



Hydrogen - A Competitive Energy Storage Medium To Enable the Large Scale Integration of Renewable Energies

Seville, 15-16 November 2012

ADELE – Adiabatic Compressed Air Energy Storage for Electricity Supply

Integration of Wind Power Calls for Additional Storage

Storing electricity efficiently, safely and in large quantities is one of the key challenges of future power supply. The integration of the desired massive use of renewable energy - in particular wind and photovoltaic - calls for additional storage capacities to balance electricity demand and fluctuating power production of these sources. Due to limited expansion potential of hydro pump storage - the preferable technology with an efficiency of about 80% - and poor economic/technical properties of available compressed air energy storage (CAES) technologies, alternatives have to be developed.

“Enhanced economic boundary conditions are a prerequisite for the deployment of storage technologies ...”

ADELE as an Alternative to Hydro Pump

RWE is working along with partners to develop the adiabatic compressed air energy storage technology for electricity supply (ADELE). „Adiabatic“ here means: additional use of the compression heat to increase efficiency up to 70 % while avoiding any use of fossil fuels and related CO₂-emissions.

Aim, Partners, Budget

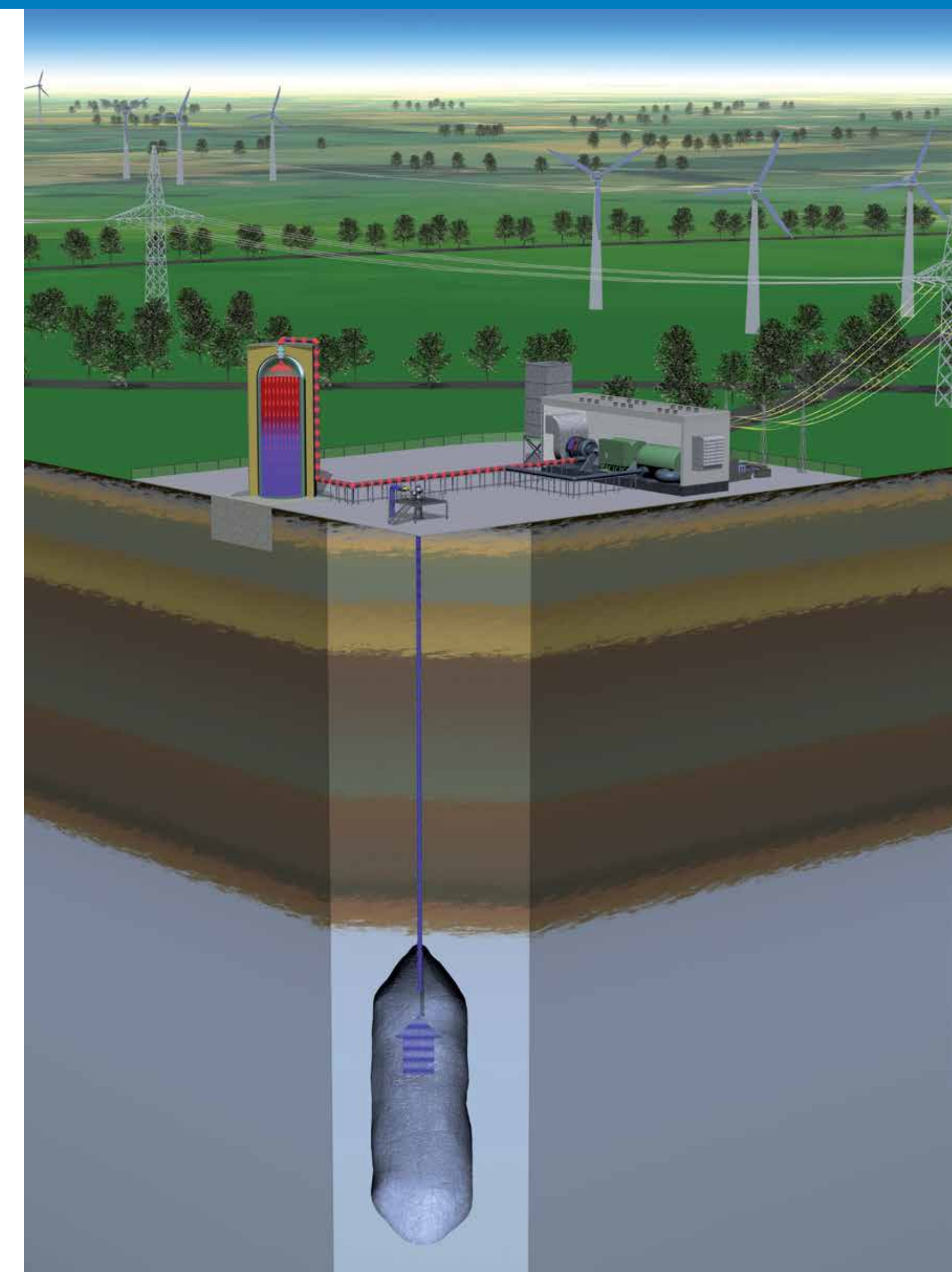
Within the ADELE R&D project the partners RWE Power AG, GE Global Research, Ed. Züblin AG, Ooms-Iltner-Hof GmbH, ESK GmbH and the German Aerospace Center (DLR) develop the core components of an adiabatic CAES plant. Altogether, the project members contribute an amount of EUR 12 million for the 3 ½ year development phase. The federal ministry for economics is funding the ADELE project.

