

WELCOME

A warm welcome to this month's issue of *Worldwide Independent Power* - as always bringing you closer to the stories and issues affecting on-site power and cogeneration around the world. For editorial comments, please do not hesitate to contact the editor.

BIENVENUE

Soyez le bienvenu à cette issue de *Worldwide Independent Power*. Comme d'habitude, nous vous apportons toujours plus près des sujets qui affectent l'énergie et la co-génération sur place autour du monde.

N'hésitez pas contacter le rédacteur pour des commentaires éditoriaux.

WILLKOMMEN

Herzlich Willkommen zur Ausgabe dieses Monats von *Worldwide Independent Power*. Wie immer bringen wir Sie näher heran an die Ereignisse und Geschichten der Stromerzeugungsindustrie rund um die Welt.

Für redaktionelle Kommentare und Anregungen wenden Sie sich bitte an den Autor.

BIENVENIDO

Bienvenido a esta edición de *Worldwide Independent Power*. Como siempre, acercándolo a los temas que afectan a la energía y a la cogeneración in-situ. No dude en contactar con nuestro editor para cualquier cuestión editorial.

BENVENUTI

Benvenuti a questa nuova edizione di *Worldwide Independent Power*. Come sempre cercheremo di offrirvi storie e questioni riguardanti on-site power e cogeneration a livello globale. Per commenti editoriali, si prega di contattare l'editore.

Aidan Turnbull
- Editor



New energy storage system based on crushed rocks

An energy storage system which works by means of a direct heat exchange with crushed rock could radically change Europe's energy grids if the idea takes off. The company behind the idea is UK-based Isentropic Ltd, founded in 2007 by James Macnaghten, Jonathan Howes and Mark Wagner to exploit and further develop PHES technology conceived by Jonathan Howes in the late 1990s.

Known as Pumped Heat Energy Storage (PHES) system, Isentropic's PHES system operates as both an engine and a heat pump. Fundamentally, electrical energy is stored as the temperature difference between hot and cold rocks. When the 'battery' needs to be charged, spare energy can be used to compress argon gas until it reaches 500°C.

This hot gas is then used to heat up rocks, transferring the energy and storing it temporarily. The gas emerges from the rocks at atmospheric pressure (1 bar) and a temperature of -160°C. To release the energy that is stored in the rock, the process is reversed. The argon gas flows in the opposite direction; this causes the gas to heat up so that it can be used to generate electricity through a mechanical engine.

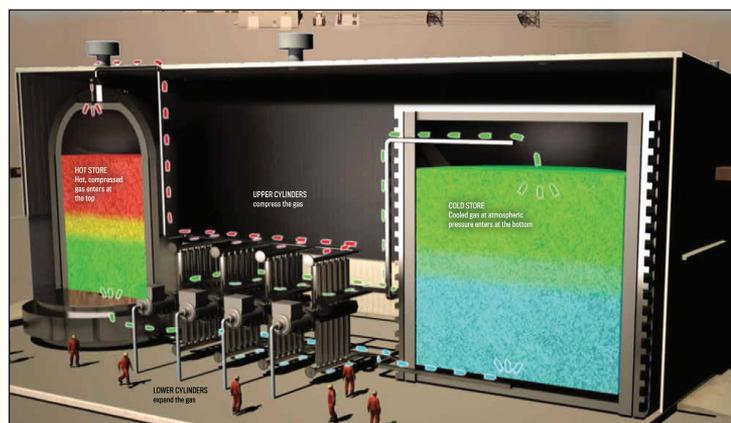
The company is currently rolling out small (up to 1.5MW) and medium-scale (up to 50MW) PHES systems for businesses, but has plans to develop large scale (100MW+) systems for the electricity grid.

The critical issue is the cost of energy storage. Storing hot and cold is the cheapest way to store energy and is well understood. Isentropic's system is said to transform electrical energy into a temperature difference between two volumes of crushed mineral material. The system then efficiently recovers electricity from that temperature difference.

The advantages of the system - says the company - are:

- The lowest cost of any electricity storage device
- A high round-trip efficiency of 72-80% depending on size
- A small unit size 2MW
- Safe and environmentally inert, using steel, argon and gravel
- Uses no dangerous chemicals or explosive pressures
- Can be installed anywhere and is road-transportable
- Has a long life and large number of cycles

According to the company the system can achieve a levelized cost of storage (LCOS) of less than US\$35/MWh stored - the lowest price of any storage technology - including pumped hydro.



So far, the UK's Energy Technologies Institute (ETI) has provided project funding and a major equity investment, together totalling £14m.

Isentropic has been using the funding to develop a radically new 1.5MW/6MWh electricity storage unit, which will be deployed on a UK-based primary substation owned by Western Power Distribution in the UK's Midlands region.

EUROPE

ASIA-PACIFIC

MIDDLE EAST

AFRICA

AMERICAS