice for the design and operation of a BESS and still remains within the limits of the Rochdale Envelope.

2.3 Post-consent, the OBSMP will be updated once the proposed phasing of development is known and in line with any new regulations and/or guidelines that are introduced. Both the HSE and Humberside Fire and Rescue will be consulted on the updated Battery Safety Management Plan. Any updates to the Battery Safety Management Plan must be submitted to the LPA for approval in accordance with Requirement 7 of the draft DCO.

3. Description of Works

3.1 The BESS is based on a design of 16 No. 53' container units with individual ratings of ST6000kWh per container giving a total rating of 90 MW / 96 MWh. Each ST6000kWh unit has 1 x Battery unit, containing 3.2V LFP-280Ah, 416S10P LFP batteries with circa 6,000 kWh capacity, in total there will be 260 Battery Modules in each BESS container. Also each 53' container will have 2 x Battery Connection Panel (BCP), Heating, Ventilation and Air Conditioning system (HVAC), Fire Suppression System and other auxiliary devices connected to 2 No. PCS 2.5MVA inverter units which are located on the external skids adjacent to the 53' container.

3.2 Following extensive discussions with g2E around technological and safety advancements, INRG is proposing to use Lithium Iron Phosphate ('LFP') battery cells as its chosen form of Lithium-Ion battery technology.

3.3 LFP batteries are proven to have a lower temperature rise when compared to other types of lithium-ion batteries during thermal runaway events. Thermal runaway is a condition that occurs when the chemical reaction inside a battery cell exceeds its ability to disperse heat.

3.4 LFP batteries can deliver rapid discharge and recharge while generating very little heat. They require less ventilation or cooling and can withstand higher temperatures without decomposing.

3.5 The Fire Suppression System proposed for the BESS is a gas-based system using NOVEC 1230 a clean agent fire extinguishant. The primary function of NOVEC 1230 is to put out flames by physically cooling below the ignition temperature of what is burning and chemically inhibiting the fuel source.

4. Guidance

4.1 In addition to the working alongside g2E, INRG has reviewed the various guidance documents listed below during the preparation of this OBSMP to ensure that a broad range of the potential risks are identified and considered and that the strategies to be implemented meet all relevant guidelines. INRG will continue to monitor developments in technological and regulatory advancements for BESS to ensure that the final design of the BESS is amended if necessary, to comply with any future amendments to the minimum fire and safety standards.

4.2 The guidance documents reviewed are:

1. Allianz Risk Consulting (ARC), Tech Talk Volume 26 (2019). Battery Energy Storage Systems (BESS) using Li-ion batteries[1]

2. Institute of Engineering and Technology - Code of Practice for Electrical Energy Storage Systems (August 2017)[2]

3. The Energy Institute: Battery Storage Guidance Note 1 - Battery Storage Planning (August 2019)[3]

4. Safety requirements for grid-integrated EES systems — Electrochemical-based systems. IEC 62933-5-2:2020[4]

5. National Fire Protection Association (NFPA) 855, Standard for the Installation of Stationary Energy Storage Systems, 2020 edition[5]

6. UN 'Recommendations on the Transport of Dangerous Goods' – Section 38.3 covers Lithium-Ion Batteries[6]

[1]https://www.agcs.allianz.com/content/dam/onemarketing/agcs/agcs/pdfs-risk-advisory/tech-talks/ARC-Tech-Talk-Vol-26-BESS.pdf [2]https://shop.theiet.org/code-of-practice-for-electrical-energy-storage-systems
[3]https://publishing.energyinst.org/topics/power-generation/battery-storage/battery-storage-guidance-note-1-battery-storage-planning
[4]https://webstore.iec.ch/publication/32177#:~:text=IEC%2062933%2D5%2D2%3A2020%20primarily%20describes%20safety%20aspects,electrochemical%20storage%20subsystem%20is%20used
[5]https://www.nfpa.org/codes-and-standards/all-codes-and-standards/list-of-codes-and-standards/detail?code=855
[6]https://www.unece.org/fileadmin/DAM/trans/danger/ST_SG_AC.10_11_Rev6_E_WEB_-With_corrections_from_Corr.1.pdf

5. Battery Energy Storage System Detailed Design

5.1 INRG has completed a detailed design in accordance with the various guidelines and recommendations contained in the documents listed above. Full details of the proposed BESS design are contained in the Outline BESS Installation Specification in Appendix 1.

6. Conclusion

6.1 The OBSMP outlines the guidance documents used by INRG to design the proposed BESS at Little Crow Solar Park. The OBSMP will form part of the consultation process INRG will undertake with the HSE and Humberside Fire and Rescue and following completion of the consultation process the OBSMP will be updated as necessary.

Appendix 1

Outline Battery Energy Storage System Installation Specification

At

Little Crow Solar Park

Customer:	INRG Solar (Little Crow) Ltd
Project Name:	**Little Crow Solar Park**
Project Size:	90MW/96 MWh
Project Location:	Scunthorpe, DN20 0BG
Contact:	Kelvin Ruck: kelvin.ruck@g2energy.co.uk
Author:	Kelvin Ruck
Date:	17th September 2020
Version:	1
Revison Date:	N/A

Contents

1. Project Overview

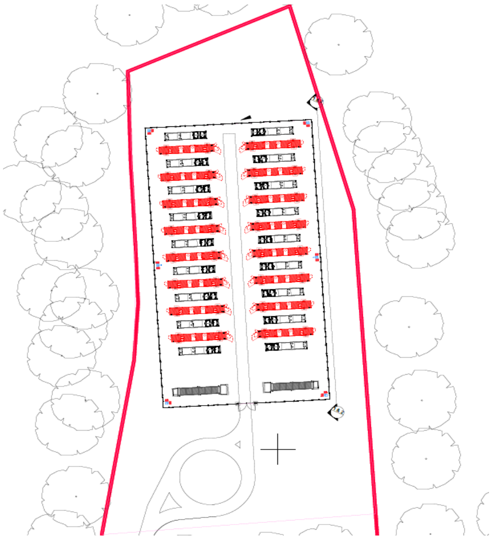
The purpose of this document is to define the specification of the proposed Battery Energy Storage System ('BESS') at Little Crow Solar Park, Scunthorpe DN20 0BG, for INRG Solar (Little Crow) Ltd ('INRG') and to clarify the technical features of all equipment within the specification.

