

Noise mitigation: Addressing acoustics for optimal BESS operations

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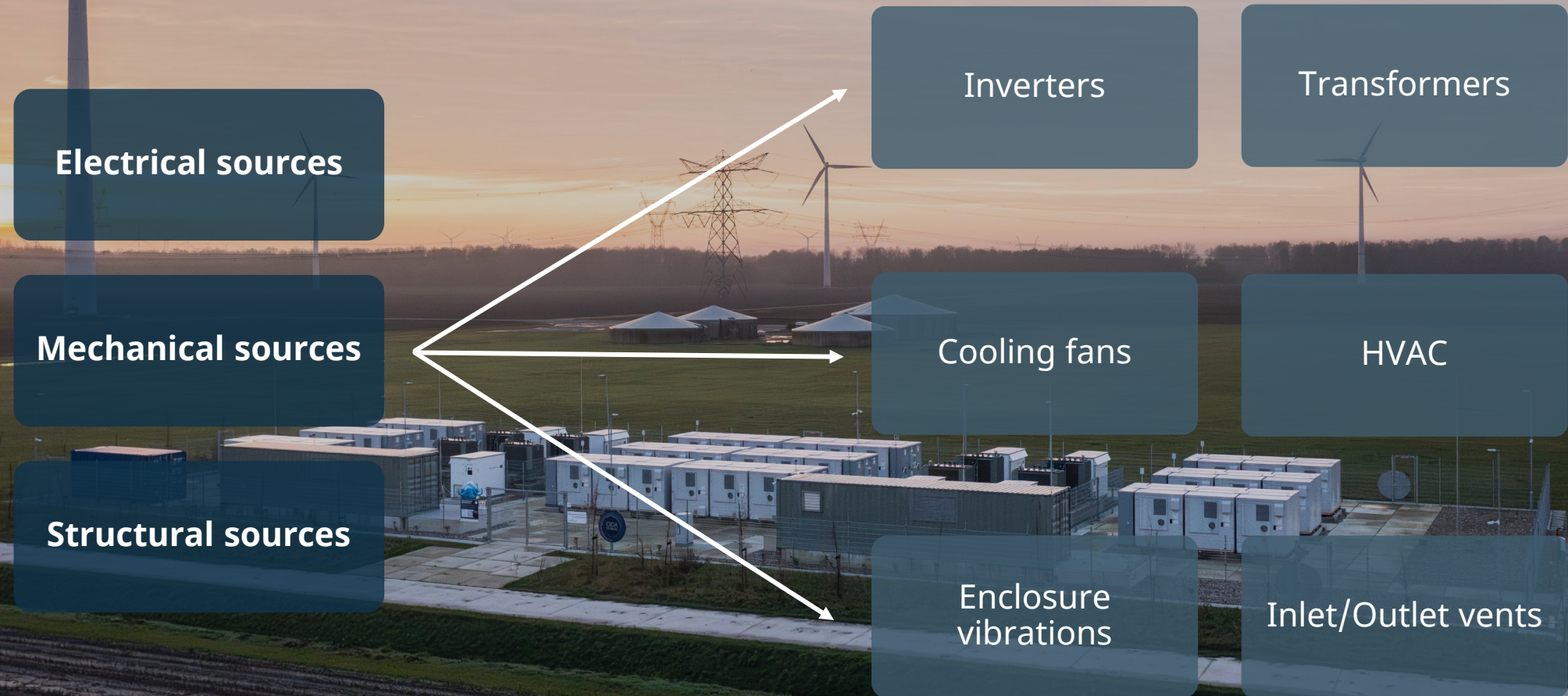
The Silent Challenge: Why Noise In BESS Matters

- Growing role of battery energy storage systems (BESS) applications
- Impact on stakeholders – from project approval to public perception
- Regulatory and compliance risks
- Operational and maintenance challenges

“Ultimately, the aim is to ensure compliance with evolving regulations and minimise its impact on surrounding communities.”



Noise Sources: BESS Focus



Impact of noise mitigation

Atmospheric effects

Wind, temperature gradients, and humidity can all affect how sound propagates.

Absorption

Certain materials absorb sound, reducing the noise level, e.g. vegetation and porous surfaces.

Distance and reflection

Sound intensity decreases with distance. When sound waves hit surfaces like walls or buildings, they can bounce back, causing reflections that affect how noise is heard.

Health and well-being

Prolonged exposure to high levels of noise can lead to hearing loss, stress, sleep disturbances, and increased risk of cardiovascular problems.

Environmental impact

Noise pollution affects wildlife by disrupting communication, and navigation—particularly in areas near airports, highways, or urban areas.

