



# GeoWell Innovative materials and designs for long-life high-temperature geothermal wells

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## Overview

EC-funded Horizon 2020 project

Project start date: February 1st, 2016

Duration: 36 Months

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Webpage: <http://www.geowell-h2020.eu/>

Total cost / EU contribution: 4.7 MEuro

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## Objective

The project aims to develop reliable, economical and environmentally friendly technologies for design, completion and monitoring of high-temperature geothermal wells with the intent to expedite the development of geothermal exploitation globally. GeoWell will address all relevant steps in the geothermal well completion process to enhance the lifetime of high-temperature geothermal wells. These include cement and sealing technologies, material selection and coupling of casings. Methods of temperature and strain measurements in wells, using fibre optic technologies to monitor well integrity, will be developed as well as methods for assessment of risk related to design and operation of high-temperature geothermal wells.

To assure the quality of the approach and the final results of the project, the research is based on traditional production wells as well as deeper wells where the pressure is as high as 150 bar and temperature exceeds 400°C. This new technology will be tested both in laboratories, where real situations will be simulated, and also partly in existing geothermal environment.

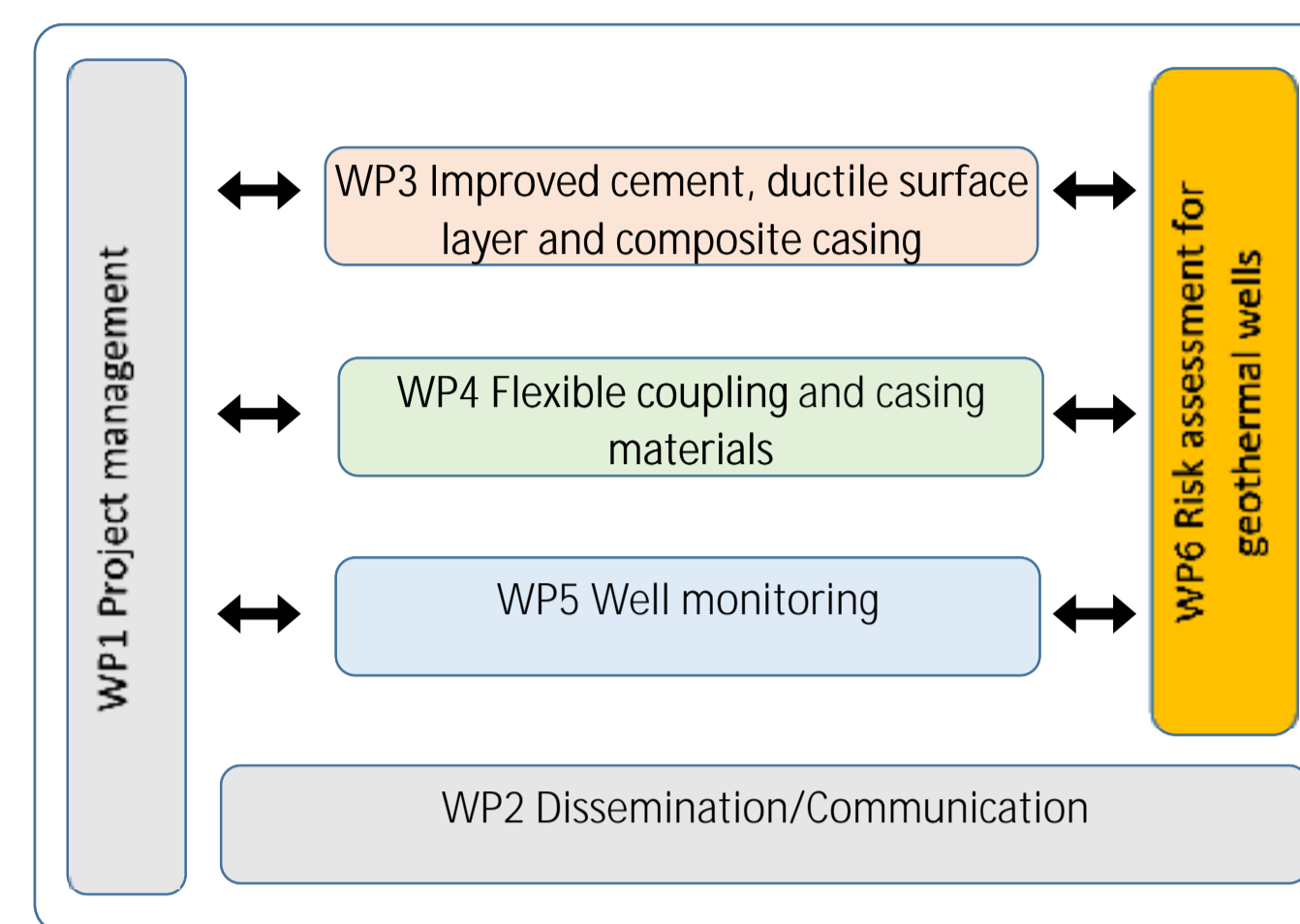
## Participants

The GeoWell consortium gathers 8 partners from public research institutes, academia, industry, and one SME, as well as two third parties (SINTEF, EGP):