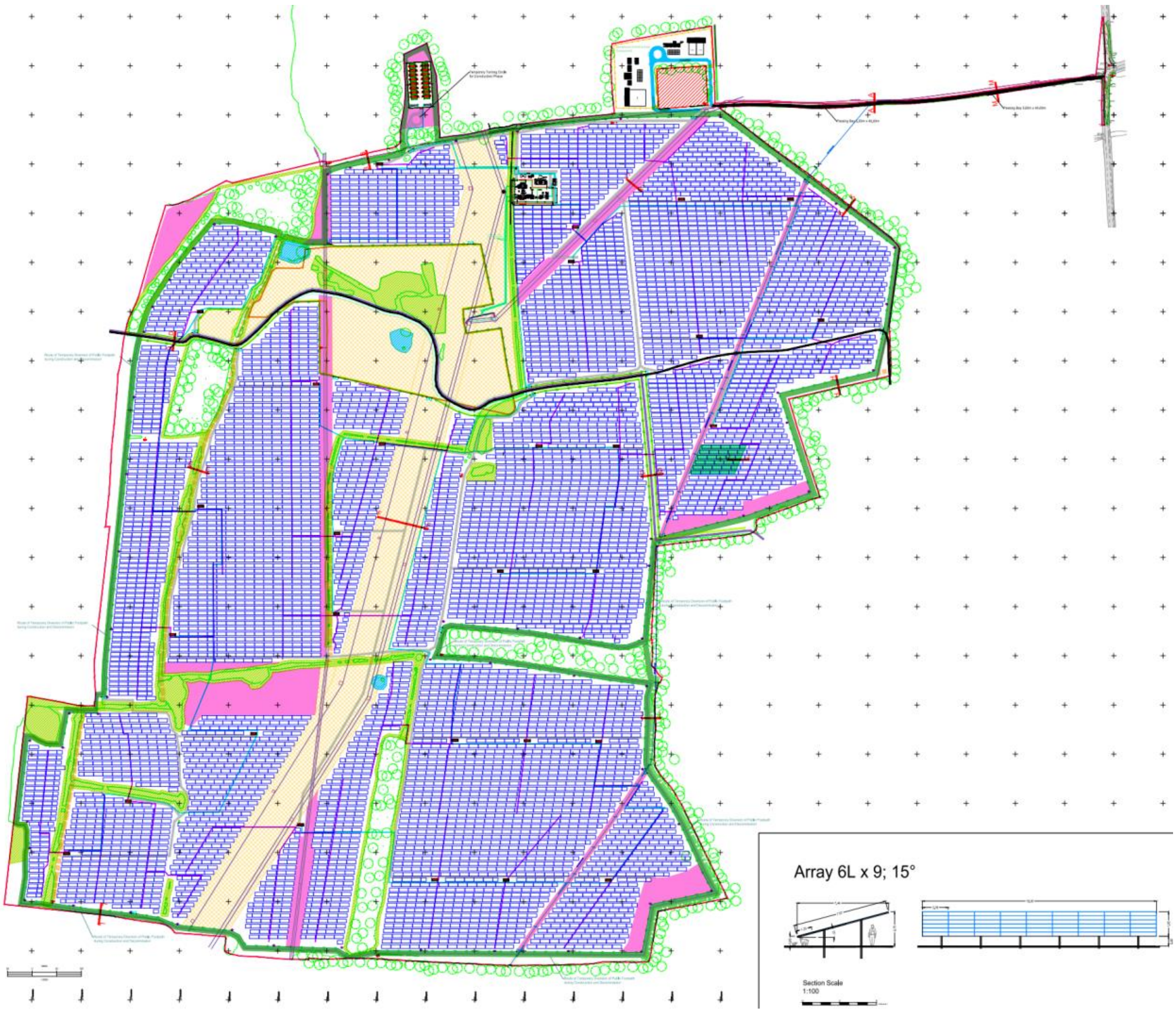
The scope of the technical features is based on the technical discussions between g2E and INRG and may be subject to minor change prior to final design approval due to technological and regulatory advancements in BESS projects.

A detailed list of the proposed specification is below:

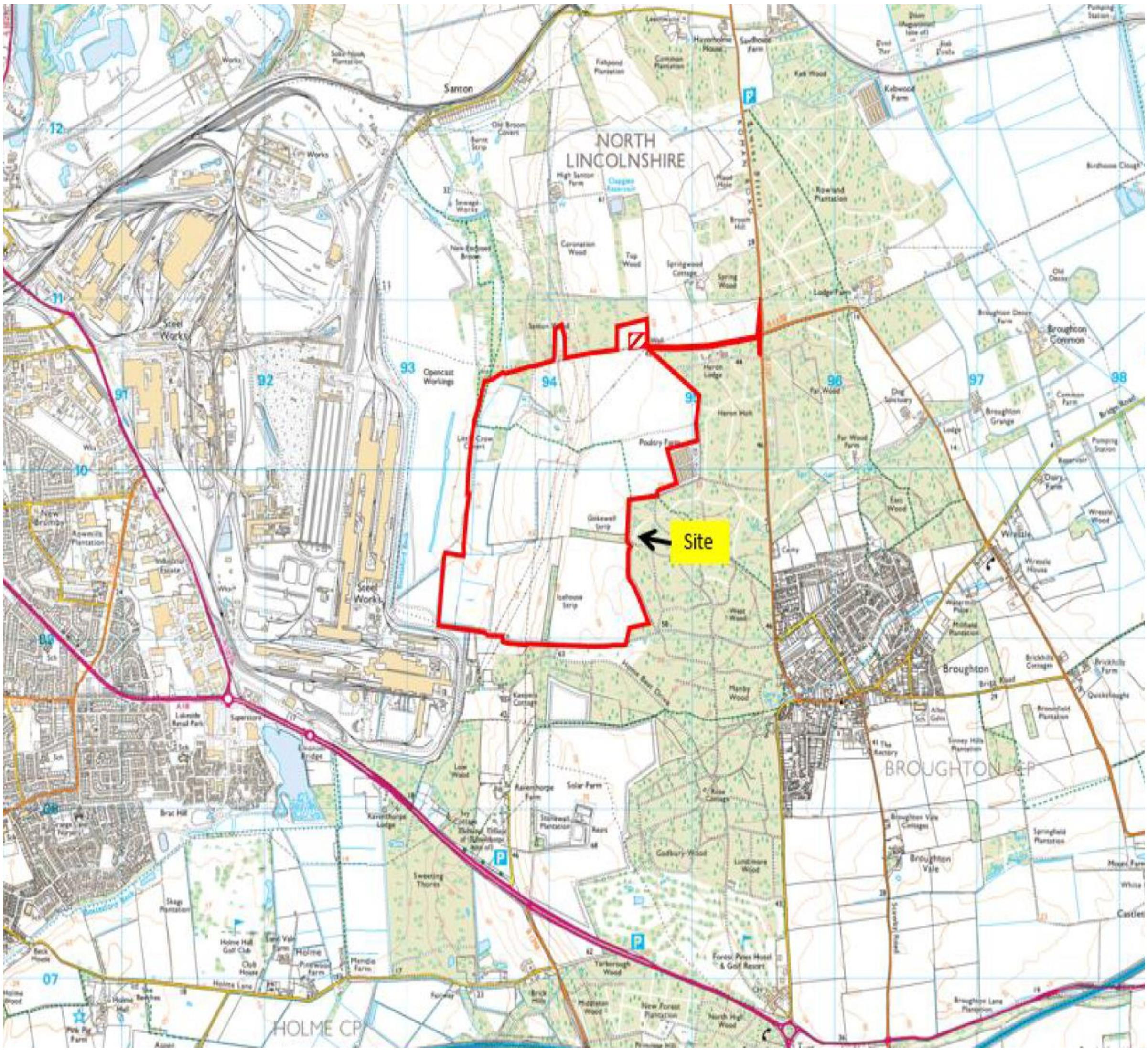
- Client-Side Switch room/control room in 40' steel ISO container
- 1 x client side 33kV Interface collector switchboard
- 1 x Auxiliary Supplies Transformer
- 36 x 2.5MVA PCS Sungrow inverter units (SC2500HV)
- 36 x 2.475MVA dual wound 33/.550/.550KV PCS transformers
- 16 x 6MWh BESS 53' containers with Lithium Iron Phosphate ('LFP') battery cells, with full BMS system
- Control and monitoring systems
- Fire Fighting Systems
- Battery Connection Panels
- All associated cable works (33KV, LV, AC & DC)

