INTERREG IVC
INNOVATION & ENVIRONMENT
REGIONS OF EUROPE SHARING SOLUTIONS

GEO POWER

EUROPEAN REGIONAL
DEVELOPMENT FUND

GEO.POWER PROJECT:
SWOT ANALYSIS AND TRASFERABILITY ASSESSMENT OF GROUND-COUPLED HEAT PUMP (GCHP) SYSTEM INTO THE PROVINCE OF FERRARA (ITALY)

Province of Ferrara

university of ferrara
600 YEARS OF LOOKING FORWARD.

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The GEO.POWER project (INTERREG IV C)

CONCEPT	Low enthalpy geothermal energy – use of GCHP for heating and cooling of residential and industrial buildings
DURATION	**2 YEARS** (Nov 2010 ⇒ Dec 2012)
BUDGET	**2.031.530,00 €**

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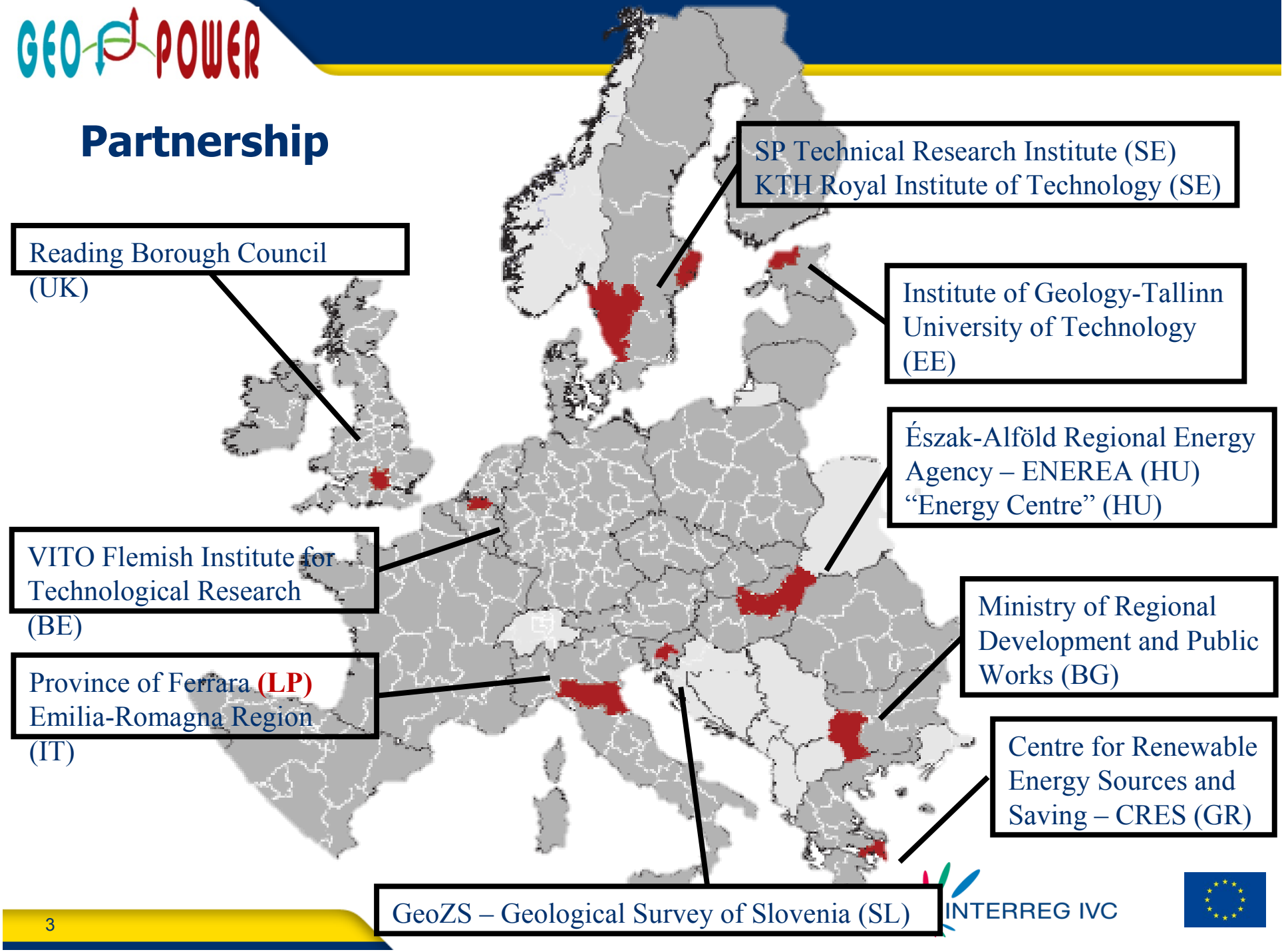
Partnership



