

Part V – Data integration and visualization



Overview of existing web-based geothermal information systems

ThermoGIS



Summary/aim:

A public web-based information system ThermoGIS provides depth, thickness, porosity and permeability maps of many potential aquifers in the Netherlands. In addition, a stochastic fast model based performance module is integrated in ThermoGIS that enables the user to automatically assess the generated power, expected flow rate, the Coefficient Of Performance (COP) and economic variables for any specific location.

Involved countries: NL

Features:

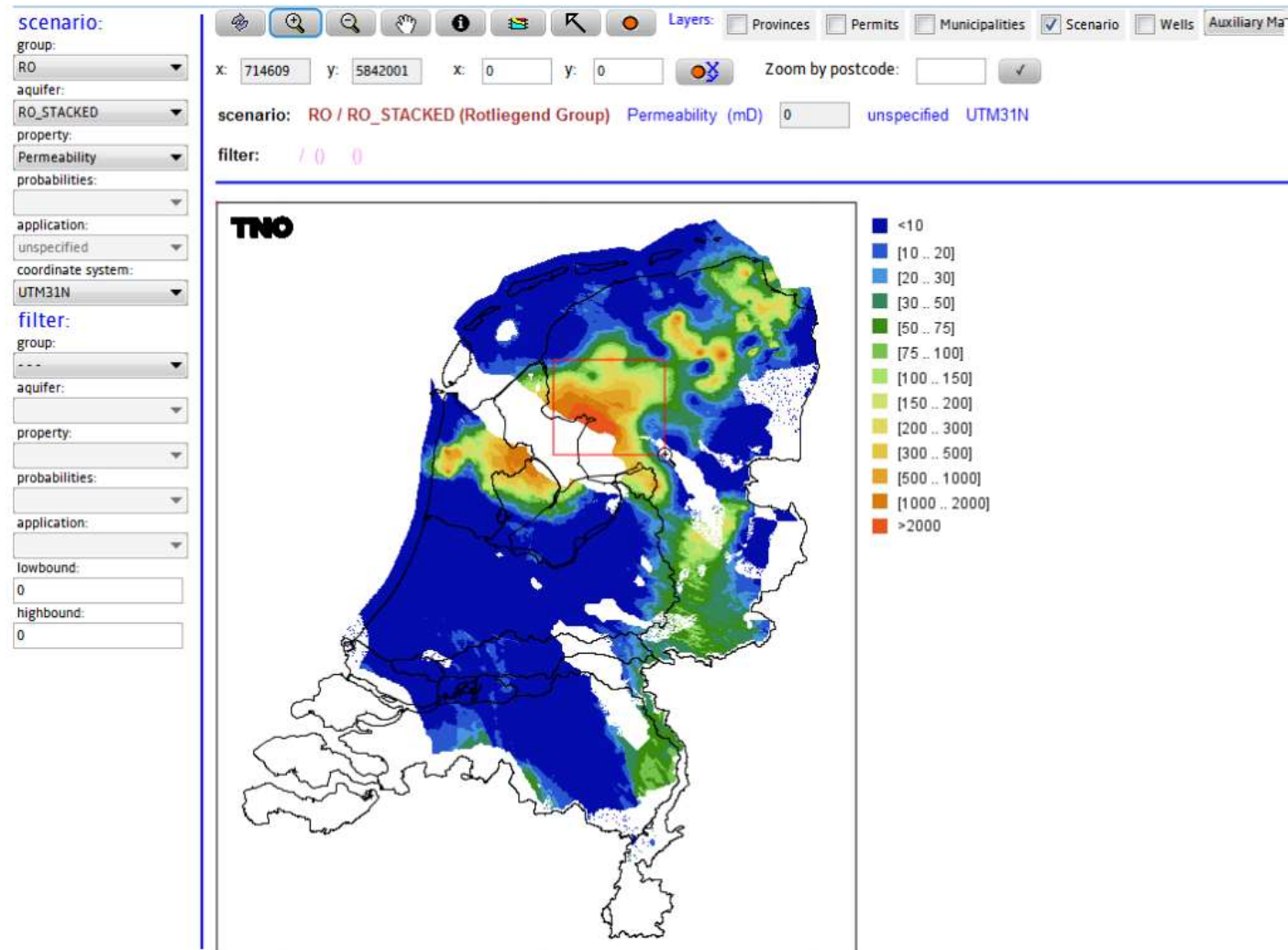
Web viewer, Techno-economic performance resource assesment, doublet calculator, one could generate cross-sections or syntetic borehole profiles