1.1 Proposed Site Layout

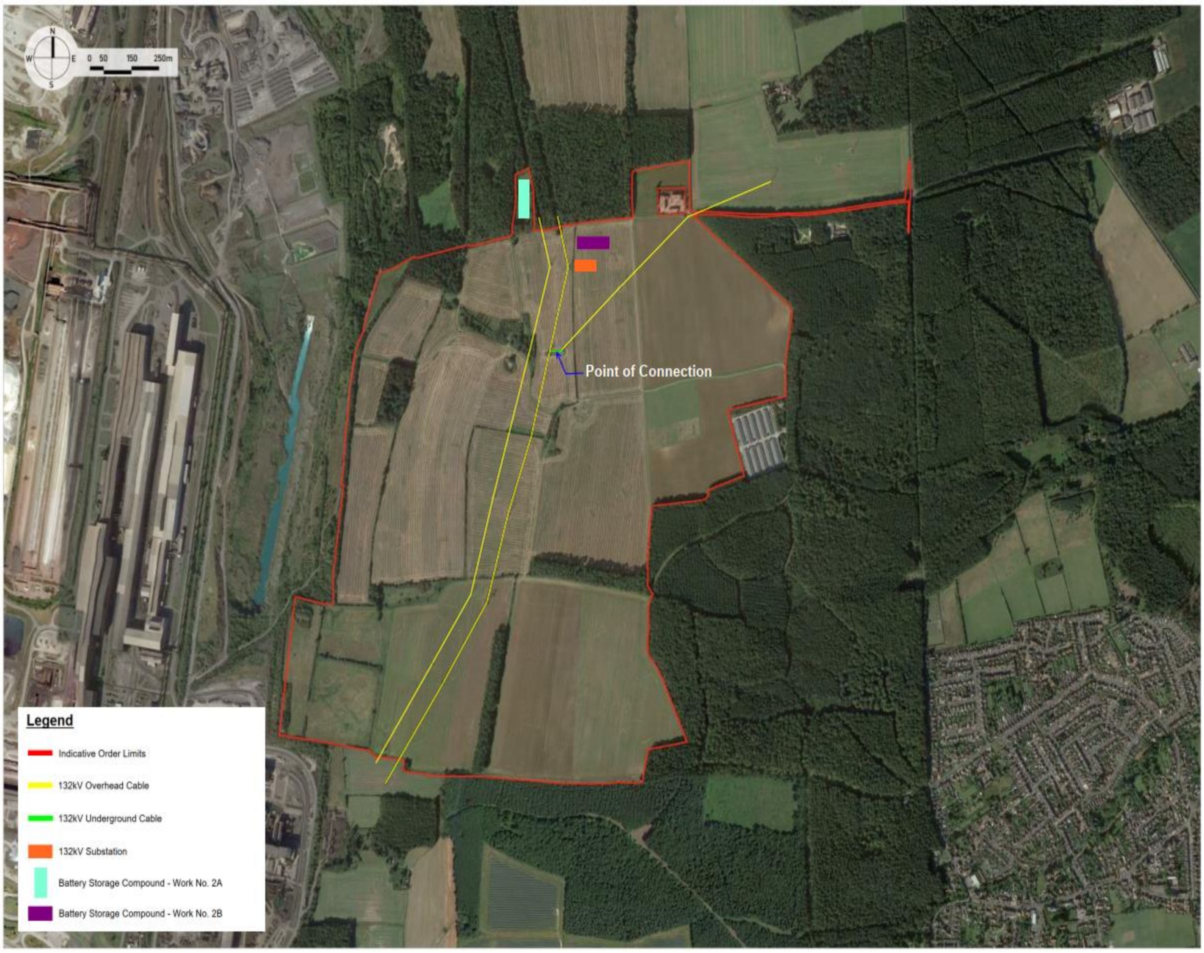




1.2 Location Plan



1.3 Aerial View



2. Battery System Design

2.1 System Configuration

The proposed design solution has 16 BESS units of ST6000kWh with total rating of 90 MW / 96 MWh. Each ST6000kWh unit has 1 x Battery unit, containing 3.2V LFP-280Ah, 416S10P LFP batteries with circa 6,000 kWh capacity, in total there will be 260 Battery Modules in each BESS container. Also each 53' HQ container will have 2 x Battery Connection Panel ('BCP'), Heating, Ventilation and Air Conditioning system ('HVAC'), Fire Suppression System (0FFS)'and other auxiliary devices connected to Power Conversion System ('PCS') 2.5MVA inverter units which are located on the external skid adjacent to the 53' container.

Detailed system configuration is shown in following diagrams.