SP Technical Research Institute (SE)
KTH Royal Institute of Technology (SE)

Reading Borough Council (UK)

Institute of Geology-Tallinn University of Technology (EE)

Észak-Alföld Regional Energy Agency – ENEREA (HU)
"Energy Centre" (HU)

VITO Flemish Institute for Technological Research (BE)

Ministry of Regional Development and Public Works (BG)

Province of Ferrara **(LP)**
Emilia-Romagna Region (IT)

Centre for Renewable Energy Sources and Saving – CRES (GR)

GeoZS – Geological Survey of Slovenia (SL)

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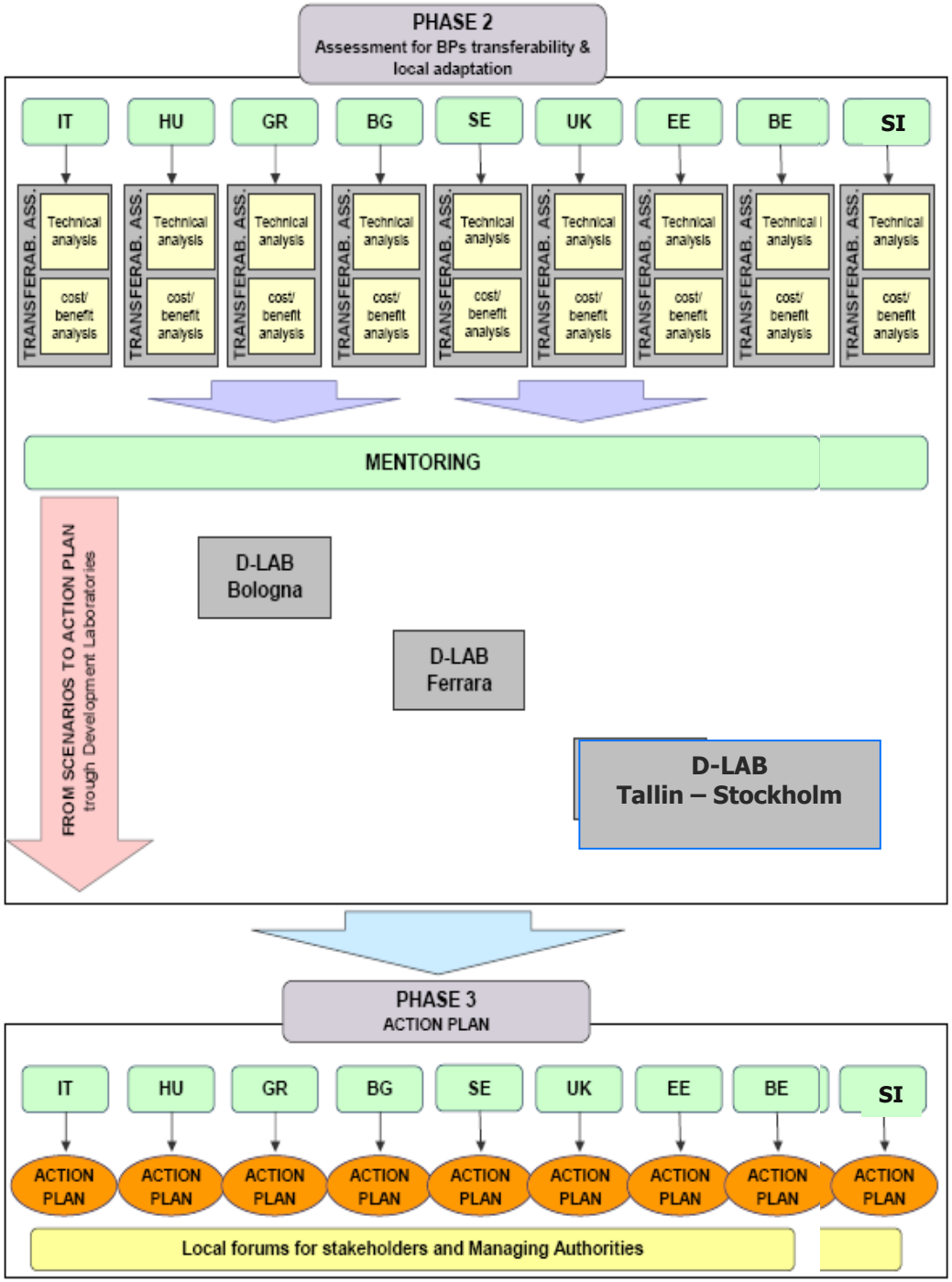
From PHASE 1: 12 BPs

