# *Welcome to our Information Meeting on BESS safety*

***By Simon Cox and***
***Marcus Jones AMIMarEST, DipMarSur(IND)***
***Member of Electrical SIG ImarES,MBF Working group***

26 November 2025

This Zoom meeting will be recorded and made available on our website.

# Welcome

STOP LIME DOWN

| | |
|---|---|
| **Introduction** | **Anna-Kate Fuller** |
| **Lime Down BESS** | **Simon Cox**<br>an experienced consultant, who has undertaken a wide range of risk management and Health & Safety management compliance reviews.<br>Simon is the SDL work stream lead on Major Accidents & Disasters. |
| **Noise & Vibration** | **Simon Durrant**<br>Simon is the SDL work stream lead on Noise & Vibration. |
| **What is a BESS** | **Marcus Jones AMIMarEST, DipMarSur(IND)**<br>Member of Electrical SIG ImarES,MBF Working group |
| **Your Q&As** | Please place your question in the **Q&A function** |

25 November 2025

# STOP LIME DOWN SOLAR

## 9 JANUARY 2026

**It's now or never.**
**MAKE YOUR VOICE HEARD NOW,**
**before it's too late.**

**Please register.**

stoplimedown.com

# Very Important

Registration and ‘Relevant Representations’ are a **single process**

So, **before** you start registration, you need to think about **the issues that concern you** and maybe draft them out in writing.

Once you have submitted your registration form, **you will not be able to go back and add any more relevant representations.**

If you are registered, there will be a further opportunity to comment in **more details** at the Examination Stage (the ‘**Written Representations’** next year).