The Next Step

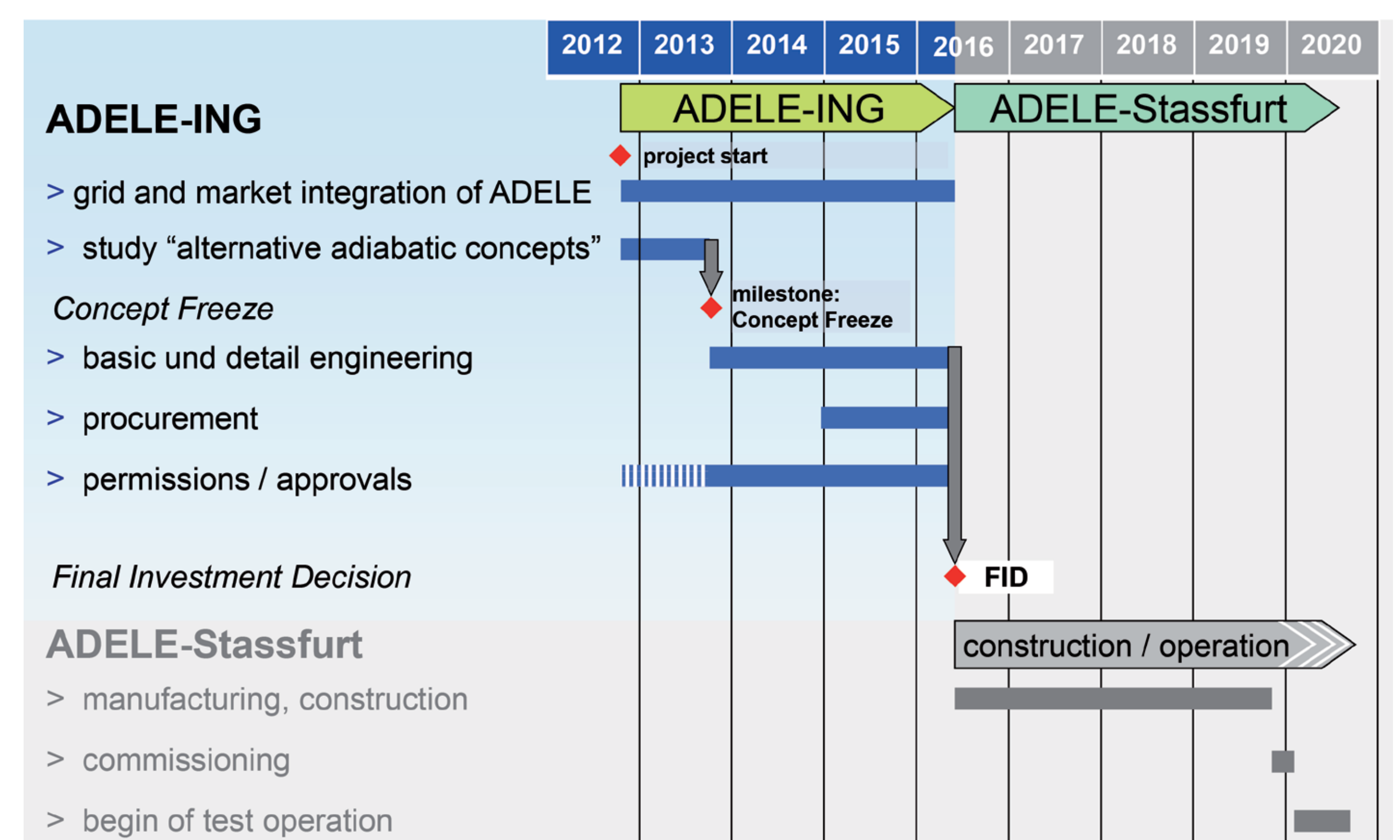
The consortium has proposed a 3 ½ year follow-up project “ADELE-ING” within the German “Funding Initiative Energy Storage”. ADELE-ING will cover the engineering not only for the core components but also for the overall plant concept as well as basic and detail engineering to provide the basis for an investment decision for a first demonstration plant.

Conclusions

Storage technologies will not be a panacea, but could gain considerably in importance on tomorrow’s electricity market. Extension potential for hydro pump storage is limited, today’s CAES technologies are economically not attractive. RWE and its partners started the development of a new alternative adiabatic CAES technology to be prepared for future needs. However, today’s market boundary conditions do not justify an investment yet and need to change before an investment in storage can be realized.



ADELE plant layout – design study to illustrate the functional principal



Timeline towards realization: ADELE-ING (engineering project for a first demo plant) and ADELE-Stassfurt (construction and operation in Stassfurt, Germany)

Project Overview

- Roland Marquardt, RWE Power AG, roland.marquardt@rwe.com
- Ed. Züblin AG - ESK GmbH (RWE Group) - GE (GE Global Research, GE Oil & Gas) - German Aerospace Center (DLR) - Ooms-Iltner-Hof GmbH (Züblin Group) - RWE Power AG
- 12/2009 to 06/2013
- www.rwe.com/innovation/ADELE