Pros: Developed methodology for geothermal potential assesment

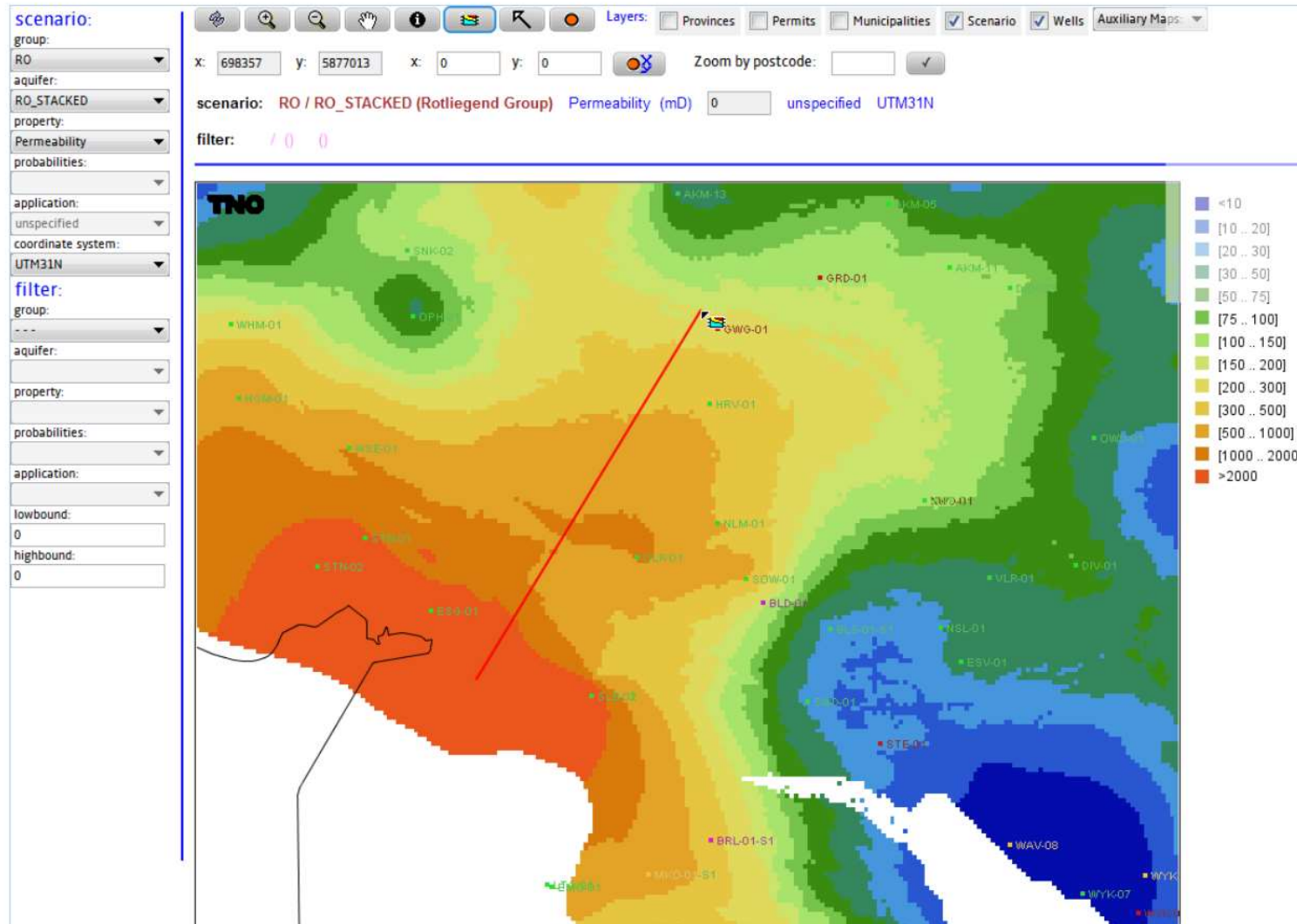
Cons: Very detailed data is needed

Link: http://www.thermogis.nl/thermogis_en.html

ThermoGIS



ThermoGIS



GeoTIS



Summary/aim:

The Geothermal Information System shows the geothermal potentials and installations of deep geothermal use in Germany.