- ÍSOR, Íslenskar orkurannsóknir - Iceland GeoSurvey (Iceland)
- IRIS, International Research Institute of Stavanger AS (Norway)
- GFZ, Helmholtz-Zentrum Potsdam Deutsches GeoForschungsZentrum (Germany)
- TNO, Nederlandse Organisatie Voor Toegepast Natuurwetenschappelijk Onderzoek (Netherlands)
- BRGM, Bureau de Recherches Géologiques et Minières (France)
- STATOIL, Statoil Petroleum AS (Norway)
- HS ORKA, HS Orka hf. (Iceland)
- AKIET, Akiet BV (Netherlands)



## Project Structure



- WP1 - Management
- WP2 - Dissemination / Communication
- WP3 - Improved cement, ductile surface layer and composite casing
- WP4 - Flexible coupling and casing materials
- WP5 - Well monitoring
- WP6 - Risk assessment for geothermal wells

## Project Segment

### Cement

Develop cement and sealing technologies optimized for high-enthalpy geothermal applications in order to ensure casing protection and zonal isolation at elevated temperatures and pressures (up to 450°C and >100 bars).

### High-temperature composite casings (HTCC)

Assess the potential of using high temperature composite casings in geothermal wells. HTCC will be designed and tested in laboratories.

### Flexible coupling

Design and test flexible couplings for casings were thermal expansion due to heating or cooling is allowed with lower strain on the casing material.

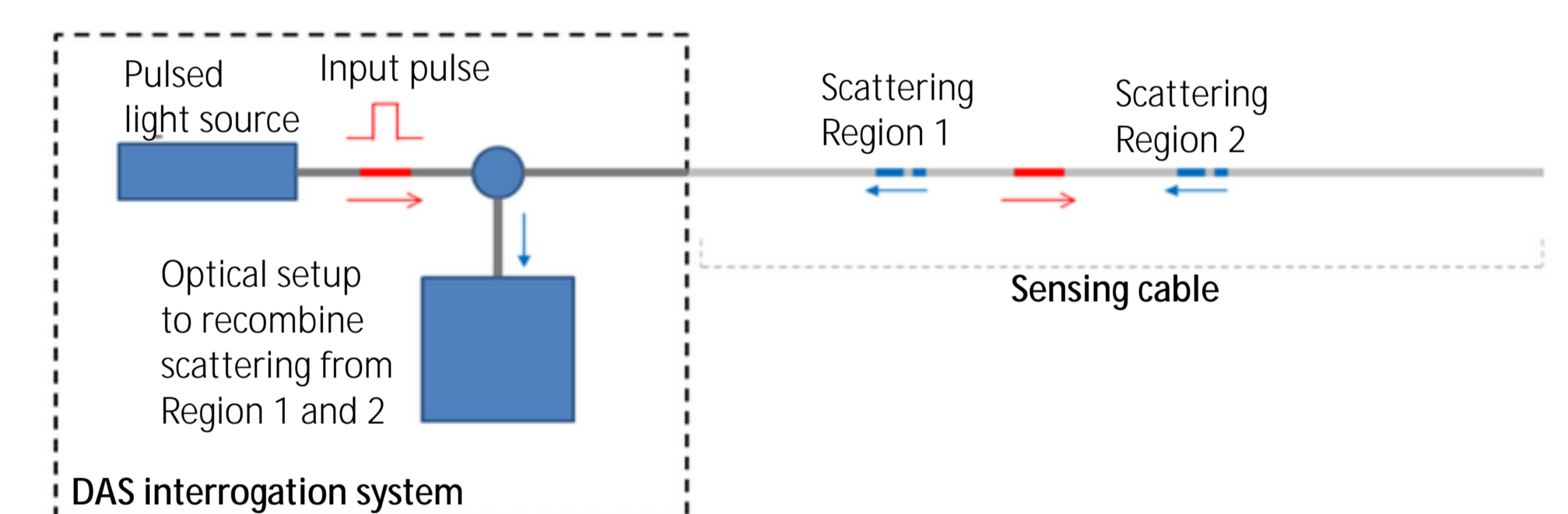
### Casing materials

Standard and innovative casing materials will be tested to withstand temperature loading and aggressive geothermal environment to ensure long lifetime of casings. Cladded casing materials will also be tested. Corrosion damage on a liner is shown on the photo to the right.



### Well monitoring

Identify processes influencing well integrity by developing and testing distributed fiber optic sensing technologies to simultaneously measure temperature, strain and acoustic noise within the cemented annulus of a geothermal well.



### Risk assessment

Develop risk and reliability analysis tools for risk assessment in geothermal wells, both high enthalpy wells and extreme temperature wells in volcanic areas.



Drilling activity at Reykjanes high-temperature area in Southwest Iceland. Photo Jón Ragnarsson.