# www.stoplimedown.com

# How to Register

1. Google “Planning Inspectorate Lime Down”, Or “limedown@planninginspectorate.gov.uk” Or go to www.stoplimedown.com

2. Click **Project information**

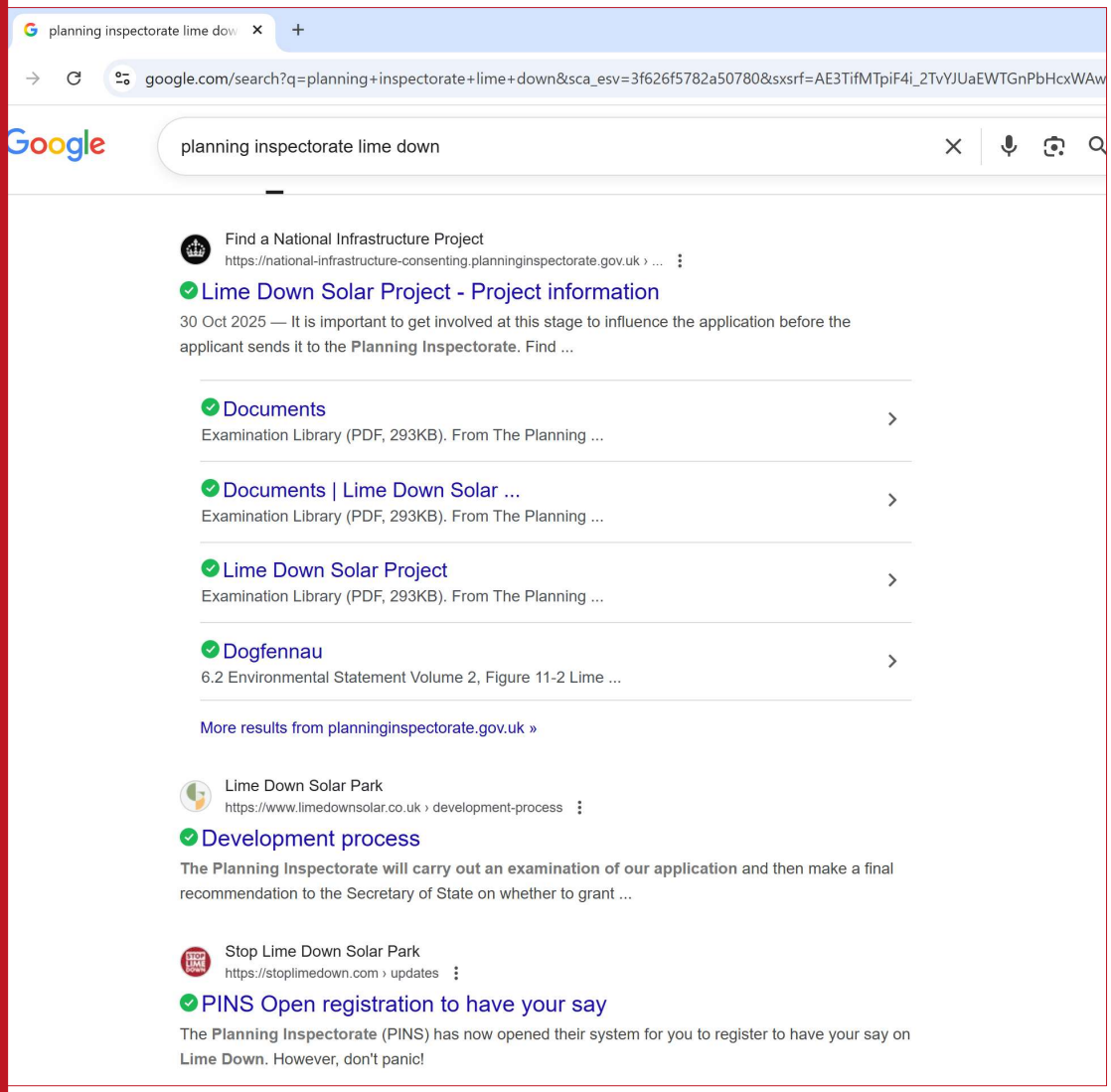
3. Click **Register to have your say**

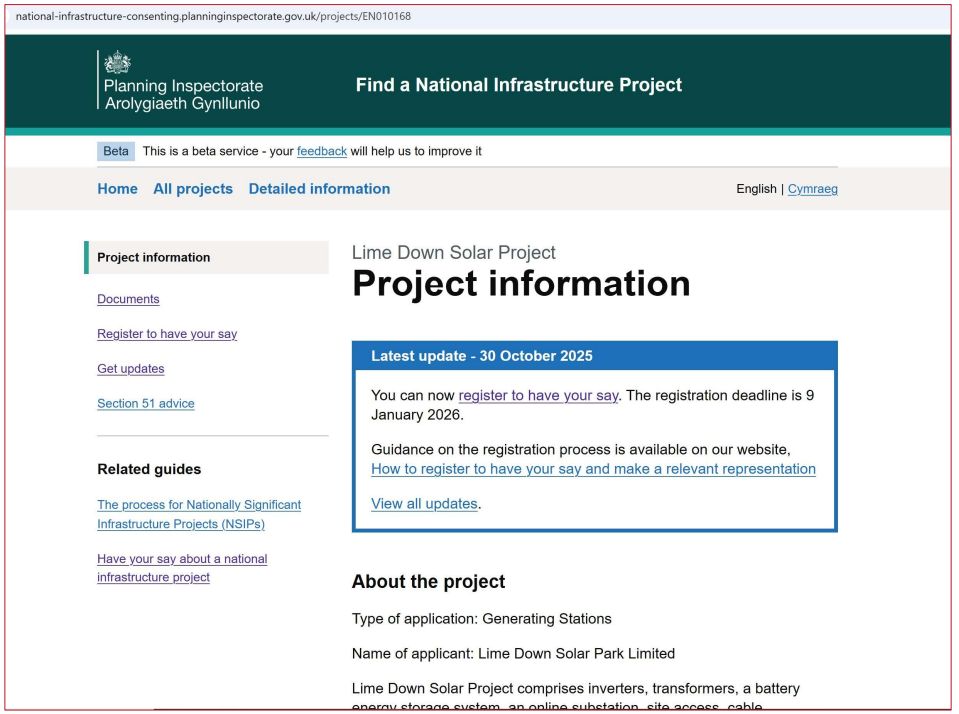
4. Click **Start Now**

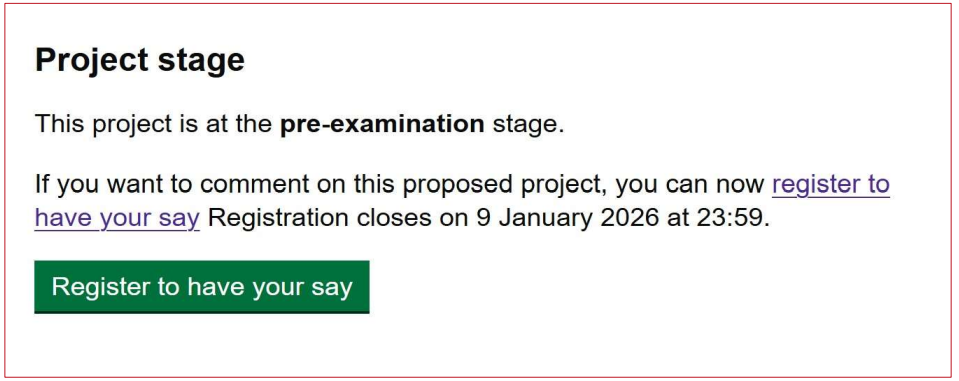
You will be given an **interested party reference number** which you must use for future submissions

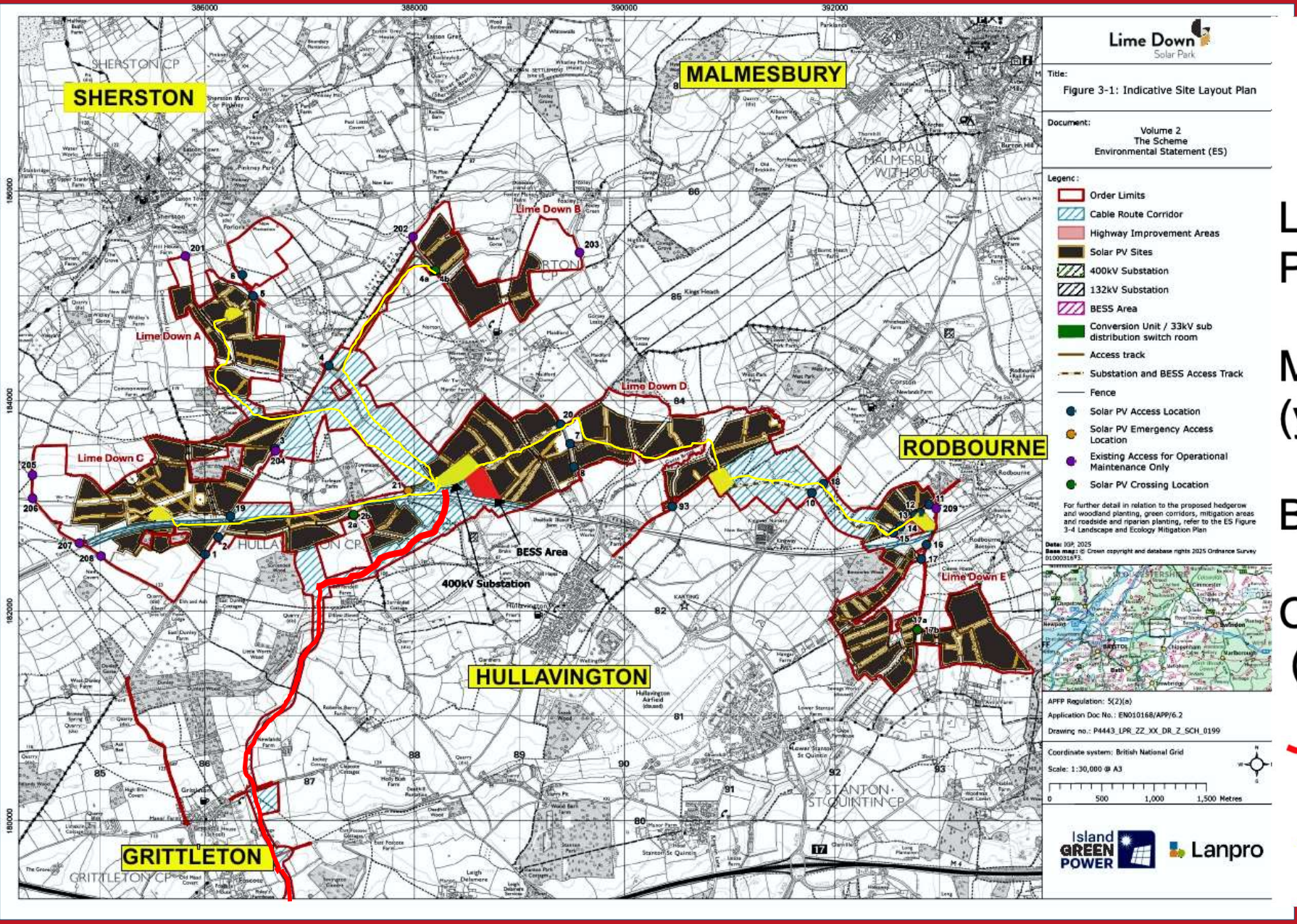
5. **Follow the simple instructions:**

- Who are you registering for?
- Full name
- Are you 18 or over?
- Email address
- Postal address
- Phone number
- **What do you want to tell us?**
- Check your answers
- Declaration
- Submit


planning inspectorate lime dow
google.com/search?q=planning+inspectorate+lime+down&sca_esv=3f626f5782a50780&sxsrf=AE3TifMTpiF4i_2TvYJUaEWTGnPbHcxWAw
Google
planning inspectorate lime down
Find a National Infrastructure Project
https://national-infrastructure-consenting.planninginspectorate.gov.uk › ...
Lime Down Solar Project - Project information
30 Oct 2025 — It is important to get involved at this stage to influence the application before the applicant sends it to the Planning Inspectorate. Find ...
Documents
Examination Library (PDF, 293KB). From The Planning ...
Documents | Lime Down Solar ...
Examination Library (PDF, 293KB). From The Planning ...
Lime Down Solar Project
Examination Library (PDF, 293KB). From The Planning ...
Dogfennau
6.2 Environmental Statement Volume 2, Figure 11-2 Lime ...
More results from planninginspectorate.gov.uk »
Lime Down Solar Park
https://www.limedownsolar.co.uk › development-process
Development process
The Planning Inspectorate will carry out an examination of our application and then make a final recommendation to the Secretary of State on whether to grant ...
Stop Lime Down Solar Park
https://stoplimedown.com › updates
PINS Open registration to have your say
The Planning Inspectorate (PINS) has now opened their system for you to register to have your say on Lime Down. However, don't panic!