Involved countries: DE

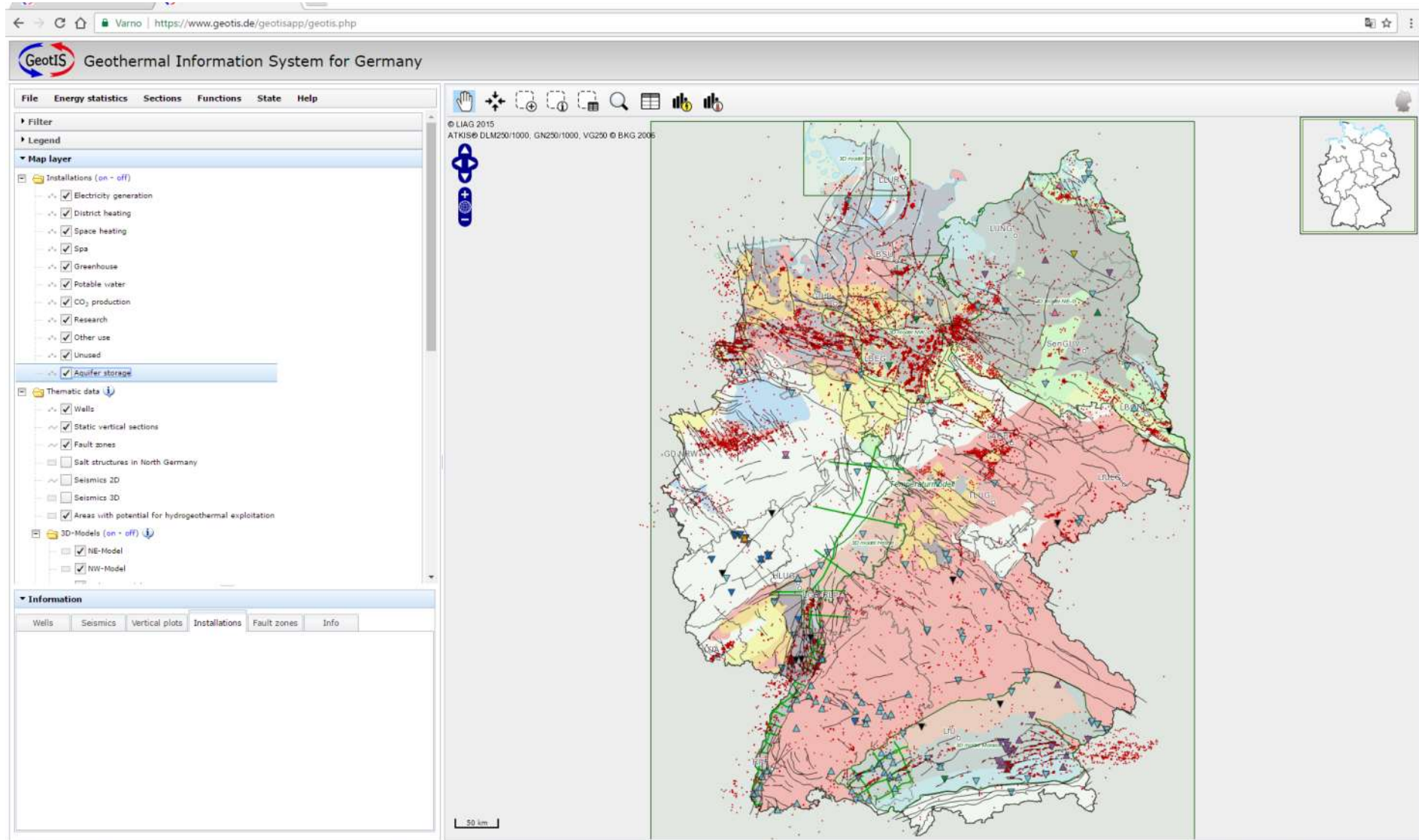
Features:

Map viewer (geothermal installations, wells, cross-sections, fault-zones, locations of 2D and 3D seismic survey, hydrothermal potential areas, formation hydraulic conductivity, concession areas, geothermal potential maps, locations of 3D models of reservoirs)

Pros: A lot of very useful information, very transparent

Cons: Availability and public access to data

Link: <https://www.geotis.de/>



EGIP



Summary/aim:

The core function of the EGIP is to organize geothermal data and information at a European scale. The EGIP pilot is aimed to demonstrate the platform capabilities and usefulness to the main geothermal actors in Europe (i.e., scientists, politics and industrial).

