



GLASS FIBRE REINFORCED EPOXY CASING SYSTEM FOR GEOTHERMAL APPLICATION (GRE-GEO)

OPERATING & DEMONSTRATION



AGENDA



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INTRODUCTION (PARTNERS)

- gec-co Global Engineering & Consulting Company GmbH, Germany, main coordinator
- DrillTec GUT GmbH, Germany
- TU Clausthal (ITE), Germany
- Future Pipe Industries (FPI), The Netherlands, national leader
- Dynaflow Research Group DRG, The Netherlands
- Nuclear Research and Consultancy NRG, The Netherlands
- Eartha AG, Switzerland
- Service Industriels de Genève, Switzerland, cooperation partner



Une énergie propre à chacun





PROJECT OBJECTIVES

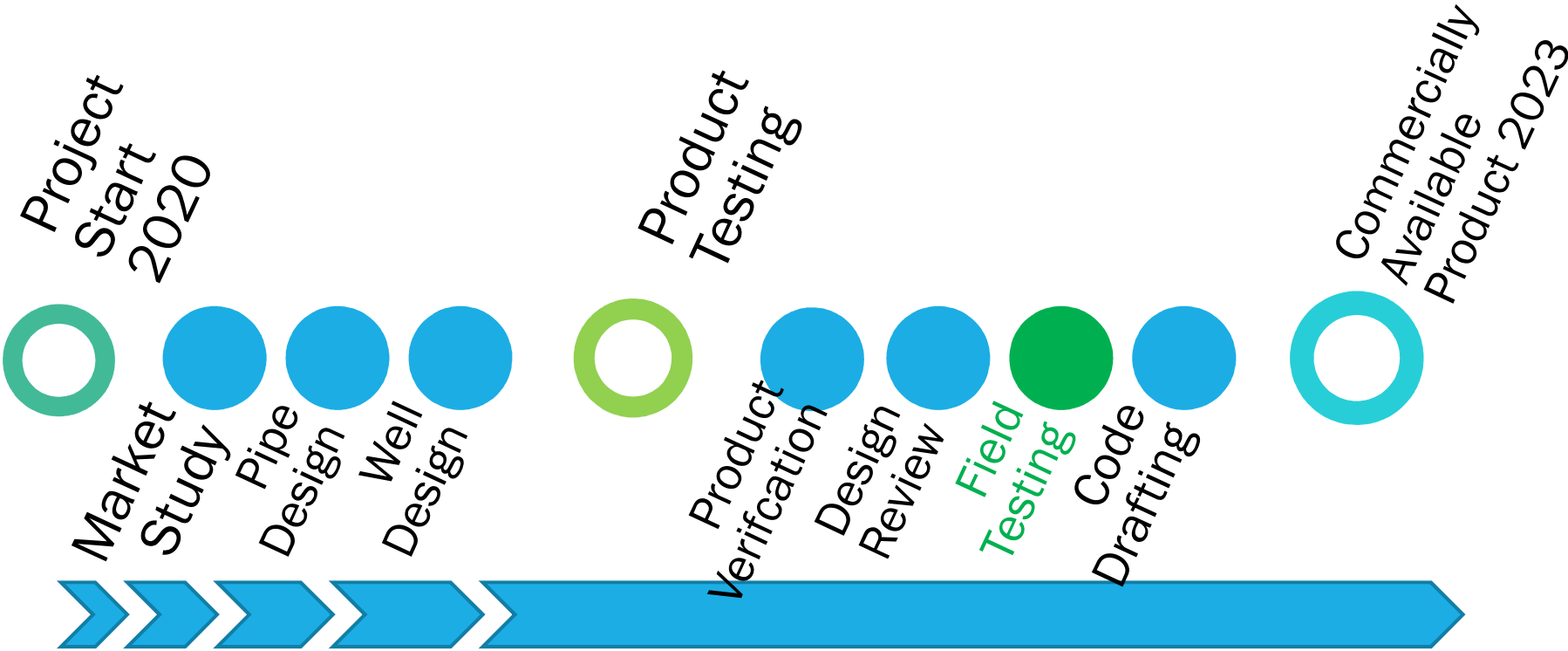
GRE Product:

The project's main objective is to develop a cost-reducing **glass-fiber reinforced epoxy piping** that is especially designed for geothermal well application (GRE-GEO) with relatively large inside diameter and reduced outside diameter. This especially concerns the pipe coupling, which would allow an installation in new wells as well as utilization for workover of old wells.