national-infrastructure-consenting.planninginspectorate.gov.uk/projects/EN010168
Planning Inspectorate
Arolygiaeth Gynllunio
Find a National Infrastructure Project
Beta This is a beta service - your feedback will help us to improve it
Home All projects Detailed information
English | Cymraeg
Project information
Documents
Register to have your say
Get updates
Section 51 advice
Related guides
The process for Nationally Significant Infrastructure Projects (NSIPs)
Have your say about a national infrastructure project
Lime Down Solar Project
Project information
Latest update - 30 October 2025
You can now register to have your say. The registration deadline is 9 January 2026.
Guidance on the registration process is available on our website, How to register to have your say and make a relevant representation
View all updates.
About the project
Type of application: Generating Stations
Name of applicant: Lime Down Solar Park Limited
Lime Down Solar Project comprises inverters, transformers, a battery


Project stage
This project is at the pre-examination stage.
If you want to comment on this proposed project, you can now register to have your say Registration closes on 9 January 2026 at 23:59.
Register to have your say




Lime Down

October 2025

Legend:
Panels (black)

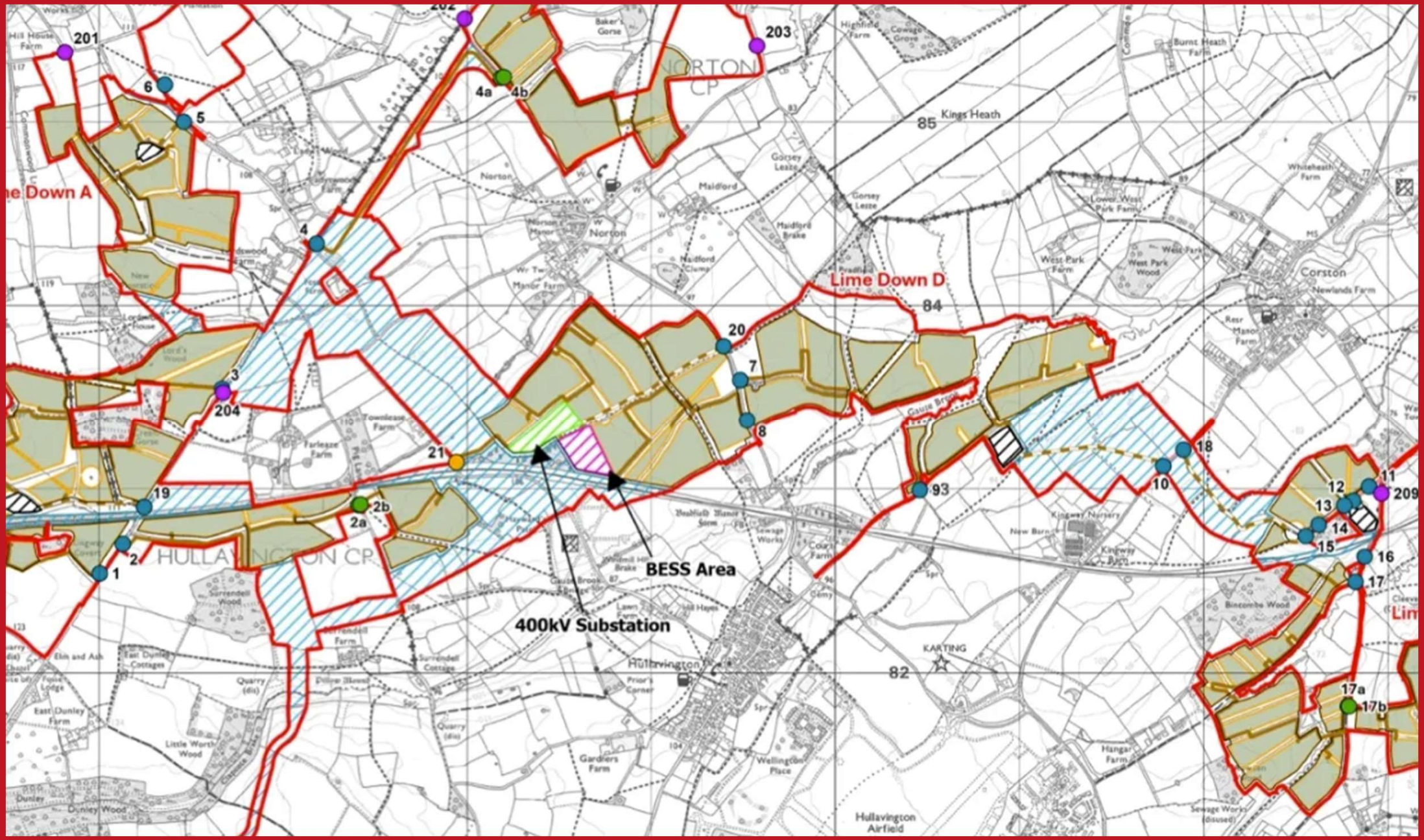
Major substations (yellow)

BESS (Red)

Cable routes (blue diagonal)

400kV

132kV


201
202
203
6
5
4a
4b
4
3
204
21
19
2b
2a
2
1
20
7
8
18
10
93
11
209
12
13
14
15
16
17
17a
17b
Lime Down D
BESS Area
400kV Substation
HULLAVINGTON CP
NORTON CP
Kings Heath
Norton
Maidford
Corston
Hullavington
KARTING
Hullavington Airfield

# The Battery Energy Storage System (BESS)

## In about 270 Containers close to Hullavington

**Picture ES Plate 3-9**

## *Why is a BESS thermal runaway is likely at Lime Down?*

- The battery cells will be stressed by daily charging from the grid (not local solar energy) when prices are low (early morning) and released (sold) back to the national grid (early evening) when prices are high – this is arbitrage NOT Green energy;
- The BESS cabinets smoke detection units do not have to be located based on air flows to detect smoke at the earliest possible time, there are no BESS design requirements on this;
- BESS heat or smoke detection units are not required to be separately wired, with fault message facility, it's assumed they are working; and
- There is no heat or smoke detection equipment testing regime – such as every 6 months in offices.

## *BESS fire: What Island Green Power / Lime Down Solar Park say*

If the battery cells associated with the BESS Area become damaged by heat or are burnt within a fire affecting a single module, a rack of modules or multiple racks, then the combustible materials consumed in the fire could give rise to a range of organic and inorganic air pollutants.