Involved countries: IT, FR, CH, HU, SI

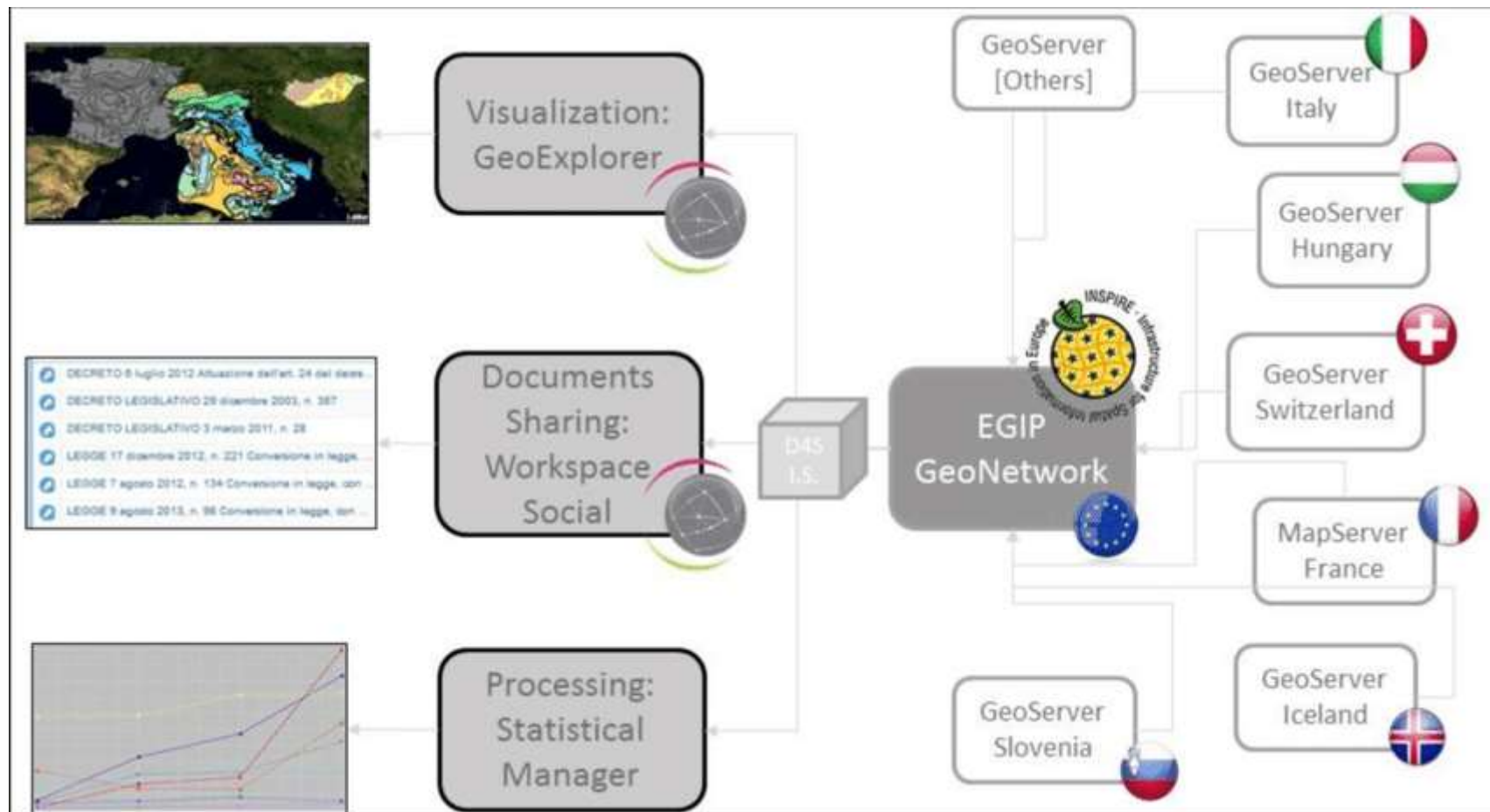
Features: document sharing point, social network, geoexplorer, statistical manager

Pros: metadata are INSPIRE arranged, distributed database system

Cons: metadata are INSPIRE arranged, user unfriendly

Link: <http://www.geothermaleranet.is/joint-activities/egip/>

Conceptual scheme of the EGIP platform



The D4Science GeoExplorer portlet, used to visualize heterogeneous data in the EGIP data catalogue



EGIP EUROPEAN GEOTHERMAL INFORMATION PLATFORM

EGIP Administration Members Data Catalog Geo Explorer Statistical Manager

GeoViewer

Layers: HeatFlowUnit

Map coordinates: Latitude: 44°44'10.8"N Longitude: 03°57'18.3"W

Data (visualization limited to 200 rows)