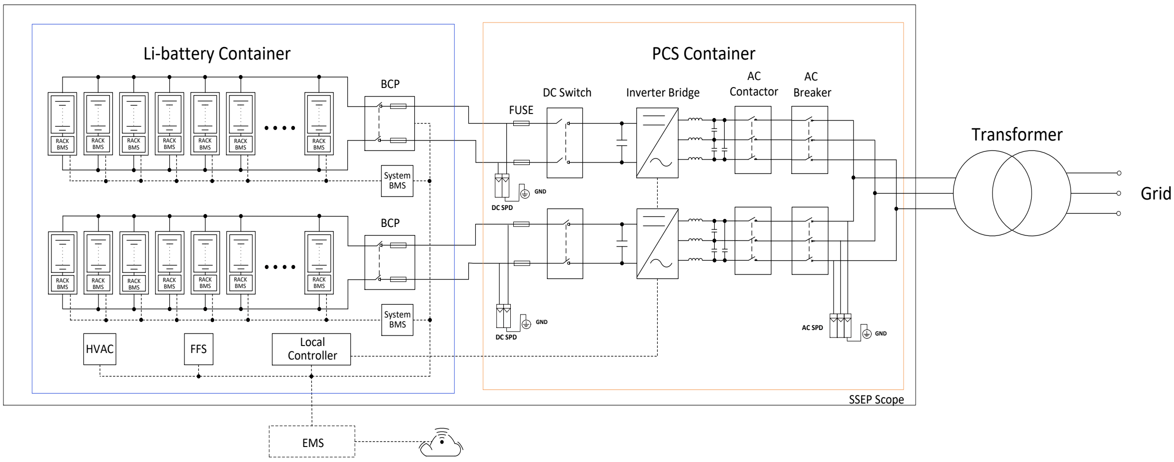


Fig.2.1-1 Circuit and Communication Diagram of one unit

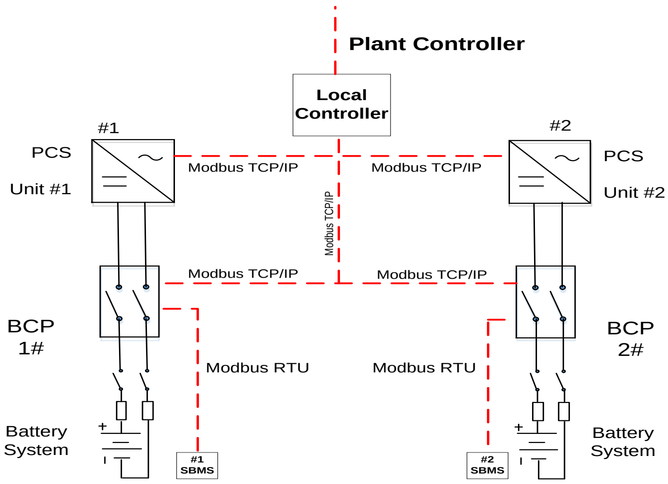


Fig.2.1-2 Communication Layout of BESS

The plant controls the BESS though the Local Controller, which is the main interface between the Power Plant Controller ('PPC') and the BESS. The BESS is monitored remotely via SCADA software which allows real time monitoring and control of the BESS systems should issues such as performance or fire and safety arise.

2.2 System Equipment List

Item	Proposed Specifications	Qty	Remark
53' Battery Containers		**16**	
Lithium-Ion Battery Details	6000kWh Total Power per container		3.2 V, LFP-280Ah, 416S10P, - 2 system BMS/SMU. - 16 Rack BMS/CMU. - 16 battery Switchgears Communication & power cables in modules and racks connection.
Battery Connection Panel	PMD-B3150K		Battery Connection Panel, including AC and DC power distribution circuits, UPS, AC/DC (24Vdc) module for Aux power supply.
53' Container Details	(W × H × D) in mms 16154 × 4138 × 2438		- 16 Racks - C3 - IP54 - HVACs, FFS, cables between equipment inside the container.
System Controller	Local Controller		Reads & collects battery system data, PCS operation information etc.
Inverter		**36**	
PCS Sungrow Inverter	SC2500HV		Nominal power: 2500 kW, 630Vac,50Hz,
40' Client Switchroom Containers		**2**	
Container	(W x H x D) in mms 12192 x 2996 x 2438		- IP54

Fig 2.2-1: Equipment List

3. Lithium-Ion Battery Specification

3.1 Battery Cell

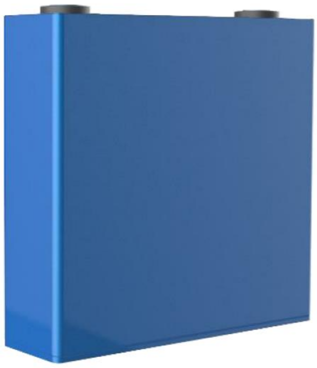
Sample	Item		Specification
	Cell Dimension, W x D x H [mm] (excluding terminals)		174 x 72 x 207
	Weight [kg]		c5.4kg
	Capacity [Ah] (nominal)		280
	Design Energy [Wh] (nominal)		896
	Energy Density	Gravimetric [Wh/kg]	165
		Volumetric [Wh/L]	357
	Voltage	Max [V]	3.65
		Nominal [V]	3.2
		Min [V]	2.5

Fig 3.1-1: Typical Specification of Battery Cell

3.2 Battery Module

Sample	Item		Specification
	Configuration		1P16S
	Design Energy [kWh] (nominal)		14.336
	Power [kW]	Continuous (CHG/DCHG)	14.336（1CP）
		Peak	-
	Operating Voltage(V)		43.2 ~ 58.4
	Dimension (W×D×H)		420 × 760 × 230
	Weight (kg)		~100
	E-Density	Gravimetric [Wh/kg]	141
		Volumetric [Wh/L]	195
	Recommended application		1CP↓

Fig 3.2-2: Typical Specification of Battery Module

3.3 Battery Rack

Each three racks consist of 26 battery modules and one DC switch gear, which has a rack-level BMS inside.

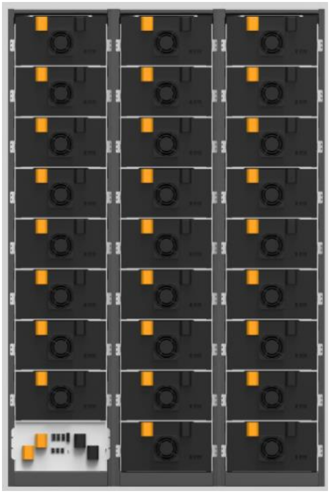
Sample	Item	Unit	Specification
	Configuration	-	1P416S
	Key component	EA	26 Modules, 1 Switch gear
	Dimension	mm	1620*760*2300
	Nominal Capacity	Ah	280
	Nominal Energy	kWh	372.7
	Nominal Voltage	Vdc	1331.2
TBD	Operating Voltage	Vdc	1,123.2 ~ 1,497.6

Fig 3.3-1: Typical Specification of Battery Rack

3.4 Switch Gear with Rack BMS

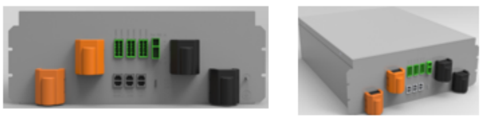
<table>
<tr><th colspan="3">Classification</th><th>Switchgear</th></tr>
<tr><td colspan="3">Image</td><td></td></tr>
<tr><td colspan="3">Dimension</td><td>420×760×230</td></tr>
<tr><td colspan="3">Weight</td><td>35Kg</td></tr>
<tr><td rowspan="4">Protect Device</td><td rowspan="2">DC Fuse</td><td>(+)</td><td>PV15M-400A</td></tr>
<tr><td>(-)</td><td>RSZ307-3-RAZ-400A1500V</td></tr>
<tr><td rowspan="2">DC Breaker</td><td>(+)</td><td>EVHB500HA-24S</td></tr>
<tr><td>(-)</td><td>EVHB500HA-24S</td></tr>
<tr><td colspan="3">Dielectric strength</td><td>AC 4000V for 60sec</td></tr>
</table>