Noise mitigation is a continuously developing regulatory priority

Challenges in noise management

Site Constraints:
Urban vs. rural settings



Regulatory variation
across different regions

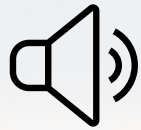


Cost vs. effectiveness
of noise control



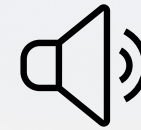
The impact of poor noise
control:

- Delays in project approval
- Fines and legal challenges
- Equipment stress and long-term reliability



Passive mitigation strategies:

- Acoustic barriers or enclosures
- Sound absorbing materials
- Strategic site placement



Active mitigation strategies:

- Smart ventilation control
- Adaptive operational noise management
- Noise cancellation technologies

Measuring and monitoring noise: What we do

We take effective noise measurements

- Noise data collection
- Ensure consistency in total sound power levels
- Proactive and continuous noise monitoring (to detect any anomalies during design phase)

We engage with clients to understand site constraints and challenges

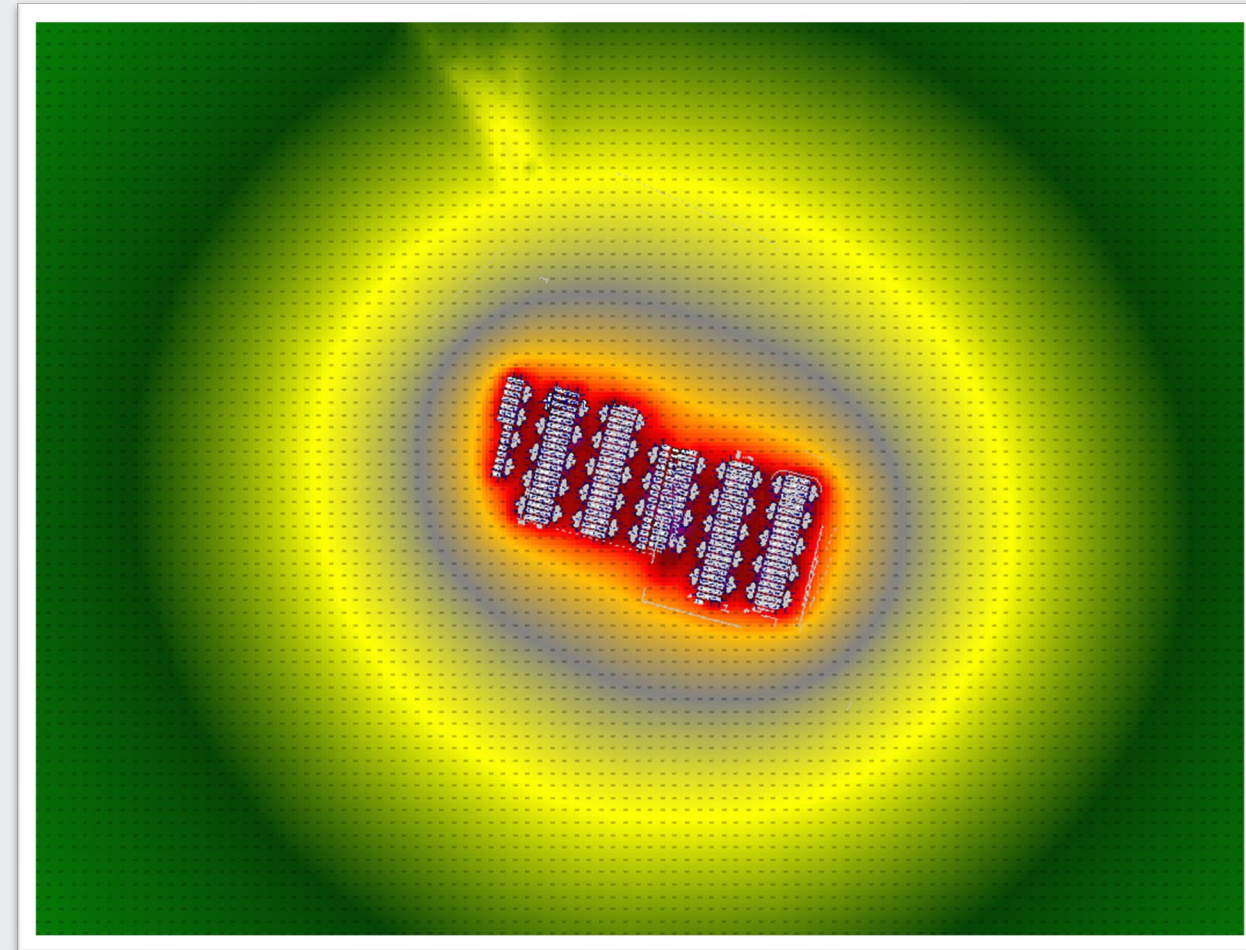
Noise modelling for noise mapping

Noise mapping is a powerful tool for predicting and visualising noise levels. It excels at modelling far-field noise, which refers to sound levels at a distance from the source.

- **Noise propagation:** How sound travels and weakens over distance
- **Impact on surrounding areas:** How far noise from a source will reach and its potential effect on nearby communities
- **Influence of barriers:** The effectiveness of walls, buildings, or other structures in blocking noise

This information is crucial for:

- **Urban planning**
- **Environmental impact assessments**
- **Noise mitigation strategies**



Noise mapping and prediction of far-field noise levels (dBA) for BESS sites

The way forward for noise mitigation in the BESS industry

Key takeaways:

Challenges are critical for noise management with stricter noise limits

Mitigation strategies do not have a one-size-fits-all solution

Integration of noise control in the design phase of BESS

Future opportunities:

Innovative developments in material science for quieter enclosures and cooling systems

Smart noise control systems embedded into BESS

Engage with experts early in project planning



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