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Compressed Air Energy Storage Systems

Small-scale energy storage plays a critical role in managing mismatch between loads and renewable energy supply. In recent years, micro compressed air energy storage (CAES) systems have gained significant attention, as they can potentially overcome these issues and provide hybrid electric-thermal storage for buildings and plants that require significant amounts of heating and cooling in addition to electricity.

Competitive advantage

- CAES systems are a scalable technology that use mechanical compressors to convert electricity into potential energy stored as pressurised air, with the pressurised air expanding to generate power when needed. Unlike electrochemical batteries, this technology does not rely on toxic, resource-limited or degradable materials. Conventional CAES systems generate a large amount of heating and cooling energy, which is wasted during compression and expansion, resulting in a low round-trip storage efficiency.

Impact

- Better small-scale integration of intermittent renewable energy sources into commercial and residential buildings

Successful applications

- Ongoing prototype development of a new type of compressor for use in a CAES system for residential or small-scale applications, Cyclonas Pty Limited.

Capabilities and facilities

- Two LDA systems (including a Dantec 3D LDA/PDA system)
- Five PIV systems (including tomographic capability)
- Flow visualisation lasers
- Computational facilities, including in-house clusters and access to NCI shared clusters
- Software, including unlimited site license for ANSYS products and open-source codes such as OpenFOAM
- In-house developed code

Our partners

- Cyclonas Pty Limited

More Information

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