Fig 3.4-1: Typical Specification of Switch Gear

4. Battery Connection Panel ('BCP') Specification

4.1 Specification of PMD-B3150K

DC side parameters	
Max. DC voltage	1500V
Nominal power	3150kW
Protection method	Load Switch +fuse
S/G load switch	
Load voltage	24Vdc
Load circuits	6
Transformer parameters	
Cable connection	3L4P
Input voltage	3P4W/AC400V/50Hz
General parameter	
Operating temperature	0~40℃
Cooling method	Temperature-controlled forced air cooling
Protection degree	IP20
Relative humidity	0~95% (Non-condensing)
Display	Touch screen
UPS	3 kVA

Fig 4.1-1 Typical Specification of PMD-B3150K

4.2 Battery Connection Panel Internal Heat Insulating layer Specification

- Container ceiling & side wall: rock wool, thickness 50mm;
- Container floor: rock wool, thickness 100m;
- Flame retardant material, level A

5. 53‘ Battery Container Specification

Item	Specification
Overall Dimensions of Container (W × H × D) in mms	16154 × 4138 × 2438
Weight (incl equipment)	Approx 63500kg
Operating Temperature range	- 30 to +50℃
Relative humidity	0 ~ 95% (No-condensing)
Max. working Altitude	4000 m (> 2,000 m derating)
Degree of protection	IP 54
Degree of anti-corrosion	C3
Cooling concept	Heating, Ventilation and Air Conditioning
Wind load	49.9 m/s
Snow load	1.91×10^{-3} Mpa.
Seismic category	Zone 4 (UBC 1997)
Painting color	To be confirmed
Main material	SPA-H (CORTEN-A)

Fig 5.1-1: Typical Specification of 53’ Battery Container

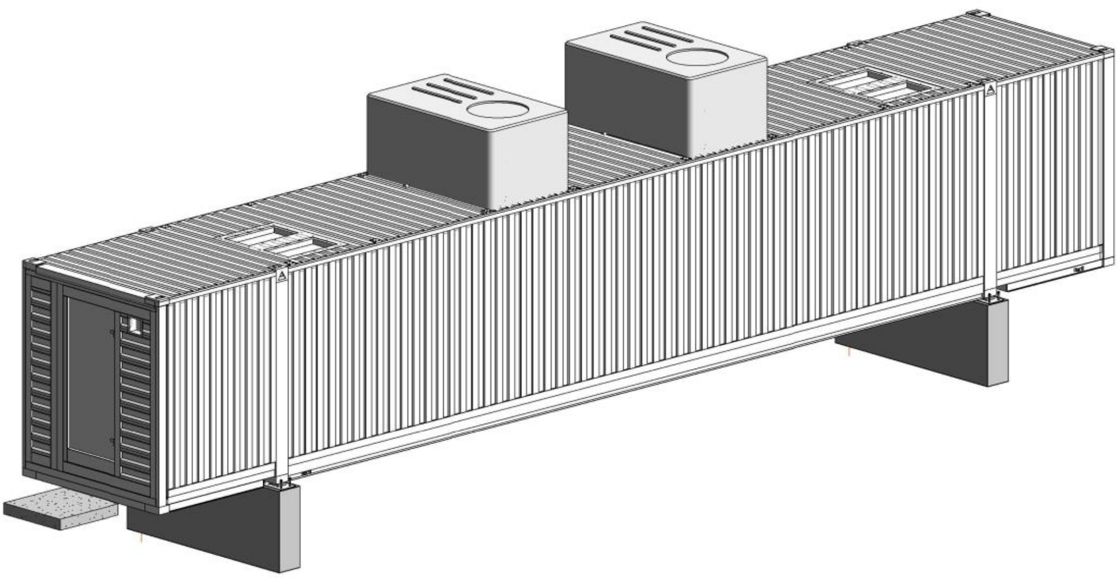


Fig 5.1-2: 3D view of 53’ Battery Container

6. Local Controller Specification

The local controller is used for the communication integration of different equipment in the energy storage system, faults and alarms management, parallel control of two or more energy storage inverters and offers one universal communication interface of the system.

Parameters	Specification	Remarks
Power Supply		
DC power supply	24VDC	
AC power supply	100～240VAC	
Interfaces		
No. of Digital Interface	8	Can be configured as alarm or fault interface
Display	Web Interface	Only for debugging
Communication Interfaces	RS485、Ethernet	Modbus RTU, Modbus TCP, IEC104
System parameters		
OS	Linux	
Installation method	Wall-mounted, rack installation	
Protection grade	NEMA 1 / IP20	Indoor
Operating temperature range	-30℃～60℃	
Cooling method	Natural cooling	
Relative humidity	0～95%	Non-condensing
Max. Altitude	4000m	
Dimensions (W × H × D)	440 × 44 × 241mm	
Weight	3kg	

Fig 6.1-1 Typical Specification of Local Controller

With consideration of different batteries and PCS's combination, heat dissipation system design, system operation control logic management, subsystem state of charge ('SOC') balancing etc, the system composition of the energy storage system is becoming very complex.

To simplify the control of energy storage system, local controllers integrated into the energy storage systems. With the local controller,the energy storage system can be considered as one equipment, rather than a bunch of different pieces of equipment interconnected together. It simplifies the external interface of the energy storage system and helps the Energy Management System ('EMS') to focus on the realization of the system control strategy.

Fig.6.2-1 Rendering of Local Controller

6.1 Features of Local Controller

The local controller has following features:

- Easy installation: standard 19-inch rack 1U design, support wall-mounting and rack installation.
- Flexibility: energy storage system can be configured to support various combinations of PCS and battery systems.
- Reliability: supporting balancing subsystems and system protection and alarm management.

Functions

- Battery and PCS system monitoring.
- HVAC, FFS and other auxiliary equipment monitoring.
- Power allocation between subsystems.
- Protection and alarm management.
- Subsystem balancing.
- Providing one data acquisition and control interface of energy storage system to EMS/PPC.

As shown in following picture, the local controller collects and uploads the real-time information of PCSs, battery system and other equipment in the energy storage system through Ethernet connection. At the same time, the EMS/PPC can control the storage system through the local controller. Within the control scope of the local controller, it processes the startup and shutdown procedure, protections and alarms management of different equipment in the system, power allocation of different energy storage subsystems etc.

