

# GEOELEC Data Acquisition Sheet

## *WP2: RESOURCE ASSESSMENT*

### **Introduction**

Below an abstract is provided from the GEOELEC Resource Assessment Protocol. In this protocol the methodology of resource assessment is described in more detail. It proposes adequate terminology and procedures for a Europe wide resource assessment.

The resource assessment protocol is based on resource assessment concepts developed in the oil and gas industry, which have been adopted in a adjusted form for geothermal resource assessment and reporting. This protocol has been based on the following work:

- Beardsmore et al., 2010. A protocol for estimating and mapping the global EGS potential.
- AGEA, 2010. Australian code for reporting of exploration results, geothermal resources and geothermal reserves: the geothermal reporting code
- CanGEA, 2010. The Canadian geothermal code for public reporting

For GEOELEC we envisage 3 levels of resource detailing (see chapter 3 in the Resource Assessment Protocol).

- Level 1: Global European prospective resource assessment for EGS
- Level 2: Prospective undiscovered resource assessment for different play types
- Level 3: Contingent (discovered) resources and reserves

In GEO-ELEC we aim to perform a global Level 1 assessment, complemented with some level 2 and level 3 information if easily available. The assessment and map information will be presented in a public web-based information system (cf [www.thermogis.nl/worldaquifer](http://www.thermogis.nl/worldaquifer)) containing key maps and data, such as spatially resolved temperatures, complemented with some level 2 and level 3 information. The compiled maps will be made digitally available to data providers.

The information gathering for the assessment will be accomplished through data workshops. These data worksheets serve to compile available information

The responsibility of GEOELEC partners is to collect the data and decide what is considered to be useful and/or essential. So there is no guarantee that delivered data will be used. However, the (compilation of knowledge on relevant data) will be stored for possible future EU project funding, and could be well used as meta data information in web-based information system.

## Data information sheet for LEVEL 1 and (partly) LEVEL 2

For the GEOELEC, we would kindly request you to fill in the questionnaire below. Note that the provider of the information is not responsible for the delivery of the information. However, the provider is requested to correctly report the source of the information.

It is further assumed that the owner of the data is responsible for storing and distributing the underlying data, or alternatively you may identify data or key publications which have originated from you or affiliated institutes

Digital = Database in any accessible form (\*.xls, \*.mdb, etc)  
Paper = Either printed or in PDF  
#... = Number of ...

Please indicate whether the information provided is/will be publically available

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1. Name of institute:

2. Country:

3. Contact person:

4. Contact details:

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5. Known data of the temperature in the subsurface (e.g. oil and gas BHT/DST)

a. #.... Uncorrected BHT data

Publically available

Yes No

Data available on:

Digital Paper

(Internet) source location:

b. #.... Corrected BHT data

Publically available

Yes No

Data available on:

Digital Paper

(Internet) source location:

c. #..... DST data

Publically available

|                          |                          |
|--------------------------|--------------------------|
| Yes                      | No                       |
| <input type="checkbox"/> | <input type="checkbox"/> |
| Digital                  | Paper                    |
| <input type="checkbox"/> | <input type="checkbox"/> |

Data available on:

(Internet) source location:

6. Surface heat flow measurements and map interpretation

a. # .... measurements

Publically available

|                          |                          |
|--------------------------|--------------------------|
| Yes                      | No                       |
| <input type="checkbox"/> | <input type="checkbox"/> |
| Digital                  | Paper                    |
| <input type="checkbox"/> | <input type="checkbox"/> |

Data available on:

(Internet) source location:

b. map coverage

Publically available

|                          |                          |
|--------------------------|--------------------------|
| Yes                      | No                       |
| <input type="checkbox"/> | <input type="checkbox"/> |
| Digital                  | Paper                    |
| <input type="checkbox"/> | <input type="checkbox"/> |

Data available on:

(Internet) source location:

.... % of country/ region name: .....

7. Thermal spring temperatures

a. #.... springs (incl. temperatures when known)

Publically available

|                          |                          |
|--------------------------|--------------------------|
| Yes                      | No                       |
| <input type="checkbox"/> | <input type="checkbox"/> |
| Digital                  | Paper                    |
| <input type="checkbox"/> | <input type="checkbox"/> |

Data available on:

(Internet) source location:

8. High enthalpy data/interpretation in volcanic areas

a. # ... measurements (reservoir temperature)

Publically available

|                          |                          |
|--------------------------|--------------------------|
| Yes                      | No                       |
| <input type="checkbox"/> | <input type="checkbox"/> |
| Digital                  | Paper                    |
| <input type="checkbox"/> | <input type="checkbox"/> |

Data available on:

(Internet) source location:

9. Published temperature model interpretation (e.g. regional heat flow, local effects due to meteoric effects)

a. Map coverage

|                                       |                                     |                                   |
|---------------------------------------|-------------------------------------|-----------------------------------|
| Publically available                  | Yes<br><input type="checkbox"/>     | No<br><input type="checkbox"/>    |
| Data available on:                    | Digital<br><input type="checkbox"/> | Paper<br><input type="checkbox"/> |
| (Internet) source location:           |                                     |                                   |
| .... % of country/ region name: ..... |                                     |                                   |

b. Temperature at ..... km depth (can be more than 1)

|                             |                                     |                                   |
|-----------------------------|-------------------------------------|-----------------------------------|
| Publically available        | Yes<br><input type="checkbox"/>     | No<br><input type="checkbox"/>    |
| Data available on:          | Digital<br><input type="checkbox"/> | Paper<br><input type="checkbox"/> |
| (Internet) source location: |                                     |                                   |

c. Heat flow at ... km depth (>3 km)

|                             |                                     |                                   |
|-----------------------------|-------------------------------------|-----------------------------------|
| Publically available        | Yes<br><input type="checkbox"/>     | No<br><input type="checkbox"/>    |
| Data available on:          | Digital<br><input type="checkbox"/> | Paper<br><input type="checkbox"/> |
| (Internet) source location: |                                     |                                   |

