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## **C2Po1C-04: Compressed air supply system based on cryogenic energy storage**

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In current industrial production, compressed air has many industrial uses and is widely used in the petroleum, chemical, metallurgical, and power industries, playing a vital role. Normally, compressed air is produced directly through electrically-driven compressors, but the electricity market is gradually changing. As more renewable energy sources are integrated into the grid, the peak-to-valley electricity price differential will increase further. Direct compressed air production for uninterrupted industrial production is becoming increasingly uneconomical. In this paper, a novel compressed air supply (CAS) system is proposed based on cryogenic energy storage (CES), utilizing the solid-phase packed bed for high-grade CES, and compressed heat is used for domestic hot water supply. During the valley period, the air is compressed by compressors and liquefied by the packed bed, and in the peak period, the liquid air is vaporized to release the cold energy and regulated to a certain pressure for industrial use. The thermodynamic analysis and economic analysis of the system are carried out to determine the optimal configuration and to demonstrate the excellent economic benefits of the system. The significant potential of this concept in the current electricity market is further analyzed.

**Author:** WANG, Junjie (Chinese Academy of Sciences Key Laboratory of Cryogenics, Technical Institute of Physics and Chemistry)

**Co-authors:** FAN, Xiaoyu (Chinese Academy of Sciences Key Laboratory of Cryogenics, Technical Institute of Physics and Chemistry); GAO, Zhaozhao (Chinese Academy of Sciences Key Laboratory of Cryogenics, Technical Institute of Physics and Chemistry); YANG, Biao (Chinese Academy of Sciences Key Laboratory of Cryogenics, Technical Institute of Physics and Chemistry); LIU, Jiyun (Zhonglv Zhongke Energy Storage Technology Co., Ltd.); JI, Wei (Chinese Academy of Sciences Key Laboratory of Cryogenics, Technical Institute of Physics and Chemistry); CHEN, Liubiao (Chinese Academy of Sciences Key Laboratory of Cryogenics, Technical Institute of Physics and Chemistry)

**Presenter:** WANG, Junjie (Chinese Academy of Sciences Key Laboratory of Cryogenics, Technical Institute of Physics and Chemistry)

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