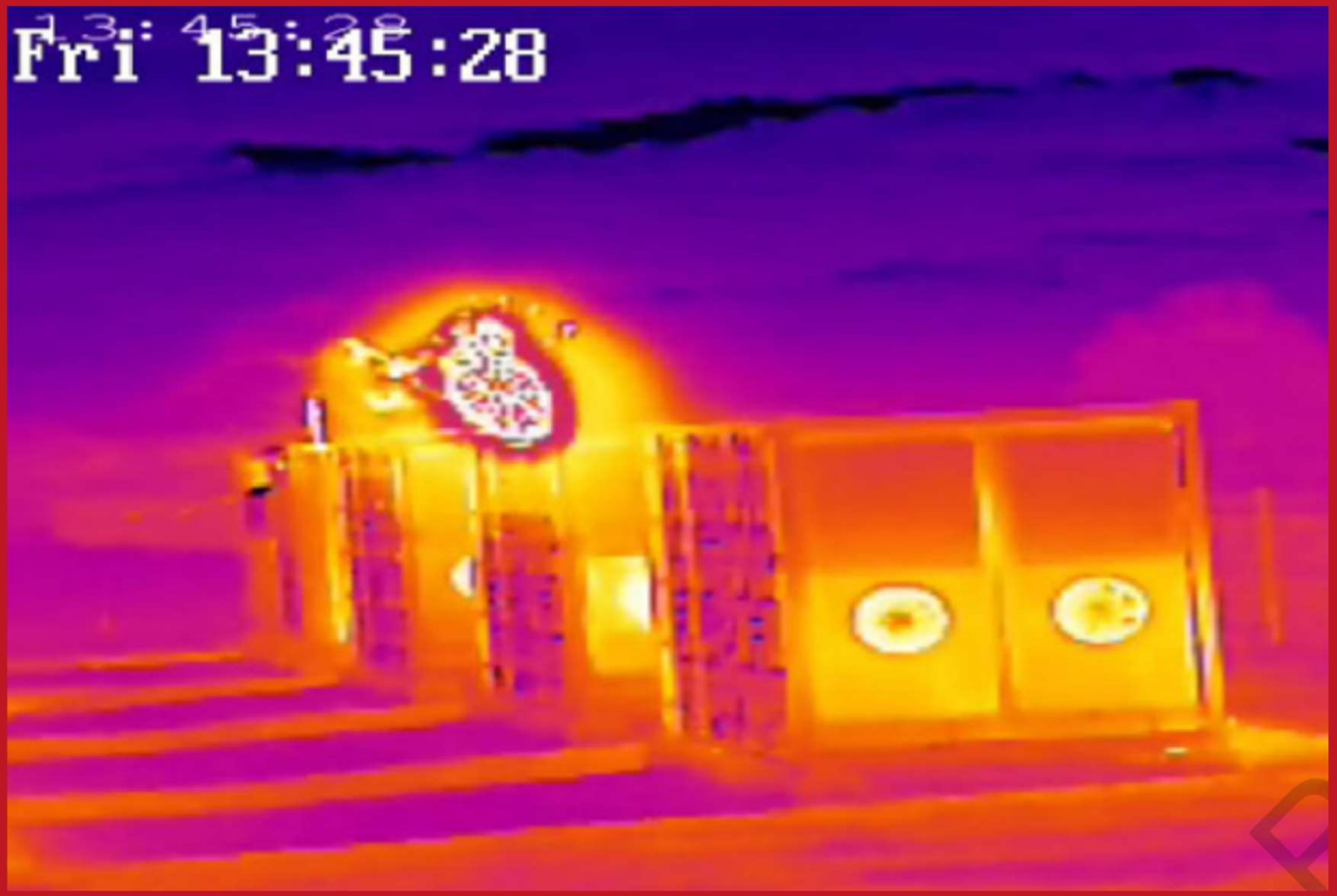
An assessment of how these fumes could impact residential properties and species is provided in **ES Volume 1, Chapter 15: Air Quality [EN010168/ APP/6.1]** which concludes that no significant effects are predicted should a fire event occur. The proximity of the BESS Area to sensitive receptors (more than 350m from the nearest PRoW and more than 600m from any residential receptors) provides adequate attenuation through the dispersion of airborne pollutants.

# *The reality*
# *Moss Landing, California 16th January 2025*

# *But it would not happen in the UK? Liverpool 15th September 2020*

# *But not locally?*
# *Cirencester 28th March 2025*

# *Cirencester 28th March 2025*
# *CCTV image @ 13.45 –*
# *why was Fire Service not called by the operator, Gridserve?*



# *Cirencester Fire demonstrates poor BESS safety regime*

**13.35 (Time)**

Voltage variance detected on the DC source, with fluctuations of ~60-100V at BESS 4.

**13.39**

Voltage spiked to 1998V (limit: 1500V), exceeding operational level (1400V) by 600V.

**13.39**

Over 260 different alarms/faults recorded at BESS 4.

**13.45**

CCTV footage shows an explosion and flames fromtop BESS 4.1.

**15.31**

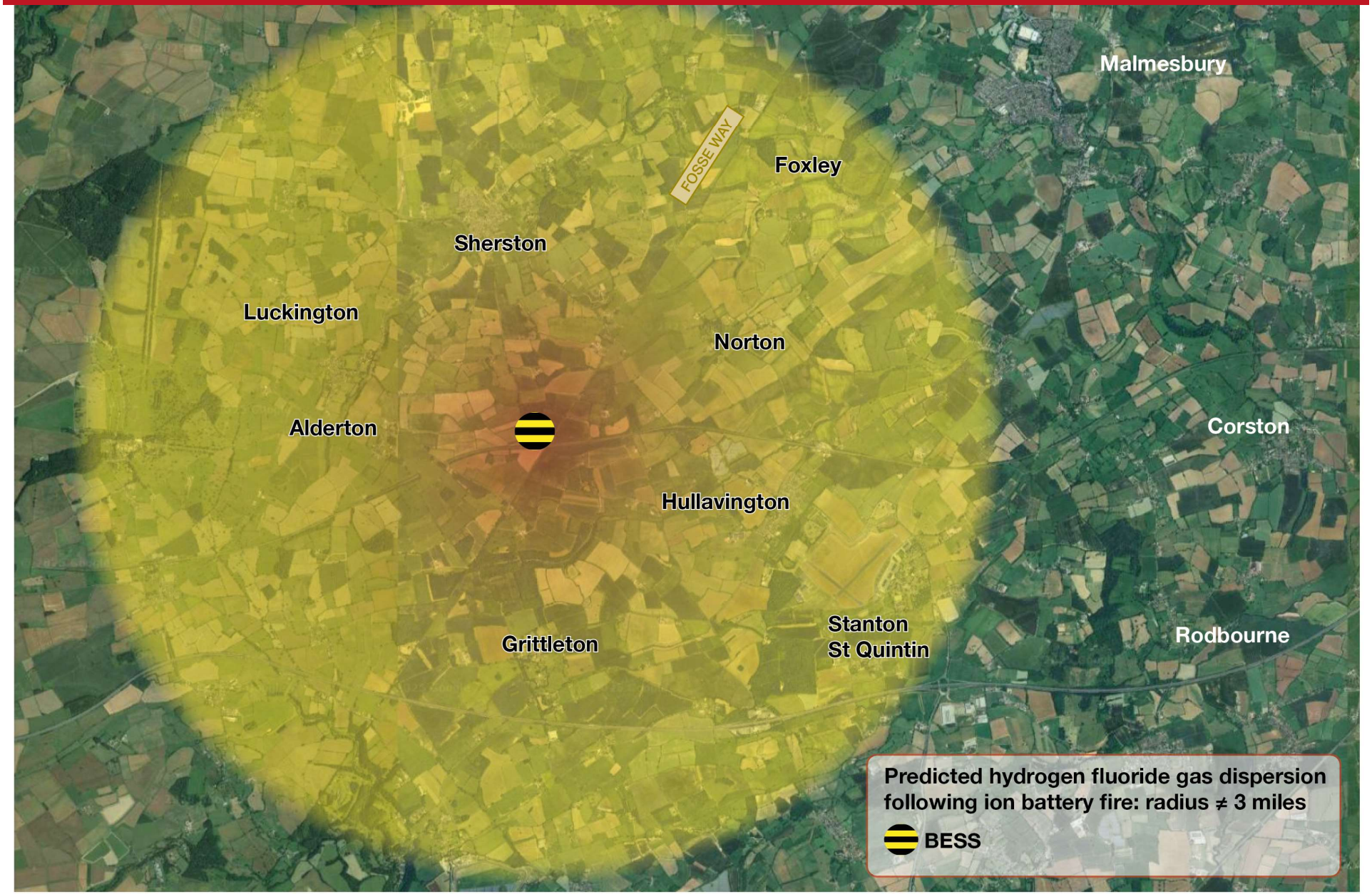
Gloucester Fire Brigade receive report of Fire from member of public