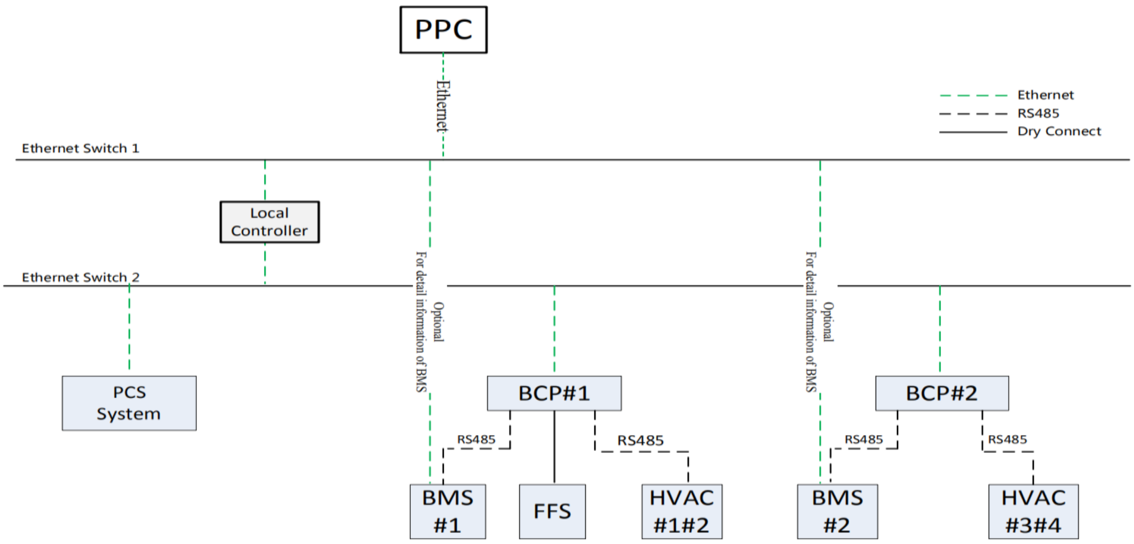


Fig.6.3-1 Communication topology of the system with the Local Controller

The Local Controller enables remote monitoring and data collection. As a minimum, real-time image, timestamping of voltage, current, kW, kVAr, kWh (in and out), SOC and temperature at various locations as well as time stamping of alarming / trips/error messages shall be cross-nationally available and deliverable.

7. PCS Battery Inverter Specification

Battery inverter offers electric connection between the electricity network and the batteries. It transforms the DC from batteries to AC by discharging, while it turns AC from the electricity network to DC by charging.

- Advanced three-level technology in SC2500HV which brings higher efficiency.
- Effective forced air cooling, 1.1 overload capacity up to 45℃;
- Wide DC voltage operation window, flexible for battery configuration;
- Typical applications: peak shaving, energy shifting, frequency regulation, capacity firming
- Compatible with high voltage battery system, low system cost
- Bidirectional power conversion system with full four quadrant operation（PQ）
- Compatible with high voltage battery system, low system cost

7.1 Single Line Diagram for PCS 2.5MVA Inverter

Fig.7.1-1: Typical Elevation View of 2.5MVA Inverter

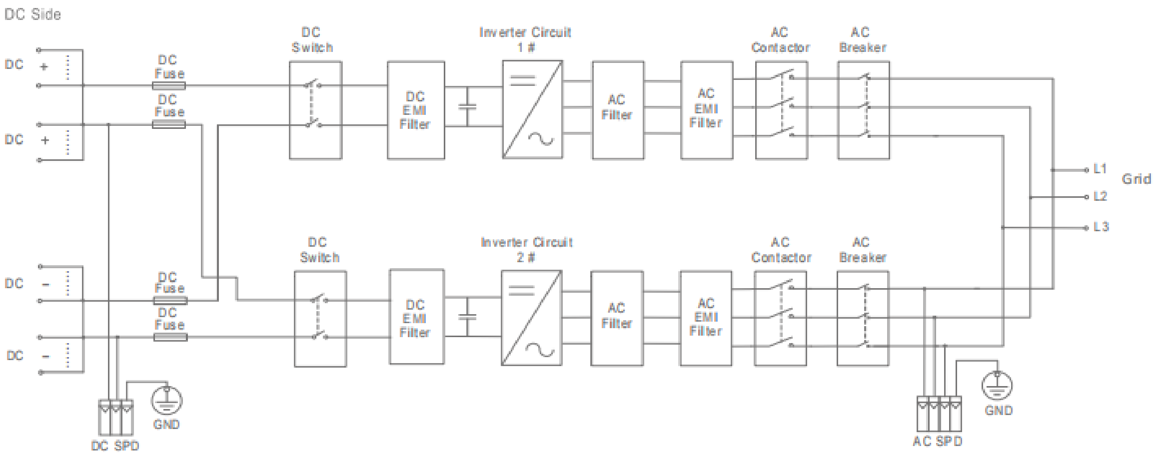


Fig.7.1-2: Typical Single line diagram of 2.5MVA Inverter

7.2 Specification of PCS 2.5MVA Inverter

DC Side Parameters	
Max. DC current	TBC
Working voltage range	800~1500V
AC Side Parameters	
Nominal power (at 50℃)	2500kW
Max. AC power at pf=1 (at 45℃)	2750kW
Max. AC current	2886A
DC component	<0.5%
Max. THD	<3% at nominal power
Nominal voltage	550V
AC voltage range	495~605 V
Nominal frequency	50
Frequency range	45~55Hz
Power factor at nominal power	>0.99
Power factor	1(lagging)~1(leading)
Off Grid Data	
Nominal output power	2500kW
Overload capacity	110% (continuous operation)
Nominal output voltage	550V+/- 3% (3 phase, 3 lines)
Nominal frequency	50Hz
Max THD for off grid output voltage	<3% (linear load)
Efficiency	
Max. Efficiency/European Efficiency	98.8%/98.5%
General Data	
Dimensions (W×H×D) in mms	2991 x 2591 x 2438
Weight	6000kg
Operating ambient temperature	- 30~60℃ (> 50 ℃ derating)
Max working altitude	4000m (>2000m derating)
Cooling concept	Temperature-controlled forced air cooling
Protection degree	IP54
Power reaction time	≤100 ms

Relative humidity (no condensing)	0~95% (Non-condensing)
Aux Power Supply	220 Vac, 2.0 kVA / Optional: 480 Vac,30 kVA
Display	Touch screen
Communication ports	RS485, Ethernet, CAN
Communication protocol	RS485, CAN, Ethernet; Optional: optical fiber
Electricity Network support	L/HVRT, L/HFRT, active & reactive power control and power ramp rate control

Fig 7.2-1: Typical Technical specification of 2.5MVA Inverter

As per the Battery Compound Layout and Elevations drawing, it is proposed to install two of the Sungrow SC2500HV PCS units on separate 40' Steel skids, along with two 2.5MVA double wound transformers. This arrangement would be similar to that used on operational battery storage projects in the UK.