IGG:HeatFlowU	lowerHe...	upperHe...	label	Identifier	depth
60	70	60-70m...	143	0	

GeoExplorer Add Selected Layers Remove All Layers Add External WMS Layer

Search for Title: enter a text

Layer Title	Abstract	Keywords	Layer Name
Industry	The class industry wa...	France, industry, EGIP	Industry
Industry	Industries Involved In ...	geothermal energy, E...	IGG:industry
Industries	Industry data for EGIP	geothermal energy, S...	swisstopo indu...
HeatFlowUnit	The class HeatFlowU...	France, EGIP, HeatFl...	HeatFlowUnit
HeatFlowUnit	Surface Heat Flow Ma...	geothermal energy, C...	IGG:HeatFlow...
HeatFlowLine	The class HeatFlowLI...	France, EGIP, HeatFl...	HeatFlowLine
HeatFlowLine	Surface Heat Flow Co...	geothermal energy, C...	IGG:HeatFlow...
Heat Flow Units	Heat Flow Unit data to...	geothermal energy, S...	swisstopo:heat...
Heat Flow Lines	Heat Flow Line data to...	geothermal energy, S...	swisstopo:heat...
GeothermalManage...	GeothermalManagem...	geothermal energy, En...	IGG:Geotherm...

Summary layer info

Metadata Identification: HeatFlowUnit

Abstract: Surface Heat Flow Map of Italy

Topic Category: CLIMATE/METEOROLOGY/ATMOSPHERE ENVIRONMENT

Keywords: Descriptives: geothermal energy, CNR, IRENA, EGIP, map, Keywords: Italy, Energy resources

Type: KeywordType[THEME]

Thesaurus Title: General

WMS Geoserver base URL: <http://repoigg.services.it.cnr.it/geoserver/IGG>

Layer Preview

Page 2 of 2 Displaying 21 - 30 of 30

Geo-DH



Summary/aim:

On this website you can find out more about Geothermal District Heating in Europe: how it works, the European market and its future development, regulation, financing, and Potential.

Involved countries: HU, SI, BG, IT, FR, PL, NL, DK, SK, EGEC

Features:

Map viewer (HFD, temperature at depth, reservoir outlines, cities with district heating, including geothermal), Case studies, Guidelines Reports on Financing and Regulation

Pros: for routing policy

Cons: Small scale, not enough detailed for feasibility studies

Link: <http://geodh.eu/>

Geo-DH

ope X

https://map.mfgi.hu/geo_DH/

GeoDH Europe
Geothermal District Heating

Enter address

About
Project website

Layer List

Layer Visibility

- Cities with district heating
- Other potential reservoirs contour
- Other potential reservoirs fill
- Hot sedimentary aquifer contour
- Hot sedimentary aquifer fill
- Neogene basins contour
- Neogene basins fill
- Heat-flow density; HFD>90mW/m2
- Temperature distribution at 1000m; T>50°C
- Temperature distribution at 2000 m; T>90°C
- Alps regions
- Project partners
- Heat demand (Mean Tj/km2)

Geothermal District Heating Market Regulation Financing Potential

There are over 5,000 district heating systems in Europe, including more than 240 Geothermal District Heating systems. The first regions to install GeoDH were those with the best hydrothermal potential, however with new technologies and systems, an increasing number of regions are developing geothermal DH. Systems can be small (from 0.5 to 2 MWh), and larger, with capacity of 50 MWh. Some new District heating schemes that utilise shallow geothermal resources are assisted by large heat pumps.

Many GeoDH systems are based on favourable geothermal conditions with high enthalpy resources, and on the doublet concept of heat extraction. Modern doublet designs include two wells drilled in deviation from a single drilling pad: a production and an injection well. Geothermal fluid production is usually sustained by production pumps.

Installing GeoDH systems in areas of high urban density improves project economics, as both resources and demand need to be geographically matched. One considerable challenge in the current economic crisis concerns the financing and the development of new heat grid infrastructures. Retrofitting existing district heating systems is an alternative for developing the GeoDH market.

The main benefits of geothermal heating and cooling are provision of local, base-load and flexible renewable energy, diversification of the energy mix, and protection against volatile and rising fossil fuels prices. Using geothermal resources can provide economic development opportunities for countries in the form of taxes, royalties, technology export, and jobs.

1000 km

Content may not reflect national geographic's current map policy. © National Geographic, Esri, DeLorme, HERE, UGC

Summary/aim:

Based on currently available information, the GEOELEC Geographical Information System presents for the first time ever a geothermal resource assessment from 1km to 5km depth of Europe.