6 Fire appliances deployed, 1st appliances arrives at **16.05**

# *Wider BESS fire issues*

- Capacity of Wiltshire Fire Service to deal with a large scale incident at Lime Down
- Any fire would potentially close main railway line, possible for days in the case of an incident as occurred at Liverpool
- Water supply at BESS location for fire suppression and cooling
- Bunding of BESS site to retain contaminated water
- Risk to human and animal health from toxic smoke, risks are below safe levels for those with underlying health conditions e.g. asthma, young people and older people
- Ground contamination from toxic materials released
- Ground and water course contamination risks, if bund fails or is insufficiently in capacity

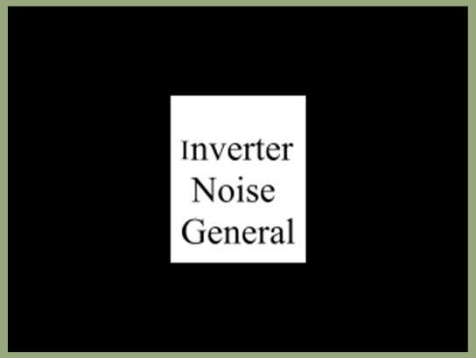
# The Lime Down potential evacuation area



# How Lime Down Limited try to hide the noise problem.

# Some background information

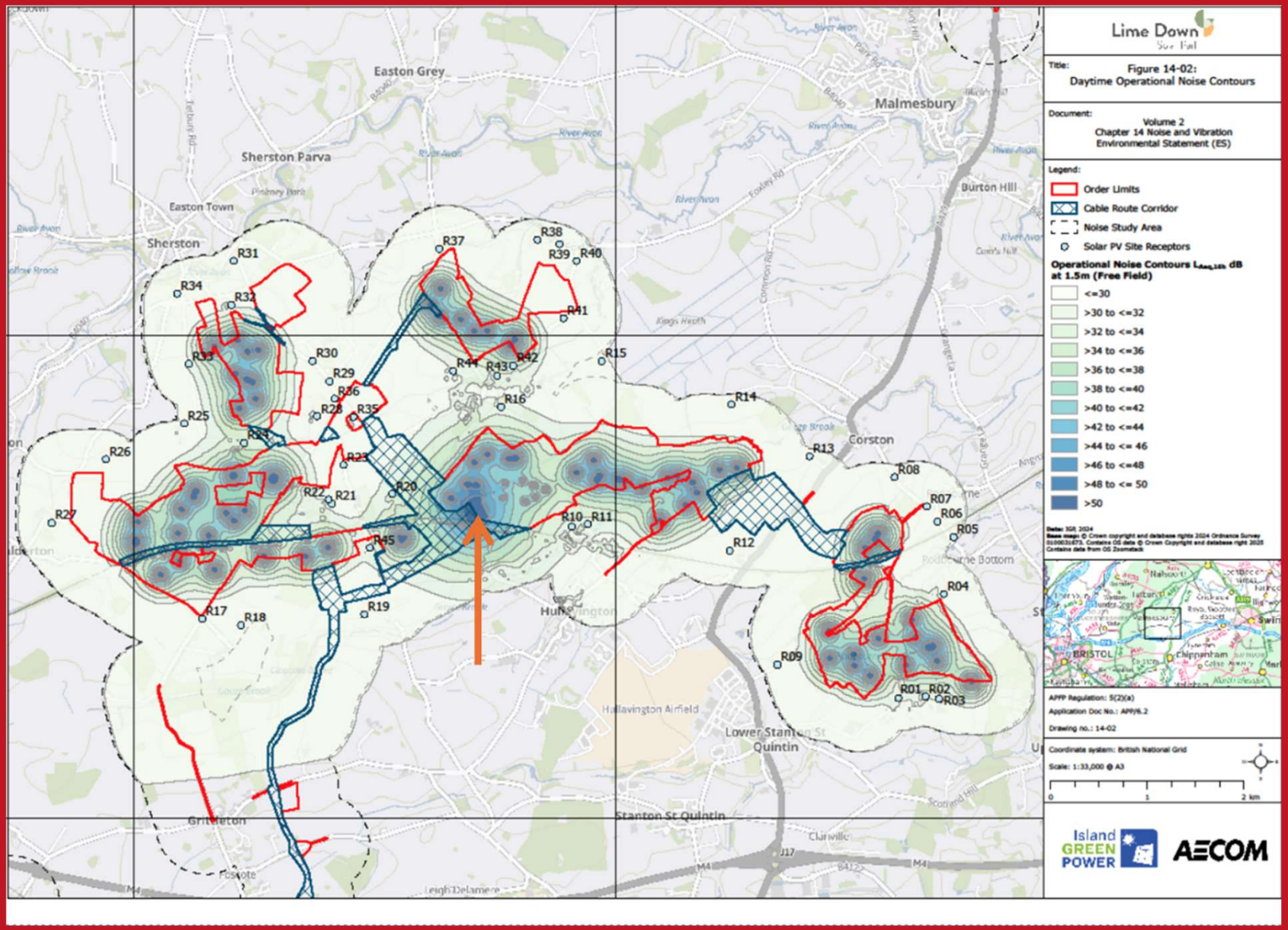
- deciBells – dB are a logarithmic measure of sound, not linear.
- **+3 dB** is a doubling of how loud something is. **dB A** is weighted to match human hearing.
- **0 dB A:** The quietest sound a healthy human ear can hear.
- **10 dB A:** Normal breathing.
- **20 dB A:** Rustling leaves.
- **30 dB A:** A whisper.
- **40 dB A:** A quiet library.
- **50 dB A:** Rainfall or a refrigerator humming.
- **60 dB A:** Normal conversation.
- **70 dB A:** A vacuum cleaner or TV audio.
- **85 dB A:** A noisy restaurant or lawnmower; prolonged exposure can cause hearing damage.
- **90 dB A:** A hairdryer or blender or train doing 90mph.
- **100 dB A:** A construction site or motorcycle riding.
- **110 dB A:** A loud concert or nightclub.
- **130 dB A:** An airplane taking off nearby or a jackhammer.
- **140 dB A:** Pain threshold, serious hearing damage can occur from short exposure.



