

RES2H2

Greek Test Site

Progress Overview

December 2005

Development of the wind-hydrogen installation

Basic features:

- Enercon E-40 500 kW wind turbine
- 25 kW electrolyser producing $5\text{Nm}^3\text{H}_2/\text{hr}$ at 20 bar
- Metal hydride tanks for storing $40\text{Nm}^3\text{H}_2$ at 15 bar
- Hydrogen compressor from 15 to 220 bar
- H₂ filling station
- Central control and data logging system

Development of the wind-hydrogen installation

The site is being built in the context of the RES2H2 EC funded project, where 14 partners are participating.

For the development of the site at Lavrion, Attica, the following partners are contributing:

- CRES, Greece (Co-ordination, W/T, site, infrastructure, electrolysis unit*, central control unit, electric networks)
- C. ROKAS SA, Greece (H₂ compressor, H₂ network, filling station, buffer tank, air compressor)
- FIT, Cyprus (metal hydride tanks, water heater)
- Inabensa, Spain (water cooling unit)

* *Sponsors of electrolysis unit: C. Rokas SA, Tropical SA*

RES2H2 Greek Test Site Progress Overview

TIMELINE

- **September 2003:** Completion of concrete base. Digging of trenches for connecting the hydrogen installation to the wind turbine
- **June 2004:** Control room delivered
- **December 2004:** Metal hydride tanks delivered, not yet activated
- **March 2005:** Delivery of electrolyser & control cabinets
- **April 2005:** Delivery of compressor
- **April 2005:** Delivery of central control unit
- **May 2005:** Activation of metal hydride tanks, water heater installed
- **May 2005:** Delivery on buffer tank and cylinder stack for filling station
- **May 2005:** Hydrogen piping installed and tested
- **June 2005:** Delivery of auxiliaries including water cooling unit and air compressor and drier (for operating pneumatic valves)
- **June 2005:** Sheds built to protect the electrolyser and compressor
- **June 2005:** Data acquisition and control software activated
- **July 2005:** Hydrogen filling station complete (with vents)
- **July 2005:** Hydrogen compressor priming with nitrogen
- **October 2005:** Start of operation
- **November 2005:** Inauguration by Greek Development Minister Mr. Sioufas

Pictorial Progress Overview



Concrete base of plant (left) and control room (right)

Pictorial Progress Overview



Delivery of electrolyser (left) and compressor (right)

Pictorial Progress Overview



Left: Cabinets in control room (from L to R: electrolyser power cabinet, electrolyser control cabinet, central control cabinet).

Right: Computer control and data logging system (Dr. M. Zoulias of CRES)

Pictorial Progress Overview



*Installation and activation of metal hydride tanks and
water heater*

*(Left: Dr. G. Karagiorgis and Right: Dr. C.
Christodoulou of FIT)*

Pictorial Progress Overview



Left: Buffer tank and filling station cylinder stack

Right: Completed filling station with vent

Pictorial Progress Overview



Installing and testing the low and high pressure hydrogen pipeline

Pictorial Progress Overview



Installing Auxiliaries: Water cooler (left) and air compressor and drier (right) for operating pneumatic valves

Pictorial Progress Overview



Left: electrolyser shed

*Right: Priming of compressor with Nitrogen
(Right: Mr. E.Kalyvas of C. Rokas SA)*

Pictorial Progress Overview



Left: electrolyser in operation

Right: Filling the buffer tank

Pictorial Progress Overview



*Inauguration of the plant on the 19th November 2005
by Greek Development Minister Mr. D. Sioufas*

Pictorial Progress Overview



The plant manager Dr. E. Varkaraki (L) and the head of the RES&H2 Technologies Section Dr. N. Lymberopoulos (R) of CRES

Pictorial Progress Overview



*General view of
RES2H2
Greek test site*