Involved countries: EGEC

Features:

Map viewer (average surface temperature, model temperature at different depth to 10 km, Surface heat flow, depth of MOHO, depth of sediment&basement boundary, heat in place, geothermal potential)

Pros:

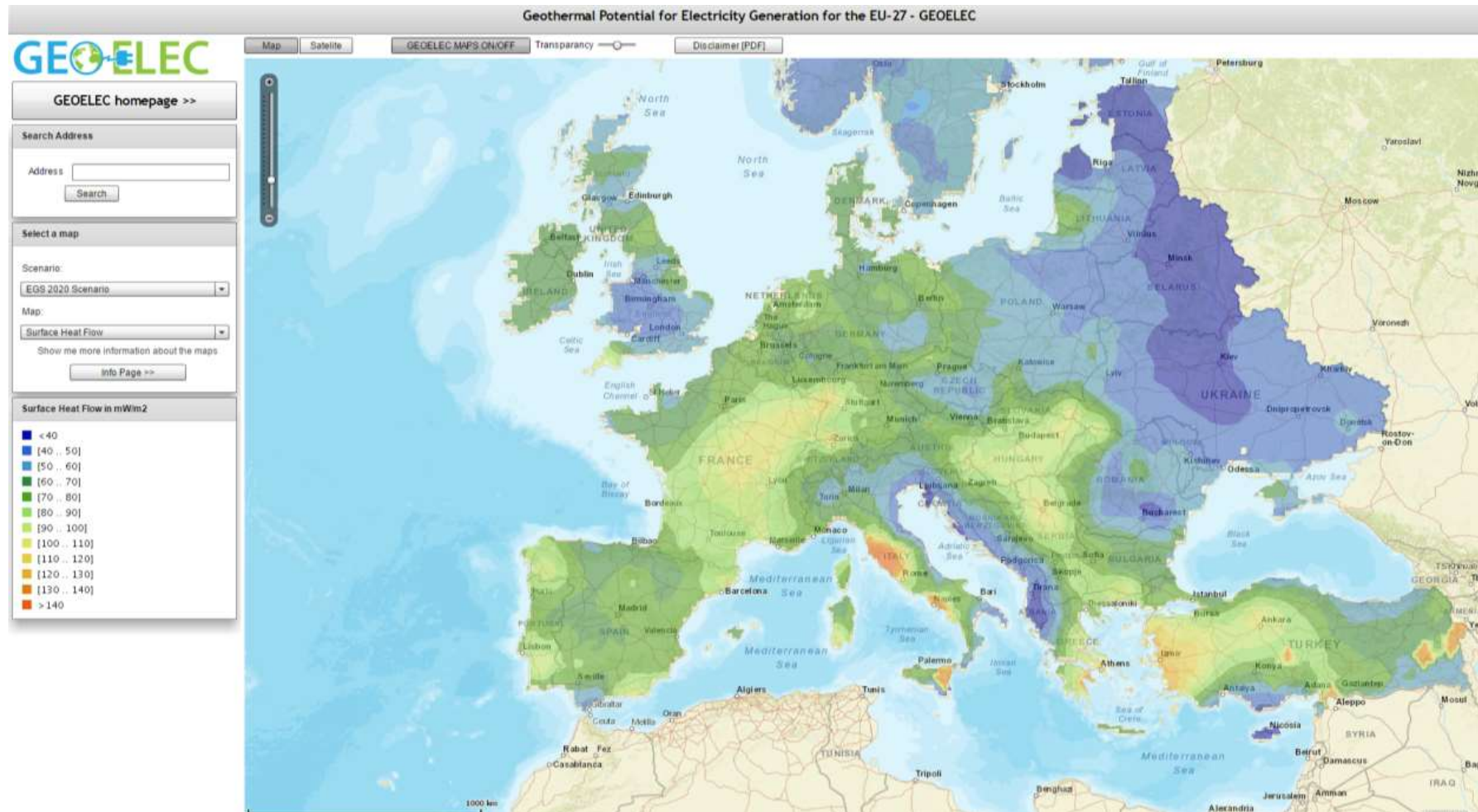
Guidelines Methodology for estimation of teotetical and technical potential for geothermal electricity

Cons:

Very general information

Link: <http://www.geoelec.eu/test-geoelec-online-viewer/>

Geoelec



Summary/aim:

to create a common geothermal information system in four central European countries. Having an environmental focus the purpose is seeking for sustainable, transboundary utilization of geothermal energy resources.

