	'Cluster'	Research-subject/ topic	Start-time	short explanation
1	Reservoir identification & well-design	**Increasing predictability of reservoir-models**	ST	analysis of the predictive value of reservoir-models, given the limited availability of data. Not only with respect to an individual doublet but also for the complete reservoir en the interference between doublets. What short-term improvements are possible? Where is more fundamental research necessary?Which experiences from comparable 'foreign' formations are available/useful? We believe the input of specialised geological avisory companies is essential.
2	Reservoir identification & well-design	**Predictability of seismicity**		No part of this call. Study to be awarded later this year.
3	Reservoir identification & well-design	**Optimal choice of well-materials: composite**	ST	What quality is needed (tubing, couplings etc.), under what circumstances? Where is the balance between price and performance (robustness)? For improvement of the well integrity and (possibly) to reduce the flow resistance and scaling the use of a composite (as casing or tubing) may be a solution. Also, this may lead to a reduction in the drilling costs. We envisage a desk-study, vendor independent, on the advantages and disadvantages of composite casings. What experience is available? (if none: how come?) Elements in question are: investment costs and risks, lifetime / aging effects on scaling, pump resistance and other production-parameters.
4	Reservoir identification & well-design	**Optimal choice of well-materials: screens**	MT	Screen Selection. The right screens are important for the capacity of the well. An investigation of the shape, material and dimensions of the screens can show the optimal configuration (for different conditions), including the potential to reduce the resistance. It is not clear wether generic outcomes are possible or only site-specific calculations can be made. In the latter case this is no Research Agenda subject.
5	Reservoir identification & well-design	**Optimal choice of well-materials: ESP's**	MT	ESP choice. The ESP is the heart of the subsurface installation. The pump efficiency and service life are of great importance for the profitability of the system. Research should focus on the design of the ESP depending on pressure (desired / required) depth, flow, pump efficiency and composition of the formation water. Ideally a standard design is proposed? We believe this is more a European project (due to scale) than a country-based initiative.
6	Reservoir identification & well-design	**Well-integrity**		No part of this call. Related study to be awarded later this year.
7	Reservoir identification & well-design	**Deep geothermal: drilling techniques and well-designs**	MT	The IF / ECN-report on geothermal energy (> 5 km) in industry (2014) has shown that the risks are currently too large for individual companies. We have several questions (that may be addressed independently of each-other): 1. A roadmap with several studies / steps is probably needed for such a geo project. (> 5 km, with e-generation?) 2. Suitable drilling techniques (plasma drilling?) 3. Suitable well-designs. It is possible these questions require a supranational approach.
8	Reservoir identification & well-design	**Logging & measuring**	ST	Logging and measuring are important for a good understanding (and therefore management) of the wells and the reservoir, but are also costly. To have the optimum result, what combinations under what circumstances are advisable? What new techniques can be applied? Perhaps this knowledge is for the main part readily available, so a workshop and/or dedicated overview is all that is needed. Maybe new ways to gain knowledge of the composition of the aquifer can be investigated for geothermal projects.
9	Reservoir identification & well-design	**Dual-play: combining gas- and geothermal wells**		This is the subject of a DEI-subsidiy. We first wait for outcomes.
10	Drilling & Completion	**Re-injection of produced (test-) water**	ST	When testing a newly-drilled well (and later after i.e. work-overs) water is produced that cannot be injected in the normal way. How should the water be treated before injection? When is discharge to sea or other locations to be considered? The study is probably in the form of a decision tree. A second, related, subject is the long-term effects and risks of water-injection. P.e. the high pressures involved and the long-term behaviour of the casing may lead to unwanted situations. What is practically imaginable, what mitigating measures are practicable?
11	Drilling & Completion	**Stimulation: procedure and effects**	ST	No part of this call. Related study to be awarded later this year.
12	Drilling & Completion	**completion design**	MT	Feasibility and risks of a 'gravel pack' or other usable completion concepts. Including implications for the design, the costs and the risk-management. We expect this topic can be addressed in a workshop or another interactive form of knowledge-transfer.

	'Cluster'	Research-subject/ topic	Start-time	short explanation
13	Operations	**Production modelling: Optimisation of doublet-use and reservoir behaviour**	MT	An optimum use of the wells provides a good yield, good utilization of the heat in the reservoir and a long service life, taking into account possible seismicity and other risks. We look for a "production model" that gives the optimal production volume, given the maximum injection pressure, injection temperature, etc. Not a theoretical exercise, but a program / method an operator can use to make his (annual) planning and improve it year by year. Can this be seen separately from the investigations into 'increasing the predictability of reservoir models'? The model will probably heavily depend on reliable and effective monitoring techniques of reservoir performance. (addressed in another topic.) If practical models have few or no generic parts, the question remains how operators can optimise the well-performance. Can they jointly make such a model? In all cases it is relevant to know which data has to be collected and how. To verify the models, historic data is probably necessary. Few data-sets are available, operators so far have no 'common database'. The bidder is asked to address this issue.
14	Operations	**Production modelling: effectiveness of monitoring-techniques on reservoir behaviour**	MT	How can data on the 'behaviour' of an aquifer be obtained cost-efficiently, what are the (in-) accuracies involved? What alternatives are there for (expensive) sampling and testing? What is the value of pressure- and other tests? How can these be used to calibrate and verify a production model?
15	Operations	**Production modelling: long-term changes in doublet behaviour**	MT	What changes in yield (production-pressures etc, injection-pressures) in the reservoirs can be expected over time? How to anticipate on this in the design? What are meaningful design requirements in this regard? How should the manager deal with it? This probably results from the "production model", otherwise a separate study desirable. For verification historic data is perhaps necessary. Few data-sets are available, operators so far have no 'common database'. The bidder is asked to address this issue.
16	Operations	**Development of maintenance methodologies and management-information systems**	ST	Only through a good understanding of the (change of) the state of the system can it be kept efficient and easy to operate (and getting better). Corrosion and scaling are important elements in this. When is what (other) information needed? What design of the measurement and the analysis is required? What are the corresponding design- and maintenance-demands? A practical and easy-to implement overall management information system (MIS) supports the operator in the operational phase. (not for some elements, but for all.) This system needs to receive data, and analyse and present them to the operator. What information should the MIS provide as a minimum? Based on the control- and maintenance philosophy the operator creates a total maintenance plan, including monitoring. Ideally, a MIS is set up, including the corresponding implementation plan. It is conceivable that this is basic at first, based on the current data and configurations, but it should be expandable. For verification, historic data is probably necessary. Few data-sets are available, operators so far have no 'common database'. The bidder is asked to address this issue.
17	Downstream operations	**Optimal use of associated gas (and liquids)**	MT	It has been determined (TNO, 2014) that the use (via degassing) of the associated gas increases the risk of scaling. Gas on the other hand represents a financial value. If the operator chooses to exploit the gas/oil, what is then (under what conditions) the optimum? (Gas yield vs. cost of equipment and prevention of scaling.) What is, under what circumstances, the right design choice; what are the proper settings of the systems (pressure, flow rate, etc.) Same questions for the (further) processing of materials (E.g. gas drying)
18	Accompanying measures	**Public interaction and acceptance**		P.M.