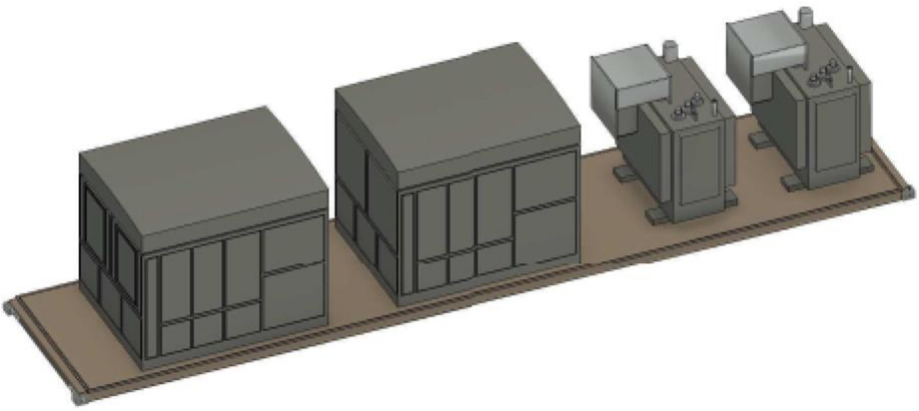


Fig 7.2-2: 3D View of 2.5MVA Inverter

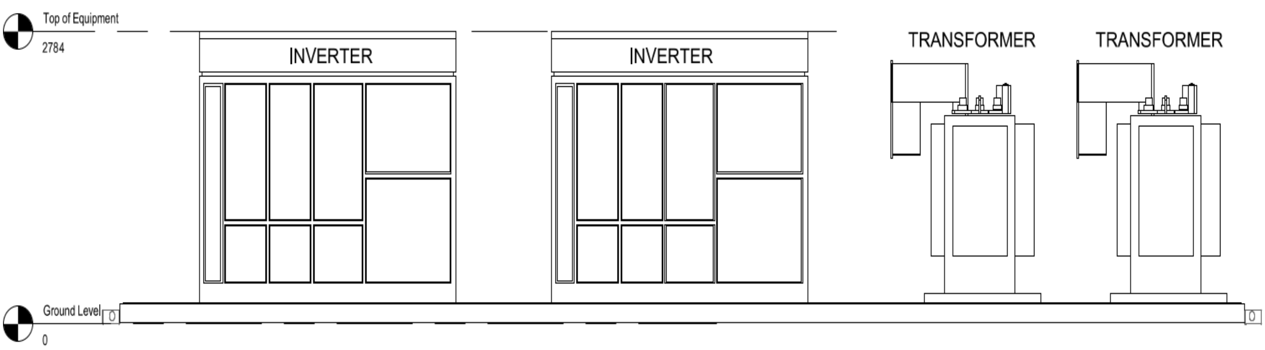


Fig 7.2-3: Front Elevation of 2.5MVA Inverter

8. 40‘ Client Switchroom Container

The 40‘ Client Switchroom houses the switchgear that controls the flow of electricity between the substation and the battery compound.

Item	Specification
Overall Dimensions of Container (W × H × D) in mms	12192 × 2896 × 2438
Weight (incl equipment)	Approx 30000kg
Operating Temperature range	- 30 to +50°C
Relative humidity	0 ~ 95% (No-condensing)
Max. working Altitude	4000 m (> 2,000 m derating)
Degree of protection	IP 54
Degree of anti-corrosion	C3
Cooling concept	Ventilation with spring closers in the event of fire
Wind load	49.9 m/s
Snow load	1.91×10^{-3} Mpa.
Seismic category	Zone 4 (UBC 1997)
Painting color	To be confirmed
Main material	SPA-H (CORTEN-A)

Fig 8.1-1: Typical Specification of 40’ Client Switchroom Container

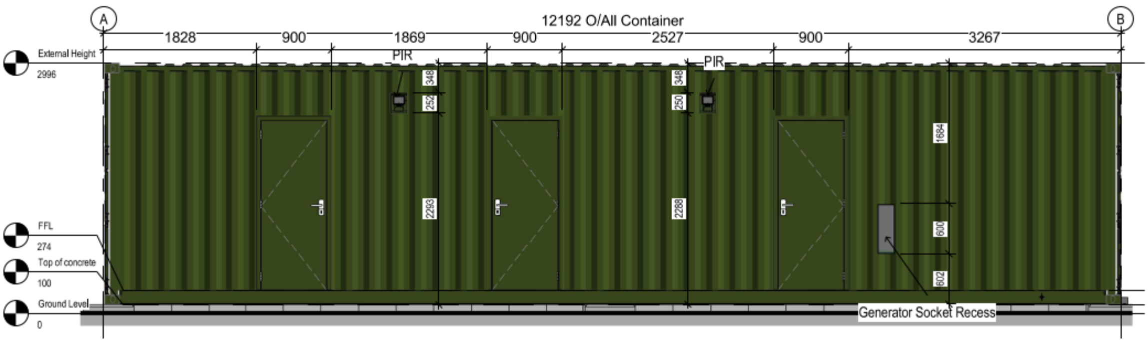


Fig 8.1-2: Typical Front Elevation of 40’ Client Switchroom Container

9. HVAC System

The Air Conditioner with Heat Exchanger is a cooling product developed for cabinets. It is applicable for the scenarios where internal equipment of the cabinet emits a large quantity of heat and needs to be isolated from the outdoor environment completely. The unit integrates the heat pipe exchanger with air conditioner. When the external ambient temperature is lower than the cabinet inner temperature, the heat pipe exchanger takes precedence to work, and 6.realize reduce heat-dissipating consumption.

9.1 HVAC Equipment Specification

Equipment	Description	Manufacture/Model	Certification
HVAC	Heating, Ventilation and Air Condition	To be confirmed	CE or equivalent
Operating temperature range		-25~45°C	
Cooling capacity		16 kW	
Cooling type		Non-condensing climate control	

Fig 9.1-1: Typical Specification of HVAC for Lithium-Ion Battery Storage

9.2 Operating principle

The operating principle of Air Conditioner with Heat Exchanger is shown as Fig.9.2-1. The heat exchange system and air conditioner share the same indoor/outdoor fans. The heat exchanger and the compressor of the Air Conditioner with Heat Exchanger adopt grading interlocking control. The heat exchanger is defined as the first level heat dissipation and the compressor is defined as the second level cooling. According to the cabinet internal/external temperatures, dividing into four working modes: internal fan running, heat exchanger running, air conditioner running and both running.