Involved countries: HU, SI, AT, SK

Features:

Web Map Service (model of surfaces, cross-section, utilisation maps, temperature and HFD maps, outlines of Reservoir, database of boreholes)

Pros: a lot of information for very broad spectre of stakeholders

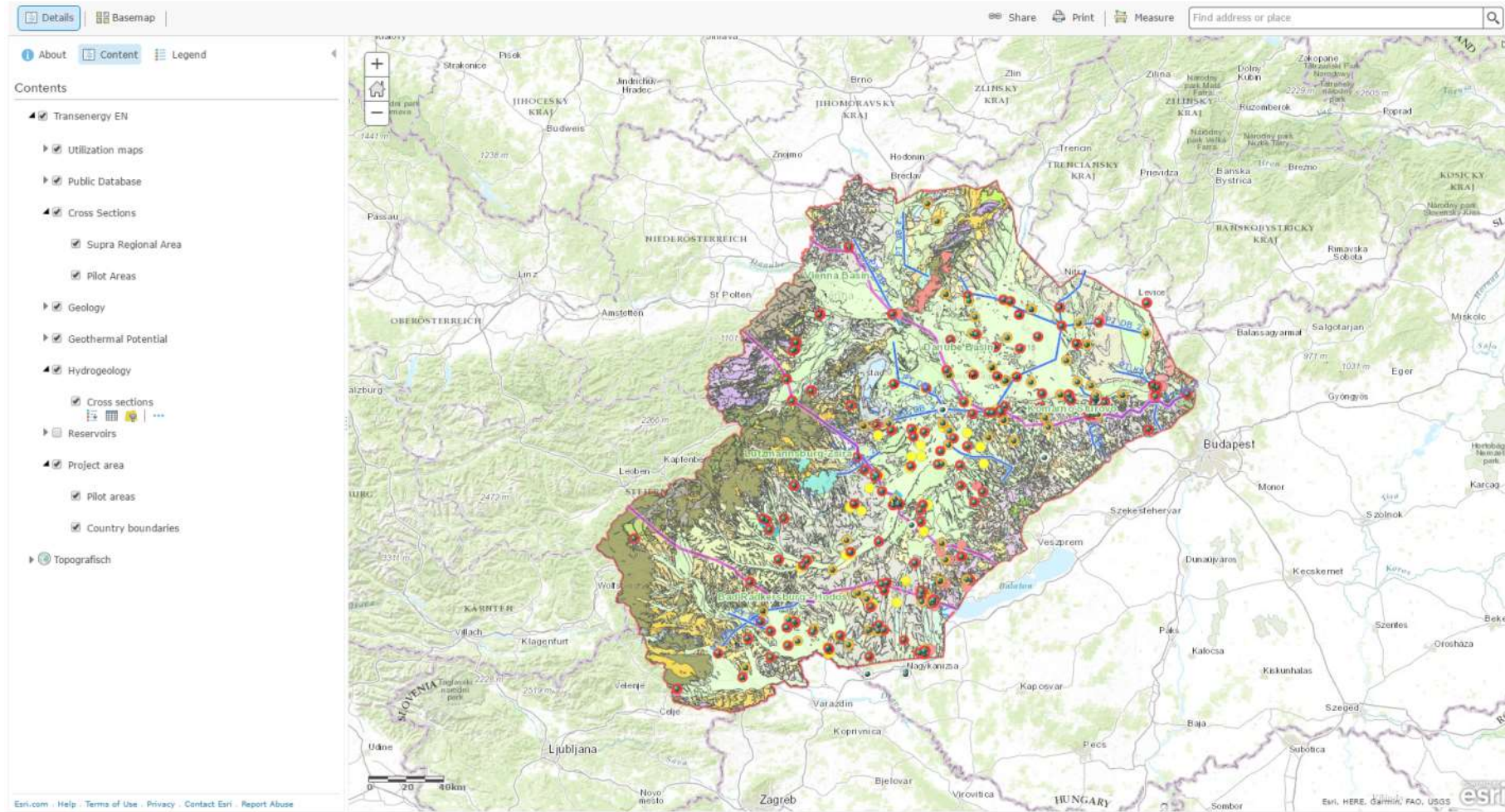
Cons: fragmentation of databases (not all info available in one viewer), visibility of some isolines not good enough

Link: <http://transenergy-eu.geologie.ac.at/>

Transenergy

ArcGIS ▾ Transenergy - Transboundary Geothermal Energy Resources of Slovenia, Austria, Hungary and Slovakia EN

Modify Map  Sign In



Summary/aim:

Assessing subsurface potentials of the Alpine Foreland Basins for sustainable planning and use of natural resources. GeoMol provides consistent 3-dimensional subsurface information based on coherent evaluation methods and commonly developed criteria and guidelines. Enhancing the common knowledge of the subsurface in the Alpine Foreland Basins will help to boost homemade, decentralized green energy by exploiting geo-potentials and using subsurface storage capacities.