# The tricks Lime Down Ltd use

- The Lime Down noise maps show noise contours generated by the equipment. They only show from 30dB to “>50dB”: More than 50dB
- So, this trick immediately disguises the real loudness.
- Analogy is a Police Officer using a speed gun that only measures to 50mph – every vehicle on the motorway is doing 50mph!
- In fact, every piece of equipment that has a noise figure stated is much greater than 50dB e.g.
- There are 72 “BESS containers” of a type that generates 82.6dB
- That’s 33dB (33 / 3 = 11 times) louder than indicated by >50dB

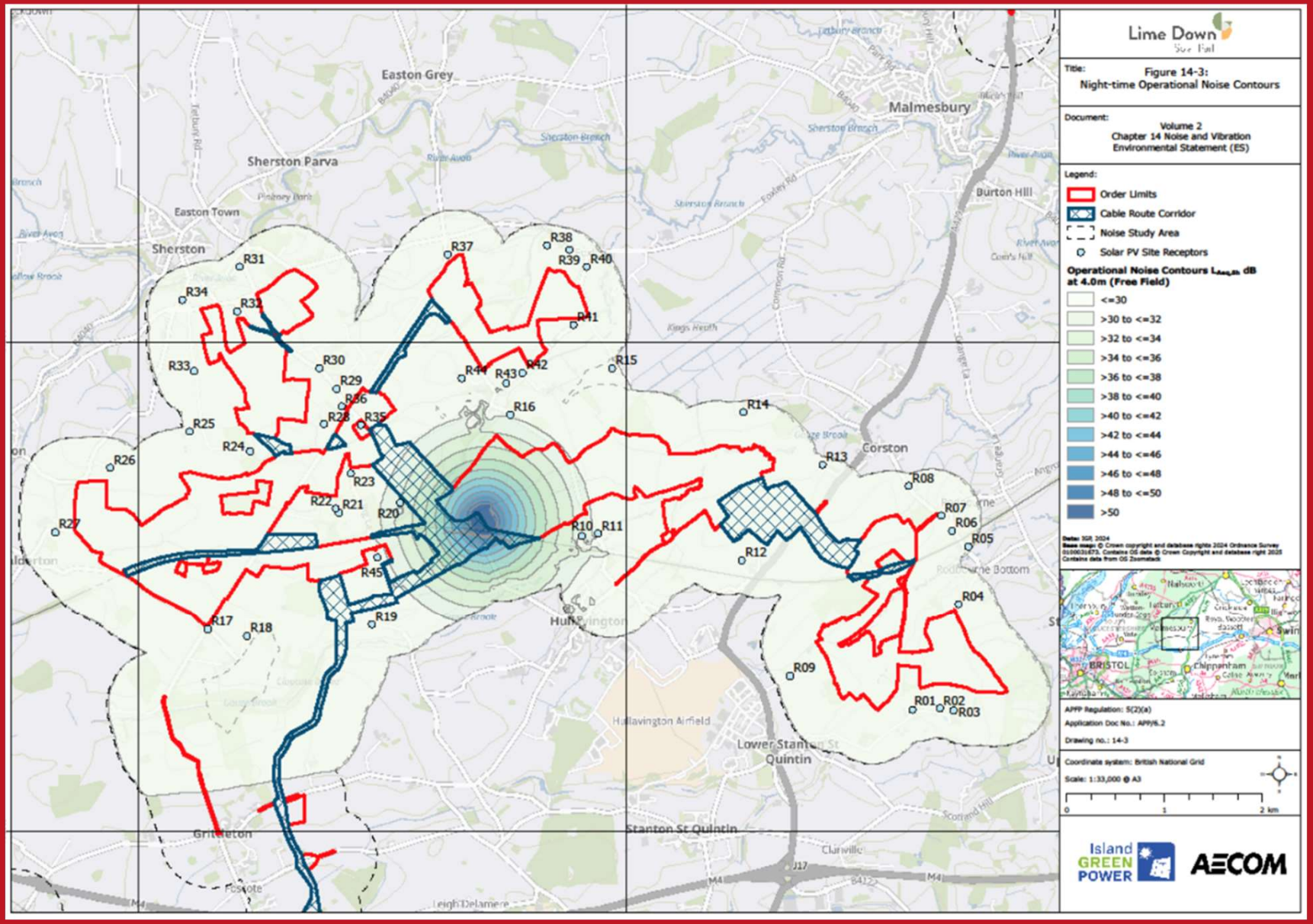
# Daytime noise




Each of the small dark blue dots is an equipment that generates 90.6dB of noise. That's 40.6dB more than the >50dB shown. 40.6 / 3 = 13.5 times louder than indicated.

The BESS has a calculated total noise output over 110dB
It's right, that is >50dB

# Nighttime noise




**It's that BESS again.**

**Note that the 30dB contour is further out to the South than the daytime noise map: The BESS is louder at night than in the day.**

# The tricks Lime Down Ltd use

- The second trick is to not consider any noise beyond 500m.
- This neatly avoids acknowledging noise in Sherston, Hullavington, Corston… so it looks like no one is going to be impacted.
- Couple this with dense overlays that mean you can't even see Norton, for example, and you'd think no one is affected at all.
- All the noise figures we have come from Lime Down as the manufacturers don't give public access to the equipment data.
- If 500m is enough, how come I can hear the M4 from over three miles away when walking in the Lime Down area?

# The tricks Lime Down Ltd use

- The third big trick is to get the Planning Inspectorate to agree that the solar panels should be “out of scope” because they are silent.
- Following this, they introduced the bigger, moving panels that will make noise.
- Because they are “panels” they are still “out of scope” so none of the noise they will make is included in the models.
- So far, have not found any noise figures for the active panels.
- They also got the Wiltshire EHO to agree that any noise measurements are to be done between 5 a.m. and 7 a.m.

# THE SERECT LIFE OF BESS

By Marcus Jones AMIMarEST, DipMarSur(IND)
Member of Electrical SIG ImarES,MBF Working group
www.lsemarine.com , Contact marcus@lsemarine.com

## *So what is BESS*

## *BESS is a BATTERY ENEGRY STORAGE SYSTEM.*
## *And looks like this.*

## *What is inside the BESS*

- Battery energy storage systems (BESS) is just a jumbo sized Lithium battery pack. Like those in electric cars (EV) or in your phone or laptop

- A BESS is required to smooth out supply to the national grid. Where wind or solar is used for generation.

