



AlphaESS
your smart energy

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When Power Gets Loud

Unmasking the Noise Behind Energy Storage Projects



Who Are We?



AlphaESS is a leading global smart energy storage solution provider. The company excels in providing tailored products and solutions for residential, C&I and utility projects. With 200,000+ systems actively running in over 90 countries and 15+ subsidiaries in the globe, AlphaESS provides local support and enables millions of people to live with reliable, accessible and clean energy.



14

Years of Experience



90+

Countries & Regions



200,000+

Active ESS Systems Globally



180+

Patents in ESS Technology



4

Product Development Units



15+

Subsidiaries Worldwide



1,500+

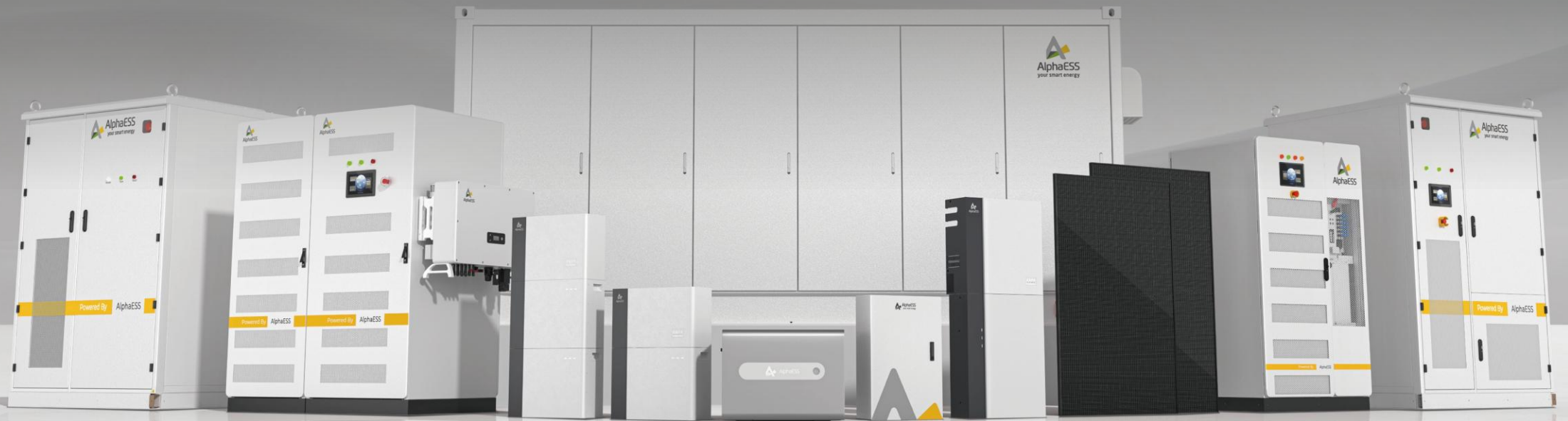
Employees in the Globe



10 GWh

Annual Production Capacity

Residential – C&I – Utility Scale



Noise is becoming a major concern for BESS developers

- Residents' fears & concerns:

- Constant 'hum' (low-frequency tonal noise)
- It will be worse at night when background levels are low
- They will have industrial noise in quiet rural settings

- Construction noise shapes residents' early perception of what the site will be like when operational

- Site Planning Restrictions / permission is different by location and country

POWER PAIN We moved to dream home in rural part of Scotland -it's going to be ruined by monstrosity the size of 21 football pitches

The renewables company says noise and disruption will be kept 'to a minimum'

Gordon Tait, Chief Reporter
Published: 18:32, 18 Aug 2025

Rothienorman residents fear 'constant hum' from lithium battery plant would spoil quiet village

Blackford against BESS are battling against the plans for the energy storage development.

by Jamie Sinclair

April 27 2025, 8:00 am



ANGRY residents living next to a battery storage site have branded the local facility a 'nightmare' as it causes chaos on a daily basis.

[Kilmarnock](#) locals have hit out at the noise and disruption caused by [construction](#) work at a battery [energy](#) storage system (BESS) next to their countryside homes.

What are the sources of noise in a BESS Project?