Involved countries: DE, FR, AT, CH, IT, SI

Features:

Map viewer, 3D-explorer

Pros: very good presentation of 3-D models *available on web for end user*, one could generate cross-sections or syntetic borehole profiles

Cons: expensive nonstandard commercial software, not user friendly

Link: http://www.geomol.eu/home/index_html

GeoMol

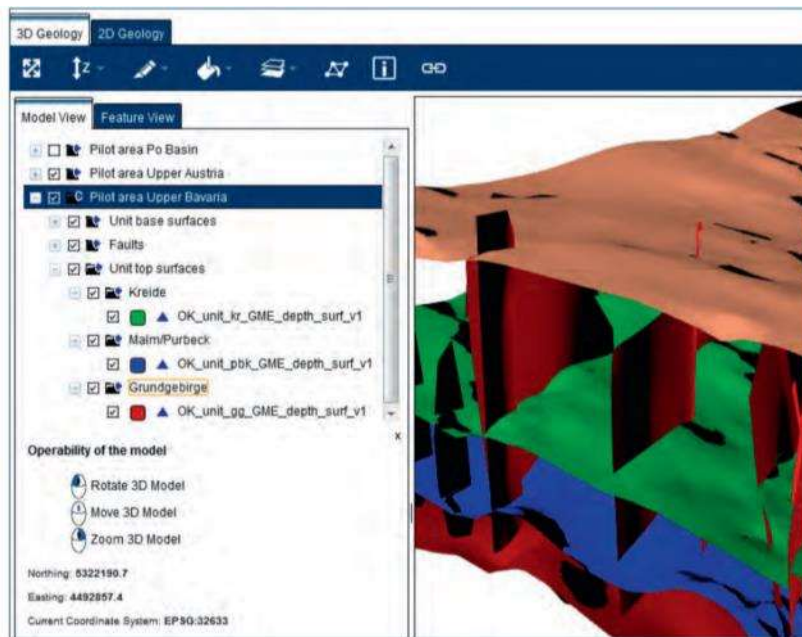


Figure 10.2-7: The interactive legend allows toggling data to be visualised in the 3D scene. On the top tabs the user can switch the application from 3D mode ("3D Geology") to 2D mode ("2D Geology"). On bottom left, below the legend and the instructions for the mouse operability, the coordinates of the current cursor position are displayed. (Screenshot of the GeoMol 3D-Explorer, beta version as of March 2015).

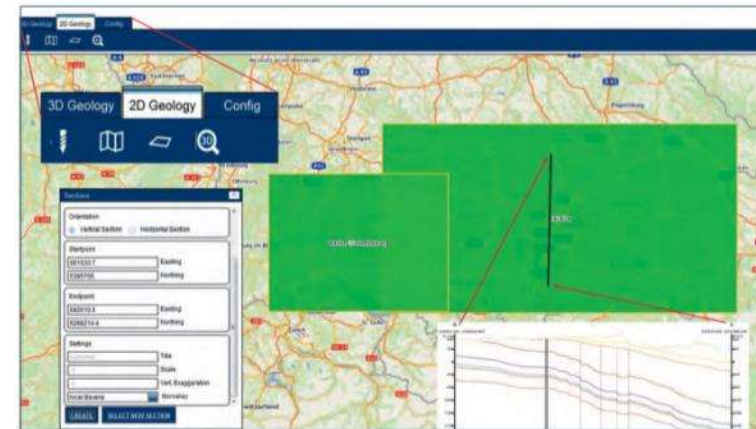


Figure 10.2-8: The 2D mode ("2D Geology") of GeoMol's 3D-Explorer features an overview of the available 3D models (green areas as an example) and provides tools for the generation of virtual boreholes, vertical sections (see clip of a print-out in the inset at the bottom) and horizontal sections as well as a browser for rectangular model cut-outs by dragging a box with the mouse.

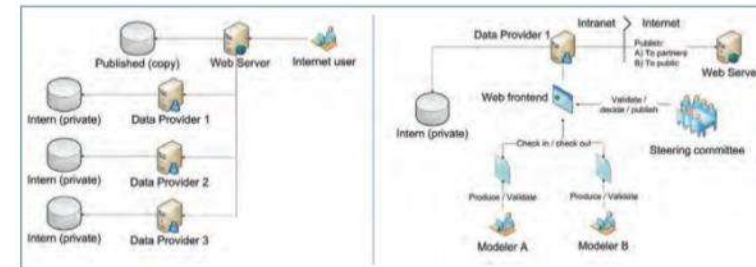


Figure 10.2-9: Central GeoMol server accessing each partners GST instance in order to present a complete model to the internet user (left). For each of the data providers a web frontend allows to publish data to partners or for the public access.