application/adaptation of the identified technologies in each PP's area based on the local technical, economic and environmental situation

12 SWOT analyses + transferability assessments



SWOT ANALYSIS

Internal Analysis (SW)

Strengths

Weaknesses

External analysis (OT)

Opportunities

Threats

Weighting Factor (WF)

Internal analysis	Weighting Factor (WF)
Energy efficiency	20
Net avoided CO2 emissions	20
Reliability	16
Economic efficiency	12
Qualification/experience of installer	12
Post-installation management and performance monitoring	12
Market share	4
Profit margins	8
Promotion budgets	8
Size	10
Age of construction	4
Volume served	12
Energy produced	20
Distribution	4
Internal quality system	8
Potential improvement	10
Potential investments	10
Degree of innovation	10
Total	**200**

External analysis	Weighting Factor (WF)
Market segment	
Market segment size	4
Growth rate	6
Interest from customers	4
Degree of acceptance	6
Price sensitivity	12
Attracting cooperation	8
Job creation potential	4
Government subsidies and incentives	10
Growing economy	10
Taxation	6
Investor interest	10
Environment	
Environmental impact	12
Suitability of boundary conditions	8
Government regulations	10
Political support	12
Public opinion and public awareness	6
Actor involvement (stakeholders, public administrations, Multiutility companies, etc.)	8
Capacity for & promotion of innovations/new technologies	6
Competition vulnerabilities	
Competing energy sources – price & availability	8
Competing plant technologies – price & availability	8
Selling power	10
Financial resources	6
Distribution network and infrastructure	4
Applicability of technology and use (public building, industry & SMEs sector, and/or agriculture)	12
Visibility of the BP and promotional activity	10
Total	**200**

Score of the transferability degree (SC)

Criteria	Score (SC)
Very high transferability	2
Good transferability, above average	1
Not applicable	0
Poor transferability: causes some problems	-1
Very poor transferability: needs a lot of attention	-2

Transferability rank = WF*SC

This unified methodology allowed to compare SWOT analyses among PPs.

BP	LP (IT)	CRES (GR)	Min (BG)	ENEREA (HU)	Reading (UK)	SP (SE)	En. C. (HU)	KTH (SE)	RER (IT)	UT (EE)	VITO (BE)	GeoZs (SL)	TOT
Polytechnic Institute of Setùbal (Portugal)	X	X		X					X			X	5
2-family house in Pikermi (GR)	X	X						X	X				4
Avenue Centre (UK)	X					X	X		X	X			5
Strawberry Garden in Antwerp (BE)	X			X			X	X	X				5
Energy Centre in Hun Street (HU)	X		X		X	X			X	X	X	X	8
Hotel Amalia (GR)		X	X										2
1-family house in Ohlsdorf (Austria)		X	X		X			X				X	5
District Heating System (Casaglia, Ferrara, IT)				X						X	X		3
Telenor building (HU)				X		X							2
INFRAX (BE)					X							X	2
Arlanda airport (SE)							X						1
Total	5	4	3	4	3	3	3	3	5	3	2	4	