BESS

- Thermal Management systems are the biggest sources of noise
 - Fans
 - Liquid cooled batteries are much improved on air cooled, but they require cooling via a chiller
- Noise is also dependent on the power rating and temperature conditions
- Typical sound power is 75dB @ 1m



PCS

- Fans cause noise in addition to tonal noises i.e., humming
- Typical sound power is 85dB @1m

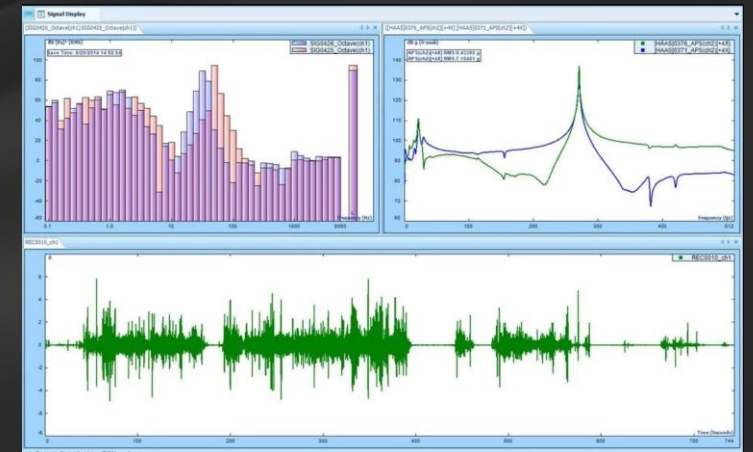
Transformers

- 1 High voltage transformer per site
- 1 Medium voltage transformer per PCS
- Typical sound power is around 70dB @1m



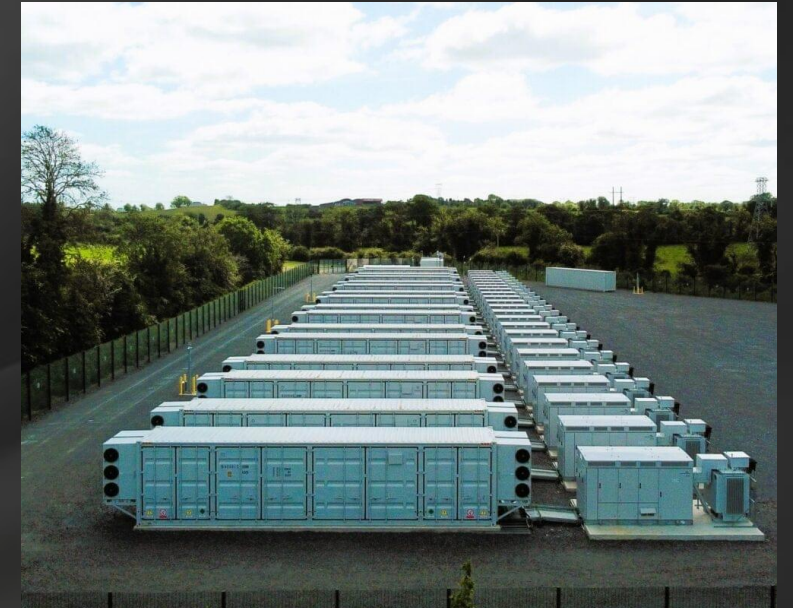
Project Design: Noise Measurement & Monitoring

- **Real time sound monitoring**
 - Essential to do a baseline measurement before any development starts
 - Create a noise map of the site using multiple sensors
 - Software tools available to support this. Analytics to analyze trends and spike
- **Frequency Analysis**
 - Identify any frequencies that spike or dominate the noise profiles
 - Analytics can be used for targeted noise reduction and the mitigation strategies you need to employ e.g. sound dampening



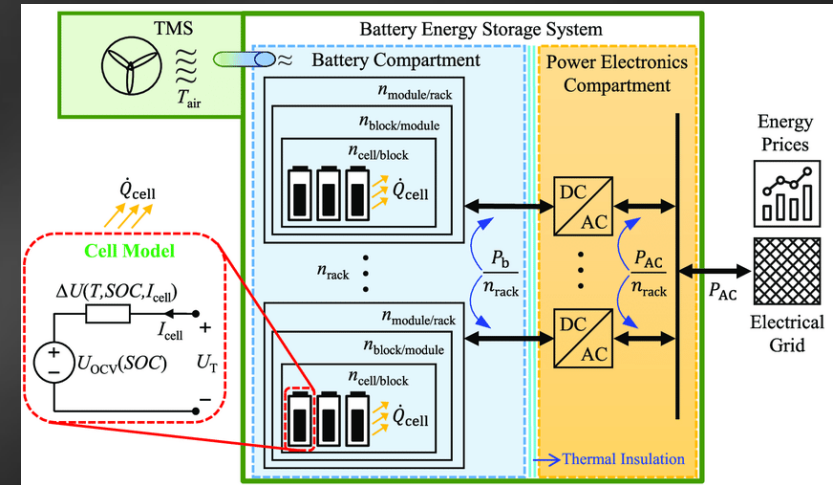
Noise Mitigation strategies

- **Site Layout Design**
 - **Positioning of the equipment on site – proximity to boundary**
 - **Can you position the container HVAC facing inwards?**
 - **Use natural buffers such as trees at boundaries**
- **Reducing Noise at Source – active controls**
 - **Look to implement quieter machinery – do your homework on the manufacturers**
 - **Look for options that are available e.g., Sound dampeners, mufflers**
 - **HVAC Design**
 - **Select a BESS that utilizes low noise components**
 - **Fans that can operate at variable speeds**