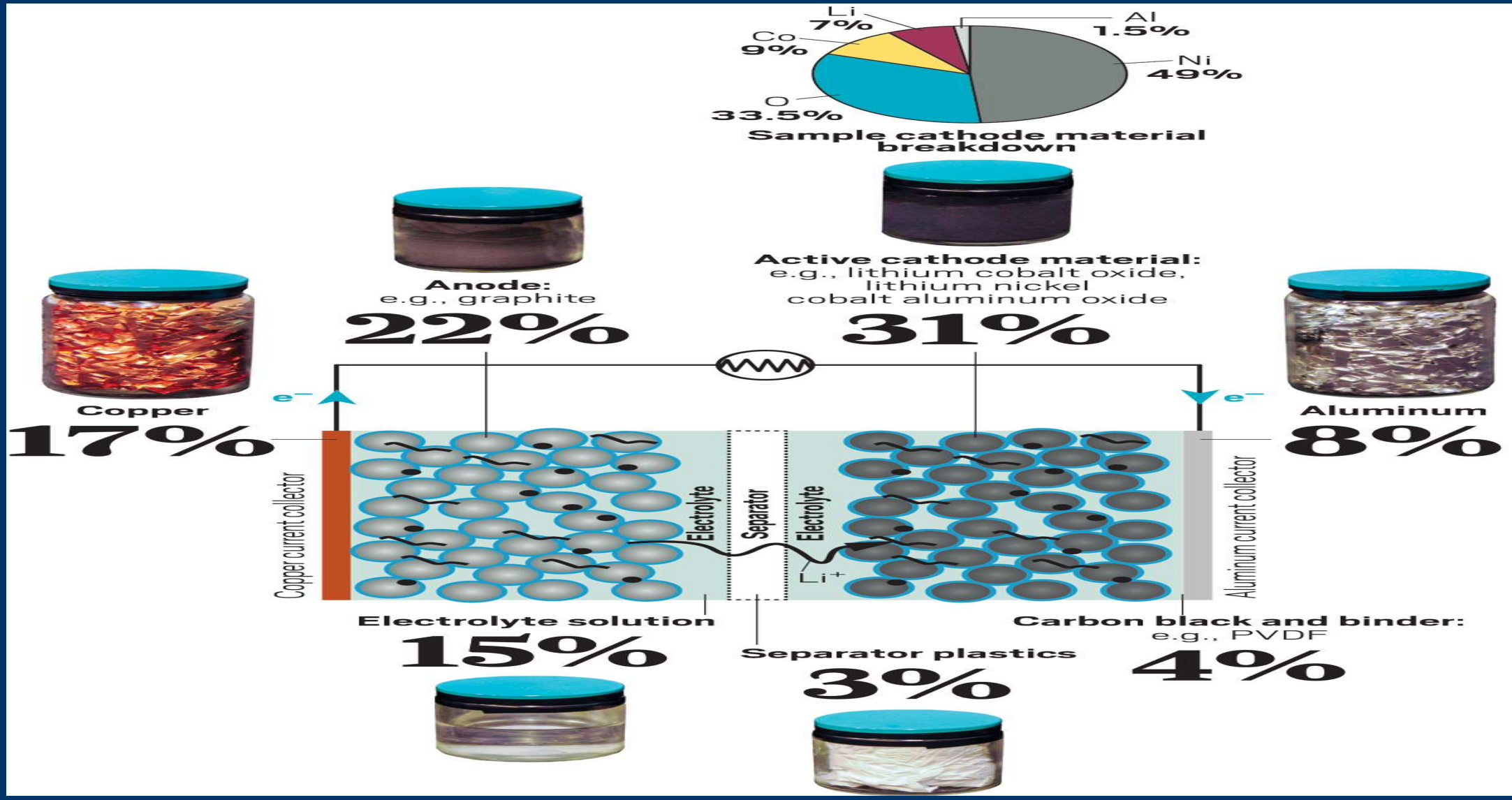
- The BESS is made of Lithium cells
- Lithium cells are great things, and can store a lot of energy. But they have a secret, which makes safety challenging. When they release energy in a uncontrolled way.

## *WHAT IS A LITHIUM BATTERY*

LITIUM BATTERIES: LiBs

- Lithium Ion is generic term that covers all the chemistry types below. Its NOT! a chemistry itself !!!
- Types named after the cathode material.
- LPF($LiFePO_4$), NMC($LiNiMnCo_2$), LCO($LiCoO_2$), LMO($LiMn_2O_4$), LTO($Li_2TiO_3$), NCA($LiNiCoALO_2$)
- Invented in the 1970and 80s. For small devices.

# *INSIDE THE LITHIUM CELL*



## *LITHIUM BATTERY CELLS*

- CELL FORM FACTORS
  - 18/6/50 CYLINDRICAL (NUMBERS REF TO LENGTH/ DIA IN MM = 18mm LEGNTH/6.5mm DIA) OTHER SIZES ARE MADE.
  - POUNCH CELL FLEXIBLE POUNCH WHICH CAN BE SHAPED TO FIT WITHIN A CASE.
  - PRISMATIC CELL HARD CASE THE SIZE TWO 20 CIG PACKS STACKED PLACED SIDE BY SIDE
  - ALL FORMS APPEAR IN ALL APPLICATIONS
  - CELLS MADE INTO STRINGS (SERIES) AND THEN MODULES OR BATTERY PACKS.

# LITHIUM BATTERY CELLS

## *CELLS MAKE UP MODULES,*

Many modules make battery packs,
Many battery packs make a BESS in a box.

## *LITHUIM BATTERY NORMAL LIFE*

- NORMAL OPERATION

- Exothermic heat production. Natural part of function
- Ions transfer across the cell. Lithiation of the Anode graphite.
- CATHODE TO ANODE ON CHARGING
- ANODE TO CAHTHODE ON DISCHARGING

- Formation of SEI (Solid electrolyte interface).
- Cell separator

## *LITHUIM BATTERY SECERTS*

- FAILURE !!

- Exothermic heat production. Or wants to release energy in an uncontrolled way, rather than store it.

- LiBs are thermodynamicaly unstable. Not supposed to exist.
- *Lithium batteries don't commit suicide, they are murdered.*
- SEI layer is the brakes on the natural chemical reactions (exothermic)
- Exothermic reactions continue until energy is used up.

## *LITHIUM BATTERIES DON'T COMMIT SUICIDE*

- **FAILURE**.

- Thermal Runaway: What it is.

- Rapid rise in cell temperature over time

  – Self sustaining exothermic chemical reaction increasing temp faster than it can be dissipated from the surface area of cell causing thermal decomposition of chemistry.

  – They are Murdered by abuse:
  Physical damage, Over charging, Low temp charging, High ambient temp, OM defects, Water ingress, short circuit, Defeat or error in BMS electrics or software.

  – Currently TR can be slowed, but not halted.