BP	LP (IT)	CRES (GR)	Min (BG)	ENEREA (HU)	Reading (UK)	SP (SE)	En.C. (HU)	KTH (SE)	RER (IT)	UT (EE)	VITO (BE)	GeoZs (SL)	MEAN
Polytechnic Institute of Setùbal (Portugal)	248	168		272					248			232	234
2-family house in Pikermi (GR)	244	194						282	268				247
Avenue Centre (UK)	168					188	482		200	166			240
Strawberry Garden in Antwerp (BE)	330			346			470	254	338				348
Energy Centre in Hun Street (HU)	268		276		156	252			346	270	394	234	275
Hotel Amalia (GR)		220	352										286
1-family house in Ohlsdorf (Austria)		66	218		100			224				224	183
District Heating System (Casaglia, Ferrara, IT)				292						238	322		284
Telenor building (HU)				432		298							365
INFRAX (BE)					206							264	264
Arlanda airport													

TELENOR HEADQUARTER (HUNGARY)

- Financial resources
- Political support
- Incentives
- Price sensitivity

- Energy efficiency
- Avoided gas emission
- Small environmental impact
- Degree of innovation
- Intelligent building management system for monitoring
- Investor interest

180 BHE 100 m deep + solar collectors for hot water + intelligent management system

High efficiency insulation + energy-efficient air conditioning system

GREENHOUSE (BELGIUM)

- Climate condition
- Reluctance in abandoning the old production system and cultivation techniques
- Lack of knowledge (few references regarding this installation in agricultural sector)
- Incentives
- Market size
- Investment costs

- Geothermal and agricultural potential
- Investor interest to make higher profits from selling off-season vegetables and fruit
- Reduced use of gas and electricity
- Cost reductions
- Avoided gas emission

Air unit conditioning + ATES + GSHP (open-loop) + oil boiler

ONE-FAMILY HOUSE IN OHLSDORF (AUSTRIA)

- Decreasing market share
- Free space required for the installation of ground heat exchanger
- Some technical aspect (no backup heating system; no buffer storage, use of oil; etc.)
- Degree of acceptance (use of propane)

- Energy performance and efficiency
- Limited installation costs
- Minimal technical maintenance and simplified management
- Economic savings
- Reduced gas emissions

Direct expansion-to-water heat pump (use of propane) + flat collector (six horizontal and parallel refrigerant circuits) + separate air-to-water HP to heat domestic hot water

Floor heating

ARLANDA AIRPORT IN STOCKHOLM (SWEDEN)

- Construction size
- Market segment size
- Global financial crisis
- Price sensitivity
- Selling power

- Energy efficiency
- Environmental impact
- Visibility and promotional activity
- Job creation potential