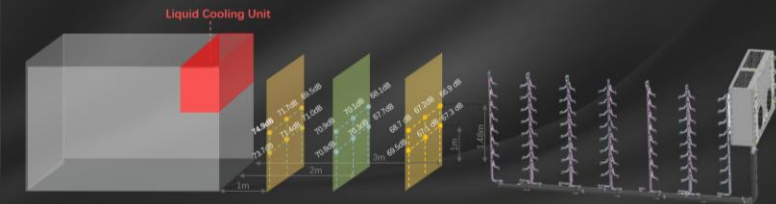


Noise Mitigation strategies

- **Site Operation / Maintenance**
 - Can you change the operation of the equipment e.g., turn the fan speed down
- **Market dynamics and the move to longer duration discharges**
 - This will reduce the power output which therefore lowers cooling requirement
 - Leads to lower noise ...
- **Perform regular schedule maintenance**
 - Keep noise reducing features in optimal condition
- **Blocking or reducing noise when operating – passive controls**
 - Manufacturers may have options for mufflers to attach to HVAC
 - Enclosures / Soundproofing materials
 - Thicker walls / barriers
 - Acoustic barriers to prevent sound from amplifying



2.2 Intelligent Low-Noise Liquid Cooling System



The noise values observed when the system is operating at full power.
Conclusion: The maximum noise level is 74.9 dB when the system operates at full power.

Project in Germany



Mitigation Methode: Custom Housing + Ventilation System

Noise Isolation: Physical barrier reduces sound transmission

Thermal Self-Regulation:

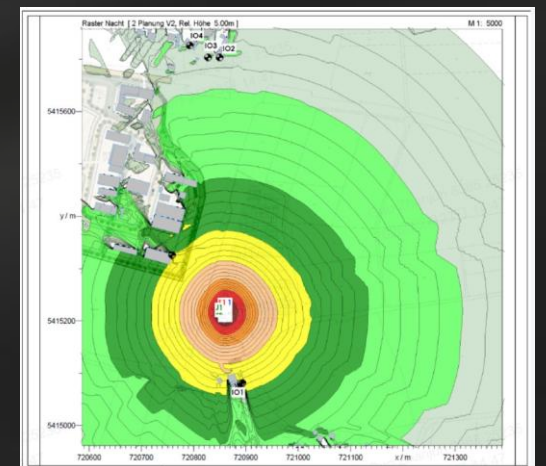
- ❄️ Winter: Battery's own heat maintains operating temp
- ☀️ Summer: Passive ventilation removes excess heat

Project Information

Project Location: water protection zone in Oberpfalz, Germany

Application Type: Utility, Frequency Regulation + Arbitrage

Capacity: 3 MW / 6 MWh



Project in a coal-fired power plant (confidential)

Project Information

Project Location: coal-fired power plant (confidential)

Application Type: Utility, Frequency Regulation + Arbitrage

Capacity: 160MW/320MWh

Challenges:

BESS system shall add no more than 50 dB @1m from outline;
no more than 20dB from measure points near village.

the following attenuations must be achieved:

- 35 dB for the PCS
- 25 dB for the AlphaESS ASTER 5000 battery
- 15 dB for transformer



Project in a coal-fired power plant (confidential)




Project Information

Project Location: coal-fired power plant (confidential)

Application Type: Utility, Frequency Regulation + Arbitrage

Capacity: 160MW/320MWh

Solutions:

-  Standard noise barriers wall or regular noise reduction kits
-  **Custom Forced-ventilated Noise Enclosure** for BESS + PCS + Transformer
-  **Smart Sensor-driven Ventilation Integration**



KEY TAKEAWAYS

- **Noise is a major concern for BESS site developers. Residents are increasingly becoming resistant to developments ‘in their back yard’ . Early community engagement is important**
- **Start noise control management in the design phase of your BESS development**
- **There are many mitigation strategies you can deploy –one size doesn’ t fit all scenarios**
- **Manufacturers are increasingly looking to embed noise reduction in their products**

Come and visit our stand to explore more



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