Code, Verification & Handling:

Furthermore, the project will include the much-needed **guidelines (standard / code)** plus tools for the design and qualification of the GRE piping system, combined with pipe and coupling **wear & load (collapse, burst, tensile) testing and verification (4 quadrant service envelope)**. Additionally, **handling tools** for the installation of the GRE piping system are designed / improved during the project.

TIMELINE



PREREQUISITES

R&D Project:

- Handling Tong & Tools ready.
- Installation process defined.
- GRE casing tests finished & final product ready.
- Draft Code for GRE casing (e.g. pressure testing) ready.
- Crew training ready (certification and training program).

Practical aspects:

- Suitable partner for field test found.
- Test well and test location defined.
- Test program incl. type of tests defined (e.g. RIH operation as a minimum).



FIELD TEST

Objective:

The objective is to demonstrate the developed product in a **relevant environment**. The minimum goal is to have a run-in borehole operation, to demonstrate the suitability of the GRE piping and its handling system for market acceptance.

Options:

- DrillTec Client → Test GRE pipe running in Conductor
- DrillTec yard → Test GRE pipe running at test well
- Third Party well → Cement GRE pipe in place
- Test center Rijswijk → Do tests as per priority list

Goals:

Depending on the requirements of the end-user a test scenario is developed. The well design is determined along with corresponding GRE-pipes and coupling system. According to design outcome the piping is produced and supplied to for demonstration.

GRE casing system demonstration for geothermal application with testing according to developed protocols.

FIELD TEST – PRIORITY LIST

Minimum Option:

- Run in hole casing with newly developed handling tools (incl. handling tong, low indentation). Make-up torque monitoring.
- Do a pressure test to check if connectors are fluid (and gas) tight.
- Pull out of hole the casing and lay it down.
- Aim: Test functionality of tools and running capability. Test performance of GRE pipe.

Medium Option:

- Run in hole casing with newly developed handling tools (incl. handling tong, low indentation). Make-up torque monitoring.
- Do a pressure test to check if connectors are fluid (and gas) tight.
- Installation as a second barrier in an already cased hole.
- Annular pressure monitoring for long time leak tightness.
- Aim: Long-term leak tightness, installation capability as second barrier in wellhead. Test polished bore receptacle and compatibility with GRE casing.

Green: Supplied by Consortium; Yellow: To be discussed; Black: Supplied by Operator

FIELD TEST – PRIORITY LIST

Maximum Option:

- Run in hole casing with newly developed handling tools (incl. handling tong, low indentation). Make-up torque monitoring.
- Do a pressure test to check if connectors are fluid (and gas) tight.
- Installation as a casing, cement GRE pipe in place.
- Receive further information from well owner:
 - Quality of cement job
 - Possibility to drill out
 - Logging options
 - Workover options
 - Long time performance of GRE casing
 - Water information (scaling, fluid compatibility)
- Aim: Long-term leak tightness, installation capability & fluid compatibility as a casing in wellhead.

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OUR OFFER

Consortium partners offer:

- DrillTec:
 - Provide man power and equipment for running in hole GRE casing (free of charge, depending on well design).
- FPI:
 - Provide GRE pipe of certain diameter and length for installation (certain length, free of charge, depending on well design).
 - Provide supervisor for running in hole GRE casing (free of charge, depending on the well design).
- Additional services:
 - Full consortium support (Gec-co, ITE, Dynaflow, FPI, DrillTec, NRG, Eartha AG, SiG)



THANK YOU FOR YOUR ATTENTION!