***TWO FACTS TO TAKE AWAY.***

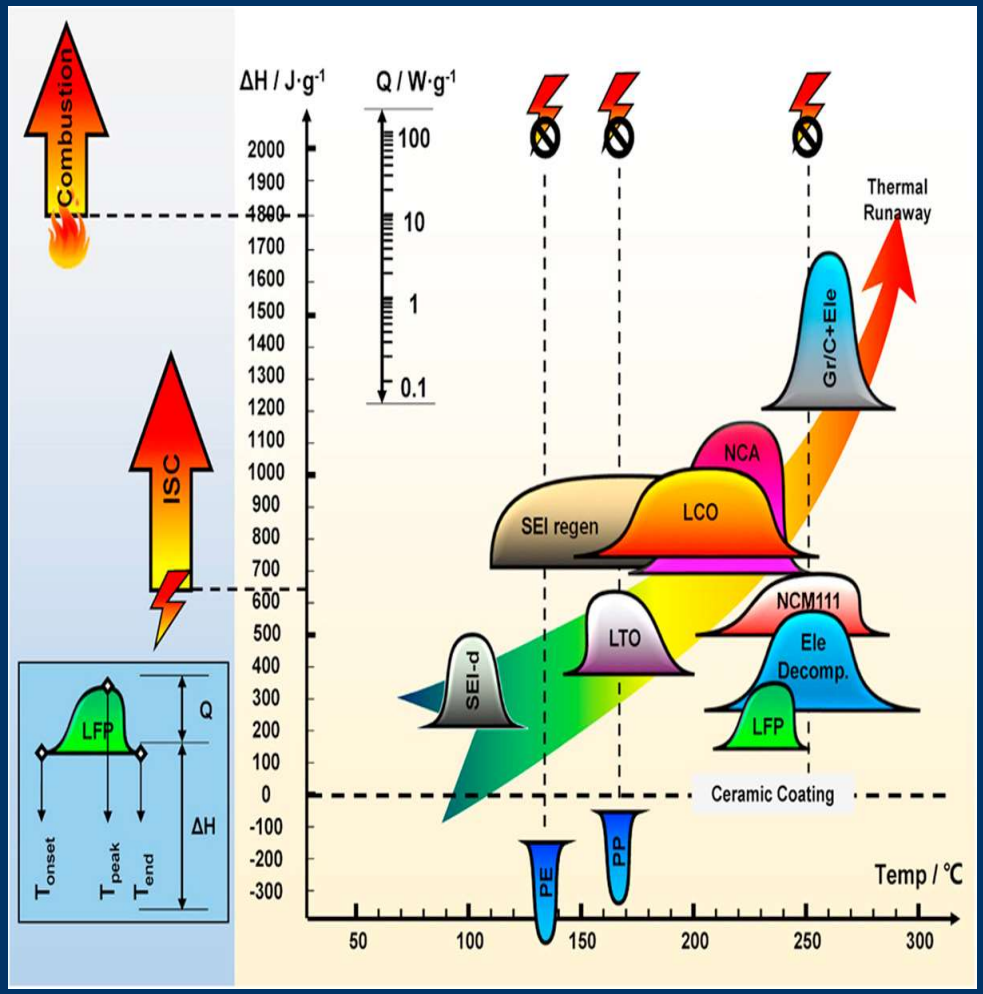
YOU TAKE AWAY NOTHING MORE THAN THIS, I HAVE DONE SOMETHING!.

******(TR)THERMAL RUNAWAY= HEAT, NOT A FIRE, NO ACTIVE FIRE IS NEEDED.******

******CAN OCCURE IN ALL CHEMISTRIES, BUT IS EXPRESSED IN DIFFERENT WAYS, CHANGING PRIMERY HAZARDS!!!******

.

# *THERMAL RUNWAY IN DIFFENT CHEMISTRIES*




General stages of thermal runway

Separator brake down 60c
SEI breakdown 70C
Gas and vaporising of electrolyte
90 to 220C
Cathode decomposition 200C
Burning of battery 500C

H2 auto ignition 500C.
Electric spark temp 6000C plus
Thresholds change with age!

## *FAILURE CAN RESEULT IN….*

- ***Remember !! THERMAL RUNAWAY= IS NOT A FIRE, ITS HEAT!! No Active fire needed!***
- Results:
- BATTERY EXPLODES
- BOIL OF VAPOUR CLOUD (LOW SoC CAN STILL RESULT IN THIS) NO FIRE, EXPLOSIVE ATMOSPHERE.
- FIRE OR FOCUSED ROCKET LIKE FLAMES 1000C
- ***VAPOUR CLOUD EXPLOSION IF IGNITION IS DELAYED. (DEFLIGATION)***

## *ITS MORE THAN A FIRE.*

- Venting of gases.
  - VAPOUR VOLUME 500-5000 LITRES PER KWH depending of cell form and chemistry.
  - 2 types of vapour cloud, lighter and denser then air, One or other will dominate Not fully understood yet.
  - Highly flammable.
  - LEL 6%-11% NMC or LFP 5% to 80%
  - Danger to life and health (DLH well below LEL)
  - Corrosive and toxic cloud.
  - Fire suppression doesn't stop TR currently.

# *ITS NOT SMOKE!!*

Test at UL labs USA

BESS venting vapour

## *TOXIC VAPOUR*

- FAILURES
  - Safety distances are not settled 100m US hazmat world.
  - FLAMMABLE AND TOXIC COCKTAIL:
  - HYDROGEN FLOURIDE, HYDROGEN
  - CO
  - CO2
  - HYDROGEN SULFIDE
  - BENZEN
  - HYDROGEN CYONIDE
  - SULPHUR DIOXIDE
  - DROPLETS OF ORGANIC SOLVENT (VISIBLE)

## *THERMAL PROPOGATION, WHAT IS THAT.*

- THERMAL PROPAGATION, can be limited.

- This is the propagation of heat within a module or from cell to cell. module to module, or rack to rack.
- Will cause repeated VCE or increase in fire as other cells fail going into TR.
- TR and TP can be slowed, but not stopped. With current fire suppression systems Buys useful time but not safe resolution.
- Installation design can effect TP. (Moss Landing CA USA, Brim Oslo fjord, Surprise in Arizona 2019)

## *FIRE*

- SUPPRESSION OF FIRE.

- Knocking out fire, flips risk to VCE as TR/TP continues.
- ***It's like pouring water on the roof of the house when the kitchen is on fire.***

- Water seems to the best as it cools effectively
- Use of powder increases the power of VCEs
- Gas Co2, Halon has no cooling effect so useless.
- Containment via perimeter cooling seems to be best way limit damage.

## *DEFLEGRATION ??*

- FAILURE Management:

  - VCE (deflagration risk):
  - Effective safe ventilation of both vapour clouds. The dense cloud presents a little understood environmental . Hazard (keep below LEL within box)
  - Acid from HF reaction with water on surfaces or skin.(PPE) Don’t want to enter containers or smoke diving

  - Electrical hazard from stranded energy:
  - Arc flash if HV
  - Re ignition possible, weeks or days afterwards.

## *STEEP SATETY LERNING CURVE, WILD WEST*

- Regulations
  - Many guidelines. But gaps in understanding of the risks
  - VCE not fully really understood yet.
  - Focus on fire suppression (The flipping of risk to VCE missed)
  - Need for baseline regulations PAS63100 domestic?
  - ISO,EN,BS,ICE  cell and module tests. Focus on fire not venting gas.
  - The USA and now Canada using UL 9540A design goals for BESS
  - Repurposing EV of batteries needs regulation NOW!
  - DIY installations of domestic BESS using ex EV batteries.
  -

## *LITHIUM BATTERY HAZARDS*

- Regulations
  - UL full scale installations testing has lead to design changes of BESS
  - NFPA 855 regs for domestic BESS installation in US
  - FSRI sharing information on testing
  - On going process with all parties involved. Including the battery suppliers etc. NFPA and FSRI in USA is doing this now.
  - Development of training material

## *LITHIUM BATTERY HAZARDS*

- Links to information

- FSRI www.fsri.org
- NFPA www.nfpa.org
- NSWFR www.fire.nsw.gov
- Lithium ion safety (Prof Paul Christiansen)
- www.lithiumionsaftey.co.uk

Lithium batteries are great, but we are still learning how to manage the challenging hazards these high energy devices come with.

- Thank you. www.lsemarine.com, Contact marcus@lsemarine.com

STOP
LIME
DOWN
STOP THE
INDUSTRIALISATION
OF THE COUNTRYSIDE
www.stoplimedown.com