10. If applicable: basin layout and sediment-basement interface depth

a. Basin contours

|                                       |                                   |                                   |
|---------------------------------------|-----------------------------------|-----------------------------------|
| Publically available                  | Yes<br><input type="checkbox"/>   | No<br><input type="checkbox"/>    |
| Data available on:                    | Shape<br><input type="checkbox"/> | Paper<br><input type="checkbox"/> |
| (Internet) source location:           |                                   |                                   |
| .... % of country/ region name: ..... |                                   |                                   |

b. Sediment thickness

|                                       |                                    |                                   |
|---------------------------------------|------------------------------------|-----------------------------------|
| Publically available                  | Yes<br><input type="checkbox"/>    | No<br><input type="checkbox"/>    |
| Data available on:                    | Raster<br><input type="checkbox"/> | Paper<br><input type="checkbox"/> |
| (Internet) source location:           |                                    |                                   |
| .... % of country/ region name: ..... |                                    |                                   |

11. If applicable: outlines of granitic formations:

a. granite outlines

Publically available

|                          |                          |
|--------------------------|--------------------------|
| Yes                      | No                       |
| <input type="checkbox"/> | <input type="checkbox"/> |
| Digital                  | Paper                    |
| <input type="checkbox"/> | <input type="checkbox"/> |

Data available on:

(Internet) source location:

... % of country/ region name: .....

b. granite thickness (thickness map or 3 classes <3km, >3 km, >6km)

Publically available

|                          |                          |
|--------------------------|--------------------------|
| Yes                      | No                       |
| <input type="checkbox"/> | <input type="checkbox"/> |
| Digital                  | Paper                    |
| <input type="checkbox"/> | <input type="checkbox"/> |

Data available on:

(Internet) source location:

**Stress likelihood of EGS**

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12. Fault mapping → Tertiary and Quaternary fault systems

Publically available

|                          |                          |
|--------------------------|--------------------------|
| Yes                      | No                       |
| <input type="checkbox"/> | <input type="checkbox"/> |
| Digital                  | Paper                    |
| <input type="checkbox"/> | <input type="checkbox"/> |

Data available on:

(Internet) source location:

13. Recorded seismicity

Publically available

|                          |                          |
|--------------------------|--------------------------|
| Yes                      | No                       |
| <input type="checkbox"/> | <input type="checkbox"/> |
| Digital                  | Paper                    |
| <input type="checkbox"/> | <input type="checkbox"/> |

Data available on:

(Internet) source location:

**Restrictions on development**

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14. Information about geographical restricted areas for geothermal?  
(Consider mining, oil exploration, CCS, nuclear storage, spa's, interference with drinking water, etc.)

Publically available

|                          |                          |
|--------------------------|--------------------------|
| Yes                      | No                       |
| <input type="checkbox"/> | <input type="checkbox"/> |
| Digital                  | Paper                    |
| <input type="checkbox"/> | <input type="checkbox"/> |

Data available on:

(Internet) source location:

|     |    |
|-----|----|
| Yes | No |
|-----|----|

15. Do you for see competitive planning of the subsurface?

Please elaborate:

16. Information about surface restrictions for geothermal?  
(Consider land slides, natural reserves, etc.)

|                      |                                     |                                   |
|----------------------|-------------------------------------|-----------------------------------|
| Publically available | Yes<br><input type="checkbox"/>     | No<br><input type="checkbox"/>    |
| Data available on:   | Digital<br><input type="checkbox"/> | Paper<br><input type="checkbox"/> |

(Internet) source location:

### **Ongoing exploration licenses**

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17. Exploration and production licenses and (projected) power production

|                      |                                     |                                   |
|----------------------|-------------------------------------|-----------------------------------|
| Publically available | Yes<br><input type="checkbox"/>     | No<br><input type="checkbox"/>    |
| Data available on:   | Digital<br><input type="checkbox"/> | Paper<br><input type="checkbox"/> |

(Internet) source location:

## Level 2

Prospective undiscovered resource assessment for different play types: Identify delimited areas with a particular play type (Hot Sedimentary Aquifer (HSA), active faults, granites, magmatic convective). Include data relevant to exploration of particular play types and exploration outcomes (cf. AGEA-AGEC, 2010) for exploration data relevant to resources assessment

The following play systems have been identified at this stage

- Hot Sedimentary Aquifers (including pressurized and karstified)
- EGS as partially enhancing natural permeability (active faults, low permeability aquifers)
- Granites (covered by sediments)
- volcanic naturally convective

### What can you provide?

1. HSA → Raster maps on transmissivity, lateral extend of lithologic units which are potentially suitable
2. HSA → Porosity-Permeability measurements or concepts for poro-perm relationships\_and Porosity/depth relationship, Overpressure data
3. Exploration data on particular data prospective resources
4. Which plays do you recon are present in your country
5. Who is, according to you, the entity or person who is on behalf of your country responsible for providing the data?

## Level 3

Contingent (discovered) resources and reserves: From industry and government reporting obtain information on drilled prospects and producing reserves

At this stage no further data/information required.