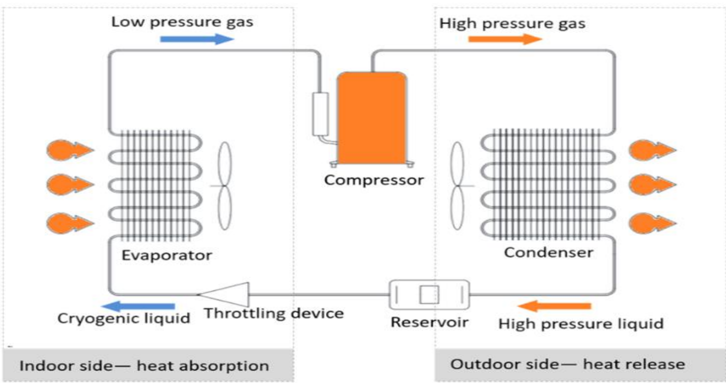


Fig. 9.2-1: Operating principle diagram

9.3 HVAC Features

- High reliability.
- Intelligent control.
- Energy-saving.
- Integrating air conditioner and heat exchanger, skilled technological and effectivecombination, air conditioner and heat exchanger backup for each other.
- Wide voltage range: 400Vac 50Hz, which will be powered by an aux. power supply transformer inside BCP.
- Offering dry contact and RS485 intelligent communication interface.
- Capable of maintain the ambient temperature inside battery enclosure between 17℃ and 35℃as suggest.

10. Automatic Fire Suppression System ('FFS')

To protect the battery storage system, it is equipped with an FFS (Fire Fighting (Suppression) System) inside the container. FFS includes a smoke detector, control panel, alarm device, exhaust pipe and bump head. It uses a clean fire suppression gas to minimize the damage to the BESS. Before gas blow-out, the system controller will send a signal to the HVAC main power switch to stop working as well as isolating the fans and thus achieve the fire suppression process. Remote monitoring of the BESS via SCADA will ensure that Humberside Fire and Rescue are immediately informed of any incidences where there is a risk of fire spread.

10.1 FFS Equipment Specification

Equipment	Description	Manufacture/Model	Certification
FFS	Clean agent fire suppression system	NOVEC1230 or equivalent	CE, IEC, ISO or equivalent

Table 10.1-1: Specification of FFS

10.2 Fire Suppression System Workflow

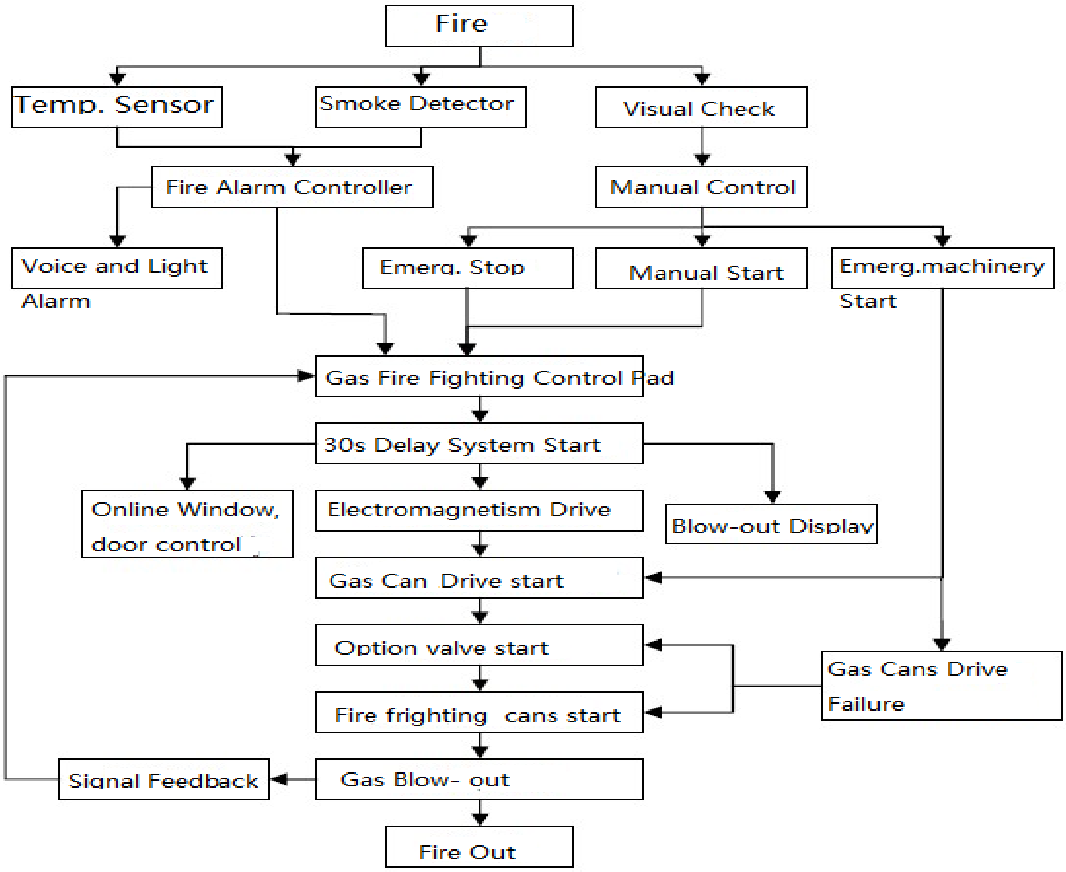


Fig. 10.2-1: Fire Suppression System workflow

10.3 Automatic Mode (No Operations and Maintenance personnel are on site)

If smoke and/or a temperature rise is detected inside a battery container, the smoke detector and/or thermal sensor inside that battery container will be activated which will send the fire alarm signal to fire suppression controller. The controller will then immediately switch to level one fire alarm status. The electric alarm will be activated in parallel and will also send out a signal to the remote monitoring control centre via SCADA who can cross check that the BESS FFS is functioning correctly and inform Humberside Fire and Rescue if there is a risk of fire spread. The system will respond with a fire suppression start signal. The controller immediately sends out a comprehensive fire alarm, and after leaving sufficient time to ensure that any nearby personnel evacuate the battery compound, the fire suppression sequence commences and releases the fire suppression gas inside the battery container to extinguish the fire. The controller will light up the external gas release status light to avoid people getting closer.

10.4 Manual Mode (Operations and Maintenance personnel are on site)

The Fire Suppression System controller will only send the alarm signals but without the corresponding reactions. When the personnel in the battery compound confirms the fire, they can press the Emergency start button to start the fire suppression sequence immediately and evacuate the compound. Before the gas releasing signal is sent out, pressing emergency stop on the control board or manual stop can stop the fire suppression sequence if it turns out to be a false alarm.