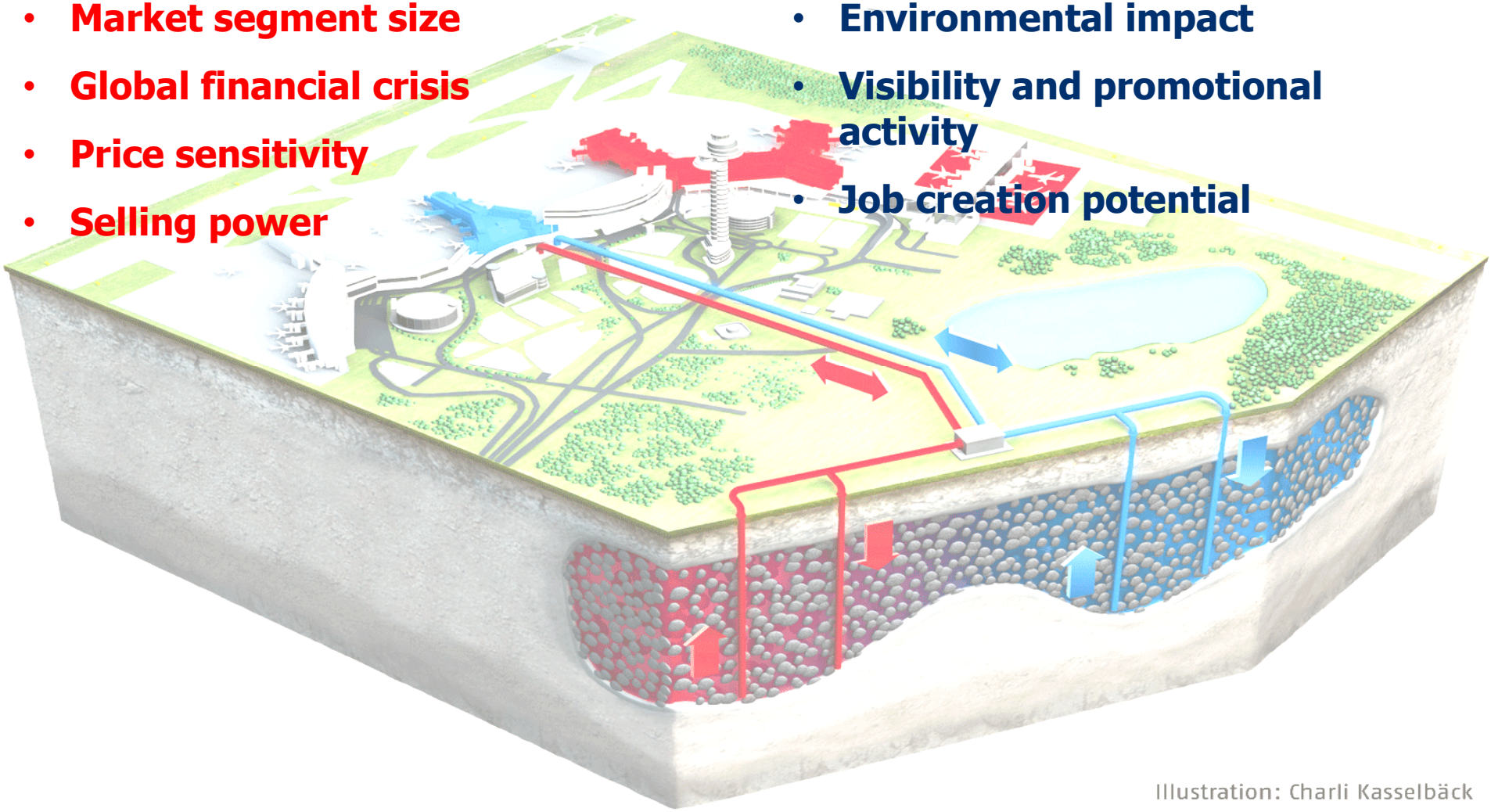


Illustration: Charli Kasselbäck

Conclusions:

- ✓ **Knowledge sharing**

- ✓ **The choice of a specific GCHP installation is driven by the ability to achieve optimal efficiency with the lowest possible energy consumption, and to meet the needs of consumers**

- ✓ **Overall: neutral to positive market opportunities**

- ✓ **Market size:**

  - **Limited market segment**
  - **Economy in recession**
  - **Rising taxation**
  - **High price sensitivity**

  - **Increasing growth rates**
  - **Increasing customers and investors interest**
  - **High possibility to attract cooperation and create jobs**

Conclusions:

- ✓ **Geothermal power is still underestimated in many regions**
  - **Lack of government regulations and significant incentives for RES**
  - **Competition with conventional energy sources (gas and oil)**
  - **Visibility of BPs and promotional activity**
  - **Applicability to different climate and hydrogeological conditions**
- ✓ **More advanced and complex geothermal systems required more accurate transferability actions**
- ✓ **Economy in recession -> Adequate tariffs and other incentives could help to overcome the sensible upfront investment costs and risks before pay-back**
- ✓ **Action plans (PHASE III of Geo.Power Project) should take into account these points for increasing the selling power and competition of geothermal energy.**

Thank you for your attention

Project website http://geopower-i4c.eu/

CONTATTI

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